COPYRIGHT NOTICE

Jim Cline

Tips. Tricks. Training. Mastery!

The Master Guide to Financial Reporting and Analysis

Rev. 1.14

Printed in Bay Town, TX, United States of America

Introduction

When I was a college student in the 1980s, I took a course called "Introduction to Computers." The first part of the class was devoted to WordPerfect, a popular word processing program at the time. That part of the course was helpful, but it was the rest of the semester that changed my life forever. That is when I was introduced to a spreadsheet program called Lotus 1-2-3. As an Accounting major, I loved the ability to manipulate numbers any way I wanted on a spreadsheet. When we got to the macros section of the class, I fell in love all over again. I knew I had discovered my career.

Over decades of working with spreadsheets, I decided to write this course. I have compiled in this course the material that took me years to learn, in easy-to-understand examples, lessons, projects and code. I will walk you through hundreds of formulas, functions and code examples that are designed to give you the experience necessary to masterfully work Excel on your own. I explain each task or concept just like I was at your desk, helping you each step of the way. However, I cannot teach you all of the logic that you will need in every situation you may encounter. I will show you how to use Excel and I will do my best to teach you logic for many different situations, but it is up to you to apply that logic to your particular circumstance.

Let me explain how this course works. The projects, illustrations, tasks, and examples taught in this course could be considered as on-the-job training, as it would take you years to gain this experience on your own. In the course, there are more than 745 screenshots, screentips, and icon images total included helping to show you how to do the almost 1,500 tasks you will perform. The concepts herein are designed to teach you the basics of financial reporting and analysis using Excel. These are real-world examples that you would find in actual situations. In fact, many of the exercises are actual projects that I have done over the years in my experience as an auditor, tax accountant, real estate appraiser, financial analyst, web developer, programmer, and instructor. As you work these examples, I encourage you to think about the concepts being taught and make up examples of your own, using data and situations with which you are familiar. This will significantly reinforce the concepts taught herein for your own Excel mastery.

This course is based on progressive learning. When I teach a new concept, I will explain in full detail how to do it. Thereafter, I will not explain it in detail, but I will assume that you have learned that concept. If you need to refresh your memory on how to accomplish the task, refer back to the pages where that concept was originally taught. I encourage you to try to do it on your own before referring back, unless you are completely lost. In my years of experience, I have discovered that is the best way to learn. The course is made up of 18 chapters, and it should take you between one and four hours to complete each chapter (see the CPE Credit Schedule table), including working the examples, completing the Review Questions and taking the online chapter exam at the end of each chapter. Some of the more advanced chapters may take more time, depending on your experience level with the concepts taught.

It is important to realize that the concepts taught in this course are very versatile and there are many ways to do essentially the same thing. If you have learned a concept in a way that is different from how it is presented in this course but it achieves the same objective, feel free to use it. This course is designed to give you exposure to a variety of ways of doing things. For example, most people are familiar with using the mouse to execute commands, but I prefer to use the keyboard whenever I can. I find that I can move around a spreadsheet much faster by using keystrokes on the keyboard than I can with a mouse. As much as is reasonable, I will teach how to use both the mouse and keystrokes on the keyboard to show you how to execute the commands.

In developing this course, I created a company whose accounting system is complex enough to simulate real world activity, but simple enough to be used in the examples and projects. I didn't want the students to have to take a course just to learn the accounting system of this company, but I had to make it complex enough to teach the necessary concepts. As such, I created a fictitious company called Nitey-Nite Mattresses. Nitey-Nite's business is to operate 29 retail stores across the United States. Nitey-Nite purchases mattresses, pillows, and other merchandise from various manufacturers, and sells them in their retail stores.

> ***Please note:*** *The financial data contained herein is purely fictitious and does not resemble the activity in any way of any similar retail store today. The accounting methods used in these examples and projects do not necessarily conform with GAAP (Generally Accepted Accounting Principles) requirements for the industry, although the financial statements and accounting practices herein reflect standard double-entry accounting methodology.*

This course is written specifically for Microsoft Office Excel 2016 using the Windows 10 operating system. While the skills and tips taught generally translate to other versions of Excel, this training program should be taken with a copy of Microsoft Excel 2016, which is not included in ExcelCEO training. Now, in Excel 2007, the Microsoft engineers introduced the concept of the Office Ribbon, which is located at the top of the program window. All of the toolbars and menus prior to Excel 2007 have been reorganized into the Office Ribbon tabs and galleries. If you are an experienced user for any version prior to 2007, you will initially find yourself very frustrated. Excel 2016 expands on the capabilities of Excel 2007 — 2013, although there haven't been many major changes since Excel 2010 for Excel. If you are new to Excel, you will find it very easy to unlock the powerful data analysis capabilities as compared to previous versions.

I sincerely hope that you will enjoy this course. If you find any errors that should be corrected, or if you would like to send me any feedback, please email Customer.Service@ExcelCEO.com. Thank you.

Jim Cline
Founder, Developer, and Author

Derek Mecham
Editor, Designer, and Technical Support

Getting Started

Welcome to the ExcelCEO Excel 2016 training course! Whether or not you are taking this course for CPE credit, we are confident you will gain significant and useful skills as you follow the detailed, step-by-step instructions provided in this course manual and work through these 18 chapters of projects designed to teach you beginning to advanced Excel. This course will challenge you, but the gains will definitely be worth the effort!

ExcelCEO courses are classified as self-study, and are not considered to be online courses, so you will need access to a copy of the Microsoft Excel 2016 or similar program to follow along with the examples outlined in this course manual. All CPE credit chapters (1-17) have available tutorial videos through the Videos section of your ExcelCEO training account Main Menu at www.ExcelCEO.com. The tutorials are designed to show you skills you should be able to gain for yourself as you progress toward ExcelCEO Excel Master status by allowing you to see the instructions and work hands-on with the projects given. Completing the hands-on projects is essential for passing the chapter exams.

When you registered for this course, you received a Password. Your password is case-sensitive. You will input the email address that you registered with as your User ID, and then your Password to login at www.ExcelCEO.com to download the Practice Files, take Review Questions and Chapter Exams, and gain general access to your ExcelCEO profile. Keep your User ID and Password in a secure place, so you can refer back to them when needed. A [Forgot Your Password?] link is also available at ExcelCEO.com.

To work the many examples illustrated in this course, you need to download the Practice Files from the Main Menu in your student profile. To download the **Practice Files** for your selected course, log in to www.ExcelCEO.com with your User ID and Password, and click on the **Downloads** link on the **Main Menu**. Step-by-step instructions are provided to show you what to expect as the files download to the computer you are using. If you choose to save the Practice Files somewhere besides the default location, remember where you saved them to ensure convenient access later. If you do forget the location, you can click on the Windows button (Windows 7), the Start Menu icon (Windows 8/8.1), or the Windows button (Windows 10), then type Excel2016 in the search box, and select the file folder from that menu.

Review Questions

As you work through the course manual, you will periodically be instructed to sign on to www.ExcelCEO.com and complete the Review Questions. Review Questions are formatted in the same way as the actual examination questions, but are provided for review purposes as well as for extended learning opportunities. Review Questions are not graded, though the program will indicate whether or not the chosen answer is correct. Have the Excel program open for hands-on learning when completing Review Questions. If you choose an incorrect answer, a message will pop up indicating why the chosen answer is incorrect, and the program will allow you to choose another answer. You must choose the correct answer before continuing to the next question. Login to your student profile at www.ExcelCEO.com to complete the Review Questions when you see a note paragraph like the following:

> ***Review Questions**: It is now time to complete the hands-on Review Questions. Log on to www.ExcelCEO.com with your Email address and Password, click on the* **Excel 2016 Review Questions, Chapter 1, Section 1 of 3** *option in your Main Menu, and complete the Review Questions.*

The program will guide you to the correct Review Questions section or Chapter Exam based on the sections you have already completed. Each chapter (except Chapter 18) contains between two and four sections of Review Questions. Review Questions for each chapter must be completed in order to access the chapter exams.

Chapter Examinations

There are 18 chapters in the course, contained in four sections (Beginning, Intermediate, Advanced, and Master). At the end of each chapter, you will be instructed to go to www.ExcelCEO.com, log in, and take that chapter's exam. After you login with your User ID and Password, and complete the Review Questions, you will click on the link for the test indicated which will navigate you to the appropriate test. All tests are administered sequentially after you successfully pass the previous exam. The exam uses questions from a database of thousands of possible questions, so it is unlikely that any two people will get the same exam. Some of the exam questions are based on the examples in the practice files, so you are encouraged to complete all of the exercises in the course. For example, if you complete an exercise that calculates net income by store, one exam question may ask, "*What is the 2016 Net Income for Store 1002, if you change Other Revenue to $25,000?*" Each question is in a multiple-choice format, and you will have four choices from which to choose.

The only recorded score for each exam is the passing grade. Your ExcelCEO student profile contains a Certificates section where exams you complete are tracked by date and score. You must score a 70% or better on each exam to pass. After obtaining a passing grade, you will be able to complete a short survey of the chapter, then print out a Certificate of Completion as evidence that you've read the material, worked the hands-on project examples, completed the Review Questions, and passed the chapter exam.

CPE (Continuing Professional Education) Credits

To claim CPE credits under NASBA guidelines, the CPA must successfully complete any chapters in the course within one year from the date of purchase to claim credit for them. The CPE credits for each chapter in this manual are listed below. Upon completion of a chapter, sign on to www.ExcelCEO.com with your email address and password and click on the Certificates link to view and print a copy of the certificate of completion. As of December 31, 2010, the student can take up to two retests on final exams that were failed. After the second retest (or the third time to take the final exam), the student cannot receive CPE credits for that chapter).

National Association of State Boards of Accountancy (NASBA)

ClineSys is registered with the National Association of State Boards of Accountancy (NASBA) as a sponsor of continuing professional education on the National Registry of CPE Sponsors. State boards of accountancy have final authority on the acceptance of individual courses for CPE credit. Complaints regarding registered sponsors may be submitted to the National Registry of CPE Sponsors through its website: www.nasbaregistry.org

CPE Credit Schedule

Chapter	Title	CPE Credits
1	Excel 2016 Basics	3.0
2	Formatting	2.0
3	Simple Graphs and Flowcharts	2.0
4	Sorting, Subtotaling and Filtering	2.0
5	Printing	1.5
6	Intro to Formulas and Functions	2.0
7	Text Functions	2.0
8	Financial and Math Functions	3.5
9	Date, Statistical and Lookup Functions	3.0
10	Advanced Lookup and Logical Functions	2.0
11	Intro to PivotTables	2.5
12	Advanced PivotTables	3.0
13	Charts, Graphs and Objects	2.0
14	Analysis Tools	2.5
15	Graphics, Protection and Sharing	2.0
16	Macros and the Developer tab	3.0
17	The Web and New 2016 Features	2.0
18	The Comprehensive Project	0.0
	Total	**40.0**

***Note**: There is no CPE credit given for completing* **Chapter 18**. *Completion of Chapter 18 is required to earn an* **ExcelCEO Excel Master** *certificate.*

Conventions Used In This Course

The basis behind this course is learning by example. As such, I have included hundreds of tasks, examples and projects. Step numbers to complete a task are numbered and shown in italicized, bolded text. Objects or buttons you can see are in Bold font, and object names or formulas you should type are bolded and italicized. Workbook tabs have vertical tab lines around them, and are bolded. Here are some examples:

1. *Click on* **Cell B12** *on the* Sheet1 *tab.*
2. *Type* ***=SUM(B2:B11)****, and press* **[Enter]**.

To assist you, I have included hundreds of screen shots and pictures of the icons used in the examples, including simple assists like this Save icon:  Screen shots are from Excel 2016 using Windows 10.

Action keys (keys that do something other than type a character on the screen) on the keyboard are referred to in brackets, such as the Enter key **[Enter]** and the F2 key **[F2]**. Sometimes it is required to hold down one or more keys on the keyboard to perform a certain action. For example, to make a cell bold,

you press and hold the Control key [Ctrl] and then type the "***b***" key. I will refer to this action as **[Ctrl]+*b***. Action keys can also be sequential, by typing one key at a time. For example, to execute the process to set a column width using action keys would be to press and release the [Alt] key, then the o, c, and w keys, each separated by a comma. I will refer to this action as [Alt], o, c, w. These work in Excel 2016 just as they did in previous versions of Excel. If you are accustomed to using action keys in previous versions of Excel, you'll feel at Home with Excel 2016.

Keyboard Shortcuts

Keyboard shortcuts are keyboard strokes that execute functionalities without having to choose the options from the Office ribbon with the mouse. Keyboard shortcuts generally include the use of the [Ctrl], [Alt], and/or [Shift] keys. For those of you who liked to use keyboard shortcuts in Excel 2003, you'll be happy to know that the same shortcuts exist in Excel 2016. To get a complete list of keyboard shortcuts available in Excel, go to the Excel Help menu, search for "keyboard shortcuts" and click on "Excel shortcut and function keys".

Prerequisites

Prerequisites for taking the Excel series of this course include a basic knowledge of a Windows operating system, and knowing how to use the keyboard and mouse. This course is written specifically for people with accounting or financial training, so I will assume you know the basics of income statements and the transactions (the debits and credits) that make up the statements. Familiarity and prior experience with Excel is helpful, but not essential.

New for Excel 2016

As you work through the course, and I introduce a concept that is new to Excel 2016, I will indicate it. Microsoft has been following a pattern of introducing revisions over time. Excel 2007 brought major upgrades compared to Excel 2003. Excel 2010 and 2013 were not overly different from 2007, and now we have Excel 2016, which has some useful upgrades to improve functionality with expanded Sharing and cloud-based storage access, and to follow the productivity trend of making documents more portable/ mobile and easy to intrepret. Below are some specifications of Excel for you to compare:

Item	Excel 2003	Excel 2007 — 2016
Columns in a worksheet	256	16,384
Rows in a worksheet	65,536	1,048,576
Number of conditional formats applied to a cell	3	Only limit is available memory
Sort levels in a table	3	64
Items displayed in a Filter list	1,024	32,768
Characters displayed in a cell	1,024	32,768
Unique cell styles in a workbook	4,000	65,536
Number of nested levels in a formula	7	64
Maximum arguments in a formula	30	255
Number of columns allowed in a PivotTable	255	16,384
Number of fields displayed in the PivotTable Field List	255	16,384

The Microsoft Office suite continues to become more flexible with the 2016* (and 2013) version. New features since Excel 2013 include:

Share* - Simplified ability to collaborate on files by allowing you to grant access, permissions, and email files directly from Excel.

Query* - This provides standard access to Power Query, which was previously an Excel add-in. Connect to data sources and even write and edit SQL queries within Excel for returning selected data.

Tell me what you want to do (or Search)* - This search box above the Office Ribbon allows for you to search for functions based on a typed explanation of what you want to accomplish.

Flash Fill - Flash Fill is a predictive auto-fill feature that looks for patterns in the way data in a column is being entered. This feature tentatively populates the column with what it is seen as the pattern from the first and second cells in the column, and can do simple things like extract a domain name for an email address list, first or last names, etc. The tentative fill is optional, and defeatable for the column, or you can disable the feature using Excel Options to customize your experience.

Quick Analysis - When selecting a table or data for quick options, a preview mode is available to show you what the option would look like in finished form, which assists with making your data more illustrative. Quick Analysis provides access to chart controls, including Sparklines, which were introduced in Excel 2010.

Recommended Charts - This is a new option in the Insert tab available through the Quick Analysis box, or to the right of a chart you create. Editor buttons show to the right. Report Filtering is much easier. Click Apply after filtering. Keep working with Chart Elements or click outside the chart to finish.

OneDrive® (formerly SkyDrive) - Options like saving files to OneDrive, the hard drive on your computer, the web, or to other locations makes it quick and easy to retrieve files on mobile devices and computers for yourself, or for team members you choose to Share with wherever you have access to this cloud-based application (app). OneDrive works as a cloud backup, increasing file security, as well as providing an option to access and sync files offline from a variety of devices.

Representational State Transfer (REST)-compliant web services - Compatibility is made easier with online editing , and you can use the same file and version to collaborate. Excel online makes it possible to save part of your workbook to the web for access and editing.

Rich Data Labels - formatting that stays with the chart, even if you change the chart style. Charts are much more user-friendly in Excel 2016, and provide previews as you make changes, so you can decide whether or not the change you've made accomplishes what you intended.

View animations in charts - watch changes in your chart when data changes. Charts are no longer static. PivotTable analysis comes with previews, and you create more tables using the same Fields, add timelines to compare rolling data, and more.

SECTION I: BEGINNING EXCEL

The first section of this course is designed to teach you the basics of Excel 2016. I realize that you may already have some Excel experience and may even consider yourself to be an Excel expert. As such, you may think this material is insulting your intelligence by asking you to complete the examples. However, please understand that I have designed this course as one that builds on concepts taught in previous lessons. I expect for you to continue your education beyond Excel to other topics I teach, including Access and SQL. The ideas and concepts I teach in the Excel course serve as a foundation for concepts you will learn in later courses, and I must be assured that you have reviewed and understand the basics. I will therefore ask you to work all of the examples in these exercises. To keep you advanced people engaged, I've included a lot of tips and tricks in the beginning chapters that many of the Excel "experts" don't know. Additionally, you will need to complete the exercises in their entirety in order to answer some of the questions in the exams.

If you are a former Excel 2003 (or previous version) user, and tried to use Excel 2007, 2010, 2013, or 2016 with no instruction, you have probably become very frustrated. The new Excel interface is vastly different from previous versions, and you have probably asked questions like, "*How in the blazes do I open the* **Find** *dialog box?*" Rest assured, you are not alone. I will point out those differences in many of the exercises herein, which gives you even more of a reason to work ALL of the exercises.

Excel® 2016

Complete Self-study Course

ExcelCEO

Chief Excel Officer

CHAPTER ONE — EXCEL 2016 BASICS

Chapter Objectives:

- Identify basic icons, groups, and menus within the Office Ribbon and File tab
- Recognize how to enter and edit basic data directly into a cell as well as in the Formula Bar
- Choose the Excel Options to customize your Excel program interface
- Recognize and use Alt key sequences to execute Keyboard Shortcuts
- Choose a custom Cell Style for application to selected cells
- Identify Merge & Center functionality
- Select the appropriate keystrokes to Copy and Paste cell contents
- Determine the correct way to insert columns and rows to increase spreadsheet flexibility for use
- Identify how dates are formatted and how calculations can be performed on them
- Recognize Data Fill to copy data and formula patterns within a column
- Choose the Freeze Panes and Split Windows functionalities to increase visibility to important rows and columns
- Recognize how to insert and delete Comments to a spreadsheet cell
- Identify File Properties area and add identifiers to a workbook
- Select an Excel workbook to insert into an email message

Projects You Will Complete During This Chapter:

- *myIncomeStmt.xlsx* (beginning from a Blank workbook)
- *myMay_Sales.xlsx* (using pre-configured *May_Sales.xlsx*)

CPE Credits possible for this chapter: 3

Excel 2016 Basics

Excel is an electronic ***spreadsheet***. It allows you to organize data into lists, filter, sort, summarize, compare, rank, add, subtract, multiply, divide, and do just about anything you want to do with those numbers. In the information age of today, time is money, and Excel helps you collect, organize, and analyze information very quickly. With Excel, you can calculate the average days outstanding on your receivables, sum total sales figures for each region of your company, or calculate the average age of your customers, and present it all in graphs that allow upper management to see trends. And the more you know how to organize and manipulate those numbers, the more valuable you become to your company. Data is little more than a collection of numbers or words by itself. The goal of this course is to teach you through hands-on projects how to make sense of the data given, and to teach you many of the ways Excel can help you understand and present the data in ways that help you make informed decisions. The ExcelCEO Excel courses cannot teach every single thing Excel is capable of doing in one course, but by the time you finish your training, you should have a solid understanding of how Excel works, and then your limitation becomes only your imagination, or knowing what you want to accomplish.

In this chapter, you will learn the basics of Excel. Please note that it is not my goal to insult your intelligence by making you do some seemingly easy tasks, as you may have a great deal of experience with Excel. However, I have included in this chapter a few tricks that not many Excel users know about, so it will definitely be worth your while to work every example in the chapter, and in the whole course for that matter. Let's first discuss some of the basics in Excel 2016.

The Backstage View

When you first open Excel in the 2016 version, the default setting brings up the Backstage view. From the Backstage, you have the option to search through pre-configured Excel templates, open a Blank workbook, or use the Recent files section on the left to open any recent files you have been working with.

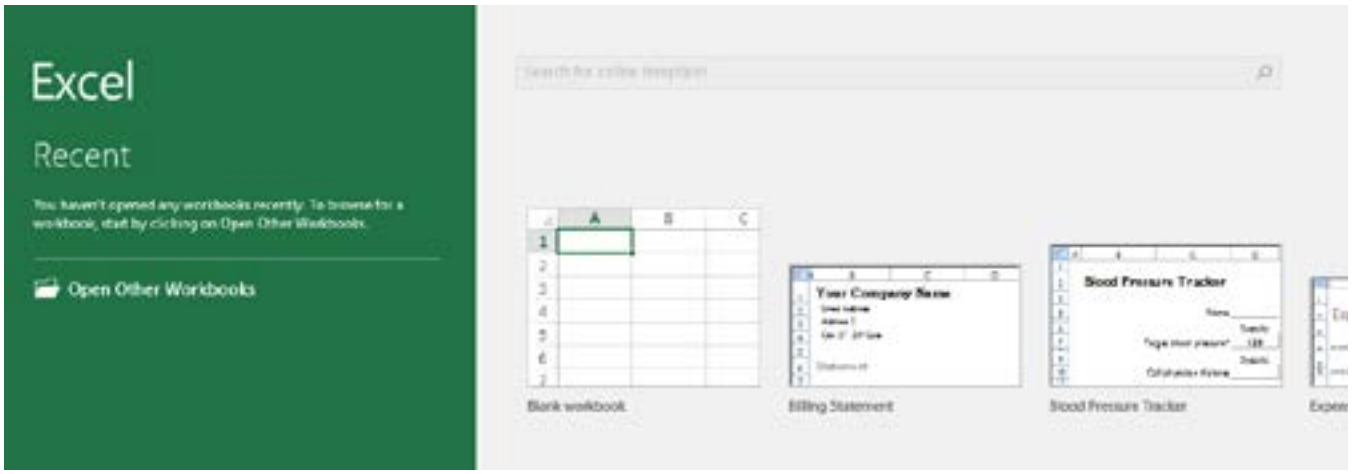


Figure 1.1

1. **Open Excel 2016** *(If you are using* **Windows 10***, click on the* **Windows**  *icon,* **All Apps***, scroll down to* **Microsoft Office 2016***,* **Microsoft Excel 2016***). For* **Windows 8/8.1***, the* **Start Menu** *button is an icon that looks like a Home*  *. Type* ***Excel 2016****, and select the* **Excel 2016** *under the heading of* **Apps***, which will open the* **Excel 2016** *program for you.*

2. **Excel 2016** *does not open to a Blank workbook (by default), so click on* **Blank workbook** *from the templates after opening the* **Excel 2016** *program and a new workbook will be created.*

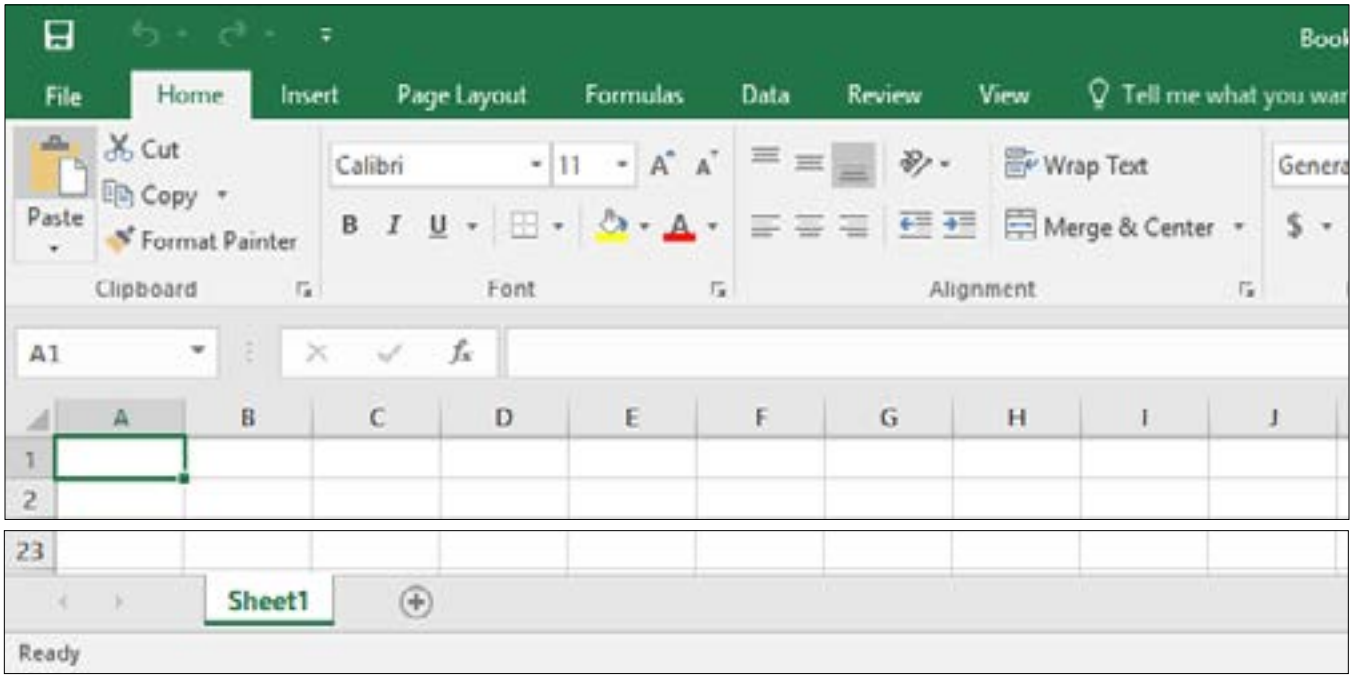


Figure 1.2

The Office Ribbon

Click the Blank workbook option to open Excel and you will see the Office Ribbon at the top of the screen that looks something like the image below, based on a full, wide screen. Note that the Office Button in Excel 2007 was replaced with the File tab in Excel 2010 — Excel 2016. In the next few exercises, we'll go through how to navigate within the Ribbon.

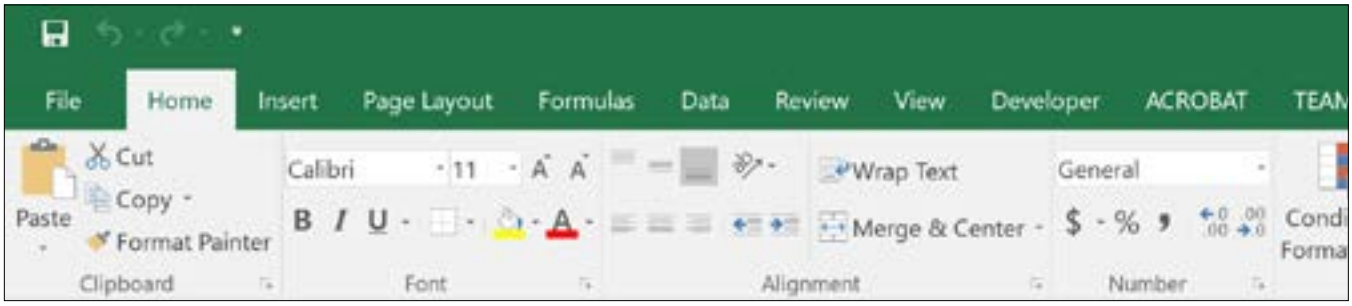


Figure 1.3

In the upper-left corner of the Excel screen, just to the right of the Microsoft Excel button is the ***Quick Access Toolbar*** . We'll discuss the Quick Access Toolbar a little later. Along the top and center of the spreadsheet is the Title Bar Book1 - Excel. It shows the name of the file. In the upper-right corner of the spreadsheet are the standard Microsoft Excel Help (F1), Ribbon Display Options, Minimize, Maximize, and Close buttons . Just below the ***Title Bar*** of the spreadsheet are ten

default tabs: File, Home, Insert, Page Layout, Formulas, Data, Review and View. Your version may or many include Acrobat, Add-ins and/or Team. All of these tabs, with the exception of the File, Acrobat, and Team tabs, are the same as in Excel 2007. The File tab in Excel 2010 — 2016 replaced the Office Button in Excel 2007. When you click on any tab, the Office Ribbon will change to show the icons associated with that tab. If you hold your cursor over almost any icon or menu item, a ***ScreenTip*** will appear. The screen tip tells you what the icon or menu item does. Hold your cursor over the ***Format Painter*** icon to see a screen tip for applying its use in a new section on the lower-left of the screen in addition to the temporary window that appears near your cursor.

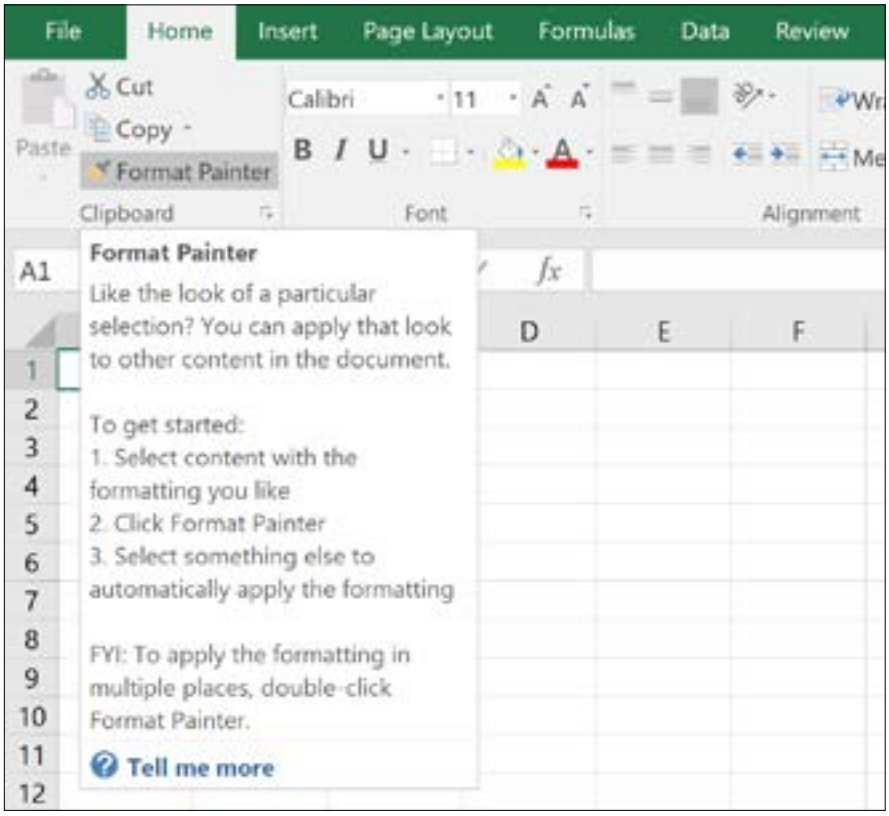


Figure 1.4

If you click on the File tab, you will see the following expanded feature screen with vertical tabs to display document information in the following categories: Info, New, Open, Save, Save As, Print, Share, Export, Publish, Close, Account, Options, and Feedback. Several of these are common Office features you should be familiar with, and some are new.

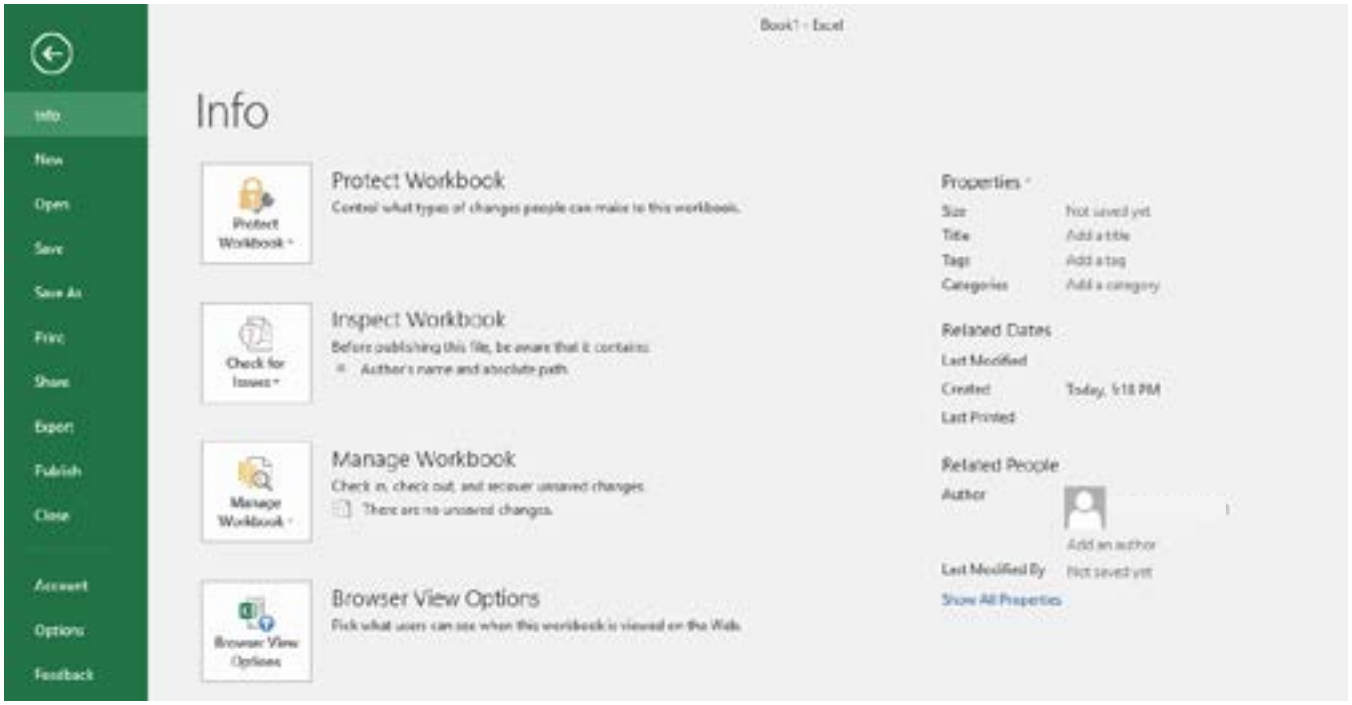


Figure 1.5

We'll go through the menu items on the left in future exercises. If you have experience with previous versions of Excel, you should already be familiar with some of the icons like Save, Save As, Open, Close, and New. You make each choice active by clicking on it. For example, if you click on the Info tab, it shows information about the spreadsheet that you currently have open. We'll go through each of the various options as needed throughout the course. The section to the right gives more information and choices within the selected tab. The Options button allows you to create and customize certain options within Excel. The Close button will, of course, close the Excel program.

When you open Excel 2016, the program opens to a templates page, the first of which is ***Blank workbook*** with one tab located along the bottom of the screen. The tab defaults to name Sheet1 and contains a worksheet, also called a spreadsheet. With the new Office interface, you can add more spreadsheets by clicking the circled plus symbol to the right of the existing sheet tab - called New Sheet. The main body of the worksheet is divided into ***columns*** (indicated by alphabetic characters across the top of the spreadsheet) and ***rows*** (indicated by numeric characters located along the left side of the spreadsheet). The box at the intersection of a column and row is called a ***cell***. The location of a cell is referred to by its column letter and row number. Cell A1, for example, is the first cell on the spreadsheet. Cell A6 is located in Column A, Row 6, Cell F19 is located in Column F, Row 19, and so forth. The body of the spreadsheet looks like the image below:

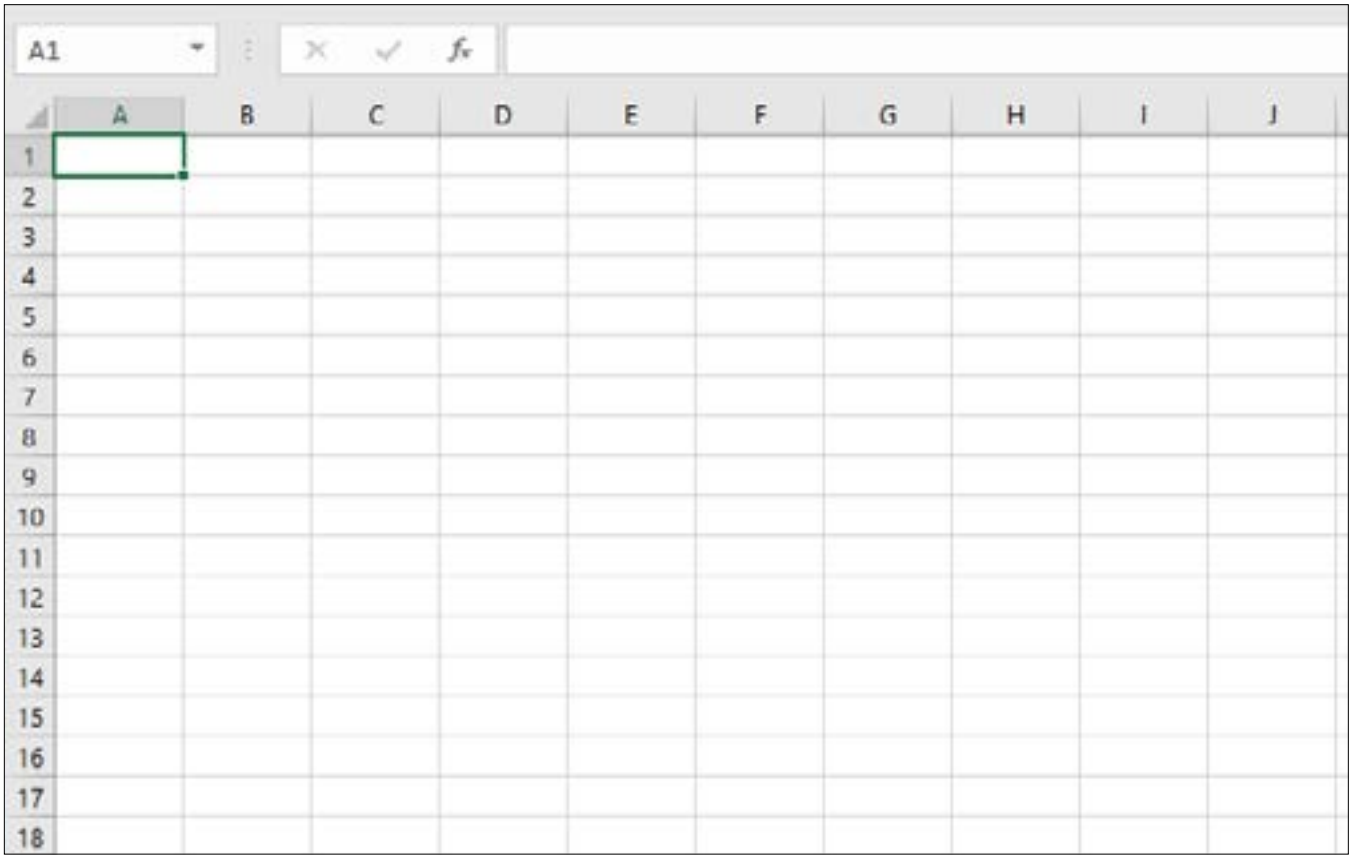


Figure 1.6

When you open a new workbook, Excel 2016 gives you one worksheet by default within the workbook. Versions of Excel previous to Excel 2013 defaulted to three tabs. You can add more worksheets or delete worksheets, and I'll show you how to do that in this and later chapters. Each spreadsheet, or tab, is named by default Sheet1, Sheet2, and so forth, and are shown in tabs at the bottom of the screen. The next figure shows the result of clicking the New Sheet icon ⊕.

Figure 1.7

You make a tab active by simply clicking on the tab. You can use the tab selectors to select the tabs at the beginning ◂, one tab to the left ⋯, one tab to the right ▸, or the last tab ◂ ▸ ⋯. Unless you have numerous tabs on the workbook, you can usually see all of them at the bottom of the screen. Typically, data in each tab should relate to other data in the workbook. For example, the first tab may contain a list of vendors and the second tab could contain invoices payable to each vendor. If you right-click on any of the tab selectors, a dialog box pops up that shows you all of the tabs in the workbook. If you have more spreadsheets in your workbook than are visible along the named tabs bar, you can scroll to see them, or right-click on the Last arrow to see all sheets listed.

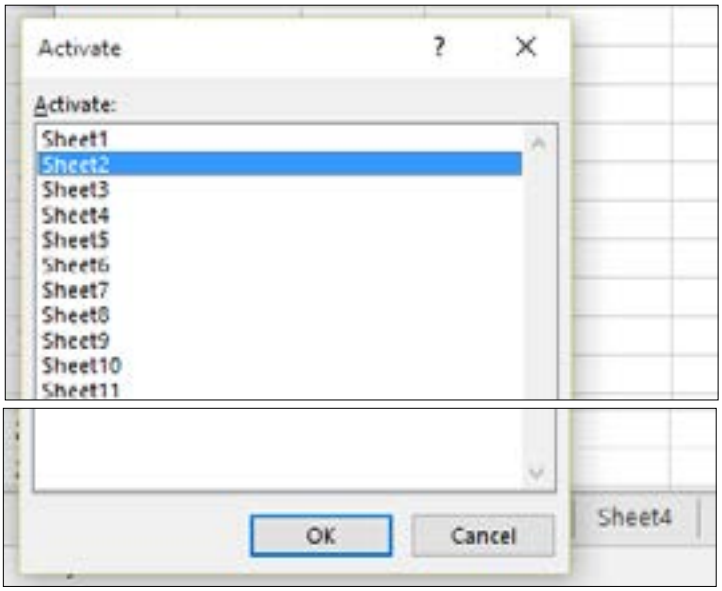


Figure 1.8

Entering and Editing Data

Let's start by typing some data onto a blank spreadsheet. That is one of the beautiful things about Excel – anyone can open a spreadsheet and start typing data into cells and make Excel do something. There are basically two ways to type data into a spreadsheet: typing directly into the cell and entering data using the ***Formula Bar***. Let's first enter data directly into the spreadsheet.

3. *Click on the* **Home** *tab.*
4. *With the* Sheet1 *tab selected, click on* **Cell A1** *and type* ***Nitey-Nite Mattress****, then press the* **[Enter]** *key.*

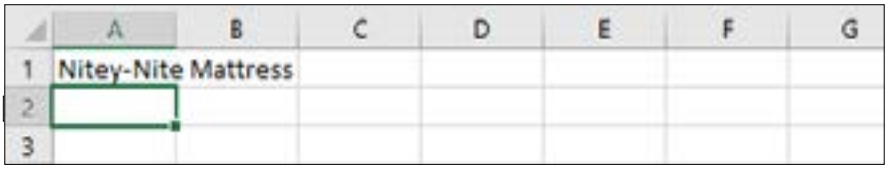
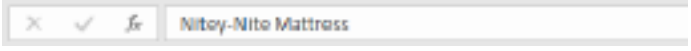


Figure 1.9

Pressing the **[Enter]** key inputs the typed characters into spreadsheet cell A1. However, we find that we've made a mistake. The name of the company is Nitey-Nite Mattresses. We will now edit the name to include the extra "es".

5. *With your mouse, click on* **Cell A1**.

The Formula Bar is the box located just above the column lettering above the spreadsheet with "f_x" or Insert Function button to the left. We will discuss the use of the ***Insert Function*** button later. The Formula Bar should look like this: 

6. *Click inside the* **Formula Bar** *to the right of the* **Nitey- Nite Mattress** *text.*

Once you click inside the Formula Bar, you will see an "X" and a check mark to the left activated, with fill color no longer grey. If you click on the X, it will undo any changes you made to the cell before they were entered. The check mark accepts the changes. It is similar to the [Enter] key, except the mouse will not move down one cell.

7. *Edit the text to read* ***Nitey-Nite Mattresses****, and click the check mark in the* **Formula Bar**.

The Formula Bar and spreadsheet should now look as follows:

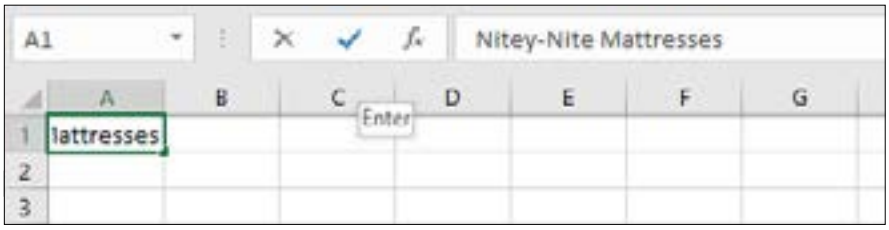


Figure 1.10

Moving a Cell

Moving a cell is very easy. Let's suppose that you wanted the Nitey-Nite Mattresses text in Cell C1 instead of Cell A1. All you have to do is drag the text over. Let's try it.

8. *Place your cursor over the bottom, top, or side line of* **Cell A1**. *Your cursor will turn to a cross with arrows on the tips.*
9. *Click, hold, and drag the cell over to* **Cell C1**, *then release.*

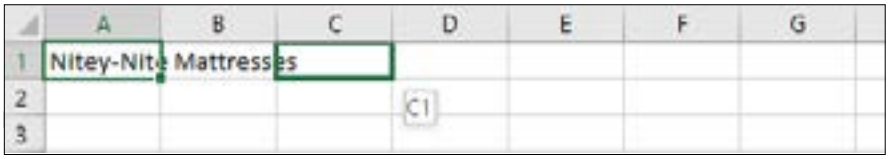
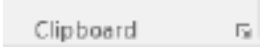


Figure 1.11

The Nitey-Nite Mattresses text is now in Cell C1. Alternatively, you can ***Cut*** and ***Paste*** the cell. When you cut and paste the cell, you are cutting the cell contents into memory then pasting those contents to another cell location.

When you open a workbook, Excel 2016 selects the Home tab by default. Let's now cut and paste the contents of Cell C1 using the icons in the Home tab.

10. *With the* **Home** *tab selected, and with your cursor on* **Cell C1**, *click on the* **Cut** *icon*  *in the* **Clipboard**  *group.*

Note: **Groups** *are sets of similarly-functioning icons within a tab that are divided by thinly outlined boxes. For example, the* **Clipboard** *group contains icons that store data into virtual memory for relocation, allowing you to modify your spreadsheet without having to erase, write, or memorize cell contents during the transition.*

Cell C1 is now surrounded by a moving dotted line, indicating that the cell is either copied or cut.

11. Click on **Cell A1**, *then click the* **Paste** *icon.* 

***Note**: You can click on either the icon, or the drop-down arrow, then click on the* **Paste** *icon. This is a little different from Excel 2007.*

The text is now back in Cell A1.

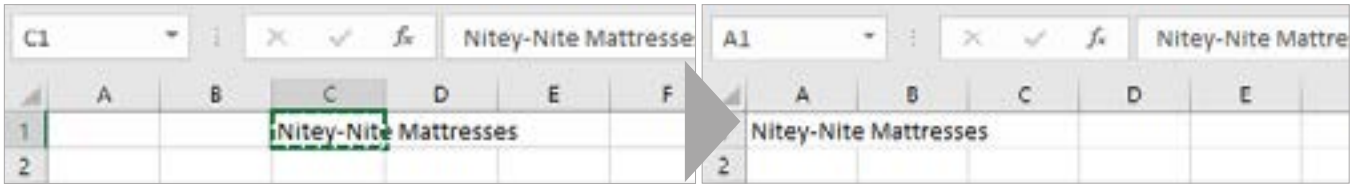


Figure 1.12

Excel Options

When you press the [Enter] key, your cursor may skip down one cell. Personally, that bugs me, because I usually want the cursor to stay where it is after I press [Enter]. The only exception is when I am entering in data, but I can make the cursor automatically jump to the next cell in other ways. For now, I want to turn off the automatic skipping down by one cell. You can do this using ***Excel Options***. The next few steps show how to turn that off. If you don't want to turn it off, just skip those steps. However, you should read through the instructions in case you need that functionality someday.

12. Click on the **File** *tab, then click on the* **Options** *button at the bottom of the left column of the dialog box.*

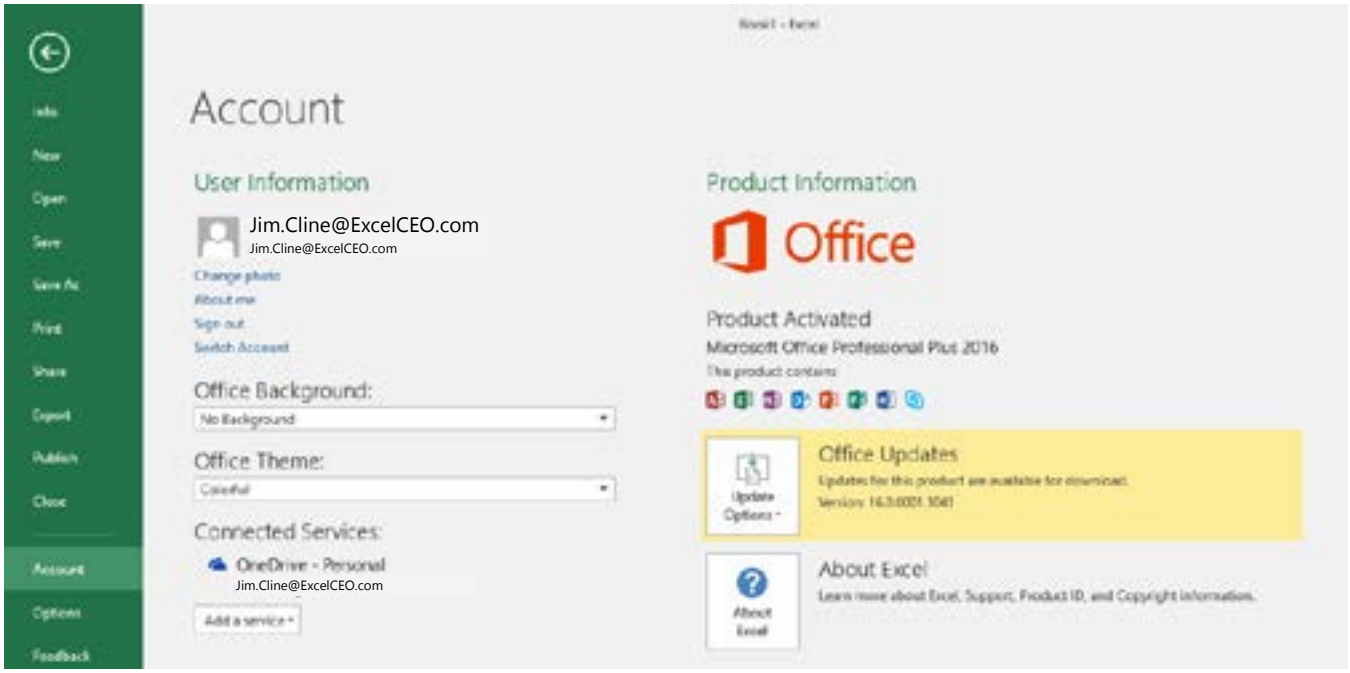


Figure 1.13

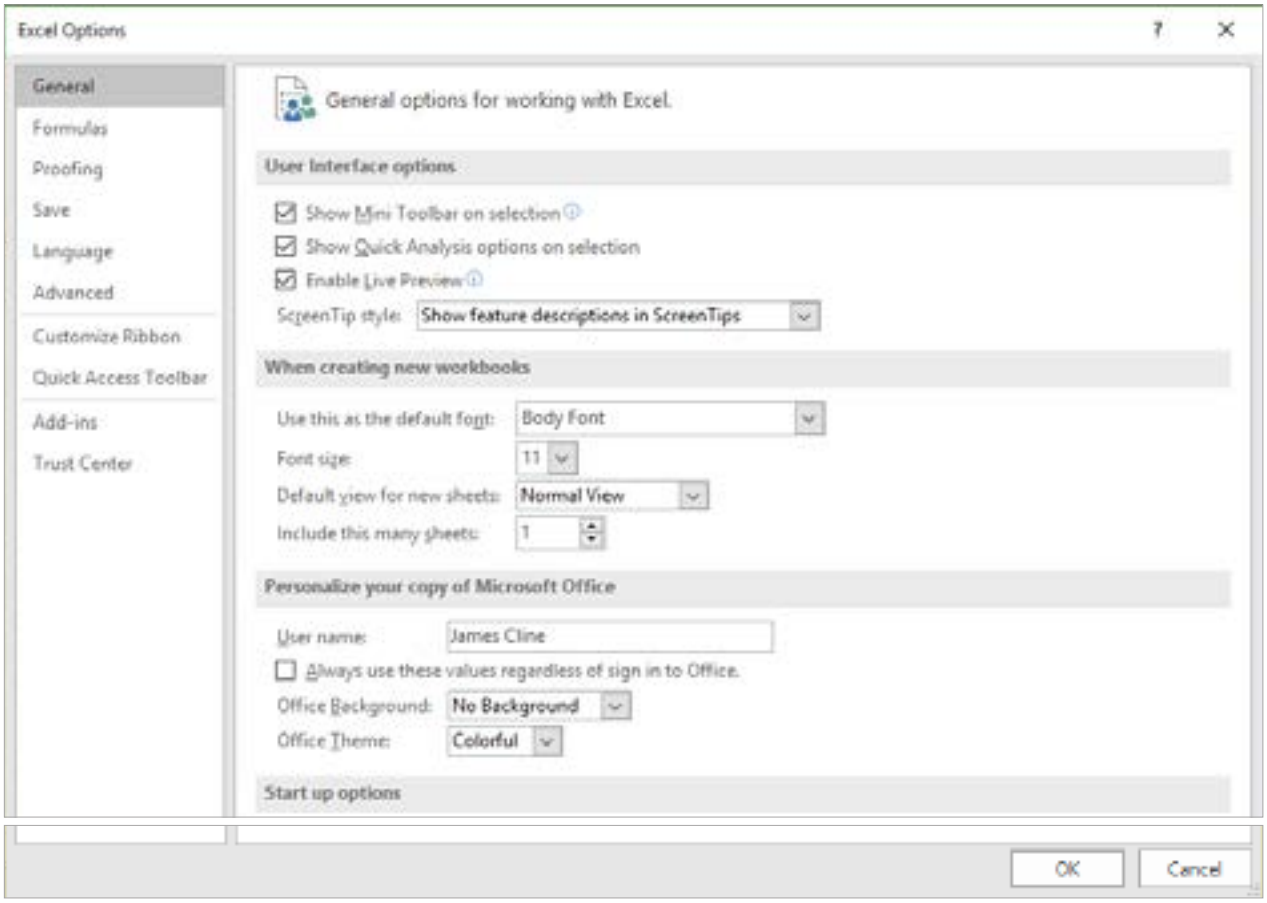


Figure 1.14

The **Excel Options** dialog box opens. There are MANY options you can change in this dialog box. I encourage you to click on the menu items to the left to find out which options are contained in each. In this exercise, we'll turn off the functionality that moves the cursor down when you press [Enter].

13. *Click on the* **Advanced** *menu item on the left side of the dialog box.*
14. *If necessary, uncheck the* **After pressing Enter, move selection** *box (the first box under* **Editing Options***).*

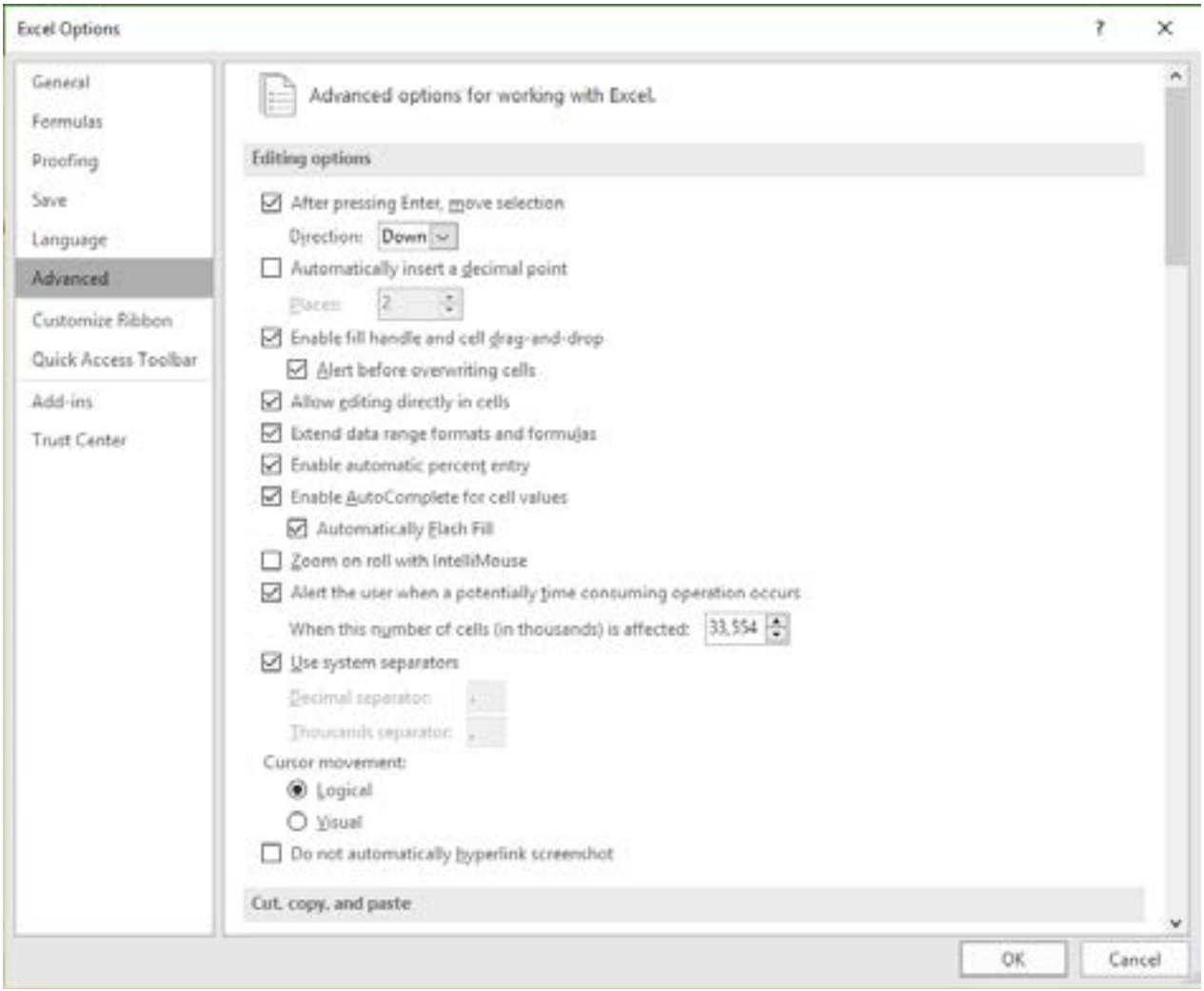


Figure 1.15

15. *Click* **OK**.

The dialog box disappears and you return to the worksheet. Now you will input some more data on to the worksheet.

16. *Type the following data into the indicated cells (***Plain** *text,* **no italics** *when you type the data):*

Cell	Cell Input Value
Cell A3	***Three Year Sales Summary***
Cell A5	***Sales***
Cell A6	***Mattresses***
Cell A7	***Pillows***
Cell A8	***Total Sales***
Cell B5	***2016***
Cell C5	***2015***
Cell D5	***2014***
Cell B6	***33415892***
Cell B7	***14682832***
Cell C6	***31585275***
Cell C7	***13892897***
Cell D6	***29574225***
Cell D7	***11546835***

Your spreadsheet should now look as follows:

	A	B	C	D	E	F	G
1	Nitey-Nite Mattresses						
2							
3	Three Year Sales Summary						
4							
5	Sales	2016	2015	2014			
6	Mattresse	33415892	31585275	29574225			
7	Pillows	14682832	13892897	11546835			
8	Total Sales						

Figure 1.16

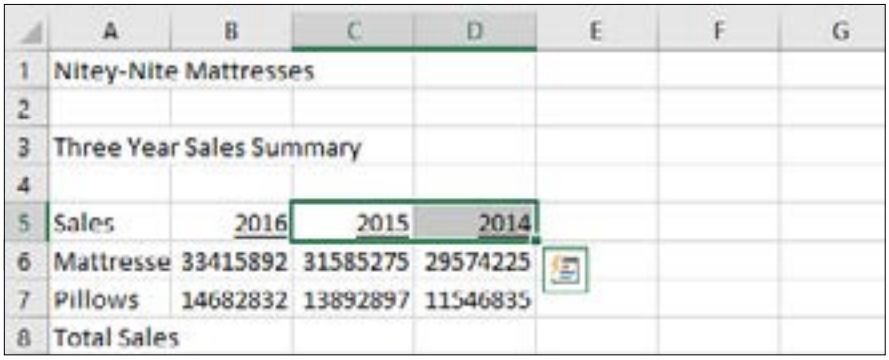
Formatting Cells

Not to be disrespectful, but your spreadsheet looks kind-of, uh, bland. Fortunately, we have some tools at our disposal to make the report look more attractive. Most of the formatting tools you need in this exercise to make the report look nicer are found in the Home tab. There are seven standard groups in the Home tab: Clipboard, Font, Alignment, Number, Styles, Cells, and Editing. The formatting tools you'll need in this exercise are found in the Font, Alignment, and Number groups. Take a few moments to look at those icons. Hold your cursor over each icon and read the screen tip to see what that icon does. Let's clean up the report a little by using some formatting.

17. *Click on* **Cell B5**.
18. *Click the* **Underline** *icon*  *in the* **Font** *group.*

Now Cell B5 is underlined. You want to ***underline*** the other years in Cells C5 and D5 as well, but you don't have to do it one cell at a time.

19. *Left-click on* **Cell C5** *and hold.*
20. *Drag the cursor over to* **Cell D5** *(to select both cells).*
21. *Release the left-click on the mouse (this process is called selecting cells).*
22. *Click the* **Underline** *icon.* 



	A	B	C	D	E	F	G
1	Nitey-Nite Mattresses						
2							
3	Three Year Sales Summary						
4							
5	Sales	2016	2015	2014			
6	Mattresse	33415892	31585275	29574225			
7	Pillows	14682832	13892897	11546835			
8	Total Sales						

Figure 1.17

Now Cells B5, C5 and D5 are underlined.

Keyboard Shortcuts

If you prefer to use the keyboard to select multiple cells, you can click on Cell C5, hold down the [Shift] key and press the right arrow key on your keyboard to select both cells. With those cells selected, you can press and hold the [Ctrl] key and type the letter "u" to underline the cells. The [Ctrl]+u trick is the same in all Microsoft Office and most Windows-based programs. These are called keyboard shortcuts. A ***keyboard shortcut*** is the keyboard version of executing commands (or choosing options) that could also be done with a mouse. There are many other keyboard shortcuts in Excel. One easy way to find out what they are is to hold your cursor over the icon and read the screen tip. If a keyboard shortcut is available, the screen tip will tell you what the keyboard shortcut is. For example, if you hold your cursor over the Copy icon in the Clipboard group of the Home tab, you will see the following screen tip:

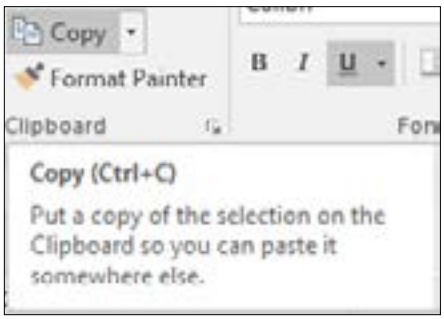
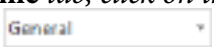


Figure 1.18

To the right of the Copy choice you see (Ctrl+C). This means that you can click Ctrl+C together, and then Excel will copy whatever you have selected. The Ctrl+C reference is the shortcut. It is a little deceiving in that the C in the reference is capitalized, and the shortcut works when [Caps Lock] is on or when you type Ctrl+c (lower-case c). If you type Ctrl+Shift+c (to put the c in upper-case), it will not work as intended. If you prefer to use the keyboard to do many commands (like I do), these keyboard shortcuts can save you a lot of time. When you use keyboard shortcut combos, note that the "+" is to show you the combination of keys to use together — the "+" is not a part of the combination.

Let's now return to our spreadsheet. Our file is starting to look a little better, but those numbers need some formatting. The years look good, as year numbers are typically shown with no formatting, but the sales numbers need to have some formatting, so let's do that now.

23. *Select* **Cells B6 through D7**.
24. *In the* **Number** *group of the* **Home** *tab, click on the* **Number Format** *drop-down arrow to the right of the word* **General**. 

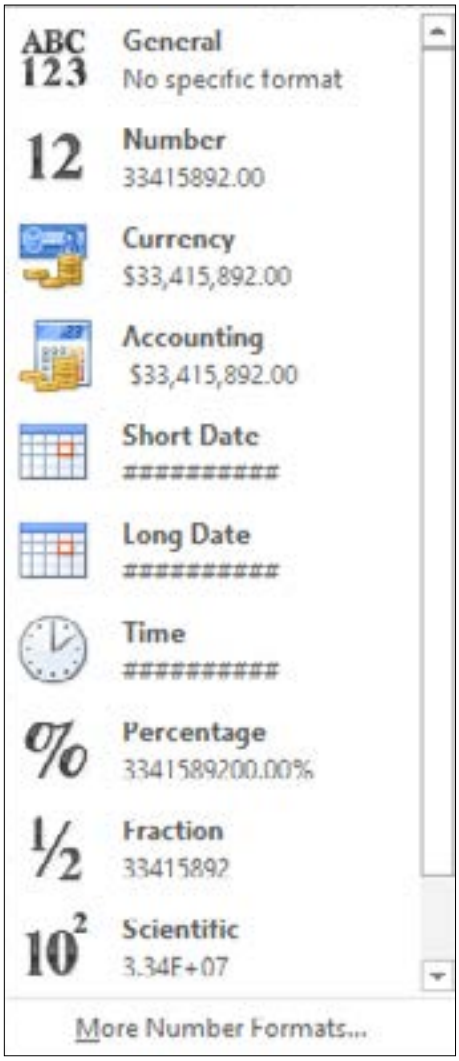


Figure 1.19

This is a short list of commonly used number formats. We want to format our sales figures with commas with no decimal places, and such a format is not included in this list. In this and previous versions of Excel, you could use the ***Format Cells*** dialog box. To display the Format Cells dialog box in Excel 2016, click on the ***Dialog Expander***, located at the lower-right corner of the Number group.

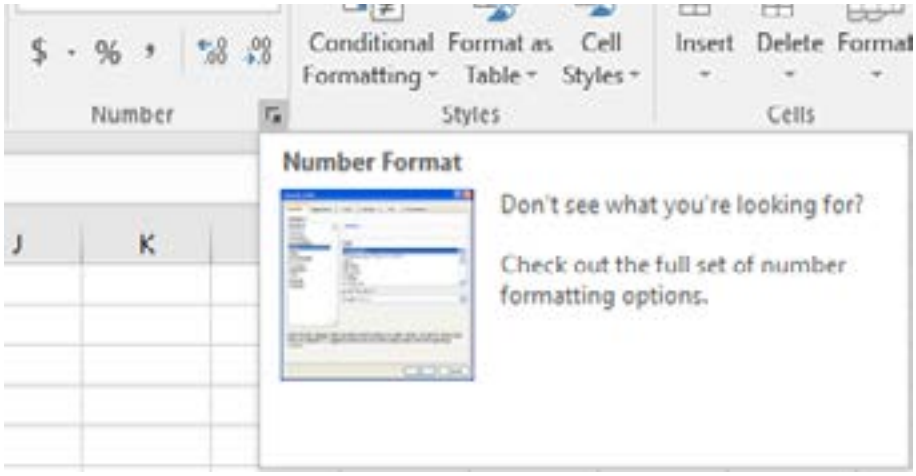


Figure 1.20

25. *Click anywhere outside the* **Number Format** *list (to make the list disappear).*
26. *Click on the* **Dialog Expander** *, located in the lower-right corner of the* **Number** *group of the* **Home** *tab.*

The Format Cells dialog box opens. Another way to open the Format Cells dialog box is to right-click anywhere in the spreadsheet and choose Format Cells.

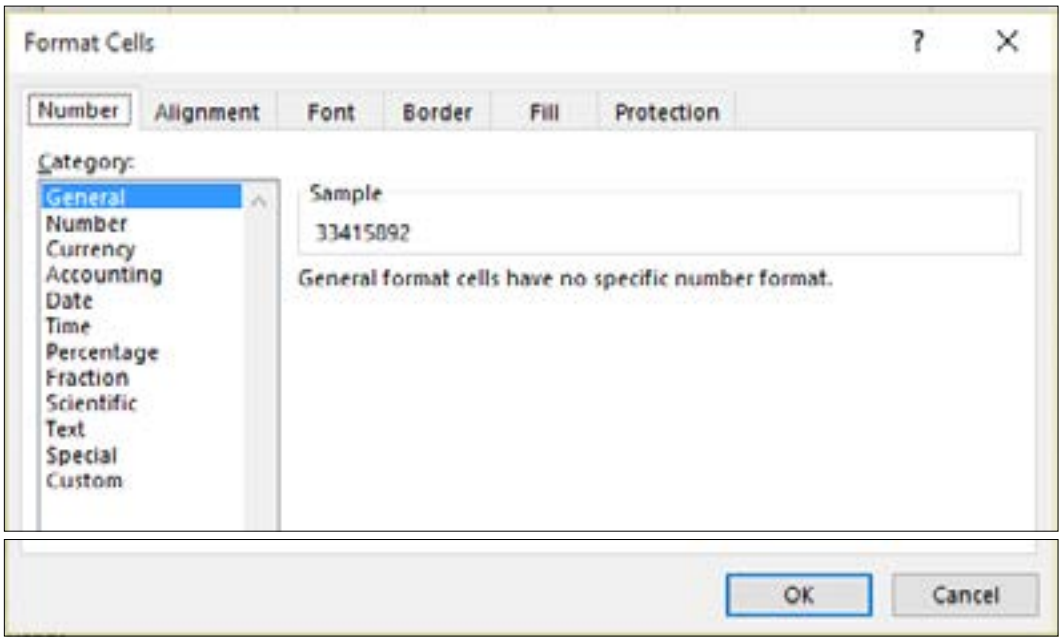


Figure 1.21

27. *In the* **Format Cells** *dialog box, make sure the* **Number** *tab is selected.*
28. *In the* **Category:** *field, click on* **Number**.
29. *Check the* **Use 1000 Separator (,)** *box.* 

30. *Click on the down arrow in the* **Decimal places:** *box until it reaches* **0**.

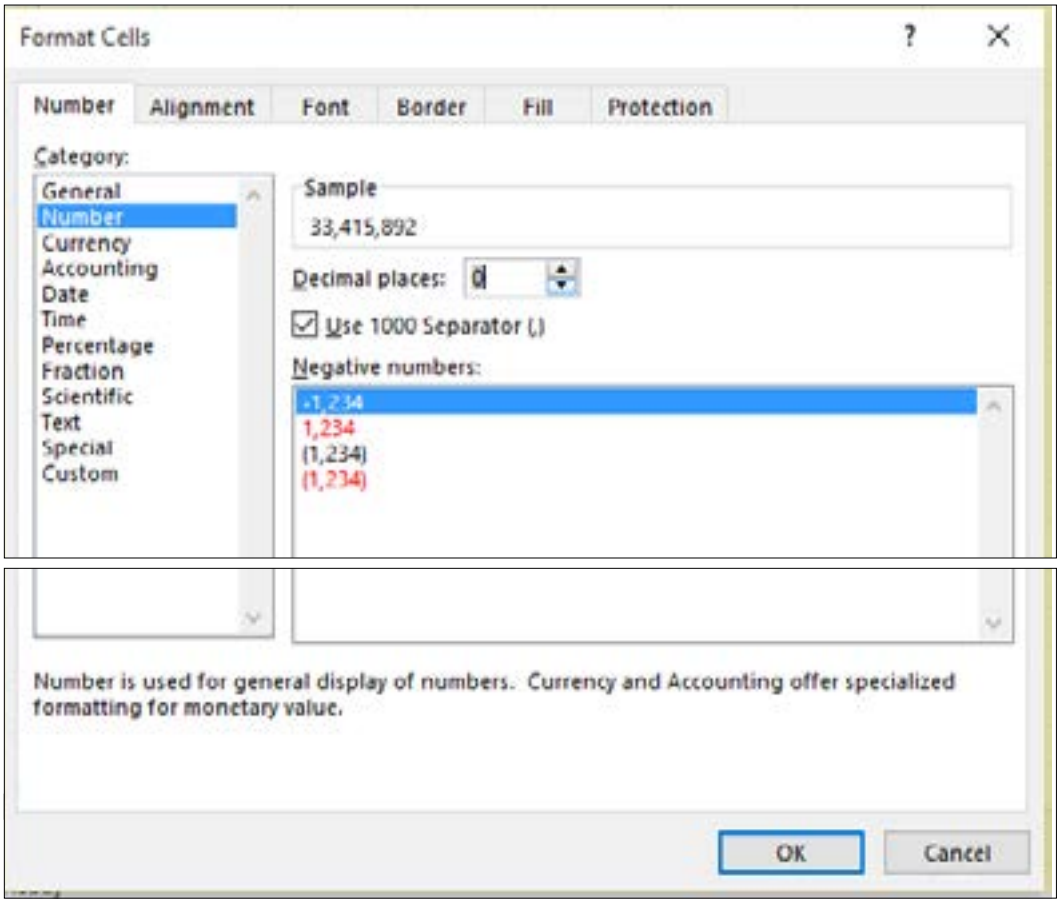


Figure 1.22

31. *Click* **OK**.

	A	B	C	D	E	F	G	H
1	Nitey-Nite Mattresses							
2								
3	Three Year Sales Summary							
4								
5	Sales	2016	2015	2014				
6	Mattresse	33,415,892	31,585,275	29,574,225				
7	Pillows	14,682,832	13,892,897	11,546,835				
8	Total Sales							

Figure 1.23

You should spend some time experimenting with the different cell formatting options in the Format Cells dialog box. You will most likely use many of the formats available.

One more useful tip: You will be using Excel a lot during this course, so it would be a good idea to make the program easy to find. Microsoft makes it possible to Pin items to your Start Menu, or even to your Taskbar, so you don't have to search for programs each time you want to open them, and this can be a real time-saver for accessing any program you use regularly.

32. *With* **Excel** *still open, right-click on the* **Excel 2016** *icon on your* **Windows Taskbar**, *and click* **Pin this program to taskbar**.

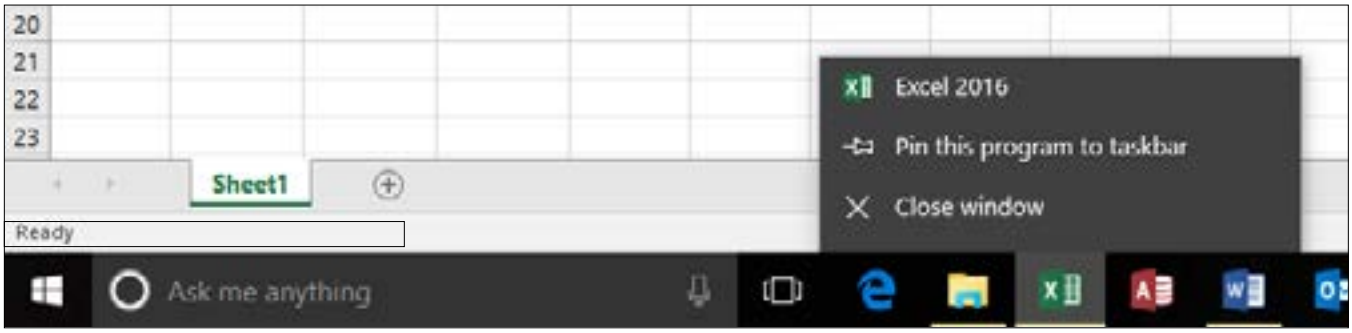


Figure 1.24

Now the Excel 2016 program is Pinned to your taskbar, and even when the program is closed, you can see the icon, and click to open it without having to search through Program Files from the Start Menu, or even through Cortana. You can Pin most any program to your Taskbar. We'll explore more of this Pin functionality later.

***Review Questions**: It is now time to complete the hands-on Review Questions. Log on to www.ExcelCEO.com with your Email address and Password, click on the* **Excel 2016 Review Questions, Chapter 1, Section 1 of 3** *option in your Main Menu, and complete the Review Questions.*

Cell Style

When creating reports, it's nice to have a standard format for the numbers. I like to use a cell format of Number with the comma separator with zero decimal places. Sometimes it can be tedious to remember the different formats of all the possible styles. Excel provides a great tool for you to store the formatting style and use it again and again. This functionality is called a ***Cell Style***. Let's set up a style.

1. *With* **Cells B6 through D7** *selected, click on the* **Cell Styles** *icon* 

in the **Styles** *group of the* **Home** *tab.*

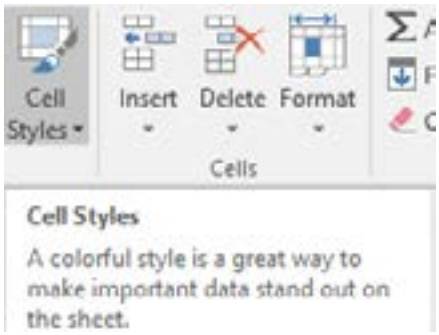


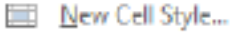
Figure 1.25

You can use one of these styles provided by Excel 2016, or you can create one of your own. One great feature about Excel 2016 is that you can hover your cursor over a formatting style and see what it would look like on your spreadsheet without having to click on the style. Let's try it.

2. *Place your cursor over the* **60% - Accent1** *box (located under* **Themed Cell Styles**, *first column, third row), but don't click on it.*

When you place your cursor over the style, watch how the formatting for Cells B6 through D7 change. Play around with it a bit. Place your cursor over different styles and see which one you like best.

Let's suppose that you don't want any of the styles provided in the dialog box. You can create your own style.

3. *In the* **Cell Styles** *dialog box, click on the* **New Cell Style…**  *icon.*

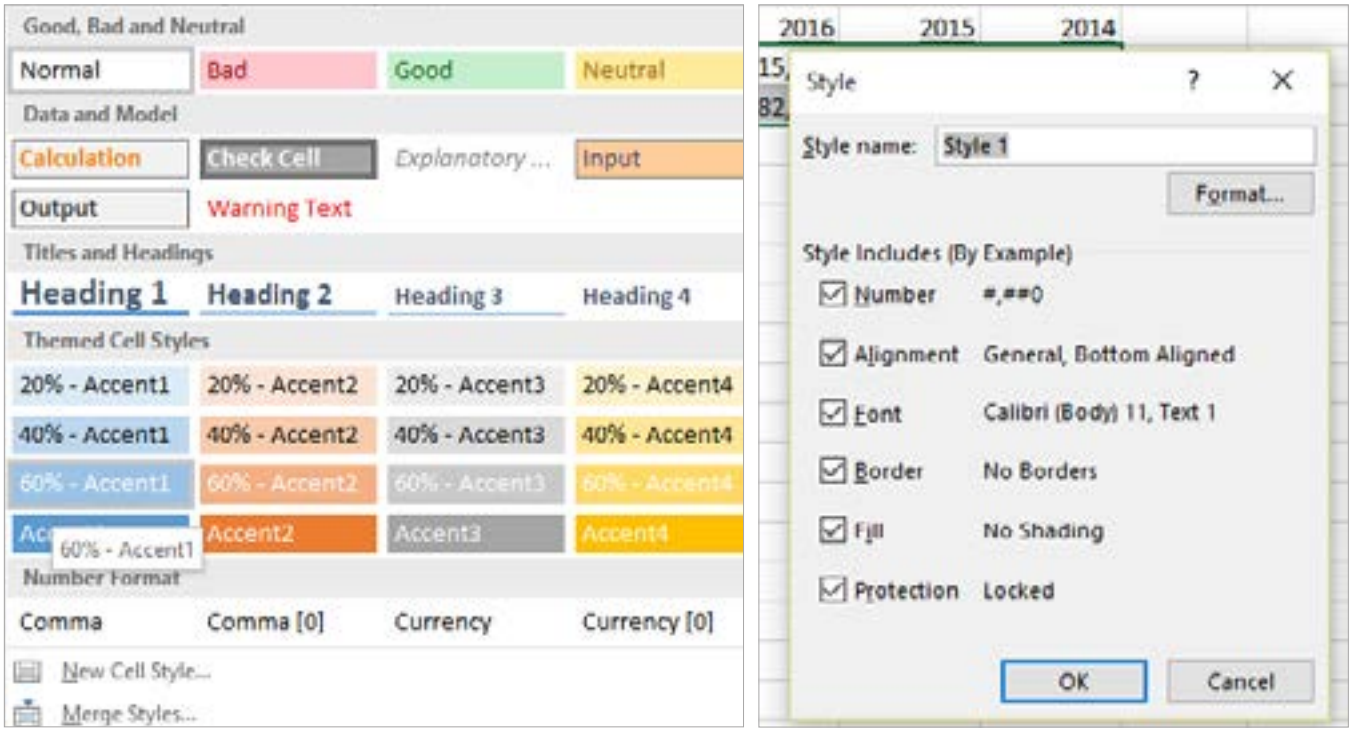


Figure 1.26

The Style dialog box appears. Note that it is already pre-populated with the style for which the cell range is currently formatted. If you like, you can change the formatting by clicking the Format… button. Clicking the Format… button will make the Format Cells dialog box appear, and you can make any change you want.

4. *In the* **Style name:** *box, type* ***ExcelCEO1*** *and click on the* **Format…** *button.*
5. *In the* **Number** *tab of the* **Format Cells** *dialog box, make sure* **Number** *is chosen under the* **Category** *group, the* **Use 1000 Separator (,)** *box is checked, and* **0** *is in the* **Decimal places** *box.*
6. *Click on the* **Font** *tab.*
7. *Under* **Font Style**, *choose* **Bold**, *then click* **OK**.
8. *Click* **OK** *in the* **Style** *box.*

Nothing happened to the formatting of Cells B6 – D7. Why? You created a new cell style but you haven't applied it to the range yet. Let's do that now.

9. *Click on the* **Cell Styles** *icon.*

You should now see the ExcelCEO1 style listed under the Custom group, as illustrated below.

Figure 1.27

10. *With the range* **B6 – D7** *selected, click on the* **ExcelCEO1** *custom style.*

The range is now formatted with the custom style you created.

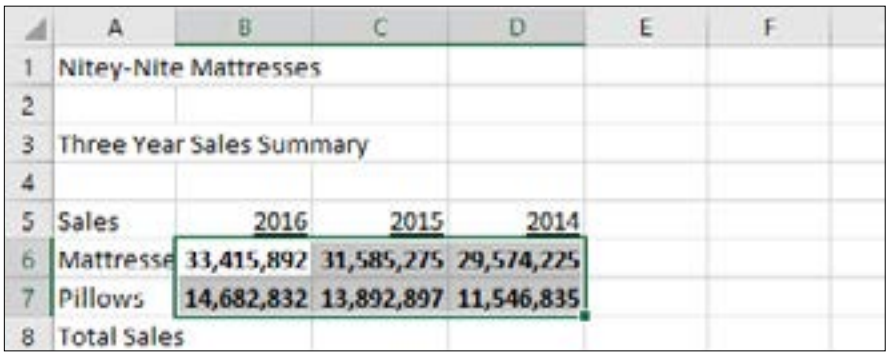


Figure 1.28

Column Widths

Do you see how the last "s" in the word Mattresses in Cell A6 appears to touch the outline in Cell B6? That is because Column A isn't wide enough. A standard Excel column measures 8.43 characters, but can be increased to 255 characters or decreased down to zero (hidden). These sizes represent the number of characters that can be displayed in a cell that is formatted with the standard font. There are a number of ways you can resize a column. Let's explore some of those ways.

1. *Place your cursor on the column margin (the line* **between Columns A and B***) above* **Row 1** *and your cursor will become a vertical line with left and right arrows.*
2. *Double-click on the column line.*

Column A is automatically resized to fit the cell containing the longest text string in the column, which would be Cell A3 (Three Year Sales Summary). We don't need for the column to be that wide. All we want to do is to adjust it so it is just to the right of the word "Mattresses" in Cell A6.

3. *Place your cursor on the column line between* **Columns A and B** *where your cursor turns to a vertical line with left and right arrows.* ↔
4. *Click, hold, and drag the column line to the left.*

As you drag the line to the left, you will see a ***ScreenTip*** box. This box tells you the width of the column as you drag it.

5. *Drag the column line until the screen tip reads* **Width: 10.00** *(75 pixels), and release.*

> ***Trick**: You can also set a column width by using the keyboard. With your cursor placed in the column(s) you want to adjust, type the **[Alt]** key and then type the letters "**o**", "**c**" and "**w**", then input the desired column width. (These are the commands to set column widths since Excel 2003, and also works in 2016.) Additionally, you can also right-click the Column letter and choose Column Width...*

At this point, you should be able to see all of the word "Mattresses" in Cell A6 with space following.

	A	B	C	D	E	F
1	Nitey-Nite Mattresses					
2						
3	Three Year Sales Summary					
4						
5	Sales	2016	2015	2014		
6	Mattresses	33,415,892	31,585,275	29,574,225		
7	Pillows	14,682,832	13,892,897	11,546,835		
8	Total Sales					

Figure 1.29

Merge & Center

It really would be nice if we could have the title centered over the report. What's that you say? Can we do that? Sure we can. Just about every time I think of a question that begins with, "*I wonder if Excel can …*", it usually can. It just takes a little investigation on how to get it done. In this case, you can use the ***Merge & Center*** icon.

6. *Select* **Cells A1 through D1**.
7. *Click the* **Merge & Center**  *icon in the* **Alignment** *group of the* **Home** *tab.*

This action combines the four cells as one and centers the text "Nitey-Nite Mattresses" over the report. You can use the Merge & Center icon to merge and center, merge across, merge cells or unmerge cells. To see these choices, simply click on the drop-down arrow located on the right side of the Merge & Center icon. Let's do some more formatting.

8. *Click on the* **Font Size** *box in the* **Font** *group of the* **Home** *tab and choose* **14**. 
9. *Click on the* **Italics** *button.* 

This increases the size of the text to a size 14 font and italicizes the text.

10. *Select* **Cells A3 through D3** *and use the* **Merge & Center** *icon to center that text over the report.*
11. *Change the font size to* **12**.

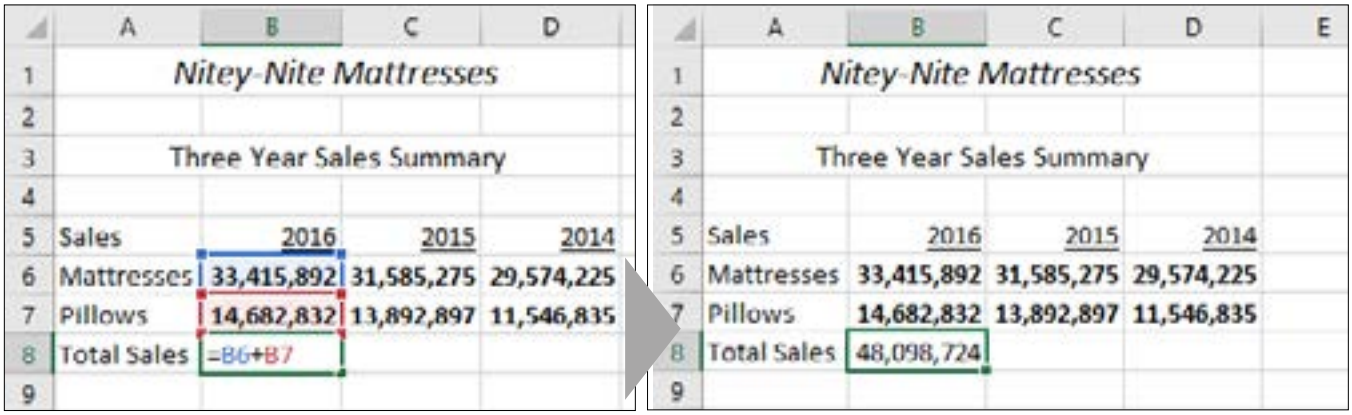
	A	B	C	D	E	F
1	Nitey-Nite Mattresses					
2						
3	Three Year Sales Summary					
4						
5	Sales	2016	2015	2014		
6	Mattresses	33,415,892	31,585,275	29,574,225		
7	Pillows	14,682,832	13,892,897	11,546,835		
8	Total Sales					
9						

Figure 1.30

Simple Formulas

Now we will calculate the Total Sales. This is the meat of Excel – calculations and formulas. When typing formulas, you must always begin the formula with an equal sign "=". Let's begin with the most basic of Excel formulas: adding two cells together.

12. *Click on* **Cell B8**, *type* ***=B6+B7*** *and press* **[Enter]**.



	A	B	C	D
1	Nitey-Nite Mattresses			
2				
3	Three Year Sales Summary			
4				
5	Sales	2016	2015	2014
6	Mattresses	33,415,892	31,585,275	29,574,225
7	Pillows	14,682,832	13,892,897	11,546,835
8	Total Sales	=B6+B7		
9				

	A	B	C	D	E
1	Nitey-Nite Mattresses				
2					
3	Three Year Sales Summary				
4					
5	Sales	2016	2015	2014	
6	Mattresses	33,415,892	31,585,275	29,574,225	
7	Pillows	14,682,832	13,892,897	11,546,835	
8	Total Sales	48,098,724			
9					

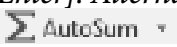
Figure 1.31

> ***Trick**: To input this formula, you can also type "=" then click on* **Cell B6**, *type the "+" sign, and click on* **Cell B7**. *Alternatively, type "=" then scroll to* **Cell B6** *with the arrow keys on your keyboard, type the "+" sign, then scroll to* **Cell B7**.

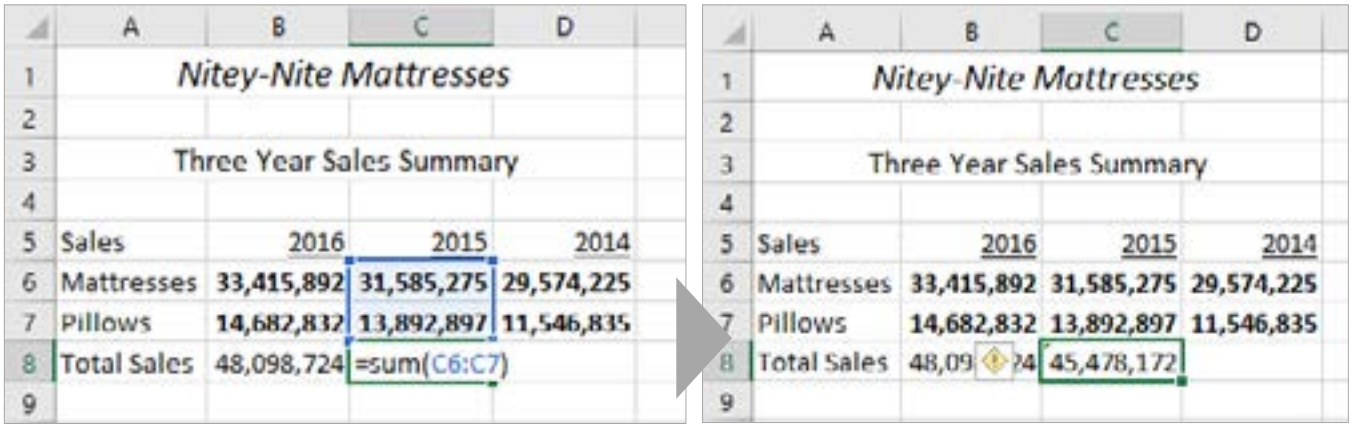
The SUM() Function

This is one of the easiest calculations in Excel - adding two cells together. But what if you want to sum up a bunch of numbers? Answer: use the ***SUM()*** function. Even though we don't have a lot of numbers to sum, I'll show you how it works. I will cover other helpful functions in later chapters.

13. *Click on* **Cell C8** *and type the following partial formula:* **=SUM(** *then click on* **Cell C6** *and drag the cursor down to* **Cell C7**, *release the mouse, type the closing parenthesis) and press* **[Enter]**.

> ***Trick**: You can also type* ***=SUM(*** *then scroll to* **Cell C6** *with the arrow key on your keyboard, press and hold the* **[Shift]** *key, then the down arrow key to select* **Cell C7**, *type the closing parenthesis, and press [Enter]. Alternatively, you can click on* **Cell C8** *and click the* **AutoSum** *icon*  *in the* **Editing** *group of the* **Home** *tab. BUT BE CAREFUL! If you do that, the icon automatically inputs the formula adding up all contiguous cells above it, including the Year heading (***2015***). Because of that, I prefer not to use that icon much.*

The formula in Cell C8 should read "=SUM(C6:C7)". Whenever you type a formula into a cell, the result appears in the cell. The formula itself appears in the Formula Bar, as shown as follows:



	A	B	C	D
1	Nitey-Nite Mattresses			
2				
3	Three Year Sales Summary			
4				
5	Sales	2016	2015	2014
6	Mattresses	33,415,892	31,585,275	29,574,225
7	Pillows	14,682,832	13,892,897	11,546,835
8	Total Sales	48,098,724	=sum(C6:C7)	
9				

	A	B	C	D
1	Nitey-Nite Mattresses			
2				
3	Three Year Sales Summary			
4				
5	Sales	2016	2015	2014
6	Mattresses	33,415,892	31,585,275	29,574,225
7	Pillows	14,682,832	13,892,897	11,546,835
8	Total Sales	48,09 24	45,478,172	
9				

Figure 1.32

To the left of Cell C8, you should see a caution icon. This icon will appear when formulas that are next to each other are not consistent. The formula in Cell B8 reads "=B6+B7", which is not consistent with the formula in Cell C8, even though they are basically the same. For now, click on the caution icon and choose Ignore error. We will explore those messages in more detail in later chapters.

> ***Tip**: The* **Caution** *icon is setup to appear based on criteria in* **Excel Options** *in the* **Formula** *group. In this case, the checkbox* **Formulas which omit cells in a region** *is checked, and applies here.*

14. *Click on the* **caution** *icon next to* **Cell C8** *and choose* **Ignore error**.

Copy and Paste

It appears that you will be using the same basic formula for the summation of sales in Column D, and Excel has provided the functionality where you can copy a formula and paste it in other cells.

1. *With your cursor on* **Cell C8**, *press the* **Copy** *icon* Copy *in the* **Clipboard** *group of the* **Home** *tab.*

You will see a moving dotted line around Cell C8. This is the indication that the cell is copied and is in memory.

2. *Click on* **Cell D8** *and click the* **Paste** *icon in the* **Clipboard** *group of the* **Home** *tab.*
3. *Press the* **[Esc]** *key to take the* **Copy** *command out of copy mode.*
4. **Ignore** *the error on* **Cell D8**.

> ***Trick**: You can also type* **[Ctrl]+*c*** *to copy and* **[Ctrl]+*v*** *to paste. I like to use the keyboard commands much more than using the icons.*

When you use the Copy command (either from the icons or the keyboard), Excel assumes that the cell references will change in the direction of the Copy and Paste commands. For example, when you copied

the formula "=SUM(C6:C7)" over one column to Cell D8, Excel assumed you will use the cells above Cell D8 and accordingly changed the formula to "=SUM(D6:D7)". Wasn't that nice of Mr. Gates?

> ***Trick**: To copy a formula over, down, or up without the cells changing, copy the formula in the* **Formula Bar**, *press* **[Esc]** *(to exit out of Edit mode), click on the cell you want to copy the formula to, and press* **[Ctrl]**+***v*** *to paste it.*

Now all we have to do is to clean it up a little more and we will have a working report.

5. *Select* **Cells B7 through D7** *and click the* **Underline** *icon in the* **Font** *group of the* **Home** *tab.*
6. *Select* **Cells A5 through D5**, *then press and hold the* **[Ctrl]** *key, select* **Cells A8 through D8**, *release the* **[Ctrl]** *key and click the* **Bold** *icon.* 
7. *Select* **Cells B6 – D7** *and click the* **Bold** *icon.*

Since the selection B6 – D7 was already bolded, by clicking the bold icon again removes the bold. By pressing and holding the [Ctrl] key, you can select a non-contiguous range of cells.

> ***Trick**: A keyboard shortcut to* **Bold**, **Italicize**, *or* **Underline** *is to select the cells you want to format, press and hold the* **[Ctrl]** *key, then press the "**b**" key (for Bold), the "**i**" key (for Italics), and the "**u**" key (for Underline).*

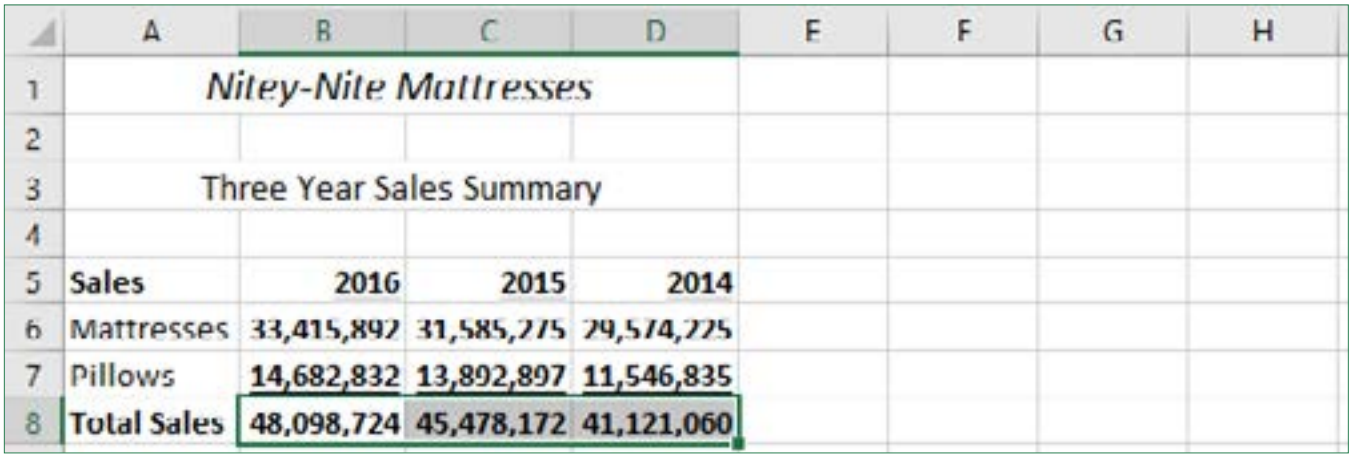
When we bolded some of the cells, it may have increased the size of the text a bit, so it may be a good idea to resize all the columns to give the numbers a little more breathing room. Excel 2016 usually does a good job of resizing columns as data is entered, but sometimes it's a good idea to resize everything just for grins. Here's a trick on how to resize all of the columns in the spreadsheet at once.

8. *Click in the blank gray box that is above* **Row 1** *in the spreadsheet to the left of* **Column A**.

This highlights or selects the contents of the entire spreadsheet.

9. *Place your cursor over any column line above* **Row 1** *where the cursor turns to a vertical line with right and left arrows, and double-click on the column line.*
10. *Click on any cell in the spreadsheet to deselect the entire spreadsheet selection.*

When you double-click the column line, you should see the columns automatically adjust their widths. Note that this method of adjusting widths ignores the text that is merged and centered on Rows 1 and 3.



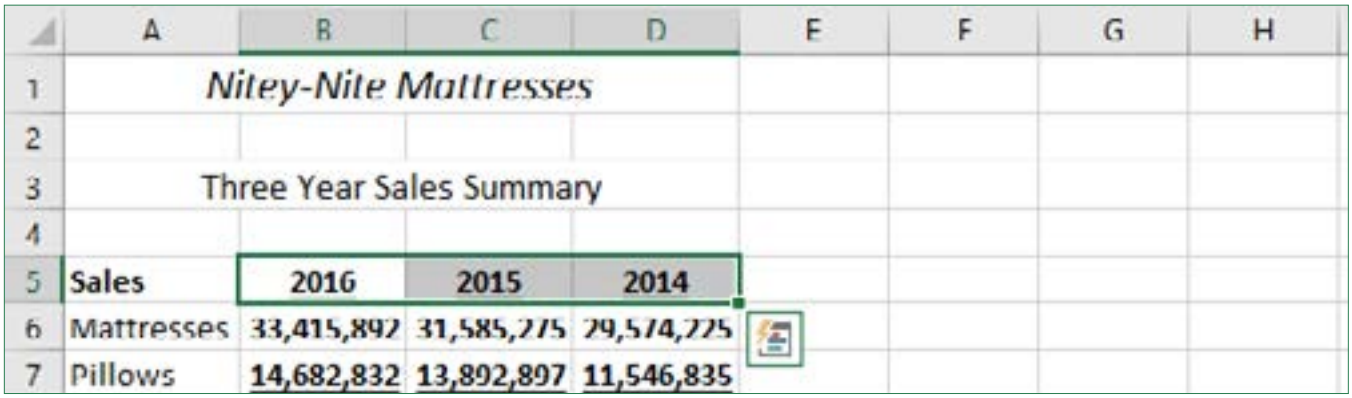
	A	B	C	D	E	F	G	H
1		Nitey-Nite Mattresses						
2								
3		Three Year Sales Summary						
4								
5	Sales	2016	2015	2014				
6	Mattresses	33,415,892	31,585,275	29,574,225				
7	Pillows	14,682,832	13,892,897	11,546,835				
8	Total Sales	48,098,724	45,478,172	41,121,060				

Figure 1.33

Aligning Text

Notice that, by default, all of the numbers are right-justified and all of the text is left-justified. With Excel, you can change the alignment of any cell to be right, centered, or left justified by using the ***Align Text Left***, ***Center***, and ***Align Text Right*** icons. You can also align cells vertically, using the ***Top Align***, ***Middle Align***, and ***Bottom Align*** icons. All of these icons are located in the Alignment group of the Home tab. Let's center the Years.

11. *Select* **Cells B5 through D5**.
12. *Click the* **Center icon**.



	A	B	C	D	E	F	G	H
1		Nitey-Nite Mattresses						
2								
3		Three Year Sales Summary						
4								
5	Sales	2016	2015	2014				
6	Mattresses	33,415,892	31,585,275	29,574,225				
7	Pillows	14,682,832	13,892,897	11,546,835				

Figure 1.34

13. *Click the* **Save** *icon* *in the* **Quick Access Toolbar** *just above the* **File** *tab.*

By clicking the Save icon on a workbook that is not yet named will display the Save As screen.

14. *In the* **Save As** *screen, navigate to the* **Chapter1 folder** *under the* **C:\ExcelCEO\Excel 2016 folder** *on your computer (it may be under* **Current Folder** *or* **Recent** *depending what you have been working on).*

15. *In the* **Save As** *dialog box* **File name** *box, type* ***myIncomeStmt***.
16. *Make sure the* **Save As type** *box is set to* **Excel workbook**. **(*xlsx)**
17. *Click the* **Save** *button.*
18. *Close the* **myIncomeStmt.xlsx** *and* **Excel** *by clicking on the* **Close Window** *icon (in*  *the upper-right corner of the spreadsheet).*

> ***Review Questions****: It is now time to complete the hands-on Review Questions. Log on to www.ExcelCEO.com with your Email address and Password, click on the* **Excel 2016 Review Questions, Chapter 1, Section 2 of 3** *option in your Main Menu, and complete the Review Questions.*

Let's start another project. In this project, you will add to your Excel skills in formatting a spreadsheet by creating a multiple page report.

At Nitey-Nite Mattresses, there are ten store managers that are considered to be the best in the company. Upper-management wants you to develop a report that shows the daily sales of each of these people. It is known as the Top Ten Report. They want the report to show the daily sales for each person each month for the last three months. You have an unformatted text file that gives you all of the data you need to create the report. All you have to do is take that text file and format it to create the Top Ten Report. The text file is located on Sheet1 of the May_Sales.xlsx file.

1. *Open* **Excel** *to a* **Blank workbook**, *then click on the* **File** *tab, and then click on* **Open**  *from the menu. (You can also use the Open Other Workbooks icon on the bottom-left of the templates page when you first open Excel. These options take you to the same place overall.)*
2. *Navigate to the* **May_Sales.xlsx** *file from the* **C:\ExcelCEO\Excel 2016\Chapter1** *folder, and* **Open** *it. (Click* **Enable Editing** *(if the* **Protected View** *security message appears).*
3. *Click on the* **File** *tab again, click on the* **Save As** 

option.

This opens the Save As screen.

4. *Navigate to the* **C:\ExcelCEO\Excel 2016\Chapter1** *folder (should be under* **Current Folder**).
5. *Click on the drop-down menu in the* **Save As type** *box and review the types of files you can save the file as (Excel Workbook (*.xlsx), Excel 97-2003 Workbook (*.xls), etc.)*
6. *Make sure the* **Save As** *type* **Excel Workbook (*.xlsx)** *is selected.*
7. *Change the name of the file to* ***myMay_Sales.xlsx*** *and click the* **Save** *button.*

> ***Note****: Whenever you use an* **ExcelCEO practice file** *in this course, you will open the file, then save it typing the word "****my****" at the beginning of the file name. Make sure you complete each project in each chapter, as chapter exams will refer to these projects, and further your understanding of the functions learned by having you change specific details, and answer based on the changes. These are additional opportunities for mastery of Excel, so make sure your work is correct.*

	A	B	C	D	E	F	G	H	I	J
1	Jim Wilcox	Henry Sosa	Jerry Banks	Vivian Orte	Terry Smith	Richard Le	Susan Pike	Lee Underw	Thomas Ma	Evan Thurston
2	March									
3	0	0	3219.313	0	0	0	2959.295	3525.355	4542.103	3650.388
4	3372.845	2707.26	2711.093	3247.457	2362.036	3192.77	2881.533	2927.833	2374.64	2588.867
5	3527.327	0	0	3203.783	0	0	3911.962	2360.625	4197.49	3079.049
6	0	2079.363	3010.594	0	3992.861	2649.212	3943.868	3711.617	3986.797	0
7	2140.938	3762.33	3079.858	2962.761	3952.102	3282.037	2693.451	3110.408	3881.222	0
8	3688.903	0	0	2698.619	3569.702	2768.765	4009.124	0	0	3986.033
9	0	2334.847	0	2786.929	0	0	2572.222	2162.41	2817.655	2592.714
10	3036.317	4095.819	2889.348	0	2749.149	3953.033	0	0	0	3520.357
11	3149.362	4013.781	2578.677	0	0	0	0	2177.553	3669.11	0
12	0	3810.029	2580.386	0	3873.98	3714.296	0	4308.368	0	2239.392
13	0	2177.243	0	3067.289	3055.395	0	2273.651	3195.346	2609.677	0
14	3186.126	3248.688	0	2322.214	2185.821	2969.763	3651.377	2858.213	2353.256	2099.737
15	5212.777	2412.706	3048.637	3844.38	3338.86	3891.647	4267.745	0	0	3099.713
16	0	3461.071	3472.454	3694.677	2781.251	2445.29	2566.667	4010.472	3613.556	4143.548
17	3912.424	2757.095	3397.746	2607.096	0	0	3728.113	4224.228	3079.579	3141.53
18	2201.318	3760.233	3673.59	3685.937	3357.87	3162.727	0	2496.227	3226.136	4141.68
19	0	2649.451	3838.681	2367.843	3289.631	2878.934	2891.982	2895.393	2712.469	0

Figure 1.35

As you can see, the data is unformatted and needs a lot of work. Each row of data contains the sales for each day of the month, but it has no dates. As you scroll down in the file, you will see that the March data is followed by April data, which is followed by May data.

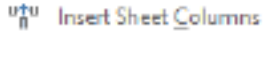
The first thing we need to do is to format the sale amounts and resize the columns, so we can more easily read the data.

8. *Select the entire sheet.* 
9. *Resize all columns.*
10. *Format all cells in* **Columns A through J** *to be* **Currency, two decimal places** *with the dollar* **($)** *sign (Do this from the* **Format Cells** *dialog box)*
11. *Place your cursor to the left of* **Row 1** *and left of* **Column A** *and the cursor will turn into a right arrow. Click on* **Row 1** *and the entire row will be selected.*
12. *Underline all cells in* **Row 1**.

Insert a Column

Next we will add a date field to be the first field in the spreadsheet. To do so, we need to Insert a column to the left of the data in which we can store the dates.

1. *Click on any cell in* **Column A**.
2. *In the* **Cells** *group of the* **Home** *tab, click on the drop-down arrow below the* **Insert** *icon.* 

3. *Choose the* **Insert Sheet Columns** *option.* 

***Trick**: Alternatively, to Insert a column, you can right-click on any cell in* **Column A** *and choose* **Insert…**, *choose* **Entire Column** *from the* **Insert** *dialog box, and click* **OK**. *If you prefer to use the keyboard method, you can click the* **[Alt]** *key, then type the letters "**i**" and "**c**".*

4. *In* **Cell A1**, *type* ***Date***
5. *In* **Cell A3**, *type* ***3/1/2016***

	A	B	C	D	E	F	G
1	Date	Jim Wilcox	Henry Sosa	Jerry Banks	Vivian Ortega	Terry Smith	Richard Lewis
2		March					
3	42,430	$0.00	$0.00	$3,219.31	$0.00	$0.00	$0.00
4		$3,372.84	$2,707.26	$2,711.09	$3,247.46	$2,362.04	$3,192.77
5		$3,527.33	$0.00	$0.00	$3,203.78	$0.00	$0.00
6		$0.00	$2,079.36	$3,010.59	$0.00	$3,992.86	$2,649.21
7		$2,140.94	$3,762.33	$3,079.86	$2,962.76	$3,952.10	$3,282.04
8		$3,688.90	$0.00	$0.00	$2,698.62	$3,569.70	$2,768.76
9		$0.00	$2,334.85	$0.00	$2,786.93	$0.00	$0.00
10		$3,036.32	$4,095.82	$2,889.35	$0.00	$2,749.15	$3,953.03
11		$3,149.36	$4,013.78	$2,578.68	$0.00	$0.00	$0.00
12		$0.00	$3,810.03	$2,580.39	$0.00	$3,873.98	$3,714.30
13		$0.00	$2,177.24	$0.00	$3,067.29	$3,055.40	$0.00
14		$3,186.13	$3,748.69	$0.00	$2,322.21	$2,185.82	$2,969.76
15		$5,212.78	$2,412.71	$3,048.64	$3,844.38	$3,338.86	$3,891.65

Figure 1.36

Dates

Hhhmmmm? The cell now reads 42,430. What's that all about? Let's talk a little about ***dates***. In Excel, a date is simply a formatted number. The number 1 represents January 1, 1900. The number 2 represents January 2, 1900 and so forth, one day for each whole number. March 1, 2016 is 42,430. In other words, there are 42,430 days from January 1, 1900 to March 1, 2016. When you input a date in the Month/Day/Year format, Excel will usually assume it is a date unless the cell had previously been formatted as another type of number. This makes performing calculations on dates very easy.

To further illustrate, let's suppose you have a birth date in one cell, say February 7, 1961, and another date, use June 13, 2017, in another cell. If you subtract February 7, 1961 from June 13, 2017 and format the result as a number, you get 20,580, or the number of days from February 7, 1961 to June 13, 2017. To get the age, simply divide 20,580 by 365.25 (the 0.25 is to account for the leap year day every four years) which results in 56.34 years. The time of the day is stored in numbers less than 1. For example, 42,899.46 formatted as date and time is June 13, 2017 at 11:02 AM. We'll do those and more complex date calculations in future exercises and projects, but for now, let's just input the dates we need.

6. *Format* **Cell A3** *as* **Date**, *in a* **m/d/yyyy** *format (choose *3/14/2012 in the* **Date** *category,* **Number** *tab in the* **Format Cells** *dialog box)*

	A	B	C	D	E	F	G	H	I
1	Date	Jim Wilcox	Henry Sosa	Jerry Banks	Vivian Ortega	Terry Smith	Richard Lewis	Susan Pike	Lee Unden
2		March							
3	3/1/2016	$0.00	$0.00	$3,219.31	$0.00	$0.00	$0.00	$2,959.30	$3,52
4		$3,372.84	$2,707.26	$2,711.09	$3,247.46	$2,362.04	$3,192.77	$2,881.53	$2,92
5		$3,527.33	$0.00	$0.00	$3,203.78	$0.00	$0.00	$3,911.96	$2,36
6		$0.00	$2,079.36	$3,010.59	$0.00	$3,992.86	$2,649.21	$3,943.87	$3,71
7		$2,140.94	$3,762.33	$3,079.86	$2,962.76	$3,952.10	$3,282.04	$2,693.45	$3,11
8		$3,688.90	$0.00	$0.00	$2,698.62	$3,569.70	$2,768.76	$4,009.12	$
9		$0.00	$2,334.85	$0.00	$2,786.93	$0.00	$0.00	$2,572.22	$2,16
10		$3,036.32	$4,095.82	$2,889.35	$0.00	$2,749.15	$3,953.03	$0.00	$
11		$3,149.36	$4,013.78	$2,578.68	$0.00	$0.00	$0.00	$0.00	$2,17
12		$0.00	$3,810.03	$2,580.39	$0.00	$3,873.98	$3,714.30	$0.00	$4,30
13		$0.00	$2,177.24	$0.00	$3,067.29	$3,055.40	$0.00	$2,273.65	$3,19
14		$3,186.13	$3,248.69	$0.00	$2,322.21	$2,185.82	$2,969.76	$3,651.38	$2,85
15		$5,212.78	$2,412.71	$3,048.64	$3,844.38	$3,338.86	$3,891.65	$4,267.75	$
16		$0.00	$3,461.07	$3,472.45	$3,694.68	$2,781.25	$2,445.29	$2,566.67	$4,01
17		$3,912.42	$2,757.10	$3,397.75	$2,607.10	$0.00	$0.00	$3,728.11	$4,22

Figure 1.37

Data Fill

Cell A3 should now read "3/1/2016". If you were to type in the date for every line item, it would take quite awhile, as you have three months of data. Excel provides a way to make this much easier. This functionality is called ***Data Fill***. Using Data Fill, you can fill in the data below (up or to the side) beginning with the cell that is currently selected. When you use Data Fill with dates, Excel assumes you want to increase each date by one day. Let's try it.

7. *With* **Cell A3** *selected, place your cursor over the small black box at the bottom-right corner of the cell. (Depending on your computer settings, cell outline and* **Data Fill** *may be red.)*

Your cursor will turn to bold plus sign "+". This activates the Data Fill button.

8. *Click and drag the* **Data Fill** *button down to* **Cell A33**, *and release.*

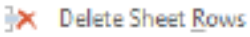
As you drag the cell down, you will notice a screen tip appears on every cell the cursor is dragged to, increasing the date by one day. You can also double-click the Data Fill button and Excel will automatically fill in the dates for every cell beneath. Double-clicking on Data Fill works only when you want to fill in data BELOW the cell you are currently on. When you do this, all cells below must be contiguous (i.e.- no blank cells) and the data in the rows must reflect data that is one day apart.

Deleting

Our data is not quite in the right format, as three rows of data (currently Rows 2, 34 and 65) contain the name of the month but no daily sales data. Let's ***delete*** those rows so we can use Data Fill properly. I will show you three ways of deleting rows in the steps below.

1. *Click on* **Cell A2** *(or any cell in* **Row 2***).*

2. *In the* **Cells** *group of the* **Home** *tab, click on the drop-down arrow below the* **Delete** 

icon, and choose **Delete Sheet Rows**. 

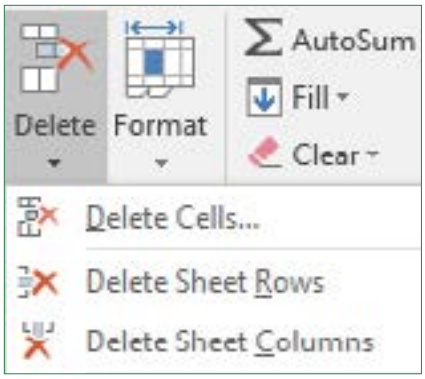


Figure 1.38

Row 2 is deleted and all of the rows beneath Row 2 move up. BE CAREFUL! If you click the Delete icon itself (not the drop-down arrow), Excel will delete the cell and move the other cells in that column up one row. That can really make a mess of your spreadsheet, if you're not careful.

3. *Click on* **Cell A33**.
4. *On your keyboard, type* **[Alt], *e*, *d*, *r*, [Enter]**

This is the keyboard method of deleting rows. Watch the commands on the screen execute as you type the various keys. Now we'll do the right-click method of deleting a row.

5. *Right-click anywhere on* **Row 63**.

A series of choices pops up in a short menu.

6. *Choose* **Delete…**
7. *Click on the* **Entire row** *radio button, and click* **OK**.

Remember, right-click is your friend. If you want to do something and can't remember where it is, try a right-click and see if the correct choice pops up.

If you want to delete only the contents of the cells but not the rows themselves, you can select the range and press the [Delete] key on your keyboard or use the Cut icon . Using the [Delete] key or the Cut icon will delete only the contents of the cells, but it will not delete the formatting. One difference between the two is that the Cut icon will keep the deleted selection in memory, while using the Delete key will not.

Now that your data is all contiguous (i.e.- no blank rows), you can add dates for every row of data in one easy step.

8. *Click on* **Cell A32** *(the last date we populated with a date).*
9. *Double-click the* **Data Fill** *box.*

The dates are filled in through Row 93, which is exactly what we wanted to do.

	A	B	C	D	E	F	G	H
28	3/27/2016	$3,074.87	$2,994.15	$2,293.28	$3,552.57	$0.00	$2,683.87	$3,497.16
29	3/28/2016	$3,779.59	$3,427.56	$0.00	$3,121.38	$0.00	$3,308.99	$3,324.94
30	3/29/2016	$2,081.29	$3,330.59	$2,335.10	$0.00	$4,027.76	$2,287.44	$2,301.49
31	3/30/2016	$3,364.14	$3,635.87	$3,012.14	$0.00	$0.00	$3,536.52	$3,206.14
32	3/31/2016	$3,045.12	$2,313.08	$0.00	$2,981.85	$3,274.43	$2,211.54	$3,162.56
33	4/1/2016	$0.00	$0.00	$0.00	$3,918.35	$0.00	$2,646.54	$0.00
34	4/2/2016	$0.00	$0.00	$3,673.28	$2,246.15	$0.00	$3,230.08	$3,075.01
35	4/3/2016	$3,625.93	$0.00	$2,779.97	$3,849.59	$2,636.86	$3,710.95	$0.00
36	4/4/2016	$3,042.41	$3,508.83	$0.00	$3,232.91	$4,581.17	$3,485.96	$2,465.77
37	4/5/2016	$3,357.76	$3,830.97	$2,346.40	$2,203.83	$3,683.54	$4,039.04	$0.00
38	4/6/2016	$2,093.86	$0.00	$0.00	$3,377.00	$0.00	$0.00	$2,495.89
39	4/7/2016	$3,876.79	$2,429.78	$3,046.43	$2,202.81	$2,604.53	$3,970.27	$0.00

Figure 1.39

Freeze Panes and Split Windows

Notice that the names in Row 1 are the same for the three months of data. As you scroll down the page to see April and May data, the names of the managers disappear. When you scroll down, you would like to fix or ***freeze*** the first row of names. Let's do that.

1. *On your keyboard, press* **[Ctrl]+[Home]** *(this takes you to* **Cell A1***).*
2. *Click on the* **View** *tab.*
3. *In the* **Window** *group, click on the* **Freeze Panes** *icon.*

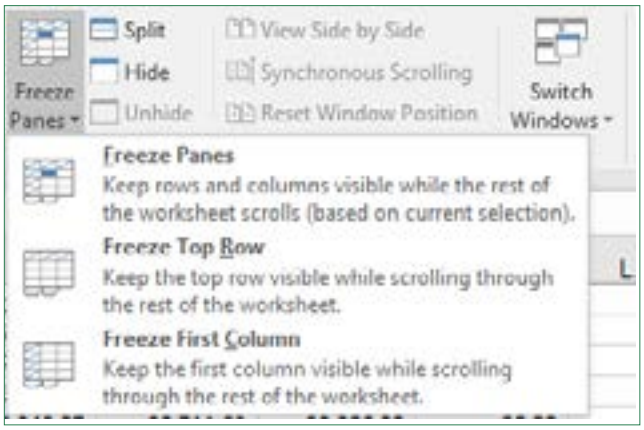


Figure 1.40

4. *Click on the* **Freeze Top Row** *item.*

The first row of names will now remain in place while you scroll down through the rest of the records. If you want to freeze column(s) on the left, simply position your cursor in the cell to the immediate right of the last column you want to freeze and choose Freeze Panes. Let's do that.

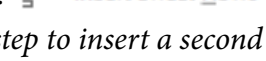
5. *Click on the* **Freeze Panes** *icon, and choose* **Unfreeze Panes**.
6. *Click on* **Cell B2**.
7. *Click on the* **Freeze Panes** *icon, and choose the* **Freeze Panes** *item.*

Now you can scroll up and down, to the right and to the left and the titles AND dates are frozen. You can also use the ***Split*** functionality under the Window group of the View tab. The split window differs from the freeze panes option in that a split window allows you to scroll independently in each window.

Insert a Row

In looking at this data, I think we need totals by person. That way, upper management can see monthly totals for each of the top ten people. Currently, there are no blank rows between the monthly data, so we need to ***Insert*** a couple of blank rows after every month end. This is similar to inserting columns like you previously learned.

8. *Click on* **Cell A33**, *and click on the* **Home** *tab.*
9. *Click on the drop-down arrow under the* **Insert** *icon* 

on the **Cells** *group, and choose* **Insert Sheet Rows**. 

10. *Repeat the previous step to insert a second row.*
11. *In* **Cell A33**, *type* ***Total***

25	3/24/2016	$0.00	$2,612.14	$2,597.27	$3,769.39	$2,572.08	$4,105.69	$3,221.47	$3,9
26	3/25/2016	$3,627.55	$2,800.55	$0.00	$2,556.02	$3,306.83	$2,235.03	$2,769.97	
27	3/26/2016	$3,523.81	$2,599.26	$3,120.05	$2,633.10	$4,650.58	$0.00	$0.00	$2,5
28	3/27/2016	$3,074.87	$2,994.15	$2,293.28	$3,552.57	$0.00	$2,683.87	$3,497.16	$3,4
29	3/28/2016	$3,779.59	$3,427.56	$0.00	$3,121.38	$0.00	$3,308.99	$3,324.94	$2,0
30	3/29/2016	$2,081.29	$3,330.59	$2,335.10	$0.00	$4,027.76	$2,287.44	$2,301.49	
31	3/30/2016	$3,364.14	$3,635.87	$3,012.14	$0.00	$0.00	$3,536.52	$3,206.14	$3,7
32	3/31/2016	$3,045.12	$2,313.08	$0.00	$2,981.85	$3,274.43	$2,211.54	$3,162.56	
33	Total								
34									
35	4/1/2016	$0.00	$0.00	$0.00	$3,918.35	$0.00	$2,646.54	$0.00	
36	4/2/2016	$0.00	$0.00	$3,673.28	$2,246.15	$0.00	$3,230.08	$3,075.01	
37	4/3/2016	$3,625.93	$0.00	$2,779.97	$3,849.59	$2,636.86	$3,710.95	$0.00	

Figure 1.41

> ***Note**: To set the height of a row, click on the bottom line of the row, and drag it down or up. You can also set the row height by clicking on the* **Format** *icon in the* **Cells** *group, choose* **Row Height…** *and type in the height you want the row to be.*

12. *Insert two rows at the break between* **April** *and* **May**.

13. *Type the word* ***Total*** *at the end of the* **April** *and* **May** *data.*

Now you are ready to sum the sales numbers for each manager in each month.

14. *In* **Cell B33**, *type a formula that sums the contents of all cells above it. (Remember how to do this? If not, go back to the* **SUM()** *function you used previously.)*
15. *Copy that formula to* **Cells C33 through K33**.
16. *Bold* **Cells A33 through K33**
17. *Underline* **Cells B32 through K32**.

17	3/16/2016	$2,201.32	$3,760.23	$3,673.59	$3,685.94	$3,357.87	$3,162.73	$0.00
18	3/17/2016	$0.00	$2,649.45	$3,838.68	$2,367.84	$3,289.63	$2,878.93	$2,891.98
19	3/18/2016	$4,159.62	$3,008.09	$0.00	$4,228.16	$3,748.12	$2,268.73	$4,014.45
20	3/19/2016	$3,678.29	$2,287.89	$0.00	$0.00	$2,284.55	$3,663.43	$2,907.88
21	3/20/2016	$3,751.84	$2,967.26	$4,067.57	$0.00	$3,196.04	$0.00	$3,328.41
22	3/21/2016	$0.00	$3,372.78	$2,680.76	$2,918.49	$2,320.97	$3,433.62	$3,575.66
23	3/22/2016	$3,613.91	$3,927.19	$0.00	$0.00	$3,124.94	$3,012.44	$2,215.76
24	3/23/2016	$2,400.37	$3,609.19	$2,810.46	$3,252.03	$0.00	$3,143.65	$0.00
25	3/24/2016	$0.00	$2,612.14	$2,597.27	$3,769.39	$2,572.08	$4,105.69	$3,221.47
26	3/25/2016	$3,627.55	$2,800.55	$0.00	$2,556.02	$3,306.83	$2,235.03	$2,769.97
27	3/26/2016	$3,523.81	$2,599.26	$3,120.05	$2,633.10	$4,650.58	$0.00	$0.00
28	3/27/2016	$3,074.87	$2,994.15	$2,293.28	$3,552.57	$0.00	$2,683.87	$3,497.16
29	3/28/2016	$3,779.59	$3,427.56	$0.00	$3,121.38	$0.00	$3,308.99	$3,324.94
30	3/29/2016	$2,081.29	$3,330.59	$2,335.10	$0.00	$4,027.76	$2,287.44	$2,301.49
31	3/30/2016	$3,364.14	$3,635.87	$3,012.14	$0.00	$0.00	$3,536.52	$3,206.14
32	3/31/2016	$3,045.12	$2,313.08	$0.00	$2,981.85	$3,274.43	$2,211.54	$3,162.56
33	Total	$73,528.75	$86,155.52	$60,417.00	$65,501.98	$71,014.95	$70,799.42	$79,876.89
34								
35	4/1/2016	$0.00	$0.00	$0.00	$3,918.35	$0.00	$2,646.54	$0.00
36	4/2/2016	$0.00	$0.00	$3,673.28	$2,246.15	$0.00	$3,230.08	$3,075.01
37	4/3/2016	$3,625.93	$0.00	$2,779.97	$3,849.59	$2,636.86	$3,710.95	$0.00

Figure 1.42

18. *Do the same for* **April** *and* **May** *totals.*

Comments

In scrolling through the report, you notice that Lee Underwood had kind of a low month in April where he sold only $41,522.92. When you called him to see what happened, he explained that he had some sickness in his family and was unable to come to work for a number of days during the month. You decide you would like to communicate this information to upper management, and you want to put it somewhere in the file, but where? Excel provides a nifty little tool called ***Comments***. In any cell, you can type any comment you want. Let's try it here.

1. *Right-click on* **Cell I65**, *and choose* **Insert Comment**. Insert Comment

Your computer name should show up as the first part of the comment.

D	E	F	G	H	I	J	K
Jerry Banks	Vivian Ortega	Terry Smith	Richard Lewis	Susan Pike	Lee Underwood	Thomas Maker	Evan Thurston
$3,237.61	$2,350.53	$0.00	$2,611.03	$3,755.60	$0.00	$0.00	$3,151.23
$2,055.92	$3,376.95	$3,458.63	$3,556.43	$3,421.25	$0.00	$0.00	$3,089.79
$2,836.73	$3,518.32	$0.00	$0.00	$2,643.23	$2,696.09	$3,897.80	$2,462.20
$3,170.56	$0.00	$3,104.79	$0.00	$0.00	$0.00	$3,349.29	$0.00
$2,997.67	$0.00	$0.00	$4,015.88	$2,905.61	$0.00	$2,572.18	$2,725.44
$0.00	$3,181.19	$0.00	$2,310.11	$0.00	$3,485.43	$2,794.88	$2,222.83
$3,636.87	$3,514.57	$2,634.16	$0.00	$0.00	$0.00	$3,491.55	$2,284.33
$2,578.82	$3,854.03	$2,348.76	$0.00	$0.00	$2,297.11	$2,351.83	$3,409.41
$2,520.99	$0.00	$2,628.40	$3,062.37	$0.00	$3,615.87	$0.00	$3,325.97
$3,852.54	$2,339.73	$0.00	$0.00	$2,984.75	$0.00	$2,553.96	$3,277.78
$2,972.60	$0.00	$3,721.99	$0.00	$3,913.24	$0.00	$2,448.52	$2,149.98
$4,136.96	$0.00	$0.00	$2,965.30	$3,295.86	$3,302.81	$2,511.24	$3,823.15
$2,855.69	$0.00	$3,272.62	$0.00	$3,720.51	$0.00		
$65,183.32	$59,749.58	$60,123.59	$60,651.40	$59,212.55	$41,522.92		
$0.00	$3,064.38	$3,856.55	$0.00	$2,620.77	$0.00		
$3,856.34	$4,179.35	$2,265.43	$3,420.12	$2,271.94	$0.00		
$0.00	$2,071.98	$2,298.56	$0.00	$0.00	$2,894.49	$4,232.15	$0.00

Jim Cline:

Figure 1.43

2. *In the* **Comment** *box, type* ***Lee had some family sickness this month.***
3. *Press the* **[Esc]** *key twice to exit* **Insert Comment** *mode.*

$0.00	$3,181.19	$0.00	$2,310.11	$0.00	$3,485.43	$2,794.88	$2,222.83
$3,636.87	$3,514.57	$2,634.16	$0.00	$0.00	$0.00	$3,491.55	$2,284.33
$2,578.82	$3,854.03	$2,348.76	$0.00	$0.00	$2,297.11	$2,351.83	$3,409.41
$2,520.99	$0.00	$2,628.40	$3,062.37	$0.00	$3,615.87	$0.00	$3,325.97
$3,852.54	$2,339.73	$0.00	$0.00	$2,984.75	$0.00	$2,553.96	$3,277.78
$2,972.60	$0.00	$3,721.99	$0.00	$3,913.24	$0.00	$2,448.52	$2,149.98
$4,136.96	$0.00	$0.00	$2,965.30	$3,295.86	$3,302.81	$2,511.24	$3,823.15
$2,855.69	$0.00	$3,272.62	$0.00	$3,720.51	$0.00		
$65,183.32	$59,749.58	$60,123.59	$60,651.40	$59,212.55	$41,522.92		
$0.00	$3,064.38	$3,856.55	$0.00	$2,620.77	$0.00		
$3,856.34	$4,179.35	$2,265.43	$3,420.12	$2,271.94	$0.00		
$0.00	$2,071.98	$2,298.56	$0.00	$0.00	$2,894.49	$4,232.15	$0.00
$4,022.40	$2,766.21	$0.00	$0.00	$3,827.81	$3,373.27	$2,539.88	$2,240.36
$3,653.27	$2,115.82	$2,553.86	$0.00	$0.00	$0.00	$0.00	$3,152.23
$2,269.59	$3,831.13	$0.00	$2,256.66	$2,286.26	$0.00	$3,359.56	$3,943.89

Jim Cline:
Lee had some family sickness this month.

Figure 1.44

When you escape out of design mode for the comment, the comment will either remain visible or it will disappear, depending on if you have used the Comment functionality previously. If it remains visible, you can right-click on the cell and choose Hide Comment. The commented cell is tagged with a red triangle in the upper-right corner of the cell. It will remain displayed until you hide it. Let's do that now.

4. *Right-click on* **Cell I65** *and choose* **Hide Comment** *(if necessary).*

The comment will now remain hidden until the user moves the cursor over the cell. You now decide you want it to remain visible so upper management can immediately see it when they open the report.

5. *Right-click on* **Cell I65** *and choose* **Show/Hide Comments**.

Again, this makes the comment visible whenever the user is looking at the spreadsheet. Note that the displayed comment will not print when you print the report.

6. *Insert a comment in* **Cell I69** *that reads* ***Lee returned to work today.***

You can also use the Comments group of the Review tab to manage all comments in the spreadsheet. I typically find that I don't need that group much as I can use the right-click functionality to manage all the comments I have. To remove a comment, you can right-click on the commented cell and choose Delete Comment. You can remove all commented cell comments at once by using the Go To dialog box.

7. *Click on any cell that does not contain a* **Comment**.
8. *Press the* **[F5]** *(or Fn+[F5]) key on your keyboard.*

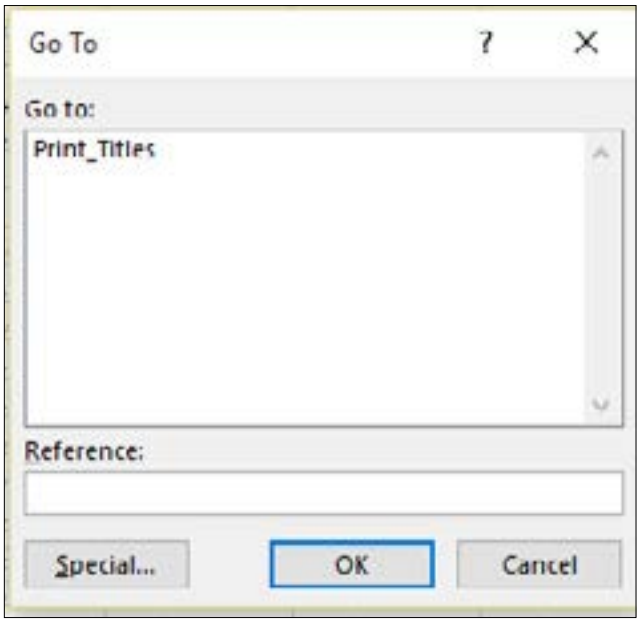


Figure 1.45

The Go To dialog box appears. The Go To functionality helps you to find text, numbers, Formulas and formatting.

9. *In the* **Go To** *dialog box, click on the* **Special…** *button.*

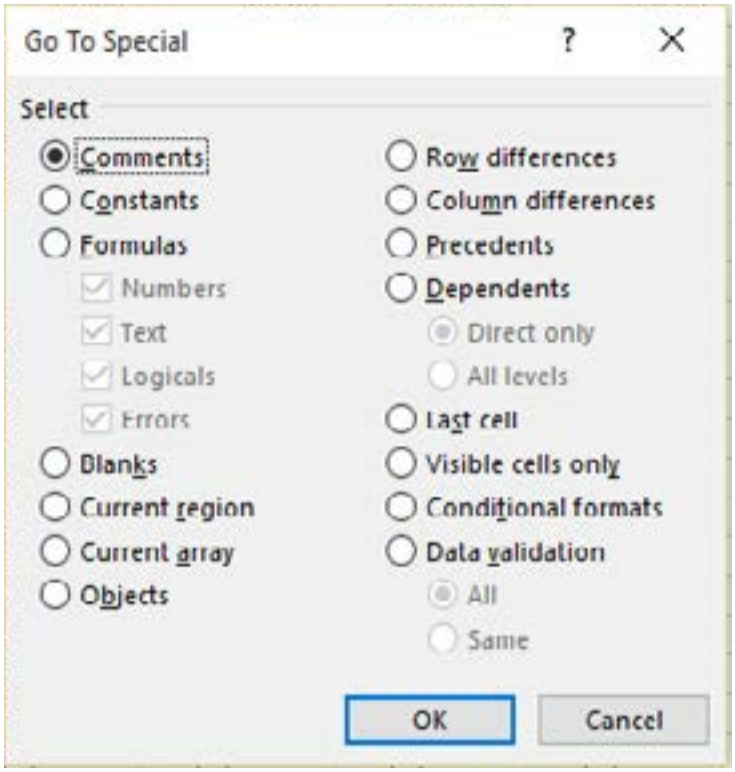


Figure 1.46

10. *In the* **Go To Special** *dialog box, make sure the* **Comments** *radio button is selected, and click* **OK**.

Excel will select the commented cells I65 and I69.

11. *To delete the Comments, right-click either* **Cell I65 or I69**, *and choose* **Delete Comment**.

Both comments are deleted. To edit a comment, right-click the cell where the comment is and choose Edit Comment.

File Properties

You will probably save this file on the hard drive of your computer, but many people save files on network drives. Sometimes, particularly if you create a lot of files, you may store them in places that you can't remember. In Excel, you can search for files based on certain criteria, like name, size, author, and keywords. This type of information is stored in the file's ***properties***. It is good practice to put in keywords into a file to make it easier for you or your colleagues to find it later. Let's use "Top Ten" as the keyword for this file.

1. *Click on the* **File** *tab and make sure the* **Info** 

icon to the left is selected.
2. *In the panel to the far-right, click on the* **Properties** *icon*

(it's not really apparent at first, so you may not see it right away).

3. *Click on* **Advanced Properties**.

The Properties dialog box for this workbook (myMay_Sales.xlsx) appears. Here you can view properties associated with the open document, and add Keywords to make the file easier to find and categorize.

4. *Click on the* **Summary** *tab.*

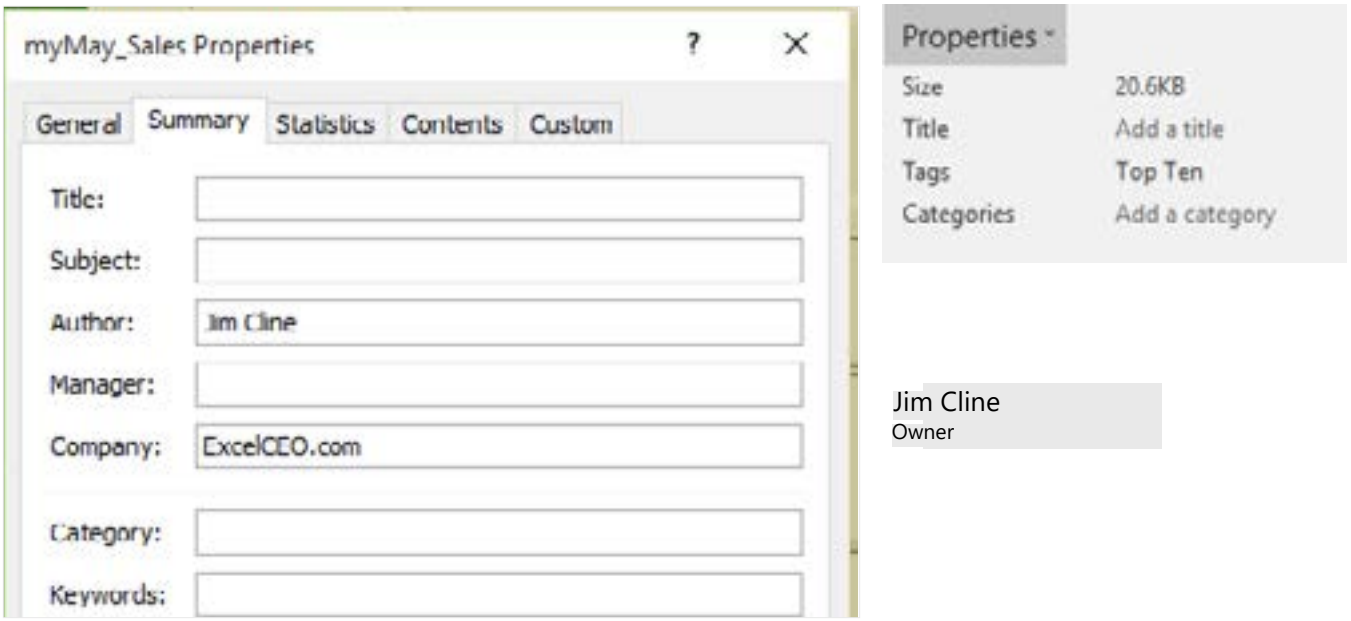


Figure 1.47

5. *In the* **Keywords:** *box, type* ***Top Ten***.
6. *Click* **OK** *to close the* **myMay_Sales Properties** *dialog box (Clicking the red X will not save the key words).*

On the Info window, Top Ten now appears as a Tag. Review the other boxes in the Properties group to familiarize yourself with the types of file properties that are available. If you were to open the Save As dialog box, below the Save as type: box, you would see the Top Ten keyword visible in the Tags: box. From there, you can add more keywords, or edit existing keywords before saving

Enhanced File Sharing

You know how sometimes you want to send the file you're working on as an attachment? Most people save the file, then open Outlook (or some other email management program), create a new email and attach the file to the email. In Excel, all of this can be done in two clicks while you still have the file open thanks to a new feature for Office 2016 called ***Share***. All you need is to have the file saved on a network drive or in cloud-based storage (OneDrive or similar - your favorite cloud storage should work).

1. *Click the* **Back** *arrow*  *icon, then on the* **File** *tab and click* **Share** 

on the upper-right of the **Excel** *window.*

Tip: **Save** *the file to your cloud-based storage to do this exercise. Or, just read Steps 2-4 to learn how Share works without actually sharing this file.*

2. *In the* **Share** *pane below the* **Invite People** *box, type your email address.*
3. *Leave the edit options drop-down box set to* **Can Edit**.
4. *Type* ***ExcelCEO Excel 2016 Ch. 1 - myMay_Sales.xlsx*** *in the* **Include a message (optional)** *box, then click the* **Share** *button.*

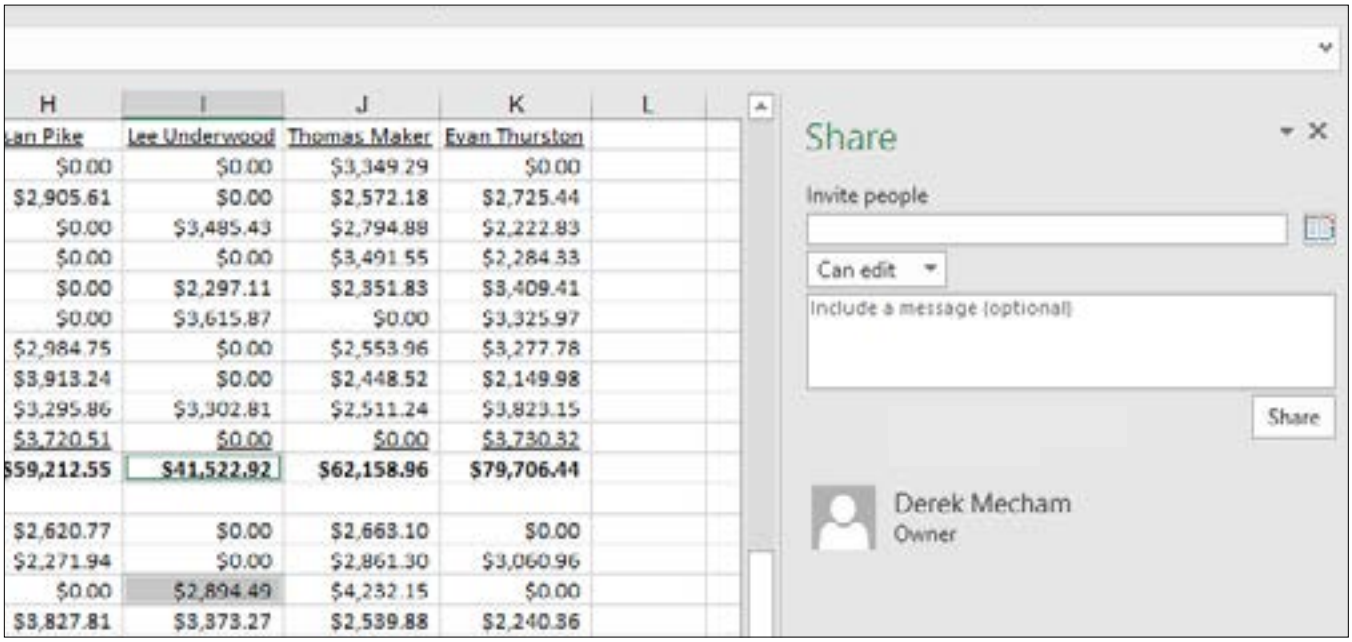


Figure 1.48

You can even access a contact list using the icon to the right of the Invite people box. Once you click Share, the file instantly sends as an email attachment (as long as you are connected to the internet) using your Microsoft account-associated email address. Since Office 2013, and expanded in Office 2016, Microsoft has worked to make Office programs, including Excel 2016, more collaborative and user-friendly. You should have seen your name as the file owner below the Include a message (optional) box, and you could have clicked the Email icon in that box. Once the file is shared, you can see the list of users attached to the file.

With your own projects, you could use the Address Book icon to the right of the Invite people box, and in the attached user list, expanded options for sharing can be had using features from Skype for Business, if the contact has that application available. There is even a link on the bottom-right of the Share pane where you could Get a sharing link to make available to team members as a web page URL, SharePoint link, etc. This is just one more option where you could add value to your team, and by the time you reach ExcelCEO Excel master status, there would be so much more you could do and share.

5. **Save** *and* **close myMay_Sales.xlsx**.

***Review Questions**: It is now time to complete the hands-on Review Questions. Log on to www.ExcelCEO.com with your Email address and Password, click on the* **Excel 2016 Review Questions, Chapter 1, Section 3 of 3** *option in your Main Menu, and complete the Review Questions.*

Conclusion

In this chapter, you learned the basics of Excel. You learned what a spreadsheet looks like, how to work the navigation, how to use the various tabs and the Office Ribbon, and how to enter basic data on a blank spreadsheet. You learned how to move the contents of a cell to another location and how to turn off the skipping down of the cursor when you press [Enter]. You cut and pasted data within cells, and formatted data and text by using the underline, bold, italicize icons (and keyboard functions), you aligned text to be centered, left-justified and right-justified, and formatted cells using the Format Cells dialog box. You learned how to use keyboard shortcuts, resize column widths and row heights, and used the Merge & Center icon to center text across multiple columns. You created your own Cell Style. You created simple Formulas and Inserted rows and columns. You wrote a formula using the SUM() function, worked with dates, used the Data Fill functionality, and learned how to delete cell contents. You can make a row and/or column stay fixed by using Freeze Panes and/or the Split Window functionality. You deleted rows and text, and can now insert comments in any cell of a spreadsheet. Finally, you learned about file Properties and how to send a workbook as an email attachment using Share.

Chapter Exam

You can now go to www.ExcelCEO.com, type your email address you registered for training with along with your password on the top-right of the ExcelCEO.com page, log in and take the exam. Make sure that you take the exam on the same computer on which you completed the practice files, as some of the questions on the exam may refer to some of the completed projects. Chapter exams are intended to be hands-on to test how you completed the chapter projects, so make sure you completed them correctly.

CHAPTER TWO — FORMATTING

Chapter Objectives:

- Identify and use the Underscore character in column and naming data ranges
- Recognize the Format Painter for quickly applying cell formats to multiple locations
- Choose different types of cell formats to enhance cell appearance
- Locate and Paste functions using menus and keyboard shortcuts
- Find the Custom Formatting environment
- Identify errors within Formulas and how to handle them
- Identify Absolute, Mixed, and Relative references to enhance formula writing
- Recognize the appropriate icons for increasing the Indent of text within a cell
- Choose the Fill Color and Font Color formatting icons
- Identify options within the Borders menu for drawing borders around and within a report
- Select the Undo and Redo buttons
- Identify how to create a template file
- Organize files to the Taskbar icon for quick access with the Pin feature

Projects You Will Complete During This Chapter:

- *myNet_Inc.xlsx*
- *myNet_Inc.xltx*
- *myNet_Inc_Tmpl.xltx*
- *mySls_Jrnl.xlsx*

CPE Credits possible for this chapter: 2

Introduction

In one of my previous jobs as a real estate appraiser, I was assigned numerous tasks using my computer skills to create complex discounted cash flow analyses. Sometimes, my manager would ask me to analyze a property and not give him a report, but simply "a number" along with the supporting calculations. He would tell me not to worry about formatting a report – just give him one sheet of paper with the supporting calculations and the value of the property. And that is exactly what I gave to him. Every time I did this, he would take that sheet of paper and begin to mark it up with his infamous red pen and write, "*Center this title*", "*Format this as a number with two decimal places*", "*Make these numbers right-justified*", etc, etc, etc. I got so upset when he did that, especially when he specifically told me not to format the report. He said that the report can't be right on the first try, so he HAD to edit something. I then decided that I was going to take the time to format ALL of the reports and analyses I gave him, even if he said not to do it. That taught me a great lesson – whenever you create a report, format it so that the person you give it to can review it, understand it, make no corrections, and send it along to the next person who needs to see it. Data means little unless it is easily understood.

In this chapter, we'll be exploring more formatting options.

1. **Open Excel 2016**, *and navigate to the file located at* **C:\ExcelCEO\Excel 2016\Chapter2\Sls_Jrnl.xlsx**.
2. **Save As C:\ExcelCEO\Excel 2016\Chapter2*mySls_Jrnl.xlsx***.

	A	B	C	D	E	F	G	H	I
1	Store	Sale_Date	Ticket_No	Item_Cd	Qty	Unit_Sale_	Disc_Pct	Warr_Amt	Deliv_Amt
2	1026	##########	10262002C	DMQF130	3	519	0	50	0
3	1026	##########	10262002C	DMKE128	1	809	0	50	55
4	1026	##########	10262002C	DMDB137	2	649	0	50	55
5	1026	##########	10262002C	DMQG131	1	569	0	50	55
6	1026	##########	10262002C	SMDF120	1	799	0	0	55
7	1026	##########	10262002C	LMQG162	2	269	0	0	0
8	1026	##########	10262002C	DMQE132	1	619	0	50	0
9	1026	##########	10262002C	LMTF167	1	109	0	50	0
10	1026	##########	10262002C	DMQG131	3	569	0	0	0
11	1026	##########	10262002C	CMTF154	2	219	0	0	55

Figure 2.1

This is a file of the individual sales made in the month of May 2016 for Store No. 1026. Fields included are the store number (which is the same for all records as we are looking only at Store No 1026), Sale Date, Ticket Number, Item Code, Quantity Sold, Sale Price per item, the Discount percent given on the sale, Warranty Charge (if any), and a Delivery Charge (if any).

The Underscore Character

There is one thing I need to mention here that will save you a lot of headaches in your programming career. You may have noticed that many field names, like Sale_Date, Ticket_No and Item_Cd have

an underscore (_) character in place of the space. There is a reason for this. The ***underscore*** character is a commonly accepted symbol to use in place of a space, as computer languages read an underscore character much easier than space. Particularly when you use those column names in a PivotTable (to be discussed later) or in other applications like Access or SQL Server, it will be much less confusing if you use the underscore character in place of the space. Depending on the program, field names sometimes are required to be all contiguous (no spaces) as spaces can greatly confuse programming languages. No, it's not real pretty, but you should get used to it. Another alternative is to take out all spaces and separate words with a capital letter (called CamelCase), like NetSales.

To make it easier for us to read the data in the file, we need to clean it up a bit.

3. *Resize all columns to fit, if necessary.*
4. *Click on* **Column F** *(the entire column should be selected), hold down the* **[Ctrl]** *key, click on* **Columns H and I**, *release the* **[Ctrl]** *key, and click on the* **Accounting Number Format** *icon in the* **Number** *group from the* **Home** *tab.*

I1 Deliv_Amt

	A	B	C	D	E	F	G	H	I	J
1	Store	Sale_Date	Ticket_No	Item_Cd	Qty		Disc_Pct			
2	1026	01 May 16	1026200205011	DMQF130	3	$ 519.00	0	$ 50.00	$ -	
3	1026	01-May-16	1026200205012	DMKF128	1	$ 809.00	0	$ 50.00	$ 55.00	
4	1026	01 May 16	1026200205013	DMDB137	2	$ 649.00	0	$ 50.00	$ 55.00	
5	1026	02-May-16	1026200205021	DMQG131	1	$ 569.00	0	$ 50.00	$ 55.00	
6	1026	02-May-16	1026200205022	SMDE120	1	$ 799.00	0	$ -	$ 55.00	
7	1026	03-May-16	1026200205031	LMQG162	2	$ 269.00	0	$ -	$ -	
8	1026	03-May-16	1026200205032	DMQE132	1	$ 619.00	0	$ 50.00	$ -	
9	1026	03-May-16	1026200205033	LMTF167	1	$ 109.00	0	$ 50.00	$ -	
10	1026	03-May-16	1026200205034	DMQG131	3	$ 569.00	0	$ -	$ -	
11	1026	04 May 16	1026200205041	CMTF154	2	$ 219.00	0	$ -	$ 55.00	

Figure 2.2

Format Painter

Oops. It looks like the heading in Cell F1, H1, and I1 went away (H1 and I1 may or may not look blank, as above.) However, if you click on Cell F1, you will see in the Formula Bar that the words are still there. The Column F header text, Unit_Sale_Amt, is too wide when formatted as Accounting, so the cell appears to be blank. The other column headings are is still readable, so you just need to format Cell F1, H1, and I1 the same way. You can do that by using the ***Format Painter*** icon. This tool allows you to copy the formatting, but not the text of a cell and "paint" another cell with the same format.

5. *Click on* **Cell G1** *(In actuality, you can click on any of the column headers except the ones we're going to format).*
6. *Click the* **Format Painter** *icon* Format Painter *in the* **Clipboard** *group of the* **Home** *tab.*
7. *Click and hold on* **Cell F1**, *and drag to select* **Cells F1 through I1**, *and release.*

The heading for Cells F1, H1 and I1 should now reappear.

	A	B	C	D	E	F	G	H	I	J
1	Store	Sale Date	Ticket No	Item Cd	Qty	Unit Sale Amt	Disc Pct	Warr Amt	Deliv Amt	
2	1026	01-May-16	1026200205011	DMQF130	3	$ 519.00	0	$ 50.00	$ -	
3	1026	01-May-16	1026200205012	DMKE128	1	$ 809.00	0	$ 50.00	$ 55.00	
4	1026	01-May-16	1026200205013	DMDB137	2	$ 649.00	0	$ 50.00	$ 55.00	
5	1026	02-May-16	1026200205021	DMQG131	1	$ 569.00	0	$ 50.00	$ 55.00	
6	1026	02-May-16	1026200205022	SMDE120	1	$ 799.00	0	$ -	$ 55.00	
7	1026	03-May-16	1026200205031	LMQG162	2	$ 269.00	0	$ -	$ -	
8	1026	03-May-16	1026200205032	DMQE132	1	$ 619.00	0	$ 50.00	$ -	
9										

Figure 2.3

> ***Trick**: If you want to use the* **Format Painter** *to format multiple cells that are not in a contiguous range, double-click the Format Painter icon. When you click on each cell, the Format Painter will remain activated. To deactivate it, simply left-click on the Format Painter icon.*

Formatting Cells

In Columns F, H and I, do you see how the "$" sign is left justified and the rest of the numbers are right-justified? I don't like that. I want the "$" to be next to the numbers. Also, I don't like the dash (-) when there is a $0 dollar amount. I want it to appear as $0. There is another Currency option in the ***Format Cells*** dialog box, so let's try that one and see if it works better.

8. *Select* **Column F**.
9. *Navigate to the* **Format Cells** *dialog box and choose* **Currency, two decimal places** *with the* **$** *symbol.*
10. *Apply the same formatting to* **Columns H and I**.

Increase and Decrease Decimal Icons

That looks much better. But now that I'm looking at it, all of the sale prices are in dollars with two decimal places. I really don't need two decimal places because there are no cents on any of the sale prices. Instead of going into the Format Cells dialog box, you can use the ***Increase Decimal*** and ***Decrease Decimal*** icons to do it a little quicker. These icons are located in the Number group of the Home tab.

11. *Select* **Columns F, H, and I**.
12. *Click on the* **Decrease Decimal** *icon* *twice.*

You can use the Increase and Decrease Decimal icons for other number formats as well. Let's format Column G as **Percent** with one decimal place.

13. *Select* **Column G**, *and click on the* **Percent Style** *icon* *in the* **Number** *group of the* **Home** *tab.*

14. *Click on the* **Increase Decimal** *icon*  *to increase the decimal place to one.*
15. *Resize all columns.*
16. *Freeze* **Row 1** *of the table.*

Using the formatting icons is a quick and easy way to format lots of data.

	A	B	C	D	E	F	G	H	I
1	Store	Sale_Date	Ticket_No	Item_Cd	Qty	Unit_Sale_Amt	Disc_Pct	Warr_Amt	Deliv_Amt
2	1026	01 May 16	1026200205011	DMQF130	3	$519	0.0%	$50	$0
3	1026	01-May-16	1026200205012	DMKE128	1	$809	0.0%	$50	$55
4	1026	01-May-16	1026200205013	DMDB137	2	$649	0.0%	$50	$55
5	1026	02-May-16	1026200205021	DMQG131	1	$569	0.0%	$50	$55
6	1026	02-May-16	1026200205022	SMDE120	1	$799	0.0%	$0	$55
7	1026	03-May-16	1026200205031	LMQG162	2	$269	0.0%	$0	$0
8	1026	03-May-16	1026200205032	DMQE132	1	$619	0.0%	$50	$0
9	1026	03 May 16	1026200205033	LMTF167	1	$109	0.0%	$50	$0

Figure 2.4

Would you like to see how many sales we made? We'll write the formula for that, but first let's review some of the data's field definitions. The Qty field is the quantity of items sold. The Unit_Sale_Amt field is the sale price per item sold. The Disc_Pct is the percentage amount of discounts that were given on the total sale, excluding warranty and delivery charge. The Warranty charge is a flat $50 per ticket no matter how many mattresses were sold (if purchased), and the Delivery charge is a one-time charge of $55, if purchased. So the total sale price of the ticket is the quantity times the unit sale price times (1-Disc_Pct) plus warranty and delivery charges. Let's do that calculation.

17. *In* **Cell J1** *type* ***Total_SP*** *(for sale price).*
18. *In* **Cell J2** *input the following formula:* ***=E2*F2*(1-G2)+H2+I2***
19. *Make sure* **Cell J2** *is formatted as* **Currency** *with* **two decimal places**.

=F2*F2*(1-G2)+H2+I2

	C	D	E	F	G	H	I	J	K
1	Ticket_No	Item_Cd	Qty	Unit_Sale_Amt	Disc_Pct	Warr_Amt	Deliv_Amt	Total_SP	
2	1026200205011	DMQF130	3	$519	0.0%	$50	$0	$1,607.00	
3	1026200205012	DMKE128	1	$809	0.0%	$50	$55		
4	1026200205013	DMDB137	2	$649	0.0%	$50	$55		
5	1026200205021	DMQG131	1	$569	0.0%	$50	$55		
6	1026200205022	SMDE120	1	$799	0.0%	$0	$55		

Figure 2.5

Now we're starting to get into some more complex formulas. Multiplication in Excel is done by using the asterisk "*" and division is done by the slash "/" key. The result in Cell J2 should be $1,607.00. Now

all you have to do is to copy that formula down for all rows in the spreadsheet. You've done that before by clicking the Copy and Paste icons, but this time you have 93 rows of data to copy to. You don't want to do it one at a time, so let me show you two ways to do a "mass copy" job. You learned how to do this in Chapter 1 with dates, but I want to make absolutely sure you understand this concept, so we'll walk through it again.

20. *With the cursor on* **Cell J2**, *place the mouse pointer over the small black (or red) box in the lower-right corner of the cell. The pointer will change to a small plus sign "+" (Remember? This activates* **Data Fill**.*)*
21. *Click, hold, and drag the pointer down to* **Cell J7** *and release.*

The formula is copied down and the total sale price is calculated for every row of data. Now, you still have a bunch of rows to copy to, so let's do it the REAL EASY way.

22. *Click on* **Cell J7**.
23. *Place the mouse pointer over the* **Data Fill** *box in the lower-right corner of the cursor where the pointer changes to a small plus sign "+".*
24. *Double-click on the plus sign.*

J7 =E7*F7*(1-G7)+H7+I7

	A	B	C	D	E	F	G	H	I	J
1	Store	Sale_Date	Ticket_No	Item_Cd	Qty	Unit_Sale_Amt	Disc_Pct	Warr_Amt	Deliv_Amt	Total_SP
2	1026	01-May-16	1026200205011	DMQF130	3	$519	0.0%	$50	$0	$1,607.00
3	1026	01-May-16	1026200205012	DMKE128	1	$809	0.0%	$50	$55	$914.00
4	1026	01-May-16	1026200205013	DMDB137	2	$649	0.0%	$50	$55	$1,403.00
5	1026	02-May-16	1026200205021	DMQG131	1	$569	0.0%	$50	$55	$674.00
6	1026	02-May-16	1026200205022	SMDE120	1	$799	0.0%	$0	$55	$854.00
7	1026	03-May-16	1026200205031	LMQG162	2	$269	0.0%	$0	$0	$538.00
8	1026	03-May-16	1026200205032	DMQE132	1	$619	0.0%	$50	$0	$669.00
9	1026	03-May-16	1026200205033	LMTF167	1	$109	0.0%	$50	$0	$159.00

Figure 2.6

Pretty cool, huh? Just like it did for dates in Chapter 1, Excel copies this formula down to all rows in the table. It knows to stop copying when it runs out of rows. For that reason, it is very important to maintain all of your tables with contiguous rows and columns.

AutoSum

Now let's add up all of the ticket sale prices in the whole table. You already know how to do a SUM() function. All you have to do is to go below the last cell in Column J and write the SUM() function. But there is another way to quickly look at the total sales. That is by using ***AutoSum*** in the ***Status Bar*** on the lower-right of Excel.

25. *Select* **Cells J2 through J9**.

J2 =E2*F2*(1-G2)+H2+I2

	A	B	C	D	E	F	G	H	I	J
1	Store	Sale_Date	Ticket_No	Item_Cd	Qty	Unit_Sale_Amt	Disc_Pct	Warr_Amt	Deliv_Amt	Total_SP
2	1026	01-May-16	1026200205011	DMQF130	3	$519	0.0%	$50	$0	$1,607.00
3	1026	01-May-16	1026200205012	DMKE128	1	$809	0.0%	$50	$55	$914.00
4	1026	01-May-16	1026200205013	DMDB137	2	$649	0.0%	$50	$55	$1,403.00
5	1026	02-May-16	1026200205021	DMQG131	1	$569	0.0%	$50	$55	$674.00
6	1026	02-May-16	1026200205022	SMDE120	1	$799	0.0%	$0	$55	$854.00
7	1026	03-May-16	1026200205031	LMQG162	2	$269	0.0%	$0	$0	$538.00

Figure 2.7

Look at the bottom-right portion of your screen and you should see a box that contains the script "**Average: $852.25 Count: 8 Sum: $6,818.00**" (or something similar, depending on the settings). This area of your screen is called the **Status Bar**. If you right-click on the *Status Bar*, you will see the following list of options:

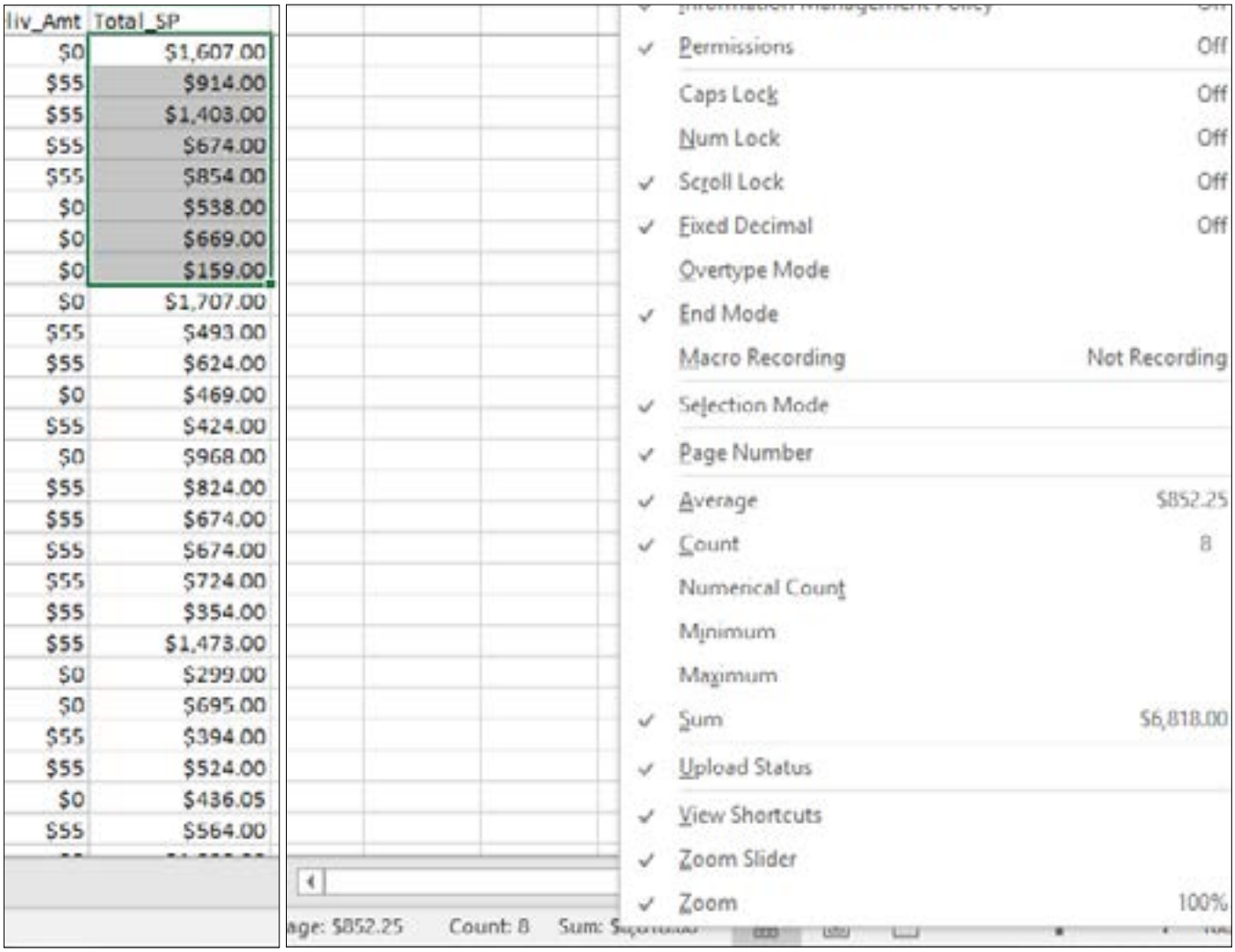


Figure 2.8

In this list, you can turn off and on any of the options available. It allows you to select any range of numbers and automatically sum, average and count them. You see the results in this box without having to write any Formulas.

26. Select all of **Column J**. *The* **AutoSum** *box should read* **Sum= 81060.7**.

Notice that the AutoSum box reads the formatting of the first cell in the range (in this case, Cell J1). To make the formatting of the AutoSum box be the same as the data, you can format all of Column J as Currency, zero decimal places.

27. **Save** *and* **close** *the* **mySls_Jrnl.xlsx**.

The next exercise is to learn how to make reports pretty (or "purdy" as we say in Texas). Excel has provided a number of formatting icons that will help you with that. For this exercise, we will use the Net_Inc.xlsx file located in C:\ExcelCEO\Excel 2016\Chapter2.

1. **Open** *the file located at* **C:\ExcelCEO\Excel 2016\Chapter2\Net_Inc.xlsx**.
2. **Save As C:\ExcelCEO\Excel 2016\Chapter2*myNet_Inc.xlsx***
3. *Resize columns to fit, if necessary.*

	A	B	C	D	E	F	G	H	I
1	Nitey-Nite Mattresses								
2									
3	Summary Net Income Statement								
4	As of 7/31/2017								
5	Store No. 1026								
6									
7		MTD	MTD						
8		1-Jul-17	1-Jul-16	$ Diff	% Diff				
9	Revenue								
10	Mattresses								
11	Pillows								
12	Total Merchandise								
13	Services								
14	Discounts								

Figure 2.9

This workbook has only one sheet called Net_Inc_Stmt. It is a skeleton financial statement with no numbers in it. This is the general format in which upper management likes to see the Summary Income Statement for each store. Your job is to input the numbers and make it look nice by using the various formatting tools. You will populate the numbers, perform the calculations, and then make it look "purdy". Let's get started.

3. *Resize* **Column A** *to be a little wider than* **General Admin Expenses** *on* **Row 28**.
4. *Select* **Cells B8 and C8**.

Custom Formatting

Management likes to see headings above the numbers in the Month Year format, like "July 2017". If you look in the Date category of the Format Cells dialog box, there is no such format. Therefore, we need to create that format using the ***Custom Format*** feature.

5. *Open the* **Format Cells** *dialog box.*

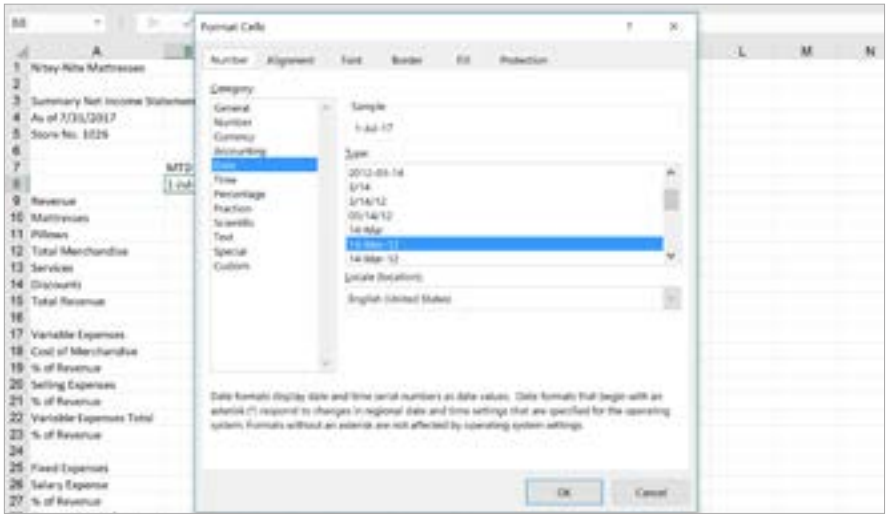


Figure 2.10

6. *In the* **Category:** *field of the* **Number** *tab, select* **Custom**.
7. *In the* **Type:** *field, delete the existing text, type* ***mmmm yyyy****, and click* **OK**.

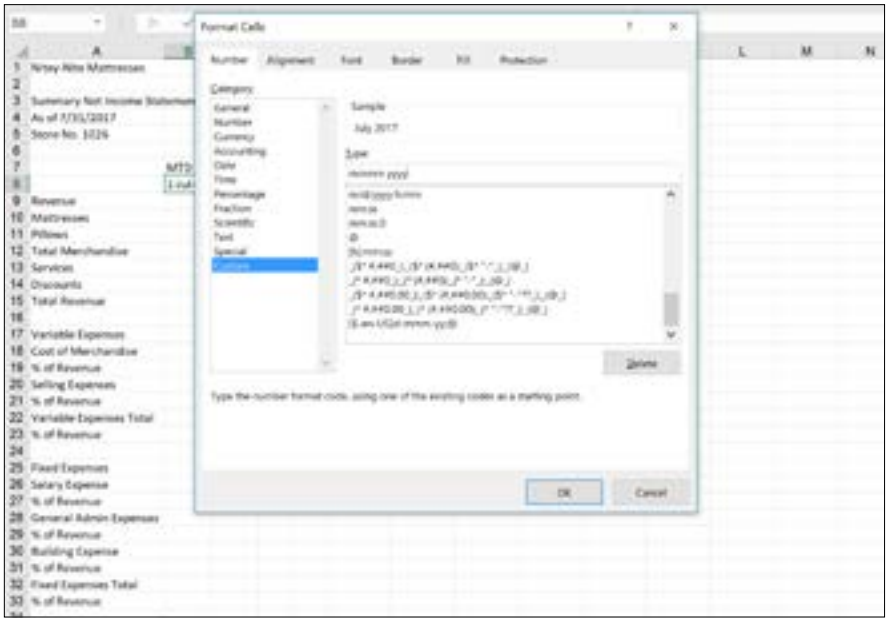


Figure 2.11

The cells change formatting to July 2017 and July 2016 respectively. When using the Custom formatting, four "m's" returns the full month name (January, February and so on). Three "Ms" returns the abbreviated month (Jan, Feb), two "Ms" returns the month number with the leading 0 (01, 02) and one "m" returns the simple month number without the leading 0 (1, 2). On the Year, one or two "Ys" returns the two-digit year (16, 17) and three or four "Ys" returns the four-digit year. You can also use the day ("d") format in the Custom type. One "d" returns the day number, two "Ds" returns the day number with the leading 0, three "Ds" returns the abbreviated day of the week (Mon, Tue, etc.) and four "Ds" returns the full name of the day of the week (Monday, Tuesday, etc.).

> ***Trick**: Excel offers* **Special Formatting** *to format numbers as zip codes, phone numbers and US Social Security numbers. Try it! In a blank cell, type* ***7134816515*** *(the ExcelCEO phone number). Right-click on the cell, choose* **Format Cells** *on the* **Number** *tab under* **Category**, *choose* **Special**. *Under* **Type**, *choose* **Phone Number**, *and click* **OK**. *This is useful when you want to store the phone number as a number, but make it appear in a phone number format.*

B8 | 7/1/2017

	A	B	C	D	E	F	G	H	I	J	K
1	Nitey-Nite Mattresses										
2											
3	Summary Net Income Statement										
4	As of 7/31/2017										
5	Store No. 1026										
6											
7		MTD	MTD								
8		July 2017	July 2016	$ Diff	% Diff						
9	Revenue										
10	Mattresses										
11	Pillows										
12	Total Merchandise										
13	Services										
14	Discounts										
15	Total Revenue										
16											
17	Variable Expenses										
18	Cost of Merchandise										
19	% of Revenue										
20	Selling Expenses										
21	% of Revenue										
22	Variable Expenses Total										
23	% of Revenue										
24											
25	Fixed Expenses										
26	Salary Expense										

Figure 2.12

8. *Input the following values for each line item on the financial statement, beginning with the* **Revenue** *section:*

	A	B	C
8		July 2017	July 2016
9	Revenue		
10	Mattresses:	***85211***	***68495***
11	Pillows:	***3536***	***3545***
13	Services:	***3510***	***3460***
14	Discounts:	***-3689***	***-2145***
17	Variable Expenses		
18	Cost of Merchandise:	***21358***	***18643***
20	Selling Expense:	***10786***	***9287***
25	Fixed Expenses		
26	Salary Expense:	***8397***	***7864***
28	General Admin Expense:	***4838***	***5709***
30	Building Expense:	***1632***	***1712***

		July 2017	July 2016	$ Diff	% Diff
9	Revenue				
10	Mattresses	85211	68495		
11	Pillows	3536	3545		
12	Total Merchandise				
13	Services	3510	3460		
14	Discounts	-3689	-2145		
15	Total Revenue				
16					
17	Variable Expenses				
18	Cost of Merchandise	21358	18643		
19	% of Revenue				
20	Selling Expenses	10786	9287		
21	% of Revenue				
22	Variable Expenses Total				
23	% of Revenue				
24					
25	Fixed Expenses				
26	Salary Expense	8397	7864		
27	% of Revenue				
28	General Admin Expenses	4838	5709		
29	% of Revenue				
30	Building Expense	1632	1712		

Figure 2.13

9. *Format all numbers below* **Cells B9 and C9** *to be* **Number, zero decimal places**, *with the* **1000 separator**.

10. **Center** *the text on* **Rows 1, 3, 4 and 5** *over the entire report*

> ***Note**: You can use the* **Merge & Center** *icon for only one row at a time, or you can use the* **Format Cells** *dialog box, click the* **Alignment** *tab and, in the* **Horizontal:** *drop-down box, click* **Center Across Selection**. *This allows you to center* **Rows 1**, **3**, **4** *and* **5** *at once and avoid range selection issues later!*

11. *Go to* **Cell B12** *and create a formula to sum the two cells above it.*
12. *Copy* **Cell B12** *over to* **Cell C12**.
13. *Create a formula to calculate* **Total Merchandise+Services+Discounts** *in* **Cell B15**.
14. *Copy that formula to* **Cell C15**.

As a check, the result in Cell B15 should be 88,568 and Cell C15 it should be 73,355.

15. *Underline* **Cells B8 through E8, B11, C11, B14, and C14**.
16. *Bold* **Cells A9, A15, B15** *and* **C15**.

In Column D, we want to calculate the dollar difference in each Revenue line item, and we want to calculate the percentage difference in Column E.

17. *In* **Cell D10**, *calculate the dollar difference between the* **July 2017** *Mattresses revenue number and the* **July 2016** *Mattresses revenue number.*
18. *Copy that formula down for all revenue line items. Format the cells as in* **Columns B and C**.
19. *In* **Cell E10**, *type* ***=B10/C10*** *(which is B10 divided by C10)*
20. *Format* **Cell E10** *as* **Percent, one decimal place**, *and copy* **Cell E10** *down to all revenue line items using similar bold and underline formatting, as in the other columns.*

E15 =B15/C15

	A	B	C	D	E	F	G	H	I	J
4		As of 7/31/2017								
5		Store No. 1026								
6										
7		MTD	MTD							
8		July 2017	July 2016	$ Diff	% Diff					
9	**Revenue**									
10	Mattresses	85,211	68,495	16,716	124.4%					
11	Pillows	3,536	3,545	-9	99.7%					
12	Total Merchandise	88,747	72,040	16,707	123.2%					
13	Services	3,510	3,460	50	101.4%					
14	Discounts	-3,689	-2,145	-1,544	172.0%					
15	**Total Revenue**	**88,568**	**73,355**	**15,213**	**120.7%**					
16										
17	Variable Expenses									

Figure 2.14

In analyzing at the Revenue section of this statement, it looks like things are going well. Total Revenue at this store is up 20.7% over the previous year. The only revenue line item that is down is Pillow revenue, and it's only down by $9 or 0.3% from the previous year. Overall, it looks like this store is having a good year in terms of revenue. Now let's work on the Expense section of the report.

21. *In* **Cell B22**, *calculate the sum of* **Cells B18 and B20**.

> ***Note**: Do NOT use the =SUM() function to highlight B18:B20. The results would not be correct.*

22. *Copy the formula in* **Cell B22 to Cell C22**.
23. *Calculate the appropriate formulas in* **Columns D and E**.
24. **Bold** *the cells on* **Row 22**.

	A	B	C	D	E	F	G	H	I	J	K	L
13	Services	3,510	3,460	50	101.4%							
14	Discounts	-3,689	-2,145	-1,544	172.0%							
15	**Total Revenue**	**88,568**	**73,355**	**15,213**	**120.7%**							
16												
17	Variable Expenses											
18	Cost of Merchandise	21,358	18,643	2,715	114.6%							
19	% of Revenue											
20	Selling Expenses	10,786	9,287	1,499	116.1%							
21	% of Revenue											
22	**Variable Expenses Total**	**32,144**	**27,930**	**4,214**	**115.1%**							
23	% of Revenue											
24												
25	Fixed Expenses											
26	Salary Expense	8,397	7,864									
27	% of Revenue											
28	General Admin Expenses	4,838	5,709									
29	% of Revenue											
30	Building Expense	1,632	1,712									

Figure 2.15

> ***Review Questions**: It is now time to complete the hands-on Review Questions. Log on to www.ExcelCEO.com with your Email address and Password, click on the* **Excel 2016 Review Questions, Chapter 2, Section 1 of 2** *option in your Main Menu, and complete the Review Questions.*

Now we'll get into a formula that's a little tricky. I'm going to walk you through a few steps and we'll calculate the wrong formula just so you can see why it's wrong. Then we'll do it the right way.

1. *In* **Cell B19**, *type* ***=B18/B15***
2. *Format it as* **Percent, one decimal place**.

Formatted as a percent, the result should be 24.1%. This number reflects the Cost of Merchandise as a percentage of Total Revenue. Now copy that formula down to Cell B21 and see what happens.

3. *Copy the formula in* **Cell B19 to Cell B21**.

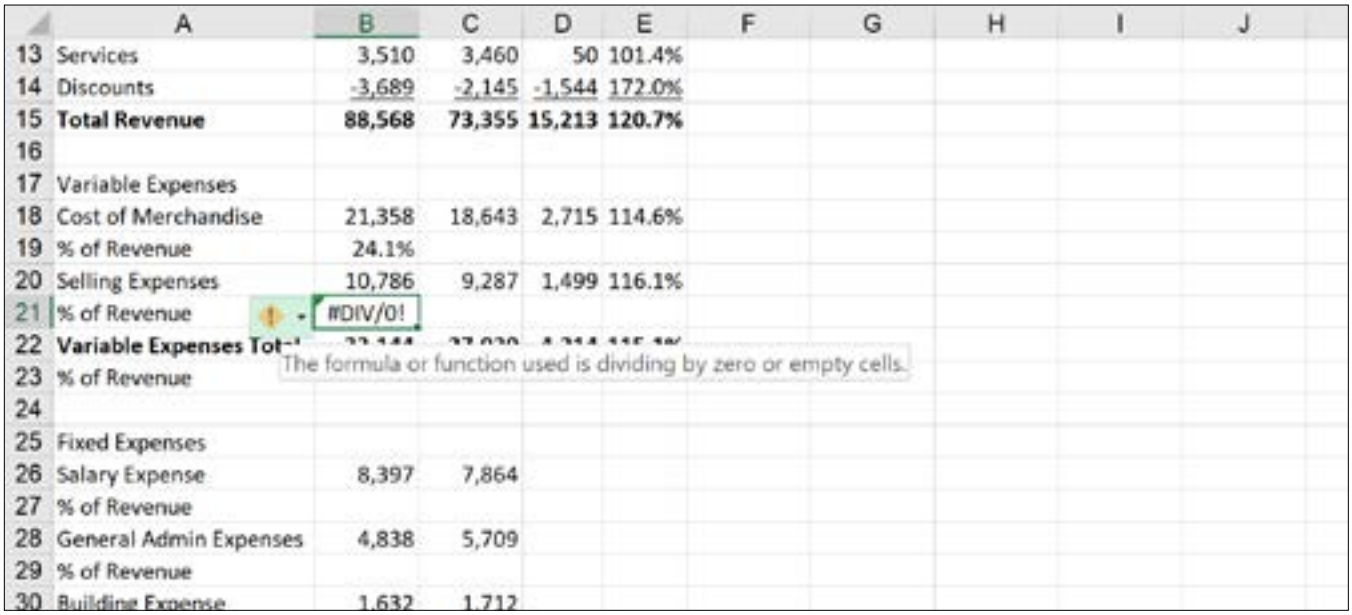


Figure 2.16

Handling Errors

You should get a ***#DIV/0! (divide by zero) error***. This happens when you try to divide a number by zero, which is mathematically impossible. There are numerous kinds of errors you can get when developing an Excel file. The table below lists the most common types of errors and what they mean.

Excel Errors and Descriptions

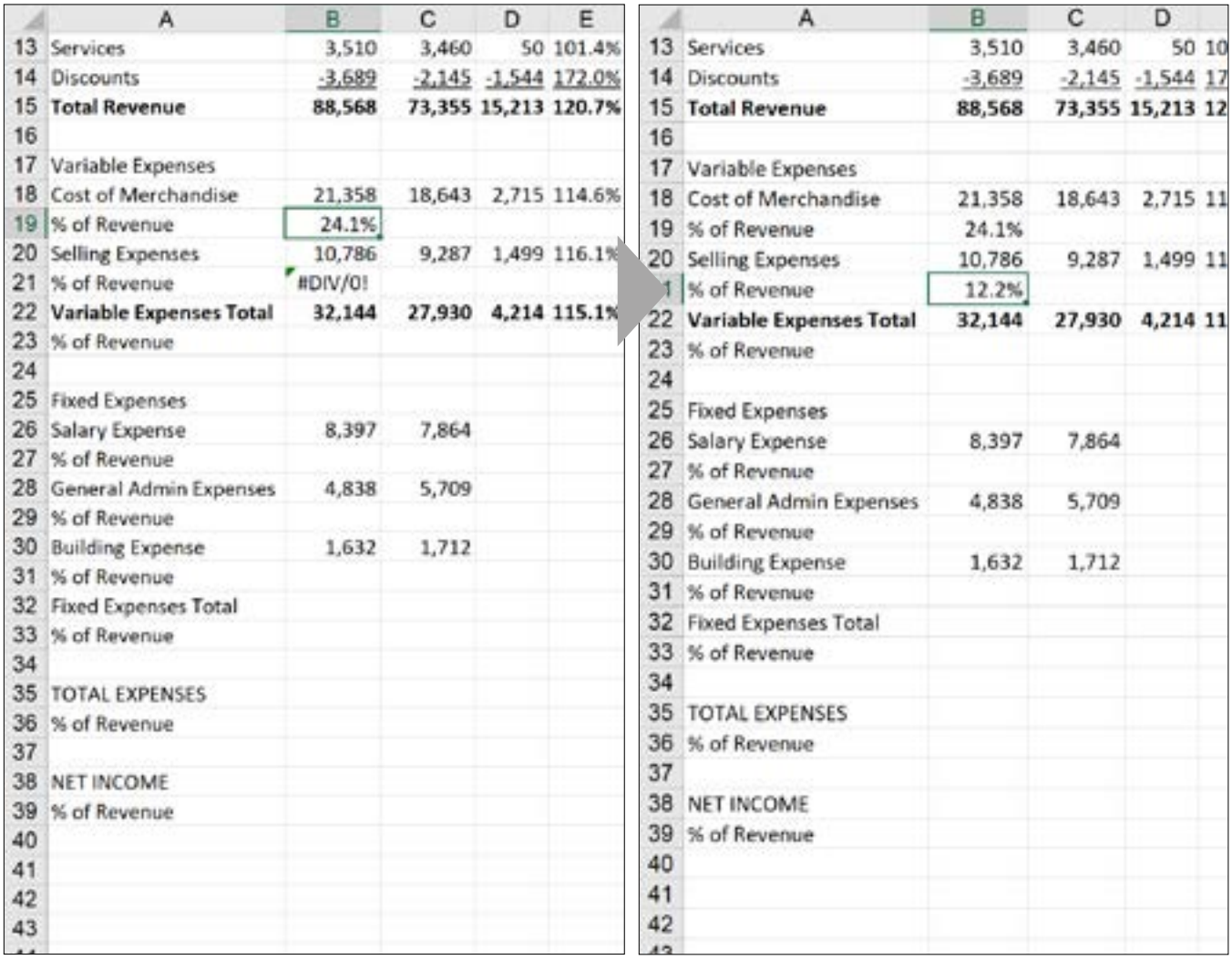
Error	Error Description
########	The column isn't wide enough to show the entire number.
#VALUE!	There is an error in writing the formula (like you put a text string where a number is required)
#NAME?	The formula includes a function or range name that Excel doesn't recognize.
#REF!	The formula is referring to a cell that doesn't exist.
#DIV/0!	The formula is trying to divide a number by zero.

Absolute, Mixed, and Relative References

Let's take a closer look at the formula. If you click on Cell B21, you will see that the formula reads "=B20/B17". In our spreadsheet, we want to divide all of the expense numbers by the Total Revenue line for each respective MTD number. You did that in the formula you wrote in Cell B19, but when you copied it to Cell B21, the denominator changed from B15 to B17. You need to make the denominator remain static, or fixed, and let the numerator (the number on top) move as you copy the formula. You do this by using Absolute, Mixed and Relative references. In our case, we want the formula in Cell B19 to always divide by

Cell B15. An ***Absolute reference*** means that cell reference (both the row and column) will remain fixed no matter where you copy it to. This is done by placing a dollar sign ("$") in front of the Column and Row references. A ***Mixed reference*** is used when you want to allow the column OR row to remain fixed during the copy routine. A ***Relative reference*** is when there is no dollar sign before either the column or row reference. Let's try it.

4. *Edit the formula in* **Cell B19** *to* ***=B18/$B$15***
5. *Copy* **Cell B19 to Cell B21**.



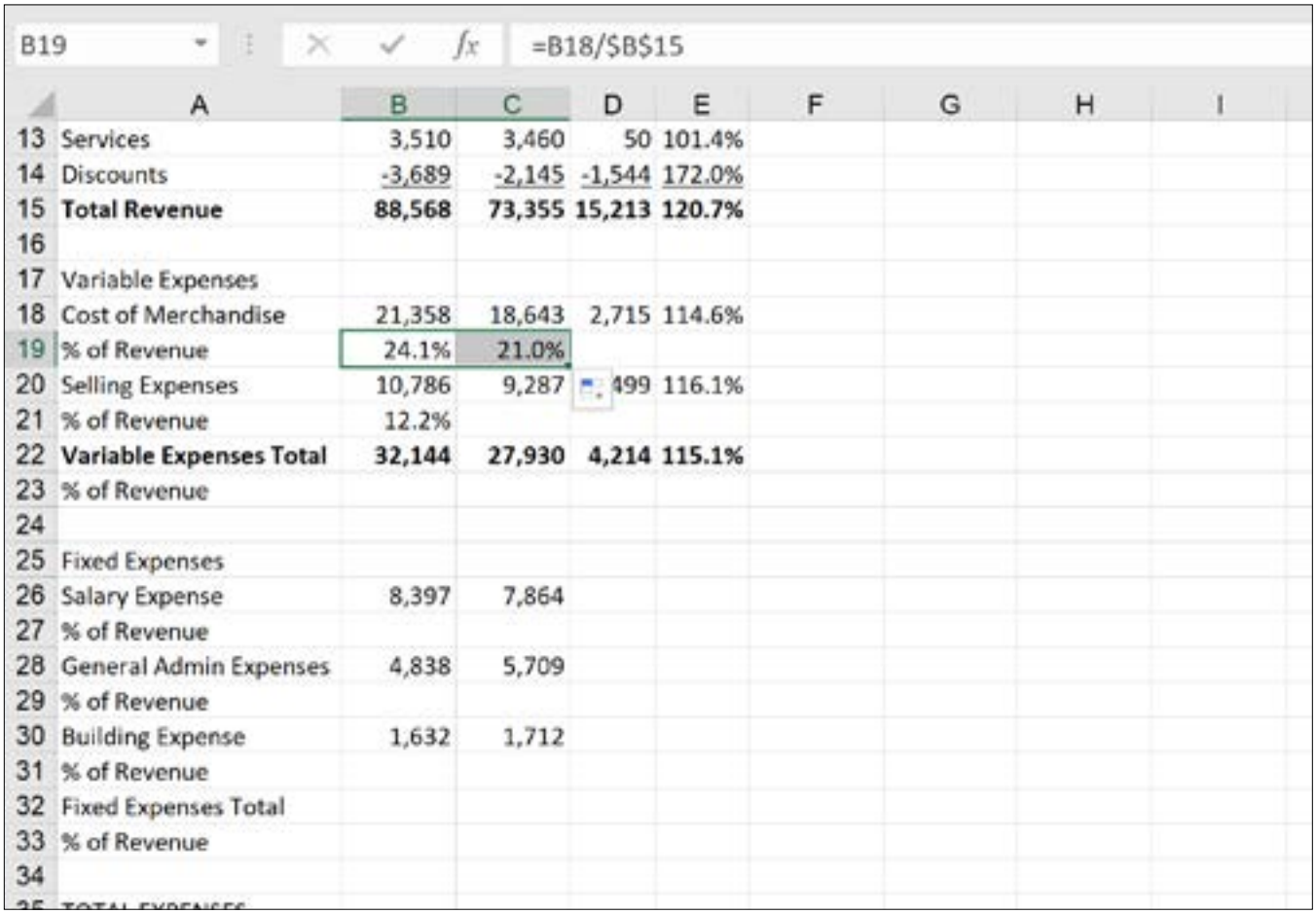
	A	B	C	D	E
13	Services	3,510	3,460	50	101.4%
14	Discounts	-3,689	-2,145	-1,544	172.0%
15	**Total Revenue**	**88,568**	**73,355**	**15,213**	**120.7%**
16					
17	Variable Expenses				
18	Cost of Merchandise	21,358	18,643	2,715	114.6%
19	% of Revenue	24.1%			
20	Selling Expenses	10,786	9,287	1,499	116.1%
21	% of Revenue	#DIV/0!			
22	**Variable Expenses Total**	**32,144**	**27,930**	**4,214**	**115.1%**
23	% of Revenue				
24					
25	Fixed Expenses				
26	Salary Expense	8,397	7,864		
27	% of Revenue				
28	General Admin Expenses	4,838	5,709		
29	% of Revenue				
30	Building Expense	1,632	1,712		
31	% of Revenue				
32	Fixed Expenses Total				
33	% of Revenue				
34					
35	TOTAL EXPENSES				
36	% of Revenue				
37					
38	NET INCOME				
39	% of Revenue				
40					
41					
42					
43					

	A	B	C	D
13	Services	3,510	3,460	50 10
14	Discounts	-3,689	-2,145	-1,544 17
15	**Total Revenue**	**88,568**	**73,355**	**15,213 12**
16				
17	Variable Expenses			
18	Cost of Merchandise	21,358	18,643	2,715 11
19	% of Revenue	24.1%		
20	Selling Expenses	10,786	9,287	1,499 11
21	% of Revenue	12.2%		
22	**Variable Expenses Total**	**32,144**	**27,930**	**4,214 11**
23	% of Revenue			
24				
25	Fixed Expenses			
26	Salary Expense	8,397	7,864	
27	% of Revenue			
28	General Admin Expenses	4,838	5,709	
29	% of Revenue			
30	Building Expense	1,632	1,712	
31	% of Revenue			
32	Fixed Expenses Total			
33	% of Revenue			
34				
35	TOTAL EXPENSES			
36	% of Revenue			
37				
38	NET INCOME			
39	% of Revenue			
40				
41				
42				

Figure 2.17

The result in Cell B21 should be 12.2% and you will see the formula: =B20/$B$15. It now appears to be working. Now let's copy the formula to Column C.

6. *Copy* **Cell B19 to Cell C19**.



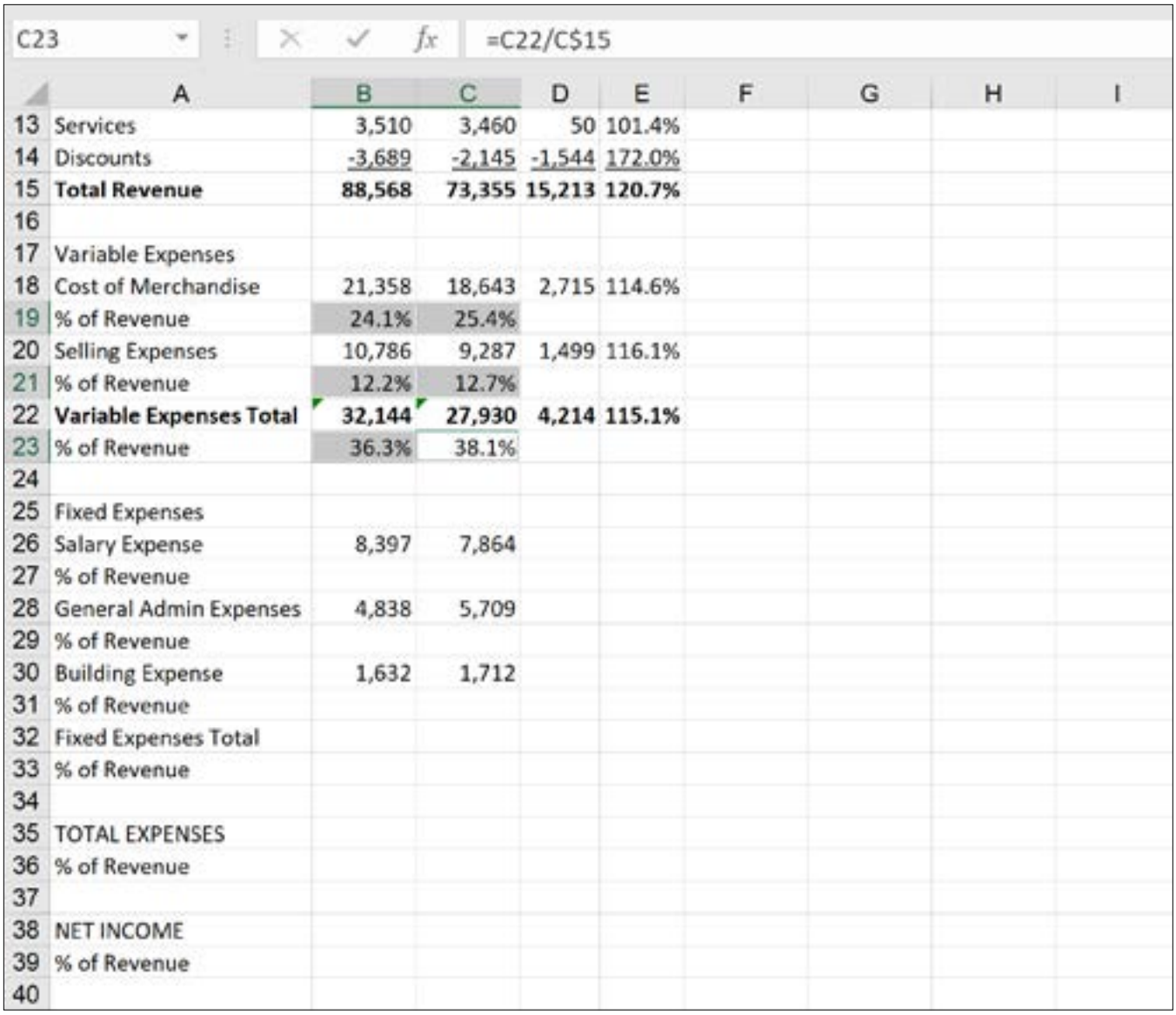
	A	B	C	D	E	F	G	H	I
13	Services	3,510	3,460	50	101.4%				
14	Discounts	-3,689	-2,145	-1,544	172.0%				
15	**Total Revenue**	**88,568**	**73,355**	**15,213**	**120.7%**				
16									
17	Variable Expenses								
18	Cost of Merchandise	21,358	18,643	2,715	114.6%				
19	% of Revenue	24.1%	21.0%						
20	Selling Expenses	10,786	9,287	499	116.1%				
21	% of Revenue	12.2%							
22	**Variable Expenses Total**	**32,144**	**27,930**	**4,214**	**115.1%**				
23	% of Revenue								
24									
25	Fixed Expenses								
26	Salary Expense	8,397	7,864						
27	% of Revenue								
28	General Admin Expenses	4,838	5,709						
29	% of Revenue								
30	Building Expense	1,632	1,712						
31	% of Revenue								
32	Fixed Expenses Total								
33	% of Revenue								
34									

Figure 2.18

Is it working? Let's see. The formula in Cell C19 returns 21.0%. Is that the right number? Well, the calculation would be 18,643 divided by 73,355, which is 25.4%. Why did we get a different number? Take a look at the formula. When you copied it over, it is still using B15 as the denominator (because of the absolute reference) whereas it should be using C15. So in this case we need to make the row stay fixed and allow the column to change. This is a good lesson to learn – check and re-check your calculations to make sure they are working as expected.

7. *Edit the formula in* **Cell B19** *to be* ***=B18/B$15***
8. *While on* **Cell B19**, *press* **[Ctrl]+c** *(to copy the formula into memory), click on* **Cell B21**, *hold down the* **[Ctrl]** *key, click on* **Cells C19, C21, B23 and C23**, *release the* **[Ctrl]** *key and press* **[Enter]**.

> ***Trick**: While typing a formula, you can toggle between an* **Absolute**, **Mixed**, *and* **Relative** *references by clicking the* **[F4]** *key. (Some keyboards are setup to use* **Fn+F4***). Try it! In a blank cell, type* ***=A1***, *but don't press* **[Enter]** *yet. While in Edit mode (with the blinking cursor at the end of A1), click* **[F4]** *(or Fn+F4) key a number of times, and you will see it toggles between* **$A$1** *(Absolute),* **A$1**, **$A1** *(Mixed), and* **A1** *(Relative). The* **$** *acts as an anchor.*



C23 =C22/C$15

	A	B	C	D	E	F	G	H	I
13	Services	3,510	3,460	50	101.4%				
14	Discounts	-3,689	-2,145	-1,544	172.0%				
15	**Total Revenue**	**88,568**	**73,355**	**15,213**	**120.7%**				
16									
17	Variable Expenses								
18	Cost of Merchandise	21,358	18,643	2,715	114.6%				
19	% of Revenue	24.1%	25.4%						
20	Selling Expenses	10,786	9,287	1,499	116.1%				
21	% of Revenue	12.2%	12.7%						
22	**Variable Expenses Total**	**32,144**	**27,930**	**4,214**	**115.1%**				
23	% of Revenue	36.3%	38.1%						
24									
25	Fixed Expenses								
26	Salary Expense	8,397	7,864						
27	% of Revenue								
28	General Admin Expenses	4,838	5,709						
29	% of Revenue								
30	Building Expense	1,632	1,712						
31	% of Revenue								
32	Fixed Expenses Total								
33	% of Revenue								
34									
35	TOTAL EXPENSES								
36	% of Revenue								
37									
38	NET INCOME								
39	% of Revenue								
40									

Figure 2.19

9. *Bold* **Cell A17**.
10. *Perform similar calculations in the* **Fixed Expense** *section of the* **Net Income Statement** *to calculate* **Fixed Expenses**.
11. *Calculate* **Total Expenses** *(***Variable Expenses** + **Fixed Expenses***) and* **Net Income** *(***Total Revenue** *less* **Total Expenses***) and the appropriate* **% of Revenue** *calculations.*
12. *Input the appropriate formulas in the* **$ Diff** *and* **% Diff** *columns.*
13. *Bold the rows for* **Fixed Expenses**, **Fixed Expenses Total**, **Total Expenses**, *and* **Net Income**.
14. *Copy* **Cell B19** *to all of the* **% of Revenue** *cells.*
15. *Italicize all* **% of Revenue** *rows.*
16. *Center all of the* **% of Revenue** *calculations, so they don't appear to be right-justified with the other numbers.*

	A	B	C	D	E	F	G	H	I	J
7		MTD	MTD							
8		July 2017	July 2016	$ Diff	% Diff					
9	**Revenue**									
10	Mattresses	85,211	68,495	16,716	124.4%					
11	Pillows	3,536	3,545	-9	99.7%					
12	Total Merchandise	88,747	72,040	16,707	123.2%					
13	Services	3,510	3,460	50	101.4%					
14	Discounts	-3,689	-2,145	-1,544	172.0%					
15	**Total Revenue**	**88,568**	**73,355**	**15,213**	**120.7%**					
16										
17	**Variable Expenses**									
18	Cost of Merchandise	21,358	18,643	2,715	114.6%					
19	% of Revenue	24.1%	25.4%							
20	Selling Expenses	10,786	9,287	1,499	116.1%					
21	% of Revenue	12.2%	12.7%							
22	**Variable Expenses Total**	**32,144**	**27,930**	**4,214**	**115.1%**					
23	% of Revenue	36.3%	38.1%							
24										
25	**Fixed Expenses**									
26	Salary Expense	8,397	7,864	533	106.8%					
27	% of Revenue	9.5%	10.7%							
28	General Admin Expenses	4,838	5,709	-871	84.7%					
29	% of Revenue	5.5%	7.8%							
30	Building Expense	1,632	1,712	-80	95.3%					
31	% of Revenue	1.8%	2.3%							
32	**Fixed Expenses Total**	**14,867**	**15,285**	**-418**	**97.3%**					
33	% of Revenue	16.8%	20.8%							
34										
35	**TOTAL EXPENSES**	**47,011**	**43,215**	**3,796**	**108.8%**					
36	% of Revenue	53.1%	58.9%							
37										
38	**NET INCOME**	**41,557**	**30,140**	**11,417**	**137.9%**					
39	% of Revenue	46.9%	41.1%							

Figure 2.20

Indenting

Sometimes you will want to offset, or indent, text within a cell to make the report a little more readable. You do this by using the Increase and Decrease Indent icons.

1. *Click on* **Cell A19**, *and click on the* **Increase Indent** *icon.* 
2. *Indent all* **% of Revenue** *references in* **Column A**.
3. **Bold** *the* **Nitey-Nite Mattresses** *title, and increase the font size to* **14**.
4. *Italicize* **Cells A3 and A4**, *and increase the font size to* **12**.

	A	B	C	D	E
1	**Nitey-Nite Mattresses**				
2					
3	*Summary Net Income Statement*				
4	*As of 7/31/2017*				
5	Store No. 1026				
6					
7		MTD	MTD		
8		July 2017	July 2016	$ Diff	% Diff
9	**Revenue**				
10	Mattresses	85,211	68,495	16,716	124.4%
11	Pillows	3,536	3,545	-9	99.7%
12	Total Merchandise	88,747	72,040	16,707	123.2%
13	Services	3,510	3,460	50	101.4%
14	Discounts	-3,689	-2,145	-1,544	172.0%
15	**Total Revenue**	**88,568**	**73,355**	**15,213**	**120.7%**
16					
17	**Variable Expenses**				
18	Cost of Merchandise	21,358	18,643	2,715	114.6%
19	% of Revenue	*24.1%*	*25.4%*		
20	Selling Expenses	10,786	9,287	1,499	116.1%
21	% of Revenue	*12.2%*	*12.7%*		
22	**Variable Expenses Total**	**32,144**	**27,930**	**4,214**	**115.1%**
23	% of Revenue	*36.3%*	*38.1%*		
24					
25	**Fixed Expenses**				
26	Salary Expense	8,397	7,864	533	106.8%
27	% of Revenue	*9.5%*	*10.7%*		
28	General Admin Expenses	4,838	5,709	-871	84.7%

Figure 2.21

Fill Color and Font Color

Let's pretty it up a little more by adding some color. With Excel, you can change the color of the font (the text) by using the ***Font Color*** icon or you can add color to the background of the cell by using the ***Fill Color*** icon.

1. *Select* **Cells A1 through E5**.
2. *Click on the drop-down button beside the* **Fill Color** *icon*  *in the* **Font** *group and choose* **Yellow**.
3. *Click on the drop-down menu beside the* **Font Color** *icon*  *in the* **Font** *group and choose* **Dark Blue**.
4. *Select every even-numbered row starting at* **Row 10 (Rows 10, 12, 14** *and so forth through* **Row 38**).
5. *From the* **Fill Color** *icon, choose* **White, Background 1, Darker 15%**.

***Note**: If you do not find* **White, Background 1, Darker 15%** *in your default color palette, more palettes are available by going to the* **Page Layout** *tab in the* **Theme** *group under the* **Color** *option. White, Background 1, Darker 15% is included with the* **Office 2007 - 2010** *group, if not in* **Office**.

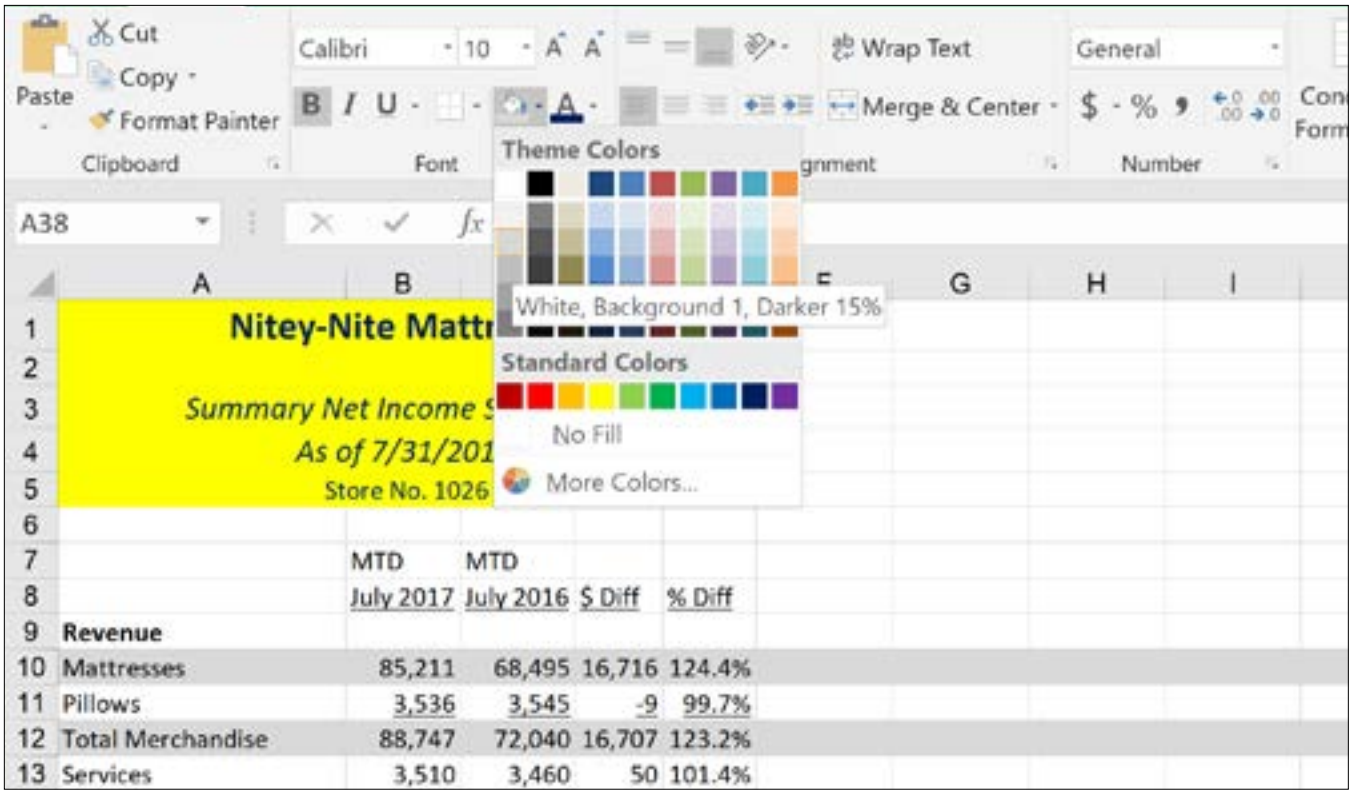


Figure 2.22

Borders

One feature of Excel that I really like (and use a lot) is the ability to draw lines or borders around, or within, a report.

1. *Select* **Cells A1 through E39** *(the entire report).*
2. *Click on the drop-down arrow beside the* **Borders** *icon*  *in the* **Font** *group and choose* **Outside Borders** Outside Borders .

Notice that the ***Borders*** icon is now changed to be the last border type used, which is the Outside Border. The same holds true for the Fill Color and Font color icons (they have changed to be the last color you used). Using the Borders icon, you can draw all kinds of borders and lines around any cell you want.

3. *Select* **Cells A1 through E5**.
4. *Click on the* **Borders** *icon (which is now set to* **Outside Borders** *from Step 2 with a matching screentip and keyboard shortcut).*

5. *Select* **Cells A7 through E39**.
6. *From the* **Borders** *drop-down arrow, choose the* **All Borders** *icon.* 

Undo and Redo Buttons

Now that I look at it, I really don't like the All Borders in the whole report. I believe the shading every other line is enough to break up the monotony of the report.

7. *Click the* **Undo** *icon*  *(in the* **Quick Access Toolbar**, *which we'll discuss later) to undo the* **All Borders**.

I use ***Undo*** and ***Redo*** icons  all the time. As implied, these icons will undo and redo the previous action(s) performed. Notice that there is a drop-down arrow next to each of those icons. You can use this drop-down arrow to go backward or forward to a specific action you performed. Note that if you choose a previous action from the menu, it will undo or redo all actions up to that point.

> ***Tip:*** *The keyboard shortcuts for* **Undo** *(**[Ctrl]+z**) and* **Redo** *(**[Ctrl]+y**) can be big time-savers for making quick corrections to the most recent data entries, keystrokes, etc. Keep in mind that a few functions, including some PivotTable calculations, macros, and more do not allow an Undo feature.*

	A	B	C	D	E
1	**Nitey-Nite Mattresses**				
2					
3	*Summary Net Income Statement*				
4	*As of 7/31/2017*				
5	Store No. 1026				
6					
7		MTD	MTD		
8		July 2017	July 2016	$ Diff	% Diff
9	**Revenue**				
10	Mattresses	85,211	68,495	16,716	124.4%
11	Pillows	3,536	3,545	-9	99.7%
12	Total Merchandise	88,747	72,040	16,707	123.2%
13	Services	3,510	3,460	50	101.4%
14	Discounts	-3,689	-2,145	-1,544	172.0%
15	**Total Revenue**	**88,568**	**73,355**	**15,213**	**120.7%**
16					
17	**Variable Expenses**				
18	Cost of Merchandise	21,358	18,643	2,715	114.6%
19	% of Revenue	*24.1%*	*25.4%*		
20	Selling Expenses	10,786	9,287	1,499	116.1%
21	% of Revenue	*12.2%*	*12.7%*		

Figure 2.23

Now we are ready to analyze this store's performance. Total Revenue is up 20.7% over the prior year, which is the right direction. Variable Expenses are also up, but at a lower rate (15.1% over prior year). Both Cost of Merchandise and Selling Expenses have increased slightly less than revenue, which may still be an area of concern. Fixed Expenses, however, are lower than in the prior year, which may mean that fixed expenses are under control, or at least we are improving year-over-year. Store management may not have the ability to alter Cost of Merchandise, as that is something that is determined by the vendors or by management. In our case, retail prices are mandated by the Home Office, so the primary means by which store management can affect business is through increased sales and managing Fixed Expenses. Total Expenses are up in comparison to the prior year, but they are not up in terms of percent as high as Total Revenue, which is good. That leads to a favorable year-over-year Net Income amount. Net Income is up 37.9% over the prior year, and it now represents 46.9% of Revenue. Last year, Net Income represented 41.1% of Revenue, which seems to be reflective of improving financial management.

Working with Graphics

Another topic I want to review with you in this chapter is working with ***graphics*** and ***images***. In this project, you can see that we typed the name of the company, Nitey-Nite Mattresses, at the top of the spreadsheet. You can also import a graphic, like a logo, onto a spreadsheet. Once it's imported, you can move it to any position in the spreadsheet and resize it as well as change it in other ways. Let's import the Nitey-Nite logo (a jpeg file which you will actually create in a later chapter) to work with as an example.

1. *Click on* **Cell G1** *and click on the* **Insert** *tab.*
2. *In the* **Insert** *tab in the* **Illustrations** *group, click on the* **Pictures** *icon.* 

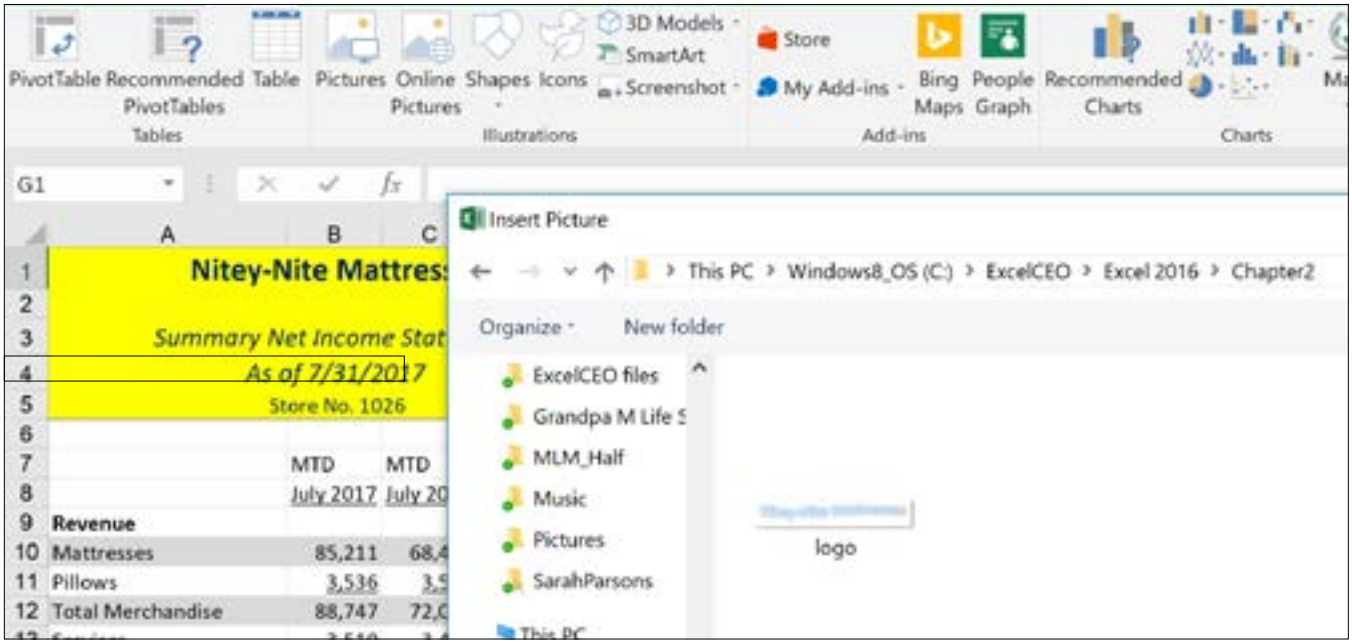
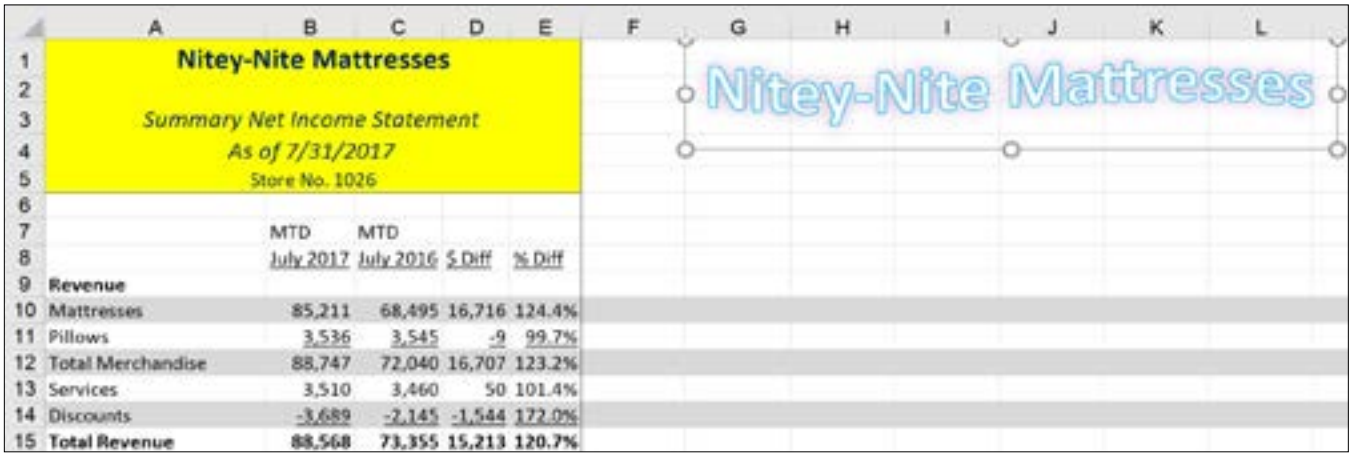


Figure 2.24

3. *Navigate to* **C:\ExcelCEO\Excel 2016\Chapter2**, *click on the* **logo.png** *file, and click the* **Insert** *button.*



	A	B	C	D	E
1	**Nitey-Nite Mattresses**				
2					
3	*Summary Net Income Statement*				
4	*As of 7/31/2017*				
5	Store No. 1026				
6					
7		MTD	MTD		
8		July 2017	July 2016	$ Diff	% Diff
9	**Revenue**				
10	Mattresses	85,211	68,495	16,716	124.4%
11	Pillows	3,536	3,545	-9	99.7%
12	Total Merchandise	88,747	72,040	16,707	123.2%
13	Services	3,510	3,460	50	101.4%
14	Discounts	-3,689	-2,145	-1,544	172.0%
15	**Total Revenue**	**88,568**	**73,355**	**15,213**	**120.7%**

Figure 2.25

The image should import into the spreadsheet. When the image is imported, you will see a new contextual tab appear called **Picture Tools, Format**. A ***contextual tab*** appears when certain objects are selected that need a unique set of tools. The Picture Tools, Format contextual tab appears whenever an image is selected. It allows you to use special tools to work with images.

You can now drag the graphic to anywhere on the spreadsheet you want. You know the graphic is selected when the small circles appear around the graphic. The small circles are called ***handles***. Let's drag the image over the Nitey-Nite Mattresses text.

4. *Click and drag the image and position it over the blue* **Nitey-Nite Mattresses** *text.*

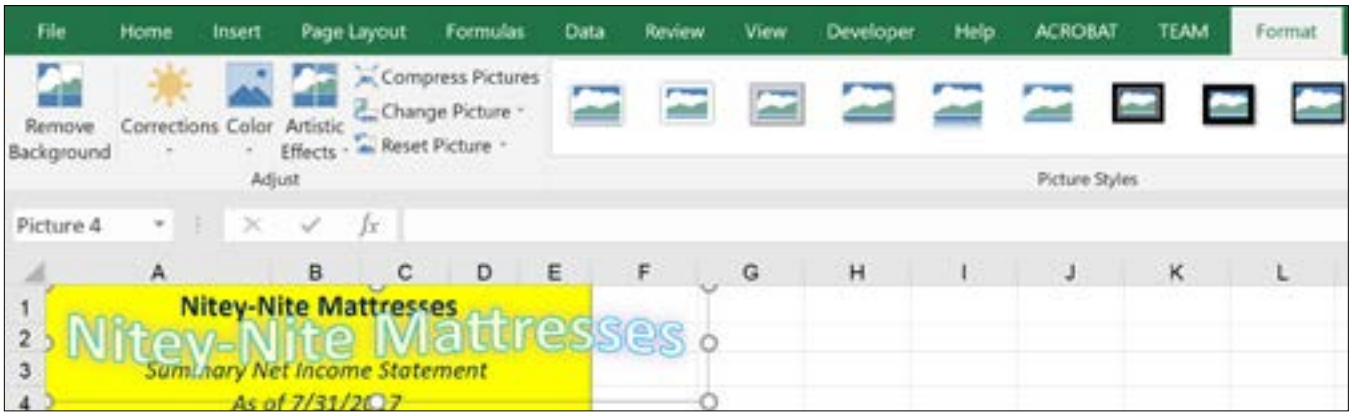
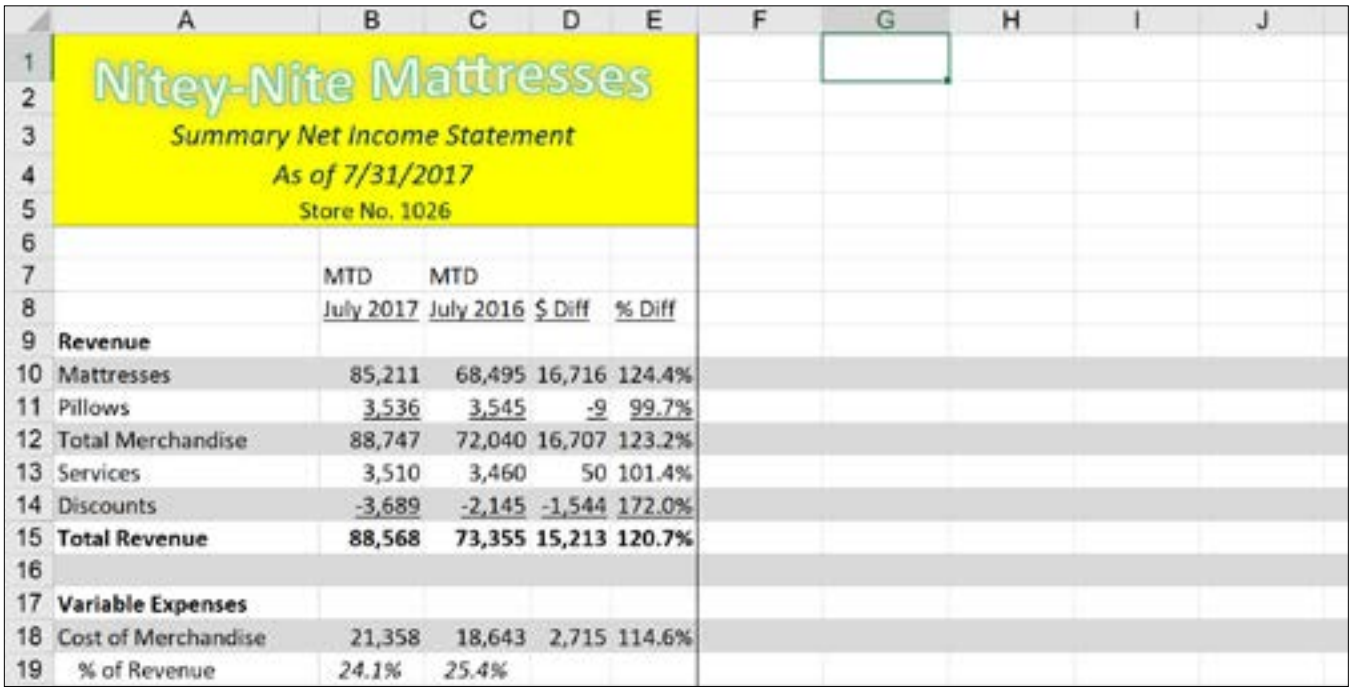


Figure 2.26

As you can see, the graphic overlaps the "Summary Net Income Statement" text, but not to worry. We can resize the graphic to make it a little smaller by clicking the handles.

5. *Click the bottom-right handle and drag the graphic to the left and up.*
6. *Resize it until it is big enough to fit over the* **Nitey-Nite Mattresses** *text, but not too big to cover the text below it.*

7. *Reposition the image to where it is centered over the report.*
8. *Click anywhere outside the graphic to deselect it.*
9. *Click on* **Cell A1**, *and click* **[Delete]** *to remove the underlying text, if it shows through.*



	A	B	C	D	E
1	Nitey-Nite Mattresses				
2					
3	*Summary Net Income Statement*				
4	*As of 7/31/2017*				
5	Store No. 1026				
6					
7		MTD	MTD		
8		July 2017	July 2016	$ Diff	% Diff
9	**Revenue**				
10	Mattresses	85,211	68,495	16,716	124.4%
11	Pillows	3,536	3,545	-9	99.7%
12	Total Merchandise	88,747	72,040	16,707	123.2%
13	Services	3,510	3,460	50	101.4%
14	Discounts	-3,689	-2,145	-1,544	172.0%
15	**Total Revenue**	**88,568**	**73,355**	**15,213**	**120.7%**
16					
17	**Variable Expenses**				
18	Cost of Merchandise	21,358	18,643	2,715	114.6%
19	% of Revenue	*24.1%*	*25.4%*		

Figure 2.27

10. **Save** *the* **myNet_Inc.xlsx** *file.*

Templates

You've spent a lot of time working on this file, haven't you? And I must admit, that's a dang good-looking report. Your manager also thinks it's a great report, and he decides that he wants to use this format for ALL the summary financial statements from here on out. You suggest to him that you save this file as the standard, or template, for all future financial statements. He thinks that is a great idea, and you proceed to do so.

A ***template*** is simply a pattern that is saved where you have all of the formatting and formulas designed just like you want them. A template should contain no data — just the format and formulas. To save an existing file as a template, you should first delete all of the data (NOT the formulas) and save it as a file type of template. Let's use the myNet_Inc file as the base for the template.

1. *With the* **myNet_Inc.xlsx** *file open, take out the shading to the right of the statement.*

> ***Hint**: Select all cells to the right of* **Column E** *and choose* **No Fill** *from the* **Fill** *icon. A quick way to do this is to click* **Cell F1**, *click* **Ctrl+Shift+down arrow** *and then* **Ctrl+Shift+right arrow** *to select the shaded cells.*

2. *Delete all of the hard-coded numbers in the file (NOT the formulas).*
3. *Change* **Cell A4** *to be* ***As of ??/??/????***
4. *Change* **Cells B8 and C8** *to be* ***mm yy***.

The statement should now look like this:

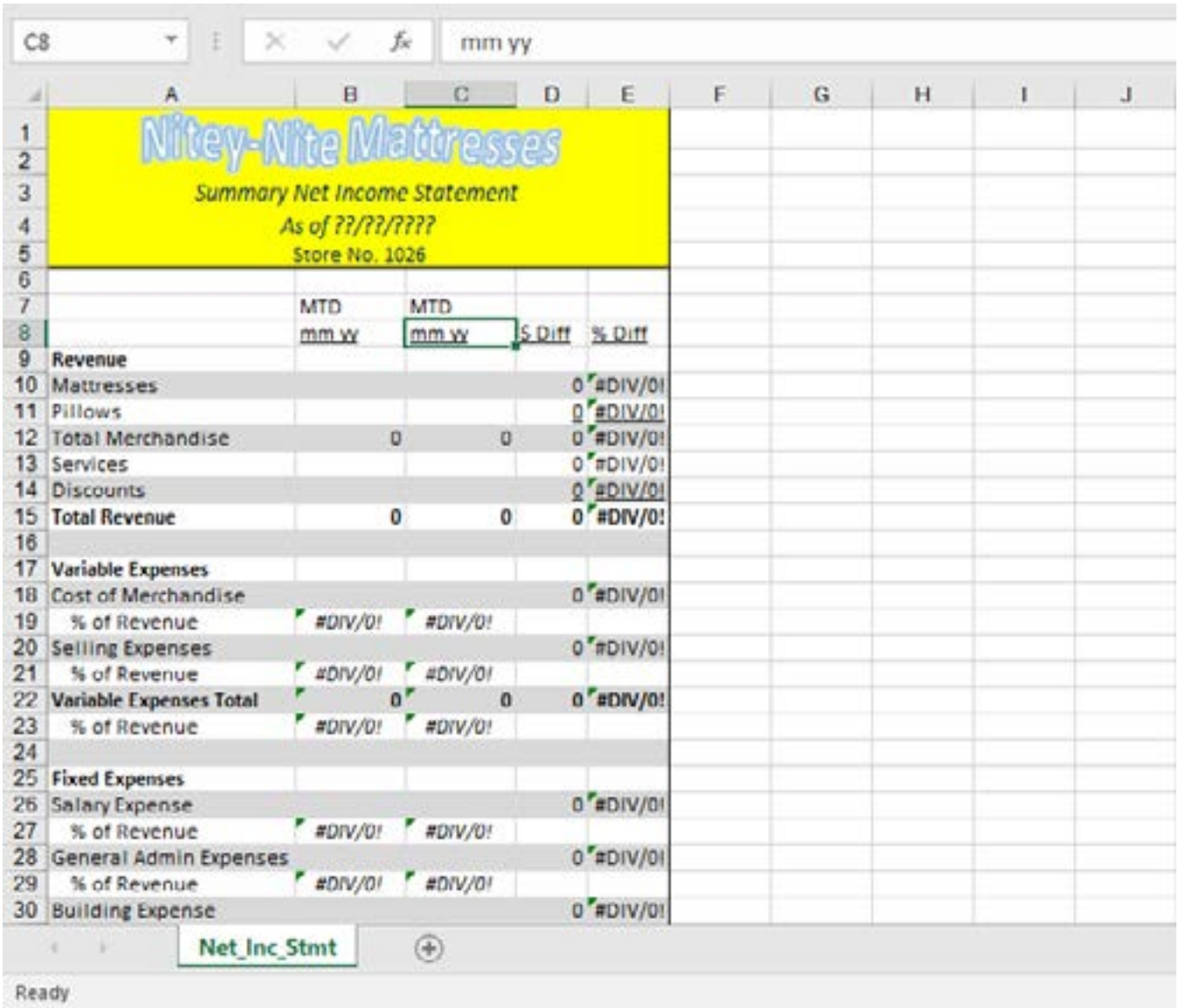


Figure 2.28

The #DIV/0! error message will appear until there are numbers in the appropriate cells.

5. *Click on* **File**, **Save As**, *navigate to the* **Chapter2** *folder, and in the* **Save As** *dialog box, click on the* **Save as type:** *drop-down menu, and choose* **Excel Template (*.xltx)**.

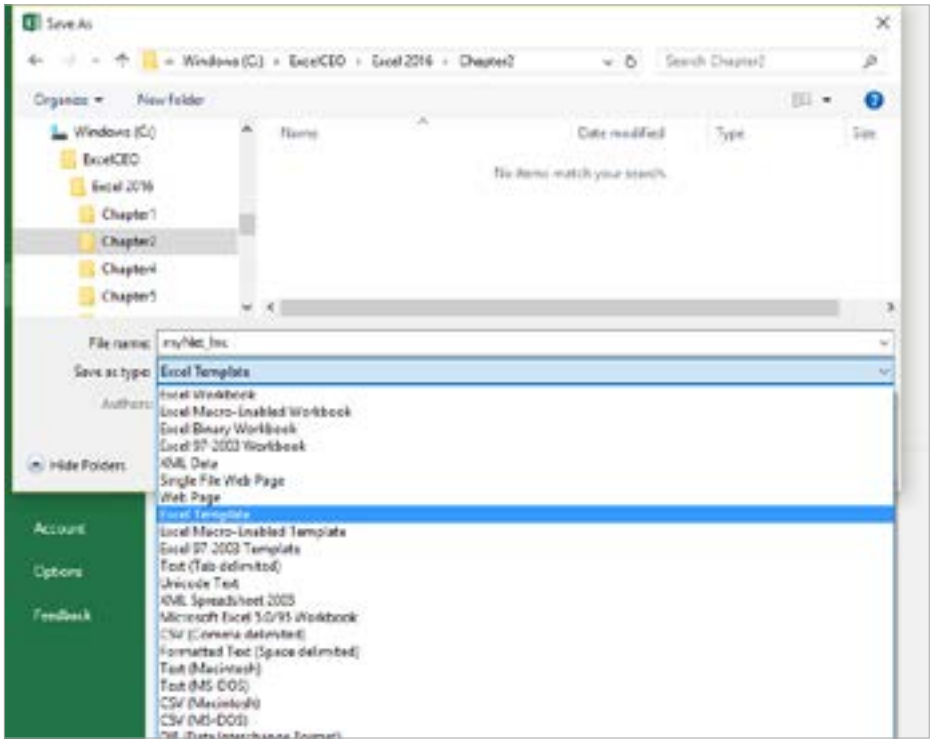


Figure 2.29

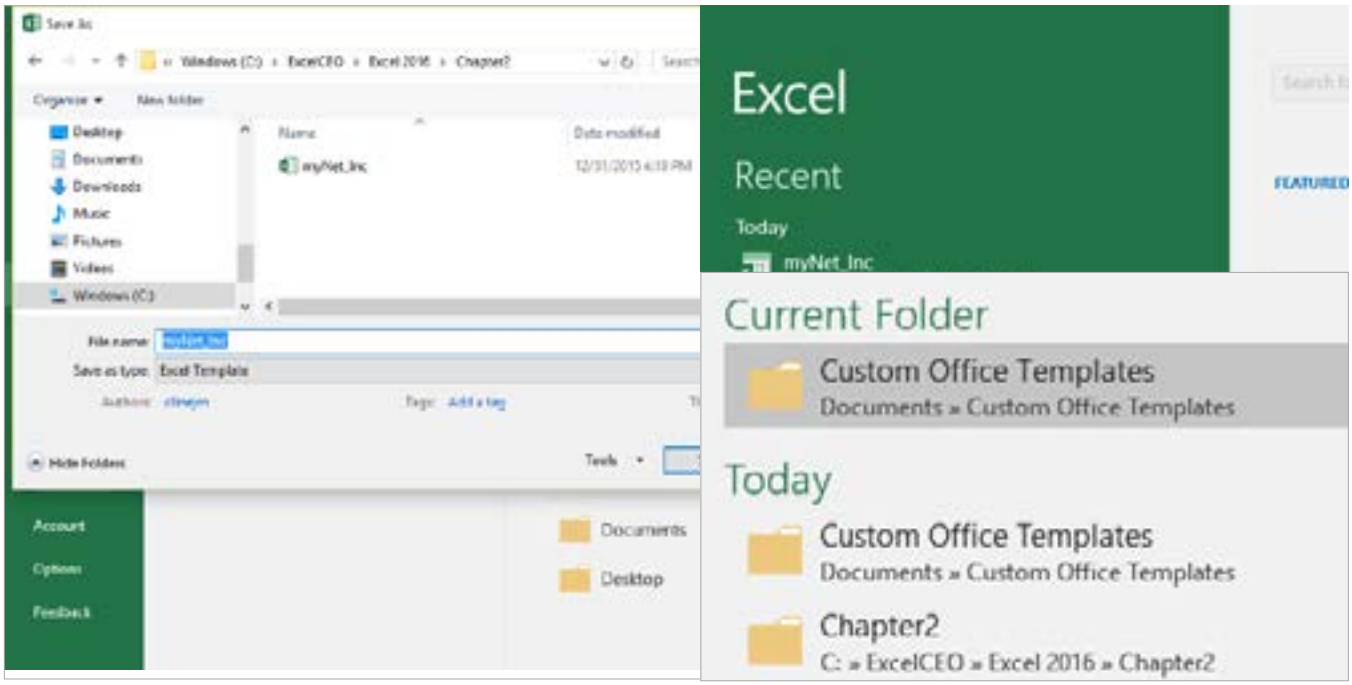


Figure 2.30

Notice that when you choose Excel Template (*.xltx), the directory is automatically changed to the default Custom Office Templates directory. It is a good idea to store templates in this directory so they will be available through the Templates dialog box.

6. *Change the name of the file to* ***myNet_Inc_Tmpl*** *and click* **Save**.
7. *Right-click on the* **Excel** *program icon on your desktop* **Taskbar**, *locate* **myNet_Inc_Tmpl**, *hover your cursor over the* **Push Pin** *icon, then click the push pin icon to* **Pin to this list**.

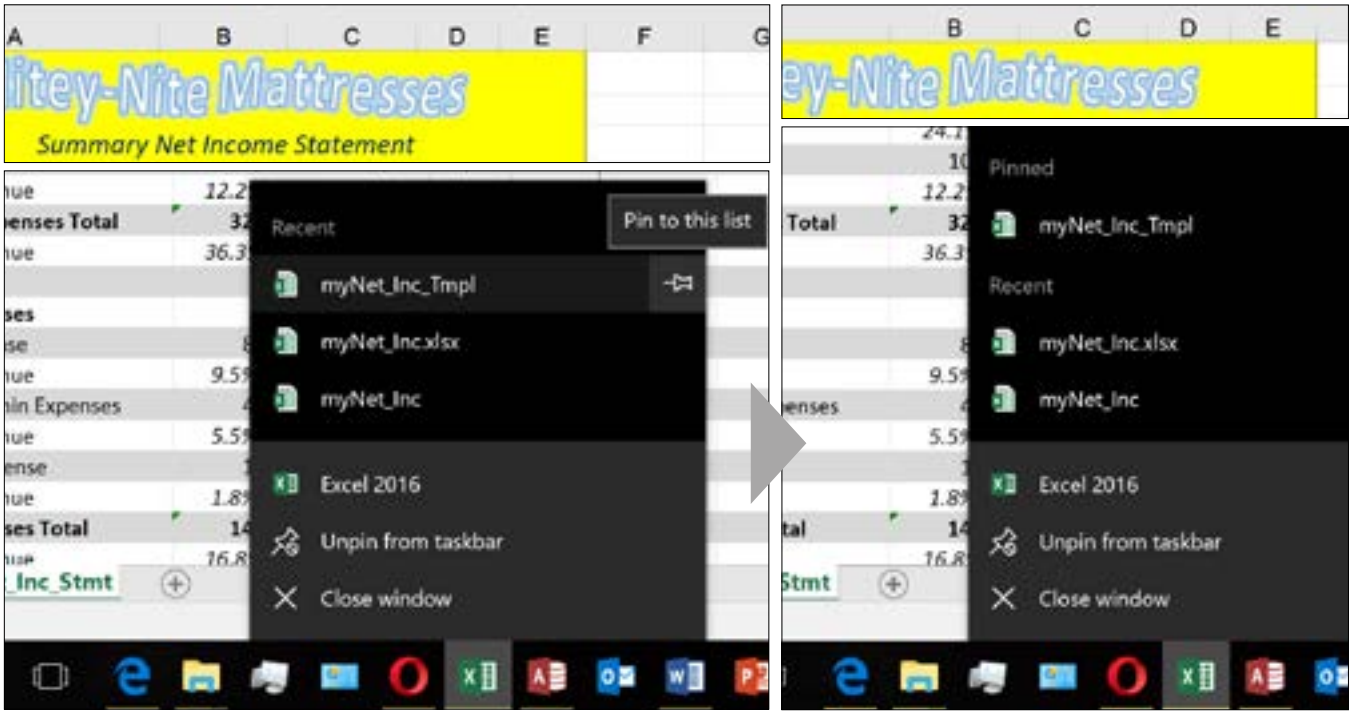


Figure 2.31

8. **Close** *the* **myNet_Inc_Tmpl.xltx** *file.*

After you closed the file, you realized that you still have Store No 1026 hard-coded. Changing a template is easy – just open it up and change it.

9. *Right-click on the* **Excel 2016** *program icon on your* **Taskbar** *to access the* **Pinned** *and* **Recent** *lists available for you in* **Excel**. *(Recent files are also available from the* **File** *tab.)*
10. *On the* **Pinned** *list, click on* **myNet_Inc_Tmpl** *(Files will initially appear in alphabetical order, but they can be re-ordered using click and drag).*
11. *Change* **Cell A5** *to* ***Store No. ????***
12. **Save** *and* **close myNet_Inc_Templ.xltx**.

Your changes are now saved to the template.

Review Questions*: It is now time to complete the hands-on Review Questions. Log on to www.ExcelCEO.com with your Email address and Password, click on the* **Excel 2016 Review Questions, Chapter 2, Section 2 of 2** *option in your Main Menu, and complete the Review Questions.*

Conclusion

In this chapter, you learned about the importance of the underscore character in field/column names. You learned more about formatting icons that are available in the Home tab. You used the Format Painter icon and different types of cell formats. You reviewed how to copy cells and performed a "mass" copy job. You learned how to use the AutoSum feature. You learned how to use Custom Formatting for special formats that aren't already available in the standard formatting choices. You learned about the various kinds of errors and what they mean. You saw how to use Absolute, Mixed, and Relative references in formulas. You learned how to indent text within a cell. You added color and lines to a report using the Fill Color, Font Color, and Borders icons. You learned how to undo your mistakes and redo actions by using the Undo and Redo buttons. You used all of these tools to format an existing file to make it look much more presentable, and you created an income statement almost from scratch. The end result was a report that you could be proud to present to any level of management. We even took a little time to analyze the final report. You ended the chapter by importing, moving, and resizing a graphic. Finally, you created a template file and Pinned it for quick access.

Chapter Exam

You can now go to www.ExcelCEO.com, click on Sign In, log in and take the exam. Make sure that you take the exam on the same computer on which you completed the practice files, as some of the questions on the exam may refer to some of the completed projects. Chapter exams are intended to be hands-on.

CHAPTER THREE — SIMPLE GRAPHICS AND FLOWCHARTS

Chapter Objectives:

- Identify and customize the Quick Access Toolbar
- Select a new folder from the Open dialog box
- Choose illustrative Shapes and Objects to incorporate into a file
- Recognize, resize, move, and format a Text Box
- Identify Flowchart items by selecting predefined Shapes
- Recognize and use WordArt to create pictures and graphics

Projects You Will Complete During This Chapter:

- *Add Chapter3 folder to ExcelCEO Excel 2016 practice files folder*
- *myArt.xlsx*

CPE Credits possible for this chapter: 2

Quick Access Toolbar

There are many useful icons available in Excel 2016. Most of the icons are the same as the ones in Excel 2007—2013. You can also customize Excel 2016 to make it friendlier to the way you work. One of the customization features I like that makes things easier is the ***Quick Access Toolbar***. The Quick Access Toolbar is located above the File and Home tabs and is where you can place the icons that you use most frequently. By default, the Quick Access Toolbar comes with the Save, Undo, and Redo icons. A picture of the default Quick Access Toolbar is illustrated below.

Figure 3.1

If you hold your cursor over the drop-down menu to the right of the Quick Access Toolbar, you will see a screen tip that reads Customize Quick Access Toolbar. In this next exercise, you will add icons to the Quick Access Toolbar using two different methods.

1. **Open** *a* **Blank workbook** *in* **Excel 2016** *(click on the* **File** *tab, then* **New**, **Blank Workbook***).*
2. *Click on the drop-down arrow to the right of the* **Quick Access Toolbar**.

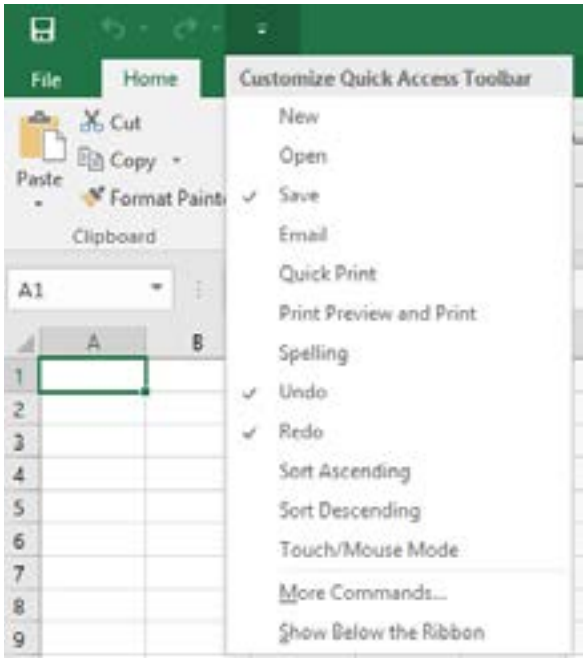


Figure 3.2

The Customize Quick Access Toolbar menu appears. Twelve options appear in the first section. These are the standard options that Excel allows you to add to the Quick Access Toolbar. Let's add a few icons that I use most frequently.

3. *Click on the* **Open** *option.*

Figure 3.3

The menu disappears and the Open icon is displayed in the Quick Access Toolbar.

4. *Using the same method, add the* **New** *icon.*

You can also add icons that don't appear as standard options in the first menu.

5. *Click on the drop-down arrow next to the* **Quick Access Toolbar**, *and click on* **More Commands…**

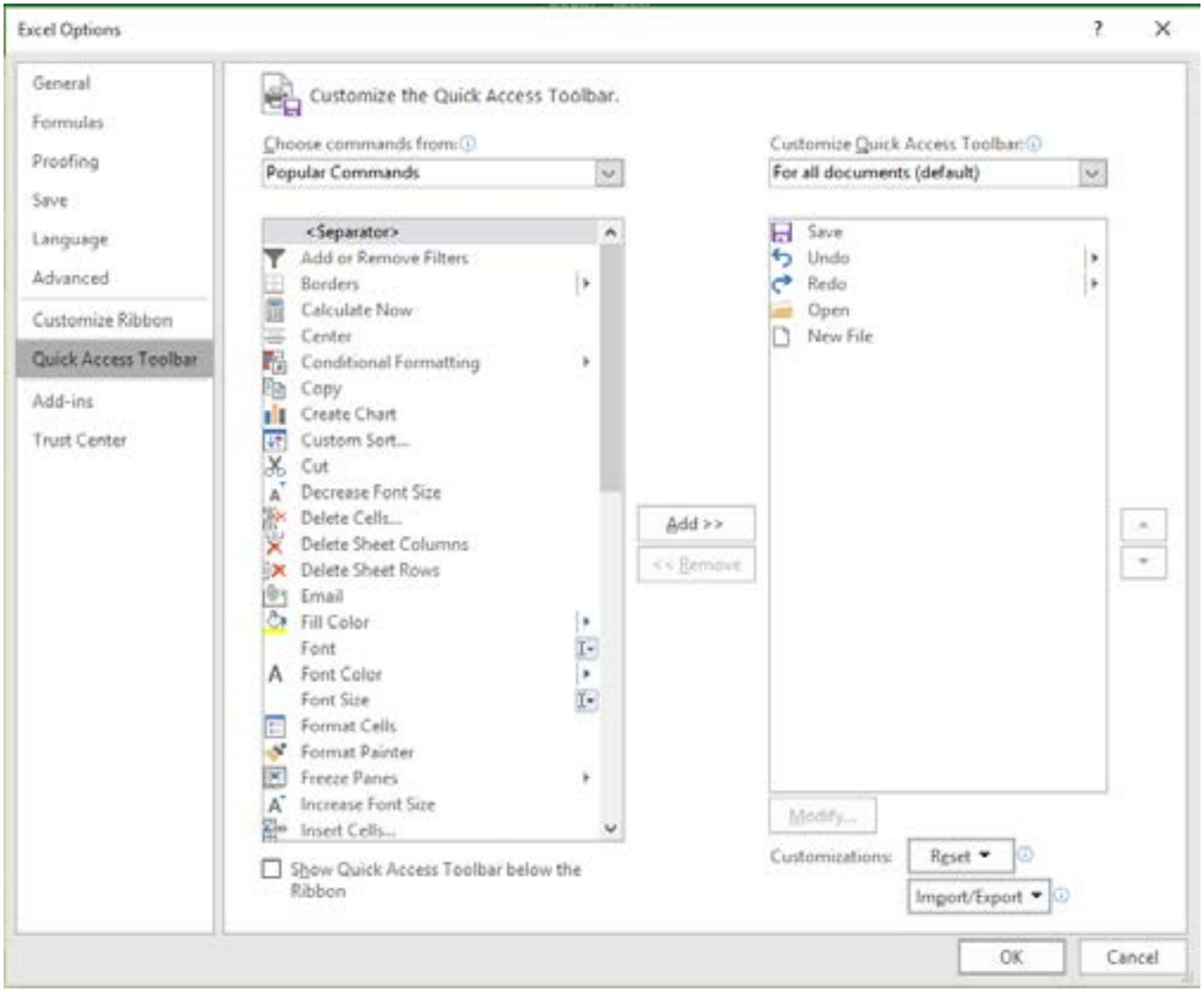


Figure 3.4

The Excel Options dialog box appears. This dialog box is also available by clicking on the File tab and choosing Options, and then by clicking on Quick Access Toolbar. On the right side of the dialog box, you see the icons you've already added. Let's add the Print Preview and Find icons. The Print Preview functionality will be discussed in more detail in Chapter 5. The Find icon allows you to find a text string or value in the spreadsheet or selection.

6. *Click on the* **Print Preview and Print** *icon*  *on the left section of the dialog box (you'll have to scroll down to find it), then click the* **Add>>**  *button between the two sections.*
7. *Click on the drop-down arrow that currently reads* **Popular Commands**, *and choose* **Home Tab**.
8. *Scroll about halfway down the list of available icons, and click on the* **Find…** *icon.* 
9. *Move it over to the section on the right.*
10. *Click* **OK**.

The Print Preview and Print and Find icons are now added to the Quick Access Toolbar. Notice the Move Up and Move Down arrows to the right-most section of the dialog box. These arrows allow you to reposition the icons in the Quick Access Toolbar. Take some time to explore this dialog box and discover some of the available options that could make your Excel life a little easier.

Create a Folder from the Open Dialog Box

To prepare for the next exercise, you need to create a folder. You can easily create a folder from the Open dialog box.

1. *Click on the* **Open** *icon*  *on the* **Quick Access Toolbar**, *and navigate to the* **C:\ExcelCEO\Excel 2016** *folder.*

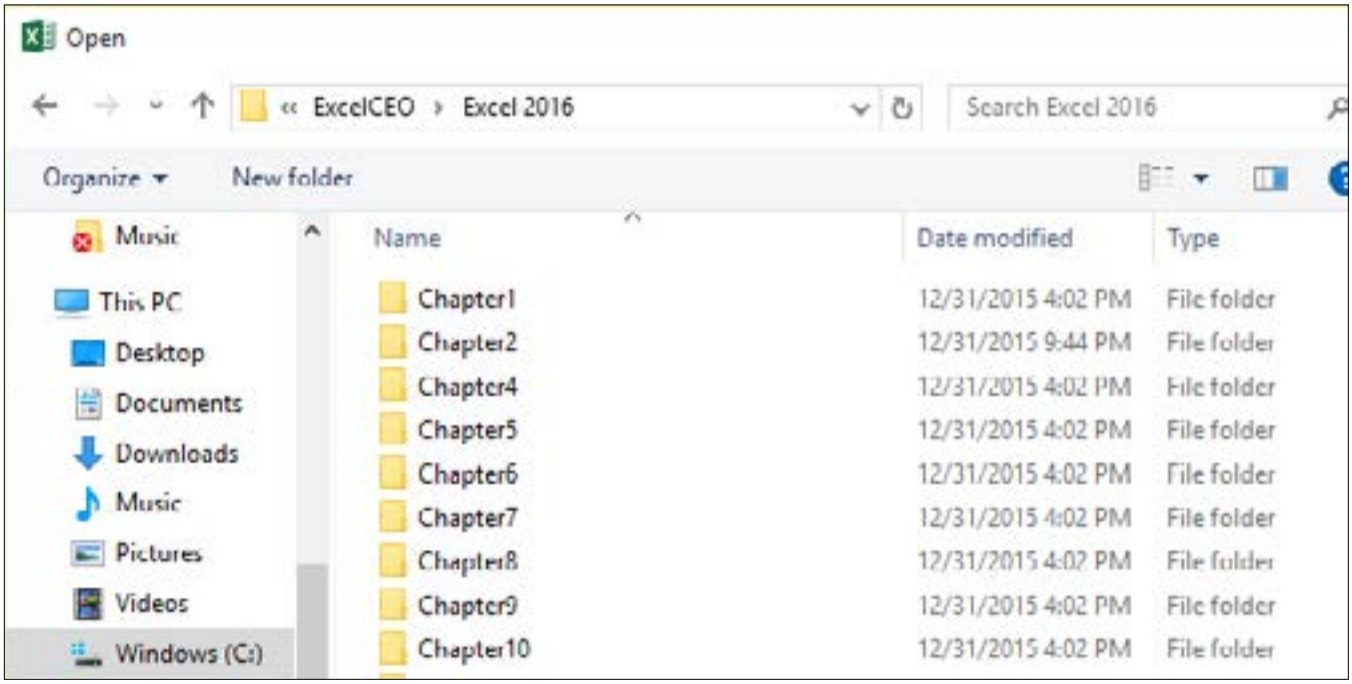


Figure 3.5

As you can see, there is no Chapter3 folder. To create the folder, simply click on the New Folder icon.

2. *In the* **Open** *dialog box, click on the* **New Folder** *text icon, name the new folder* **Chapter3**, *and click* **Open**.

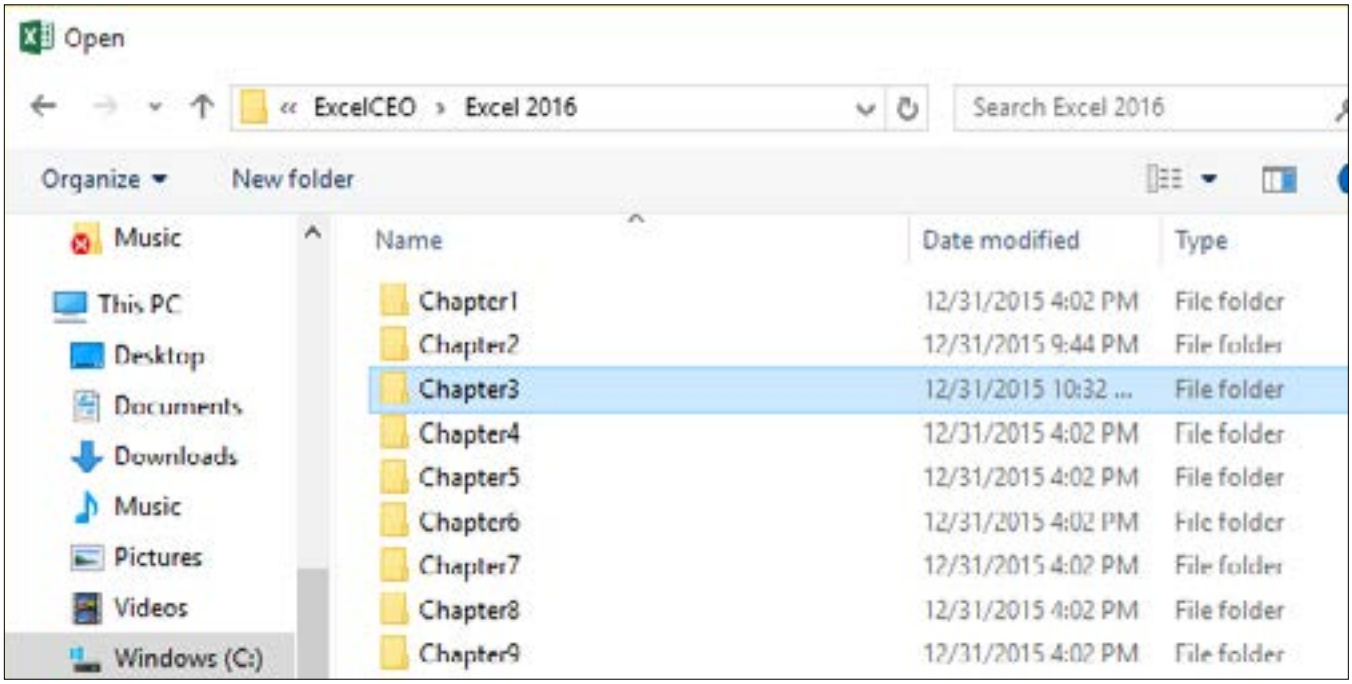


Figure 3.6

The Chapter3 folder is now created.

3. *Click* **Cancel** *in the* **Open** *dialog box.*

Creating Shapes and Objects

One toolbar that I really liked in Excel 2003 was the Drawing toolbar. In Excel 2016, the ***Drawing Toolbar*** functionalities are found in the Insert tab. There are many more icons available in Excel 2016 in the Insert tab than in the Excel 2003 Drawing toolbar. If you're an artsy kind of person (which I am definitely NOT) these icons can be a lot of fun to use. Even for people like me, having these icons can significantly compensate for my lack of artistic ability. Let's create a simple text box to show you how some of these functionalities work.

Text Boxes

Let's begin our experimentation of creating objects by drawing a ***Text box***.

1. *Return to the* **Blank workbook**.
2. *Click on the* **Insert** *tab on the* **Office Ribbon**.
3. *In the* **Text** *group, click on the icon labeled* **Text Box**. 

4. *Move your cursor to bottom-right corner of* **Cell B2**, *and click and drag to the bottom-right corner of* **Cell C4**. *This action draws the text box.*
5. *Release the mouse.*

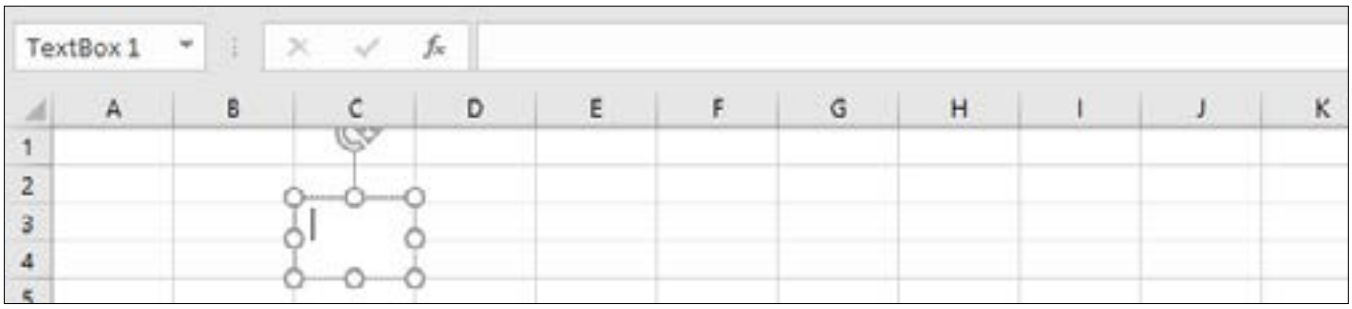


Figure 3.7

You are now in the Edit mode for a text box. The text box doesn't appear to be big enough for what we will do, but don't worry. Increasing the size of the text box is easy.

5. *Place your cursor over the handle at the bottom-right corner of the Text box.*

When you place your cursor over any corner handle, it will turn to a diagonal arrow. When you click and drag on the corner handles, you adjust the height AND width of the text box at the same time. If you use the handles in the middle of the text box's outside edges, your cursor will turn to horizontal or vertical arrows so you can adjust either the height OR the width.

6. *Drag the bottom-right handle to the bottom-right corner of* **Cell D5**, *and release.*
7. *Click inside the text box and type:* ***Nitey-Nite Mattresses***
8. *To exit out of* **Edit** *mode, press the* **[Esc]** *key twice.*

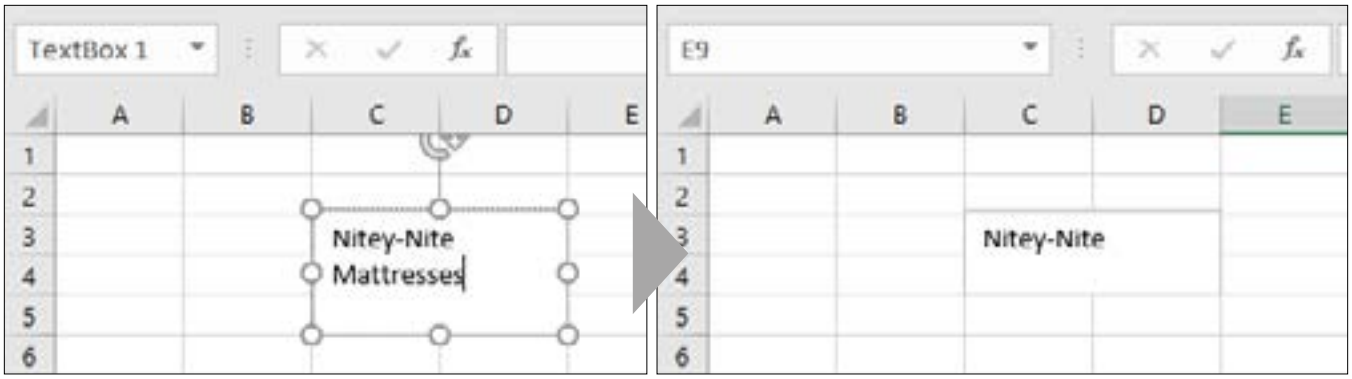


Figure 3.8

Let's format the text and move the text box up a little. You can use the icons in the Drawing Tools, Format contextual tab and in the Home tab to format the text and background of text boxes.

9. *Click inside the text box (this puts the text box into* **Edit** *mode).*
10. *Highlight all of the text with your mouse.*
11. **Bold** *and* **italicize** *the text, and change the font to a size of* **14** 11 .
12. *Drag the right edge of the text box to the right until the text fits on one line (about Cell E5).*
13. *Drag the bottom edge of the text box up to better align with the bottom of the text.*
14. *In the* **Home** *tab in the* **Font** *group, click on the down arrow on the* **Fill Color** *icon, and choose* **Yellow**.
15. *Click anywhere on the line around the text box (but not on the handles), and drag the text box to the upper-left portion of the spreadsheet with the upper-left corner of the text box somewhere in* **Cell A1**.
16. *Click on any cell outside of the text box (to exit out of* **Edit** *mode). Resize, if necessary.*

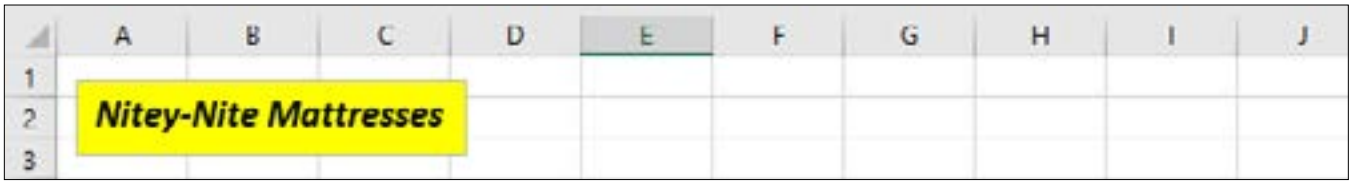


Figure 3.9

You can now move this text box to anywhere in your spreadsheet and it will maintain its same format. You can also copy this text box for use in other spreadsheets.

17. *Click anywhere in the text box to put it in* **Edit** *mode), then click anywhere on the edge of the* **Text box** *(this selects the text box without being in Edit mode).*

18. *Click the* **New Sheet** *icon*  *to create* **Sheet2**.
19. *Copy the text box (using the* **[Ctrl]+*c*** *key, or use the* **Copy** *icon) and paste (***[Ctrl]+*v***, *or the* **Paste** *icon) the text box somewhere on* **Sheet2**.
20. *Save the file as* **C:\ExcelCEO\Excel 2016\Chapter3*myArt.xlsx***.

> ***Review Questions**: It is now time to complete the hands-on Review Questions. Log on to www.ExcelCEO.com with your Email address and Password, click on the* **Excel 2016 Review Questions, Chapter 3, Section 1 of 2** *option in your Main Menu, and complete the Review Questions.*

WordArt

One of the things I like about writing courses like this is the opportunity I have to criticize Microsoft. ***WordArt*** is a fun tool to create more advanced graphics, but they changed it a little bit from Excel 2003 to later versions. I was all ready to slam Microsoft on their "enhancement" of Excel 2007's version of WordArt, but I was disappointed in that effort. When I first looked at WordArt in Excel 2007, I didn't like it. But after I started working with it, I liked it MUCH better than the WordArt in Excel 2003. WordArt in Excel 2016 is identical to the rest of the Office 2016 and Office 2013 programs, and much simpler to use than in previous versions.

If you have used WordArt in Excel or in other previous versions of Office programs, it may be time to revisit them and choose a new favorite setting or two. Many of the functions are the same, but the layout may require some adjustment, as you can no longer see a preview of the text from the options box as with Excel 2007 and 2003. WordArt in Excel 2016 is simplified even from Excel 2010, as shown below.

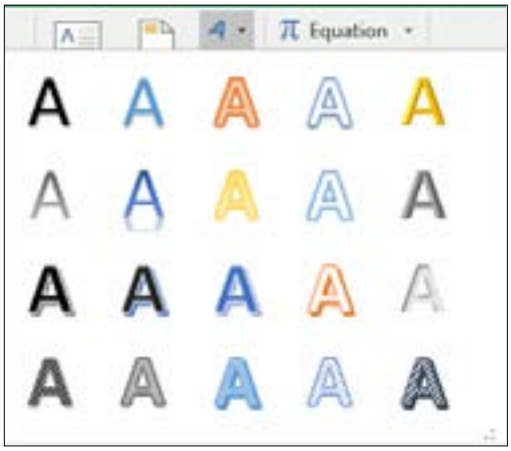


Figure 3.10

When you click on the WordArt in the Text group of the Insert tab in Excel 2016, you get the following:

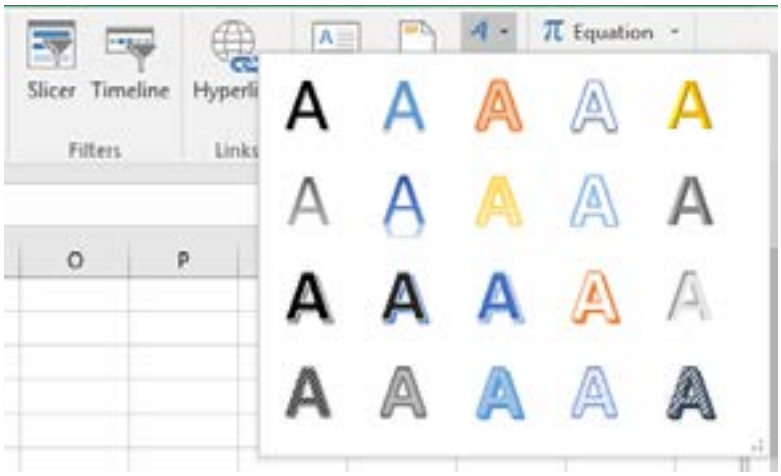


Figure 3.11

It doesn't automatically show you the cool kinds of styles available as in the previous versions. However, let's use it a little and explore some of the enhancements.

1. *Click on the* **New Sheet** *icon to create a* Sheet3 *tab.*
2. *Click on the* **WordArt** *icon* *in the* **Text** *group of the* **Insert** *tab.*
3. *Click on the letter* **A** *in the second row, first A on the left.*

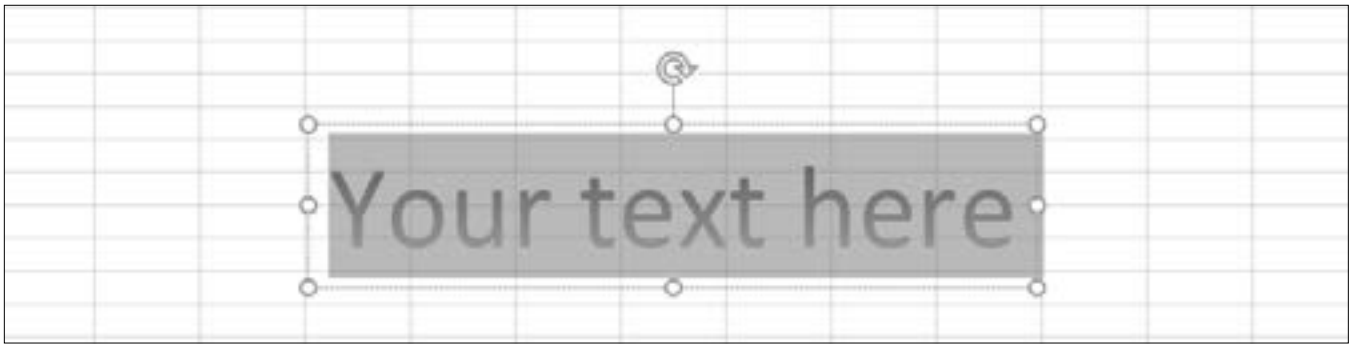


Figure 3.12

Once you click on the letter A, you see the beginning of an object with the text "Your text here". Additionally, the ***Drawing Tools, Format*** contextual tab appears in the Office Ribbon that contains a number of tools you can use to modify the WordArt graphic. We will use several of those tools just to show you how they work. You can explore other icons on your own.

4. *Replace* **Your Text Here** *with* ***Nitey-Nite Mattresses***
5. *With your cursor, select the text* **Nitey-Nite Mattresses**
6. *When you finish selecting the text, release the mouse without moving it.*

When you finish selecting the text and release the mouse (without moving it), you should see a faint image of miscellaneous controls, as in the following figure.

Figure 3.13

7. Move your cursor over the faint image and it will become clearer.

8. In the **Font Size** *box, replace the existing size with* **20**.

9. Italicize the selection.

10. Click anywhere outside the graphic to deselect it.

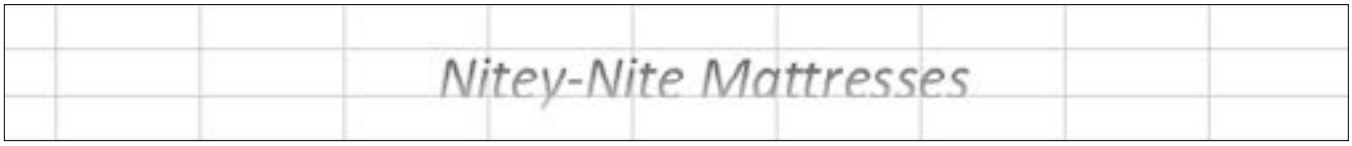


Figure 3.14

The floating graphic is now formatted and can be moved to any part of the spreadsheet by simply clicking on it and dragging it to its new location just like you did with text boxes. When you click on the graphic to place it in Edit mode, you will see square handles (or boxes) on the corners and its sides. When you click and drag the handles, it adjusts the height and width of the graphic. The handles adjust the height or the width, whichever one you choose. The handle above the graphic controls its rotation. Click and drag these handles back and forth to see what they do. Click on the Text Effects button in the Format tab and click on the Transform button to give it some more pizzazz. Play around with it as much as you want. Feel free to explore this feature by using different WordArt styles, fonts and colors, as most of the selections in the FORMAT tab are self-explanatory. But now we're going to explore one of my favorite utilities of using shapes, flowchart objects.

Flowcharts

There are many stand-alone ***flowcharting*** programs out there, but I have yet to see any of them that are easier to use as Excel. Excel flowcharting is basically putting a bunch of text boxes and other objects on a worksheet and connecting them with lines. You access the flowcharting tools from the Illustrations group of the Insert tab.

In this next exercise, we will document in a flowchart an accounting process for submitting a journal entry to the General Ledger. The process is as follows: 1) The Senior Accountant creates a journal entry, 2) The Senior Accountant emails the journal entry to the Accounting Supervisor, 3) The Accounting Supervisor Reviews it and either sends it back to the Senior Accountant for rework or, if approved, emails it to the Accounting Clerk, 4) The Accounting Clerk uploads the journal entry into the General Ledger system. It's a straightforward process and easy to put into a flowchart. To start, we need to Insert a new worksheet.

1. *Click on the* **New Sheet** *icon next to the* Sheet3 *tab to create a new worksheet.*

2. *Click on the* **Insert** *tab in the* **Office Ribbon**, *and then click on the* **Shapes** *icon*  *in the* **Illustrations** *group.*

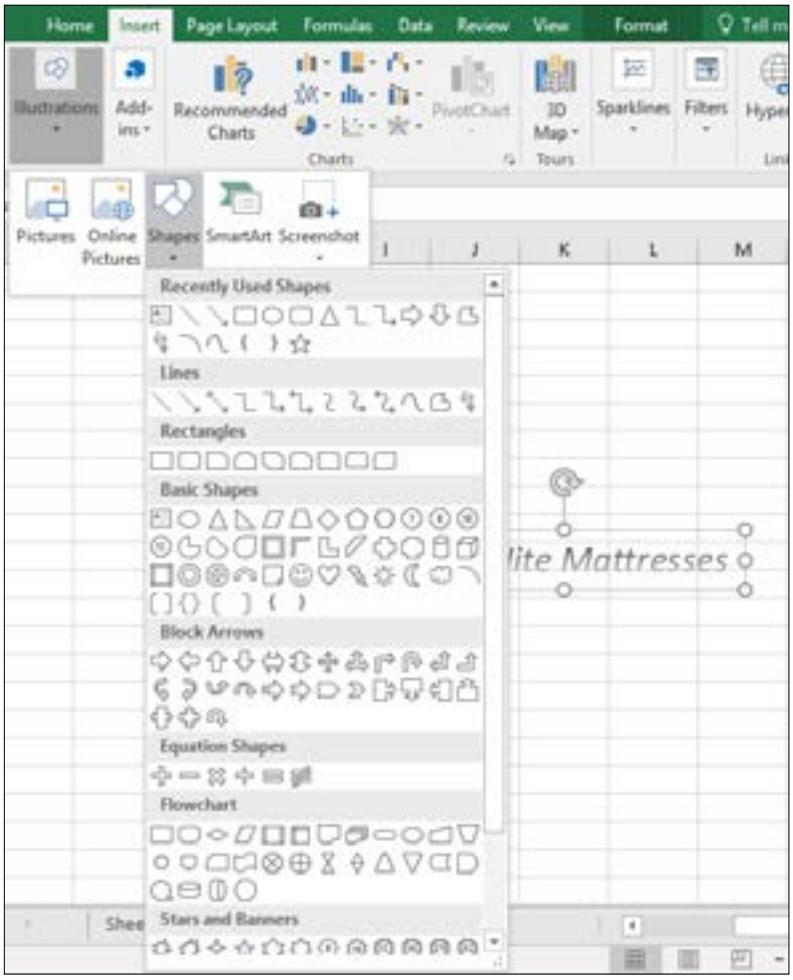


Figure 3.15

The Shapes dialog box appears with several choices from which to choose. You can try others later, but for now we'll concentrate on the Flowchart options.

3. *Click on the* **Flowchart: Preparation** *figure.* 
4. *With your cursor appearing as a "+" sign, draw a rectangle from the upper-left corner of* **Cell B4** *to halfway through* **Cell D7**, *then release the cursor.*
5. *In the* **Preparation** *box, type:* ***Senior Accountant creates/reworks journal entry.***
6. *While in* **Edit** *mode, click the* **Center**  *icon on the* **Alignment** *group on the* **Home** *tab (to center the text), and click outside the* **Preparation** *box.*
7. *Resize the box using the handles, if necessary, to look like the following figure:*

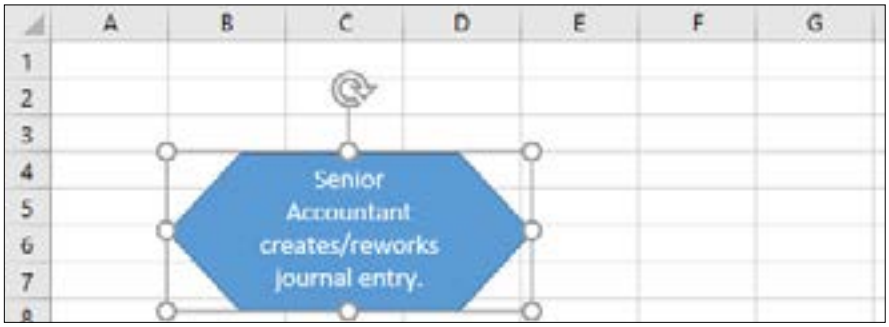


Figure 3.16

8. *Choose the* **Flowchart: Process** *graphic* ▭ *from the* **Shapes** *option.*
9. *Draw the* **Process** *box to the right of the* **Preparation** *box, beginning at about* **Cell F4**.
10. *In the* **Process** *box, type:* ***Senior Accountant emails journal entry to Accounting Supervisor.*** *This is* **Process Box 1**.
11. *Make sure the text is centered. Resize and/or reposition the box, as necessary, to appear as in Figure 3.17, and exit the box.*
12. *From the* **Shapes** *list, under the* **Lines** *section, choose* **Arrow**. ↘
13. *Move your cursor (now in the shape of a "plus" sign) over the* **Preparation** *box, and all connection points will turn red or black. Position your cursor over the right-most connection point on the* **Preparation** *box, click, and hold.*
14. *Now move your cursor over* **Process Box 1** *and all connection points will appear. Click on the left-most connection point.*
15. *Click outside the flowchart.*
16. *Reposition* **Process Box 1** *where the connecting arrow is a straight line from the* **Preparation** *box to* **Process Box 1**. *The arrow will remain connected to* **Process Box 1** *as you move it.*

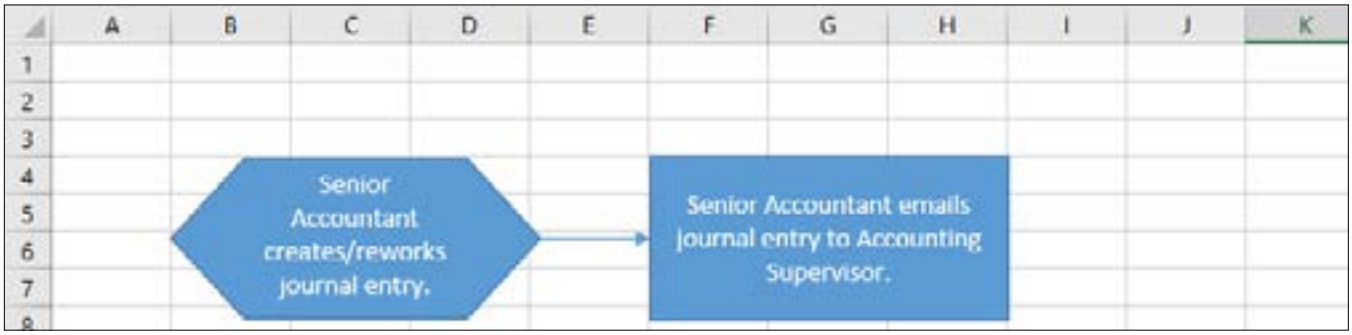


Figure 3.17

You can also move any of the objects with the arrow keys on your keyboard while the object is selected.

17. *Choose the* **Flowchart: Decision** *icon* ◇ *from the* **Shapes** *icon, and draw the box to the right of* **Process Box 1**.
18. *In the* **Decision** *box, type:* ***Approval?***

19. *Connect* **Process Box 1** *to the* **Decision** *box with an* **Arrow**.

Figure 3.18

At this point, look at Figure 3.19. You should be able to create the rest of the flowchart on your own. You can create the Yes and No boxes by using a Text Box and taking out the border. Try it on your own and see how close you can get to the end product. If you need a little help, follow steps 20 – 33.

20. *Below* **Process Box 1**, *create another* **Process** *box that reads:* ***Accounting Supervisor emails journal entry back to Senior Accountant for rework.*** *This is* **Process Box 2**.
21. *Connect the bottom connection point on the* **Decision** *box to the right side of* **Process Box 2** *by using an* **Elbow Arrow Connector**.
22. *Connect the* **Process Box 2** *to the bottom of the* **Preparation** *box by using an* **Elbow Arrow Connector**.
23. *Below and slightly to the left of the* **Decision** *box, insert a text box with the word* **No** *in it.*
24. *Resize the text box to be small and take out the line around it (Right-click on the "***No***" text box border and click on the drop-down menu below the* **Outline** *icon and choose* **No Outline**).
25. *Create another* **Process** *box to the right of the* **Decision** *box. In it, type:* ***Senior Accountant emails journal entry to Accounting Clerk.*** *This is* **Process Box 3**.
26. *Connect the* **Decision** *box to* **Process Box 3** *using an* **Arrow**.
27. *Copy and paste the* **No** *text box. In the copied text box, change the text to* **Yes** *and move it to be positioned above the connecting line between the* **Decision** *box and* **Process Box 3**.
28. *Below* **Process Box 3**, *create another* **Process** *box that reads:* ***Accounting clerk uploads journal entry to General Ledger.*** *This is* **Process Box 4**.
29. *Connect the two using an* **Arrow**.
30. *Below* **Process Box 4**, *create a* **Magnetic Disk** *object* *and label it:* ***General Ledger***.
31. *Connect the two with an* **Arrow**.
32. *Make sure the text in all text boxes is centered.*
33. *In the* **Show** *group of the* **View** *tab, uncheck the* **Gridlines** *box to remove visible gridlines behind your flowchart.*

Your flowchart should look like the figure below:

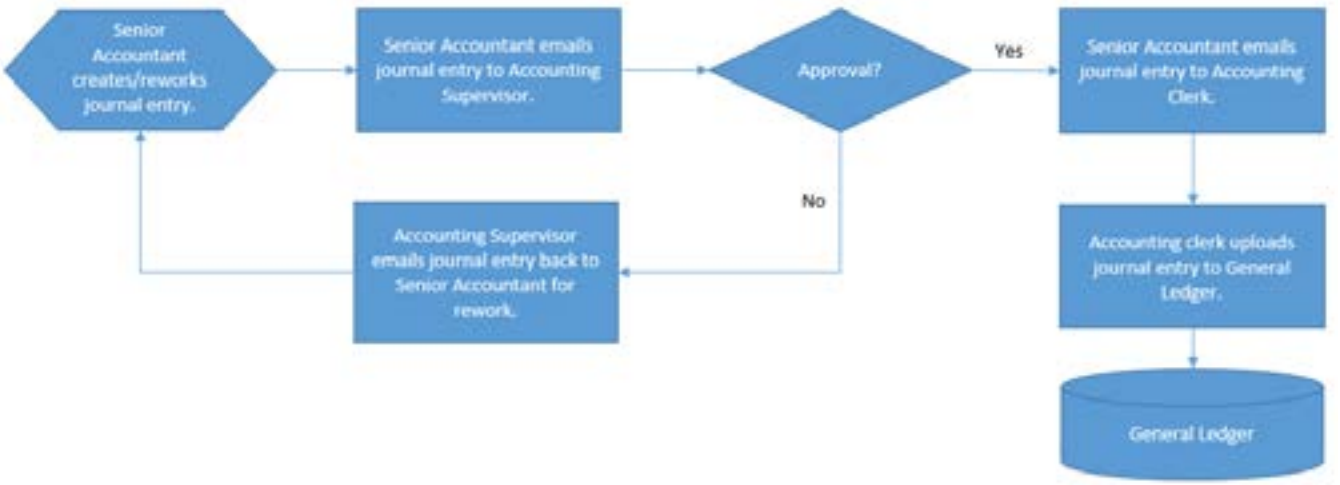


Figure 3.19

33. **Save** *and* **close myArt.xlsx**.

One note on using shapes – if you hold down the [Shift] key while drawing a shape, it will keep the shape's proportions constant. For example, if you click on the Oval shape and draw it with your mouse, you will almost always get an oval shape. But if you hold down the [Shift] key while drawing the oval, it will be a circle.

In this course, we will use many icons in most of the tabs. The Shapes objects are just one example of the many functionalities available with Excel. I encourage you to explore other tools as you come across them.

> ***Review Questions**: It is now time to complete the hands-on Review Questions. Log on to www.ExcelCEO.com with your Email address and Password, click on the* **Excel 2016 Review Questions, Chapter 3, Section 2 of 2** *option in your Main Menu, and complete the Review Questions.*

Conclusion

In this chapter, you learned how to create a folder from within the Open dialog box. You customized the Quick Access Toolbar by clicking on its drop-down arrow and choosing icons to be included in it. Next, you learned how to create and format shapes and objects, starting with text boxes. You discovered how to create graphics using WordArt. Finally, you created a Flow Chart by using the Flow Chart objects in the Shapes dialog box.

Chapter Exam

To take the examination for this chapter, you must have successfully completed the examination for the previous chapter. You can now go to www.ExcelCEO.com, click on Sign In, log in and take the exam. Make sure that you take the exam on the same computer on which you completed the practice files, as some of the questions on the exam may refer to some of the completed projects. Chapter exams are intended to be hands-on.

CHAPTER FOUR - SORTING, SUBTOTALING AND FILTERING

Chapter Objectives:

- Select and open multiple files of related data
- Choose the appropriate Sort Ascending and Sort Descending icons
- Select and use Custom Sort options
- Identify subtotal functionality for summarizing data
- Choose data filters for numeric and text data
- Identify and use the Top Ten filter
- Select Advanced and Search filtering

Projects You Will Complete During This Chapter:

- *my2015_Sales.xlsx*
- *myItem.xlsx*
- *myQ3_Sales.xlsx*

CPE Credits possible for this chapter: 2

Introduction

Once I had an assignment to take over a report that someone else had developed. That employee had the responsibility of calculating incentive travel. She created reports showing who won the various trips the salespeople could earn. The top X number of salespeople who sold the most over their budget won an all expense paid trip, and EVERYONE wanted to win. My job was to see how this employee created the report, and take over the maintenance of the report. I was expecting to see sophisticated calculations, databases, and spreadsheets since I was doing these calculations for literally thousands of sales people. I discovered she was simply taking a spreadsheet that someone in the Accounting department had given her, summing each sales person's sales, and sorting it in Descending order by the amount sold. The top producers were the first ones on the list, and they got to go on the trip. We spent a lot of money to take those people on the trip, and it was almost scary how easy it was to determine who got to go.

Excel provides many wonderful tools that allow you to sort, summarize, and filter your data without having to do ANY complex calculations. Sorting data is very useful, particularly if you need to rank the data from top to bottom, or if you want to identify some type of trends that may exist in the data. After you've sorted your data, you may want to calculate subtotals to see sums of certain groups of numbers. Then you can filter out what you don't need or display only what you want to see. This chapter will teach you how to do all of this in just a few easy clicks of the mouse.

Working with Multiple Files

To begin this chapter, however, I'd like to talk about combining files. Often, you will not be able to control the format or manner in which files or data are sent to you. When people give you information, it usually comes in the format that *they* are more comfortable with. Sometimes it comes to you in different files and you have to put it together. In the next exercise, you will open three files at once and combine them into one file.

1. *Open* **Excel 2016**.
2. *Click on the* **Open** *icon and navigate to* **C:\ExcelCEO\Excel 2016\Chapter4**.
3. *Click on the* **Aug_Sales.xlsx** *file, hold down the* **[Ctrl]** *key, and click on the* **Jul_Sales.xlsx** *and the* **Sep_Sales.xlsx** *files.*
4. *Release the* **[Ctrl]** *key, right-click on a selected file, then click* **Open**.

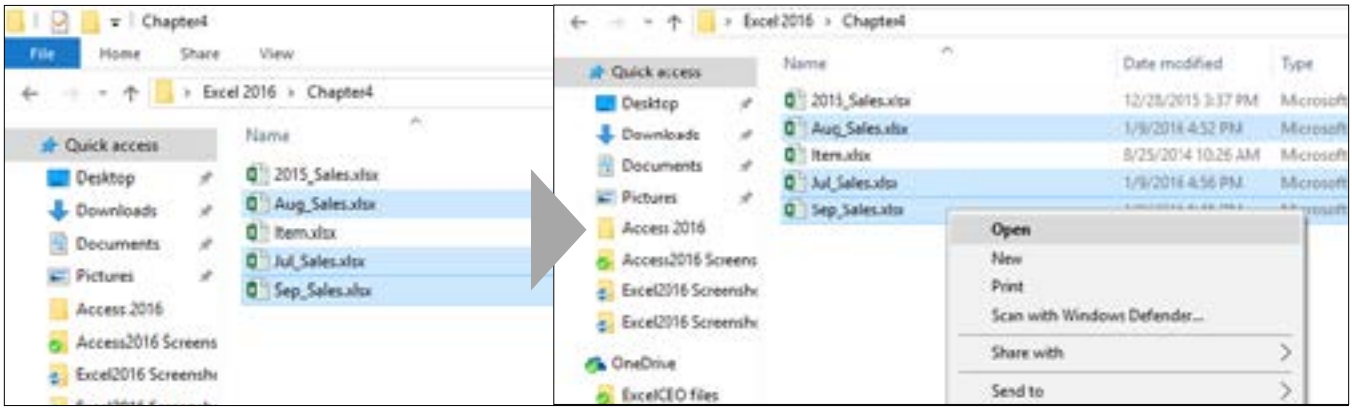
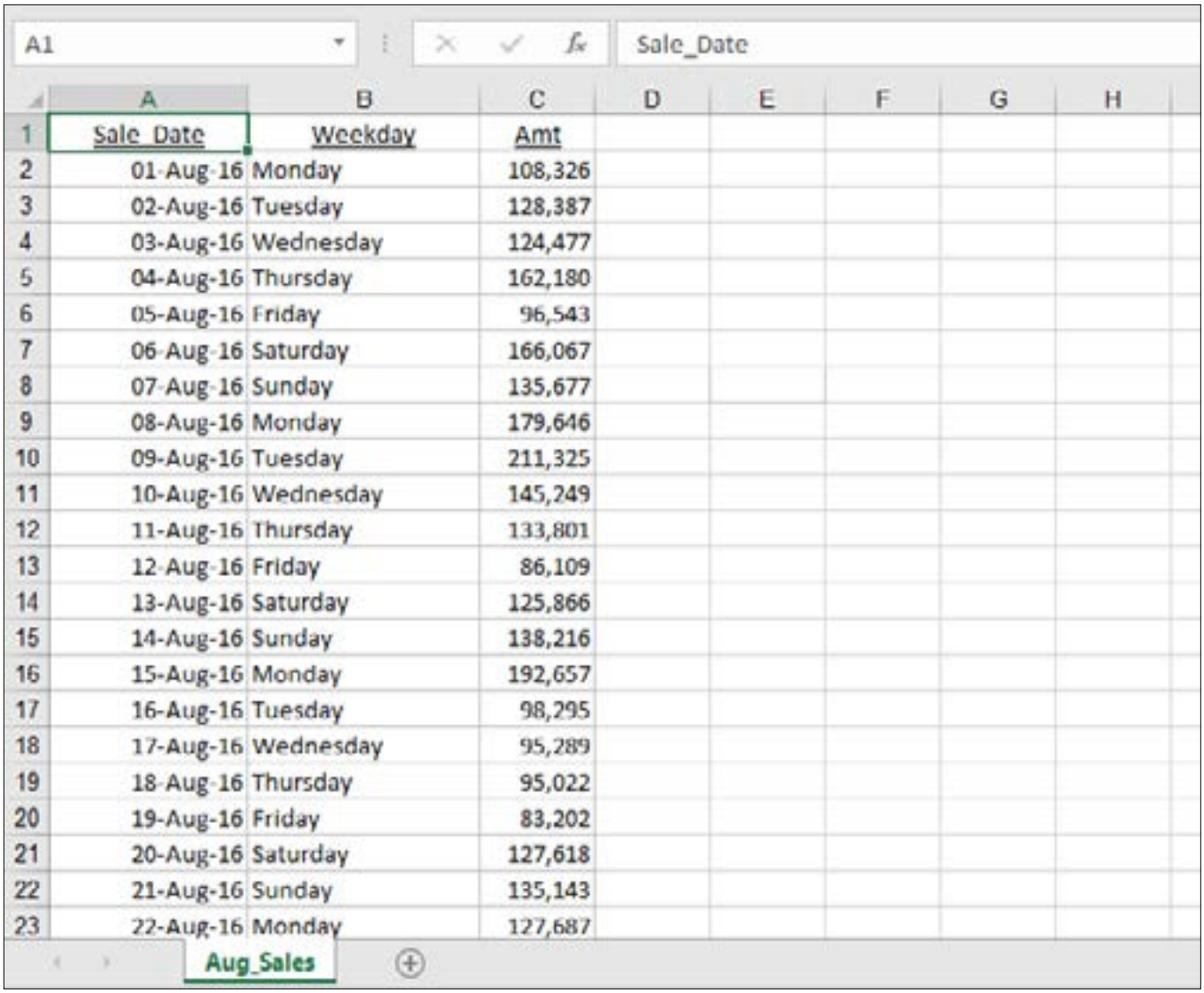


Figure 4.1

***Tip**: If your computer settings do not allow opening multiple files directly from Excel 2016 due to single-click, you can also navigate to the* **Chapter4** *folder from* **File Explorer** *from the* **Start Menu**, *then follow Steps 3-4.*

All three files open at once. In older versions of Excel, you could only view one workbook at a time, and the program would make you toggle between them. Microsoft finally made it possible, by default, to open workbooks in separate windows, and view them side-by-side. This is a very useful enhancement that should feel natural to you soon, if not already. If you find you preferred the Cascading layout for workbooks, that is still available to use from the Windows group in the view tab of the Office Ribbon. The old features still work when you want to view multiple workbooks at once, so let's explore some of them now. Below, you can see each file you opened is visible in a separate window rather than as tabs.



	A	B	C
1	Sale_Date	Weekday	Amt
2	01-Aug-16	Monday	108,326
3	02-Aug-16	Tuesday	128,387
4	03-Aug-16	Wednesday	124,477
5	04-Aug-16	Thursday	162,180
6	05-Aug-16	Friday	96,543
7	06-Aug-16	Saturday	166,067
8	07-Aug-16	Sunday	135,677
9	08-Aug-16	Monday	179,646
10	09-Aug-16	Tuesday	211,325
11	10-Aug-16	Wednesday	145,249
12	11-Aug-16	Thursday	133,801
13	12-Aug-16	Friday	86,109
14	13-Aug-16	Saturday	125,866
15	14-Aug-16	Sunday	138,216
16	15-Aug-16	Monday	192,657
17	16-Aug-16	Tuesday	98,295
18	17-Aug-16	Wednesday	95,289
19	18-Aug-16	Thursday	95,022
20	19-Aug-16	Friday	83,202
21	20-Aug-16	Saturday	127,618
22	21-Aug-16	Sunday	135,143
23	22-Aug-16	Monday	127,687

Figure 4.2

5. *To see all of your open files, click on the* **Switch Windows** *icon on the* **View** *tab. The visible file will have a check mark next to it.*

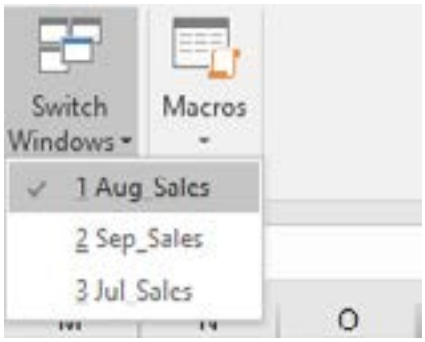


Figure 4.3

6. *If necessary, click to* **activate** *the* **Jul_Sales** *file.*

> ***Trick**: Toggling between files can also be done from the* **snap menu** *on the* **Windows Taskbar**, *as seen on the bottom of the following figure which displays open files when you hover your cursor over the* **Excel 2016** *icon.*

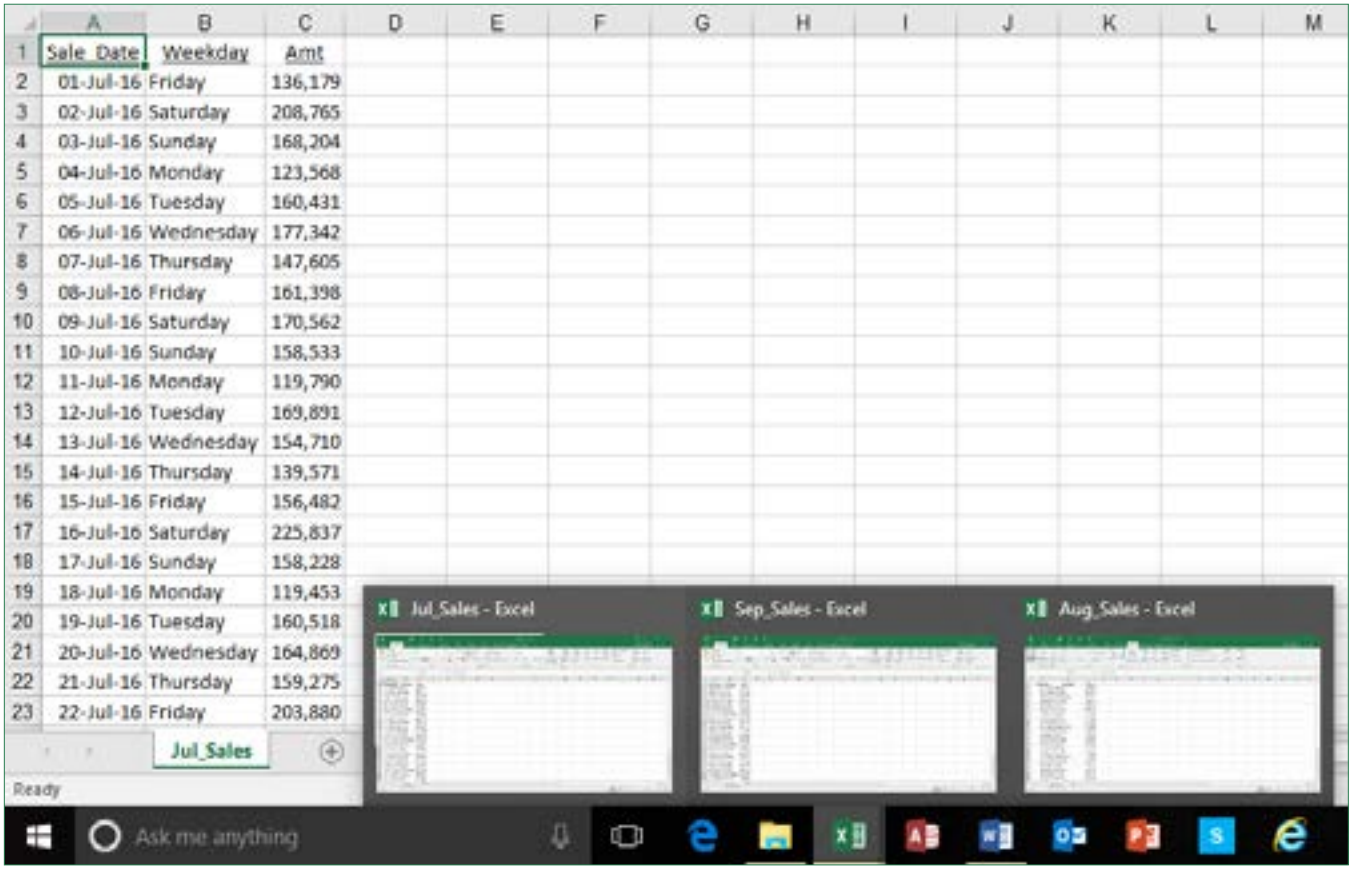


Figure 4.4

7. **Save** *the* **Jul_Sales.xlsx** *file as* ***myQ3_Sales.xlsx***.

We will combine the data in each of the files into one file called myQ3_Sales.xlsx. Now that you have all the files open, there are various options you have to quickly organize the view to help you work with them. Let's arrange them in a cascading order.

8. Click on the **Arrange All** *icon*  *in the* **Window** *group of the* **View** *tab.*

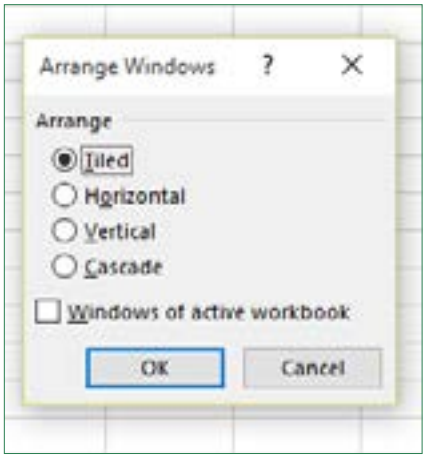


Figure 4.5

The Arrange Windows dialog box appears. In this box, you can tell Excel how to arrange the view of the files, choosing from Tiled, Horizontal, Vertical, and Cascade.

9. Click on the **Cascade** *radio button, and click* **OK**.

You now see all of the open files overlapping in one screen. The July file does not appear because you saved it as myQ3_Sales.xlsx. To make a file active, just click on the name of the file in that corresponding file's title bar.

10. Click on the **Aug_Sales** *file to make it active.*

Now we will copy the Aug_Sales tab into the myQ3_Sales file.

11. In the **Aug_Sales** *file, right-click on the* 

tab, and choose **Move or Copy…** *from the pop-up menu.*

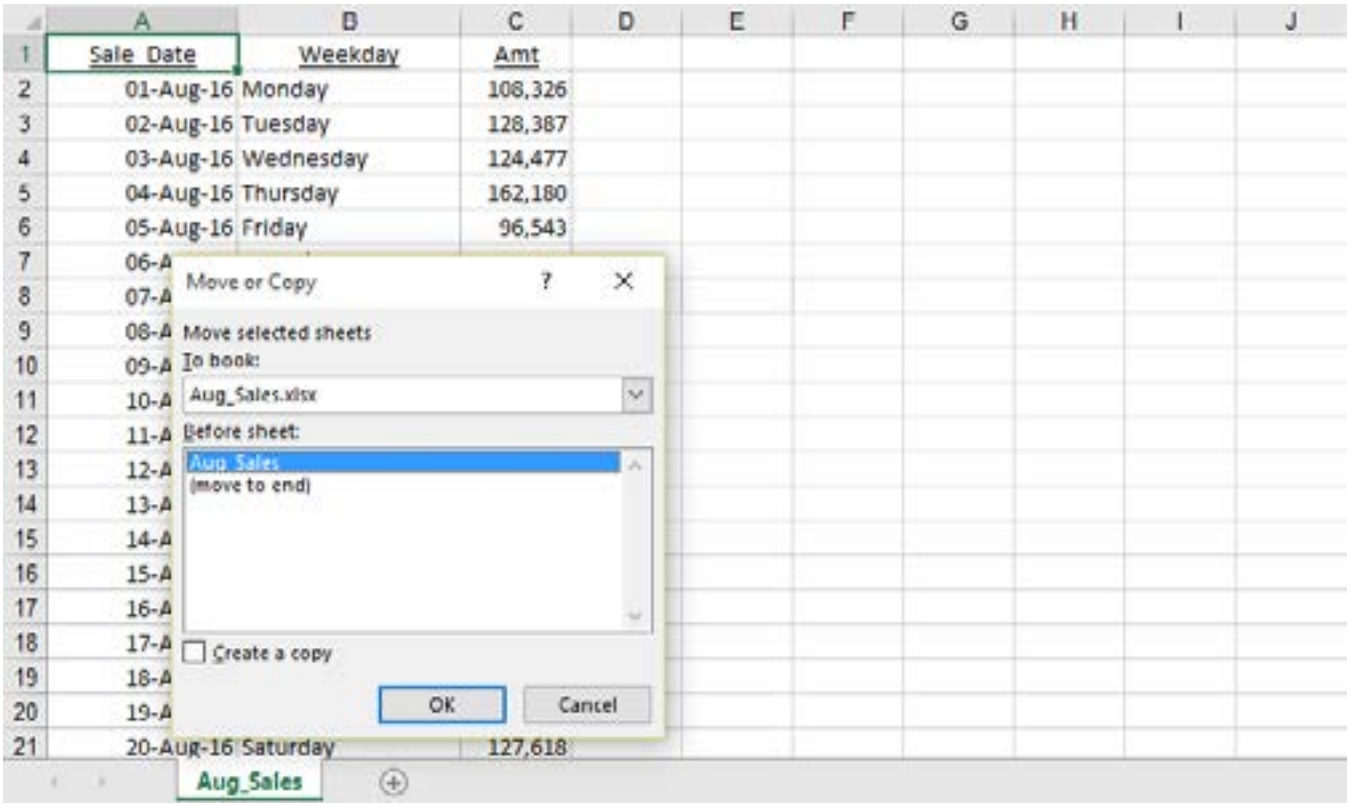


Figure 4.6

The Move or Copy dialog box appears.

12. *Click on the drop-down menu under* **To book:** *and choose* **myQ3_Sales.xlsx**.
13. *Click on* **(move to end)** *in the* **Before sheet** *list, check the* **Create a copy** *checkbox, and click* **OK**.

Now the myQ3_Sales file has two tabs: Jul_Sales and Aug_Sales.

14. *Copy the* Sep_Sales *tab in the* **Sep_Sales** *file over to the* **myQ3_Sales** *file.*

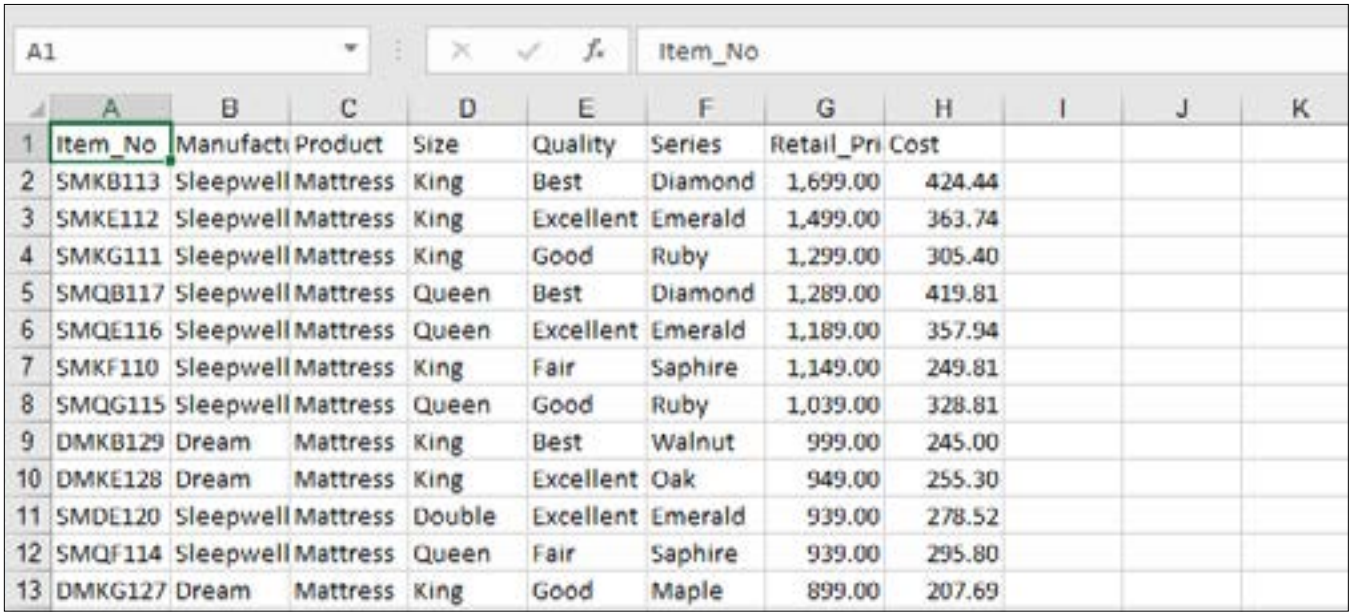
The myQ3_Sales file should now contain three tabs of data: Jul_Sales, Aug_Sales and Sep_Sales.

15. *Click on the* **Maximize** *button on the* **myQ3_Sales** *file (to take off the* **Cascade** *View).*
16. **Save** *and* **close** *the three files.*

Sorting

The next topic is sorting. Let's suppose that you want to see how many manufacturers you purchase products from. This is very easy to do, and you can do this by using the ***Sort Ascending*** and ***Sort Descending*** icons. In the next exercise, you will open the Item file and perform sorts on it.

1. **Open** *the file at* **C:\ExcelCEO\Excel 2016\Chapter4\Item.xlsx**.
2. **Save As C:\ExcelCEO\Excel 2016\Chapter4*myItem.xlsx***.



	A	B	C	D	E	F	G	H	I	J	K
1	Item_No	Manufacti	Product	Size	Quality	Series	Retail_Pri	Cost			
2	SMKB113	Sleepwell	Mattress	King	Best	Diamond	1,699.00	424.44			
3	SMKE112	Sleepwell	Mattress	King	Excellent	Emerald	1,499.00	363.74			
4	SMKG111	Sleepwell	Mattress	King	Good	Ruby	1,299.00	305.40			
5	SMQB117	Sleepwell	Mattress	Queen	Best	Diamond	1,289.00	419.81			
6	SMQE116	Sleepwell	Mattress	Queen	Excellent	Emerald	1,189.00	357.94			
7	SMKF110	Sleepwell	Mattress	King	Fair	Saphire	1,149.00	249.81			
8	SMQG115	Sleepwell	Mattress	Queen	Good	Ruby	1,039.00	328.81			
9	DMKB129	Dream	Mattress	King	Best	Walnut	999.00	245.00			
10	DMKE128	Dream	Mattress	King	Excellent	Oak	949.00	255.30			
11	SMDE120	Sleepwell	Mattress	Double	Excellent	Emerald	939.00	278.52			
12	SMQF114	Sleepwell	Mattress	Queen	Fair	Saphire	939.00	295.80			
13	DMKG127	Dream	Mattress	King	Good	Maple	899.00	207.69			

Figure 4.7

This file is the master list of all items that Nitey-Nite Mattresses stocks in their inventory. You can see that there are 69 rows of data in the list, with the first row being the column names. That means there are 68 items in the list. The fields include Item_Number, Manufacturer, Product, Size, Quality, Series, Retail_Price, and Cost.

3. *Resize all columns, so you can see the complete field name and contents of each cell.*
4. *Underline the cells in* **Row 1**.
5. *Click on the* **Freeze Panes** *icon*  *in the* **Window** *group of the* **View** *tab, and click on* **Freeze Top Row**.

This is one minor functionality that I really like in Excel - the ability to freeze the top row or left column without having to actually click on it. It's not a big deal, but it can be a time-saver.

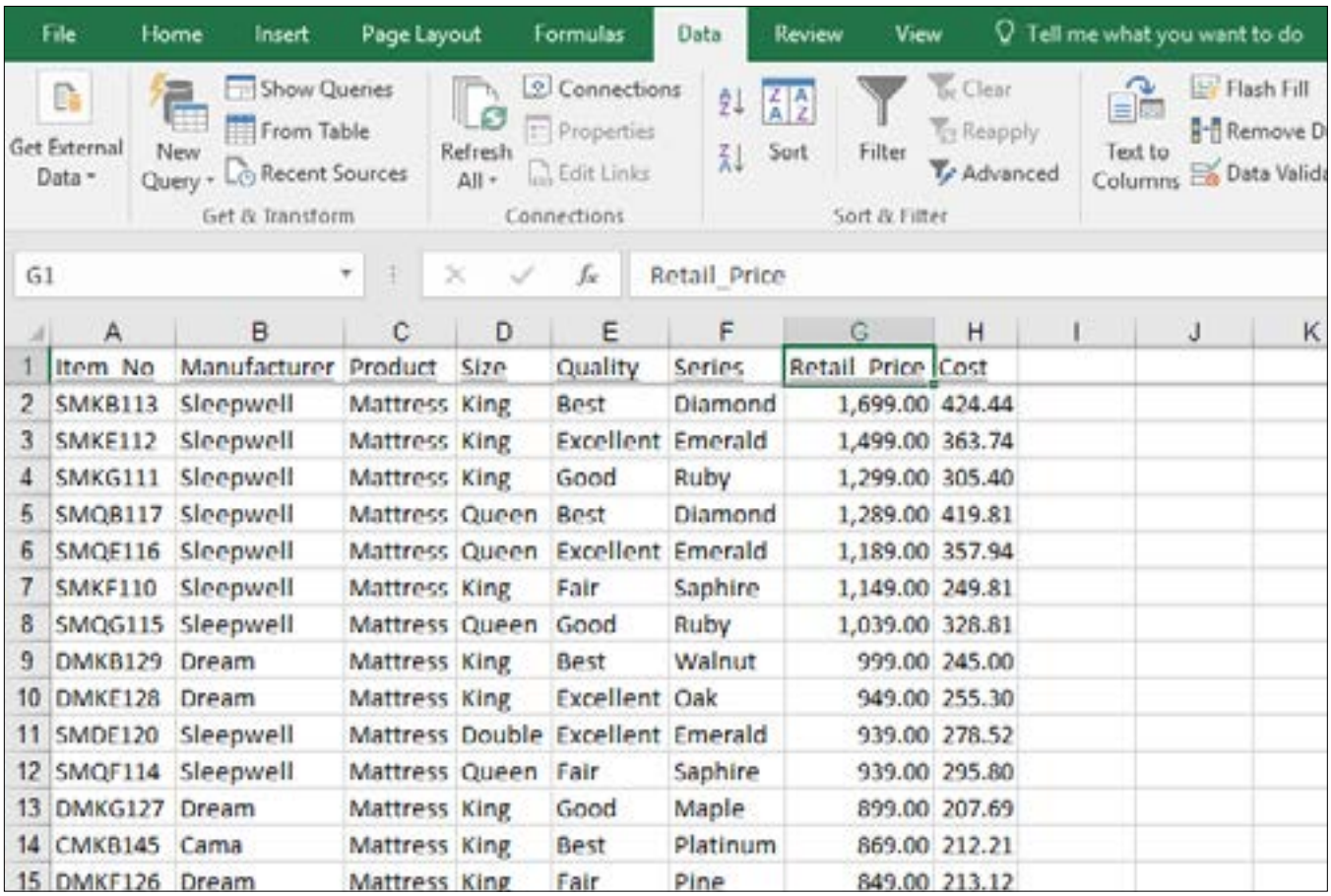
6. *Click on any single cell in the table to de-select* **Row 1**.
7. *Right-click on* **Cell B1**, *point to* **Sort**, *and choose* **Sort A to Z** 

> ***Note**: There are many other ways you can sort data in an Excel 2016 table. One way is to click on the* **Data** *tab, and use the* **Sort A to Z (ascending)**, *or* **Sort Z to A (descending)** *icons in the* **Sort & Filter** *group. If you want to sort multiple fields, or on formatting options like cell color or font color, you can use the* **Sort** *icon in the* **Sort & Filter** *group.*

Pay attention to the various options available on the Sort option in the right-click menu, like sorting by the Cell Color and Font Color options, available if any cells meet those criteria. Using those options is beyond the scope of this chapter, but they come in handy when you need to sort on cells that contain conditional formatting (covered in Chapter 14).

This list is now sorted in ascending order by Manufacturer. As you scroll down the list, you can see that there are four manufacturers whose names are repeated on numerous lines: Cama, Dream, Leavan and Sleepwell. Now you want to see all of the items sorted by Retail Prices from highest to lowest.

8. *Click on* **Cell G1** *(In actuality, you can click on any cell in* **Column G**, *but DO NOT SELECT the entire column as doing so will sort only the data in that column, and can alter your data relationships to the other columns).*
9. *Click on the* **Sort Z to A** *icon*  *in the* **Sort & Filter** *group of the* **Data** *tab.*



	A	B	C	D	E	F	G	H	I	J	K
1	Item_No	Manufacturer	Product	Size	Quality	Series	Retail_Price	Cost			
2	SMKB113	Sleepwell	Mattress	King	Best	Diamond	1,699.00	424.44			
3	SMKE112	Sleepwell	Mattress	King	Excellent	Emerald	1,499.00	363.74			
4	SMKG111	Sleepwell	Mattress	King	Good	Ruby	1,299.00	305.40			
5	SMQB117	Sleepwell	Mattress	Queen	Best	Diamond	1,289.00	419.81			
6	SMQE116	Sleepwell	Mattress	Queen	Excellent	Emerald	1,189.00	357.94			
7	SMKF110	Sleepwell	Mattress	King	Fair	Saphire	1,149.00	249.81			
8	SMQG115	Sleepwell	Mattress	Queen	Good	Ruby	1,039.00	328.81			
9	DMKB129	Dream	Mattress	King	Best	Walnut	999.00	245.00			
10	DMKE128	Dream	Mattress	King	Excellent	Oak	949.00	255.30			
11	SMDE120	Sleepwell	Mattress	Double	Excellent	Emerald	939.00	278.52			
12	SMQF114	Sleepwell	Mattress	Queen	Fair	Saphire	939.00	295.80			
13	DMKG127	Dream	Mattress	King	Good	Maple	899.00	207.69			
14	CMKB145	Cama	Mattress	King	Best	Platinum	869.00	212.21			
15	DMKF126	Dream	Mattress	King	Fair	Pine	849.00	213.12			

Figure 4.8

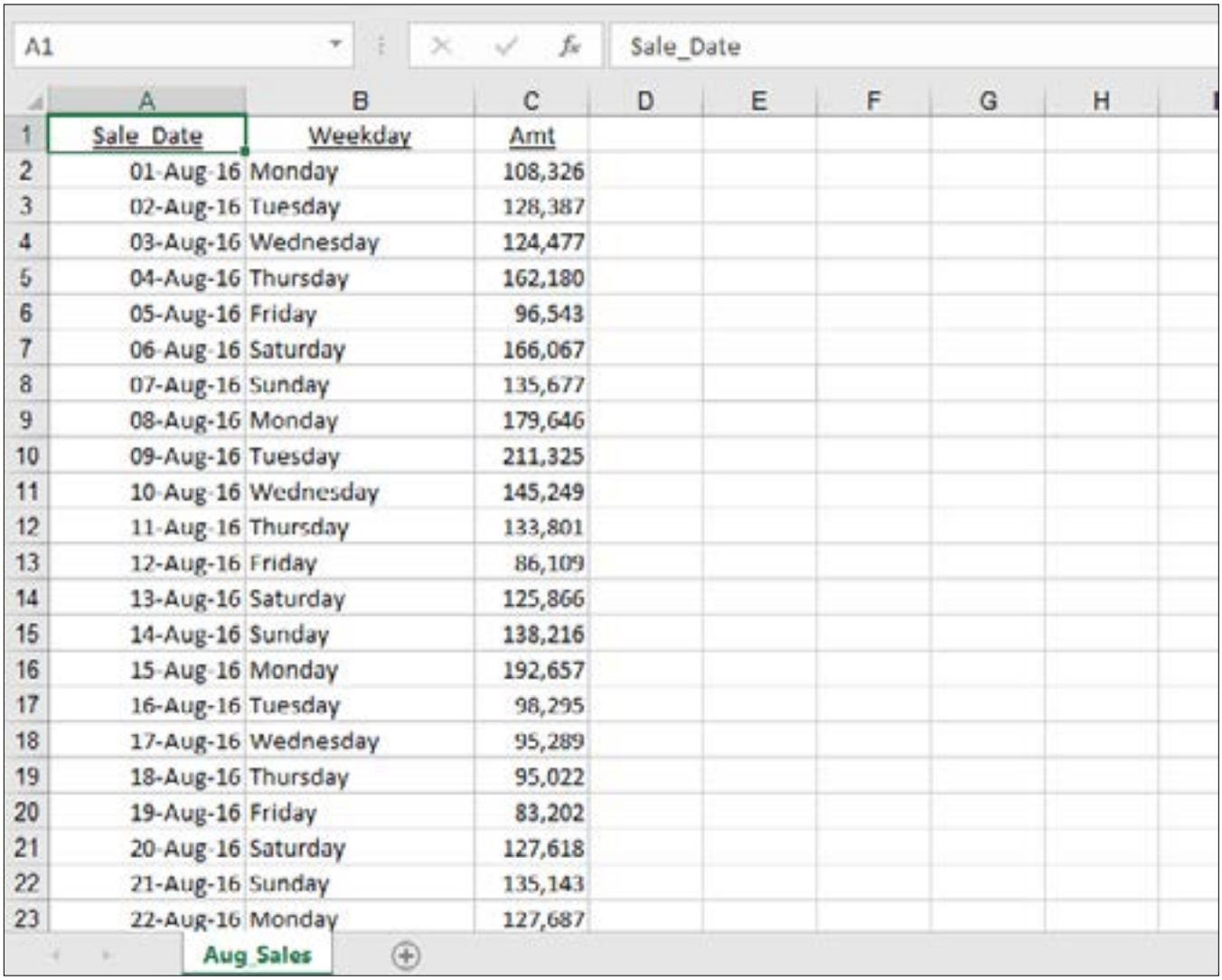
The highest priced item you have appears at the top of the list, which sells for $1,699.00. It is the King size Diamond series mattress from Sleepwell.

10. **Save** *and close the* **myItem.xlsx** *file.*

Custom Sorting

You can also sort on ***custom*** lists, like days of the week or months of the year.

1. **Open** *the file at* **C:\ExcelCEO\Excel 2016\Chapter4\Aug_Sales.xlsx**.
2. **Save As C:\ExcelCEO\Excel 2016\Chapter4*myAug_Sales.xlsx***.



	A	B	C
1	Sale_Date	Weekday	Amt
2	01-Aug-16	Monday	108,326
3	02-Aug-16	Tuesday	128,387
4	03-Aug-16	Wednesday	124,477
5	04-Aug-16	Thursday	162,180
6	05-Aug-16	Friday	96,543
7	06-Aug-16	Saturday	166,067
8	07-Aug-16	Sunday	135,677
9	08-Aug-16	Monday	179,646
10	09-Aug-16	Tuesday	211,325
11	10-Aug-16	Wednesday	145,249
12	11-Aug-16	Thursday	133,801
13	12-Aug-16	Friday	86,109
14	13-Aug-16	Saturday	125,866
15	14-Aug-16	Sunday	138,216
16	15-Aug-16	Monday	192,657
17	16-Aug-16	Tuesday	98,295
18	17-Aug-16	Wednesday	95,289
19	18-Aug-16	Thursday	95,022
20	19-Aug-16	Friday	83,202
21	20-Aug-16	Saturday	127,618
22	21-Aug-16	Sunday	135,143
23	22-Aug-16	Monday	127,687

Figure 4.9

This is a listing of daily sales totals for all of Nitey-Nite's stores. It shows the date, the weekday and the total sale amount. Your job is to find out the best and worst sales days of the week. You can do this in a number of ways. For the purposes of this exercise, we will sort the list by weekday beginning with Sunday.

3. *Right-click on* **Cell B1**, *point to* **Sort**, *and choose* **Custom Sort…** 

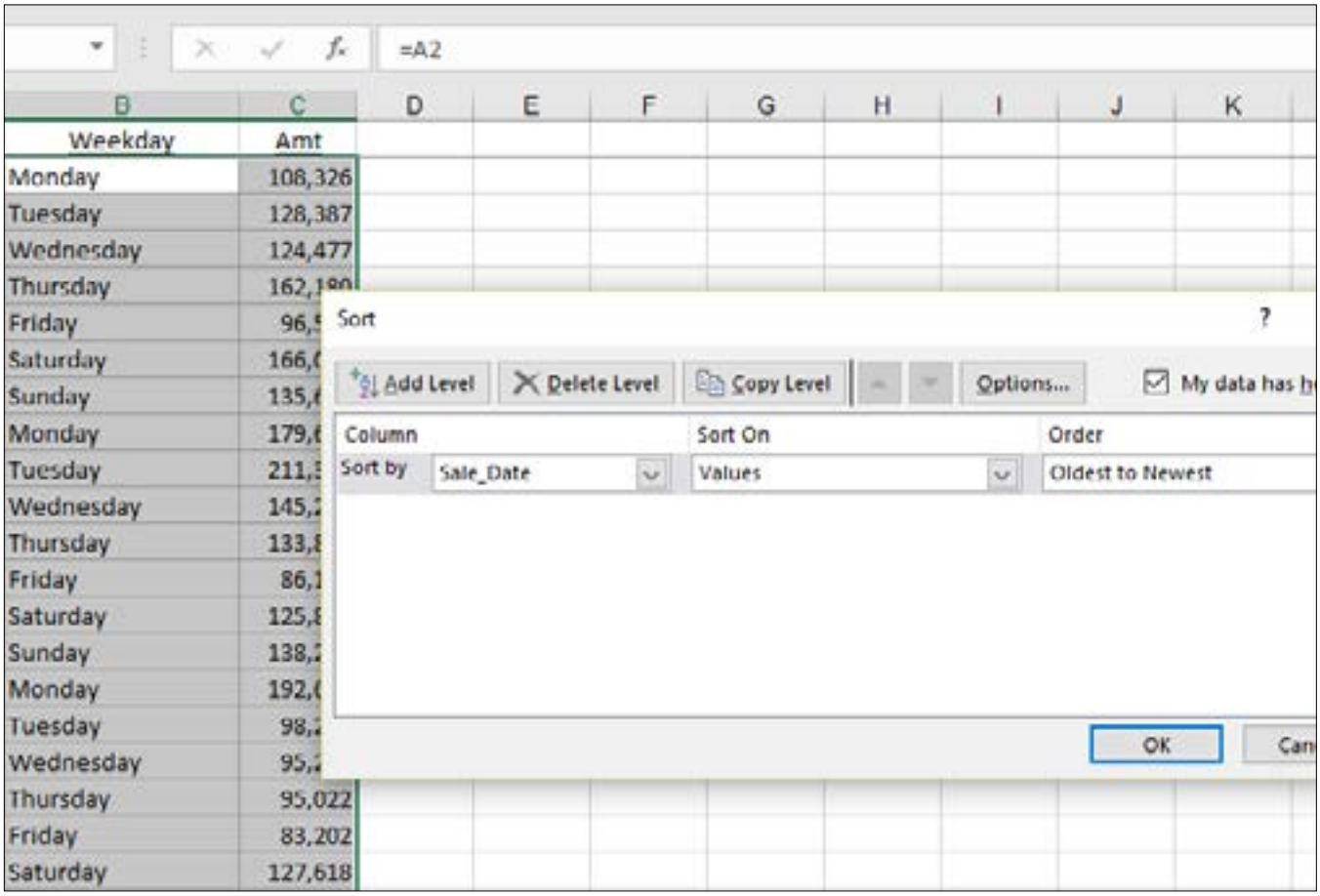


Figure 4.10

The Sort dialog box appears. In this dialog box, you can sort on many levels. Excel 2003 offered only three sort levels, but in Excel 2007 and beyond, you can sort on as many fields as you have in the table, up to 64.

5. *Make sure the* **My data has headers** *checkbox is checked.*
6. *In the* **Sort By** *drop-down menu, choose* **Weekday**.
7. *Leave the* **Sort on** *option on* **Values**, *and in the* **Order** *drop-down menu, choose* **Custom List…**

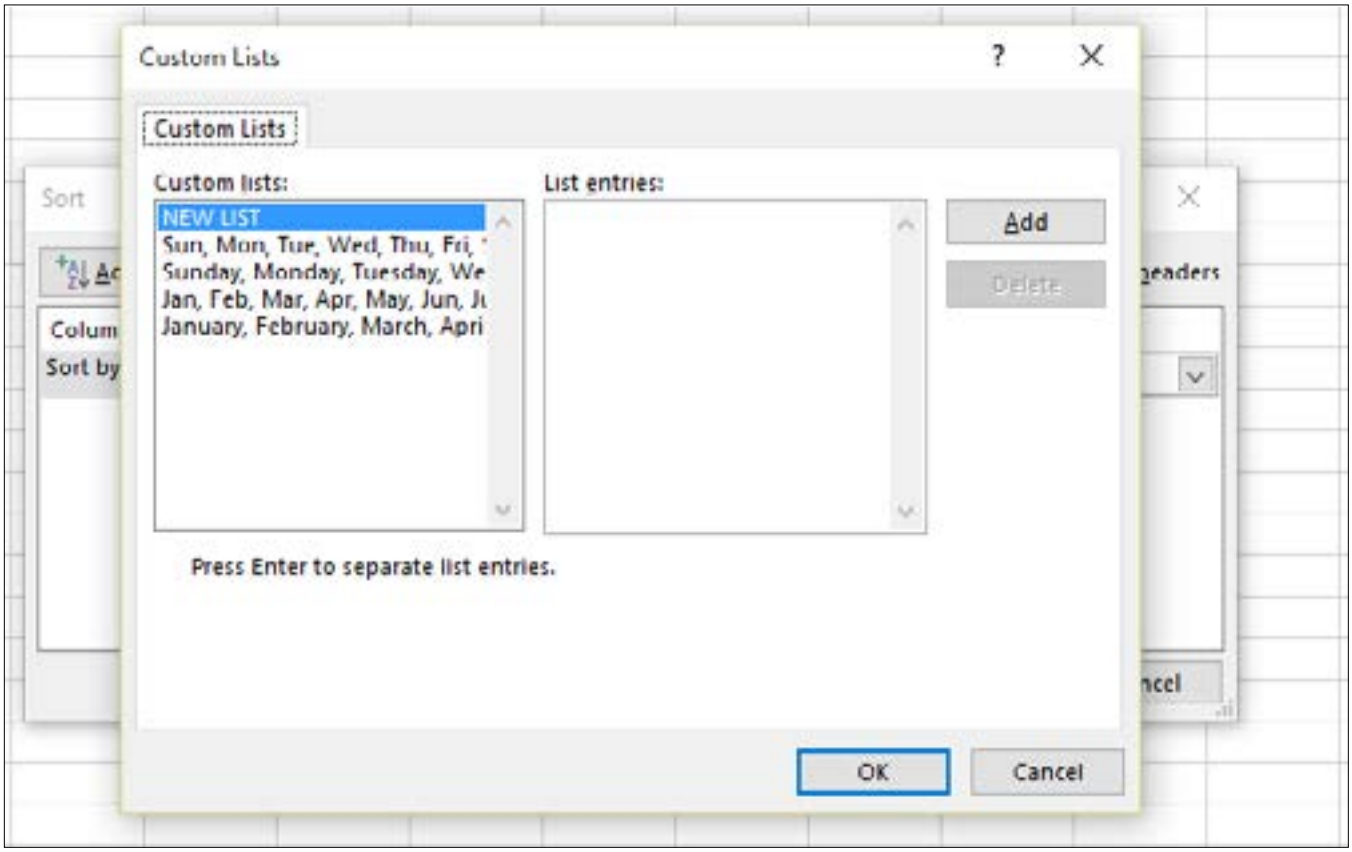


Figure 4.11

This is the dialog box that allows you to sort your data using various lists.

8. *In the* **Custom lists** *section, click on* **Sunday, Monday, Tuesday, Wed…** *and click* **OK**.
9. *Click* **OK** *in the* **Sort** *dialog box.*

Your data is now sorted by Weekday. To analyze the data, you could write some formulas, but you can also look at it on the fly. Scroll up and down the list and you can see that Fridays appear to have the lowest total sales. All Friday totals are less than $100,000, and most all of the other days' totals are more than $100,000 per day.

Subtotals

To find out what the totals for each day are, you typically have to do some type of calculation. In this case, I would usually use a PivotTable (discussed later in this course), but for now we'll use Excel's quick and clean ***Subtotal*** feature.

10. *With the data sorted by* **Weekday**, *click on the* **Data** *tab, and click on the* **Subtotal** *icon* Subtotal *in the* **Outline** *group.*

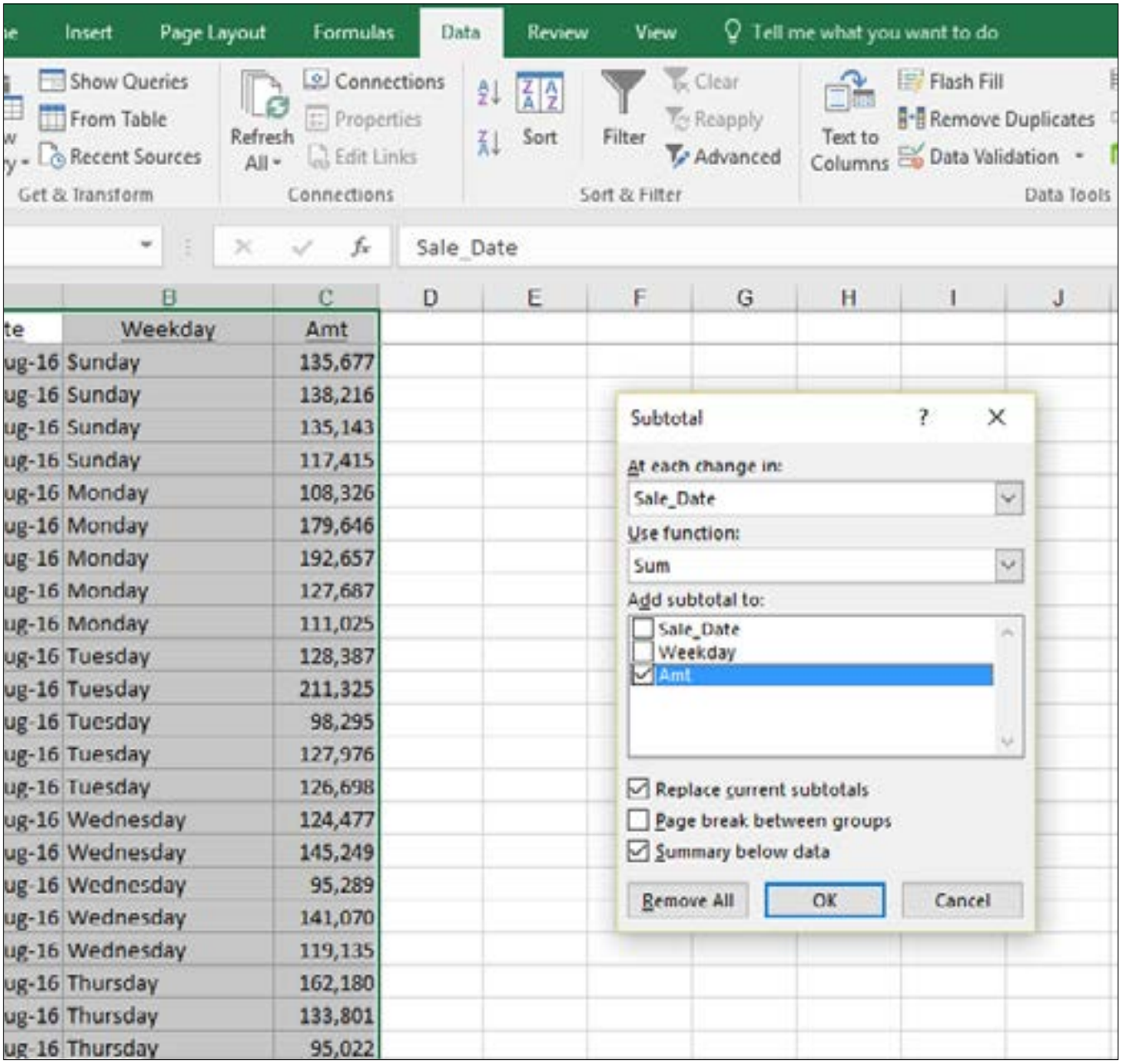


Figure 4.12

There are various sections included in the Subtotal dialog box. The **At each change in:** box allows you to specify the field you want to subtotal. In our case, we want a subtotal for each change in Weekday. You can choose Sum, Count, Average, Max, Min, and other functions in the **Use function:** box, depending on the type of subtotal you want. Typically, you perform calculations on numbers (sales, quantity, etc.) and you count non-numbers (weekdays, contracts, names, etc.). You check the fields you want to create subtotals for in the **Add subtotal to:** list. By default, Excel checks the last box. The next three check boxes allow you to replace subtotals that may currently be in the list, insert a page break between subtotal groups, and summarize groups below the data. Finally, you can remove all subtotals by clicking the **Remove All** button.

11. *Choose* **Weekday** *in the* **At each change in:** *list.*
12. *Make sure* **Sum** *is chosen in the* **Use function:** *list.*
13. *Make sure the* **Amt** *field in the* **Add subtotal to:** *list is checked.*
14. *Leave the* **Replace current subtotals** *and* **Summary below data** *boxes checked.*

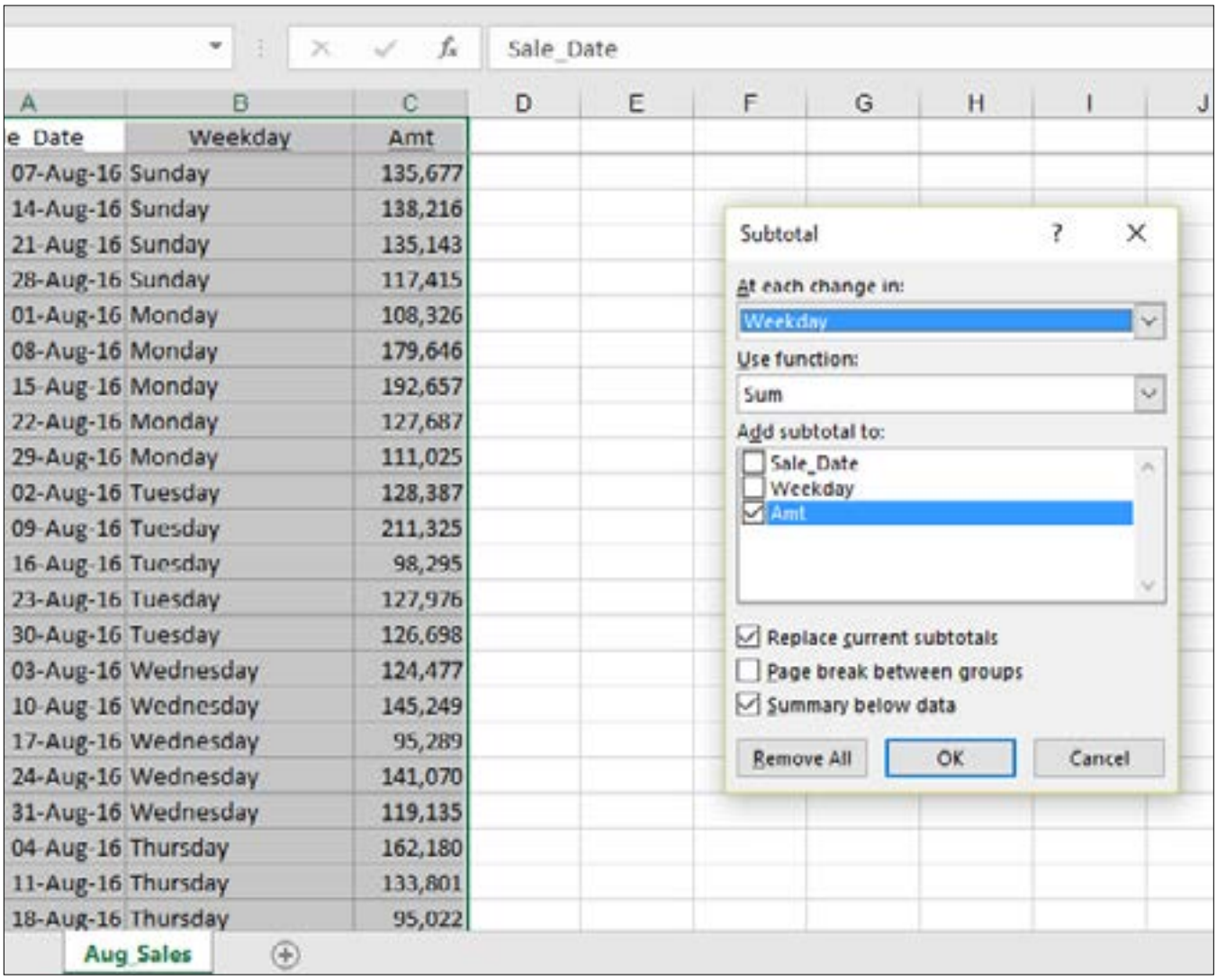


Figure 4.13

15. *Click* **OK**.

	A	B	C
1	Sale_Date	Weekday	Amt
2	07-Aug-16	Sunday	135,677
3	14-Aug-16	Sunday	138,216
4	21-Aug-16	Sunday	135,143
5	28-Aug-16	Sunday	117,415
6		**Sunday Total**	526,452
7	01-Aug-16	Monday	108,326
8	08-Aug-16	Monday	179,646
9	15-Aug-16	Monday	192,657
10	22-Aug-16	Monday	127,687
11	29-Aug-16	Monday	111,025
12		**Monday Total**	719,342
13	02-Aug-16	Tuesday	128,387
14	09-Aug-16	Tuesday	211,325
15	16-Aug-16	Tuesday	98,295
16	23-Aug-16	Tuesday	127,976
17	30-Aug-16	Tuesday	126,698
18		**Tuesday Total**	692,681
19	03-Aug-16	Wednesday	124,477
20	10-Aug-16	Wednesday	145,249
21	17-Aug-16	Wednesday	95,289
22	24-Aug-16	Wednesday	141,070
23	31-Aug-16	Wednesday	119,135

Figure 4.14

Your data now contains subtotals after every change in weekday. With the Subtotaling tool, you can organize your data into levels. Look to the extreme upper-left of the spreadsheet and you will see **grouping level boxes**. 1 2 3 You can change the view of the data by simply clicking on the desired level box.

16. Click on **Level Box 1**.

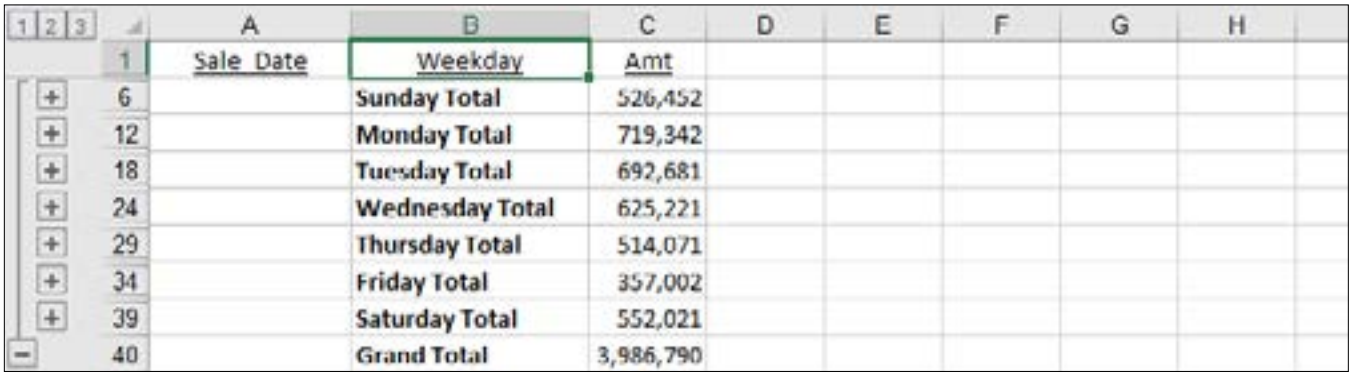
B1

	A	B	C
1	Sale_Date	Weekday	Amt
40		**Grand Total**	3,986,790
41			

Figure 4.15

The data is now summarized at a Grand Total level.

17. Click on **Level 2**.



	A	B	C	D	E	F	G	H
1	Sale_Date	Weekday	Amt					
6		Sunday Total	526,452					
12		Monday Total	719,342					
18		Tuesday Total	692,681					
24		Wednesday Total	625,221					
29		Thursday Total	514,071					
34		Friday Total	357,002					
39		Saturday Total	552,021					
40		Grand Total	3,986,790					

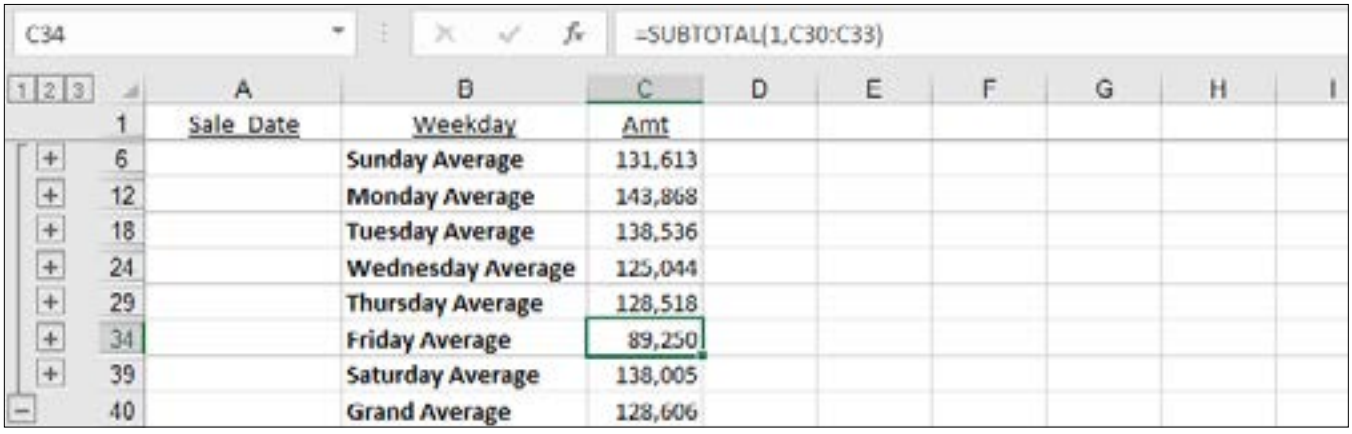
Figure 4.16

The data is now summarized at the weekday level. With the data summarized at the Weekday level (Level 2), you can easily see that Monday's total of $719,342 is clearly the highest sale day for the month of August. Tuesdays and Wednesdays appear to be the next highest days. But wait! August has 31 days and there are five Mondays, Tuesdays, and Wednesdays in August 2016, so those days should obviously have more total sales. It would probably be a better analysis if we looked at the average daily sales instead of the total daily sales in August. Let's change up our subtotaling to do that.

18. *With any cell in the subtotals selected, click on the* **Subtotal** *icon.*
19. *In the* **Subtotal** *dialog box, change the* **Use function** *from* **Sum** *to* **Average**, *and click* **OK**.

The Subtotal list expands out to show all data and the Total for each day changes to Average.

20. *Click on the* **Level 2** *box.*
21. *Expand the column widths, if necessary, to see all the data.*



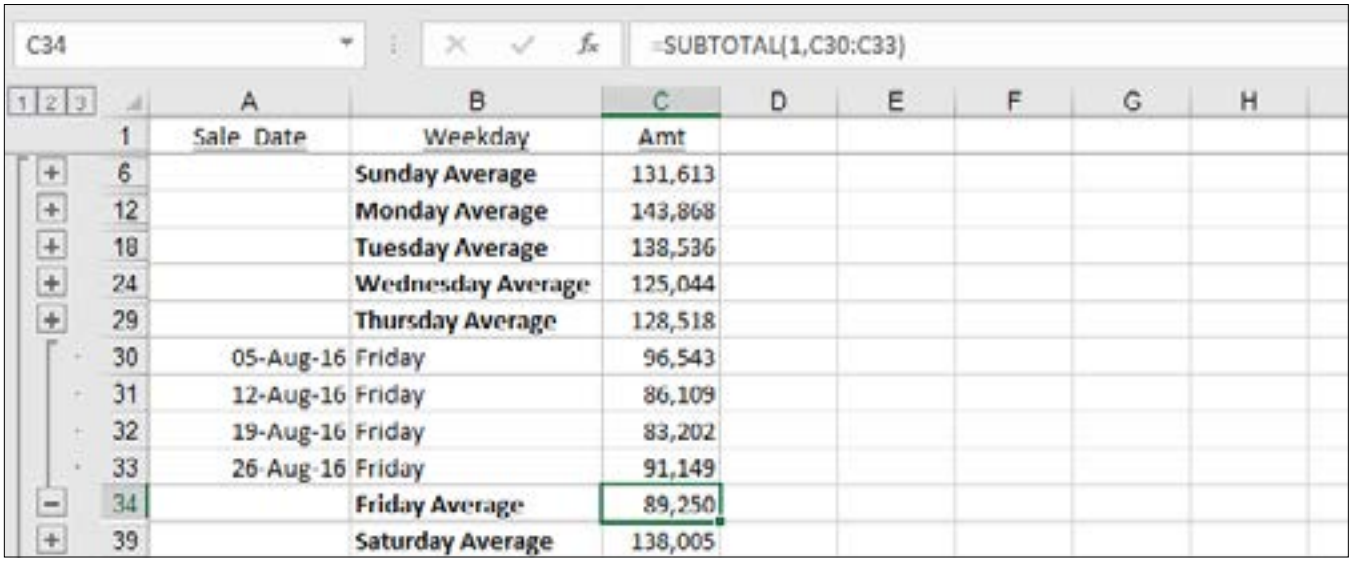
C34 =SUBTOTAL(1,C30:C33)

	A	B	C	D	E	F	G	H	I
1	Sale_Date	Weekday	Amt						
6		Sunday Average	131,613						
12		Monday Average	143,868						
18		Tuesday Average	138,536						
24		Wednesday Average	125,044						
29		Thursday Average	128,518						
34		Friday Average	89,250						
39		Saturday Average	138,005						
40		Grand Average	128,606						

Figure 4.17

We see that Monday is still the highest average sale day, followed by Tuesday, then Saturday. The averages tell a slightly different story! Fridays still appear to be lackluster days, so you may want to suggest that Nitey-Nite Mattresses hold specials on Fridays to help boost sales on those days. You can display and hide further detail or subtotals by clicking on the ***Show Detail*** ⊞ or ***Hide Detail*** ⊟ buttons.

22. *Click on the* **Show Detail** *icon* ⊞ *next to* **Friday**. *(Row 34).*



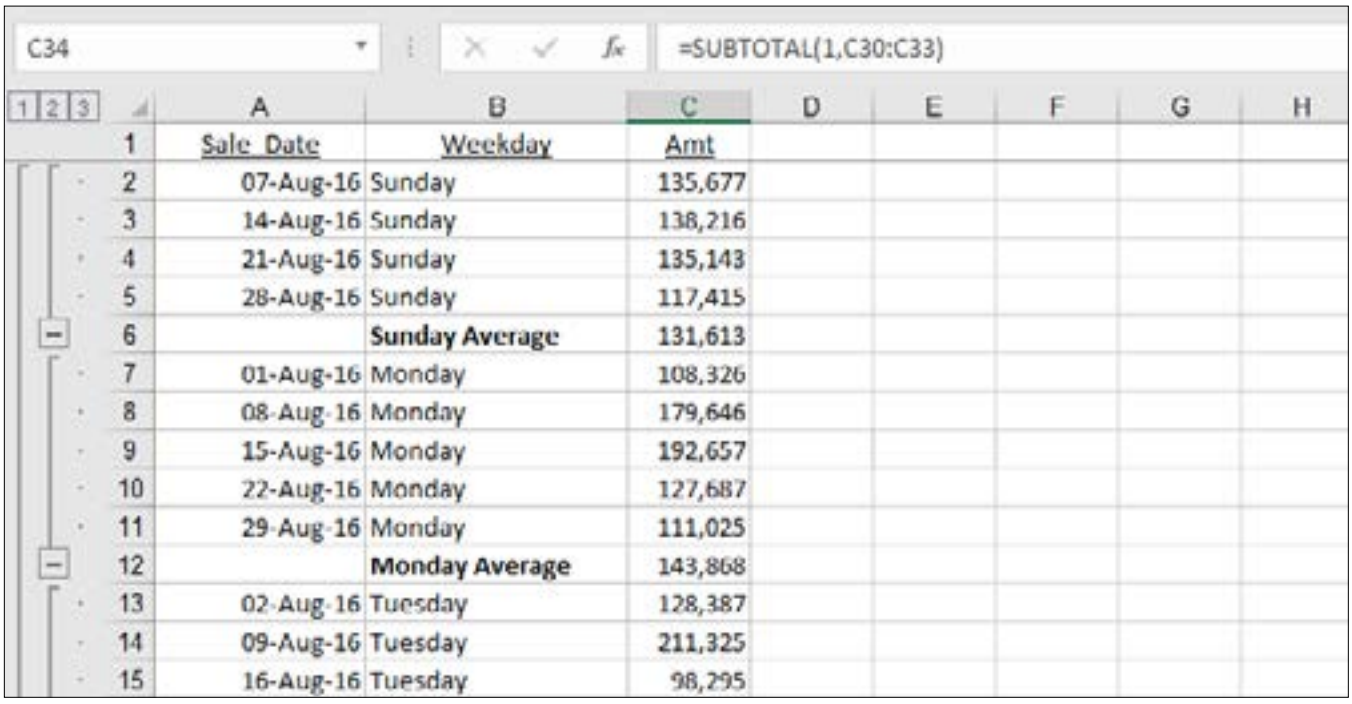
C34 =SUBTOTAL(1,C30:C33)

	A	B	C	D	E	F	G	H
1	Sale_Date	Weekday	Amt					
6		**Sunday Average**	131,613					
12		**Monday Average**	143,868					
18		**Tuesday Average**	138,536					
24		**Wednesday Average**	125,044					
29		**Thursday Average**	128,518					
30	05-Aug-16	Friday	96,543					
31	12-Aug-16	Friday	86,109					
32	19-Aug-16	Friday	83,202					
33	26-Aug-16	Friday	91,149					
34		**Friday Average**	89,250					
39		**Saturday Average**	138,005					

Figure 4.18

Now you see the detail and average for Friday.

23. *Click on the* **Level 3** *box.*



C34 =SUBTOTAL(1,C30:C33)

	A	B	C	D	E	F	G	H
1	Sale_Date	Weekday	Amt					
2	07-Aug-16	Sunday	135,677					
3	14-Aug-16	Sunday	138,216					
4	21-Aug-16	Sunday	135,143					
5	28-Aug-16	Sunday	117,415					
6		**Sunday Average**	131,613					
7	01-Aug-16	Monday	108,326					
8	08-Aug-16	Monday	179,646					
9	15-Aug-16	Monday	192,657					
10	22-Aug-16	Monday	127,687					
11	29-Aug-16	Monday	111,025					
12		**Monday Average**	143,868					
13	02-Aug-16	Tuesday	128,387					
14	09-Aug-16	Tuesday	211,325					
15	16-Aug-16	Tuesday	98,295					

Figure 4.19

The data returns to showing the subtotals for all data.

24. **Save** *and* **close myAug_Sales.xlsx**.

> ***Review Questions**: It is now time to complete the hands-on Review Questions. Log on to www.ExcelCEO.com with your Email address and Password, click on the* **Excel 2016 Review Questions, Chapter 4, Section 1 of 2** *option in your Main Menu, and complete the Review Questions.*

Multiple Subtotals

The Subtotaling feature also allows you to perform subtotals on multiple levels of data.

1. **Open** *the file at* **C:\ExcelCEO\Excel 2016\Chapter4\2015_Sales.xlsx**.
2. **Save As C:\ExcelCEO\Excel 2016\Chapter4*my2015_Sales.xlsx***.

When using Subtotals, it is important to remember to FIRST sort the data in the same order you want to subtotal for, THEN perform the subtotals. In this spreadsheet, monthly sales for each store are listed. The fields we have to work with are Region, State, Store_No, Year, Month, Sales, and Cost. We want to analyze Sales at ALL levels of the company, so we have to sort by Month, Store_No, State, and Region.

To perform a cumulative sort on multiple levels of data, you must first sort by the field that contains the lowest level of data and work your way up to the highest. In this example, the lowest level is by Month, and the highest level is by Region.

3. **Sort** *the table on the* **Month** *field in* **Ascending Order**. *(Use the* **A-Z** *icon rather than* **Sort***)*
4. *Continue to sort the data in* **Ascending Order** *in this order:* **Store_No**, **State**, **Region**.

	A	B	C	D	E
1	Region	State	Store_No	Year	Month
2	West	CA	1002	2015	12
3	South	SC	1050	2015	11
4	West	OR	1042	2015	1
5	East	NY	1001	2015	12
6	North	IL	1005	2015	9
7	East	NJ	1040	2015	10
8	South	GA	1057	2015	2
9	North	OH	1019	2015	4
10	East	NY	1032	2015	4
11	South	NC	1009	2015	2
12	West	CA	1021	2015	1
13	East	NJ	1040	2015	5
14	North	IL	1018	2015	9
15	East	NY	1001	2015	6

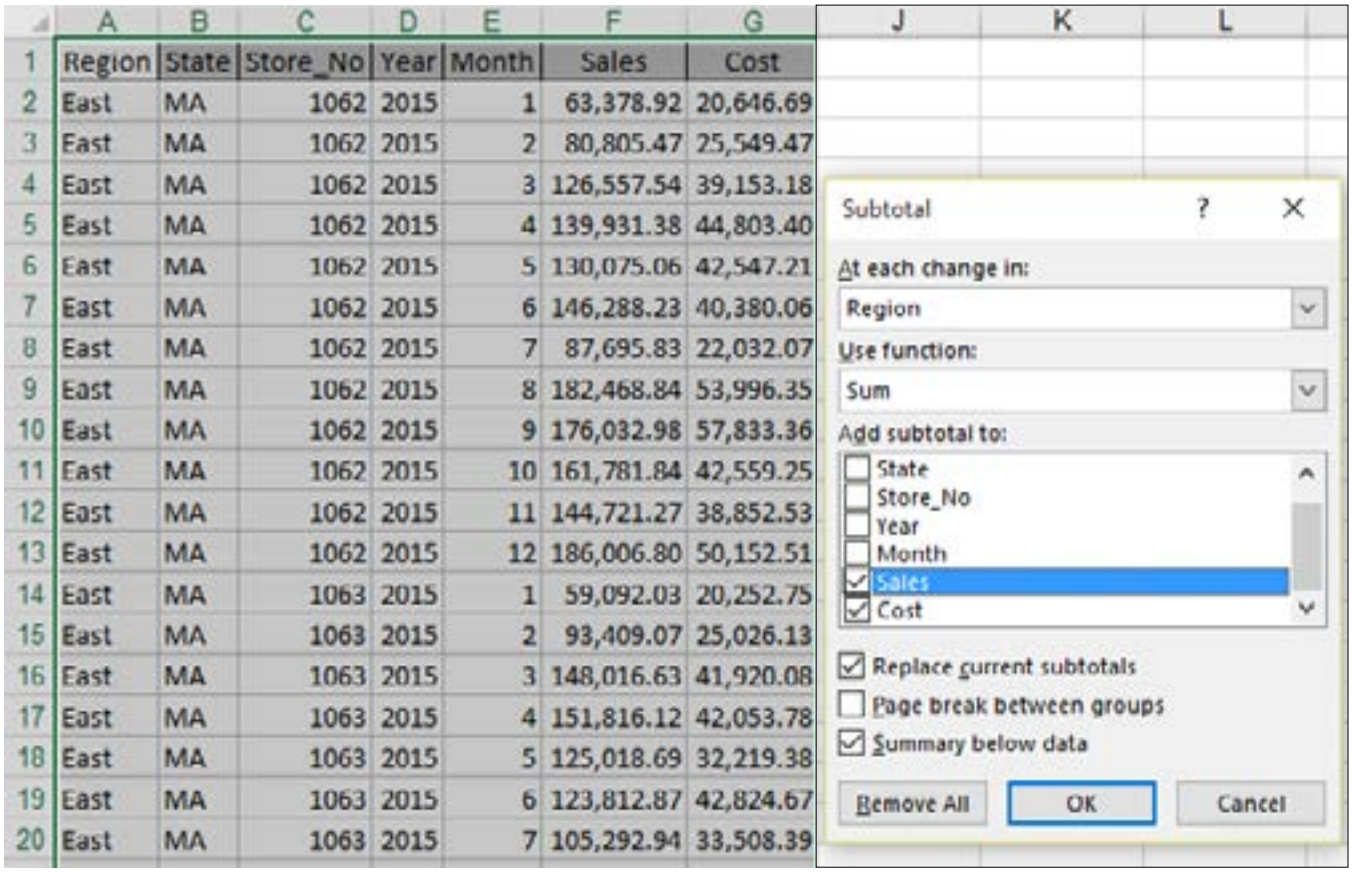
	A	B	C	D	E	F	G
1	Region	State	Store_No	Year	Month	Sales	Cost
2	East	MA	1062	2015	1	63,378.92	20,646.69
3	East	MA	1062	2015	2	80,805.47	25,549.47
4	East	MA	1062	2015	3	126,557.54	39,153.18
5	East	MA	1062	2015	4	139,931.38	44,803.40
6	East	MA	1062	2015	5	130,075.06	42,547.21
7	East	MA	1062	2015	6	146,288.23	40,380.06
8	East	MA	1062	2015	7	87,695.83	22,032.07
9	East	MA	1062	2015	8	182,468.84	53,996.35
10	East	MA	1062	2015	9	176,032.98	57,833.36
11	East	MA	1062	2015	10	161,781.84	42,559.25
12	East	MA	1062	2015	11	144,721.27	38,852.53
13	East	MA	1062	2015	12	186,006.80	50,152.51
14	East	MA	1063	2015	1	59,092.03	20,252.75
15	East	MA	1063	2015	2	93,409.07	25,026.13

Figure 4.20

***Tip**: If you want to sort using the* **Sort** *dialog box, begin with the highest level and work toward the lowest level of data to achieve the same results.*

Now that the data is sorted appropriately, let's perform our multiple subtotals.

5. *With your cursor on only one cell on the spreadsheet, click on the* **Subtotal** *icon in the* **Outline** *group of the* **Data** *tab.*
6. *In the* **Subtotal** *dialog box, make sure that:* **Region** *is chosen under* **At each change in:**, **Sum** *is selected under* **Use function:**, **Sales** *and* **Cost** *are both checked under* **Add subtotal to:**, *and that the* **Replace current subtotals** *and* **Summary below data** *boxes are checked.*



	A	B	C	D	E	F	G
1	Region	State	Store_No	Year	Month	Sales	Cost
2	East	MA	1062	2015	1	63,378.92	20,646.69
3	East	MA	1062	2015	2	80,805.47	25,549.47
4	East	MA	1062	2015	3	126,557.54	39,153.18
5	East	MA	1062	2015	4	139,931.38	44,803.40
6	East	MA	1062	2015	5	130,075.06	42,547.21
7	East	MA	1062	2015	6	146,288.23	40,380.06
8	East	MA	1062	2015	7	87,695.83	22,032.07
9	East	MA	1062	2015	8	182,468.84	53,996.35
10	East	MA	1062	2015	9	176,032.98	57,833.36
11	East	MA	1062	2015	10	161,781.84	42,559.25
12	East	MA	1062	2015	11	144,721.27	38,852.53
13	East	MA	1062	2015	12	186,006.80	50,152.51
14	East	MA	1063	2015	1	59,092.03	20,252.75
15	East	MA	1063	2015	2	93,409.07	25,026.13
16	East	MA	1063	2015	3	148,016.63	41,920.08
17	East	MA	1063	2015	4	151,816.12	42,053.78
18	East	MA	1063	2015	5	125,018.69	32,219.38
19	East	MA	1063	2015	6	123,812.87	42,824.67
20	East	MA	1063	2015	7	105,292.94	33,508.39

Figure 4.21

7. *Click* **OK** *and resize columns, if necessary.*

Subtotals are now added at the Region level. Now we will add another level of subtotals at the State level. To do this, you will change the **At each change in:** box to State and uncheck the **Replace current** box.

8. *With your cursor still inside the table, click on the* **Subtotal** *icon.*
9. *Under* **At each change in:** *change* **Region** *to* **State**.
10. *Uncheck the* **Replace current subtotals** *box, and click* **OK**.

11. *Resize the columns if necessary.*

Subtotals at the State level are added.

	A	B	C	D	E	F	G	H	I
91	East	NY	1032	2015	4	118,124.80	30,323.34		
92	East	NY	1032	2015	5	145,043.97	49,934.60		
93	East	NY	1032	2015	6	121,012.96	38,199.65		
94	East	NY	1032	2015	7	104,656.13	31,980.11		
95	East	NY	1032	2015	8	178,497.09	58,198.01		
96	East	NY	1032	2015	9	143,117.61	44,253.96		
97	East	NY	1032	2015	10	131,347.65	35,153.16		
98	East	NY	1032	2015	11	140,352.06	44,724.94		
99	East	NY	1032	2015	12	196,572.95	52,421.96		
100		**NY**				4,317,447.18	1,254,373.87		
101	**East Total**					11,022,639.22	3,262,059.99		
102	North	IL	1005	2015	1	64,942.89	20,195.60		
103	North	IL	1005	2015	2	71,763.76	21,386.89		
104	North	IL	1005	2015	3	128,910.67	41,665.69		

Figure 4.22

12. Add another **Subtotal** *level at the* **Store_No** *level.*

Now you have five levels of subtotals.

	A	B	C	D	E	F	G	H	I
91	East	NY	1027	2015	10	146,395.40	38,192.29		
92	East	NY	1027	2015	11	163,081.78	48,960.34		
93	East	NY	1027	2015	12	261,006.27	65,569.75		
94			**1027**			1,834,471.33	522,677.96		
95	East	NY	1032	2015	1	70,382.65	21,896.47		
96	East	NY	1032	2015	2	86,483.10	23,844.51		
97	East	NY	1032	2015	3	136,871.73	34,591.52		
98	East	NY	1032	2015	4	118,124.80	30,323.34		
99	East	NY	1032	2015	5	145,043.97	49,934.60		
100	East	NY	1032	2015	6	121,012.96	38,199.65		
101	East	NY	1032	2015	7	104,656.13	31,980.11		
102	East	NY	1032	2015	8	178,497.09	58,198.01		
103	East	NY	1032	2015	9	143,117.61	44,253.96		
104	East	NY	1032	2015	10	131,347.65	35,153.16		
105	East	NY	1032	2015	11	140,352.06	44,724.94		
106	East	NY	1032	2015	12	196,572.95	52,421.96		
107			**1032**			1,572,462.70	465,522.23		
108		**NY**				4,317,447.18	1,254,373.87		
109	**East Total**					11,022,639.22	3,262,059.99		

Figure 4.23

13. *Click on the* **1, 2, 3, 4, and 5 level** *boxes, and the* **Show Detail** *and* **Hide Detail** *buttons to see the* **detail** *or* **summary** *levels you want.*

Filters

While subtotaling is a very useful feature, sometimes you just want to filter the data without subtotaling. One option to get that accomplished is to use the ***Filter*** functionality.

1. *Click on the* **Subtotal** *icon and click on* **Remove All**.
2. *Having selected only one cell in the table, click on the* **Filter** *icon*  *in the* **Data** *tab.*

	A	B	C	D	E	F	G	H	I	J
1	Region	Sta	Store_I	Ye	Mon	Sales	Cost			
2	East	MA	1062	2015	1	63,378.92	20,646.69			
3	East	MA	1062	2015	2	80,805.47	25,549.47			
4	East	MA	1062	2015	3	126,557.54	39,153.18			
5	East	MA	1062	2015	4	139,931.38	44,803.40			
6	East	MA	1062	2015	5	130,075.06	42,547.21			

Figure 4.24

Drop-down arrows, or the filter arrows, appear to the right of each field in the table.

3. *Click on the* **State** *drop-down arrow.*

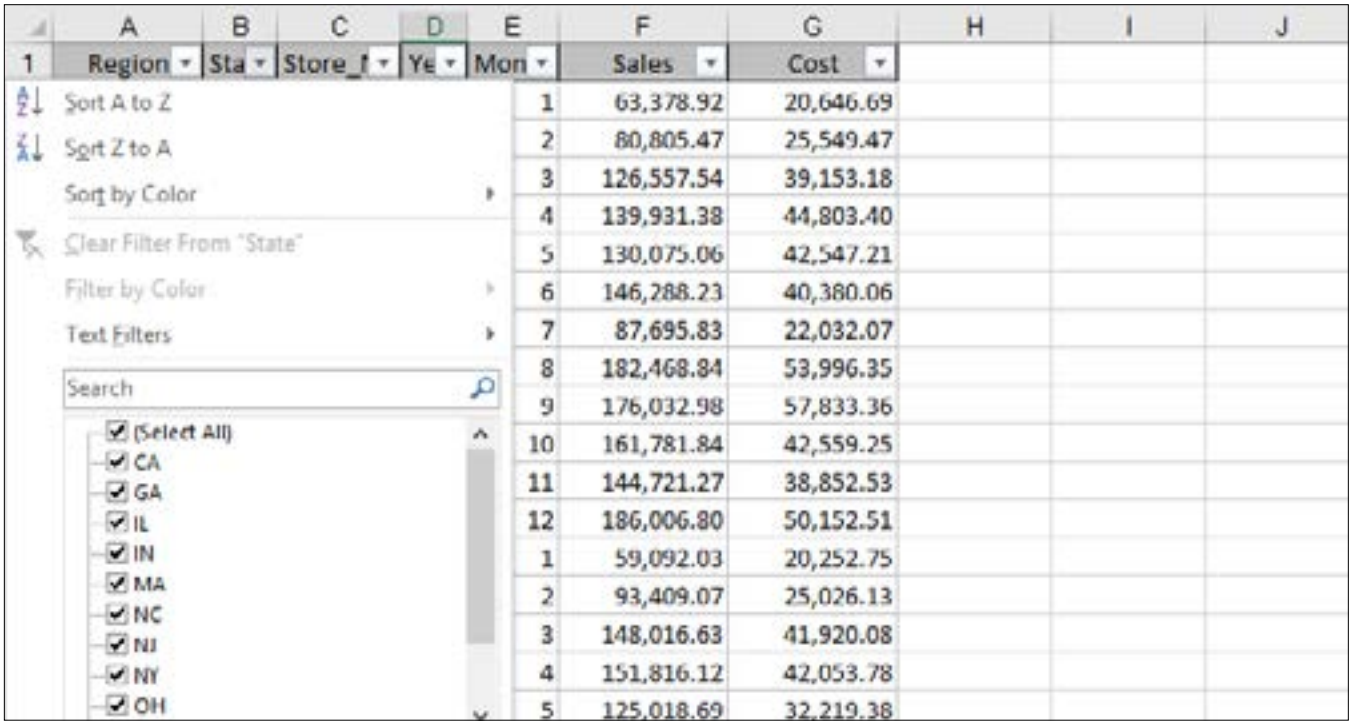
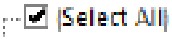


Figure 4.25

A list of all the states available in the State field appears. In this list, you can choose as many or as few options as you want.

4. *Uncheck the* **(Select All)** *box*  *(all options are deselected), check the* **IL** *box, and click* **OK**.

	A	B	C	D	E	F	G	H	I	J
1	Region	Sta	Store_I	Ye	Mon	Sales	Cost			
98	North	IL	1005	2015	1	64,942.89	20,195.60			
99	North	IL	1005	2015	2	71,763.76	21,386.89			
100	North	IL	1005	2015	3	128,910.67	41,665.69			
101	North	IL	1005	2015	4	126,267.95	39,714.39			
102	North	IL	1005	2015	5	134,570.80	38,564.48			
103	North	IL	1005	2015	6	112,248.11	33,932.84			
104	North	IL	1005	2015	7	102,426.21	27,572.42			
105	North	IL	1005	2015	8	157,076.23	41,227.06			
106	North	IL	1005	2015	9	133,090.07	37,207.16			
107	North	IL	1005	2015	10	117,850.87	40,184.02			
108	North	IL	1005	2015	11	165,037.72	50,154.16			
109	North	IL	1005	2015	12	212,116.69	68,535.02			
110	North	IL	1018	2015	1	76,046.36	22,380.71			

Figure 4.26

The table is now filtered for only the data where State equals "IL". Notice that the Row numbers turned to blue (indicating they are filtered rows) and the State drop-down arrow has a small filter icon in it.

5. *Click on the* **Region** *drop-down menu.*

You see that only the North region appears. When you choose one filter, the remaining fields are also filtered for that selection, so when you picked State equals "IL", which is in the North Region, only North appears under Region.

6. *Click* **Cancel** *in the* **Region** *filter list.*
7. *Click on the* **State** *filter and choose* **GA** *in addition to* **IL**, *and click* **OK**.

Now you have a filtered list containing all records where the state is either IL (Illinois) or GA (Georgia).

Number Filters

You can custom filter a list based on a number of criteria. If you click on any filter, you will see different options based on the data type in the field. For example, if you click on the State field filter, you'll see the Sort A to Z, Sort Z to A and Text filters options, among others. If you click on the Sales field filter, you'll see a different set of filter options, as the Sales field contains numbers, not text. In this next exercise, we'll filter the entire list to see the top 20 stores in terms of sales per month.

8. *On the* **State** *drop-down menu, choose* **(Select All)** *(to take off the custom IL and GA filter), and click* **OK**.
9. *On the* **Sales** *drop-down menu, point to* **Number Filters** *and choose* **Top 10…**

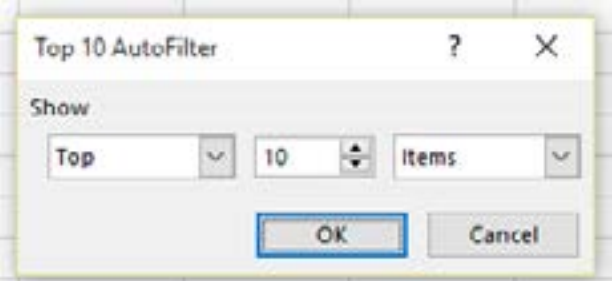


Figure 4.27

The **Top 10 AutoFilter** dialog box appears. In this box, you don't have to choose only the Top 10. You can choose Top or Bottom, and you can use the spinner button in the box that reads 10 to change the number.

10. *Click on the up arrow in the box that reads* **10**, *and scroll up until it shows* **20** *(or you can just type* ***20*** *in the box).*
11. *Click* **OK**.

	A	B	C	D	E	F	G	H	I
1	Region	Sta	Store_I	Ye	Mon	Sales	Cost		
13	East	MA	1062	2015	12	186,006.80	50,152.51		
25	East	MA	1063	2015	12	200,324.98	64,211.22		
46	East	NJ	1040	2015	9	187,403.09	59,533.26		
49	East	NJ	1040	2015	12	223,902.09	70,691.18		
81	East	NY	1027	2015	8	213,136.45	55,326.37		
82	East	NY	1027	2015	9	198,863.99	57,484.52		
85	East	NY	1027	2015	12	261,006.27	65,569.75		
97	East	NY	1032	2015	12	196,572.95	52,421.96		
109	North	IL	1005	2015	12	212,116.69	68,535.02		
112	North	IL	1018	2015	3	185,604.55	62,175.25		
117	North	IL	1018	2015	8	197,599.83	61,116.87		
118	North	IL	1018	2015	9	194,023.81	50,663.32		

2015_Store_Sales

Ready 20 of 348 records found

Figure 4.28

You now have a list of all the top 20 stores and the months when they were in the top 20. Notice it doesn't sort the data, but it simply chooses the top 20. On the lower-left of the Status Bar, notice "20 of 348 records found" is displayed. When a filter is applied, you can look at the Status Bar to see a quick summary of how many records match the filter criteria set.

12. *Click on the* **Sales** *drop-down menu, and choose* Clear Filter From "Sales" *(to take off the Top 20 filter), then click* **OK**.

Search Filters

Excel 2010 added a feature called Search filters. When you click on a filter drop-down arrow, a Search box appears. As you start to type the characters of the string or number you're looking for, Excel filters the items displayed in the filter list for those characters. This comes in very handy especially when you have a list with hundreds or thousands of items. Let's try an example using the Items file.

1. *With the* **my2015_Sales.xlsx** *file still open, open the* **Item.xlsx** *file.*
2. *Resize all columns so you can read the headings and the data.*
3. *Click on the* **Filter** *icon to apply an* **AutoFilter** *to the data.*
4. *Click on the* **AutoFilter** *for* **Series**.

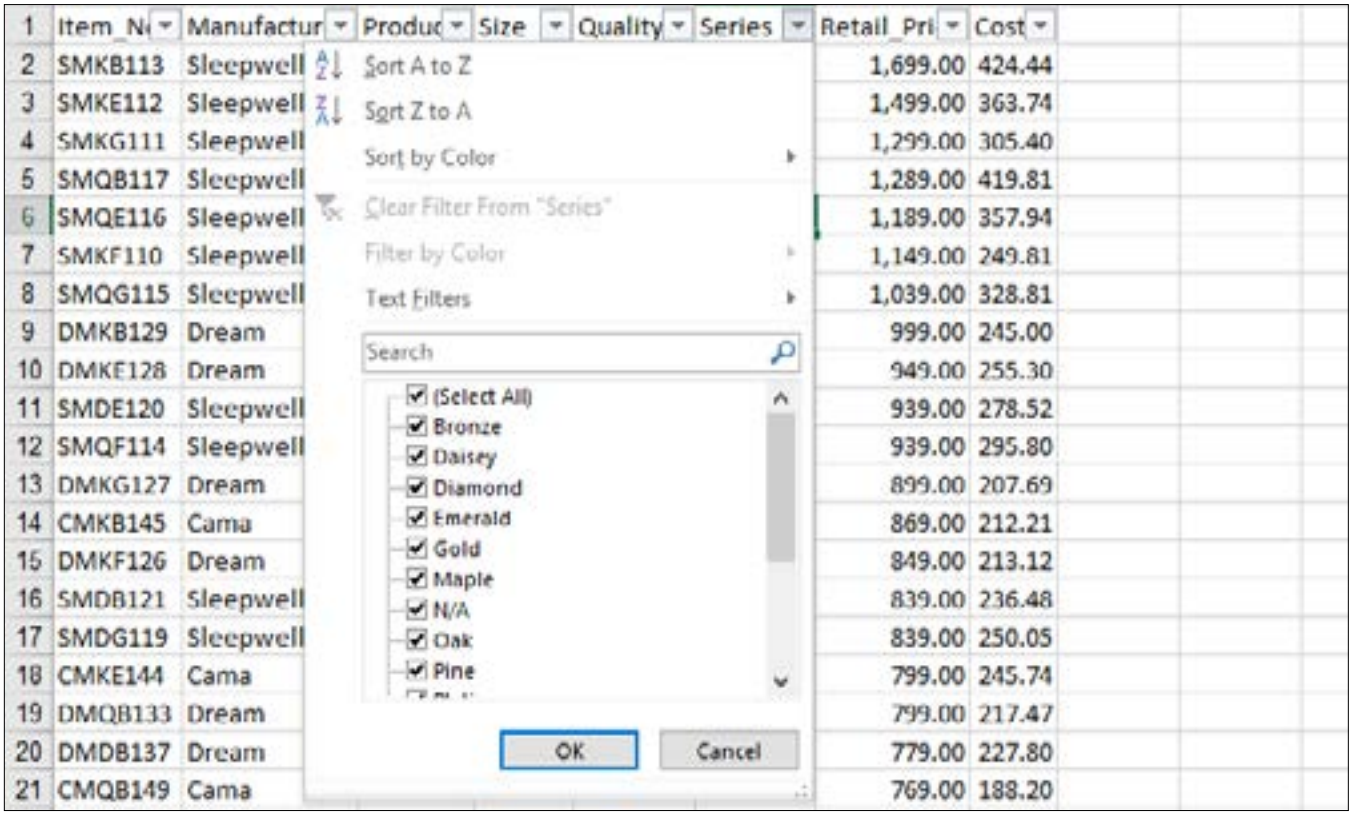


Figure 4.29

Notice that a Search box appears under the Text Filters option. You use this Search box to further filter the list.

5. *In the* **Search** *box, type the letter* **o** *(upper- or lower-case — it doesn't matter), but don't click OK yet.*

The list is filtered for all items that contain the letter "o". As you type more characters, the list is filtered further. This same feature exists when we explore PivotTables in Chapters 11 and 12. I'm not going to spend any more time on the Search filter, but it is a cool thing to know.

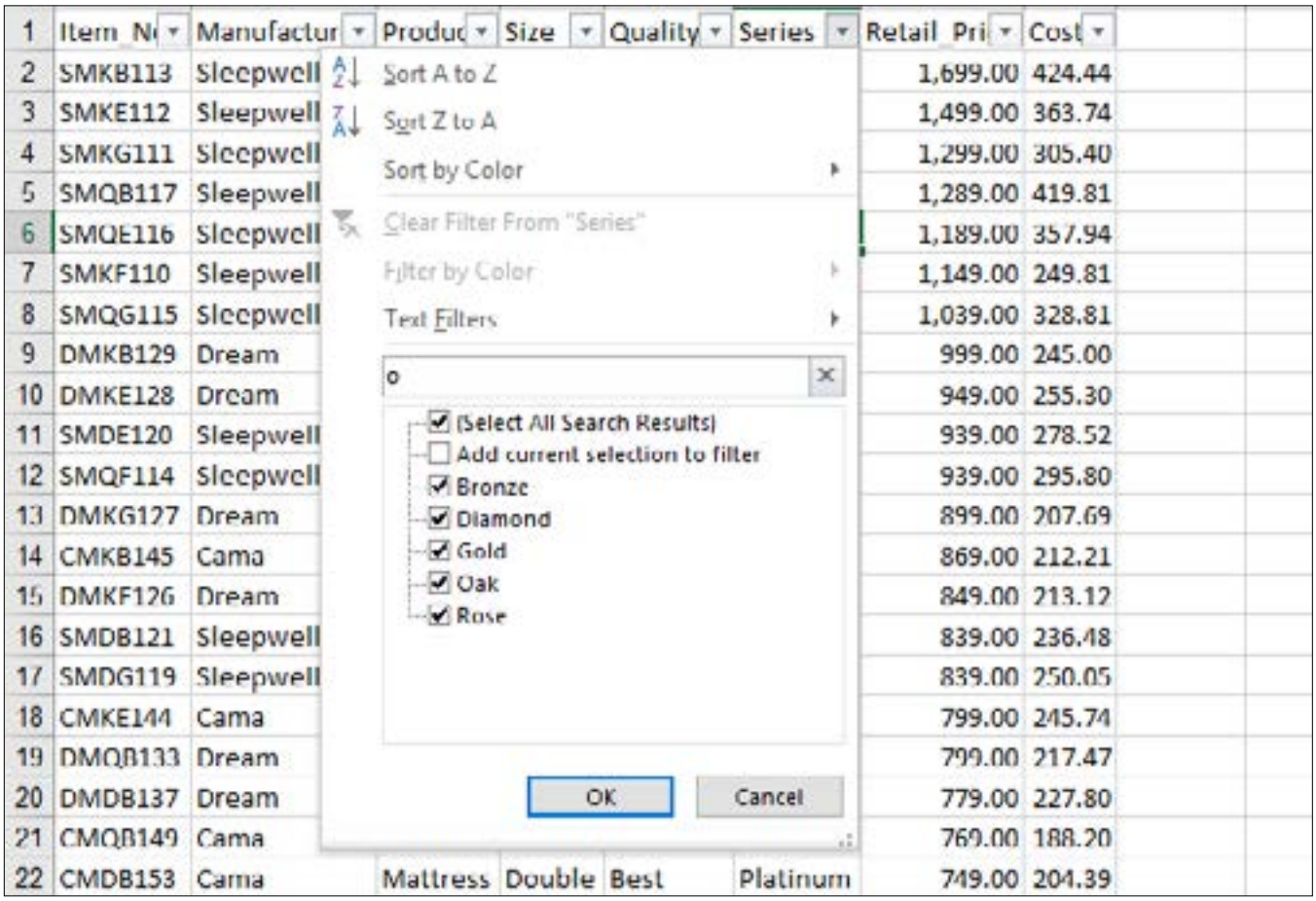


Figure 4.30

6. *Click* **Cancel**.
7. **Close** *the* **Item.xlsx** *file without saving it.*

Advanced Filtering

Another nifty function is Advanced Filtering. With Advanced Filtering, you can set up a criteria range and query data that meets that criteria. Let's try an example.

1. *On the* **my2015_Sales.xlsx** *file, click on the* **Filter** *icon to turn off the* **AutoFilter**.
2. *Select* **Rows 1 through 5** *and then click on the* **Insert** *icon (not the drop-down arrow next to it)*  *in the* **Cells** *group of the* **Home** *tab.*

3. **Copy Cells A6 through G6** *and* **Paste** *the range to* **Cell A1**.
4. *In* **Cell E2**, *type the number* **5** *(which sets this filter up for May).*

	A	B	C	D	E	F	G	H	I	J
1	Region	State	Store_No	Year	Month	Sales	Cost			
2					5					
3										
4										
5										
6	Region	State	Store_No	Year	Month	Sales	Cost			
7	East	MA	1062	2015	1	63,378.92	20,646.69			
8	East	MA	1062	2015	2	80,805.47	25,549.47			
9	East	MA	1062	2015	3	126,557.54	39,153.18			
10	East	MA	1062	2015	4	139,931.38	44,803.40			
11	East	MA	1062	2015	5	130,075.06	42,547.21			
12	East	MA	1062	2015	6	146,288.23	40,380.06			
13	East	MA	1062	2015	7	87,695.83	22,032.07			
14	East	MA	1062	2015	8	182,468.84	53,996.35			

Figure 4.31

This setup will query all sales in the table where the month is equal to 5.

5. *Click on the* **Advanced** *icon*  *in the* **Sort & Filter** *group of the* **Data** *tab.*
6. *Make sure the* **Filter the list, in place** *radio button under* **Action** *is selected.*
7. *In the* **List range:** *box, select* **$A$6:$G$354** *(or type, if it's not already there)*
8. *In the* **Criteria range** *box, type or select* **$A$1:$G$2**.

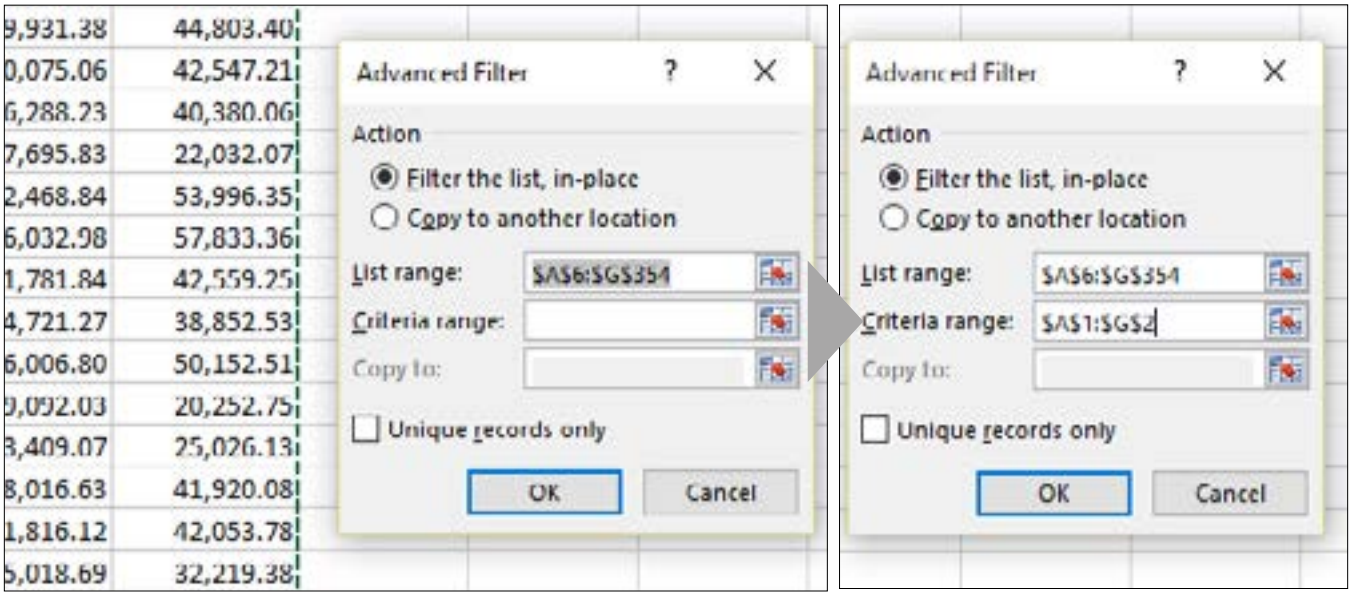


Figure 4.32

9. *Click* **OK**.

	A	B	C	D	E	F	G	H	I
1	Region	State	Store_No	Year	Month	Sales	Cost		
2					5				
3									
4									
5									
6	Region	State	Store_No	Year	Month	Sales	Cost		
11	East	MA	1062	2015	5	130,075.06	42,547.21		
23	East	MA	1063	2015	5	125,018.69	32,219.38		
35	East	NJ	1036	2015	5	31,523.49	10,126.40		
47	East	NJ	1040	2015	5	115,510.95	36,630.49		
59	East	NJ	1060	2015	5	142,098.45	45,197.83		
71	East	NY	1001	2015	5	61,264.98	17,746.36		
83	East	NY	1027	2015	5	155,336.90	50,154.47		
95	East	NY	1032	2015	5	145,043.97	49,934.60		
107	North	IL	1005	2015	5	134,570.80	38,564.48		
119	North	IL	1018	2015	5	148,881.91	46,021.99		
131	North	IN	1055	2015	5	132,438.41	36,192.24		
143	North	OH	1019	2015	5	100,780.57	29,368.45		
155	North	OH	1034	2015	5	137,811.23	46,328.04		
167	North	OH	1051	2015	5	149,703.15	47,052.72		
179	South	GA	1057	2015	5	63,895.90	16,122.43		
191	South	GA	1059	2015	5	69,606.10	20,664.33		
203	South	NC	1009	2015	5	71,368.64	18,016.85		

Figure 4.33

The records below the criteria range are now filtered for all sales in Month 5. You can also query on multiple criteria and use wildcard characters in your criteria. When you do this, however, you must be careful. Remember that when you input criteria on more than one line, Excel will filter records that match EITHER criteria. Let's suppose you want to filter for all records in May or June where the sales are greater than or equal to $100,000.

10. *In* **Cell E3**, *type* **6**.
11. *In* **Cells F2 and F3**, *type* ***>=100000***.
12. *Click on the* **Advanced** *button in the* **Sort and Filter** *group.*
13. *In the* **Advanced Filter** *dialog box, change the* **Criteria range** *to* **$A$1:$G$3** *(to add one more row in the criteria).*

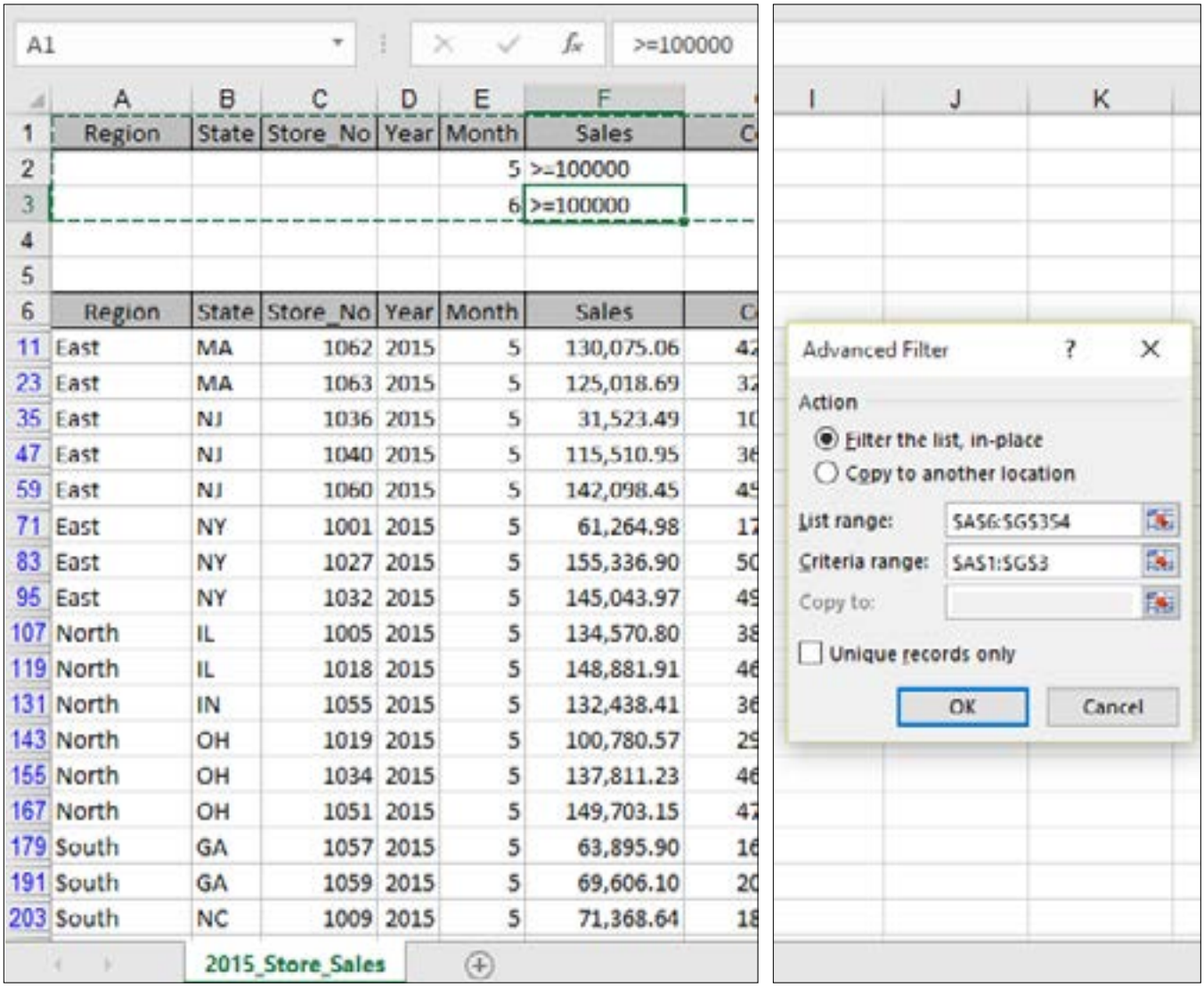


Figure 4.34

14. Click **OK**.

F3 >=100000

	A	B	C	D	E	F	G	H	I
1	Region	State	Store_No	Year	Month	Sales	Cost		
2					5	>=100000			
3					6	>=100000			
4									
5									
6	Region	State	Store_No	Year	Month	Sales	Cost		
11	East	MA	1062	2015	5	130,075.06	42,547.21		
12	East	MA	1062	2015	6	146,288.23	40,380.06		
23	East	MA	1063	2015	5	125,018.69	32,219.38		
24	East	MA	1063	2015	6	123,812.87	42,824.67		
47	East	NJ	1040	2015	5	115,510.95	36,630.49		
48	East	NJ	1040	2015	6	138,124.47	39,724.65		
59	East	NJ	1060	2015	5	142,098.45	45,197.83		
83	East	NY	1027	2015	5	155,336.90	50,154.47		
84	East	NY	1027	2015	6	122,189.20	40,543.91		
95	East	NY	1032	2015	5	145,043.97	49,934.60		
96	East	NY	1032	2015	6	121,012.96	38,199.65		
107	North	IL	1005	2015	5	134,570.80	38,564.48		
108	North	IL	1005	2015	6	112,248.11	33,932.84		

Figure 4.35

The list is now filtered for sales equal to or greater than $100,000 in May or June.

Filtering for Unique Values

With the Advanced Filter dialog box, you can query a table and extract a dataset of unique values. Let's suppose you want to extract a list of unique store numbers from the 2015_Store_Sales table. In that table, the store numbers are repeated 12 times, one time for each month. All we want is a simple list of all the store numbers (we may need those numbers in another analysis we are doing). With Advanced Filtering, it's a snap.

1. *Click on the* **Clear** *icon*  *in the* **Sort & Filter** *group of the* **Data** *tab to turn off the* **Advanced Filter**.
2. *Click on the* **Advanced** *icon.*
3. *In the* **Advanced Filter** *dialog box, choose the* **Copy to another location** *radio button.*
4. *Edit the* **List range:** *to read* **$C$6:$C$354** *(Column C contains the store numbers).*
5. *Delete the range in the* **Criteria range** *box.*
6. *In the* **Copy to** *box, type* **I1** *(This is where we want to put the filtered list.).*
7. *Check the* **Unique records only** *box.*

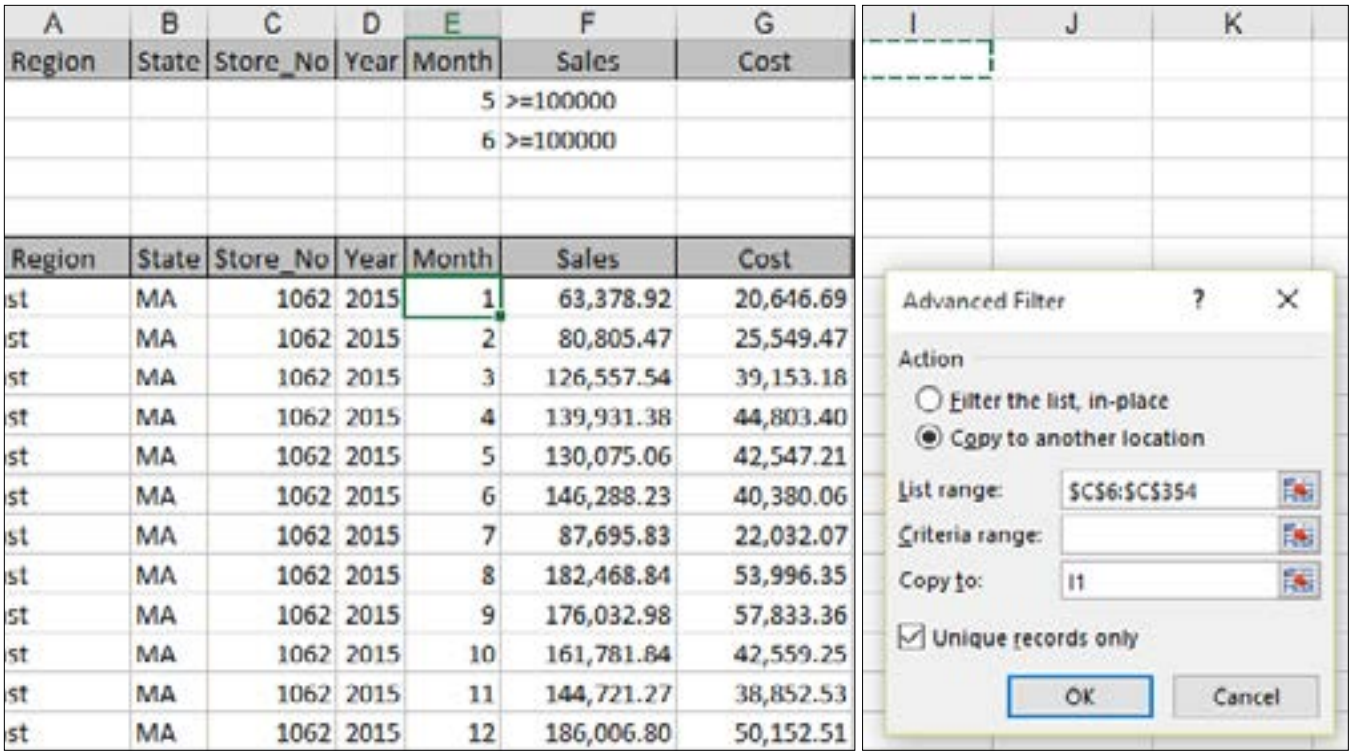


Figure 4.36

8. *Click* **OK**.

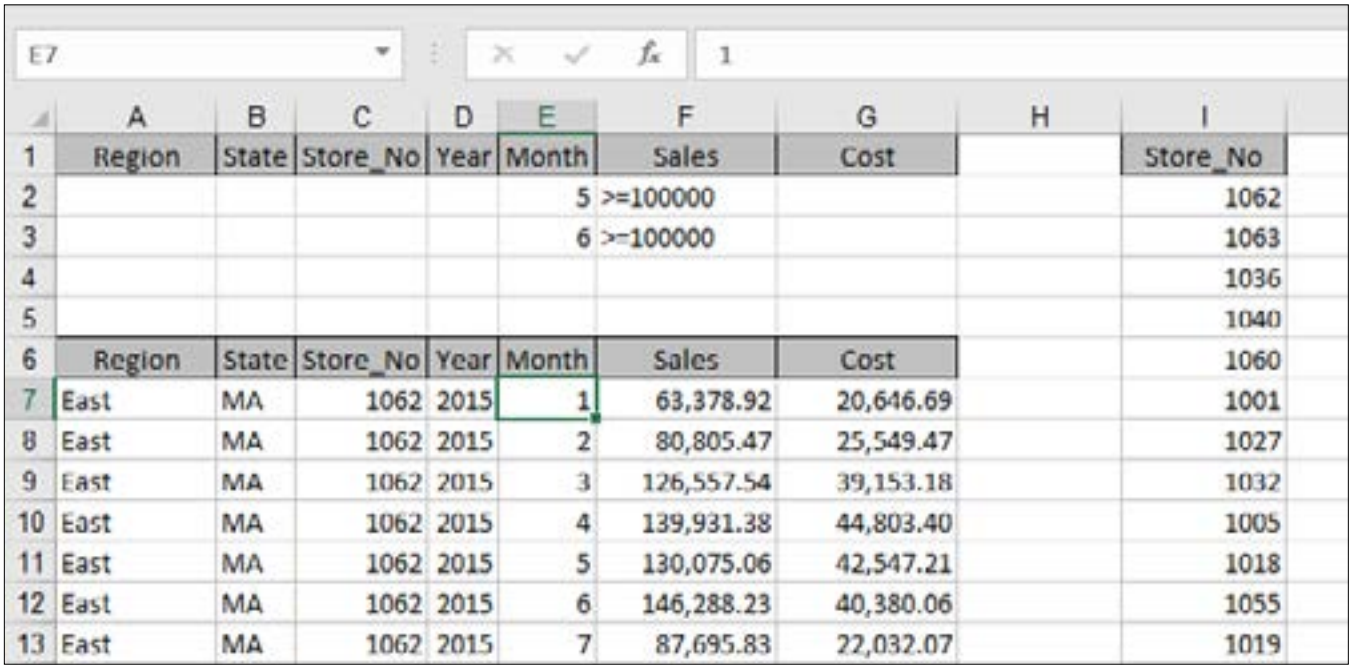


Figure 4.37

You now have a list of unique store numbers in Column I. Pretty easy, huh?

9. **Save** *and* **close** *the* **my2015_Sales.xlsx** *file.*

***Review Questions**: It is now time to complete the hands-on Review Questions. Log on to www.ExcelCEO.com with your Email address and Password, click on the* **Excel 2016 Review Questions, Chapter 4, Section 2 of 2** *option in your Main Menu, and complete the Review Questions.*

Conclusion

In this chapter, you opened and worked with multiple files, arranged them in Cascading order and copied tabs from one file to another. You learned how to use the Sort A-Z (Ascending) and Sort Z-A (Descending) icons. To re-emphasize, when using these icons, click on only ONE CELL in the column you want to sort. DO NOT SELECT THE ENTIRE COLUMN. You also learned how to perform custom sorts on the data. You worked a few examples using the Subtotal feature, which comes in handy when analyzing tables with many rows of data. You performed multiple subtotals on various levels of data. You also learned how to filter data on a spreadsheet including using Filter, custom filtering, Top 10 filtering, Search filters and explored Advanced Filters.

Chapter Exam

To take the examination for this chapter, you must have successfully completed the examination for the previous chapter. You can now go to www.ExcelCEO.com, click on Sign In, log in and take the exam. Make sure that you take the exam on the same computer on which you completed the practice files, as some of the questions on the exam may refer to some of the completed projects. Chapter exams are intended to be hands-on.

CHAPTER FIVE — PRINTING

Chapter Objectives:

- Recognize components of the Print and Print Preview dialog boxes
- Identify how to print a multiple page report
- Select Page Breaks and Margins using multiple dialog boxes
- Pick the appropriate customized Headers and Footers to a report using multiple available features
- Choose non-contiguous cells to create the print range of a report
- Recognize the functionality to hide Rows and Columns within a printed report
- Identify the Grouping functionality
- Select the Page to Fit functionality
- Identify how to save an Excel file as a PDF document

Projects You Will Complete During This Chapter:

- *myInc_Stmt.xlsx*
- *myTop_Ten_May_16.xlsx*
- *myTop_Ten_May_16.pdf*

CPE Credits possible for this chapter: 1.5

Introduction

"*The paperless office will never exist.*" At least in my lifetime it won't. You can quote me on that one. Excel gives you a wide variety of tools to create, organize, manipulate, slice, and dice your data, but many people will want to see a printed report or presentation. It will always be necessary to share information with others, and printing a report, graph, or table is essential in a working office environment, and more particularly in an accounting environment.

When considering your Excel reports, it's best to begin with the end in mind. By that I mean think about how you want your report to look. How far from the edges (top, bottom, right, left) do you want the report? Do you want it on one page or multiple pages? Landscape or portrait? Large or small font? Color or black and white? If you can picture in your mind how you want the report to look, you're halfway there. Let's start off with designing a simple one-page report.

1. **Open** *the file at* **C:\ExcelCEO\Excel 2016\Chapter5\Inc_Stmt.xlsx**.
2. **Save As C:\ExcelCEO\Excel 2016\Chapter5*myInc_Stmt.xlsx***.

Nitey-Nite Mattresses
Summary Net Income Statement
As of 5/31/2016
Store No. 1063

	MTD May 2016	MTD May 2015	$ Diff	% Diff
Revenue				
Mattresses	$76,240	$63,410	$12,830	120.2%
Pillows	3,151	3,231	-80	97.5%
Total Merchandise	79,391	66,641	12,750	119.1%
Services	3,190	3,110	80	102.6%
Discounts	-3,354	-1,943	-1,411	172.6%
Total Revenue	**79,227**	**67,808**	**11,419**	**116.8%**
Variable Expenses				
Cost of Merchandise	20,216	17,453	2,763	115.8%
% of Revenue	*25.5%*	*25.7%*		
Selling Expenses	9,805	8,443	1,362	116.1%

Figure 5.1

The file is similar to the financial statement you created in Chapter 2.

Print Preview

In Excel 2016, there are a number of ways to display the various print features. We'll explore those methods in the next few exercises. To preview how the report will look when it is printed, you first need to set the print range.

3. *Select the area of the report (***Cells A1 through E39***).*
4. *Click on the* **Page Layout** *tab, click on the* **Print Area**  *icon in the* **Page Setup** *group, and select* **Set Print Area**  .

The Print_Area is now set, as seen in the Name Box, so you can now preview the report by clicking on the ***Print Preview and Print*** icon. If you don't set the print area, Excel 2016 usually does a good job of figuring out what your print area should be, unless there are a lot of blank rows and/or columns, so most of the time you don't even need to set the print area. I do a lot of non-contiguous ranges, so I use the Set Print Range functionality quite a bit. On my computer, I have the Set Print Area icon as one of the icons in my Quick Access Toolbar. Another icon we placed in the Quick Access Toolbar in Chapter 3 is the Print Preview icon. Print Preview allows you to look at a graphic of the report as it will print.

5. *Click on the* **Print Preview and Print** *icon*  *in the* **Quick Access Toolbar**.

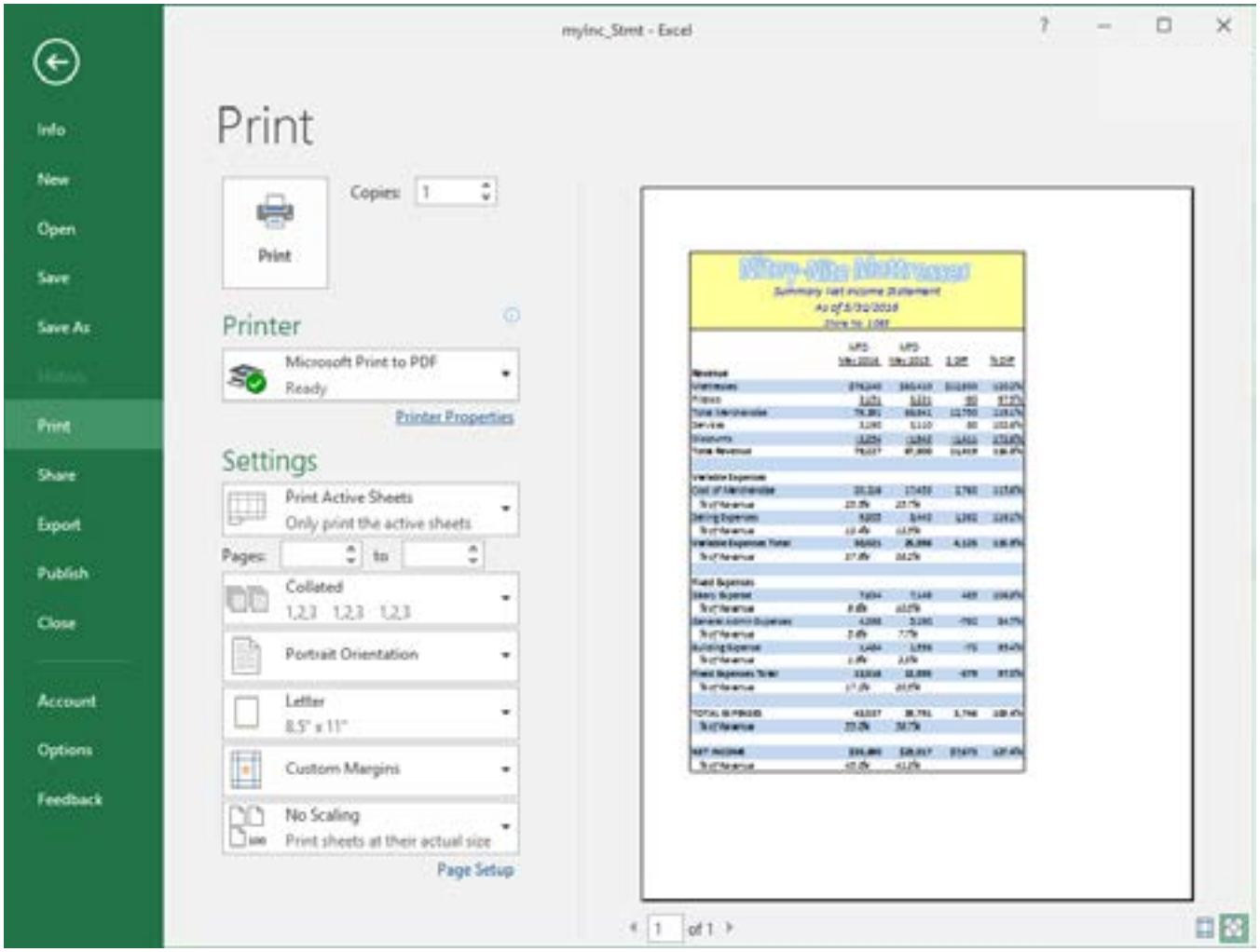


Figure 5.2

Since we haven't adjusted any of the margins, or centered the report yet, the document appears at the top of the page and over to the left.

There are a number of settings in ***Print Preview*** mode. The Print button prints the document. The ***Printer status*** button allows the user to choose a different printer, add a printer, and print to file (meaning to send the document to file such as a PDF or OneNote). The Printer Properties link opens the Printer Properties dialog box for the selected printer and gives you selected options to apply to the printed document for the printer option. Under the ***Settings*** section are several icons that allow the user to change various settings, such as print area selections, Page Orientation, paper size, margins, and scaling. The Page Setup link below the Settings section is a link to the Page Setup dialog box that many people used in previous versions of Excel. In the lower-right corner of Print Preview view are two icons: ***Show Margins*** and ***Zoom to Page***. You use the Show Margins button to see the lines in Print Preview where the margins are set. The Zoom to Page button allows you to see a larger and smaller view of the page as it will print out. In the lower-center section of Print Preview mode are ***navigation buttons*** that allow you to scroll to the previous page or next page in multiple page reports. To close out of Print Preview, just click on the back arrow button in the extreme upper-left corner. As always, feel free to explore options that you would use.

In the past, I used the Page Setup dialog box to perform all of my printing functions, and there are some functionalities in the Page Setup dialog box that are necessary to use, so let's explore using that dialog box.

6. *Click on the* **Page Setup** *dialog expander link and the* **Page Setup** *dialog box opens.*
7. *Make sure the* **Page** *tab is selected.*

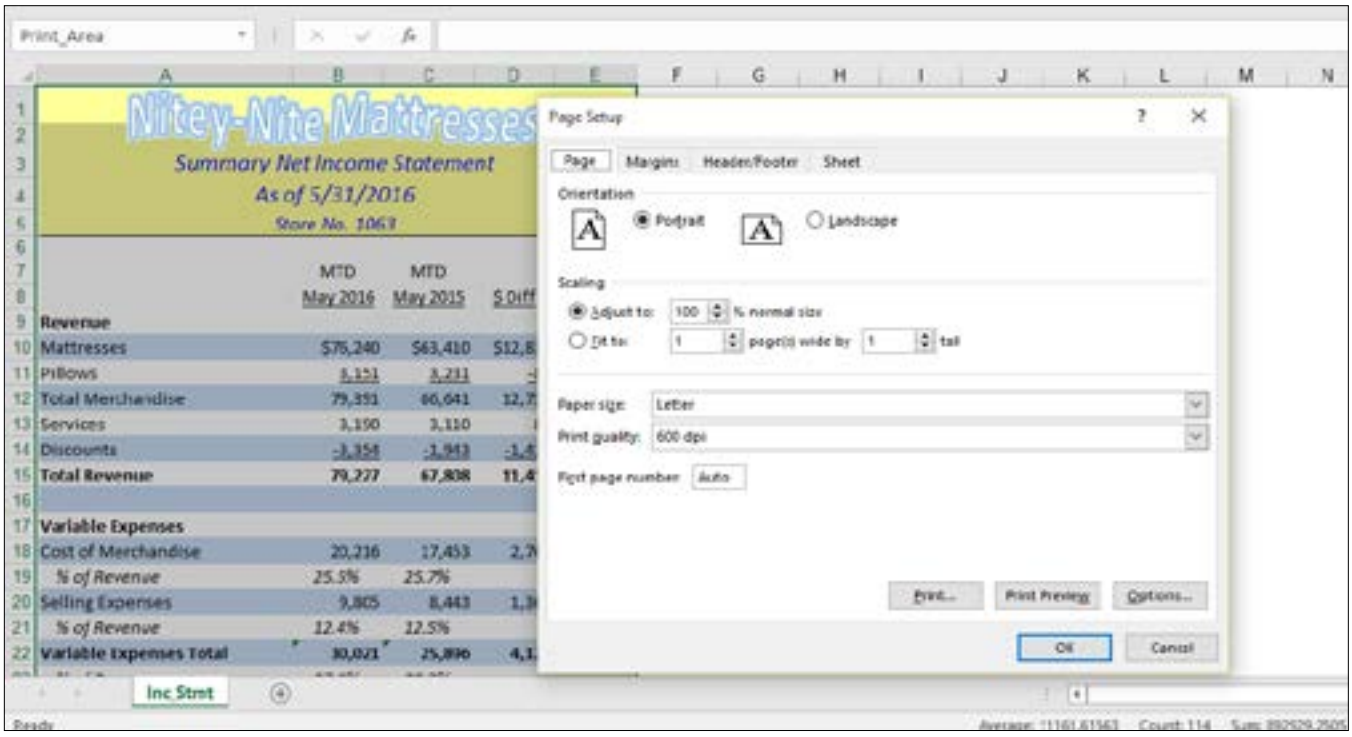


Figure 5.3

On the Page tab, you can do things like change the ***Orientation*** of the page (make it Portrait or Landscape), reduce or increase Scaling, make the document Fit to a specified number of pages (wide by tall), and change the paper size and print quality. For now, we will accept the default values (Portrait,

100% of normal size, using 8.5 x 11 inch (Letter) paper with high-quality 600 dpi print quality).

8. Click on the **Margins** *tab.*

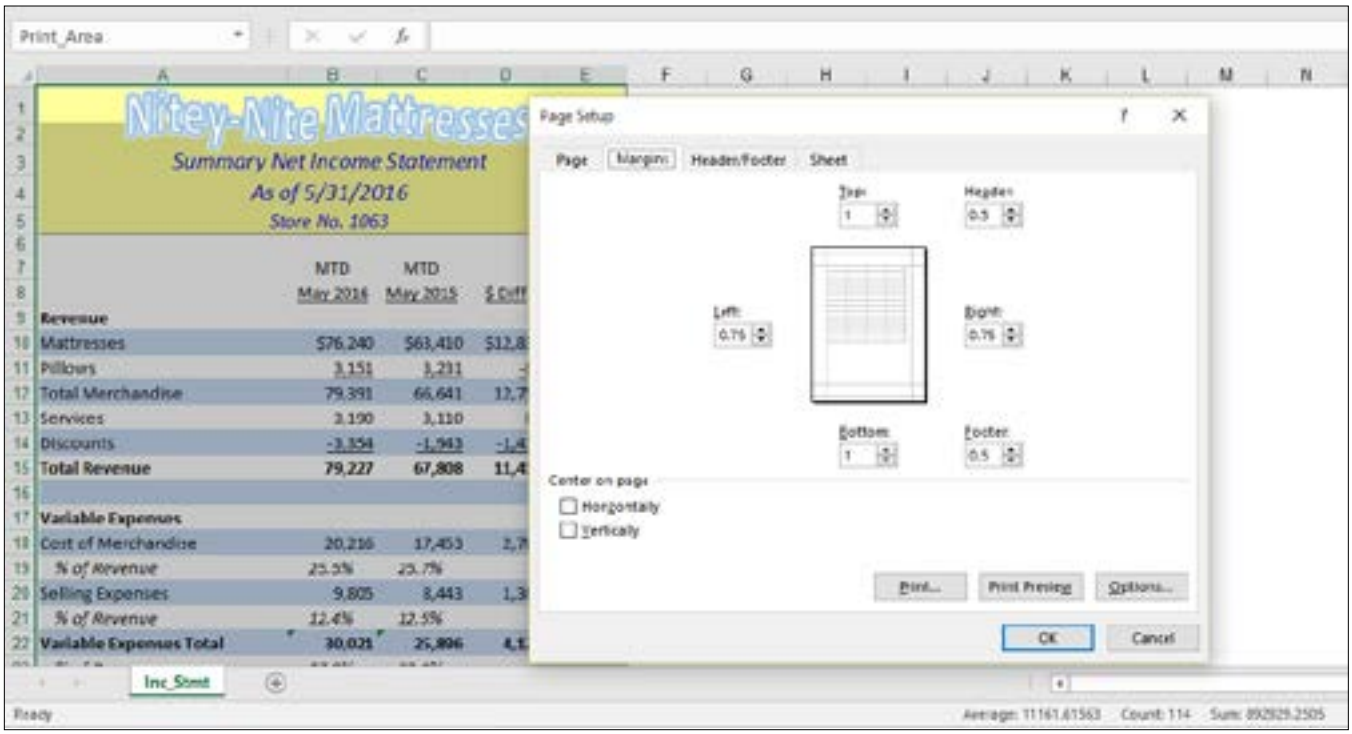


Figure 5.4

In this tab, you can set the left, right, top, bottom, header, and footer margins. You can also center the report horizontally and/or vertically.

9. Check the **Horizontally** *and* **Vertically** *boxes, and click* **Print Preview**.

You should now see a full page preview of how your document should appear before it is printed, centered horizontally and vertically.

10. Click the **Zoom to Page** *icon.*

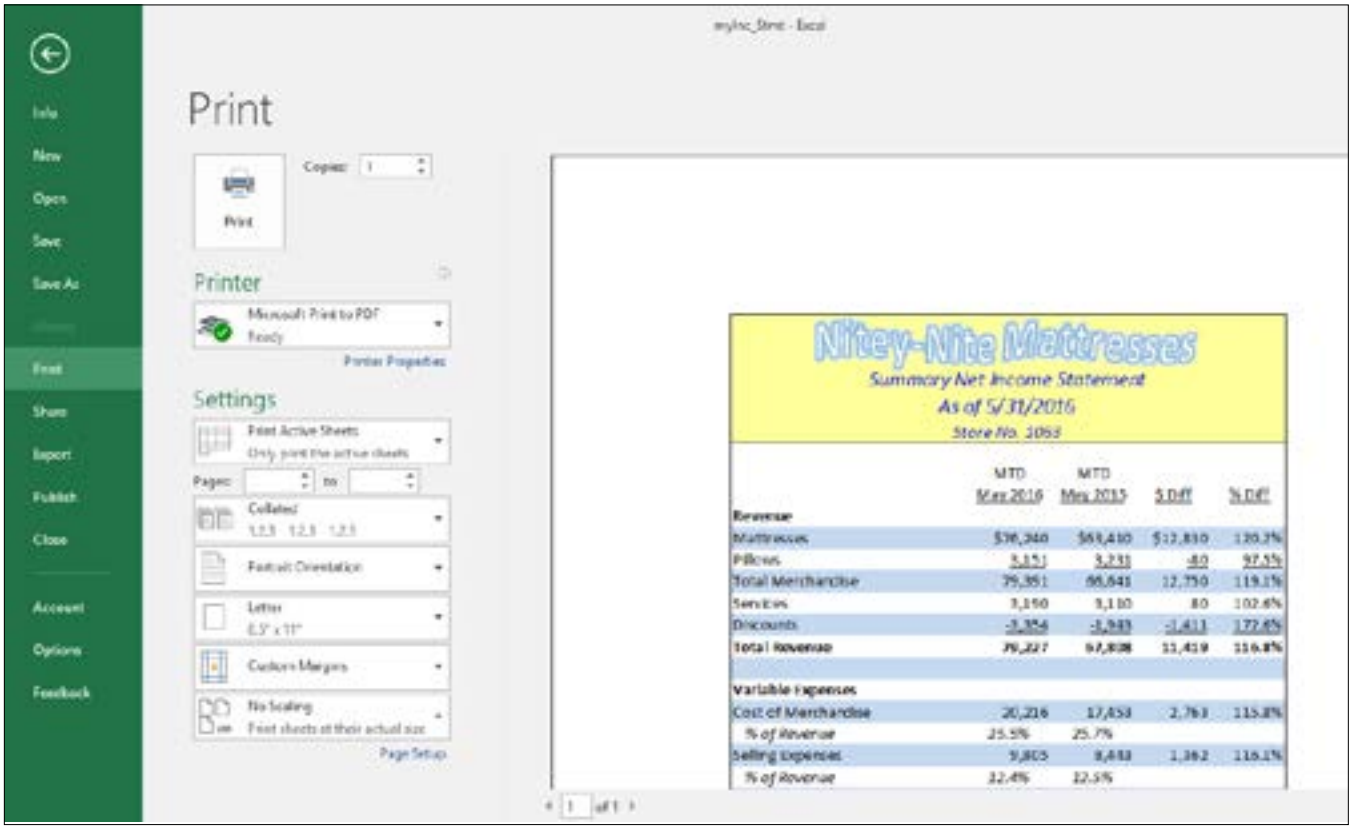


Figure 5.5

The document increases in size (i.e.- it zooms in). Click the Zoom to Page icon again to return the print preview to it full size.

11. *Click the* **Zoom to Page** *icon again (to zoom out from the document).*
12. *Click the* **Back Arrow** *icon (to get out of* **Print Preview** *view and return to the worksheet).*
13. *Click the* **Custom Views** *icon in the* **Workbook Views** *group of the* **View** *tab.*
14. *In the* **Custom Views** *dialog box, click* **Add...** *and type* ***Centered_IncStmt****.*
15. *Click* **OK***.*

This adds a printer preset you can access quickly for this report when you want it centered horizontally and vertically. You could apply other presets to this file as well, if preferences change.

16. **Save** *and* **close** *the* **myInc_Stmt.xlsx** *file.*

Multiple Page Reports

Let's open another report for a more complex printing exercise. In this example, you will set up a report to print on multiple pages.

1. **Open** *the file at* **C:\ExcelCEO\Excel 2016\Chapter5\Top_Ten_May_16.xlsx***.*

2. **Save As C:\ExcelCEO\Excel 2016\Chapter5*myTop_Ten_May_16.xlsx***.

This file is similar to the Top Ten file you completed in Chapter 1. We will work with it to prepare a printed report.

3. *Open the report in* **Print Preview**.

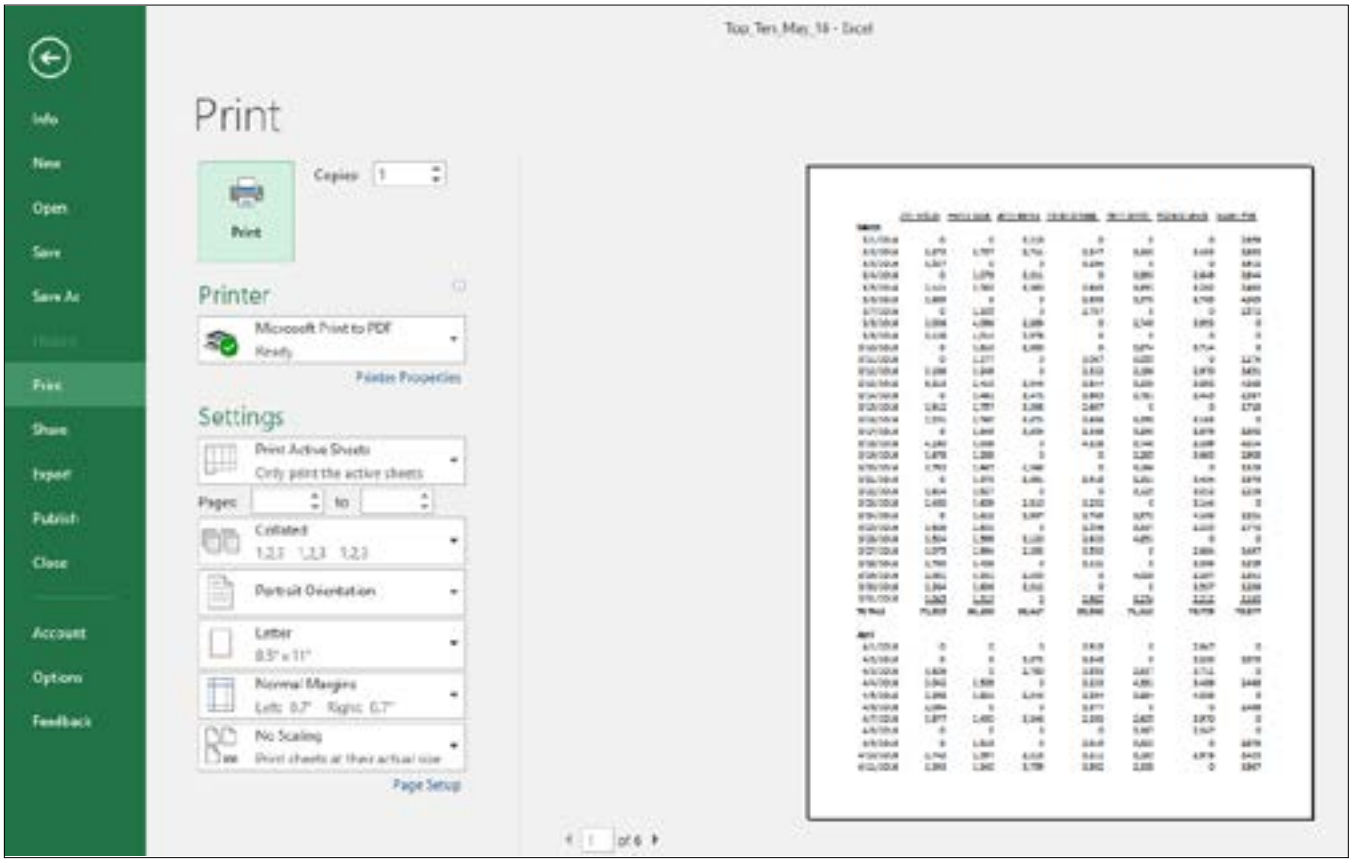


Figure 5.6

By default, Excel sets up your report in a **Portrait** format. In our report, we have 11 columns of data, consisting of one column of dates and 10 columns of people, and it doesn't appear to all fit in a Portrait mode, as there are only eight fields of data that appear in this first page of the report. If you click on the Next Page button a few times, you'll see that the column headings don't repeat and that there is partial data on some of the pages. One option to make it fit appropriately is to make the report appear with a **Landscape** orientation.

4. *Click on the* **Portrait Orientation** *button in the left section of the screen, and change it to* **Landscape Orientation**.

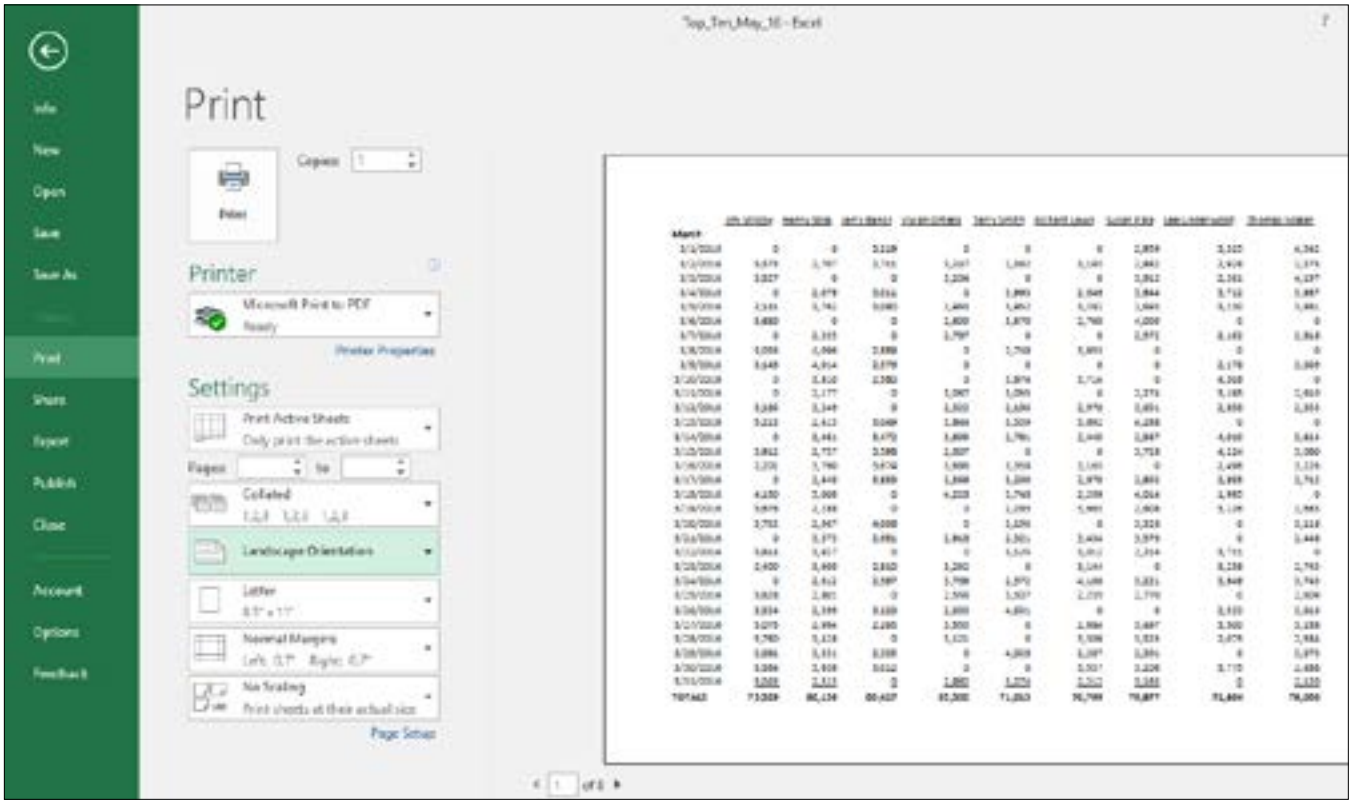


Figure 5.7

The report looks better, but still needs some work. If you click the Next button a few times, you will see that the report is now eight pages long (we want it to be three pages long – one page for each month) and that the last person, Evan Thurston, is on a page by himself. To make Evan Thurston fit on the same page as the other people, we need to adjust the margins of the report.

5. *Click on the* **Back** *arrow button, then click the* **Margins** *button in the* **Page Setup** *group of the* **Page Layout** *tab, and choose* **Custom Margins...**.
6. *Reduce the* **Left:** *and* **Right:** *boxes down to* ***.25****, and the* **Top:** *and* **Bottom:** *margins down to* ***.50****. Check the* **Horizontally** *and* **Vertically** *boxes. and click* **OK**.
7. *View the report in* **Print Preview** *mode.*

Your Print Preview should now appear as follows:

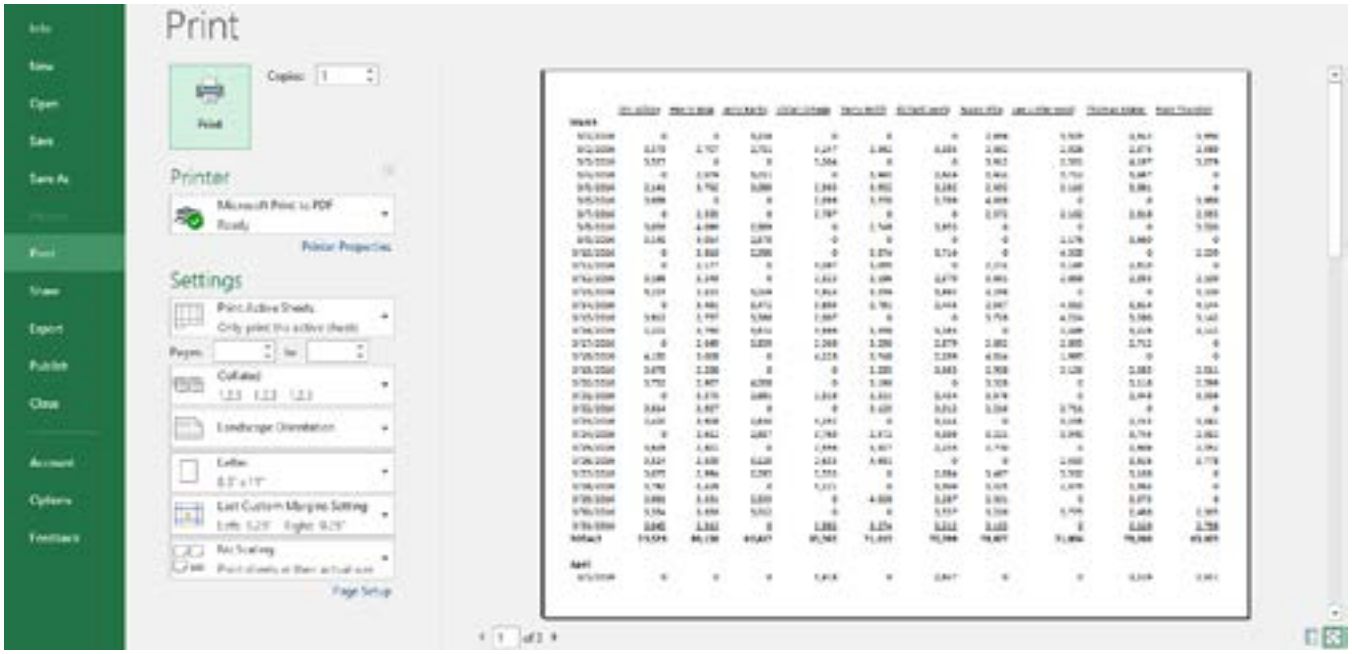


Figure 5.8

Page Breaks

The report is now down to three pages, but there is some data from April that is still on the first page. We want to display only one month on each page. One option is to play with the Top and Bottom margins until the months all fit on one page each, but in this example we will use a ***Page Break***.

1. *Click on the back arrow button, then click on the* **Page Layout** *tab.*
2. *Click on* **Cell A36** *(where the date changes from* **March** *to* **April***).*
3. *On the* **Page Layout** *tab in the* **Page Setup** *group, click on* **Breaks***, and choose* **Insert Page Break**.
4. *Insert another* **Page Break** *on* **Cell A69** *(where the date changes from* **April** *to* **May***).*
5. *View the report in* **Print Preview** *mode.*

Now each month appears on its own page.

Print Titles

As you scroll through the report in Print Preview mode, notice how the names don't repeat on the second and third pages. You will now format the report where those names repeat on every page. In Excel 2016, you set the titles for each page from the Page Layout tab.

1. *Exit out of the* **Print Preview** *mode*
2. *In the* **Page Setup** *group of the* **Page Layout** *tab, click on the* **Print Titles** *icon* 

.

This opens the Page Setup dialog box with the Sheet tab selected.

3. *Click inside the* **Rows to repeat at top:** *box.*
4. *If the box is empty (it may show $1:$1), choose* **Row 1** *on the spreadsheet, and click* **OK**.

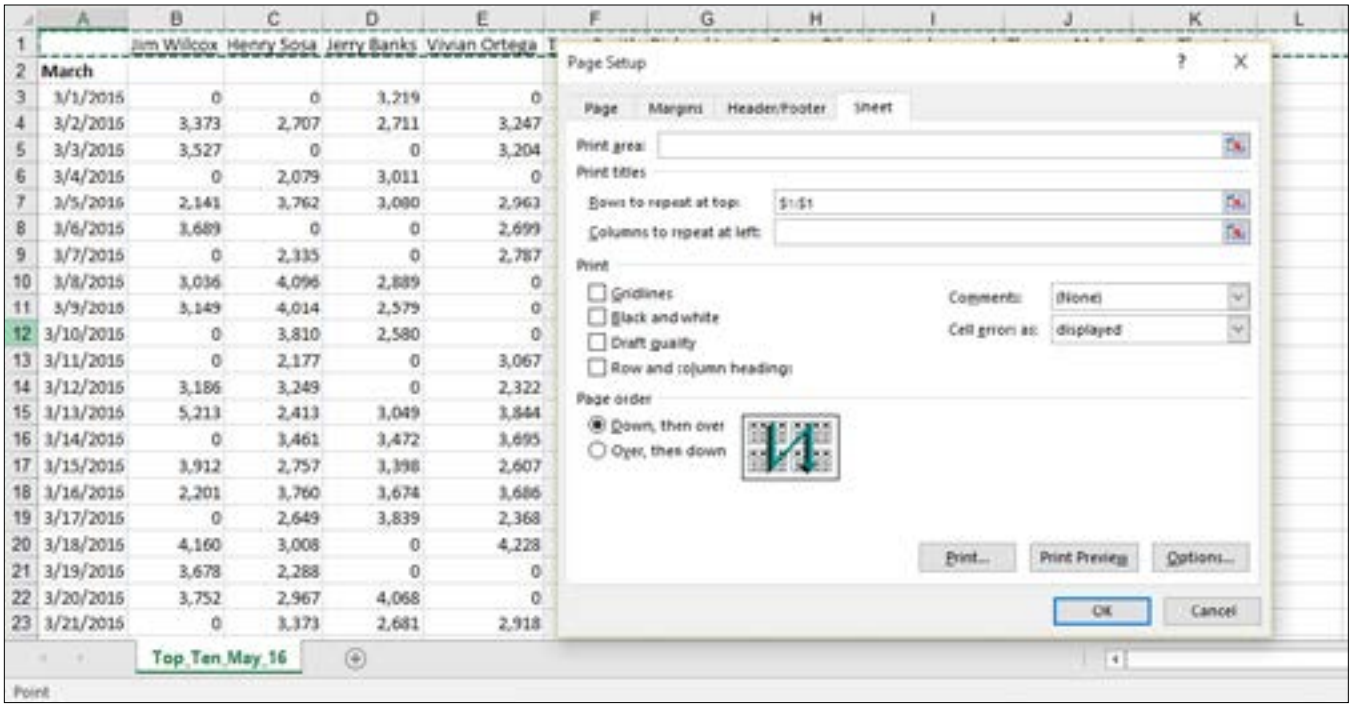


Figure 5.9

In this dialog box, you can also make columns to the left repeat on subsequent pages by clicking in the Columns to repeat at left: box and then choose on the columns you want to repeat. Now if you click on Print Preview, you will see the three pages on the report with the title row repeating on each page.

5. *View the report in* **Print Preview** *mode to ensure the names are repeated on pages 2 and 3.*

> ***Review Questions****: It is now time to complete the hands-on Review Questions. Log on to www.ExcelCEO.com with your Email address and Password, click on the* **Excel 2016 Review Questions, Chapter 5, Section 1 of 2** *option in your Main Menu, and complete the Review Questions.*

Headers and Footers

Let's add a header and footer to the report. In Headers and Footers, you can make text, dates, numbers and even images appear at the top or bottom, respectively, on every page of the report.

1. *Go to the* **Print Preview** *(if you closed the report for Review Questions) and click on the* **Page Setup** *link.*
2. *Click on the* **Header/Footer** *tab.*

3. *Click on the* **Custom Header…** *button.*
4. *Click in the* **Center** *section and type:* ***TOP TEN REPORT*** *and press* **[Enter]** *(use plain text).*
5. *On the second line, type:* ***As of May 31, 2016***
6. *With your cursor, select the* **TOP TEN REPORT** *text.*

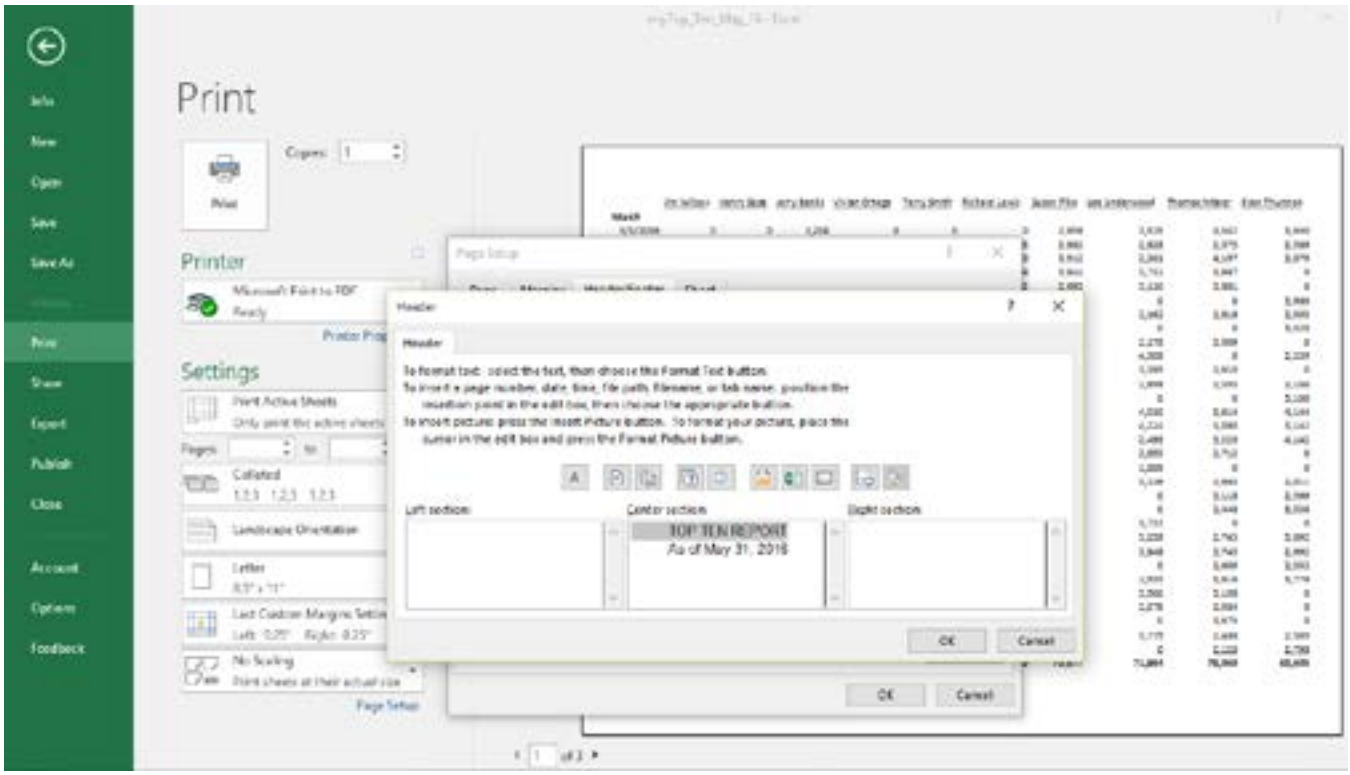


Figure 5.10

You can change the font in a header or footer section just like you can on a spreadsheet.

7. *Click on the* **Format Text** *button* A *in the* **Header** *dialog box (the* **Font** *dialog box appears).*
8. *Under* **Font style:** *choose* **Bold**.
9. *Under* **Size:** *choose* **16**, *and click* **OK**.

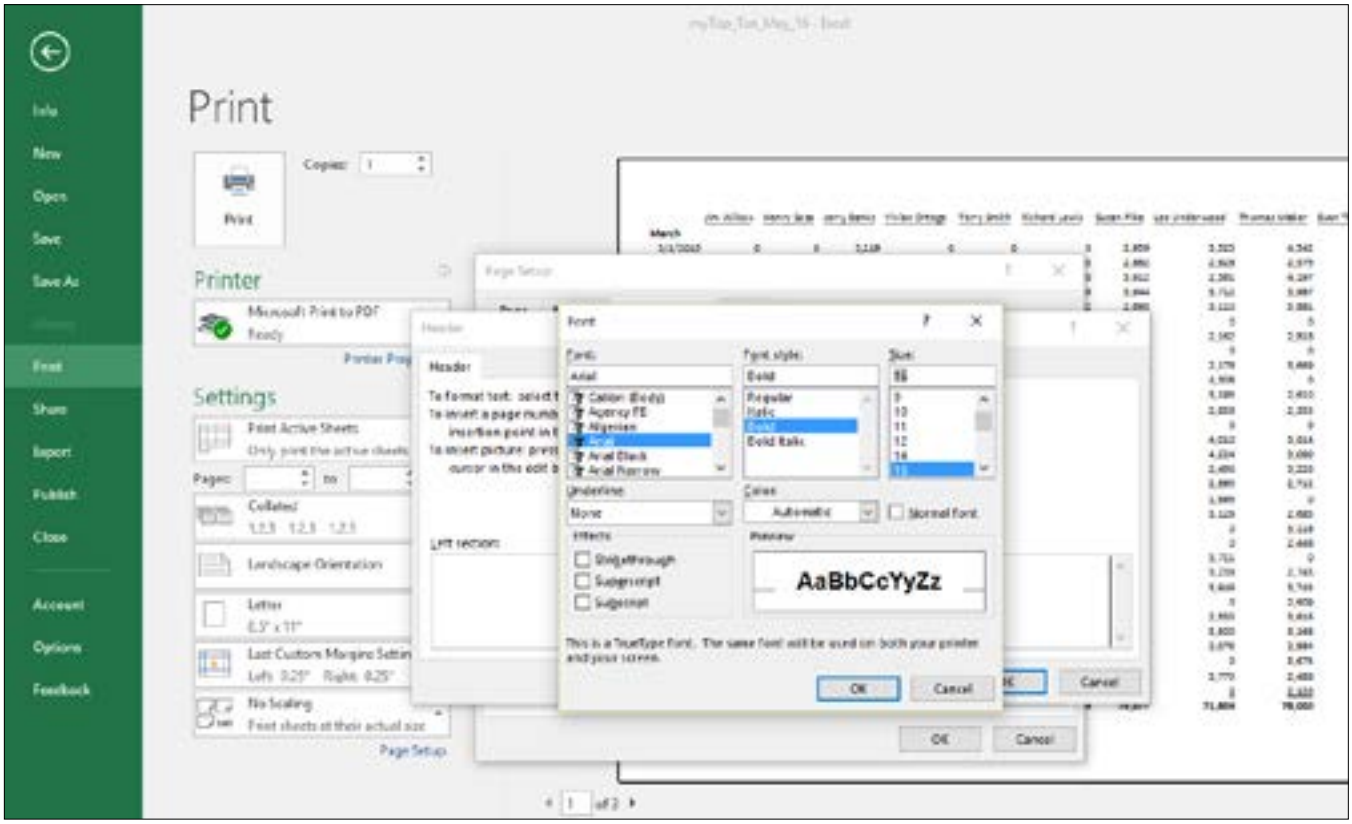


Figure 5.11

Now that I see it, I don't want for the header to be that big, so let's change it a little.

10. *In the* **Header** *dialog box, select* **TOP TEN REPORT**, *and click the* **Format Text** *button.*
11. *Under* **Font style**, *choose* **Bold Italic**. *Choose* **12** *under* **Size,** *and click* **OK** *twice.*
12. *In the* **Page Setup** *dialog box, click on the* **Custom Footer…** *button.*
13. *Click in the* **Right section** *box.*
14. *Type* ***Page***, *and click the* **Insert Page Number** *button.* 
15. *Type* ***of***, *and click the* **Insert Number of Pages** *button*  , *then type* ***Pages*** *(with the appropriate spaces between words), and click* **OK** *in each dialog box as you exit* **Page Setup**.

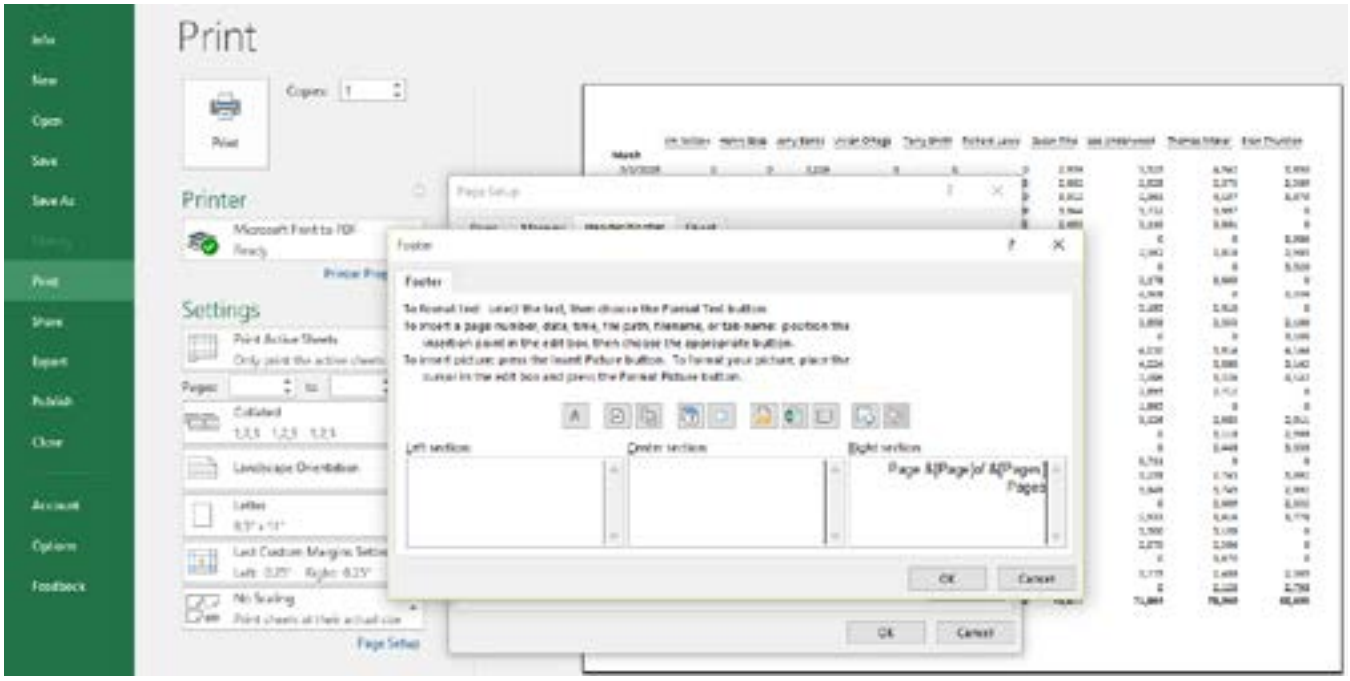


Figure 5.12

View the report in Print Preview.

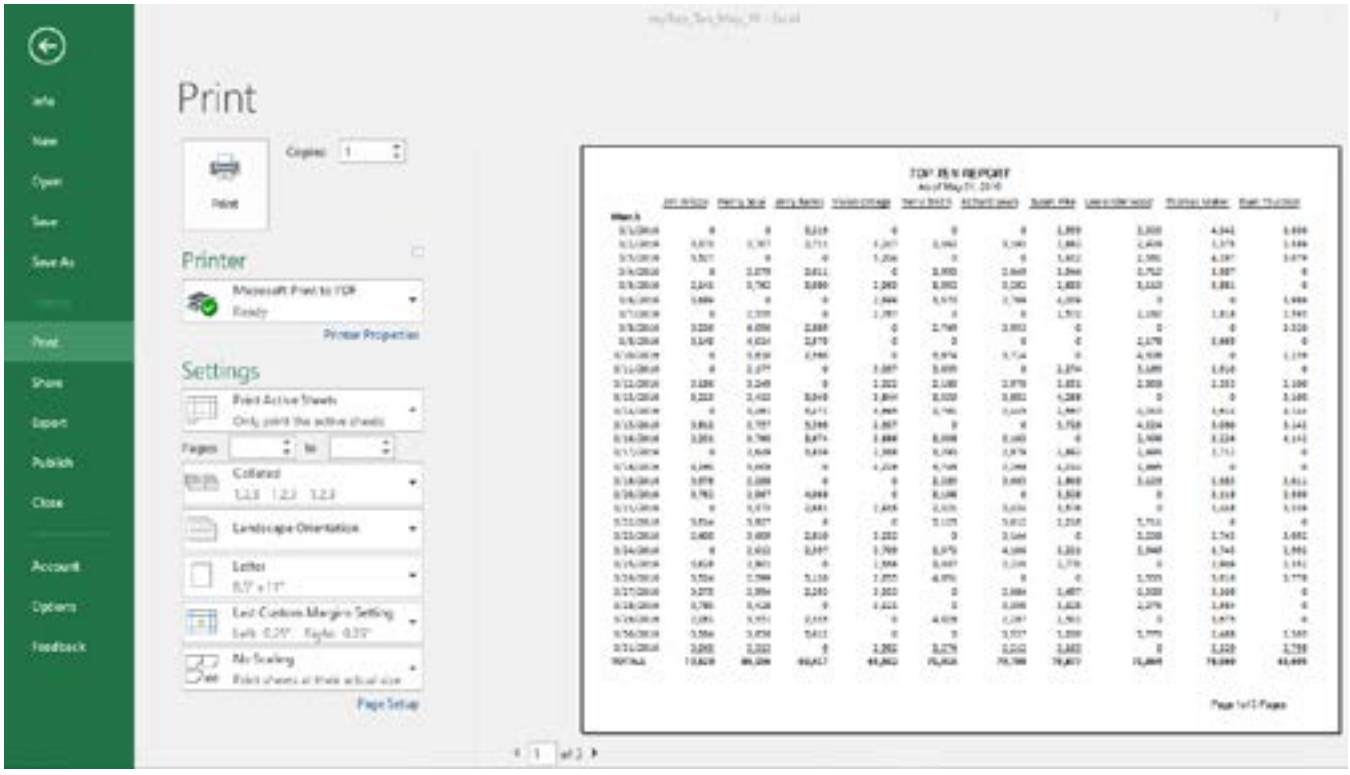


Figure 5.13

Hmmmmmm. The Header looks okay, but it would be nice to have a bit more room between the Header and the report. On the Margins tab of the Page Setup dialog box, the Header and Footer margins are set to .50 and the Top and Bottom margins are also set to .50. One way to rectify this is to reduce the Header and Footer a bit until they appear above the titles.

16. *Click on the* **Page Setup** *link on the* **Page Layout** *tab, and click on the* **Margins** *tab.*
17. *Reduce the* **Header** *and* **Footer** *margins to* ***0.25****, make the* **Top** *margin* ***0.75****, and click* **OK**.

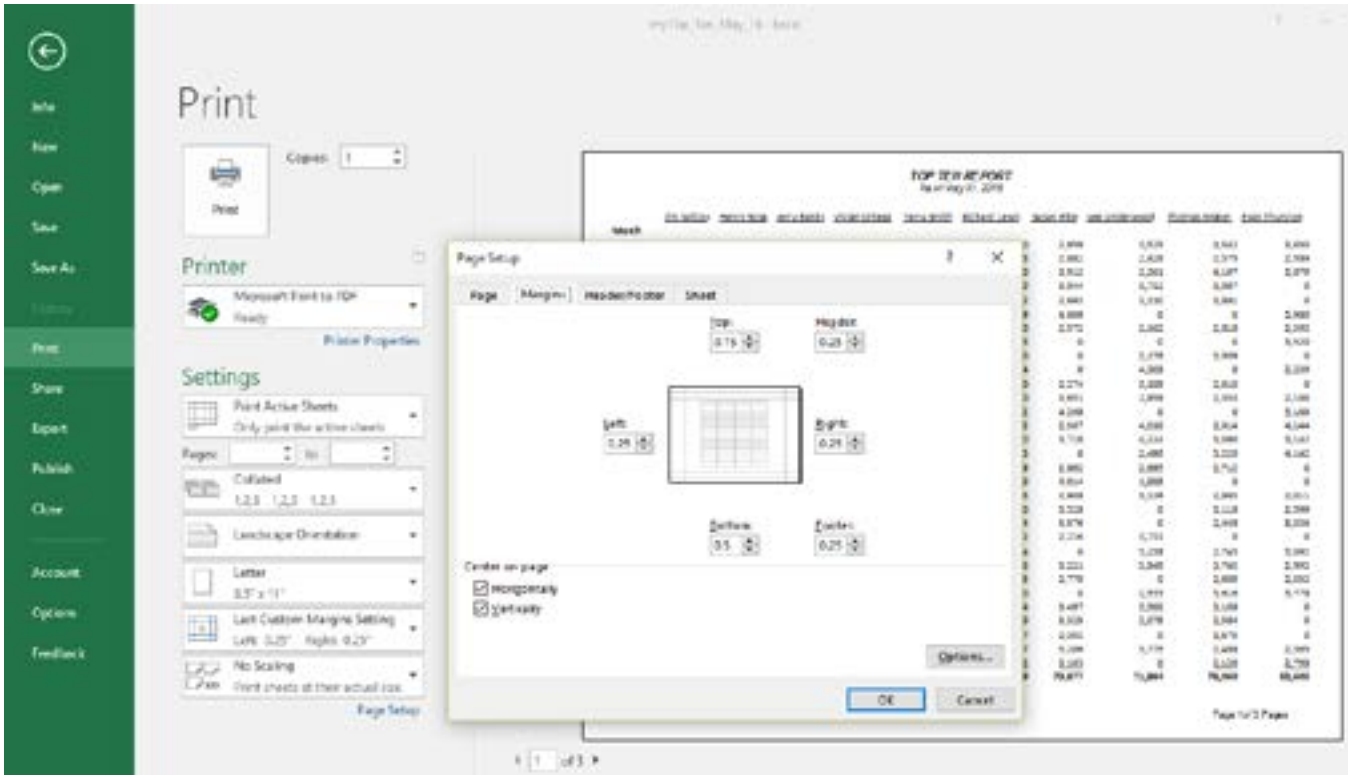


Figure 5.14

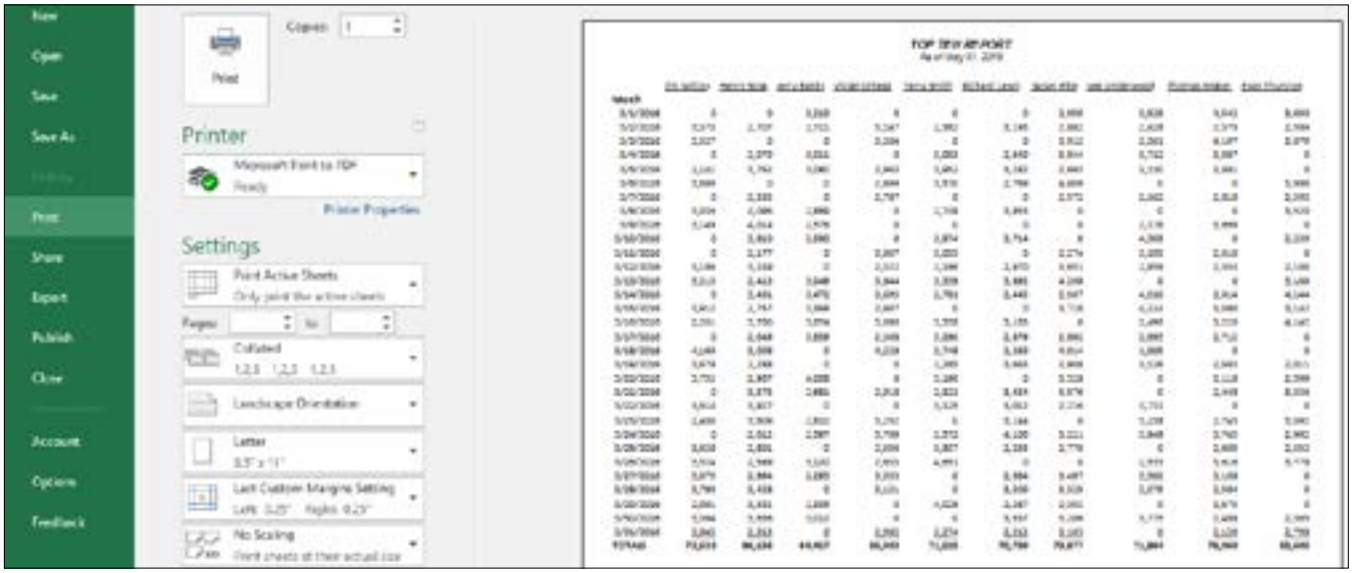


Figure 5.15

Now click on the Next and Previous buttons in Page Preview mode to see how the report will print.

Do you see how Page 1 is offset a little different than the other pages? That is caused by the vertical setting. Let's uncheck that box.

18. *In the* **Page Setup** *dialog box, in the* **Margins** *tab, uncheck the* **Vertically** *check box, Click* **OK**, *and scroll through to* **Print Preview** *of the report.*

I encourage you to click on the other buttons in the Header and Footer dialog boxes to see what they do. Note that in these dialog boxes you can insert and format a picture (or image).

> ***Tip**: You can insert a header or footer without opening the* **Page Setup** *dialog box, if there are not frozen panes in the worksheet (or the* **Page Setup** *dialog box will open). To do this, click on the* **Header & Footer** *icon in the* **Text** *group of the* **Insert** *tab. This opens the worksheet in* **Page Layout** *view and creates the* **Header & Footer Tools Design** *contextual tab.*

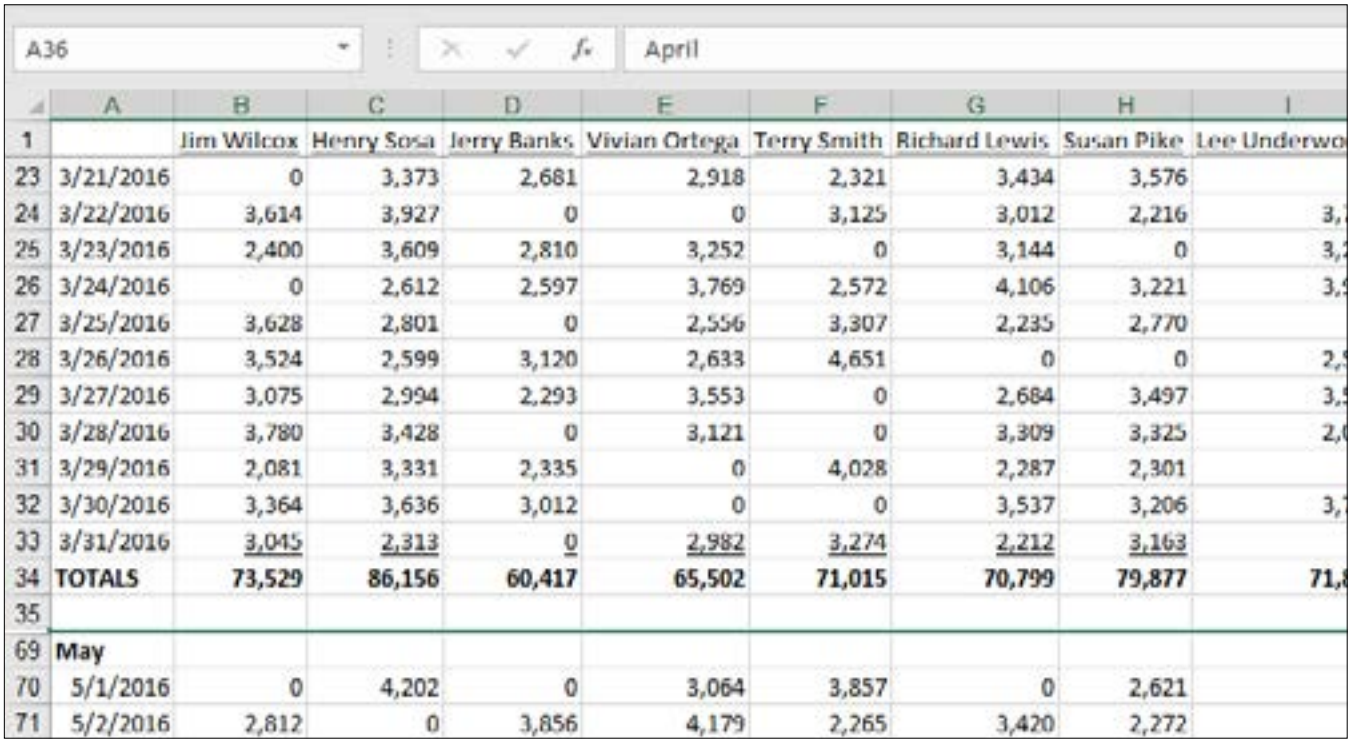
Non-Contiguous Ranges

Sometimes you want to print sections of a report that are not located next to each other. These are called ***non-contiguous ranges***. There are a few ways to handle this. One way is to ***hide*** the rows and/or columns you don't want to print. Hiding a row or column is just that – hiding. It does not delete the data. Another way is to select only the range you want to print. Let's try both methods. Let's suppose that you want to print the report only for the months of March and May.

Hide Rows

1. *Return to the workbook.*

2. *With your cursor, select* **Rows 36 through 68**.
3. *On the* **Home** *tab, click on the* **Format** *button in the* **Cells** *group.*
4. *Point to* **Hide & Unhide**, *and choose* **Hide Rows**.



A36 | April

	A	B	C	D	E	F	G	H	I
1		Jim Wilcox	Henry Sosa	Jerry Banks	Vivian Ortega	Terry Smith	Richard Lewis	Susan Pike	Lee Underwo
23	3/21/2016	0	3,373	2,681	2,918	2,321	3,434	3,576	
24	3/22/2016	3,614	3,927	0	0	3,125	3,012	2,216	3,
25	3/23/2016	2,400	3,609	2,810	3,252	0	3,144	0	3,
26	3/24/2016	0	2,612	2,597	3,769	2,572	4,106	3,221	3,
27	3/25/2016	3,628	2,801	0	2,556	3,307	2,235	2,770	
28	3/26/2016	3,524	2,599	3,120	2,633	4,651	0	0	2,
29	3/27/2016	3,075	2,994	2,293	3,553	0	2,684	3,497	3,
30	3/28/2016	3,780	3,428	0	3,121	0	3,309	3,325	2,
31	3/29/2016	2,081	3,331	2,335	0	4,028	2,287	2,301	
32	3/30/2016	3,364	3,636	3,012	0	0	3,537	3,206	3,
33	3/31/2016	3,045	2,313	0	2,982	3,274	2,212	3,163	
34	TOTALS	73,529	86,156	60,417	65,502	71,015	70,799	79,877	71,
35									
69	May								
70	5/1/2016	0	4,202	0	3,064	3,857	0	2,621	
71	5/2/2016	2,812	0	3,856	4,179	2,265	3,420	2,272	

Figure 5.16

Rows 36 through 68 are now hidden. If you click on Print Preview, you will see the rows are also hidden in that view of the report. However, it's kind of ugly because Page 2 appears with just the column names and no data.

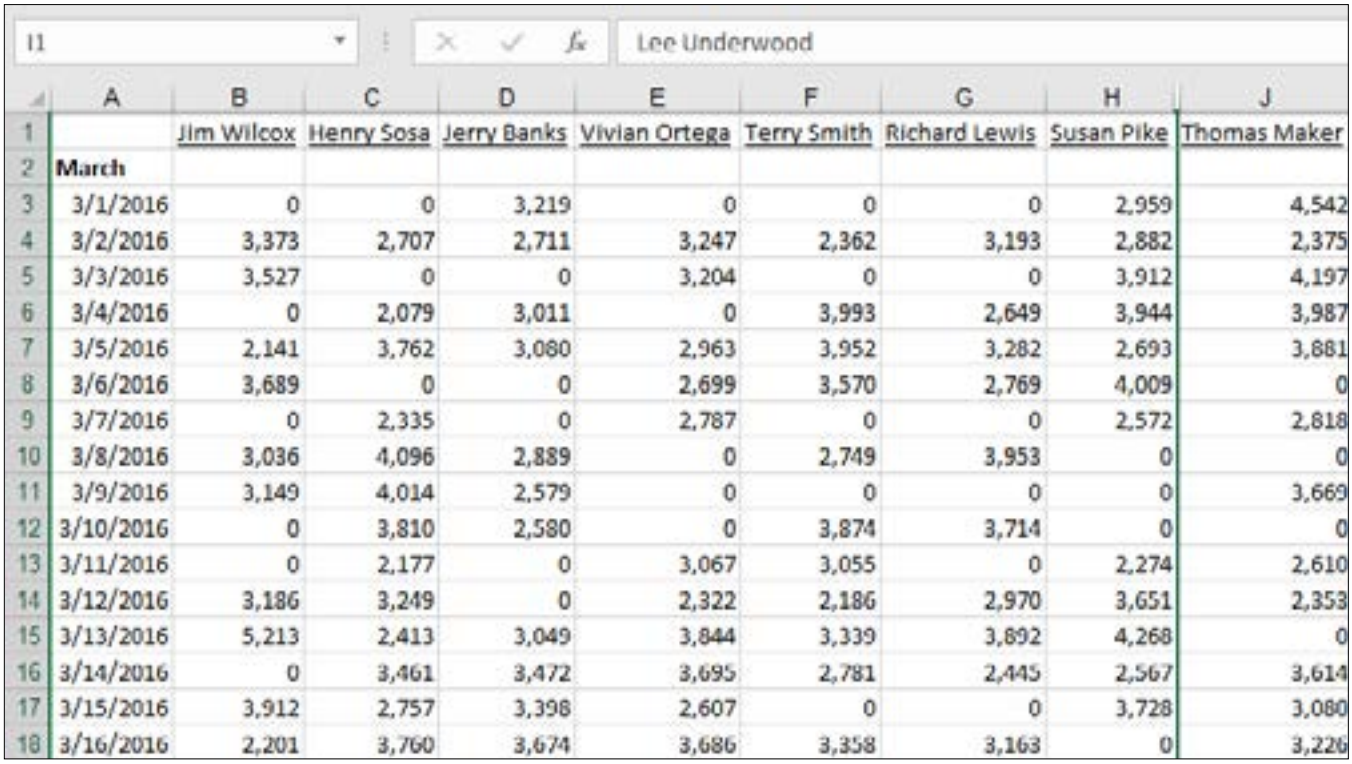
5. *Click the* **Print Preview** *button, and click the* **Next** *button (to see that the rows are hidden).*
6. *Click on the* **Back Arrow** *icon to return to the workbook.*
7. *Click the* **Undo** *icon to bring back the hidden rows back into view.*
8. *With your cursor, select* **Cells A2 through K35**, *release the mouse, press the* **[Ctrl]** *key, select* **Cells A69 through K101**, *and release the* **[Ctrl]** *key and mouse.*
9. *Set that range as the print area (by clicking on the* **Page Layout** *tab,* **Print Area** *icon,* **Set Print Area**), *and click* **Print Preview**.

Now only those selections appear in Print Preview.

Hide Columns

You can also hide columns. Let's suppose that you don't want to show the data for Lee Underwood.

10. *Click on the* **Home** *tab.*
11. *Select* **Column I**.
12. *On the* **Home** *tab, click the* **Format** *icon in the* **Cells** *group, point to* **Hide & Unhide**, *and choose* **Hide Columns**.
13. *Click* **Print Preview**.



	A	B	C	D	E	F	G	H	J
1		Jim Wilcox	Henry Sosa	Jerry Banks	Vivian Ortega	Terry Smith	Richard Lewis	Susan Pike	Thomas Maker
2	March								
3	3/1/2016	0	0	3,219	0	0	0	2,959	4,542
4	3/2/2016	3,373	2,707	2,711	3,247	2,362	3,193	2,882	2,375
5	3/3/2016	3,527	0	0	3,204	0	0	3,912	4,197
6	3/4/2016	0	2,079	3,011	0	3,993	2,649	3,944	3,987
7	3/5/2016	2,141	3,762	3,080	2,963	3,952	3,282	2,693	3,881
8	3/6/2016	3,689	0	0	2,699	3,570	2,769	4,009	0
9	3/7/2016	0	2,335	0	2,787	0	0	2,572	2,818
10	3/8/2016	3,036	4,096	2,889	0	2,749	3,953	0	0
11	3/9/2016	3,149	4,014	2,579	0	0	0	0	3,669
12	3/10/2016	0	3,810	2,580	0	3,874	3,714	0	0
13	3/11/2016	0	2,177	0	3,067	3,055	0	2,274	2,610
14	3/12/2016	3,186	3,249	0	2,322	2,186	2,970	3,651	2,353
15	3/13/2016	5,213	2,413	3,049	3,844	3,339	3,892	4,268	0
16	3/14/2016	0	3,461	3,472	3,695	2,781	2,445	2,567	3,614
17	3/15/2016	3,912	2,757	3,398	2,607	0	0	3,728	3,080
18	3/16/2016	2,201	3,760	3,674	3,686	3,358	3,163	0	3,226

Figure 5.17

Lee Underwood's data is now hidden. But since we took out one individual, it is really now the Top Nine report. A little spacer appears between Column labels H and I to show hidden data. Let's bring Lee back.

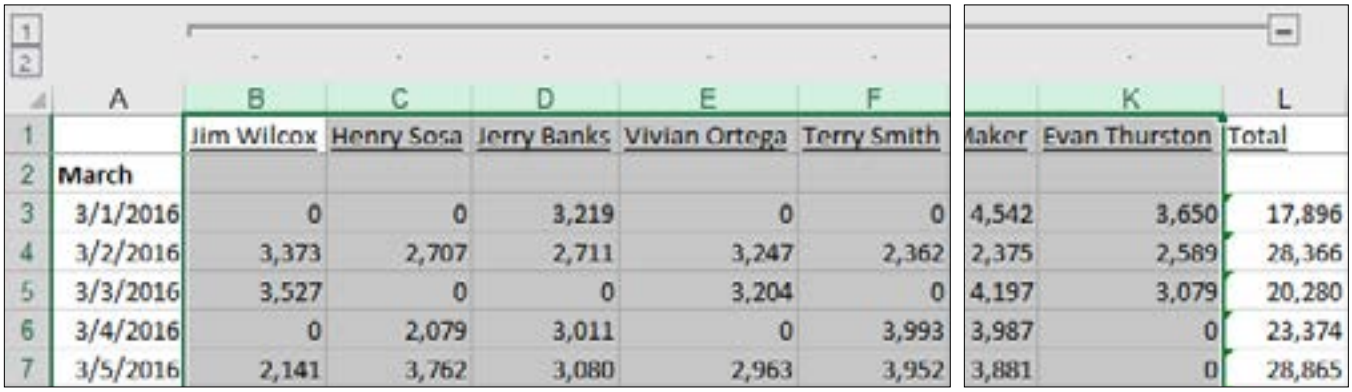
14. *Click on the* **Home** *tab and unhide* **Column I** *(you can use the same method to unhide as to hide).*

Grouping

Another way to hide and unhide rows is to group the data. ***Grouping*** is similar to subtotals, which you already learned in Chapter 4, but Grouping does not calculate subtotals. It simply groups the data. Using Grouping is a great alternative when you want the user to be able to easily hide and unhide rows and/or columns. Let's take a minute to revise the spreadsheet before we do grouping.

1. *In* **Cell L1**, *type* ***Total***.
2. *Calculate the* **total sales** *for each day of sales for each row, as well as the* **monthly totals**, *and apply the appropriate formatting.*

3. *Include* **Column L** *in the print range.*
4. *Select* **Columns B through K**.
5. *On the* **Data** *tab, click on the* **Group** *icon (not the drop-down arrow) in the* **Outline** *group.*

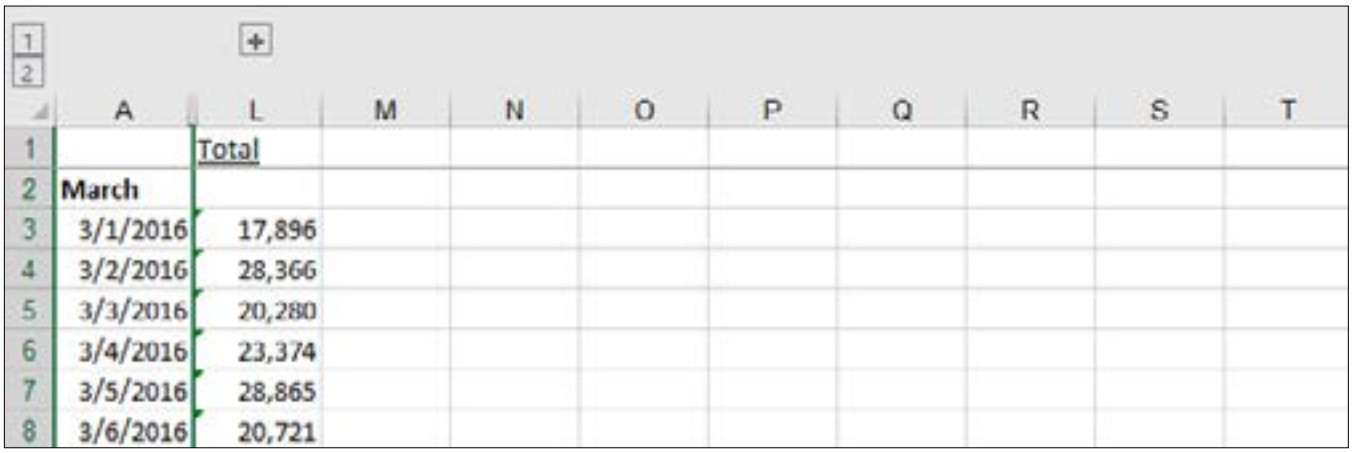


	A	B	C	D	E	F	K	L
1		Jim Wilcox	Henry Sosa	Jerry Banks	Vivian Ortega	Terry Smith	Evan Thurston	Total
2	March							
3	3/1/2016	0	0	3,219	0	0	3,650	17,896
4	3/2/2016	3,373	2,707	2,711	3,247	2,362	2,589	28,366
5	3/3/2016	3,527	0	0	3,204	0	3,079	20,280
6	3/4/2016	0	2,079	3,011	0	3,993	0	23,374
7	3/5/2016	2,141	3,762	3,080	2,963	3,952	0	28,865

Figure 5.18

The Level boxes (like you saw when you used subtotals) appear in the upper-left corner of the spreadsheet with a long line centered over Columns B through K, and a Hide Detail button over Column L.

6. *Click the* **Hide Detail** *button*  .



	A	L	M	N	O	P	Q	R	S	T
1		Total								
2	March									
3	3/1/2016	17,896								
4	3/2/2016	28,366								
5	3/3/2016	20,280								
6	3/4/2016	23,374								
7	3/5/2016	28,865								
8	3/6/2016	20,721								

Figure 5.19

The columns are now hidden and can be easily unhidden or expanded by clicking the Show Detail (+) button. You can also click on the Level boxes (1 and 2) to hide the detail (Level Box 1) or show the detail (Level Box 2). You can group and ungroup rows of data using the same methodology.

7. *Click the* **Show Detail** *button to expand out the columns.*

Page to Fit

Excel also has a **Page to Fit** feature that I find very useful. Typically I use this feature when I don't want

to mess around with the margins and font sizes trying to get a report to print on just one or a few pages. Let's explore that feature.

8. *Click on the* **Print Preview** *button.*

Oops! You see that there are now six pages in the report. That happened when you added the Total column to the report. By clicking the Next Page button a few times, you will see that pages 4, 5, and 6 contain only one column of data, the Total column. We want the report to be contained to three pages.

9. *Click on the* **Scaling** *button (the last button in the left section) and choose* **Fit All Columns on One Page.**

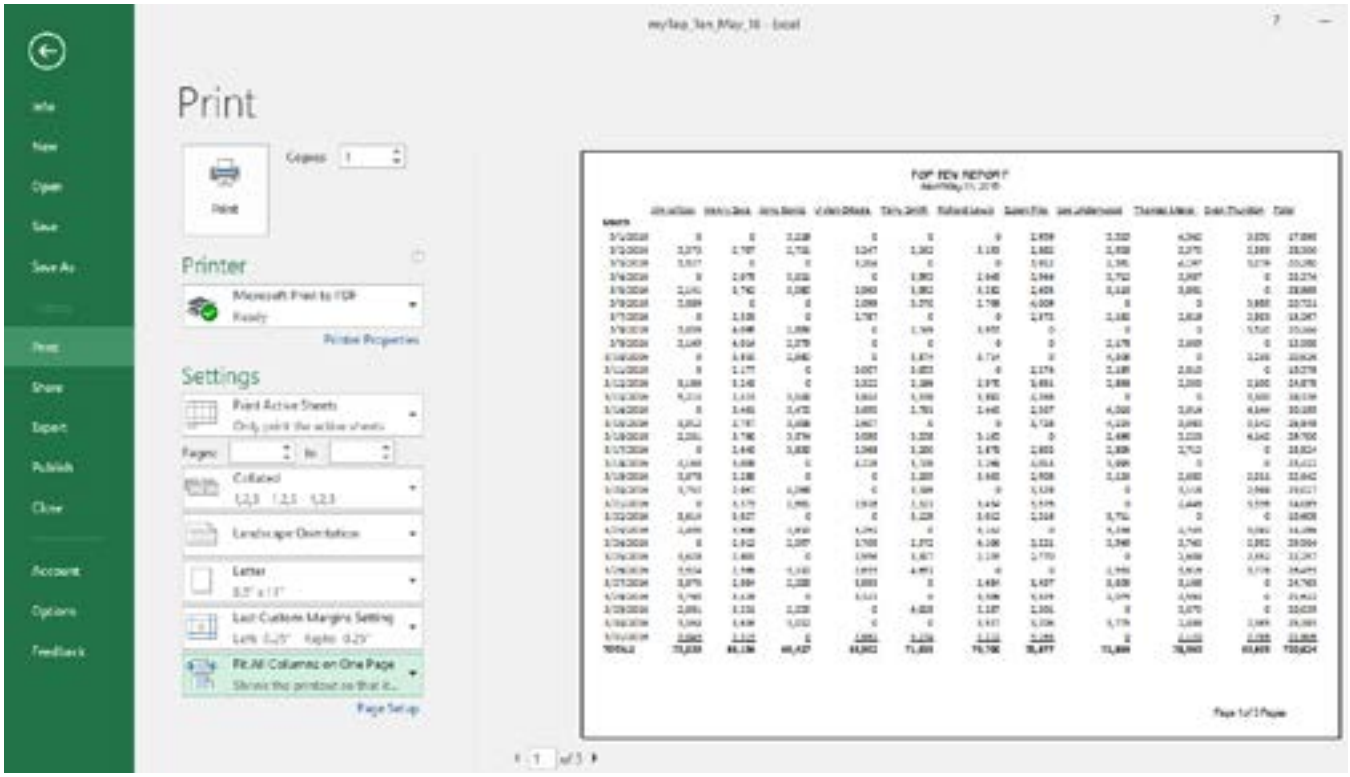


Figure 5.20

Now that the report is formatted correctly, you can let other people see it.

Save as PDF

Sometimes, you want to send a file to someone who just wants to print it out. Other times, you'll want to save it out on the Internet without letting anyone use the Excel functionalities. There is a way to save an Excel report to another format where everyone can see it, whether or not they have Excel. It is called a PDF file. PDF stands for Portable Document Format, and is a non-proprietary file format, meaning all you need to have to read it is a viewer. The Adobe Corporation has a PDF reader that is downloadable for free and is called Adobe Acrobat Reader. It is also the most common reader of PDF files. To create a PDF

file from Excel, simply save the workbook in a PDF format. Before you create the PDF file, however, you need to make sure the worksheet is formatted exactly as you would if the report were to be printed out, as that is how it will appear in the PDF file.

10. *Click on* **Save As**.
11. *Navigate to* **C:\ExcelCEO\Excel 2016\Chapter5**, *click on the* **Save As type:** *drop-down menu, and choose* **PDF**.
12. *Make sure the* **Open file after publishing** *checkbox is checked, then click* **Save**.

After a few seconds, the PDF file will appear in your default PDF reader.

13. **Close** *the PDF file, then* **Save** *and* **close myTop_Ten_May_16.xlsx**.

> ***Review Questions**: It is now time to complete the hands-on Review Questions. Log on to www.ExcelCEO.com with your Email address and Password, click on the* **Excel 2016 Review Questions, Chapter 5, Section 2 of 2** *option in your Main Menu, and complete the Review Questions.*

Conclusion

Printing a report and setting up the print properties is probably one of the easiest things to do with Excel, and it is something that could get you brownie points when done well, or big time black marks, if it's not done at all. It is good practice to always set a print range and make the report look presentable before you send the file to anyone, particularly inexperienced Excel users. Lots of management personnel like to open a file and automatically click Print. You could look bad if they print a report when the print properties are not formatted correctly. It is such an easy thing to do, so why not format ALL of your reports BEFORE you send them out? If you don't do it, it could result in others having less confidence in your abilities. Trust me – been there, done that, and I've got the battle scars to prove it.

In this chapter, you learned how to use the Print dialog box. You used the Print Preview icon numerous times. You set up a report to print on one page and another report to print on multiple pages. You worked with page breaks to begin a new page at certain places in the spreadsheet. You worked with margins, inserted headers and footers, and printed non-contiguous ranges. You learned how to hide rows and columns without deleting the data. You worked an exercise where you grouped and ungrouped columns of data. You also used the Page to Fit feature, which allows you to automatically fit the text of a spreadsheet within certain page parameters without having to adjust margins. Finally, you saved your report as a PDF file.

Chapter Exam

To take the examination for this chapter, you must have successfully completed the examination for the previous chapter. You can now go to www.ExcelCEO.com, click on Sign In, log in and take the exam. Make sure that you take the exam on the same computer on which you completed the practice files, as some of the questions on the exam may refer to some of the completed projects. Chapter exams are intended to be hands-on.

SECTION II: INTERMEDIATE EXCEL

I believe writing formulas is the **lost art of Excel**, as many Excel users have become overly dependent on the nifty buttons and icons. Writing formulas is the foundation of Excel, and we will spend a significant amount of time in this course writing formulas and using functions. The entire intermediate section is dedicated to writing formulas and understanding how to use functions. A function is a predefined word in Excel that performs a task or calculates a number based on one or more criteria or arguments. A function is always followed by an opening parenthesis, typically with a series of arguments and ends with a closing parenthesis. In many years of working with Excel, I have used numerous functions, and I have compiled in this section the list of the ones that I use most frequently. In the following chapters, we will explore each of these functions individually and you will work many examples to better familiarize yourself with these powerhouses of analysis tools.

We start off in Chapter Six by learning the basics of operators (Arithmetic, Comparison, and Text), and learning how to write simple IF() statements. You will review all of the major categories of functions in Chapter Seven, as well as learning about Text functions. Chapter Eight is the longest chapter in the course, and in that chapter you will learn about Financial and Math functions. Additionally, you will learn about methods of estimating value and use the Find and Replace functionality. In Chapter Nine, you will learn about Date, Statistical, and Lookup functions. You will take also a brief tour of database functions. Chapter Nine ends with a discussion of Data Validation and using the Text to Columns functionality. Chapter Ten is an expansion of Chapter Nine, where you will learn some of the advanced uses of Lookup functions. In this chapter, you will also learn about Logical functions, and you'll finish the chapter by building a complex spreadsheet that calculates bonuses based on numerous criteria.

Excel® 2016

Complete Self-study Course

ExcelCEO

Chief Excel Officer

CHAPTER SIX — INTRO TO FORMULAS AND FUNCTIONS

Chapter Objectives:

- Determine which functions to use when writing formulas
- Recognize Arithmetic, Comparison, and Text Operators that are usable in Excel formulas
- Identify conditional arguments within the IF() function
- Select functions and formula argument definitions using the Insert Function dialog box
- Recognize formula performance with nested IF() logic
- Identify the purpose of an Assumptions Page
- Recognize the reason why to not hard-code variables into formulas
- Identify a defined data set as a Named Range
- Select a calculated and a formatted number within a text string using concatention
- Choose the components of the TEXT() function to identify cell content categories

Projects You Will Complete During This Chapter:

- *myJune_Sales.xlsx*

CPE Credits possible for this chapter: 2

Introduction

Soon after graduation from college in the 1980s, I began working at a Big 8 accounting firm. I quickly became the spreadsheet guy in the office. There weren't too many people at the time who had significant spreadsheet experience, and I was very lucky to be one of the few who knew my way around a computer. Many people asked me to put their data into a spreadsheet. Most of the time was spent just inputting their data using Lotus 1-2-3 and summing it up, and maybe a few sorts. One day a manager came to me with a fun project. He had mailed out surveys to some clients and the completed surveys were coming back in. He wanted a program written where a clerk could enter the data from the survey onto a spreadsheet and press a button that would copy the data into a database and refresh the screen to be ready to enter a new survey. It sounded real interesting, so I took it on.

I spent about a day programming it and came up with the greatest spreadsheet ever created! It took about 180 keystrokes to enter in all of the information from one survey. I was so proud of that program! I took the 5 1/4" floppy disk to him (which tells you how long ago that was) and proudly gave it to him. I felt like I had really accomplished something great that day. After about an hour, he came back, gave me the diskette and said, "*I made some changes to it. You may want to look them over.*" My first thought was, "*YOU made changes to MY spreadsheet? How dare you mess with perfection!*" I slapped in the floppy diskette to see what he had done, and I got the education of a lifetime. He had completely torn apart my spreadsheet and built it back up again, and it was SO much more efficient. Instead of 180 keystrokes, it now took only about 90. He had formulas and functions that I had never heard of before. Truly, this man was a spreadsheet god!

In the following chapters, I will introduce you to many functions – and how to use them in writing some very useful formulas. A formula is a logical equation that performs calculations on the spreadsheet. A formula always begins with an equal sign (=), and may or may not include one or more functions. But before we get into an in-depth discussion of functions, let's talk about operators. ***Operators*** are critical in writing formulas, and it is imperative that you understand them. Operators are special characters that specify the type of calculations performed in formulas. Excel offers three types of operators: Arithmetic, Comparison, and Text.

Arithmetic Operators

Arithmetic operators perform basic mathematical operations, such as addition, subtraction, multiplication, division and exponentiation.

Arithmetic Operators	Definition (Example)
+ (Plus sign)	**Addition** (3+3, 3 plus 3)
- (Minus sign)	**Subtraction** (4-2, 4 minus 2), or Negation (-5, negative 5)
* (Asterisk)	**Multiplication** (6*5, 6 times 5)
/ (slash)	**Division** (12/8, 12 divided by 8)
^ (Caret)	**Exponentiation** (3^2, or 3 squared)

In formulas, the precedence of arithmetic operators (or the order in which they work) perform just like you learned in high school algebra:

1. ^, *Exponentiation*
2. * *and* / — *Multiplication and Division*
3. + *and* - — *Addition and Subtraction*

Let's try an example.

1. **Open Excel** *to a* **Blank workbook**.
2. *Input the following numbers in the corresponding cells:*
A1: *5*; A2: *3*; A3: *4*; A4: *8*; A5: *2*; A6: *2*
3. *Write the following formula in* **Cell B1***:* ***=A1+A2*A3-A4/A5^A6***

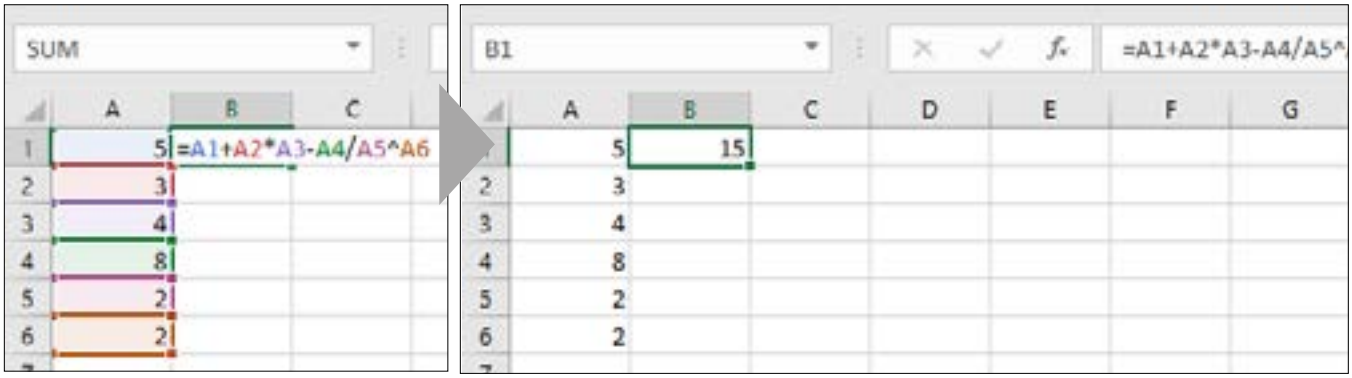


Figure 6.1

The result of this formula is 15. You can change the order of precedence by putting parentheses () around the part of the formula you want calculated first:

4. *Edit the formula in* **Cell B1** *to include parentheses around* **A1+A2**.

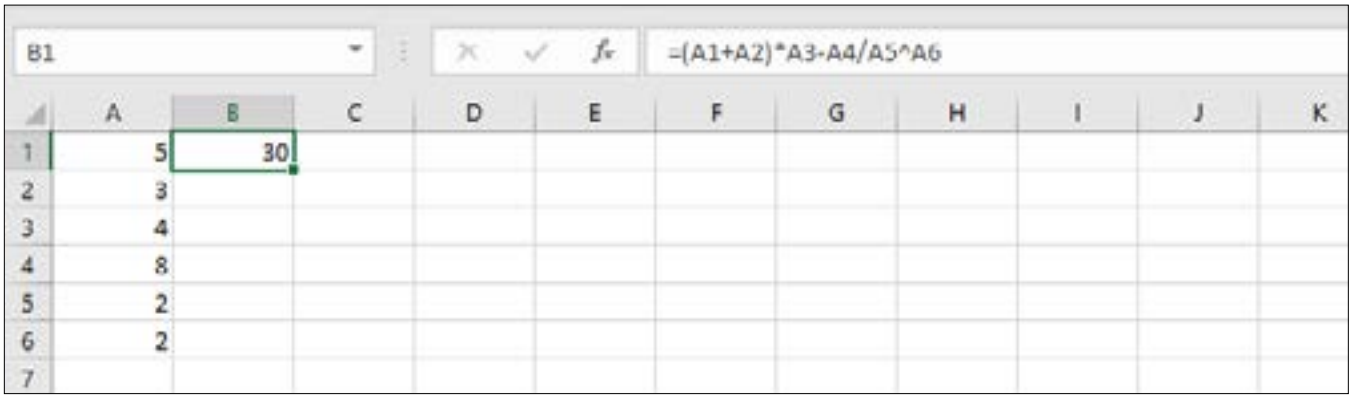


Figure 6.2

The result changes to 30. In some formulas, parentheses aren't necessary, but sometimes it helps to include them to help you organize your logic, particularly in long, complex formulas.

5. **Close** *the file (no need to save it).*

Comparison Operators

Now let's talk about Comparison operators. Comparison operators are used to compare two values to each other.

Comparison Operators	Definition (Example)
= (Equal sign)	**Equal to** (A1=B1, A1 is equal to B1)
> (Greater than sign)	**Greater than** (A1>B1, A1 is greater than B1)
< (Less than sign)	**Less than** (A1<B1, A1 is less than B1)
>= (Greater than or equal to)	**Greater than or equal to** (A1>=B1, A1 is greater than or equal to B1
<= (Less than or equal to)	**Less than or equal to** (A1<=B1, A1 is less than or equal to B1)
<> (Not equal to)	**Not equal to** (A1<> B1, A1 is not equal to B1)

The IF() Function

When using comparison operators, it is helpful to understand how to use the IF() function. In my opinion, Excel is the best "what-if" tool available, and the IF() function is central to "what-if" scenarios. In this and later chapters, you will see many examples using the IF() function. According to Microsoft Excel Help, the IF function "*Use the IF() function, one of the logical functions, to return one value if a condition is true and another value if it's false*". The IF() function is a statement that is written to check whether or not a condition is met, and has one condition and two arguments. First is the logical_test, or the condition to be evaluated. Next is the argument if the condition is true, followed by the result if the condition is false. Arguments and conditions in all functions are separated by commas (,). Let's work some examples of how to use the IF() function and comparison operators.

1. **Open** *the file* **C:\ExcelCEO\Excel 2016\Chapter6\June_Sales.xlsx**.
2. **Save As C:\ExcelCEO\Excel 2016\Chapter6*myJune_Sales.xlsx***.

	A	B	C	D	E	F	G	H	I	J	K
1	Region	State	Store_No	Year	Month	Sales	Budget				
2	East	NY	1001	2016	6	68,495	70,000				
3	West	CA	1002	2016	6	104,157	100,000				
4	North	IL	1005	2016	6	103,221	100,000				
5	South	NC	1009	2016	6	59,971	50,000				
6	South	NC	1011	2016	6	74,348	70,000				
7	South	NC	1012	2016	6	95,628	70,000				
8	North	IL	1018	2016	6	110,349	100,000				
9	North	OH	1019	2016	6	81,206	70,000				

Figure 6.3

This file contains the sales by store for the month of June 2016. It includes fields for Region, State, Store_No, Year, Month, Sales, and Budget. The Budget is the monthly amount of sales that each store is supposed to sell. If the store reaches or surpasses 100% of Budget, the store manager gets a bonus of 1% of the sales for that store. Stores are categorized by small, medium, and large stores. Management calls these levels Paper (small), Scissors (medium), and Rock (large) stores. Your job is to create a schedule using this data that identifies:

- The percent of Budget the store attained (call this column ***%_Budget***, calculated as the **Sales** divided by the **Budget**, formatted as **Percent, one decimal place**),
- An indication if the manager receives a bonus (call this column ***Qual_Bonus***, calculated as "**Yes**" if the store's sales for the month are at least 100% of Budget, and "**No**" if it is not),
- The amount of bonus the store manager receives (call this column ***Bonus_Amt***, calculated as 1% of Sales if the previous column is "**Yes**", otherwise **0**, formatted as **Number** with **one decimal place**), and
- The type of store it is: **Paper**, **Scissors**, or **Rock** (call this column ***Store_Type***, calculated as: **Paper** if the Budget is less than or equal to $50,000, **Scissors** if the Budget is $70,000, **Rock** if the Budget is $100,000).

Let's get started.

3. *In* **Cell H1**, *type:* ***%_Budget***
4. *In* **Cell I1**, *type:* ***Qual_Bonus***
5. *In* **Cell J1**, *type:* ***Bonus_Amt***
6. *In* **Cell K1**, *type:* ***Store_Type***
7. *Underline all titles and resize all columns as necessary.*
8. *In* **Cell H2**, *type the formula:* ***=F2/G2***

This formula tells Excel to divide the Sales (Cell F2) by the Budget (Cell G2).

9. *Format* **Cell H2** *as* **Percentage** *with* **one decimal place**, *and copy the formula down to all cells below.*

H2 =F2/G2

	A	B	C	D	E	F	G	H	I	J	K
1	Region	State	Store_No	Year	Month	Sales	Budget	% Budget	Qual Bonus	Bonus Amt	Store Type
2	East	NY	1001	2016	6	68,495	70,000	97.9%			
3	West	CA	1002	2016	6	104,157	100,000	104.2%			
4	North	IL	1005	2016	6	103,221	100,000	103.2%			
5	South	NC	1009	2016	6	59,971	50,000	119.9%			
6	South	NC	1011	2016	6	74,348	70,000	106.2%			
7	South	NC	1012	2016	6	95,628	70,000	136.6%			
8	North	IL	1018	2016	6	110,349	100,000	110.3%			
9	North	OH	1019	2016	6	81,206	70,000	116.0%			
10	West	CA	1021	2016	6	32,582	50,000	65.2%			
11	West	CA	1024	2016	6	119,429	100,000	119.4%			
12	West	CA	1026	2016	6	78,593	70,000	112.3%			
13	East	NY	1027	2016	6	112,363	100,000	112.4%			
14	West	OR	1029	2016	6	21,749	0	#DIV/0!			
15	East	NY	1032	2016	6	111,281	100,000	111.3%			
16	North	OH	1034	2016	6	119,628	100,000	119.6%			
17	East	NJ	1036	2016	6	35,844	50,000	71.7%			
18	East	NJ	1040	2016	6	127,017	100,000	127.0%			
19	West	OR	1042	2016	6	69,874	70,000	99.8%			
20	West	WA	1044	2016	6	58,842	50,000	117.7%			
21	West	WA	1045	2016	6	67,135	70,000	95.9%			
22	South	SC	1047	2016	6	69,227	70,000	98.9%			
23	South	SC	1050	2016	6	52,810	50,000	105.6%			

Figure 6.4

It worked very well, at least most of it. In Cell H14, the formula returned **#DIV/0!**, which is the divide by zero error message. This error occurs when you try to divide a number by zero, which is mathematically impossible. To correct this, you need to edit the formula to reflect the following logic: if the Budget (or the number on the bottom) is zero, then return a zero, otherwise divide Sales by the Budget (i.e.- the formula that we wrote). We can do that by using an IF() function.

Insert Function Dialog Box

There are basically two ways to write an IF() statement: 1) Type the formula directly into the Formula Bar, and 2) Use the Insert Function dialog box. In this course, you will be writing most formulas directly into the Formula Bar, but sometimes it helps to use the Insert Function dialog box, particularly when using complex functions. In the next exercise, you will write an IF() statement using the Insert Function dialog box.

1. *Delete the formula in* **Cell H2**.
2. *Click on the* **Insert Function** *button* *to the left of the* **Formula Bar**.

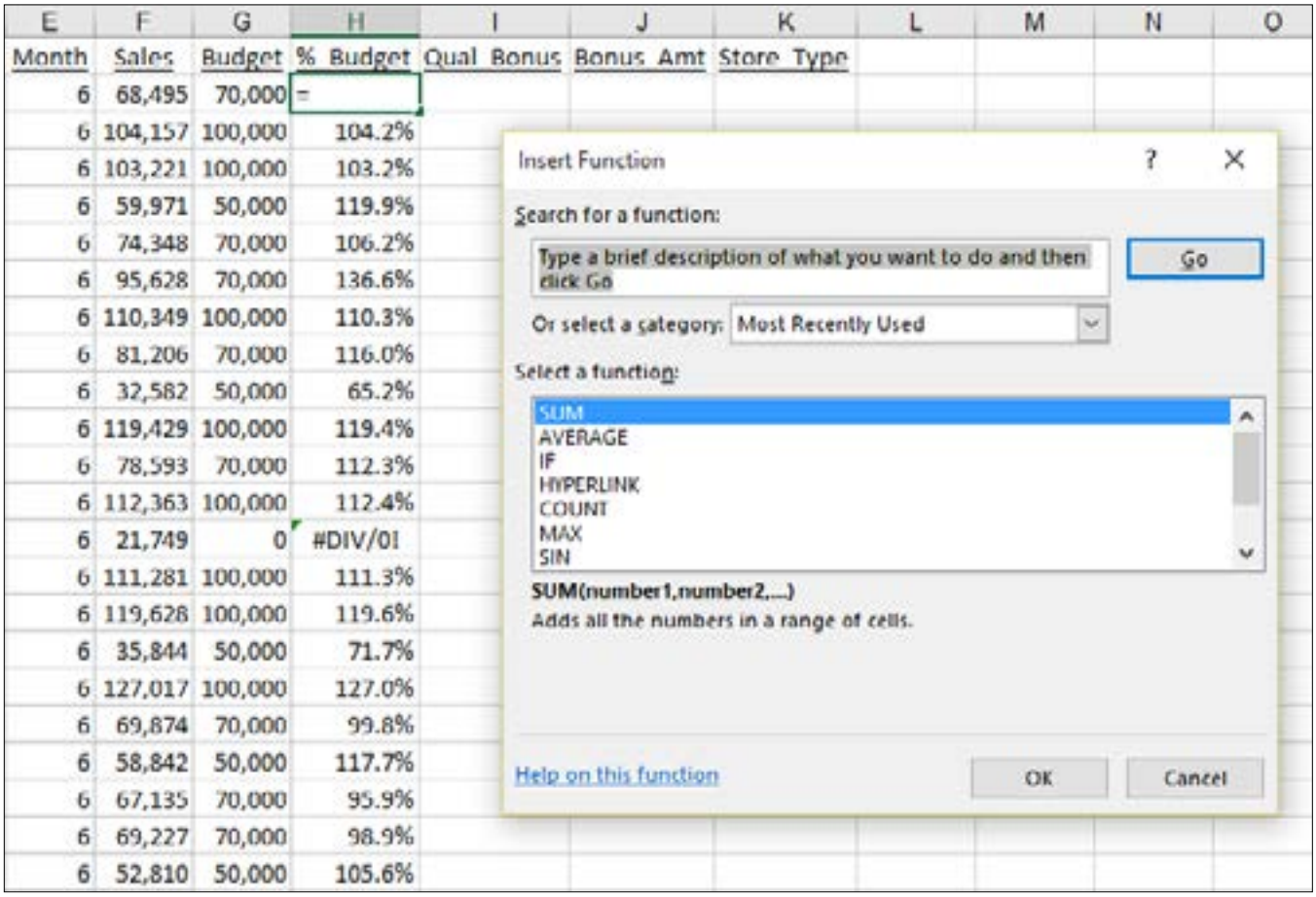


Figure 6.5

The Insert Function dialog box appears.

3. *In the* **Search for a function** *box, replace the existing text with* ***IF****, and click* **Go**.

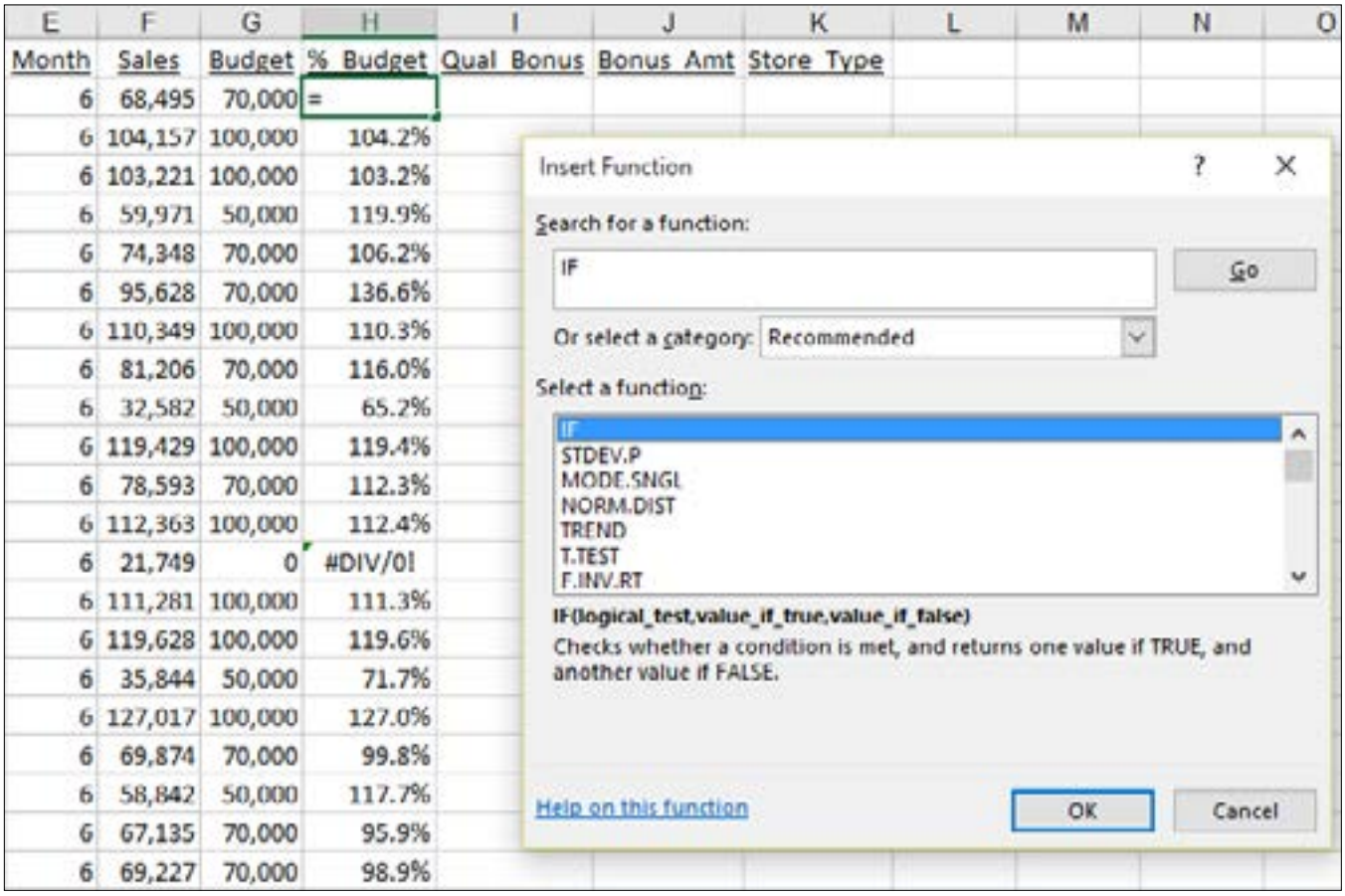


Figure 6.6

The **Select a function:** box below is now filtered for all functions that are similar to an IF() function, including lots of logical functions.

4. *Make sure* **IF** *is selected in the* **Select a function** *box, and click* **OK**.

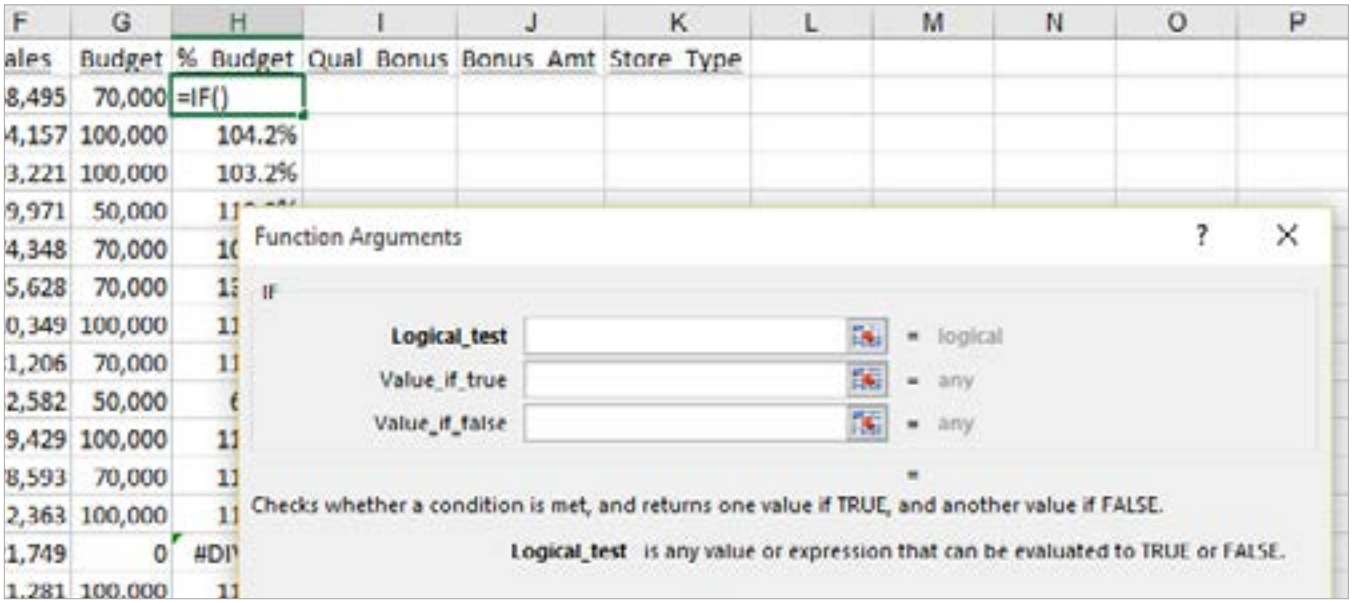


Figure 6.7

At this point, the **Function Arguments** dialog box appears. In this box, you can type in the arguments, conditions and criteria for the function to work. The text boxes in the Function Arguments box change according to the function you chose, as the arguments, conditions and criteria are different for most every function. In our case, we're using the IF() function.

5. *In the* **Logical_test** *box, type (or click on)* ***G2=0****.*
6. *Press the* **[Tab]** *key to move to the next box.*

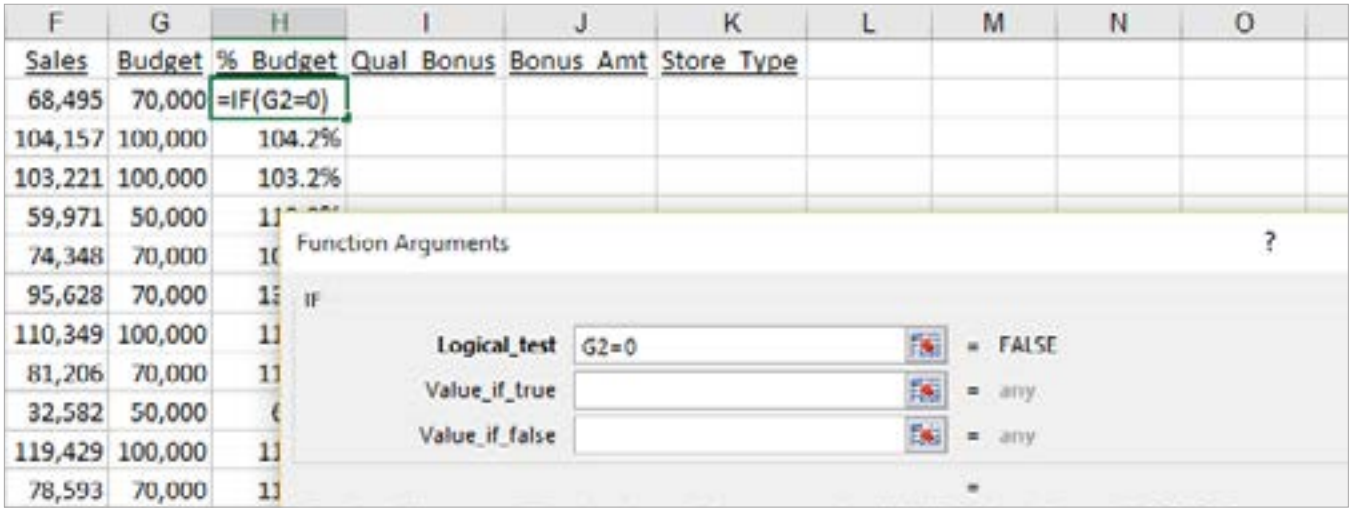


Figure 6.8

The first logical test evaluates if the value in Cell G2 is equal to zero. In the case of Cell G2, it's not zero (the value in Cell G2 is 70,000), so the condition tested FALSE, hence the FALSE reference in the Logical_test box. The next two boxes return the value if the condition is TRUE or FALSE, respectively.

7. *In the* **Value_if_true** *box, type* ***0*** *(as we want the formula to return a zero if the Budget or denominator is 0), and press* **[Tab]** *to move to the next box.*
8. *In the* **Value_if_false** *box type* ***F2/G2****, and press the* **[Tab]** *key.*

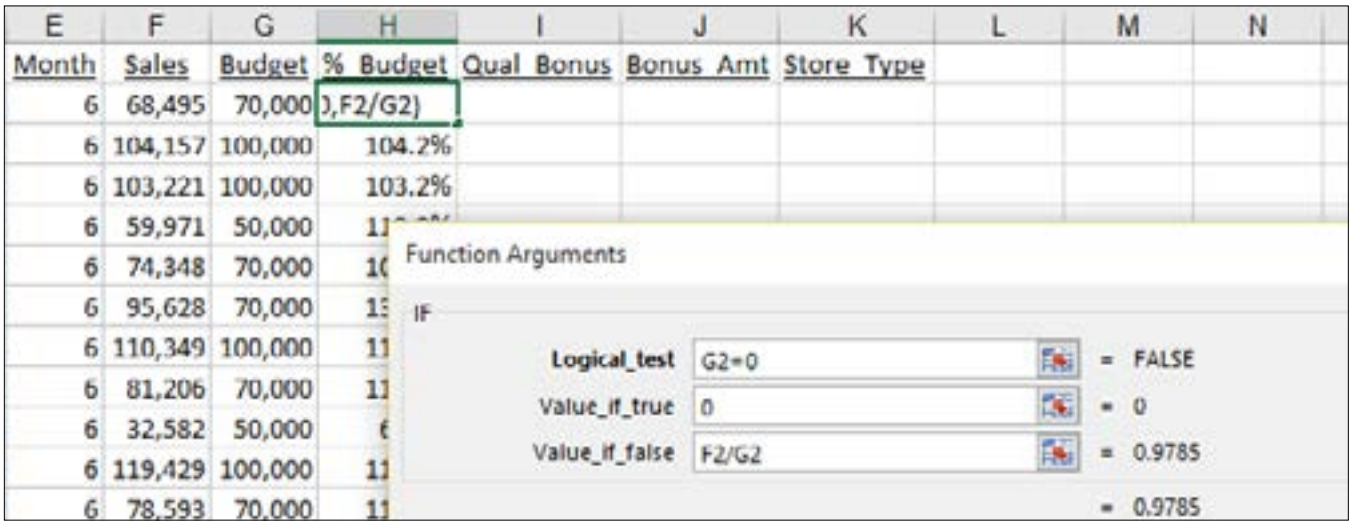


Figure 6.9

Now the dialog box returns the right answer for the formula at the bottom left of the dialog box where it reads **"Formula result = 97.9%"**.

9. *Click* **OK**.

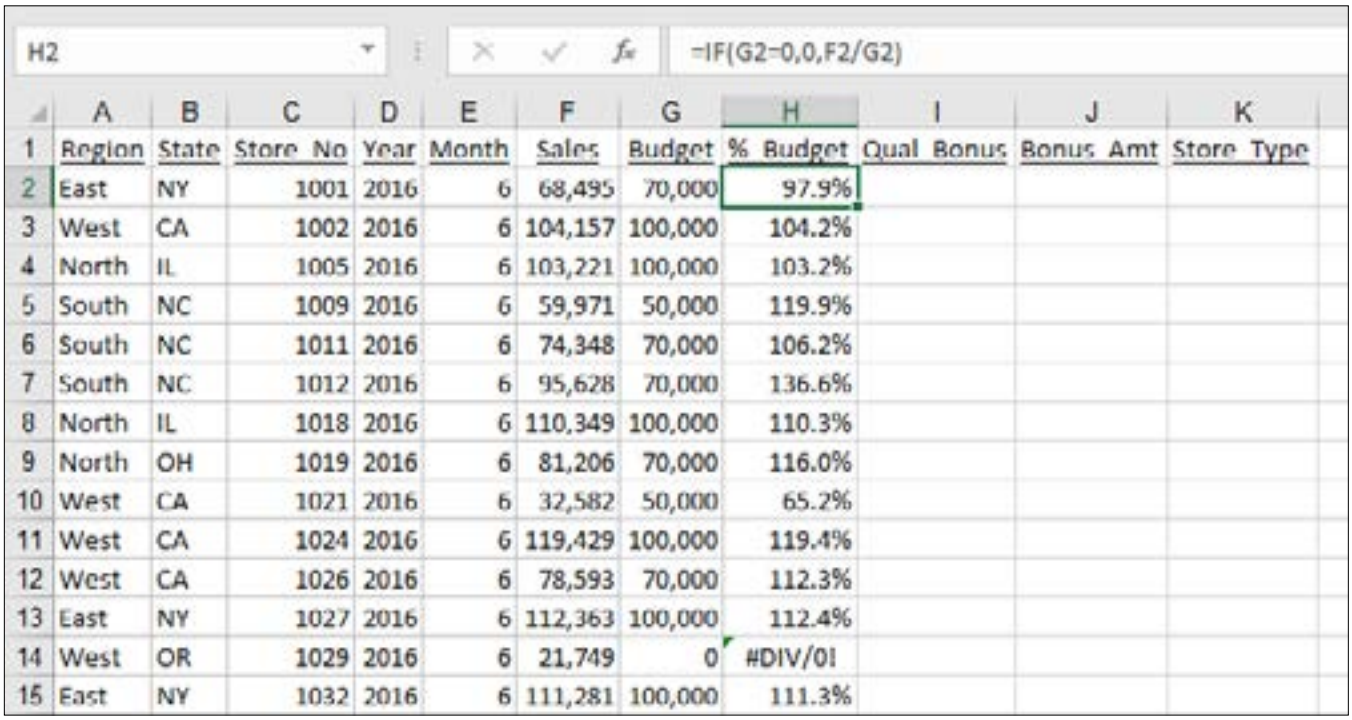


Figure 6.10

You now return to the spreadsheet where the formula in Cell H2 reads "=IF(G2=0,0,F2/G2)". The formula says if the denominator (Cell G2) is zero, then return a zero as the result. If the denominator is not zero, then perform the calculation F2/G2. That is exactly what we want, so you can copy the formula to the cells below.

10. Copy the formula down for all cells below.

The result in Cell H14 now reads 0.0%, which is correct.

> ***Review Questions**: It is now time to complete the hands-on Review Questions. Log on to www.ExcelCEO.com with your Email address and Password, click on the* **Excel 2016 Review Questions, Chapter 6, Section 1 of 2** *option in your Main Menu, and complete the Review Questions.*

Now that we have all of the %_Budget numbers calculated correctly, we can write a formula in Column I that will calculate if the manager of that store receives a bonus or not.

> ***Note**: For the remainder of the course, you will type the formulas into the cell or* **Formula Bar** *without using the* **Insert Function** *dialog box. I want you to do this to get used to typing the formulas and functions as it is important for your future programming experience. If you think you need to use* **Insert Function** *dialog box to help you better understand the function, feel free to use it.*

11. In **Cell I2**, *type the following formula:* ***=IF(H2>=1,"Yes","No")***

> ***Tip**: When typing a text string as part of a formula, as with "Yes" and "No", remember that these results are different when evaluated as compared to* **TRUE** *and* **FALSE**, *which are logical argument evaluations. If you type quotation marks around values, they are evaluated as text strings, so make sure to distinguish between text strings and logical argument evaluations.*

This formula says that if the result in Cell H2 is greater than 1 (meaning if the sales was more than 100% of budget), return the word "Yes", indicating the store manager qualified for a bonus. Otherwise, return "No".

12. Copy the formula down to all cells below.

I2 =IF(H2>=1,"Yes","No")

	A	B	C	D	E	F	G	H	I	J	K
1	Region	State	Store_No	Year	Month	Sales	Budget	% Budget	Qual_Bonus	Bonus_Amt	Store_Type
2	East	NY	1001	2016	6	68,495	70,000	97.9%	No		
3	West	CA	1002	2016	6	104,157	100,000	104.2%	Yes		
4	North	IL	1005	2016	6	103,221	100,000	103.2%	Yes		
5	South	NC	1009	2016	6	59,971	50,000	119.9%	Yes		
6	South	NC	1011	2016	6	74,348	70,000	106.2%	Yes		
7	South	NC	1012	2016	6	95,628	70,000	136.6%	Yes		
8	North	IL	1018	2016	6	110,349	100,000	110.3%	Yes		
9	North	OH	1019	2016	6	81,206	70,000	116.0%	Yes		

Figure 6.11

As shown in this example, an IF() function can return text strings as well as numbers. Whenever you want to type a text string like "Yes", "No", "Gold", "Blue", or "01ABC" within a formula or function, you must put that string between quotes. Now let's calculate the bonus.

13. *In* **Cell J2**, *write the following formula:* ***=IF(I2="Yes",F2*0.01,0)***

This formula means that if the store qualifies for a bonus, take the amount in the Sales column and multiply it by 0.01, or 1%. Otherwise, return a zero. Alternatively, you could have written a formula like **=IF(H2>=1,F2*0.01,0)**. Either one would work.

14. *Format* **Cell J2** *for* **Number**, **two decimal places**, *with* **1000 Separator(,)** *and copy down.*

J2 =IF(I2="Yes",F2*0.01,0)

	A	B	C	D	E	F	G	H	I	J	K	L
1	Region	State	Store_No	Year	Month	Sales	Budget	% Budget	Qual_Bonus	Bonus_Amt	Store_Type	
2	East	NY	1001	2016	6	68,495	70,000	97.9%	No	0.00		
3	West	CA	1002	2016	6	104,157	100,000	104.2%	Yes	1,041.57		
4	North	IL	1005	2016	6	103,221	100,000	103.2%	Yes	1,032.21		
5	South	NC	1009	2016	6	59,971	50,000	119.9%	Yes	599.71		
6	South	NC	1011	2016	6	74,348	70,000	106.2%	Yes	743.48		
7	South	NC	1012	2016	6	95,628	70,000	136.6%	Yes	956.28		
8	North	IL	1018	2016	6	110,349	100,000	110.3%	Yes	1,103.49		
9	North	OH	1019	2016	6	81,206	70,000	116.0%	Yes	812.06		
10	West	CA	1021	2016	6	32,582	50,000	65.2%	No	0.00		
11	West	CA	1024	2016	6	119,429	100,000	119.4%	Yes	1,194.29		
12	West	CA	1026	2016	6	78,593	70,000	112.3%	Yes	785.93		
13	East	NY	1027	2016	6	112,363	100,000	112.4%	Yes	1,123.63		
14	West	OR	1029	2016	6	21,749	0	0.0%	No	0.00		

Figure 6.12

Nesting IF() Functions

In this next exercise, you will determine the store type, which is a little trickier. Instead of just one condition, there are three conditions. Luckily, you can use multiple ***IF()*** functions within one formula. In Excel 2003, you were limited to seven functions in one formula. But from Excel 2007 to 2016, you can write up to 64 functions in a single formula. New for Excel 2016 is the ***IFS()*** function which allows for up to 127 logical arguments! I don't recommend using that many functions in one cell unless you want to drive a first year auditor (and possibly yourself) to the funny farm. Using multiple functions in one formula is called **nesting functions**. Excel evaluates logic within a formula from left to right, so the first IF() function you write is evaluated first, the second is evaluated next, and so on. When writing multiple functions in a formula, you have to remember to place the parentheses in the right places. Let's try it.

15. *In* **Cell K2**, *write the following formula:*
    =IF(G2<=50000,"Paper",IF(G2<=70000,"Scissors","Rock"))

The first argument in the formula says if the number in the Budget column (Column G) is less than or equal to 50,000, then return "Paper". If it is not less than or equal to 50,000, then we'll write another test, which is if the Budget column is less than or equal to 70,000, return "Scissors". For everything else, return "Rock". All numbers will fall into one of these three categories. Sometimes it is confusing doing the condition in the middle, which could also be phrased as if the Budget is between 50,000 and 70,000 then return "Scissors". But since Excel evaluates conditions from left to right, we're OK.

16. *Copy the formula down to all cells below.*

K2 =IF(G2<=50000,"Paper",IF(G2<=70000,"Scissors","Rock"))

	A	B	C	D	E	F	G	H	I	J	K
1	Region	State	Store_No	Year	Month	Sales	Budget	% Budget	Qual Bonus	Bonus Amt	Store Type
2	East	NY	1001	2016	6	68,495	70,000	97.9%	No	0.00	Scissors
3	West	CA	1002	2016	6	104,157	100,000	104.2%	Yes	1,041.57	Rock
4	North	IL	1005	2016	6	103,221	100,000	103.2%	Yes	1,032.21	Rock
5	South	NC	1009	2016	6	59,971	50,000	119.9%	Yes	599.71	Paper
6	South	NC	1011	2016	6	74,348	70,000	106.2%	Yes	743.48	Scissors
7	South	NC	1012	2016	6	95,628	70,000	136.6%	Yes	956.28	Scissors
8	North	IL	1018	2016	6	110,349	100,000	110.3%	Yes	1,103.49	Rock
9	North	OH	1019	2016	6	81,206	70,000	116.0%	Yes	812.06	Scissors
10	West	CA	1021	2016	6	32,582	50,000	65.2%	No	0.00	Paper
11	West	CA	1024	2016	6	119,429	100,000	119.4%	Yes	1,194.29	Rock
12	West	CA	1026	2016	6	78,593	70,000	112.3%	Yes	785.93	Scissors
13	East	NY	1027	2016	6	112,363	100,000	112.4%	Yes	1,123.63	Rock
14	West	OR	1029	2016	6	21,749	0	0.0%	No	0.00	Paper

Figure 6.13

17. *In* **Cell A31** *type:* ***TOTALS***
18. *Write formulas in* **Row 31** *that sum the* **Sales**, **Budget**, *and* **Bonus Amt** *columns, and copy*

the formula that calculates the **% Budget** *to Row 31.*

19. *Bold* **Row 31**, *and resize the columns as necessary.*

The Total Bonus should be $20,703.64. Pretty cool analysis, huh? Do you want to make it even better? Stay with me for a little while longer.

Assumptions Page

One thing I like to do in my spreadsheets, particularly if the variables I'm using could change, is to include all variables on one page called an ***Assumptions Page***. An Assumptions page is simply a tab or sheet that contains any possible variable that may change. Let's do that now.

1. *Insert a new sheet tab and rename it* ***Assumptions***.
2. *Click and drag the* Assumptions *tab to the left of the* June_Sales *tab, and release.*

This repositions the Assumptions tab to the left of the June_Sales tab. I prefer to have the Assumptions tab as the first tab in the workbook.

3. *Right-click on the* Assumptions *tab, point to* **Tab Color**, *and click on* **Red**.

Sometimes I like to make a tab a different color so it will stand out.

4. *On the* Assumptions *tab, in* **Cell A1** *type:* ***Bonus Percent***
5. *In* **Cell A3**, *type:* ***Total Bonus Payable***
6. *Resize* **Column A** *to fit.*
7. *Input* ***0.01*** *into* **Cell B1** *and format it as* **Percent**, **one decimal place**.
8. *Click on* **Cell B3**. *Type the = sign, then click on the* **June_Sales** *tab, click on* **Cell J31**, *and press* **[Enter]**.
9. *Make sure* **Cell B3** *is formatted as a* **Number**, **two decimal places**.

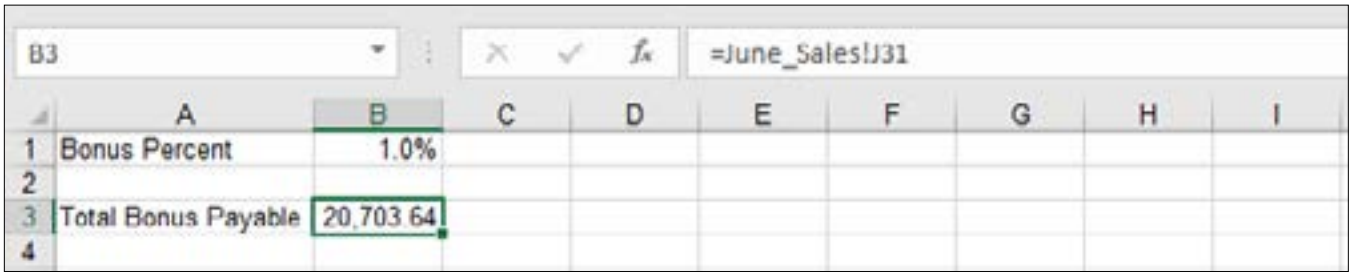


Figure 6.14

The formula in Cell B3 of the Assumptions tab should now read: =June_Sales!J31. This is Excel's way of linking to cells in other tabs. Note the exclamation point (!) separates the cell reference (J31) from the tab named June_Sales.

10. Click on the **June_Sales** *tab,* **Cell J2**.

The formula in Cell J2 of the June_Sales tab currently reads: =IF(I2="Yes",F2*0.01,0). The "0.01" reference is ***hard-coded***, meaning that it is a number, value, or text string that is written into the formula and cannot change, unless someone changes or retypes the formula. It is my heartfelt belief that numbers in a formula should NEVER be hard-coded. I always set up another tab, like the ***Assumptions*** page, where I can store all of the variables. If your manager asked you to change that number to 0.015 just to see how much bonus would be paid out, you would have to go into each cell and make that change (or at least change it in one cell and copy it to all others). We want to make it REAL EASY for the manager to change any variable he wants and immediately see the results. That is why I believe that Excel is the best "what if" tool available today — it is SO EASY to set up these kinds of analyses.

11. In **Cell J2** *of the* June_Sales *tab, select* ***0.01*** *with your mouse, click on the* Assumptions *tab, click on* **Cell B1**, *press the* **[F4]** *key once to make* **Cell B1** *an* **Absolute Reference**, *and press* **[Enter]**.

J2 =IF(I2="Yes",F2*Assumptions!$B$1,0)

	A	B	C	D	E	F	G	H	I	J	K
1	Region	State	Store_No	Year	Month	Sales	Budget	% Budget	Qual_Bonus	Bonus_Amt	Store
2	East	NY	1001	2016	6	68,495	70,000	97.9%	No	0.00	Scisso
3	West	CA	1002	2016	6	104,157	100,000	104.2%	Yes	1,041.57	Rock
4	North	IL	1005	2016	6	103,221	100,000	103.2%	Yes	1,032.21	Rock
5	South	NC	1009	2016	6	59,971	50,000	119.9%	Yes	599.71	Paper
6	South	NC	1011	2016	6	74,348	70,000	106.2%	Yes	743.48	Scisso
7	South	NC	1012	2016	6	95,628	70,000	136.6%	Yes	956.28	Scisso
8	North	IL	1018	2016	6	110,349	100,000	110.3%	Yes	1,103.49	Rock
9	North	OH	1019	2016	6	81,206	70,000	116.0%	Yes	812.06	Scisso
10	West	CA	1021	2016	6	32,582	50,000	65.2%	No	0.00	Paper
11	West	CA	1024	2016	6	119,429	100,000	119.4%	Yes	1,194.29	ck
12	West	CA	1026	2016	6	78,593	70,000	112.3%	Yes	785.93	Scisso
13	East	NY	1027	2016	6	112,363	100,000	112.4%	Yes	1,123.63	Rock

Figure 6.15

The formula in Cell J2 of the June_Sales tab should now read: =IF(I2="Yes",F2*Assumptions!$B$1,0)

12. Copy the formula down for all cells, except the last cell that contains the total summation.

This formula means that if Cell I2 is "Yes", then multiply Cell F2 by whatever value is in Cell B1 on the Assumptions tab. When you copy the formula down, the Assumptions!$B$1 remains the same in all Formulas, hence the use of the absolute reference. The total Bonus_Amt column should still be 20,703.64.

13. Click on **Assumptions** *tab,* **Cell B1**.

14. *Change the* **Bonus Percent** *cell (Cell B1) to* ***0.015*** *(or 1.5%), and press* **[Enter]**.

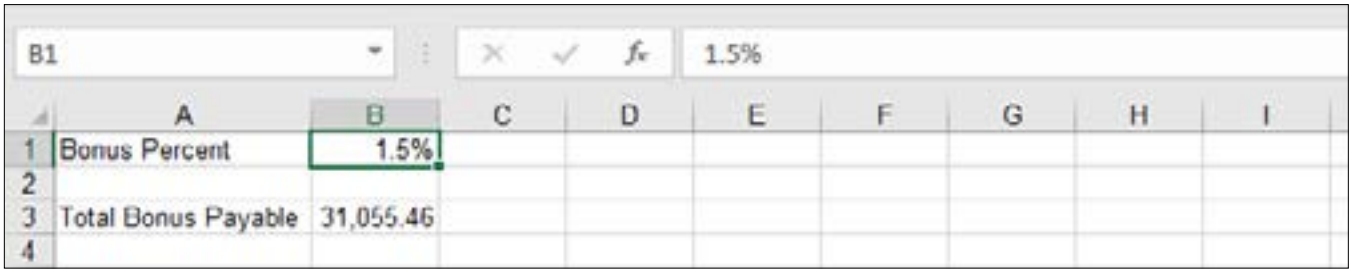


Figure 6.16

Instantaneously, the Total Bonus Payable changes to $31,055.46. Now your manager can use any bonus percent he wants and can instantly see the change in the total bonus payable.

Named Ranges

Sometimes while writing formulas, it is confusing looking at a reference like Assumptions!$B$1. If you wanted to see what value is contained at Assumptions!$B$1, you would have to click on that tab and find that particular cell. Excel has a way that you can rename a cell or a range of cells to something that makes a little more sense and easier to program and audit in formulas. This is called a Named Range sometimes called a List Range. A ***Named Range*** is a word or string of characters that represents a cell, range of cells, formula, or constant value. It's a good idea to use easy-to-understand names when naming ranges. In the next exercise, we will create an input called **Bonus Entry Point** and create a named range called **EntryPoint** and refer to it in the formula.

Let's suppose your manager wants to know how much would be paid if the entry point to start earning a bonus was raised to 110% instead of 100%. That's easy, since we know how to do it.

1. *On the* **Assumptions** *page, insert two rows below* **Row 1**.
2. *In* **Cell A3**, *type:* ***Bonus Entry Point***
3. *In* **Cell B3**, *type* ***110%***
4. *Format* **Cell B3** *as* **Percent**, **zero decimal places**.
5. *With your cursor on* **Cell B3**, *click in the* **Name Box** *just above* **Column A** *(it should read* **B3***),*
   type ***EntryPoint***, *and press* **[Enter]**.

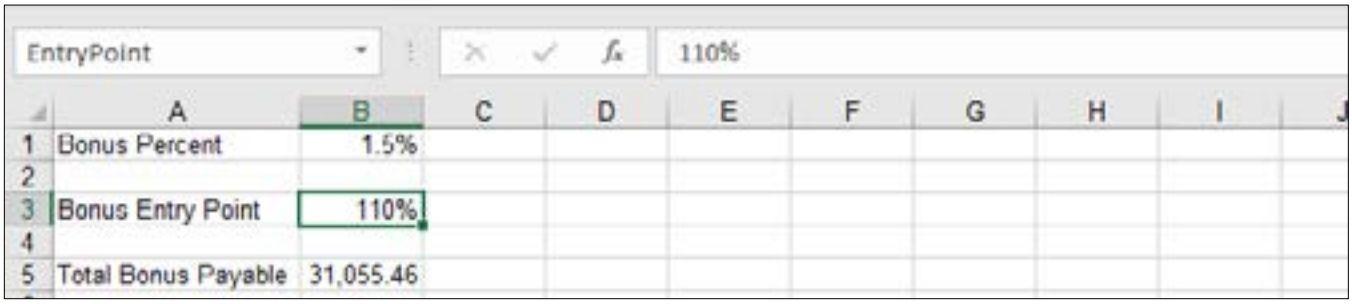


Figure 6.17

Typing EntryPoint in the ***Name Box*** creates a name for that cell. Note that you cannot use spaces or wildcard characters (*, ? or ~) in a Named Range name. You can also create Named Ranges for multiple groups of cells, which we will do in later chapters.

Since the Bonus_Amt field in the June_Sales tab refers to the Qual_Bonus field to determine if the store earned a bonus or not, all we have to do is modify the Qual_Bonus formulas and the bonus calculation should be correct. Let's try it.

6. *Click on* **Cell I2** *of the*  *tab.*

7. *Replace the formula:* **=IF(H2>=1,"Yes","No")** *with* ***=IF(H2>=EntryPoint,"Yes","No")****, then press* [**Enter**].

Notice there are no quotes around EntryPoint. This is because it is not a text string, but a Named Range, which Excel recognizes just like a value. Notice the Named Range tag that appeared as you typed EntryPoint into the formula. You can click to add and it shows the Named Range from Name Manager.

8. *Copy the edited formula down to all cells below.*
9. *Click on the*  *tab.*

The Bonus Payable is now $26,037.41. At this point, you can change the Bonus Percent and/or the Bonus Entry Point to anything you want and the Bonus Payable will immediately re-calculate.

10. *Change the* **Bonus Percent** *to* ***1.2%****, and the* **Bonus Entry Point** *to* ***105%*** *(Answer: $22,355.82)*

By using Comparison Operators and the IF() function in writing formulas, you are limited only to your creativity.

Text Operators

Now let's take a look at Text Operators. The most useful Text operators are the Ampersand sign (&) and the quote (").

Text Operators	Definition (Example)
& (Ampersand) and " " (Quote)	Connects or concatenates two values to produce one contiguous text string. Example: Assuming **Nitey-Nite** is in Cell A1 and **Mattresses** is in Cell B1, =A1&" "&B1 produces **Nitey-Nite Mattresses**

Concatenation

Let's try an example using text operators on the Assumptions tab. In this example, you will write a sentence that contains the amount of the Bonus Payable concatenated within the phrase.

1. *On the* **Assumptions** *tab,* **Cell A7***, type:* ***="The Total Bonus Payable is "&B5***

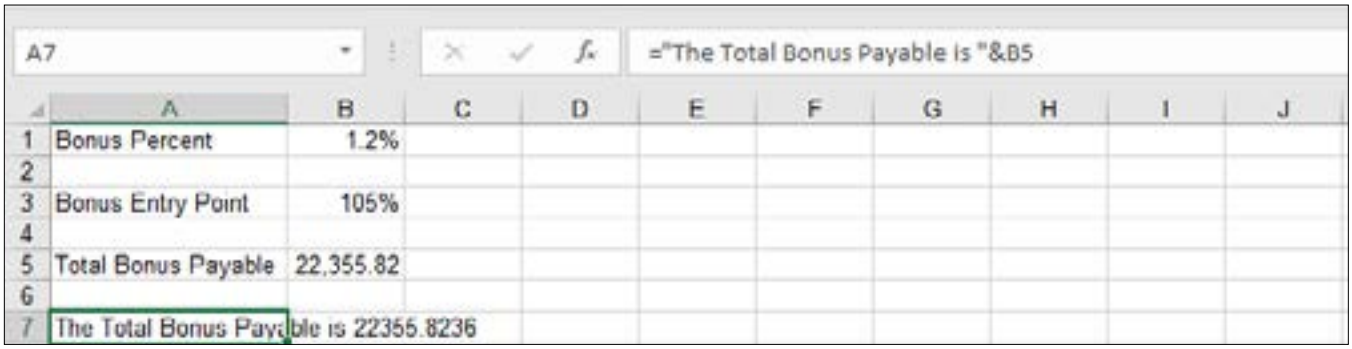


Figure 6.18

The TEXT() Function

The number for the Total Bonus Payable is correct, but it's not formatted. To format a number within a concatenation string like this, you need to use the TEXT() function. The TEXT() function formats text into almost any kind of format. In our case, we want to format the result in a currency format. This is how to do it:

2. *Edit the formula in* **Cell A7** *to be as follows:*

="The Total Bonus Payable is "&TEXT(B5,"$0,000.00")

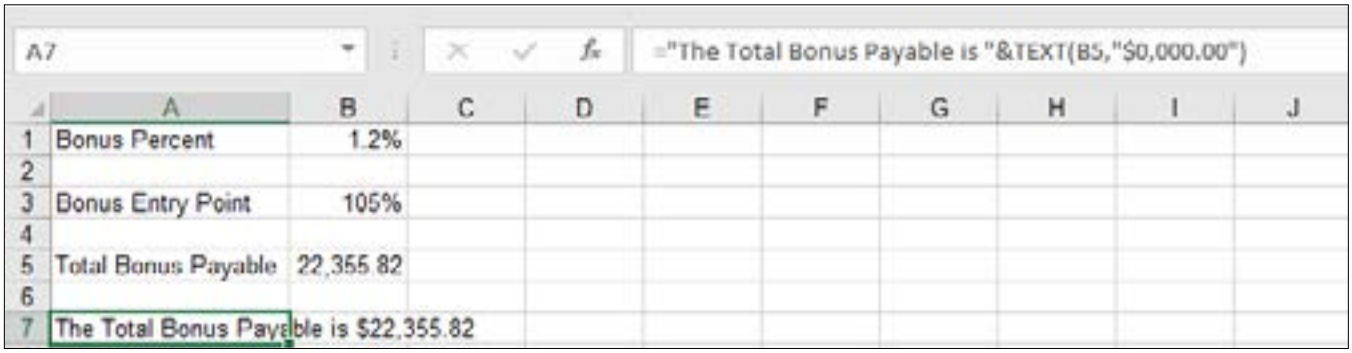


Figure 6.19

Notice that the TEXT() function has two arguments: the cell reference or string you want to format, and the format type. The format type is surrounded by quotes. I encourage you to play around with this function and try to create some of your own formats. To create a Percent format with one decimal place, the format type would be "0.0%". To concatenate more text at the end of the formula, simply type the & sign followed by a quote and the text you want. If the formula ends with a function, you can simply end the formula with the closing parenthesis. Otherwise, you need to end the formula with an ampersand sign and a quote. Let's suppose you want to end the sentence with a period and then a statement that says, "*Please forward to the Accounts Payable department.*"

3. *Edit the formula in* **Cell A7** *to be as follows:*

="The Total Bonus Payable is "&TEXT(B5,"$0,000.00")&". Please forward to the Accounts Payable department."

	A	B	C	D	E	F	G	H	I	J	K	L
1	Bonus Percent	1.2%										
2												
3	Bonus Entry Point	105%										
4												
5	Total Bonus Payable	22,355.82										
6												
7	The Total Bonus Payable is $22,355.82. Please forward to the Accounts Payable department.											

Figure 6.20

4. *Now change the* **Bonus Percent** *to be* ***1.8%****.*

The Total Bonus Payable AND the Bonus sentence change when the Bonus Percent is modified.

5. **Save** *and* **close** *the* **myJune_Sales.xlsx** *file.*

Text Operators make it simple to put data in an English sentence which makes it easy for people who don't do well with numbers on a spreadsheet. You will find this very useful for putting two or more strings of data together in one cell.

Review Questions*: It is now time to complete the hands-on Review Questions. Log on to www.ExcelCEO.com with your Email address and Password, click on the* **Excel 2016 Review Questions, Chapter 6, Section 2 of 2** *option in your Main Menu, and complete the Review Questions.*

Conclusion

In the chapter, you learned the basics of writing formulas. Behind the basics of formula-writing are Arithmetic, Comparison, and Text Operators, which you should now know very well. You were introduced to the IF() function, which is one of the most common functions you will use in Excel. To help you write an IF() function (or any other function), you were exposed to the Insert Function dialog box. You learned how to use multiple IF() functions in a formula, which is called nesting functions. You developed an Assumptions page where you stored all of the variables used in your analysis. Using an Assumptions page makes it useful to avoid hard-coded numbers into formulas. You also created a Named Range, which makes writing and auditing formulas much easier. Finally, you concatenated a calculated number and formatted it using a TEXT() function within a text string, making an accurate, easy-to-understand, and updatable sentence.

Chapter Exam

To take the examination for this chapter, you must have successfully completed the examination for the previous chapter. You can now go to www.ExcelCEO.com, click on Sign In, log in and take the exam. Make sure that you take the exam on the same computer on which you completed the practice files, as some of the questions on the exam may refer to some of the completed projects. Chapter exams are intended to be hands-on.

Excel® 2016

Complete Self-study Course

ExcelCEO

Chief Excel Officer

CHAPTER SEVEN — TEXT FUNCTIONS

Chapter Objectives:

- Recognize uses for capabilities with text functions
- Select the correct arguments in a LEFT() function
- Indicate the correct arguments in a MID() function
- Identify how the LEFT(), RIGHT(), MID() functions work
- Indicate the proper uses for the UPPER(), LOWER(), and PROPER() functions
- Identify the correct use of a PROPER() function
- Indicate when to use the LEN() function into a formula to count characters
- Determine how to remove extra spaces with the TRIM() function
- Identify the proper uses of the VALUE() function
- Recognize the way Flash Fill recognizes and displays patterns based on user inputs

Projects You Will Complete During This Chapter:

- *myEmployees.xlsx*

CPE Credits possible for this chapter: 2

Introduction

I LOVE writing Formulas. Here are two of my favorites:

=IF(ISERROR(VLOOKUP(MATCH(G5,Assumptions!$E$3:$E$10,1),Assumptions! $D$3:$F$10,3,FALSE) D5),0,VLOOKUP(MATCH(G5,Assumptions!$E$3:$E$10,1),Assumptions!$D$3:$F$10,3,FALSE)*D5)*

This one calculates a bonus based on a criteria table. It's similar to the one we did in Chapter 6, but it does everything in one cell.

=MID(B2,FIND(",",B2)+2,100)&" "&LEFT(B2,FIND(",",B2)-1)

This formula takes a name which is formatted as "LastName, FirstName" in Cell B2 and switches it to a "FirstName LastName" format. You will become an expert at this formula in this chapter.

This is what the meat of Excel is all about – writing formulas. In this and the three following chapters, you will work many examples using popular and useful functions. Following are the most common functions I have used. There are lots of other functions in Excel. However, in my work as an accountant and financial analyst, these are some of the ones I've found to be most useful:

Common Functions (* New since Excel 2010)

TEXT	**FINANCIAL**	**DATE & TIME**
FIND()	FV()	DATE()
LEFT()	IRR()	DAY()
LEN()	NPV()	MONTH()
LOWER()	PMT()	NOW()
MID()	PV()	TODAY()
PROPER()		WEEKDAY()
RIGHT()	**MATH**	YEAR()
SEARCH()	ABS()	
TEXT()	INT()	**STATISTICAL**
TRIM()	RAND(), RANDBETWEEN()	AVERAGE()
UPPER()	SUM()	AVERAGEIFS()*
VALUE()	ROUND()	COUNT()
	SUMIF(), SUMIFS()*	COUNTIF()
LOGICAL		COUNTIFS()*
AND()	**LOOKUP & REFERENCE**	MAX()
CELL()	HLOOKUP(), VLOOKUP()	MEDIAN()
IF(), IFS()*	INDEX()	MIN()
ISERROR(), IFERROR()*	LOOKUP()	MODE()
OR()	MATCH()	RANK()

Text Functions

Let's first talk about **Text Functions**. Text functions are basically things you can do with text strings.

1. **Open** *the file* **C:\ExcelCEO\Excel 2016\Chapter7\Employees.xlsx**.
2. **Save As C:\ExcelCEO\Excel 2016\Chapter7*myEmployees.xlsx***.
3. *Click on the* Employee *tab.*

This file is a list of the employees at Nitey-Nite Mattresses. Note that the names in this tab are in a Last Name, First Name format. We'll use this list of names as the example behind your lesson on TEXT functions. In the next few pages, you will write a formula in **one** cell that will turn these names from a Last Name, First Name format into a First Name Last Name format. To accomplish this, you will write a series of formulas using only TEXT functions to break apart the first and last names, and then write a formula to put it back together again. (We WILL do better than all the king's horses and all the king's men). The trick is to write one formula that will accomplish all of this. We will use some of the TEXT functions listed at the beginning of this chapter, as well as our experience in working with concatenating strings you learned in Chapter 6 to accomplish it. But first, let's go over each function.

The FIND() and SEARCH() Functions

The first text functions we'll learn how to use are the **FIND()** and **SEARCH()** functions. The FIND() function finds a text string (find_text) within another text string (within_text), and returns the number of the starting position of the find_text, from the first character of the within_text. You can use the SEARCH() function to find one text string within another, but unlike SEARCH(), FIND() is case-sensitive and doesn't allow wildcard characters. Following is the list of wildcard characters used in Excel.

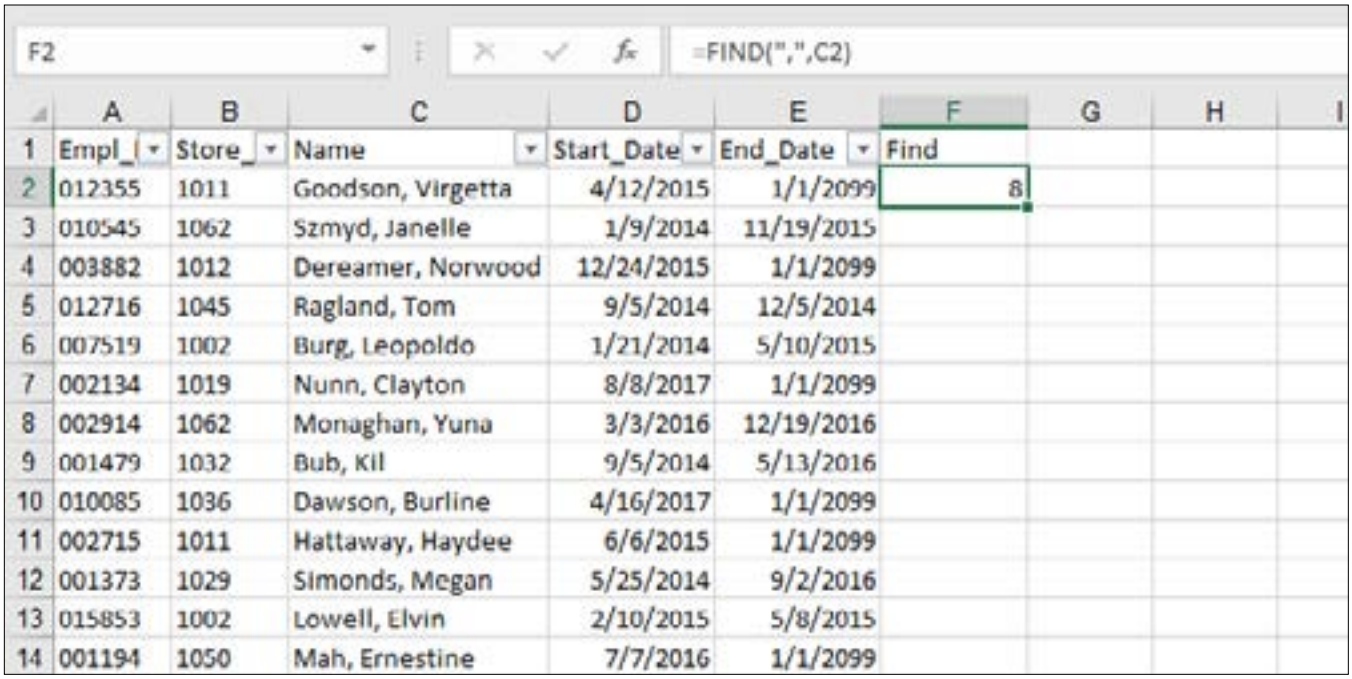
Wildcard Character	Using SEARCH() Finds:
? (Question mark)	Any single character Example: sm?th finds "smith" and "smyth"
* (Asterisk)	Any number of characters Example: *east finds "Northeast" and "Southeast"
~ (Tilde) followed by ~?, ~* to find the ? or * characters	A question mark, asterisk, or tilde Example: How does this work? "How does this work~?"

The FIND() and SEARCH() functions have two required arguments and one optional argument. The first argument is the find_text, or the text you want to find. The second argument is the within_text, or the string in which you want to search. The optional argument is the start_num argument. You use this optional argument when you don't want to start at the first character in the string. The functions return the number position of the text string you're searching for and then other functions return the actual value. In the next example, you'll use the FIND() function, although writing either function would work.

In this example, we want to find the number position of the comma (,) in the cells that contain the

employees' names. The comma is the common character in all of the names, and so it acts as a sort of anchor we can use to tell Excel where to split the names. You may not understand why we do this right now, but humor me for a few minutes and follow along.

4. *In* **Cell F1**, *type:* ***Find***
5. *In* **Cell F2**, *type:* ***=FIND(",",C2)***



F2 =FIND(",",C2)

	A	B	C	D	E	F	G	H	I
1	Empl_I	Store_	Name	Start_Date	End_Date	Find			
2	012355	1011	Goodson, Virgetta	4/12/2015	1/1/2099	8			
3	010545	1062	Szmyd, Janelle	1/9/2014	11/19/2015				
4	003882	1012	Dereamer, Norwood	12/24/2015	1/1/2099				
5	012716	1045	Ragland, Tom	9/5/2014	12/5/2014				
6	007519	1002	Burg, Leopoldo	1/21/2014	5/10/2015				
7	002134	1019	Nunn, Clayton	8/8/2017	1/1/2099				
8	002914	1062	Monaghan, Yuna	3/3/2016	12/19/2016				
9	001479	1032	Bub, Kil	9/5/2014	5/13/2016				
10	010085	1036	Dawson, Burline	4/16/2017	1/1/2099				
11	002715	1011	Hattaway, Haydee	6/6/2015	1/1/2099				
12	001373	1029	Simonds, Megan	5/25/2014	9/2/2016				
13	015853	1002	Lowell, Elvin	2/10/2015	5/8/2015				
14	001194	1050	Mah, Ernestine	7/7/2016	1/1/2099				

Figure 7.1

The result of this formula is 8, meaning that the comma in Cell C2 is in the eighth character from the left in the string: Goodson, Virgetta.

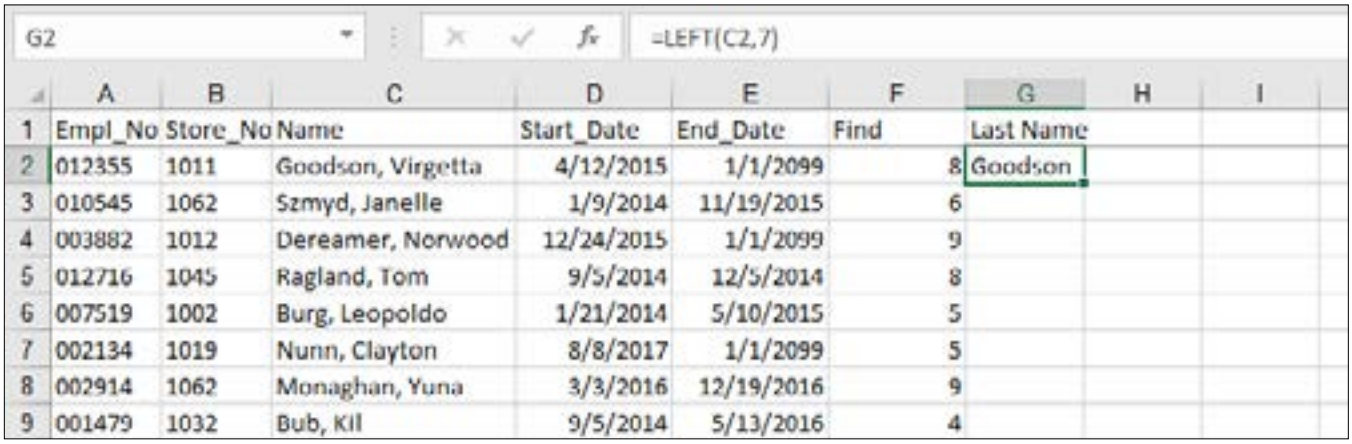
6. *Copy the formula in* **Cell F2** *down to all cells below.*

You see that the comma in the next few cells is found as the sixth character, the ninth character, and so on. FIND() is a very simple yet valuable function that returns a simple value.

The LEFT() Function

The ***LEFT() function*** returns the left-most characters in a text string, based on the number of characters you specify. This function has two arguments: first is the text from where you want to extract the string. Second is the number of characters you want to extract, starting from the first character on the left. Let's work an example.

7. *In* **Cell G1**, *type:* ***Last Name***
8. *In* **Cell G2**, *type the following formula:* ***=LEFT(C2,7)***



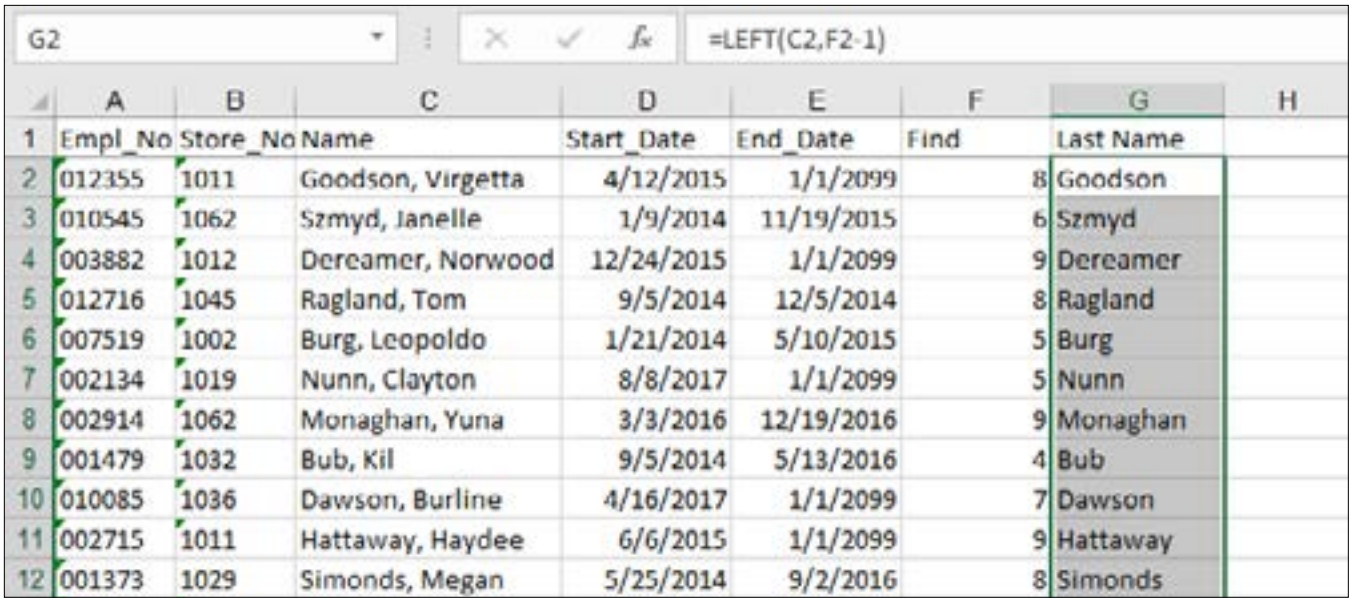
G2 =LEFT(C2,7)

	A	B	C	D	E	F	G	H	I
1	Empl_No	Store_No	Name	Start_Date	End_Date	Find	Last Name		
2	012355	1011	Goodson, Virgetta	4/12/2015	1/1/2099	8	Goodson		
3	010545	1062	Szmyd, Janelle	1/9/2014	11/19/2015	6			
4	003882	1012	Dereamer, Norwood	12/24/2015	1/1/2099	9			
5	012716	1045	Ragland, Tom	9/5/2014	12/5/2014	8			
6	007519	1002	Burg, Leopoldo	1/21/2014	5/10/2015	5			
7	002134	1019	Nunn, Clayton	8/8/2017	1/1/2099	5			
8	002914	1062	Monaghan, Yuna	3/3/2016	12/19/2016	9			
9	001479	1032	Bub, Kil	9/5/2014	5/13/2016	4			

Figure 7.2

This formula tells Excel to return the left seven (7) characters in the text string in Cell C2. The result is "Goodson". In this manner, we can extract that last name of the names in Column C. However, the last name won't always be seven characters long, like we programmed into the function. How can we calculate the length of the last name? Well, we've already calculated where the comma is, and the last name will always end one character before the comma. For "Goodson, Virgetta", the comma is the eighth character, so the last name should be at the comma (or the eighth place) less one. Let's modify our formula to see if that works.

9. *Edit the formula in* **Cell G2** *to the following:* ***=LEFT(C2,F2-1)***
10. *Click* **[Ctrl]+[Enter]** *to copy down to all cells below, and resize* **Column G** *as needed.*



G2 =LEFT(C2,F2-1)

	A	B	C	D	E	F	G	H
1	Empl_No	Store_No	Name	Start_Date	End_Date	Find	Last Name	
2	012355	1011	Goodson, Virgetta	4/12/2015	1/1/2099	8	Goodson	
3	010545	1062	Szmyd, Janelle	1/9/2014	11/19/2015	6	Szmyd	
4	003882	1012	Dereamer, Norwood	12/24/2015	1/1/2099	9	Dereamer	
5	012716	1045	Ragland, Tom	9/5/2014	12/5/2014	8	Ragland	
6	007519	1002	Burg, Leopoldo	1/21/2014	5/10/2015	5	Burg	
7	002134	1019	Nunn, Clayton	8/8/2017	1/1/2099	5	Nunn	
8	002914	1062	Monaghan, Yuna	3/3/2016	12/19/2016	9	Monaghan	
9	001479	1032	Bub, Kil	9/5/2014	5/13/2016	4	Bub	
10	010085	1036	Dawson, Burline	4/16/2017	1/1/2099	7	Dawson	
11	002715	1011	Hattaway, Haydee	6/6/2015	1/1/2099	9	Hattaway	
12	001373	1029	Simonds, Megan	5/25/2014	9/2/2016	8	Simonds	

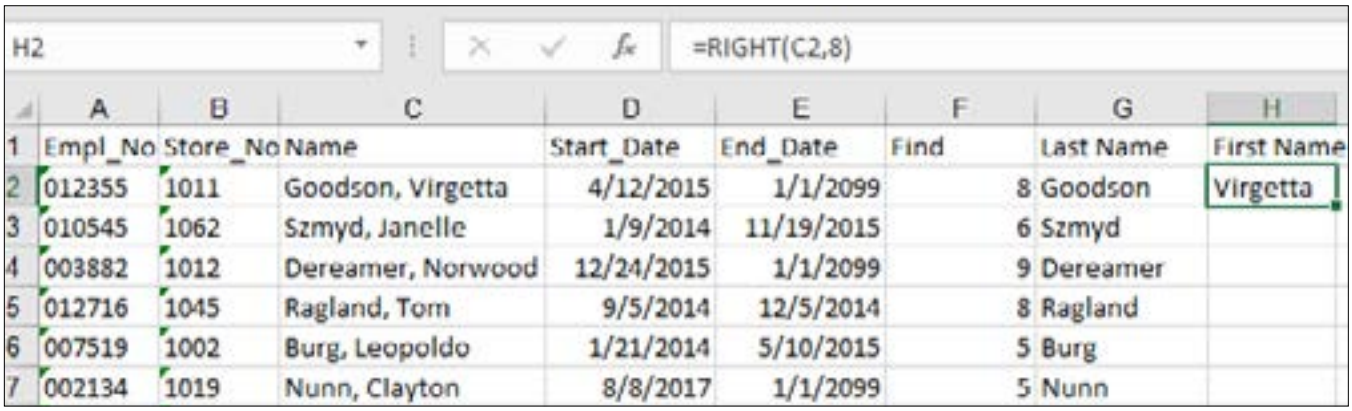
Figure 7.3

That seems to work. All we're doing here is taking the number in Column F less one to populate the num_char argument in the LEFT() function.

The RIGHT() Function

The ***RIGHT() function*** operates in the same way as the LEFT() function, except it returns characters from the right.

11. *In* **Cell H1**, *type:* ***First_Name***
12. *In* **Cell H2**, *type the following formula:* ***=RIGHT(C2,8)***



H2 =RIGHT(C2,8)

	A	B	C	D	E	F	G	H
1	Empl_No	Store_No	Name	Start_Date	End_Date	Find	Last Name	First Name
2	012355	1011	Goodson, Virgetta	4/12/2015	1/1/2099	8	Goodson	Virgetta
3	010545	1062	Szmyd, Janelle	1/9/2014	11/19/2015	6	Szmyd	
4	003882	1012	Dereamer, Norwood	12/24/2015	1/1/2099	9	Dereamer	
5	012716	1045	Ragland, Tom	9/5/2014	12/5/2014	8	Ragland	
6	007519	1002	Burg, Leopoldo	1/21/2014	5/10/2015	5	Burg	
7	002134	1019	Nunn, Clayton	8/8/2017	1/1/2099	5	Nunn	

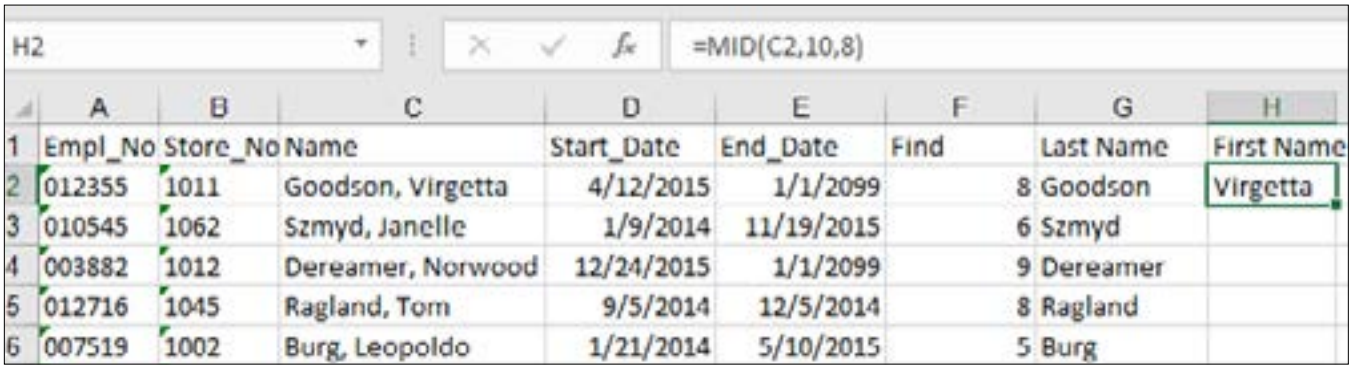
Figure 7.4

Again, hard-coding the "8" in this formula will work for the first cell, and it will work for all first names with eight characters, but it won't work for all names. In this case, we could use a nested left/right function to extract the correct value, but it's a lot easier to use the MID() function.

The MID() Function

The ***MID() function*** operates in the same manner as the LEFT() and RIGHT() functions, with one additional argument – it requires you to specify which character to start on.

13. *In* **Cell H2**, *delete the previous formula, and type this formula:* ***=MID(C2,10,8)***



H2 =MID(C2,10,8)

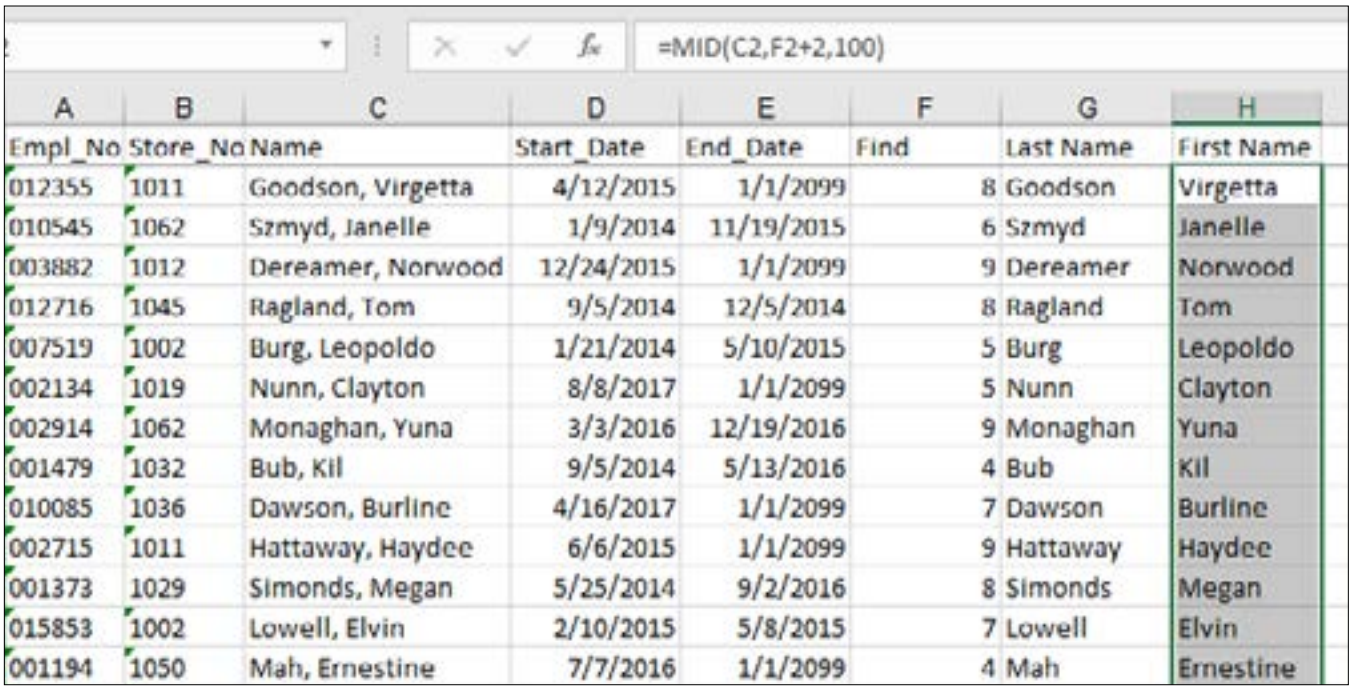
	A	B	C	D	E	F	G	H
1	Empl_No	Store_No	Name	Start_Date	End_Date	Find	Last Name	First Name
2	012355	1011	Goodson, Virgetta	4/12/2015	1/1/2099	8	Goodson	Virgetta
3	010545	1062	Szmyd, Janelle	1/9/2014	11/19/2015	6	Szmyd	
4	003882	1012	Dereamer, Norwood	12/24/2015	1/1/2099	9	Dereamer	
5	012716	1045	Ragland, Tom	9/5/2014	12/5/2014	8	Ragland	
6	007519	1002	Burg, Leopoldo	1/21/2014	5/10/2015	5	Burg	

Figure 7.5

This formula tells Excel to return the eight right-most characters starting from the 10th character from

the left. When we analyze all the names in the list, there are two variables we need to calculate: first, the character to start on, and second, how many characters are in the first name. Since we've already calculated the position of the comma, we know that the beginning character of the first name is always going to be at the comma plus two (remember to include the space after the comma as a character). I usually put 100 as the number of characters in the first name, as I don't know ANY first names with more than 100 characters. This way, Excel will return all of the characters in the first name. Don't worry - if there are less than 100 characters in the first name, this exercise will not add spaces to make up for the missing characters. Let's try it.

14. *Edit* **Cell H2** *to the following:* ***=MID(C2,F2+2,100)***
15. *Copy down to all cells below, and resize columns as necessary.*



	A	B	C	D	E	F	G	H
	Empl_No	Store_No	Name	Start_Date	End_Date	Find	Last Name	First Name
	012355	1011	Goodson, Virgetta	4/12/2015	1/1/2099	8	Goodson	Virgetta
	010545	1062	Szmyd, Janelle	1/9/2014	11/19/2015	6	Szmyd	Janelle
	003882	1012	Dereamer, Norwood	12/24/2015	1/1/2099	9	Dereamer	Norwood
	012716	1045	Ragland, Tom	9/5/2014	12/5/2014	8	Ragland	Tom
	007519	1002	Burg, Leopoldo	1/21/2014	5/10/2015	5	Burg	Leopoldo
	002134	1019	Nunn, Clayton	8/8/2017	1/1/2099	5	Nunn	Clayton
	002914	1062	Monaghan, Yuna	3/3/2016	12/19/2016	9	Monaghan	Yuna
	001479	1032	Bub, Kil	9/5/2014	5/13/2016	4	Bub	Kil
	010085	1036	Dawson, Burline	4/16/2017	1/1/2099	7	Dawson	Burline
	002715	1011	Hattaway, Haydee	6/6/2015	1/1/2099	9	Hattaway	Haydee
	001373	1029	Simonds, Megan	5/25/2014	9/2/2016	8	Simonds	Megan
	015853	1002	Lowell, Elvin	2/10/2015	5/8/2015	7	Lowell	Elvin
	001194	1050	Mah, Ernestine	7/7/2016	1/1/2099	4	Mah	Ernestine

Figure 7.6

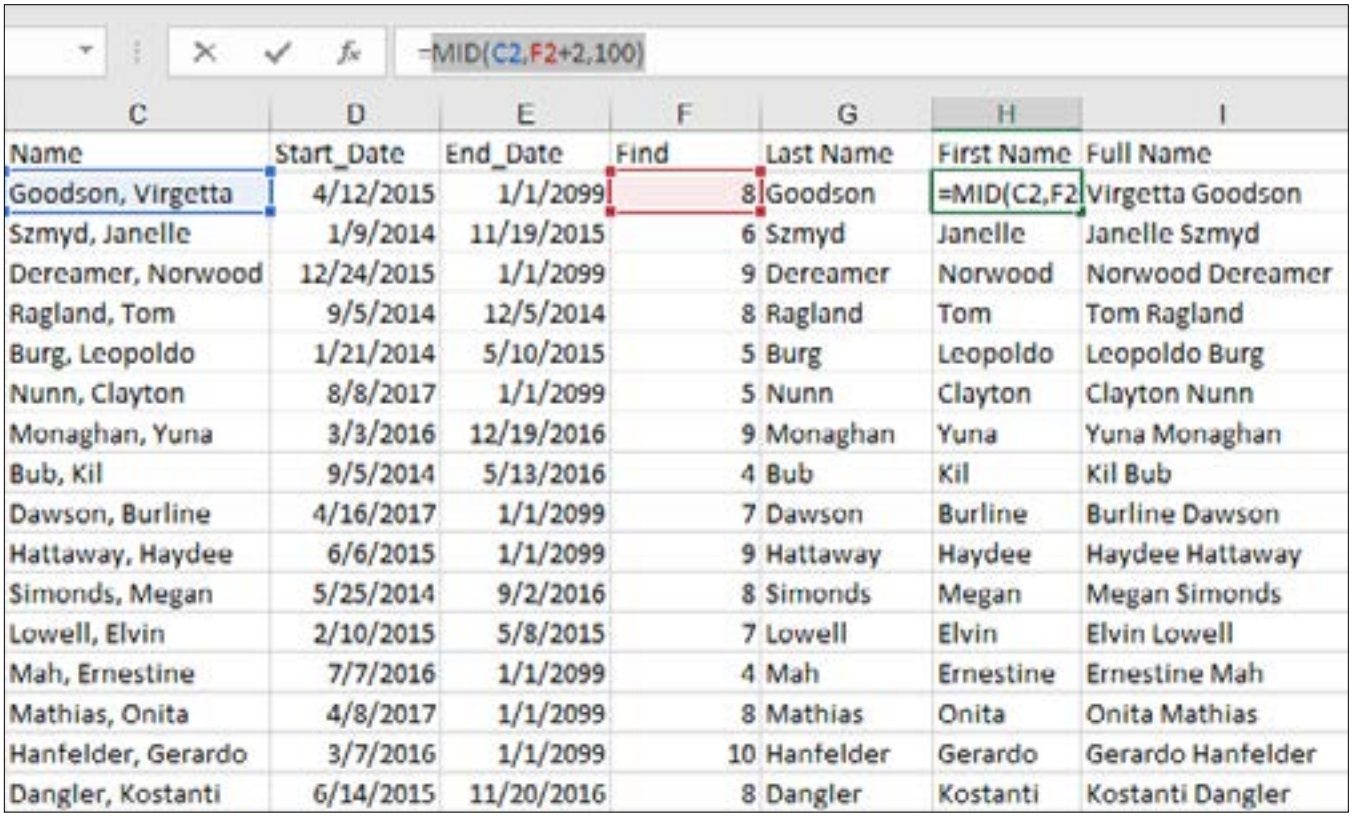
Since you already know how to concatenate cells, all you have to do now is to write a formula in Cell I2 to put the first name and last name together.

16. *In* **Cell I1**, *type:* ***Full Name***
17. *In* **Cell I2**, *type the following formula:* ***=H2&" "&G2***
18. *Copy down to all cells below and resize the column as necessary.*

We now have the full name, but we would like to put the formula in ONE cell. So far, we have used four columns to come up with the full name. To put it all in one cell, all we have to do is some copying and pasting. As you can see, the formulas so far contain cell references. Let's put the formula together!

19. *Click on* **Cell H2**.

20. *With your cursor, highlight the entire formula in the* **Formula Bar** *without the "=" sign, press* **[Ctrl]+c** *to copy the formula into memory, then press* **[Esc]** *to take the action out of copy mode.*



	C	D	E	F	G	H	I
	Name	Start_Date	End_Date	Find	Last Name	First Name	Full Name
	Goodson, Virgetta	4/12/2015	1/1/2099	8	Goodson	=MID(C2,F2	Virgetta Goodson
	Szmyd, Janelle	1/9/2014	11/19/2015	6	Szmyd	Janelle	Janelle Szmyd
	Dereamer, Norwood	12/24/2015	1/1/2099	9	Dereamer	Norwood	Norwood Dereamer
	Ragland, Tom	9/5/2014	12/5/2014	8	Ragland	Tom	Tom Ragland
	Burg, Leopoldo	1/21/2014	5/10/2015	5	Burg	Leopoldo	Leopoldo Burg
	Nunn, Clayton	8/8/2017	1/1/2099	5	Nunn	Clayton	Clayton Nunn
	Monaghan, Yuna	3/3/2016	12/19/2016	9	Monaghan	Yuna	Yuna Monaghan
	Bub, Kil	9/5/2014	5/13/2016	4	Bub	Kil	Kil Bub
	Dawson, Burline	4/16/2017	1/1/2099	7	Dawson	Burline	Burline Dawson
	Hattaway, Haydee	6/6/2015	1/1/2099	9	Hattaway	Haydee	Haydee Hattaway
	Simonds, Megan	5/25/2014	9/2/2016	8	Simonds	Megan	Megan Simonds
	Lowell, Elvin	2/10/2015	5/8/2015	7	Lowell	Elvin	Elvin Lowell
	Mah, Ernestine	7/7/2016	1/1/2099	4	Mah	Ernestine	Ernestine Mah
	Mathias, Onita	4/8/2017	1/1/2099	8	Mathias	Onita	Onita Mathias
	Hanfelder, Gerardo	3/7/2016	1/1/2099	10	Hanfelder	Gerardo	Gerardo Hanfelder
	Dangler, Kostanti	6/14/2015	11/20/2016	8	Dangler	Kostanti	Kostanti Dangler

Figure 7.7

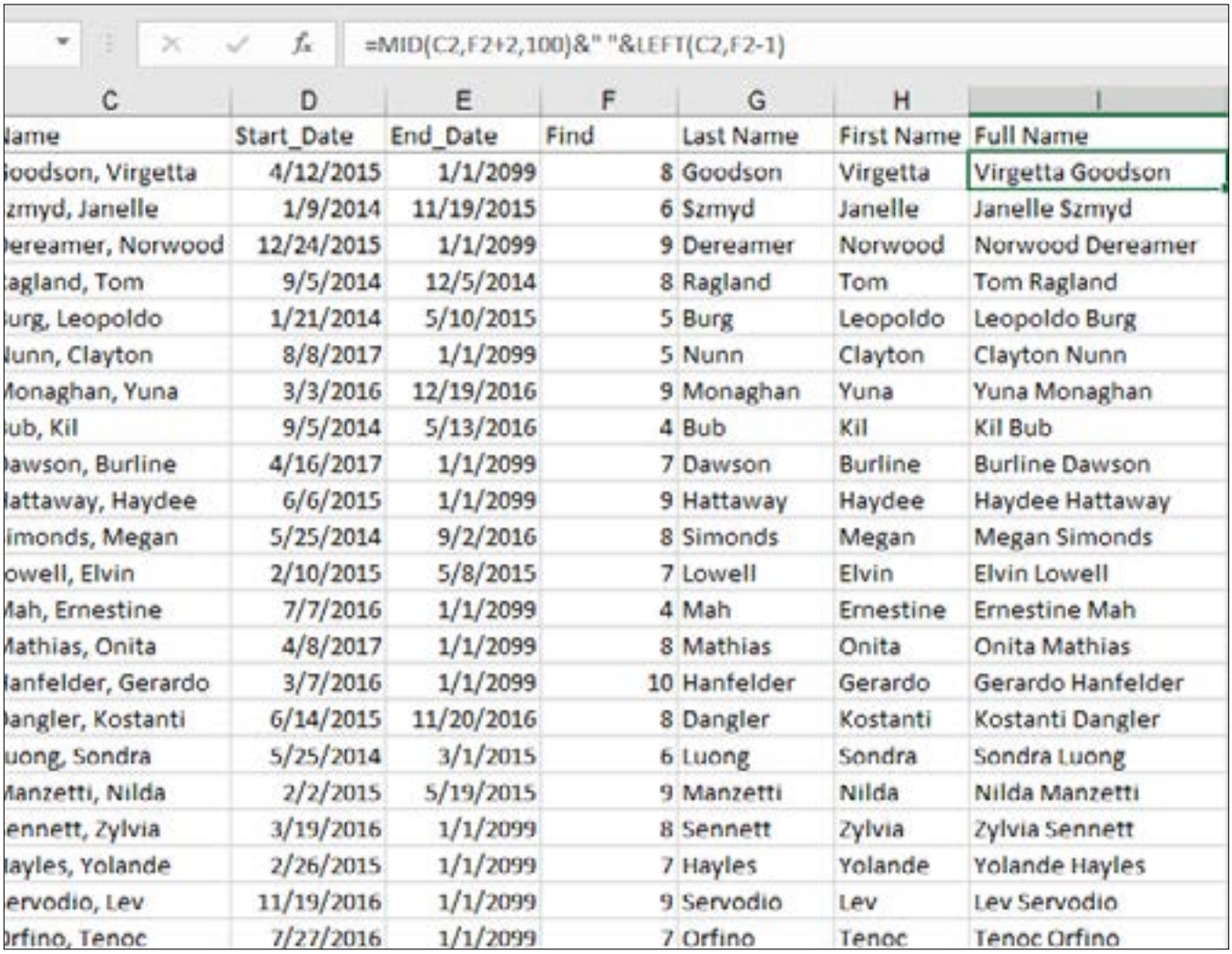
All we did here was to put the formula in Cell H2 (without the "=" sign) into memory.

21. *With the formula in* **Cell H2** *now in memory, click on* **Cell I2**, *highlight* **H2** *in that formula, press* **[Ctrl]+v** *(to paste the H2 formula), and press* **[Enter]**.

The formula in Cell H2 should now read as follows:
=MID(C2,F2+2,100)&" "&G2

All we did was to replace H2 with the formula in Cell H2. Let's do the same for Cell G2.

22. *Click on* **Cell G2**.
23. *With your cursor, highlight the formula (without the "=" sign), press* **[Ctrl]+c** *to copy the formula into memory, and press* **[Esc]** *(to take the action out of edit mode).*
24. *With the formula in Cell G2 in memory, click on* **Cell I2**, *highlight G2 in the formula, and press* **[Ctrl]+v** *(to paste the G2 formula) and press* **[Enter]**.



=MID(C2,F2+2,100)&" "&LEFT(C2,F2-1)

C	D	E	F	G	H	I
lame	Start_Date	End_Date	Find	Last Name	First Name	Full Name
oodson, Virgetta	4/12/2015	1/1/2099	8	Goodson	Virgetta	Virgetta Goodson
zmyd, Janelle	1/9/2014	11/19/2015	6	Szmyd	Janelle	Janelle Szmyd
ereamer, Norwood	12/24/2015	1/1/2099	9	Dereamer	Norwood	Norwood Dereamer
agland, Tom	9/5/2014	12/5/2014	8	Ragland	Tom	Tom Ragland
urg, Leopoldo	1/21/2014	5/10/2015	5	Burg	Leopoldo	Leopoldo Burg
lunn, Clayton	8/8/2017	1/1/2099	5	Nunn	Clayton	Clayton Nunn
Monaghan, Yuna	3/3/2016	12/19/2016	9	Monaghan	Yuna	Yuna Monaghan
ub, Kil	9/5/2014	5/13/2016	4	Bub	Kil	Kil Bub
awson, Burline	4/16/2017	1/1/2099	7	Dawson	Burline	Burline Dawson
lattaway, Haydee	6/6/2015	1/1/2099	9	Hattaway	Haydee	Haydee Hattaway
imonds, Megan	5/25/2014	9/2/2016	8	Simonds	Megan	Megan Simonds
owell, Elvin	2/10/2015	5/8/2015	7	Lowell	Elvin	Elvin Lowell
Mah, Ernestine	7/7/2016	1/1/2099	4	Mah	Ernestine	Ernestine Mah
Mathias, Onita	4/8/2017	1/1/2099	8	Mathias	Onita	Onita Mathias
lanfelder, Gerardo	3/7/2016	1/1/2099	10	Hanfelder	Gerardo	Gerardo Hanfelder
angler, Kostanti	6/14/2015	11/20/2016	8	Dangler	Kostanti	Kostanti Dangler
uong, Sondra	5/25/2014	3/1/2015	6	Luong	Sondra	Sondra Luong
Manzetti, Nilda	2/2/2015	5/19/2015	9	Manzetti	Nilda	Nilda Manzetti
ennett, Zylvia	3/19/2016	1/1/2099	8	Sennett	Zylvia	Zylvia Sennett
layles, Yolande	2/26/2015	1/1/2099	7	Hayles	Yolande	Yolande Hayles
ervodio, Lev	11/19/2016	1/1/2099	9	Servodio	Lev	Lev Servodio
rfino, Tenoc	7/27/2016	1/1/2099	7	Orfino	Tenoc	Tenoc Orfino

Figure 7.8

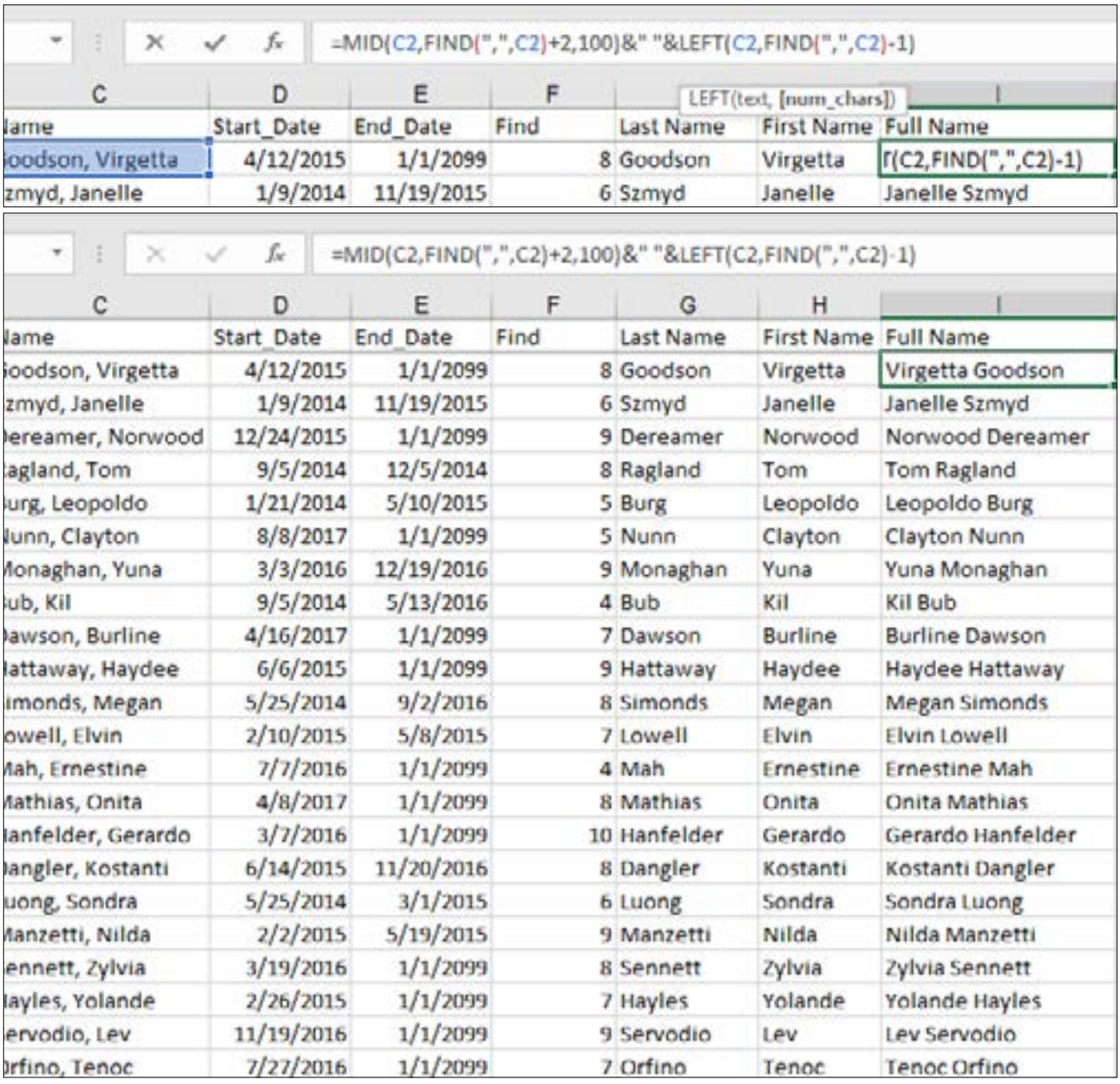
The formula in Cell I2 should now read as follows:
=MID(C2,F2+2,100)&“ ”&LEFT(C2,F2-1)

Come to think of it, the two occurrences of F2 in this formula are also formulas, so we can replace those references as well.

25. *Click on* **Cell F2**.
26. *With your cursor, highlight the formula (without the “=” sign), press* **[Ctrl]+*c*** *to copy the formula into memory, and press* **[Esc]** *(to take the action out of edit mode).*
27. *With the formula in* **Cell F2** *in memory, click on* **Cell I2**, *highlight the first occurrence of* **F2** *in the formula, and press* **[Ctrl]+v** *(to paste the* **F2** *formula), then do the same for the second occurrence of* **F2**, *and press* **[Enter]**.

The formula in Cell H2 should now read as follows:

=MID(C2,FIND(“,”,C2)+2,100)&“ ”&LEFT(C2,FIND(“,”,C2)-1)



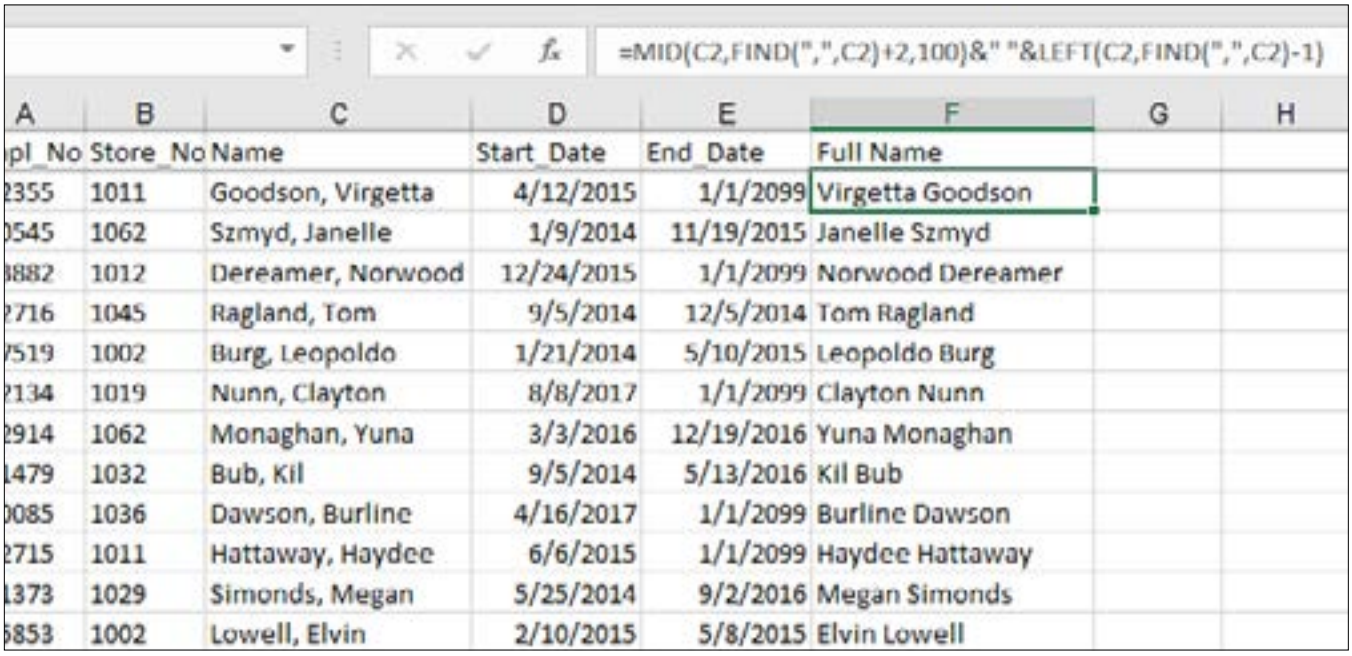
C	D	E	F	G	H	I
lame	Start_Date	End_Date	Find	Last Name	First Name	Full Name
oodson, Virgetta	4/12/2015	1/1/2099	8	Goodson	Virgetta	Virgetta Goodson
zmyd, Janelle	1/9/2014	11/19/2015	6	Szmyd	Janelle	Janelle Szmyd
ereamer, Norwood	12/24/2015	1/1/2099	9	Dereamer	Norwood	Norwood Dereamer
agland, Tom	9/5/2014	12/5/2014	8	Ragland	Tom	Tom Ragland
urg, Leopoldo	1/21/2014	5/10/2015	5	Burg	Leopoldo	Leopoldo Burg
lunn, Clayton	8/8/2017	1/1/2099	5	Nunn	Clayton	Clayton Nunn
Monaghan, Yuna	3/3/2016	12/19/2016	9	Monaghan	Yuna	Yuna Monaghan
ub, Kil	9/5/2014	5/13/2016	4	Bub	Kil	Kil Bub
awson, Burline	4/16/2017	1/1/2099	7	Dawson	Burline	Burline Dawson
lattaway, Haydee	6/6/2015	1/1/2099	9	Hattaway	Haydee	Haydee Hattaway
imonds, Megan	5/25/2014	9/2/2016	8	Simonds	Megan	Megan Simonds
owell, Elvin	2/10/2015	5/8/2015	7	Lowell	Elvin	Elvin Lowell
Mah, Ernestine	7/7/2016	1/1/2099	4	Mah	Ernestine	Ernestine Mah
Mathias, Onita	4/8/2017	1/1/2099	8	Mathias	Onita	Onita Mathias
lanfelder, Gerardo	3/7/2016	1/1/2099	10	Hanfelder	Gerardo	Gerardo Hanfelder
langler, Kostanti	6/14/2015	11/20/2016	8	Dangler	Kostanti	Kostanti Dangler
uong, Sondra	5/25/2014	3/1/2015	6	Luong	Sondra	Sondra Luong
Manzetti, Nilda	2/2/2015	5/19/2015	9	Manzetti	Nilda	Nilda Manzetti
ennett, Zylvia	3/19/2016	1/1/2099	8	Sennett	Zylvia	Zylvia Sennett
layles, Yolande	2/26/2015	1/1/2099	7	Hayles	Yolande	Yolande Hayles
ervodio, Lev	11/19/2016	1/1/2099	9	Servodio	Lev	Lev Servodio
rfino, Tenoc	7/27/2016	1/1/2099	7	Orfino	Tenoc	Tenoc Orfino

Figure 7.9

28. Copy down to all cells below and resize the column.

At this point, you don’t need Columns F, G, and H, so you can delete them.

29. Delete **Columns F**, **G**, *and* **H**.



A	B	C	D	E	F	G	H
pl_No	Store_No	Name	Start_Date	End_Date	Full Name		
2355	1011	Goodson, Virgetta	4/12/2015	1/1/2099	Virgetta Goodson		
0545	1062	Szmyd, Janelle	1/9/2014	11/19/2015	Janelle Szmyd		
8882	1012	Dereamer, Norwood	12/24/2015	1/1/2099	Norwood Dereamer		
2716	1045	Ragland, Tom	9/5/2014	12/5/2014	Tom Ragland		
7519	1002	Burg, Leopoldo	1/21/2014	5/10/2015	Leopoldo Burg		
2134	1019	Nunn, Clayton	8/8/2017	1/1/2099	Clayton Nunn		
2914	1062	Monaghan, Yuna	3/3/2016	12/19/2016	Yuna Monaghan		
1479	1032	Bub, Kil	9/5/2014	5/13/2016	Kil Bub		
0085	1036	Dawson, Burline	4/16/2017	1/1/2099	Burline Dawson		
2715	1011	Hattaway, Haydee	6/6/2015	1/1/2099	Haydee Hattaway		
1373	1029	Simonds, Megan	5/25/2014	9/2/2016	Megan Simonds		
6853	1002	Lowell, Elvin	2/10/2015	5/8/2015	Elvin Lowell		

Figure 7.10

***Review Questions**: It is now time to complete the hands-on Review Questions. Log on to www.ExcelCEO.com with your Email address and Password, click on the* **Excel 2016 Review Questions, Chapter 7, Section 1 of 2** *option in your Main Menu, and complete the Review Questions.*

The UPPER(), LOWER() and PROPER() Functions

There is another thing that we can do to clean up the formula just a little more. Look at Cell F25. The first name BLAIR is in caps, whereas all other names are in upper and lower-case. Excel has a formula to change text to upper-case, lower case or proper case. Proper-case is where the first letter of each word is capitalized and the remaining letters are lower-case. Let's enclose our formula with the ***UPPER()***, ***LOWER()***, and ***PROPER()*** functions.

30. *Edit* **Cell F2** *and input* ***UPPER(*** *just to the right of the "=" sign and close the formula with an ending parenthesis.*

The formula in Cell E2 should now read as follows:

=UPPER(MID(C2,FIND(",",C2)+2,100)&" "&LEFT(C2,FIND(",",C2)-1))

The name is now shown as **VIRGETTA GOODSON**.

31. *In the formula in* **Cell F2**, *replace the word* **UPPER** *with* ***LOWER***.

The name is now shown as virgetta goodson.

32. *In the formula, replace the word* **LOWER** *with* ***PROPER***.
33. *Copy down to all cells below.*

The PROPER() function capitalizes the first letter in a text string and any other letters in the text that follow any character other than a letter. It then converts all other letters to lower case. Using the PROPER() function in this formula now converts the name to Virgetta Goodson.

> ***Note**: When you use the* **PROPER()** *function, names like Jim McGowen and Joe Smith III will appear as Jim Mcgowen and Joe Smith Iii. Although this function is very useful in some cases, there are still some quirks to using it.*

> ***Tip**: Work this example as many times as necessary to lock it in your memory. You will find MANY uses for formulas similar to this one.*

The LEN() and TRIM() Functions

Now we'll discuss the ***LEN()*** and ***TRIM()*** functions. These functions are very useful when analyzing data that may not quite be in the right format. Sometimes when data is copied or imported from one database to another, numbers are copied over as text strings and vice-versa. This sometimes happens when databases are not programmed correctly and sometimes it may add characters to the data that are almost invisible to the user.

1. *Click on the* Stores *tab of the* **myEmployees.xlsx** *file.*

A2 | 2

	A	B	C	D	E	F	G	H
1	Store_ID	Store_No	Store_Name	Address1	City	State	ZIP	Phone
2	2	1005	Nitey-Nite Glynn	1082 Glynn Court	Philadelphia	PA	24378-1245	(107) 021-2094
3	3	1063	Nitey-Nite Alan	922 Alan Blvd	Philadelphia	PA	24477	(107) 566-2859
4	4	1034	Nitey-Nite Capri	351 Capri Parkway	Jersey City	NJ	32582	(108) 812-5833
5	5	1029	Nitey-Nite Marakas	337 Marakas Way	Baltimore	MD	24442	(104) 124-6759
6	6	1050	Nitey-Nite Reid	617 Reid Street	Baltimore	MD	24400-3456	(104) 108-6508
7	7	1032	Nitey-Nite Pease	348 Pease Street	Philadelphia	PA	24543	(107) 382-9110
8	8	1009	Nitey-Nite Isidor	1106 Isidor Parkway	Philadelphia	PA	24510	(107) 234-3425
9	10	1011	Nitey-Nite McKinny	111 McKinny Highwa	Baltimore	MD	24421	(104) 007-2258

Figure 7.11

This is a listing of the stores that Nitey-Nite Mattresses owns. It was copied directly from a SQL Server database and has not been cleaned up yet. Let's suppose we want to create a formula in one cell that concatenates the Address, City, and State.

2. *In* **Cell I1** *of the* **Stores** *tab, type:* ***Location***
3. *Format* **Cell I1** *as the other headings.*
4. *In* **Cell I2**, *type the following formula:* ***=D2&", "&E2&", "&F2***

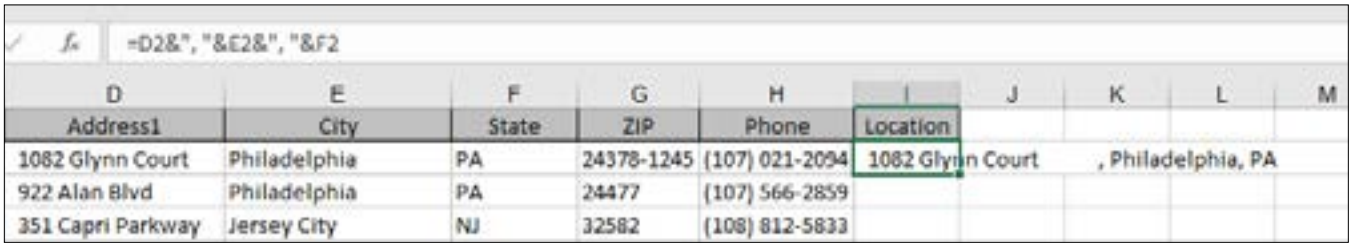


Figure 7.12

This formula puts the Address, City, and State into one cell, separated by commas. After you type the formula, you see there is a long string of spaces after the address. It also appears there are some spaces before the address, as the address appears to be indented from the left. This adding of spaces happens frequently when data is copied from a poorly-designed database into Excel (or one that was designed to teach about poorly designed databases). Let's play around with the Address field and see what is there.

5. *In* **Cell J2**, *type the following formula:* ***=LEN(D2)***

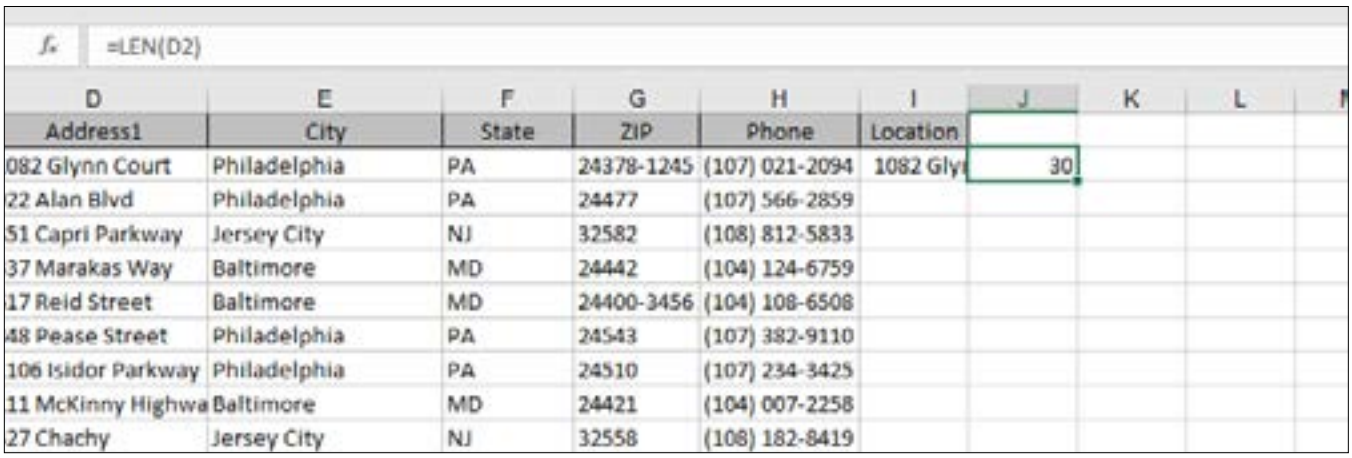


Figure 7.13

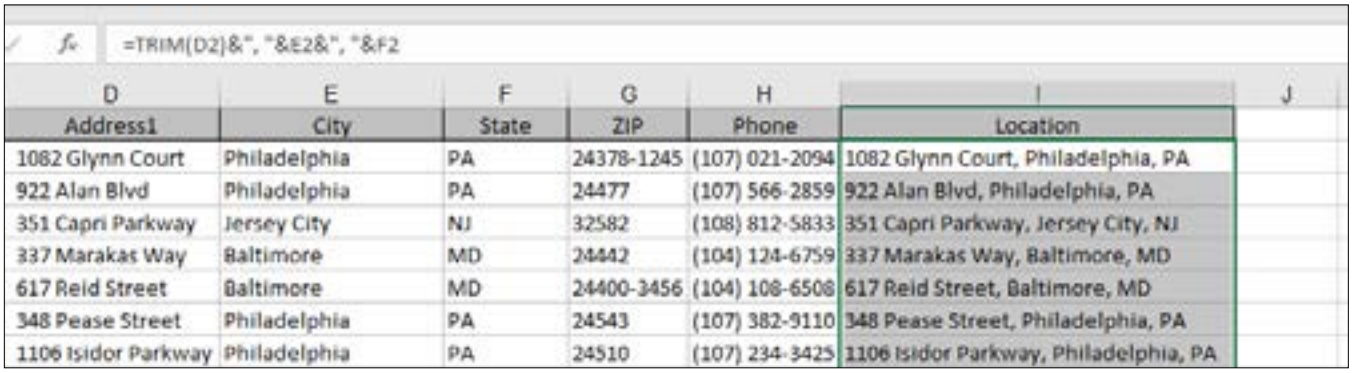
The LEN() function counts the number of characters in the text string in Cell D2 (the address). The string "1082 Glynn Court" has only 16 characters (including two spaces), so the result of the formula should be 16, but we see the LEN() function returned 30. This indicates that there are additional spaces before, after, and/or between the words in the address. You can solve the issue by enclosing the address with a TRIM() function. The TRIM () function removes all spaces from a text string except for one space between each word.

6. *Delete the contents of* **Cell J2**.
7. *Edit the formula in* **Cell I2** *to be the following:*

=TRIM(D2)&", "&E2&", "&F2

8. *Copy the formula down for all cells below, and resize the column.*

Now the concatenation of the Address, City, and State appears correctly.



=TRIM(D2)&", "&E2&", "&F2

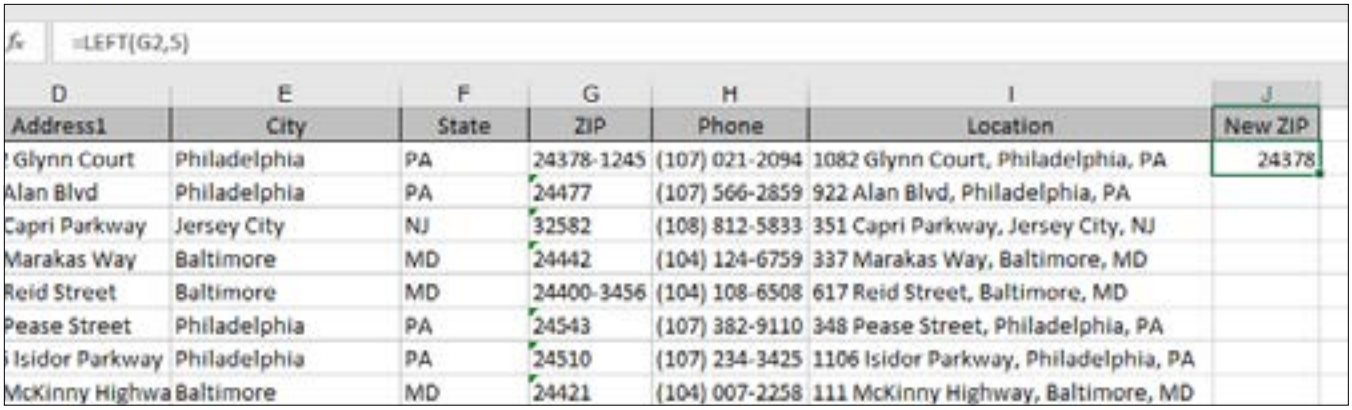
D	E	F	G	H	I	J
Address1	City	State	ZIP	Phone	Location	
1082 Glynn Court	Philadelphia	PA	24378-1245	(107) 021-2094	1082 Glynn Court, Philadelphia, PA	
922 Alan Blvd	Philadelphia	PA	24477	(107) 566-2859	922 Alan Blvd, Philadelphia, PA	
351 Capri Parkway	Jersey City	NJ	32582	(108) 812-5833	351 Capri Parkway, Jersey City, NJ	
337 Marakas Way	Baltimore	MD	24442	(104) 124-6759	337 Marakas Way, Baltimore, MD	
617 Reid Street	Baltimore	MD	24400-3456	(104) 108-6508	617 Reid Street, Baltimore, MD	
348 Pease Street	Philadelphia	PA	24543	(107) 382-9110	348 Pease Street, Philadelphia, PA	
1106 Isidor Parkway	Philadelphia	PA	24510	(107) 234-3425	1106 Isidor Parkway, Philadelphia, PA	

Figure 7.14

The VALUE() Function

Another useful function is the ***VALUE()*** function. This function turns numbers that are shown as text strings into numbers. For example, sometimes US ZIP codes contain five digits and sometimes ten digits (a five and four digit code separated by a dash). In this example, when the data was copied over from a database, Excel recognized the five digit codes as numbers and the ten digit codes as text, as you can't have a dash character in a number. Let's suppose that we really don't care about the four digit extension – all we really want is the five digit ZIP code formatted as a number.

9. *In* **Cell J1**, *type* ***New ZIP***
10. *Format the heading like the others.*
11. *In* **Cell J2**, *type the following formula:* ***=LEFT(G2,5)***



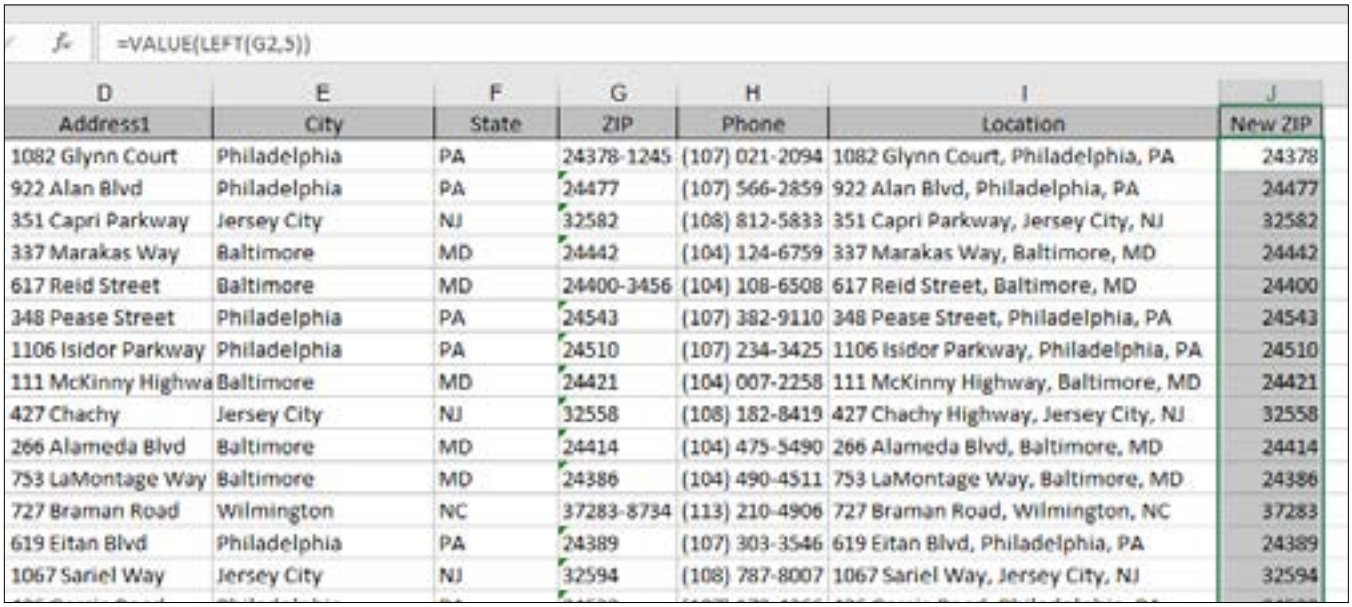
=LEFT(G2,5)

D	E	F	G	H	I	J
Address1	City	State	ZIP	Phone	Location	New ZIP
Glynn Court	Philadelphia	PA	24378-1245	(107) 021-2094	1082 Glynn Court, Philadelphia, PA	24378
Alan Blvd	Philadelphia	PA	24477	(107) 566-2859	922 Alan Blvd, Philadelphia, PA	
Capri Parkway	Jersey City	NJ	32582	(108) 812-5833	351 Capri Parkway, Jersey City, NJ	
Marakas Way	Baltimore	MD	24442	(104) 124-6759	337 Marakas Way, Baltimore, MD	
Reid Street	Baltimore	MD	24400-3456	(104) 108-6508	617 Reid Street, Baltimore, MD	
Pease Street	Philadelphia	PA	24543	(107) 382-9110	348 Pease Street, Philadelphia, PA	
Isidor Parkway	Philadelphia	PA	24510	(107) 234-3425	1106 Isidor Parkway, Philadelphia, PA	
McKinny Highwa	Baltimore	MD	24421	(104) 007-2258	111 McKinny Highway, Baltimore, MD	

Figure 7.15

When you use a text function like LEFT(), Excel turns the result into a text string. To make that text string a number, you must first be sure there are only numbers in the string. Then you can use the VALUE() function.

12. *Edit the formula in* **Cell J2** *to be as follows:* ***=VALUE(LEFT(G2,5))***
13. *Copy down for all cells.*



=VALUE(LEFT(G2,5))

D	E	F	G	H	I	J
Address1	City	State	ZIP	Phone	Location	New ZIP
1082 Glynn Court	Philadelphia	PA	24378-1245	(107) 021-2094	1082 Glynn Court, Philadelphia, PA	24378
922 Alan Blvd	Philadelphia	PA	24477	(107) 566-2859	922 Alan Blvd, Philadelphia, PA	24477
351 Capri Parkway	Jersey City	NJ	32582	(108) 812-5833	351 Capri Parkway, Jersey City, NJ	32582
337 Marakas Way	Baltimore	MD	24442	(104) 124-6759	337 Marakas Way, Baltimore, MD	24442
617 Reid Street	Baltimore	MD	24400-3456	(104) 108-6508	617 Reid Street, Baltimore, MD	24400
348 Pease Street	Philadelphia	PA	24543	(107) 382-9110	348 Pease Street, Philadelphia, PA	24543
1106 Isidor Parkway	Philadelphia	PA	24510	(107) 234-3425	1106 Isidor Parkway, Philadelphia, PA	24510
111 McKinny Highwa	Baltimore	MD	24421	(104) 007-2258	111 McKinny Highway, Baltimore, MD	24421
427 Chachy	Jersey City	NJ	32558	(108) 182-8419	427 Chachy Highway, Jersey City, NJ	32558
266 Alameda Blvd	Baltimore	MD	24414	(104) 475-5490	266 Alameda Blvd, Baltimore, MD	24414
753 LaMontage Way	Baltimore	MD	24386	(104) 490-4511	753 LaMontage Way, Baltimore, MD	24386
727 Braman Road	Wilmington	NC	37283-8734	(113) 210-4906	727 Braman Road, Wilmington, NC	37283
619 Eitan Blvd	Philadelphia	PA	24389	(107) 303-3546	619 Eitan Blvd, Philadelphia, PA	24389
1067 Sariel Way	Jersey City	NJ	32594	(108) 787-8007	1067 Sariel Way, Jersey City, NJ	32594

Figure 7.16

Now you have a clean column with five-digit ZIP codes, all in a number format. You can usually tell if a number is formatted as text or as a number by 1) seeing if the number is left- or right-justified (a left-justified number usually indicates it is text); 2) if you can add the number(s) (if the numbers don't add up in the Status Bar, they are formatted as text), or 3) if the number(s) contains a leading zero (leading zeros indicate a text field).

> ***Trick**: A quick and dirty way to turn a text string containing only numbers into a number format is to just add **0** at the end of the formula. (Actually, any mathematical calculation will work.) In this example, you would use this function: **=LEFT(G2,5)+0**. However, don't tell this to programmers. Being the purists they are, they will tell you I'm crazy, but guess what. It works! Try it.*

14. **Save** *the* **myEmployees.xlsx** *file, but don't close yet.*

Flash Fill

Flash Fill is a feature new since Excel 2013 which allows you to quickly organize and reorganize data based on text patterns Excel detects from cell content in contiguous columns in your spreadsheet. In other words, the data in which you are establishing the pattern must be touching the cells immediately to the left. Flash Fill can break data apart, and put it back together in very sophisticated ways, even to the point of replacing many of the functions you learned earlier in this chapter. Rest assured you've learned those functions and formula-writing abilities for good reason! Flash Fill detects patterns, but you do have the ability to override them by clicking [Esc]. Since Flash Fill is setup to enhance your Excel experience, let's see how it works.

1. *In* **Cell K2**, *type the visible contents of* **Cell I2**, *followed by a* **comma**, *then the first five digits of*

the **ZIP** *Code in* **Cell G2**.

2. *In* **Cell K3**, *type the first three characters of what you see in* **Cell I3**.

G	H	I	J	K	L	M	N
ZIP	Phone	Location	New ZIP				
24378-1245	(107) 021-2094	1082 Glynn Court, Philadelphia, PA	24378	1082 Glynn Court, Philadelphia, PA, 24			
24477	(107) 566-2859	922 Alan Blvd, Philadelphia, PA	24477	922 Alan Blvd, Philadelphia, PA, 24477			
32582	(108) 812-5833	351 Capri Parkway, Jersey City, NJ	32582	351 Capri			
24442	(104) 124-6759	337 Marakas Way, Baltimore, MD	24442	337 Marak			
24400-3456	(104) 108-6508	617 Reid Street, Baltimore, MD	24400	617 Reid S			
24543	(107) 382-9110	348 Pease Street, Philadelphia, PA	24543	348 Pease			
24510	(107) 234-3425	1106 Isidor Parkway, Philadelphia, PA	24510	1106 Isido			
24421	(104) 007-2258	111 McKinny Highway, Baltimore, MD	24421	111 McKin			
32558	(108) 182-8419	427 Chachy Highway, Jersey City, NJ	32558	427 Chach			
24414	(104) 475-5490	266 Alameda Blvd, Baltimore, MD	24414	266 Alame			
24386	(104) 490-4511	753 LaMontage Way, Baltimore, MD	24386	753 LaMon			
37283-8734	(113) 210-4906	727 Braman Road, Wilmington, NC	37283	727 Brama			
24389	(107) 303-3546	619 Eitan Blvd, Philadelphia, PA	24389	619 Eitan I			
32594	(108) 787-8007	1067 Sariel Way, Jersey City, NJ	32594	1067 Sarie			
24532	(107) 172-4366	426 Garcia Road, Philadelphia, PA	24532	426 Garcia			
24521	(107) 684-1135	189 Redmon Way, Philadelphia, PA	24521	189 Redm			
23461	(101) 682-1283	10101 Miami St, New York, NY	23461	10101 Mia			

Figure 7.17

You will see the contents of Cell K3 expand to match Cell I3 plus the ZIP Code from Cell G3, and ghost text will appear in the remainder of the contiguous cells in Column K. At this point, you can either click [Enter] to accept the predicted pattern, or [Esc] to continue on your own, including if Flash Fill is not recognizing your pattern as intended.

> ***Tip:*** *If you find* **Flash Fill** *to not be working when you are typing the patterns specified, your Flash Fill may be disabled. To correct this, click the* **File** *tab, click* **Options** *on the bottom-left, which opens the* **Excel Options** *dialog box. On the* **Advanced** *tab, make sure the* **Automatically Flash Fill** *check box is checked.*

3. *Click* **[Esc]** *to halt the* **Flash Fill** *and press the* **[Enter]** *key.*

The Flash Fill data disappears, and Cell K3 expands to finish the pattern you began without copying the pattern down the remainder of the contiguous column.

4. *With your cursor on* **Cell K3**, *click the* **Fill** Fill *icon in the* **Editing** *group of the* **Home** *tab.*
5. *From the* **Fill** *drop-down menu, click* **Flash Fill** Flash Fill.

	H	I	J	K	L	M	N
	Phone	Location	New ZIP				
245	(107) 021-2094	1082 Glynn Court, Philadelphia, PA	24378	1082 Glynn Court, Philadelphia, PA, 243			
	(107) 566-2859	922 Alan Blvd, Philadelphia, PA	24477	922 Alan Blvd, Philadelphia, PA, 24477			
	(108) 812-5833	351 Capri Parkway, Jersey City, NJ	32582	351 Capri Parkway, Jersey City, NJ, 3258			
	(104) 124-6759	337 Marakas Way, Baltimore, MD	24442	337 Marakas Way, Baltimore, MD, 24442			
456	(104) 108-6508	617 Reid Street, Baltimore, MD	24400	617 Reid Street, Baltimore, MD, 24400			
	(107) 382-9110	348 Pease Street, Philadelphia, PA	24543	348 Pease Street, Philadelphia, PA, 245			
	(107) 234-3425	1106 Isidor Parkway, Philadelphia, PA	24510	1106 Isidor Parkway, Philadelphia, PA,			

Figure 7.18

The text now copies down. Click on any cell in Column K to see that all the references are hard-coded into the cells as values rather than as formulas. While Flash Fill is very powerful and can extract data in some very creative ways, such as identifying and isolating email domain names in an email address, it is limited to cells adjoining on the left of the same spreadsheet to work. Once the values are established, you cannot update the way you would a formula any more than you could any other hard-coded values. For this reason, I still recommend you learn to master formula-writing, and the rest of the concepts I teach in this course, so you can be in control of your data, and be able to make updates quickly.

6. **Close** *the* **myEmployees.xlsx** *file without saving.*

***Review Questions**: It is now time to complete the hands-on Review Questions. Log on to www.ExcelCEO.com with your Email address and Password, click on the* **Excel 2016 Review Questions, Chapter 7, Section 2 of 2** *option in your Main Menu, and complete the Review Questions.*

Conclusion

In this chapter, you learned about many of the most common functions, and we explored in depth the various types of Text functions. You split apart a name in a last name, first name format using the FIND(), LEFT(), and MID() functions. You also worked an example using the RIGHT() function. You then concatenated the first name and last name fields in one impressive formula. You saw how to change the case sensitivity of text by working examples using the UPPER(), LOWER(), and PROPER() functions. You learned how to use the LEN() function to find out how many characters are in a cell. You used the TRIM() function to take out unnecessary spaces in a text string. You learned how to use a VALUE() function to turn a number formatted as text into a number. Finally, you used Flash Fill to give you another data input weapon in your arsenal.

Chapter Exam

To take the examination for this chapter, you must have successfully completed the examination for the previous chapter. You can now go to www.ExcelCEO.com, click on Sign In, log in and take the exam. Make sure that you take the exam on the same computer on which you completed the practice files, as some of the questions on the exam may refer to some of the completed projects. Chapter exams are intended to be hands-on.

Excel® 2016

Complete Self-study Course

ExcelCEO

Chief Excel Officer

CHAPTER EIGHT — FINANCIAL AND MATH FUNCTIONS

Chapter Objectives:

- Identify the proper uses of Financial Functions, including PMT(), PV(), FV(), IRR(), and NPV()
- Determine the various parts on an amortization schedule
- Recognize specific scenarios within Scenario Manager
- Identify components of and create a Proforma Income Statement
- Determine the procedure and appropriate Formulas necessary for a business valuation exercise
- Select the appropriate functionalities for a Find and Replace procedure
- Identify and use Math Functions, including RAND(), INT(), ROUND(), ABS(), SUMIF(), and SUMIFS()

Projects You Will Complete During This Chapter:

- *my1017_Mattresses.xlsx*
- *myAmort.xlsx*
- *myMath.xlsx*
- *myProforma.xlsx*
- *myScenario.xlsx*

CPE Credits possible for this chapter: 3.5

Financial and Math Functions

I just LOVE math. My idea of a good time is solving algebraic problems on the white boards in my office. I do realize, however, that some people don't share my enthusiasm for math. I'll assume if you've made it this far in the course, you either share my enthusiasm or someone is forcing you to take it (hopefully the first).

Financial Functions

If you've ever taken a Finance class, you should remember the discussions on calculating a payment (PMT), Present Value (PV), Future Value (FV), Internal Rate of Return (IRR), and Net Present Value (NPV). With ***Financial functions***, Excel makes it easy to calculate those values. Let's begin with the PMT() function.

The PMT() Function

The ***PMT() function*** is one of the most commonly used functions for financial people. We always want to know what the payment is, particularly when we are analyzing our own home loan or applying for some other type of loan. The PMT() function has three required arguments: interest rate, number of periods and present value. You can also include two optional arguments: future value and type. Future value is the cash balance you want to have after the last payment is made. A type of one means payments are made at the beginning of the period, and a type of zero means payments are made at the end of the period. If the future value and type arguments are left out, Excel assumes a zero for each of the missing arguments. In this first exercise, you will calculate the mortgage payment for a $200,000 loan.

1. **Open** *Excel to a* **Blank workbook**.
2. **Save As C:\ExcelCEO\Excel 2016\Chapter8*myAmort.xlsx***.
3. *Type data onto the spreadsheet to look as follows:*

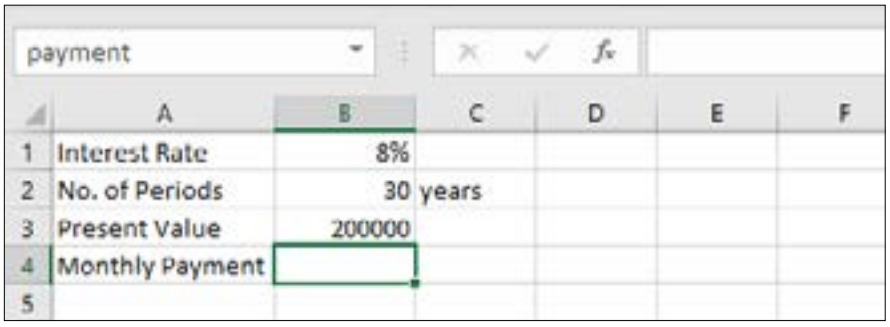


Figure 8.1

4. *In* **Cell B4**, *type* ***=PMT(B1/12,B2*12,B3)***
5. *Format* **Cell B4** *as* **Currency**, **two decimal places**.

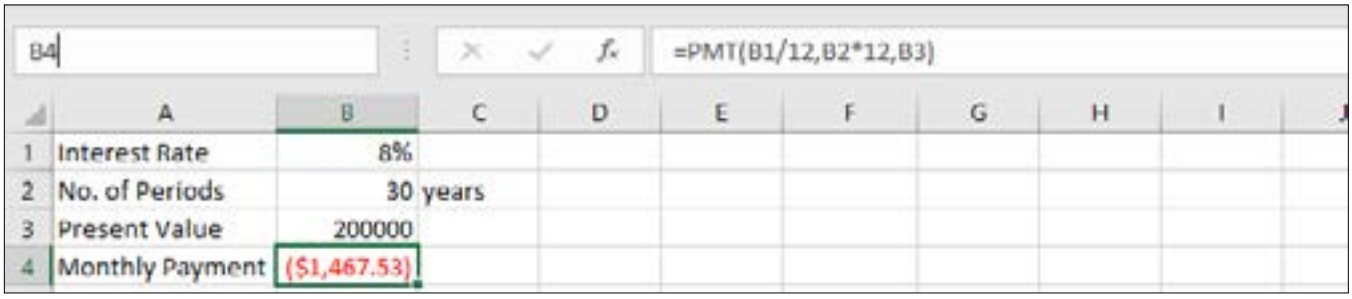


Figure 8.2

Let's discuss the different parts of the formula. The interest rate in our analysis is 8%, which is an **annual interest rate**. To calculate a monthly payment, we have to convert the annual interest rate to a **monthly interest rate**. We do that by dividing Cell B1 by 12. The number of periods is 30, or 30 years. That is a common number of periods for a home loan. Again, this is an annual number that we need to convert into a monthly number, and we do that by multiplying the number of periods by 12. Finally, we input the present value of the loan, or $200,000. Note that we input that loan amount and not the sale price of the house. You can buy a $250,000 house and put $50,000 down for a loan amount of $200,000, or you can buy a $300,000 home with $100,000 down and you would have the same loan amount and payment. The payment is calculated on the loan amount, not the purchase price of the home.

Notice that the formula returns a negative number. If the present value of the home is a positive number, then the payments should be negative to support that payment. One value is a cash inflow (the present value of the home) and the other is the cash outflow (the payments). You can make the payments be a positive number by simply putting a minus sign in front of the formula or the reference to Cell B3, but not in both places.

6. *In the formula in* **Cell B4**, *put a minus sign (-) before the reference to* **Cell B3**.

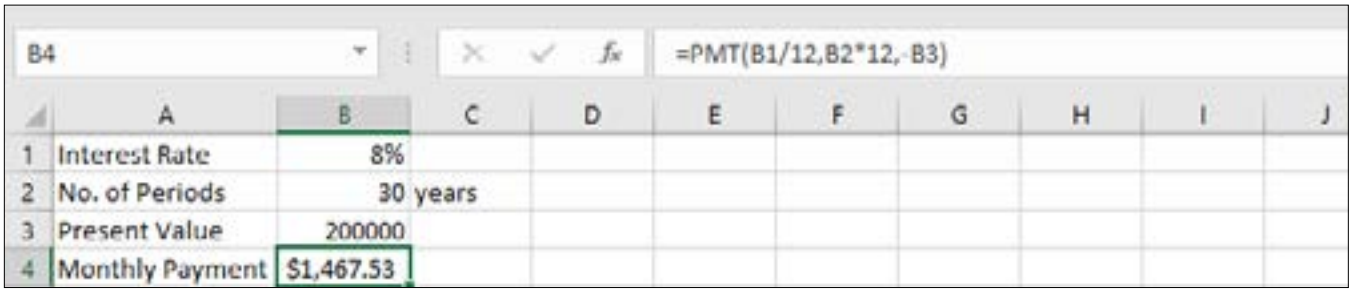
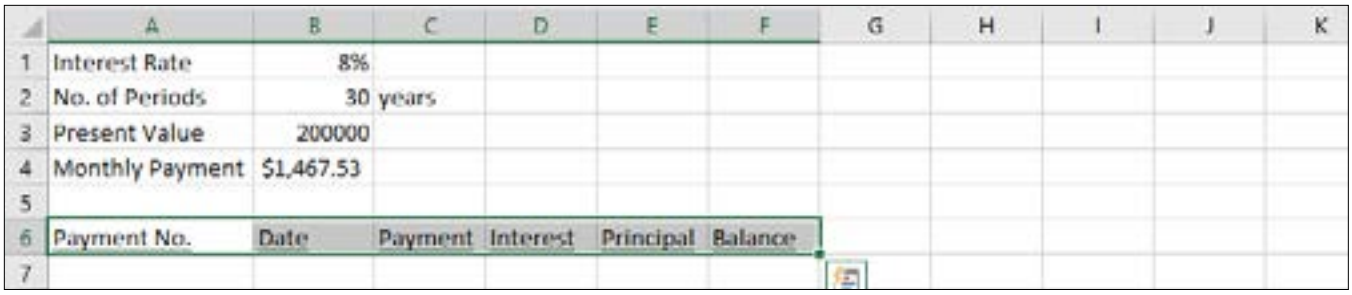


Figure 8.3

Create an Amortization Schedule

Whenever you purchase a Home, the lending institution will give you an amortization schedule. An ***amortization schedule*** shows the loan balance after every payment, as well as the interest amount and principal applied to each loan payment. In this next exercise, we will create an amortization schedule for the home loan we've modeled.

7. *Type the labels in* **Cells A6 through F6** *as follows:*



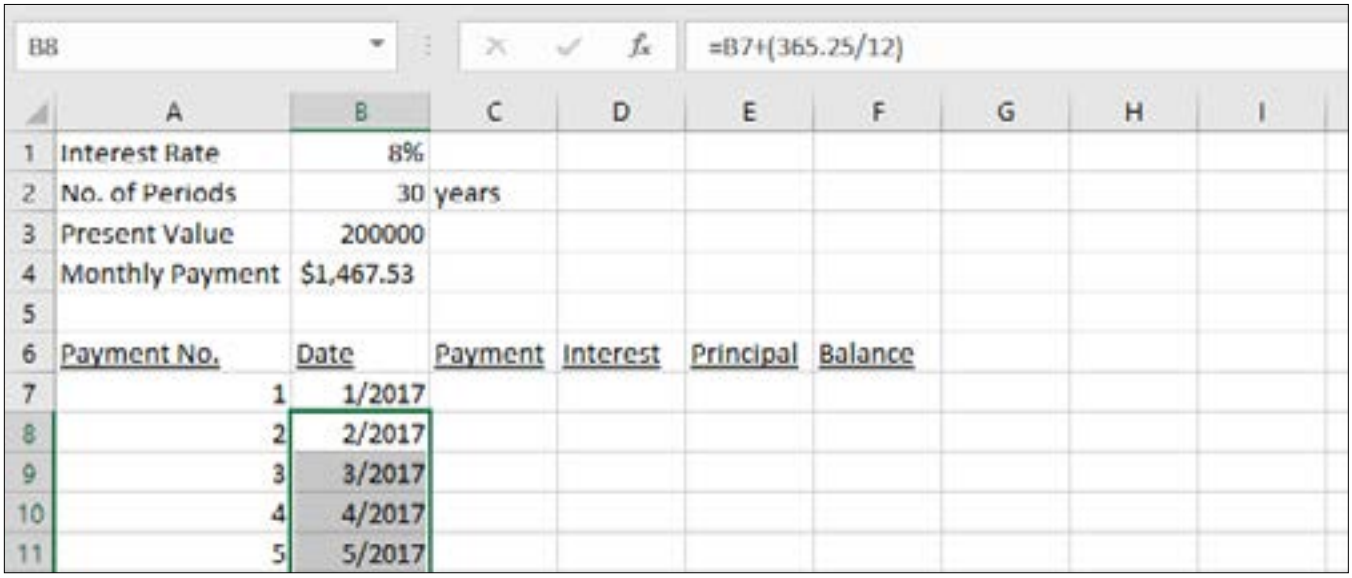
	A	B	C	D	E	F	G	H	I	J	K
1	Interest Rate	8%									
2	No. of Periods	30	years								
3	Present Value	200000									
4	Monthly Payment	$1,467.53									
5											
6	Payment No.	Date	Payment	Interest	Principal	Balance					
7											

Figure 8.4

8. *In* **Cell A7**, *type:* ***1***
9. *With your cursor on* **Cell A7**, *click the* **Fill** *icon in the* **Editing** *group of the* **Home** *tab and click on the* **Series...** *option.*
10. *In the* **Series** *dialog box, set the* **Series in** *radio button to* **Columns**, *keep* **Type** *set to* **Linear**, *and* **Step value** *is set to* **1** *(because we want to increase the count by one at a time).*
11. *In the* **Stop value** *box, type* ***360***, *then click* **OK**.

This action creates a column of payment numbers. Click [Ctrl]+[down arrow] to scroll down to Cell A366, and then [Ctrl]+[up arrow]. These commands take you down and up the column your cursor is in.

11. *Freeze the panes at* **Cell A7**.
12. *In* **Cell B7**, *type:* ***1/15/2017***
13. *Format* **Cell B7** *as* **Date** *in the format* **M/YYYY**
14. *In* **Cell B8**, *type:* ***=B7+(365.25/12)***
15. *Using* **Format Painter**, *copy the format of* **Cell B7** *to* **Cell B8**.
16. *Copy* **Cell B8** *down to all cells below ending at* **Payment No. 360**.



B8 =B7+(365.25/12)

	A	B	C	D	E	F	G	H	I
1	Interest Rate	8%							
2	No. of Periods	30	years						
3	Present Value	200000							
4	Monthly Payment	$1,467.53							
5									
6	Payment No.	Date	Payment	Interest	Principal	Balance			
7	1	1/2017							
8	2	2/2017							
9	3	3/2017							
10	4	4/2017							
11	5	5/2017							

Figure 8.5

> ***Tip**: To use* **DataFill** *for dates such as a payment due on the last day of the month, if such an issue arises, you could type* ***1/31/16*** *in* **Cell B7**, ***2/29/16*** *in* **Cell B8**, ***3/31/16*** *in* **Cell B9**, *select all three cells, double-click the* **DataFill** *button to make last days of each month appear. This accounts for leap years too.* ***Be careful*** *though, as this method does not update the way formulas do. Hopefully you are seeing why I recommend formulas in favor of "quick", automated tools so much.*

The last date in the range should be 12/2046. I like to begin using the 15th of the month and add 365.25/12 (the .25 accounts for a leap year day every four years) for each month to get the next month. Trust me, if you start with the first day of the month, you will end up with some complications in February.

Next you will create names for the various cells to make it easier to write your formulas. We did an example of this in Chapter 6.

17. Name the following cells with the following names:

Cell	Name
B1	rate
B2	no_pds
B3	pv
B4	payment

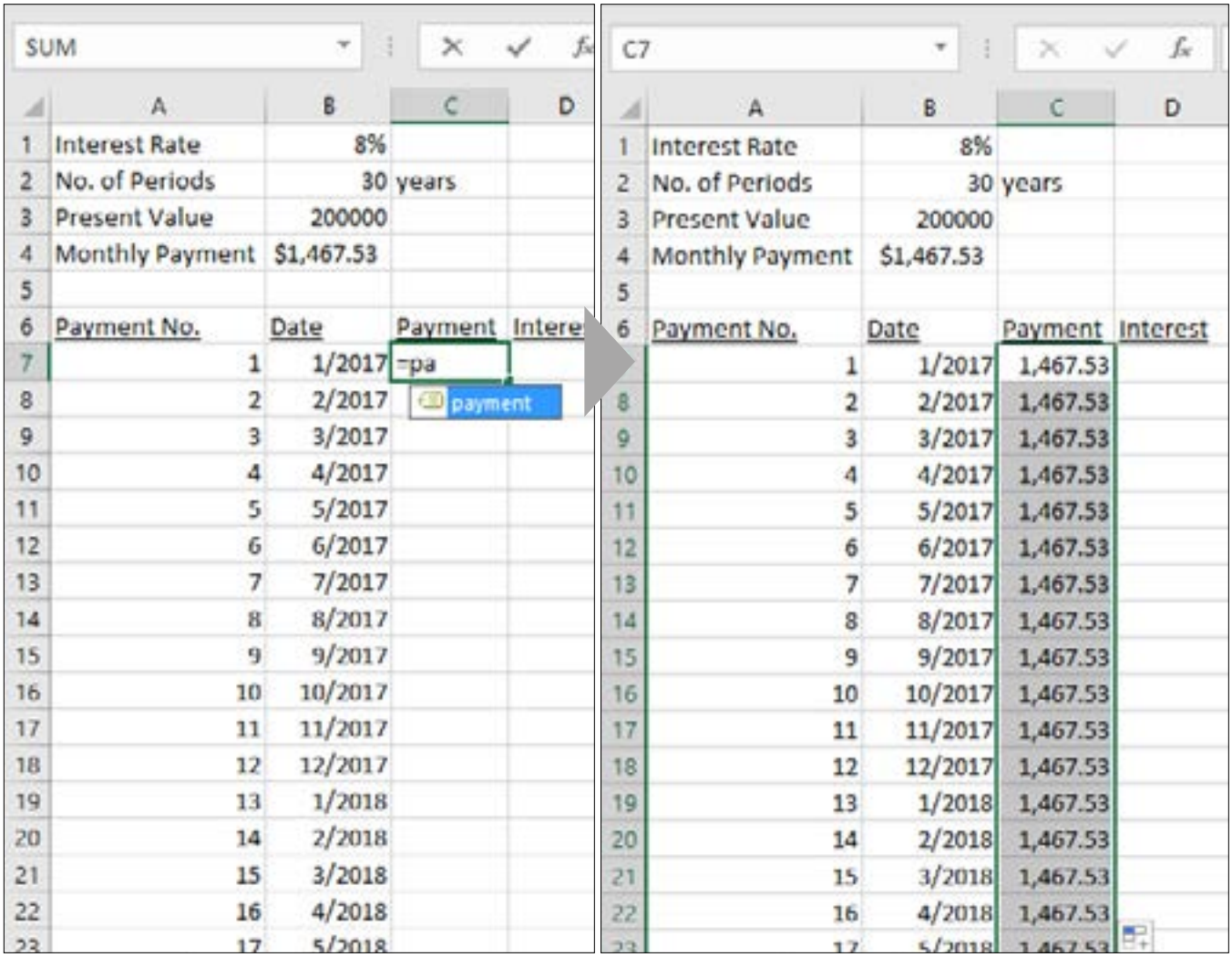
payment =PMT(B1/12,B2*12,-B3)

	A	B	C	D	E	F	G	H	I
1	Interest Rate	8%							
2	No. of Periods	30	years						
3	Present Value	200000							
4	Monthly Payment	$1,467.53							
5									
6	Payment No.	Date	Payment	Interest	Principal	Balance			
7	1	1/2017							
8	2	2/2017							
9	3	3/2017							
10	4	4/2017							
11	5	5/2017							
12	6	6/2017							
13	7	7/2017							
14	8	8/2017							

Figure 8.6

It's easier to audit formulas when you have logical names for the variables in the formulas. Notice the word "payment" in the Name Box in the upper-left corner of the figure above.

18. *In* **Cell C7**, *type:* ***=payment***
19. *Format* **Cell C7** *as* **Number**, **two decimal places**, **Use 1000 Separator(,)** *and copy down to all cells below.*



	A	B	C	D
1	Interest Rate	8%		
2	No. of Periods	30	years	
3	Present Value	200000		
4	Monthly Payment	$1,467.53		
5				
6	Payment No.	Date	Payment	Interest
7	1	1/2017	1,467.53	
8	2	2/2017	1,467.53	
9	3	3/2017	1,467.53	
10	4	4/2017	1,467.53	
11	5	5/2017	1,467.53	
12	6	6/2017	1,467.53	
13	7	7/2017	1,467.53	
14	8	8/2017	1,467.53	
15	9	9/2017	1,467.53	
16	10	10/2017	1,467.53	
17	11	11/2017	1,467.53	
18	12	12/2017	1,467.53	
19	13	1/2018	1,467.53	
20	14	2/2018	1,467.53	
21	15	3/2018	1,467.53	
22	16	4/2018	1,467.53	

Figure 8.7

So far it's been relatively easy, but here comes the tricky part. We now need to calculate the interest attributed to the first payment. That is done by taking the interest rate multiplied by the balance of the loan divided by 12 (since it is a monthly payment).

20. *In* **Cell D7**, *type:* ***=pv*rate/12***
21. *Format* **Cell D7** *as* **Number**, **two decimal places**, **Use 1000 Separator (,)**.

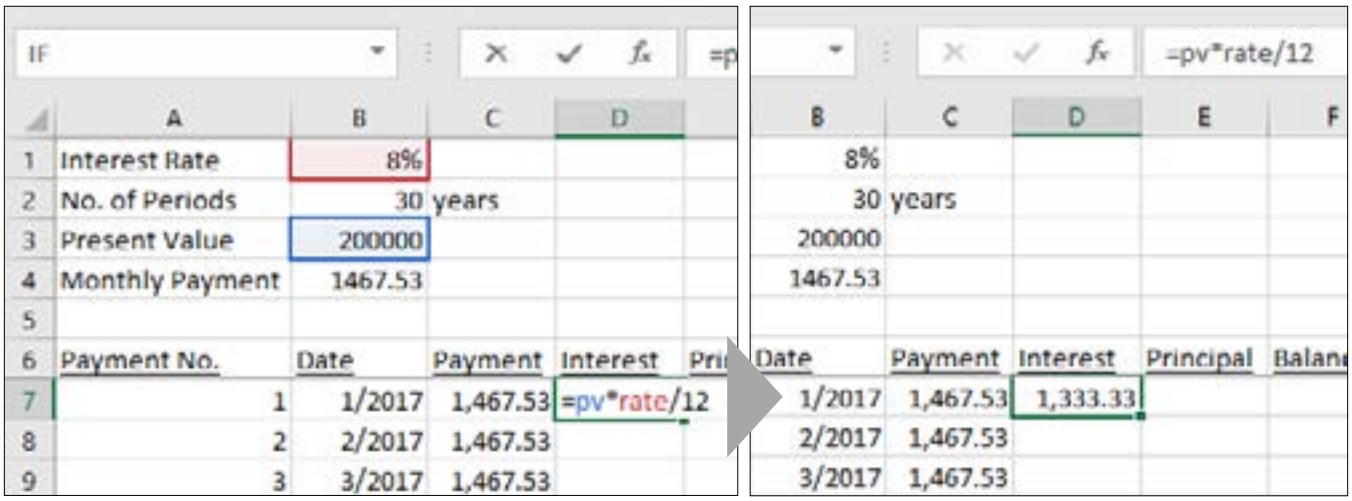


Figure 8.8

We can't copy this formula down yet because the balance of the loan will change with each payment. Now we will calculate the principal portion of the payment by simply subtracting the interest payment from the total payment. We will then calculate the ending balance of the loan by reducing the beginning balance by the principal paid. Let's model it.

22. *In* **Cell E7**, *type:* ***=C7-D7***
23. *In* **Cell F7**, *type:* ***=pv-E7*** *(to calculate the loan balance)*
24. *Format both cells as* **Number**, **two decimal places**, **Use 1000 Separator (,)**, *if Excel did not do that for you.*

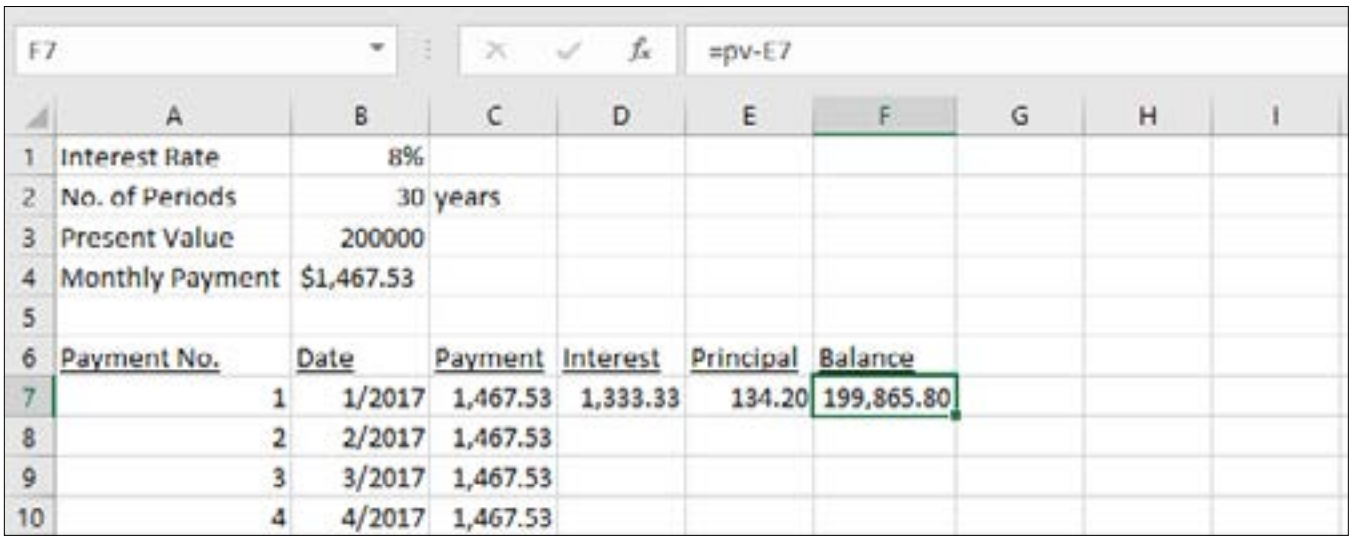
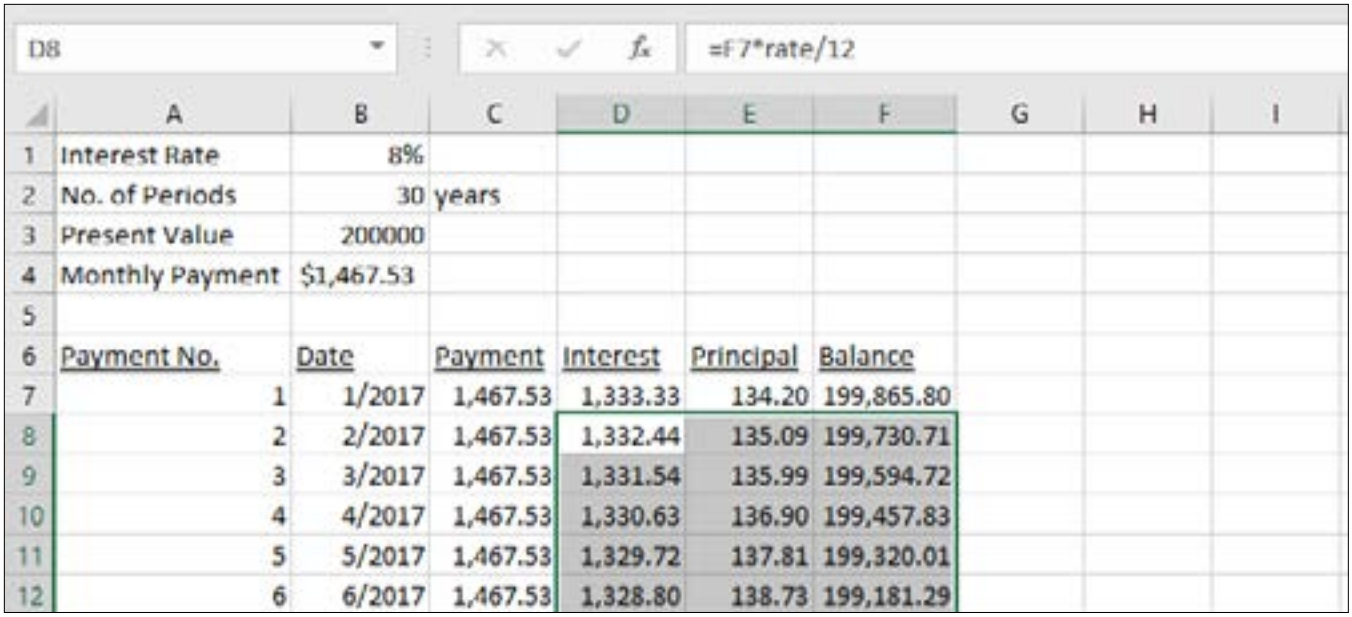


Figure 8.9

Now that we have the balance of the loan after the first payment, we can write formulas that will calculate the interest, principal, and new balance of the loan after each payment.

25. *In* **Cell D8**, *type:* ***=F7*rate/12*** *(which calculates the interest paid on the new balance)*
26. *Copy the formula in* **Cell E7** *to* **Cell E8**.
27. *In* **Cell F8**, *type:* ***=F7-E8***
28. *Format* **Cells D8, E8 and F8** *as* **Number**, **two decimal places**, **Use 1000 Separator (,)**.
29. *Copy* **Cells D8**, **E8**, *and* **F8** *down to all cells below.*



D8 | =F7*rate/12

	A	B	C	D	E	F	G	H	I
1	Interest Rate	8%							
2	No. of Periods	30	years						
3	Present Value	200000							
4	Monthly Payment	$1,467.53							
5									
6	Payment No.	Date	Payment	Interest	Principal	Balance			
7	1	1/2017	1,467.53	1,333.33	134.20	199,865.80			
8	2	2/2017	1,467.53	1,332.44	135.09	199,730.71			
9	3	3/2017	1,467.53	1,331.54	135.99	199,594.72			
10	4	4/2017	1,467.53	1,330.63	136.90	199,457.83			
11	5	5/2017	1,467.53	1,329.72	137.81	199,320.01			
12	6	6/2017	1,467.53	1,328.80	138.73	199,181.29			

Figure 8.10

If you did it correctly, the first few rows will look like the above schedule. Scroll down to the last cell in Column F (Cell F366) and you will see the balance of the loan is exactly zero. Now you can play around with the interest rate, number of periods and loan amount (present value) numbers. If you change the interest rate to 10%, the new payment will automatically calculate at $1,755.14. Change the number of periods to 20 and the payment changes to $1,930.04. The amortization schedule also changes with every change in the input.

30. **Save** *the* **myAmort.xlsx** *file, but don't close it yet.*

> ***Review Questions****: It is now time to complete the hands-on Review Questions. Log on to www.ExcelCEO.com with your Email address and Password, click on the* **Excel 2016 Review Questions, Chapter 8, Section 1 of 4** *option in your Main Menu, and complete the Review Questions.*

Scenario Manager

As I have said previously, it is my opinion that Excel is the best "What-if" analysis tool on the market today. One of the features to help users manage various analyses is called Scenario Manager. Within **Scenario Manager**, Excel allows you to create various scenarios or alternative values for cells in the spreadsheet. You can add, edit, delete, and summarize these scenarios. In this next exercise, you will

build on the skills you learned using the PMT() function to analyze various interest rates, number of periods, and loan amounts of a prospective loan.

For this exercise, let's use the home loan example. Let's say you live in an area where home prices average around $300,000 for the type of home you want to purchase. You have about $75,000 in cash for the down payment on the home, but you don't know if you want to spend all of that money on the down payment. Alternatively, you could put part of that money into a money market fund, or just have it in a savings fund for emergencies. With more money paid down on the loan, however, you could get a lower annual interest rate on the home loan. Therefore, you want to build an analysis that shows the monthly payment, total money paid into the loan, and the total interest paid under different scenarios.

1. **Open** *up a new* **Blank workbook**.
2. **Save As** ***myScenario.xlsx*** *in the* **C:\ExcelCEO\Excel 2016\Chapter8** *folder.*
3. *Create the analysis as shown in the following figure:*

	A	B	C	D	E	F	G	H	I	J
1	**My Home Analysis**									
2										
3	Sale Price of Home	$300,000								
4	Down Payment	$75,000								
5	Loan Amount	$225,000								
6	Annual Interest Rate	6.25%								
7	Number of Months	360								
8										
9	Monthly Payment	$1,385.36								
10	Total Payments	$498,731								
11	Total Interest	$273,731								
12	Total Paid	$573,731								

Figure 8.11

4. *The formulas for* **Cells B5**, **B9**, **B10**, *and* **B11** *are as follows:*

Cell B5: ***=B3-B4***
Cell B9: ***=PMT(B6/12,B7,-B5)***
Cell B10: ***=B9*B7***
Cell B11: ***=B10-B5***
Cell B12: ***=B10+B4***

5. **Format** *the dollar cells to* **zero decimal places** *(except for the* **Monthly Payment** *cell), and format all other cells as shown.*
6. *Name the following cells with the indicated ranges:* **B4:** ***down_payment***; **B6:** ***annual_interest_rate***; **B7:** ***number_of_months***; **B9:** ***monthly_payment***; **B10:** ***total_payments***; **B11:** ***total_interest***; **B12:** ***total_paid***

This is the first, or base, scenario. It assumes you will purchase a home for $300,000 and pay $75,000 down. As such, you can get a 30 year (360 month) loan at a 6.25% APR. The monthly payment calculates to be $1,385.36. The Total Payments to be made over the life of the loan is $498,731 (not counting the down payment), and the total interest paid over the life of the loan is $273,731. The questions you want answered are: 1) what would the monthly payment, total payments, and total interest figures be if you were to pay only $50,000 down and have a higher interest rate; 2) what would the same amounts be if you were to pay a higher down payment of $100,000 and get a lower interest rate, and 3) what would the numbers be if you were to get a 20 year loan which would qualify you for a slightly lower interest rate? All of these assumptions can be managed by Scenario Manager. Let's start off by creating the base scenario in Scenario Manager that analyzes the purchase and loan if we paid $75,000 down over 360 months (30 years) at an interest rate of 6.25%.

7. *On the spreadsheet, select* **Cells B4, B6**, *and* **B7**.
8. *Click on the* **Data** *tab, then click on the* **What-If Analysis**  *button in the* **Forecast** *group, and choose* **Scenario Manager** Scenario Manager... .

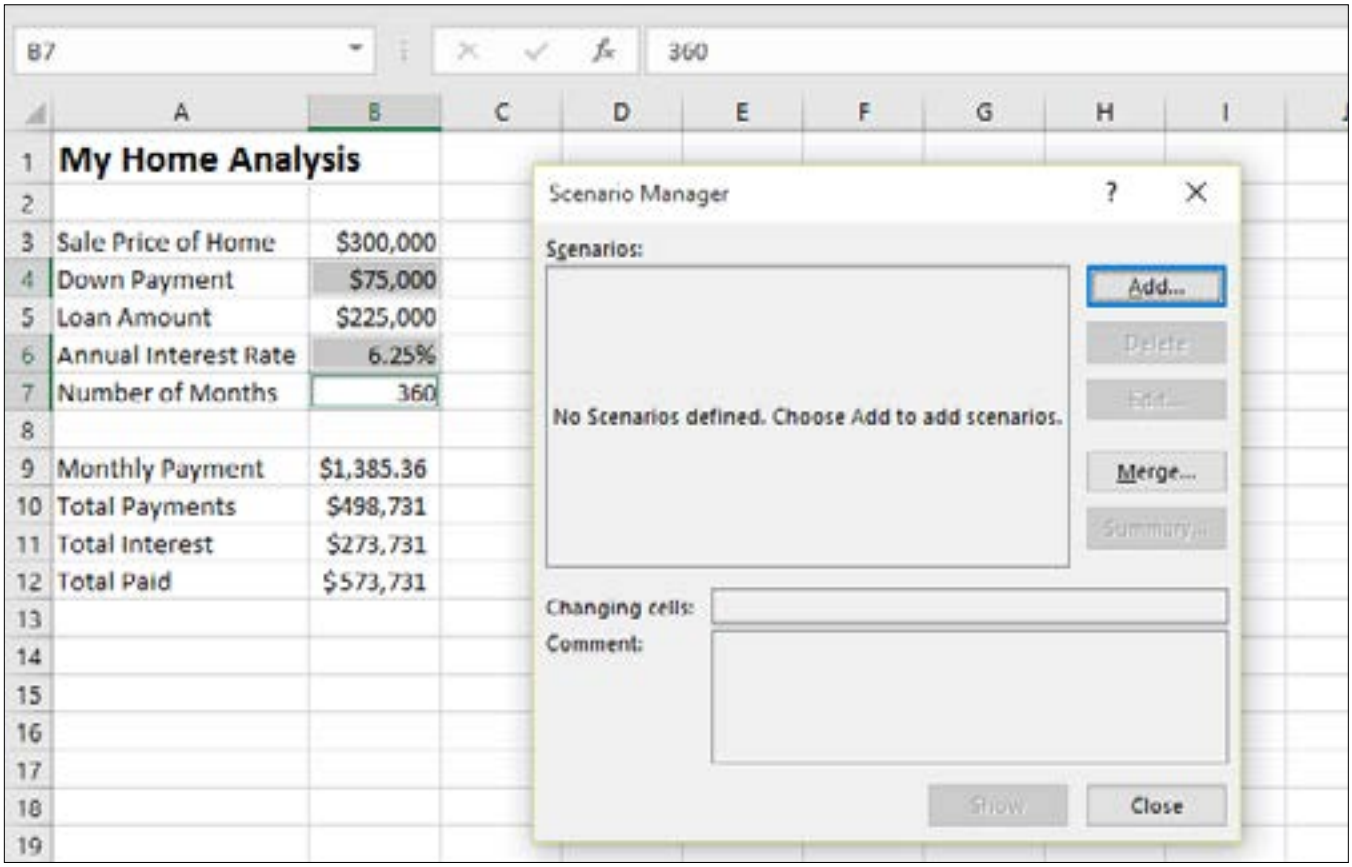


Figure 8.12

The Scenario Manager dialog box appears.

9. *Click the* **Add…** *button.*
10. *In the* **Scenario name** *box, type* ***Base Scenario***.

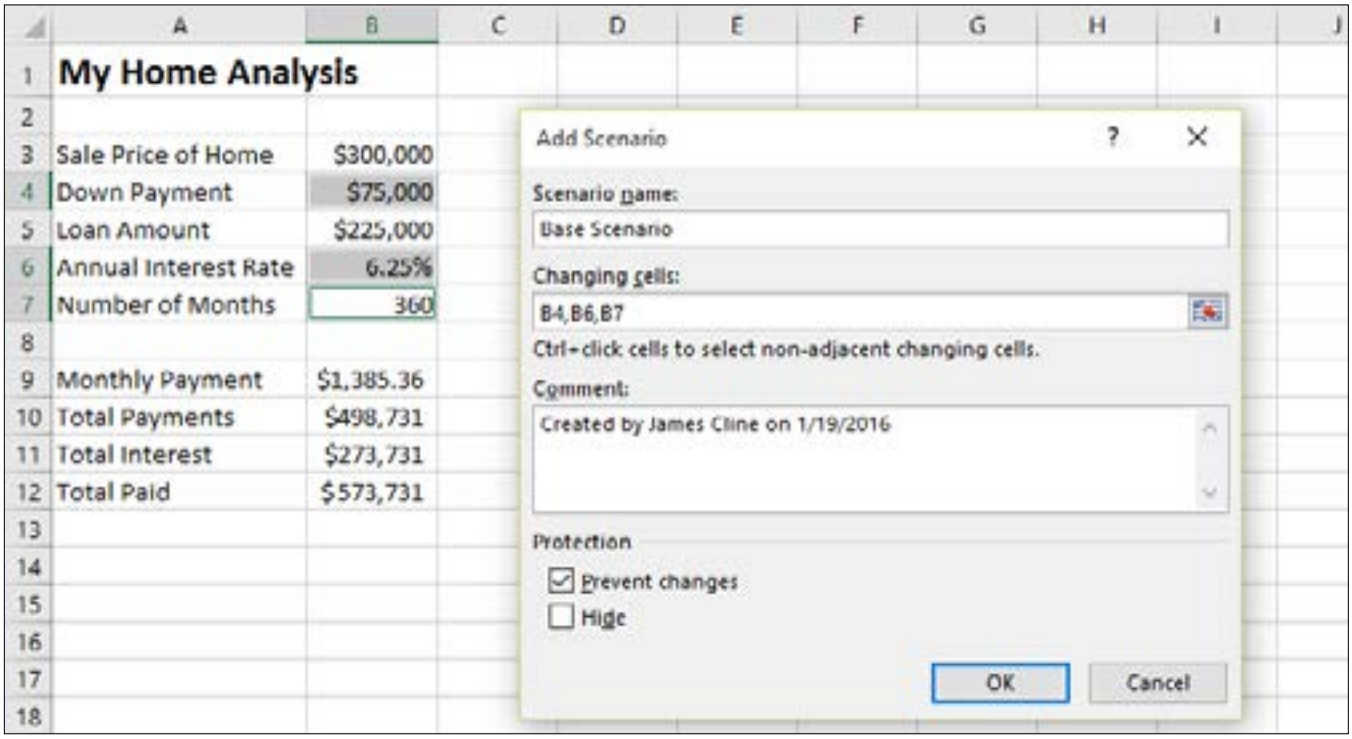


Figure 8.13

10. Click **OK**.

The Scenario Values dialog box appears.

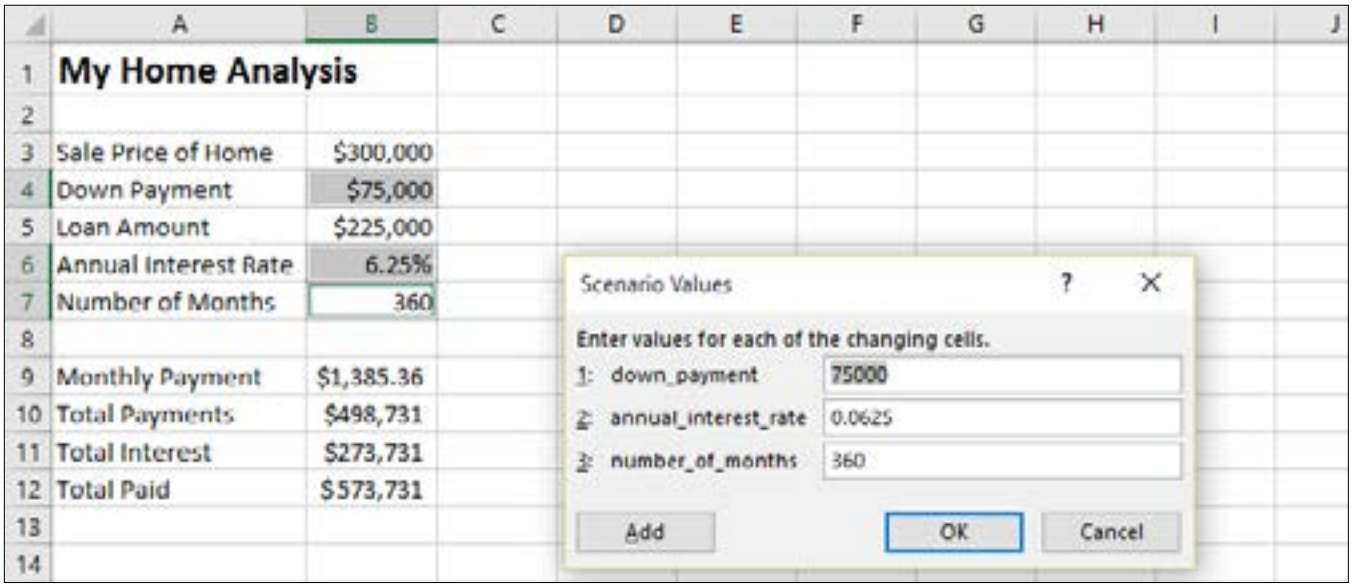


Figure 8.14

11. Click **OK** *in the* **Scenario Values** *dialog box to accept the current assumptions.*

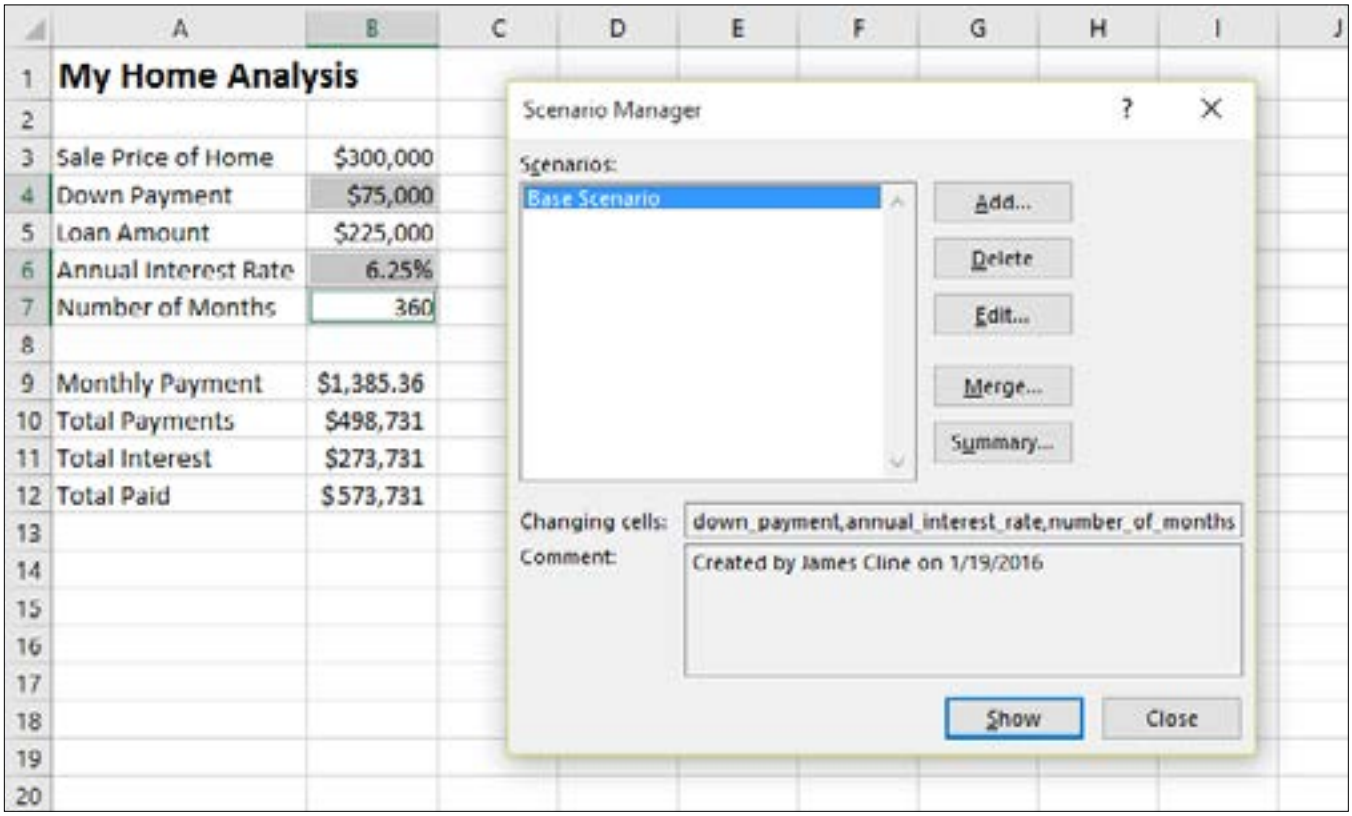


Figure 8.15

The Scenario Manager now has one scenario listed, the **Base Scenario**. To add more scenarios, just click Add... and follow the same procedure while changing the assumptions in the Scenario Values box for each scenario.

12. *Click* **Add...** *in the* **Scenario Manager** *box to add another scenario.*
13. *Call the next scenario* ***Low down, high interest rate****, and click* **OK**.
14. *Change the values in the* **Scenario Values** *dialog box to be consistent with the following values, then click* **OK**.

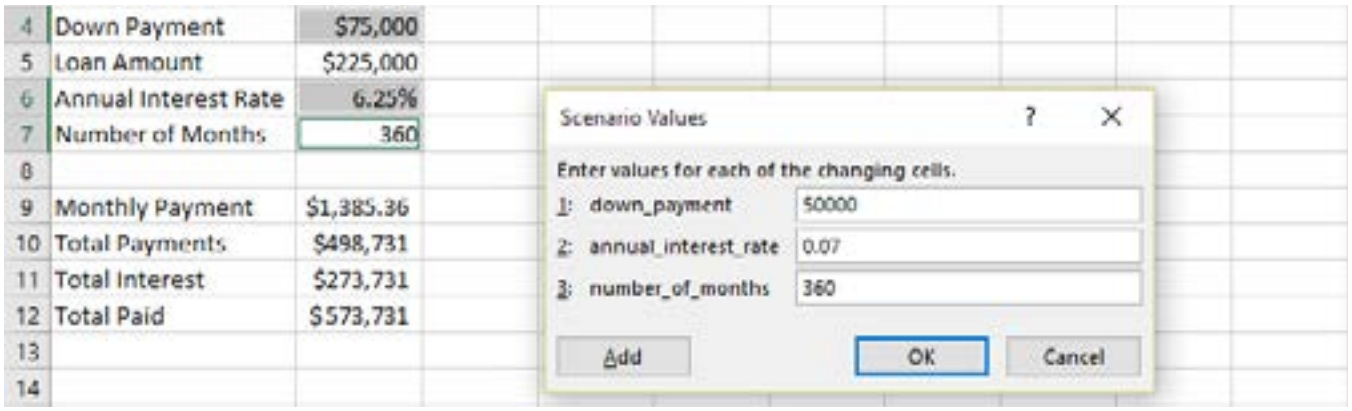


Figure 8.16

15. *Create another scenario called* ***High down, low interest rate*** *with* **$100,000** *down at a* **5.5%** *interest rate over* **360** *months.*
16. *Create the last scenario with* **$75,000** *down at* **6.00%** *interest rate over* **20** *years (240 months). Call it* ***Average down, low terms****.*

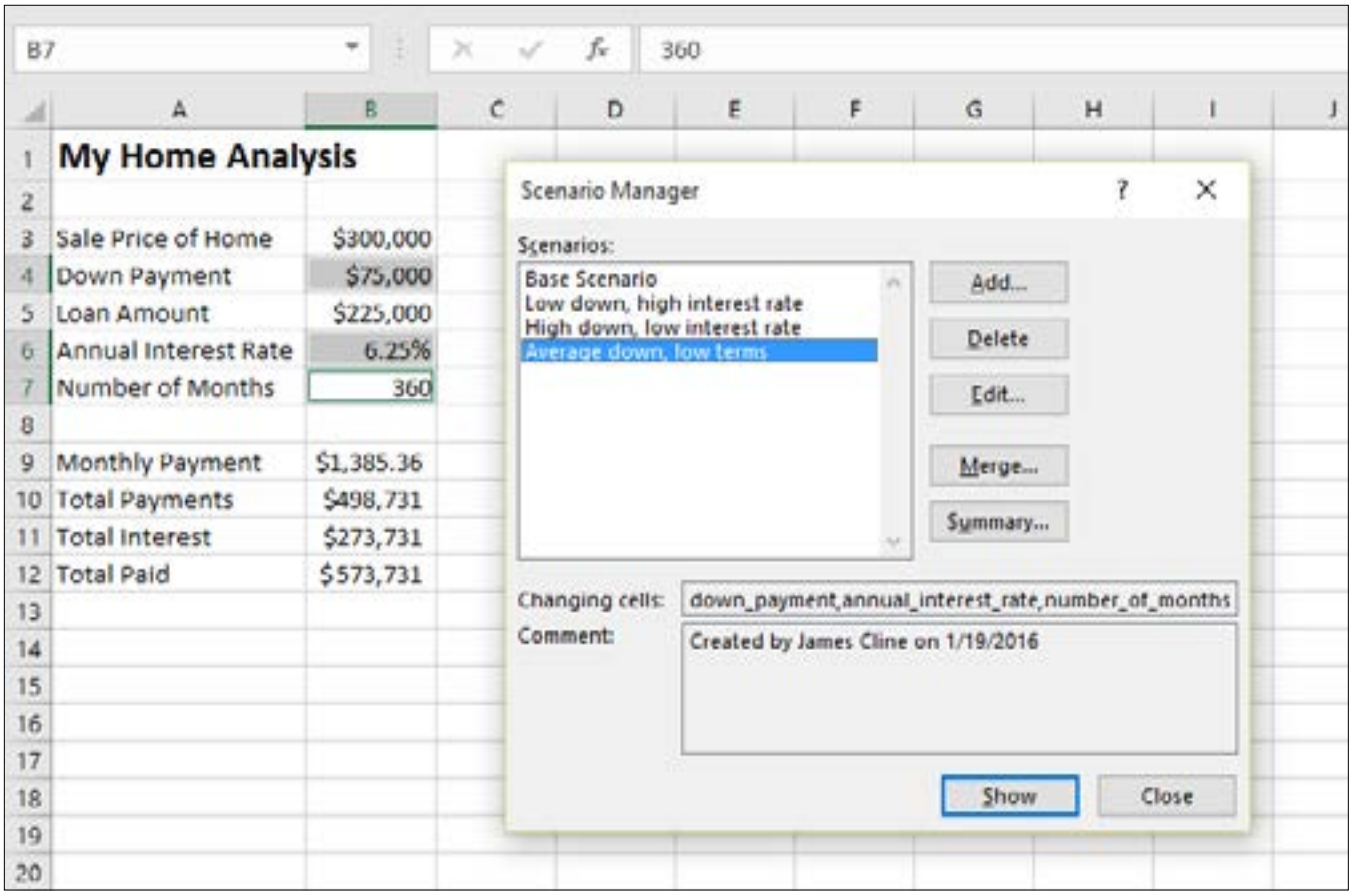


Figure 8.17

The Scenario Manager should match the figure above. To display the assumptions in each scenario in the Excel spreadsheet, simply click the Show button.

17. *Click on the* ***Low down, high interest rate*** *scenario, and click the* **Show** *button.*

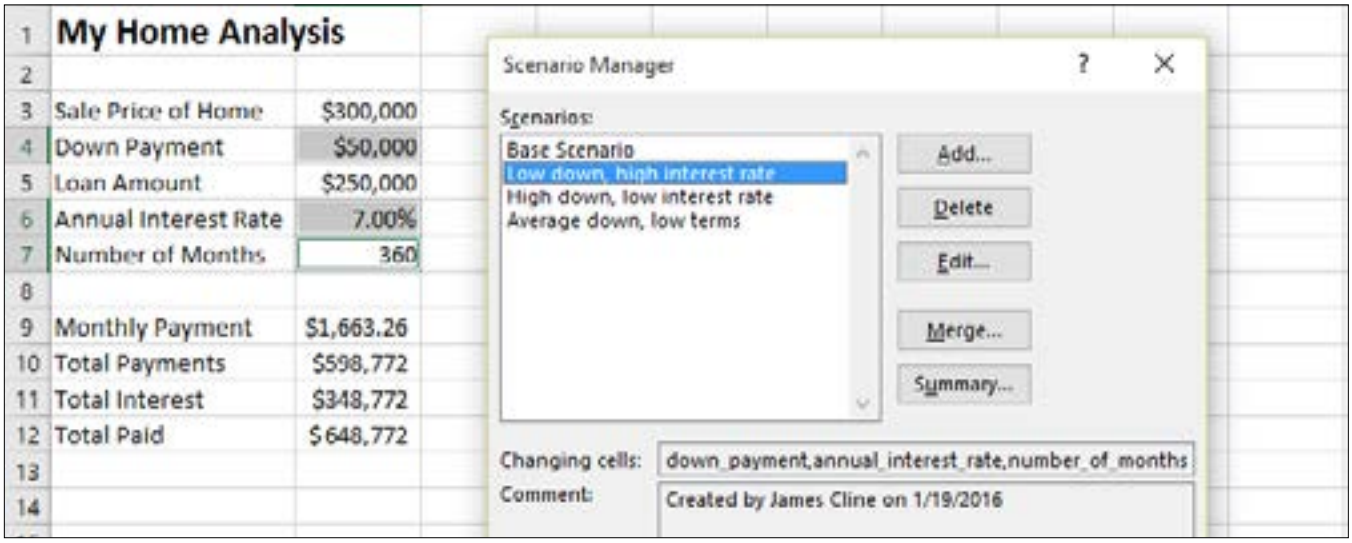


Figure 8.18

Make sure cases are consistent. The My Home Analysis cells are now updated according to the figures you input. You see that the down payment changed to $50,000 and the Annual Interest Rate changed to 7.00%. The Monthly payment went up to $1,663.26 and all of the other numbers in the analysis changed according to the changes.

18. *Click on the* **Average down, low terms** *scenario, and click the* **Show** *button.*

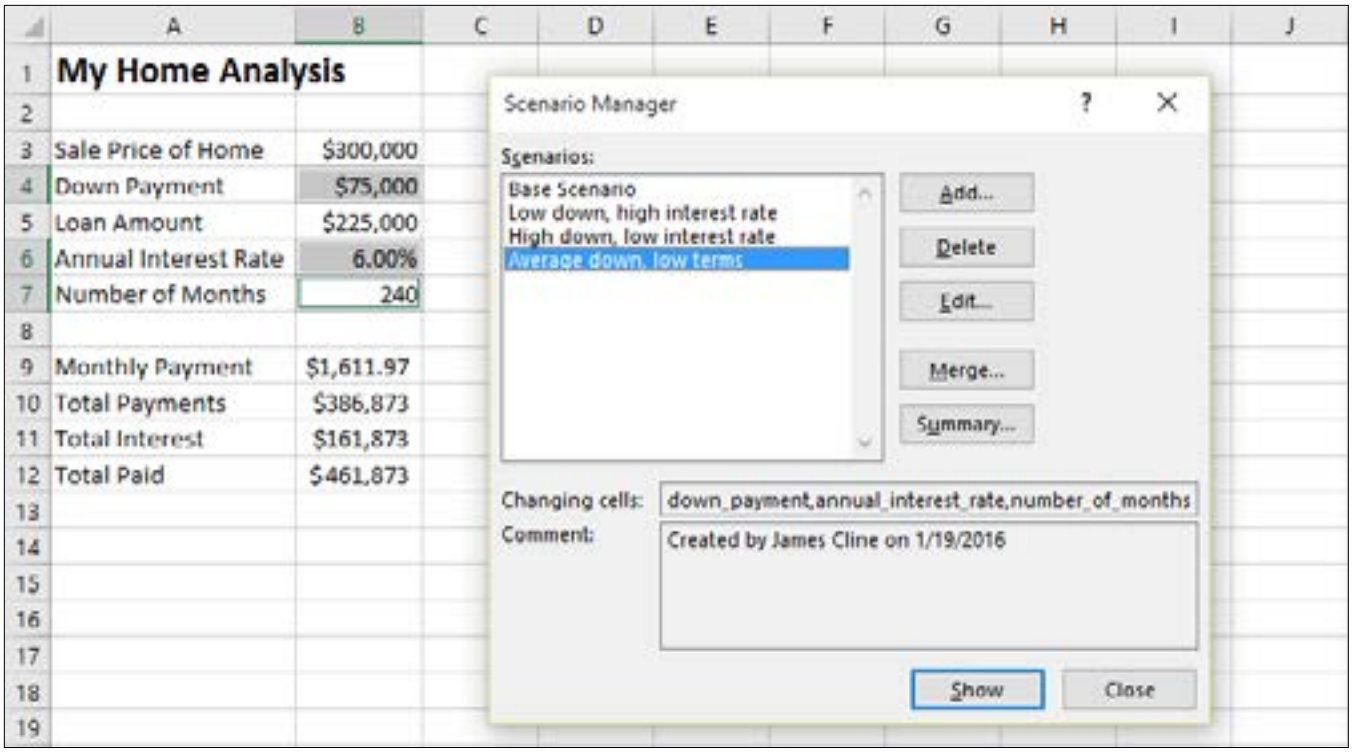


Figure 8.19

The My Home Analysis changes according to the assumptions in the Average down, lower terms scenario. But what if you wanted to see all scenarios next to each other? You can do that too.

19. *Change the current scenario back to the* **Base Scenario**, *and click the* **Summary...** *button.*
20. *Select* **Cells B9 to B12**.
21. *Make sure the* **Scenario summary** *radio button is checked, and that the* **Result cells:** *reads* **=$B$9:$B$12** *and click* **OK**.

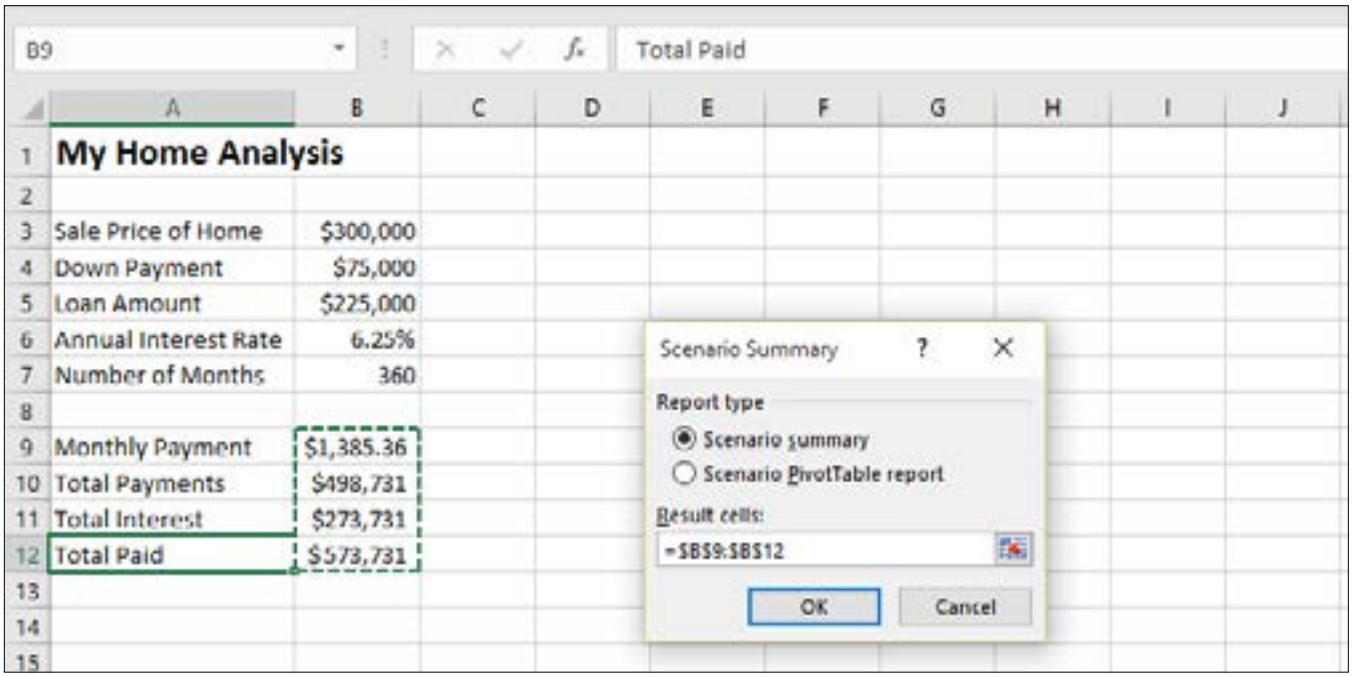


Figure 8.20

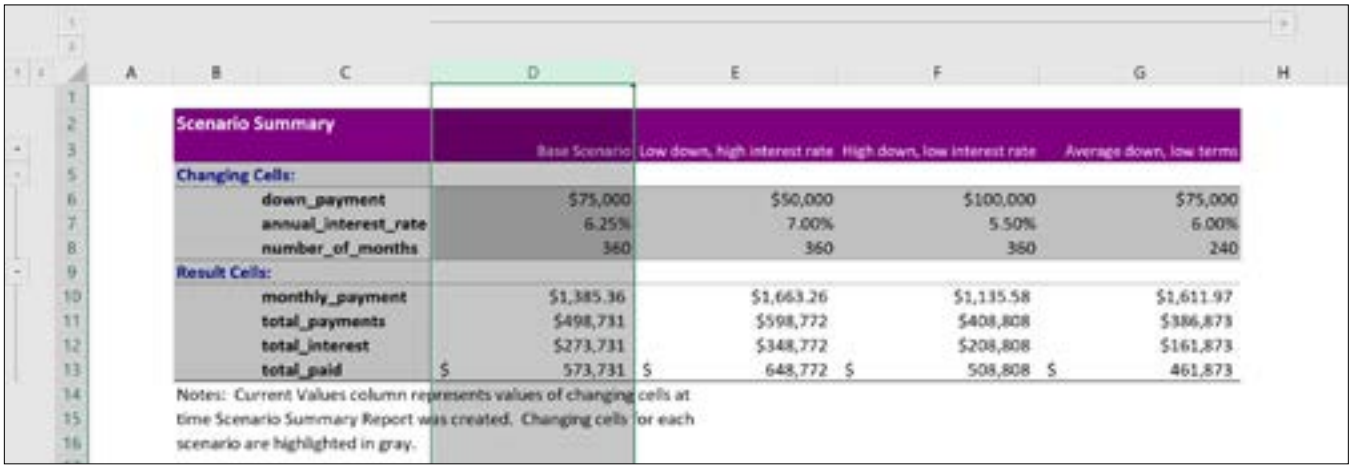
Excel creates another tab with the Scenario Summary on it.

Scenario Summary	Current Values:	Base Scenario	Low down, high interest rate	High down, low interest rate	Average down, low terms
Changing Cells:					
down_payment	$75,000	$75,000	$50,000	$100,000	$75,000
annual_interest_rate	6.25%	6.25%	7.00%	5.50%	6.00%
number_of_months	360	360	360	360	240
Result Cells:					
monthly_payment	$1,385.36	$1,385.36	$1,663.26	$1,135.58	$1,611.97
total_payments	$498,731	$498,731	$598,772	$408,808	$386,873
total_interest	$273,731	$273,731	$348,772	$208,808	$161,873
total_paid	$ 573,731	$ 573,731	$ 648,772	$ 508,808	$ 461,873

Notes: Current Values column represents values of changing cells at time Scenario Summary Report was created. Changing cells for each scenario are highlighted in gray.

Figure 8.21

22. *Delete* **Column D** *(Current Values) in the* **Scenario Summary** *tab.*



Scenario Summary	Base Scenario	Low down, high interest rate	High down, low interest rate	Average down, low terms
Changing Cells:				
down_payment	$75,000	$50,000	$100,000	$75,000
annual_interest_rate	6.25%	7.00%	5.50%	6.00%
number_of_months	360	360	360	240
Result Cells:				
monthly_payment	$1,385.36	$1,663.26	$1,135.58	$1,611.97
total_payments	$498,731	$598,772	$408,808	$386,873
total_interest	$273,731	$348,772	$208,808	$161,873
total_paid	$ 573,731	$ 648,772	$ 508,808	$ 461,873

Notes: Current Values column represents values of changing cells at time Scenario Summary Report was created. Changing cells for each scenario are highlighted in gray.

Figure 8.22

Now you have a scenario summary anyone can be proud of. Scenario Manager is more of an advanced tool that most Excel users don't know how to use, but it can be very useful for experienced users.

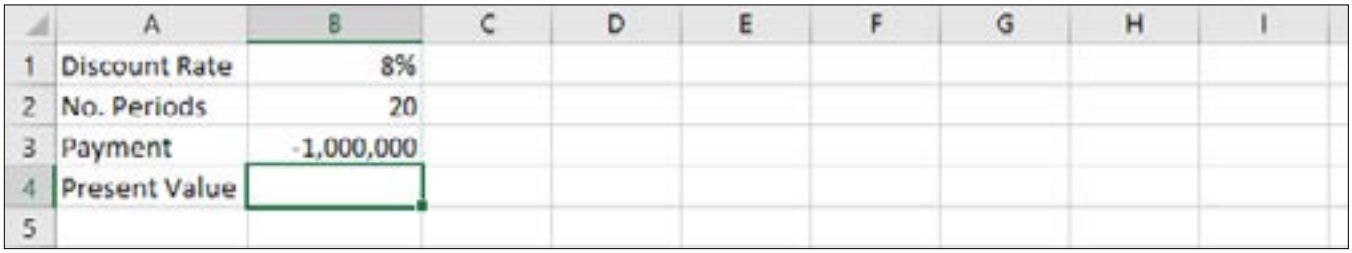
23. **Save** *and* **close** *the* **myScenario.xlsx** *file.*

The PV() Function

The Present Value function, or ***PV() function***, returns the present value of an investment. The present value is the total amount that a series of future payments is worth in today's dollars, discounted back at a certain discount rate. This function has three required arguments and two optional arguments. The three required arguments are rate (interest rate or discount rate), number of periods, and payment. The optional arguments are future value (or a cash balance you want to attain after the last payment is made) and type, which indicates when the payments are due. A type of 0 represents payments at the end of the period and a type of 1 represents payments made at the beginning of the period. If the optional arguments are omitted, 0 is assumed for both. Note that the PV() function requires the payment to be in equal amounts, like an annuity.

Let's assume you took the advice of the fortune cookie you had at lunch today and chose the numbers 4, 7, 10, 20, 21, and 26 in the state lottery and you won $20,000,000! I assume if that happened, you wouldn't be taking this course. That aside, the state says you can take your winnings in 20 annual payments of $1,000,000 per year for the next 20 years, or you can take a one-time lump sum payment of $10,000,000. The lump sum payment represents the present value of the 20 annual $1,000,000 payments. Is that a good deal or not? Which one would you take? The answer lies in the discount rate. Let's suppose that you read in the paper that investors were paying an 8% discount rate on lottery winnings. All you have to do is calculate the lump sum payment (or the present value) at an 8% rate and compare that with the $10,000,000 the state is offering, and you choose the larger of the two. Let's do it.

1. *Click on the* **New Sheet** *icon of the* **myAmort.xlsx** *file.*
2. *Rename* **Sheet2** *as* ***PV****.*
3. *Input the following values in the indicated cells, and resize* **Column A**.

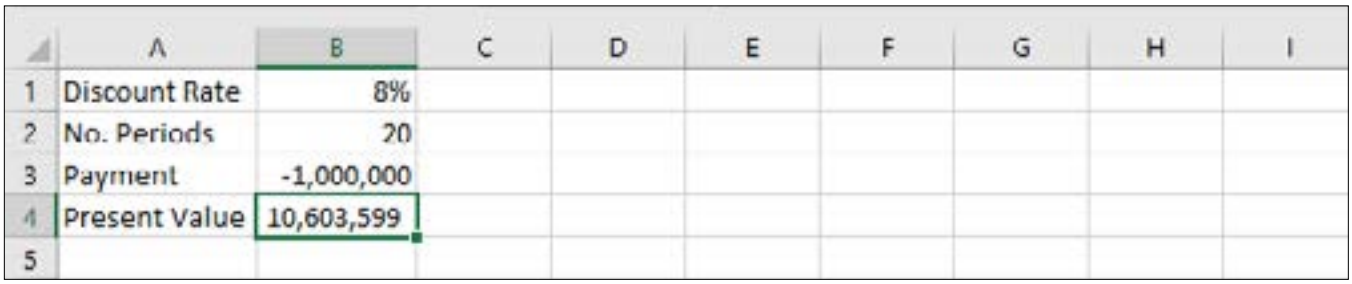


	A	B	C	D	E	F	G	H	I
1	Discount Rate	8%							
2	No. Periods	20							
3	Payment	-1,000,000							
4	Present Value								
5									

Figure 8.23

4. *In* **Cell B4**, *type this formula:* ***=PV(B1,B2,B3,0,1)***
5. *Format* **Cell B4** *as* **Number**, **zero decimal places**, **Use 1000 Separator (,)**.
6. *Resize* **Column B**, *if necessary.*

Cell B3 needs to be a negative number as if we were making payments so the present value will calculate as a positive number. I included the optional arguments of 0 as the future value (as the state will not make any payments after the last payment) and a 1 for the type, assuming you will receive the first $1,000,000 payment immediately. The answer is $10,603,599, as follows:

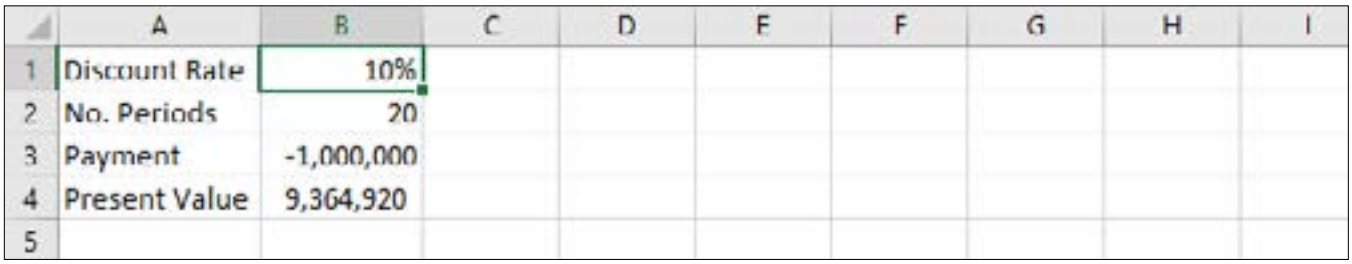


	A	B	C	D	E	F	G	H	I
1	Discount Rate	8%							
2	No. Periods	20							
3	Payment	-1,000,000							
4	Present Value	10,603,599							
5									

Figure 8.24

This means the investor would make you a lump sum payment of $10,603,599, which is higher than the $10,000,000 the state offered you. Since your name is splattered all over the front page after your win, you get a letter in the mail from another investor offering you a 10% discount rate. That sounds better, doesn't it? Just to make sure, let's change our discount rate assumption.

7. *Change the* **Discount Rate** *to* ***10%***.



	A	B	C	D	E	F	G	H	I
1	Discount Rate	10%							
2	No. Periods	20							
3	Payment	-1,000,000							
4	Present Value	9,364,920							
5									

Figure 8.25

Uh-oh! Did we do something wrong? The value went **down** to $9,364,920. That is correct! The **higher** the discount rate is, the **lower** the present value will be. Different investors have different investment criteria, and a higher discount rate indicates the investor's perception of the risk associated with the investment. The higher the risk, the more the investor needs to make on the investment, thus the lower present value, or the lower the amount the investor is willing to pay for the investment. Another way to look at this is that the Discount Rate represents the amount the seller is discounting the sale for the buyer.

The FV() Function

The Future Value, or ***FV() function***, is similar to the PV() function except it calculates the future value of an investment based on periodic, constant payments and a constant rate of interest. It has the same arguments as the PV() function, except it allows you to input a present value in place of the future value in the optional arguments. All other assumptions are the same.

Let's do an example of a Future Value calculation. We will assume that you will receive the $1,000,000 every month from the state and put it into an investment earning an average of 7.5% per year over the next 20 years. What would the value of that investment be in 20 years, compounding the 7.5% earned?

1. *Copy the* PV *tab, and rename the* **new tab *FV*** *(press [Ctrl] and click on the PV tab and drag it to the right and release).*
2. *Change* **Cell A1** *in the* FV *tab to be:* ***Interest Rate***
3. *Lower the* **Interest Rate** *in* **Cell B1** *to* ***7.5%***
3. *Add one decimal place to* **Cell B1**.
4. *Change* **Cell A4** *to be:* ***Future Value***
5. *Change the formula in* **Cell B4** *to the following:* ***=FV(B1,B2,B3)***

Holy Cow! Could that be correct? Yes, it is. Many people don't realize the power of compounded interest until they experiment with formulas like this one. In this example, I didn't use the optional arguments as they don't apply.

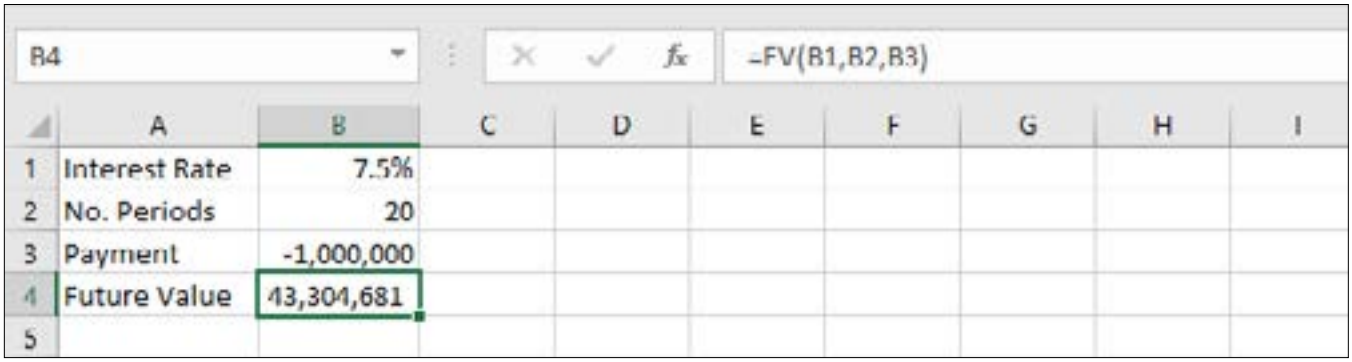


Figure 8.26

6. **Save** *and* **close** *the* **myAmort.xlsx** *file.*

***Review Questions**: It is now time to complete the hands-on Review Questions. Log on to www.ExcelCEO.com with your Email address and Password, click on the* **Excel 2016 Review Questions, Chapter 8, Section 2 of 4** *option in your Main Menu, and complete the Review Questions.*

Proforma Income Statement

When analyzing the value of a property or business, many investors or analysts look at a business' ten-year income statement. In this next exercise, we will build a ***proforma*** (or projected) ten-year income statement for one of Nitey-Nite's stores to estimate the value of the business. First we will populate the proforma income statement with all of the appropriate numbers and then apply functions and formulas to analyze the store's anticipated performance.

1. **Open** *the file located at* **C:\ExcelCEO\Excel 2016\Chapter8\Proforma.xlsx**.
2. **Save As C:\ExcelCEO\Excel 2016\Chapter8*myProforma.xlsx***.

This file is the shell of a ten-year proforma operating statement for Store No. 1021. The accountants have delivered this statement to you so you can estimate the value of the business. It contains the amount of the initial investment (-$203,649, shown as a negative number), the actual revenue and expense numbers for the year 2016, and columns for ten more years of income statement data. In actuality, it is an 11-year statement, as we'll be using the 11th year Net Income number later.

Figure 8.27

There are numerous ways to estimate the value of a business, investment, or income-producing property. Two of the more popular ways are the ***Direct Capitalization method*** and the ***Discounted Cash Flow (DCF) method***. The Direct Capitalization method is by far the easiest. Using the Direct Capitalization method, you divide the Net Income from the investment by a capitalization rate. In our example, let's suppose the capitalization rate is 8%. The value of the business using this method is estimated by dividing the net income of $57,032 by 8%, resulting in a value of $712,900, rounded to $713,000. While this is an easy way to estimate the value of a business, it is sometimes inaccurate, particularly when the net income for the year isn't representative of a typical year. An example of an atypical year is if the store was hit by a tornado and was closed for a couple of months, or if it was a new store and operated for only part of the year.

The DCF method is more complex. This method is performed by discounting each year's net income back to a present value. If this is not making a lot of sense to you yet, just stay with me for a while longer. It will make much more sense when we complete the proforma and you can look back to see what you've done.

In applying the DCF method, the most common practice is to estimate the Net Income for eleven years, apply the Direct Capitalization method to the 11th year Net Income and discount each year's net income PLUS the capitalized value of the investment in the 11th year (per the Direct Capitalization method) back to a present value. Capitalizing the 11th year Net Income assumes we sell the business at the end of the 11th year. We do this as we can assume the investment is operating at a **stabilized** rate after 11 years of operations. We don't really plan on selling it at the end of the 11th year, but it is done as a valuation technique. We will apply this methodology in our analysis.

Let's suppose that this store is a relatively new store, and that it opened on January 1, 2016. From our experience in opening similar stores, we believe that revenue should increase by 20% in 2017, 10% in 2018 and should increase at approximately the rate of inflation thereafter. Let's also assume that fixed expenses should increase at the rate of inflation. Variable expenses are expected to be the same percentage of revenue as they were in 2016, and we will use a 3% general inflation rate. With that said, let's modify the spreadsheet to include the above assumptions.

3. In **Cells A35 through B39**, *input the following data:*

Revenue Inflation Year 1	20%
Revenue Inflation Year 2	10%
General Inflation	3%
11th Year Capitalization Rate	10%
Discount Rate	7%

3													
4					*Projected Net Income Statement*								
5					*For the Years 2016 - 2026*								
6					*Store No. 1021*								
7		Investment	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
23	**Gross Margin**		**94,918**										
25	**Fixed Expenses**												
26	Salary Expense		17,401										
27	General Admin Expenses		12,943										
28	Building Expenses		7,542										
29	**Fixed Expenses Total**		**37,886**										
31	**TOTAL EXPENSES**		**95,691**										
33	***NET INCOME***	-$203,649	$57,032										
34													
35	Revenue Inflation Year 1	20%											
36	Revenue Inflation Year 2	10%											
37	General Inflation	3%											
38	11th Year Capitalization Rate	10%											
39	Discount Rate	7%											

Figure 8.28

4. Name the following cells with the following names:

Cell	Cell Name
C18	com_pct
C20	sell_pct
B35	rev_infl_1
B36	rev_infl_2
B37	infl
B38	cap_rate
B39	disc_rate

5. *Copy all cells in* **Column C** *that contain formulas (not hard-coded numbers) to* **Column D**.
6. *In* **Cell D9**, *type the following formula:* ***=C9*(1+rev_infl_1)***

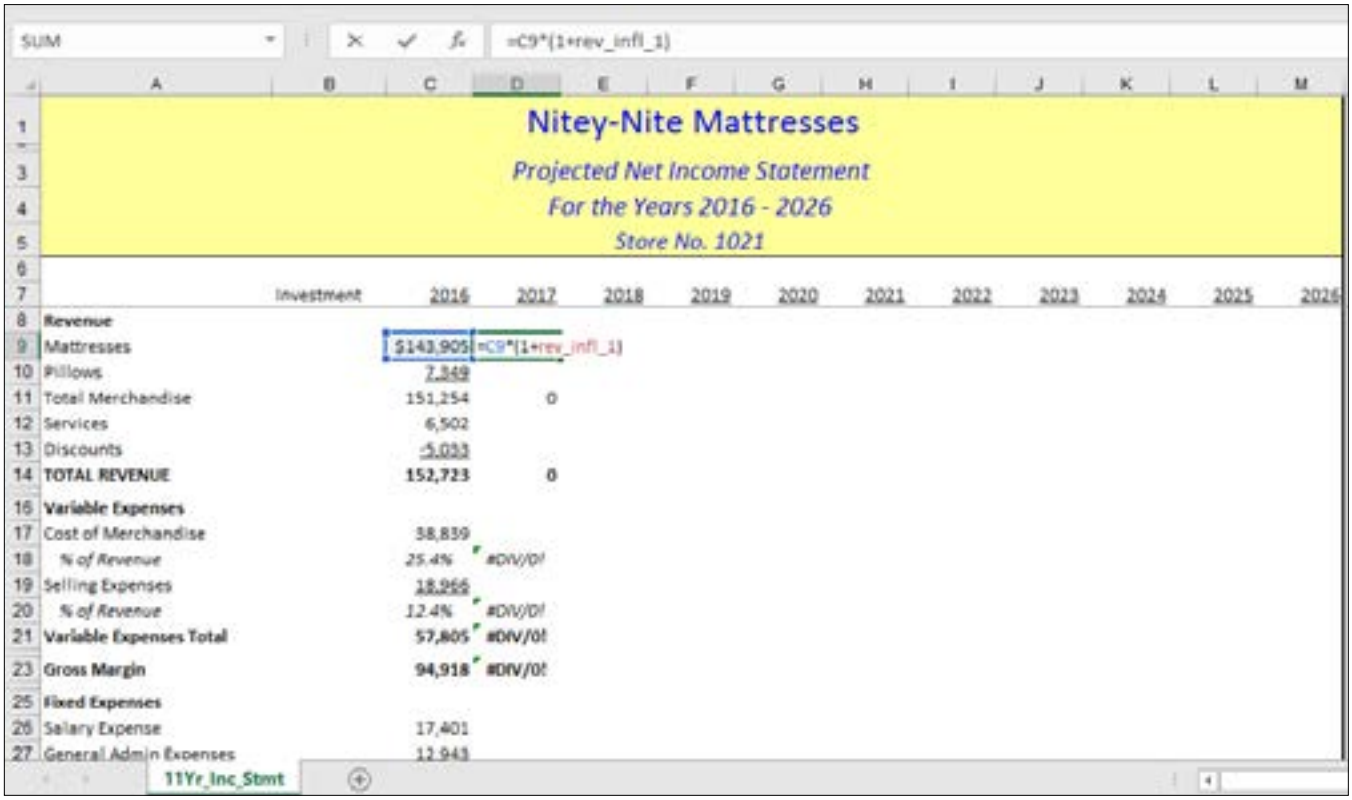


Figure 8.29

This formula takes the dollar amount in Cell C9 and increases it by the rate of revenue inflation for year 1, or 20%. We will apply this formula to all Revenue accounts in 2017.

7. *Copy the formula in* **Cell D9** *down to* **Cells D10**, **D12**, *and* **D13**, *and apply the appropriate formatting.*

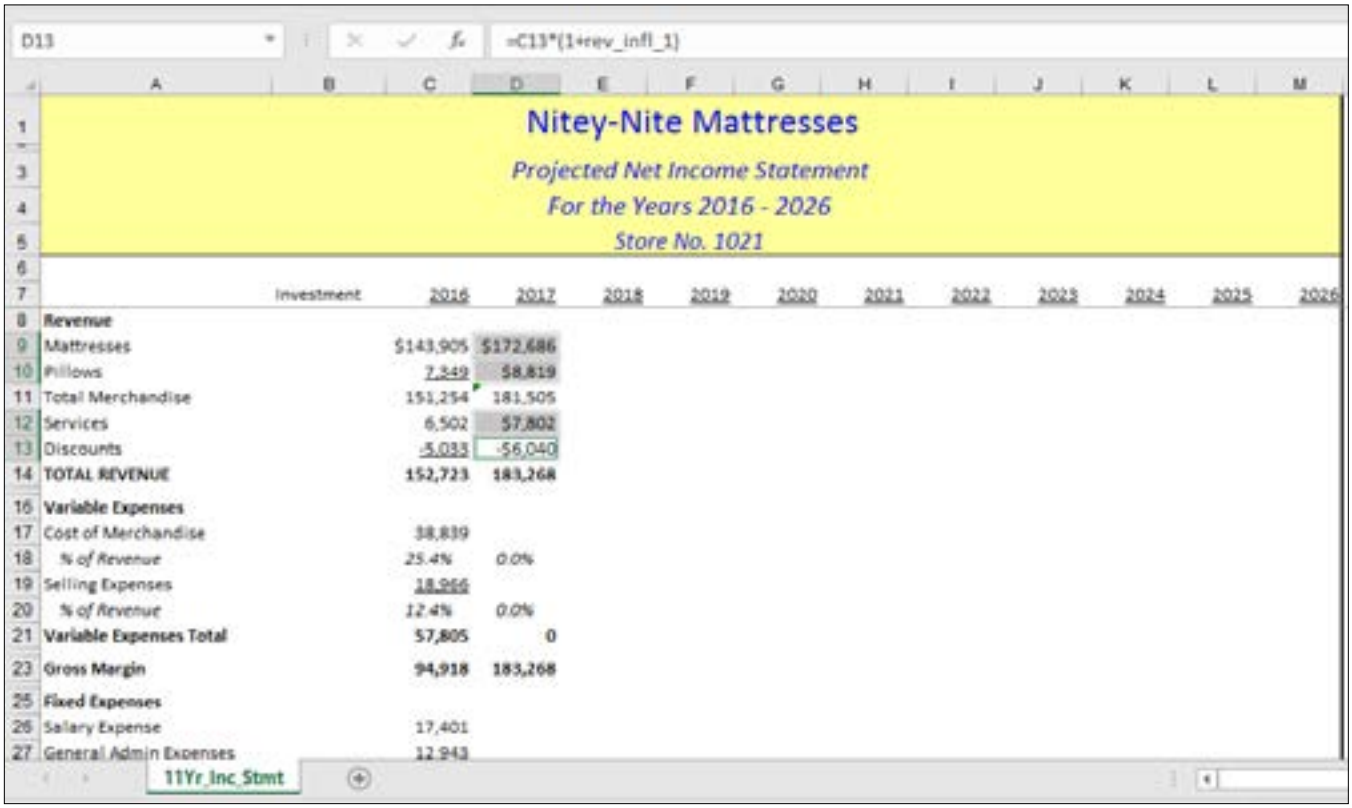


Figure 8.30

Now we have estimated the revenue for 2017. Let's go on to the expenses.

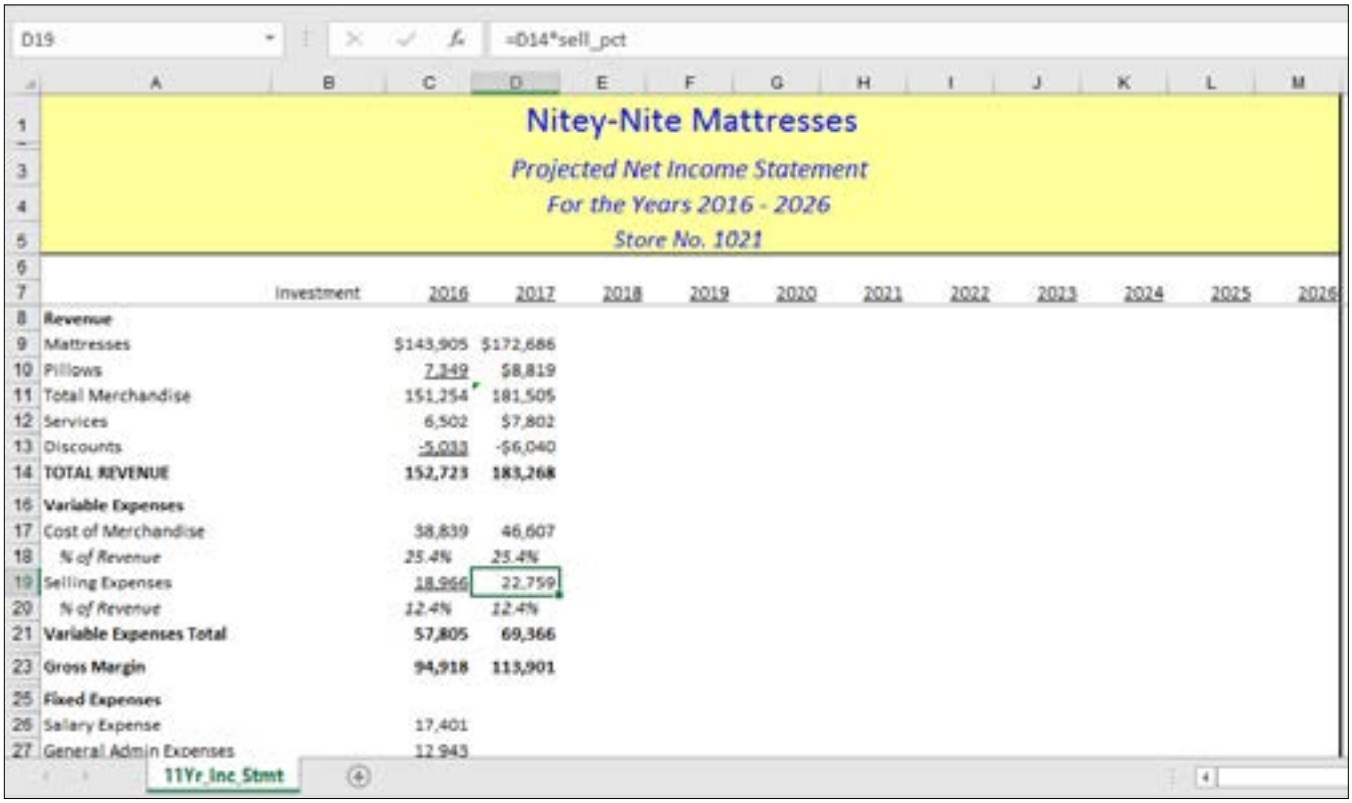
8. *In* **Cell D17**, *write the following formula:* ***=D14*com_pct***

As you type the named ranges (like com_pct), notice how the intelli-sense menu appears that shows the name of the range or a function that has the same first letters. For example, when you type =D14*com, you will see a menu with four items on it (com_pct, the cell that we named, and three functions, COMBIN, COMBINA, and COMPLEX). Excel keeps track of functions and named ranges there.

9. *Press the* **[Tab]** *key when* **com_pct** *is selected then click* **Enter** *to input that name into your formula.*

This formula takes the total estimated revenue for 2017 and calculates the cost of merchandise on that revenue, using the same cost of merchandise percentage as calculated in 2016. We need to do the same for the Selling Expense line, except we need to use the Selling Expense % of Revenue number.

10. *In* **Cell D19**, *type the following formula:* ***=D14*sell_pct***



	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Nitey-Nite Mattresses												
3	*Projected Net Income Statement*												
4	*For the Years 2016 - 2026*												
5	*Store No. 1021*												
6													
7		Investment	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
8	**Revenue**												
9	Mattresses		$143,905	$172,686									
10	Pillows		7,349	$8,819									
11	Total Merchandise		151,254	181,505									
12	Services		6,502	$7,802									
13	Discounts		-5,033	-$6,040									
14	**TOTAL REVENUE**		**152,723**	**183,268**									
16	**Variable Expenses**												
17	Cost of Merchandise		38,839	46,607									
18	*% of Revenue*		*25.4%*	*25.4%*									
19	Selling Expenses		18,966	22,759									
20	*% of Revenue*		*12.4%*	*12.4%*									
21	**Variable Expenses Total**		**57,805**	**69,366**									
23	**Gross Margin**		**94,918**	**113,901**									
25	**Fixed Expenses**												
26	Salary Expense		17,401										
27	General Admin Expenses		12,943										

11Yr_Inc_Stmt

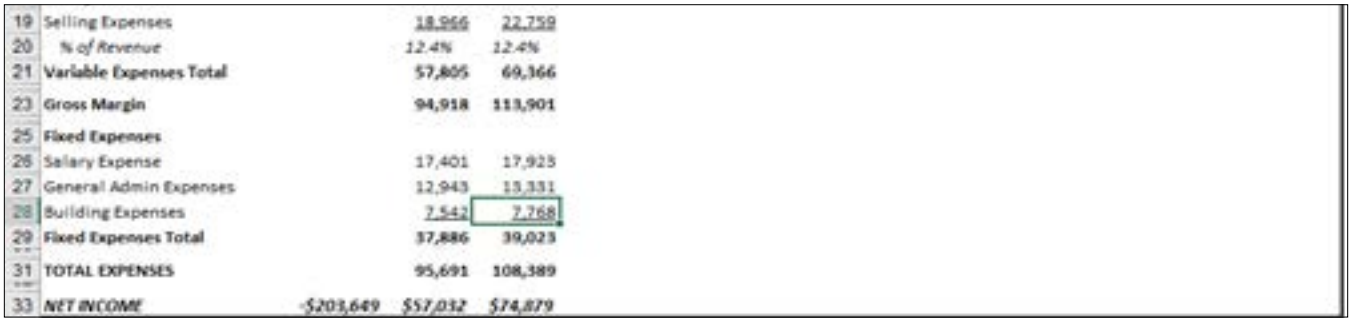
Figure 8.31

As a check, the Gross Margin line for 2017 should read 113,901. Now let's go on to Fixed Expenses.

11. In **Cell D26**, *type the following formula:* ***=C26*(1+infl)***

12. Copy the formula in **Cell D26** *to* **Cells D27** *and* **D28**.

All we're doing in this formula is increasing the 2016 Salary Expense, General Admin Expenses, and Building Expenses at the rate of inflation.



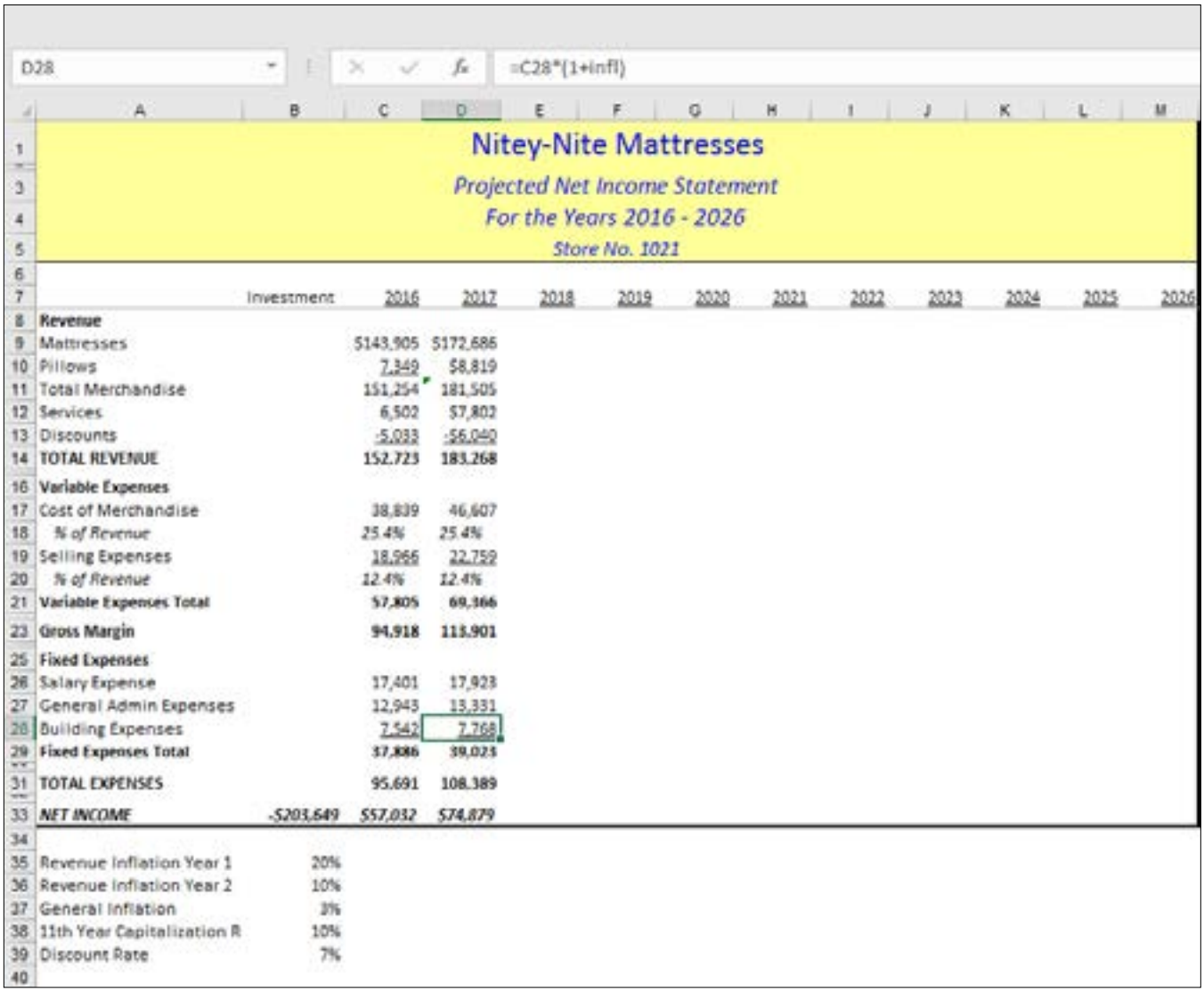
19	Selling Expenses		18,966	22,759
20	*% of Revenue*		*12.4%*	*12.4%*
21	**Variable Expenses Total**		**57,805**	**69,366**
23	**Gross Margin**		**94,918**	**113,901**
25	**Fixed Expenses**			
26	Salary Expense		17,401	17,925
27	General Admin Expenses		12,943	13,331
28	Building Expenses		7,542	7,768
29	**Fixed Expenses Total**		**37,886**	**39,023**
31	**TOTAL EXPENSES**		**95,691**	**108,389**
33	*NET INCOME*	*-$203,649*	*$57,032*	*$74,879*

Figure 8.32

13. Format all cells in **Column D** *to be the same as in* **Column C**.

***Trick**: A quick way to do this is to select* **Cells C9 through C33**, *click the* **Format Painter** *icon, and click on* **Cell D9**.

Your spreadsheet should now look something like the following figure:



D28 =C28*(1+infl)

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Nitey-Nite Mattresses												
3	*Projected Net Income Statement*												
4	*For the Years 2016 - 2026*												
5	*Store No. 1021*												
6													
7		Investment	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
8	**Revenue**												
9	Mattresses		$143,905	$172,686									
10	Pillows		7,349	$8,819									
11	Total Merchandise		151,254	181,505									
12	Services		6,502	$7,802									
13	Discounts		-5,033	-$6,040									
14	**TOTAL REVENUE**		**152,723**	**183,268**									
16	**Variable Expenses**												
17	Cost of Merchandise		38,839	46,607									
18	*% of Revenue*		*25.4%*	*25.4%*									
19	Selling Expenses		18,966	22,759									
20	*% of Revenue*		*12.4%*	*12.4%*									
21	**Variable Expenses Total**		**57,805**	**69,366**									
23	**Gross Margin**		**94,918**	**113,901**									
25	**Fixed Expenses**												
26	Salary Expense		17,401	17,923									
27	General Admin Expenses		12,943	13,331									
28	Building Expenses		7,542	7,768									
29	**Fixed Expenses Total**		**37,886**	**39,023**									
31	**TOTAL EXPENSES**		**95,691**	**108,389**									
33	***NET INCOME***	*-$203,649*	*$57,032*	*$74,879*									
34													
35	Revenue Inflation Year 1	20%											
36	Revenue Inflation Year 2	10%											
37	General Inflation	3%											
38	11th Year Capitalization R	10%											
39	Discount Rate	7%											
40													

Figure 8.33

Now we need to copy the formulas in Column D to Column E. We will first copy all of the formulas over then make the necessary changes.

14. Copy **Cells D9 through D33** *to* **E9 through E33**.

Find and Replace

Copying those cells worked fine, except for one thing. Remember the inflation rate that you used for 2017? You're still using it for 2018 after you did the copy. You need to change it to be the revenue inflation

rate for 2018, or Year 2. You can use the **Find and Replace** functionality to quickly change it:

15. *Select* **Cells E9 through E13**.
16. *Type* **[Ctrl]+*h*** *on your keyboard, and the* **Find and Replace** *dialog box appears.*
17. *Make sure the* **Replace** *tab is selected.*
18. *In the* **Find what:** *box, type:* ***rev_infl_1***
19. *In the* **Replace with:** *box, type:* ***rev_infl_2***

Figure 8.34

> ***Note**: You can also click the* **Find** *icon (the magnifying glass icon) you placed on your* **Quick Access Toolbar** *and click on the* **Replace** *tab.*

20. *Click the* **Replace All** *button.*

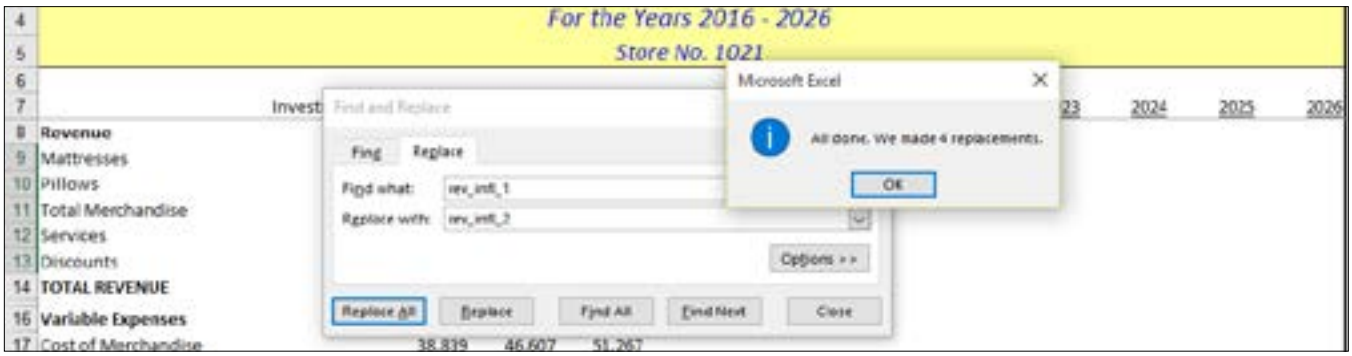


Figure 8.35

21. *Click* **OK**, *then* **Close** *the* **Find and Replace** *dialog box.*

> ***Trick**: Another way you can "go to" a place in your workbook is to type the* **[F5]** *key (or Fn+F5). When you press the [F5] key, the following dialog box appears:*

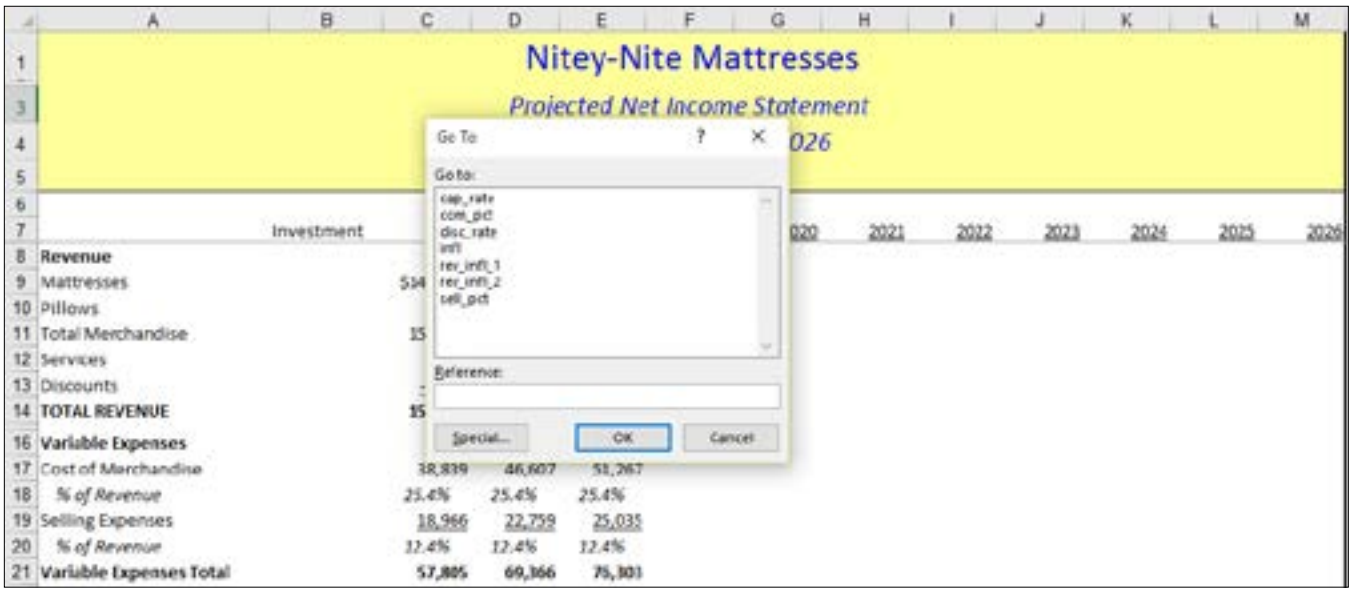


Figure 8.36

Just type in the cell reference or select the named range you want to go to and click OK.

Excel should have replaced four formula references of rev_infl_1. Since that is the only change needed to the formulas, you can now copy everything in Column E to Column F.

22. *Copy all cells in* **Column E** *to* **Column F**.
23. *Replace* **rev_infl_2** *with* ***infl*** *in all* **Revenue** *cells (you should again have four replacements).*
24. *Copy all cells in* **Column F** *to* **Columns G through M**.
25. *Format the statement to have a dark bold line (***Thick Outside Borders***) surrounding the entire statement.*

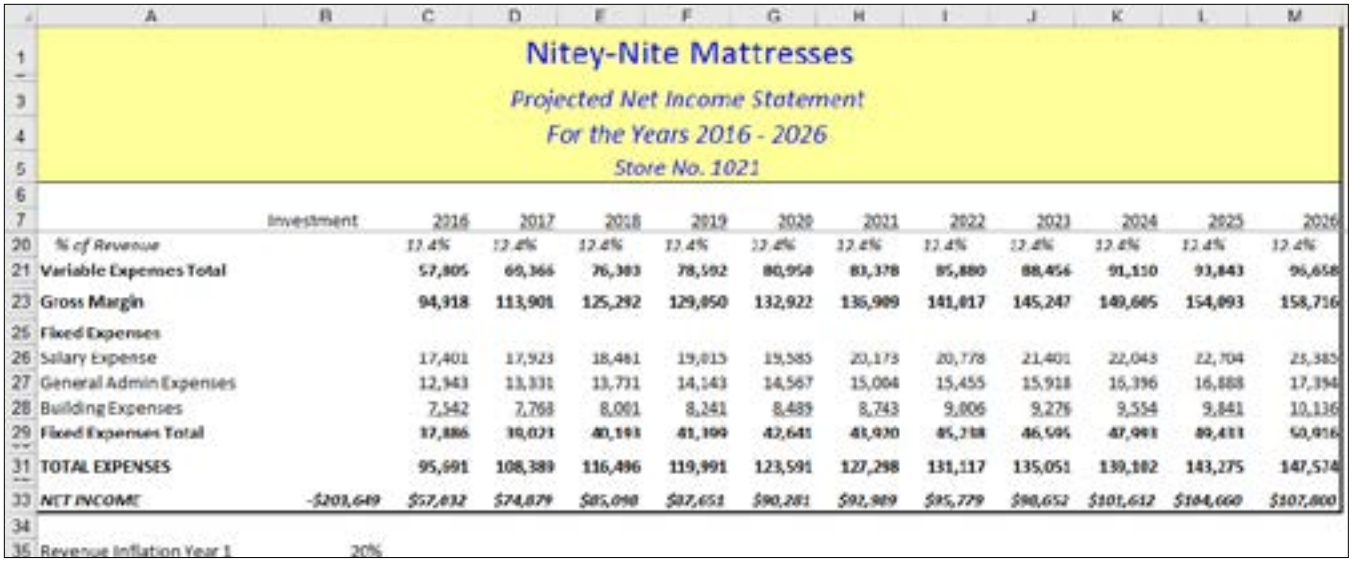


Figure 8.37

The next step in creating our proforma is to divide the Net Income number in 2026 by the 11th year capitalization rate. You also need to footnote that number so it is clear in the proforma what the last year's Net Income number represents.

26. *Edit the formula in* **Cell M33** *to be the following:* ***=(M14-M31)/cap_rate****, and resize, if necessary.*
27. *In* **Cell N33**, *type:* ***'(1)*** *(the apostrophe is necessary to make the cell a text reference rather than a number).*
28. *Italicize* **Cell N33**.
29. *In* **Cell D35**, *type:* ***="(1) Capitalizes Net Income of"&TEXT(M14-M31,"$0,000")&" as if the store was sold."***
30. *Italicize* **Cell D35**.

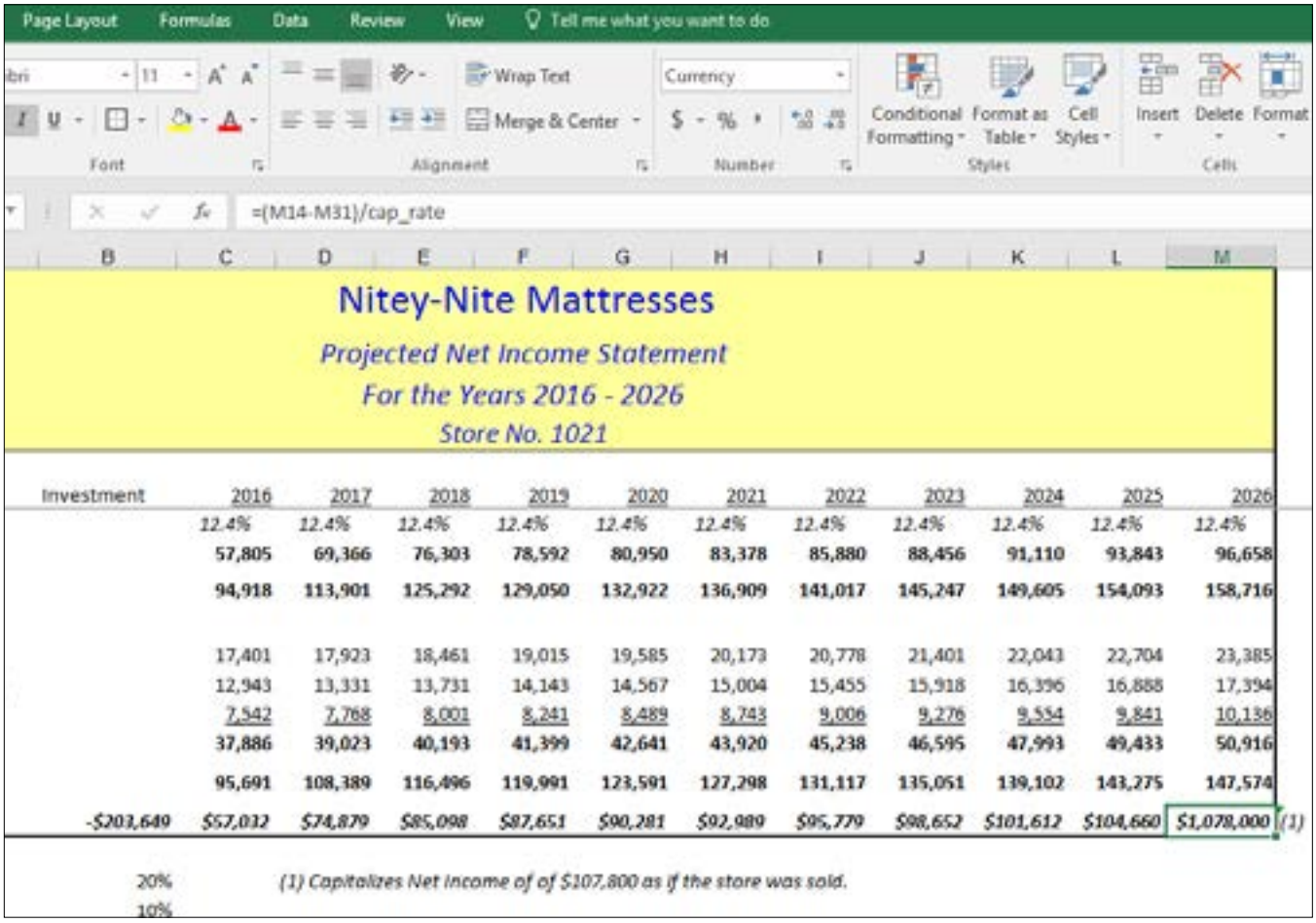


Figure 8.38

The IRR() Function

And Presto! You have built a complete proforma income statement where you can change any one of a number of assumptions and immediately see the result. Now we are ready to analyze it using the IRR() function (Internal Rate of Return). The ***IRR() function*** returns the internal rate of return for a series of

cash flows represented by the numbers in values. These cash flows do not have to be the same, as with the PV() function. However, the cash flows must occur at regular intervals, such as monthly or annually. The internal rate of return is the rate received for an investment consisting of payments (negative values) and income (positive values) that occur at regular periods. The IRR() function has two arguments: the series of values (income stream, cash flows, whatever you want to calculate the IRR for), and a guess at what the approximate IRR would be.

31. *In* **Cell A40**, *type:* ***Internal Rate of Return***
32. *In* **Cell B40**, *write the following formula:* ***=IRR(B33:M33,0.2)***

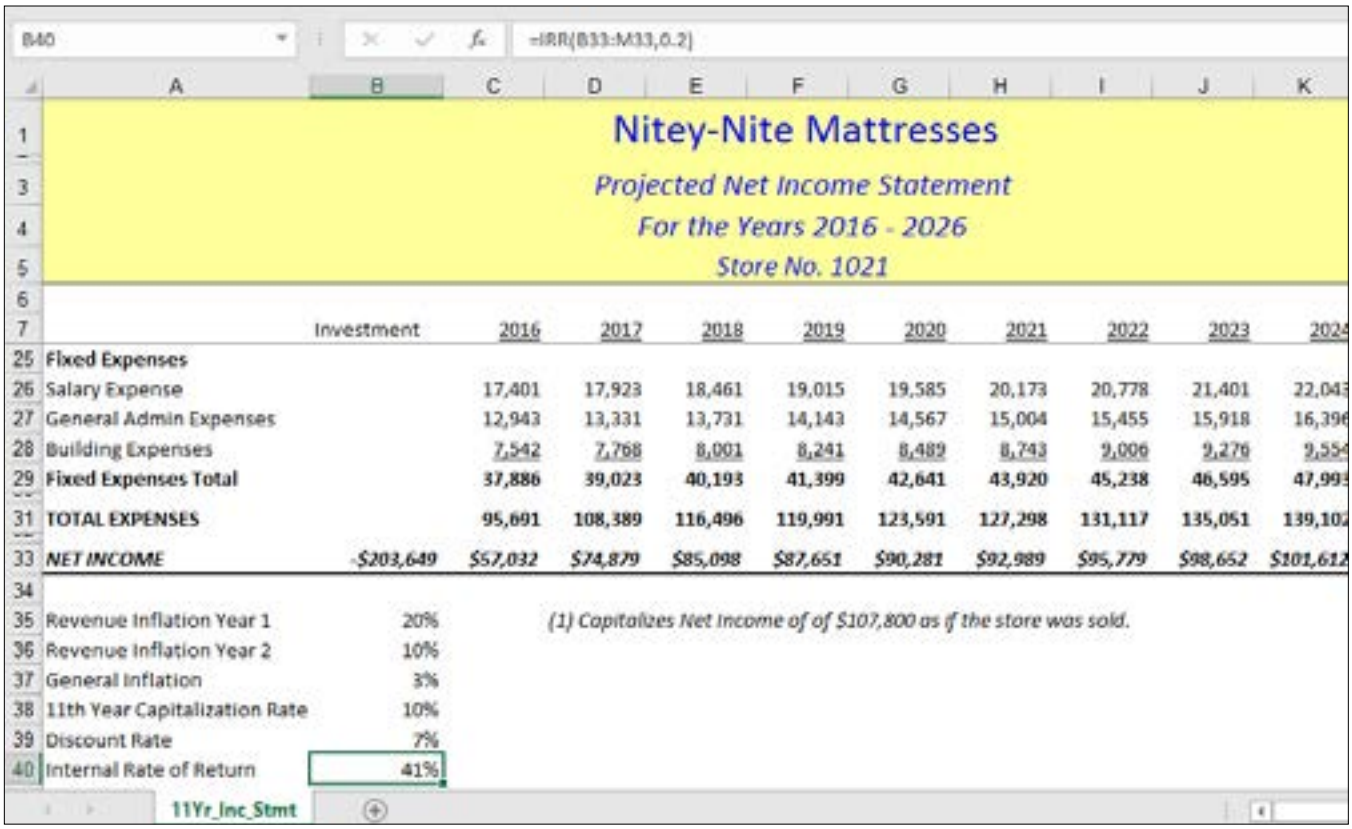


Figure 8.39

The range B33:M33 includes the initial investment outflow of $203,649 and all the other net income numbers, including the last year's theoretical sale of the business. For the second argument, I chose 0.2, or 20%. It really doesn't matter what you choose for the guess, as long as it's reasonable. You should have calculated an internal rate of return of 41%.

> ***Review Questions****: It is now time to complete the hands-on Review Questions. Log on to www.ExcelCEO.com with your Email address and Password, click on the* **Excel 2016 Review Questions, Chapter 8, Section 3 of 4** *option in your Main Menu, and complete the Review Questions.*

The NPV() Function

The Net Present Value, or ***NPV() function*** returns the Present Value of the future income (or cash flows) of an investment net of the initial investment. The NPV() function contains two arguments: rate and range. In our example, we paid a total of $203,649 to set up the store and we forecast annual income of $57,032, $74,879, and so on. The Net Present Value formula is written as follows:

1. *In* **Cell A41**, *type:* ***Net Present Value***
2. *In* **Cell B41**, *type the following formula:* ***=NPV(disc_rate,B33:M33)***
3. *Format* **Cell B41** *to be* **Currency**, **zero decimal places**.

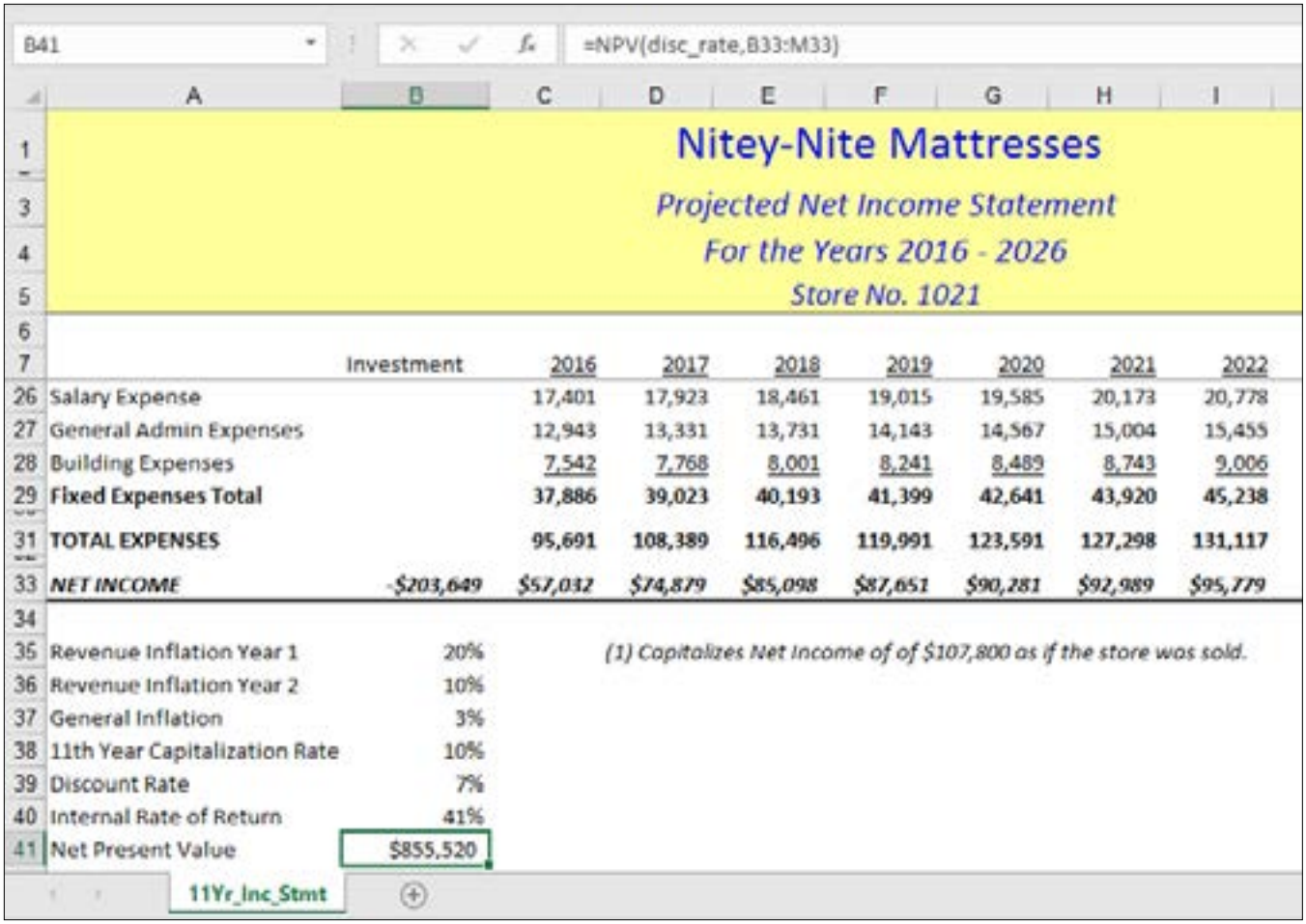


Figure 8.40

The Net Present Value formula returns a value of $855,520, meaning that if you spend $203,649 on the initial investment, you have a store that has a net present value of $855,520. You can also trick the NPV() function to return a present value number. Remember, if you use a PV() function, you must have equal payments, like an annuity. In our example, the annual net income is different every year, so we can't use a PV() function. Using the NPV() function, you can have unequal payments to calculate the investment's present value – just eliminate the initial investment number. Let's try it.

1. *In* **Cell A42**, *type:* ***Present Value***
2. *In* **Cell B42**, *type the following formula:* ***=NPV(disc_rate,C33:M33)***
3. *Format* **Cell B42** *to be* **Currency**, **zero decimal places**.

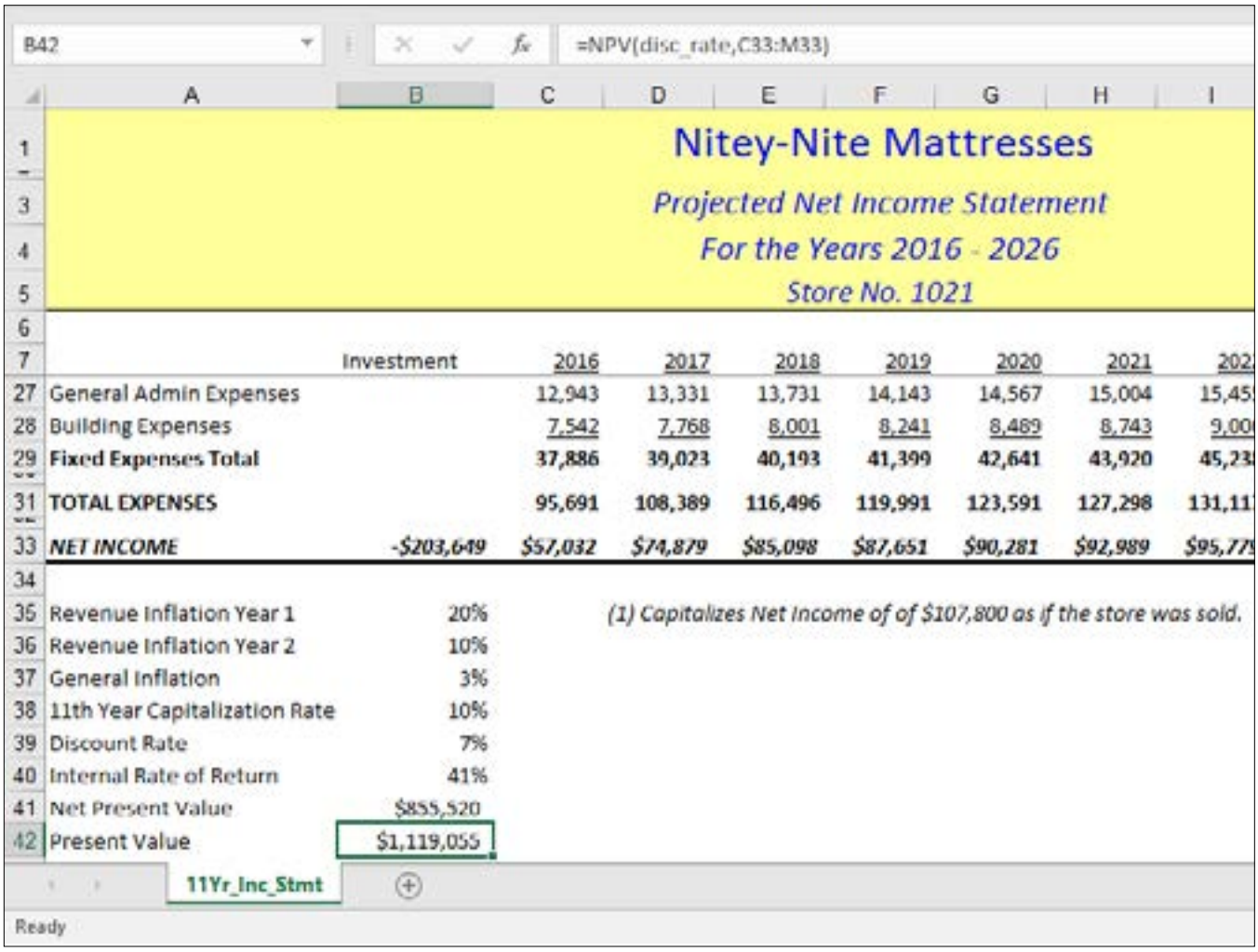


Figure 8.41

The result is $1,119,055, which represents the **present value** of the investment. Just remember, the present value does not consider the initial investment, whereas the **net present value** includes it.

> ***Note:*** *If you tried to subtract the* **Present Value** *calculation from the* **Net Present Value** *calculation, you would recognize that the result does not equal $203,649. Why? Remember that the* **disc_rate** *is included, and does not equal zero, so there is currently a rate applied to the initial investment. For proof, you could set the disc_rate to zero. At this point, the difference equals the initial investment of $203,649.*

4. **Save** *and* **close** *the* **myProforma.xlsx** *file.*

Math Functions

Math functions are very useful and easy to learn, assuming you have a relatively good grasp on math. Let's start off with the RAND() function.

The RAND() Function

Sometimes when creating spreadsheets, I need to input some test, or fictitious data. One of the most useful math functions in creating fictitious data is the Random, or RAND() function. It is a function that simply creates a random number between 0 and 1. Let's try it.

1. **Open** *a* **Blank workbook**.
2. **Save As C:\ExcelCEO\Excel 2016\Chapter8*myMath.xlsx***.
3. *In* **Cell A1** *of* **Sheet1**, *type:* ***=RAND()***

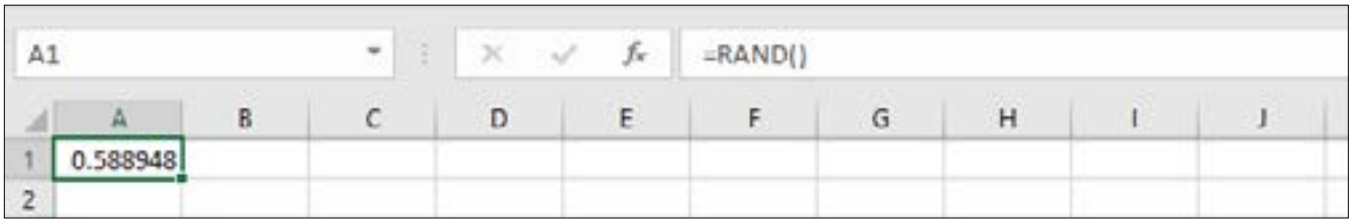


Figure 8.42

Keep in mind that my number will be different from yours, as Excel is generating a random number. Excel 2016 also provides a function called RANDBETWEEN(). It is a great function if you need random numbers between two ranges and are too lazy (like me) to write the formula inside the RAND() formula. Let's create random numbers between 1,000 and 9,999.

4. *Edit* **Cell A1** *to be:* ***=RANDBETWEEN(1000,9999)***
5. *Copy* **Cell A1** *down* **through Cell A10**.

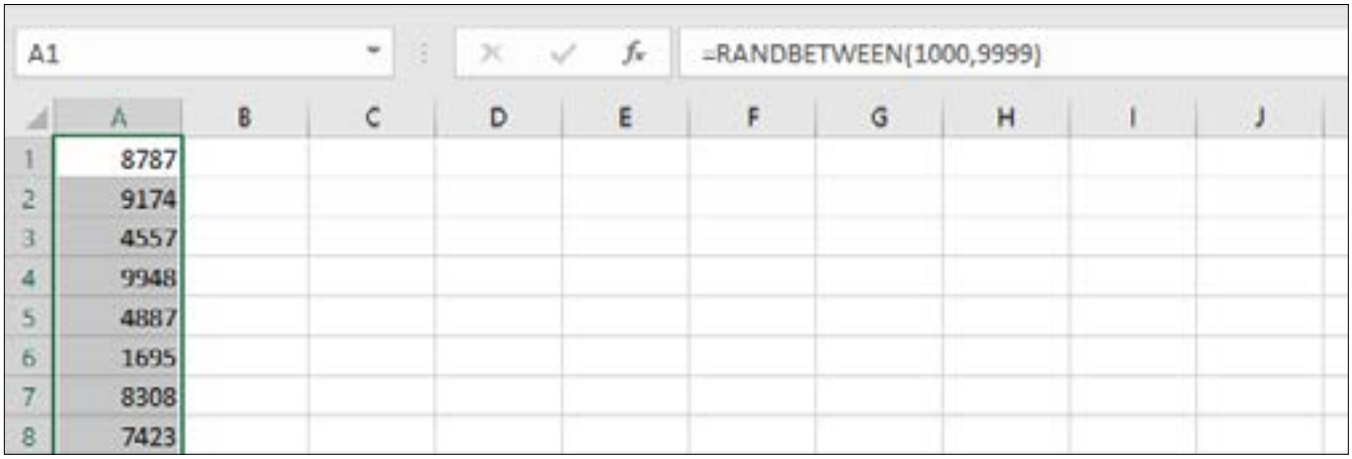


Figure 8.43

Again, your numbers will be different than mine. Every time you make a change to the spreadsheet, or when you press the [F9] key, the ***RAND()*** or ***RANDBETWEEN()*** numbers change. Try it. Press the [F9] key several times and watch the numbers generated by these functions change.

The INT() and ROUND() Functions

The ***INT() function*** rounds a number down to the nearest whole integer, and the ***ROUND() function*** rounds a number up or down to a level you specify. Normally, I use the ROUND() function, but I've found the ***INT() function*** to be very useful in certain situations. To illustrate the difference, try the following:

6. *Insert a* **New Sheet** *in the* **myMath.xlsx** *file.*
7. *Type the following values in the corresponding cells:*

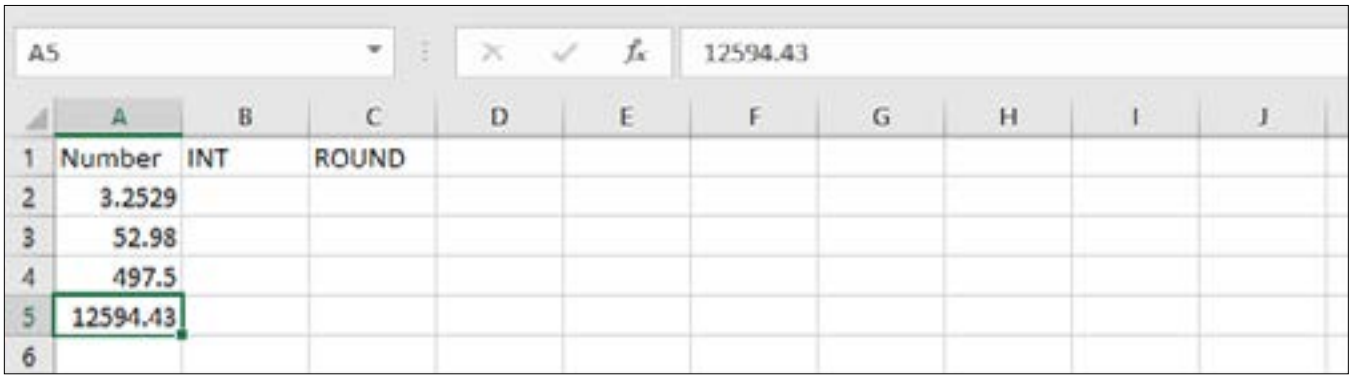


Figure 8.44

8. *In* **Cell B2**, *type:* ***=INT(A2)***

The result is 3, as the formula takes 3.2529 and rounds it down to the nearest whole integer, which is 3. In other words, the INT() function truncates or deletes all numbers to the right of the decimal point. Note that the INT() function has only one argument – the number that you want to apply the function to.

9. *Copy the formula down for all cells through* **Cell B5**.

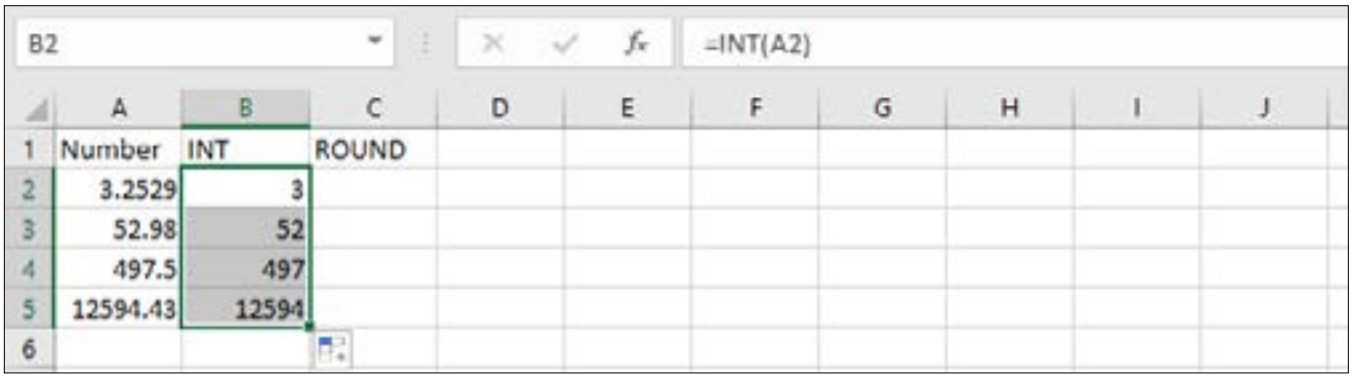


Figure 8.45

The ROUND() function allows you to specify the decimal place you want to round to. You make that determination in the second argument of the function.

10. In **Cell C2**, *write the following formula:* ***=ROUND(A2,2)***

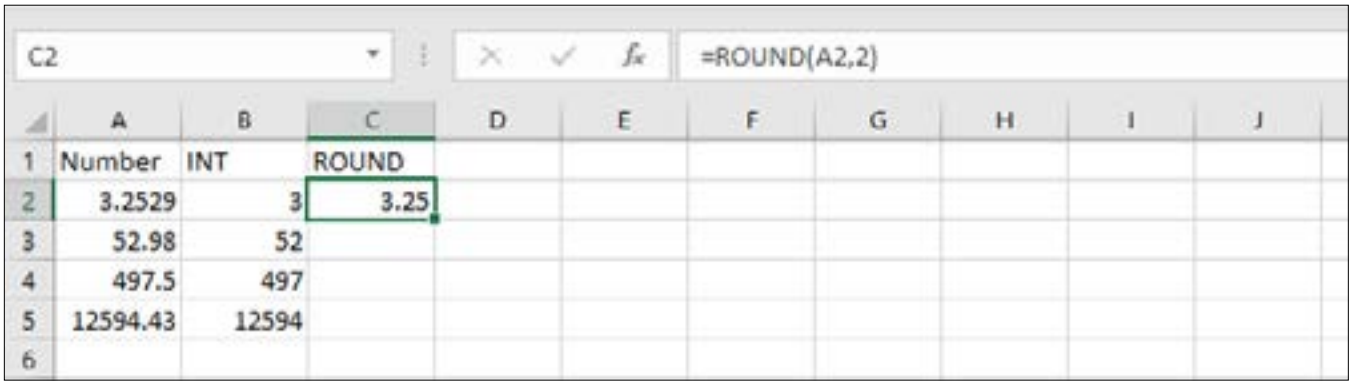


Figure 8.46

You can round to as many decimal places as you want by simply changing the number in the second argument.

11. In **Cell C3**, *write the following formula:* ***=ROUND(A3,0)***

12. Copy **Cell C3** *down* **to Cell C4**.

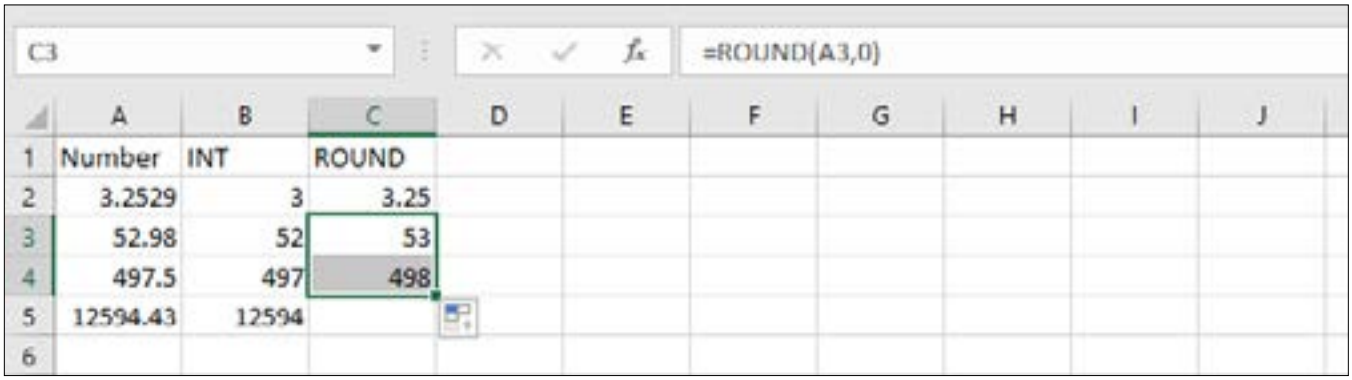
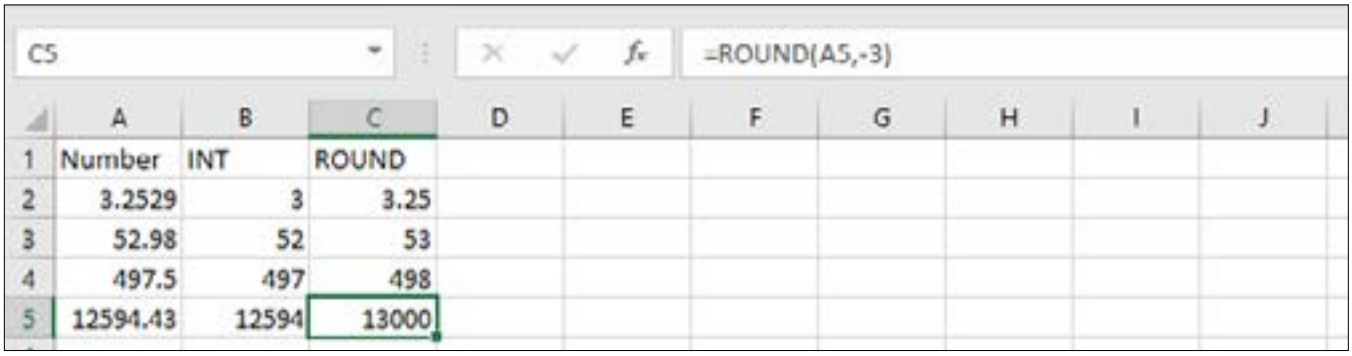


Figure 8.47

You can also round a number to a significant level, such as 10s, 100s, 1000s, etc. You do this by typing a negative number in the second argument. For example, suppose you want to round 12,594.43 to the thousands of dollars.

13. In **Cell C5**, *write the following formula:* ***=ROUND(A5,-3)***



	A	B	C	D	E	F	G	H	I	J
1	Number	INT	ROUND							
2	3.2529	3	3.25							
3	52.98	52	53							
4	497.5	497	498							
5	12594.43	12594	13000							

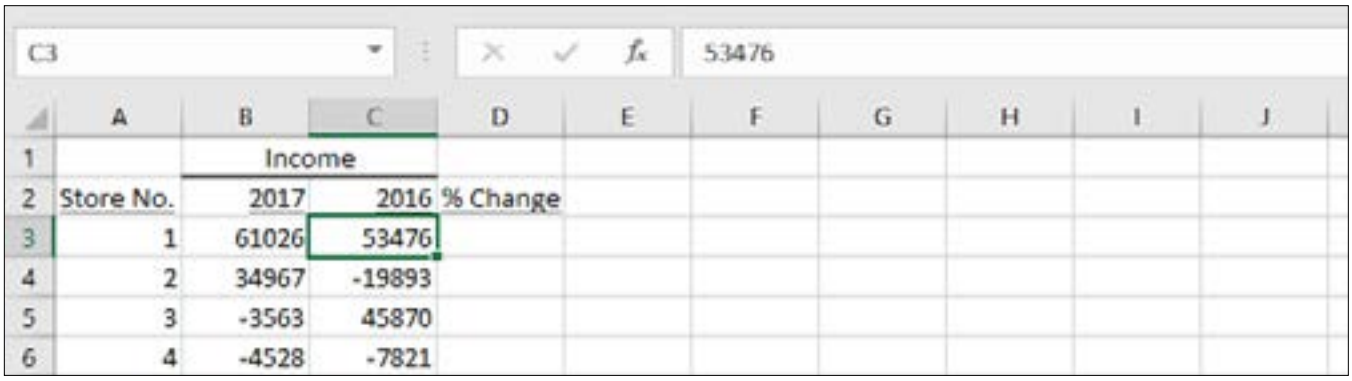
Figure 8.48

Changing the formula to be =ROUND(A5,-2) rounds to the hundreds of dollars and returns 12600.

The ABS() Function

The next helpful math function is the Absolute Value, or ***ABS() function***. An absolute value is simply the positive value of any number, or the distance it is from zero. It has only one argument, which is the number for which you want to calculate the absolute value. Over the years, I've used this function in a handy little formula that calculates year-over-year performance. Sometimes the year-over-year numbers get kind of weird, and the ABS() function has helped save the day.

1. *Insert a* **New Sheet**.
2. *Create a table similar to the following:*



	A	B	C	D	E	F	G	H	I	J
1		Income								
2	Store No.	2017	2016	% Change						
3	1	61026	53476							
4	2	34967	-19893							
5	3	-3563	45870							
6	4	-4528	-7821							

Figure 8.49

Typically, a percentage change formula is calculated by taking the current year number less the prior year number, divided by the prior year number.

3. *In* **Cell D3**, *type the following formula:* ***=(B3-C3)/C3***
4. *Format as* **Percent**, **one decimal place**.
5. *Copy that formula down to* **Cells D4 through D6**.

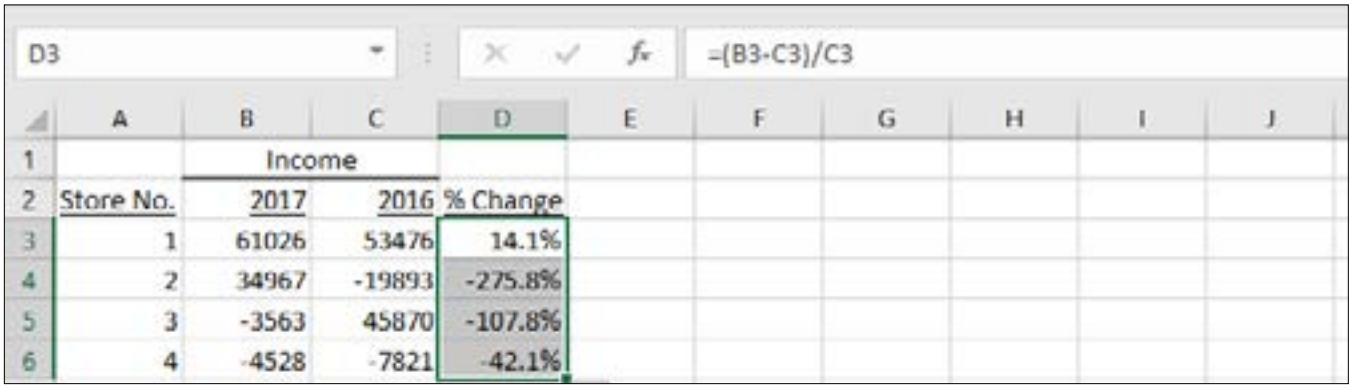


Figure 8.50

The numbers calculate with no error message, but look at the results. The % Change for Store No. 1 looks reasonable (indicating a 14.1% increase in income), but Store No. 2 had negative income in 2016 and positive income in 2017, yet the % Change calculates to be a negative percentage, which can't be correct. Mathematically it is correct, but logically it is not. You can use the ABS() function in the formula to correct the calculation:

6. *Edit the formula in* **Cell D3** *to the following:* ***=(B3-C3)/ABS(C3)***
7. *Copy the formula down to the cells below.*

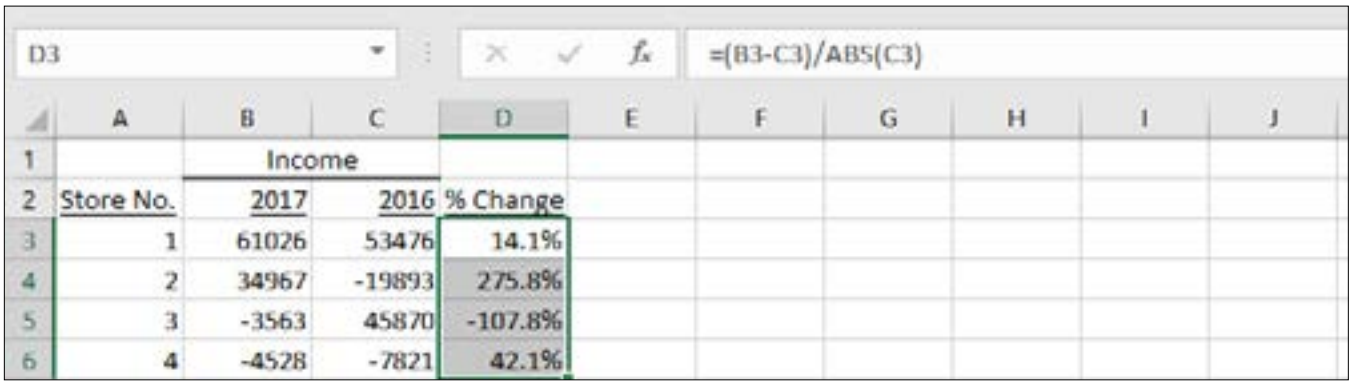


Figure 8.51

Now let's look logically at the results. Store No. 2 did much better in 2017 than it did in 2016 and the percentage change reflects a big increase. Store No. 3 was very positive in 2016, but went down below zero in 2017, as reflected in the -107.8% number. Store No. 4 is negative in both years, but it is less negative in 2017, which indicates a positive trend. Trust me – this formula works. It is a very handy formula. Keep it.

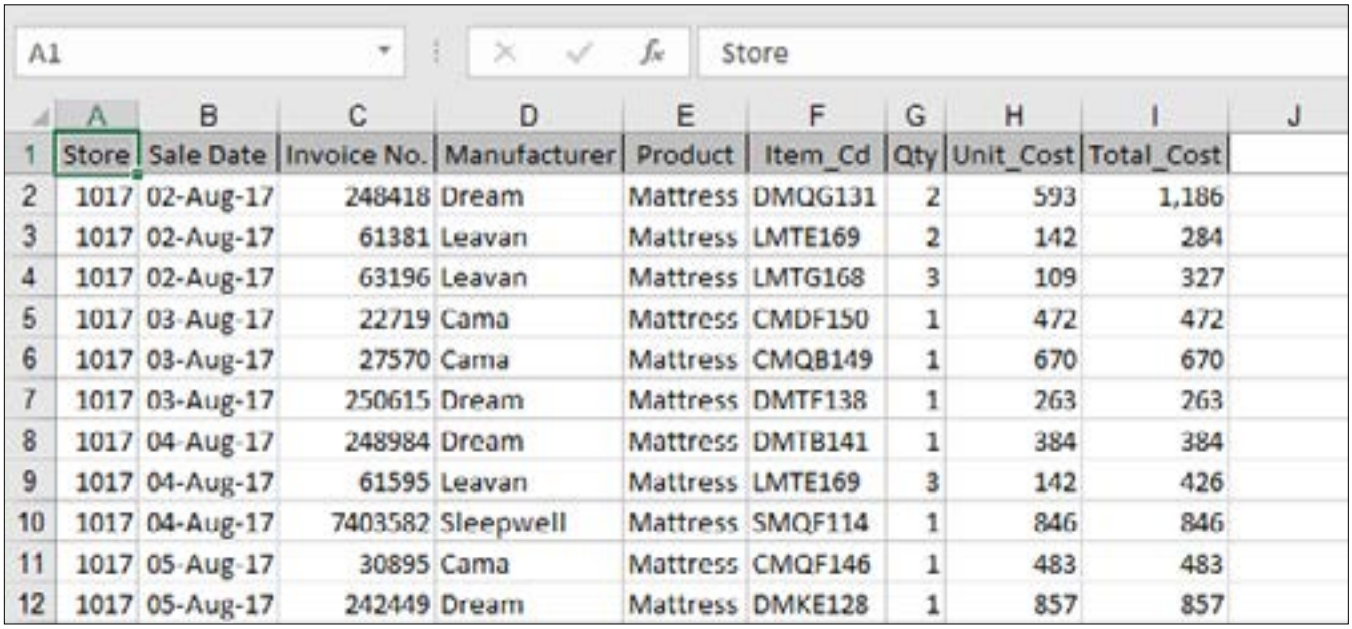
8. **Save** *and* **close** *the* **myMath.xlsx** *file.*

The SUMIF() Function

We already introduced the =SUM() function in Chapter 1. However, the ***SUMIF() function*** is very useful

in extracting summary data from databases by adding cells that meet a specified criteria. Let's try an example using this function.

1. **Open** *the file* **C:\ExcelCEO\Excel 2016\Chapter8\1017_Mattresses.xlsx**.
2. **Save As C:\ExcelCEO\Excel 2016\Chapter8*my1017_Mattresses.xlsx***.

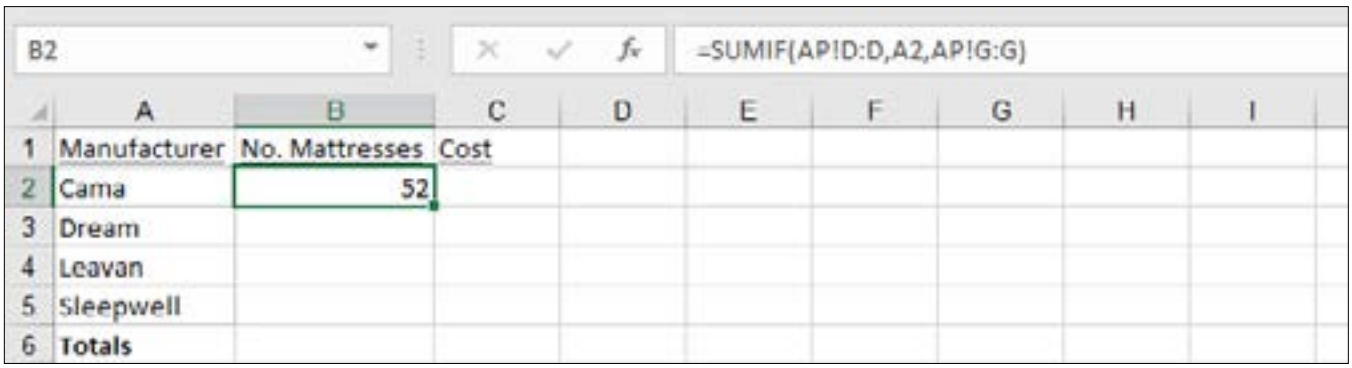


	A	B	C	D	E	F	G	H	I	J
1	Store	Sale Date	Invoice No.	Manufacturer	Product	Item_Cd	Qty	Unit_Cost	Total_Cost	
2	1017	02-Aug-17	248418	Dream	Mattress	DMQG131	2	593	1,186	
3	1017	02-Aug-17	61381	Leavan	Mattress	LMTE169	2	142	284	
4	1017	02-Aug-17	63196	Leavan	Mattress	LMTG168	3	109	327	
5	1017	03-Aug-17	22719	Cama	Mattress	CMDF150	1	472	472	
6	1017	03-Aug-17	27570	Cama	Mattress	CMQB149	1	670	670	
7	1017	03-Aug-17	250615	Dream	Mattress	DMTF138	1	263	263	
8	1017	04-Aug-17	248984	Dream	Mattress	DMTB141	1	384	384	
9	1017	04-Aug-17	61595	Leavan	Mattress	LMTE169	3	142	426	
10	1017	04-Aug-17	7403582	Sleepwell	Mattress	SMQF114	1	846	846	
11	1017	05-Aug-17	30895	Cama	Mattress	CMQF146	1	483	483	
12	1017	05-Aug-17	242449	Dream	Mattress	DMKE128	1	857	857	

Figure 8.52

The AP tab (AP stands for Accounts Payable) contains a detailed list of all of the mattresses purchased by Nitey-Nite at Store No. 1017 in August 2017. Your job is to create a summary report that lists the name of the manufacturer, the total number of units purchased from that manufacturer, and the total cost. The Summary tab contains a shell of the report. You need to write the SUMIF() formula to calculate the total units and total costs.

3. *Click on the* Summary *tab.*
4. *In* **Cell B2**, *write the following formula:* ***=SUMIF(AP!D:D,A2,AP!G:G)***



	A	B	C	D	E	F	G	H	I
1	Manufacturer	No. Mattresses	Cost						
2	Cama	52							
3	Dream								
4	Leavan								
5	Sleepwell								
6	Totals								

Figure 8.53

Remember, instead of typing the formula, you can type "=SUMIF(" then click on Column D in the AP tab, type a comma, click on Cell A2 in the Summary tab, type a comma, and click on Column G in the AP tab. For me, that way is easier than typing in the formula. As long as there are no subtotals or anything else that is inconsistent with the data in the referenced tab, the formula will work.

This formula says to look at Column D in the AP tab, and for every occurrence of whatever is in Cell A2, sum the contents of Column G in the AP tab, or the number of units. The answer is 52. Let's check that number.

5. *Sort the list in the* AP *tab by* **Manufacturer**.
6. *Select* **Cells G2 through G29** *(which should be the Quantity sold by Cama).*

The AutoSum number should be 52.

7. *Copy the formula in the* **Summary** *tab,* **Cell B2**, *to* **Cells B3**, **B4**, *and* **B5**.

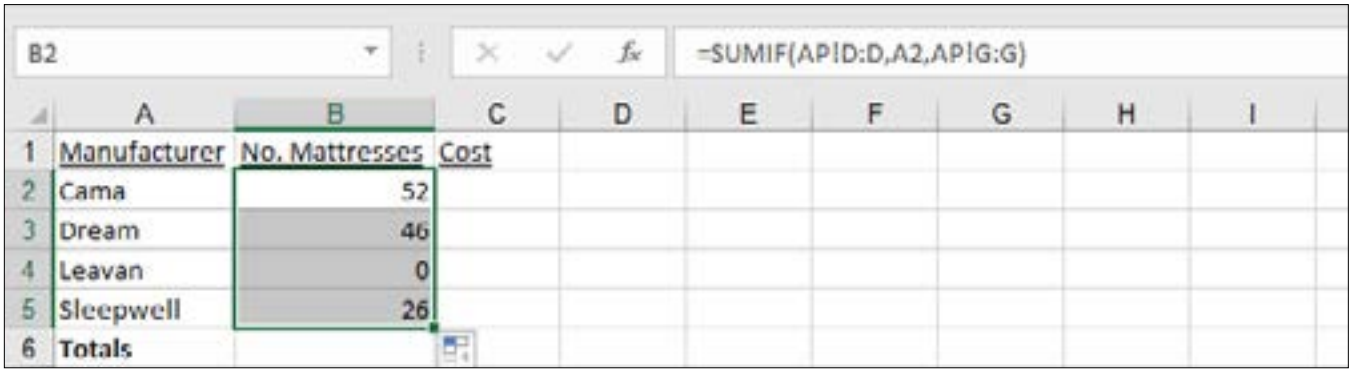


Figure 8.54

***Note**: Since we selected the entire columns* **D** *and* **G** *in our formula, we had no problems with unrelated data involved when we copied the formula down.*

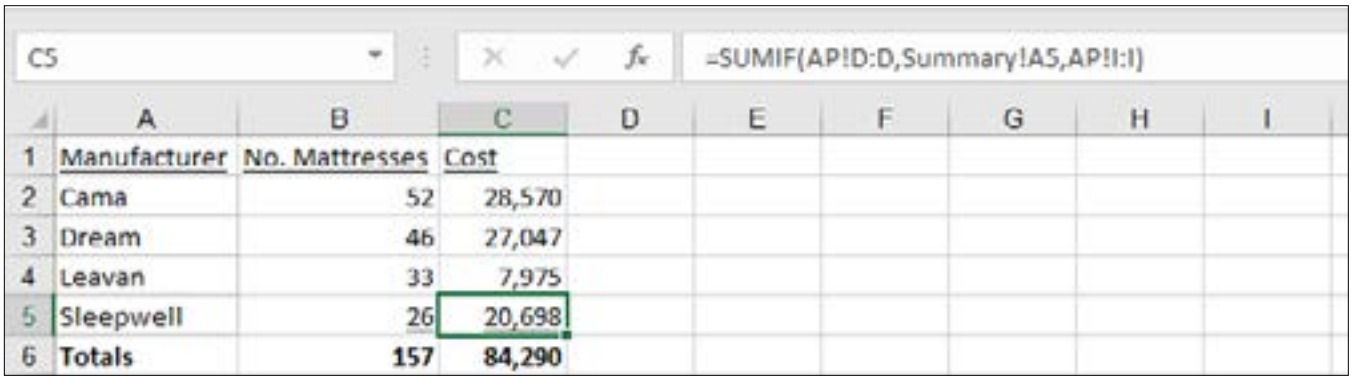
The formula indicates that Leavan sold no mattresses. Is that correct? If you look at the AP tab, you will see that is not correct, as Leavan has a number of entries. What could be wrong? In order for the SUMIF() function to work, the criteria in the database (i.e.- the Manufacturer name) and the criteria in the Summary tab must be exactly the same. But they appear to be the same! Remember, sometimes text comes from programs with spaces in screwy places. In this case, there is a space after the letter "n" in Leavan in Cell A4 of the Summary tab. Take out that space and the formula will work.

8. *Edit* **Cell A4** *of the* Summary *tab to take out the space after the letter* **n**.

Alternatively, you could surround the A4 reference in the formula with a TRIM() function. Either way would work.

9. *Write a* **SUMIF()** *formula to calculate the total cost for each manufacturer.*

10. *Underline* **Cells B5 and C5**.
11. **Sum** *the number of mattresses, and the cost in* **Cells B6 and C6**.
12. *Format the values as follows:*



	A	B	C	D	E	F	G	H	I
1	Manufacturer	No. Mattresses	Cost						
2	Cama	52	28,570						
3	Dream	46	27,047						
4	Leavan	33	7,975						
5	Sleepwell	26	20,698						
6	**Totals**	**157**	**84,290**						

Figure 8.55

13. *Check your answers with the* AP *tab.*

The SUMIFS() Function

The ***SUMIFS() function***, which was new in Excel 2010, allows the user to use a SUMIF() function to input multiple criteria. You could probably nest an AND() function (discussed later in this course) to accomplish the same purpose, but it sure is convenient to have the SUMIFS() function be able to contain multiple criteria, which is very handy when you want a sum to filter on multiple criteria such as Dream King Size Excellent mattresses sold in June 2016.

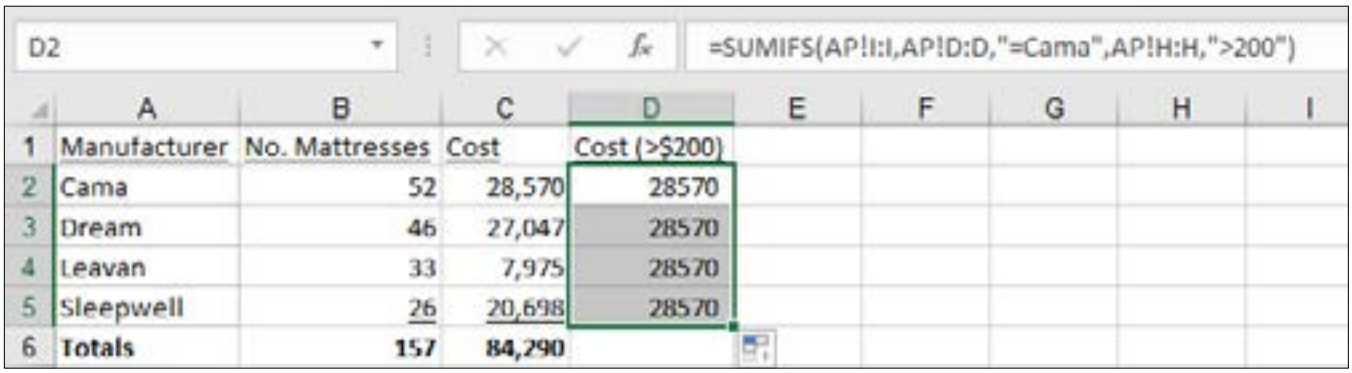
Let's say you want to repeat the same cost calculation as you did in the previous exercise, but you want to include only the items that have a unit cost greater than $200. Management believes that the items with a cost lower than $200 would distort what they are trying to accomplish in this analysis. I'll give you the formula and then we'll discuss it.

14. *In* **Cell D1**, *type* ***Cost (>$200)***, *underline the cell and resize the column.*
15. *In* **Cell D2**, *write the following formula and press* **[Enter]**: ***=SUMIFS(AP!I:I,AP!D:D, "=CAMA",AP!H:H,">200")***

Let's take a look at this formula. It looks similar to a SUMIF() function, but it has more stuff in it. The first part of the formula is the sum_range. It says that we want to sum up the values in Column I of the AP tab. Then we have to program in the criteria. If you notice in the screen tip that appears when you click inside the formula in the Formula Bar on AP!D:D, the text criteria_range1 appears in bold. This is the range of the first criteria. As it appears without brackets, it is a required field. Our formula indicates that the range is in Column D of the AP tab, which shows the name of the manufacturer. The last two arguments are to filter only the values in Column H for those that havea unit cost greater than $200. As you can see in the screen tip, you can have several additional criteria, indicated by the arguments in brackets ([criteria_range3, criteria3], etc.). If you did it right, Cells C2 and D2 return the same result as there are no unit costs for CAMA less than $200.

In the criteria1 argument, we have "=CAMA" typed all in upper-case. I just wanted to do that to show you that this criteria is not case-sensitive. Let's change the criteria to look like Cell A2.

16. *Change the formula in* **Cell D2** *to show* ***Cama***.
17. *Copy the formula in* **Cell D2** *to* **Cells D3 through D5**.



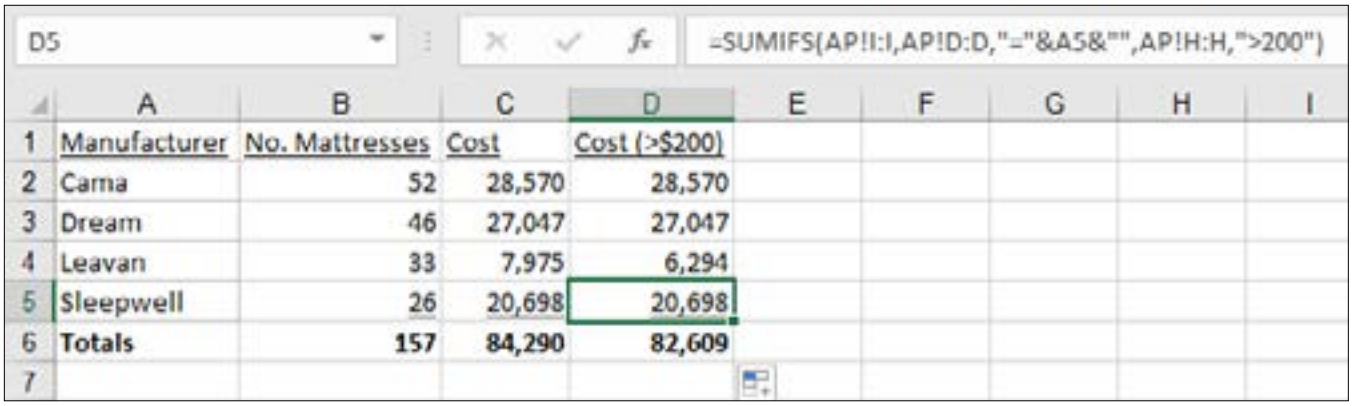
D2 =SUMIFS(AP!I:I,AP!D:D,"=Cama",AP!H:H,">200")

	A	B	C	D	E	F	G	H	I
1	Manufacturer	No. Mattresses	Cost	Cost (>$200)					
2	Cama	52	28,570	28570					
3	Dream	46	27,047	28570					
4	Leavan	33	7,975	28570					
5	Sleepwell	26	20,698	28570					
6	**Totals**	**157**	**84,290**						

Figure 8.56

What happened there? It should be easy to figure out. The manufacturer Cama is hard-coded in the formula, so no matter what the name of the manufacturer is in Column A, the formula will return the results for Cama. Let's correct that. Now, since the name Cama is a text string, we need to convert this formula to read whatever is in Column A. To do that, we need to replace Cama with "&A2&".

18. *In the formula in* **Cell D2**, *replace* **Cama** *with* ***"&A2&"***, *copy to all cells below, and format the same as in* **Column C**.



D5 =SUMIFS(AP!I:I,AP!D:D,"="&A5&"",AP!H:H,">200")

	A	B	C	D	E	F	G	H	I
1	Manufacturer	No. Mattresses	Cost	Cost (>$200)					
2	Cama	52	28,570	28,570					
3	Dream	46	27,047	27,047					
4	Leavan	33	7,975	6,294					
5	Sleepwell	26	20,698	20,698					
6	**Totals**	**157**	**84,290**	**82,609**					
7									

Figure 8.57

If you check the data in the AP tab, you'll see that the only manufacturer with items that cost less than $200 is Leavan. The cost for all of the other manufacturers is the same as in the SUMIF() function. The sample data here is small, but SUMIF() and particularly SUMIFS() can be very powerful for filtering very specifically on your data. One word of caution: The larger the dataset, the more of a resource hog these functions can become. If the filtering becomes too complex, a PivotTable may become a better option as those tend to calculate quicker.

19. **Save** *and* **close** *the* **my1017_Mattresses.xlsx** *file.*

> ***Review Questions****: It is now time to complete the hands-on Review Questions. Log on to www.ExcelCEO.com with your Email address and Password, click on the* **Excel 2016 Review Questions, Chapter 8, Section 4 of 4** *option in your Main Menu, and complete the Review Questions.*

Conclusion

In this chapter, you learned about the various Financial functions. You used the PMT() function to help in the creation of a basic amortization schedule. You used Scenario Manager to keep track of your scenarios of a mortgage/home purchase analysis. You created a Proforma Income Statement that had variables you could change and instantly see the results. You learned some of the ways that appraisers and analysts estimate the value of a business, investment, or income-producing property (the Direct Capitalization and the Discounted Cash Flow (DCF) method), and worked an example using both methods. You created other formulas using the PV(), FV(), IRR() and NPV() functions. You used the Find and Replace functionality to look for and replace text within formulas. Finally, you learned about Math Functions and worked examples using the RAND(), RANDBETWEEN(), INT(), ROUND(), ABS(), SUMIF() and SUMIFS() functions.

Chapter Exam

To take the examination for this chapter, you must have successfully completed the examination for the previous chapter. You can now go to www.ExcelCEO.com, click on Sign In, log in and take the exam. Make sure that you take the exam on the same computer on which you completed the practice files, as some of the questions on the exam may refer to some of the completed projects. Chapter exams are intended to be hands-on.

CHAPTER NINE — DATE, STATISTICAL AND LOOKUP FUNCTIONS

Chapter Objectives:

- Identify Date Functions, including:
  - o NOW()
  - o TODAY()
  - o MONTH()
  - o DAY()
  - o YEAR()
  - o DATE()
  - o WEEKDAY()

- Recognize Statistical Functions, including:
  - o COUNT()
  - o AVERAGE() and AVERAGEIFS()
  - o MEDIAN()
  - o MODE()
  - o MAX()
  - o MIN()
  - o COUNTIF() and COUNTIFS()
  - o RANK()

- Choose the appropriate Statistical functions create a summary and an item-by-item margin analysis
- Identify database Functions, including:
  - o DSUM()
  - o DCOUNT()

- Recognize Lookup Functions, including:
  - o Develop VLOOKUP() Formulas for establishing complex relationship in your data
  - o Understand HLOOKUP() functionality for when tables are setup in a horizontal format

- Choose the methodology for creating drop-down menus using Data Validation
- Determine how to separate data into columns using Text to Columns

Projects You Will Complete During This Chapter:

my1018_Sales.xlsx, myDate.xlsx, myEmployees.xlsx, myItem.xlsx, myItem_2.xlsx, myLookup.xlsx

CPE Credits possible for this chapter: 3

Introduction

Back in the 1960's, there was a game show hosted by Monty Hall called "*Let's Make a Deal*". On stage, there were three doors: Door No. 1, Door No. 2, and Door No. 3. Behind one of the doors was a grand prize, like a car, a living room suite, or something else very expensive. Behind the other two doors were booby prizes, like a candy bar or a box of pencils. The contestant would pick one of the doors and win whatever prize was behind it. Before the contestant saw the prize behind the door he or she picked, Monty would show the contestant and the audience one of the booby prizes behind one of the doors not picked. Then Monty would give the contestant a choice: Do you want to stay with the original door chosen, or do you want to pick the other one? What should the contestant do? Should the contestant A) always switch to the other door; B) always stay with the original door they picked; or C) it doesn't matter. Most people would say C, as there appears to be a 50/50 chance. However, if the contestant would always switch, he/she would have a 67% win rate. How is that so? Answer: The magic of statistics. A programmer friend of mine once argued with me about this until he was blue in the face. He finally proved it to himself by writing a program that played the game and made those choices. He came back humbled and told me that the win rate was 68% out of 10,000 iterations, if he always switched doors in his program.

Date Functions

We've already introduced the concepts of formatting dates in Chapter 1, but now we'll review date and time functions. Remember that a date is simply a number that is formatted to look like a date. The number 1 represents January 1, 1900, 2 represents January 2, 1900. March 4, 2017 is 42,798, or in other words, there are 42,798 days from 1/1/1900 to 3/4/2017. Sometimes you will want to perform calculations based on the day of the week (Monday, Tuesday, etc.) and other times you may want to split apart the month, day, and year into separate cells. Let's experiment with each of those functions.

The NOW() and TODAY() Functions

1. **Open** *Excel to a* **Blank workbook**, *and make* **Sheet1** *look like the following:*

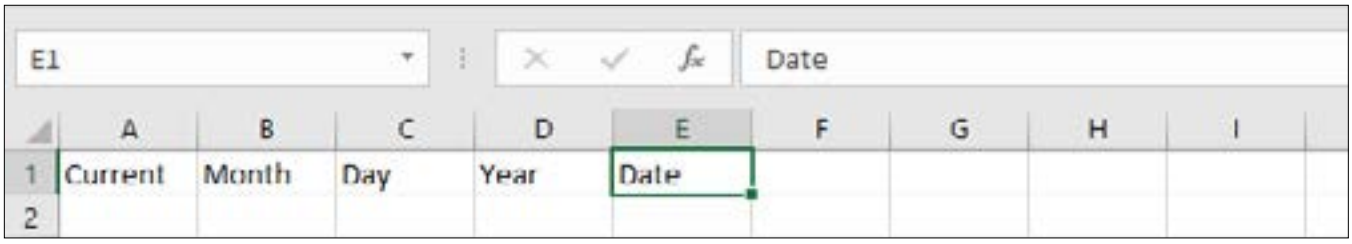


Figure 9.1

2. **Save As C:/ExcelCEO/Excel 2016/Chapter9/*myDate.xlsx*.**
3. *In* **Cell A2**, *type:* ***=NOW()***
4. *In* **Cell A3**, *type:* ***=TODAY()***

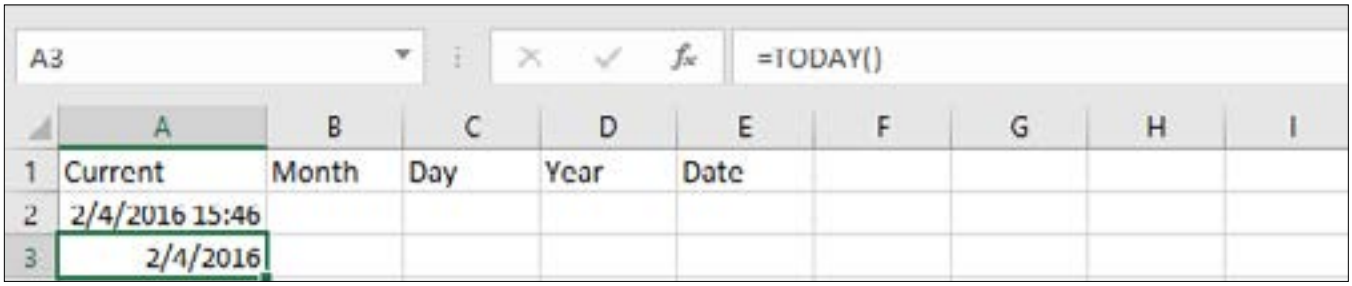


Figure 9.2

The ***NOW()*** and ***TODAY()*** functions are very similar, except that the NOW() function returns the current date and time, whereas the TODAY() function includes only the current date. Your results will reflect the date and time you performed this exercise.

The MONTH(), DAY(), YEAR(), and DATE() Functions

You can split out the Month, Day and Year from a date using the ***MONTH()***, ***DAY()***, and ***YEAR()*** functions.

6. *In* **Cell B2**, *type:* ***=MONTH(A2)***

This formula returns the number 2, as I was writing this portion of the course on February 4, 2016. You can now treat this number just like any other number.

7. *Edit* **Cell B2** *as follows:* ***=MONTH(A2)-1***
8. *Format* **Cell B2** *as* **Number** *with* **no decimal places**.

The result in my example is now 1, which is 2 less one. You have to be careful with the MONTH() function, though. I had a student do a similar example in January and ended up with 0. Just remember that this function returns a number, not a month.

9. *Take out the -1 in* **Cell B2**.
10. *In* **Cell C2**, *type:* ***=DAY(A2)***
11. *In* **Cell D2**, *type:* ***=YEAR(A2)***

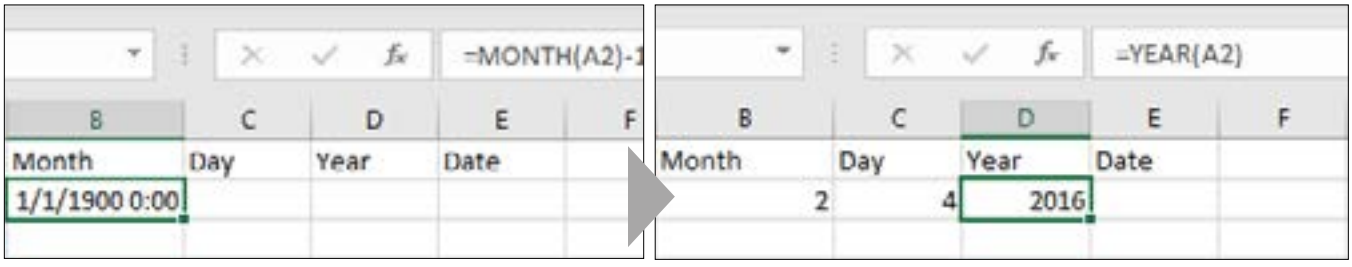


Figure 9.3

The MONTH(), DAY(), and YEAR() functions are very easy to understand. Sometimes data can come

to you in different ways, and many times dates are split up into Month, Day, and Year columns. You can easily put them back into one cell by using the DATE() function. The DATE() function has three arguments: Year, Month, and Day.

12. In **Cell E2**, *type:* ***=DATE(D2,B2,C2)***

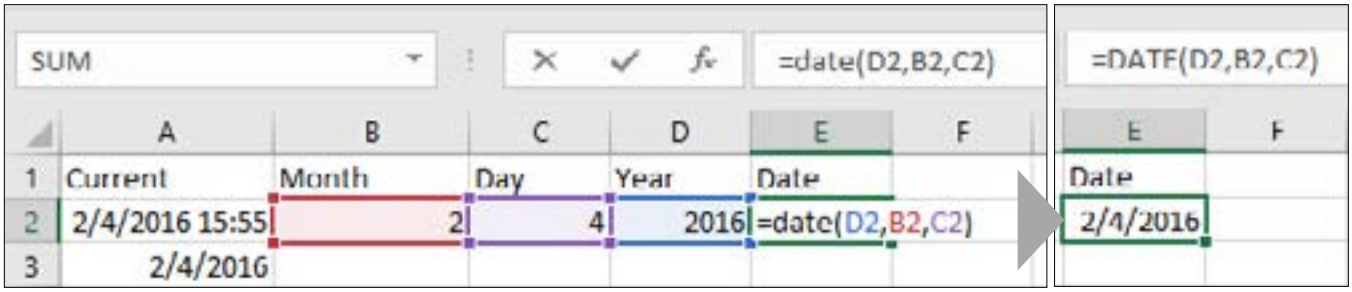


Figure 9.4

The result is 2/4/2016, which is the same date as the NOW() and TODAY() functions we input into Column A.

The WEEKDAY() Function

Sometimes you need to know the day of the week (i.e., Sunday, Monday, Tuesday, etc.). Do you think it would be important to understand the daily highs and lows of a retail sales operation based on the days of the week? You bet it's important. If your lowest sales day of the week is on Wednesday, you may want to run a "Wicked Wednesday" special to try and drive sales on that day. For this, you can use the ***WEEKDAY()*** function.

13. In **Cell E3**, *type:* ***=WEEKDAY(E2)***

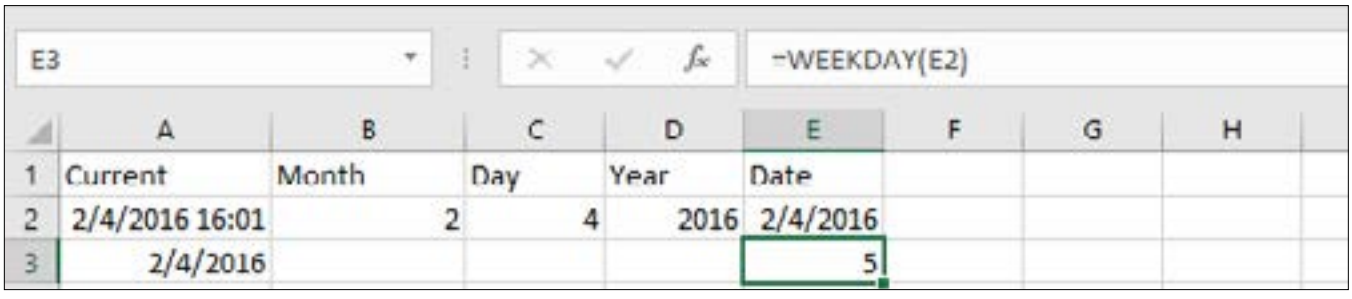


Figure 9.5

The result is 5, meaning that 2/4/2016 falls on the fifth day of the week, Thursday. To display the word "Thursday" instead of the number five, simply format the cell.

14. While on **Cell E3**, *press* **[Ctrl]+1** *(which is another way to display the* **Format Cells** *dialog box).*

15. Click on the **Custom** *category, and input* ***dddd*** *in the* **Type** *box.*

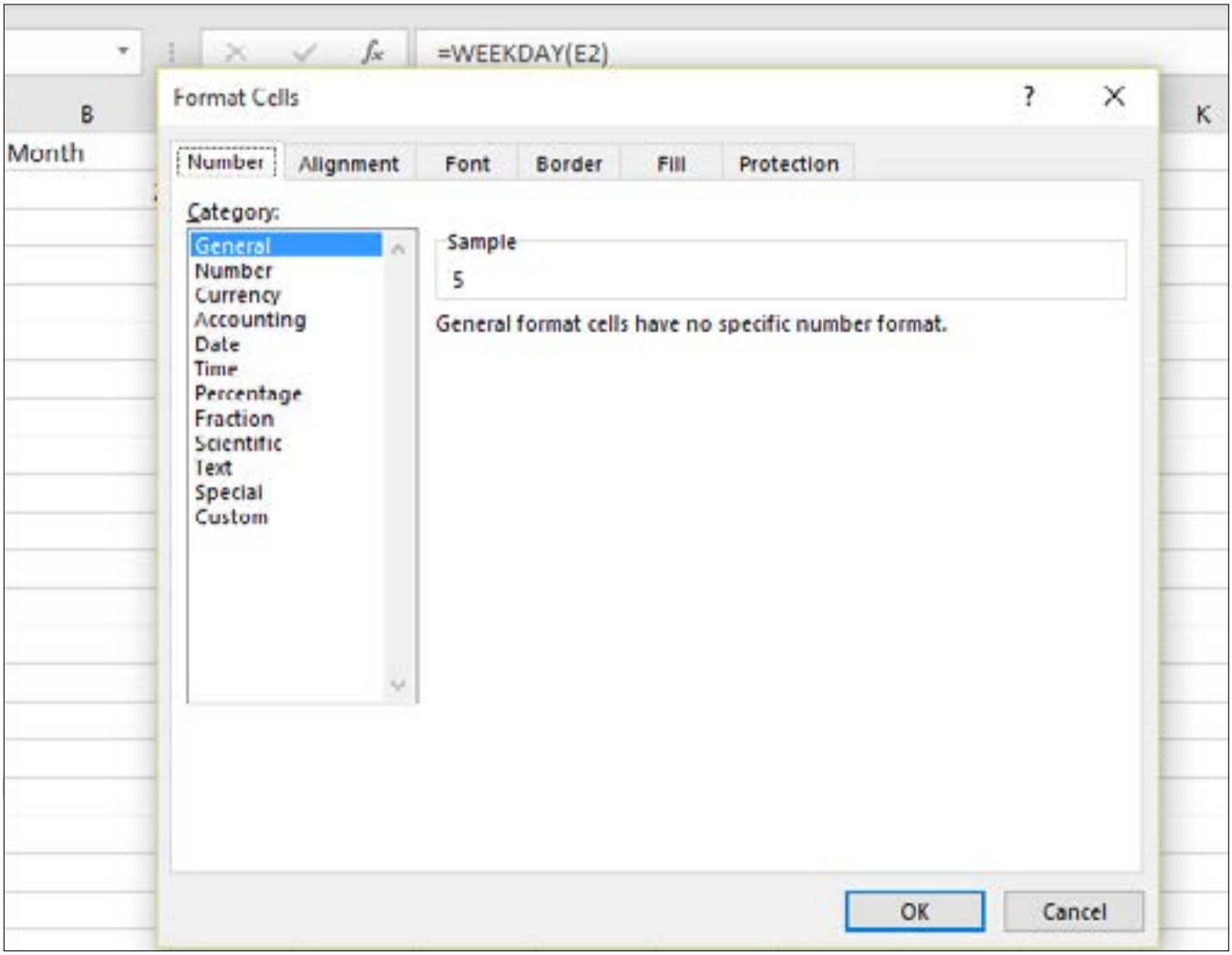


Figure 9.6

16. Click **OK**.

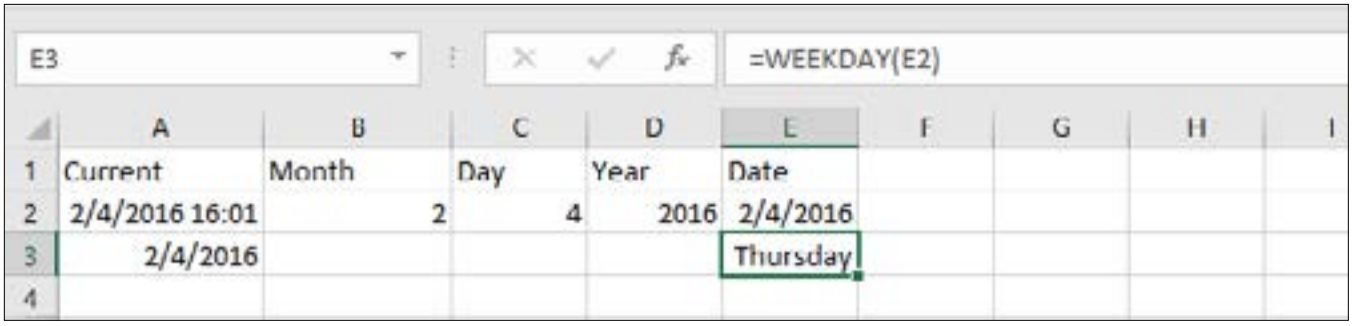


Figure 9.7

Dates in Excel can be seemingly difficult to understand, but if you've completed this simple exercise, you should now have a relatively good grasp on dates.

17. **Save** *and* **close** *the* **myDate.xlsx** *file.*

> ***Review Questions****: It is now time to complete the hands-on Review Questions. Log on to www.ExcelCEO.com with your Email address and Password, click on the* **Excel 2016 Review Questions, Chapter 9, Section 1 of 4** *option in your Main Menu, and complete the Review Questions.*

Statistical Functions

Managers love **statistics**. In many companies, statistics are the life-blood of the organization. Since Nitey-Nite Mattresses is an up-and-coming company, there are numerous vendors who try to convince us to use their products. We would be interested in using other vendors if their products made sense to the organization, both financially and in terms of making the product fit into our line. In the next exercise, you will prepare a report that analyzes the profit margins of all the products that Nitey-Nite sells. When vendors approach us, management can use this report to compare our current line with their products to make a first-pass decision on whether or not a relationship should be investigated. To do so, we will use a number of statistical functions.

The COUNT() Function

Probably the easiest statistical function to understand in the COUNT() function. The ***COUNT() function*** simply counts the number of cells in the selected range that contain any **numeric** value. Let's prepare an example to use.

1. **Open** *the file* **C:\ExcelCEO\Excel 2016\Chapter9\Item.xlsx**.
2. **Save As C:\ExcelCEO\Excel 2016\Chapter9*myItem.xlsx***.

A2 | 1

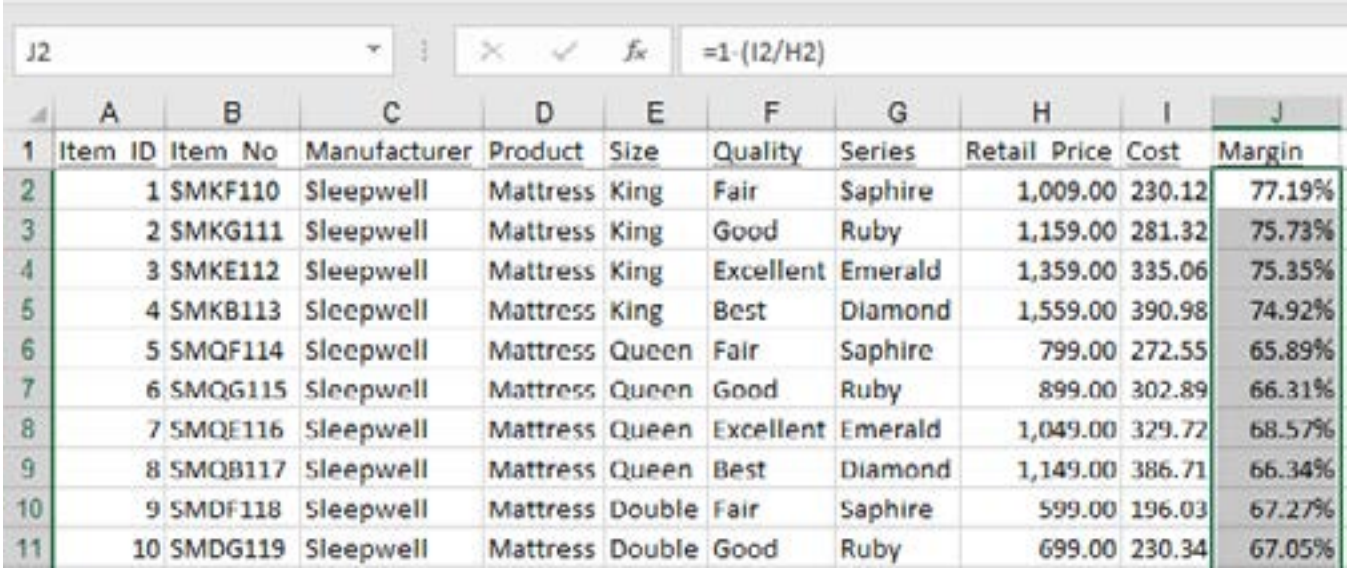
	A	B	C	D	E	F	G	H	I
1	Item_ID	Item_No	Manufacturer	Product	Size	Quality	Series	Retail_Price	Cost
2	1	SMKF110	Sleepwell	Mattress	King	Fair	Saphire	1,009.00	230.12
3	2	SMKG111	Sleepwell	Mattress	King	Good	Ruby	1,159.00	281.32
4	3	SMKE112	Sleepwell	Mattress	King	Excellent	Emerald	1,359.00	335.06
5	4	SMKB113	Sleepwell	Mattress	King	Best	Diamond	1,559.00	390.98
6	5	SMQF114	Sleepwell	Mattress	Queen	Fair	Saphire	799.00	272.55
7	6	SMQG115	Sleepwell	Mattress	Queen	Good	Ruby	899.00	302.89

Figure 9.8

This file is a listing of every mattress and pillow that Nitey-Nite sells. The first thing you need to do is to prepare the file to return the statistics you need. Then you will set up an area on the spreadsheet which will contain summary statistical information about the items in the list.

3. *In* **Cell J1**, *type:* ***Margin****, and underline it.*

4. *In* **Cell J2**, *write a formula that calculates the margin (the margin is the inverse of the cost over the retail price, or one minus (cost / retail price)).*
5. *Format* **Cell J2** *to be* **Percent** *with* **two decimal places**, *and copy to all cells below.*

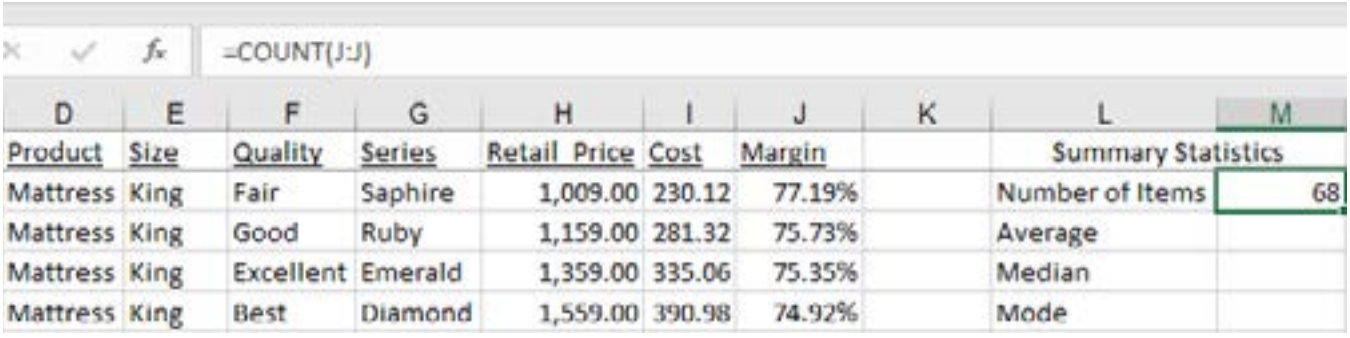


J2 | =1-(I2/H2)

	A	B	C	D	E	F	G	H	I	J
1	Item ID	Item No	Manufacturer	Product	Size	Quality	Series	Retail Price	Cost	Margin
2	1	SMKF110	Sleepwell	Mattress	King	Fair	Saphire	1,009.00	230.12	77.19%
3	2	SMKG111	Sleepwell	Mattress	King	Good	Ruby	1,159.00	281.32	75.73%
4	3	SMKE112	Sleepwell	Mattress	King	Excellent	Emerald	1,359.00	335.06	75.35%
5	4	SMKB113	Sleepwell	Mattress	King	Best	Diamond	1,559.00	390.98	74.92%
6	5	SMQF114	Sleepwell	Mattress	Queen	Fair	Saphire	799.00	272.55	65.89%
7	6	SMQG115	Sleepwell	Mattress	Queen	Good	Ruby	899.00	302.89	66.31%
8	7	SMQE116	Sleepwell	Mattress	Queen	Excellent	Emerald	1,049.00	329.72	68.57%
9	8	SMQB117	Sleepwell	Mattress	Queen	Best	Diamond	1,149.00	386.71	66.34%
10	9	SMDF118	Sleepwell	Mattress	Double	Fair	Saphire	599.00	196.03	67.27%
11	10	SMDG119	Sleepwell	Mattress	Double	Good	Ruby	699.00	230.34	67.05%

Figure 9.9

6. *In* **Cell L1**, *type:* ***Summary Statistics***
7. *Using the* **Merge & Center** *icon, center* **Summary Statistics** *over* **Cells L1 and M1**.
8. *In* **Cell L2**, *type:* ***Number of Items***
9. *In* **Cell L3**, *type:* ***Average***
10. *In* **Cell L4**, *type:* ***Median***
11. *In* **Cell L5**, *type:* ***Mode***
12. *In* **Cell L6**, *type:* ***Maximum***
13. *In* **Cell L7**, *type:* ***Minimum***
14. *Resize* **Column L** *to fit.*
15. *In* **Cell M2**, *type the following formula:* ***=COUNT(J:J)***



=COUNT(J:J)

	D	E	F	G	H	I	J	K	L	M
	Product	Size	Quality	Series	Retail Price	Cost	Margin		Summary Statistics	
	Mattress	King	Fair	Saphire	1,009.00	230.12	77.19%		Number of Items	68
	Mattress	King	Good	Ruby	1,159.00	281.32	75.73%		Average	
	Mattress	King	Excellent	Emerald	1,359.00	335.06	75.35%		Median	
	Mattress	King	Best	Diamond	1,559.00	390.98	74.92%		Mode	

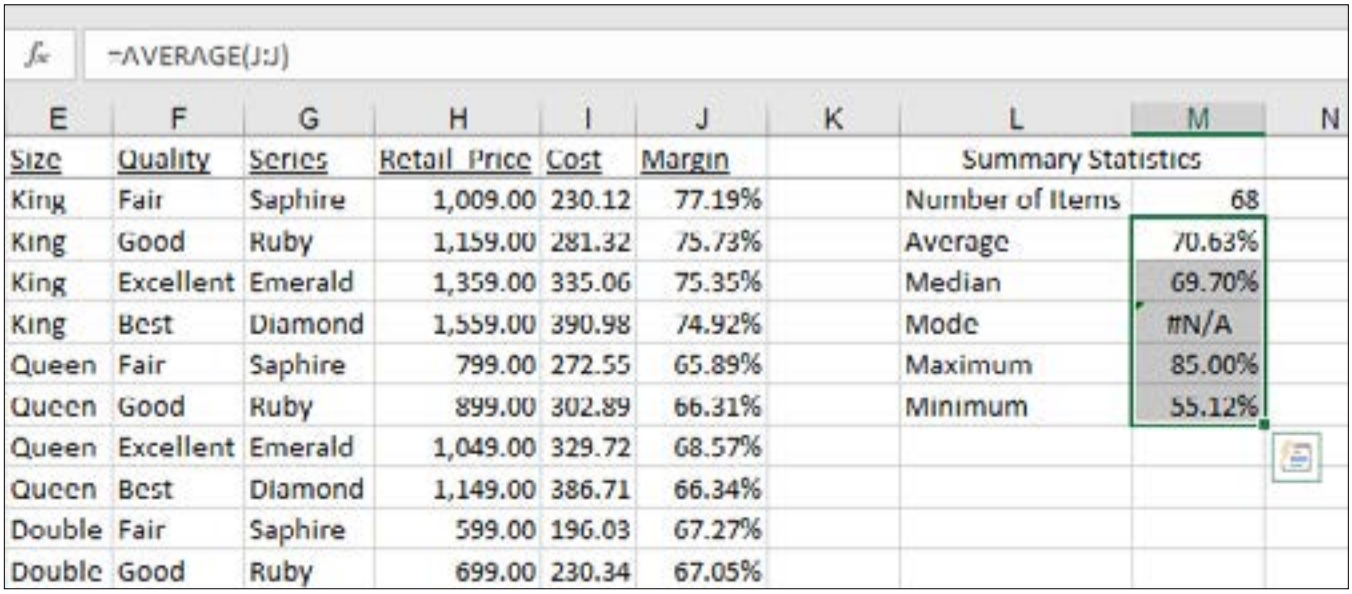
Figure 9.10

Remember, the COUNT() function counts the number of cells in the range that contain numbers, not text strings. If you select the entire Column J and look at the Count in the Status Bar, you'll see the result is 69 (the count of cells with content, which includes the Margin heading in Cell J1.

The AVERAGE(), MEDIAN(), MODE(), MAX(), and MIN() Functions

With the spreadsheet set up this way, we are now prepared to use other statistical functions. The ***AVERAGE() function*** is a simple average, or arithmetic mean, of the data range. The ***MEDIAN() function*** is the number in the middle of a set of numbers; that is, half the numbers have values that are greater than the median, and half have values are less. The ***MODE() function*** returns the most frequently occurring value. The ***MAX() function*** returns the highest value in the selected range and the ***MIN() function*** returns the lowest value. Let's populate our example with these functions.

1. *Copy* **Cell M2** *down* **to Cell M3**, *and change* **COUNT** *to* **AVERAGE** *in* **Cell M3**.
2. *Copy* **Cell M3** *down* **through Cell M7**, *and change* **AVERAGE** *to* **MEDIAN**, **MODE**, **MAX**, *and* **MIN**, *respectively. Format as* **Percentage** *with* **two decimal places**.



=AVERAGE(J:J)

E	F	G	H	I	J	K	L	M	N
Size	Quality	Series	Retail Price	Cost	Margin		Summary Statistics		
King	Fair	Saphire	1,009.00	230.12	77.19%		Number of Items	68	
King	Good	Ruby	1,159.00	281.32	75.73%		Average	70.63%	
King	Excellent	Emerald	1,359.00	335.06	75.35%		Median	69.70%	
King	Best	Diamond	1,559.00	390.98	74.92%		Mode	#N/A	
Queen	Fair	Saphire	799.00	272.55	65.89%		Maximum	85.00%	
Queen	Good	Ruby	899.00	302.89	66.31%		Minimum	55.12%	
Queen	Excellent	Emerald	1,049.00	329.72	68.57%				
Queen	Best	Diamond	1,149.00	386.71	66.34%				
Double	Fair	Saphire	599.00	196.03	67.27%				
Double	Good	Ruby	699.00	230.34	67.05%				

Figure 9.11

In our example, there are no duplicate margin values, so Excel returns an #N/A error for the MODE() function. Since it returns an error, we don't need that field in our summary statistics, so we will move the Maximum and Minimum cells on top of it.

Note: *Don't delete the row as it will delete the data in the base table to the left.*

3. *Select* **Cells L6 through Cell M7**.
4. *Position your cursor over the top bold line of the selected range, and your cursor will turn to a pointer over a cross with up, down, left, and right arrows*
5. *Click, hold, and drag the selection where the word* **Maximum** *is in* **Cell L5** *and release.*

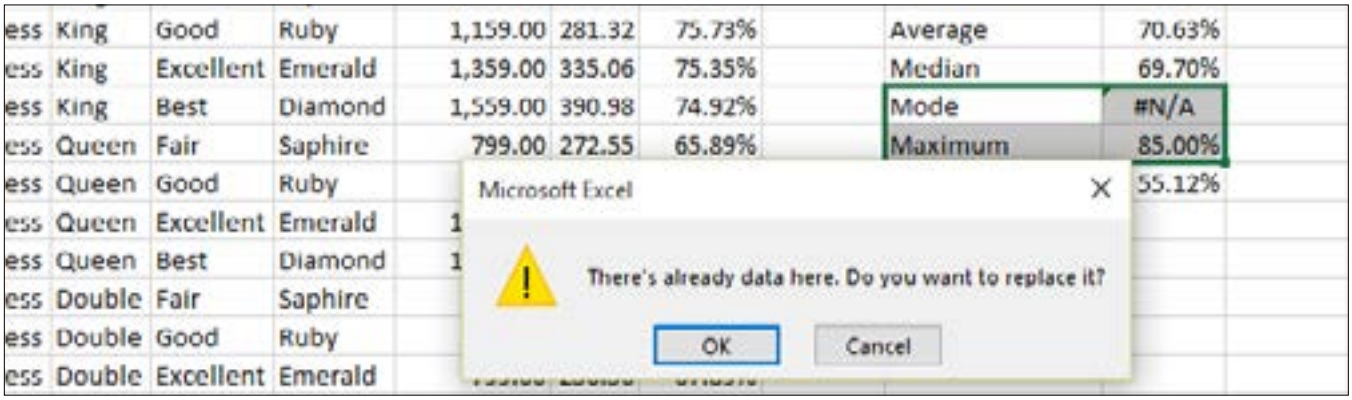


Figure 9.12

6. *Click* **OK**.

F	G	H	I	J	K	L	M	N
Quality	Series	Retail Price	Cost	Margin		Summary Statistics		
Fair	Saphire	1,009.00	230.12	77.19%		Number of Items	68	
Good	Ruby	1,159.00	281.32	75.73%		Average	70.63%	
Excellent	Emerald	1,359.00	335.06	75.35%		Median	69.70%	
Best	Diamond	1,559.00	390.98	74.92%		Maximum	85.00%	
Fair	Saphire	799.00	272.55	65.89%		Minimum	55.12%	
Good	Ruby	899.00	302.89	66.31%				
Excellent	Emerald	1,049.00	329.72	68.57%				
Best	Diamond	1,149.00	386.71	66.34%				
Fair	Saphire	599.00	196.03	67.27%				
Good	Ruby	699.00	230.34	67.05%				
Excellent	Emerald	799.00	256.56	67.89%				

Figure 9.13

The COUNTIF() Function

In our Summary Statistics table, we know the number of items in the table (68), but we don't yet know the count of items for manufacturer. For that, we can use the ***COUNTIF() function***.

1. *Select* **Cells L3 to M6**, *and move the range down where Average is in* **Cell L7**.
2. *In* **Cells L3 through L6**, *type the following:* ***Cama***, ***Dream***, ***Leavan***, *and* ***Sleepwell***.
3. *Select* **Cells L3 through L6**, *and click the* **Increase Indent** *icon in the* **Alignment** *group of the* **Home** *tab.*
4. *In* **Cell M3**, *type the following formula:* ***=COUNTIF(C:C,L3)***

This formula counts all of the cells in Column C (Manufacturer) that equal the value(s) in Column L. If

you had placed spaces before the manufacturer name instead of using the Indent functionality, the results would have been wrong. You did a similar function in Chapter 8 when you wrote the SUMIF() function.

5. *Copy the formula in* **Cell M3 through Cell M6**.

=COUNTIF(C:C,L3)

E	F	G	H	I	J	K	L	M
Size	Quality	Series	Retail Price	Cost	Margin		Summary Statistics	
King	Fair	Saphire	1,009.00	230.12	77.19%		Number of Items	68
King	Good	Ruby	1,159.00	281.32	75.73%		Cama	16
King	Excellent	Emerald	1,359.00	335.06	75.35%		Dream	16
King	Best	Diamond	1,559.00	390.98	74.92%		Leavan	12
Queen	Fair	Saphire	799.00	272.55	65.89%		Sleepwell	24
Queen	Good	Ruby	899.00	302.89	66.31%		Average	70.63%

Figure 9.14

The count for each manufacturer populates correctly. As a check, you can see that the Status Bar returns a Sum of 68, which is the correct total. If we had inputted spaces rather than indenting, results would have been zero, or no matches, since we know spaces report as characters which are not present in the Manufacturer names in Column C.

The AVERAGEIFS() and COUNTIFS() Functions

As with the SUMIF() and SUMIFS() functions, the AVERAGEIF() and COUNTIF() functions also have new capabilities since Excel 2010: the ***AVERAGEIFS()*** and ***COUNTIFS()*** functions. Like the SUMIFS() function, these functions allow the user to filter for multiple criteria. The syntax for the AVERAGEIFS() function is exactly the same for the SUMIFS() function, so if you need to know more about that function, please refer to it where it was introduced in Chapter 8. The syntax for the COUNTIFS() function is COUNTIFS(criteria_range1, criteria1, [criteria_range2, criteria2], [criteria_range3, criteria3], etc.), with the second criteria and range forward being optional. The only difference is that the COUNTIFS() function does not include a data_range argument.

The RANK() Function

Another statistical function I've found to be very useful is the RANK() function. The ***RANK() function*** returns the rank of a number in a list of numbers. The rank of a number is its size relative to other values in a list. It contains two required arguments (the number or cell you want to rank and the range of the ranking) and one optional argument, order. A zero order, or if it is omitted, means to sort the rank as if the range was in descending order (highest to lowest). An optional argument of 1 means to sort the rank as if the reference range was in ascending order. We will now use the RANK() function to rank all of the items in the list based on a descending order or margin, where the highest margin appears with a rank number of one.

1. **Insert** *a column between* **Columns K and L**.

2. *In* **Cell K1**, *type:* ***Rank****, and underline it.*
3. *In* **Cell K2**, *type the following formula:* ***=RANK(J2,$J$2:$J$69)***

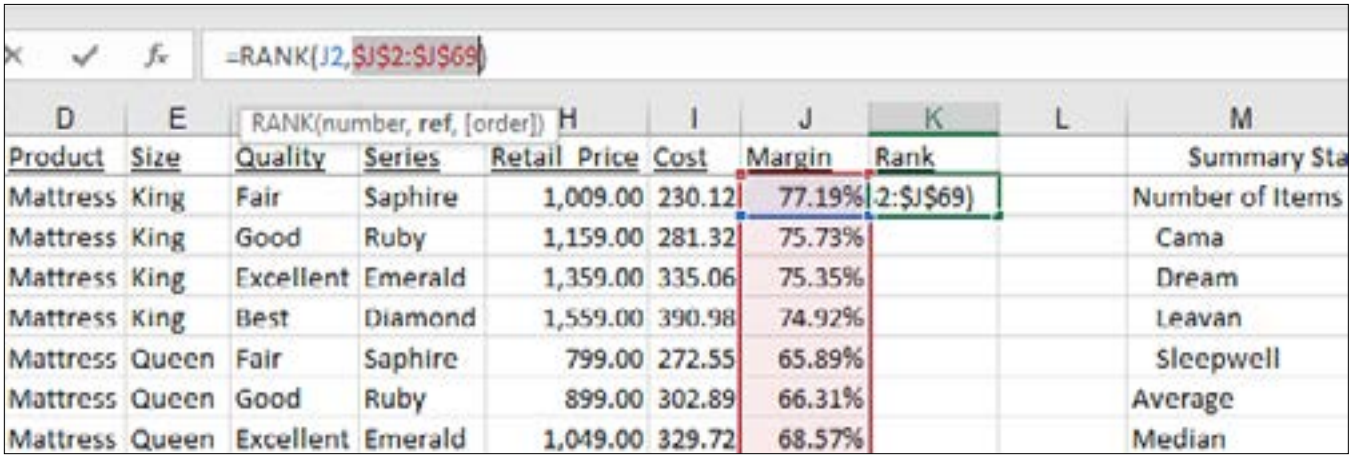


Figure 9.15

Make sure to include the absolute references in the second argument, as you want to keep this range intact when copying.

4. *Copy the formula in* **Cell K2** *to all cells below.*
5. **Sort** *the table in* **Ascending Order** *(smallest to largest) on* **Column K**.

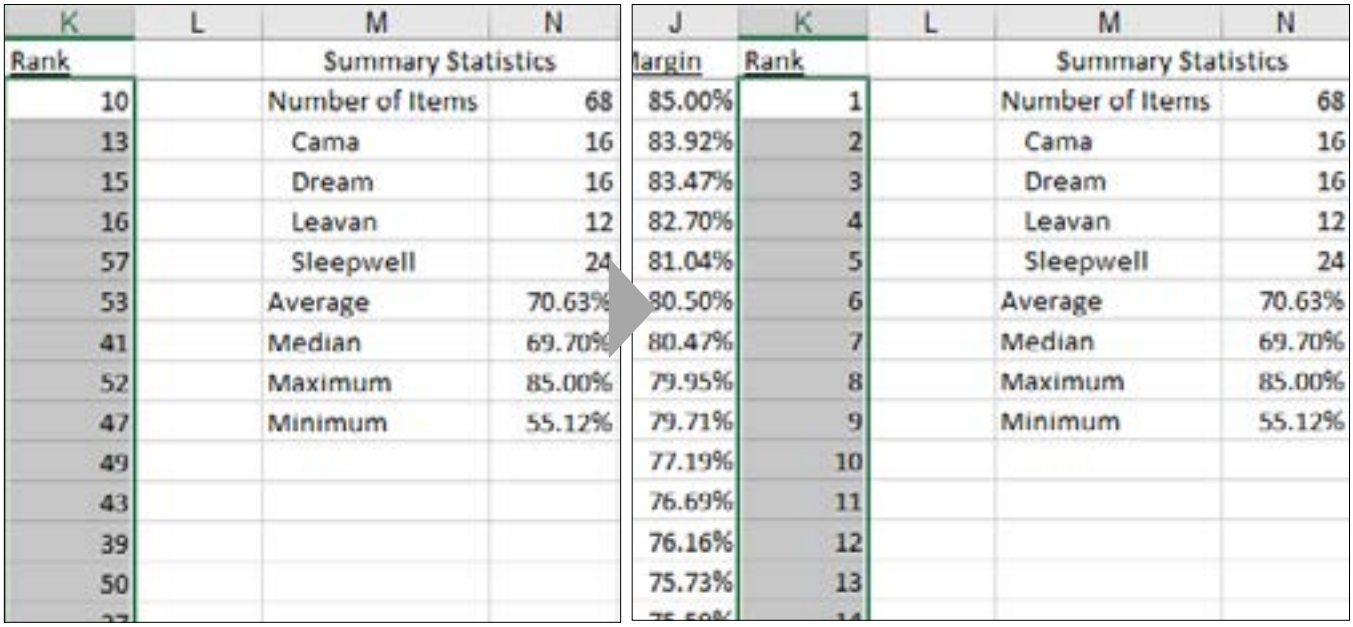


Figure 9.16

Now you see that Rank is sorted in Ascending order, and Margin in Descending order. You can use statistical functions to really impress upper-management. You may even consider a new career as an actuary!

6. **Save** *and* **close** *the* **myItem.xlsx** *file.*

***Review Questions**: It is now time to complete the hands-on Review Questions. Log on to www.ExcelCEO.com with your Email address and Password, click on the* **Excel 2016 Review Questions, Chapter 9, Section 2 of 4** *option in your Main Menu, and complete the Review Questions.*

Database Functions

I'll be the first to say that **database functions** are not my favorite functions in Excel. If you find yourself using a lot of database functions, you are probably doing a project that should be done in Access or some other database, rather than Excel. Many times, you can use a PivotTable (discussed in Chapters 11 and 12) to replace a database function, which is usually my preference. However, knowing database functions are necessary to becoming an Excel master, so it is necessary to briefly review them here.

In the Statistical Functions section in this chapter, you learned about a lot of different types of functions like COUNT(), MAX(), MIN(), AVERAGE() and the like. Database functions work very similar to statistical functions, but you are able to define criteria with a database function. One obvious difference between database and statistical functions is that database functions begin with the letter "D" at the beginning of the name, like DSUM(), DCOUNT() and DMAX(). As the syntax for most database functions is basically the same, we will do examples of only two database functions, DSUM() and DCOUNT(). If you need to use other database functions, you should be able to figure out the syntax easily enough.

To illustrate, you will use the 1018_Sales file.

1. **Open** *the* **1018_Sales.xlsx** *file under the* **C:\ExcelCEO\Excel 2016\Chapter9** *folder.*
2. **Save As** ***my1018_Sales.xlsx*** *in the same folder.*

A3 | 1018

	A	B	C	D	E	F	G	H	I
1	Store No	Sale Date	Month	Ticket No	Item Code	Total Sale			
2	1018	9/25/2016	9	1018200301457	SMKE112	1,495.00			
3	1018	9/19/2016	9	1018200301419	DMQF130	560.00			
4	1018	3/30/2016	3	1018200300431	SPQE175	196.00			
5	1018	8/5/2016	8	1018200301114	SPQE175	98.00			
6	1018	11/2/2016	11	1018200301664	CMTE156	552.00			
7	1018	10/30/2016	10	1018200301647	SPQG174	76.00			
8	1018	9/8/2016	9	1018200301346	DMQG131	615.00			
9	1018	2/4/2016	2	1018200300126	CMDF150	966.00			
10	1018	10/26/2016	10	1018200301620	DMQE132	1,909.00			

Figure 9.17

The DSUM() Function

The file is a simple spreadsheet that contains detail sales data by ticket for Store No. 1018 for all sales in 2016. We will create a database function that will calculate the total sales amount in July 2016 using the ***DSUM() function***. To do this without a database function, you could sort and/or filter the data and sum all of the sales in July. Alternatively, you can write a database function to sum it for you. To use a database function, you first have to set up a criteria range. That is usually done by copying the titles of each column to another part of the spreadsheet and using the row under that range as the inputs for the criteria.

3. *Copy the range* **Cell A1 to F1** *to* **Cell I1**. *(This will be used as the Criteria input range for the database functions.)*
4. *Resize the columns, as necessary.*
5. *In* **Cell K2**, *type 7 (as we want to filter the list for sales in July).*

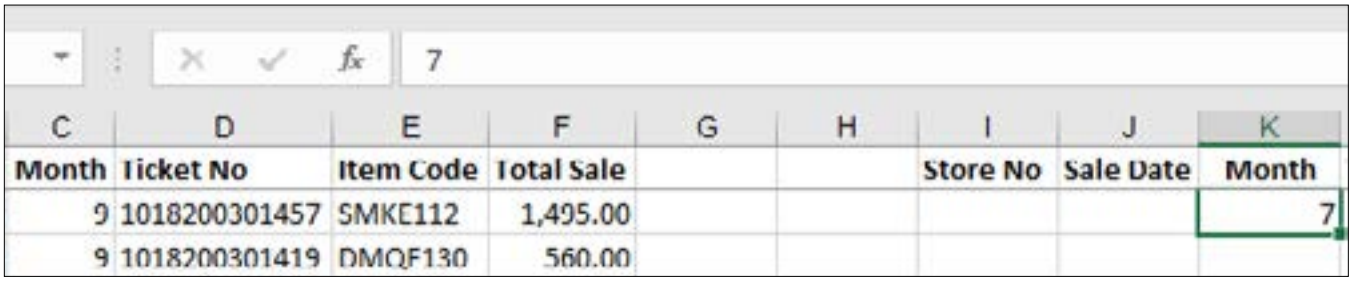


Figure 9.18

6. *In* **Cell H5**, *type* ***July Sales:***, *and resize the column.*
7. *In* **Cell I5**, *write the formula* ***=DSUM(A1:F2110,"Total Sale",I1:N2)***
8. *In the* **Number** *group of the* **Home** *tab, click on the* **Number Format** *drop-down arrow, and choose* **Currency**.

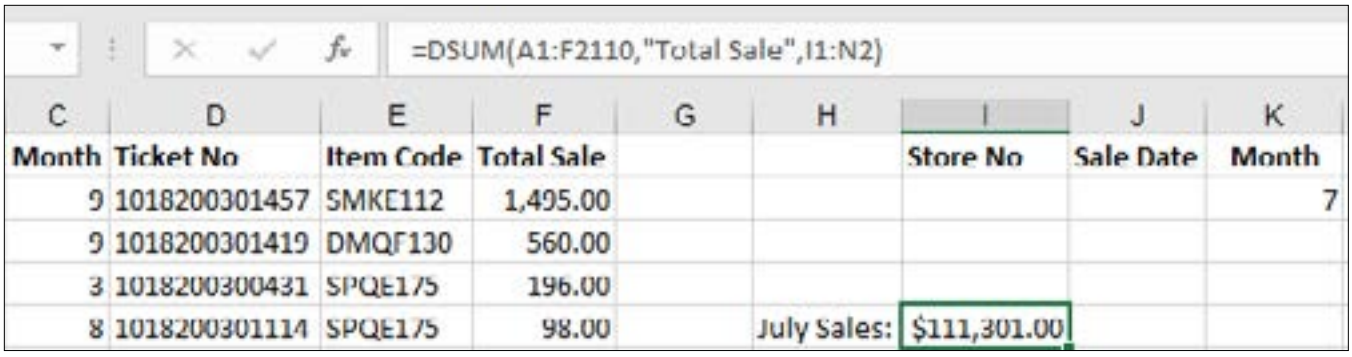


Figure 9.19

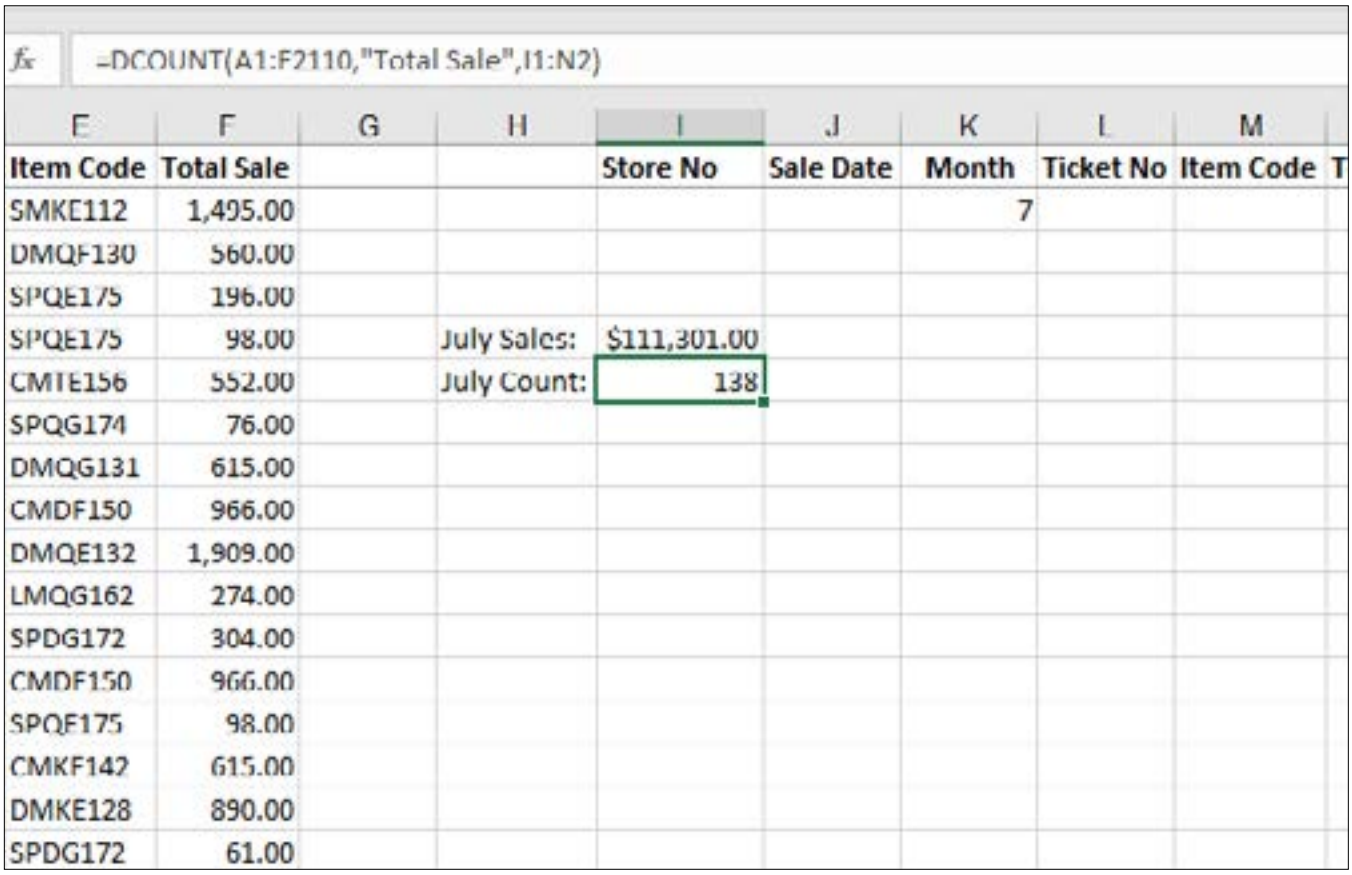
Let's talk about the formula. It has three arguments. The first is the **database**, or the list/table where you want to pull the data from (in this case, the range is Cells A1 to F2110). Next is the **field**, or the specific column you want to total, count, etc. (the Total Sale column). Last is the **criteria range** (Cells I1

to N2). The criteria range should include the names of the field as well as one row beneath it to include the criteria you want to type in. In this example, it tells us that there was $111,301.00 in sales in July 2016 at Store No 1018.

The DCOUNT() Function

To get a count of the number of sales, you can use the DCOUNT() function in a similar way.

9. *In* **Cell H6**, *type* ***July Count:***, *then resize the column.*
10. *In* **Cell I6** *write the formula* ***=DCOUNT(A1:F2110,"Total Sale",I1:N2)***
11. *Format* **Cell I6** *as* **Number**, **zero decimal places**, *and* **Use 1000 Separator (,)**.

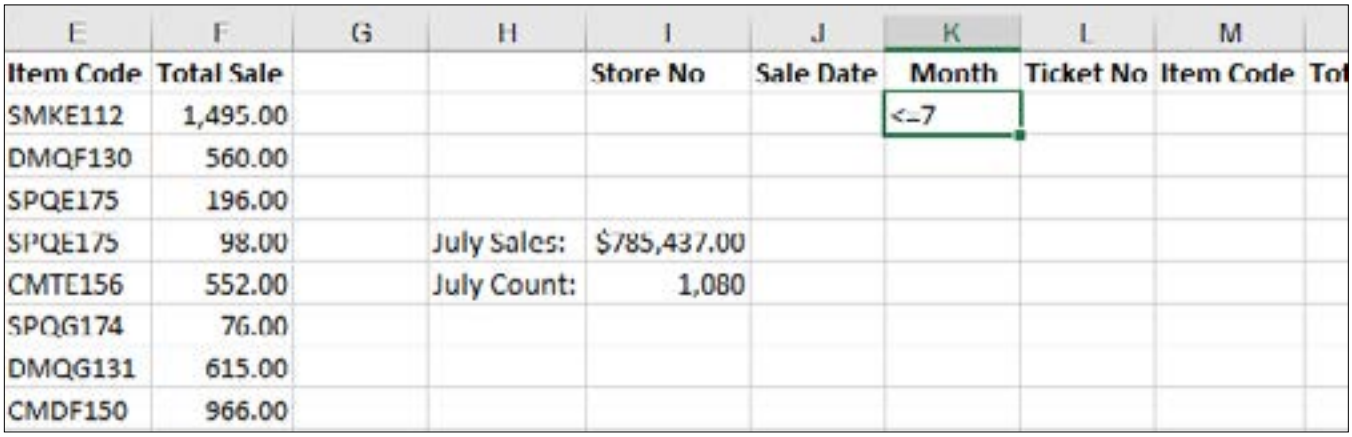


E	F	G	H	I	J	K	L	M	
Item Code	Total Sale			Store No	Sale Date	Month	Ticket No	Item Code	T
SMKE112	1,495.00					7			
DMQF130	560.00								
SPQE175	196.00								
SPQE175	98.00		July Sales:	$111,301.00					
CMTE156	552.00		July Count:	138					
SPQG174	76.00								
DMQG131	615.00								
CMDF150	966.00								
DMQE132	1,909.00								
LMQG162	274.00								
SPDG172	304.00								
CMDF150	966.00								
SPQF175	98.00								
CMKF142	615.00								
DMKE128	890.00								
SPDG172	61.00								

Figure 9.20

Another trick is to use arithmetic operators in the criteria range. Suppose you wanted to see the year-to-date sales and count for July, meaning all sales from January through July. You can use arithmetic operators in the criteria section.

12. *Change* **Cell K2** *to be* ***<=7***



E	F	G	H	I	J	K	L	M	
Item Code	Total Sale			Store No	Sale Date	Month	Ticket No	Item Code	Tot
SMKE112	1,495.00					<=7			
DMQF130	560.00								
SPQE175	196.00								
SPQE175	98.00		July Sales:	$785,437.00					
CMTE156	552.00		July Count:	1,080					
SPQG174	76.00								
DMQG131	615.00								
CMDF150	966.00								

Figure 9.21

As soon as you press [Enter], the July Sales and Count numbers change. Like I said, if you want to use other database functions, learn how to use the normal statistical function then apply the database function syntax we have reviewed here. And again, I would advise you to re-examine your project, if you find yourself using a lot of database functions. I get nervous when people use database functions in a spreadsheet, just like I'm wary of doing what-if analyses in a database.

13. **Save** *and* **close** *the* **my1018_Sales.xlsx** *file.*

Lookup Functions

In my humble opinion (although some people say there's nothing humble about my opinion), there are three things that EVERY Excel user should know how to do: a nested IF statement (which we talked about in Chapter 6), PivotTables (Chapters 11 and 12), and a VLOOKUP() function, which is the next subject.

The VLOOKUP() Function

The ***VLOOKUP() function*** is one of the most, if not THE most powerful, functions in standard Excel. It is similar to creating a join, or establishing a relationship, between two tables in a relational database. The "V" in VLOOKUP stands for ***vertical***, meaning that the data in the table must be in a vertical format (from top to bottom, or that the fields must be in columns, not rows). VLOOKUP searches for a value in the left-most column in a range, and then returns a value in the same row from a column you specify in the range. The VLOOKUP() function has three required arguments and one optional argument, although I contend that the optional argument should be required in most cases. The three required arguments are: 1) the lookup_value, or the value you want to find in the table; 2) the table, array or database range that you want to use to find the values; and 3) index number, or the column in the table, array or database you want to return a value from.

The optional argument, which I will tell you to almost always include, is a TRUE/FALSE argument (Excel defines this as the range/lookup argument, but I think that definition is not very meaningful). The TRUE/FALSE argument tells the function whether or not to return the closest value. If the argument is set to TRUE, or if it is omitted, it will return the largest value that is less than or equal to lookup value. I

rarely use that functionality. Therefore, I set the optional argument in a VLOOKUP() function to FALSE, as I want to return an exact match or an error when there is no exact match. In most of your work, you will probably do the same.

Let's start with a simple example.

1. **Open** *a* **Blank workbook**.
2. **Save As C:\ExcelCEO\Excel 2016\Chapter9*myLookup.xlsx***.
3. *Starting with* **Cell A1**, *create a table with the following data:*

State Abb.	State Name
AL	Alabama
AK	Alaska
AZ	Arizona
CA	California
CO	Colorado
DE	Delaware
FL	Florida
GA	Georgia
HI	Hawaii
IA	Iowa

4. *Underline* **Cells A1 and B1**, *and resize the columns, if necessary.*

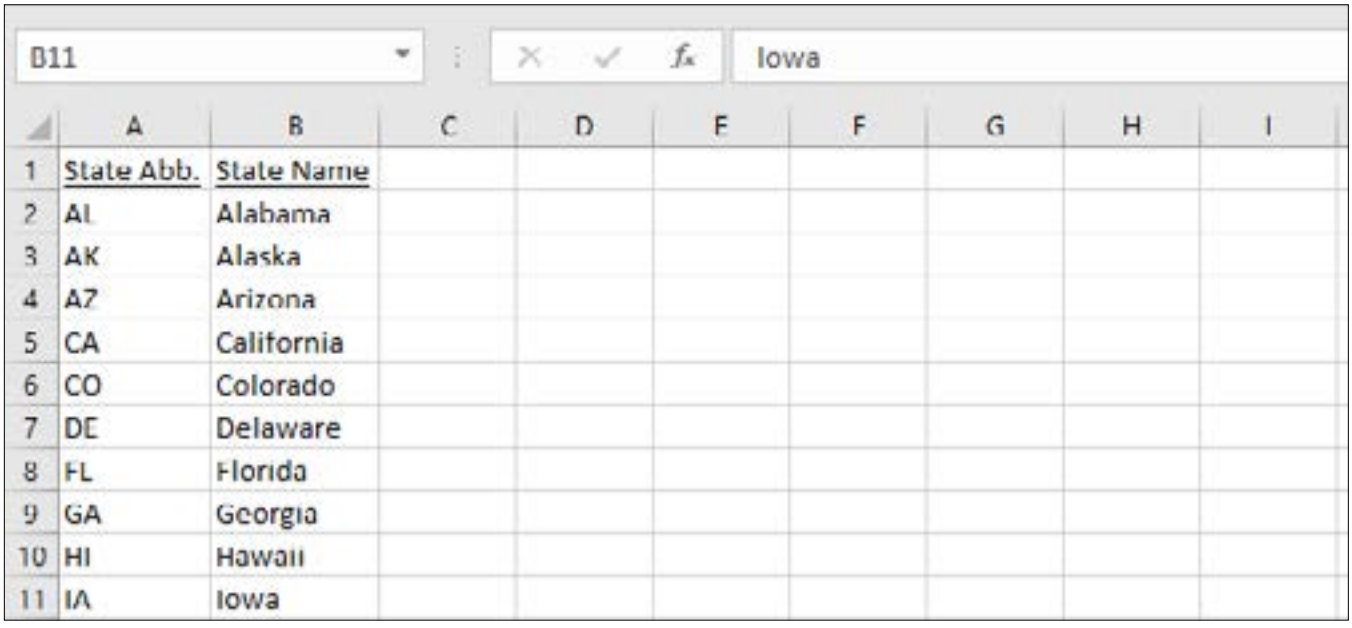
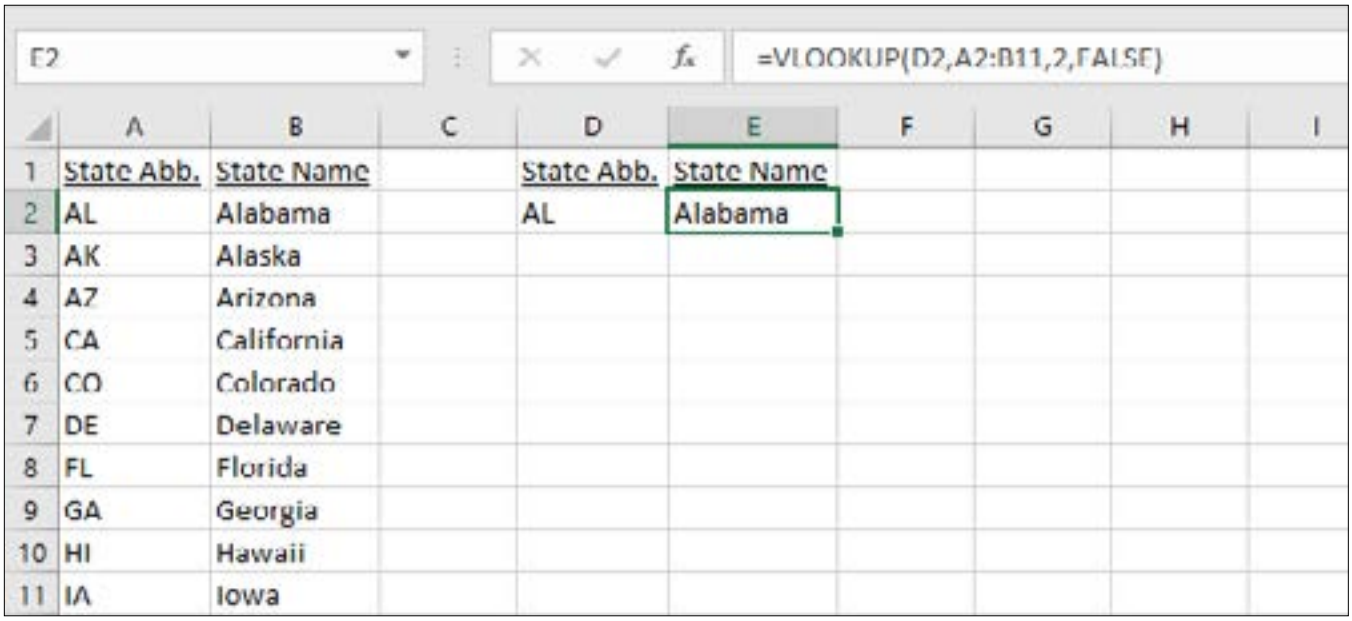


Figure 9.22

Next you will write a VLOOKUP() statement where the user inputs the state abbreviation in one cell and the VLOOKUP() statement will return the corresponding state name in the adjacent cell.

5. *In* **Cell D1**, *type* ***State Abb.*** *and in* **Cell E1** *type* ***State Name****. Underline both cells and resize both columns.*
6. *In* **Cell D2**, *type* ***AL****.*
7. *In* **Cell E2** *write the following formula:* ***=VLOOKUP(D2,A2:B11,2,FALSE)***



	A	B	C	D	E	F	G	H	I
1	State Abb.	State Name		State Abb.	State Name				
2	AL	Alabama		AL	Alabama				
3	AK	Alaska							
4	AZ	Arizona							
5	CA	California							
6	CO	Colorado							
7	DE	Delaware							
8	FL	Florida							
9	GA	Georgia							
10	HI	Hawaii							
11	IA	Iowa							

Figure 9.23

Let's review the formula. Cell D2 is the value you want to look up, or the value you want to find the state name for. The range A2:B11 is the range of the database. It is important to remember that the left-most column in your database must contain the same values as those contained as your formula's lookup_value argument. If you don't set it up that way, the VLOOKUP() function will not work. The third argument, 2, tells the function that you want to return the value that is contained in the second column of the database range. Finally, FALSE tells the function that you want an exact match. Typing TRUE or omitting the argument could return an incorrect result, such as if you had the [range_lookup] set to TRUE and typed AR (the abbreviation for Arkansas) into Cell D2. In this case, with Arkansas not present, the formula would return Alaska, which is not correct. Sometimes "close enough" is not close enough.

This is the basic syntax behind a VLOOKUP function. Seems pretty simple, huh? Let's play around with our formula using FALSE as the [range_lookup].

8. *In* **Cell D2**, *type:* ***CO***

Cell E2 *changes to "Colorado"*

9. *In* **Cell D2**, *type:* ***HI***

Cell E2 *changes to "Hawaii"*

10. In **Cell D2**, *type:* ***TX***

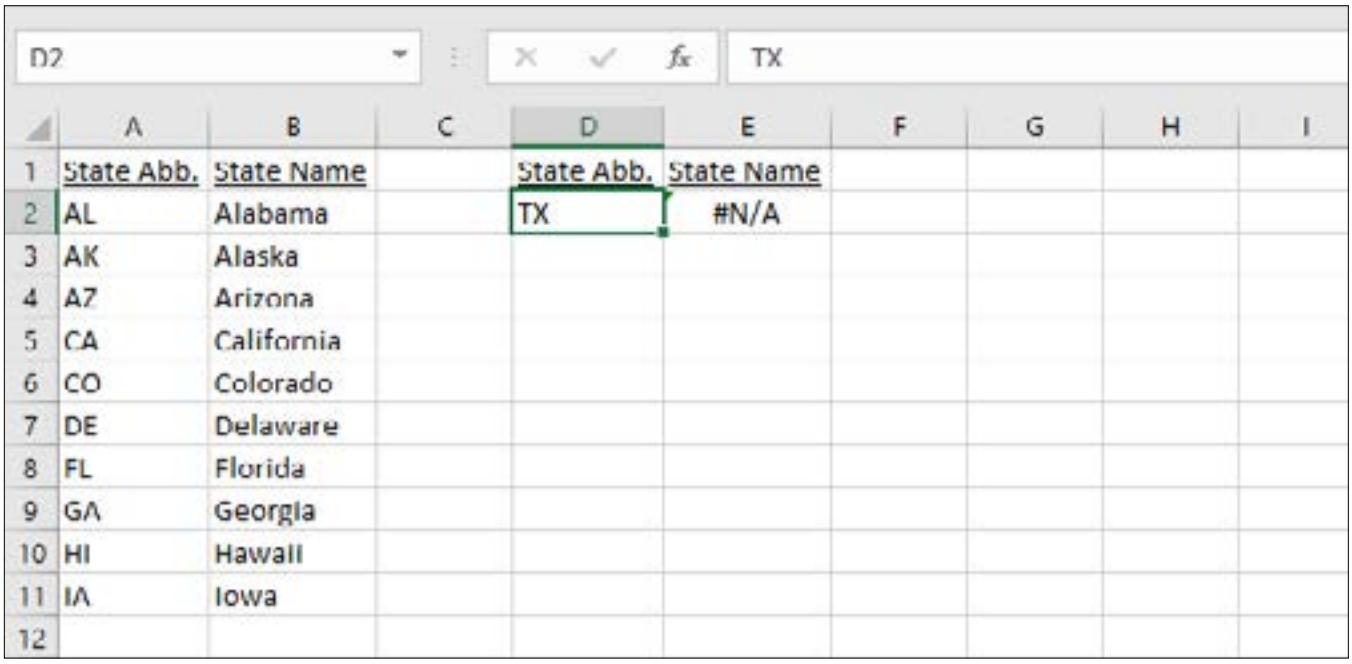


Figure 9.24

Cell E2 returns an #N/A error, because TX is not contained in the left-most column of the database range. So you need to include Texas in your list of states.

11. In **Cell A12**, *type:* ***TX***

12. In **Cell B12**, *type:* ***Texas***

Cell E2 still returns a #N/A error. That is because the database range in the formula is still shown as A2:B11. TX and Texas are listed in Cells A12 and B12. Therefore, you need to revise the database range in your formula to incorporate the new cells.

13. Edit the database range in your **VLOOKUP()** *formula to include the* **Texas** *cells on* **Row 12**.

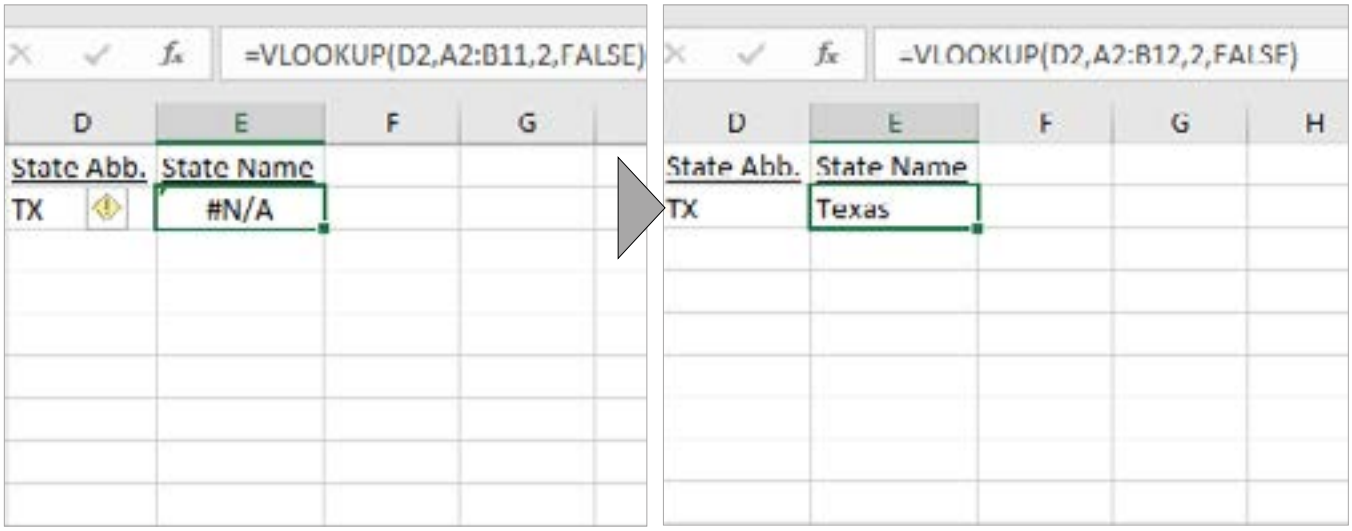


Figure 9.25

Now the formula returns the correct value.

Data Validation

As we saw in our example, if you input a value other than those contained in range A2 through A11, it returned an error message. To force users to choose one of the values in the list, you can create a drop-down menu. This is done using ***Data Validation***. Let's deviate from lookup functions for a short while and create a drop-down list in our example to require users to choose one of the values.

1. *Click on* **Cell D2**.
2. *Click on the* **Data** *tab, then click on the* **Data Validation** *button in the* **Data Tools** *group.*

The Data Validation dialog box appears.

3. *Make sure the* **Settings** *tab is selected.*
4. *In the* **Allow:** *drop-down menu, choose* **List**.
5. *Click in the* **Source** *box, and use your mouse to select the range* **A2 to A12**, *and click* **OK**.

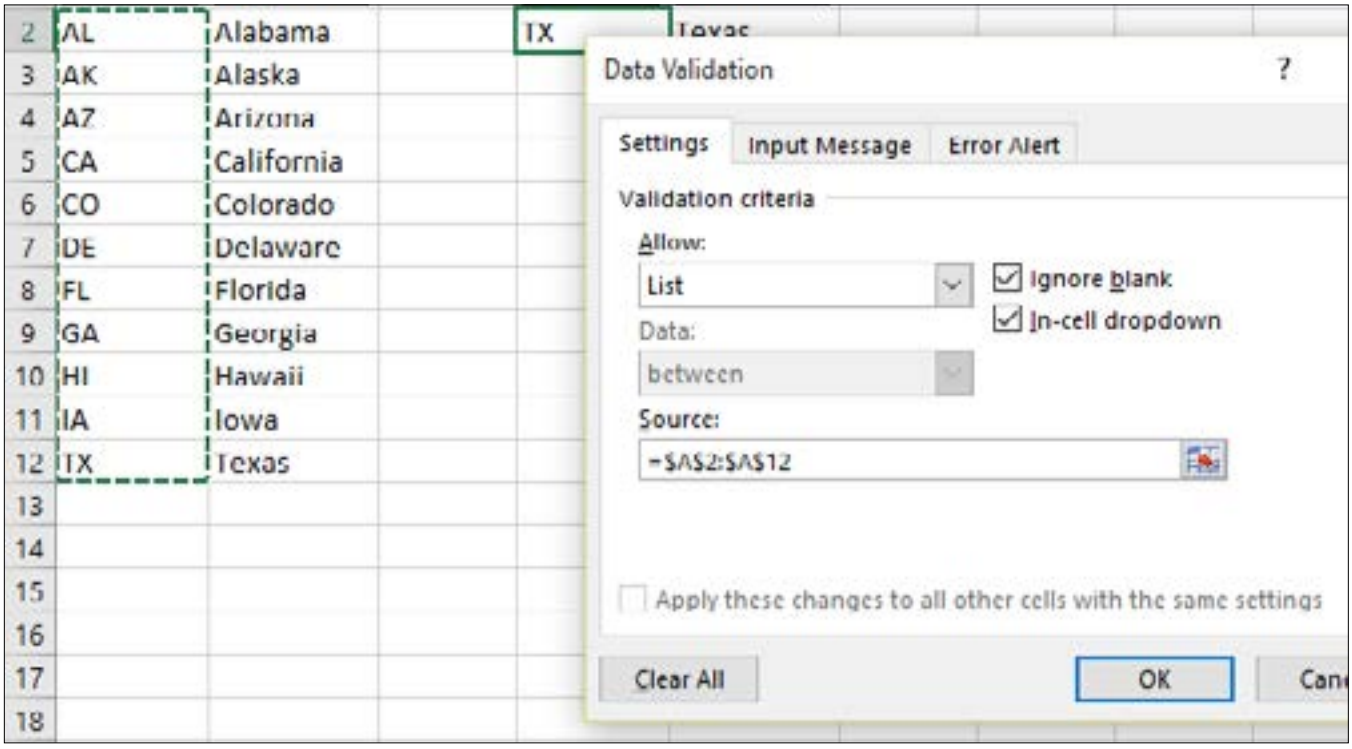


Figure 9.26

You can use the mouse to select the range or you can type it in. If you use the mouse to select the range, Excel will automatically input the range using an Absolute Reference, with $s around the cell references. The Absolute Reference fixes the range to where it will not change if it is copied to another cell. The $ acts as an anchor where it is placed, fixing both the column letter and the row number for Absolute Reference.

Cell D2 now has a drop-down menu attached to it. The drop-down menu will appear only when the cell is selected.

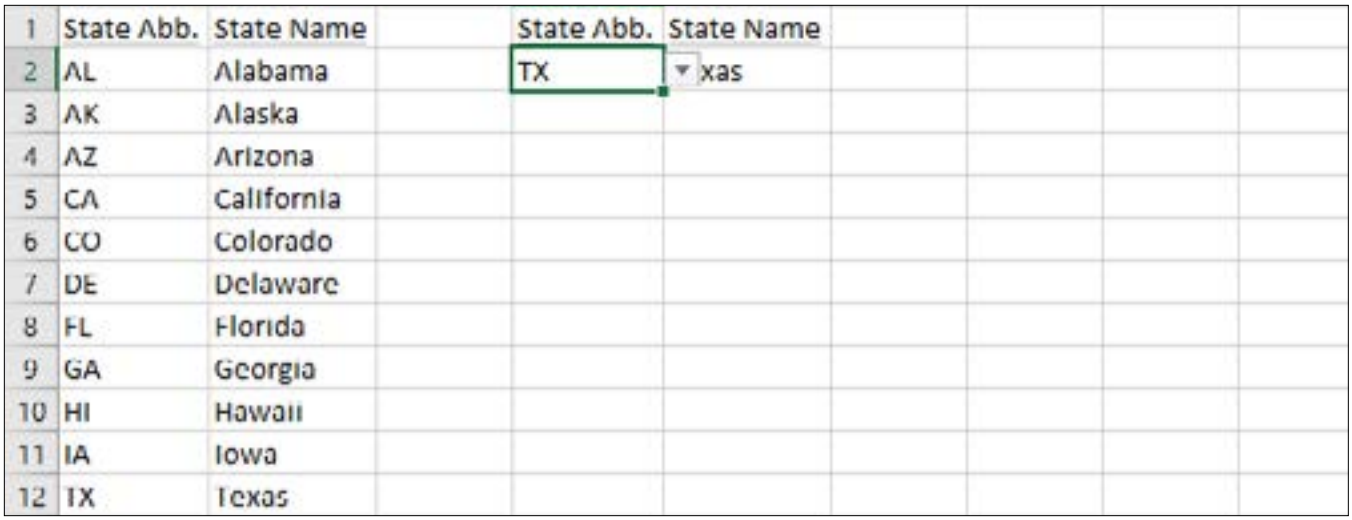


Figure 9.27

You can use this functionality to restrict values that can be used. Let's make the drop-down menu a little more functional.

6. *While* **Cell D2** *is selected, click on the* **Data Validation** *button to open the* **Data Validation** *dialog box.*
7. *Click on the* **Input Message** *tab.*
8. *In the* **Title:** *box, type* ***State****. In the* **Input message:** *box type* ***Choose a state from the list****.*

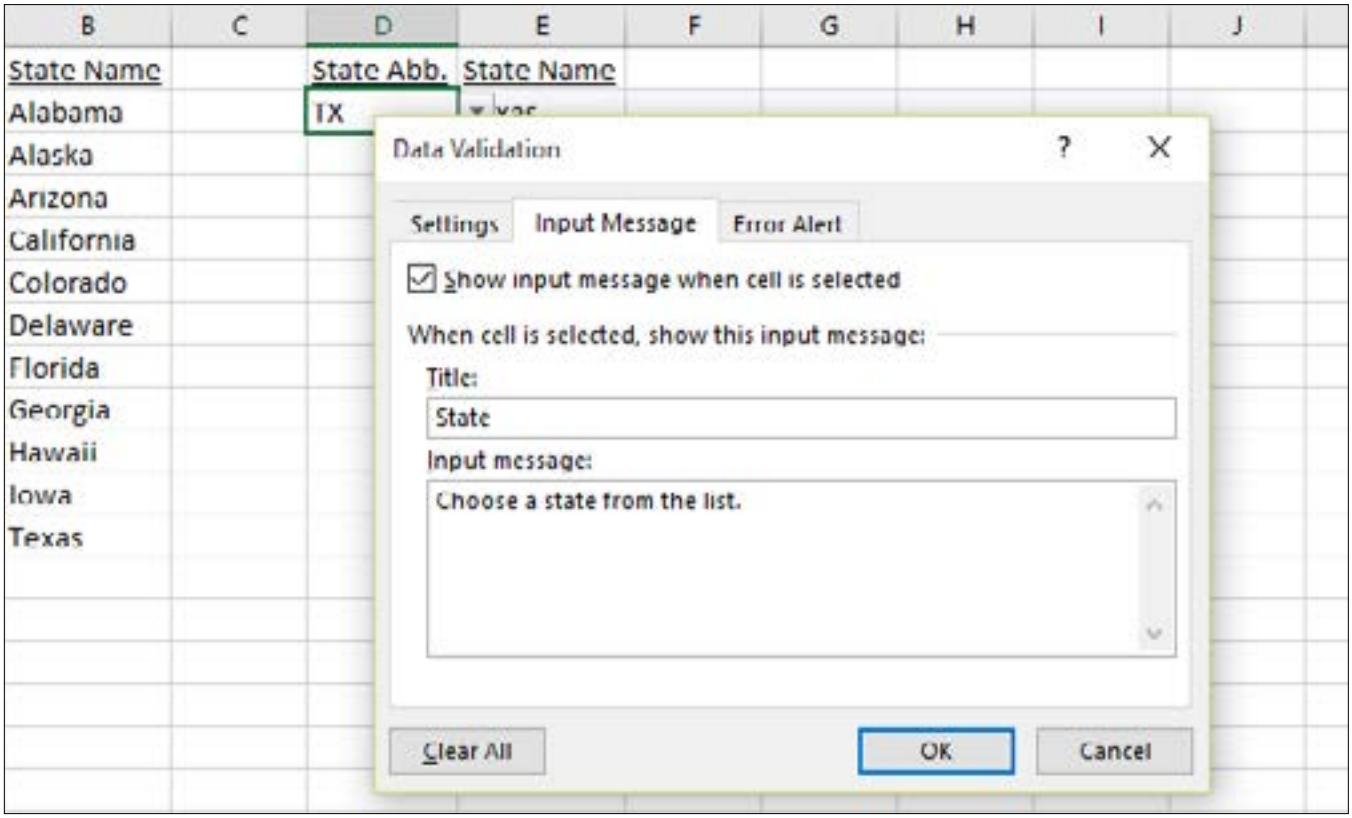


Figure 9.28

9. *Click in the* **Error Alert** *tab.*
10. *In the* **Style:** *box, make sure* **Stop** *is selected.*
11. *In the* **Title:** *box, type* ***OOPS!***
12. *In the* **Error Message** *box, type,* ***You must choose a state from the list****.*

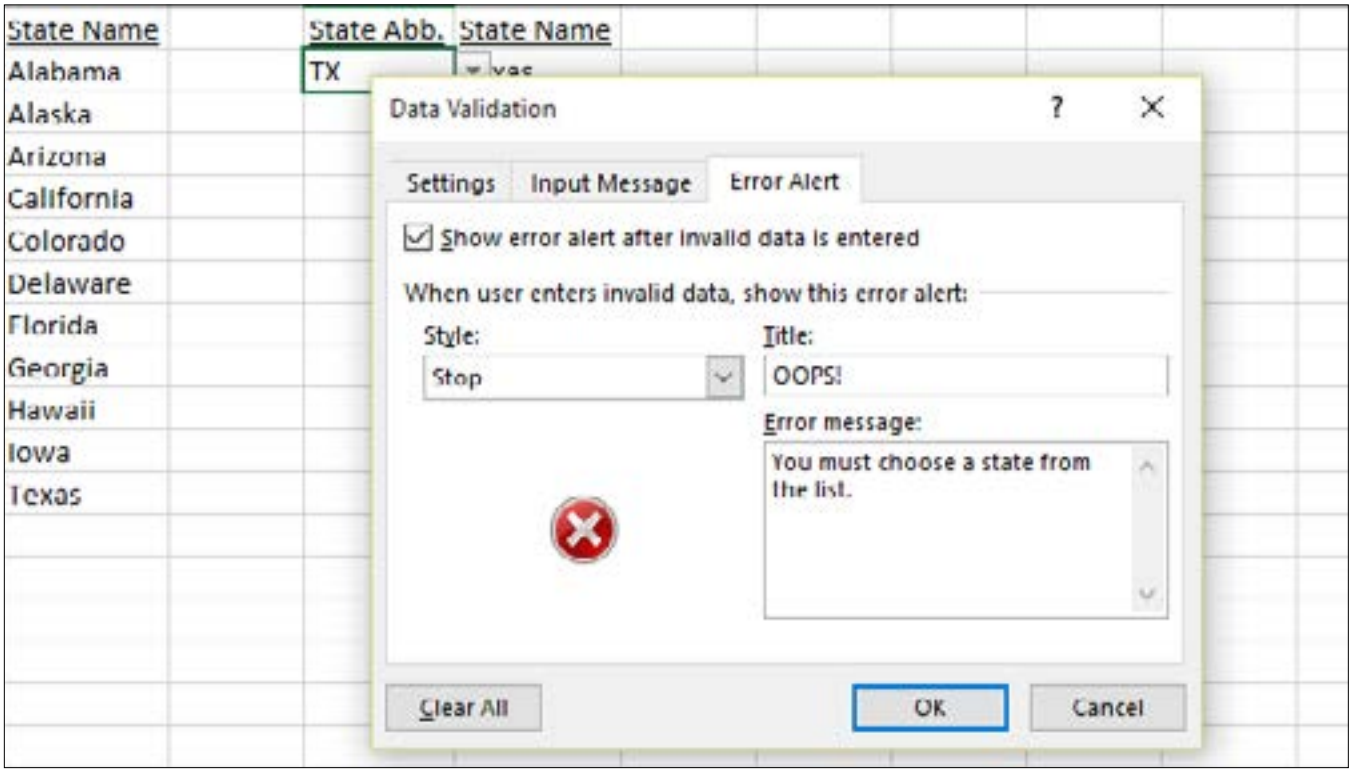


Figure 9.29

13. Click **OK**.

By typing in a title and message in the Input Message tab, the title and message automatically appear whenever the cell is selected.

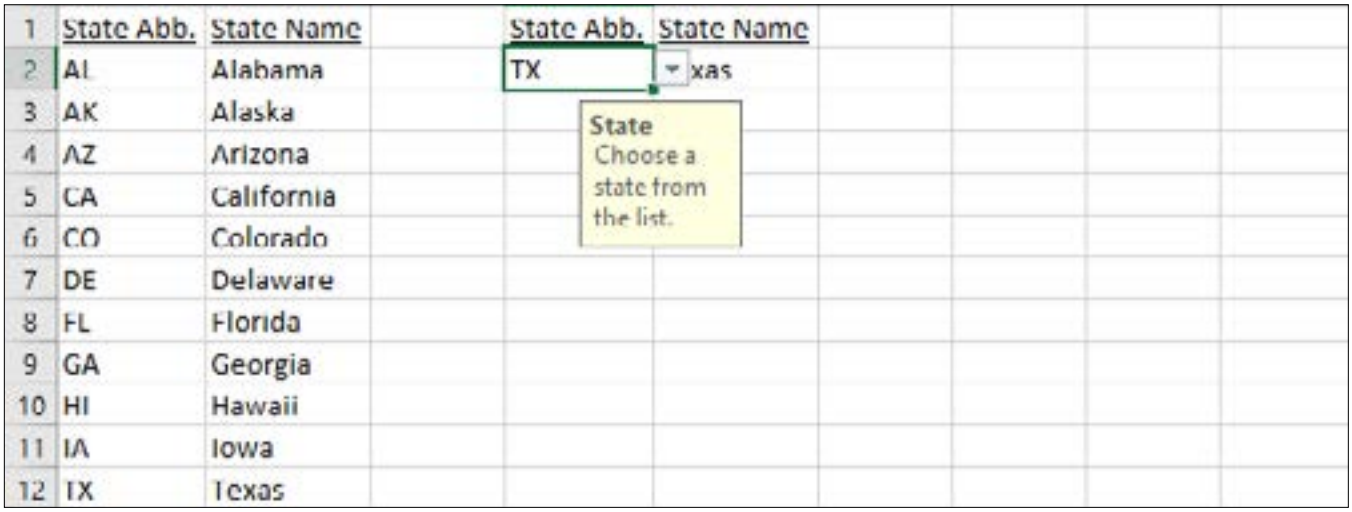


Figure 9.30

14. Click on the drop-down menu in **Cell D2**, *and choose* **DE**.

15. Click on any cell other than **Cell D2.**

The state name Delaware appears in Cell E2. To see the complete name of the state in Cell E2, you must click on any cell outside of Cell D2 so the drop-down arrow disappears.

16. In **Cell D2***, type:* ***UT****, then press* **Enter**.

You get the OOPS! error message telling you that you have to choose a state from the list.

18. Click **Cancel***, and* **Save** *the* **myLookup.xlsx** *file.*

Validation Rules

You can also create ***validation rules*** on existing data. Excel provides a nifty tool for you to identify cells with invalid data.

1. **Open** *the* **Item_2.xlsx** *file located at* **C:\ExcelCEO\Excel 2016\Chapter9**.

	A	B	C	D	E	F	G	H	I
1	Item_ID	Item_No	Manufacturer	Product	Size	Quality	Series	Retail_Price	Cost
2	1	SMKF110	Sleepwell	Mattress	King	Fair	Saphire	1,009.00	230.12
3	2	SMKG111	Sleepwell	Mattress	King	Good	Ruby	1,159.00	281.32
4	3	SMKE112	Sleepwell	Mattress	King	Excellent	Emerald	1,359.00	335.06
5	4	SMKB113	Sleepwell	Mattress	King	Best	Diamond	1,559.00	390.98
6	5	SMQF114	Sleepwell	Mattress	Queen	Fair	Saphire	799.00	272.55
7	6	SMQG115	Sleepwell	Mattress	Queen	Good	Ruby	899.00	302.89
8	7	SMQE116	Sleepwell	Mattress	Queen	Excellent	Emerald	1,049.00	329.72
9	8	SMQB117	Sleepwell	Mattress	Queen	Best	Diamond	1,149.00	386.71
10	9	SMDF118	Sleepwell	Mattress	Double	Fair	Saphire	599.00	196.03
11	10	SMDG119	Sleepwell	Mattress	Double	Good	Ruby	699.00	230.34
12	11	SMDE120	Sleepwell	Mattress	Double	Excellent	Emerald	799.00	256.56
13	12	SMDB121	Sleepwell	Mattress	Double	Best	Diamond	699.00	217.84
14	13	SMTF122	Sleepwell	Mattress	Twin	Fair	Saphire	299.00	100.13
15	14	SMTG123	Sleepwell	Mattress	Twin	Good	Ruby	349.00	97.89
16	15	SMTE124	Sleepwell	Mattress	Twin	Excellent	Emerald	399.00	102.72
17	16	SMTB125	Sleepwell	Mattress	Twin	Best	Diamond	449.00	134.29
18	17	DMKF126	Dream	Mattress	King	Fair	Pine	709.00	196.32

Figure 9.31

This file is simply a copy of the Item file used previously. Let's assume that you want to have a validation rule that says the size should be either King, Queen, Double, or Twin. Let's create that rule.

2. In **Cells L1 through L5***, create the following list:*

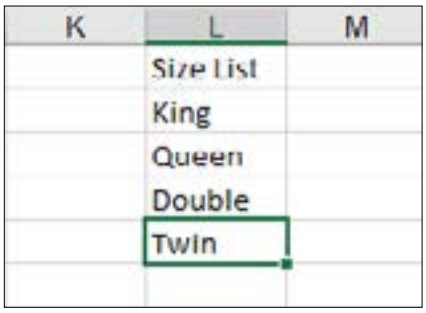


Figure 9.32

3. *Select* **Cells E2 through E69**, *and click on the* **Data Validation** Data Validation *button to open the* **Data Validation** *dialog box.*
4. *Make sure the* **Settings** *tab is displayed.*
5. *On the* **Allow:** *drop-down menu, choose* **List**.
6. *In the* **Source:** *box, type (or select)* ***=$L$2:$L$5*** *and click* **OK**.

> ***Note:*** *If you do not include the equal sign in your* **Source** *reference,* **Data Validation** *will view the entry as a value rather than as a range reference, and all options would end up circled.*

7. *With the* **Range E2:E69** *selected, click on the* **Data Validation** *drop-down arrow and choose* **Circle Invalid Data** Circle Invalid Data .
8. *Scroll down to the bottom of the list.*

Any cell that is not King, Queen, Double, or Twin now has a red circle around it.

E69 | King

	A	B	C	D	E	F	G	H	I	J
1	Item_ID	Item_No	Manufacturer	Product	Size	Quality	Series	Retail_Price	Cost	
40	39	CMQE148	Cama	Mattress	Queen	Excellent	Gold	559.00	172.90	
41	40	CMQB149	Cama	Mattress	Queen	Best	Platinum	629.00	173.40	
42	41	CMDF150	Cama	Mattress	Double	Fair	Bronze	439.00	149.33	
43	42	CMDG151	Cama	Mattress	Double	Good	Silver	489.00	147.64	
44	43	CMDE152	Cama	Mattress	Double	Excellent	Gold	539.00	149.05	
45	44	CMDB153	Cama	Mattress	Double	Best	Platinum	609.00	188.28	
46	45	CMTF154	Cama	Mattress	Single	Fair	Bronze	199.00	51.01	
47	46	CMTG155	Cama	Mattress	Single	Good	Silver	239.00	77.57	
48	47	CMTE156	Cama	Mattress	Single	Excellent	Gold	279.00	77.99	
49	48	CMTB157	Cama	Mattress	Single	Best	Platinum	319.00	109.10	
50	49	LMKF158	Leavan	Mattress	King	Fair	Daisey	459.00	93.13	
51	50	LMKG159	Leavan	Mattress	King	Good	Tulip	499.00	86.31	
52	51	LMKE160	Leavan	Mattress	King	Excellent	Rose	599.00	98.99	
53	52	LMQF161	Leavan	Mattress	Queen	Fair	Daisey	199.00	37.73	
54	53	LMQG162	Leavan	Mattress	Queen	Good	Tulip	249.00	48.62	
55	54	LMQE163	Leavan	Mattress	Queen	Excellent	Rose	279.00	41.86	
56	55	LMFF164	Leavan	Mattress	Full	Fair	Daisey	199.00	46.38	
57	56	LMFG165	Leavan	Mattress	Full	Good	Tulip	249.00	59.36	
58	57	LMFE166	Leavan	Mattress	Full	Excellent	Rose	279.00	54.41	
59	58	LMTF167	Leavan	Mattress	Twin	Fair	Daisey	79.00	12.70	

Figure 9.33

9. *Click on the* **Data Validation** *drop-down arrow, and choose the* **Clear Validation Circles** Clear Validation Circles *option.*
10. **Close** *the* **myItem_2.xlsx** *file (no need to save it).*

***Review Questions**: It is now time to complete the hands-on Review Questions. Log on to www.ExcelCEO.com with your Email address and Password, click on the* **Excel 2016 Review Questions, Chapter 9, Section 3 of 4** *option in your Main Menu, and complete the Review Questions.*

The HLOOKUP() Function

Let's now explore the ***HLOOKUP () function***. The HLOOKUP() function behaves in the same way as the VLOOKUP() function, except that the database or reference table is contained in a ***horizontal*** format rather than a vertical format. The lookup is done in rows instead of columns, but everything else is the same as with a VLOOKUP(). As databases are typically contained in vertical formats, the HLOOKUP() function is less common than VLOOKUP(), but every now and then it's necessary to use it, so let's do an example.

11. *Create a* **New sheet** *in the* **myLookup.xlsx** *file.*
12. *Input data in the cells as follows:*

	A	B	C	D
1	N	S	E	W
2	North	South	East	West
3				

Figure 9.34

13. *In* **Cell F1**, *type:* ***S***
14. *In* **Cell G1**, *type the following formula:* ***=HLOOKUP(F1,A1:D2,2,FALSE)***

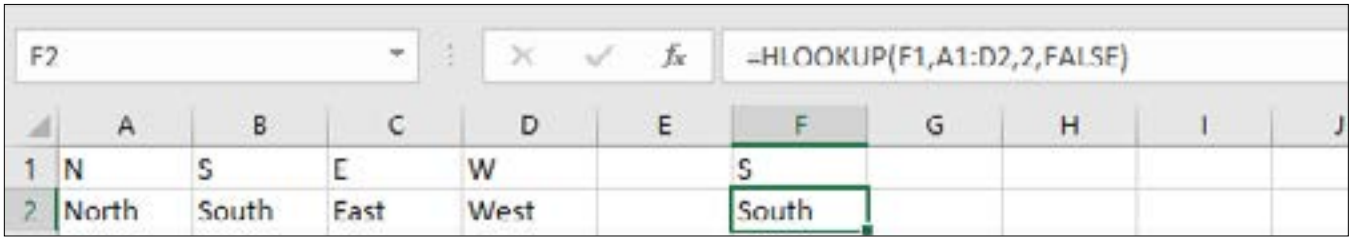


Figure 9.35

The formula now works using a table in a horizontal format rather than a vertical format. Easy to understand, huh?

15. **Save** *and* **close** *the* **myLookup.xlsx** *file.*

Text to Columns

One of the things that make people like us very valuable is our ability to manipulate data. Many times, we don't get to choose the format in which we receive data. Sometimes, the data is just flat ugly. Data can come in multiple formats, and sometimes it's contained all in one column.

1. **Open** *the file at* **C:\ExcelCEO\Excel 2016\Chapter9\Employees.xlsx**.
2. **Save As C:\ExcelCEO\Excel 2016\Chapter9*myEmployees.xlsx***.

This is a simple file of the store managers at Nitey-Nite and the stores they manage. In this file, all of the data is contained in one column. The data is actually in six columns, but sometimes when data is copied from one system to another, it copies to one column. In this case, you can use a ***Text to Columns*** procedure to split out the data into separate columns. If you notice, the data in this spreadsheet is separated by a comma, otherwise known as Comma Separated Values (.csv). The comma is known as the ***delimiter***, or the character that separates the fields of data. Other common delimiters include a space, semi-colon, or a tab. Some of the more sophisticated databases use other characters that are rarely used in text strings, like a tilde (~) or pipe symbol (|). Let's use the Text to Columns functionality to separate this data into its respective columns.

3. *Select* **Column A**.
4. *Click on the* **Data** *tab, then click on the* **Text to Columns**  *icon in the* **Data Tools** *group (the* **Convert Text to Columns Wizard** *opens).*
5. *In* **Step 1** *of the* **Convert Text to Columns Wizard**, *make sure the* **Delimited** *radio button is selected, and click* **Next**.

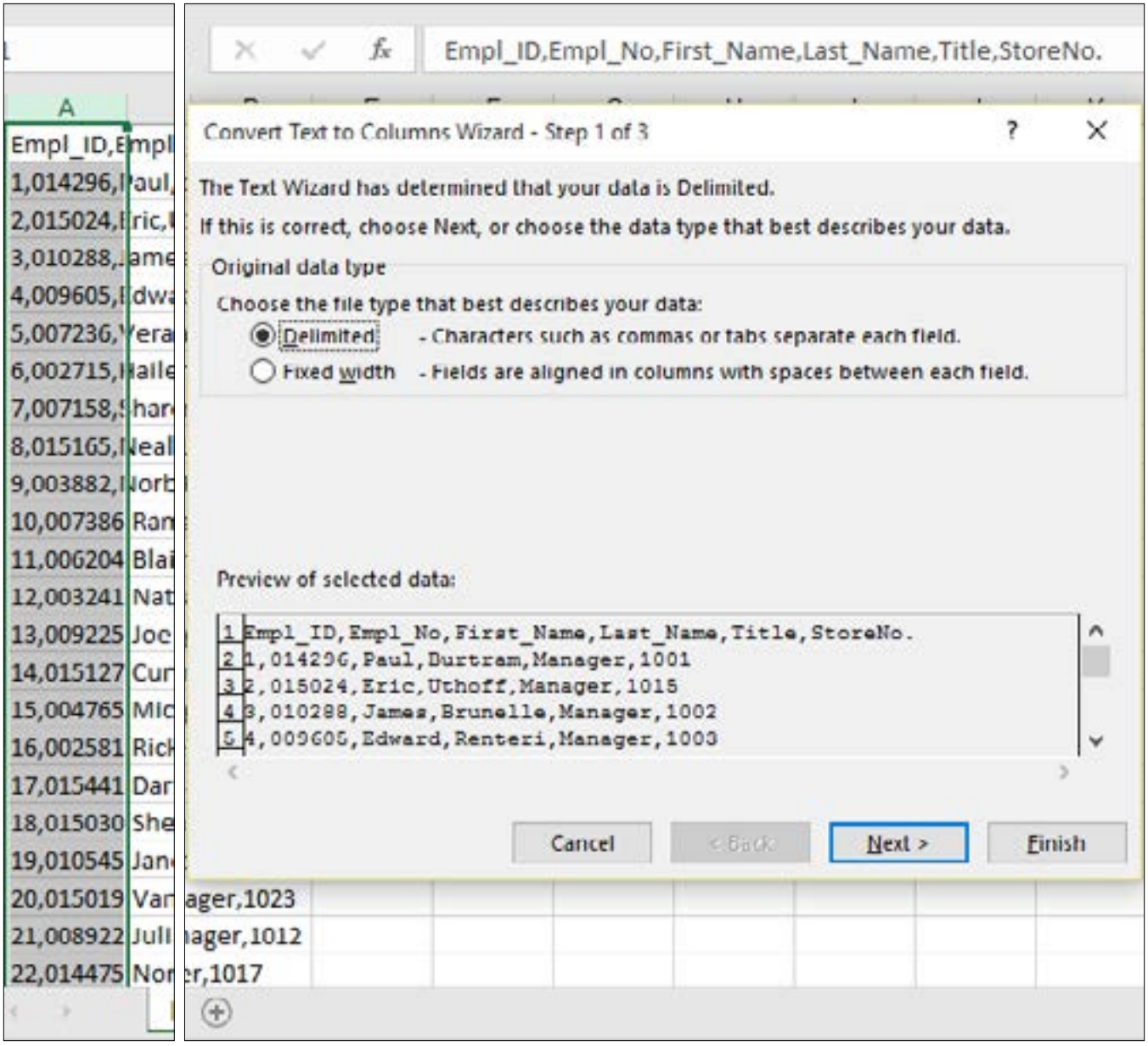


Figure 9.36

6. *In* **Step 2**, *uncheck the* **Tab** *checkbox (or any other checkbox that is checked), check the* **Comma** *checkbox, and click* **Next**.

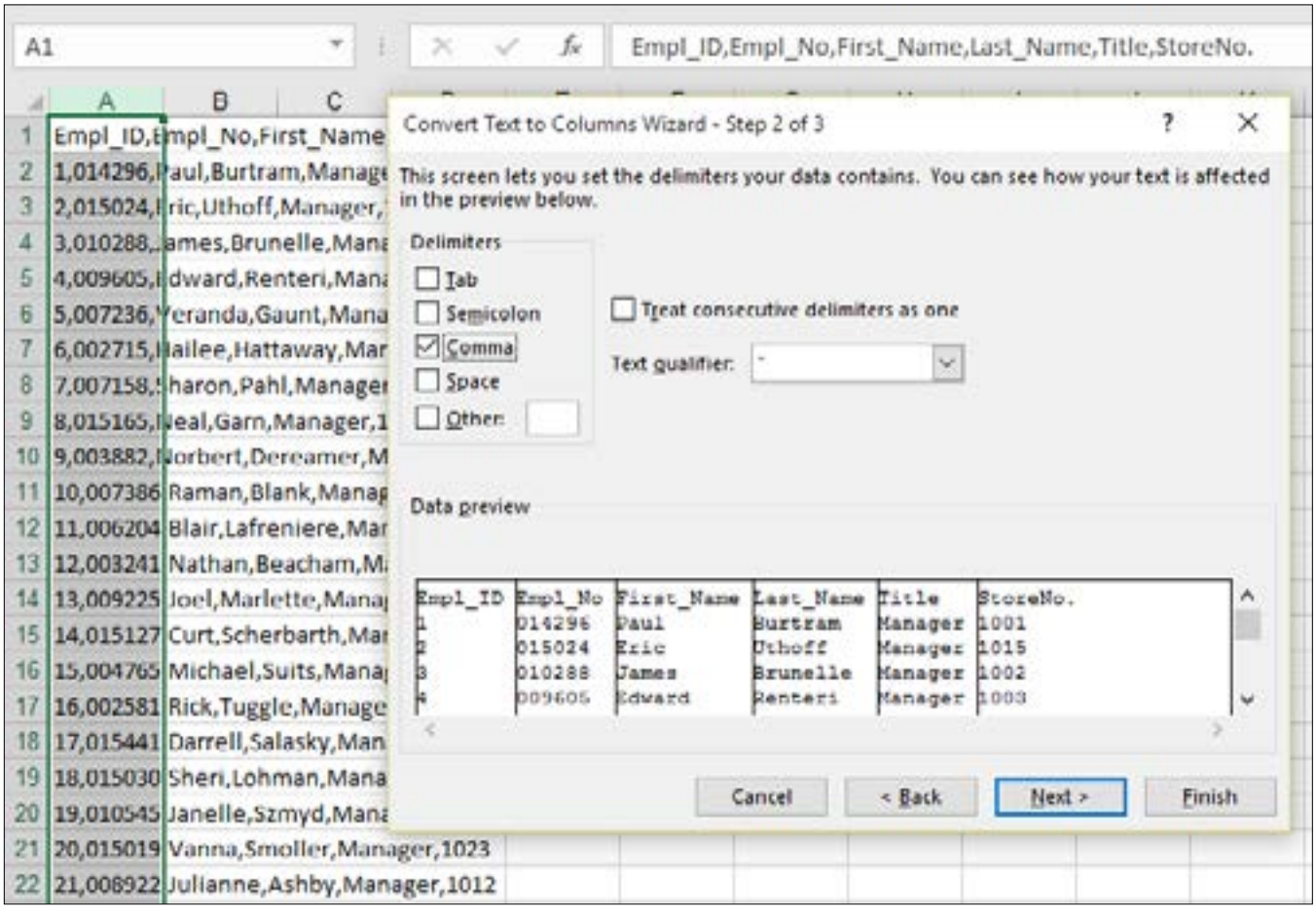


Figure 9.37

7. *In the last step of the wizard, under* **Data preview**, *click on the second column (that reads* **General** *and* **Empl_No** *on the first and second lines), click on the* **Text** *radio button in the* **Column Data format** *section, and click* **Finish**.

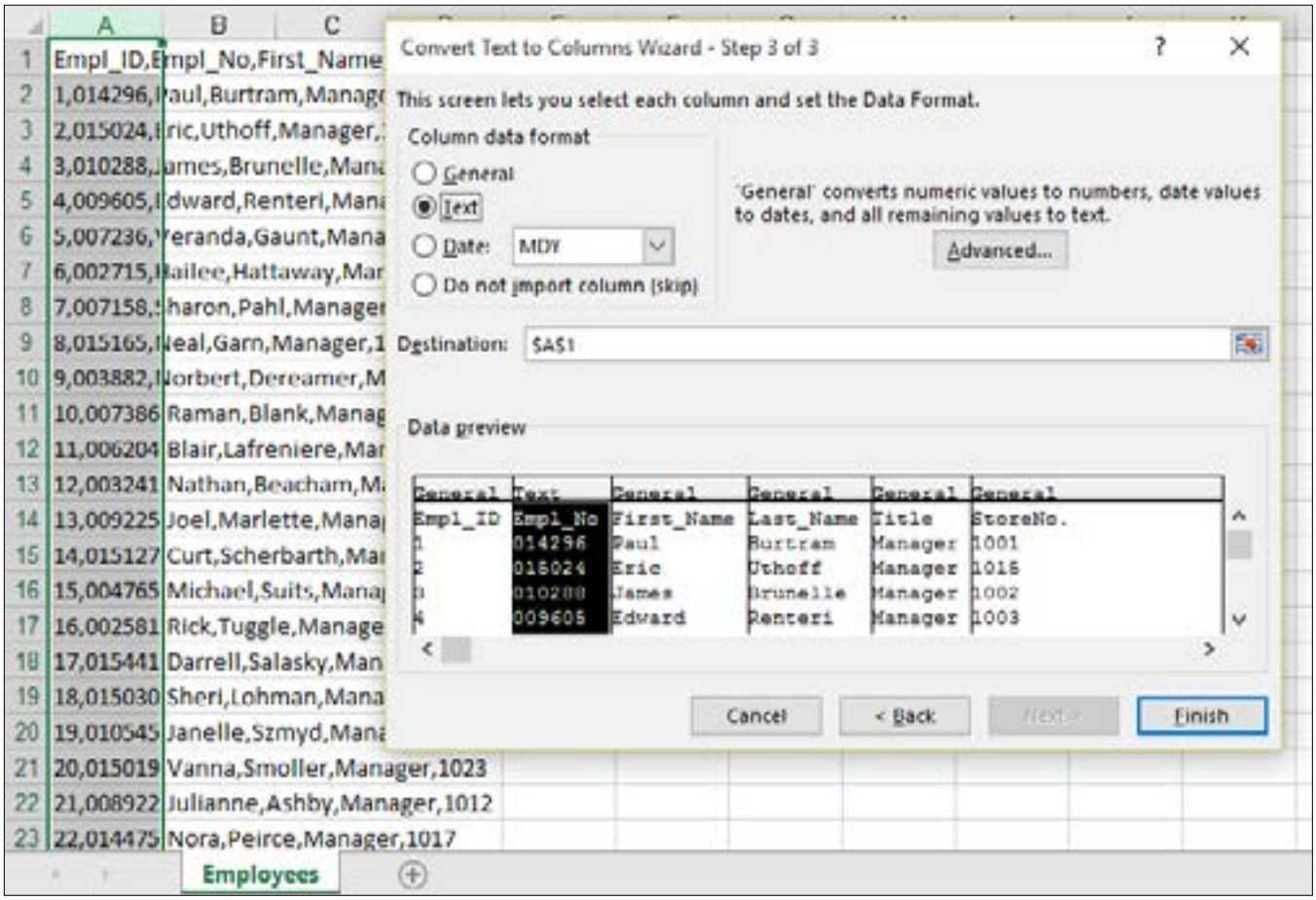


Figure 9.38

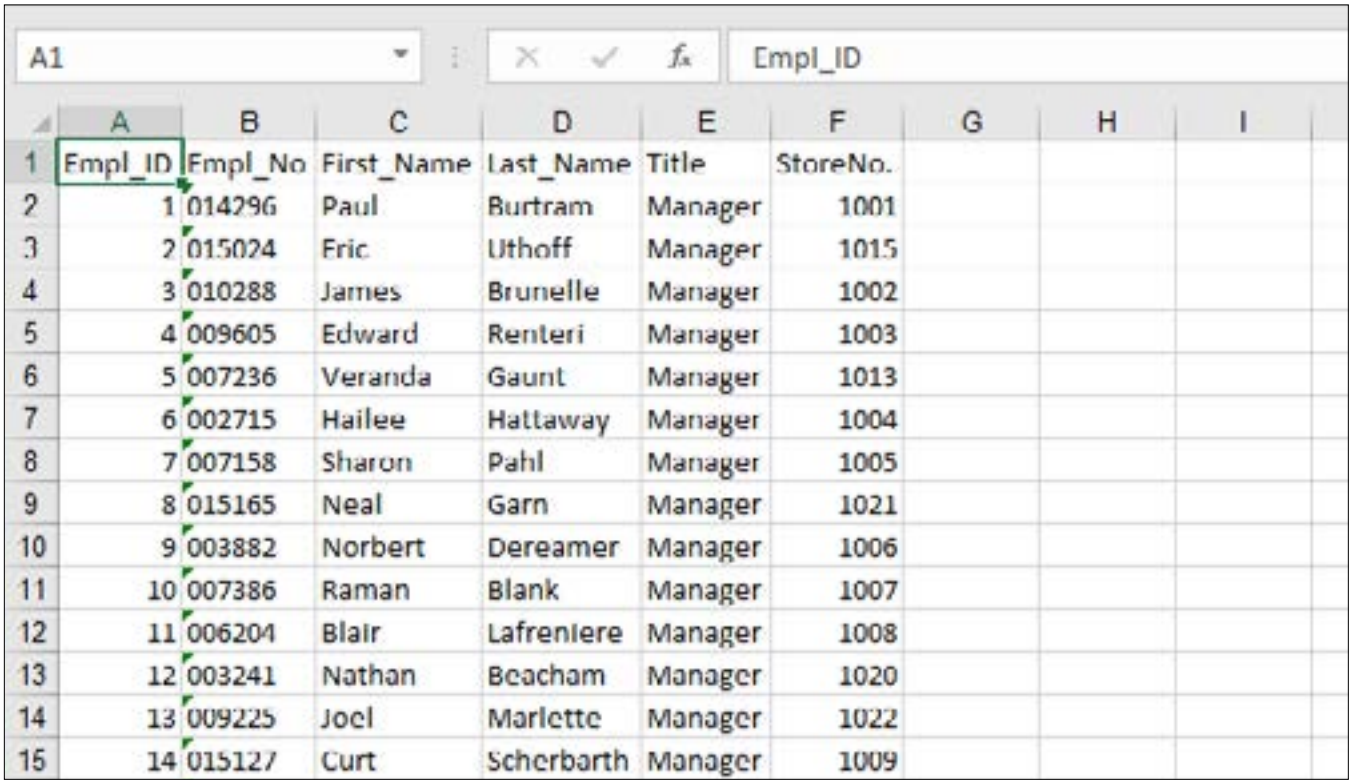
8. *Make sure the column widths are set appropriately.*

> ***Note:*** *In the last step where you clicked on the* **Empl_No** *field, I had you check the* **Text** *radio button. That ensured that the values in that field would be converted as Text, not Numbers. Had we left it alone, Excel would have brought in the data as numbers with no leading zeroes.*

The data is now separated out into six columns.

Numbers vs. Text Strings in a VLOOKUP() Function

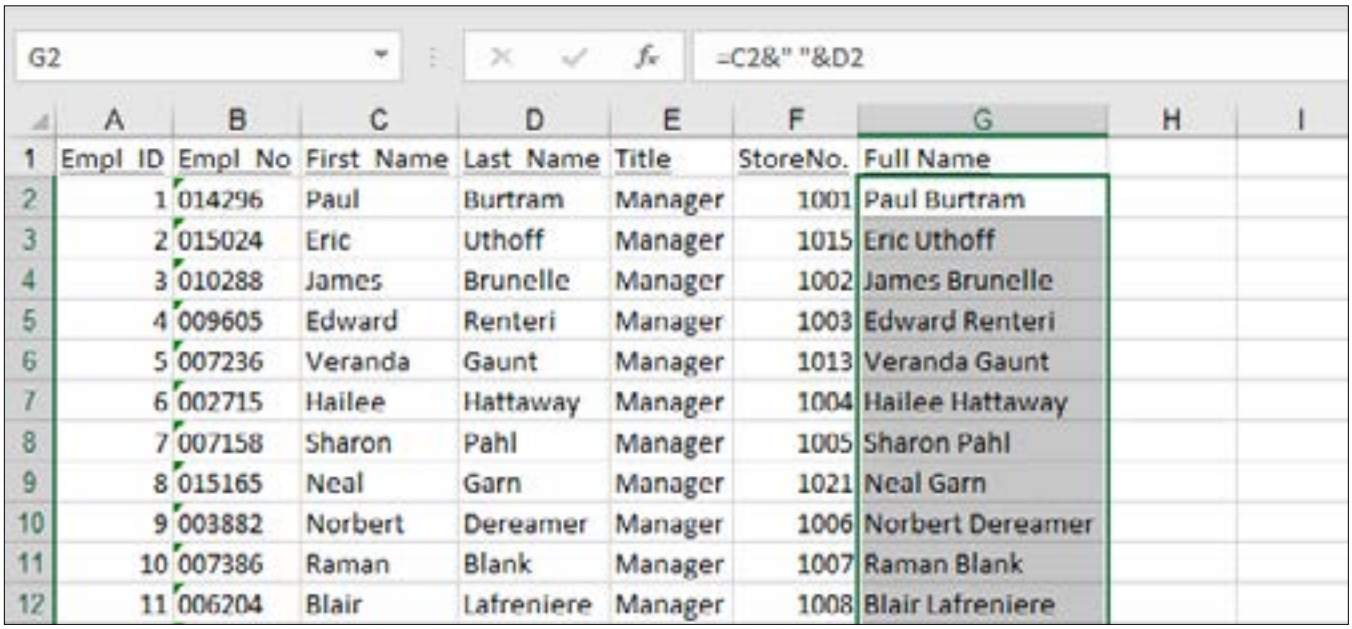
Sometimes you want to use numbers instead of text strings in your lookup values. For the next exercise, we need to clean up the file to be in a more useable format.



	A	B	C	D	E	F
1	Empl_ID	Empl_No	First_Name	Last_Name	Title	StoreNo.
2	1	014296	Paul	Burtram	Manager	1001
3	2	015024	Eric	Uthoff	Manager	1015
4	3	010288	James	Brunelle	Manager	1002
5	4	009605	Edward	Renteri	Manager	1003
6	5	007236	Veranda	Gaunt	Manager	1013
7	6	002715	Hailee	Hattaway	Manager	1004
8	7	007158	Sharon	Pahl	Manager	1005
9	8	015165	Neal	Garn	Manager	1021
10	9	003882	Norbert	Dereamer	Manager	1006
11	10	007386	Raman	Blank	Manager	1007
12	11	006204	Blair	Lafreniere	Manager	1008
13	12	003241	Nathan	Beacham	Manager	1020
14	13	009225	Joel	Marlette	Manager	1022
15	14	015127	Curt	Scherbarth	Manager	1009

Figure 9.39

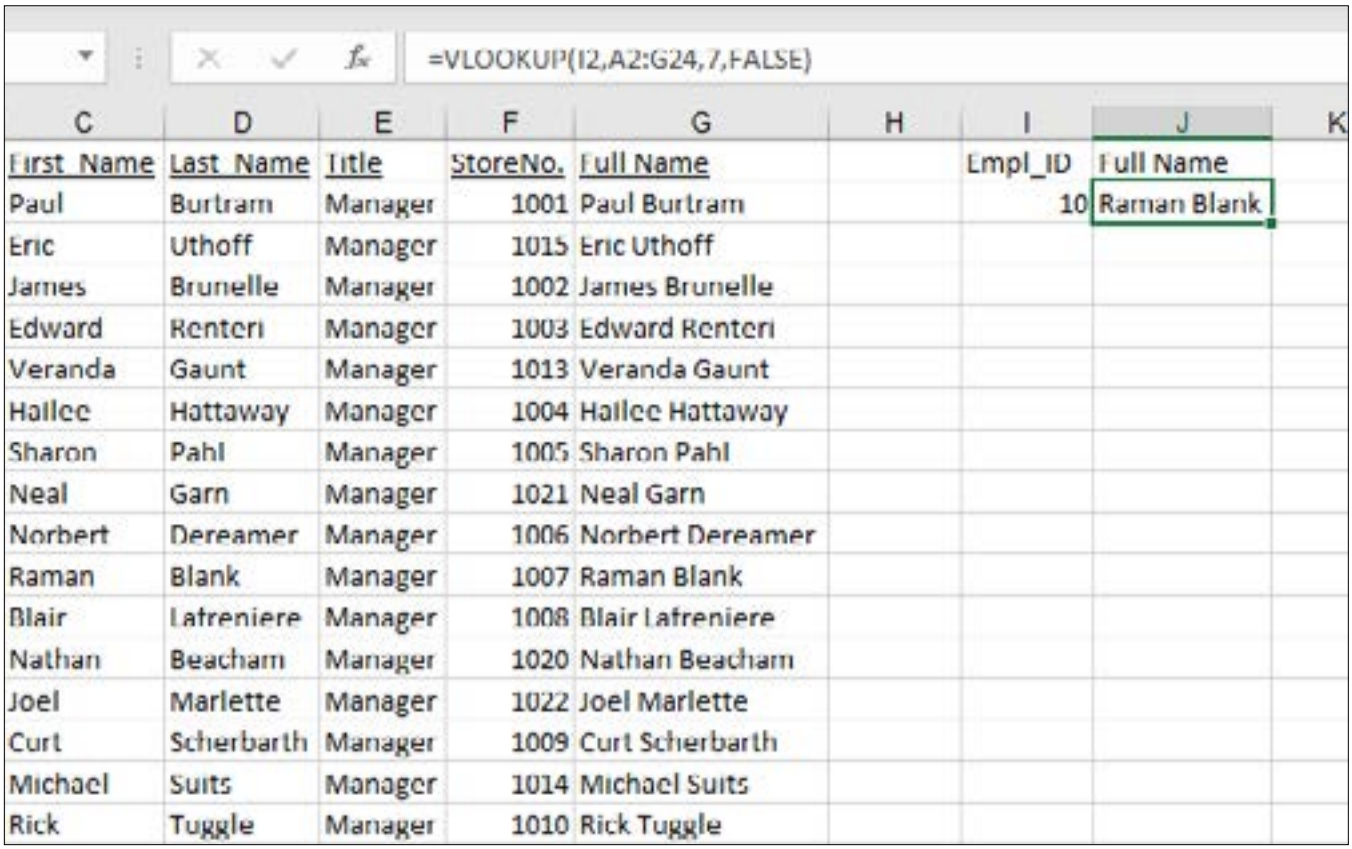
9. *In* **Cell G1**, *type:* ***Full Name*** *and underline all title headings.*
10. *Write a formula in* **Cell G2** *to* **concatenate** *the* **first name** *and* **last name** *to be the full name, copy to all cells below, and resize all columns.*



	A	B	C	D	E	F	G
1	Empl_ID	Empl_No	First_Name	Last_Name	Title	StoreNo.	Full Name
2	1	014296	Paul	Burtram	Manager	1001	Paul Burtram
3	2	015024	Eric	Uthoff	Manager	1015	Eric Uthoff
4	3	010288	James	Brunelle	Manager	1002	James Brunelle
5	4	009605	Edward	Renteri	Manager	1003	Edward Renteri
6	5	007236	Veranda	Gaunt	Manager	1013	Veranda Gaunt
7	6	002715	Hailee	Hattaway	Manager	1004	Hailee Hattaway
8	7	007158	Sharon	Pahl	Manager	1005	Sharon Pahl
9	8	015165	Neal	Garn	Manager	1021	Neal Garn
10	9	003882	Norbert	Dereamer	Manager	1006	Norbert Dereamer
11	10	007386	Raman	Blank	Manager	1007	Raman Blank
12	11	006204	Blair	Lafreniere	Manager	1008	Blair Lafreniere

Figure 9.40

11. *In* **Cell I1**, *type:* ***Empl_ID***
12. *In* **Cell I2**, *type:* ***10***
13. *In* **Cell J1**, *type:* ***Full Name***
14. *In* **Cell J2**, *write a formula that looks up the value in* **Cell I2** *in the database, and returns the employee's full name.*
15. *Resize* **Column J**, *if necessary.*



	C	D	E	F	G	H	I	J	K
1	First_Name	Last_Name	Title	StoreNo.	Full Name		Empl_ID	Full Name	
2	Paul	Burtram	Manager	1001	Paul Burtram		10	Raman Blank	
3	Eric	Uthoff	Manager	1015	Eric Uthoff				
4	James	Brunelle	Manager	1002	James Brunelle				
5	Edward	Renteri	Manager	1003	Edward Renteri				
6	Veranda	Gaunt	Manager	1013	Veranda Gaunt				
7	Hallee	Hattaway	Manager	1004	Hallee Hattaway				
8	Sharon	Pahl	Manager	1005	Sharon Pahl				
9	Neal	Garn	Manager	1021	Neal Garn				
10	Norbert	Dereamer	Manager	1006	Norbert Dereamer				
11	Raman	Blank	Manager	1007	Raman Blank				
12	Blair	Latreniere	Manager	1008	Blair Latreniere				
13	Nathan	Beacham	Manager	1020	Nathan Beacham				
14	Joel	Marlette	Manager	1022	Joel Marlette				
15	Curt	Scherbarth	Manager	1009	Curt Scherbarth				
16	Michael	Suits	Manager	1014	Michael Suits				
17	Rick	Tuggle	Manager	1010	Rick Tuggle				

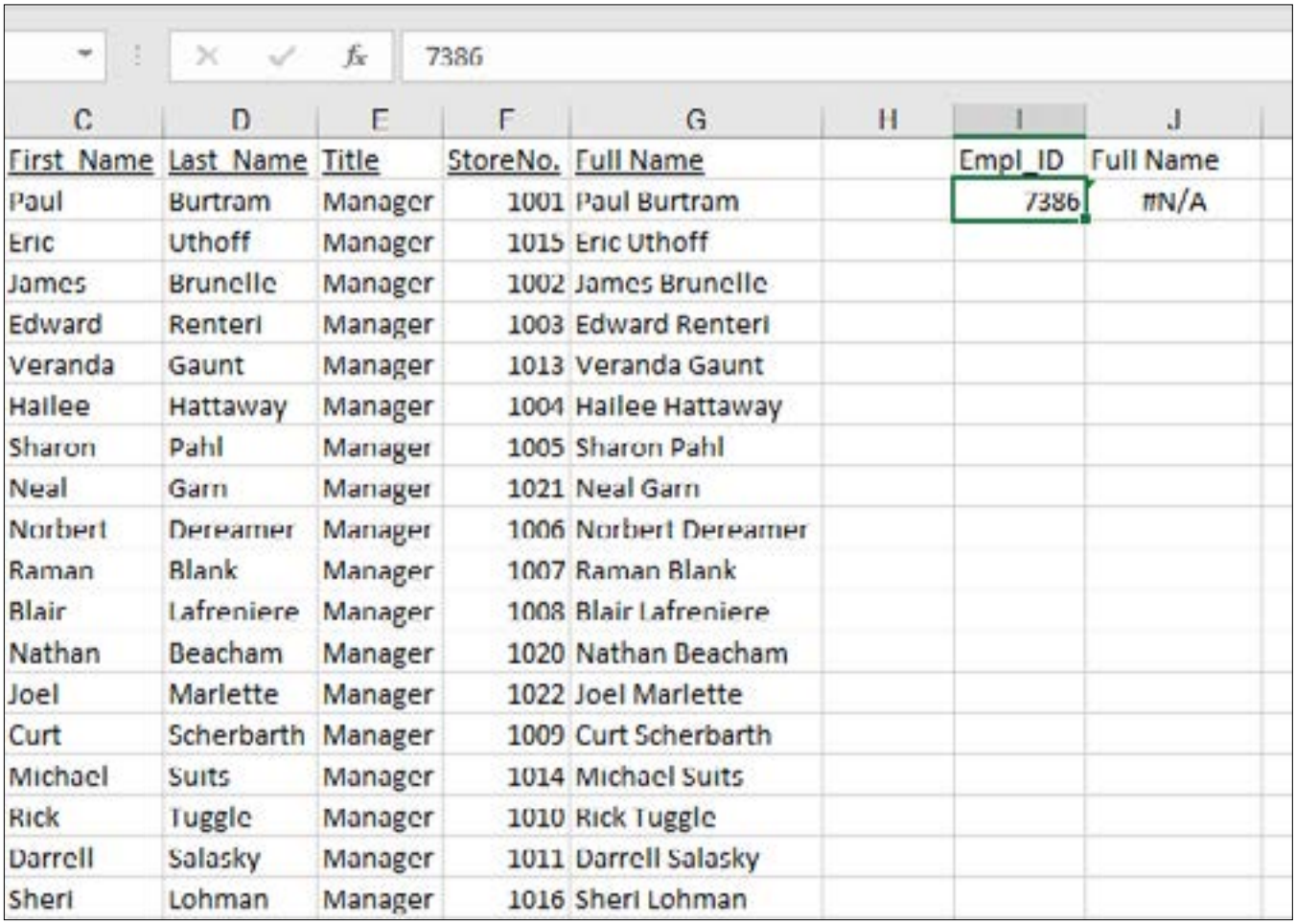
Figure 9.41

Now let's try the same VLOOKUP() using the Empl_No (not the Empl_ID).

16. *Replace the contents of* **Cell I1** *with:* ***Empl_No***.
17. *Edit the range in the formula in* **Cell J2** *to be:* ***=VLOOKUP(I2,B2:G24,6,FALSE)***

In the formula, we needed to change the range to start with Column B as those are the values we want to base our formula on. We also changed the 7 to a 6 because now the data we want to return is in the sixth column of the table if we begin with Column B. The formula right now should return an #N/A error, because Cell I2 still contains the number 10 which is an employee ID and not the employee number.

18. *In* **Cell I2**, *type* ***007386***, *then click* **Enter**.



	C	D	E	F	G	H	I	J
	First_Name	Last_Name	Title	StoreNo.	Full Name		Empl_ID	Full Name
	Paul	Burtram	Manager	1001	Paul Burtram		7386	#N/A
	Eric	Uthoff	Manager	1015	Eric Uthoff			
	James	Brunelle	Manager	1002	James Brunelle			
	Edward	Renteri	Manager	1003	Edward Renteri			
	Veranda	Gaunt	Manager	1013	Veranda Gaunt			
	Hallee	Hattaway	Manager	1004	Hallee Hattaway			
	Sharon	Pahl	Manager	1005	Sharon Pahl			
	Neal	Garn	Manager	1021	Neal Garn			
	Norbert	Dereamer	Manager	1006	Norbert Dereamer			
	Raman	Blank	Manager	1007	Raman Blank			
	Blair	Lafreniere	Manager	1008	Blair Lafreniere			
	Nathan	Beacham	Manager	1020	Nathan Beacham			
	Joel	Marlette	Manager	1022	Joel Marlette			
	Curt	Scherbarth	Manager	1009	Curt Scherbarth			
	Michael	Suits	Manager	1014	Michael Suits			
	Rick	Tuggle	Manager	1010	Rick Tuggle			
	Darrell	Salasky	Manager	1011	Darrell Salasky			
	Sheri	Lohman	Manager	1016	Sheri Lohman			

Figure 9.42

It still returns the ***#N/A*** error. Why? This one problem has been the cause of hours of frustrations for me and many other Excel users. When you input "007386", Excel recognized that as a number and consequently changed it to a number format and eliminated the leading zeros. The data in Column B is formatted as text, not numbers. You can tell it is text because of the leading zeros. Another way to tell if numbers are formatted as text is to select the numbers in question and look to see if the AutoSum feature in the Status Bar is working. You can also try to write a SUM() function using those numbers. If it returns an error or doesn't add up, chances are the numbers are formatted as text.

In this case, we can do one of two things. The fastest and easiest way (but not recommended by me) is to change the data in Column B (the Empl_No field) to numbers format. You can do this very easily by selecting the entire column, and choose Text to Columns and walk through the Convert Text to Columns Wizard. Let's do that.

1. *Select* **Column B**.
2. *Click on the* **Text to Columns** *button in the* **Data Tools** *group of the* **Data** *tab.*

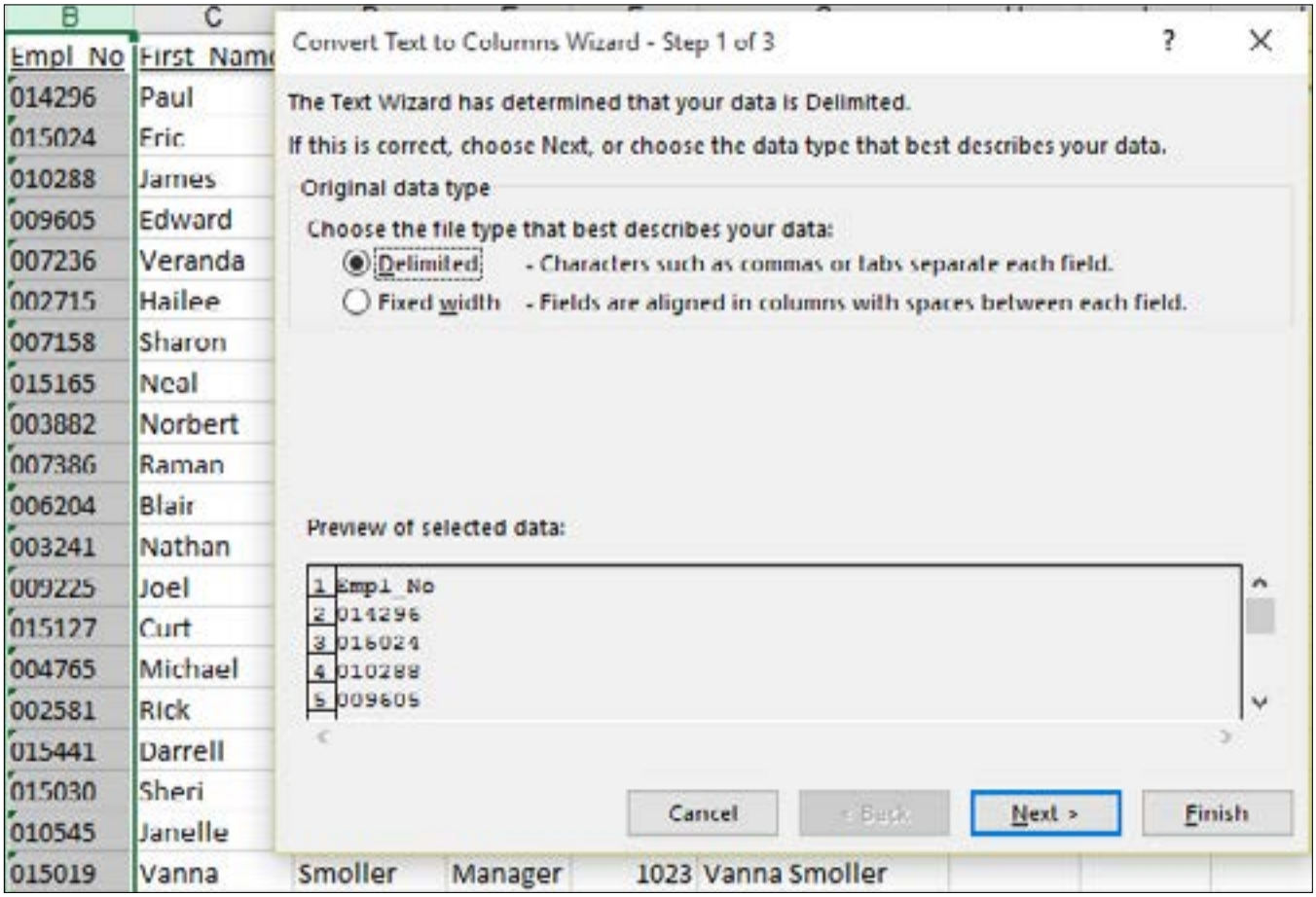


Figure 9.43

3. *Leave the* **Delimited** *data type checked and click* **Next >**
4. *In* **Step 2** *of the Wizard, uncheck all boxes in the* **Delimiters** *section (if there are no boxes checked, check and uncheck any box) and click* **Next >**.
5. *In* **Step 3** *of the Wizard, make sure the* **General** *radio button is selected, and click* **Finish**.

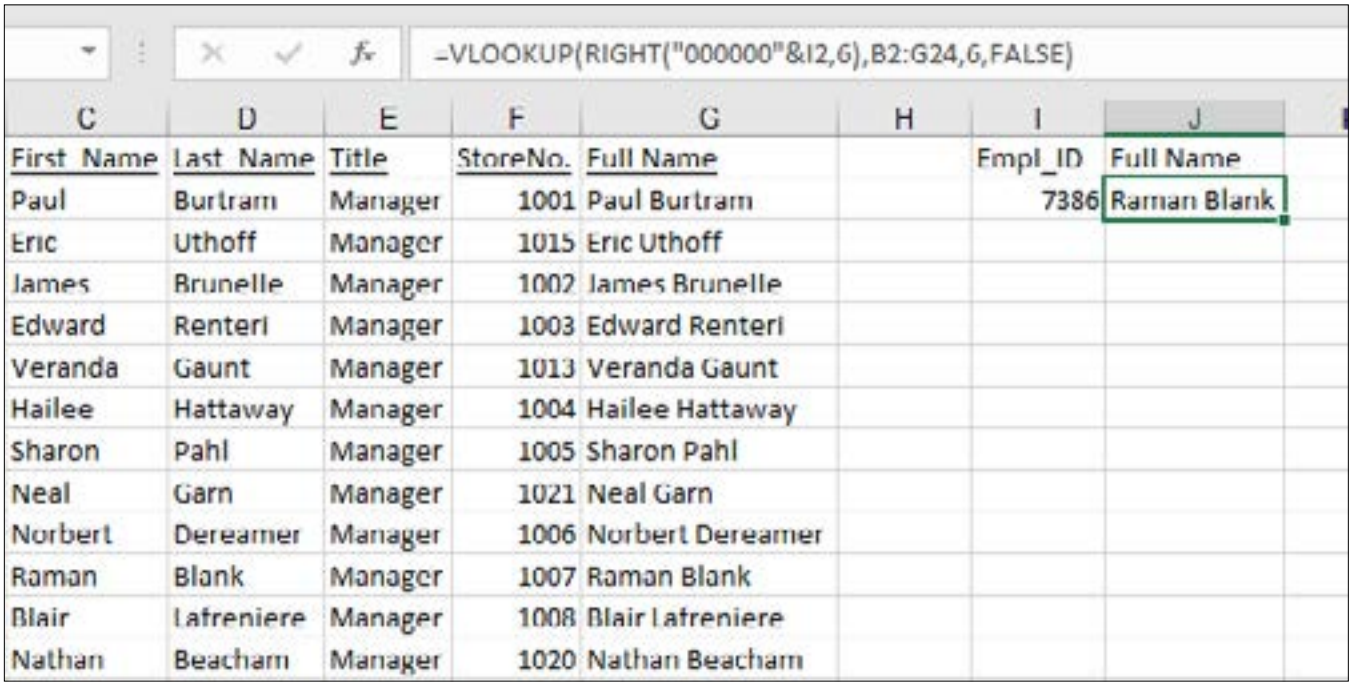
The values in Column B are changed to numbers and the formula in Cell J2 works. Although this way works, I do not suggest doing it. I often set up my spreadsheets so I can easily update the data, and if I were to refresh this table with new data, the Empl_no values would come in again as text and I would have to go through the motions again of converting the text values to numbers. I try to program my spreadsheets to have as little human intervention as possible.

6. *Click the* **Undo** *icon*  *(or press* **[Ctrl]**+*z on your keyboard).*

The Text to Columns procedure was undone and the values in Column B are now converted back to text.

7. *Edit the formula in* **Cell J2** *to be as follows:*
   =VLOOKUP(RIGHT("000000"&I2,6),B2:G24,6,FALSE)

Now stay with me on this one. I PROMISE you will love this trick once you understand the logic. This is an example of a nested function, or a function within a function. At Nitey-Nite, the Empl_No is always a six-digit number with leading zeros. The concatenation string "000000"&I2 will take the number that is in Cell I2 and add six leading zeros. RIGHT("000000"&I2,6) will return the six right-most characters from that string. Remember that whenever you use a Text function, it turns the number into a text string. In this case, that is exactly what we want.



=VLOOKUP(RIGHT("000000"&I2,6),B2:G24,6,FALSE)

C	D	E	F	G	H	I	J
First_Name	Last_Name	Title	StoreNo.	Full Name		Empl_ID	Full Name
Paul	Burtram	Manager	1001	Paul Burtram		7386	Raman Blank
Eric	Uthoff	Manager	1015	Eric Uthoff			
James	Brunelle	Manager	1002	James Brunelle			
Edward	Renteri	Manager	1003	Edward Renteri			
Veranda	Gaunt	Manager	1013	Veranda Gaunt			
Hailee	Hattaway	Manager	1004	Hailee Hattaway			
Sharon	Pahl	Manager	1005	Sharon Pahl			
Neal	Garn	Manager	1021	Neal Garn			
Norbert	Dereamer	Manager	1006	Norbert Dereamer			
Raman	Blank	Manager	1007	Raman Blank			
Blair	Lafreniere	Manager	1008	Blair Lafreniere			
Nathan	Beacham	Manager	1020	Nathan Beacham			

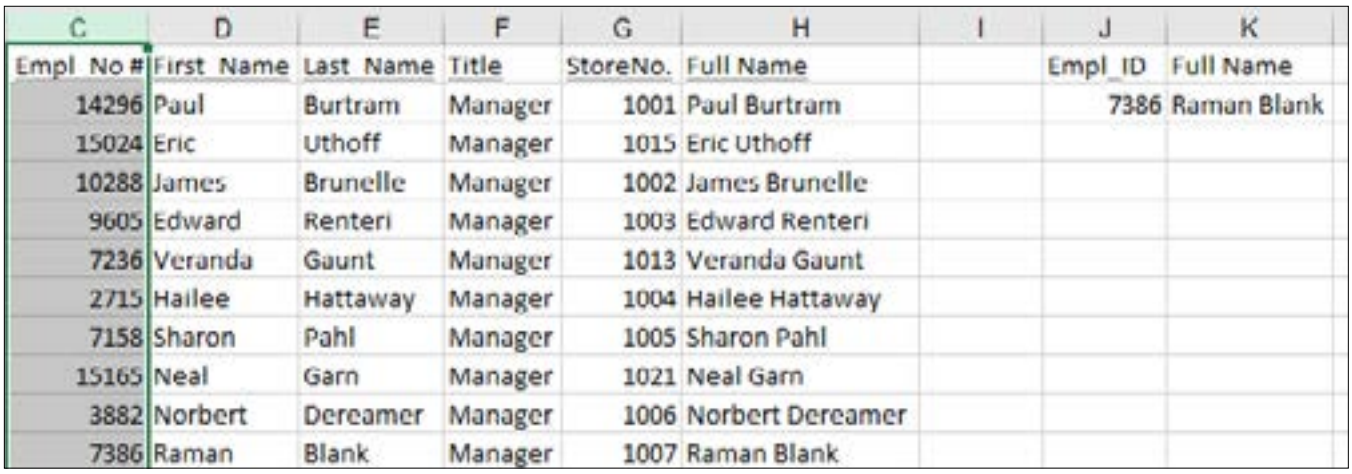
Figure 9.44

Sometimes you may want to go the other way and convert a text string into a number. Let's add a column beside the Empl_No column which will convert the Empl_No's from text strings to numbers.

8. *Insert a column after* **Column B**.
9. *In* **Cell C1**, *type:* ***Empl_No #****, and resize the column.*

There are different functions that you can use for this procedure, but I found a formula that works perfectly. In Chapter 6, we saw that we could use the VALUE() function to do this conversion, but there is another way. I'll ask you not to tell this trick to any programmers, as they will tell you it won't work, but just between you and me, it does.

10. *Click in* **Cell C2**, *and change the* **Number Format** *from* **Text** *to* **General** *to reset the cell's formatting which was inherited from* **Column B**.
11. *In* **Cell C2**, *type:* ***=B2+0***
11. *Copy the formula to all cells below.*
12. *In* **Cell K2**, *change the VLOOKUP()* **col_index_num** *to 7, since you inserted a column.*
13. *Right-align the numbers.*



C	D	E	F	G	H	I	J	K
Empl_No #	First_Name	Last_Name	Title	StoreNo.	Full Name		Empl_ID	Full Name
14296	Paul	Burtram	Manager	1001	Paul Burtram		7386	Raman Blank
15024	Eric	Uthoff	Manager	1015	Eric Uthoff			
10288	James	Brunelle	Manager	1002	James Brunelle			
9605	Edward	Renteri	Manager	1003	Edward Renteri			
7236	Veranda	Gaunt	Manager	1013	Veranda Gaunt			
2715	Hailee	Hattaway	Manager	1004	Hailee Hattaway			
7158	Sharon	Pahl	Manager	1005	Sharon Pahl			
15165	Neal	Garn	Manager	1021	Neal Garn			
3882	Norbert	Dereamer	Manager	1006	Norbert Dereamer			
7386	Raman	Blank	Manager	1007	Raman Blank			

Figure 9.45

That's it? Yep, that's it. All you have to do is to add zero (or multiply by 1) to a text string of numbers to convert it to a number. Of course, there can be only numbers (no alpha characters) in the text string. Since I believe LOOKUP Formulas are critically important, we will continue the discussion of LOOKUP Formulas in the next chapter and introduce the last set of functions, Logical Functions.

14. **Save** *and* **close** *the* **myEmployees.xlsx** *file.*

***Review Questions**: It is now time to complete the hands-on Review Questions. Log on to www.ExcelCEO.com with your Email address and Password, click on the* **Excel 2016 Review Questions, Chapter 9, Section 4 of 4** *option in your Main Menu, and complete the Review Questions.*

Conclusion

In this chapter, you learned about Date Functions, and used the NOW(), TODAY(), MONTH(), DAY(), YEAR(), DATE() and WEEKDAY() functions in many formulas. You learned about Statistical Functions in formulas, including the COUNT(), AVERAGE(), MEDIAN(), MODE(), MAX(), MIN(), COUNTIF(), and RANK() functions. You used these functions to create a summary and an item-by-item margin analysis. You learned about database functions and wrote formulas using the DSUM() and DCOUNT() functions. You learned about one of the most important types of functions, Lookup Functions. Additionally, you used the Data Validation functionality to create drop-down menus and validation rules and you used the Text to Columns functionality several times. You used the Circle Invalid Data functionality to help identify formulas that didn't meet specific criteria. Finally, you saw how to switch back and forth between using numbers and text strings by using the RIGHT() function and the +0 trick.

Chapter Exam

To take the examination for this chapter, you must have successfully completed the examination for the previous chapter. You can now go to www.ExcelCEO.com, login to your ExcelCEO student profile, and take the exam. Make sure that you take the exam on the same computer on which you completed the practice files, as some of the questions on the exam may refer to some of the completed projects. Chapter exams are intended to be hands-on.

Excel® 2016

Complete Self-study Course

ExcelCEO

Chief Excel Officer

CHAPTER TEN — ADVANCED LOOKUP AND LOGICAL FUNCTIONS

Chapter Objectives:

- Recognize Absolute Reference ranges in VLOOKUP() formulas
- Determine data to return using the LOOKUP() function
- Select the appropriate criteria in a MATCH() function
- Identify cell contents by type using the CELL() function
- Select the components of an IFERROR() function
- Recognize the uses of the AND() and OR() functions
- Identify formula errors by tracing cell dependents

Projects You Will Complete During This Chapter:

- *myBonus.xlsx*
- *myBonus2.xlsx*

CPE Credits possible for this chapter: 2

Introduction

Once I was teaching an Excel class to a group of accountants. The primary purpose of the class was to show them how to connect an Excel file to an OLAP cube (an external database), and pull in data. Once the data was in the spreadsheet, I showed them how to write a complex VLOOKUP() function to bring the data to different parts of the spreadsheet. One of the participants was bored with the class, as she already knew how to do all of that. Then I showed them the trick on how to turn a text string to a number by simply adding zero, and nesting that formula in a VLOOKUP() function. Her eyes almost popped out of her head and she said, "*No way! It CAN'T be that easy!*" She jumped up out of her chair, ran out of the room and into her office. She was back within two minutes shouting, "*IT WORKS! IT WORKS!*" Writing formulas is what Excel is all about, and I sincerely hope you've found this course to be useful so far.

Advanced Lookup Functions

Sometimes you will run into a situation where you need to look up a number that falls between a range of numbers. In Chapter 6, I introduced you to the IF() function and showed you how to write this formula:

=IF(G2<=50000,"Paper",IF(G2<=70000,"Scissors","Rock"))

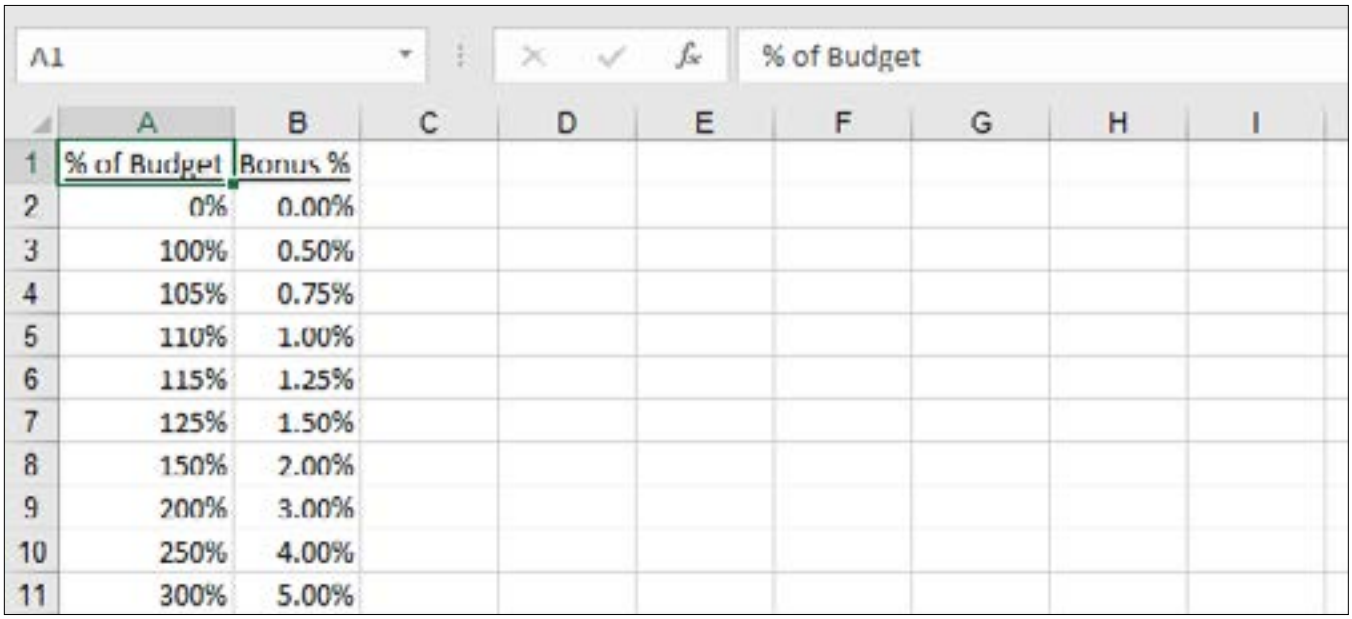
This formula tells us if the value in Cell G2 is less than or equal to 50,000, then return the word "Paper". If Cell G2 is less than or equal to 70,000, return "Scissors", and for all other values, return "Rock". The IF() function works very well in this situation, as there are only three options: Paper, Scissors, and Rock. In Excel 2003, you could nest only seven IF() functions in one formula. However, in Excel 2007 and beyond, you can nest up to 64 IF() functions in one formula. Honestly, I don't know why Microsoft allowed so many IF() functions in one formula, because it would be a full-time job just keeping track of all those conditions. In the first part of this chapter, I'll introduce you to some alternative methods of looking up values where many IF() statements could be used.

Over the years, I have been given many schedules like the following on which to calculate bonuses:

% of Budget	Bonus %
Less than 100%	0.00%
100%	0.50%
105%	0.75%
110%	1.00%
125%	1.50%
150%	2.00%
200%	3.00%
250%	4.00%
300%	5.00%

In this case, the Store Manager has a budgeted amount of sales he/she should attain every month. If the store manager reaches 100% of that budgeted number, they begin to receive a bonus based on the percentage over budget on his/her actual sales. Depending on the amount of their sales to budget determines their bonus amount: the higher the sales, the higher the bonus amount.

1. **Open** *the file located at* **C:\ExcelCEO\Excel 2016\Chapter10\Bonus.xlsx**.
2. **Save As C:\ExcelCEO\Excel 2016\Chapter10*myBonus.xlsx***.



A1 | % of Budget

	A	B	C	D	E	F	G	H	I
1	% of Budget	Bonus %							
2	0%	0.00%							
3	100%	0.50%							
4	105%	0.75%							
5	110%	1.00%							
6	115%	1.25%							
7	125%	1.50%							
8	150%	2.00%							
9	200%	3.00%							
10	250%	4.00%							
11	300%	5.00%							

Figure 10.1

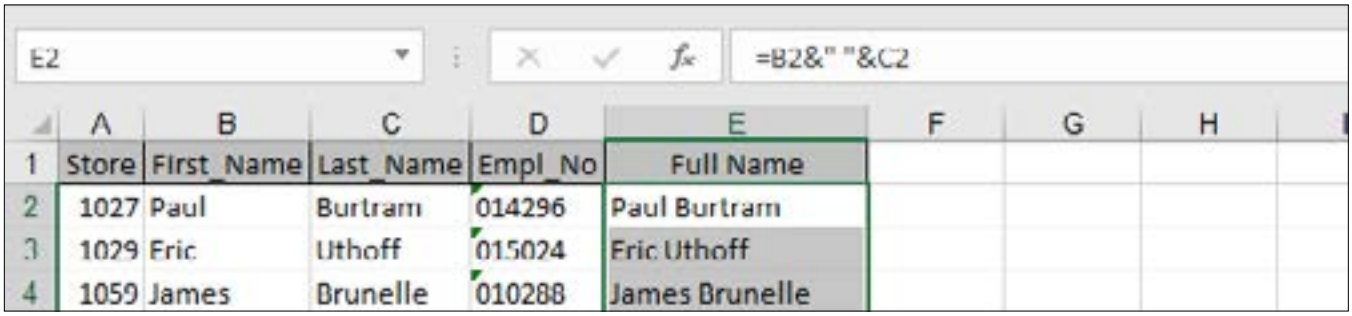
Let's review this file. On the Assumptions tab that reflects the data above. This schedule means that if the Store Manager (SM) achieves less than 100% of budget, he/she receives no bonus. If the SM sells between 100% and 105%, he/she earns a bonus equal to 0.50% of actual sales. Once the SM reaches 105%, the bonus percentage increases to 0.75%, going back to dollar one. So if the SM sells $104,000 and has a $100,000 budget, his percent of budget is 104% (104,000/100,000), and he qualifies for a 0.50% bonus. The bonus equates to $520, or $104,000 x 0.50%. The Sep_16_Data tab contains the total mattress and pillow sales for each store in September 2016. The Managers tab contains the names of the managers for each store and the Budget tab contains the Budget numbers for each store.

Let's first organize the data where it is easier to work with.

3. *Copy the* Sep_16_Data *tab, and rename the new tab* ***Bonus***.

It's always good practice to save the original data and perform calculations in a copied version of the data, just in case you need to start over.

4. *In the* Managers *tab,* **Cell E1**, *type:* ***Full Name***
5. *Format* **Cell E1** *like* **Cell D1**.
6. *Write a formula in the* **Full Name** *column that creates the manager's full name for all rows. Resize column, if necessary.*

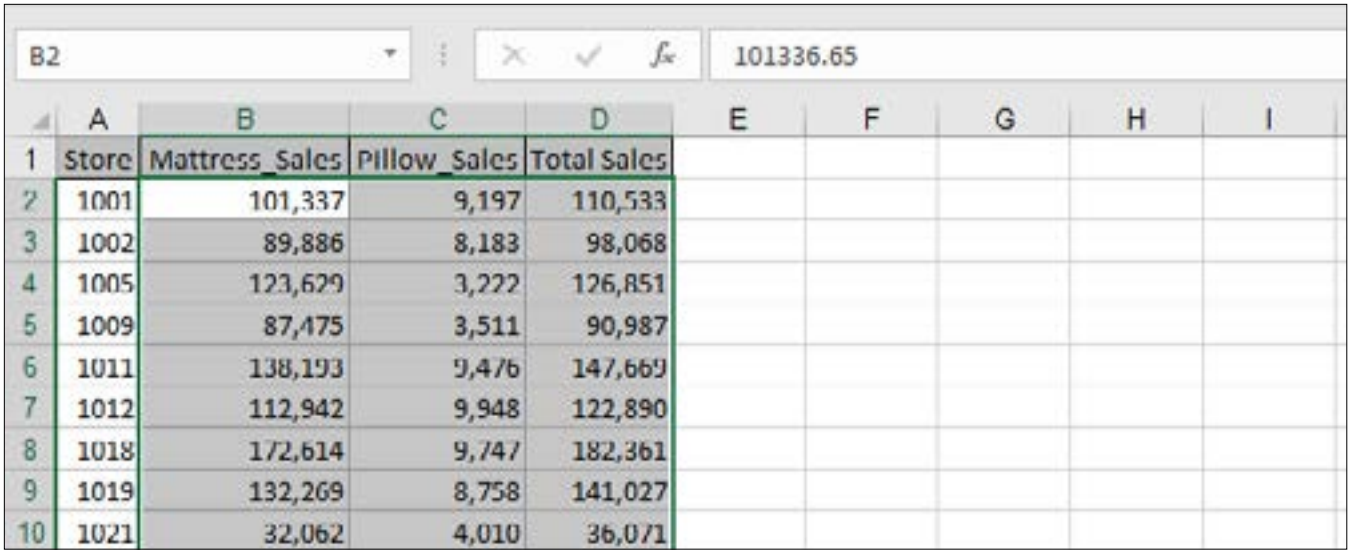


E2 =B2&" "&C2

	A	B	C	D	E	F	G	H
1	Store	First_Name	Last_Name	Empl_No	Full Name			
2	1027	Paul	Burtram	014296	Paul Burtram			
3	1029	Eric	Uthoff	015024	Eric Uthoff			
4	1059	James	Brunelle	010288	James Brunelle			

Figure 10.2

7. *In the* **Bonus** *tab,* **Cell D1**, *type:* ***Total Sales***
8. *Format* **Cell D1** *like* **Cell C1**.
9. *Calculate the total sales for each store in* **Column D**.
10. *Format the* **Mattress Sales**, **Pillow Sales**, *and* **Total Sales** *fields as* **Number**, **no decimal places**, **Use 1000 Separator (,)**.



B2 101336.65

	A	B	C	D	E	F	G	H	I
1	Store	Mattress_Sales	Pillow_Sales	Total Sales					
2	1001	101,337	9,197	110,533					
3	1002	89,886	8,183	98,068					
4	1005	123,629	3,222	126,851					
5	1009	87,475	3,511	90,987					
6	1011	138,193	9,476	147,669					
7	1012	112,942	9,948	122,890					
8	1018	172,614	9,747	182,361					
9	1019	132,269	8,758	141,027					
10	1021	32,062	4,010	36,071					

Figure 10.3

11. *Insert a column between* **Store** *and* **Mattress_Sales**.
12. *In* **Cell B1**, *type:* ***Manager***

VLOOKUP() and Absolute References

Remember that when you copy a formula down, up, or over, the cell references shift as well. This will also happen to a range in a VLOOKUP() function unless 1) the range is named or 2) the range is in Absolute References. As you learned in Chapter 2, you can press the [F4] key (or Fn+[F4], depending on your keyboard) to toggle between Absolute, Mixed, and Relative references. In our case here, we will use an Absolute Reference in our VLOOKUP() function.

13. *In* **Cell B2**, *write a* **VLOOKUP()** *formula to lookup the full name of each manager listed on the* Managers *tab, based on the store number.*

14. *Make the range in the* **VLOOKUP()** *function be an* **Absolute Reference**.
15. *Copy the formula down to all cells below.*
16. *If any of the rows grow in size, format all rows in the tab to be* **15.00** *in height.*
17. **Left-justify** *all manager names and adjust the column width to fit.*

B2 =VLOOKUP(A2,Managers!$A$2:$E$30,5,FALSE)

	A	B	C	D	E	F	G	H
1	Store	Manager	Mattress_Sales	Pillow_Sales	Total Sales			
2	1001	Rasheda Webber	101,337	9,197	110,533			
3	1002	Julianne Ashby	89,886	8,183	98,068			
4	1005	Raman Blank	123,629	3,222	126,851			
5	1009	Rick Tuggle	87,475	3,511	90,987			
6	1011	Curt Scherbarth	138,193	9,476	147,669			
7	1012	Michael Suits	112,942	9,948	122,890			
8	1018	Eva Roseman	172,614	9,747	182,361			
9	1019	Norbert Dereamer	132,269	8,758	141,027			
10	1021	Neal Garn	32,062	4,010	36,071			
11	1024	Blair Lafreniere	140,251	8,137	148,388			
12	1026	Veranda Gaunt	116,726	4,631	121,357			

Figure 10.4

Note that when you refer to cells in another tab, the name of the tab and the data range in the formula are separated by an exclamation point, as in this VLOOKUP() function. If you refer to a different workbook, the name of the workbook appears in brackets (like =[Book1.xlsx]Sheet1!$A$1). This type of a reference is called a ***3-D reference***, as it refers to the three parts of the link's path. If there are spaces in the name of the workbook or in the tab name, the name will be surrounded by apostrophes. As such, when writing formulas that refer to ranges or cells in different tabs and/or workbooks, it is usually easier to choose the range with your mouse rather than manually typing the entire formula.

18. *In* **Cell F1**, *type:* ***Budget***
19. *Format* **Cell F1** *like* **Cell E1**.
20. *In* **Cell F2**, *write a* **VLOOKUP()** *formula to look up the budget number in the* Budget *tab based on the* **Store** *number.*
21. *Format as* **Number**, **no decimal places**, *and* **Use 1000 Separator (,)**, *then copy* **Cell F2** *down to all cells.*

F2 =VLOOKUP(A2,Budget!$A$2:$B$30,2,FALSE)

	A	B	C	D	E	F	G	H
1	Store	Manager	Mattress Sales	Pillow Sales	Total Sales	Budget		
2	1001	Rasheda Webber	101,337	9,197	110,533	152,000		
3	1002	Julianne Ashby	89,886	8,183	98,068	63,000		
4	1005	Raman Blank	123,629	3,222	126,851	169,000		
5	1009	Rick Tuggle	87,475	3,511	90,987	93,000		
6	1011	Curt Scherbarth	138,193	9,476	147,669	77,000		
7	1012	Michael Suits	112,942	9,948	122,890	119,000		

Figure 10.5

22. *In* **Cell G1**, *type:* ***% Budget***
23. *Format* **Cell G1** *appropriately.*
24. *In* **Cell G2**, *calculate the* **percent of budget** *by dividing the* **Total Sales** *by* **Budget**.
25. *Format* **Cell G2** *as* **Percentage**, **one decimal place**, *and copy down to all cells below.*

G2 =F2/F2

	A	B	C	D	E	F	G	H
1	Store	Manager	Mattress_Sales	Pillow_Sales	Total Sales	Budget	% Budget	
2	1001	Rasheda Webber	101,337	9,197	110,533	152,000	72.7%	
3	1002	Julianne Ashby	89,886	8,183	98,068	63,000	155.7%	
4	1005	Raman Blank	123,629	3,222	126,851	169,000	75.1%	
5	1009	Rick Tuggle	87,475	3,511	90,987	93,000	97.8%	
6	1011	Curt Scherbarth	138,193	9,476	147,669	77,000	191.8%	
7	1012	Michael Suits	112,942	9,948	122,890	119,000	103.3%	

Figure 10.6

The LOOKUP() Function

Now we're ready to do the actual bonus calculations. The first thing we need to do is to find out the bonus percentage for each Store Manager. We will do this with a LOOKUP() function. The ***LOOKUP() function*** has two arguments in the way we use it: the value to look up and the range. Remember, the lookup value and the left-most column in the range must be the same numbers. Let's go forward.

26. *In* **Cell H1**, *type:* ***Bonus %***
27. *Format* **Cell H1** *accordingly.*
28. *Select the* **Range A2 to B11** *on the* Assumptions *tab, and name that range* ***Bonus_Table***.
29. *In the* **Bonus** *tab,* **Cell H2**, *type the following formula:* ***=LOOKUP(G2,Bonus_Table)***

30. Format **Cell H2** *as* **Percentage**, **two decimal places**, *and copy down to all cells below.*

H2 =LOOKUP(G2,Bonus_Table)

	A	B	C	D	E	F	G	H
1	Store	Manager	Mattress_Sales	Pillow_Sales	Total Sales	Budget	% Budget	Bonus %
2	1001	Rasheda Webber	101,337	9,197	110,533	152,000	72.7%	0.00%
3	1002	Julianne Ashby	89,886	8,183	98,068	63,000	155.7%	2.00%
4	1005	Raman Blank	123,629	3,222	126,851	169,000	75.1%	0.00%
5	1009	Rick Tuggle	87,475	3,511	90,987	93,000	97.8%	0.00%
6	1011	Curt Scherbarth	138,193	9,476	147,669	77,000	191.8%	2.00%
7	1012	Michael Suits	112,942	9,948	122,890	119,000	103.3%	0.50%
8	1018	Eva Roseman	172,614	9,747	182,361	99,000	184.2%	2.00%
9	1019	Norbert Dereamer	132,269	8,758	141,027	112,000	125.9%	1.50%
10	1021	Neal Garn	32,062	4,010	36,071	37,000	97.5%	0.00%
11	1024	Blair Lafreniere	140,251	8,137	148,388	45,000	329.8%	5.00%
12	1026	Veranda Gaunt	116,726	4,631	121,357	130,000	93.4%	0.00%
13	1027	Paul Burtram	176,812	10,196	187,008	118,000	158.5%	2.00%
14	1029	Eric Uthoff	29,200	4,766	33,966	42,000	80.9%	0.00%

Figure 10.7

You should spot check some of these numbers with the Bonus Table on the Assumptions tab to make sure the bonus percentages are correct.

The MATCH() Function

Another function you can use in this scenario is the MATCH() function. I use this function more frequently than the LOOKUP() function as it is more versatile. The ***MATCH() function*** returns the relative position of an item in a table or array that matches a specified value in a specified order. You should use the MATCH() instead of one of the LOOKUP functions when you need to see the position of an item in a range instead of the item itself. The MATCH() function has two required arguments and one optional argument. The two required arguments are the lookup value and the lookup array (which is the database range or table). It is important to know that the table or array must be sorted by the lookup value. Let's try an example.

1. *In* **Cell I1**, *type:* ***Match***
2. *Format* **Cell I1** *appropriately.*
3. *In* **Cell I2**, *type the following formula:* ***=MATCH(G2,Assumptions!$A$2:$A$11)***
4. *Copy to all cells below.*

=MATCH(G2,Assumptions!$A$2:$A$11)

B	C	D	E	F	G	H	I
Manager	Mattress_Sales	Pillow_Sales	Total Sales	Budget	% Budget	Bonus %	Match
Rasheda Webber	101,337	9,197	110,533	152,000	72.7%	0.00%	1
Julianne Ashby	89,886	8,183	98,068	63,000	155.7%	2.00%	7
Raman Blank	123,629	3,222	126,851	169,000	75.1%	0.00%	1
Rick Tuggle	87,475	3,511	90,987	93,000	97.8%	0.00%	1
Curt Scherbarth	138,193	9,476	147,669	77,000	191.8%	2.00%	7
Michael Suits	112,942	9,948	122,890	119,000	103.3%	0.50%	2
Eva Roseman	172,614	9,747	182,361	99,000	184.2%	2.00%	7
Norbert Dreamer	132,269	8,758	141,027	112,000	125.9%	1.50%	6
Neal Garn	32,062	4,010	36,071	37,000	97.5%	0.00%	1
Blair Lafreniere	140,251	8,137	148,388	45,000	329.8%	5.00%	10

Figure 10.8

The MATCH() function returns the position of the lookup value. The first lookup value, 72.7%, is positioned between 0% and 100% in the database range and is in the first position. The next value, 155.7%, is between 150% and 200%, in the seventh position, and so forth. To find the Bonus % value in the table, we need to edit the Assumptions tab a bit.

5. *On the* Assumptions *tab, insert a column to the left of the* **% of Budget** *column.*
6. *In* **Cell A1**, *type:* ***Position***
7. *Underline* **Cell A1**.
8. *Type the numbers* ***1 – 10*** *in* **Cells A2 through A11**.

	A	B	C	D	E	F	G	H	I
1	Position	% of Budget	Bonus %						
2	1	0%	0.00%						
3	2	100%	0.50%						
4	3	105%	0.75%						
5	4	110%	1.00%						
6	5	115%	1.25%						
7	6	125%	1.50%						
8	7	150%	2.00%						
9	8	200%	3.00%						
10	9	250%	4.00%						
11	10	300%	5.00%						
12									

Figure 10.9

9. *On the* **Bonus** *tab,* **Cell J1**, *type:* ***Match Bonus %***
10. *Format* **Cell J1** *like the others in* **Row 1**, *and resize the column.*
11. *In* **Cell J2**, *write a formula that looks up the value of* **Cell I2** *in the database* **range A2 to C11** *on the* Assumptions *tab, and returns the value in the third column.*

12. *Format* **Cell J2** *as* **Percentage**, **two decimal places**, *and copy to all cells below.*

=VLOOKUP(I2,Assumptions!$A$2:$C$11,3,FALSE)

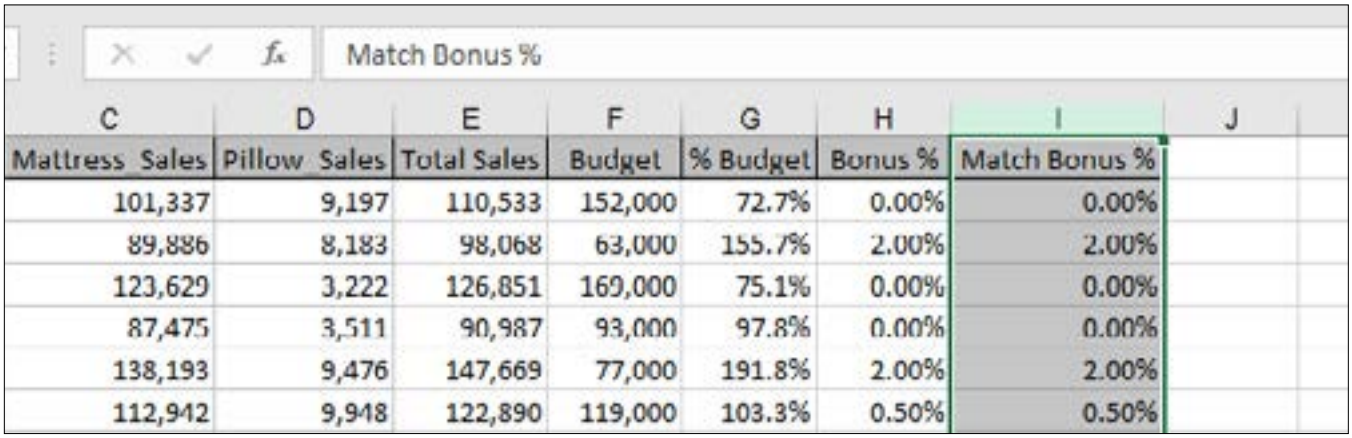
C	D	E	F	G	H	I	J
Mattress_Sales	Pillow_Sales	Total Sales	Budget	% Budget	Bonus %	Match	Match Bonus %
101,337	9,197	110,533	152,000	72.7%	0.00%	1	0.00%
89,886	8,183	98,068	63,000	155.7%	2.00%	7	2.00%
123,629	3,222	126,851	169,000	75.1%	0.00%	1	0.00%
87,475	3,511	90,987	93,000	97.8%	0.00%	1	0.00%
138,193	9,476	147,669	77,000	191.8%	2.00%	7	2.00%
112,942	9,948	122,890	119,000	103.3%	0.50%	2	0.50%
172,614	9,747	182,361	99,000	184.2%	2.00%	7	2.00%
132,269	8,758	141,027	112,000	125.9%	1.50%	6	1.50%
32,062	4,010	36,071	37,000	97.5%	0.00%	1	0.00%
140,251	8,137	148,388	45,000	329.8%	5.00%	10	5.00%
116,726	4,631	121,357	130,000	93.4%	0.00%	1	0.00%
176,812	10,196	187,008	118,000	158.5%	2.00%	7	2.00%
29,200	4,766	33,966	42,000	80.9%	0.00%	1	0.00%
126,821	8,490	135,310	113,000	119.7%	1.25%	5	1.25%
148,114	8,972	157,086	155,000	101.3%	0.50%	2	0.50%
35,934	4,438	40,373	36,000	112.1%	1.00%	4	1.00%
172,886	3,380	176,267	150,000	117.5%	1.25%	5	1.25%

Figure 10.10

Nesting MATCH() within a VLOOKUP()

The percentages in Column J should exactly match the percentages in Column H. In order to make the formula take up only one column instead of two, you can nest the MATCH() function in Column I into the VLOOKUP() Formulas in Column J.

13. *Copy the formula in* **Cell I2** *(everything after the "=" sign), and replace the* **I2** *reference in the formula in* **Cell J2** *with it.*
14. *Copy to all cells below.*
15. *Delete* **Column I**.



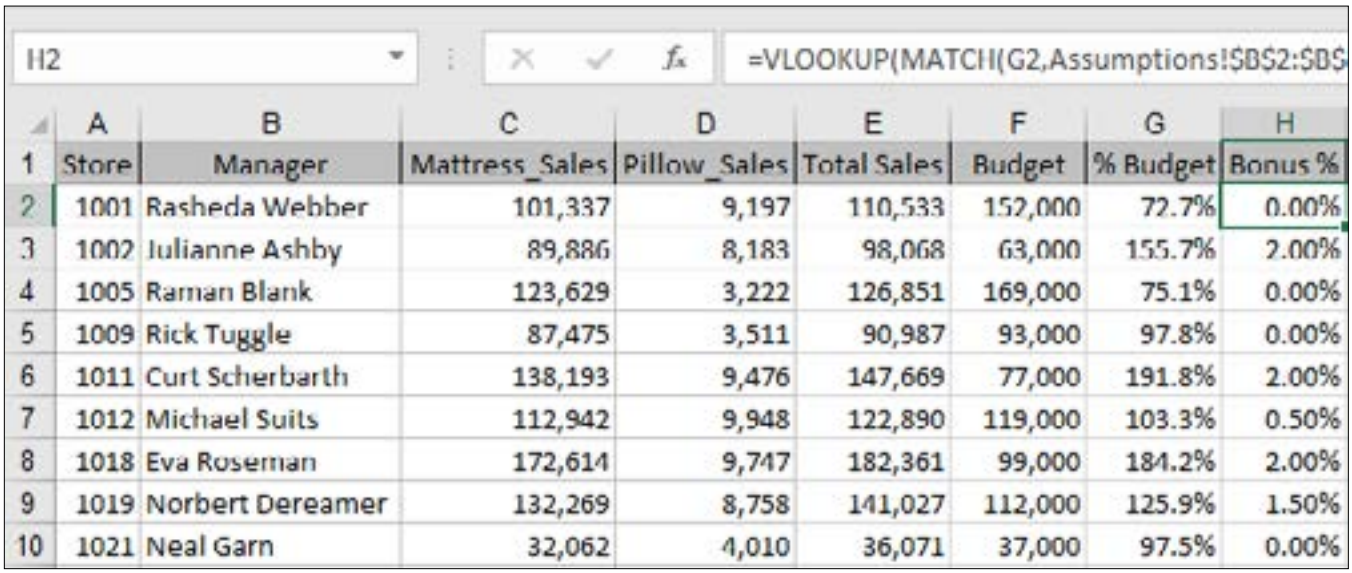
Match Bonus %

C	D	E	F	G	H	I	J
Mattress_Sales	Pillow_Sales	Total Sales	Budget	% Budget	Bonus %	Match Bonus %	
101,337	9,197	110,533	152,000	72.7%	0.00%	0.00%	
89,886	8,183	98,068	63,000	155.7%	2.00%	2.00%	
123,629	3,222	126,851	169,000	75.1%	0.00%	0.00%	
87,475	3,511	90,987	93,000	97.8%	0.00%	0.00%	
138,193	9,476	147,669	77,000	191.8%	2.00%	2.00%	
112,942	9,948	122,890	119,000	103.3%	0.50%	0.50%	

Figure 10.11

Since we don't need two columns with the exact same data in them, you can delete one of the columns. Let's keep the column with the MATCH() function in it.

16. *Delete* **Column H**.
17. *Rename* **Cell H1** ***Bonus %****, and resize the column to fit.*



H2 =VLOOKUP(MATCH(G2,Assumptions!$B$2:B

	A	B	C	D	E	F	G	H
1	Store	Manager	Mattress_Sales	Pillow_Sales	Total Sales	Budget	% Budget	Bonus %
2	1001	Rasheda Webber	101,337	9,197	110,533	152,000	72.7%	0.00%
3	1002	Julianne Ashby	89,886	8,183	98,068	63,000	155.7%	2.00%
4	1005	Raman Blank	123,629	3,222	126,851	169,000	75.1%	0.00%
5	1009	Rick Tuggle	87,475	3,511	90,987	93,000	97.8%	0.00%
6	1011	Curt Scherbarth	138,193	9,476	147,669	77,000	191.8%	2.00%
7	1012	Michael Suits	112,942	9,948	122,890	119,000	103.3%	0.50%
8	1018	Eva Roseman	172,614	9,747	182,361	99,000	184.2%	2.00%
9	1019	Norbert Dereamer	132,269	8,758	141,027	112,000	125.9%	1.50%
10	1021	Neal Garn	32,062	4,010	36,071	37,000	97.5%	0.00%

Figure 10.12

Up to now, the formula is only calculating the percentage at which the SM earned a bonus. Now we have to write a formula that multiplies the Bonus % by the Total Sales column.

18. *In* **Cell I1**, *type:* ***Bonus Earned***
19. *Format* **Cell I1** *like the other headers in* **Row 1**, *and resize the column.*
20. *In* **Cell I2**, *write a formula that multiplies the* **Bonus %** *by the* **Total Sales**.
21. *Format* **Cell I2** *to be* **Number**, **two decimal places, Use 1000 Separator(,)**, *and copy down.*

C	D	E	F	G	H	I	J
Mattress_Sales	Pillow_Sales	Total Sales	Budget	% Budget	Bonus %	Bonus Earned	
101,337	9,197	110,533	152,000	72.7%	0.00%	0.00	
89,886	8,183	98,068	63,000	155.7%	2.00%	1,961.37	
123,629	3,222	126,851	169,000	75.1%	0.00%	0.00	
87,475	3,511	90,987	93,000	97.8%	0.00%	0.00	
138,193	9,476	147,669	77,000	191.8%	2.00%	2,953.38	
112,942	9,948	122,890	119,000	103.3%	0.50%	614.45	

Figure 10.13

22. *In the* Assumptions *tab,* **Cell E4**, *type:* ***Bonus Earned***
23. *In* **Cell F4**, *write a* **SUM()** *formula that will sum the values in the* **Bonus** *tab,* **Column I**.
24. *Format* **Cell F4** *as* **Number**, **two decimal places, use 1000 Separator(,)**.
25. *Bold* **Cells E4 and F4**.
26. *Resize* **Columns E and F**.

F4 =SUM(Bonus!I:I)

	A	B	C	D	E	F	G	H	I
1	Position	% of Budget	Bonus %						
2	1	0%	0.00%						
3	2	100%	0.50%						
4	3	105%	0.75%		Bonus Earned	37,204.06			
5	4	110%	1.00%						
6	5	115%	1.25%						
7	6	125%	1.50%						
8	7	150%	2.00%						
9	8	200%	3.00%						

Figure 10.14

Now you can change the numbers in the Assumptions tab and see the total Bonus Earned number change accordingly. Too cool!

> ***Review Questions**: It is now time to complete the hands-on Review Questions. Log on to www.ExcelCEO.com with your Email address and Password, click on the* **Excel 2016 Review Questions, Chapter 10, Section 1 of 2** *option in your Main Menu, and complete the Review Questions.*

Logical Functions

Let's talk a little about Logical functions. ***Logical functions*** are the essence of writing formulas. All of

the functions and formulas that you have previously written can be incorporated into logical functions. The most common logical function by far is the IF() function. You have already experimented a little with the IF() function in Chapter 6. We will expand on that knowledge and introduce some other logical functions in the next few exercises.

The CELL() Function

How many times have you printed a report and then months or even years later someone shows you the report and wants you to update it? It happens more often than you realize. When I create spreadsheets, I like to put the name of the file and its path onto the report. There is a function you can use to help with this: the CELL() function. The ***CELL()*** function displays information about the formatting, location, or contents of the upper-left cell in a reference. There is one argument in a CELL() function, info_type. Following is a list of all the available info_types in the CELL() function.

Info_type	Value Returned
"address"	Reference of the first cell in reference, as text.
"col"	Column number of the cell in reference.
"color"	1 if the cell is formatted in color for negative values; otherwise returns 0 (zero).
"contents"	Value of the upper-left cell in reference; not a formula.
"filename"	Filename (including full path) of the file that contains reference, as text. Returns empty text ("") if the worksheet that contains reference has not yet been saved.
"format"	Text value corresponding to the number format of the cell. The text values for the various formats are shown in the following table. Returns "-" at the end of the text value if the cell is formatted in color for negative values. Returns "()" at the end of the text value if the cell is formatted with parentheses for positive or all values.
"parenthesis"	1 if the cell is formatted with parentheses for positive or all values; otherwise returns 0.
"prefix"	Text value corresponding to the "label prefix" of the cell. Returns single quotation mark (') if the cell contains left-aligned text, double quotation mark (") if the cell contains right-aligned text, caret (^) if the cell contains centered text, backslash (\) if the cell contains fill-aligned text, and empty text ("") if the cell contains anything else.
"protect"	0 if the cell is not locked, and 1 if the cell is locked.
"row"	Row number of the cell in reference.
"type"	Text value corresponding to the type of data in the cell. Returns "b" for blank if the cell is empty, "l" for label if the cell contains a text constant, and "v" for value if the cell contains anything else.
"width"	Column width of the cell rounded off to an integer. Each unit of column width is equal to the width of one character in the default font size.

The most common argument in the CELL() function I use is filename. Let's use this function in the spreadsheet we just modified.

1. *In* **Cell A16** *of the* **Assumptions** *tab, type the following formula:* ***=CELL("filename")***
2. *Italicize* **Cell A16**.
3. *Select* **Cells A15 through D15** *and draw a line at the bottom of the cell using the* **Border** *icon.*

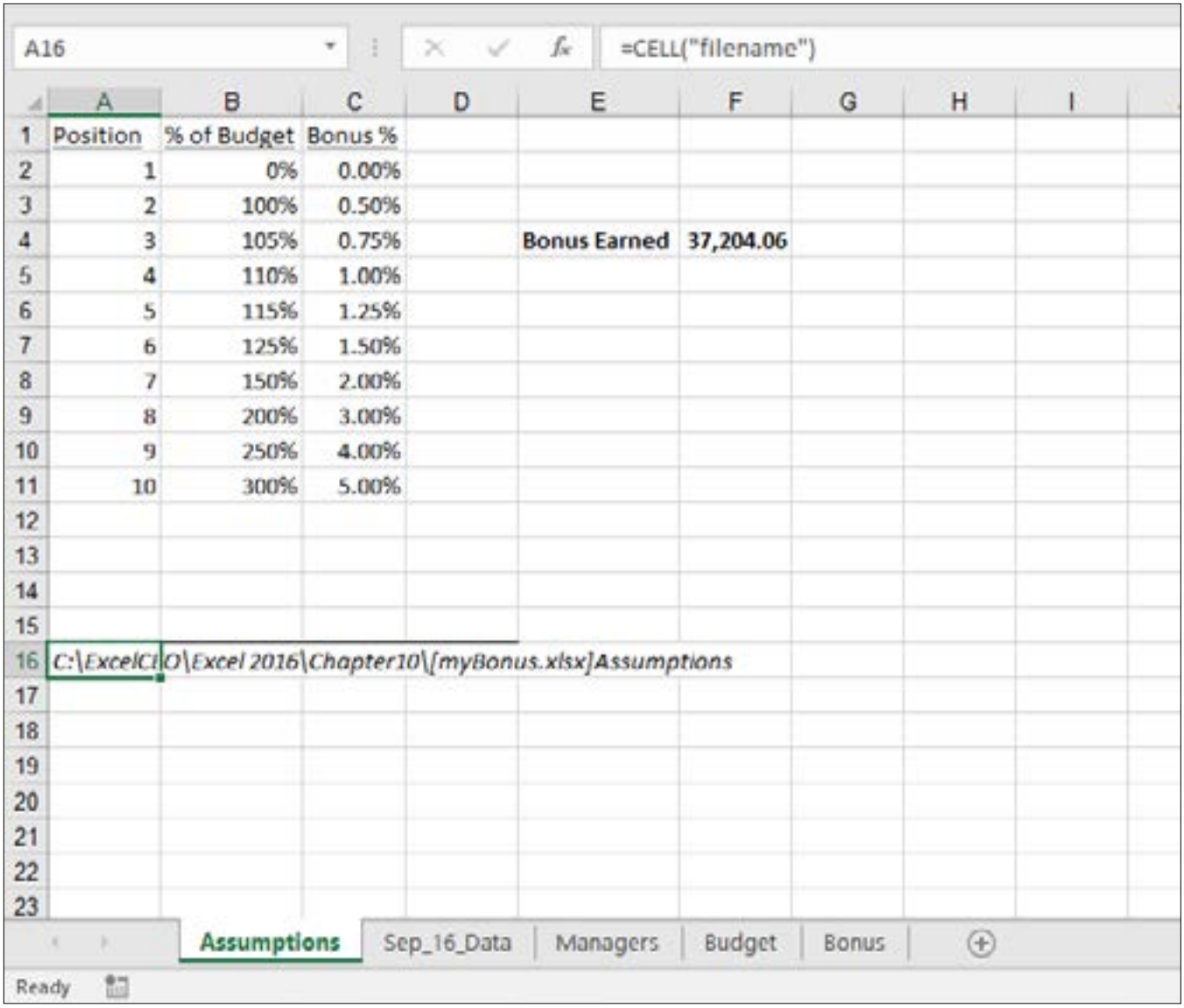


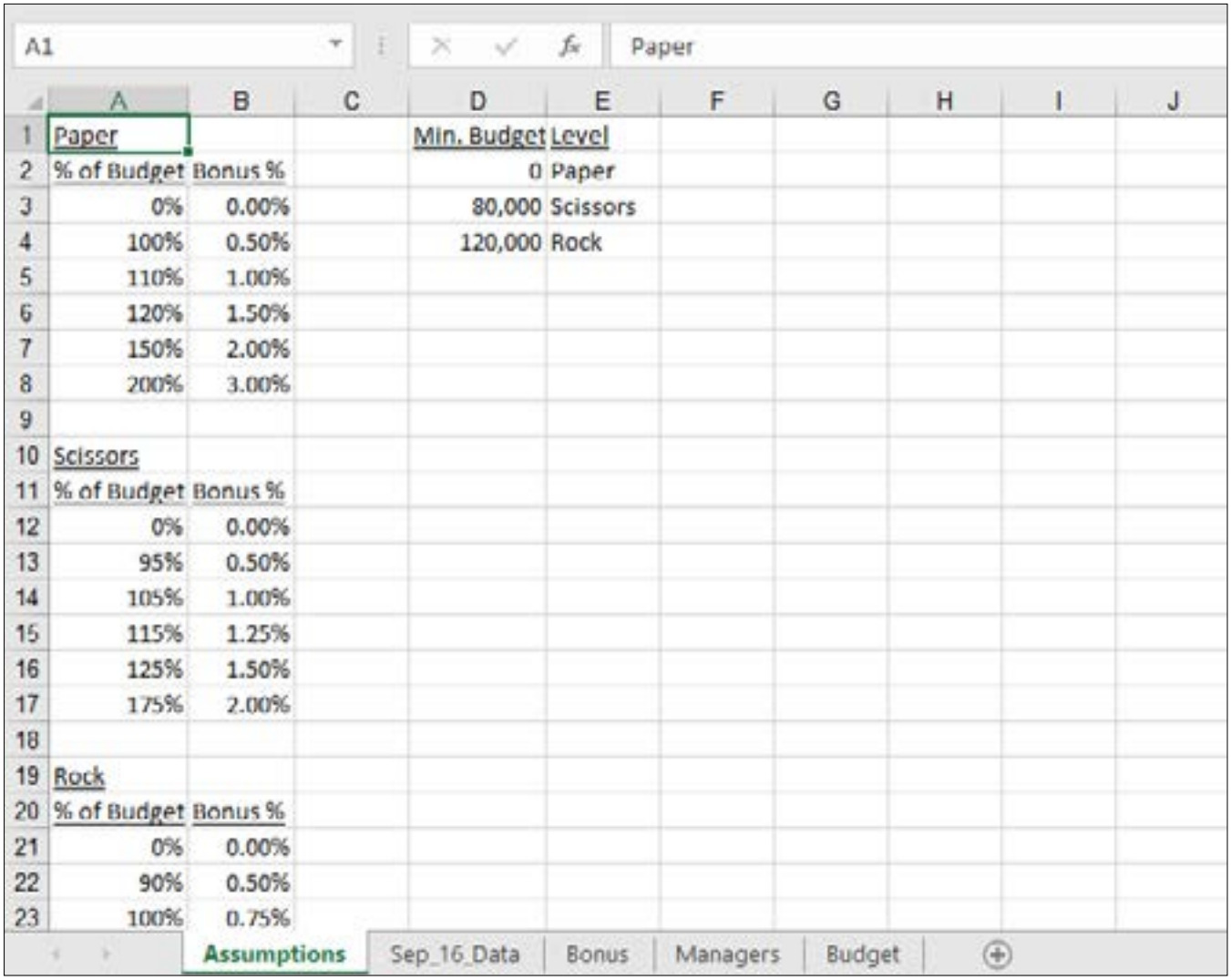
Figure 10.15

4. **Save** *and* **close** *the* **myBonus.xlsx** *file.*

Since I create SO MANY spreadsheets, I like to use this function, if for no other purpose, to help me find the file when someone has a printout.

Let's open another file so we can practice with Logical Functions a little more.

1. **Open** *the file at* **C:\ExcelCEO\Excel 2016\Chapter10\Bonus2.xlsx**.
2. **Save As C:\ExcelCEO\Excel 2016\Chapter10*myBonus2.xlsx***.
3. *Click in the* **Assumptions** *tab.*



	A	B	C	D	E	F	G	H	I	J
1	Paper			Min. Budget	Level					
2	% of Budget	Bonus %		0	Paper					
3	0%	0.00%		80,000	Scissors					
4	100%	0.50%		120,000	Rock					
5	110%	1.00%								
6	120%	1.50%								
7	150%	2.00%								
8	200%	3.00%								
9										
10	Scissors									
11	% of Budget	Bonus %								
12	0%	0.00%								
13	95%	0.50%								
14	105%	1.00%								
15	115%	1.25%								
16	125%	1.50%								
17	175%	2.00%								
18										
19	Rock									
20	% of Budget	Bonus %								
21	0%	0.00%								
22	90%	0.50%								
23	100%	0.75%								

Figure 10.16

This is the same file as the Bonus.xlsx file you just worked with, except I've added in a little more data. The first change is that there are different levels of bonus percentages. The levels (Paper, Scissors, Rock) are based on the Budget for each location. I've already taken the liberty of naming the % of budget ranges appropriately (Paper, Scissors, and Rock). The range name for the Budget Levels, found on the Assumptions tab Cells D2 through Cell E4, is Bgt_Levels, and the named range for the Budgets found in the Budget tab is Budget. Your job is to complete the bonus calculations with the available data. Let's get started.

The first thing we have to do is to bring in the Budget numbers into the Bonus tab.

4. *Click on the* Bonus *tab.*

5. *In* **Cell F2**, *write a VLOOKUP() formula that brings the* **Budget** *numbers by* **store number** *from the* Budget *tab.*

6. *Copy down.*

F2 =VLOOKUP(A2,Budget,2,FALSE)

	A	B	C	D	E	F	G	H
7	1012	Michael Suits	112,942	9,948	122,890	119,000		
8	1018	Eva Roseman	172,614	9,747	182,361	99,000		
9	1019	Norbert Dreamer	132,269	8,758	141,027	112,000		
10	1021	Neal Garn	32,062	4,010	36,071	37,000		
11	1024	Blair Lafreniere	140,251	8,137	148,388	45,000		
12	1026	Veranda Gaunt	116,726	4,631	121,357	130,000		
13	1027	Paul Burtram	176,812	10,196	187,008	118,000		
14	1029	Eric Uthoff	29,200	4,766	33,966	42,000		
15	1032	Vanna Smoller	126,821	8,490	135,310	113,000		
16	1034	Darrell Salasky	148,114	8,972	157,086	155,000		
17	1036	Joel Marlette	35,934	4,438	40,373	36,000		
18	1040	Hailee Hallaway	172,886	3,380	176,267	150,000		
19	1042	Charley Harthun	85,669	3,198	88,867	85,000		
20	1044	Sheri Lohman	80,061	7,943	88,004	122,000		
21	1045	Sharon Pahl	90,252	8,328	98,580	147,000		
22	1047	Chloe Nicolette	65,975	4,254	70,229	43,000		
23	1050	Janelle Szmyd	59,640	4,027	63,667	64,000		
24	1051	Lourdes Matta	153,386	9,083	162,468	204,000		
25	1053	Glenn Hudson	42,831	2,060	44,892	#N/A		
26	1055	Nora Peirce	104,691	10,422	115,113	111,000		
27	1057	Nathan Beacham	72,138	4,012	76,149	87,000		
28	1059	James Brunelle	55,428	3,830	59,258	76,000		
29	1060	Edward Renteri	120,402	9,548	129,950	178,000		

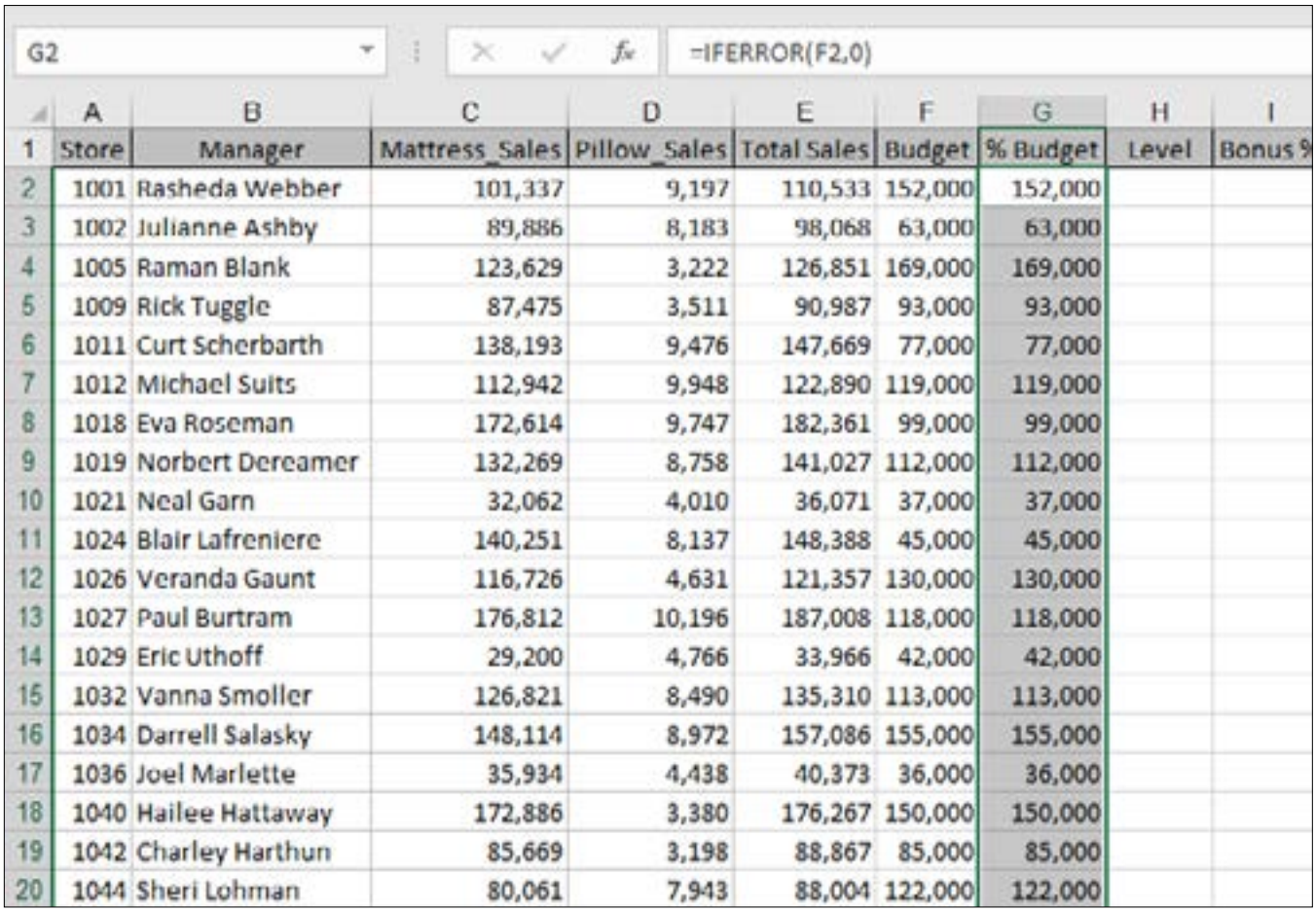
Figure 10.17

We already have a problem. Look at Store No. 1053 on Row 25. We're getting an #N/A error message. Why is that? If you look in the Budget tab, you will see that there is no budget for Store 1053. This is a new store that we haven't established a budget for yet. Our manager tells us that if there is no budget, just make it 0. That store manager won't qualify for a bonus this month.

The IFERROR() Function

The IFERROR() function is one solution to error handling. We can write a formula using the IFERROR() function to make the formula that produces an error return something other than the ugly #N/A or #DIV/0! messages, like 0. Let's first write the formula in an adjacent cell, then we'll combine the two.

7. In **Cell G2**, *write the following formula:* ***=IFERROR(F2,0)****, then copy down.*



G2 =IFERROR(F2,0)

	A	B	C	D	E	F	G	H	I
1	Store	Manager	Mattress_Sales	Pillow_Sales	Total Sales	Budget	% Budget	Level	Bonus %
2	1001	Rasheda Webber	101,337	9,197	110,533	152,000	152,000		
3	1002	Julianne Ashby	89,886	8,183	98,068	63,000	63,000		
4	1005	Raman Blank	123,629	3,222	126,851	169,000	169,000		
5	1009	Rick Tuggle	87,475	3,511	90,987	93,000	93,000		
6	1011	Curt Scherbarth	138,193	9,476	147,669	77,000	77,000		
7	1012	Michael Suits	112,942	9,948	122,890	119,000	119,000		
8	1018	Eva Roseman	172,614	9,747	182,361	99,000	99,000		
9	1019	Norbert Dereamer	132,269	8,758	141,027	112,000	112,000		
10	1021	Neal Garn	32,062	4,010	36,071	37,000	37,000		
11	1024	Blair Lafreniere	140,251	8,137	148,388	45,000	45,000		
12	1026	Veranda Gaunt	116,726	4,631	121,357	130,000	130,000		
13	1027	Paul Burtram	176,812	10,196	187,008	118,000	118,000		
14	1029	Eric Uthoff	29,200	4,766	33,966	42,000	42,000		
15	1032	Vanna Smoller	126,821	8,490	135,310	113,000	113,000		
16	1034	Darrell Salasky	148,114	8,972	157,086	155,000	155,000		
17	1036	Joel Marlette	35,934	4,438	40,373	36,000	36,000		
18	1040	Hailee Hattaway	172,886	3,380	176,267	150,000	150,000		
19	1042	Charley Harthun	85,669	3,198	88,867	85,000	85,000		
20	1044	Sheri Lohman	80,061	7,943	88,004	122,000	122,000		

Figure 10.18

This formula says that if the value in Cell F2 is an error, return a 0, otherwise, return the value of Cell F2. Now we will incorporate the formulas in Cells F2 and G2 into one cell. In previous versions of Excel, you had to combine an IF() function with an ISERROR() function. That was an effective work-around, but having the formula work the way it was intended is even better! For reference, the old formula would have looked like this: =IF(ISERROR(F2),0,F2)

8. Copy the formula in **Cell F2** *(without the "=" sign) and replace the* **F2** *reference in the formula in* **Cell G2**.

9. Move **Cell G2** *to* **Cell F2**.

10. Copy down to all cells in **Column F**, *and delete the formulas in* **Column G**.

F2 =IFERROR(VLOOKUP(A2,Budget,2,FALSE),0)

	A	B	C	D	E	F	G	H	I
1	Store	Manager	Mattress_Sales	Pillow_Sales	Total Sales	Budget	% Budget	Level	Bonu
2	1001	Rasheda Webber	101,337	9,197	110,533	152,000			
3	1002	Julianne Ashby	89,886	8,183	98,068	63,000			
4	1005	Raman Blank	123,629	3,222	126,851	169,000			
5	1009	Rick Tuggle	87,475	3,511	90,987	93,000			
6	1011	Curt Scherbarth	138,193	9,476	147,669	77,000			

Figure 10.19

The Budget for Cell F25 now reads "0" instead of the error message.

11. *In* **Cell G2**, *write the following formula:* ***=E2/F2***
12. *Format as* **Percentage**, **one decimal place**, *and copy down.*

G2 =E2/F2

	A	B	C	D	E	F	G	H
4	1005	Raman Blank	123,629	3,222	126,851	169,000	75.1%	
5	1009	Rick Tuggle	87,475	3,511	90,987	93,000	97.8%	
6	1011	Curt Scherbarth	138,193	9,476	147,669	77,000	191.8%	
7	1012	Michael Suits	112,942	9,948	122,890	119,000	103.3%	
8	1018	Eva Roseman	172,614	9,747	182,361	99,000	184.2%	
9	1019	Norbert Dereamer	132,269	8,758	141,027	112,000	125.9%	
10	1021	Neal Garn	32,062	4,010	36,071	37,000	97.5%	
11	1024	Blair Lafreniere	140,251	8,137	148,388	45,000	329.8%	
12	1026	Veranda Gaunt	116,726	4,631	121,357	130,000	93.4%	
13	1027	Paul Burtram	176,812	10,196	187,008	118,000	158.5%	
14	1029	Eric Uthoff	29,200	4,766	33,966	42,000	80.9%	
15	1032	Vanna Smoller	126,821	8,490	135,310	113,000	119.7%	

Figure 10.20

Dang it! Another error. Notice in Cell G25 there is a #DIV/0! message. As you learned previously, this happens when you try to divide a number by zero. In this case, you could use an ISERROR() or IFERROR() function to correct it, but I usually try to keep things simple, so we'll use an IF() function to solve when the denominator is 0.

13. *Edit the formula in* **Cell G2** *to read:* ***=IF(F2=0,0,E2/F2)***
14. *Copy down.*

G2 =IF(F2=0,0,E2/F2)

	A	B	C	D	E	F	G	H
10	1021	Neal Garn	32,062	4,010	36,071	37,000	97.5%	
11	1024	Blair Lafreniere	140,251	8,137	148,388	45,000	329.8%	
12	1026	Veranda Gaunt	116,726	4,631	121,357	130,000	93.4%	
13	1027	Paul Burtram	176,812	10,196	187,008	118,000	158.5%	
14	1029	Eric Uthoff	29,200	4,766	33,966	42,000	80.9%	
15	1032	Vanna Smoller	126,821	8,490	135,310	113,000	119.7%	
16	1034	Darrell Salasky	148,114	8,972	157,086	155,000	101.3%	
17	1036	Joel Marlette	35,934	4,438	40,373	36,000	112.1%	
18	1040	Hailee Hattaway	172,886	3,380	176,267	150,000	117.5%	
19	1042	Charley Harthun	85,669	3,198	88,867	85,000	104.5%	

Figure 10.21

Problem solved. Note that there are other functions like ISNA() that will help you find errors. I tend to use the IFERROR() function as it will handle all errors, not just the #N/A error. Let's continue on.

15. *Write a formula in* **Cell H2** *that brings in the* **Budget Levels** *using the named range* **Bgt_ Levels**.
16. *Copy to all cells below, and resize the column.*

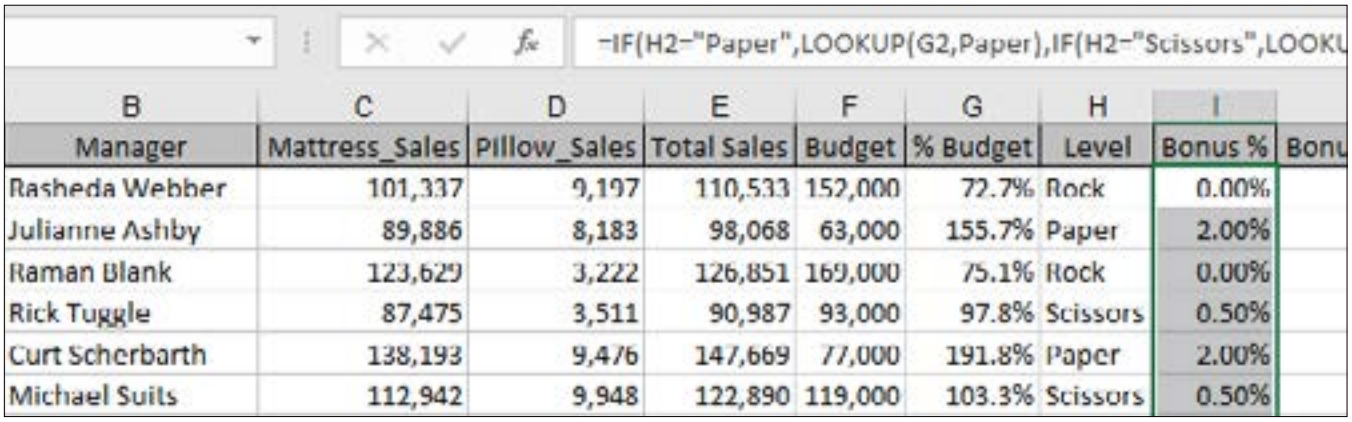
H2 =LOOKUP(F2,Bgt_Levels)

	A	B	C	D	E	F	G	H	
1	Store	Manager	Mattress_Sales	Pillow_Sales	Total Sales	Budget	% Budget	Level	Bon
2	1001	Rasheda Webber	101,337	9,197	110,533	152,000	72.7%	Rock	
3	1002	Julianne Ashby	89,886	8,183	98,068	63,000	155.7%	Paper	
4	1005	Raman Blank	123,629	3,222	126,851	169,000	75.1%	Rock	
5	1009	Rick Tuggle	87,475	3,511	90,987	93,000	97.8%	Scissors	
6	1011	Curt Scherbarth	138,193	9,476	147,669	77,000	191.8%	Paper	
7	1012	Michael Suits	112,942	9,948	122,890	119,000	103.3%	Scissors	
8	1018	Eva Roseman	172,614	9,747	182,361	99,000	184.2%	Scissors	
9	1019	Norbert Dereamer	132,269	8,758	141,027	112,000	125.9%	Scissors	
10	1021	Neal Garn	32,062	4,010	36,071	37,000	97.5%	Paper	
11	1024	Blair Lafreniere	140,251	8,137	148,388	45,000	329.8%	Paper	
12	1026	Veranda Gaunt	116,726	4,631	121,357	130,000	93.4%	Rock	
13	1027	Paul Burtram	176,812	10,196	187,008	118,000	158.5%	Scissors	

Figure 10.22

Now comes another tricky part. The bonus calculation depends on the level. If the level is Paper, then use the Paper range. If it is Scissors, use the Scissors range, and if it is Rock, use the Rock range. Let's try it.

17. *In* **Cell I2**, *write the following formula:* ***=IF(H2="Paper",LOOKUP(G2,Paper),IF (H2="Scissors",LOOKUP(G2,Scissors),LOOKUP(G2,Rock)))***
18. *Format as* **Percentage**, **two decimal places**, *and copy down.*



=IF(H2="Paper",LOOKUP(G2,Paper),IF(H2="Scissors",LOOKU

B	C	D	E	F	G	H	I	
Manager	Mattress_Sales	Pillow_Sales	Total Sales	Budget	% Budget	Level	Bonus %	Bonu
Rasheda Webber	101,337	9,197	110,533	152,000	72.7%	Rock	0.00%	
Julianne Ashby	89,886	8,183	98,068	63,000	155.7%	Paper	2.00%	
Raman Blank	123,629	3,222	126,851	169,000	75.1%	Rock	0.00%	
Rick Tuggle	87,475	3,511	90,987	93,000	97.8%	Scissors	0.50%	
Curt Scherbarth	138,193	9,476	147,669	77,000	191.8%	Paper	2.00%	
Michael Suits	112,942	9,948	122,890	119,000	103.3%	Scissors	0.50%	

Figure 10.23

This formula says that if the Level is Paper, then do a LOOKUP() function on Cell G2 using the range called Paper. If that argument is false, then the logic moves to the second argument using the Level Scissors, then do a LOOKUP() function on Cell G2 using the range called Scissors. For everything else (only the Rock Level remains), do a LOOKUP() function on Cell G2 using the range called Rock. This is another example of a nested IF() statement, or an IF() function within an IF() function.

To complete the project, calculate the bonus.

19. *In* **Cell J2**, *write a formula that calculates the bonus by multiplying* **Cell I2** *by* **Cell E2**.
20. *Format as* **Number**, **two decimal places**, **Use 1000 Separator (,)**, *and copy down.*

C	D	E	F	G	H	I	J	K
Mattress_Sales	Pillow_Sales	Total Sales	Budget	% Budget	Level	Bonus %	Bonus Earned	
101,337	9,197	110,533	152,000	72.7%	Rock	0.00%	0.00	
89,886	8,183	98,068	63,000	155.7%	Paper	2.00%	1,961.37	
123,629	3,222	126,851	169,000	75.1%	Rock	0.00%	0.00	
87,475	3,511	90,987	93,000	97.8%	Scissors	0.50%	454.93	
138,193	9,476	147,669	77,000	191.8%	Paper	2.00%	2,953.38	
112,942	9,948	122,890	119,000	103.3%	Scissors	0.50%	614.45	
172,614	9,747	182,361	99,000	184.2%	Scissors	2.00%	3,647.22	
132,269	8,758	141,027	112,000	125.9%	Scissors	1.50%	2,115.41	

Figure 10.24

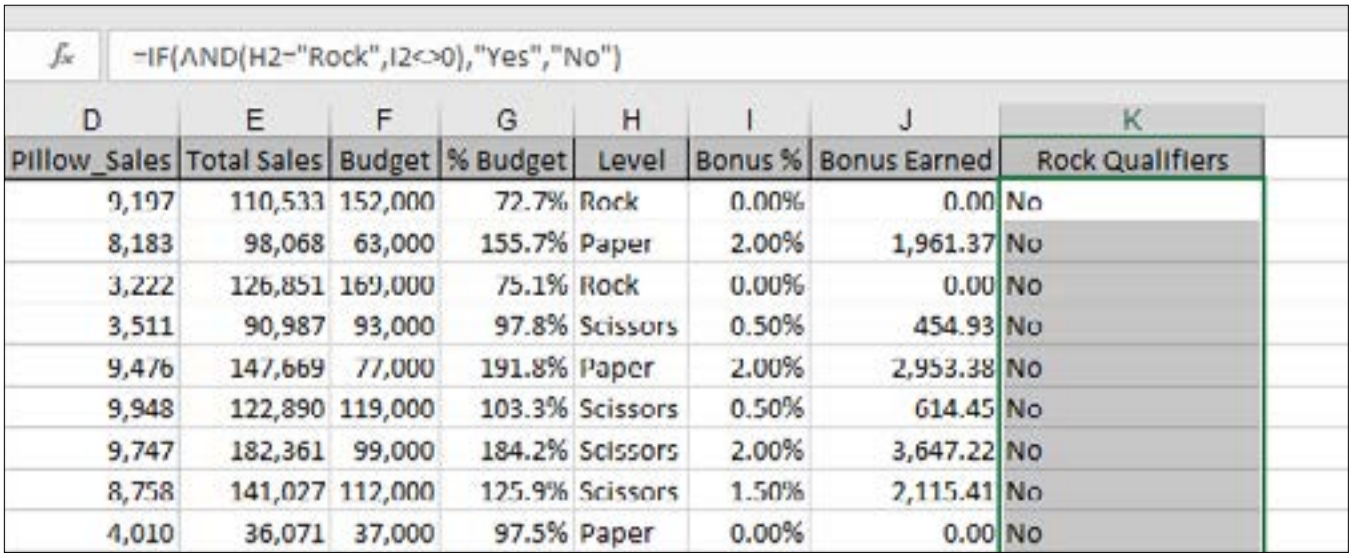
The total bonus payable should be $33,093.47.

The AND() and OR() Functions

The last two logical functions we will cover are AND() and OR(). The AND() function returns TRUE if all of the conditions in the statement are true, and FALSE if any one of the statements is not true. The OR() function behaves in a similar manner, except that it returns TRUE if any of the statements are true and FALSE if all of them are false.

For example, let's say you want to include a column of Yes/No values indicating whether or not the store is a "Rock" store AND they qualified for a bonus. You can have up to 30 logical conditions in an AND() or OR() function, but please don't put that many in. That will drive you crazy trying to find an error.

21. *In* **Cell K1**, *type:* ***Rock Qualifiers****, and format accordingly.*
22. *In* **Cell K2**, *type:* ***=IF(AND(H2="Rock",I2<>0),"Yes","No")***
23. *Copy down to all cells.*



D	E	F	G	H	I	J	K
Pillow_Sales	Total Sales	Budget	% Budget	Level	Bonus %	Bonus Earned	Rock Qualifiers
9,197	110,533	152,000	72.7%	Rock	0.00%	0.00	No
8,183	98,068	63,000	155.7%	Paper	2.00%	1,961.37	No
3,222	126,851	169,000	75.1%	Rock	0.00%	0.00	No
3,511	90,987	93,000	97.8%	Scissors	0.50%	454.93	No
9,476	147,669	77,000	191.8%	Paper	2.00%	2,953.38	No
9,948	122,890	119,000	103.3%	Scissors	0.50%	614.45	No
9,747	182,361	99,000	184.2%	Scissors	2.00%	3,647.22	No
8,758	141,027	112,000	125.9%	Scissors	1.50%	2,115.41	No
4,010	36,071	37,000	97.5%	Paper	0.00%	0.00	No

Figure 10.25

There should be three "Yes" values: Store numbers. 1026, 1034, and 1040.

Now let's work on an example using the OR() function. Upper management wants to send letters of congratulations to all of the Store Managers who made equal to or above 125% of budget, and inquiry letters to all managers whose stores were below 75% of budget. You want to know how many letters will be sent out, irrespective of the type of letter.

24. *In* **Cell L1**, *type:* ***Letter List****, and format appropriately.*
25. *In* **Cell L2**, *write the following formula:* ***=IF(OR(G2>=1.25,G2<0.75),"Yes","No")***
26. *Copy down to all cells below.*

OR(G2>=1.25,G2<0.75),"Yes","No")

E	F	G	H	I	J	K	L
Total Sales	Budget	% Budget	Level	Bonus %	Bonus Earned	Rock Qualifiers	Letter List
110,533	152,000	72.7%	Rock	0.00%	0.00	No	Yes
98,068	63,000	155.7%	Paper	2.00%	1,961.37	No	Yes
126,851	169,000	75.1%	Rock	0.00%	0.00	No	No
90,987	93,000	97.8%	Scissors	0.50%	454.93	No	No
147,669	77,000	191.8%	Paper	2.00%	2,953.38	No	Yes
122,890	119,000	103.3%	Scissors	0.50%	614.45	No	No
182,361	99,000	184.2%	Scissors	2.00%	3,647.22	No	Yes
141,027	112,000	125.9%	Scissors	1.50%	2,115.41	No	Yes
36,071	37,000	97.5%	Paper	0.00%	0.00	No	No
148,388	45,000	329.8%	Paper	3.00%	4,451.63	No	Yes
121,357	130,000	93.4%	Rock	0.50%	606.78	Yes	No
187,008	118,000	158.5%	Scissors	1.50%	2,805.12	No	Yes
33,966	42,000	80.9%	Paper	0.00%	0.00	No	No
135,310	113,000	119.7%	Scissors	1.25%	1,691.38	No	No
157,086	155,000	101.3%	Rock	0.75%	1,178.15	Yes	No
40,373	36,000	112.1%	Paper	1.00%	403.73	No	No
176,267	150,000	117.5%	Rock	1.25%	2,203.33	Yes	No
88,867	85,000	104.5%	Scissors	0.50%	444.33	No	No
88,004	122,000	72.1%	Rock	0.00%	0.00	No	Yes
98,580	147,000	67.1%	Rock	0.00%	0.00	No	Yes

Figure 10.26

There should be 14 "Yes" values in the Letter List field.

27. **Save** *and* **close** *the* **myBonus2.xlsx** *file.*

Error Finding and Checking

Let's talk a little about errors. Have you ever opened a workbook that was created by someone else and had trouble trying to follow their logic? Hopefully, the last user kept the formulas in the worksheet, so other users could try to understand what they did. Excel has some great error checking and auditing tools that make it visually easier to discover how the formulas were written and can help save a lot of time when you are trying to follow someone else's logic. You can see the cells that are active in a formula by tracing the cell's precedents. You can also find not-so-obvious errors in the calculations. Let's explore some of these tools.

1. **Open** *the* **Errors.xlsx** *file at* **C:\ExcelCEO\Excel 2016\Chapter10**

	A	B	C	D	E	F	G
10	1021	Neal Garn	32,062	4,010	36,071	37,000	
11	1024	Blair Lafreniere	140,251	8,137	148,388	45,000	
12	1026	Veranda Gaunt	116,726	4,631	121,357	130,000	
13	1027	Paul Burtram	176,812	10,196	187,008	118,000	
24	1051	Lourdes Matta	153,386	9,083	162,468	204,000	
25	1053	Glenn Hudson	42,831	2,060	44,892	#N/A	
26	1055	Nora Peirce	104,691	10,422	115,113	111,000	
27	1057	Nathan Beacham	72,138	4,012	76,149	87,000	
28	1059	James Brunelle	55,428	3,830	59,258	76,000	
29	1060	Edward Renteri	120,402	9,548	129,950	178,000	
30	1062	Tuong Pollari	156,858	9,365	166,223	83,000	
31	1063	Neily Karban	143,019	7,491	150,510	119,000	
32	Totals		3,167,500	202,623	3,375,730	#N/A	

Figure 10.27

The file is a spreadsheet that contains the store number, the name of the manager, the mattress sales, pillow sales, and total sales, along with the store's budget. There are two obvious errors in the table: Cells F25 and F32. You can see some of the errors because of the #N/A error messages. Let's first look at which cells make up the error in Cell F32.

2. *Click on* **Cell F32**.
3. *Click on the* **Formulas** *tab, then click on the* **Trace Precedents** *button in the* **Formula Auditing** *group.*

	A	B	C	D	E	F	G
1	Store	Manager	Mattress_Sales	Pillow_Sales	Total Sales	Budget	
2	1001	Rasheda Webber	101,337	9,197	110,533	152,000	
3	1002	Julianne Ashby	89,886	8,183	98,068	63,000	
4	1005	Raman Blank	123,629	3,222	126,851	169,000	
5	1009	Rick Tuggle	87,475	3,511	90,987	93,000	
6	1011	Curt Scherbarth	138,193	9,476	147,669	77,000	
7	1012	Michael Suits	112,942	9,948	122,890	119,000	
8	1018	Eva Roseman	172,614	9,747	182,361	112,000	
9	1019	Norbert Dereamer	132,269	8,758	141,027	112,000	
10	1021	Neal Garn	32,062	4,010	36,071	37,000	
11	1024	Blair Lafreniere	140,251	8,137	148,388	45,000	
12	1026	Veranda Gaunt	116,726	4,631	121,357	130,000	
13	1027	Paul Burtram	176,812	10,196	187,008	118,000	

Figure 10.28

A red arrow appears going from Cell F2 through F32. These are the ***precedent cells*** for Cell F32. The cell range is also encircled by a blue line. Now you can visually see which cells are included in the formula, and you should see that Cell F25, which is included in the range, is the source of the error.

4. *Click on the* **Remove Arrows** *button.*

All arrows and the blue box are now removed.

5. *With your cursor on* **Cell F32**, *click on the drop-down arrow next to the* **Error Checking** *button, and choose* **Trace Error**.

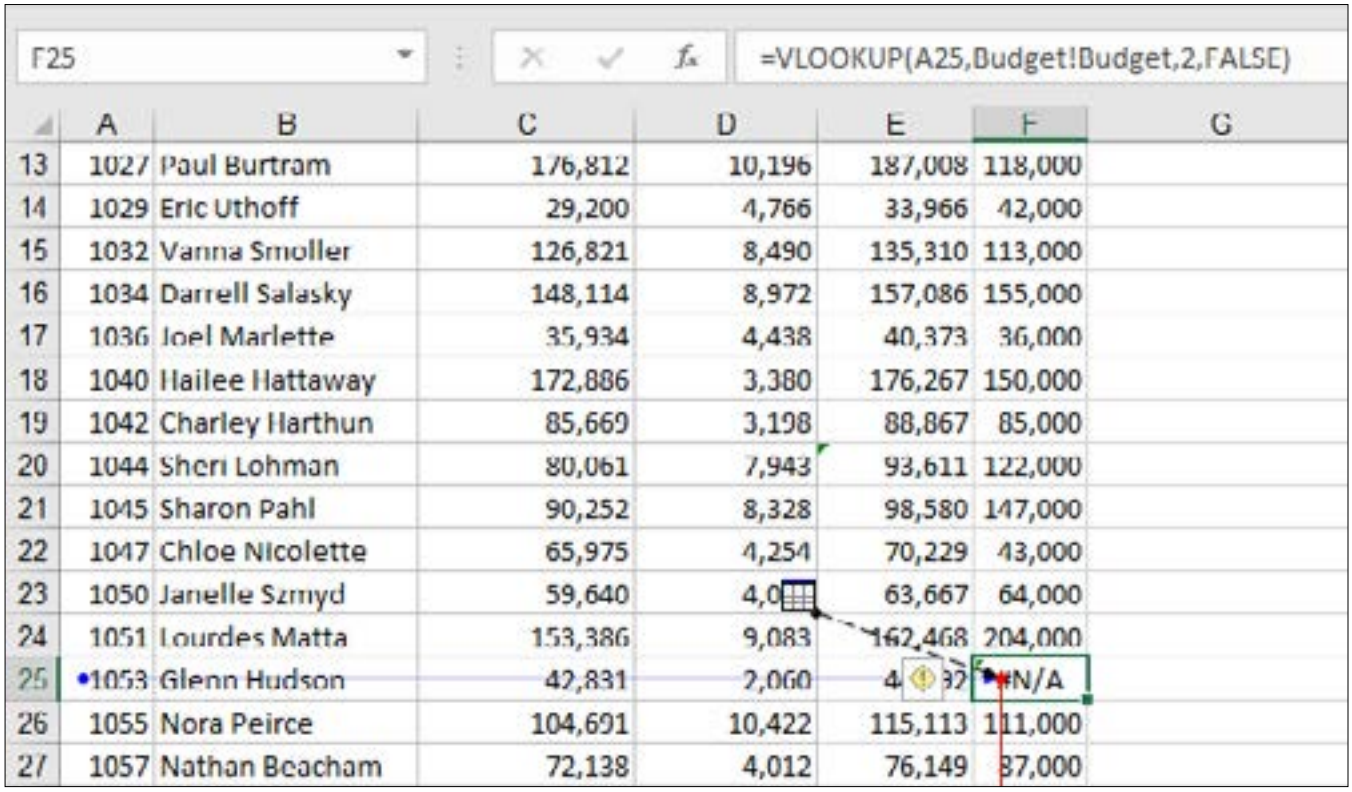


Figure 10.29

Excel shows you the path to the source of the errors, which first goes to Cell F25, then to Cell A25. Cell F25 is a VLOOKUP() formula based on Cell A25.

6. *Click on the* **Remove Arrows** *button.*

We can easily identify those two errors because of the #N/A error message. But are there any other errors? Error messages like the #N/A error are very obvious, but there may be other errors in the spreadsheet that you can check for. Let's run a formula error check on the table.

7. *With your cursor on* **Cell F32**, *click on the* **Error Checking** *button (not the drop-down menu).*

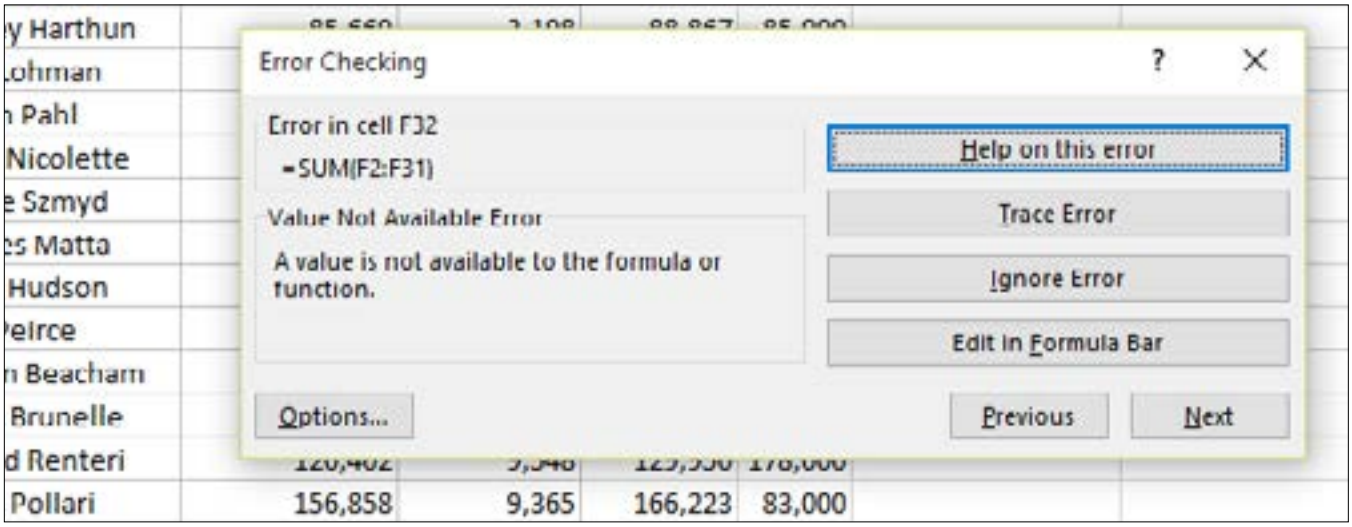


Figure 10.30

The Error Checking dialog box appears. In the upper-left corner of the dialog box you will see "Error in cell F32" with the cell's formula below it. It tells you what kind of an error is occurring as well. We won't do anything about this error for now, so let's continue.

8. *Click* **Next**.

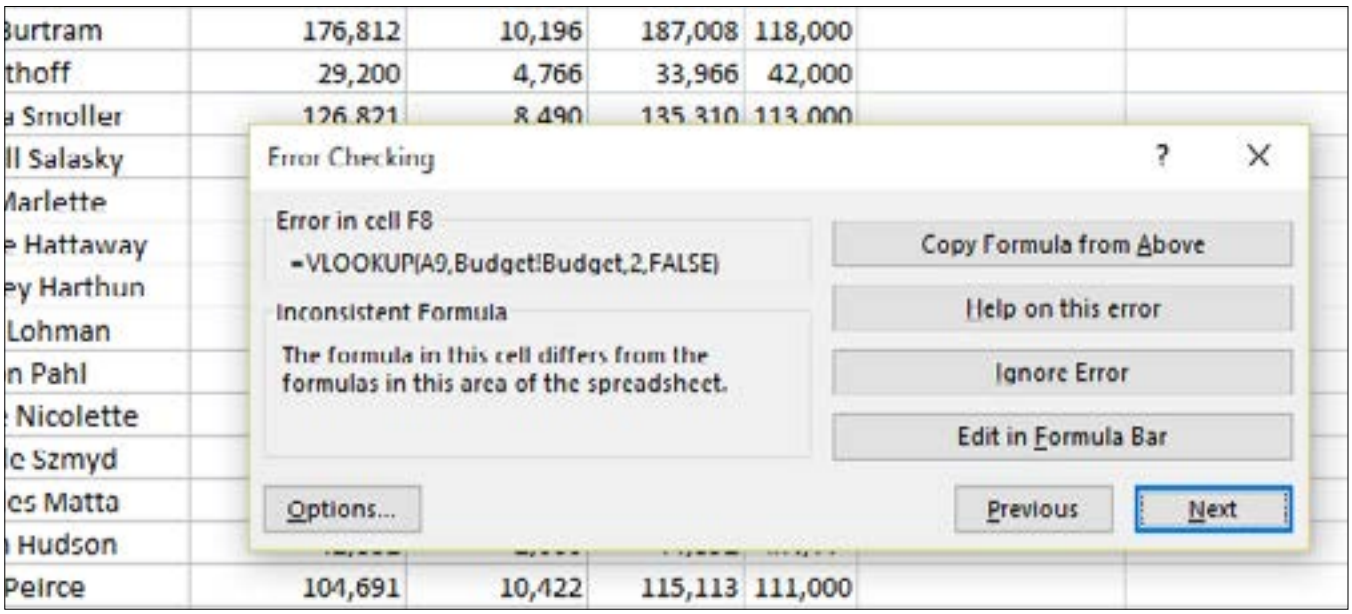


Figure 10.31

The dialog box goes to Cell F8 and finds an inconsistent formula, based on the cells surrounding it. The formula "VLOOKUP(A9,Budget!Budget,2,FALSE)" should be referring to Cell A8 instead of Cell A9.

9. *Click the* **Copy Formula from Above** *button.*

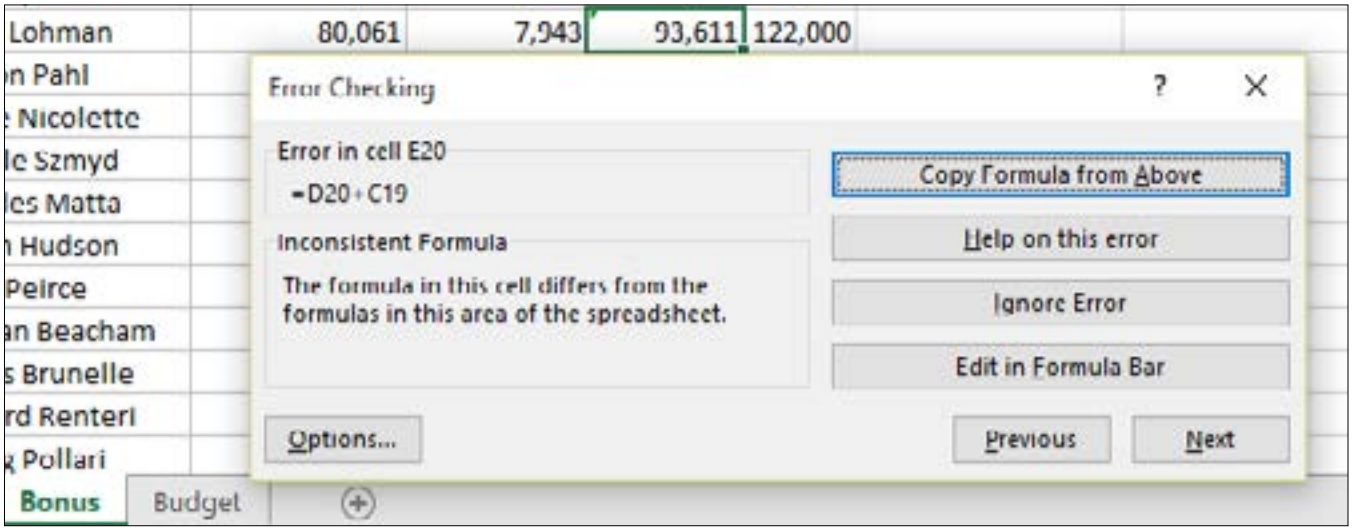


Figure 10.32

After you click the button, it takes you to another inconsistent cell, Cell E20.

10. Click the **Copy Formula from Above** *button again.*

Next, it takes you to Cell F25, which has the VLOOKUP() error. We'll skip that one.

11. Click **Next**.

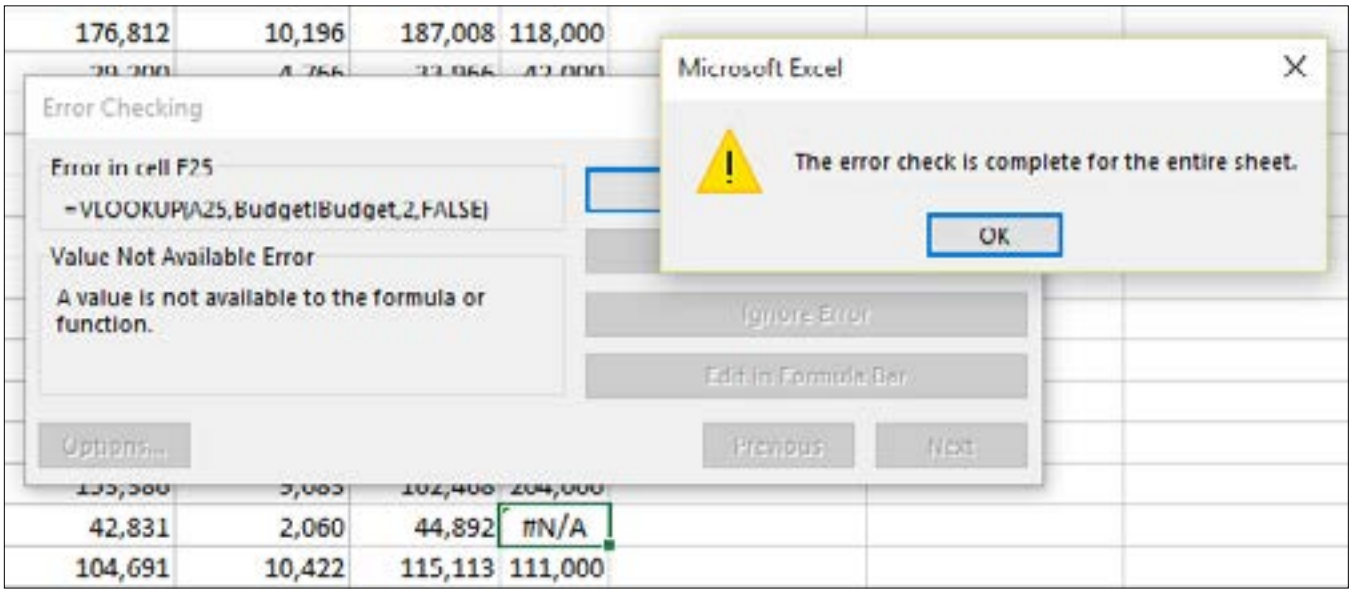


Figure 10.33

12. Click **OK**.

13. **Close** *the* **Errors.xlsx** *file without saving it.*

I would encourage you to continue to explore all of the auditing tools available in Excel. We only touched on a few of them here, but it gave you a good introduction to get you thinking about some tools that would be helpful to you.

Writing formulas is what Excel is all about. We reviewed a lot of functions and formulas in the last five chapters. It may have been painful, but most good medicine doesn't taste real good. I hope you will learn to use these functions in your everyday work. They can make your job MUCH easier and will result in better analyses and reports. I encourage you to make up some examples of your own using data in your world. You will remember these concepts much easier that way.

> ***Review Questions**: It is now time to complete the hands-on Review Questions. Log on to www.ExcelCEO.com with your Email address and Password, click on the* **Excel 2016 Review Questions, Chapter 10, Section 2 of 2** *option in your Main Menu, and complete the Review Questions.*

Conclusion

In this chapter, you learned some of the advanced uses of LOOKUP functions. You learned why and how to use Absolute References in a VLOOKUP() functions. You learned to use a LOOKUP() function and wrote a number of formulas using that function. You also learned how to use a MATCH() function. You worked examples of nesting a MATCH() function within a VLOOKUP() function. You learned about Logical functions and wrote formulas containing the ISERROR(), CELL(), AND(), and OR() functions. You saw how to find and check for errors using Formula Auditing functionality. You also built a complex spreadsheet that calculates bonuses based on multiple criteria and set it up where the criteria could easily be changed.

Chapter Exam

To take the examination for this chapter, you must have successfully completed the examination for the previous chapter. You can now go to www.ExcelCEO.com, login to your ExcelCEO student profile, and take the exam. Make sure that you take the exam on the same computer on which you completed the practice files, as some of the questions on the exam may refer to some of the completed projects. Chapter exams are intended to be hands-on.

SECTION III: ADVANCED EXCEL 2016

One of my beliefs is that the developer of a report or analysis should make it as easy as possible for the user to manipulate. For example, I've written courses to train upper management personnel to manipulate PivotTables and use VLOOKUP() functions. I have found that some executives love the capability of manipulating PivotTables so they can find out the answers to the questions they have without having to ask me to run it for them each time. Others, however, lack the willingness to learn. Therefore, I try to make my spreadsheets very easy to use. In this section, we will continue to explore many procedures and functionalities that can assist you in analyzing data, understanding it, and sharing it with others.

PivotTables was the major technological breakthrough with the release of Office 95. Before PivotTables, users could use Data Tables, but they were clunky to program. I remember thinking when I did my first PivotTable that this was the wave of the future. PivotTable technology has significantly improved the ease of manipulating large amounts of data to the point where just about anyone can do it with minimal instruction. I believe that PivotTables are key to understanding grouping of data - not only in Excel, but in database programs like Access, SQL Server, and Oracle. If you understand the concept of PivotTables, the concepts of the GROUP BY statement in Access, and writing transact SQL code will come much easier.

Chapter 11 introduces you to PivotTables. In that chapter, you will create a simple PivotTable, show and hide the PivotTable Fields list, add rows, columns, and data fields to an existing PivotTable; filter fields, and move or "pivot" fields around in a PivotTable. You will create a calculated field, explore PivotTable Options and learn how to sort data within a PivotTable. In Chapter 12, you will explore more advanced functions of PivotTables. You will create complex calculated fields, set up a PivotTable with drill-down capability, and learn about formatting PivotTable and PivotChart reports. You will start to work with External Data Sources, and finally, pull external data containing hundreds of thousands of rows of data directly into a PivotTable.

The remaining chapters of this section address various advanced topics where the goal is to teach you some of the advanced tools I've found most helpful in making spreadsheets "user-friendly", but very powerful. These include charts and graphs, inserting graphics, analysis tools, protection and sharing, macros, using the Developer tab (which contains some very cool tools), and exposure to working with the Web.

Excel® 2016

Complete Self-study Course

ExcelCEO

Chief Excel Officer

CHAPTER ELEVEN — INTRO TO PIVOTTABLES

Chapter Objectives:

- Identify the correct method to create a simple PivotTable
- Recognize the PivotTable Fields list utilizing the Analyze contextual tab
- Choose Row, Column, and Data Fields in a PivotTable
- Select field formats in a PivotTable with Value Field Settings
- Identify data fields from the PivotTable Fields list to be viewed in an existing PivotTable
- Recognize the methodology to create basic Calculated Fields from the insert Calculated Field dialog box
- Select PivotTable settings with the PivotTable Options dialog box
- Indicate the appropriate way to sort data within a PivotTable using simple filters

Projects You Will Complete During This Chapter:

- *myAnnual_Sales.xlsx*

CPE Credits possible for this chapter: 2.5

Introduction

With the massive databases that exist in most companies, there is a desperate need to be able to capture that data and present it in a meaningful format, with the ability to extract, summarize, sort, filter, and organize the data in a meaningful and actionable way. Once you have captured data, you need to be able to create reports that analyze the data, make comparisons, detect patterns and relationships, and analyze trends. All of this is possible, and very easy to do, with PivotTables.

If there is any chapter in this course I want you to learn inside and out, it's this one. PivotTables are a precursor to "grouping", or a "GROUP BY" statement in Access and SQL. PivotTables are simply subtotaling data by using different fields and filters. You can dynamically "pivot" a field as a row, column, or page filter and instantly see the results.

I speak three languages (English, which is my native language, Portuguese, and Spanish). When I speak in English, I think in English. When I speak in Portuguese, I think in that language, and I do the same with Spanish. People who speak only one language seem to have a hard time grasping how one can "think" in a different language, but it comes very easy to those who speak the language fluently. Similarly, it takes a change in thought pattern to understand grouping and relational databases, and using PivotTables is a great way to introduce that concept.

A Simple PivotTable

There are many ways to manipulate data within a ***PivotTable***, and data can come into an Excel spreadsheet in various manners, like copy and paste from an Access database, or link to a SQL Server table, import from a .CSV file, among other ways. In this chapter, I will assume that you don't have to worry about the source of the data. We covered that in previous chapters. We will assume the data is correct and your job is to manipulate and reorganize the information, as necessary, to present to upper management. Let's rock and roll!

1. **Open** *the file* **C:\ExcelCEO\Excel 2016\Chapter11\Annual_Sales.xlsx**.
2. **Save As C:\ExcelCEO\Excel 2016\Chapter11*myAnnual_Sales.xlsx***.

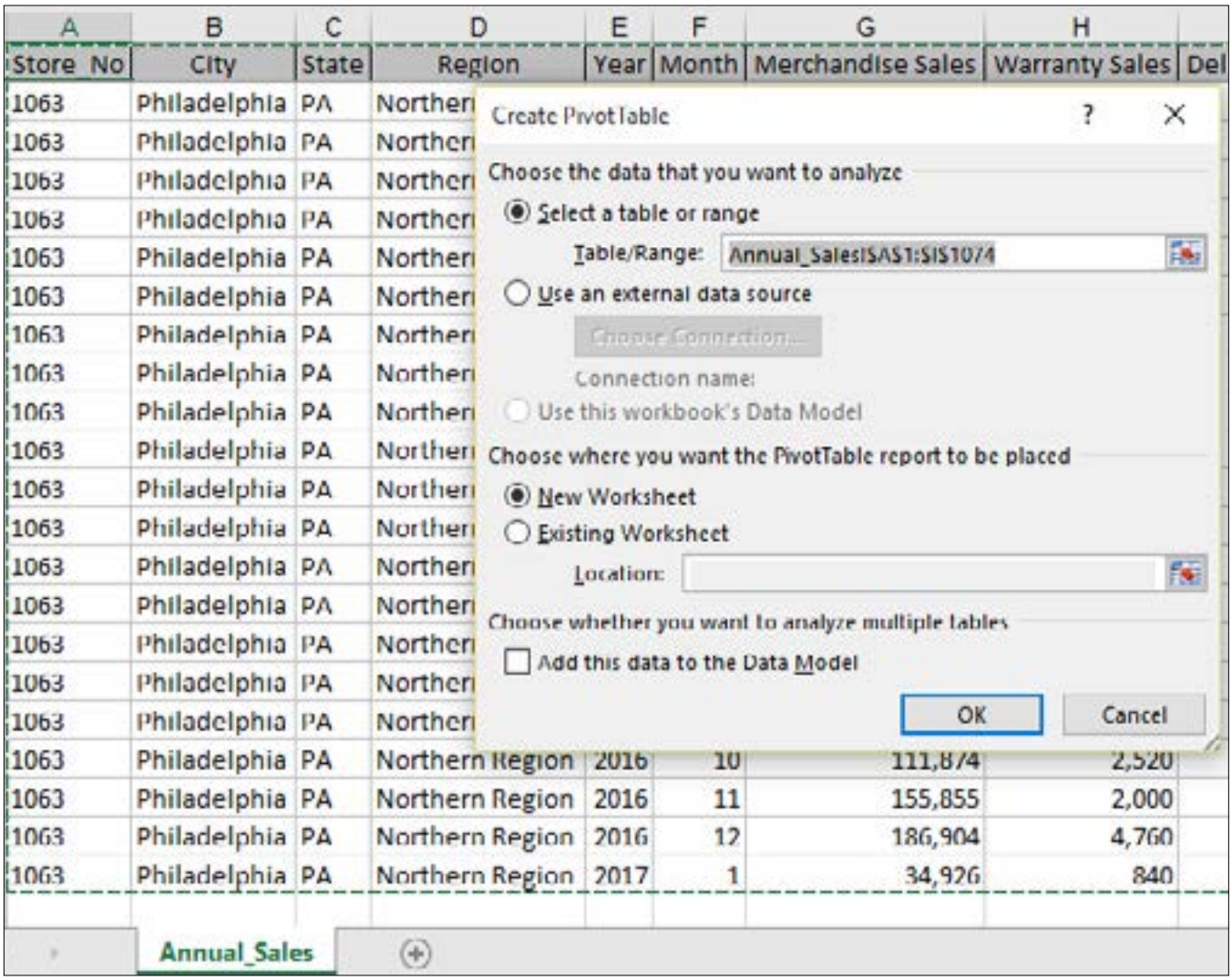
J2

	A	B	C	D	E	F	G	H
1	Store_No	City	State	Region	Year	Month	Merchandise Sales	Warranty Sales
2	1021	Washington	DC	Southern Region	2014	1	18,950	595
3	1021	Washington	DC	Southern Region	2014	2	28,203	630
4	1021	Washington	DC	Southern Region	2014	3	27,251	560
5	1021	Washington	DC	Southern Region	2014	4	24,722	490
6	1021	Washington	DC	Southern Region	2014	5	31,286	630
7	1021	Washington	DC	Southern Region	2014	6	33,687	490
8	1021	Washington	DC	Southern Region	2014	7	38,006	525

Figure 11.1

This file is a table of sales by store. Fields in the table include the Store_No, City, State, Region, Year, Month, Merchandise Sales, Warranty Sales, and Delivery Sales. The Region field is a geographic assignment that Nitey-Nite has created to make groups of stores easier to manage. Each Region has a Regional President. The Regional Presidents report to the President of the company. In this exercise, you will calculate the total sales for the Company by year.

3. *Click on* **Cell A2** *(or any single cell within the table), click on the* **Insert** *tab, and click on the* **PivotTable** *button in the* **Tables** *group.*



Store_No	City	State	Region	Year	Month	Merchandise Sales	Warranty Sales	Del
1063	Philadelphia	PA	Northern					
1063	Philadelphia	PA	Northern					
1063	Philadelphia	PA	Northern					
1063	Philadelphia	PA	Northern					
1063	Philadelphia	PA	Northern					
1063	Philadelphia	PA	Northern					
1063	Philadelphia	PA	Northern					
1063	Philadelphia	PA	Northern					
1063	Philadelphia	PA	Northern					
1063	Philadelphia	PA	Northern					
1063	Philadelphia	PA	Northern					
1063	Philadelphia	PA	Northern					
1063	Philadelphia	PA	Northern					
1063	Philadelphia	PA	Northern					
1063	Philadelphia	PA	Northern					
1063	Philadelphia	PA	Northern Region	2016	10	111,874	2,520	
1063	Philadelphia	PA	Northern Region	2016	11	155,855	2,000	
1063	Philadelphia	PA	Northern Region	2016	12	186,904	4,760	
1063	Philadelphia	PA	Northern Region	2017	1	34,926	840	

Figure 11.2

The Create PivotTable dialog box appears. In Excel 2003, a similar action launched the PivotTable Wizard, but in Excel 2016, there is no such wizard. For this and other reasons, I think you will prefer the way Excel 2016 handles PivotTables.

4. *Click* **OK**.

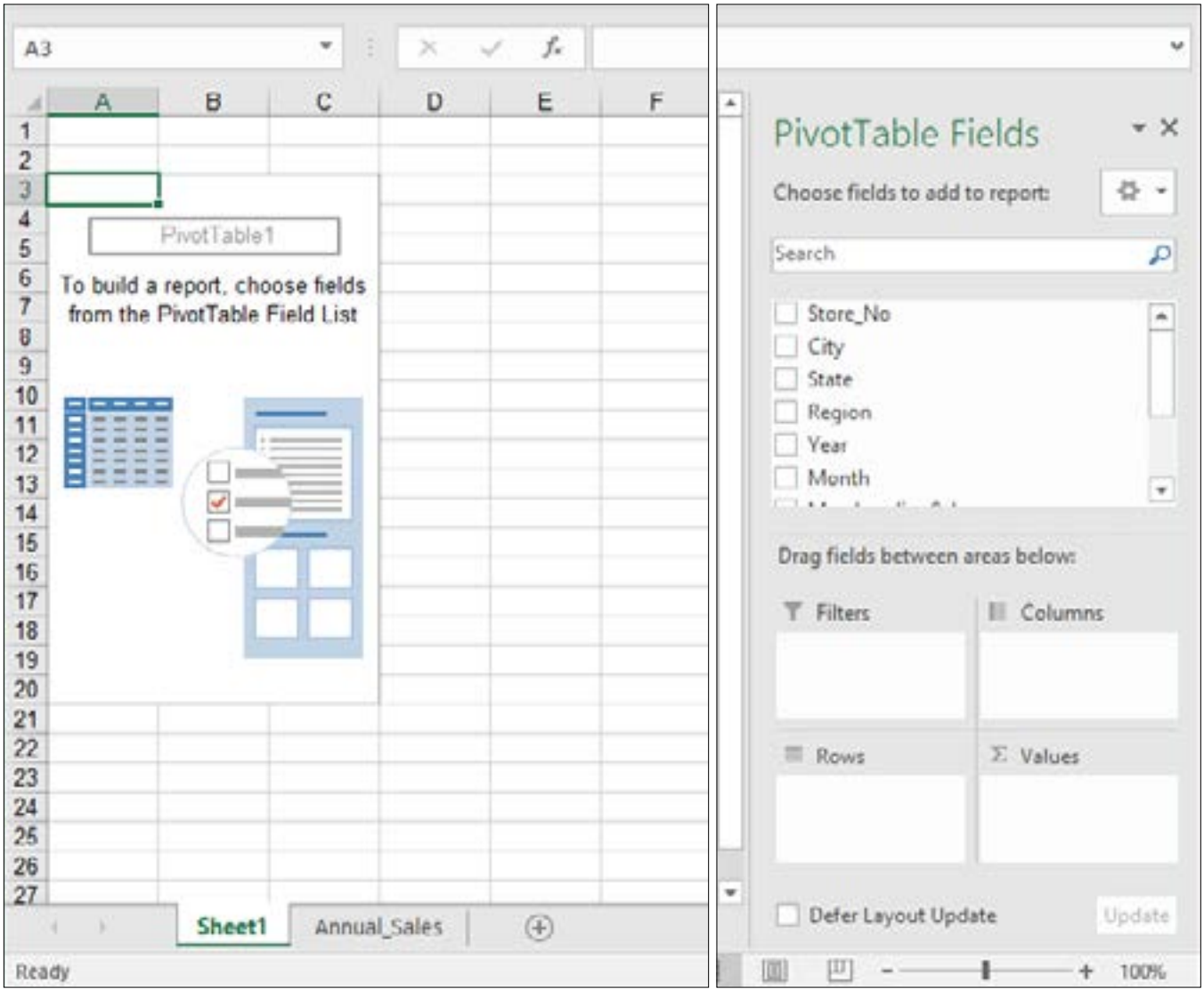


Figure 11.3

On a wide screen, your expanded View would appear as below:

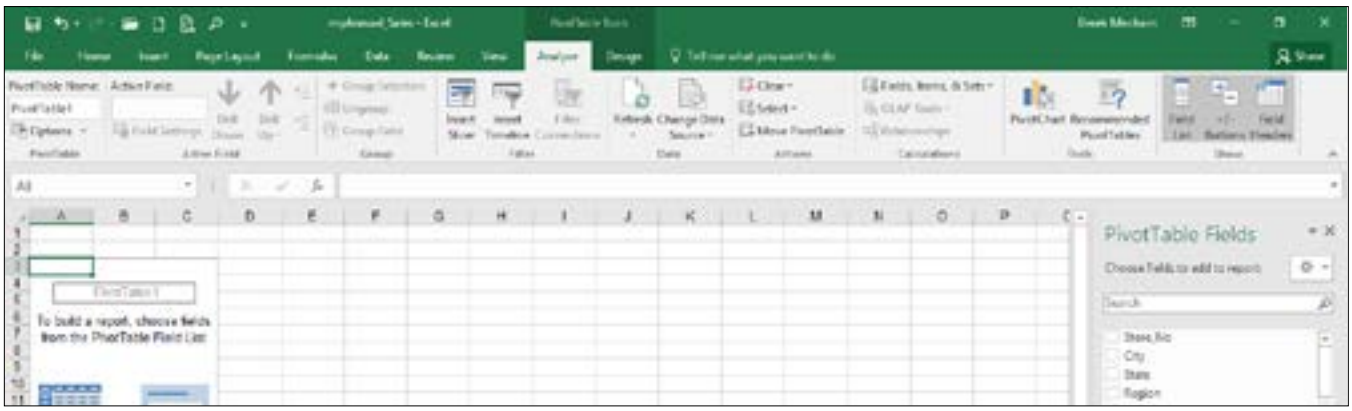


Figure 11.4

Since you began with a table in Excel, Excel automatically assumes you want to use the table where your cursor is.

> ***Note**: When creating a PivotTable in this manner (i.e., by clicking on only one cell within the table), Excel includes all of the contiguous cells (columns and rows) in the PivotTable. Therefore, there should be no blank columns, rows, or field names in the table you want to use.*

The value in the Table/Range: box should read $A$1:$I$1074, which is the range of our data.

The PivotTable Fields list

When the shell of the PivotTable is created, you will see the ***PivotTable Fields list*** on the right side of the screen (as well as several contextual tool boxes you will see and use later). This Fields list contains all of the column headings in the data tab (Excel automatically assumes that the first row of your database contains the correct headings, so it is important that the headings are appropriately named). The Office Ribbon will automatically change to include a new grouping of contextual tabs called PivotTable Tools which contains two tabs: Analyze and Design. We will be working extensively with these new tabs. You can click on the Field List button to hide or show the PivotTable Field List. Note that your cursor must be somewhere in the PivotTable (anywhere in the Page Fields, Column Fields, Row Fields, or Data Fields) for the icons in the PivotTable Tools group to become active and usable.

Row, Columns, and Data Fields

Your task is to calculate the year-over-year sales for all data in this table, so let's start moving fields into the **row**, **column**, and **data** areas of the PivotTable.

5. *In the* **PivotTable Fields** *list, click on the checkbox beside the* **Region** *field.*

Excel automatically assumes that you will be using the Region field as a row item, so it places the two values for Region (Northern Region and Southern Region) as rows. If you don't want Excel to guess where you want the fields, you can drag them to the area you want them.

6. *Drag the* **Year** *field down to the* **Columns** *group of the* **PivotTable Fields** *list.*
7. *Drag the* ***Merchandise Sales*** *field to the section in the* **PivotTable Fields** *list called* **Values**.

	A	B	C	D	E	F	G
1							
2							
3	Sum of Merchandise Sales	Column Labels					
4	Row Labels	2014	2015	2016	2017	Grand Total	
5	Northern Region	16730626.65	17350363.2	17798330.35	415316.5	52294636.7	
6	Southern Region	13750092.35	14331137	14856034.55	371023.25	43308287.15	
7	Grand Total	30480719	31681500.2	32654364.9	786339.75	95602923.85	
8							

Figure 11.5

Congratulations! You just created a PivotTable. But those numbers look kind-of ugly. Let's apply some formatting to make them easier to read.

8. *Click on the* **Sum of Merchandise Sales** *field in the* **PivotTable** *(it should be on* **Cell A3***).*
9. *Click on the* **Field Settings** *button in the* **Active Field** *group of the* **Analyze** *contextual tab.*

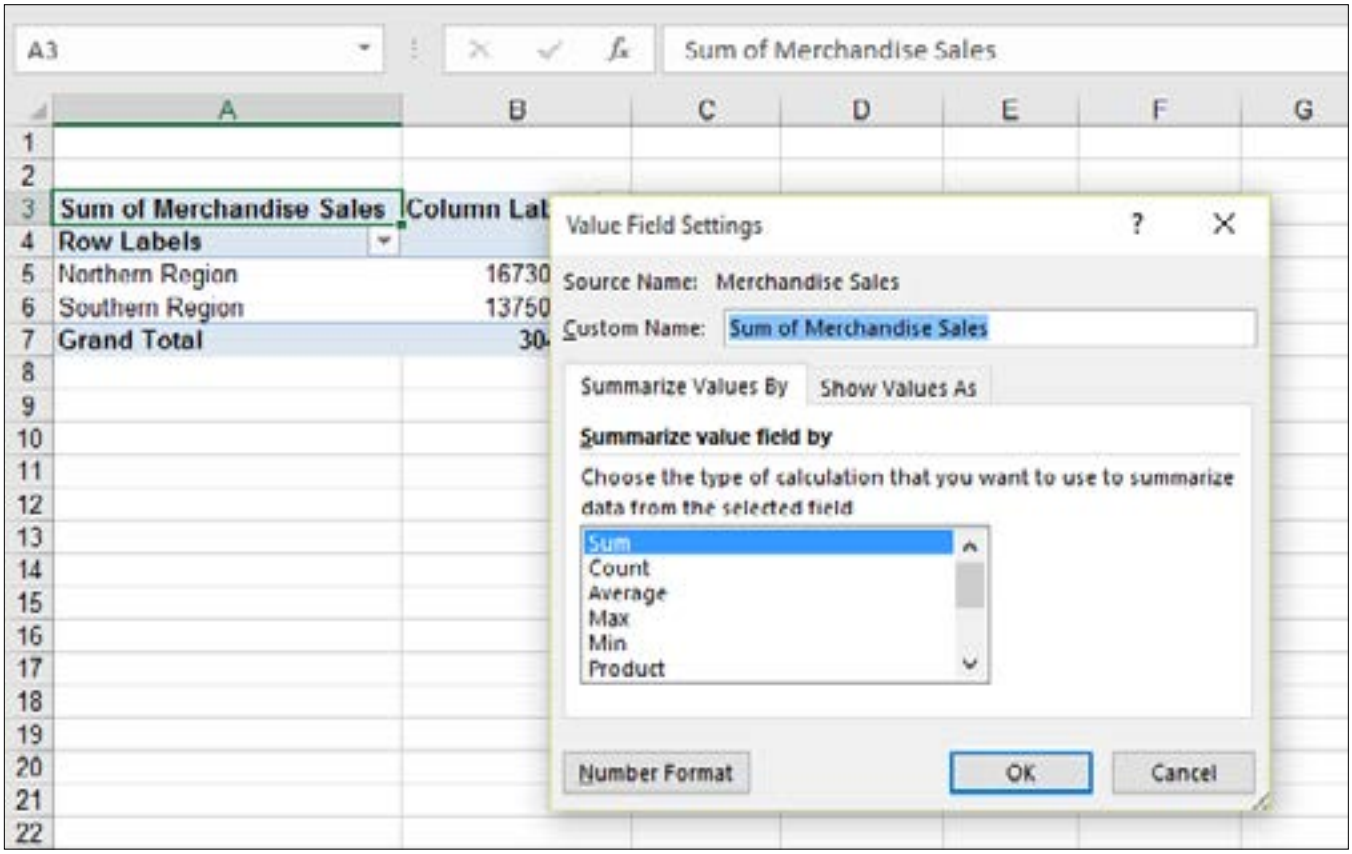


Figure 11.6

The Value Field Settings dialog box appears. With this dialog box, you can change the setting and formatting of a PivotTable field. It is already summing the data correctly (i.e., we don't want a COUNT or AVERAGE summarization), but we will format the field to be Number with zero decimal places.

10. *Click on the* **Number Format** *button.*

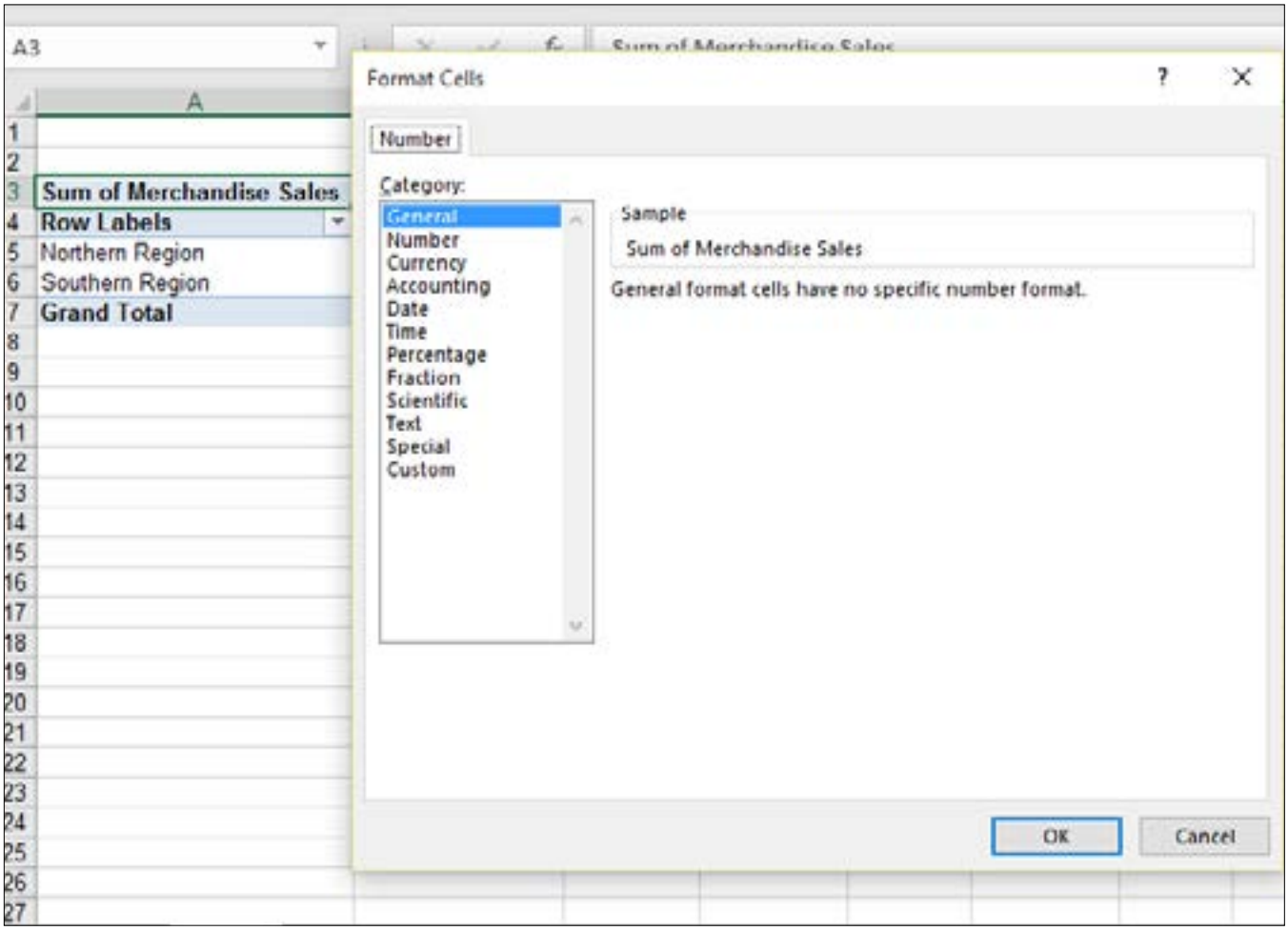
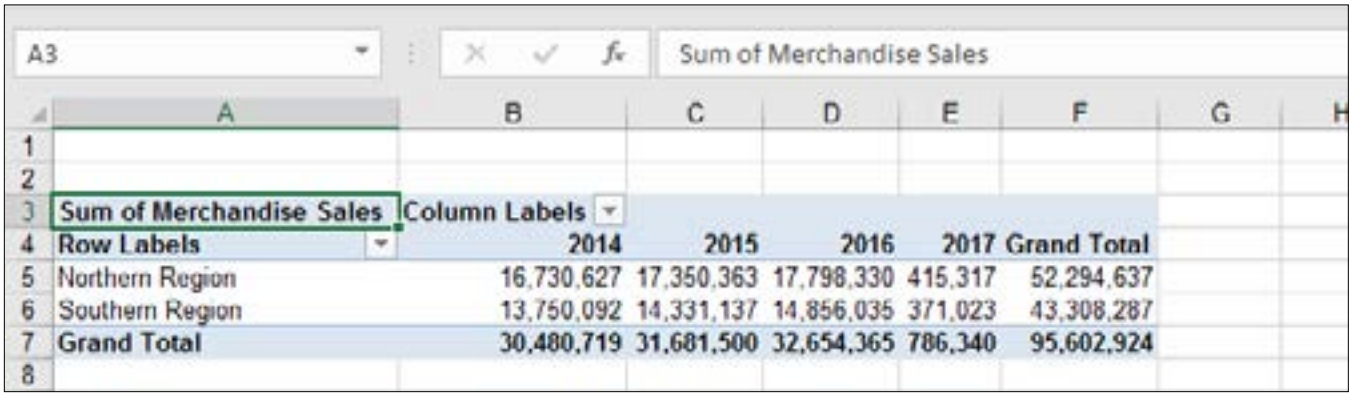


Figure 11.7

The Format Cells dialog box appears, but unlike the typical Format Cells dialog box, this one has only the Number tab.

11. *Format the field to be* **Number** *with* **zero decimal places**, *check the* **Use 1000 Separator (,)** *option, and click* **OK**.
12. *Click* **OK** *in the* **Value Field Settings** *dialog box.*

Your PivotTable should now look something like the figure that follows:



A3 | Sum of Merchandise Sales

	A	B	C	D	E	F	G	H
1								
2								
3	Sum of Merchandise Sales	Column Labels						
4	Row Labels	2014	2015	2016	2017	Grand Total		
5	Northern Region	16,730,627	17,350,363	17,798,330	415,317	52,294,637		
6	Southern Region	13,750,092	14,331,137	14,856,035	371,023	43,308,287		
7	Grand Total	30,480,719	31,681,500	32,654,365	786,340	95,602,924		
8								

Figure 11.8

Note that when a field in the Field List box is used in a PivotTable, it appears bold and checked.

Filtering Fields

Per the PivotTable, there were Merchandise Sales of $95,602,924 for all years in the data. It also tells us what the corresponding Merchandise Sales for each year. Look at the amount for the Year 2017. It is significantly lower than the other years. That is because the data for the sales stopped in January 2017. Most likely, this data was extracted from the system after 2016 had closed and picked up some data that had already been posted in 2017. We don't need the 2017 data in our PivotTable, so let's exclude it. The **filter** functionality in a PivotTable works very similar to a data filter you learned previously.

1. *In the* **PivotTable**, *click on the drop-down arrow next to* **Column Labels**, *and uncheck the* **2017** *checkbox.*
2. *Click* **OK**.

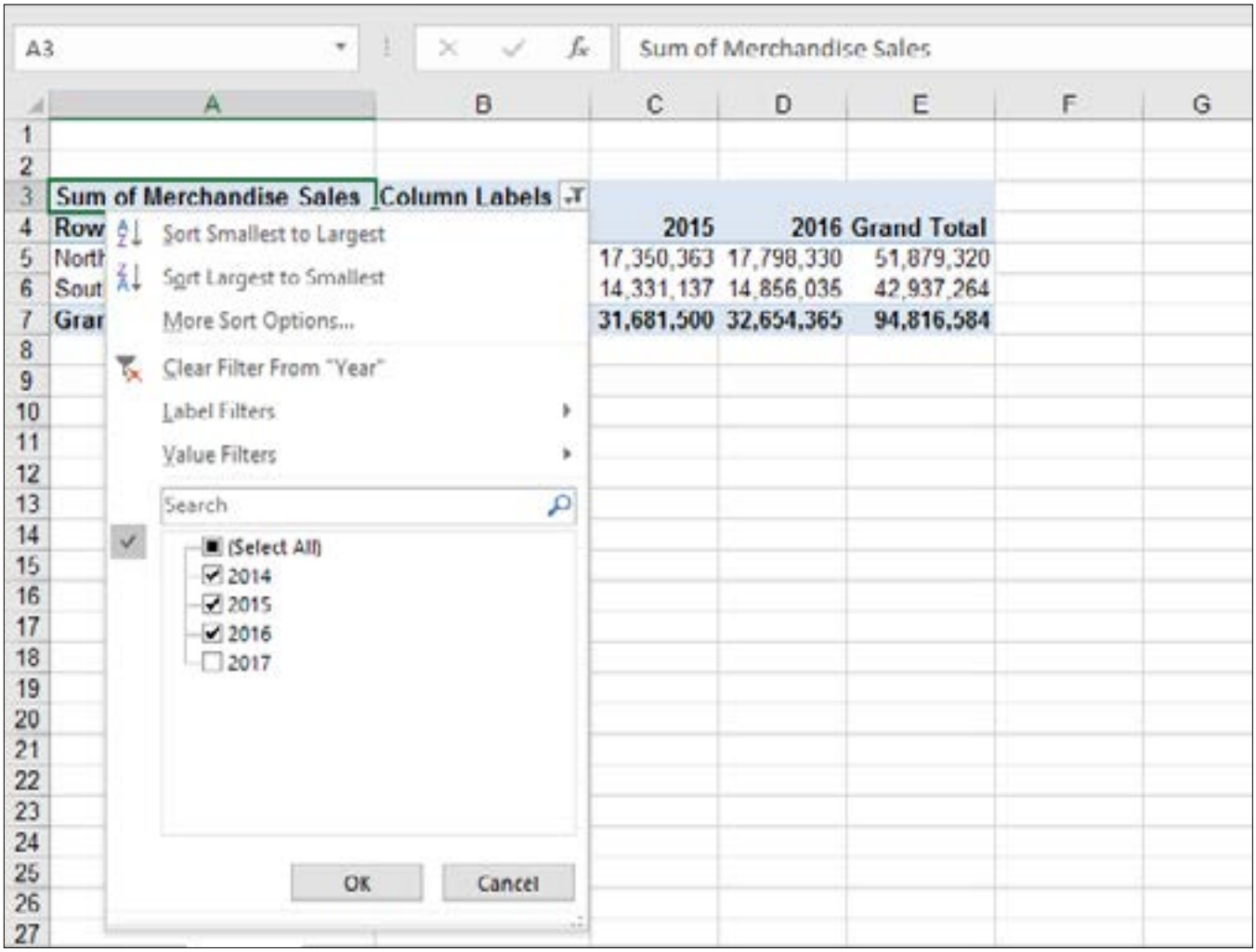


Figure 11.9

Once you click OK, the 2017 data is filtered out of the PivotTable. By default, the (Select All) option is selected when filtering Row, Column and data fields. Now you have a list of Merchandise Sales for each region in each year, excluding 2017. That wasn't too hard, was it?

Adding Fields

Now, upper management would like to see Merchandise Sales by state within the Regions. Let's add in the State field in our PivotTable.

3. *In the* **PivotTable Field List**, *drag the* **State** *field down to the* **Rows** *section under* **Region**.

Sum of Merchandise Sales	Column Labels			
Row Labels	2014	2015	2016	Grand Total
Northern Region	16,730,627	17,350,363	17,798,330	51,879,320
NJ	3,846,112	3,985,368	4,046,592	11,878,072
NY	3,558,589	3,678,761	3,835,358	11,072,707
PA	9,325,926	9,686,235	9,916,381	28,928,541
Southern Region	13,750,092	14,331,137	14,856,035	42,937,264
DC	5,352,897	5,633,789	5,763,205	16,749,891
MD	5,300,489	5,483,555	5,682,893	16,466,937
NC	3,096,706	3,213,794	3,409,937	9,720,436
Grand Total	30,480,719	31,681,500	32,654,365	94,816,584

Figure 11.10

Now you have columns for the Region, State, and Merchandise Sales for 2014, 2015, and 2016. Are you getting the picture now? Manipulating a PivotTable isn't much more difficult than that – just clicking and dragging the fields where you want the data to be organized.

This PivotTable shows what I consider to be one of the most significant changes from Excel 2003 to what is available in Excel 2007 and beyond. In Excel 2003, the State field would have shown up in its own column. In versions from Excel 2007 on, multiple columns of rows appear in a ***Compact View***, which has the show (+) and hide (-) buttons to the left of the field values. You can switch between compact, outline, and tabular Views of a PivotTable by clicking on the Report Layout button in the Layout section of the Design tab.

4. *Click on the* **Report Layout** *button in the* **Layout** *group of the* **Design** *tab, and choose* **Show in Outline Form**.

Sum of Merchandise Sales		Year			
Region	State	2014	2015	2016	Grand Total
Northern Region		16,730,627	17,350,363	17,798,330	51,879,320
	NJ	3,846,112	3,985,368	4,046,592	11,878,072
	NY	3,558,589	3,678,761	3,835,358	11,072,707
	PA	9,325,926	9,686,235	9,916,381	28,928,541
Southern Region		13,750,092	14,331,137	14,856,035	42,937,264
	DC	5,352,897	5,633,789	5,763,205	16,749,891
	MD	5,300,489	5,483,555	5,682,893	16,466,937
	NC	3,096,706	3,213,794	3,409,937	9,720,436
Grand Total		30,480,719	31,681,500	32,654,365	94,816,584

Figure 11.11

Play around with the different layouts for a PivotTable. I prefer the Compact Layout as it saves on space (all of the row fields are contained in one column). Right now, our PivotTable includes only Merchandise Sales, but we also have Warranty Sales and Delivery Sales. We want to include those fields in our PivotTable as well.

5. *Set the* **PivotTable** *to a* **Compact form**.
6. *From the* **PivotTable Fields** *list, drag the* **Warranty Sales** *field and drop it below the* **Sum of Merchandise Sales** *in the* **Values** *section.*
7. *Drag the* **Delivery Sales** *field, and drop it below the* **Sum of Warranty Sales** *in the* **Values** *section.*

When you drag a second level of data into the Values section, you will see the field appear in the Columns section. This tells you that the values in the Values section will appear as columns. We want the values to appear as rows, so you need to move the 

field into the Rows section.

8. *Move the* 

field from the **Columns** *section to the* **Rows** *section of the* **PivotTable Fields** *list.*
9. *Click on any one of the* **Sum of Warranty Sales** *cells in the* **PivotTable** *and set the format to* **Number**, **zero decimal places**. *Check the* **Use 1000 Separator (,)** *box.*
10. *Apply the same formatting for* **Sum of Delivery Sales**.

3		Column Labels			
4	Row Labels	2014	2015	2016	Grand Total
5	Northern Region				
6	NJ				
7	Sum of Merchandise Sales	3,846,112	3,985,368	4,046,592	11,878,072
8	Sum of Warranty Sales	73,115	84,920	80,800	238,835
9	Sum of Delivery Sales	103,500	103,500	113,300	320,300
10	NY				
11	Sum of Merchandise Sales	3,558,589	3,678,761	3,835,358	11,072,707
12	Sum of Warranty Sales	67,130	76,160	77,600	220,890
13	Sum of Delivery Sales	93,950	96,400	106,700	297,050
14	PA				
15	Sum of Merchandise Sales	9,325,926	9,686,235	9,916,381	28,928,541
16	Sum of Warranty Sales	179,340	203,720	202,600	585,660
17	Sum of Delivery Sales	255,800	247,800	274,890	778,490
18	**Northern Region Sum of Merchandise Sales**	**16,730,627**	**17,350,363**	**17,798,330**	**51,879,320**
19	**Northern Region Sum of Warranty Sales**	**319,585**	**364,800**	**361,000**	**1,045,385**
20	**Northern Region Sum of Delivery Sales**	**453,250**	**447,700**	**494,890**	**1,395,840**
21	Southern Region				
22	DC				
23	Sum of Merchandise Sales	5,352,897	5,633,789	5,763,205	16,749,891
24	Sum of Warranty Sales	103,495	118,280	115,920	337,695
25	Sum of Delivery Sales	145,150	148,950	161,150	455,250
26	MD				
27	Sum of Merchandise Sales	5,300,489	5,483,555	5,682,893	16,466,937
28	Sum of Warranty Sales	98,210	111,360	112,880	322,450
29	Sum of Delivery Sales	141,700	142,800	158,290	442,790
30	NC				
31	Sum of Merchandise Sales	3,096,706	3,213,794	3,409,937	9,720,436
32	Sum of Warranty Sales	58,065	65,840	66,600	190,505
33	Sum of Delivery Sales	80,250	83,950	89,155	253,355
34	**Southern Region Sum of Merchandise Sales**	**13,750,092**	**14,331,137**	**14,856,035**	**42,937,264**
35	**Southern Region Sum of Warranty Sales**	**259,770**	**295,480**	**295,400**	**850,650**
36	**Southern Region Sum of Delivery Sales**	**367,100**	**375,700**	**408,595**	**1,151,395**

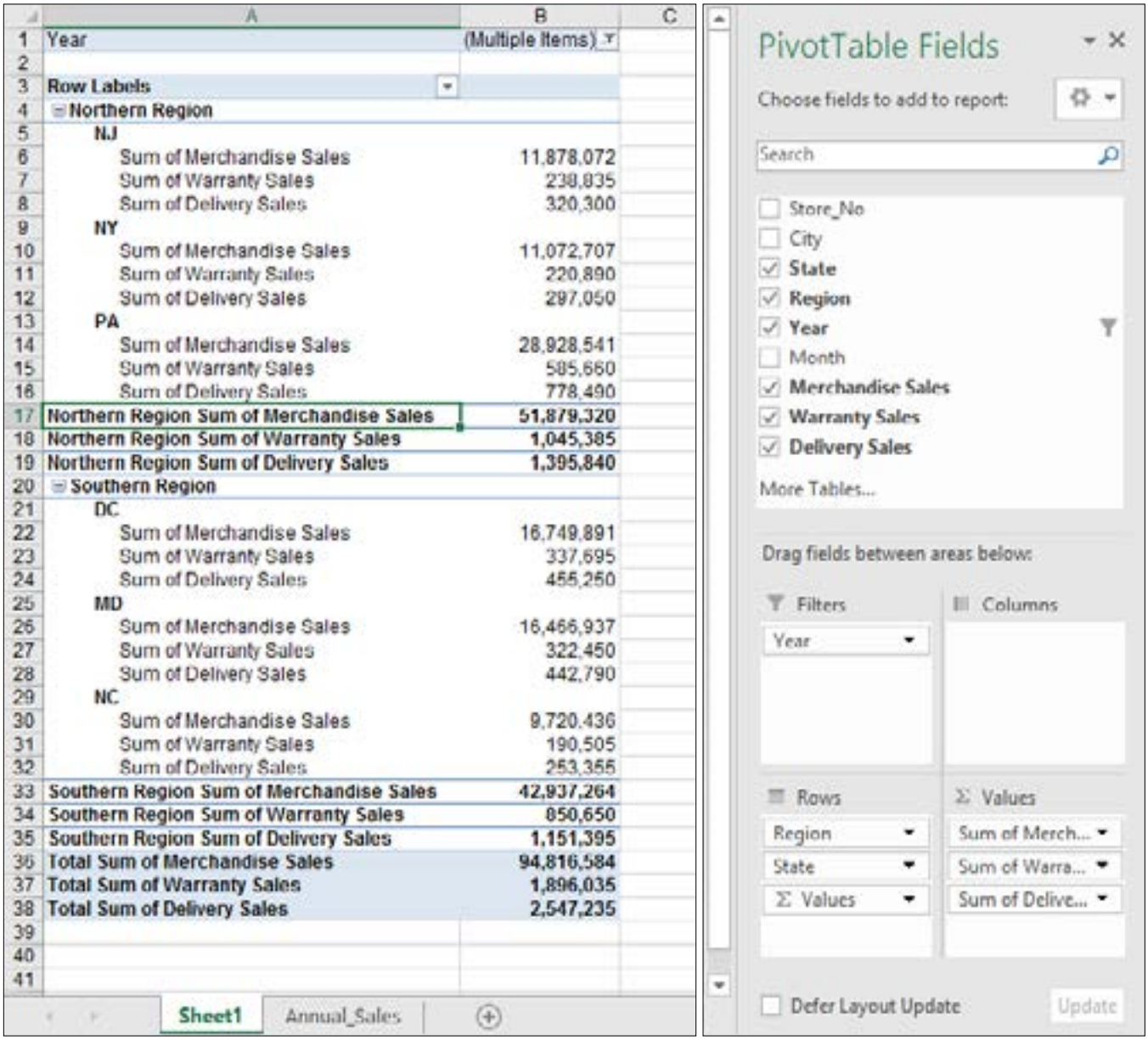
Figure 11.12

***Review Questions**: It is now time to complete the hands-on Review Questions. Log on to www.ExcelCEO.com with your Email address and Password, click on the* **Excel 2016 Review Questions, Chapter 11, Section 1 of 2** *option in your Main Menu, and complete the Review Questions.*

Report Filter

As you can see, the PivotTable gets more complex each time you add a field. Let's suppose that upper management is not really interested (for this analysis) in a year-over-year analysis, but rather they want to see each year by itself with the corresponding sales figures. We can let them choose to see the year they want by making the Year field a Report Filter. A **Report Filter** filters the entire PivotTable for a chosen item.

1. *Drag the* **Year** *field from the* **Columns** *section to the* **Filters** *section.*



	A	B	C
1	Year	(Multiple Items)	
2			
3	Row Labels		
4	Northern Region		
5	NJ		
6	Sum of Merchandise Sales	11,878,072	
7	Sum of Warranty Sales	238,835	
8	Sum of Delivery Sales	320,300	
9	NY		
10	Sum of Merchandise Sales	11,072,707	
11	Sum of Warranty Sales	220,890	
12	Sum of Delivery Sales	297,050	
13	PA		
14	Sum of Merchandise Sales	28,928,541	
15	Sum of Warranty Sales	585,660	
16	Sum of Delivery Sales	778,490	
17	Northern Region Sum of Merchandise Sales	51,879,320	
18	Northern Region Sum of Warranty Sales	1,045,385	
19	Northern Region Sum of Delivery Sales	1,395,840	
20	Southern Region		
21	DC		
22	Sum of Merchandise Sales	16,749,891	
23	Sum of Warranty Sales	337,695	
24	Sum of Delivery Sales	455,250	
25	MD		
26	Sum of Merchandise Sales	16,466,937	
27	Sum of Warranty Sales	322,450	
28	Sum of Delivery Sales	442,790	
29	NC		
30	Sum of Merchandise Sales	9,720,436	
31	Sum of Warranty Sales	190,505	
32	Sum of Delivery Sales	253,355	
33	Southern Region Sum of Merchandise Sales	42,937,264	
34	Southern Region Sum of Warranty Sales	850,650	
35	Southern Region Sum of Delivery Sales	1,151,395	
36	Total Sum of Merchandise Sales	94,816,584	
37	Total Sum of Warranty Sales	1,896,035	
38	Total Sum of Delivery Sales	2,547,235	
39			
40			
41			

Figure 11.13

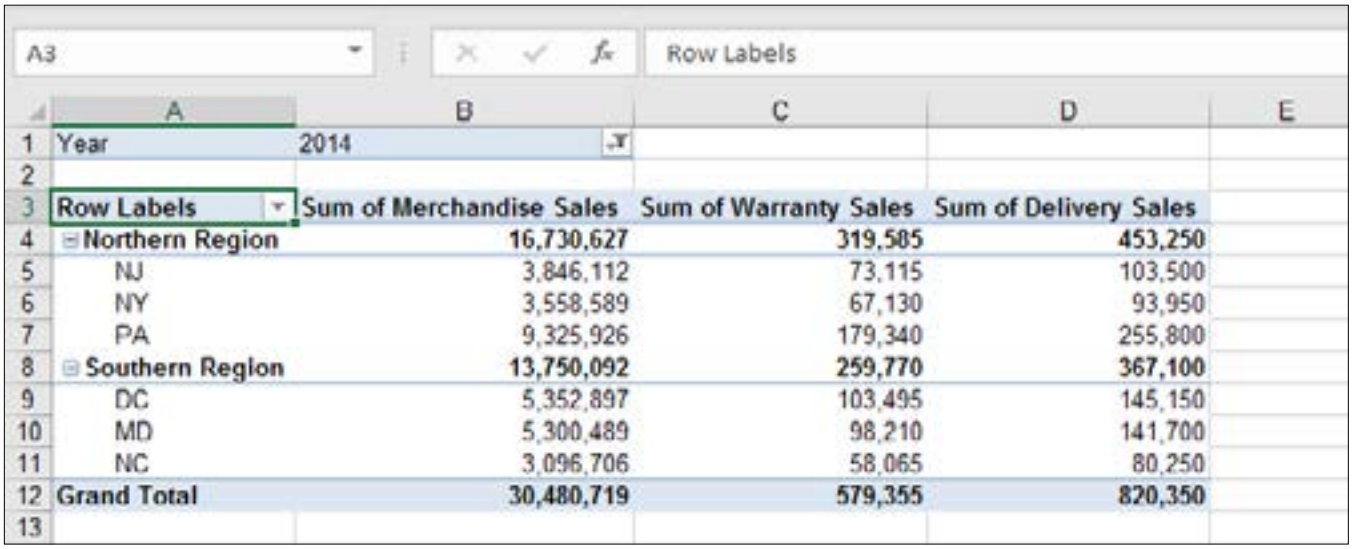
The Year indicator changes to (Multiple Items) since we had previously deselected 2017. To include all years, simply click on the Year drop-down menu and check the 2017 checkbox.

2. *Click the* **Year** *drop-down arrow, uncheck all boxes except for* **2014** *and click* **OK**.

All of the data now changes to reflect only the sales in 2014. I think it's kind of clunky looking at the sales fields (Merchandise, Warranty and Delivery) on top of one another. Let's pivot the data around where the sales fields appear in columns rather than in rows.

3. *Move the* Σ Values *field over to the* **Columns** *section of the* **PivotTable Fields** *list.*

Trick: *If more than one level of data is dropped into the* ***Columns*** *or* ***Rows*** *section of the PivotTable grid, the* ***Values*** *drop-down will appear below the* ***Field*** *boxes. You can move this between Columns and Rows to change how the drop-down data is displayed in the PivotTable. Be careful though! The amount of data being displayed can make the transition time-consuming.*

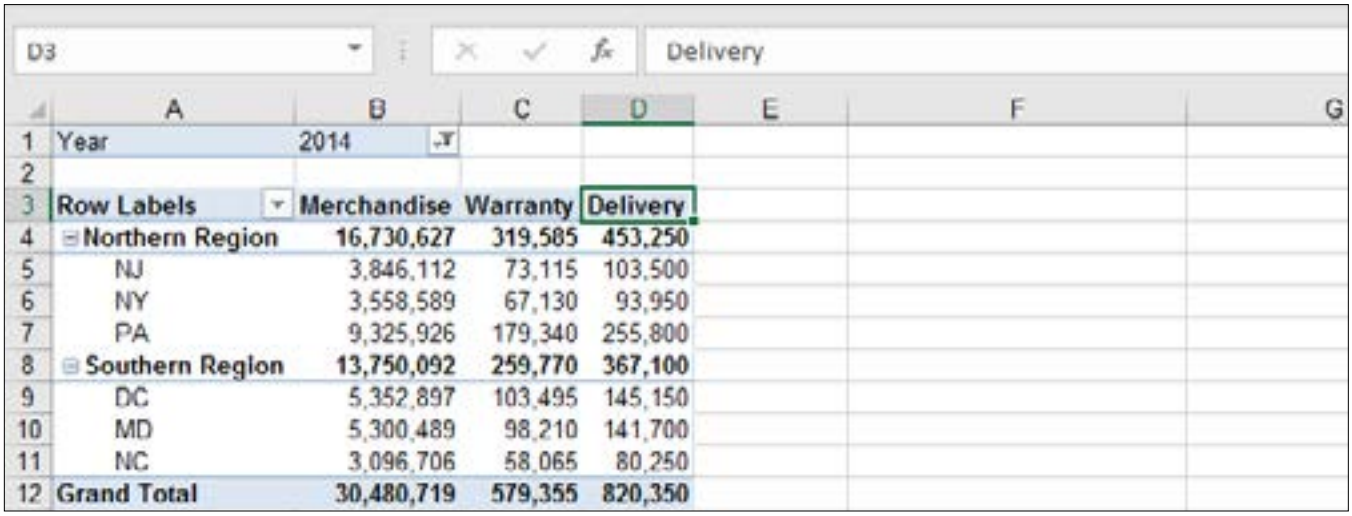


	A	B	C	D	E
1	Year	2014			
2					
3	Row Labels	Sum of Merchandise Sales	Sum of Warranty Sales	Sum of Delivery Sales	
4	Northern Region	16,730,627	319,585	453,250	
5	NJ	3,846,112	73,115	103,500	
6	NY	3,558,589	67,130	93,950	
7	PA	9,325,926	179,340	255,800	
8	Southern Region	13,750,092	259,770	367,100	
9	DC	5,352,897	103,495	145,150	
10	MD	5,300,489	98,210	141,700	
11	NC	3,096,706	58,065	80,250	
12	Grand Total	30,480,719	579,355	820,350	
13					

Figure 11.14

The columns are kind-of wide, so let's rename the fields to save space.

4. *Click on* **Cell B3**, *which currently reads* **Sum of Merchandise Sales**.
5. *Rename* **Sum of Merchandise Sales** *to* ***Merchandise***.
6. *Replace* **Sum of Warranty Sales** *with* ***Warranty***, *and* **Sum of Delivery Sales** *with* ***Delivery***.
7. *Adjust the column widths to fit.*



	A	B	C	D	E	F	G
1	Year	2014					
2							
3	Row Labels	Merchandise	Warranty	Delivery			
4	Northern Region	16,730,627	319,585	453,250			
5	NJ	3,846,112	73,115	103,500			
6	NY	3,558,589	67,130	93,950			
7	PA	9,325,926	179,340	255,800			
8	Southern Region	13,750,092	259,770	367,100			
9	DC	5,352,897	103,495	145,150			
10	MD	5,300,489	98,210	141,700			
11	NC	3,096,706	58,065	80,250			
12	Grand Total	30,480,719	579,355	820,350			

Figure 11.15

Calculated Fields

At this point, let's talk about calculated fields. There is not a field in the Annual_Sales tab or in the PivotTable that sums up all sales, so let's do that in the PivotTable itself.

1. *Make sure your cursor is somewhere on the* **PivotTable**, *and click on the* **Fields, Items, & Sets** *button in the* **Calculations** *group of the* **Analyze** *contextual tab.*
2. *Choose* **Calculated Field…**

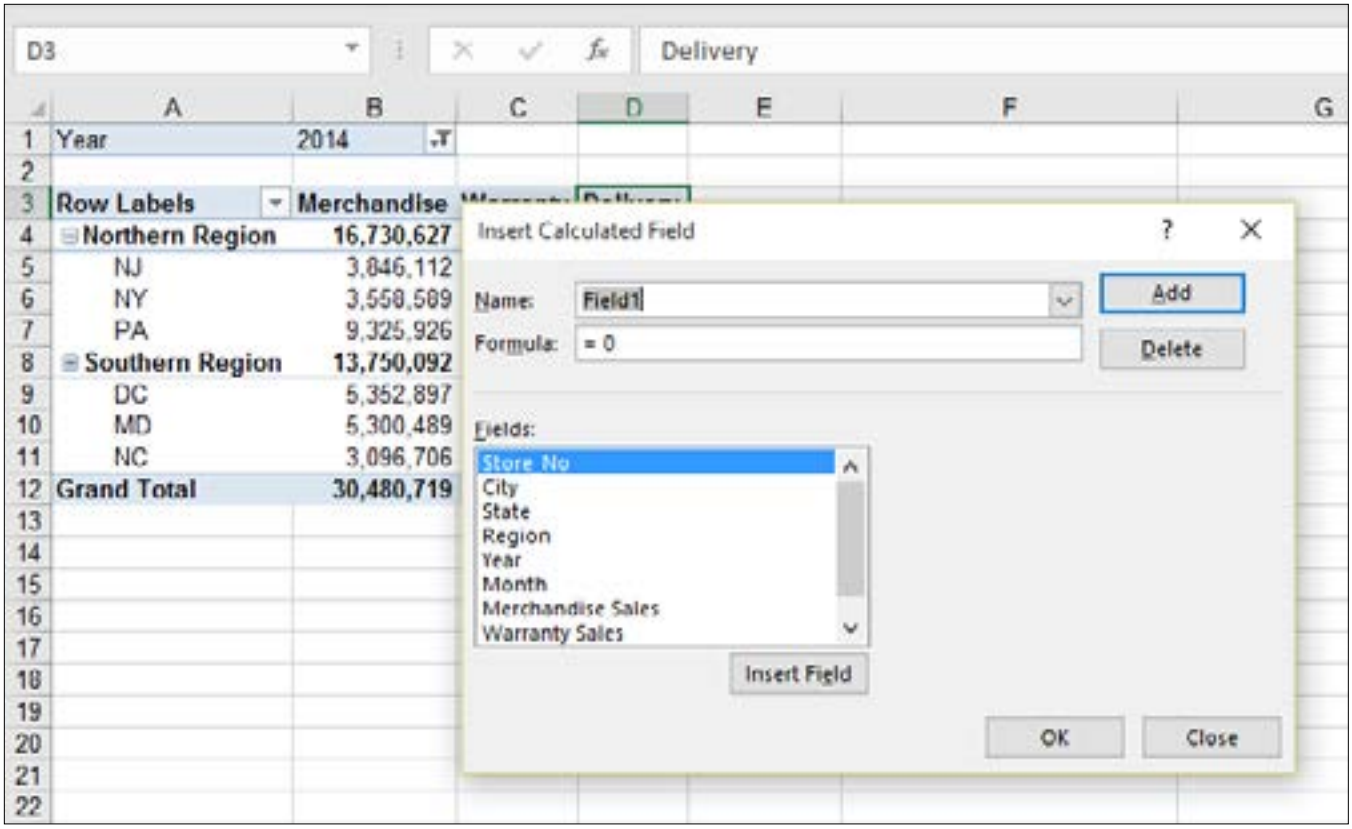


Figure 11.16

3. *In the* **Name:** *field in the* **Insert Calculated Field** *dialog box, type* ***Total_Sales****.*
4. *Delete the* **0** *in the* **Formula:** *box*
5. *In the* **Fields:** *box, click on* **Merchandise Sales** *and click the* **Insert Field** *button.*
6. *In the* **Formula:** *box, to the right of* **"Merchandise Sales"**, *type the "+" key.*
7. *Double-click on the* **Warranty Sales** *field in the* **Fields:** *box.*
8. *Type the "+" key.*
9. *Double-click on the* **Delivery Sales** *field in the* **Fields:** *box.*

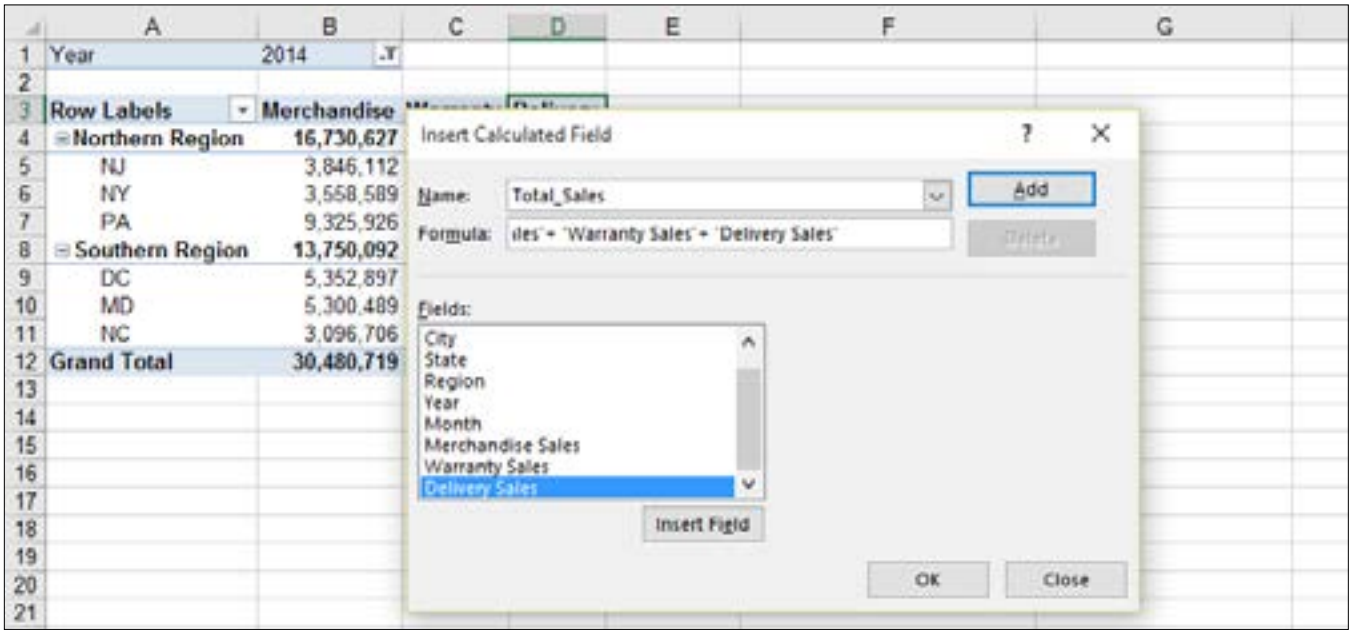


Figure 11.17

The formula should read ='Merchandise Sales' + 'Warranty Sales' + 'Delivery Sales'.

Note that when there is a space in the field name, Excel will surround the field name with apostrophes.

10. Click **OK**.

Year	2014			
Row Labels	**Merchandise**	**Warranty**	**Delivery**	**Sum of Total_Sales**
Northern Region	**16,730,627**	**319,585**	**453,250**	**17,503,462**
NJ	3,846,112	73,115	103,500	4,022,727
NY	3,558,589	67,130	93,950	3,719,669
PA	9,325,926	179,340	255,800	9,761,066
Southern Region	**13,750,092**	**259,770**	**367,100**	**14,376,962**
DC	5,352,897	103,495	145,150	5,601,542
MD	5,300,489	98,210	141,700	5,540,399
NC	3,096,706	58,065	80,250	3,235,021
Grand Total	**30,480,719**	**579,355**	**820,350**	**31,880,424**

Figure 11.18

Now you have created a new field that calculates Total Sales. It is called Sum of Total_Sales. Again, that name is too long, so let's change it.

11. In the **PivotTable**, *change* **Sum of Total_Sales** *to* ***Total***.

12. Resize the column.

	A	B	C	D	E	F	G
1	Year	2014					
2							
3	Row Labels	Merchandise	Warranty	Delivery	Total		
4	Northern Region	16,730,627	319,585	453,250	17,503,462		
5	NJ	3,846,112	73,115	103,500	4,022,727		
6	NY	3,558,589	67,130	93,950	3,719,669		
7	PA	9,325,926	179,340	255,800	9,761,066		
8	Southern Region	13,750,092	259,770	367,100	14,376,962		
9	DC	5,352,897	103,495	145,150	5,601,542		
10	MD	5,300,489	98,210	141,700	5,540,399		
11	NC	3,096,706	58,065	80,250	3,235,021		
12	Grand Total	30,480,719	579,355	820,350	31,880,424		

Figure 11.19

Now you have an analysis that means something. You send this to your manager and he loves it. Then he says, "*You know, we really do need to look at annual sales in one table, but it needs to show total sales, not the individual sales categories. Can your PivotTable do that?*" Your response is, "*Yes, but it's REAL hard to do, and I'm the only one in the company who can do it.*" We'll keep the truth just between us.

To do what he requested, we need to get rid of the Merchandise, Warranty, and Delivery fields, keep the Total field and bring the Year field back down as a Column Label. That shouldn't be too hard, should it? Let's see.

1. *Uncheck the* **Merchandise Sales**, **Warranty Sales**, *and* **Delivery Sales** *fields from the* **PivotTable Fields** *list (this takes those fields out of the PivotTable), but leave the* **Total_ Sales** *field.*
2. *Drag the* **Year** *field from the* **Filters** *section to the* **Columns** *section.*
3. *Click on the* **Column Labels** *drop-down menu in the* **PivotTable**, *and select all years except* **2017**.

	A	B	C	D	E	F
1						
2						
3	Total	Column Labels				
4	Row Labels	2014	2015	2016	Grand Total	
5	Northern Region	17,503,462	18,162,863	18,654,220	54,320,545	
6	NJ	4,022,727	4,173,788	4,240,692	12,437,207	
7	NY	3,719,669	3,851,321	4,019,658	11,590,647	
8	PA	9,761,066	10,137,755	10,393,871	30,292,691	
9	Southern Region	14,376,962	15,002,317	15,560,030	44,939,309	
10	DC	5,601,542	5,901,019	6,040,275	17,542,836	
11	MD	5,540,399	5,737,715	5,954,063	17,232,177	
12	NC	3,235,021	3,363,584	3,565,692	10,164,296	
13	Grand Total	31,880,424	33,165,180	34,214,250	99,259,854	
14						

Figure 11.20

PivotTable Options

The Grand Total column (Column E) really doesn't add anything to our analysis, so we can take it out. We do that by using PivotTable Options.

1. *Right-click anywhere in the* **PivotTable** *and choose* **PivotTable Options…**

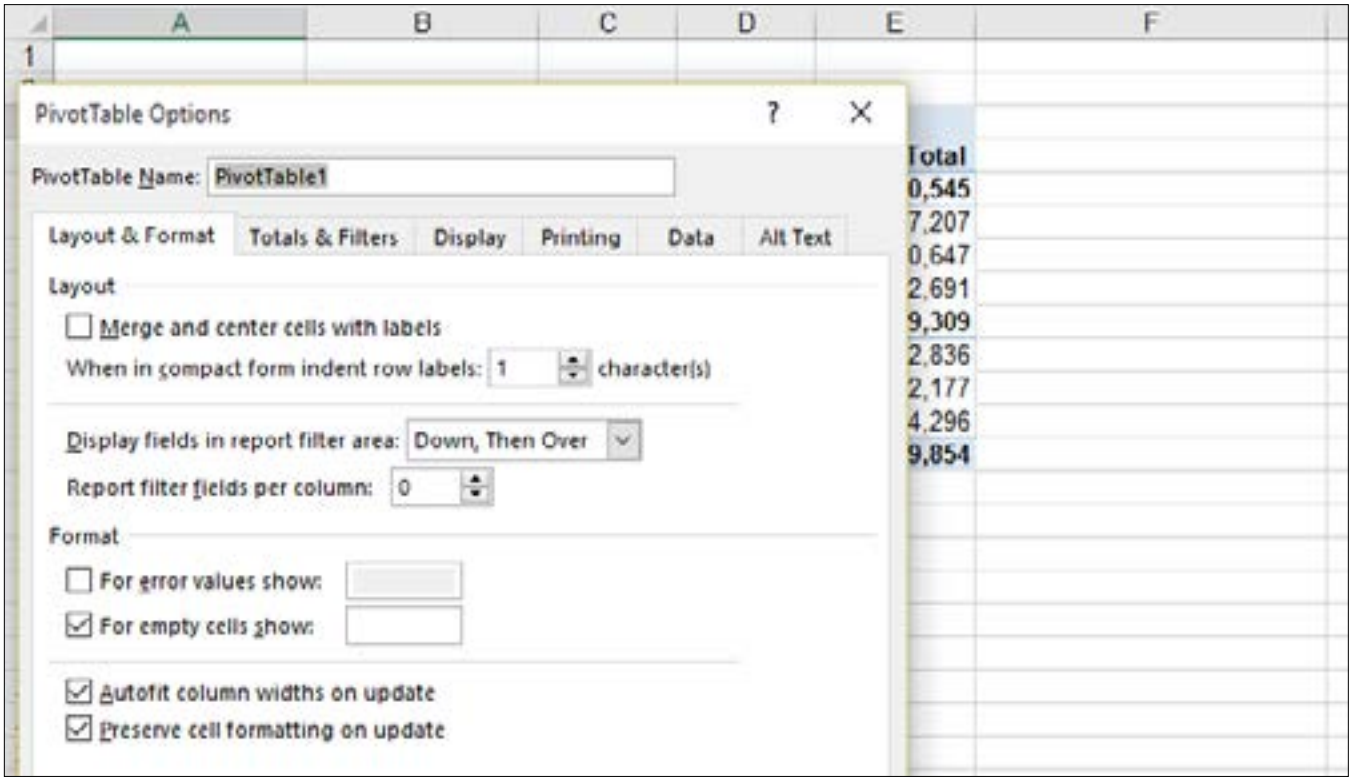


Figure 11.21

The PivotTable Options dialog box appears.

2. *Click on the* **Totals & Filters** *tab.*
3. *Uncheck the* **Show grand totals for rows** *box and click* **OK**.

You can also click on the Options button in the PivotTable section of the Analyze tab to display the PivotTable Options dialog box. After you click OK, the Grand Total column in the PivotTable goes away. Take a moment and review the various options available in this dialog box. You will use many of them.

Sorting within a PivotTable

Now that we've created fields within our PivotTable and pivoted the information around a bit, let's do some **sorting**. Sorting a PivotTable in Excel 2003 was a bit cumbersome, as you had to use the Sort and Top 10 functionality. Excel 2016 provides a cool Sort section for sorting within a PivotTable. Let's suppose you want to sort the PivotTable to make the States with the most Total Sales appear on top (Descending order) within each region.

4. *Right-click on any cell under the* **2016** *column.*
5. *Point to the* **Sort** *option in the drop-down menu, and select* **More Sort Options...**

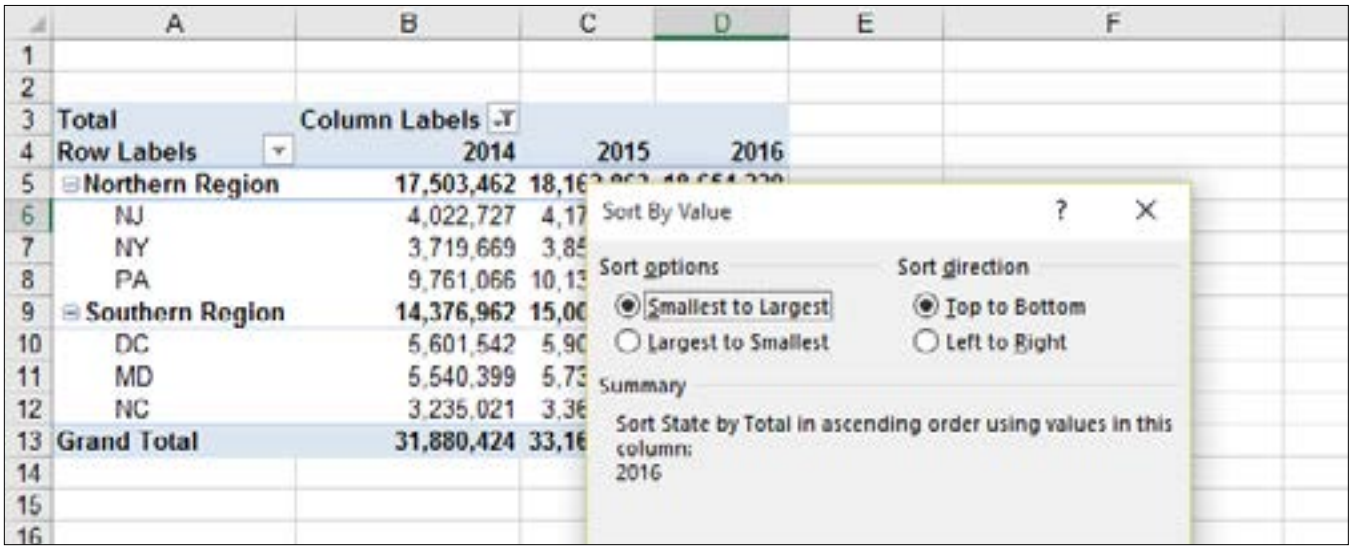


Figure 11.22

The Sort By Value dialog box appears. By default, the Smallest to Largest and Top to Bottom radio buttons are selected. The Summary section below reads that this will sort the State field by the Total in Ascending order using the values in the 2016 column. Since we want to sort from high to low (or descending order), we need to click on the Largest to Smallest radio button.

6. *Click on the* **Largest to Smallest** *radio button.*
7. *Click* **OK**.

Your PivotTable should now look like the figure below:

Total	Column Labels		
Row Labels	2014	2015	2016
Northern Region	17,503,462	18,162,863	18,654,220
PA	9,761,066	10,137,755	10,393,871
NJ	4,022,727	4,173,788	4,240,692
NY	3,719,669	3,851,321	4,019,658
Southern Region	14,376,962	15,002,317	15,560,030
DC	5,601,542	5,901,019	6,040,275
MD	5,540,399	5,737,715	5,954,063
NC	3,235,021	3,363,584	3,565,692
Grand Total	31,880,424	33,165,180	34,214,250

Figure 11.23

The data is now sorted by State. Easy, huh?

8. *Rename the sheet containing the* **PivotTable** *to* ***Pivot****.*
9. **Save** *and* **close** *the* **myAnnual_Sales.xlsx** *file.*

As you can see, PivotTables are very useful tools for organizing, slicing, and dicing your data. Go over the exercises in this chapter again and again until you thoroughly understand the concepts of PivotTables. It will significantly enhance your future understanding of the "GROUP BY" clause in SQL. We'll explore more about PivotTables in the next chapter.

> ***Review Questions****: It is now time to complete the hands-on Review Questions. Log on to www.ExcelCEO.com with your Email address and Password, click on the* **Excel 2016 Review Questions, Chapter 11, Section 2 of 2** *option in your Main Menu, and complete the Review Questions.*

Conclusion

In this chapter, you began your introduction to PivotTables. First, you created a simple PivotTable. You learned how to show and hide the PivotTable Field list, and added rows, columns, and values to the PivotTable. You learned how to format fields and filter fields within a PivotTable. You added fields, moved fields around, added a Report Filter and even calculated a new field. You learned how to work with the PivotTable Options dialog box. Finally, you learned how to sort data within a PivotTable.

Chapter Exam

To take the examination for this chapter, you must have successfully completed the examination for the previous chapter. You can now go to www.ExcelCEO.com, click on Sign In, log in and take the exam. Make sure that you take the exam on the same computer on which you completed the practice files, as some of the questions on the exam may refer to some of the completed projects. Chapter exams are intended to be hands-on.

CHAPTER TWELVE — ADVANCED PIVOTTABLES

Chapter Objectives:

- Identify a PivotTable's Field Settings to customize data appearance
- Recognize how to develop complex calculated fields in a PivotTable
- Indicate levels of data within a PivotTable to use drill-down capability
- Determine how to create a PivotChart Report
- Identify the procedure on how to connect to an External Data Source
- Recognize how to pull external data directly into a PivotTable

Projects You Will Complete During This Chapter:

- *mySales_Summary.xlsx*
- *myAccess.xlsx*
- *myGL_Summary.xlsx*

CPE Credits possible for this chapter: 3

Introduction

Once I received a phone call from a financial manager in another state. She had a database of personnel information and wanted to roll it up to various management levels within our organization. This manager had heard of PivotTables, but understood they were very complex, and wanted to know the name of a good consultant to do the PivotTable for us. I said, "*Yes. You.*" I asked why she couldn't do the PivotTable for herself. Her response was that she didn't have the time to learn how to use PivotTables before the report had to be ready. I asked her to send me the database via email, and then I spent about 15 minutes showing her how to manipulate a PivotTable on the phone. She was fascinated with how easy it was to create and manipulate PivotTables, as I hope you are as well.

Now that you have a taste of PivotTables, we'll have a little more fun with them. Again, the main concept I want you to learn here is how to pivot fields within the database to group and summarize the data. You can use just about any of the fields in the database for such a summary and you can do just about any calculation.

Let's suppose that your manager wants to look at annual sales activity and wants to see a percentage growth year-over-year, by state. He also wants the capability to drill-down to find out which stores are the lower performers. Remember, sometimes you receive data in different ways, from different files, and in different formats. In this chapter, I used the same base data as in Chapter 11, but I've changed it around a little, so you can experience the different data formats. Instead of having a Year field and each category of sales in columns, the Category is one column and the Year is contained in four different columns with the sale amounts. Let's review that file.

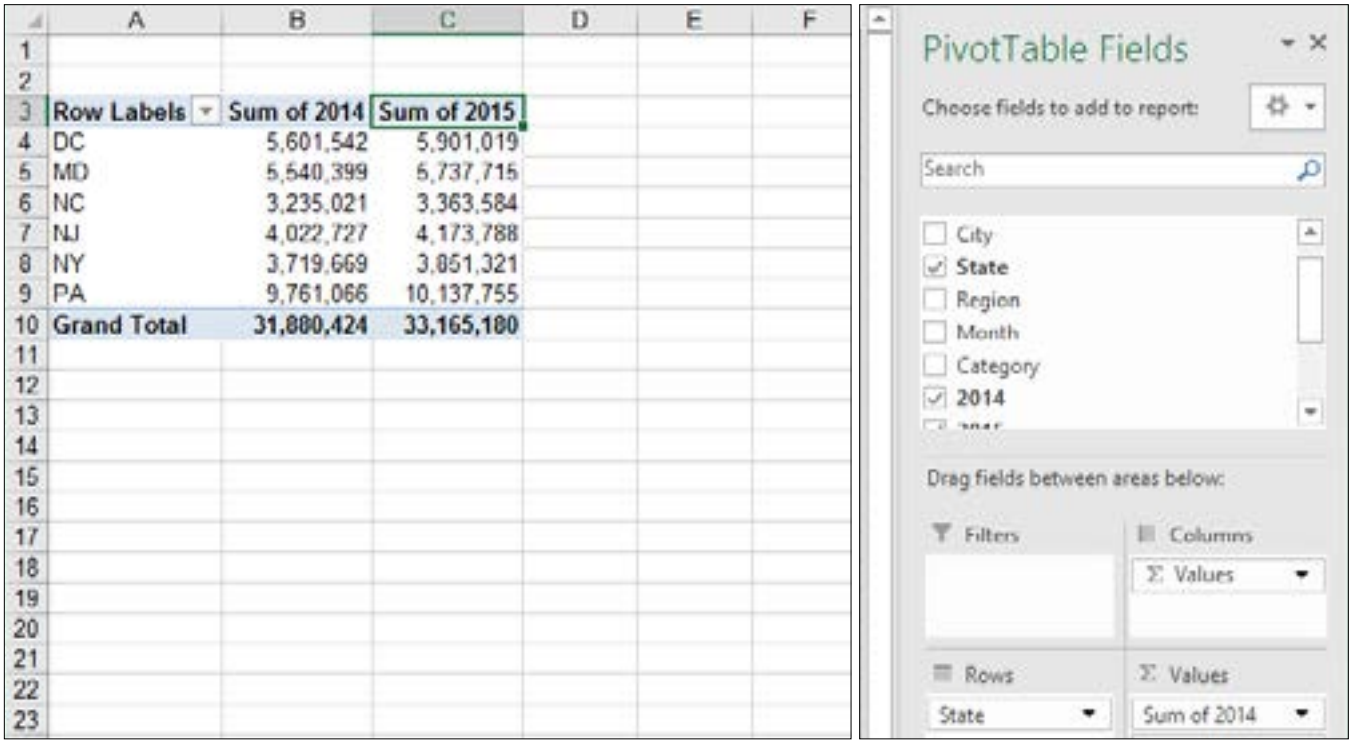
1. **Open** *the* **C:\ExcelCEO\Excel 2016\Chapter12\Sales_Summary.xlsx** *file.*
2. **Save As C:\ExcelCEO\Excel 2016\Chapter12*mySales_Summary.xlsx*.**

	A	B	C	D	E	F	G	H	I	J
1	Store_No	City	State	Region	Month	Category	2014	2015	2016	2017
2	1055	New York	NY	Northern Region	4	Merchandise	99,959	84,278	91,007	
3	1009	Philadelphia	PA	Northern Region	2	Delivery	1,350	1,450	1,595	
4	1018	New York	NY	Northern Region	6	Merchandise	125,034	103,929	127,385	
5	1045	Raleigh	NC	Southern Region	9	Merchandise	83,624	93,910	81,539	
6	1018	New York	NY	Northern Region	6	Warranty	2,100	2,440	2,240	
7	1012	Philadelphia	PA	Northern Region	5	Merchandise	103,203	121,008	99,977	
8	1012	Philadelphia	PA	Northern Region	12	Merchandise	173,345	169,513	173,517	
9	1002	Jersey City	NJ	Northern Region	2	Merchandise	48,639	57,246	54,798	36,141
10	1005	Philadelphia	PA	Northern Region	1	Merchandise	47,523	58,448	51,581	14,258
11	1062	Washington	DC	Southern Region	5	Warranty	2,275	2,320	2,560	

Figure 12.1

In this file, the amount fields are called 2014, 2015, 2016, and 2017. These are amounts that correspond with each Store, Month, and Category. Note that the data under the 2017 column is mostly blanks, as there are no sales recorded yet for March 2017 and beyond. Also in this data, Store No. 1009 was closed in September 2016, and that store consequently has blanks from September 2016 forward in its sales data. You will now create a PivotTable that shows sales by state by year from 2014 - 2017.

3. *Create a new* **PivotTable** *by clicking on the* **Insert** *tab,* **PivotTable** *button, and click* **OK**.
4. *Drag the* **State** *field to the* **Rows** *section.*
5. *Drag the* **2014 and 2015** *fields and drop them in the* **Values** *section.*
6. *Make sure the* **Values** *field appears in the* **Columns** *section.*
7. *Double-click on the* **Sum of 2014** *cell in the* **PivotTable** *(to display the* **Value Field Settings** *dialog box). Format the field as* **Number**, **zero decimal places**, *and* **Use 1000 Separator (,)**.
8. *Apply the same formatting to the* **Sum of 2015** *field.*



Row Labels	Sum of 2014	Sum of 2015
DC	5,601,542	5,901,019
MD	5,540,399	5,737,715
NC	3,235,021	3,363,584
NJ	4,022,727	4,173,788
NY	3,719,669	3,851,321
PA	9,761,066	10,137,755
Grand Total	**31,880,424**	**33,165,180**

Figure 12.2

9. *Drag the* **2016** *field and place it in the* **Values** *section.*

Row Labels	Sum of 2014	Sum of 2015	Count of 2016
DC	5,601,542	5,901,019	180
MD	5,540,399	5,737,715	216
NC	3,235,021	3,363,584	144
NJ	4,022,727	4,173,788	108
NY	3,719,669	3,851,321	108
PA	9,761,066	10,137,755	276
Grand Total	**31,880,424**	**33,165,180**	**1032**

Figure 12.3

Change a Field's Settings

When you brought in the data for 2016, you may have had some odd results. Since some of the fields within the 2016 data are blank, Excel tried to count the cells rather than sum them, resulting in much lower numbers than in Years 2014 and 2015. Notice that the name of that column is "Count of 2016" instead of "Sum of 2016" (Some versions of Excel 365 are updated to correct for this). Let's fix that.

10. *Right-click on the* **Count of 2016** *cell (it should be* **Cell D3***).*
11. *On the pop-up menu, choose* **Value Field Settings…**

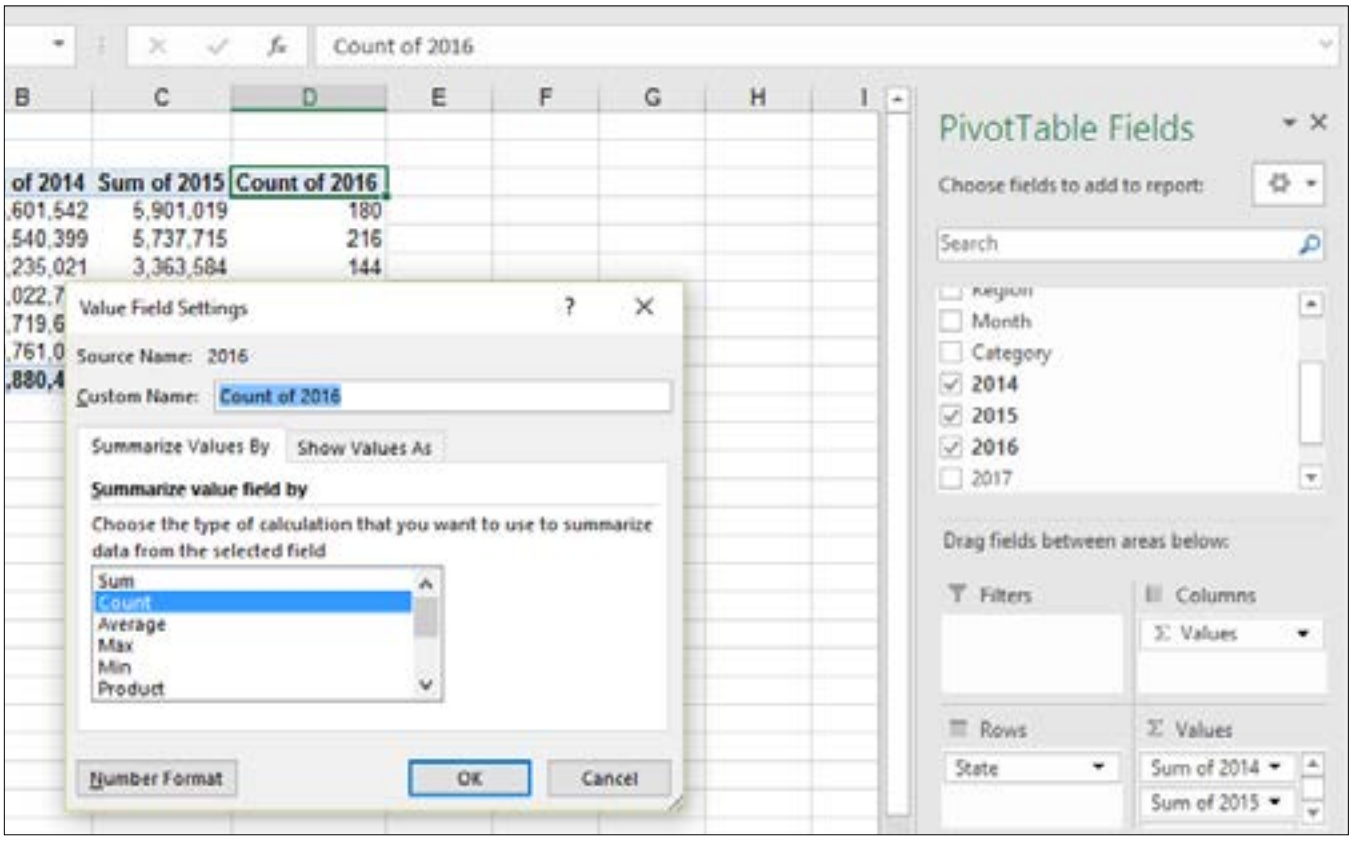
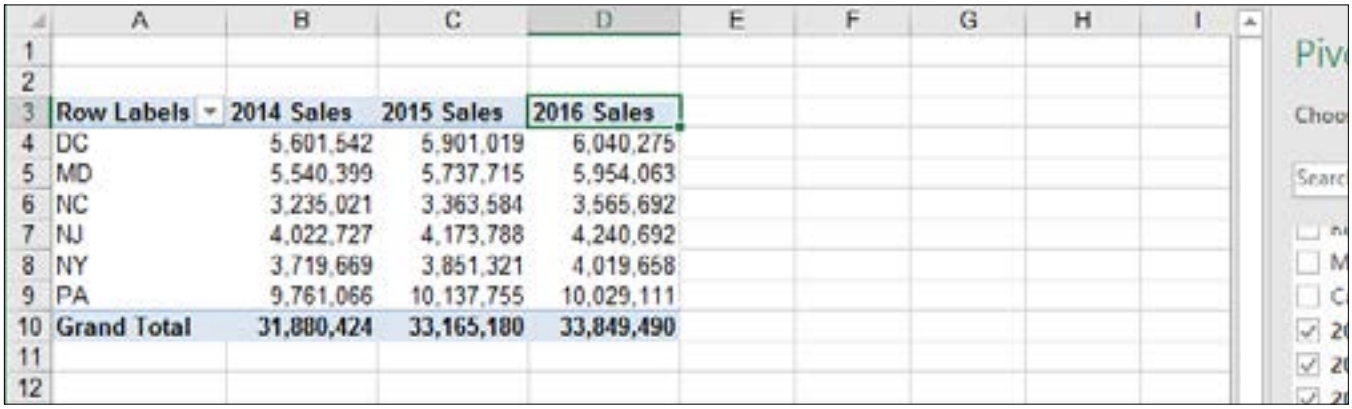


Figure 12.4

12. *In the* **Value Field Settings** *dialog box, choose* **Sum**.
13. *Click on the* **Number Format** *command button and format the field as* **Number**, **zero decimal places**. *Click the* **Use 1000 Separator (,)** *box.*
14. *Click* **OK** *twice to exit the* **Format Cells** *and* **Value Field Settings** *dialog boxes.*

Let's rename the fields to something that looks better than Sum of 2014, etc. When you rename a field within a PivotTable, you can't use the exact name as it appears in the data. In this example, you can name the 2014 column anything except 2014.

15. *Rename the* **Column** *fields* ***2014 Sales***, ***2015 Sales***, *and* ***2016 Sales***.



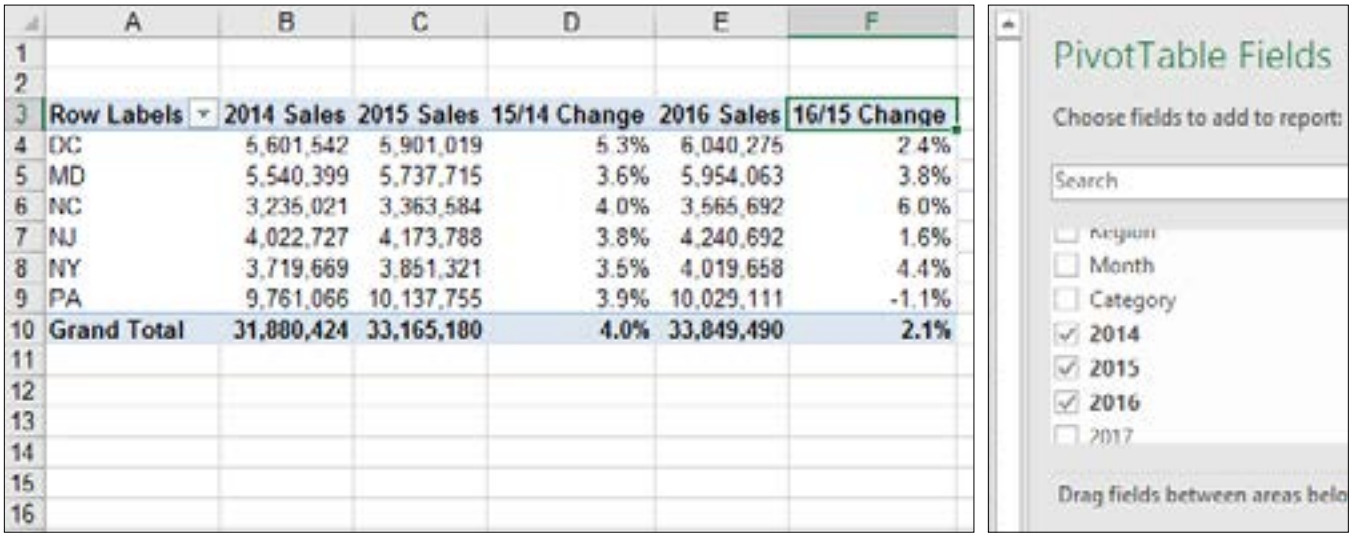
Row Labels	2014 Sales	2015 Sales	2016 Sales
DC	5,601,542	5,901,019	6,040,275
MD	5,540,399	5,737,715	5,954,063
NC	3,235,021	3,363,584	3,565,692
NJ	4,022,727	4,173,788	4,240,692
NY	3,719,669	3,851,321	4,019,658
PA	9,761,066	10,137,755	10,029,111
Grand Total	31,880,424	33,165,180	33,849,490

Figure 12.5

Complex Calculated Fields

Now we'll do a more **complex calculation** and calculate the percentage growth from one year to the next.

1. *In the* **Analyze** *tab, click on* **Fields, Items, & Sets***, and create a new calculated field.*
2. *Name the* **Calculated Field** ***15/14_Chg****.*
3. *Create the formula:* ***=('2015'-'2014')/ABS('2014')***
4. *Click* **OK**.
5. *Format the new field as* **Percentage***,* **one decimal place**.
6. *Rename the new field* ***15/14 Change****.*
7. *Move the new* **15/14 Change** *field to the right of* **2015 Sales** *(click on the* **15/14 Change** *field in the* **Values** *section and move it to between the* **2015 Sales** *and* **2016 Sales** *fields).*
8. *Create a similar calculated field for the* **16/15 Change**.
9. *Resize columns as needed.*



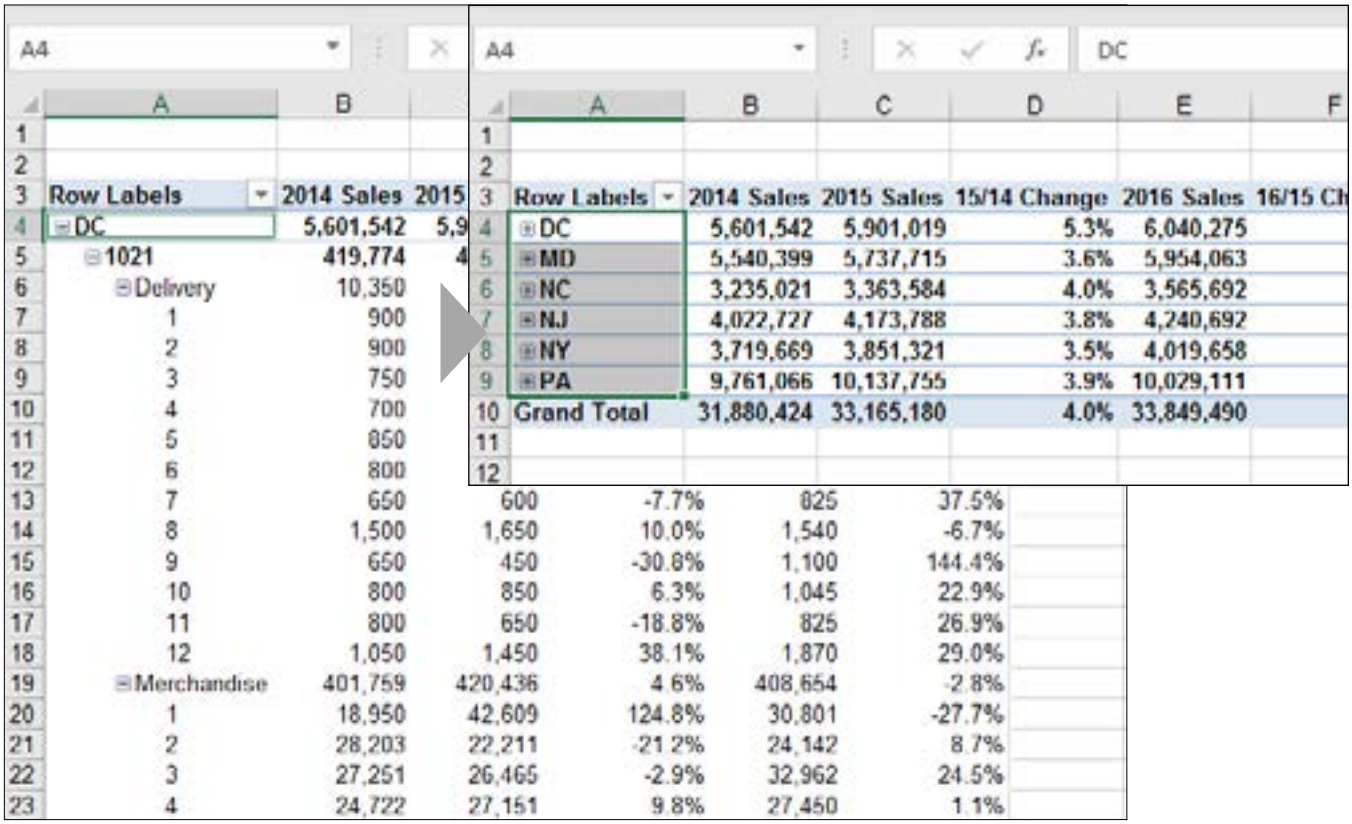
Row Labels	2014 Sales	2015 Sales	15/14 Change	2016 Sales	16/15 Change
DC	5,601,542	5,901,019	5.3%	6,040,275	2.4%
MD	5,540,399	5,737,715	3.6%	5,954,063	3.8%
NC	3,235,021	3,363,584	4.0%	3,565,692	6.0%
NJ	4,022,727	4,173,788	3.8%	4,240,692	1.6%
NY	3,719,669	3,851,321	3.5%	4,019,658	4.4%
PA	9,761,066	10,137,755	3.9%	10,029,111	-1.1%
Grand Total	31,880,424	33,165,180	4.0%	33,849,490	2.1%

Figure 12.6

Drill Down in a PivotTable

Now there's an analysis you can sink your teeth into. Although we see similar changes between states from 2014 to 2015 (ranging from 3.5% to 5.3%), the more current data (2016) shows we may have concerns about at least two states, NJ and PA. The PA data even shows sales are declining when we know there was an overall price increase. We need to look at more detail about these states to see if there is a problem we need to address with local management. But how do you get down to the detail? Before you get on the phone and start screaming at the field management, let's analyze the data a little further. We may need to **drill down** to the Store level and then maybe down to the Category and/or Month level. Let's set it up.

1. *From the* **PivotTable Field List**, *drag the* **Store_No** *field to below the* **State** *field.*
2. *Click on the first* **Row Label** *(it should be* **DC** *in* **Cell A4***), and click on the* **Collapse Field** *button* *in the* **Active Field** *group of the* **Analyze** *tab.*
3. *Drag the* **Category** *field below the* **Store_No** *field.*
4. *Drag the* **Month** *field below the* **Category** *field.*



Row Labels	2014 Sales	2015
DC	5,601,542	5,9
1021	419,774	4
Delivery	10,350	
1	900	
2	900	
3	750	
4	700	
5	650	
6	800	
7	650	600
8	1,500	1,650
9	650	450
10	800	850
11	800	650
12	1,050	1,450
Merchandise	401,759	420,436
1	18,950	42,609
2	28,203	22,211
3	27,251	26,465
4	24,722	27,151

		-7.7%	825	37.5%	
		10.0%	1,540	-6.7%	
		-30.8%	1,100	144.4%	
		6.3%	1,045	22.9%	
		-18.8%	825	26.9%	
		38.1%	1,870	29.0%	
		4.6%	408,654	-2.8%	
		124.8%	30,801	-27.7%	
		-21.2%	24,142	8.7%	
		-2.9%	32,962	24.5%	
		9.8%	27,450	1.1%	

Row Labels	2014 Sales	2015 Sales	15/14 Change	2016 Sales	16/15 Ch
DC	5,601,542	5,901,019	5.3%	6,040,275	
MD	5,540,399	5,737,715	3.6%	5,954,063	
NC	3,235,021	3,363,584	4.0%	3,565,692	
NJ	4,022,727	4,173,788	3.8%	4,240,692	
NY	3,719,669	3,851,321	3.5%	4,019,658	
PA	9,761,066	10,137,755	3.9%	10,029,111	
Grand Total	31,880,424	33,165,180	4.0%	33,849,490	

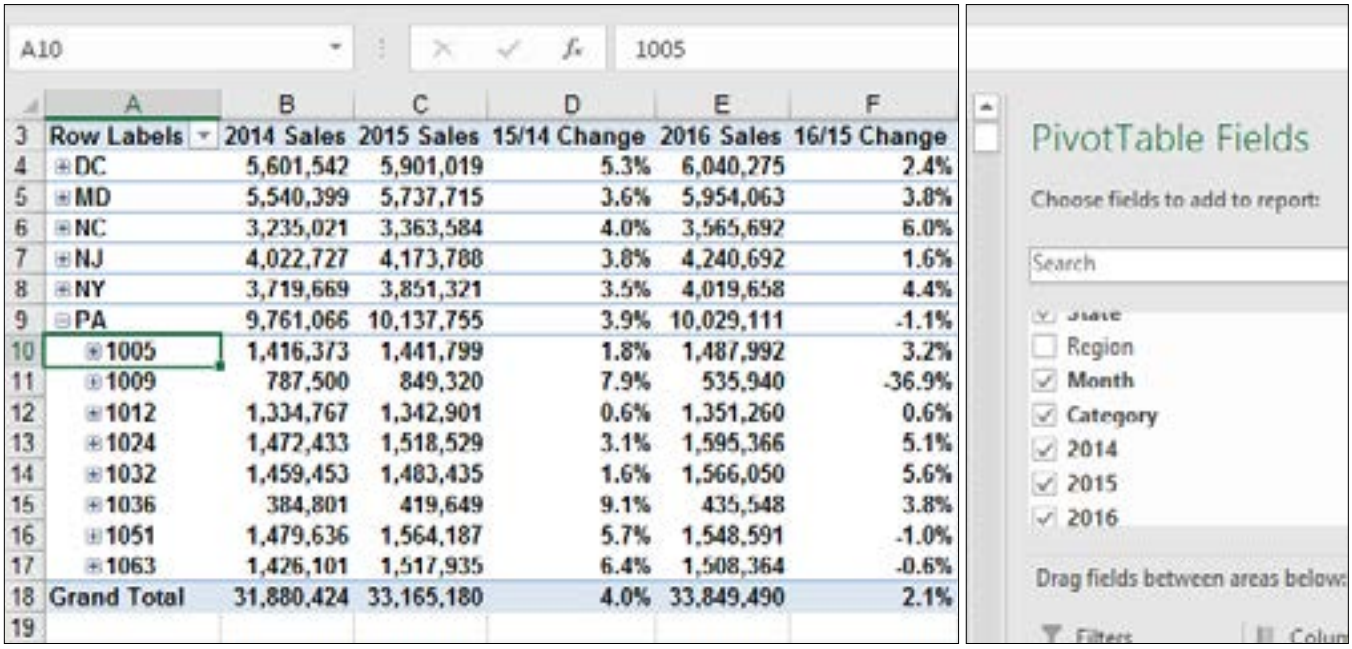
Figure 12.7

Clicking on the Show Detail icon (the + button) in the Row Labels column displays all of the data below it, and the Show Detail (+) button turns to the Hide Detail (-) button. Since we want to see what's going on in PA, let's drill down on that state first.

5. *Click on the* **Show Detail** *(+) button next to* **PA**.

All of the data below PA displays. To collapse the data at the Store No level, click on any Store No and click on the Collapse button in the Active Field group.

6. *Click on* **Store No 1005**, *and click on the* **Collapse Field** *button in the* **Active Field** *group of the* **Analyze** *tab.*

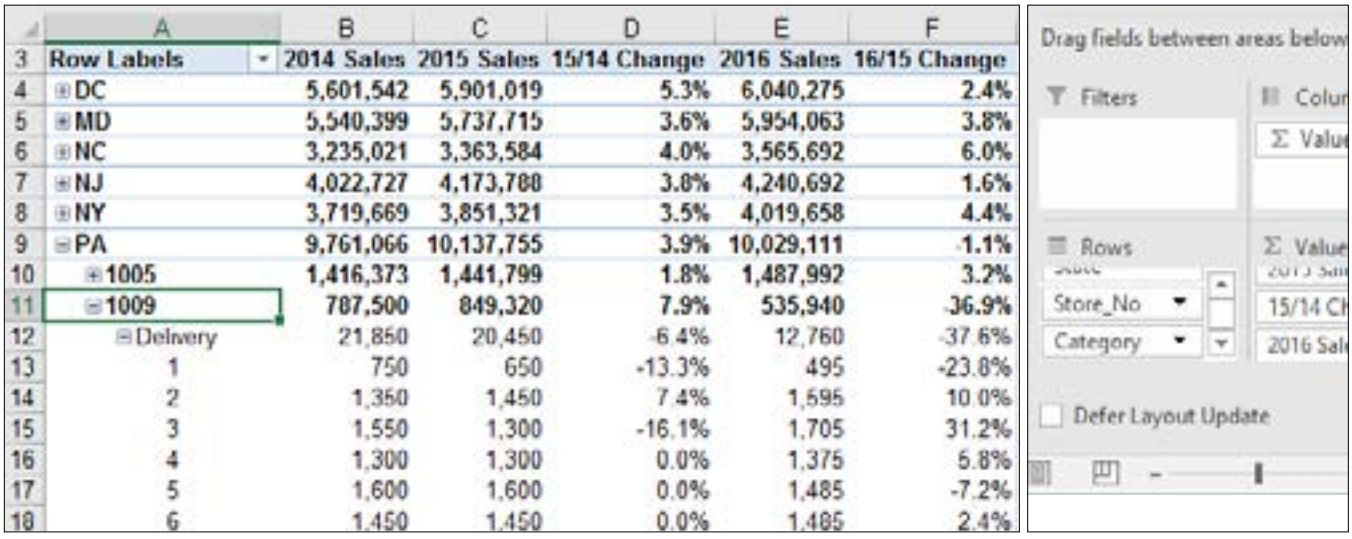


	A	B	C	D	E	F
3	Row Labels	2014 Sales	2015 Sales	15/14 Change	2016 Sales	16/15 Change
4	⊞DC	5,601,542	5,901,019	5.3%	6,040,275	2.4%
5	⊞MD	5,540,399	5,737,715	3.6%	5,954,063	3.8%
6	⊞NC	3,235,021	3,363,584	4.0%	3,565,692	6.0%
7	⊞NJ	4,022,727	4,173,788	3.8%	4,240,692	1.6%
8	⊞NY	3,719,669	3,851,321	3.5%	4,019,658	4.4%
9	⊟PA	9,761,066	10,137,755	3.9%	10,029,111	-1.1%
10	⊞1005	1,416,373	1,441,799	1.8%	1,487,992	3.2%
11	⊞1009	787,500	849,320	7.9%	535,940	-36.9%
12	⊞1012	1,334,767	1,342,901	0.6%	1,351,260	0.6%
13	⊞1024	1,472,433	1,518,529	3.1%	1,595,366	5.1%
14	⊞1032	1,459,453	1,483,435	1.6%	1,566,050	5.6%
15	⊞1036	384,801	419,649	9.1%	435,548	3.8%
16	⊞1051	1,479,636	1,564,187	5.7%	1,548,591	-1.0%
17	⊞1063	1,426,101	1,517,935	6.4%	1,508,364	-0.6%
18	Grand Total	31,880,424	33,165,180	4.0%	33,849,490	2.1%
19						

Figure 12.8

You now see that Store No 1009 has a 36.9% decrease in sales in 2016 from the 2015 levels. Why is that? Let's drill down on that store.

7. *Click the + sign (or double-click on the* **Store** *number) on* **Store 1009** *to expand it.*



	A	B	C	D	E	F
3	Row Labels	2014 Sales	2015 Sales	15/14 Change	2016 Sales	16/15 Change
4	⊞DC	5,601,542	5,901,019	5.3%	6,040,275	2.4%
5	⊞MD	5,540,399	5,737,715	3.6%	5,954,063	3.8%
6	⊞NC	3,235,021	3,363,584	4.0%	3,565,692	6.0%
7	⊞NJ	4,022,727	4,173,788	3.8%	4,240,692	1.6%
8	⊞NY	3,719,669	3,851,321	3.5%	4,019,658	4.4%
9	⊟PA	9,761,066	10,137,755	3.9%	10,029,111	-1.1%
10	⊞1005	1,416,373	1,441,799	1.8%	1,487,992	3.2%
11	⊟1009	787,500	849,320	7.9%	535,940	-36.9%
12	⊟Delivery	21,850	20,450	-6.4%	12,760	-37.6%
13	1	750	650	-13.3%	495	-23.8%
14	2	1,350	1,450	7.4%	1,595	10.0%
15	3	1,550	1,300	-16.1%	1,705	31.2%
16	4	1,300	1,300	0.0%	1,375	5.8%
17	5	1,600	1,600	0.0%	1,485	-7.2%
18	6	1,450	1,450	0.0%	1,485	2.4%

Figure 12.9

Now we're getting somewhere. For the months of September through December, there is no data in any of the Delivery, Merchandise, or Warranty categories. Remember? Store No. 1009 was closed in September 2016, so it won't have any sales thereafter. It looks kind of strange to have cells in the PivotTable with null or no values – it should at least have a zero. Remember that a zero is a number, but this data has no values for this store from September through December, and is thus returning nothing. There is a table option where you can make null values become zeros, just to make the report look better.

8. *Right-click anywhere in the* **PivotTable** *and choose* **PivotTable Options…**
9. *In the* **Layout & Format** *tab of the* **PivotTable Options** *dialog box, make sure the* **For empty cell, show:** *checkbox is checked, and type* ***0*** *in the text box.*
10. *Click* **OK**.

Those cells that were null are now populated with 0s, but remember that Store 1009 was closed in September 2016, and as such we should probably exclude that store from our analysis to get a true year-over-year picture. Since the Store No. field is a couple of levels down in the PivotTable, we'll have to find it first then filter out Store No 1009.

11. *Click on the* **Row Labels** *drop-down menu, and then under the* **Select Field** *drop-down menu, choose* **Store_No**.
12. *Uncheck* **Store No 1009** *and click* **OK**.

The PivotTable now collapses to show only the Store numbers, and Store No 1009 is not there. PA now shows a 2.2% increase over the prior year, which is much more reasonable than the -1.1% figure. It looks like the state of NJ also has some issues. Let's look into that.

13. *Collapse* **PA** *and expand* **NJ**.

In reviewing the data, we see that Store No. 1002 has a -1.0% change from 2016 as compared with 2015. Typically, we shouldn't see any stores with negative sales growth from one year to the next, so let's drill down on that store to see what happened there. Remember in analyses like this, you can sort by value fields and have the best or worst numbers on top or bottom.

14. *Drill into* **Store No 1002**.

6	⊞NC	3,235,021	3,363,584	4.0%	3,565,692	6.0%
7	⊟NJ	4,022,727	4,173,788	3.8%	4,240,692	1.6%
8	⊟1002	1,018,112	1,084,234	6.5%	1,072,907	-1.0%
9	⊟Delivery	26,550	26,750	0.8%	29,755	11.2%
10	1	1,000	850	-15.0%	990	16.5%
11	2	1,400	1,450	3.6%	1,705	17.6%
12	3	2,600	2,250	-13.5%	3,410	51.6%
13	4	2,100	2,000	-4.8%	2,365	18.3%
14	5	2,300	2,550	10.9%	2,475	-2.9%
15	6	2,450	2,250	-8.2%	2,090	-7.1%
16	7	1,650	1,550	-6.1%	1,485	-4.2%
17	8	3,000	3,250	8.3%	3,190	-1.8%

Figure 12.10

As you can see, there were several months at Store No. 1002 that had Merchandise and other sales that were lower than the 2015 levels. Now is the time to get on the phone with the store manager to see what's going on. You can continue to drill down to various levels – any level of data available in your database.

PivotTable Styles

At this point, you should get the picture on PivotTables. You should now be able to set up data in a PivotTable and be able to drill down to find any level of detail available. Calculated fields make it very easy to analyze your data to facilitate drill down analyses. However, the report looks, kind of, bland. Let's work through some examples on making the PivotTable report look a little better.

1. *Hide the detail in the* **PivotTable** *by double-clicking* **NJ**.
2. *Click on the* **Design** *tab under* **PivotTable Tools**.
3. *In the* **PivotTable Styles** *group, click on the* **More** *down arrow.*

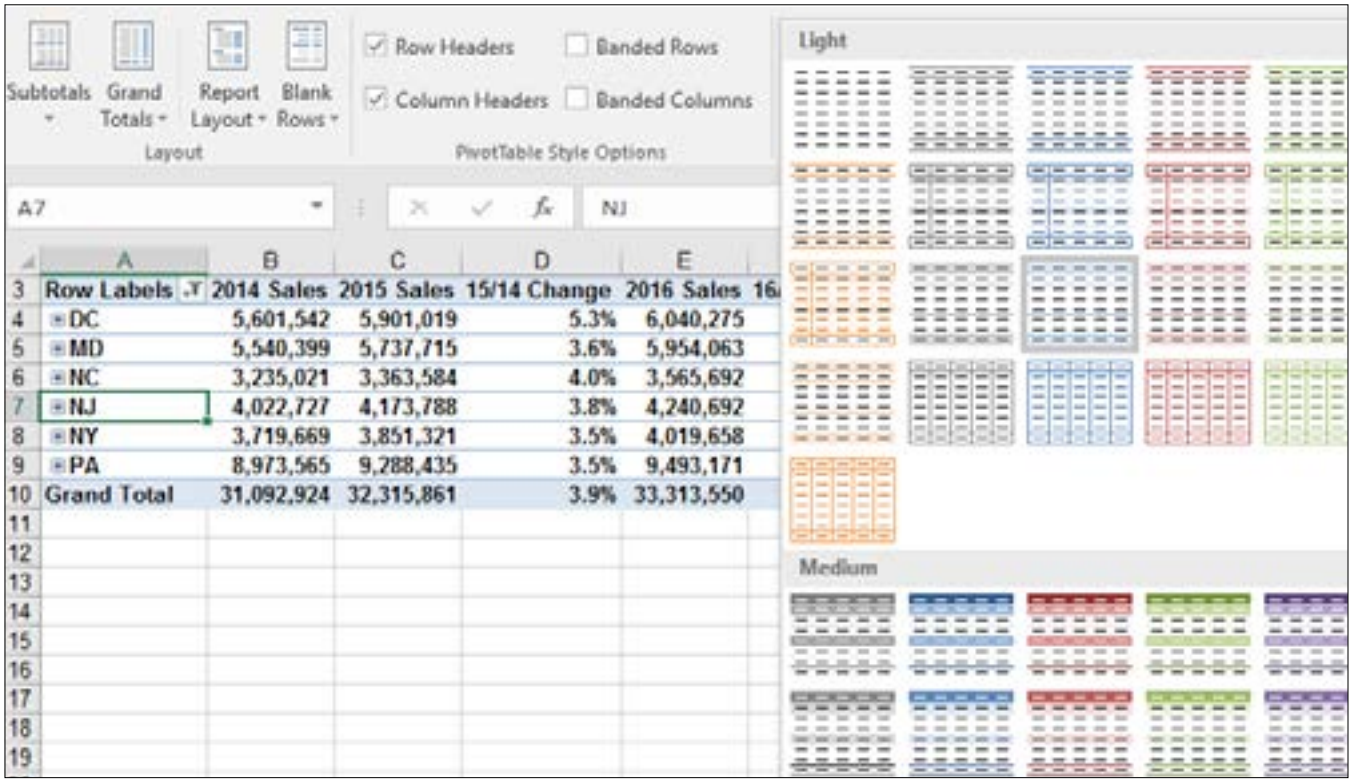


Figure 12.11

A menu appears that shows all of the pre-formatted PivotTable styles. In addition to the styles provided, you can create your own style by clicking on the New PivotTable Style… button. Since there are so many professionally designed styles available here, I like to use them.

4. *Move your cursor over any of the* **PivotTable Style** *options, but don't click on any yet.*

When you move your cursor over a style, you can see the style being applied to the PivotTable in the

background. I really like this feature in Excel 2016 as it allows you to see what the PivotTable Report will look like without actually clicking on the style. You can move your cursor relatively quickly through all the different styles and see in the background which one you like the best.

5. *Click on* **Pivot Style Medium 19**.

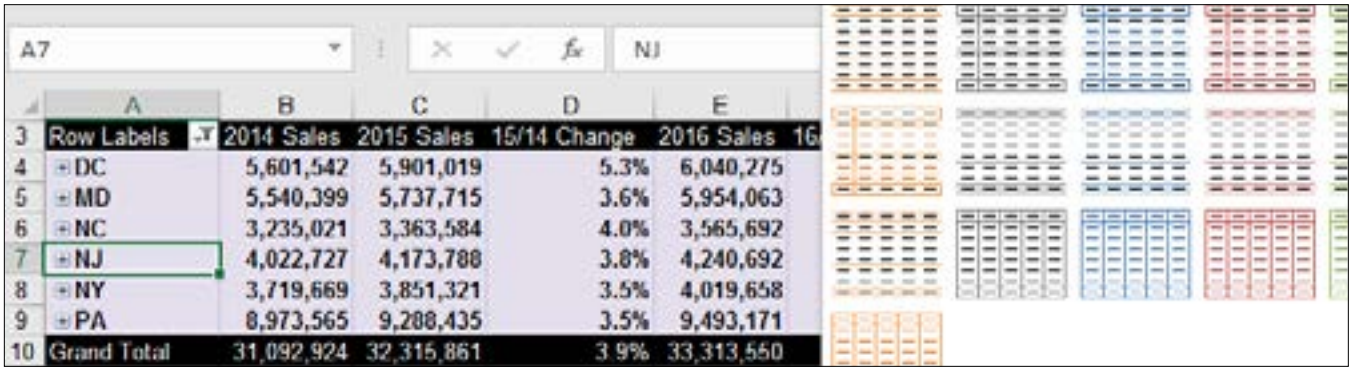


Figure 12.12

6. *Rename the tab containing the* **PivotTable** *as* ***Pivot***.

Search Filters in PivotTables

The last topic I want to cover in this section is Search Filters. In Chapter Four, I showed you a feature in Excel 2016 called Search Filters. These are filters that you can use to limit the items that appear in the filter list. In PivotTables, not only can you use this feature, but you can also toggle between different row or column fields within one filter. Let's do an example of that.

7. *Click on the* **Row Labels** *filter arrow.*

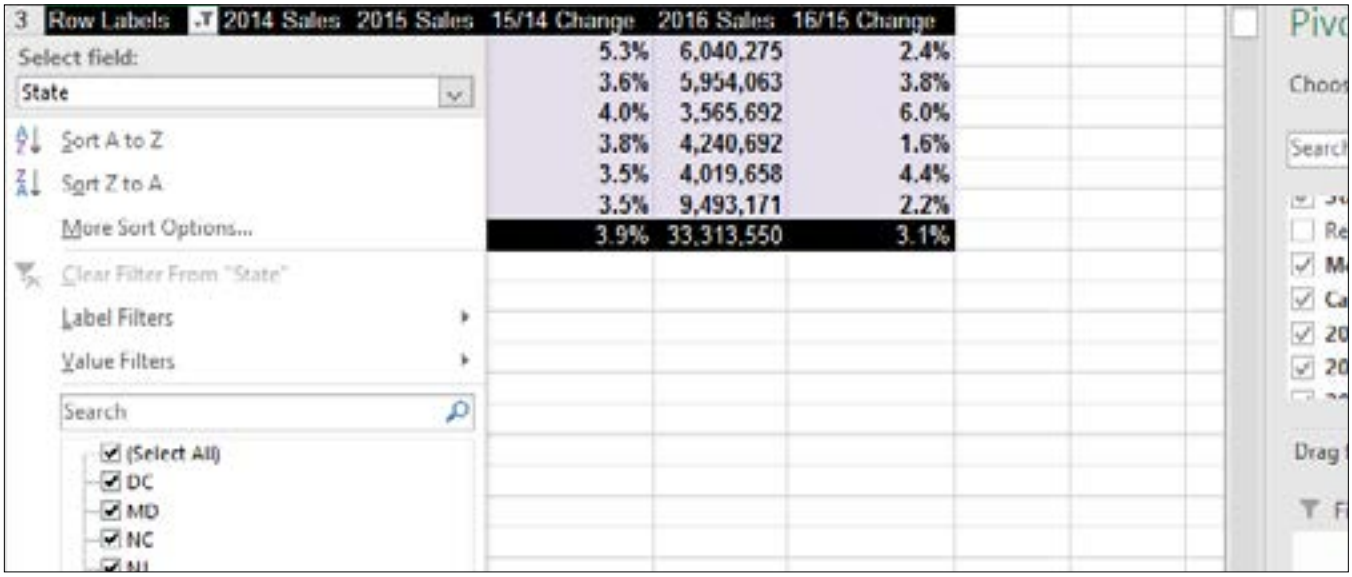


Figure 12.13

The Search box here works just like the one we did in Chapter Four, but the one difference here is that you can use any field that is set up as a Row Label.

8. *Click on the drop-down arrow under* **Select Field:** *(It should have* **State** *currently displayed).*
9. *Click on* **Store_No**.

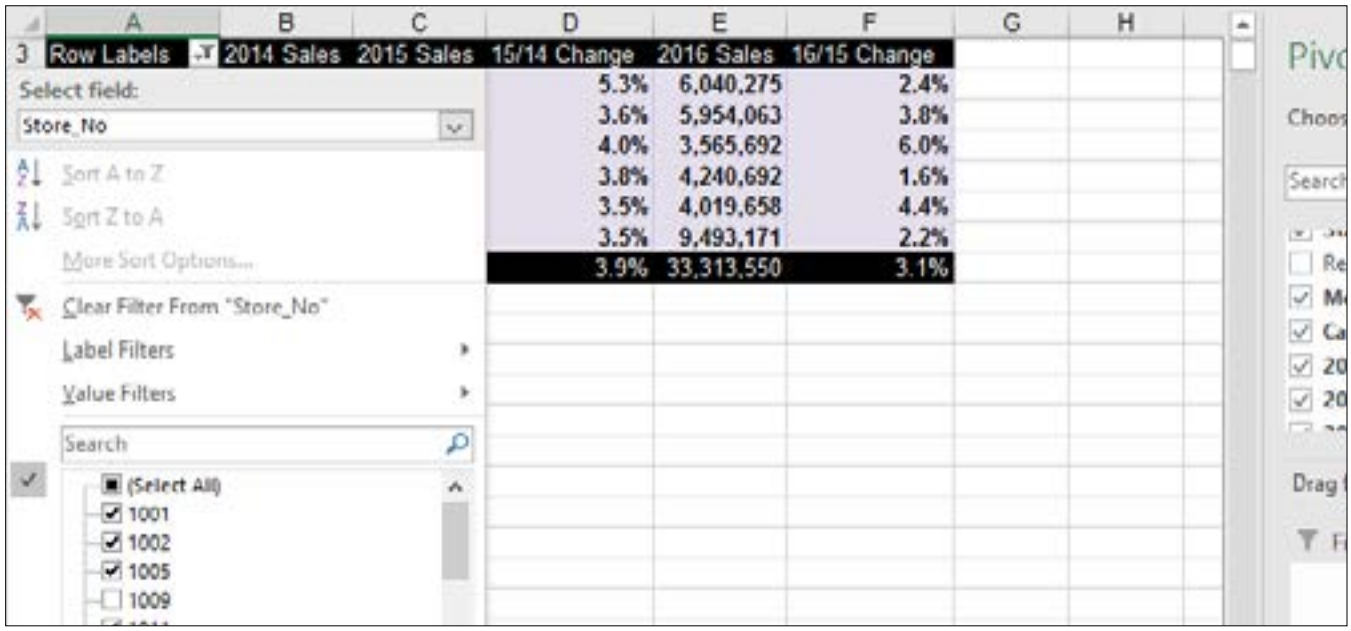


Figure 12.14

It now shows the filter items for Store_No. Notice that Store_No 1009 is unchecked, as we did previously. If you type "09" in the Search box, it will filter the list to include Store_No 1009. The trick here is that the Select Field: items must already be set up as a Row Label in the PivotTable Field list.

10. *Click* **Cancel**, *then* **Save** *and* **close** *the* **mySales_Summary.xlsx** *file.*

> ***Review Questions****: It is now time to complete the hands-on Review Questions. Log on to www.ExcelCEO.com with your Email address and Password, click on the* **Excel 2016 Review Questions, Chapter 12, Section 1 of 2** *option in your Main Menu, and complete the Review Questions.*

External Data Sources

Let's pause our PivotTable discussion for a while and talk about data sources. Up to now, all of the data that you have used has been contained in spreadsheets. In reality, data can come from various sources. One time, a prestigious East Coast consulting firm I was working with had an Excel model that was designed very well. However, one of the things about it that bugged me was that the user had to copy data from an Access database and paste it into the Excel file and then run a PivotTable based on that data. I showed them how to create a connection directly to that Access database (or any other database for that matter). It was kind of fun consulting the consultants!

Now we'll do a simple example of bringing data into an Excel file from an ***External Data Source*** using two different methods, including a new-for-Excel 2016 Query method. It's actually very easy to do, IF you know the right buttons to push. In the Chapter12 folder, you will find an Access database called Data.accdb. ***Access*** is a very good desktop relational database program that Microsoft created. I strongly encourage you to continue to the next course in the ExcelCEO training series, *Access 2016 and SQL*, so you can learn about Access and the capability to create powerful queries, reports, and forms based on databases for analysis that would further enhance what you are about to learn. For now, we will simply open the Access database and view the data in the table. The following screenshots are from Access 2016.

> ***Note**: Depending on the version of Microsoft Office you have installed on your computer, you may not have* **Microsoft Access** *available. If this fits your situation,* **do not panic!** *You can still follow along with the majority of the following exercise hands-on and understand the concepts at very least. The ability to work with external databases is a powerful skill, so if you can find a way to use Access for this project, I would encourage you to try. Otherwise, you can skip to* **Step 14**, *if you don't have Microsoft Access available to you.*

1. **Open** *a* **Blank workbook** *in* **Excel**.
2. **Save As C:\ExcelCEO\Excel 2016\Chapter12*myAccess.xlsx***.
3. **Open Microsoft Access**.

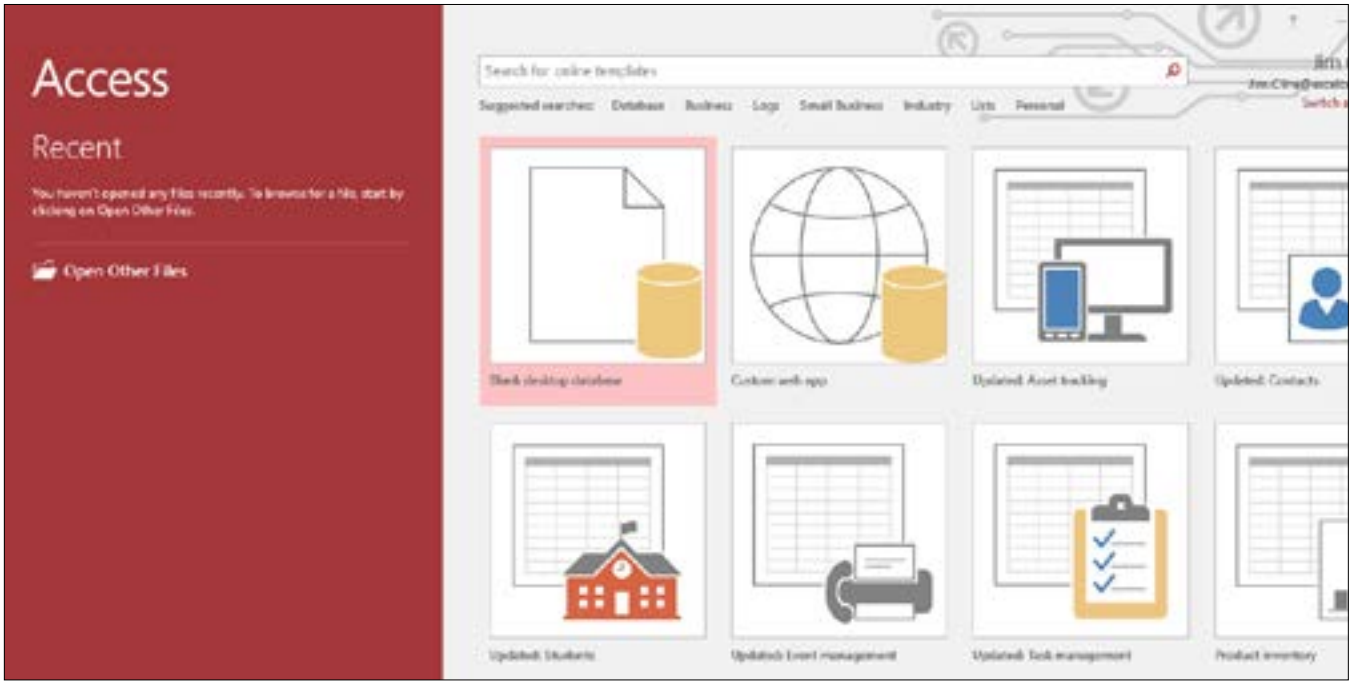


Figure 12.15

4. *In* **Access**, *click the* **Open Other Files** *icon on the left side of the screen, and navigate to* **C:\ExcelCEO\Excel 2016\Chapter12\Data.accdb**, *and* **Open** *it.*

A Microsoft Access 2016 database is stored as a .accdb file.

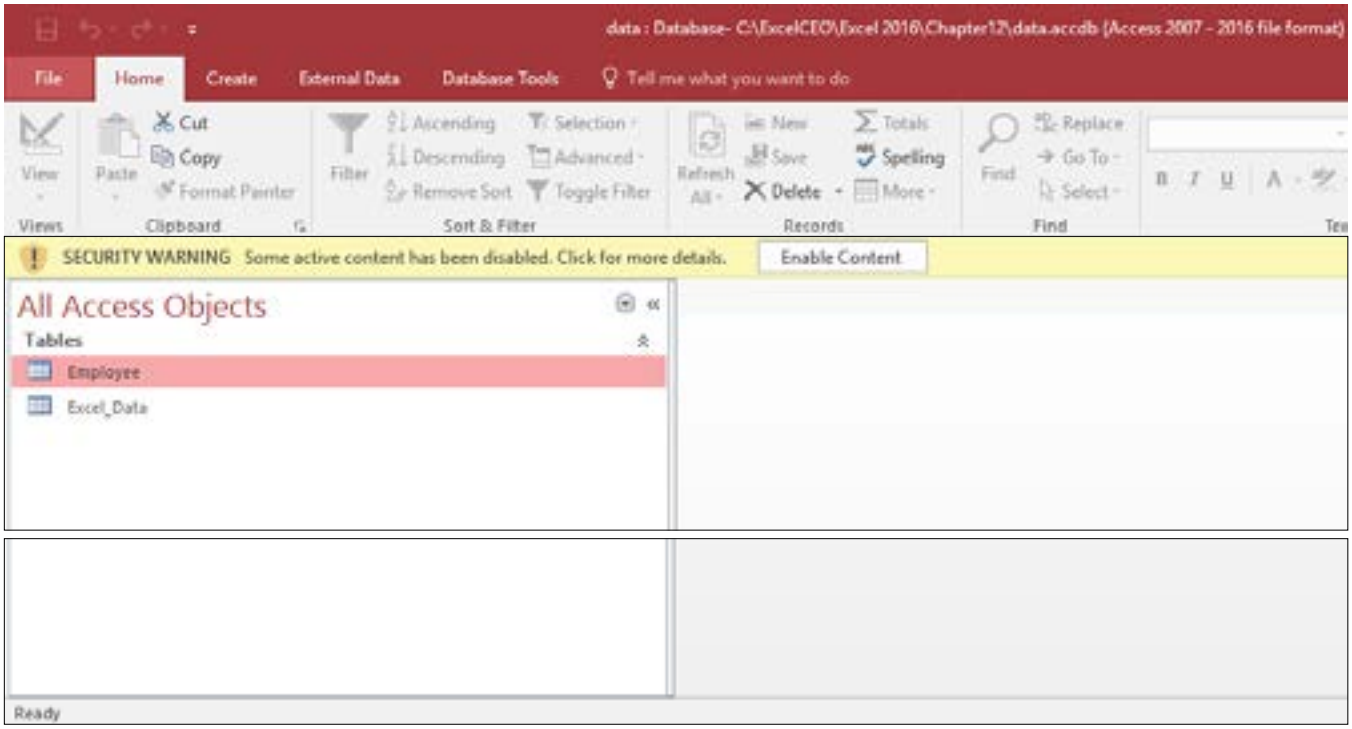


Figure 12.16

5. *If the* **Security Warning** *line appears, click on the* **Enable Content**.
6. *Double-click on the* **Employee** *table to open it.*

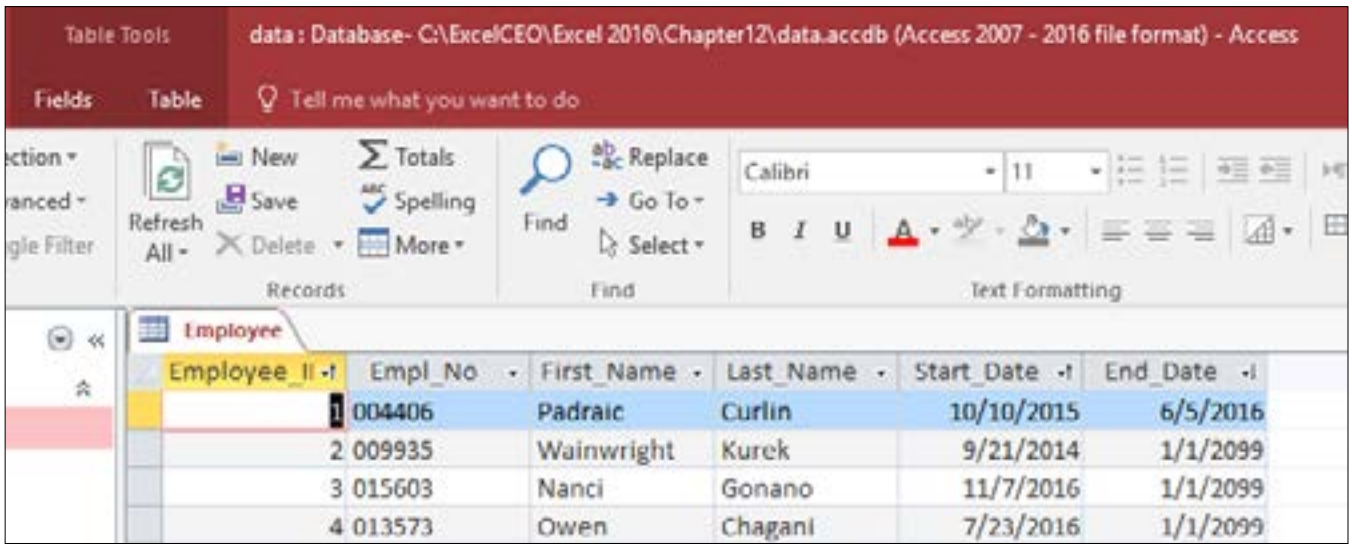
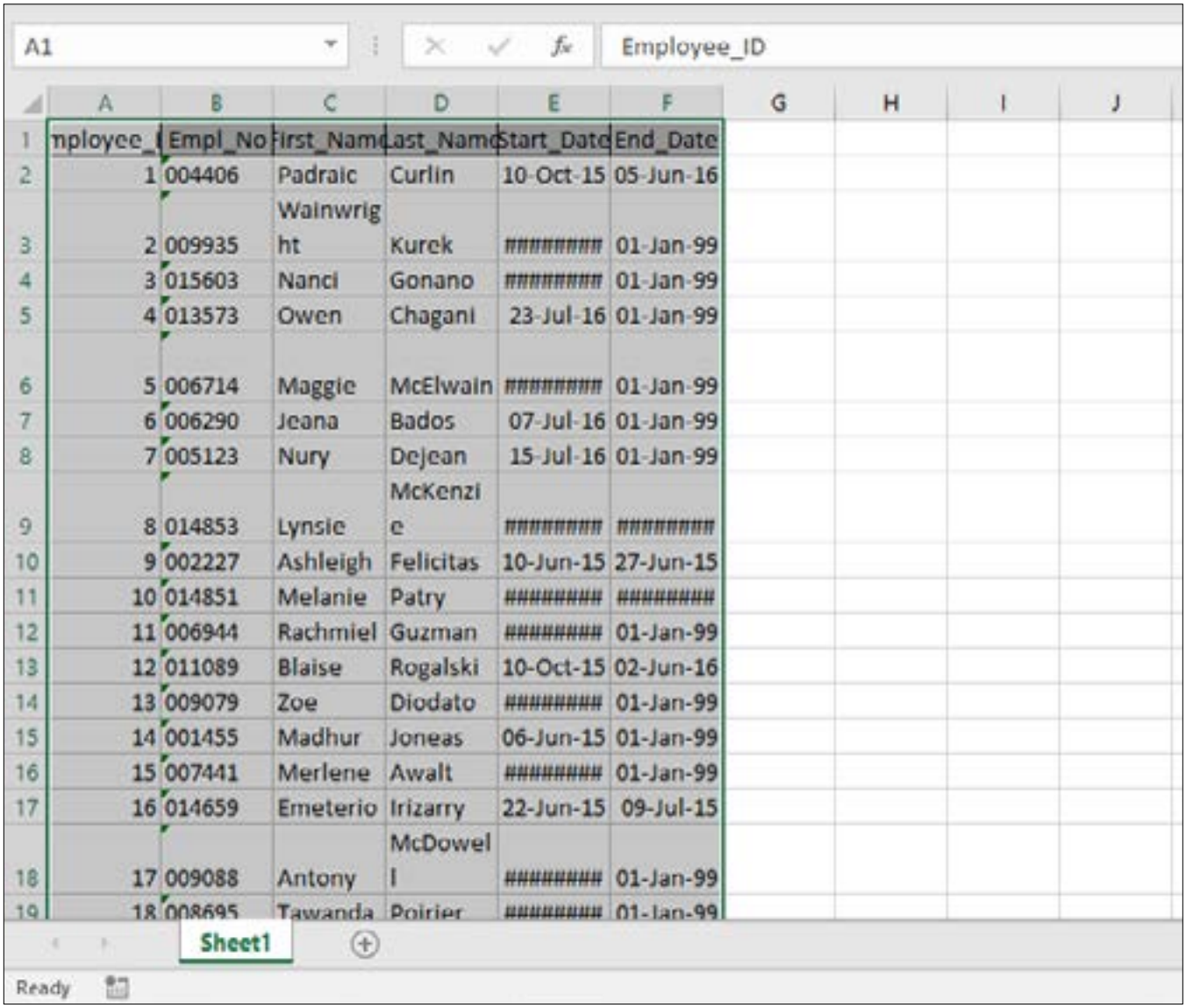


Figure 12.17

This table lists all of the current and terminated employees of Nitey-Nite. An employee who is currently employed with Nitey-Nite has an End_Date of 1/1/2099. For now, we want to import the data from this table into an Excel spreadsheet. The easiest way to copy records from an Access table or query into an Excel file is to select all of the records in the table, then copy and paste them into Excel. Let's try that.

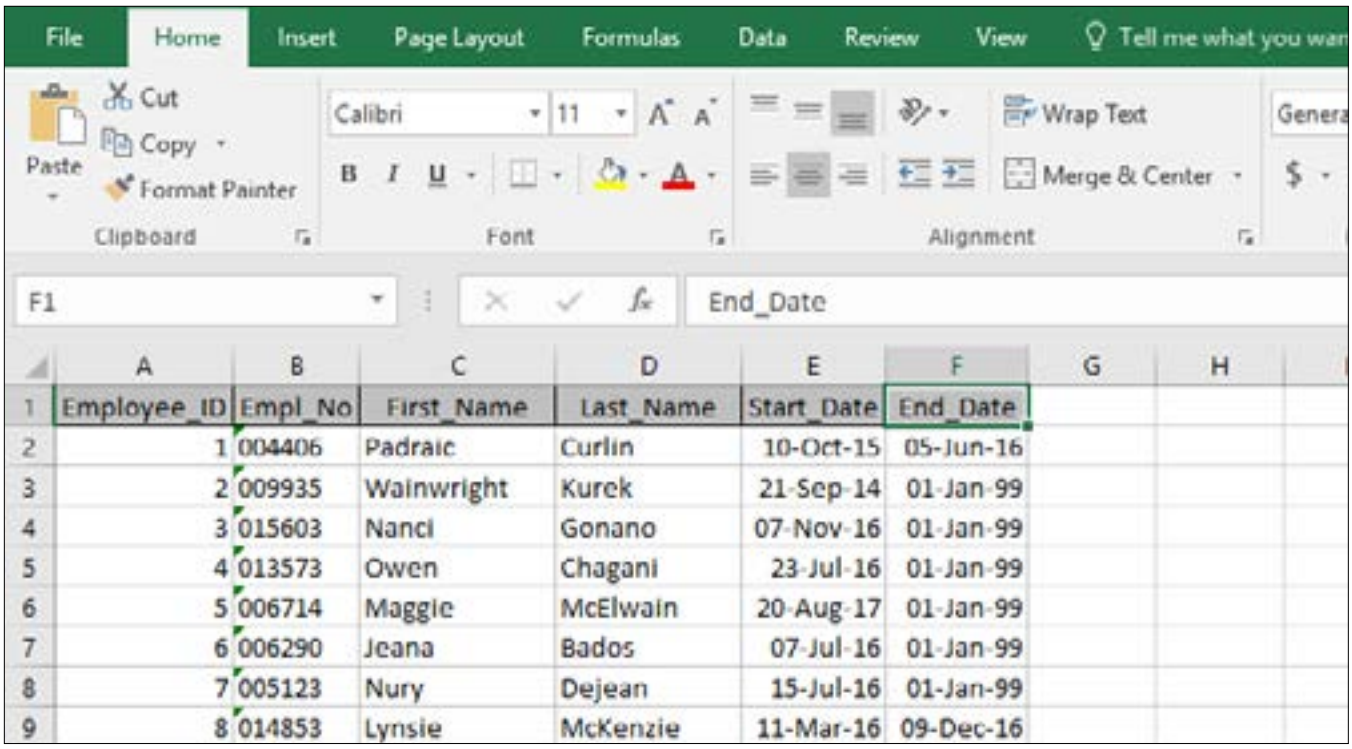
7. *Select all records in the* **Employee** *table by clicking in the gray box with the white triangle to the left of the* **Employee_ID** *field.*
8. *Type* **[Ctrl]+*c*** *to copy the data into memory.*
9. *Toggle over to the* **Excel Blank workbook** *(click on the* **Excel 2016** *icon at the bottom of your screen).*
10. *Click on* **Cell A1** *of* **Sheet1** *and type* **[Ctrl]+*v***.



	A	B	C	D	E	F	G	H	I	J
1	nployee_I	Empl_No	First_Nam	Last_Nam	Start_Date	End_Date				
2	1	004406	Padraic	Curlin	10-Oct-15	05-Jun-16				
3	2	009935	Wainwrig ht	Kurek	#########	01-Jan-99				
4	3	015603	Nanci	Gonano	#########	01-Jan-99				
5	4	013573	Owen	Chagani	23-Jul-16	01-Jan-99				
6	5	006714	Maggie	McElwain	#########	01-Jan-99				
7	6	006290	Jeana	Bados	07-Jul-16	01-Jan-99				
8	7	005123	Nury	Dejean	15-Jul-16	01-Jan-99				
9	8	014853	Lynsie	McKenzi e	#########	#########				
10	9	002227	Ashleigh	Felicitas	10-Jun-15	27-Jun-15				
11	10	014851	Melanie	Patry	#########	#########				
12	11	006944	Rachmiel	Guzman	#########	01-Jan-99				
13	12	011089	Blaise	Rogalski	10-Oct-15	02-Jun-16				
14	13	009079	Zoe	Diodato	#########	01-Jan-99				
15	14	001455	Madhur	Joneas	06-Jun-15	01-Jan-99				
16	15	007441	Merlene	Awalt	#########	01-Jan-99				
17	16	014659	Emeterio	Irizarry	22-Jun-15	09-Jul-15				
18	17	009088	Antony	McDowel l	#########	01-Jan-99				
19	18	008695	Tawanda	Poirier	#########	01-Jan-99				

Figure 12.18

11. *Click on the* **Wrap Text** *icon in the* **Alignment** *group of the* **Home** *tab twice.*
12. *Resize all columns to fit.*



	A	B	C	D	E	F	G	H
1	Employee_ID	Empl_No	First_Name	Last_Name	Start_Date	End_Date		
2	1	004406	Padraic	Curlin	10-Oct-15	05-Jun-16		
3	2	009935	Wainwright	Kurek	21-Sep-14	01-Jan-99		
4	3	015603	Nanci	Gonano	07-Nov-16	01-Jan-99		
5	4	013573	Owen	Chagani	23-Jul-16	01-Jan-99		
6	5	006714	Maggie	McElwain	20-Aug-17	01-Jan-99		
7	6	006290	Jeana	Bados	07-Jul-16	01-Jan-99		
8	7	005123	Nury	Dejean	15-Jul-16	01-Jan-99		
9	8	014853	Lynsie	McKenzie	11-Mar-16	09-Dec-16		

Figure 12.19

Now you have a table in Excel that contains all of the Employees at Nitey-Nite. You can manipulate this table in any way you want. However, what happens when an employee leaves or a new employee is hired? The table in Access will change (assuming that table is the primary database for employee data), but then you have to copy it over to your Excel file in again and repeat the process every time the data changes, which may be every day or even multiple times during the day. You can write a macro to do the formatting in Excel, but it would be nice if you could create a direct link to that data. You can do that by using an **External Data Source** link.

In this next exercise, you will create a link to a Microsoft Access database. In the Access course, you will learn much more about external data sources and will create a Data Source Name (DSN) tied to a SQL Server database. But in the Excel course, we'll stick to a simple example linking to an Access database.

One important concept when linking to an Access database in Excel is that you should not have the Access file you're linking to open at the same time with the Excel file that contains the link. You should have only the Excel OR Access file open at one time when linked databases are involved.

13. **Close** *the* **Data.accdb** *database, and* **Access**. *(Choose* **No**, *if a warning messages asks if you want to keep the copied data in memory.)*
14. *Click on the* **Data** *tab in* **Excel**, *then click on the* **New Query**  *button in the* **Get & Transform** *group. (If using Excel 365, your version may display the icon as* **Get Data**).
15. *Select* **From Database** *then click* **From Microsoft Access Database**.
16. *Navigate to the* **C:\ExcelCEO\Excel 2016\Chapter12** *folder and choose* **Data.accdb**, *and click* **Import**.

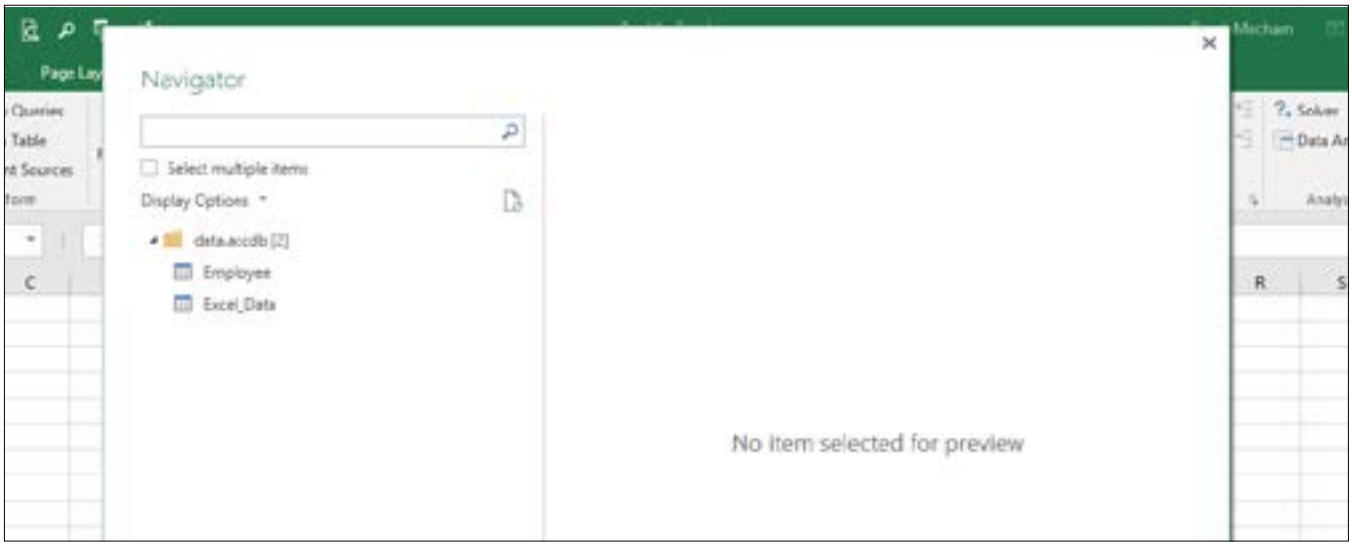


Figure 12.20

You want to link to the Employee table.

5. *Make sure the* **Employee** *table is selected, click the* **Load** *drop-down, and click* **Load To...**

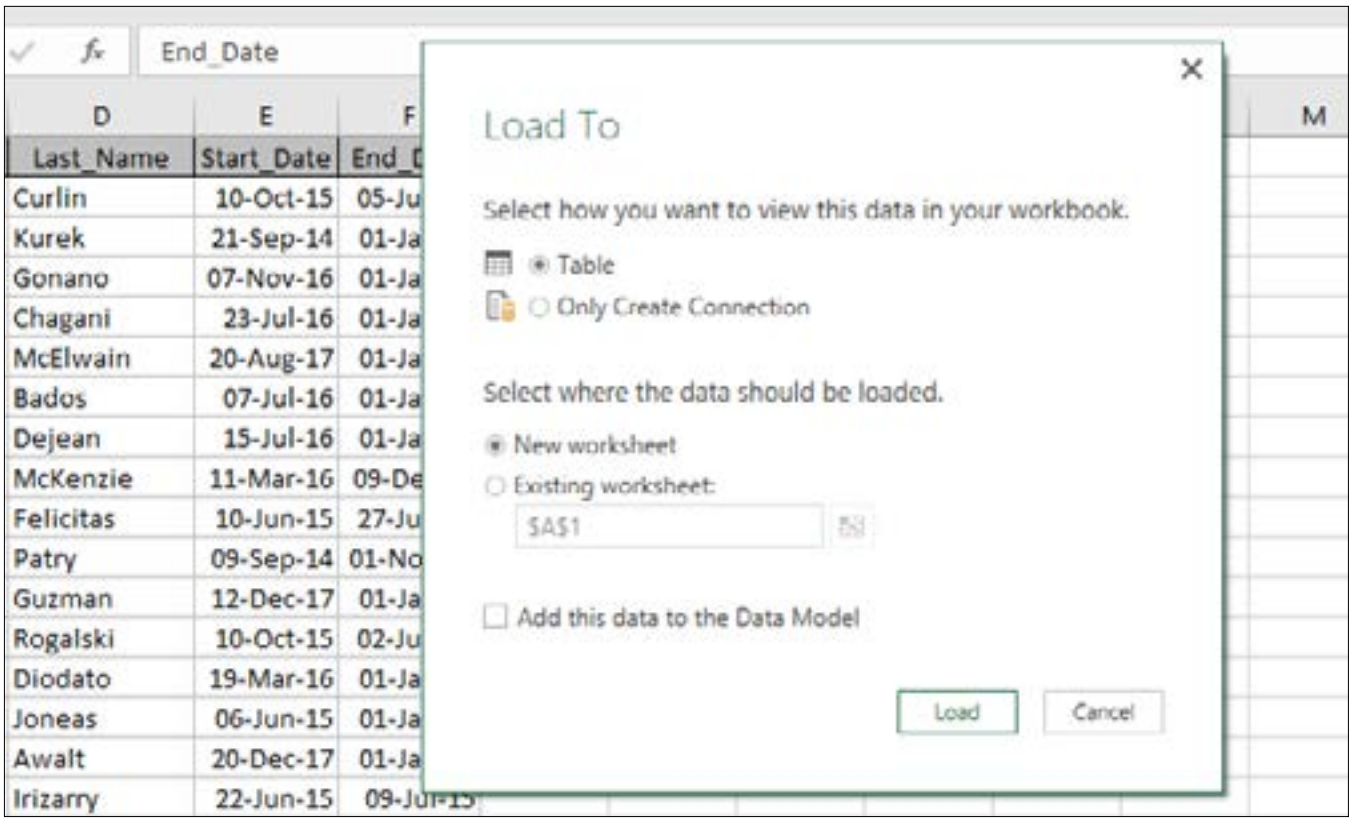


Figure 12.21

The Table radio should be selected in the Load To dialog box.

6. *Make sure the* **Select how you want to view this data in your workbook** *radio button is set to* **Table** *and* **Select where the data should be loaded** *radio button is set to* **New worksheet** *in* **Cell $A$1** *and click* **Load**.

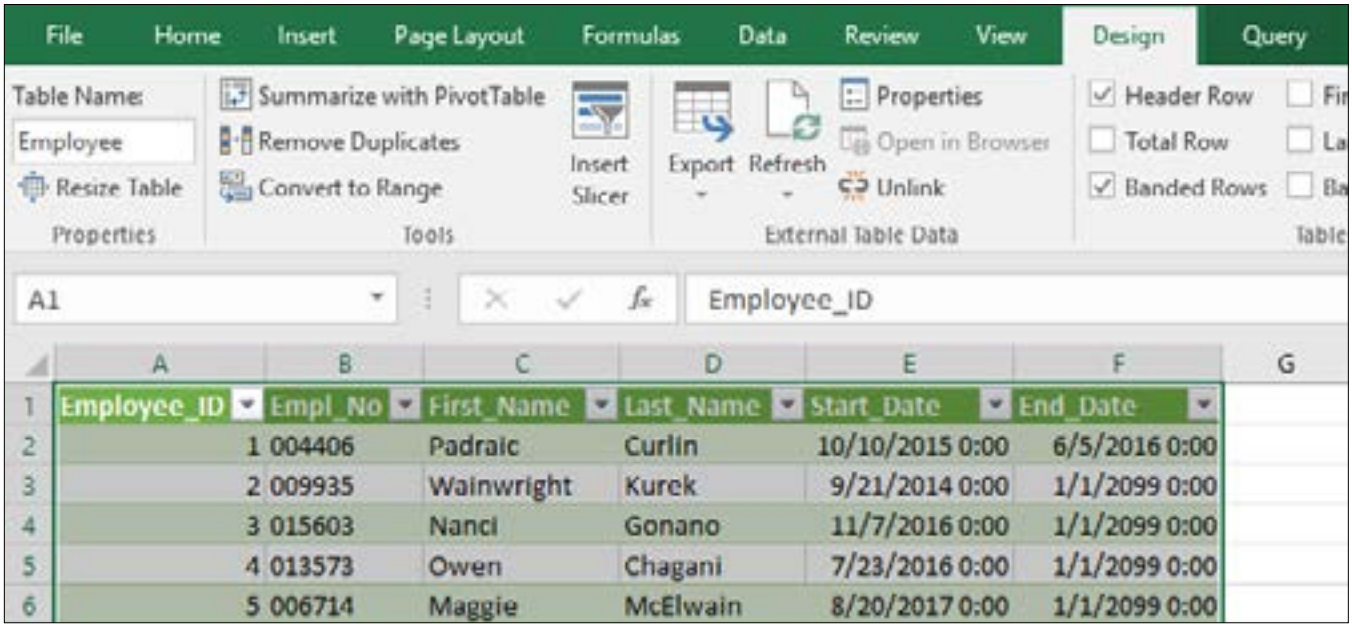


Figure 12.22

7. **Save** *the* **myAccess.xlsx** *file.*

Excel imports the data into Sheet2 beginning at Cell A1. If we already had a Sheet2, we could have clicked Existing worksheet. Let's try opening the Access database with this link established to see what happens.

> ***Note:*** *If you do not have a copy of* **Microsoft Access**, *you can skip* **Steps 8-10 and 12-19**.

8. **Open Microsoft Access**.
9. *In* **Access**, **Open** *the file at* **C:\ExcelCEO\Excel 2016\Chapter12\Data.accdb**.

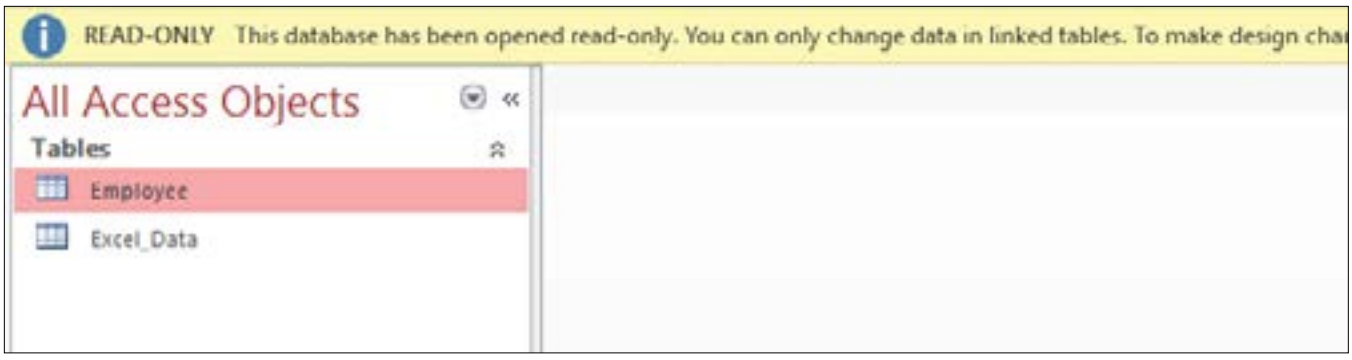
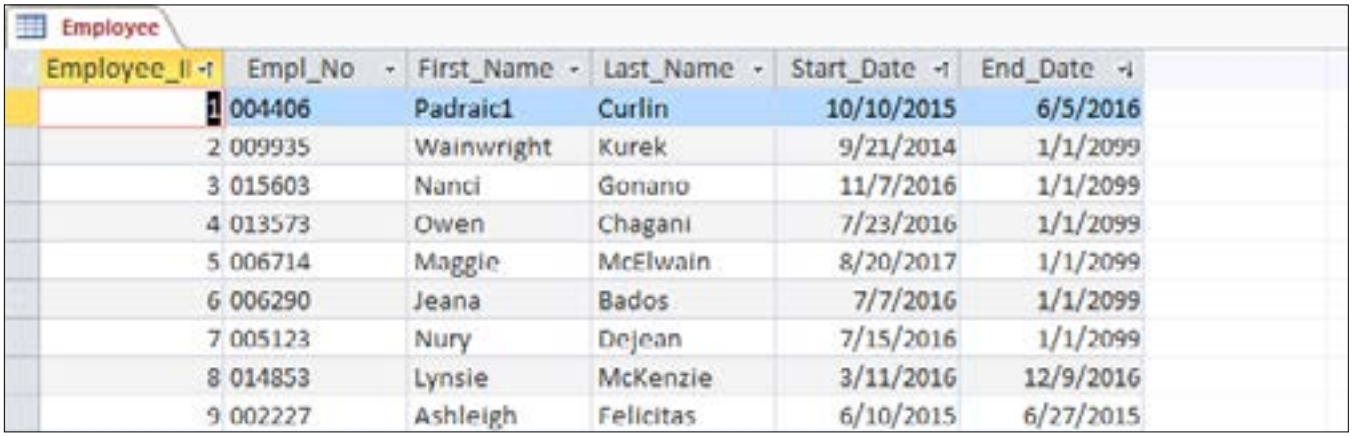


Figure 12.23

A security warning appears telling you that the database has been opened in read-only mode. This is because the Excel file that is linked to the Access database is open. As such, you can't make any changes to the Access database. Let's make a change in the Access database, but first we have to close it.

10. **Close** *the* **Data.accdb** *database.*
11. **Save** *and* **close** *the* **myAccess.xlsx** *file.*
12. **Open** *the* **Data.accdb** *database.*
13. **Open** *the* **Employee** *table.*
14. *On the first record on the* **Employee_ID** *table, change the* **First_Name** *to* ***Padraic1****.*

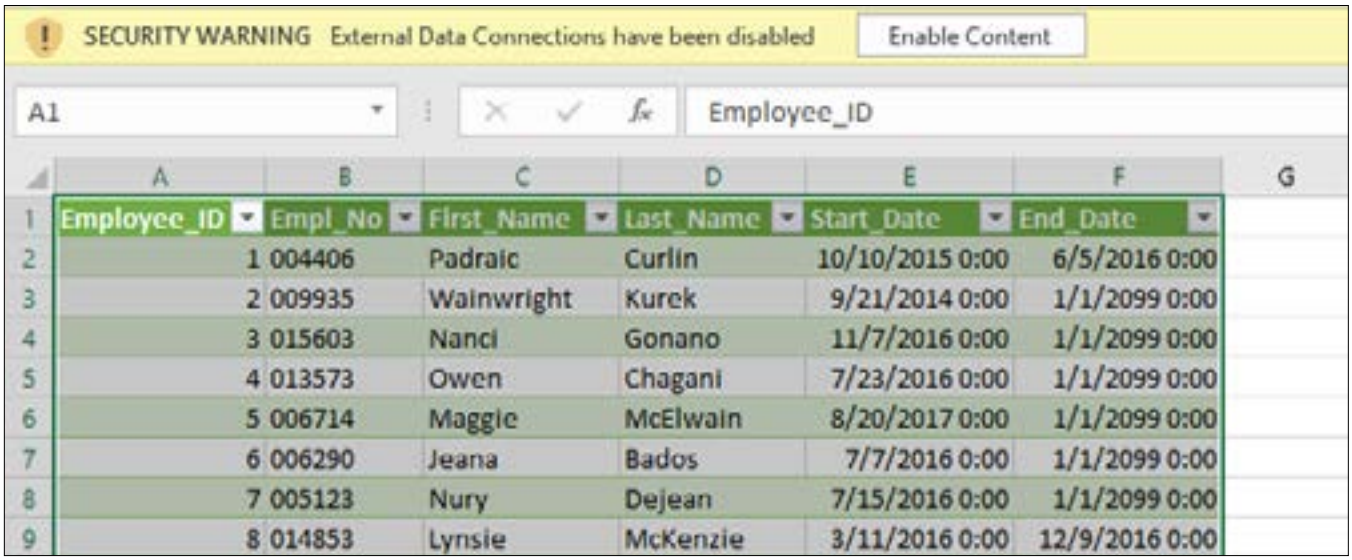


Employee

Employee_ID	Empl_No	First_Name	Last_Name	Start_Date	End_Date
1	004406	Padraic1	Curlin	10/10/2015	6/5/2016
2	009935	Wainwright	Kurek	9/21/2014	1/1/2099
3	015603	Nanci	Gonano	11/7/2016	1/1/2099
4	013573	Owen	Chagani	7/23/2016	1/1/2099
5	006714	Maggie	McElwain	8/20/2017	1/1/2099
6	006290	Jeana	Bados	7/7/2016	1/1/2099
7	005123	Nury	Dejean	7/15/2016	1/1/2099
8	014853	Lynsie	McKenzie	3/11/2016	12/9/2016
9	002227	Ashleigh	Felicitas	6/10/2015	6/27/2015

Figure 12.24

15. *Click anywhere outside of that record (to save the change), and* **close Access**.
16. **Open** *the* **myAccess.xlsx** *file.*
17. *If you get the* **Security Warning**, *click on the* **Enable Content** *button.*



SECURITY WARNING External Data Connections have been disabled Enable Content

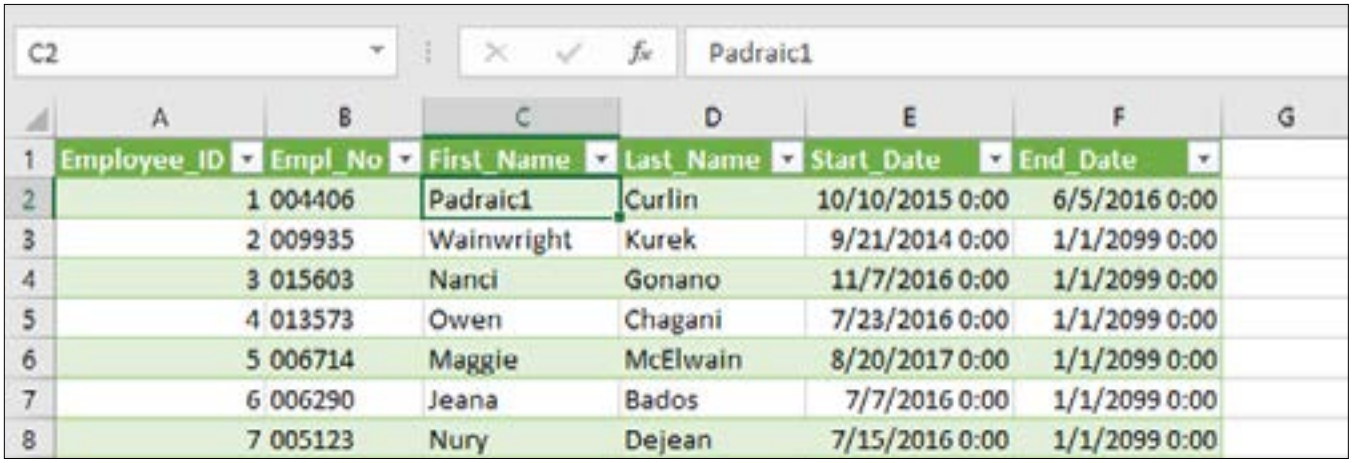
A1 Employee_ID

	A	B	C	D	E	F	G
1	Employee_ID	Empl_No	First_Name	Last_Name	Start_Date	End_Date	
2	1	004406	Padraic	Curlin	10/10/2015 0:00	6/5/2016 0:00	
3	2	009935	Wainwright	Kurek	9/21/2014 0:00	1/1/2099 0:00	
4	3	015603	Nanci	Gonano	11/7/2016 0:00	1/1/2099 0:00	
5	4	013573	Owen	Chagani	7/23/2016 0:00	1/1/2099 0:00	
6	5	006714	Maggie	McElwain	8/20/2017 0:00	1/1/2099 0:00	
7	6	006290	Jeana	Bados	7/7/2016 0:00	1/1/2099 0:00	
8	7	005123	Nury	Dejean	7/15/2016 0:00	1/1/2099 0:00	
9	8	014853	Lynsie	McKenzie	3/11/2016 0:00	12/9/2016 0:00	

Figure 12.25

18. Right-click anywhere in the table, and choose **Refresh** Refresh .

To refresh a link, you can also use the Refresh All button on the Data tab.



C2 | Padraic1

	A	B	C	D	E	F	G
1	Employee_ID	Empl_No	First_Name	Last_Name	Start_Date	End_Date	
2	1	004406	Padraic1	Curlin	10/10/2015 0:00	6/5/2016 0:00	
3	2	009935	Wainwright	Kurek	9/21/2014 0:00	1/1/2099 0:00	
4	3	015603	Nanci	Gonano	11/7/2016 0:00	1/1/2099 0:00	
5	4	013573	Owen	Chagani	7/23/2016 0:00	1/1/2099 0:00	
6	5	006714	Maggie	McElwain	8/20/2017 0:00	1/1/2099 0:00	
7	6	006290	Jeana	Bados	7/7/2016 0:00	1/1/2099 0:00	
8	7	005123	Nury	Dejean	7/15/2016 0:00	1/1/2099 0:00	

Figure 12.26

The data that you updated in the Access table (Padraic1) is now updated in Excel. Again, you will learn much more about external data connections in the Access course, but this exercise should at least get you thinking about what kinds of data you can connect to in Excel.

19. **Save** *and* **close** *the* **myAccess.xlsx** *file.*

Let's do another example just to make sure you're ready to enter the PivotTable world on your own. This one will be the ultimate analysis with PivotTables – you'll see why in a few minutes.

Using External Data in a PivotTable

Having more than 1,000,000 rows of data available in Excel 2016 can be a double-edged sword. It would be great to have that many rows in which to work, but once you start to get a lot of rows of data, Excel starts to slow down. Particularly if you have a lot of formulas in the spreadsheet, refreshing those formulas can take a long time, or your computer might freeze up, depending on its capabilities. If your spreadsheet seems to take a long time to calculate, I'll suggest a couple of things:

1) The VLOOKUP() function, although it is a very useful function, can be a resource hog. See if you can use another function, like SUMIF() or INDEX() to accomplish the same thing. Those functions take up significantly fewer processor resources, and they work quicker than VLOOKUP(). The VLOOKUP() function is many times the culprit of a worksheet that takes a long time to refresh.

2) Try keeping large amounts of data in databases like Access, SQL Server, or Oracle (databases designed to hold voluminous information), and link to them in an Excel PivotTable for your analysis.

In this next example, you will link a PivotTable to a database with almost 300,000 rows of data, and Excel will fly through it like it was 20 rows of data! Before you begin this example, I must warn you. If you've previously worked with large amounts of data and have found Excel to be very limiting, you may get too excited. What I am about to show you could possibly cause your heart to start racing too fast, which could lead to other injuries, and I don't want that on my conscience. So, before you start this example, get a drink of water, take your medication, do whatever you have to do to get settled down before this wild ride. Done? Good. Let's get started!

What we are going to create here is the ultimate financial statement analysis tool. The data is contained in the same Access database we used in the previous example, so let's open up that database again.

***Note:** If you do not have a copy of* **Microsoft Access**, *you can skip* **Steps 1-2**.

1. **Open** *the* **Access** *database at* **C:\ExcelCEO\Excel 2016\Chapter12\Data.accdb**.
2. *Click* **Enable this content** *in the* **Security Alert**, *if necessary.*
3. **Open** *the* **Excel_Data** *table (if you do not have* **Access**, *preview the table using* **New Query**).

el_Data

	Region	Store	Lvl1_Acct_D	Lvl2_Acct_D	Lvl3_Acct_D	Acct	Amt_2016
2	100, Northern I	1005, Nitey-Nit	Net Income	Revenue	Mattress Rever	101-1, King Bes	0
2	100, Northern I	1005, Nitey-Nit	Net Income	Revenue	Mattress Rever	101-1, King Bes	0
1	100, Northern I	1005, Nitey-Nit	Net Income	Revenue	Mattress Rever	101-1, King Bes	0
1	100, Northern I	1005, Nitey-Nit	Net Income	Revenue	Mattress Rever	101-1, King Bes	0
10	100, Northern I	1005, Nitey-Nit	Net Income	Revenue	Mattress Rever	101-1, King Bes	0
9	100, Northern I	1005, Nitey-Nit	Net Income	Revenue	Mattress Rever	101-1, King Bes	0
8	100, Northern I	1005, Nitey-Nit	Net Income	Revenue	Mattress Rever	101-1, King Bes	-729
10	100, Northern I	1005, Nitey-Nit	Net Income	Revenue	Mattress Rever	101-1, King Bes	-2317

Figure 12.27

Feel free to scroll up and down through the data. Let me explain the table. It is a table that was created by one of Nitey-Nite's accountants for analysis of General Ledger activity for 2014 – 2016. It actually combines three tables. From the General_Ledger table, she brought in the Month, Account, and the three Year columns (2014, 2015, and 2016). She retrieved the Store and Region fields from the Stores table and the Lv11_Acct_desc, Lv12_Acct_desc and Lv13_Acct_desc fields came from an account rollup table. With the data in this format, it is easy to put it into a PivotTable. Notice that there are 293,068 records of data in the table. Even though it's possible to use that many rows of data in Excel, it can be very slow depending on your computer. One solution to analyze this data is to bring the data directly into a PivotTable without first dumping it onto a spreadsheet. This way, the data is in memory behind the spreadsheet. You won't be able to see all of the individual records, but you don't need to. All you want to do is to summarize the data, and that can be done in the PivotTable. And let me tell you, it's REAL EASY to do. Let's do it.

4. **Close** *the* **Excel_Data** *table, and the* **Data.accdb** *database.*
5. **Open** *a* **Blank workbook** *in* **Excel**.

6. **Save As C:\ExcelCEO\Excel 2016\Chapter12*myGL_Summary.xlsx***
7. *Click on the* **Get External Data** *icon in the* **Data** *tab, then click on the* **From Access** *button.*
8. *In the* **Select Data Source** *dialog box, navigate to* **C:\ExcelCEO\Excel 2016\Chapter12\Data.accdb**, *and double-click on that file.*
9. *Click on the* **Excel_Data** *table, and click* **OK**.

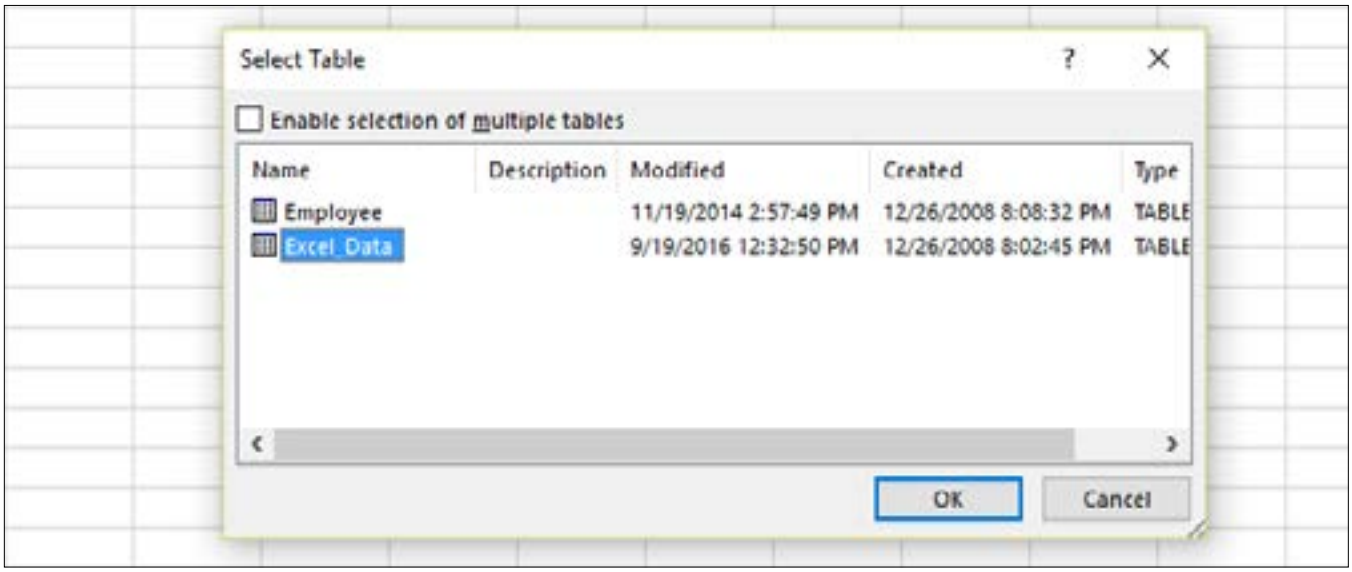


Figure 12.28

10. *In the* **Import Data** *dialog box, choose* **PivotTable Report**, *leave the* **Existing worksheet** *set to* **=$A$1**.

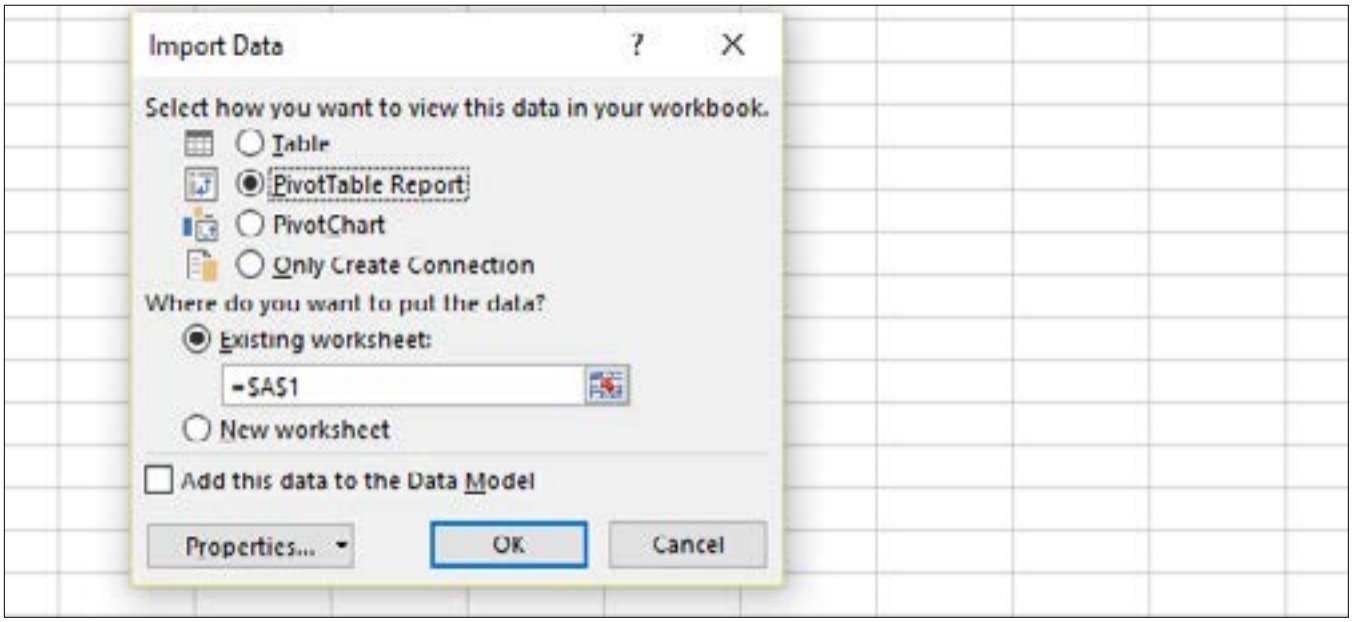


Figure 12.29

11. *Click* **OK**.

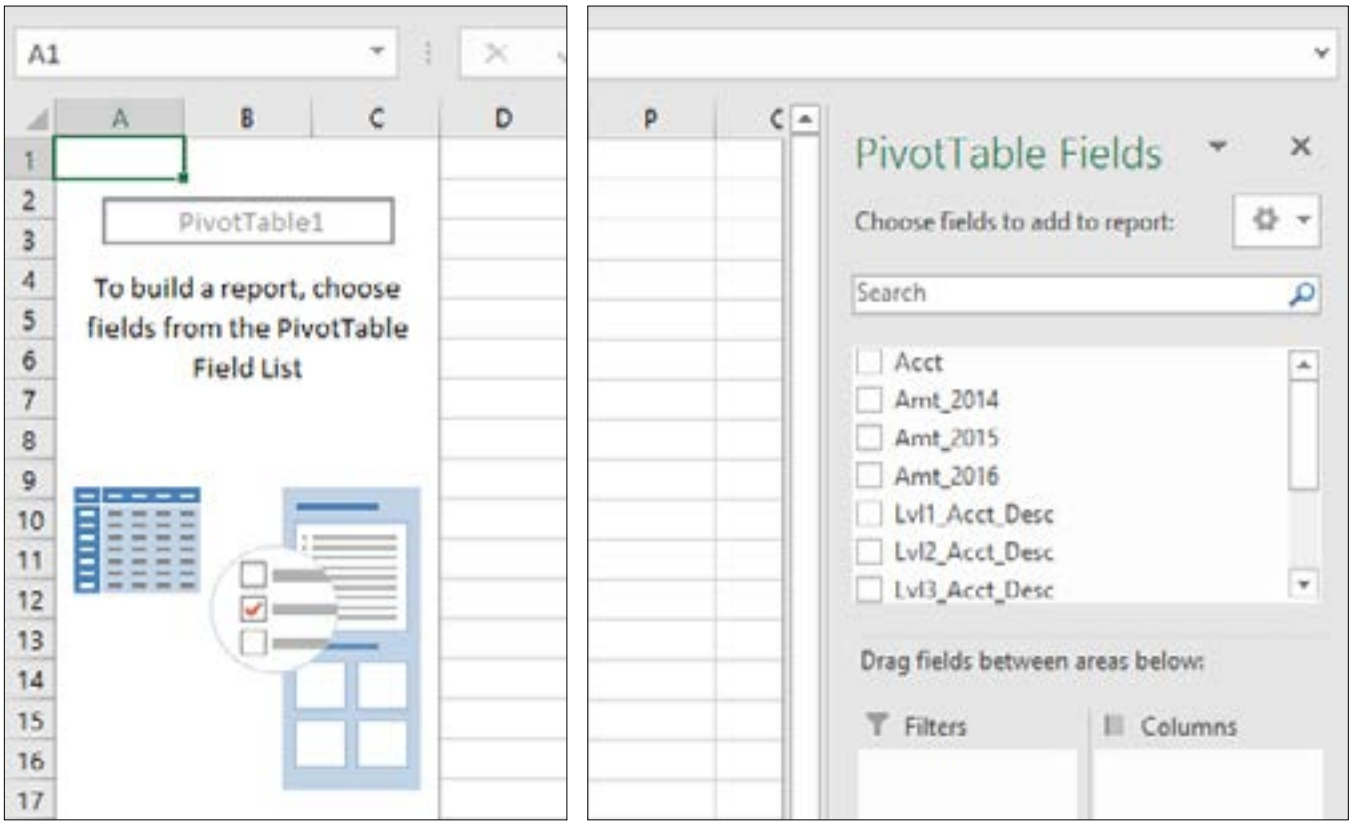


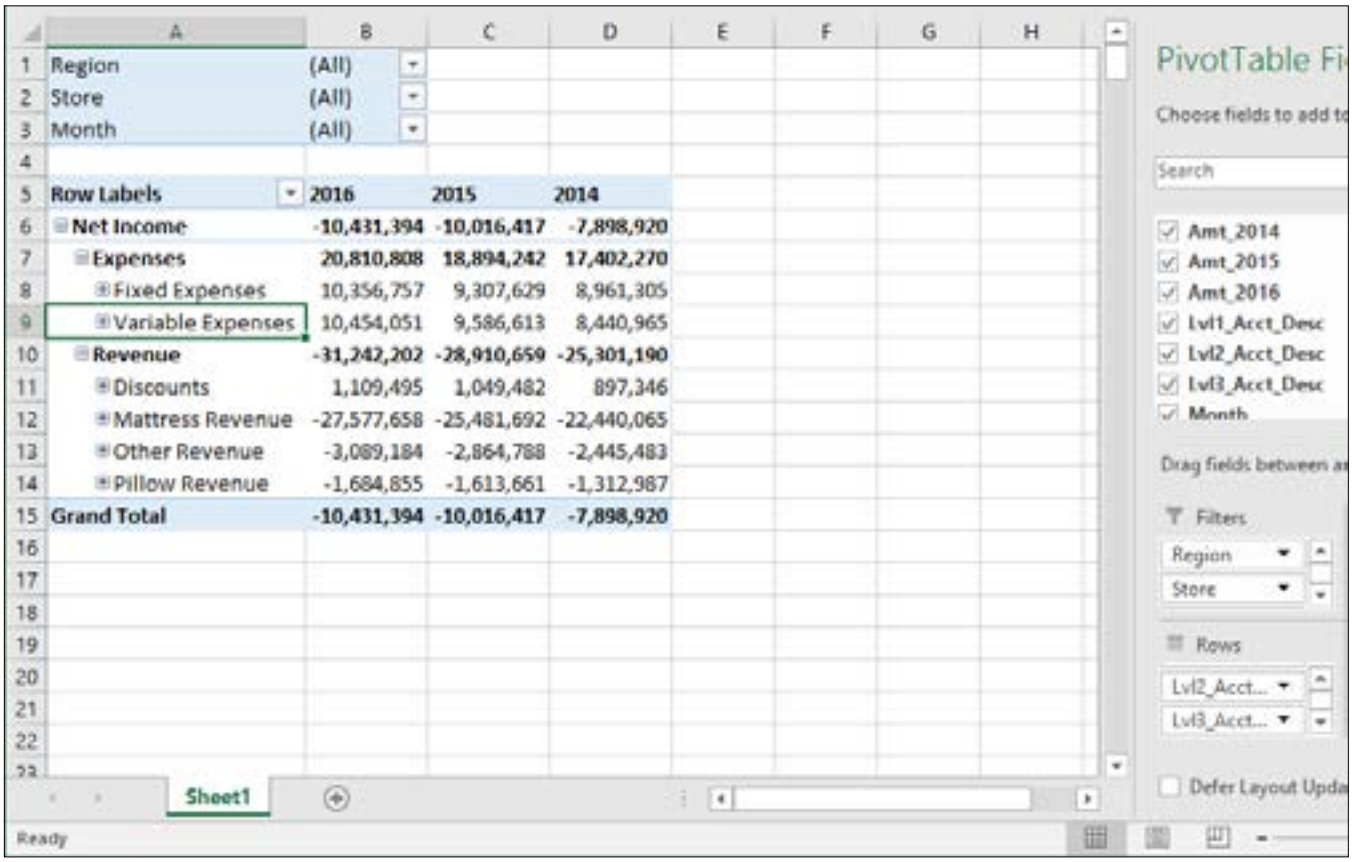
Figure 12.30

> ***Note**: At the bottom of the* **PivotTable Fields** *list, there is a check box called* **Defer Layout Update**. *If you have a PivotTable that is connected to a very large database, and it takes a lot of time to update the PivotTable each time you add or take away a field, you can check this check box, and it will not update the PivotTable until you uncheck it. This can be a huge time saver when working with large databases.*

It may take a few seconds to make the connection, and then you will see the shell of the PivotTable. Let's analyze the data.

12. *Set* **Region**, **Store**, *and* **Month** *as* **Filters** *fields.*
13. *Set* **Lvl1_Acct_Desc**, **Lvl2_Acct_Desc**, **Lvl3_Acct_Desc**, *and* **Acct** *as* **Rows** *fields.*
14. *Bring in the* **Amt_2016**, **Amt_2015**, *and* **Amt_2014** *fields in as* **Values** *fields.*
15. *Rename the* **Values** *fields* ***2016***, ***2015***, *and* ***2014***.
16. *Format the amount data in the* **PivotTable** *to be* **Number**, **zero decimal places**, *and* **Use 1000 separator (,)**
17. *Click on* **308-0, Rent Expense**, *and click the* **Collapse Field** *icon in the* **Active Field** *group of the* **Analyze** *tab.*

After all of that, you should have a PivotTable that looks like the following image:



	A	B	C	D
1	Region	(All)		
2	Store	(All)		
3	Month	(All)		
4				
5	Row Labels	2016	2015	2014
6	Net Income	-10,431,394	-10,016,417	-7,898,920
7	Expenses	20,810,808	18,894,242	17,402,270
8	Fixed Expenses	10,356,757	9,307,629	8,961,305
9	Variable Expenses	10,454,051	9,586,613	8,440,965
10	Revenue	-31,242,202	-28,910,659	-25,301,190
11	Discounts	1,109,495	1,049,482	897,346
12	Mattress Revenue	-27,577,658	-25,481,692	-22,440,065
13	Other Revenue	-3,089,184	-2,864,788	-2,445,483
14	Pillow Revenue	-1,684,855	-1,613,661	-1,312,987
15	Grand Total	-10,431,394	-10,016,417	-7,898,920

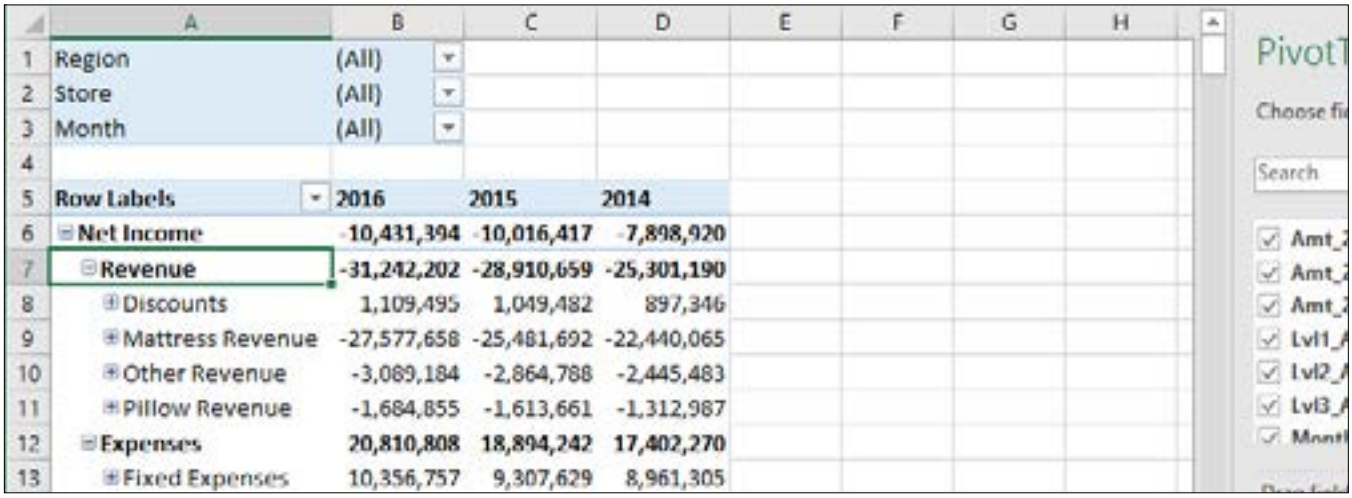
Figure 12.31

Remember that you can click on the Expand/Collapse icons to Show or Hide any level of detail you want. Keep in mind that this data comes directly from the General Ledger so the data carries GAAP signs (i.e.- revenues are credits, or minus signs). If you set up your workbook in this manner, you can now write any formula you want to analyze year-over-year changes. Your limit depends on your imagination.

In this PivotTable, Expenses shows up before Revenue, and in a typical Income Statement, Revenue appears before Expenses. Reordering this data is easy to do – just click and drag.

18. *Click on the cell that contains the word* **Revenue**.
19. *Place your cursor over the top edge of the cell, and it will turn to a thin plus sign with an arrow on each tip.*
20. *Click on the cell and drag it above the cell containing* **Expenses**, *and release.*

You will see a gray horizontal bar appear as you move the Revenue cell. Once you release it, the PivotTable is reordered to where Revenue appears on top.



	A	B	C	D
1	Region	(All)		
2	Store	(All)		
3	Month	(All)		
4				
5	Row Labels	2016	2015	2014
6	Net Income	10,431,394	10,016,417	7,898,920
7	Revenue	-31,242,202	-28,910,659	-25,301,190
8	Discounts	1,109,495	1,049,482	897,346
9	Mattress Revenue	-27,577,658	-25,481,692	-22,440,065
10	Other Revenue	-3,089,184	-2,864,788	-2,445,483
11	Pillow Revenue	-1,684,855	-1,613,661	-1,312,987
12	Expenses	20,810,808	18,894,242	17,402,270
13	Fixed Expenses	10,356,757	9,307,629	8,961,305

Figure 12.32

Let's say you now want to look only at the first quarter (January, February, and March) data for all those years. The Month is contained in a Report Filter, and Report Filters were historically (before Excel 2007) set up to handle only one filter. In Excel 2007 on, you can select multiple values in a Report Filter field.

21. *Click on the* **Month** *drop-down arrow in* **Cell B3**
22. *Click on the* **Select Multiple Items** *checkbox (all the months will have check boxes beside them and all are checked.)*
23. *Deselect the* **(All)** *checkbox, then check* **Months 1**, **2**, *and* **3**

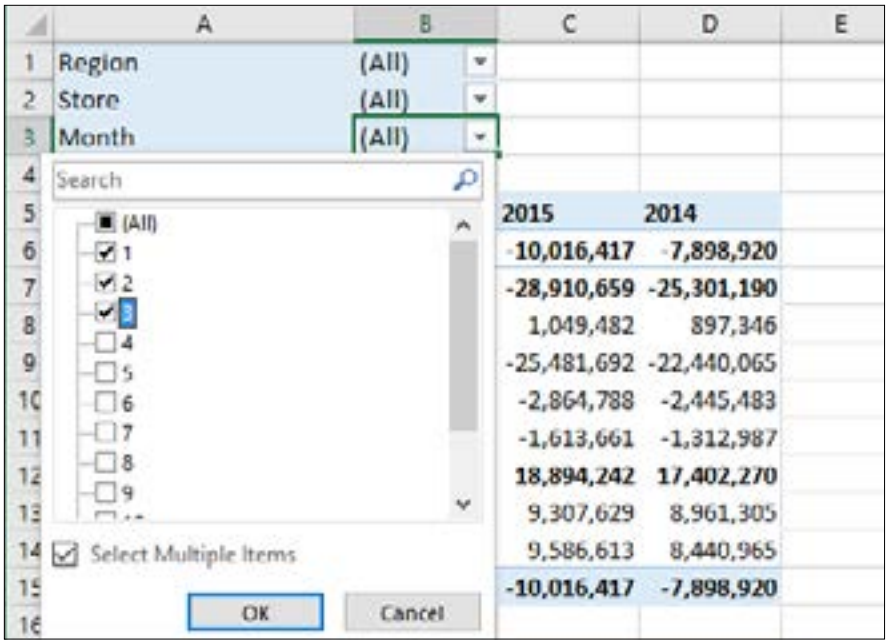
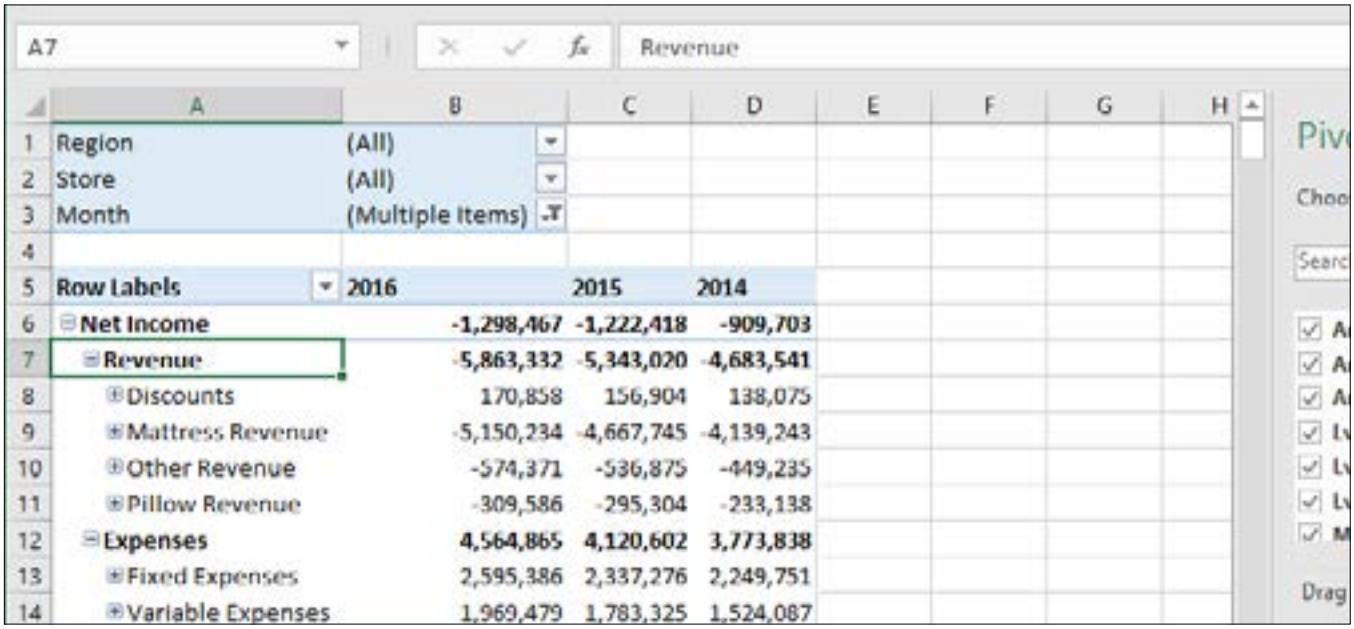


Figure 12.33

24. *Click* **OK**.



	A	B	C	D
1	Region	(All)		
2	Store	(All)		
3	Month	(Multiple Items)		
4				
5	Row Labels	2016	2015	2014
6	Net Income	-1,298,467	-1,222,418	-909,703
7	Revenue	-5,863,332	-5,343,020	-4,683,541
8	Discounts	170,858	156,904	138,075
9	Mattress Revenue	-5,150,234	-4,667,745	-4,139,243
10	Other Revenue	-574,371	-536,875	-449,235
11	Pillow Revenue	-309,586	-295,304	-233,138
12	Expenses	4,564,865	4,120,602	3,773,838
13	Fixed Expenses	2,595,386	2,337,276	2,249,751
14	Variable Expenses	1,969,479	1,783,325	1,524,087

Figure 12.34

The Month report filter now reads "Multiple Items", since it can't display months chosen in Cell B3.

Slicers

Although this feature is very cool, it has its limitations. Just by looking at the PivotTable, you can't tell which months were selected. To help with managing multiple selected items in a PivotTable, Excel 2016 offers a feature called Slicers. A ***Slicer*** is simply a view of what is selected in the PivotTable, or a change in the PivotTable's state. Inputting a Slicer is really easy – just click on the Insert Slicer icon.

1. *In the* **Filter** *group of the* **PivotTable Tools Analyze** *contextual tab, click on* **Insert Slicer**

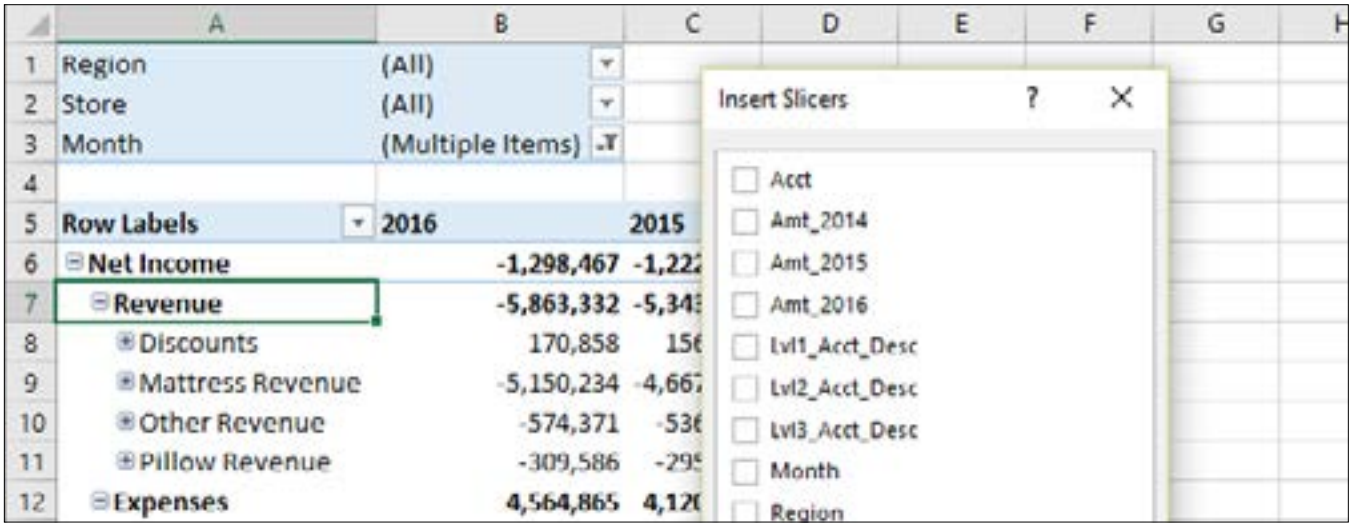
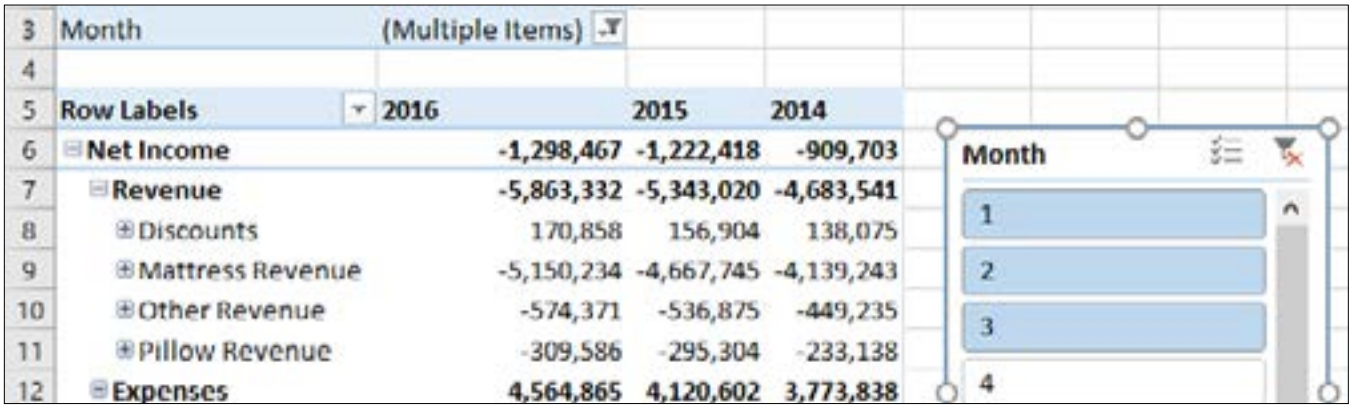


Figure 12.35

2. *Click on the* **Month** *checkbox and click* **OK**.

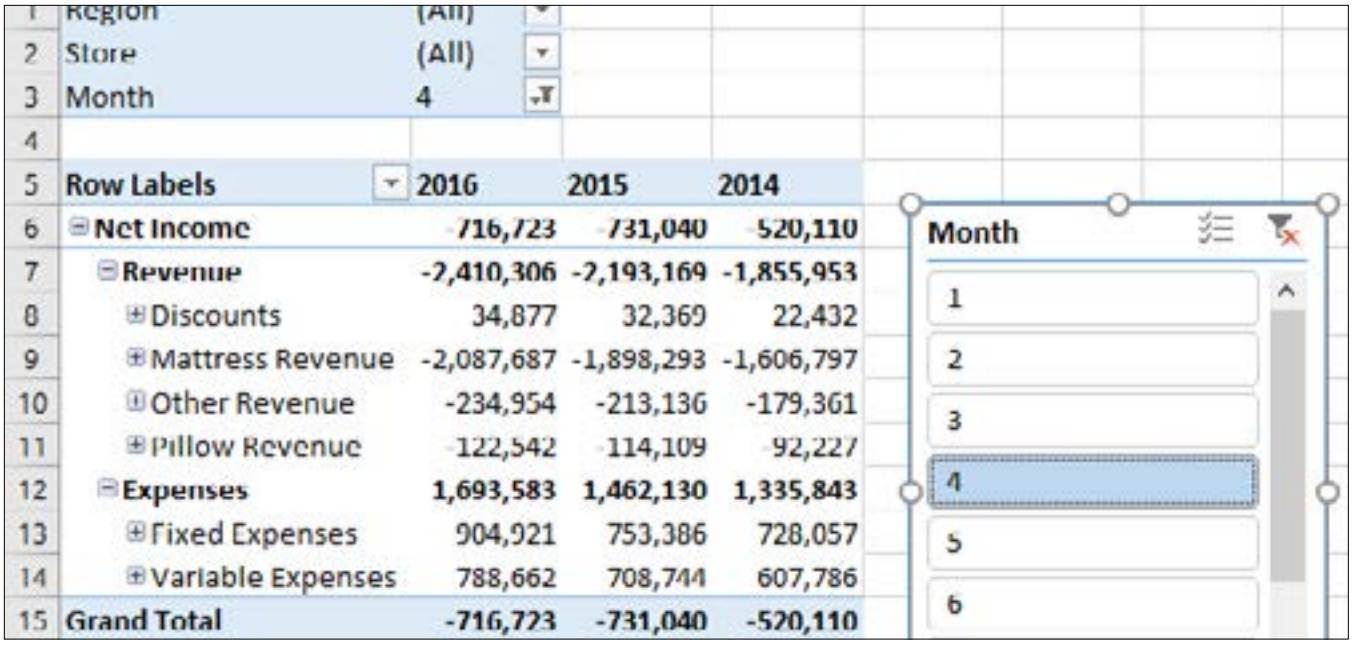


3	Month	(Multiple Items)		
4				
5	Row Labels	2016	2015	2014
6	Net Income	-1,298,467	-1,222,418	-909,703
7	Revenue	-5,863,332	-5,343,020	-4,683,541
8	Discounts	170,858	156,904	138,075
9	Mattress Revenue	-5,150,234	-4,667,745	-4,139,243
10	Other Revenue	-574,371	-536,875	-449,235
11	Pillow Revenue	-309,586	-295,304	-233,138
12	Expenses	4,564,865	4,120,602	3,773,838

Figure 12.36

The Month slicer appears with the months 1, 2, and 3 selected, because those are the selections we did previously. To change the month, just click on the month you want in the slicer.

3. *Click on* **Month 4** *in the slicer.*

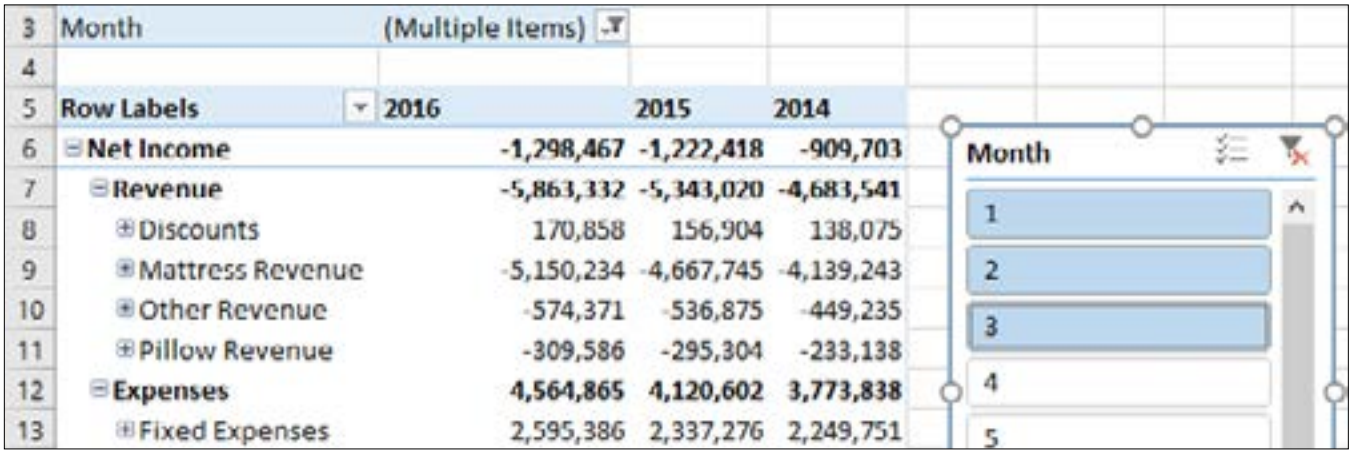


1	Region	(All)		
2	Store	(All)		
3	Month	4		
4				
5	Row Labels	2016	2015	2014
6	Net Income	716,723	731,040	520,110
7	Revenue	-2,410,306	-2,193,169	-1,855,953
8	Discounts	34,877	32,369	22,432
9	Mattress Revenue	-2,087,687	-1,898,293	-1,606,797
10	Other Revenue	-234,954	-213,136	-179,361
11	Pillow Revenue	122,542	114,109	92,227
12	Expenses	1,693,583	1,462,130	1,335,843
13	Fixed Expenses	904,921	753,386	728,057
14	Variable Expenses	788,662	708,744	607,786
15	Grand Total	-716,723	-731,040	-520,110

Figure 12.37

Notice that Month 4 in the slicer is selected and the Month Report Filter in the PivotTable reflects 4, and the data in the PivotTable changes.

4. *Click on* **Month 1** *in the* **Slicer**, *hold down the* **[Ctrl]** *key and click on* **Month 2 and 3**, *and release the* **[Ctrl]** *key.*



3	Month	(Multiple Items)		
4				
5	Row Labels	2016	2015	2014
6	Net Income	-1,298,467	-1,222,418	-909,703
7	Revenue	-5,863,332	-5,343,020	-4,683,541
8	Discounts	170,858	156,904	138,075
9	Mattress Revenue	-5,150,234	-4,667,745	-4,139,243
10	Other Revenue	-574,371	-536,875	-449,235
11	Pillow Revenue	-309,586	-295,304	-233,138
12	Expenses	4,564,865	4,120,602	3,773,838
13	Fixed Expenses	2,595,386	2,337,276	2,249,751

Figure 12.38

Note when you selected value while holding down the [Ctrl] key, the values in the PivotTable don't change, but as soon as you release the [Ctrl] key, all the values in the PivotTable change and the Month Report Filter reads "Multiple Items".

Other PivotTable Tricks

Let me show you a few other things that you can do with PivotTables that will help out in certain situations. This first exercise doesn't apply very well to the data we have in our current PivotTable, but it will show you the power of right-clicking.

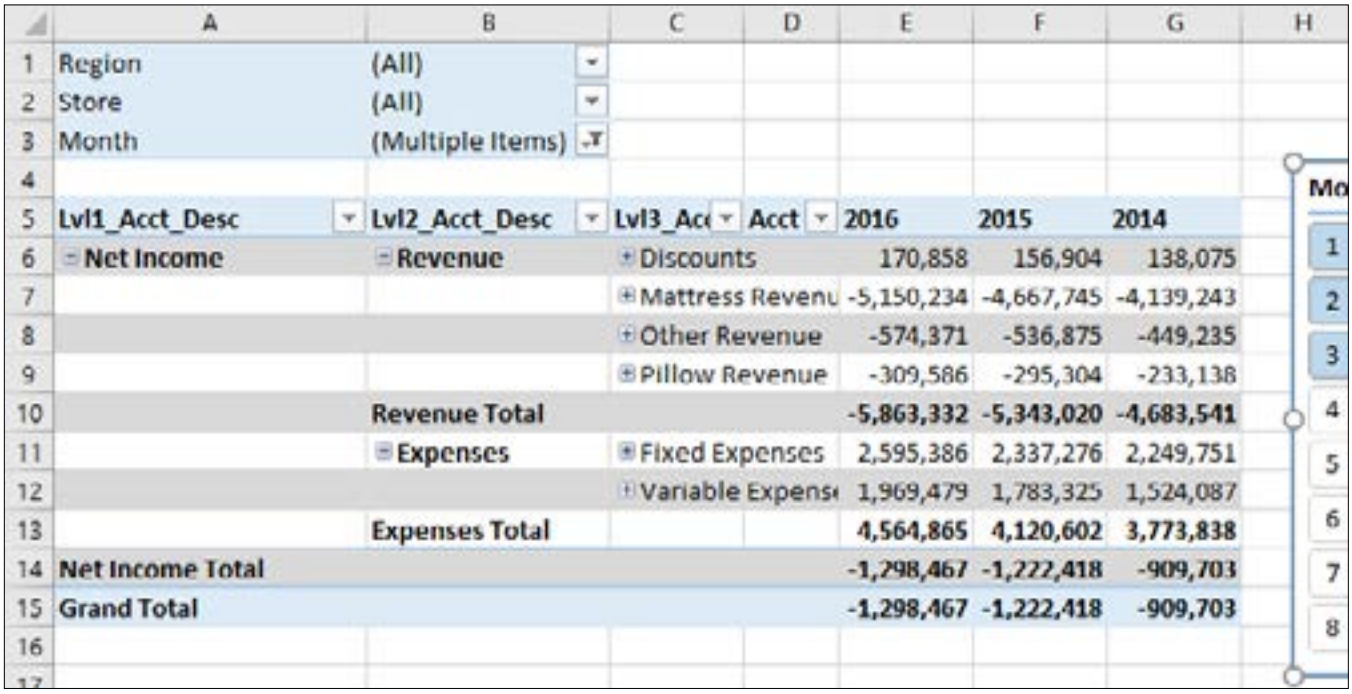
1. *Right-click anywhere under the* **2015** *field in the* **PivotTable**, *point to* **Summarize Values By** *and click on* **Average**.

The values for 2015 now reflect an average numbers instead of a summation. Make sure to review all of the options available in the right-click menu. It can greatly speed up your development of a PivotTable.

2. *Click on the* **Undo** *button (or* **[Ctrl]**+*z on your keyboard).*
3. *Click on the* **PivotTable Tools Design** *contextual tab.*
4. *Click on the* **Banded Rows** *checkbox of the* **PivotTable Style Options** *group.*

The PivotTable now displays banded rows. This is useful when there are many rows of data and you want to make it more readable. Remember when you were using the old style of PivotTables, and the row labels didn't repeat? That drove me nuts when I was trying to do a VLOOKUP() on data within a PivotTable. Excel 2016 now has the functionality to repeat items in a PivotTable. We'll first set up the PivotTable in a tabular form (the old style), then I'll show you how to repeat items.

5. *In the* **PivotTable Tools Design** *contextual tab,* **Layout** *group, click on the* **Report Layout** *icon, and click on* **Show in Tabular Form**.
6. *Move the* **Slicer** *out of the way, if necessary.*

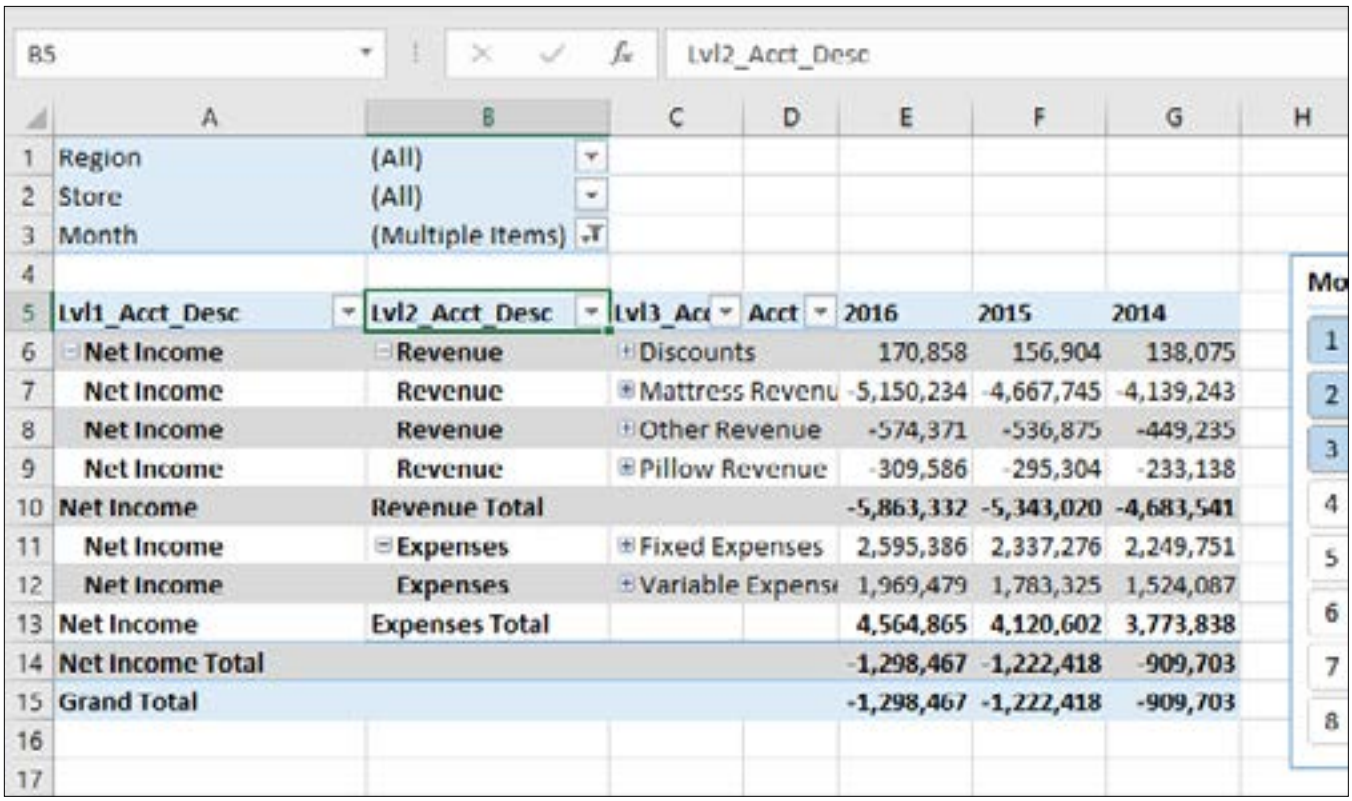


	A	B	C	D	E	F	G	H
1	Region	(All)						
2	Store	(All)						
3	Month	(Multiple Items)						
4								
5	Lvl1_Acct_Desc	Lvl2_Acct_Desc	Lvl3_Acc	Acct	2016	2015	2014	
6	Net Income	Revenue	Discounts		170,858	156,904	138,075	
7			Mattress Revenu		-5,150,234	-4,667,745	-4,139,243	
8			Other Revenue		-574,371	-536,875	-449,235	
9			Pillow Revenue		-309,586	-295,304	-233,138	
10		Revenue Total			-5,863,332	-5,343,020	-4,683,541	
11		Expenses	Fixed Expenses		2,595,386	2,337,276	2,249,751	
12			Variable Expens		1,969,479	1,783,325	1,524,087	
13		Expenses Total			4,564,865	4,120,602	3,773,838	
14	Net Income Total				-1,298,467	-1,222,418	-909,703	
15	Grand Total				-1,298,467	-1,222,418	-909,703	
16								

Mo 1 2 3 4 5 6 7 8

Figure 12.39

7. Click on the **Report Layout** *icon again, and choose* **Repeat All Item Labels**.



B5 Lvl2_Acct_Desc

	A	B	C	D	E	F	G	H
1	Region	(All)						
2	Store	(All)						
3	Month	(Multiple Items)						
4								
5	Lvl1_Acct_Desc	Lvl2_Acct_Desc	Lvl3_Acc	Acct	2016	2015	2014	
6	Net Income	Revenue	Discounts		170,858	156,904	138,075	
7	Net Income	Revenue	Mattress Revenu		-5,150,234	-4,667,745	-4,139,243	
8	Net Income	Revenue	Other Revenue		-574,371	-536,875	-449,235	
9	Net Income	Revenue	Pillow Revenue		-309,586	-295,304	-233,138	
10	Net Income	Revenue Total			-5,863,332	-5,343,020	-4,683,541	
11	Net Income	Expenses	Fixed Expenses		2,595,386	2,337,276	2,249,751	
12	Net Income	Expenses	Variable Expens		1,969,479	1,783,325	1,524,087	
13	Net Income	Expenses Total			4,564,865	4,120,602	3,773,838	
14	Net Income Total				-1,298,467	-1,222,418	-909,703	
15	Grand Total				-1,298,467	-1,222,418	-909,703	
16								
17								

Mo 1 2 3 4 5 6 7 8

Figure 12.40

8. **Save** *and* **close** *the* **myGL_Summary.xlsx** *file.*

Whew! Are you ready for a break? That was an intense chapter, but one that will help you tremendously as you start to use PivotTables in your work. You are now ready to manipulate just about any field in a PivotTable. Please make note of a few more notes:

1. Right-click is your friend. If you are in a PivotTable and you want to do something, but you don't know how, try right-clicking within the PivotTable, and you may find the answer to your question.
2. Double-clicking makes things fast and easy. If you make a mistake, you can almost always use the Undo button. Don't worry about screwing it up. Have fun with it!

> ***Review Questions****: It is now time to complete the hands-on Review Questions. Log on to www.ExcelCEO.com with your Email address and Password, click on the* **Excel 2016 Review Questions, Chapter 12, Section 2 of 2** *option in your Main Menu, and complete the Review Questions.*

Conclusion

In this chapter, you changed a PivotTable field setting from Count to Sum. You created a complex formula using the ABS() function in a PivotTable calculated field. You set up a PivotTable to include drill down capability by using the Show Detail (+) or Hide Detail (-) buttons or by double-clicking on the value you want to drill down on. You formatted a PivotTable Report using the available standard styles. You connected to an external data source to bring data into a spreadsheet, and you pulled data from an Access database directly into a PivotTable. Lastly, you learned about Slicers and the various options available in the PivotTable Tools Options and Design contextual tabs.

Chapter Exam

To take the examination for this chapter, you must have successfully completed the examination for the previous chapter. You can now go to www.ExcelCEO.com, click on Sign In, log in and take the exam. Make sure that you take the exam on the same computer on which you completed the practice files, as some of the questions on the exam may refer to some of the completed projects. Chapter exams are intended to be hands-on.

Excel® 2016

Complete Self-study Course

ExcelCEO

Chief Excel Officer

CHAPTER THIRTEEN — CHARTS, GRAPHICS, AND OBJECTS

Chapter Objectives:

- Identify how to use Chart Elements to create and edit a basic chart
- Recognize the appropriate Chart Elements to adjust appearance of a chart
- Choose the correct way to insert Sparklines into spreadsheet cells
- Determine data trends by adding a Trendline in a chart
- Identify how to link a PivotTable to a PivotChart
- Recognize how to import and export objects to and from Excel

Projects You Will Complete During This Chapter:

- *myAnnual_Sales.xlsx*
- *myAnnual_Sales_Forecast.xlsx*
- *mySales_Summary.xlsx*
- *mySmartArt.xlsx*

CPE Credits possible for this chapter: 2

Introduction

It is said, "*A picture paints a thousand words.*" Truer words have never been spoken. However, they can also be deceiving. Consider the following charts:

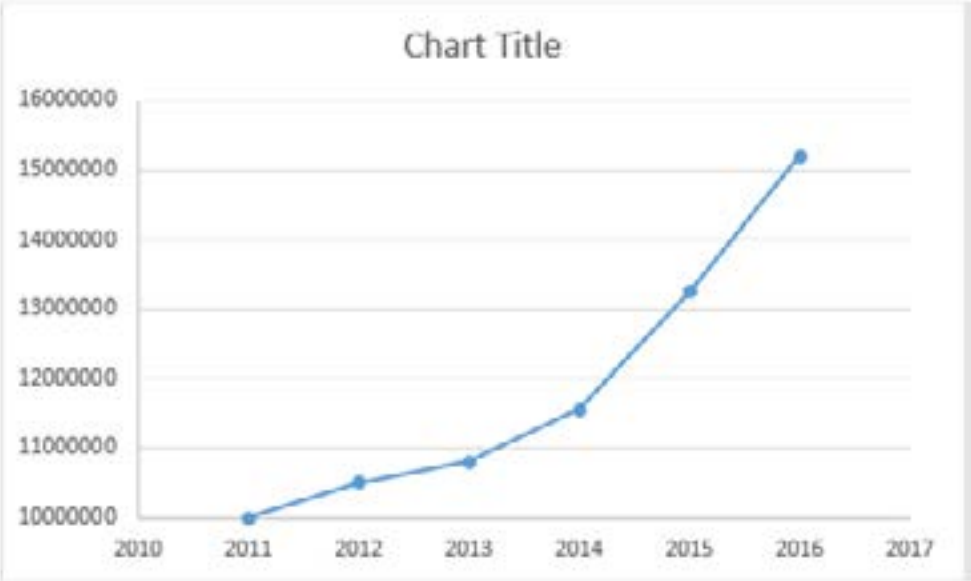


Chart A: Sales

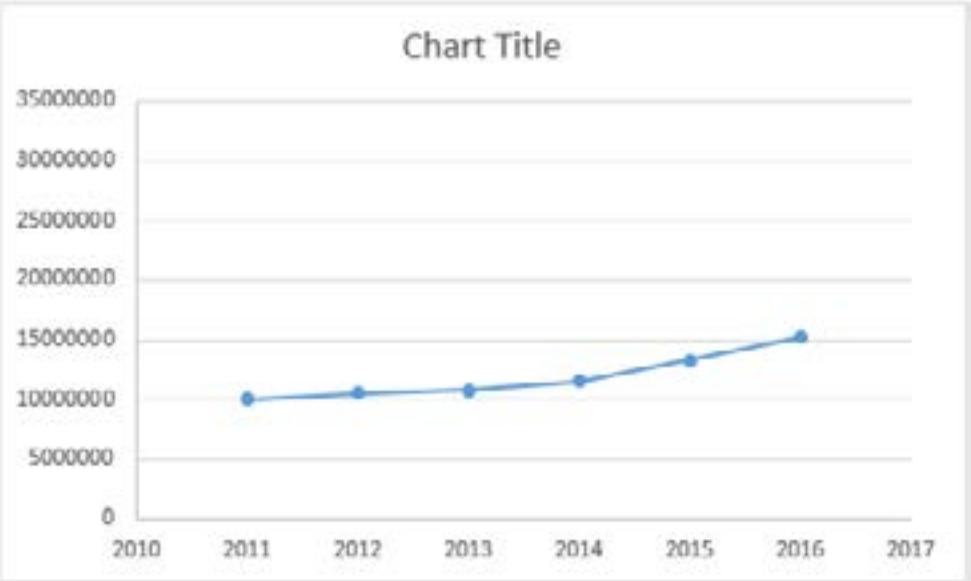


Chart B: Sales

Which one would you choose for your company, Chart A or Chart B? Most people would choose Chart A. It appears that sales in Chart A are going through the roof. The sales in Chart B appear to be increasing, but not by much. However, both charts contain exactly the same information. The only thing I did different was to change the scaling of the chart. The bottom range of Chart A is $9,000,000

and the upper-range of the scale is set at $15,000,000. In Chart B, the bottom value is $0 and the top level is $35,000,000. Thus, the higher the range, the less dramatic the lines appear to be. So even though charts can tell a lot, they can also be deceiving. For that reason, you should design your charts to present accurate information and allow management to make solid business decisions based on the underlying data.

In its simplest form, a chart is a visual representation of a collection of data. As the developer of the chart, you have the ultimate control over how that chart is created. You can change the scale, colors, series, formatting, etc. You can estimate future activity by adding a trendline. In this chapter, you will learn how to create and customize various types of charts, add a trendline based on data in a spreadsheet, and tie a chart to a PivotTable.

1. **Open** *the file* **C:\ExcelCEO\Excel 2016\Chapter13\Annual_Sales.xlsx**.
2. **Save As C:\ExcelCEO\Excel 2016\Chapter13*myAnnual_Sales.xlsx***.

	A	B	C	D	E	F	G	H
1	Annual Sales 2012 - 2016							
2								
3		2012	2013	2014	2015	2016		
4	Northern Region	17,742,860	18,086,504	18,778,830	18,889,759	20,456,452		
5	Southern Region	14,132,548	15,304,903	15,739,308	17,245,116	17,913,654		

Figure 13.1

Basic Charts

This is a very simple table. It shows annual sales for each of the two regions in the company. Let's put this data into a chart to visually show the sales activity over these five years.

3. **Enable editing**, *if necessary, then click on* **Cell A4** *(Actually, you can click on any cell in the data table to begin building a chart).*
4. *Click on the* **Insert** *tab.*

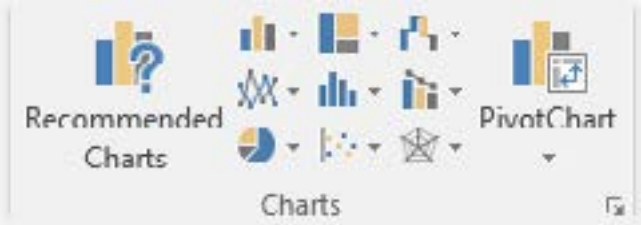


Figure 13.2

In the Charts group of the Insert tab, Excel allows you to pick the type of chart you want, then build it. Excel 2003 forced you to go through a multi-step wizard to create a chart, but Excel 2007 on allow you to first create the chart, then modify it. Let's create a basic column chart. Excel 2013 improved this process

considerably through Quick Analysis, Recommended Charts, and Chart Elements. First, some basics about Excel charts.

5. *Click on the* **Insert Column or Bar Chart** *button* *in the* **Charts** *group, and choose the first chart option in the* **2-D Column** *group called a* **Clustered Column**.
6. *Click on the plus sign icon to the right of the active chart to access* **Chart Elements**.

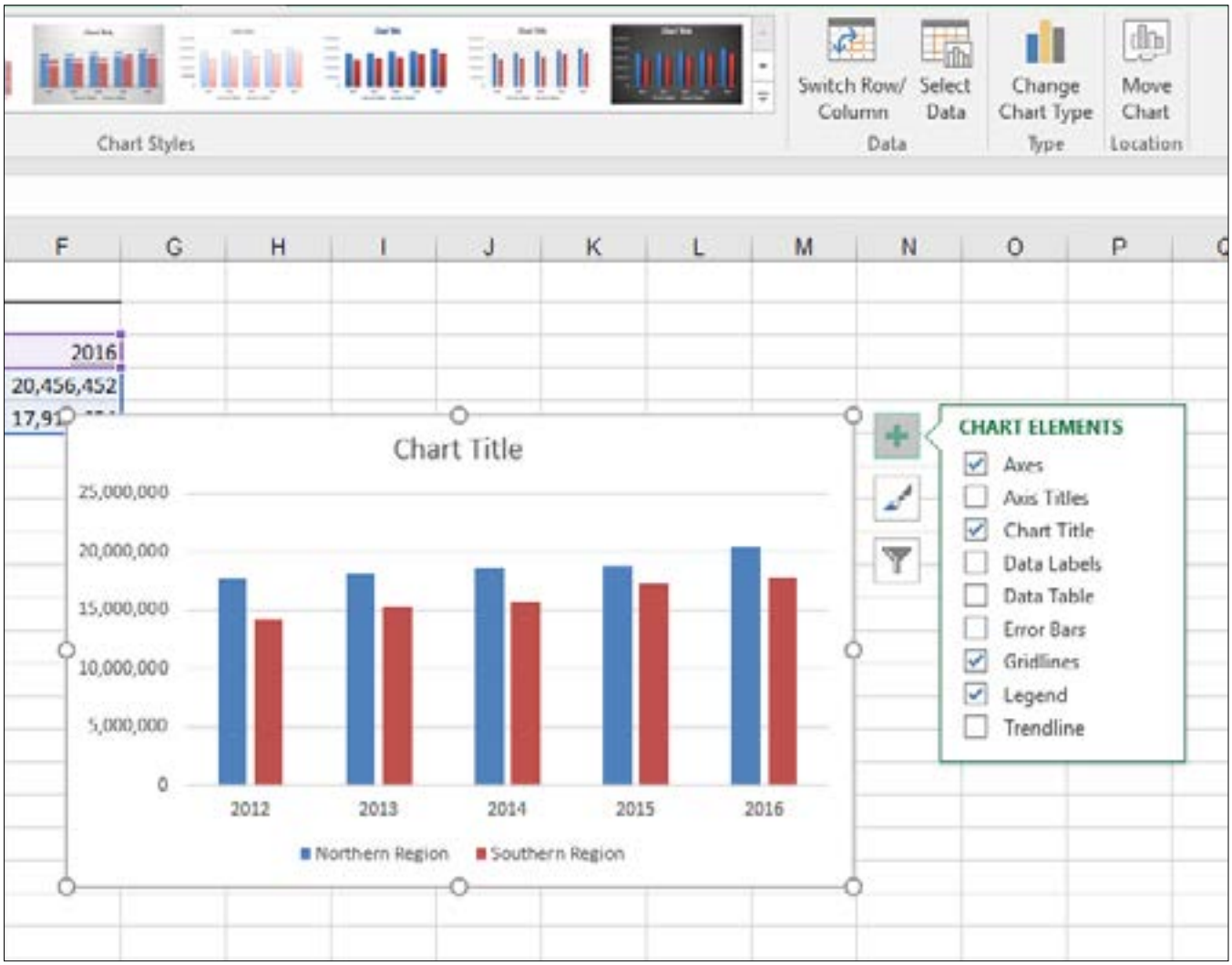


Figure 13.3

Excel does a few things. First, it creates a chart and places it in the middle of the spreadsheet. Second, it activates a new contextual tab called Chart Tools. Under Chart Tools, there are two sub-tabs: Design and Format. If you are familiar with Excel 2010, the contextual tab Layout has been replaced by Chart Elements - to the right of an active chart. Chart Elements is much more user-friendly than chart editing from versions of Excel before 2013, and provides SO MANY different options when creating charts that it is impossible to explore each of the tools in these exercises. As with other exercises, I encourage you to explore the different options that would apply to your specific projects or interests on your own.

Edit an Existing Chart

In this next exercise, we will add a title to the chart to match the data in the table.

7. *Click on the* **Chart Title** *right-arrow button in the* **Chart Elements** *box, and choose* **Centered Overlay**.
8. *Click inside the* **Title** *box in the chart, replace* **Chart Title** *with* ***Annual Sales 2012 – 2016****, and click outside the chart.*

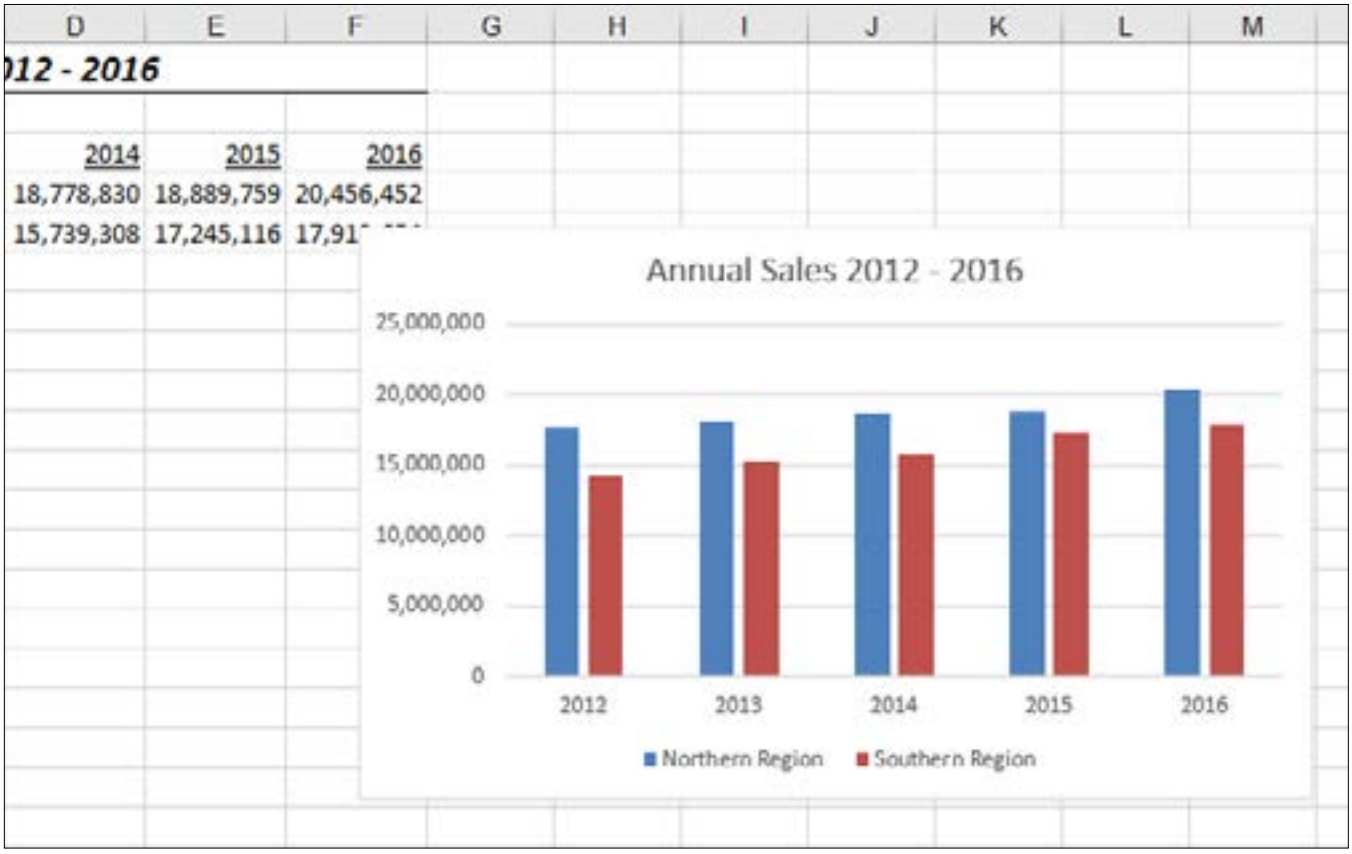


Figure 13.4

Excel creates a title for the chart. But, as you can see, the title appears within the chart itself. To fix this, we need to adjust the chart.

9. *Return to* **Chart Elements** *(by clicking anywhere in the chart area and clicking the* **Chart Elements** *plus sign to the right), and change the title location back to* **Above Chart** *in* **Chart Title**.

Just like text boxes, the active chart is identified with round handles on the outer edges. The Chart Elements functionality now adjusts the chart automatically based on your selection. You do still have the option to adjust elements in the chart manually.

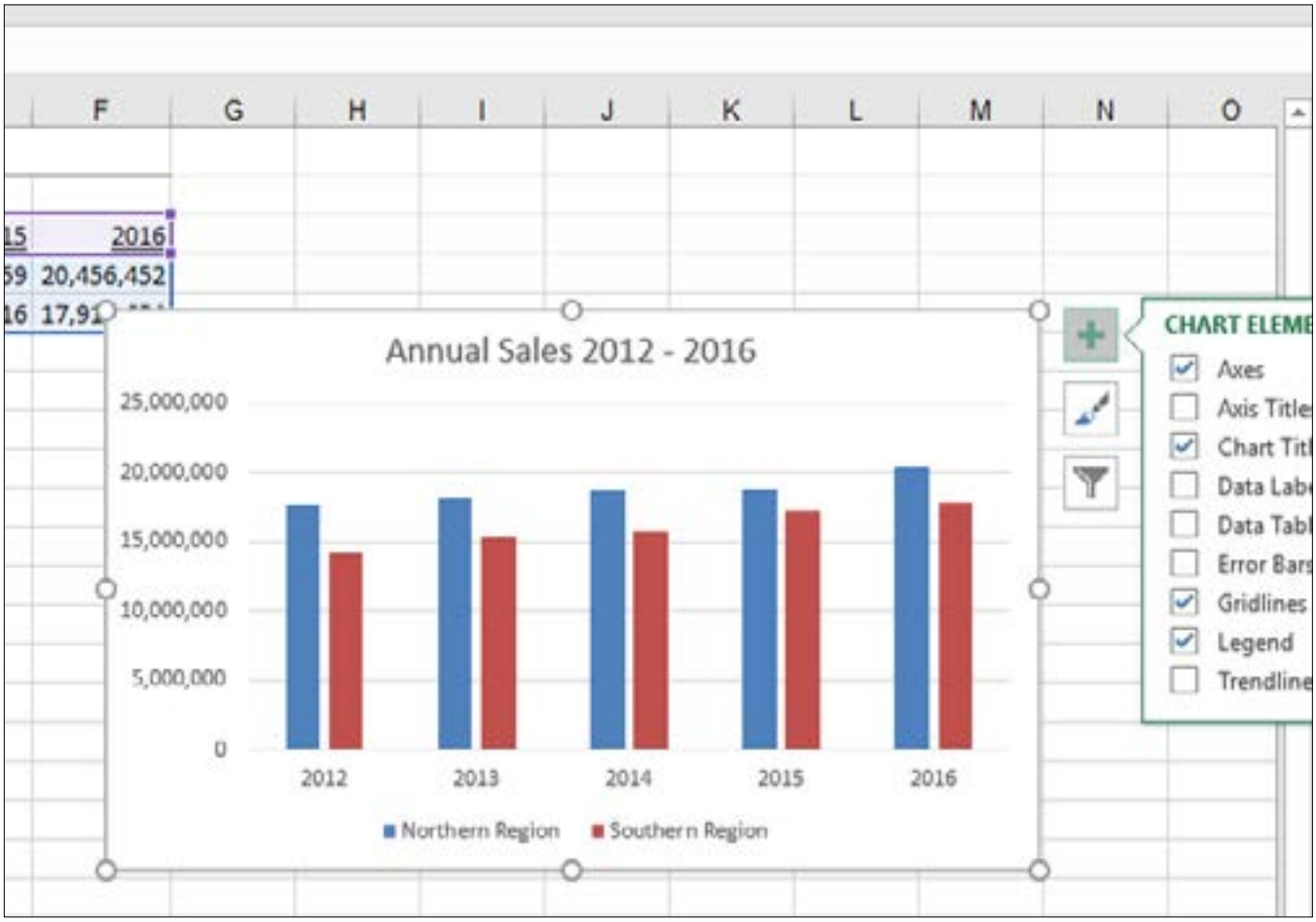


Figure 13.5

Now let's add some titles for the horizontal and vertical axes. In Excel 2016 charts, the axis on the bottom of the chart (formerly called the X axis in Excel 2003) is called the ***Primary Horizontal*** (or Category) axis. The axis on the left side of the chart (formerly called the Y axis in Excel 2003) is called the ***Primary Vertical*** (or Value) axis. The data inside the chart is referred to as the Series, grouped by Point and Value.

10. *Click the right arrow next to the* **Axis Titles** *button in the* **Chart Elements**, *and check the* **Primary Horizontal** *axis box, then click out of the* **Chart Elements** *dialog box.*

    ***Tip**: Use your mouse to hover over the different options in the dialog boxes to see previews of how those options would appear in your chart.*

11. *Click on the* **Horizontal Axis** *title text box (now visible in the chart area below the year numbers), and type* ***Year***.
12. *Click on the* **Axis Title** *right-pointing arrow in* **Chart Elements**, *and check the box to the left of* **Primary Vertical** *to activate the* **Axis Title** *Textbox to the left of the chart area.*
13. *In the* **Vertical Axis Title** *box, type* ***Sales***.

Chart Elements automatically centers Year and Sales titles on each chart axis.

14. Click anywhere outside the chart to deselect it.

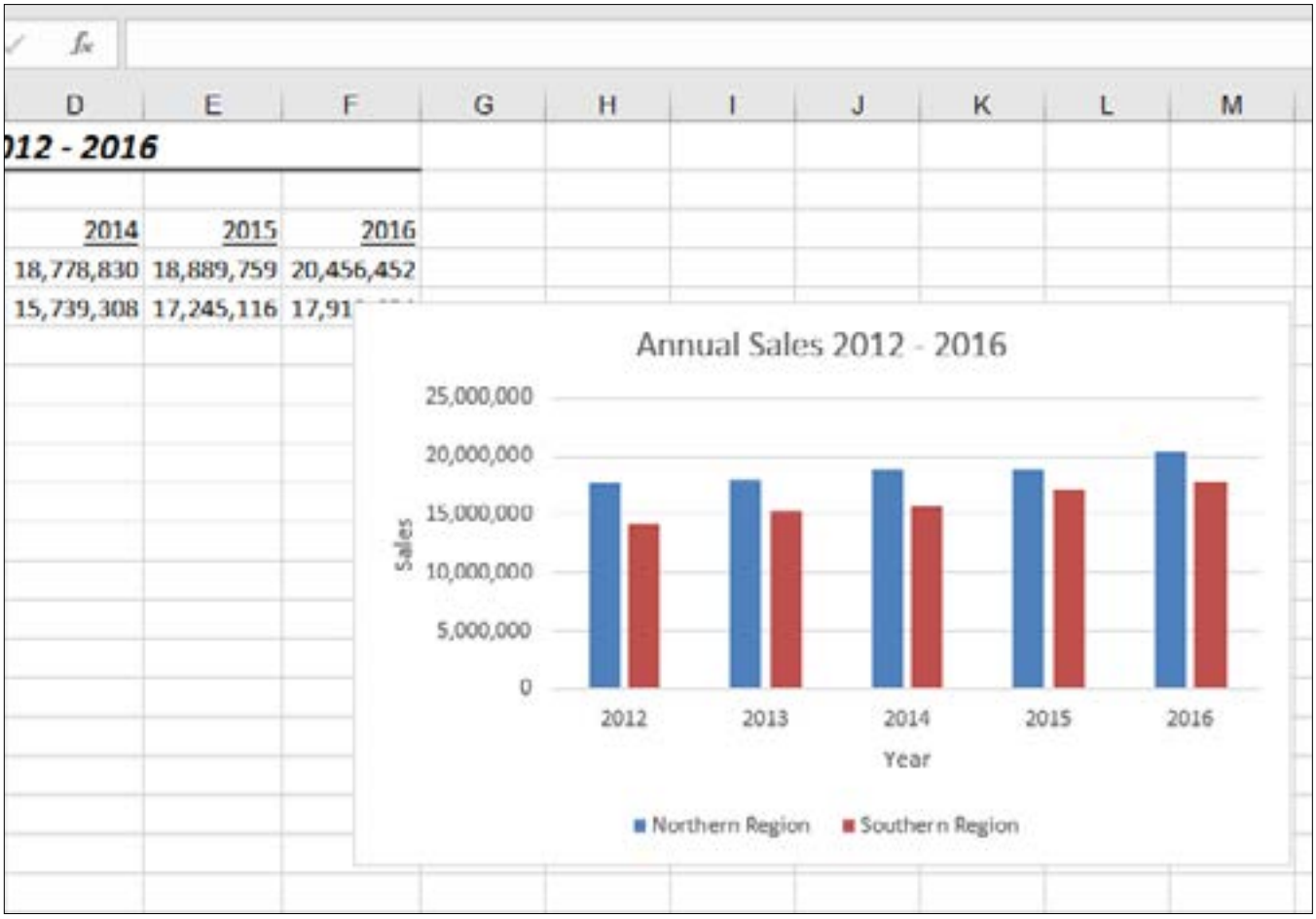


Figure 13.6

Now that our chart is done, we show it to the boss. His first reaction is, "*It looks great, but it doesn't look like sales are going up much in either region. I'd like to see it where the sales growth in every year is more pronounced within the chart. Also, I don't like the names* "Northern Region" *and* "Southern Region" *in the legend. Make them say* "North" *and* "South"*. Can you do that?*" Again, your answer is, "*I can do anything!*", and you get to work.

> ***Tip**: You can change many more features using the* **More Options…** *link, and using the* **Format** *tools box (where the* **PivotTable Fields** *box would be) for the drop-down menu option selected. Contextual tab redundancies are also available.*

First, let's change the names in the legend. Changing the names of the regions is easy:

15. Click on **Cell A4***, and change the name to* ***North****.*

Since the chart is tied to the cell, the name in the cell AND the name in the chart automatically change to North.

16. Click on **Cell A5***, and change the name to* ***South***.

The Series names are updated, and the chart legend is reformatted to accommodate the shorter names for the Series Legend Entry.

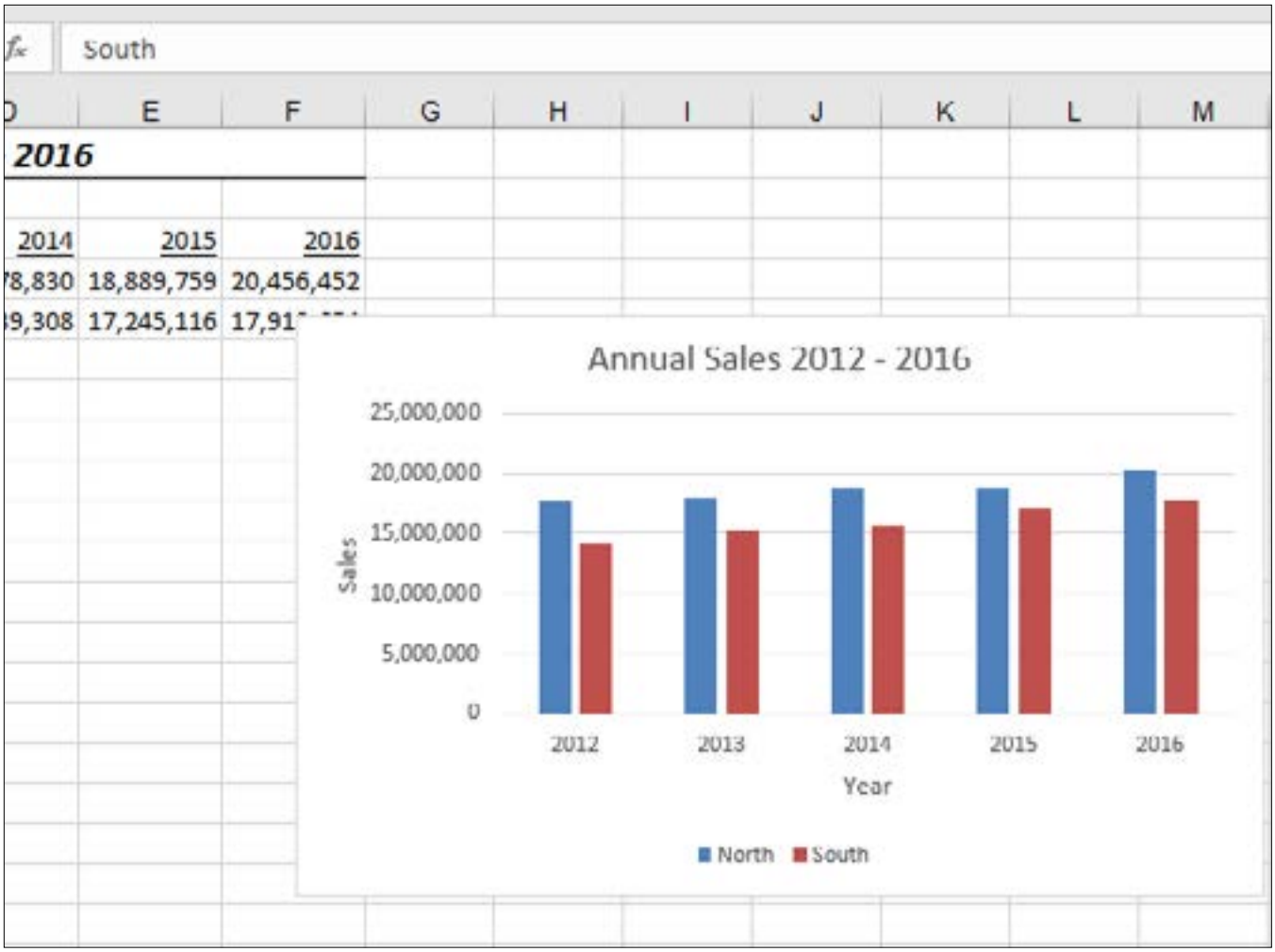


Figure 13.7

Making the sales more "pronounced" is a little more challenging, but we can do it. Perhaps the best thing to do is change the Sales scale by starting the sales figures at say $12,000,000 instead of at zero.

17. Right-click on any sales number in the **Vertical** *axis, and choose* **Format Axis…**

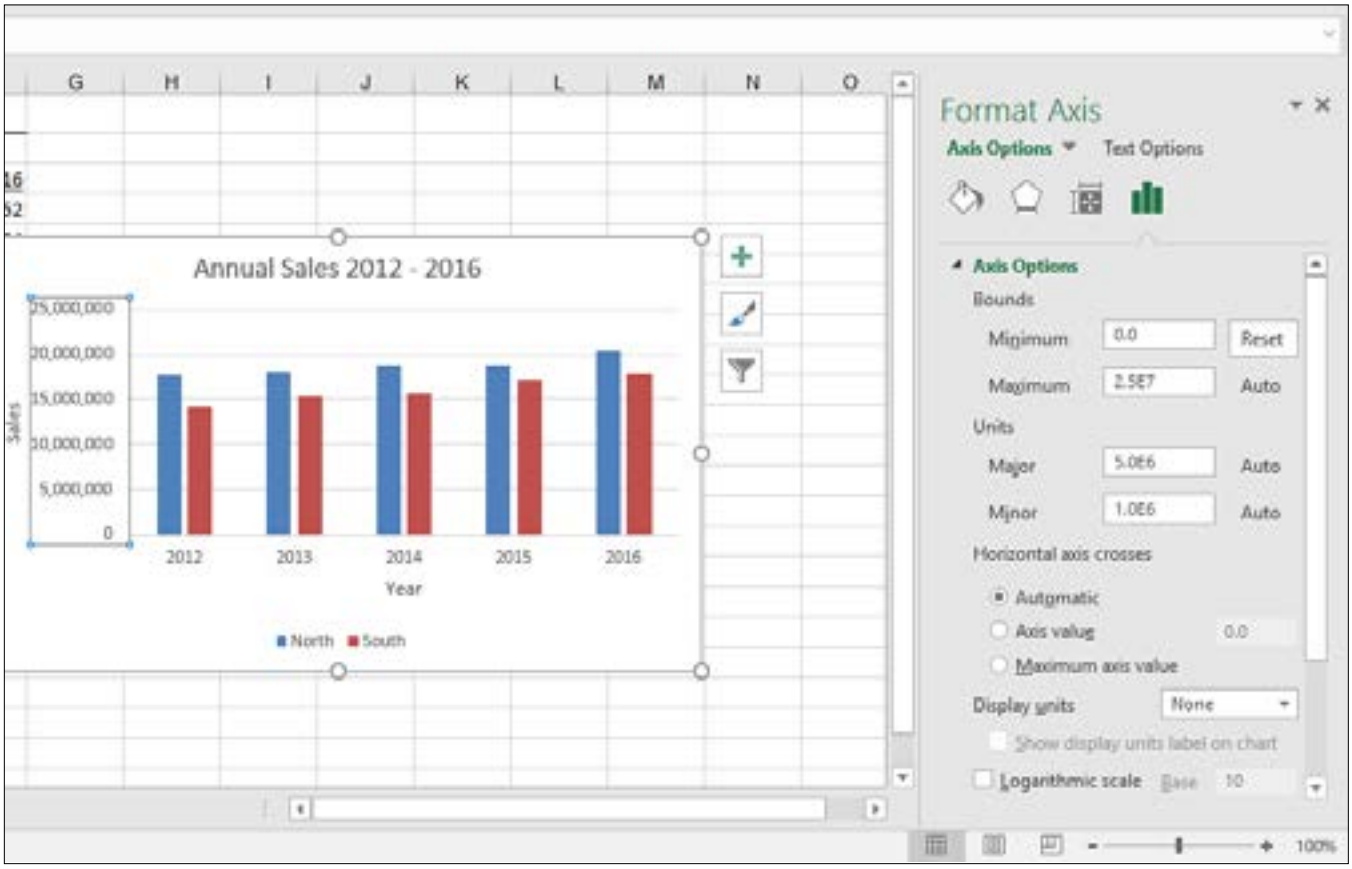


Figure 13.8

The Format Axis dialog box appears. There are numerous options in this dialog box, way too many for us to review in this exercise. You can explore the different options on your own. For now, we will change the Minimum option to be $12,000,000 and the Maximum option to $22,000,000.

18. *Click in the Text box to the right of* **Minimum** *(to activate).*
19. *In the Text box, replace* **0.0** *with* ***12000000****.*
20. *Change the* **Maximum** *box to be* ***22000000****, and make sure the* **Major Unit** *is set to* ***2000000****.*

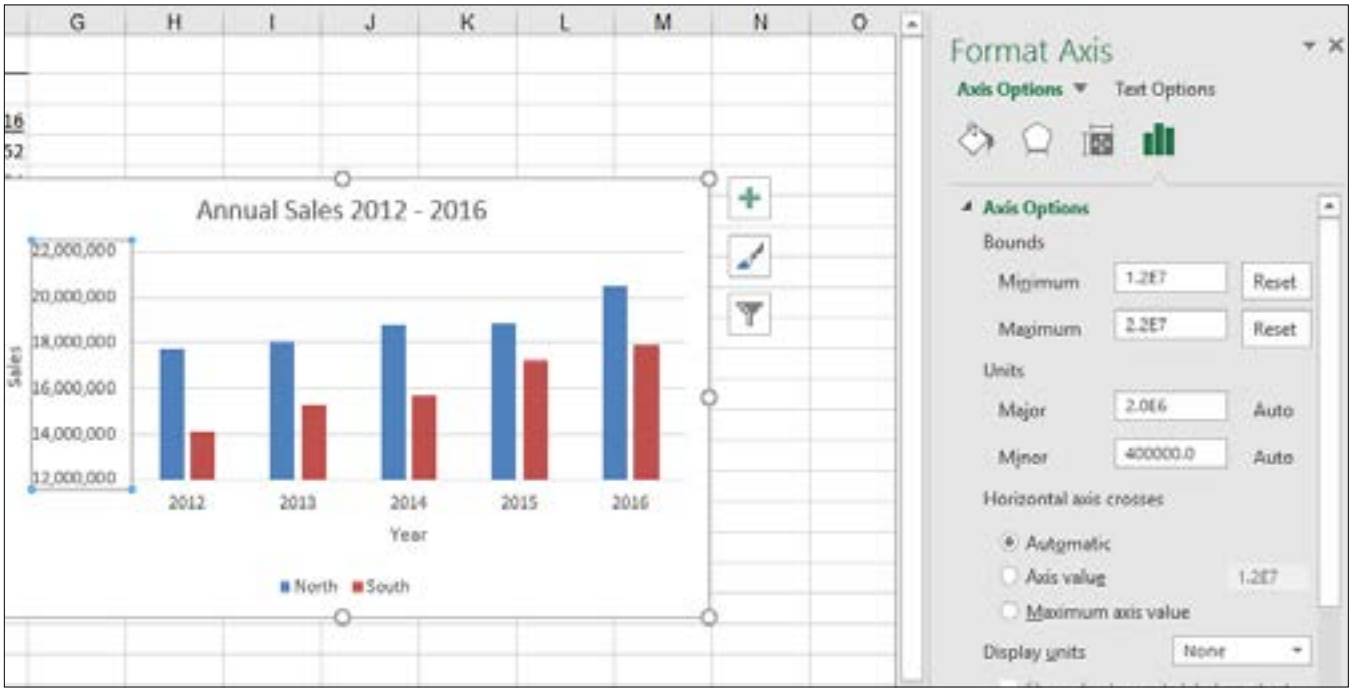


Figure 13.9

> ***Note**: You will see large numbers, such as the 12 million and 20 million we used, converted to Scientific Notation for numbers this big after you click [Enter].*

21. **Close** *the* **Format Axis** *tool box.*

The columns in the chart appear a little bolder and you can see more of a change from year to year. Let's add some more customization to the chart.

22. *Right-click in a white space within the chart but outside of the actual chart in the middle of the chart, and choose* **Format Chart Area…**

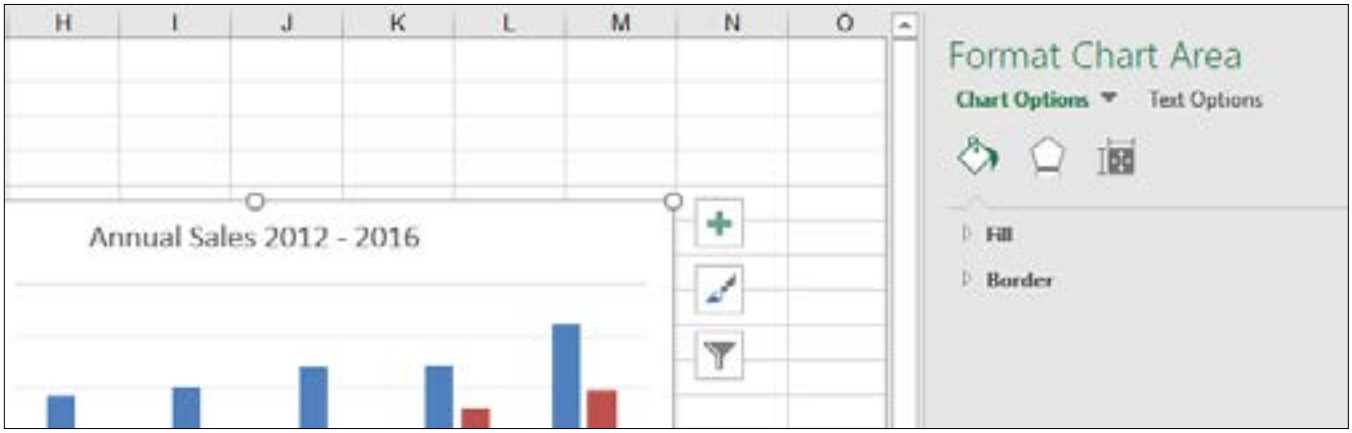


Figure 13.10

The **Format Chart Area** dialog box pops up.

23. Expand the **Fill** *option* ▷ FILL .

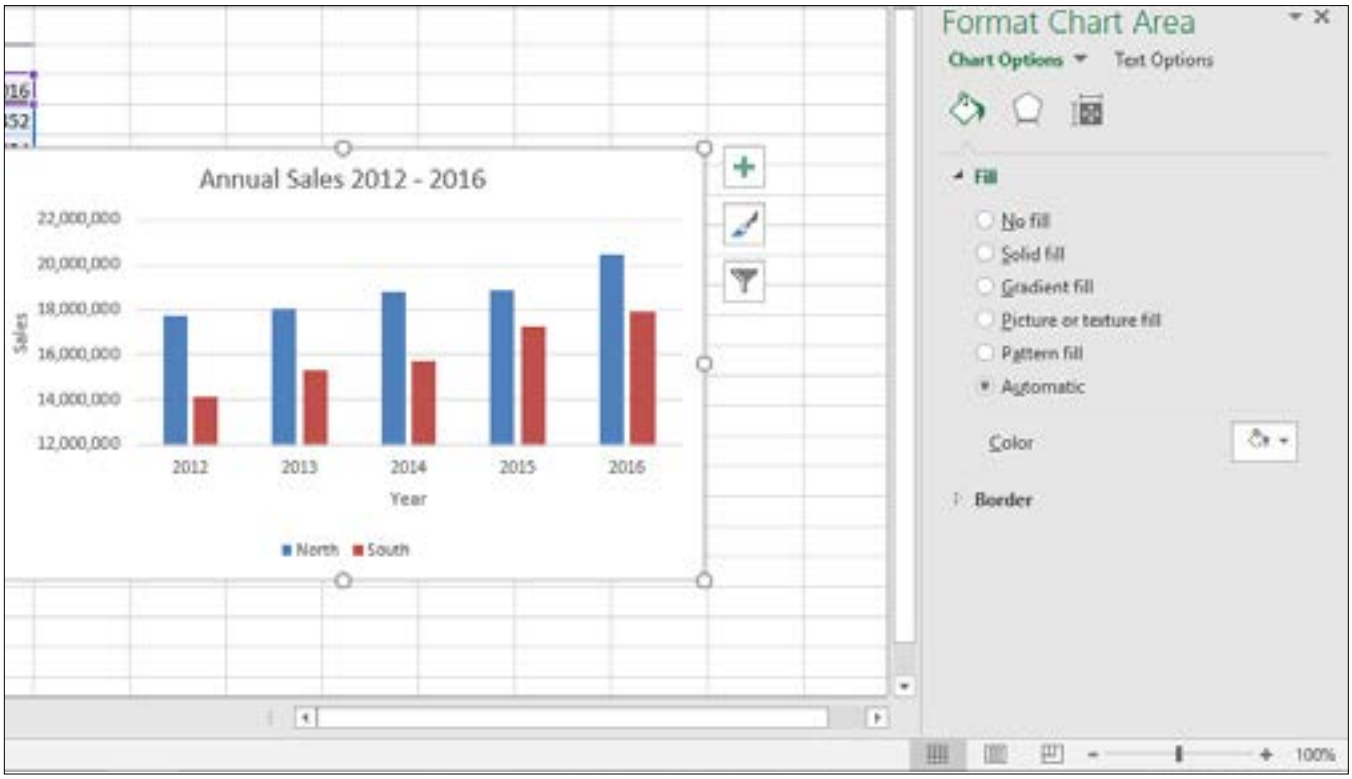


Figure 13.11

24. Click on the **Gradient fill** *radio button.*

Once you click on Gradient Fill, the Gradient Fill options appear in the section below. In the chart preview, you can see Excel also pre-fills a type of popular gradient fill option.

25. Click on the **Preset gradients** *button, choose* **Light Gradient - Accent 5** *(it should be the fifth button to the right on the top row), and click the* **Close** *"x" button to close the tool box.*

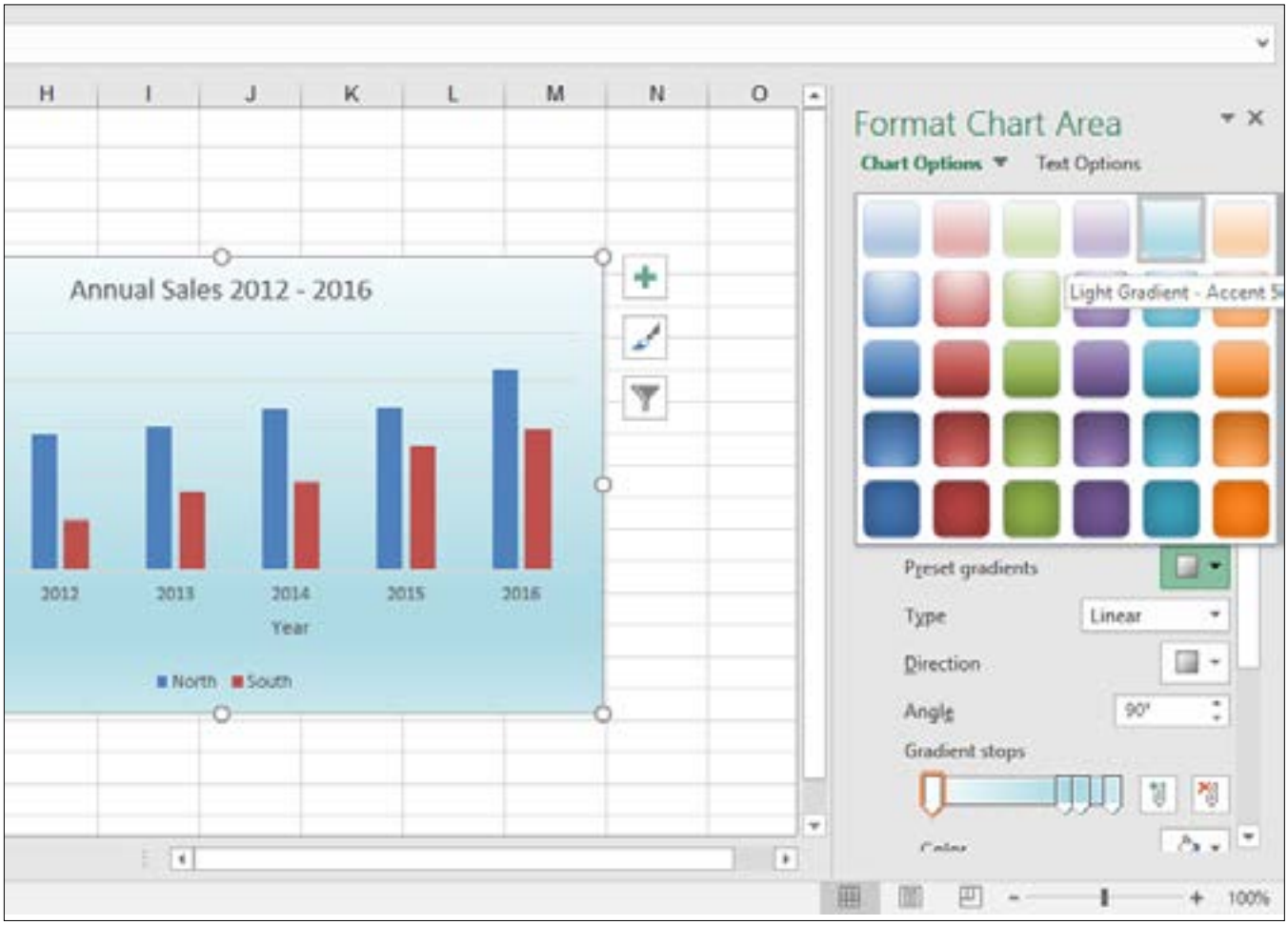


Figure 13.12

The chart is now formatted with a Light Gradient - Accent 5 background. Let's do a little more formatting.

26. *Right-click on the* **Chart Title**, *and choose* **Font…** 

27. *Choose* **Bold Italic** *under* **Font Style** *in the* **Font** *dialog box.*
28. *Click* **OK**.
29. *In the same manner, change the* **Vertical** *and* **Horizontal** *titles (***Sales** *and* **Year***) to have a* **font size of 12**.

The chart should appear like the chart image below:

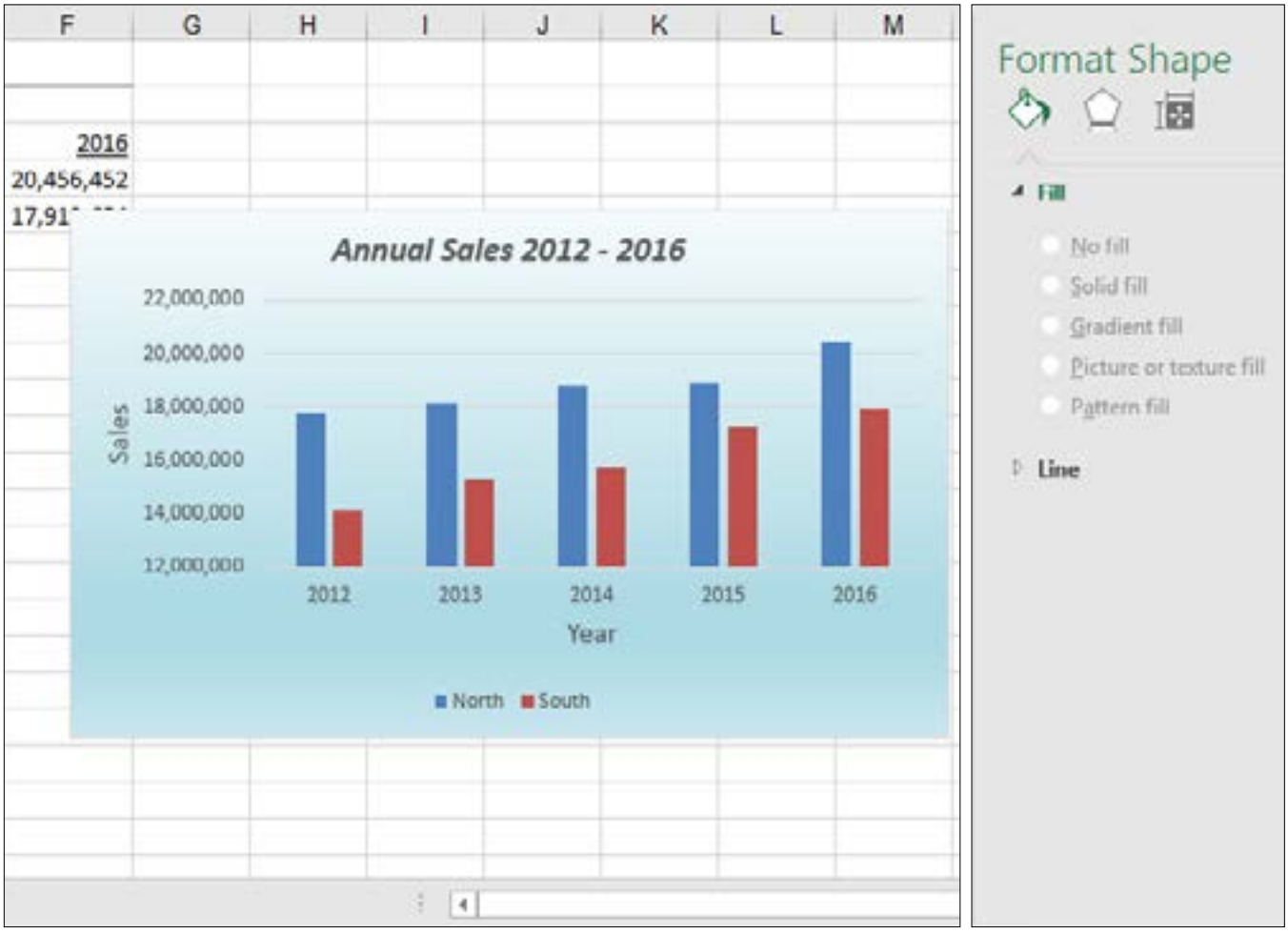


Figure 13.13

Now your chart looks much nicer. Some people, like me, prefer simple charts with little or no formatting or colors. I prefer that because I print in black and white, and black and white printers don't show colors very well. Those color toner cartridges are too dang expensive.

Positioning a Chart

Positioning or moving a chart is easy – just click and drag it.

1. *Make sure the chart area is deselected by clicking anywhere outside of the chart.*
2. *Click and hold anywhere in the blank gradient space, and drag the chart to where the upper-left corner of the chart is positioned at the upper-left corner of* **Cell A9**.
3. *Drag the right-middle sizing handle of the chart and drag the right edge of the chart to be in line with the right edge of* **Column F**.
4. *Adjust the bottom of the chart to be at the bottom of* **Row 23**.
5. *Deselect the chart.*

Figure 13.14

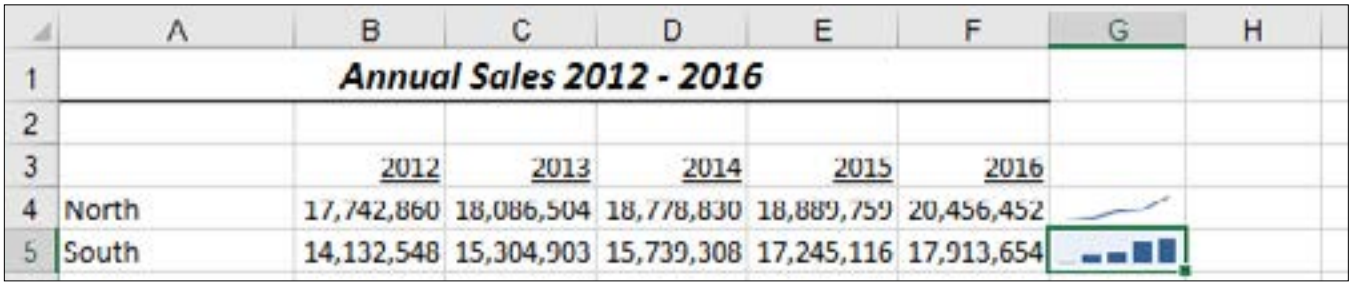
The chart should now be positioned under the table with the sales data. Keep in mind that the data in the table is tied directly to the columns in the chart, so if you change the data in the table, the chart will automatically update.

Sparklines

One of the features introduced new in Excel 2010 was sparklines. ***Sparklines*** are small, simple charts that show only one data set displayed as a Line, Column, or Win/Loss chart, and are contained in one cell. A line or column sparkline is a compact version of a line or column chart, and a win/loss sparkline shows whether a single cell's value is positive (win), negative (loss) or a zero (a tie). Let's add a line and column sparkline.

1. *Select* **Cells B4 through F4**.
2. *On the* **Insert** *tab, and in the* **Sparklines** *group, click on the* **Line** *icon.*
3. *In the* **Create Sparklines** *dialog box, the cursor should be blinking in the* **Location Range** *box.*
4. *Click on* **Cell G4** *and click* **OK**.
5. *Select* **Cells B5 through F5**, *click the* **Quick Analysis**  *icon that appears to the right of the selection, select* **Sparklines** *from the header section of the* **Quick Analysis** *dialog box, and*

choose **Column**.

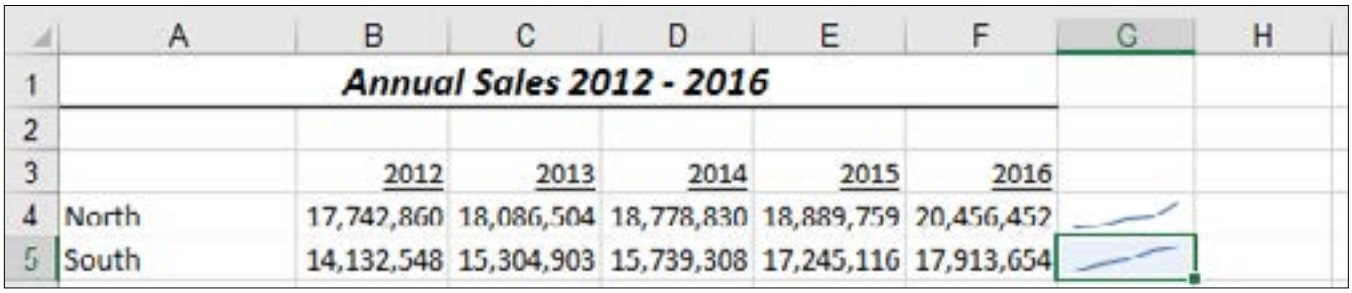


	A	B	C	D	E	F	G	H
1		Annual Sales 2012 - 2016						
2								
3		2012	2013	2014	2015	2016		
4	North	17,742,860	18,086,504	18,778,830	18,889,759	20,456,452		
5	South	14,132,548	15,304,903	15,739,308	17,245,116	17,913,654		

Figure 13.15

Now that I see the Column sparkline, I don't like it, so let's change it to a Line sparkline.

6. *With* **Cell G5** *selected, click on the* **Line** *icon in the* **Type** *group of the* **Sparkline Tools Design** *contextual tab.*



	A	B	C	D	E	F	G	H
1		Annual Sales 2012 - 2016						
2								
3		2012	2013	2014	2015	2016		
4	North	17,742,860	18,086,504	18,778,830	18,889,759	20,456,452		
5	South	14,132,548	15,304,903	15,739,308	17,245,116	17,913,654		

Figure 13.16

> ***Note**: Sparklines are a cool tool for quickly visualizing your data (which is a major benefit of charts), but use Sparklines sparingly. If you find yourself using too many Sparklines, consider using a regular chart to avoid unnecessary clutter.*

Add a Trendline

While looking at our chart, enhanced by the Sparklines, it looks like sales are going up each year. What do you think sales will do in 2017 or 2018 if they stay at the same rate of growth? We can use a trendline to show us. A ***Trendline*** is a graphical representation of trends in a data series, such as sales over a period of years.

1. *Click in the chart area to activate edit mode.*
2. *In* **Chart Elements**, *check the box next to* **Trendline**.
3. *Click the right-facing arrow next to* **Trendline** *to open the* **Add Trendline** *dialog box.*
4. *Choose* **North**, *then click* **OK**.

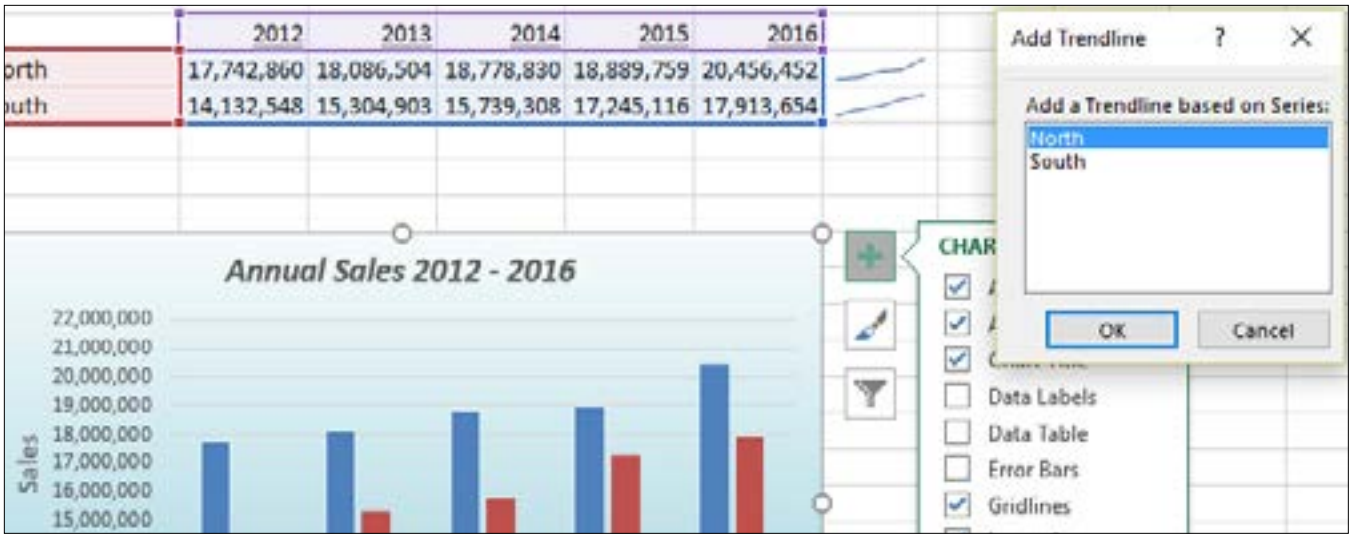


Figure 13.17

Figure 13.18

When using a Trendline, most people use a Linear type. That is because most people really don't understand the other types (Exponential or Two Period Moving Average). In this exercise, we want to forecast a linear trend over two periods, so we should use the Linear Forecast Trendline.

5. *Click on the* **Undo** *button (to remove the first Trendline we created).*
6. *Create a* **Trendline** *using the* **Linear Forecast Trendline** *option for the* **North** *and* **South**.

Chart Elements has centered and aligned the chart, the title, the axis labels and titles, and even the Legend, which is below the chart. Remember that each element in the chart is customizable, and can probably suit your charting interests.

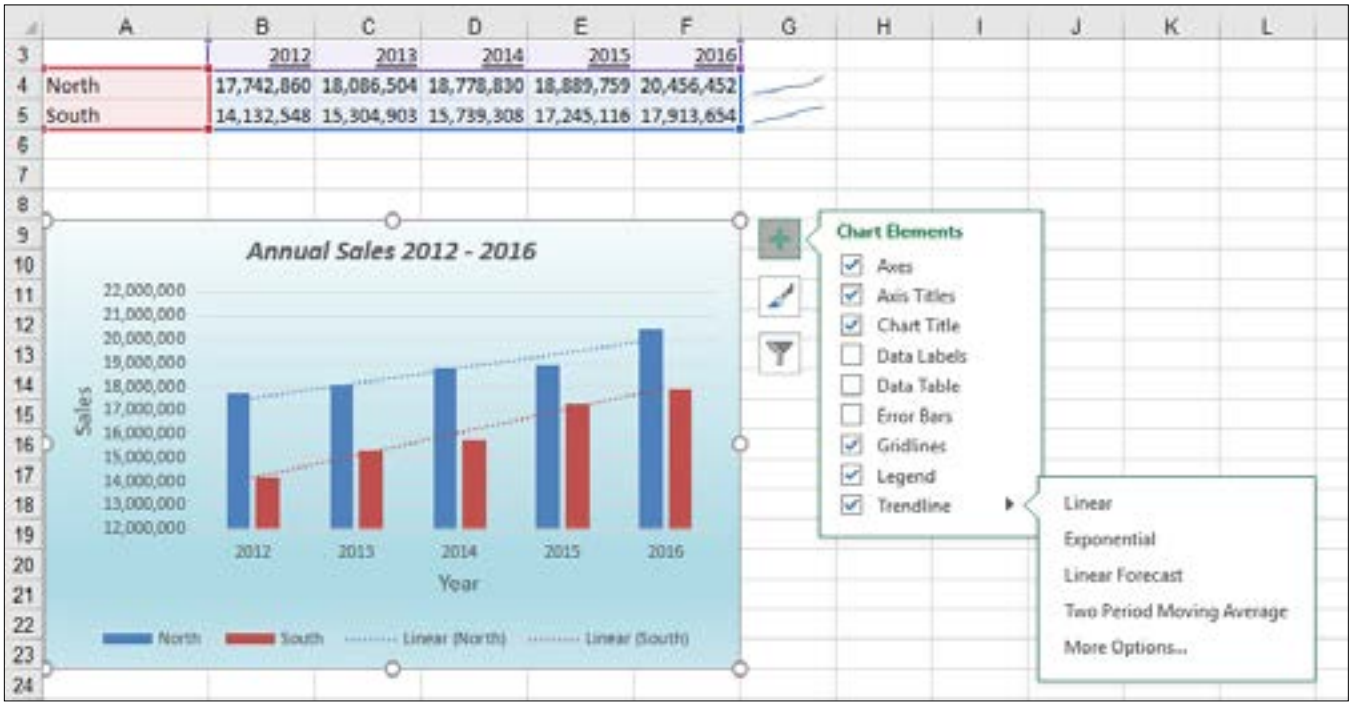


Figure 13.19

8. *Deselect the chart.*

The trendlines show that the North's sales are increasing, but the rate of growth for the South is noticeably faster. It looks like they should intersect at about the Year 2022, if the trend continues.

> ***Tip**: Check out the various icons in the* **Chart Tools Design** *tab, particularly those in the* **Type**, **Data**, *and* **Chart Layouts** *groups, or from the* **Format Trendline** *tool box. These tools can speed up your chart development significantly.*

> ***Review Questions**: It is now time to complete the hands-on Review Questions. Log on to www.ExcelCEO.com with your Email address and Password, click on the* **Excel 2016 Review Questions, Chapter 13, Section 1 of 2** *option in your Main Menu, and complete the Review Questions.*

Pie Charts

Another chart type that is very useful is a pie chart. ***Pie charts*** are named for their shape, and typically illustrate divisions by percentage. Companies love to use pie charts to view the distribution of sales, assets, or a host of other business measures. Used correctly, Pie charts can significantly enhance a presentation, or simply help you make more informed decisions.

1. *Click on the* Pie *tab in the workbook.*

	A	B	C	D	E	F	G	H	I	J	K
1	State	16 Sales									
2	DC	6,644,303									
3	MD	6,549,469									
4	NC	3,922,261									
5	NJ	4,664,761									
6	NY	4,421,623									
7	PA	11,032,022									
8											

Figure 13.20

This is a simple table that represents 2016 sales in each state.

2. *With your cursor on any cell within the chart, click on the* **Insert** *tab, then click on the* **Pie** *icon*  *in the* **Charts** *group.*
3. *Choose the first option (***Pie***).*

Figure 13.21

Excel automatically inserts a Pie chart with a legend below based on the data table. As with the Column chart (or any other chart), we need to do some formatting to the automatic chart Excel gave us. We'll rename the title of the chart to 2016 Sales by State and make the sections of the pie chart easier to read.

4. *Click on the* **16 Sales** *chart title and rename it* ***2016 Sales by State****.*
5. *In the* **Chart Elements box***, click the* **Data Labels** *right-facing arrow, and choose* **More Options…**

The Format Data Labels box appears on the right, as shown in the following figure:

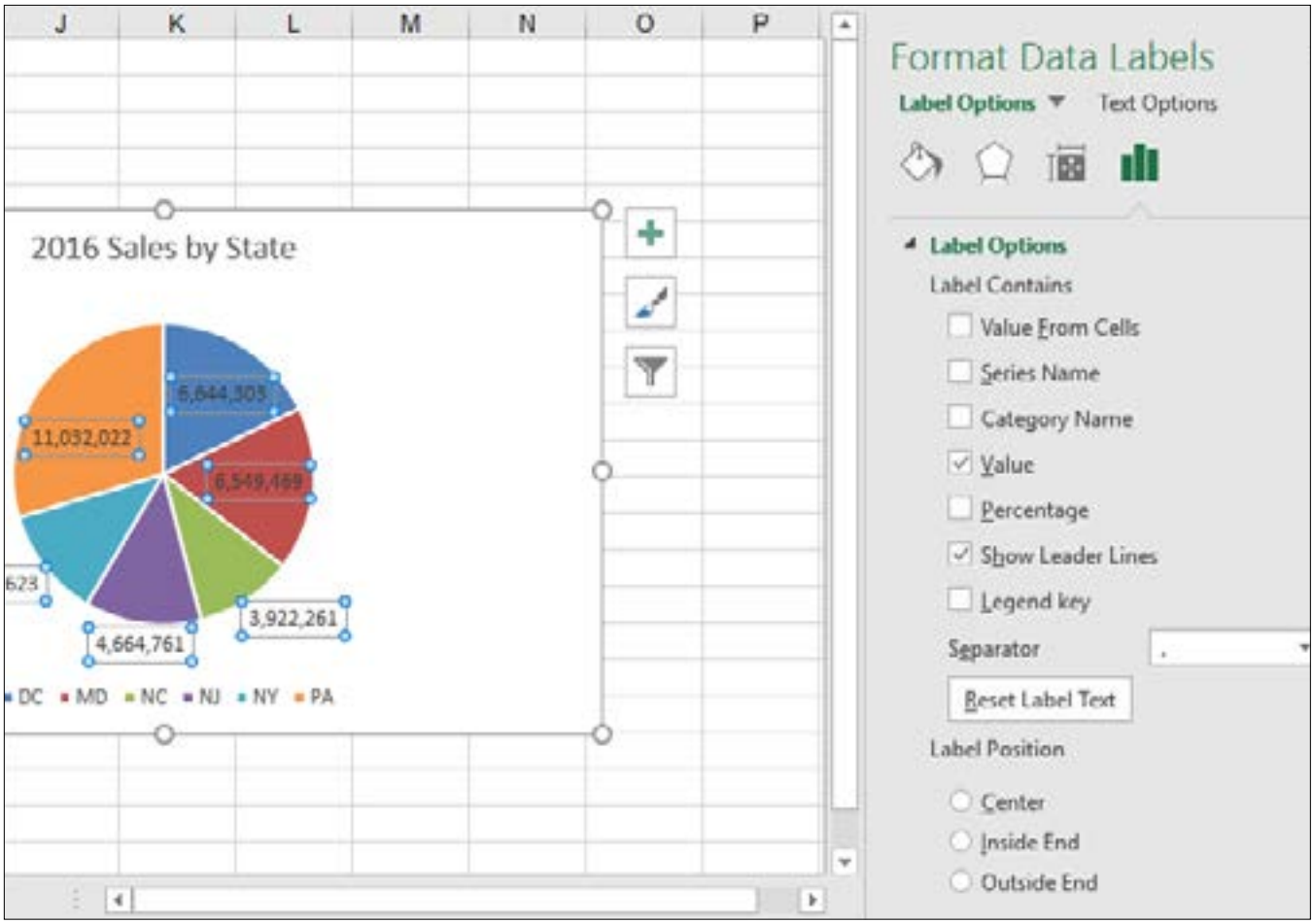


Figure 13.22

The Label Options group opens with Label Options expanded. Within the Format Data Labels tool box, you have Label Options and Number sub-categories (vertically) with Text Options to the right of Label Options, and several options within those groups for customizing your labels and text. Explore these groups to see the many ways you can customize the appearance of your data labels.

6. *In the* **Label Contains** *group, check the* **Category Name** *and* **Percentage** *boxes, and uncheck the* **Value** *box.*
7. *In the* **Label Position** *group below, click the* **Outside End** *radio button.*
8. *Click the small "x" in the top-right of the tool box to* **Close** *(not to be confused with the X for closing the Excel workbook).*

With the percentages under each state in the Pie chart, you really don't need the Legend, so you can get rid of it.

9. *Click on the legend box below the chart, and delete it.*
10. *Reposition the chart to be to the right of the data.*

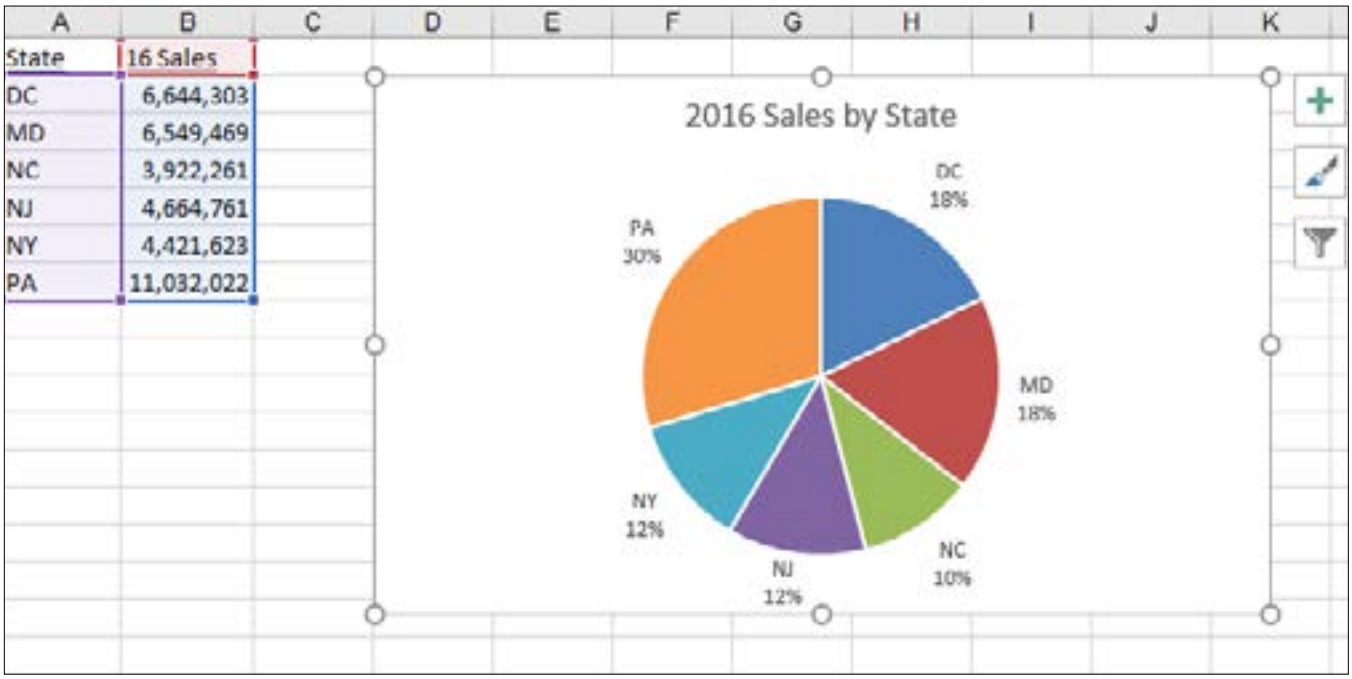


Figure 13.23

This chart is looking better, but it could still use some improvement. Chart Elements has more functionality to help, including Chart Styles and Chart Filters. As you might guess, Chart Styles allows you to see how your chart would look with different formats using a preview and select option, and you can also change the color themes in this tool box. Chart Filters makes it possible to exclude data, or columns of data from the chart, if you want to show your data in a different way.

11. *Open the* **Chart Styles** *group of* **Chart Elements** *(Click on the paint brush icon below the plus sign), and scroll down to* **Style 9**, *and select it.*

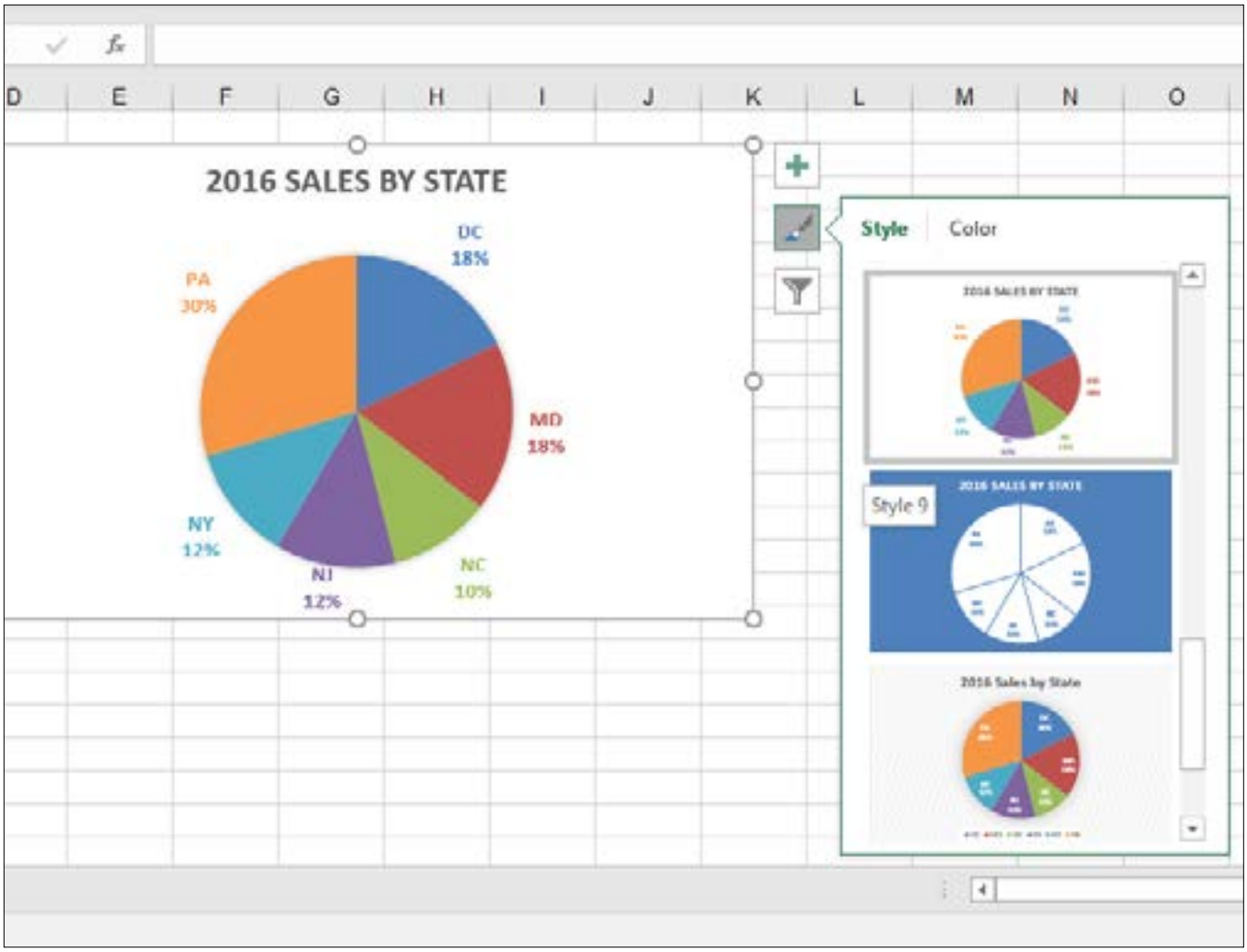


Figure 13.24

Now your chart has color-matching labels and no white lines to separate the slices in the pie. As you hover over the other style choices, you can see previews of how your chart would look.

You can see that PA is still a large part of the sales pie chart. Let's make PA stand out more in this chart.

12. *With the chart activated, click twice (with a pause between clicks) in the* **Series** *area, on the* **PA** *slice of the pie to select only that slice, then right-click on the selected pie slice for* **PA**.
13. *At the bottom of the menu, click* **Format Data Point...**
14. *In the* **Format Data Point** *tool box, in the* **Series Options** *group, slide the* **Point Explosion** *bar to* **9%**.

> ***Note:*** *You can also type specific values in the boxes to the right of the sliders, including the option for changing the rotation degrees of the Pie chart by using its* **Angle of first slice** *option.*

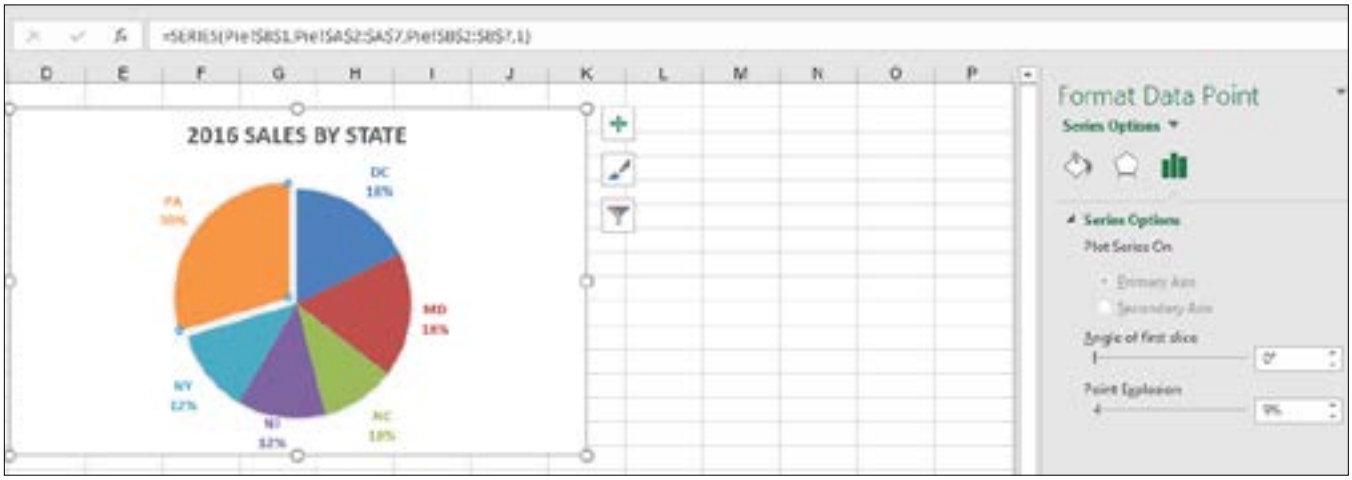


Figure 13.25

The PA slice of the pie chart is now moved away from the chart by nine percent (9%).

15. **Save** *and* **close** *the* **myAnnual_Sales.xlsx** *file.*

Chart Elements contains so many options and tool boxes for you to explore and make charts and presentations that best fit your needs. As usual, I encourage you to keep exploring this functionality.

PivotChart Reports

Since you are now an expert with PivotTables, you can create a chart using a PivotTable as the data behind the chart, and make it interactive. This is called a ***PivotChart*** report. It's easy to do, and you can build the chart while you're building the PivotTable, or even begin the PivotChart directly in Excel 2016. Let's build a PivotChart using the PivotTable.

1. **Open** *the file* **C:\ExcelCEO\Excel 2016\Chapter13\Sales_Summary.xlsx**.
2. **Save As C:\ExcelCEO\Excel 2016\Chapter13*mySales_Summary.xlsx***.

	A	B	C	D	E	F	G	H	I
1	Store_No	City	State	Region	Year	Month	Category	Sales	
2	1021	Washington	DC	Southern Region	2014	11	Merchandise	31,752	
3	1021	Washington	DC	Southern Region	2014	10	Warranty	548	
4	1021	Washington	DC	Southern Region	2014	6	Warranty	612	
5	1021	Washington	DC	Southern Region	2014	8	Merchandise	75,461	
6	1021	Washington	DC	Southern Region	2014	11	Warranty	481	
7	1021	Washington	DC	Southern Region	2014	10	Delivery	1,215	
8	1021	Washington	DC	Southern Region	2014	2	Warranty	759	
9	1021	Washington	DC	Southern Region	2014	4	Merchandise	29,786	

Figure 13.26

This is basically the same table format that you used to create a PivotTable in Chapters 11 and 12. In creating a PivotChart, you will build the PivotTable and the chart will automatically be built as you build the PivotTable.

3. *Click inside the data table on the* 14 - 16 Summary *worksheet.*
4. *On the* **Insert** *tab, in the* **Charts** *group, click the drop-down arrow below the* **PivotChart** *icon.*
5. *Select* **PivotChart & PivotTable**, *make sure the* **New Worksheet** *radio button is selected, and click* **OK**.
6. *Format* **PivotChart Fields** *to show* **Year** *in* **Legend (Series)** *Columns,* **Region** *in* **Axis (Categories)** *Rows, and* **Sales** *in* **Values**.
7. *In the data table, format the* **Sales** *data as* **Number**, **zero decimal places**, *and* **Use 1000 Separator (,)**.
8. *Rename each column* ***2014 Sales***, ***2015 Sales***, *and* ***2016 Sales***, *and resize the columns to fit.*
9. *Reposition the chart under the* **PivotTable**.
10. *Uncheck the* **Grand Totals for Columns** *and* **Grand Totals for Rows** *check boxes in the* **Totals & Filters** *tab of the* **PivotTable Options** *dialog box from the* **Analyze** *tab.*
11. *Select the* **PivotChart**.

Your screen should look similar to the following image:

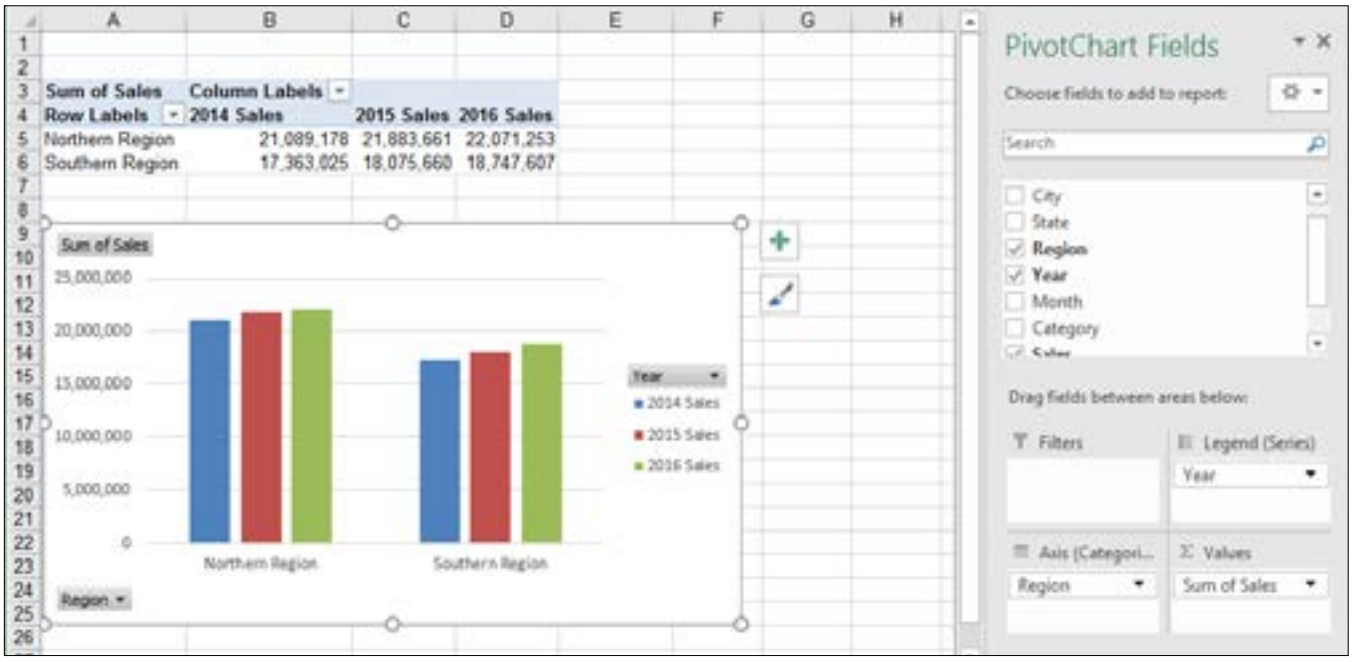


Figure 13.27

At this point, you can click on the chart and format it just like any other chart. The data in the chart is related to the PivotTable data. And in the PivotTable Fields list, Columns is replaced with Legend (Series), and Rows is replaced with Axis (Categories). But the chart doesn't tell us too much at this point, does it? Let's rearrange the PivotTable to have it show sales by state instead of by region.

11. *Take out* **Region** *in the* **Axis (Categories)** *section and replace it with* **State**.
12. *Reposition the chart to see all of the data in the* **PivotTable**, *if necessary.*

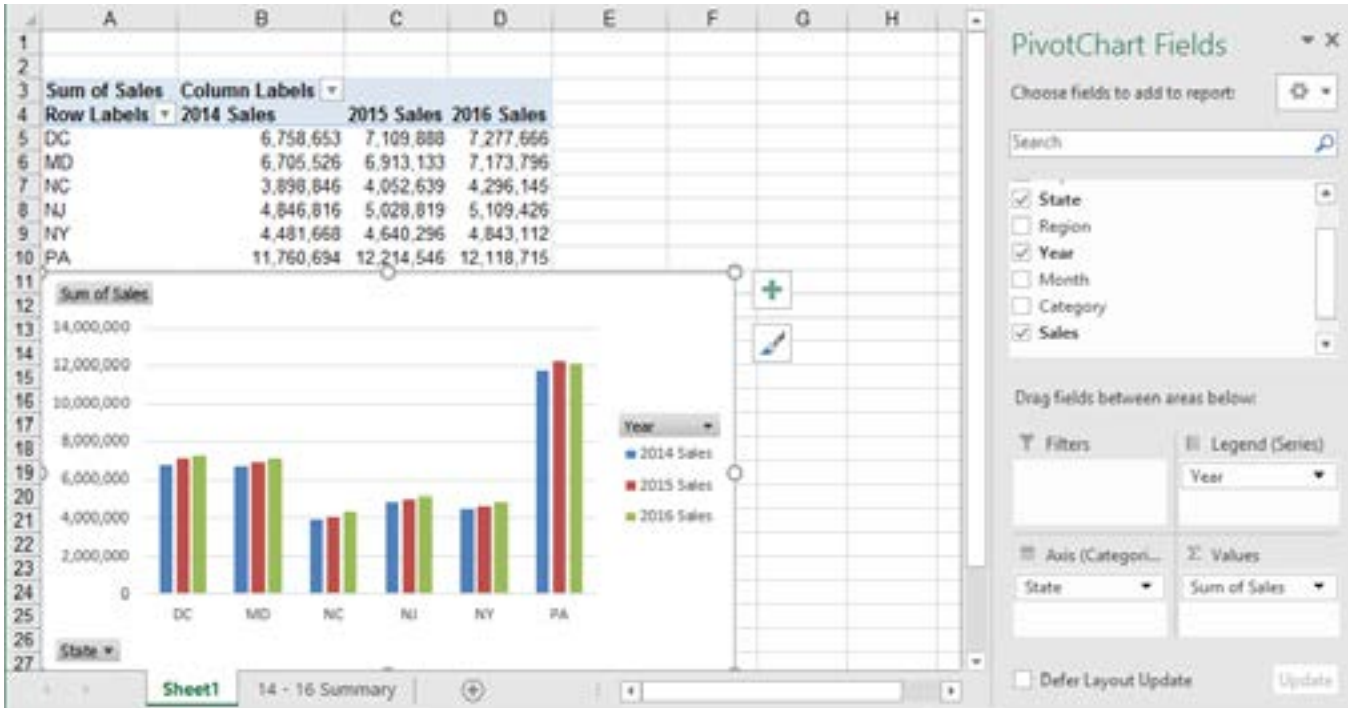


Figure 13.28

Clearly, PA has the largest amount of annual sales with a slight decline in 2016, with DC and MD running neck and neck for second and third places. A PivotChart is good for visual data, and data can be grouped into any sub-category that exists in the original table.

13. **Save** *and* **close** *the* **mySales_Summary.xlsx** *file.*

PivotCharts are a very convenient way to create and manipulate charts in a fast and effective manner. Just remember that you can double-click and right-click just about anything you want to change. Use the Design and Layout contextual tabs that come with chart development. And always remember that you can click the Undo to correct your mistakes.

SmartArt Graphics

Do you remember how we created a flowchart by using objects in the Insert tab? Excel has similar, pre-formatted charts that are accessible by using the SmartArt functionality. In SmartArt, there are many types of diagrams that can be useful to an organization. You can access these objects from the Insert tab, or you can search for features using the Tell me what you want to do box, which is similar to using Cortana in Windows 10, and new for Office 2016.

1. **Open** *a* **Blank workbook** *and* **Save As** ***mySmartArt.xlsx*** *in the* **C:\ExcelCEO\Excel 2016\Chapter13** *folder.*

2. *On* **Sheet1**, *click in the* **Tell me what you want to do** *box to the right of the* **Office Ribbon** *tab names, and type* ***SmartArt*** *, then select the* **Insert SmartArt** *drop-down option.*

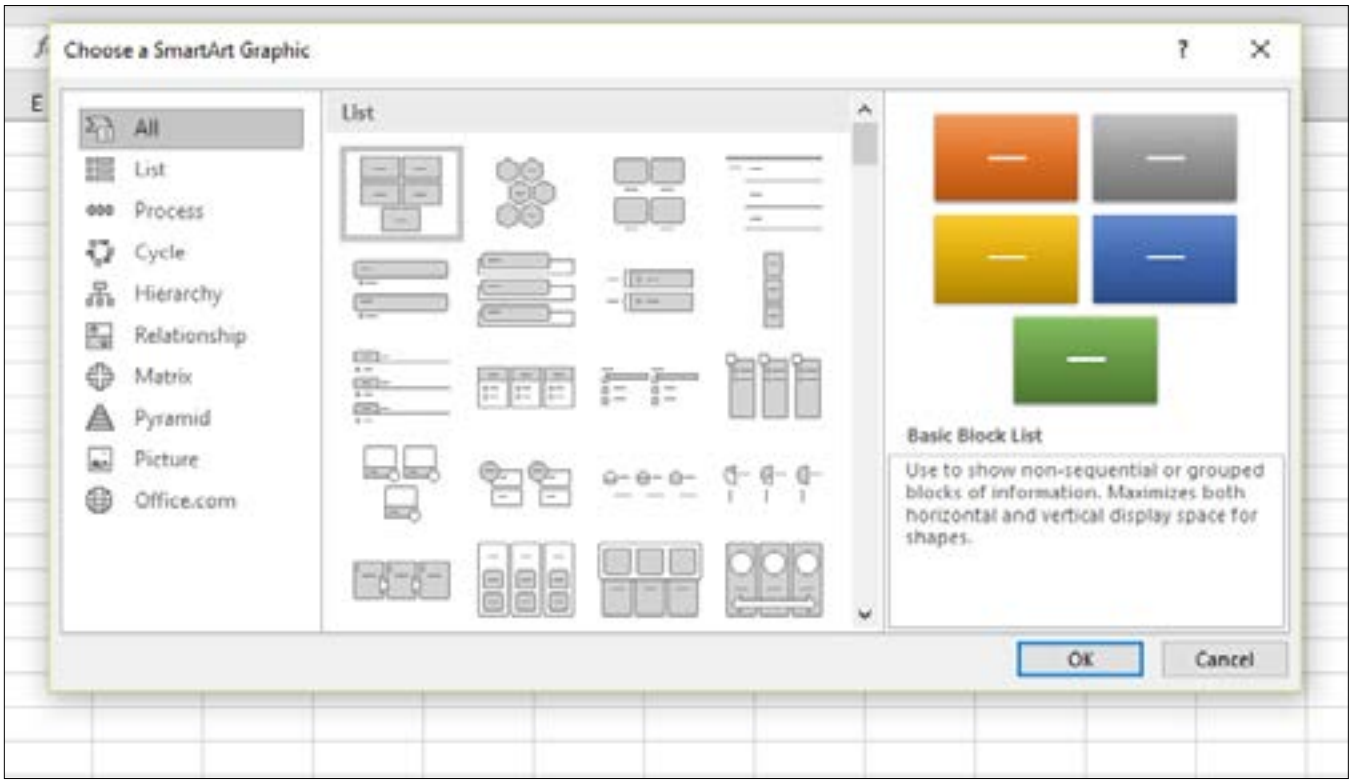


Figure 13.29

The Choose a SmartArt Graphic dialog box appears. As you can see, there are many types of SmartArt objects from which to choose. Feel free to click on each one to see what it does, and play around with each, if you think it would be useful to your organization. For the next exercise, we'll use the Organization Chart object in the Hierarchy section.

3. *Click on* **Hierarchy** *in the left section of the dialog box, then click on* **Organization Chart** *(the first object) in the middle section, and click* **OK**.

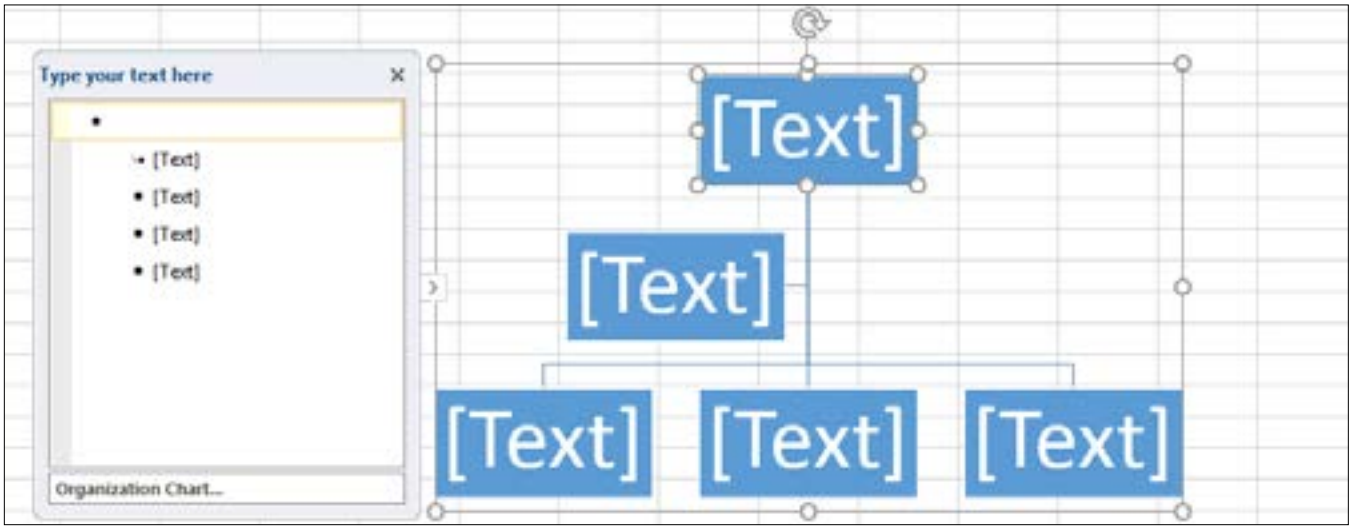


Figure 13.30

You use the SmartArt objects just like charts or other objects. The sizing handles on the corners and middle of the outside edges of the chart make it easy to resize and position the chart exactly how you want it. We will now create an organization chart.

4. *With the first box (on top) selected, type* ***President*** *in the* **Type your text here** *dialog box.*

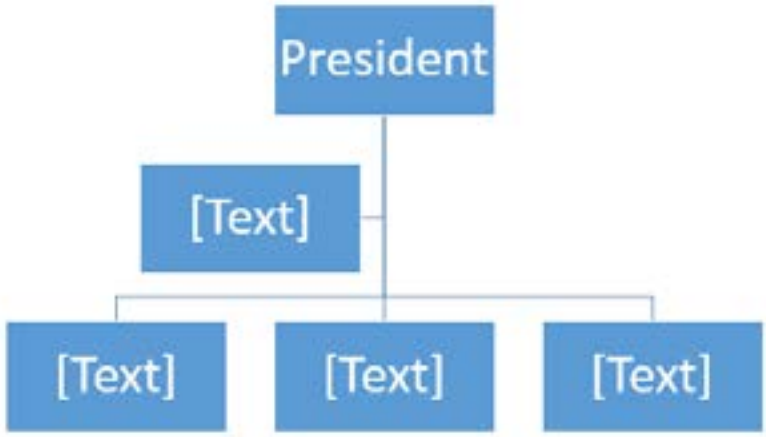


Figure 13.31

Notice that as you type, the sizes of all the boxes change to accommodate the text.

5. *Click on the* **[Text]** *box under* **President** *and type* ***President Assistant****.*
6. *In the lower three boxes, type* ***Vice President of Sales****;* ***Vice President of Purchasing****;* ***Vice President of Operations****.*
7. *Click outside the* **Organization Chart** *to deselect it.*
8. *Take off the gridlines on the spreadsheet by clicking on the* **File** *tab, click on* **Options***, click on the* **Advanced** *section, and uncheck the* **Show Gridlines** *box in the* **Display options for**

this worksheet: *section. (An option is also available in the* **Sheet Options** *group of* **Page Layout**.*)*

9. *Click* **OK**.

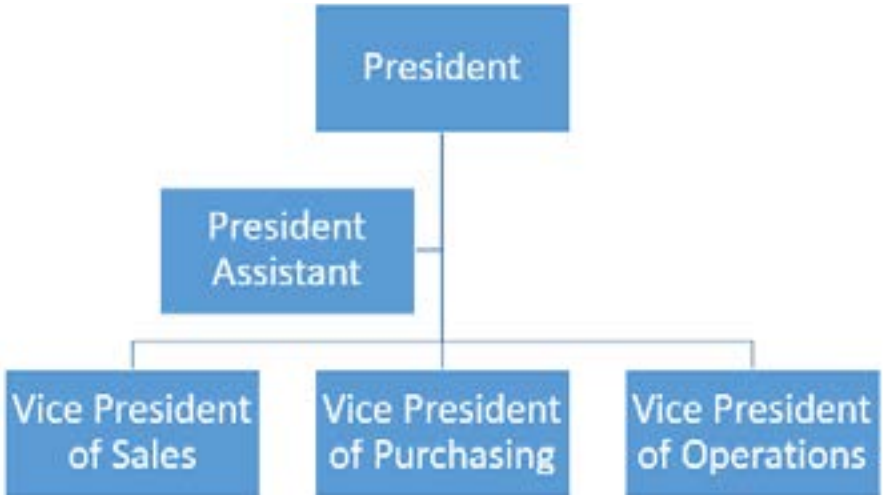


Figure 13.32

Now let's add some more levels.

10. *Right-click on the* **Vice President of Operations** *box, point to* **Add Shape**, *and choose* **Add Shape Below**.

Notice that all the objects in the entire box become smaller. That is because Excel had to add the new box into the area defined by the organization chart. To make the boxes larger or smaller, simply adjust the outside edges of the chart itself.

11. *In the new box, type* ***Director, Accounting***.
12. *Below* **Director, Accounting**, *create an* **Add Assistant** *box called* ***Director, Accounting Assistant***.

You should get the picture now. You should be able to complete the rest of the chart on your own.

13. *Under* **Director, Accounting**, *create a box for* ***Manager, General Ledger***.
14. *Create another box under* **Director, Accounting** *called* ***Manager, Accounting Systems***.
15. *Drag the* **Manager, Accounting Systems** *box over to the left to be on the same level as* **Manager, General Ledger**.
16. *Resize the* **President** *box to be larger than the others (our president has a real big ego).*
17. *Resize the organization chart as you work on it to fit all of the text boxes, then click outside the diagram to deselect it.*

Your diagram should now look something like this:

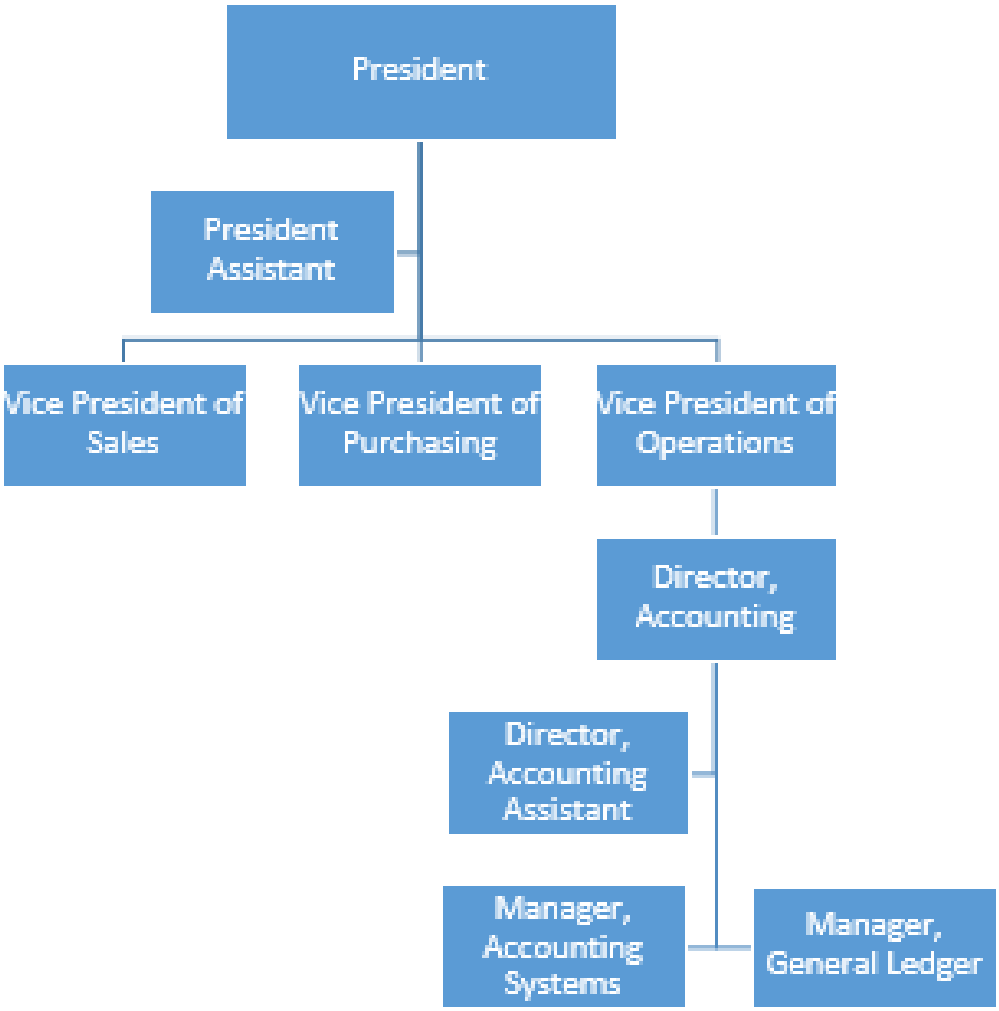


Figure 13.33

18. **Save** *the* **mySmartArt.xlsx** *file*

Many people use costly programs to create these types of charts, but I really like Excel's built-in tools.

Importing Objects

To finish up the chapter, let's talk a little about ***importing*** objects to and ***exporting*** objects from an Excel file. In this first example, we'll import a slide from a PowerPoint presentation into a blank Excel spreadsheet.

1. *Click the* **New sheet** *icon to create* **Sheet2** *of the* **mySmartArt.xlsx** *file.*
2. *On the* **Insert** *tab, click on the* **Object** *button in the* **Text** *group.*

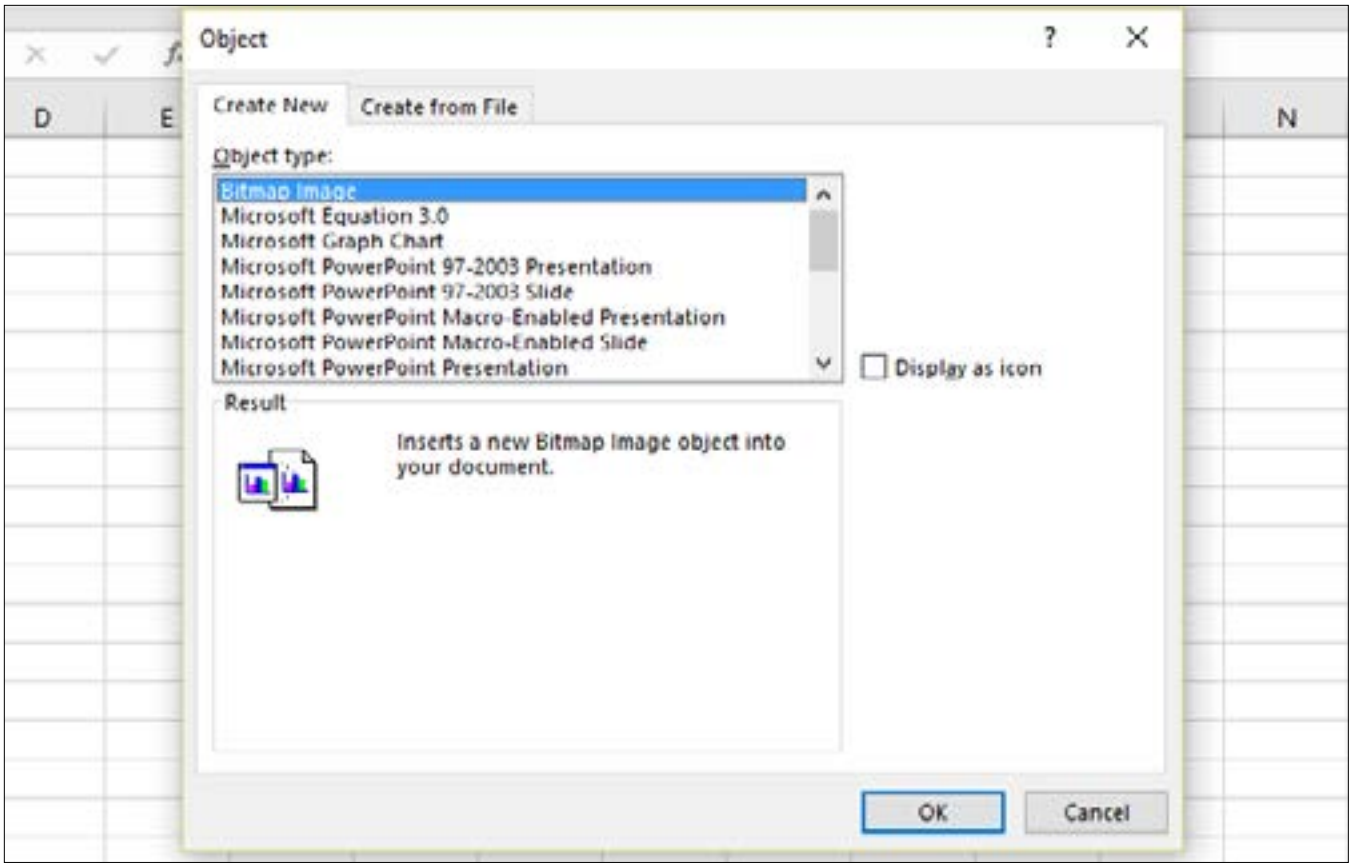


Figure 13.34

The Object dialog box appears.

3. *Click on the* **Create from file** *tab, and click the* **Browse...** *button.*
4. *Navigate to the* **C:\ExcelCEO\Excel 2016\Chapter13** *folder, click on* **AnnualReportCover.pptx**, *and click* **Insert**.
5. *In the* **Object** *dialog box, check the* **Link to file** *check box, and click* **OK**.

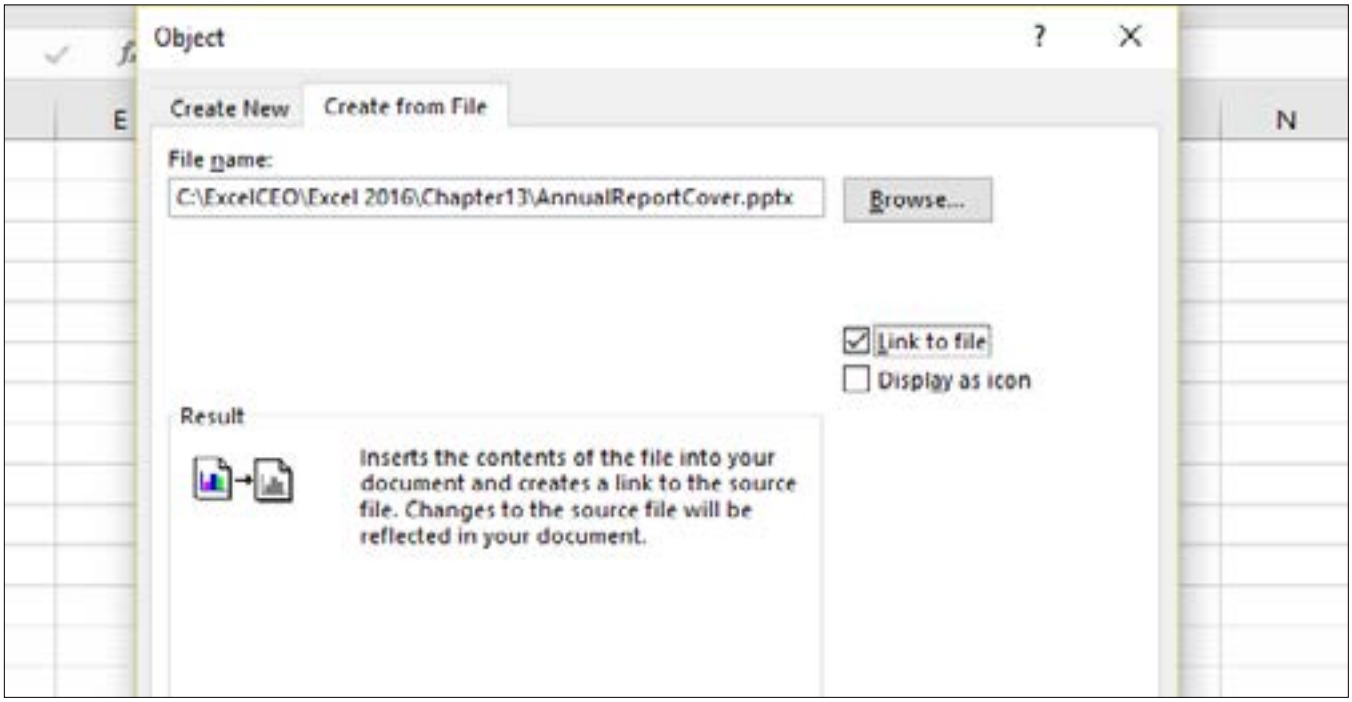


Figure 13.35

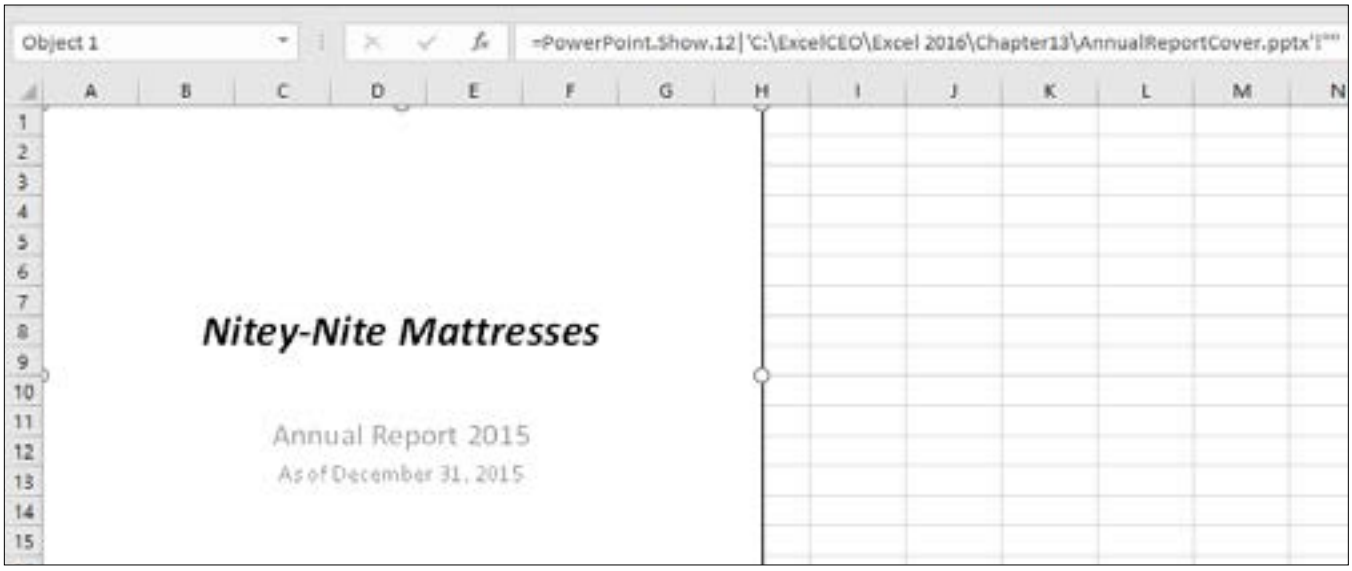


Figure 13.36

The object appears on the spreadsheet. Notice that the function box reads: *=PowerPoint.Show.12|'C:\ExcelCEO\Excel 2016\Chapter13\AnnualReportCover.pptx'!""*. This means that the object is linked to the Excel file. To edit the object in PowerPoint, just use your right-click friend.

6. *With the linked object selected, right-click on the object, point to* **Presentation Object**, *and click* **Edit**.

PowerPoint opens up to the file you linked to. To edit the object in Excel, you must open the PowerPoint file first (clicking Edit should have opened it), save it, then it will be updated in the spreadsheet.

7. *When* **PowerPoint** *opens up, change the Years from* **2015** *to* ***2016****,* **Save** *and* **close** *the* **AnnualReportCover.pptx** *PowerPoint file (Make sure to save the PowerPoint file as its original name,* **AnnualReportCover***).*

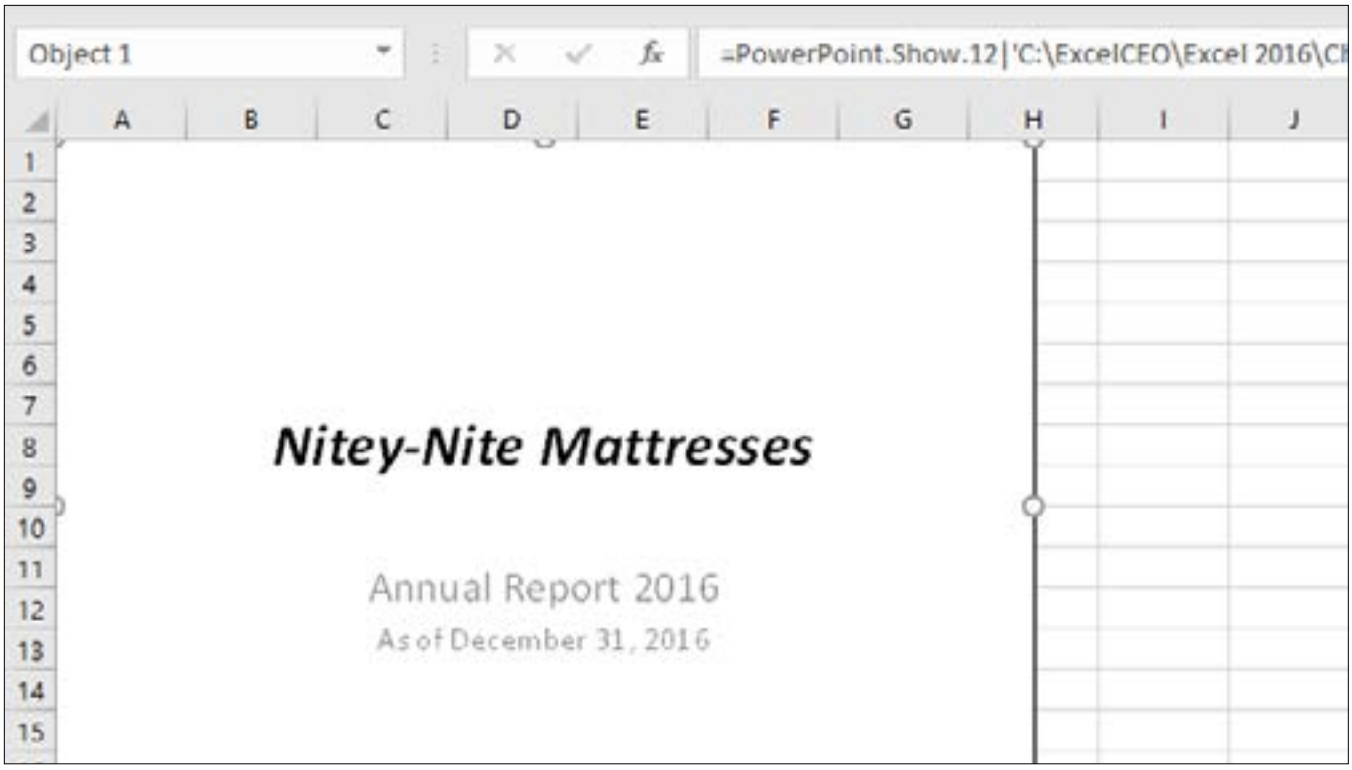


Figure 13.37

The object in the spreadsheet is now updated for 2016.

8. **Save** *and* **close** *the* **mySmartArt.xlsx** *file.*

Embedding Objects

In the last exercise, you linked a PowerPoint slide (or object) to an Excel file. One advantage on linking a file is that when the source file changes, the linked object changes as well. A disadvantage is that the location of the source file may change, or the linked file may be sent to another person who doesn't have the same source file in their system or they don't have access to it. When this happens, the link will not work. To overcome this issue, you can **embed an object**. An embedded object stays with the file it was embedded in. You can embed objects to another Microsoft Office program just as easily as you can import them to Excel. The only difference in the procedure to link an object and to embed an object is when you embed an object, don't check the "Link to file" checkbox in the Object dialog box, as illustrated in Figure 13.35. As long as you don't have space or size considerations, embedding an object can many times be a better alternative to linking an object.

***Review Questions**: It is now time to complete the hands-on Review Questions. Log on to www.ExcelCEO.com with your Email address and Password, click on the* **Excel 2016 Review Questions, Chapter 13, Section 2 of 2** *option in your Main Menu, and complete the Review Questions.*

Conclusion

In this chapter, you learned how to work with charts. You created and edited a basic chart using Chart Elements, were exposed to Chart Styles within Chart Elements, and used several of the tool boxes and elements of that new Excel chart tool. You learned how to reposition or move a chart to another part of the spreadsheet. You learned how to create a Sparkline. You added a trendline to show the direction the data is moving on a chart. You created a pie chart and explored PivotCharts. You learned how to use Excel's SmartArt functionality by creating and modifying an organizational chart diagram. Finally, you learned how to import objects to and export objects from Excel.

Chapter Exam

To take the examination for this chapter, you must have successfully completed the examination for the previous chapter. You can now go to www.ExcelCEO.com, click on Sign In, log in and take the exam. Make sure that you take the exam on the same computer on which you completed the practice files, as some of the questions on the exam may refer to some of the completed projects. Chapter exams are intended to be hands-on.

CHAPTER FOURTEEN — ANALYSIS TOOLS

Chapter Objectives:

- Identify scenario outcomes by setting variable constraints on Goal Seek and Solver projects
- Recognize Descriptive Statistics using Data Analysis
- Determine data visually by defining variable actions with Conditional Formatting
- Identify Data Bars within Conditional Formatting
- Determine the way to turn Full Screen functionality off and on
- Choose the correct process for Inserting a hyperlink
- Recognize how to use the Quick Analysis functionality

Projects You Will Complete During This Chapter:

- *my2016_Forecast.xlsx*
- *myMay_Sales.xlsx*
- *mySales_2016.xlsx*
- *mySolver.xlsx*

CPE Credits possible for this chapter: ***2.5***

Introduction

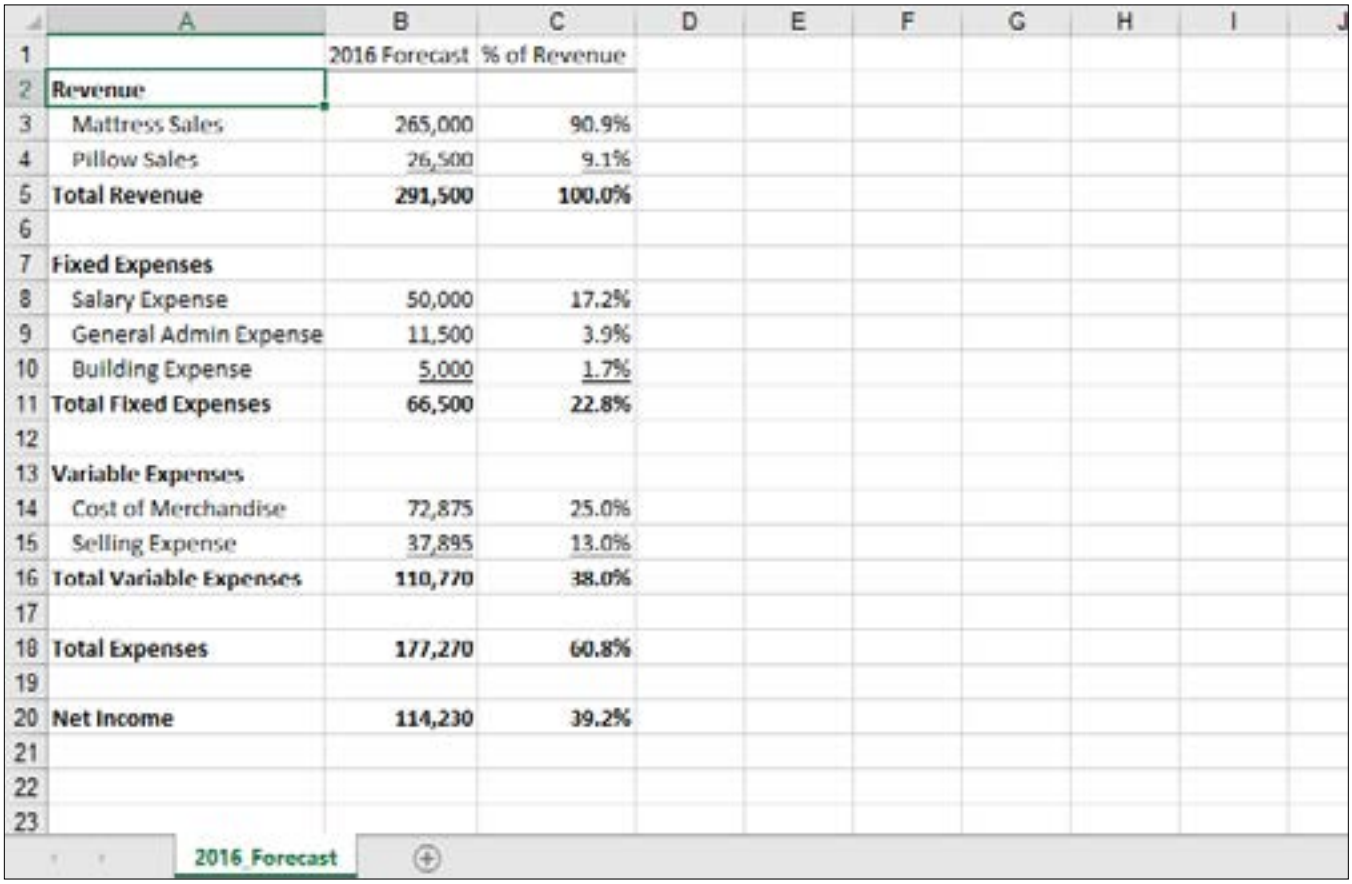
When I was learning to program web pages, I decided to create a project of my own. Since I am a family history novice, I set out to write a genealogy program on the Internet. After about a year of part-time programming, I showed it to my sister-in-law, an avid genealogist. All I had programmed was the functionality – I hadn't made it look good yet. Her response was kind of "ho-hum" and she was obviously not thrilled with it. I took a couple of weeks to put in some graphics, some colors and images, and showed it to her again. When she saw it, her eyes lit up and said, "*This is GREAT!*" I hadn't touched the functionality, but colors and a little cleanup work with solid functionality basics sold the project much better. I enjoy creating tools that are easy for inexperienced end-users to navigate through and manipulate. Typically, the easier a spreadsheet is to use, the harder it is to develop. Still, this can be an opportunity to increase productivity for you or your team, and could still end up saving you time after it is implemented. One tool that is easy to use and allows you to arrive at an answer very quickly is called Goal Seek. We'll begin this chapter by discussing Goal Seek.

Goal Seek

Goal Seek is a tool sometimes called a "What-if Analysis." When you know the desired result of a single formula but not the input value, and the formula needs to determine the result, you can use Goal Seek. When using Goal Seek, Excel changes the value in one cell potentially hundreds of times until the formula returns the result you want.

Let's try an example.

1. **Open** *the file* **C:\ExcelCEO\Excel 2016\Chapter14\2016_Forecast.xlsx**.
2. **Save As C:\ExcelCEO\Excel 2016\Chapter14*my2016_Forecast.xlsx***.



	A	B	C
1		2016 Forecast	% of Revenue
2	**Revenue**		
3	Mattress Sales	265,000	90.9%
4	Pillow Sales	26,500	9.1%
5	**Total Revenue**	**291,500**	**100.0%**
6			
7	**Fixed Expenses**		
8	Salary Expense	50,000	17.2%
9	General Admin Expense	11,500	3.9%
10	Building Expense	5,000	1.7%
11	**Total Fixed Expenses**	**66,500**	**22.8%**
12			
13	**Variable Expenses**		
14	Cost of Merchandise	72,875	25.0%
15	Selling Expense	37,895	13.0%
16	**Total Variable Expenses**	**110,770**	**38.0%**
17			
18	**Total Expenses**	**177,270**	**60.8%**
19			
20	**Net Income**	**114,230**	**39.2%**
21			
22			
23			

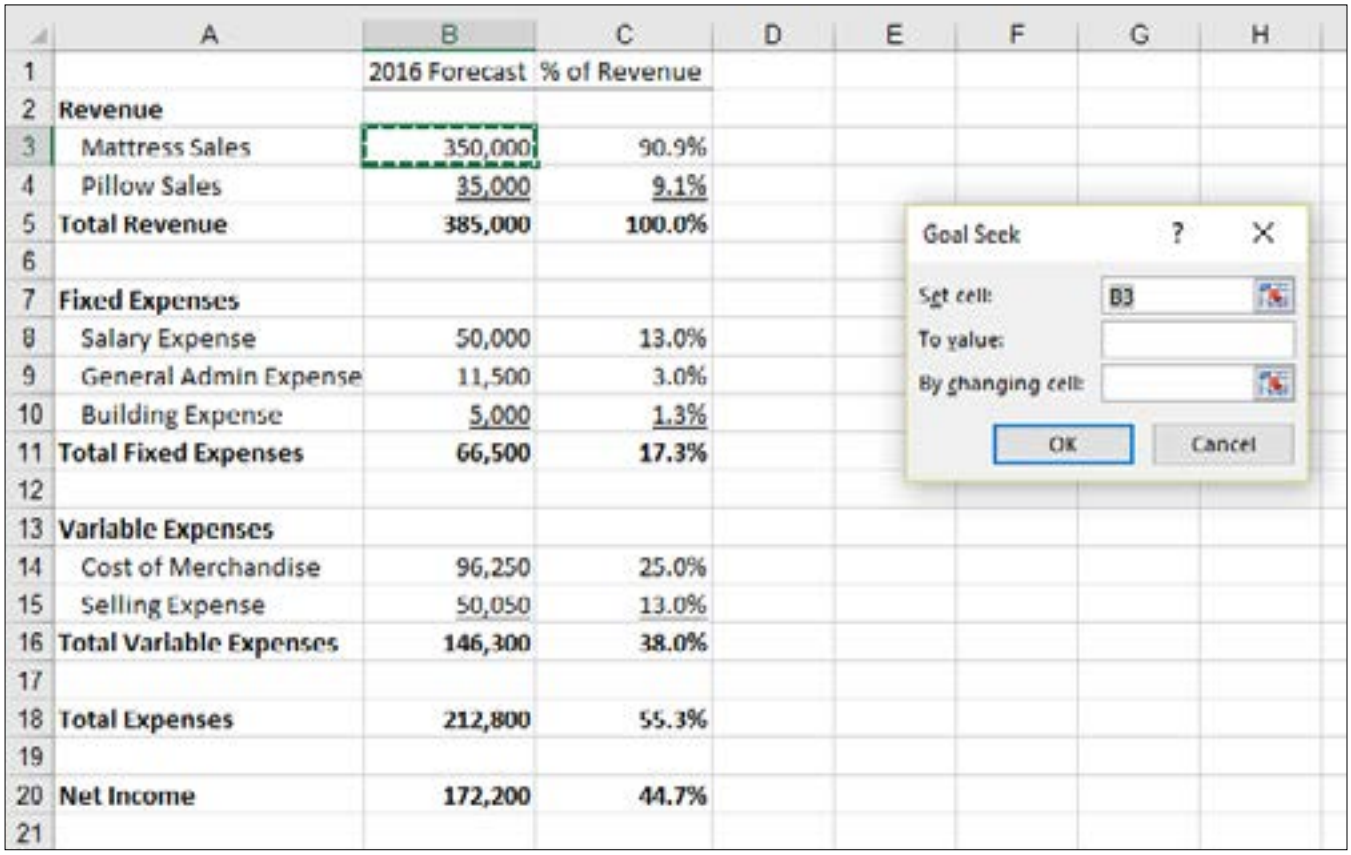
Figure 14.1

This is a simple file that calculates the Net Income for one store. In this file, the Mattress Sales are hard-coded, as are the Fixed Expenses. Pillow sales are estimated at 10% of Mattress Sales, and the formula in Cell B4 reflects that assumption. The Variable Expenses are estimated as a percentage of Total Revenue. Your manager has asked you to find out what level of sales we should have in order to have Net Income of $150,000. Right now, Net Income is at $114,230, $35,770 off from where it needs to be. Let's increase Mattress Sales by $85,000 and see what the Net Income figure changes to.

3. *Change* **Cell B3** *(Mattress Sales) to* ***$350,000****.*

Net Income changes to $172,200. We would probably spend quite a bit of time playing around with the Mattress Sales number to reach an exact $150,000, but Goal Seek will help us in one step.

4. *On the* **Data** *tab, click on* **What-If Analysis** *in the* **Forecast** *group, and choose* **Goal Seek…**

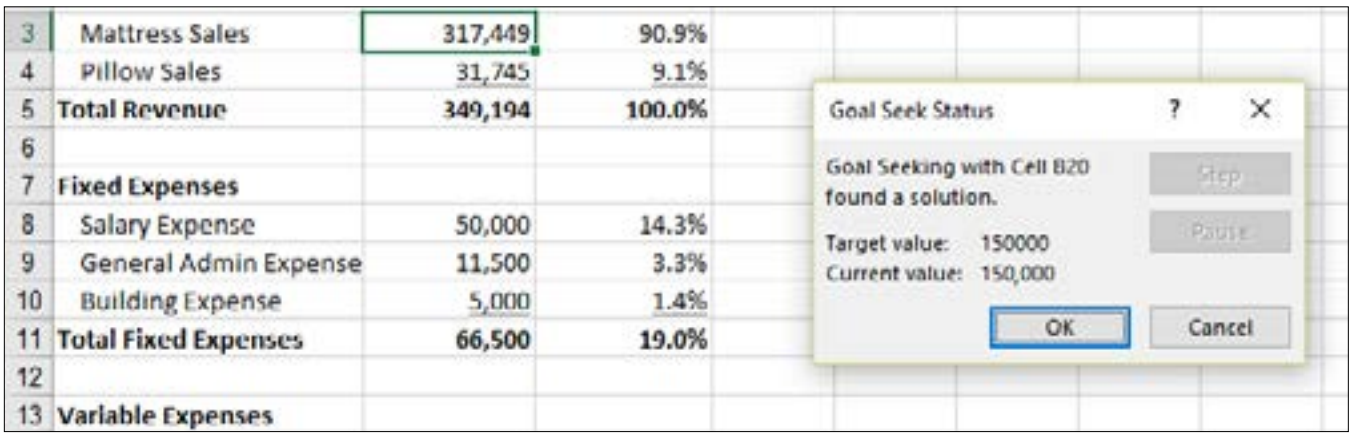


	A	B	C
1		2016 Forecast	% of Revenue
2	**Revenue**		
3	Mattress Sales	350,000	90.9%
4	Pillow Sales	35,000	9.1%
5	**Total Revenue**	**385,000**	**100.0%**
6			
7	**Fixed Expenses**		
8	Salary Expense	50,000	13.0%
9	General Admin Expense	11,500	3.0%
10	Building Expense	5,000	1.3%
11	**Total Fixed Expenses**	**66,500**	**17.3%**
12			
13	**Variable Expenses**		
14	Cost of Merchandise	96,250	25.0%
15	Selling Expense	50,050	13.0%
16	**Total Variable Expenses**	**146,300**	**38.0%**
17			
18	**Total Expenses**	**212,800**	**55.3%**
19			
20	**Net Income**	**172,200**	**44.7%**
21			

Figure 14.2

5. *Change the* **Set cell:** *box to* **B20** *(which is Net Income).*
6. *Type* ***150000*** *in the* **To value:** *box*
7. *Type* ***B3*** *(or choose Cell B3 with your mouse) in the* **By changing cell:** *box.*
8. *Click* **OK**.

Here we are telling Excel to make Net Income $150,000 by changing the Mattress Sales cell.



3	Mattress Sales	317,449	90.9%
4	Pillow Sales	31,745	9.1%
5	**Total Revenue**	**349,194**	**100.0%**
6			
7	**Fixed Expenses**		
8	Salary Expense	50,000	14.3%
9	General Admin Expense	11,500	3.3%
10	Building Expense	5,000	1.4%
11	**Total Fixed Expenses**	**66,500**	**19.0%**
12			
13	**Variable Expenses**		

Figure 14.3

Excel runs through a few iterations (almost instantly), as we would do by manually changing the Mattress Sales cell, but Excel does it a lot faster than we can.

9. Click **OK** *in the* **Goal Seek Status** *dialog box.*

B3 317448.680351906

	A	B	C	D	E	F	G	H
1		2016 Forecast	% of Revenue					
2	**Revenue**							
3	Mattress Sales	317,449	90.9%					
4	Pillow Sales	31,745	9.1%					
5	**Total Revenue**	**349,194**	**100.0%**					
6								
7	**Fixed Expenses**							
8	Salary Expense	50,000	14.3%					
9	General Admin Expense	11,500	3.3%					
10	Building Expense	5,000	1.4%					
11	**Total Fixed Expenses**	**66,500**	**19.0%**					
12								
13	**Variable Expenses**							
14	Cost of Merchandise	87,298	25.0%					
15	Selling Expense	45,395	13.0%					
16	**Total Variable Expenses**	**132,694**	**38.0%**					
17								
18	**Total Expenses**	**199,194**	**57.0%**					
19								
20	**Net Income**	**150,000**	**43.0%**					

Figure 14.4

The result is that Mattress Sales need to be $317,449 in order to have Net Income of exactly $150,000. Notice that the exact amount changed in Cell B3 is $317,448.680351906, so Excel had to go through a bunch of iterations to arrive at that exact figure. The more formulas tied to a cell, the more the iterations.

10. **Save** *and* **close** *the* **my2016_Forecast.xlsx** *file.*

Solver

Goal Seek is a great tool if you want to find a solution based on changing one variable, but what if there are multiple inputs in your analysis that could change? For that, Excel provides a nifty tool called ***Solver.*** Solver does not come with the standard installation of Excel, so when you launch Solver, you may be prompted to install it. You must go through the installation of Solver to continue with the exercise.

In this next exercise, you have a charitable opportunity. Area management has been asked to

donate mattresses that are slated to be discontinued to a local homeless shelter. Nitey-Nite should give away as many mattresses to the shelter as possible without going over a retail price of $10,000 in total. The schedule in the next file we will work with shows the item number, manufacturer, description, and retail price of each item that could be donated. Your job is to find out the maximum number of each item that could be donated without going over the $10,000 budget.

One advantage to using Solver is that it allows you to use constraints. A ***constraint*** is simply a limitation placed on Solver to control the outcome. For example, one constraint in our analysis is that the budget, or total retail price of the mattresses donated, cannot exceed $10,000. Another constraint placed on us by management is that we must give away at least two of each mattress type. You can have more than two constraints when using Solver, as you will see in this next exercise. In fact, to get the best analysis, you should input as many constraints as necessary to make the analysis as reliable as possible. Let's first make sure that Solver is installed and then set up the analysis.

1. **Open** *the file at* **C:\ExcelCEO\Excel 2016\Chapter14\Solver.xlsx**.
2. **Save As C:\ExcelCEO\Excel 2016\Chapter14*mySolver.xlsx***

If the Solver button does not appear in the Forecast group of the Data tab, you need to install it. To do so, follow Steps 3 – 7 below. If you already have it, skip to Step 8.

3. *Click on the* **File** *tab and click on the* **Options** *button at the bottom of the screen (the* **Excel Options** *dialog box appears)*
4. *Click on the* **Add-Ins** *option on the left side of the screen.*

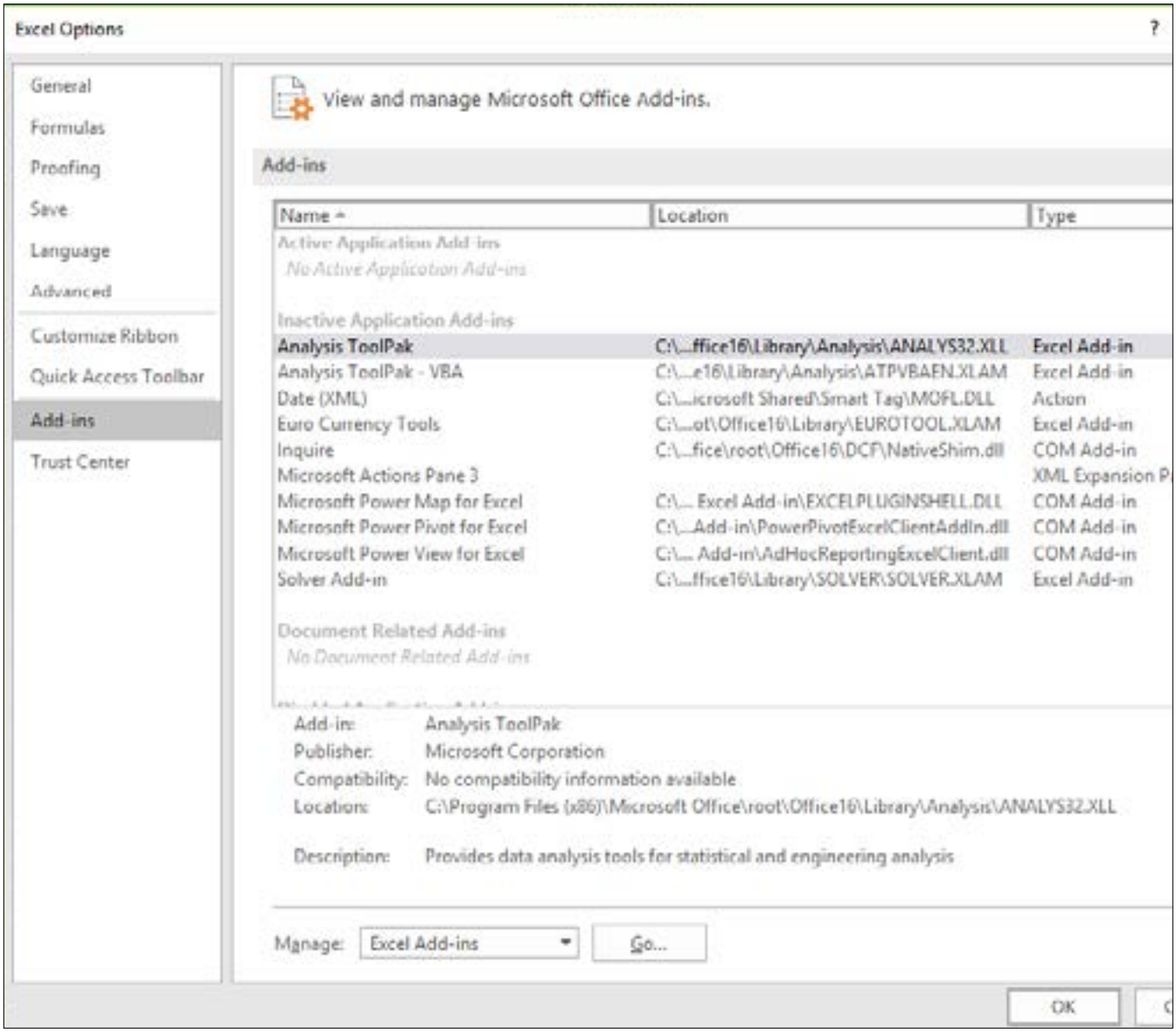
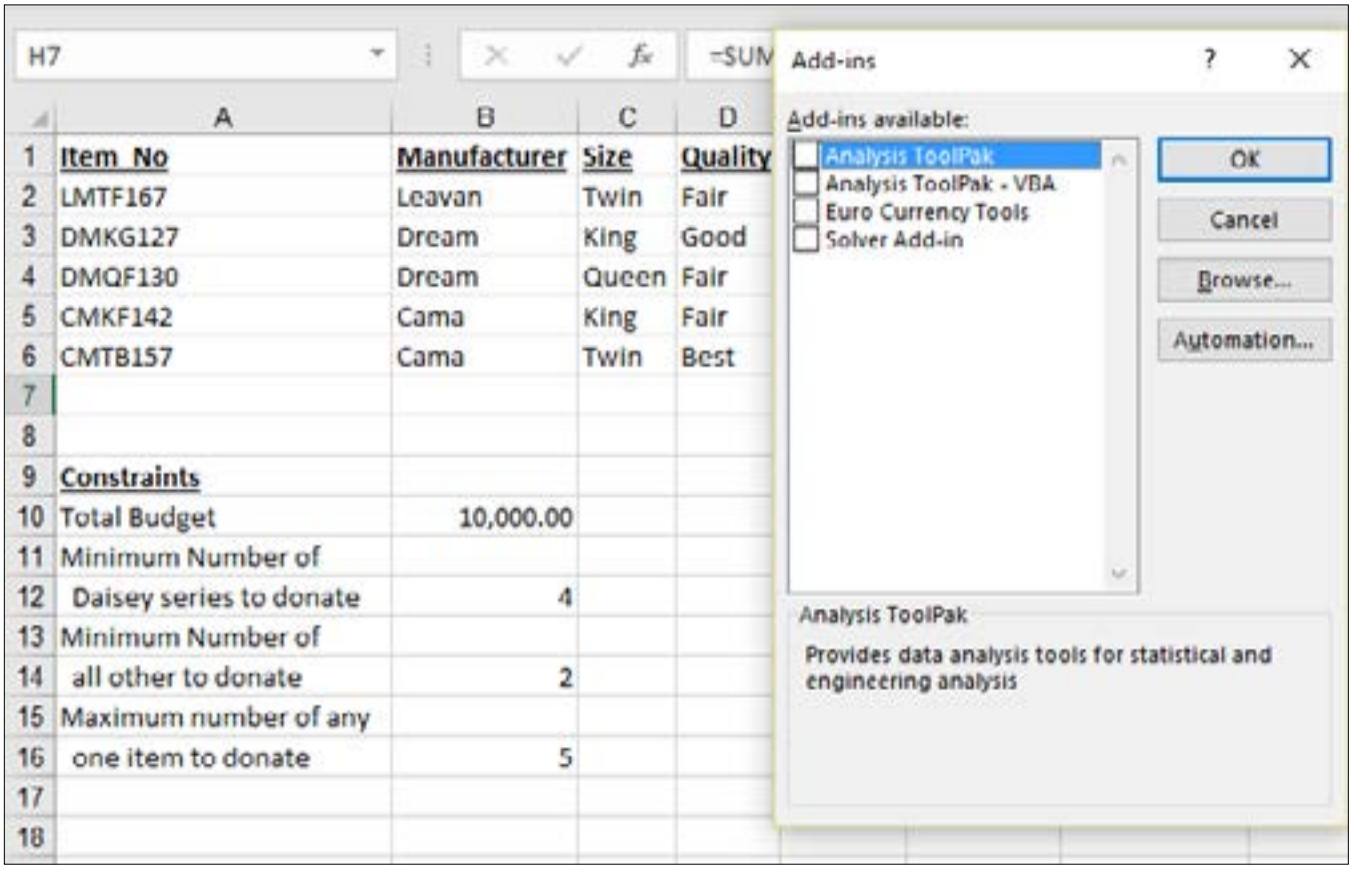


Figure 14.5

You should see Solver Add-in listed in the list of add-ins. If you don't see it, Solver was not installed with your version of Excel, and you will have to obtain a version of Excel that has this add-in to complete this exercise.

5. *Click on* **Solver Add-in**.
6. *Make sure* **Excel Add-ins** *is chosen in the* **Manage:** *box at the bottom of the* **Excel Options** *dialog box and click* **Go**.



	A	B	C	D
1	**Item_No**	**Manufacturer**	**Size**	**Quality**
2	LMTF167	Leavan	Twin	Fair
3	DMKG127	Dream	King	Good
4	DMQF130	Dream	Queen	Fair
5	CMKF142	Cama	King	Fair
6	CMTB157	Cama	Twin	Best
7				
8				
9	**Constraints**			
10	Total Budget	10,000.00		
11	Minimum Number of			
12	Daisey series to donate	4		
13	Minimum Number of			
14	all other to donate	2		
15	Maximum number of any			
16	one item to donate	5		
17				
18				

Figure 14.6

7. *In the* **Add-Ins** *dialog box, check the* **Solver Add-in** *box, and click* **OK**.

After you load Solver, it will be available in the newly-created Analyze group of the Data tab.

Let's talk a little more about constraints. We've already mentioned two constraints, but there are more. The goal here is to give away as many mattresses as possible while working within the budget we have. Let's input all of the constraints and parameters for this analysis.

=SUM(H2:H6)

	A	B	C	D	E	F	G	H
1	Item_No	Manufacturer	Size	Quality	Series	Retail Price	No. to Donate	Total to Donate
2	LMTF167	Leavan	Twin	Fair	Daisey	79.00	1	79.00
3	DMKG127	Dream	King	Good	Maple	759.00	1	759.00
4	DMQF130	Dream	Queen	Fair	Pine	509.00	1	509.00
5	CMKF142	Cama	King	Fair	Bronze	559.00	1	559.00
6	CMTB157	Cama	Twin	Best	Platinum	319.00	1	319.00
7							5	2,225.00
8								
9	Constraints							
10	Total Budget	10,000.00						
11	Minimum Number of							
12	Daisey series to donate	4						
13	Minimum Number of							
14	all other to donate	2						
15	Maximum number of any							
16	one item to donate	5						
17								

Figure 14.7

- The budget for this opportunity is $10,000.
- We must give away all of the Daisey mattresses (we have a total of four in stock).
- The only cells we can change are the number of items to donate (Cells G2 through G6).
- The minimum number of mattresses to donate per item is two, except for the Daisey series, which we will give away all four.
- The maximum number of each mattress item to donate is five.
- The number of mattresses (Cells G2 through G6) should be integers (no fractions, like 2.6 mattresses).

With these constraints in mind, let's set up Solver to do the analysis.

8. *Click on the* **Solver** *button on the* **Analyze** *group on the* **Data** *tab.*

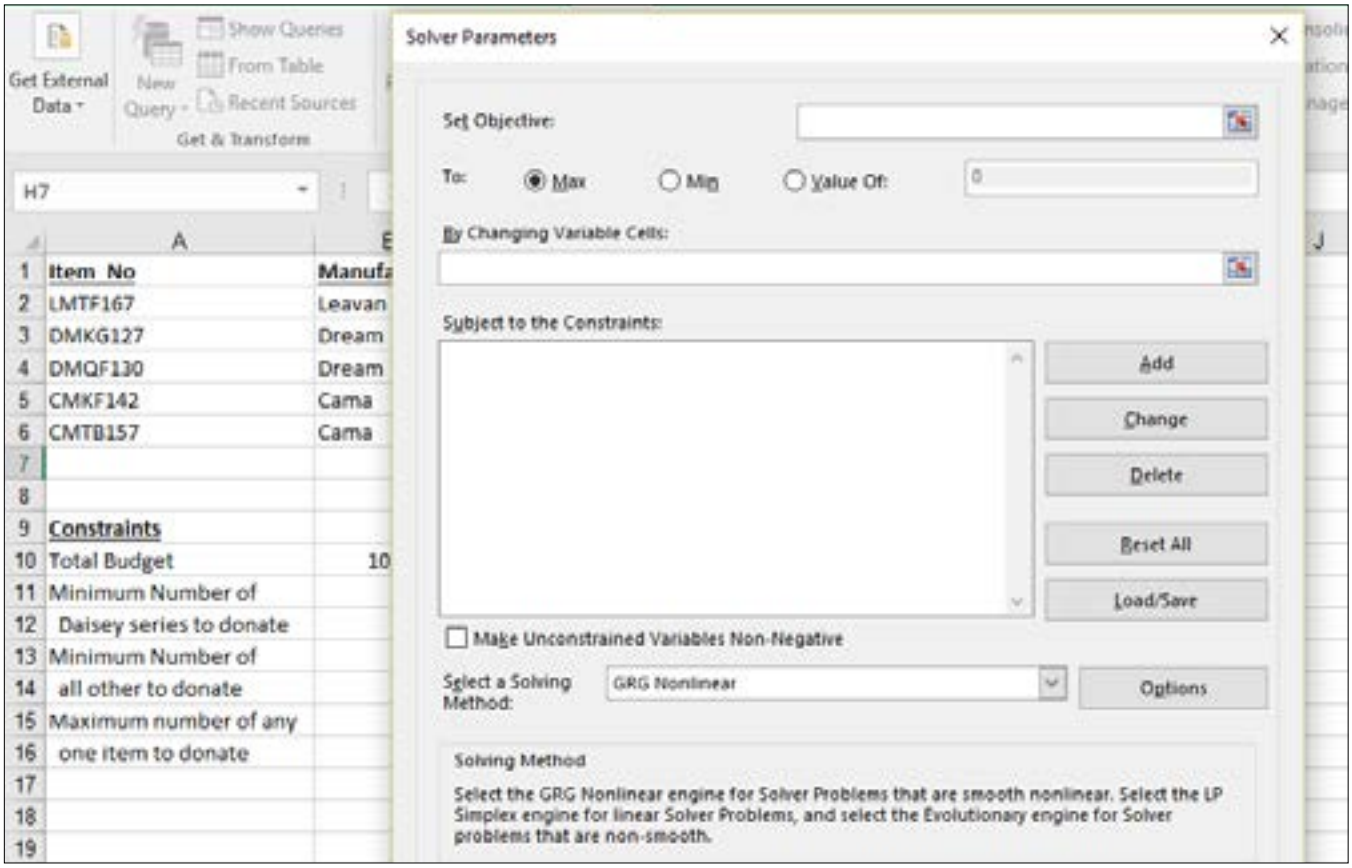


Figure 14.8

9. *In the* **Solver Parameters** *dialog box, set the* **Set Objective** *to* ***$G$7****.*
10. *Make sure the* **Max** *radio button on the* **To:** *line is chosen, as we want to donate as many mattresses as possible.*
11. *Click in the* **By Changing Variable Cells:** *box and choose* **Cells G2 through G6***.*
12. *Click the* **Add** *button to add a constraint.*

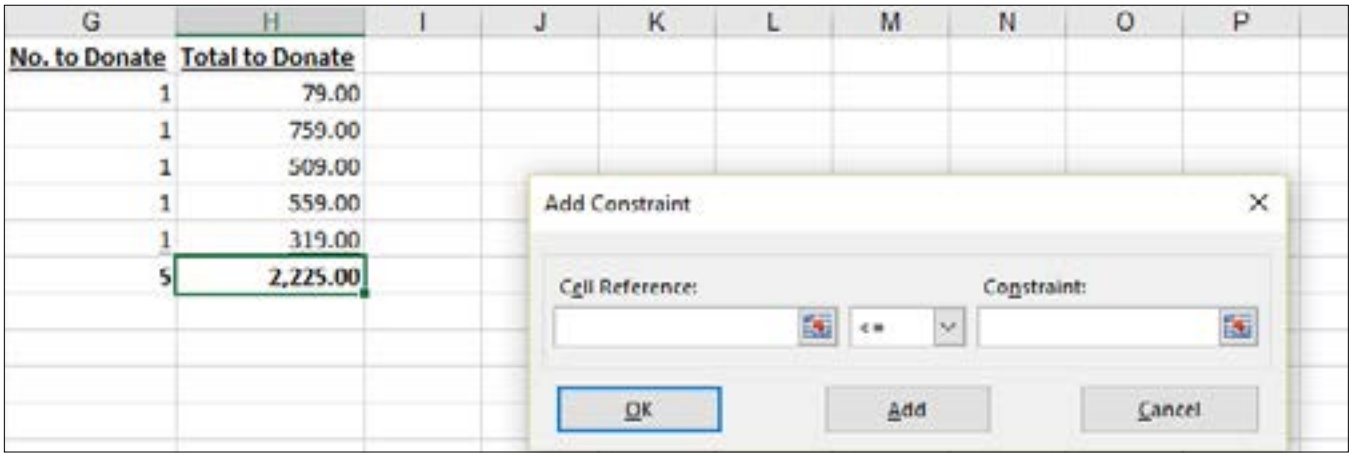


Figure 14.9

This is the box where you will add all the constraints.

13. *In the* **Cell Reference** *box, choose* **Cell H7**.
14. *Make the* **Operator** *box display "<=".*
15. *In the* **Constraint** *box, choose* **Cell B10**.

This constraint sets a maximum dollar amount of mattresses to give away, or $10,000.

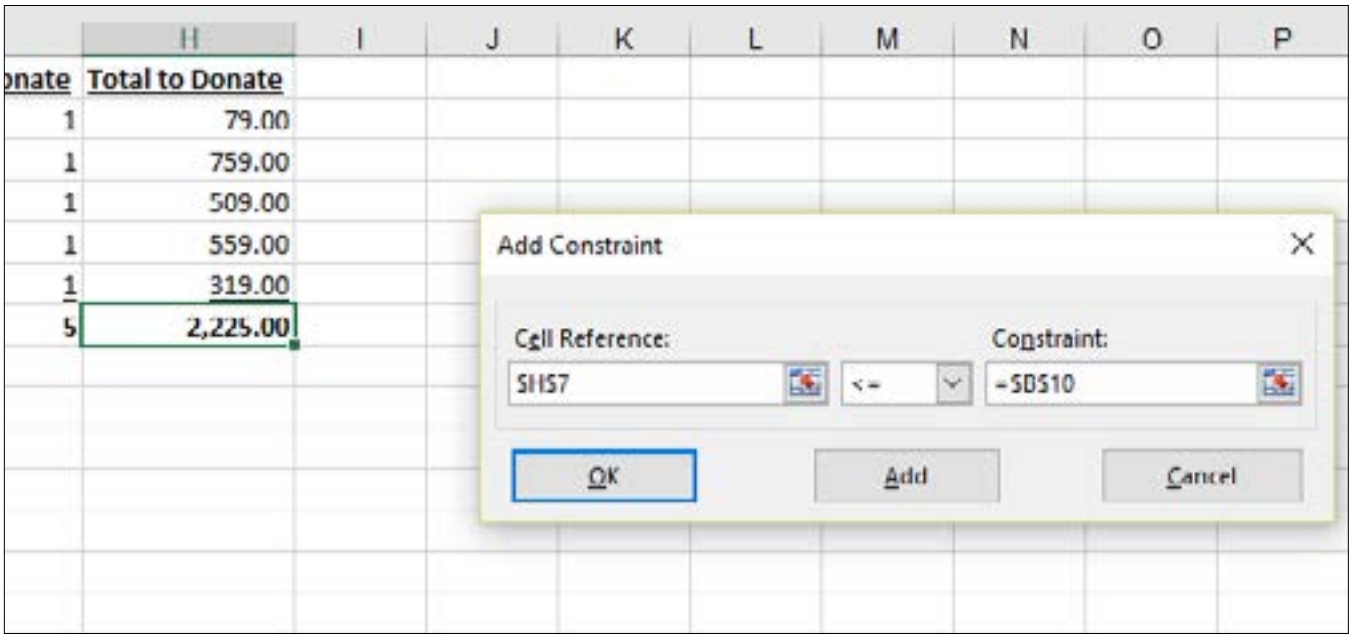


Figure 14.10

16. *Click the* **Add** *button to add another constraint.*

You should be able to input the remaining constraints yourself.

17. *Using the* **Add Constraint** *box, add all of the constraints previously discussed.*
18. *Once you have added all constraints, click the* **OK** *button.*
19. *Check your parameters with the following figure.*

Tip: *If you get stuck, in the center drop-down* **Constraint** *box,* **int** *is* **integer**.

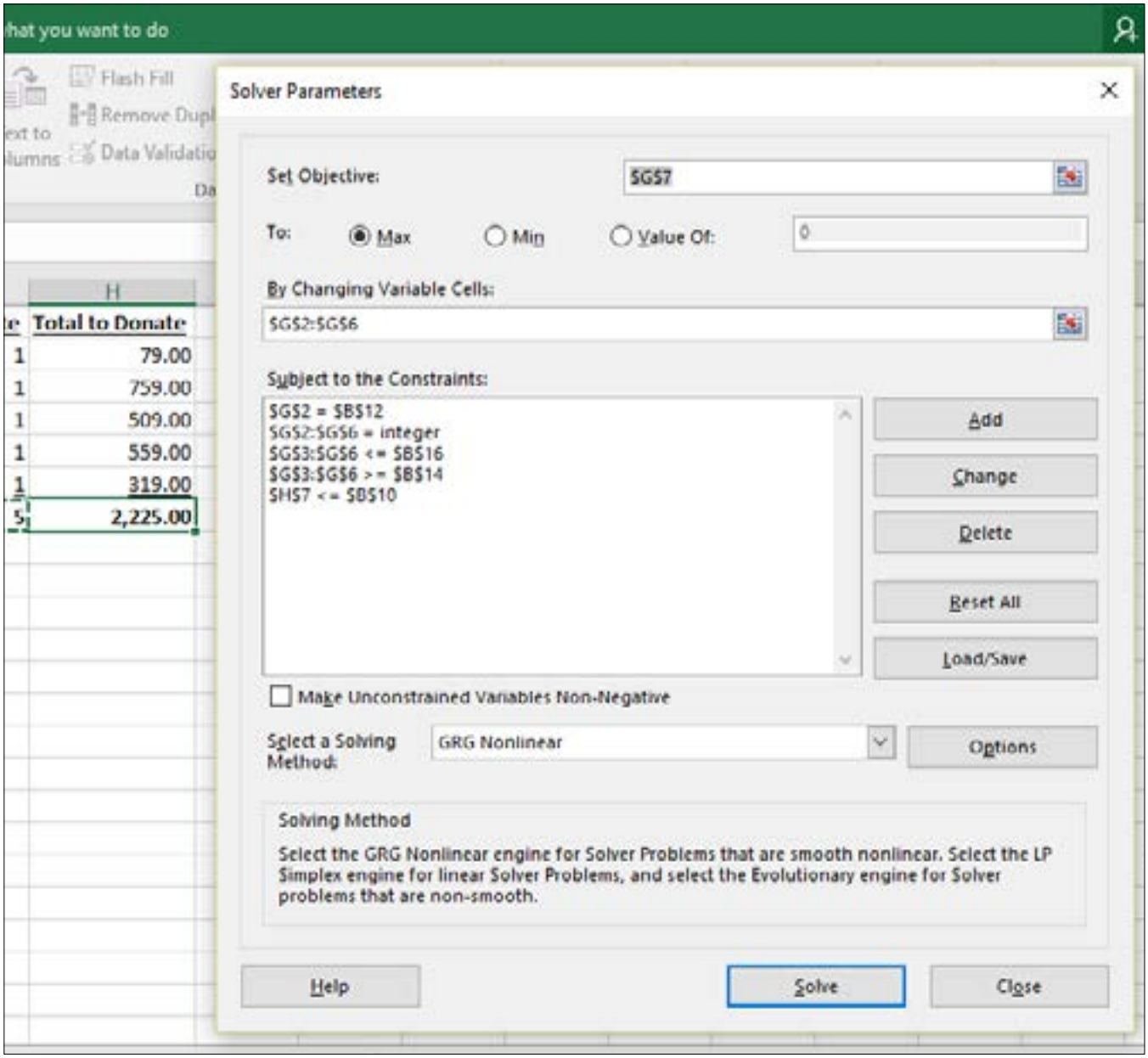


Figure 14.11

20. *Click the* **Options** *button, and make sure the* **Ignore Integer Constraints** *is unchecked, then click* **OK**.

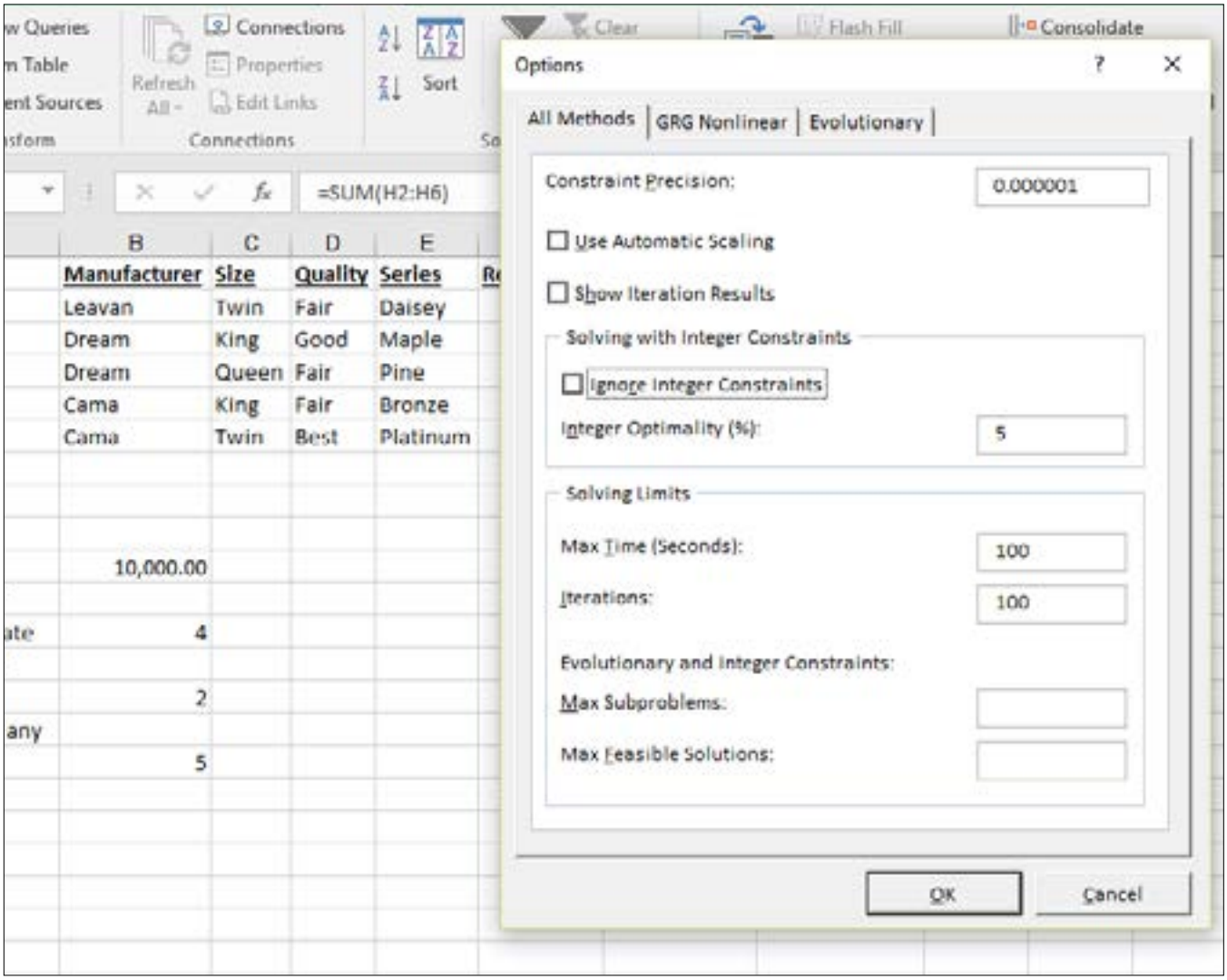


Figure 14.12

21. Click the **Solve** *button in the* **Solver Parameters** *box.*

22. Move the **Solver Results** *dialog box to see the results.*

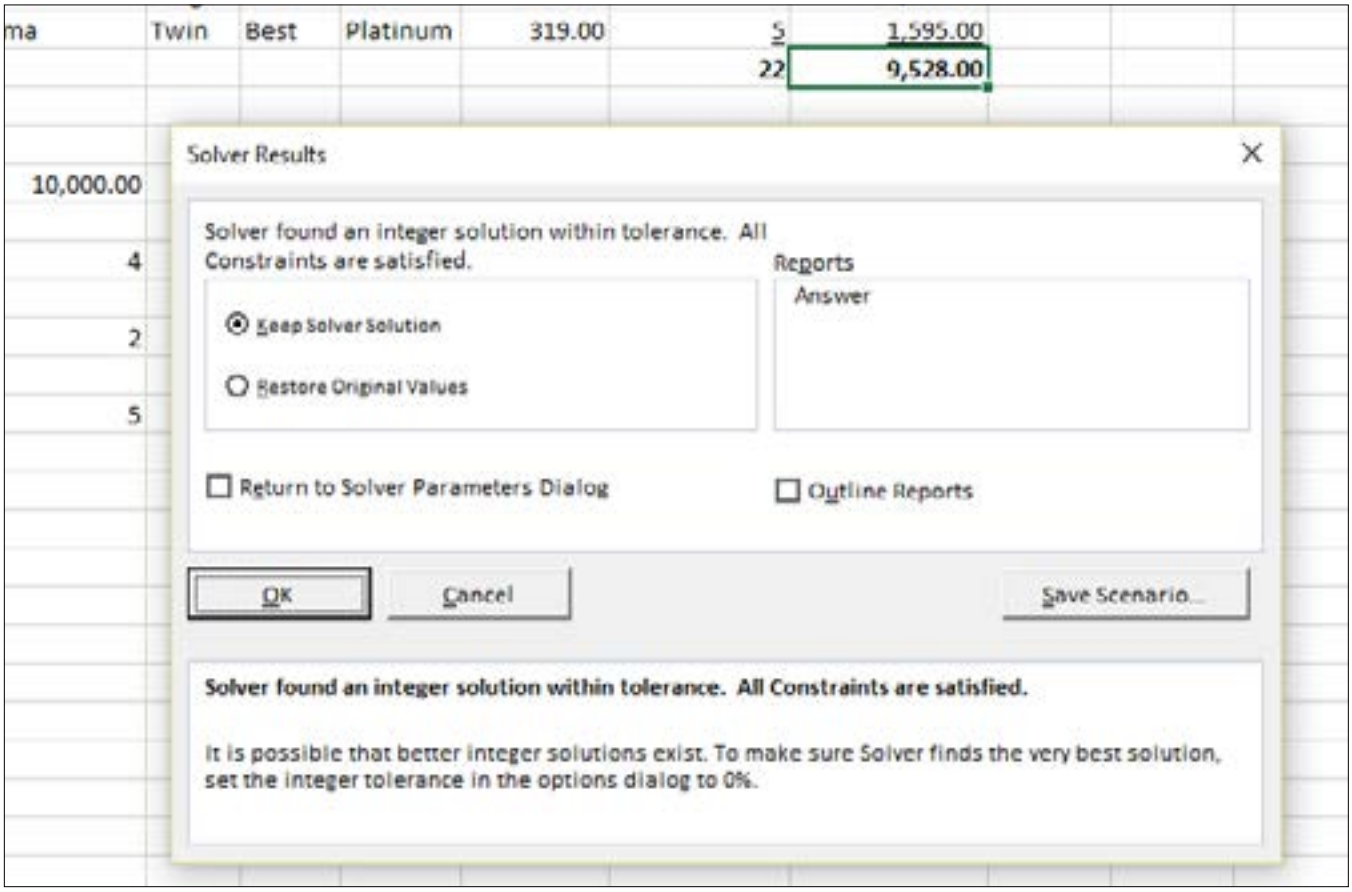


Figure 14.13

And after a few seconds, Solver goes through a whole bunch of iterations, trying different values in Cells G2 through G6 and comes up with the highest solution for the number of mattresses to be donated. This analysis returns 22 mattresses in Cell G6 to donate at a total retail price of $9,528.00. Twenty-two is the maximum mattress count Nitey-Nite can give under the criteria given, and Solver would return this solution consistently.

> ***Tip**: If you have a sharp eye for analysis, or read the* **Solver Results** *caution, you would notice there is still room in the budget to give away nicer mattresses within the* **Total Budget**, *for a maximum value of $9,978.* **Solver** *is not perfect, but it is quick with a focus on changing the constraints toward maximum allowed and does provide a solution that matches all constraints we set. In the end, it may depend on whether* **No. to Donate** *or* **Total Budget** *matters more.*

At this point you can save this analysis as a scenario, cancel out of it, keep the solution, or restore the original values.

23. *Make sure the* **Keep Solver Solution** *radio button is selected, and click* **OK**.
24. **Save** *and* **close** *the* **mySolver.xlsx** *file.*

***Review Questions**: It is now time to complete the hands-on Review Questions. Log on to www.ExcelCEO.com with your Email address and Password, click on the* **Excel 2016 Review Questions, Chapter 14, Section 1 of 2** *option in your Main Menu, and complete the Review Questions.*

Descriptive Statistics

Another handy tool that Excel has is Descriptive Statistics. ***Descriptive Statistics*** allows you to run a series of statistical analyses on a set of numbers without having to write each formula. This is not a feature I use often; however, real geeky people like to use it to display a set of statistical numbers that analyzes the entire dataset. This is not a tool that comes with the standard installation of Excel, so you may have to install it to do this next exercise.

1. **Open** *the* **May_Sales.xlsx** *file at* **C:\ExcelCEO\Excel 2016\Chapter14**
2. **Save As** ***myMay_Sales.xlsx*** *in the same folder*

If the Data Analysis button does not appear in the Analyze group of the Data tab, you need to install it. To do so, follow Steps 3 – 6 below. If you already have it, skip to Step 7.

3. *Click on the* **File** *tab and click on the* **Options** *button at the bottom of the* **Excel Options** *dialog box.*
4. *Click on the* **Add-Ins** *option on the left side of the screen.*
5. *Make sure* **Excel Add-ins** *is chosen in the* **Manage:** *box at the bottom of the* **Excel Options** *dialog box and click* **Go...**
6. *Check the* **Analysis Toolpak** *check box and click* **OK**.

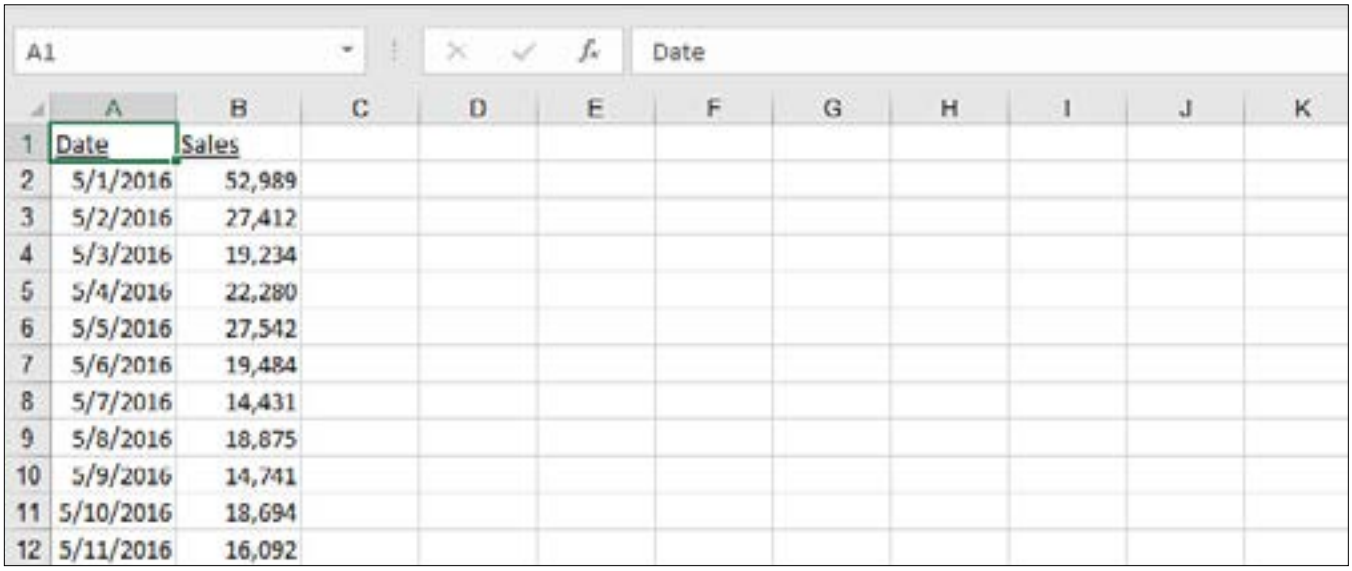


Figure 14.14

After you load Data Analysis, it will be available on the Analysis group of the Data tab.

This file is a simple file with daily sales for one month. We want to perform a comprehensive statistical analysis on the data in the file, and we'll do it using Descriptive Statistics.

8. *Click on the* **Data Analysis** *button in the* **Analysis** *group of the* **Data** *tab.*

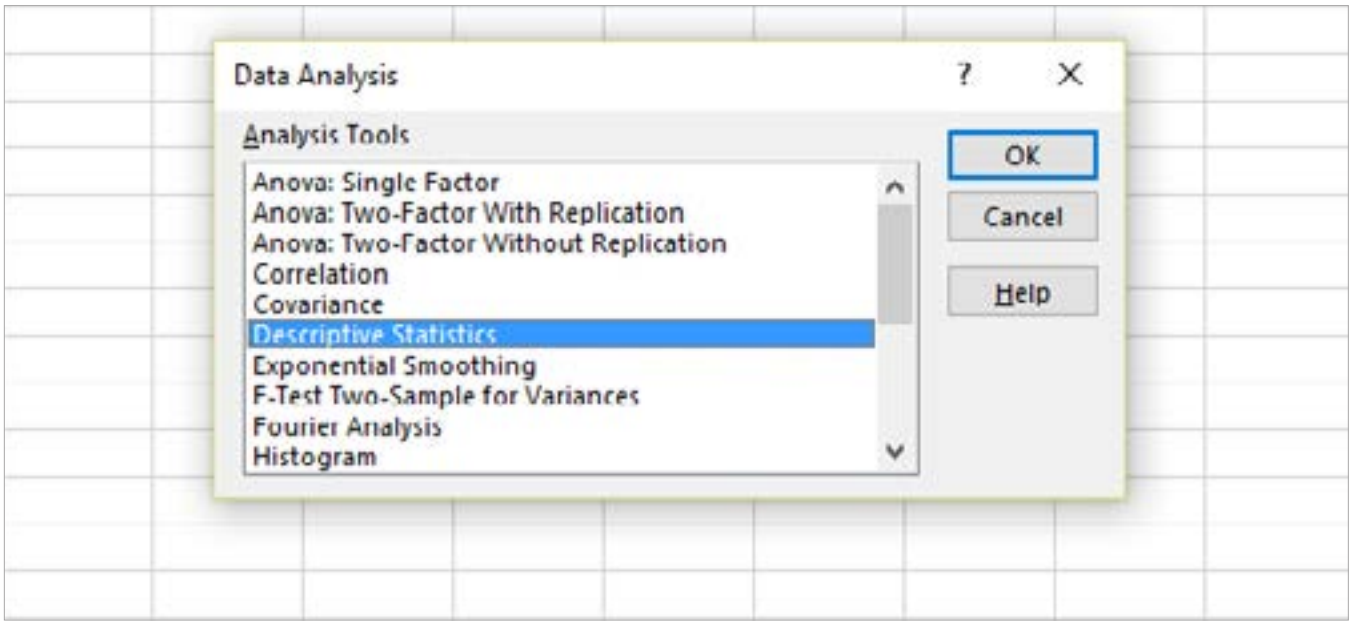


Figure 14.15

9. *In the* **Data Analysis** *dialog box, select* **Descriptive Statistics** *and click* **OK**.
10. *In the* **Descriptive Statistics** *dialog box, select the* **Input range B2 to B32**.
11. *Make sure the* **Columns** *radio button in the* **Grouped By:** *option is checked and that the* **New Worksheet Ply:** *radio button in the* **Output options** *is selected.*
12. *Check the* **Summary statistics** *check box.*

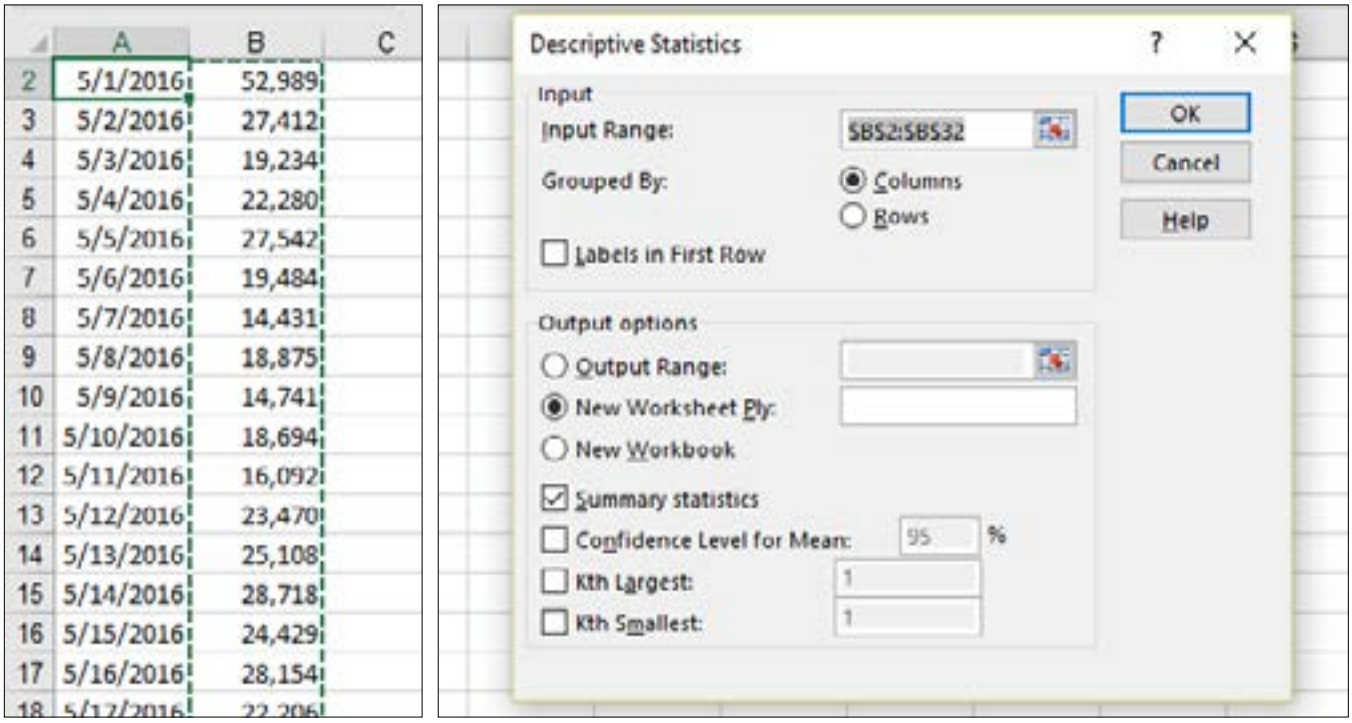


Figure 14.16

13. Click **OK**.

You should get a new worksheet in the May_Sales file that looks as shown below:

	A	B
1	*Column1*	
2		
3	Mean	23114.83
4	Standard E	1202.41
5	Median	22238.34
6	Mode	#N/A
7	Standard D	6694.735
8	Sample Va	44819478
9	Kurtosis	13.19006
10	Skewness	2.993058
11	Range	38558.43
12	Minimum	14430.94
13	Maximum	52989.37
14	Sum	716559.6
15	Count	31

Figure 14.17

Again, I don't use this feature much because I don't typically do some of these in-depth types of statistics, but it may come in handy when you have a manager who thrives on statistical analysis, like actuaries and statisticians. By the way, do you know the difference between an actuary and an accountant? An actuary

doesn't have the personality to be an accountant! (with apologies to actuaries, but it is funny!)

14. **Save** *and* **close** *the* **myMay_Sales.xlsx** *file.*

Conditional Formatting

The next topic is ***Conditional Formatting***. I have seen conditional formatting used extensively on spreadsheets where the user wanted to make numbers that meet certain criteria stand out.

1. **Open** *the file* **C:\ExcelCEO\Excel 2016\Chapter14\Sales_2016.xlsx**.
2. **Save As C:\ExcelCEO\Excel 2016\Chapter14*mySales_2016.xlsx***.

	A	B	C	D	E	F	G	H	I	J
1	Paper	% of Budget	Bonus %		Min. Budget	Level				
2	1	0%	0.00%		0	Paper				
3	2	100%	0.50%		80,000	Scissors				
4	3	110%	1.00%		120,000	Rock				
5	4	120%	1.50%							
6	5	150%	2.00%							
7	6	200%	3.00%							
8					Total Bonus	291,205				
9										
10	Scissors	% of Budget	Bonus %							

Figure 14.18

This file is similar to an exercise we did in Chapter 10. The Sales tab contains a database for sales for each location by month in 2016. It also contains the Budget, Budget_%, Store_Type, and Bonus fields. The Budget_%, Store_Type, and Bonus fields contain calculations. You learned how to do all of these calculations in previous chapters, so I'm not going to review them here. The Assumptions tab contains the assumptions (Budget % for all types and the type values based on Budget). Your assignment in this chapter is to make this spreadsheet easier to read and use.

Conditional Formatting is creating a format in a cell (like font style or background color) where the value meets a certain criteria. Let's suppose that you want to identify all of the stores that did not earn a sales bonus. You also want to highlight all of the stores where the manager made more than $2,000 in bonus for any given month. With a report like that, it would be very easy for management to scan down the list of stores in the Sales tab and quickly see who is performing and who is not. For those who did not earn a bonus, let's format all cells that are equal to zero with a bright yellow background with bold red font.

3. *In the* Sales *tab, click on* **Cell K2**.
4. *On the* **Home** *tab in the* **Styles** *group, click on the* **Conditional Formatting**  *button.*

When you click on the Conditional Formatting button, a number of different options appear. In Excel

2003, Microsoft allowed you to set the formatting of the font and cell background color. In versions since then, including Excel 2016, there are numerous additional options available, far too many for me to review in this exercise. As you go through this exercise, explore other options you see that may better suit your needs or style. For this exercise, we will identify all of the cells in the Bonus column that have a 0 with a yellow background with bold red font. Bonuses of $2,000 or more will be displayed with a green bold text.

5. *On the* **Conditional Formatting** *menu, place your cursor over* **Highlight Cells Rules**, *and choose* **Equal To**.

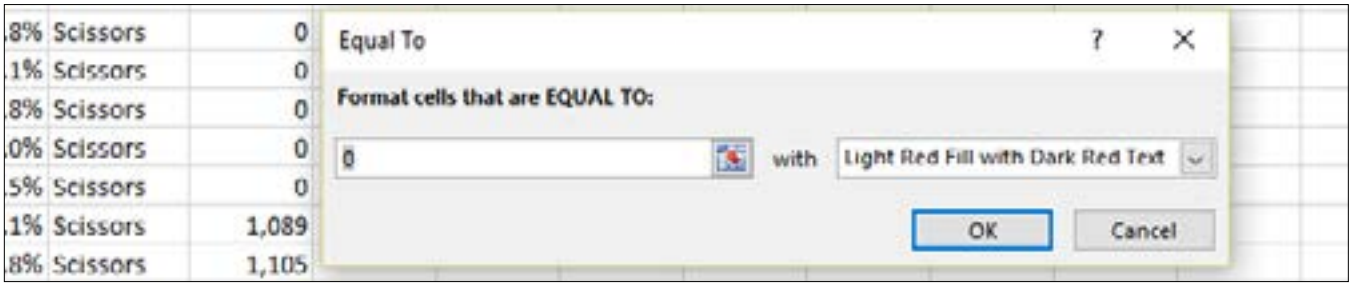


Figure 14.19

The Equal To dialog box pops up. If you click on the drop-down menu on the right side of the dialog box, you will see that a yellow background with bold red text is not an available option, so you'll have to create that custom option.

6. *Click on the drop-down menu on the right side of the text box, choose* **Custom Format…**

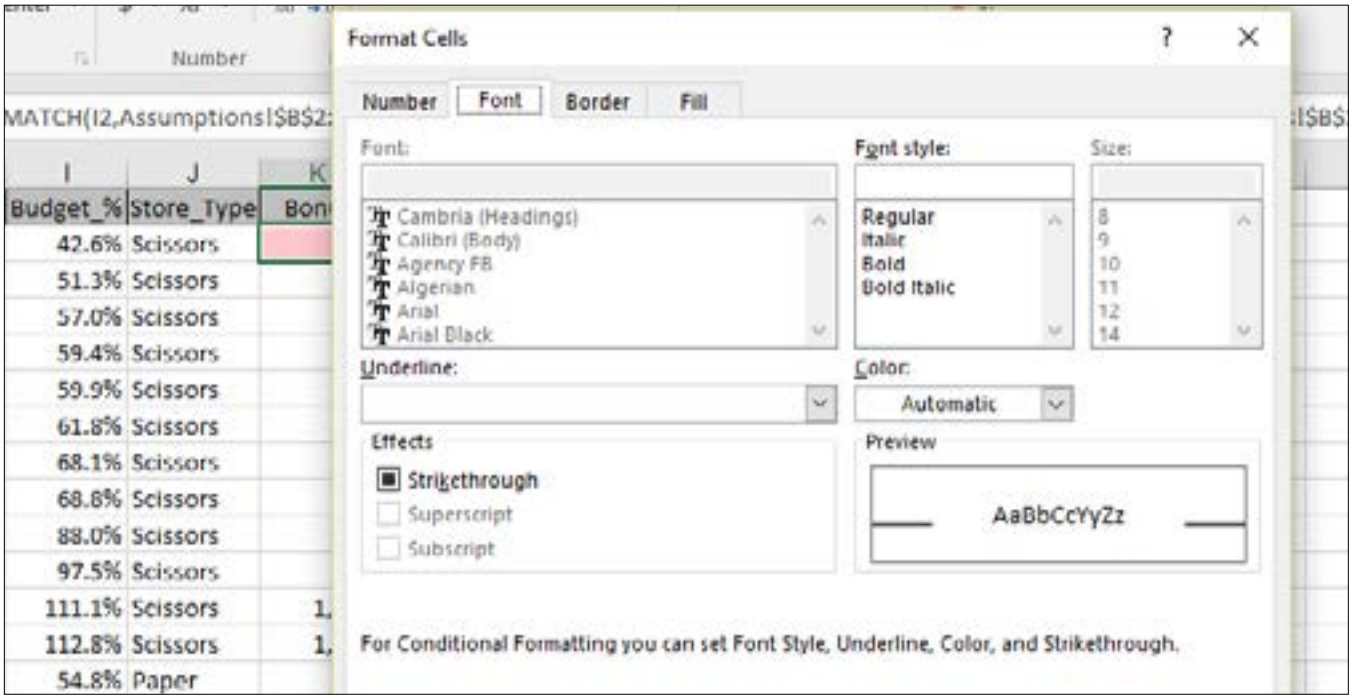


Figure 14.20

7. *With the* **Font** *tab selected, click on the drop-down menu under* **Color** *and choose* **Red**.
8. *Under* **Font style**, *click on* **Bold**.
9. *Click on the* **Fill** *tab, choose* **Yellow** *and click* **OK**.
10. *Click* **OK** *in the* **Equal To** *dialog box.*
11. *Use the* **Format Painter** *icon to copy the format in* **Cell K2** *to all of the cells beneath it (or copy the formula to all cells below).*

=IF(J2=Assumptions!$F$2,VLOOKUP(MATCH(I2,Assumptions!$B$2:$B$7,1)

B	C	D	E	F	G	H	I	J	K
Month	Store_No	Store_ID	Mattress_Rev	Pillow_Rev	Total_Rev	Budget	Budget_%	Store_Type	Bonus
1	1001	19	37,107	4,613	41,720	98,000	42.6%	Scissors	0
3	1001	19	46,224	4,021	50,245	98,000	51.3%	Scissors	0
10	1001	19	51,256	4,578	55,834	98,000	57.0%	Scissors	0
5	1001	19	54,584	3,595	58,178	98,000	59.4%	Scissors	0
2	1001	19	55,027	3,662	58,689	98,000	59.9%	Scissors	0
4	1001	19	56,609	3,911	60,520	98,000	61.8%	Scissors	0
7	1001	19	63,045	3,681	66,726	98,000	68.1%	Scissors	0
6	1001	19	63,376	4,095	67,471	98,000	68.8%	Scissors	0
11	1001	19	77,923	8,318	86,241	98,000	88.0%	Scissors	0
8	1001	19	86,017	9,506	95,523	98,000	97.5%	Scissors	0
12	1001	19	101,484	7,430	108,913	98,000	111.1%	Scissors	1,089
9	1001	19	101,337	9,197	110,533	98,000	112.8%	Scissors	1,105
1	1002	16	31,686	2,817	34,502	63,000	54.8%	Paper	0
2	1002	16	57,618	2,278	59,896	63,000	95.1%	Paper	0
7	1002	16	72,269	3,554	75,823	63,000	120.4%	Paper	1,137
10	1002	16	81,840	5,530	87,369	63,000	138.7%	Paper	1,311
4	1002	16	83,319	5,358	88,676	63,000	140.8%	Paper	1,330
3	1002	16	80,627	8,831	89,458	63,000	142.0%	Paper	1,342
11	1002	16	84,532	7,998	92,530	63,000	146.9%	Paper	1,388
5	1002	16	89,399	5,175	94,574	63,000	150.1%	Paper	1,891
9	1002	16	89,886	8,183	98,068	63,000	155.7%	Paper	1,961
6	1002	16	101,393	4,562	105,954	63,000	168.2%	Paper	2,119

Figure 14.21

Now you see that all of the cells that contain a zero (i.e.- no bonus is paid) are formatted as bold red text with a yellow background. We also want to format all cells with a value of $2,000 or more with a bold, green, italicized font. However, there is no standard option in the Highlight Cells Rules for Greater Than or Equal To, so we'll have to create another custom format. Let's do that now.

1. *Select the range* **K2:K349**.
2. *Click on the* **Conditional Formatting** *button and click on* **New Rule…**

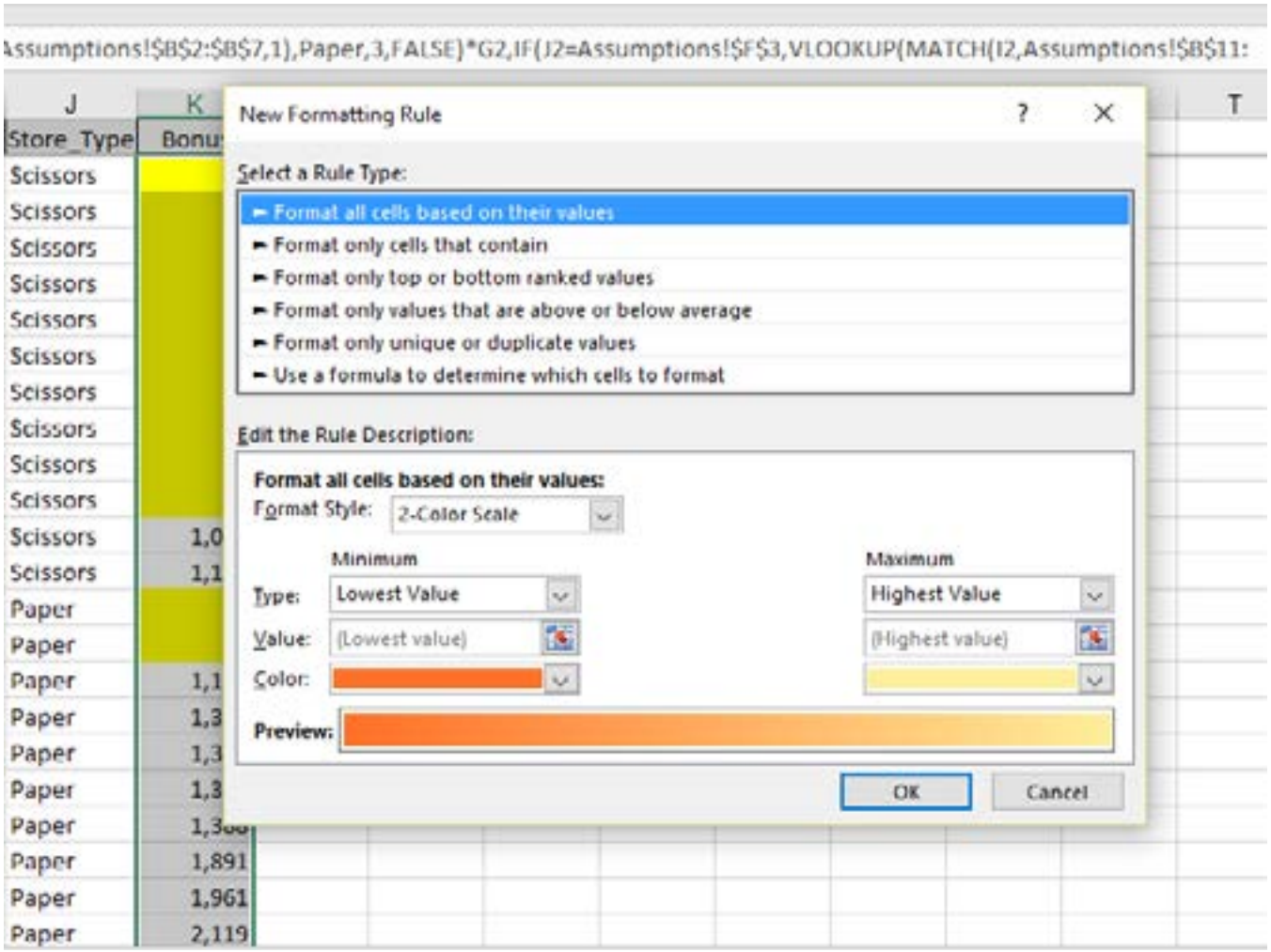


Figure 14.22

The New Formatting Rule dialog box opens. This is the dialog box in which you will create the new rule.

3. *Make sure the* **Format only cells that contain** *option is selected.*
4. *In the* **Edit the Rule Description** *section, make sure* **Cell Value** *appears in the first box, change the second box to* **greater than or equal to** *and type* ***2000*** *in the third box.*
5. *Click the* **Format…** *button.*
6. *In the* **Format Cells** *dialog box, click on the* **Font** *tab, and choose* **Green** *color, and* **Bold Italic** *font style.*
7. *Click* **OK** *in both dialog boxes.*

Store_No	Store_ID	Mattress_Rev	Pillow_Rev	Total_Rev	Budget	Budget_%	Store_Type	Bonus
1001	19	63,045	3,681	66,726	98,000	68.1%	Scissors	0
1001	19	63,376	4,095	67,471	98,000	68.8%	Scissors	0
1001	19	77,923	8,318	86,241	98,000	88.0%	Scissors	0
1001	19	86,017	9,506	95,523	98,000	97.5%	Scissors	0
1001	19	101,484	7,430	108,913	98,000	111.1%	Scissors	1,089
1001	19	101,337	9,197	110,533	98,000	112.8%	Scissors	1,105
1002	16	31,686	2,817	34,502	63,000	54.8%	Paper	0
1002	16	57,618	2,278	59,896	63,000	95.1%	Paper	0
1002	16	72,269	3,554	75,823	63,000	120.4%	Paper	1,137
1002	16	81,840	5,530	87,369	63,000	138.7%	Paper	1,311
1002	16	83,319	5,358	88,676	63,000	140.8%	Paper	1,330
1002	16	80,627	8,831	89,458	63,000	142.0%	Paper	1,342
1002	16	84,532	7,998	92,530	63,000	146.9%	Paper	1,388
1002	16	89,399	5,175	94,574	63,000	150.1%	Paper	1,891
1002	16	89,886	8,183	98,068	63,000	155.7%	Paper	1,961
1002	16	101,393	4,562	105,954	63,000	168.2%	Paper	2,119
1002	16	113,502	5,900	119,401	63,000	189.5%	Paper	2,388
1002	16	129,523	8,459	137,982	63,000	219.0%	Paper	4,139

Figure 14.23

All of the formatting you applied now appears. Note that we applied two styles of conditional formatting to these cells. You can see all of the formatting you applied by looking at the Conditional Formatting Rules Manager dialog box.

8. *Click on* **Conditional Formatting**, *and then on* **Manage Rules…**
9. *If necessary, click on the* **Show formatting rules for:** *drop-down menu and choose* **This Worksheet**.

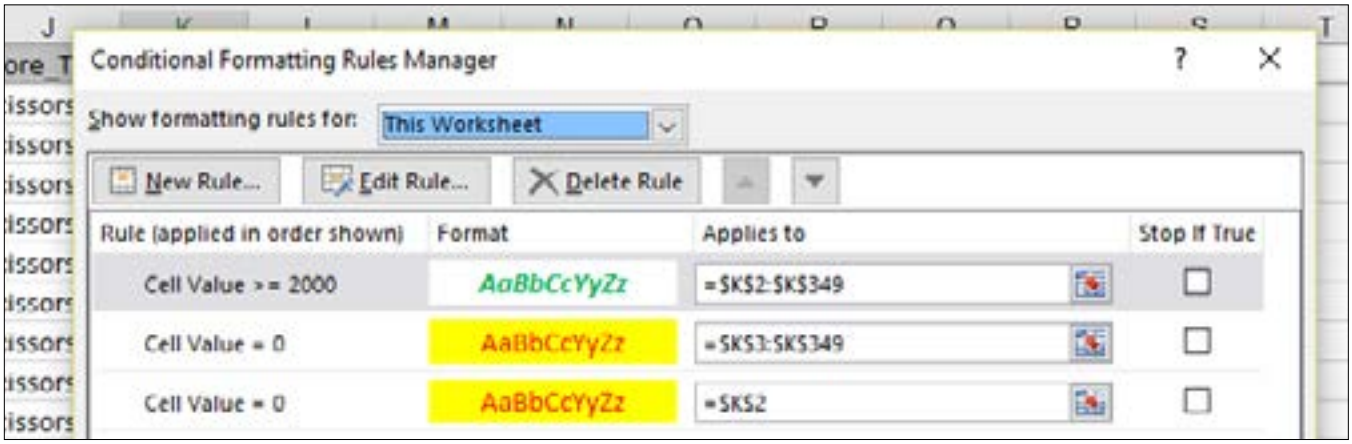


Figure 14.24

In the Conditional Formatting Rules Manager, you can see all of the formats that are applied in the current selection, on this worksheet, or on other worksheets in the workbook. In this example, we have three conditional formatting rules, when we really only need two. The second rule should be applied to the range $K$2:$K$349, so let's fix that and delete the third rule.

10. *Change the second rule's range to be* ***$K$2:$K$349****.*
11. *Click on the third rule, click the* **Delete Rule** *button, and click* **OK**.

> ***Tip****: To overcome this formatting issue, you can use the* **Data Fill** *feature after the first* **Conditional Formatting** *is set, and the range would then adjust without creating two separate rules for the same intended range.*

Let's explore one more type of Conditional Formatting: Data Bars. Data Bars were introduced in Excel 2007, and Microsoft made some minor but necessary changes to Data Bars in Excel 2010 — 2016. A Data Bar is simply solid or gradient shading behind a number. In Excel 2007, the length of the shading represented each number's position relative to other numbers in the dataset. In Excel 2010 — 2016, Data Bars compare values between the numbers based on their distance from zero.

First, we'll sort the table.

1. *Click on* **Cell B4** *(or any populated cell in* **Column B***) and click the* **Sort Smallest to Largest** *icon on the* **Data** *tab.*
2. *Right-click on* **Cell C4** *(or any populated cell in* **Column C***), point to* **Sort***, and click on* **Sort Smallest to Largest**.

You did this to sort the table in preparation for this next exercise.

3. *Select* **Cells G2:G349**.
4. *On the* **Home** *tab,* **Styles** *group, click on* **Conditional Formatting***, point to* **Data Bars***, and choose the* **Green Data Bar** *under* **Solid Fill**.
5. *Click anywhere outside the selection.*

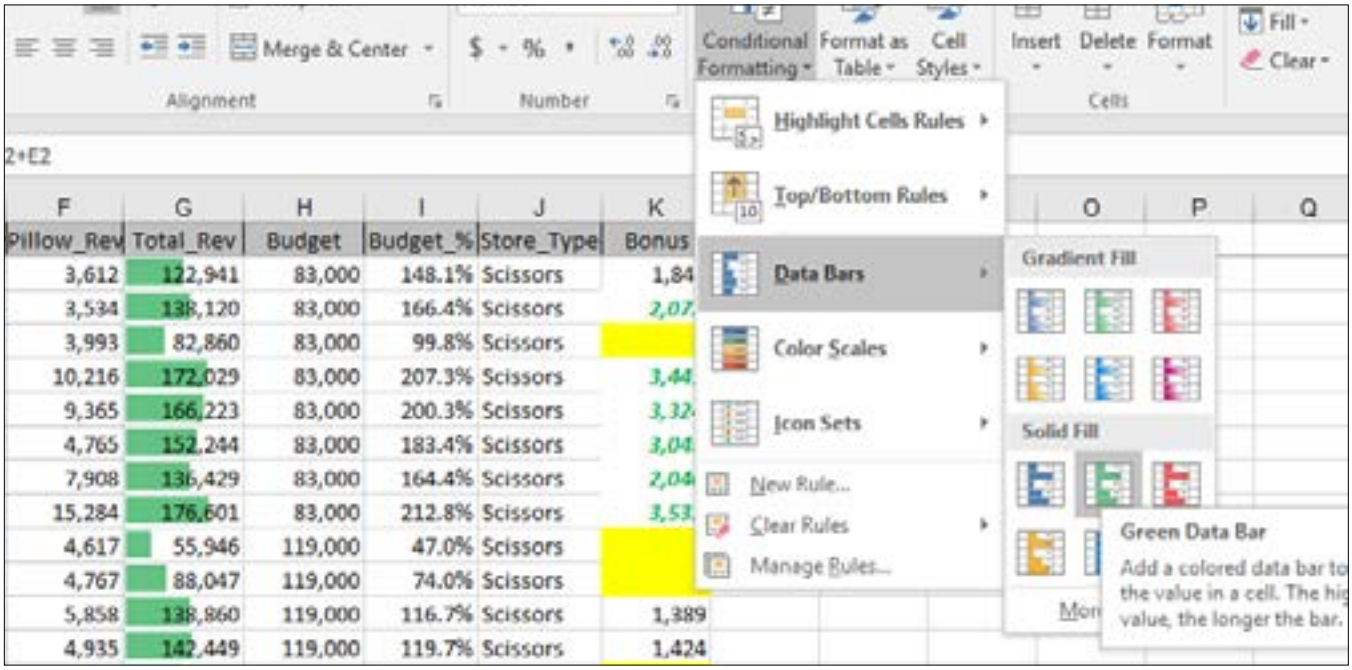


Figure 14.25

The figure above shows the Conditional Formatting applied with the green bars in Column G representing the number values compared to the others in the range. For example, G145 is the largest, so the the entire cell is green. This provides a quick visual for comparison. In Column K, the Conditional Formatting automatically applies the color and font formats you setup to the cells in that range, and also helps you see data patterns grouped at a glance. Multiple conditional formats can be applied to a specific cell or range, so as long as they visually make sense, you can set them up to meet your needs using presets, or using formulas you define for yourself.

Take some time to explore the other options available in Conditional Formatting. Management really likes to see a report in color with the different colors that make values stand out.

Full Screen

Sometimes, I don't know who of my users has Excel knowledge and who doesn't. Therefore, I try to make the applications as easy and dummy-proof as I can. One way of doing this is to hide the tabs and menus so the user is forced to use the commands on the spreadsheet. This can be accomplished in one easy step – by changing the view of the spreadsheet to ***Full Screen***. Microsoft has made this option very simple for users of Excel 2016.

1. *Click on the* Assumptions *tab.*
2. *Click on the* **Ribbon Display Options** *button in the upper-right corner of the* **Excel** *window (by your display name) and click the* **Auto-hide Ribbon** *option.*

***Tip**: You can also right-click on the* **Office Ribbon** *to hide or show different parts of the Ribbon area.*

	A	B	C	D	E	F	G	H	I	J
1	Paper	% of Budget	Bonus %		Min. Budget	Level				
2	1	0%	0.00%		0	Paper				
3	2	100%	0.50%		80,000	Scissors				
4	3	110%	1.00%		120,000	Rock				
5	4	120%	1.50%							
6	5	150%	2.00%							
7	6	200%	3.00%							
8					Total Bonus	291,205				
9										
10	Scissors	% of Budget	Bonus %							
11	1	0%	0.00%							
12	2	100%	0.50%							
13	3	110%	1.00%							
14	4	125%	1.25%							
15	5	145%	1.50%							
16	6	175%	2.00%							
17										
18										
19	Rock	% of Budget	Bonus %							
20	1	0%	0.00%							
21	2	100%	0.50%							
22	3	105%	0.75%							
23	4	115%	1.25%							
24	5	130%	1.50%							
25	6	150%	2.00%							

Figure 14.26

The Office Ribbon and Name Box are now hidden and the top item to appear is the Formula Bar. In Excel 2016, the full screen option has an ellipsis symbol (...) in the upper-right of the screen for viewing the hidden Office Ribbon options temporarily. You can choose between hidden features long-term, or simply Auto-hide to provide more workspace while you complete your work.

3. *Click the* **Ribbon Display Options** *icon, and choose* **Show Tabs and Commands**.

***Trick**: To customize the ribbon using* **Excel Options**, *click* **Advanced**, *and uncheck options in the* **Display Options for this workbook** *group. You can also right-click on any sheet tab and choose* **Hide**, *as long as at least one stays visible, or right-click the* **File** *tab, and choose* **Collapse the Ribbon**.

Hyperlinks

Believe it or not, there are some users that don't know you can click on the tabs at the bottom of the sheet to access other sheets. Sometimes, I don't want them to have that capability, so I have the option of hiding the sheet(s). With the tabs hidden, the user still needs a way to navigate from one sheet to another. In this case, I like to use ***Hyperlinks***, or a macro contained in a Command button. In this chapter, we'll look at Hyperlinks. We'll review Macros and Command Buttons to perform similar functions in Chapter 16. In the next exercise, we will insert a Hyperlink to take the user from the Assumptions tab to the Sales tab.

1. *On the* Assumptions *tab, insert two rows above* **Row 1**.
2. *In* **Cell A1**, *type:* ***Sales***
3. *Right-click on* **Cell A1**, *and choose* **Hyperlink** *(if using Excel 365, this option is labeled* **Links***).*

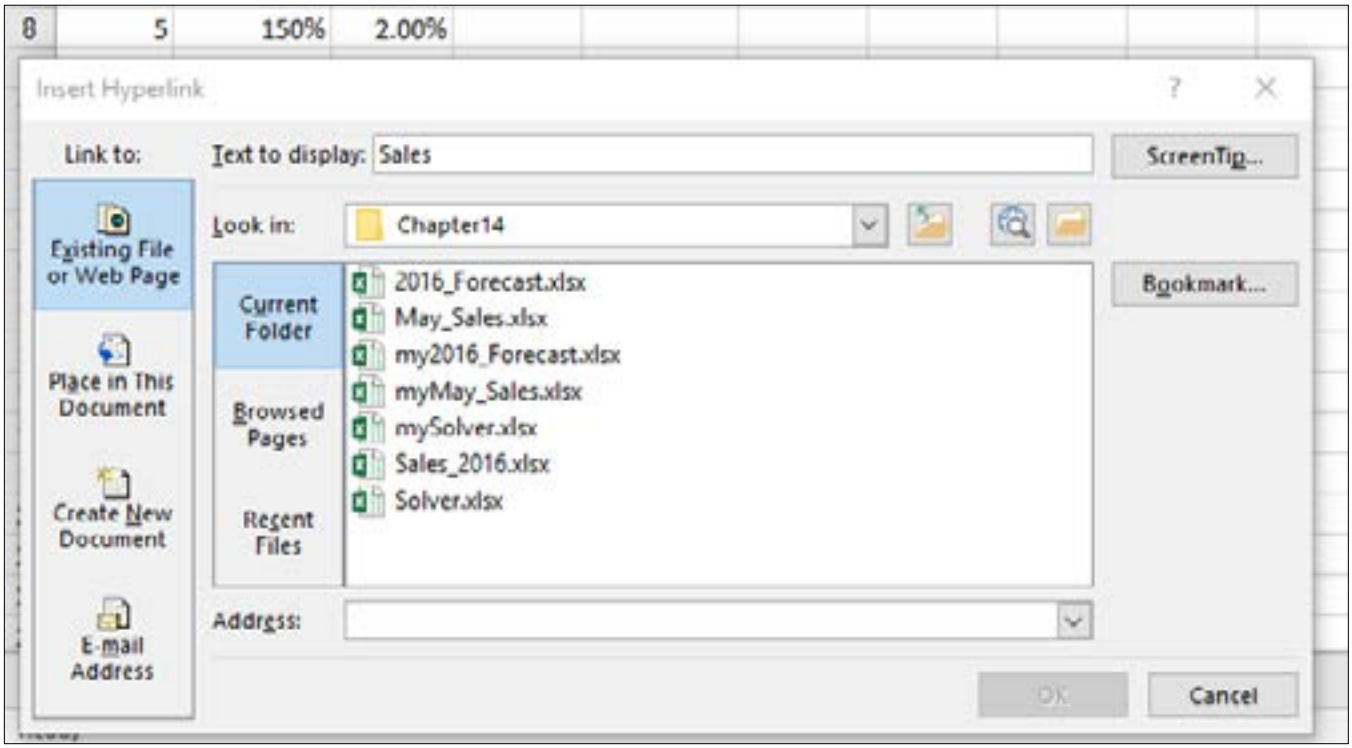


Figure 14.27

The Insert Hyperlink dialog box appears.

4. *Click on the* **ScreenTip…** *button.*
5. *In the* **Set Hyperlink ScreenTip** *dialog box, type:* ***Go to the Sales tab****.*
6. *Click* **OK**.

	A	B	C	D	E	F	G	H	I	J
1	Sales									
2										
3	Paper	% of Budget	Bonus %		Min. Budget	Level				
4	1	0%	0.00%		0	Paper				
5	2	100%	0.50%		80,000	Scissors				
6	3	110%	1.00%		120,000	Rock				

Figure 14.28

7. *Under the* **Link to:** *heading on the left, choose the* **Place in this Document** *option.*
8. *Under* **Type the cell reference**, *type:* ***K1***
9. *Under* **Cell Reference**, *choose* **Sales**.

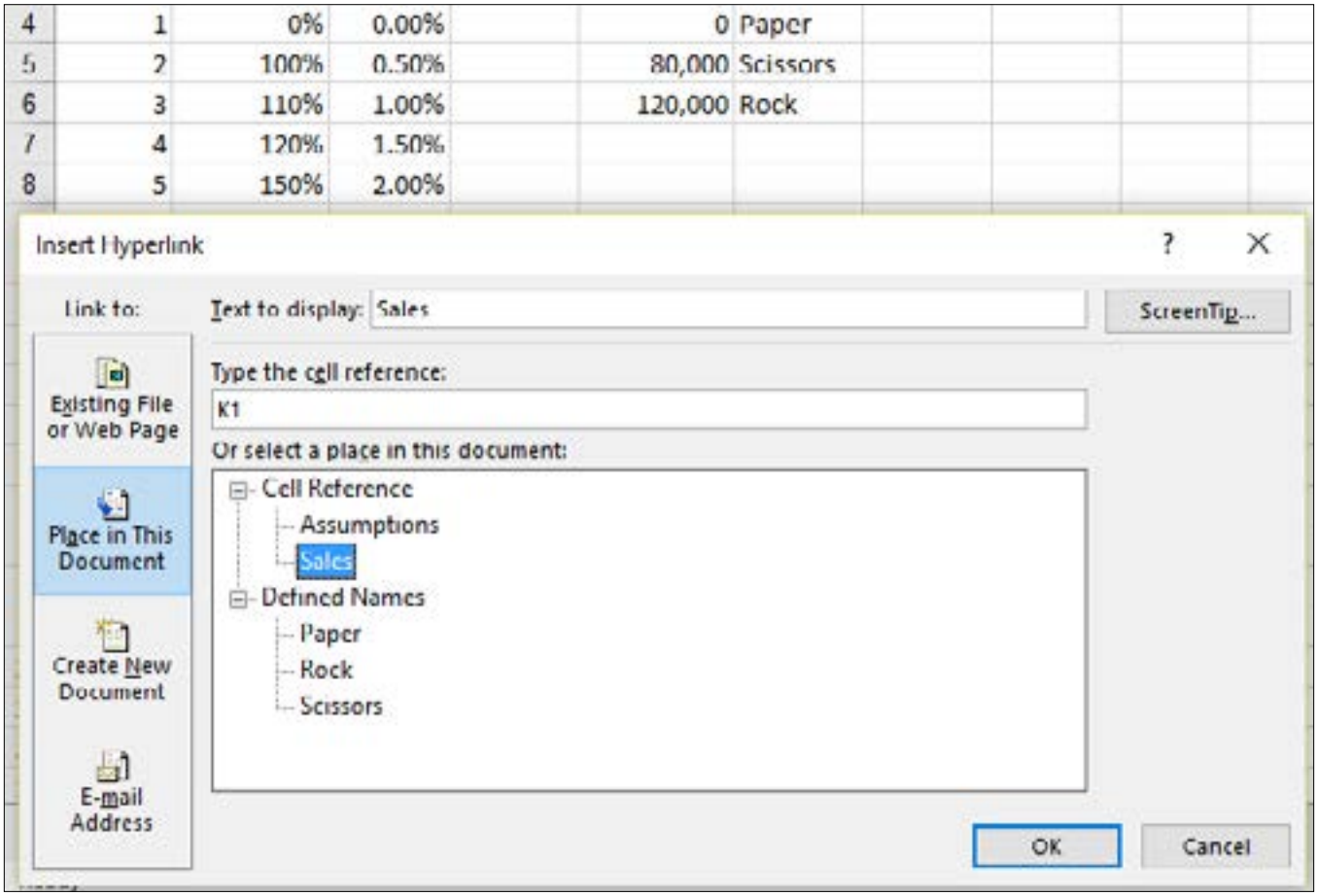


Figure 14.29

10. *Click* **OK**.

When you hold your mouse over the hyperlink, the screentip "Go to the Sales tab" appears. When you click on the hyperlink, it will automatically go to Cell K1 of the Sales tab.

	A	B	C	D	E	F	G	H	I	J
1	Sales									
2	Go to the Sales tab									
3	Paper	% of Budget	Bonus %		Min. Budget	Level				
4	1	0%	0.00%		0	Paper				
5	2	100%	0.50%		80,000	Scissors				
6	3	110%	1.00%		120,000	Rock				
7	4	120%	1.50%							
8	5	150%	2.00%							
9	6	200%	3.00%							
10					Total Bonus	291,205				

Figure 14.30

11. *In the* **Sales** *tab, insert two rows above* **Row 1**, *and Insert a* **Hyperlink** *that sends the usr to the* **Assumptions** *tab,* **Cell A3**.

A1 | Assumptions

	A	B	C	D	E	F	G	H	I
1	Assumptions								
2	Go to the Assumptions tab								
3	Year	Month	Store_No	Store_ID	Mattress_Rev	Pillow_Rev	Total_Rev	Budget	Budget_%
4	2016	1	1001	19	37,107	4,613	41,720	98,000	42.6%
5	2016	2	1001	19	55,027	3,662	58,689	98,000	59.9%
6	2016	3	1001	19	46,224	4,021	50,245	98,000	51.3%
7	2016	4	1001	19	56,609	3,911	60,520	98,000	61.8%
8	2016	5	1001	19	54,584	3,595	58,178	98,000	59.4%
9	2016	6	1001	19	63,376	4,095	67,471	98,000	68.8%
10	2016	7	1001	19	63,045	3,681	66,726	98,000	68.1%
11	2016	8	1001	19	86,017	9,506	95,523	98,000	97.5%
12	2016	9	1001	19	101,337	9,197	110,533	98,000	112.8%
13	2016	10	1001	19	51,256	4,578	55,834	98,000	57.0%
14	2016	11	1001	19	77,923	8,318	86,241	98,000	88.0%
15	2016	12	1001	19	101,484	7,430	108,913	98,000	111.1%
16	2016	1	1002	16	31,686	2,817	34,502	63,000	54.8%
17	2016	2	1002	16	57,618	2,278	59,896	63,000	95.1%
18	2016	3	1002	16	80,627	8,831	89,458	63,000	142.0%
19	2016	4	1002	16	83,319	5,358	88,676	63,000	140.8%

Figure 14.31

To edit a hyperlink, simply place your cursor over the linked text, right-click and choose Edit Hyperlink. The Edit Hyperlink dialog box will pop up which is identical to the Insert Hyperlink dialog box. All you

have to do is make the modifications and click OK. You can also remove a hyperlink, if needed.

Quick Analysis

A new feature for Excel 2013 was Quick Analysis. You likely noticed the Quick Analysis icon when you copy text down a column manually or using DataFill. Recommended Charts is closely linked to Quick Analysis, and is a decent way to visualize your data. Be careful with large tables though, as the chart can end up being more confusing than useful. Let's try the new functions, and see the benefit they can provide.

12. *On the* **Sales** *tab, select the entire table, and click the* **Quick Analysis** *icon to the upper-right of the highlighted table.*
13. *Click the* **Charts** *header, and hover your mouse over the various* **Clustered Column** *chart options.*

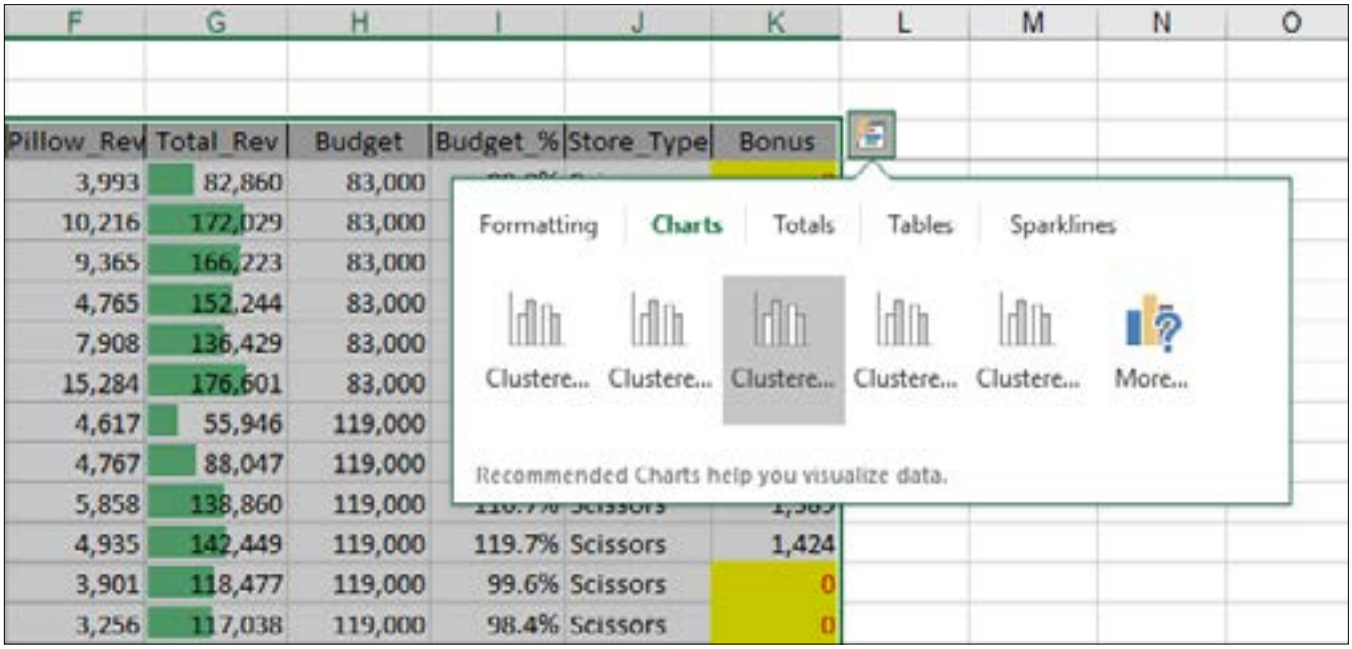


Figure 14.32

The Quick Analysis box pops up with several visual analysis headers from which to choose. These Recommended Charts provide many ways to visualize data. The more useful charts are highlighted, but you can also choose your own options by searching through the menus.

14. *Escape out of* **Quick Analysis**, *then* **Save** *and* **close** *the* **mySales_2016.xlsx** *file.*

Review Questions: *It is now time to complete the hands-on Review Questions. Log on to www.ExcelCEO.com with your Email address and Password, click on the* **Excel 2016 Review Questions, Chapter 14, Section 2 of 2** *option in your Main Menu, and complete the Review Questions.*

Conclusion

In this chapter, you learned how to change parameters to get a desired result by using Goal Seek and Solver. You used Data Analysis to calculate Descriptive Statistics. You learned how to work with Conditional Formatting, how to turn the Full Screen off and on, and you created Data Bars. You created a hyperlink that helped to move users from one place on the spreadsheet to another. Finally, you used Quick Analysis to see various chart options which can be previewed.

Chapter Exam

To take the examination for this chapter, you must have successfully completed the examination for the previous chapter. You can now go to www.ExcelCEO.com, click on Sign In, log in and take the exam. Make sure that you take the exam on the same computer on which you completed the practice files, as some of the questions on the exam may refer to some of the completed projects. Chapter exams are intended to be hands-on.

CHAPTER FIFTEEN — GRAPHICS, PROTECTION, AND SHARING

Chapter Objectives:

- Recognize graphics in Paint to create images in a spreadsheet
- Identify protections for vital workbook and cell contents prior to sharing with others
- Determine how to share a workbook and setup tracking for changes
- Select the appropriate actions to merge and compare workbooks
- Identify how to consolidate data from multiple files into a single workbook

Projects You Will Complete During This Chapter:

- *myQ1_Sales.xlsx*
- *myQ1_Sales_Link.xlsx*
- *mySales_2016.xlsx*
- *mySales_2016_Changes.xlsx*

CPE Credits possible for this chapter: 2

Graphics Using Paint

To begin this chapter, let's talk a little bit about graphics. A *graphic* is simply an image that you can use in your documents to give them a little variety and pizzazz, and they are easy to create. I like using a program called Paint to create graphics. ***Paint*** is a simple program that comes standard in all Windows packages. I like it because it's very easy to use and most of the graphic type work I do is very simple. My artistic ability is limited to drawing a straight line with a ruler, and I usually mess that up. You can use the graphic, usually saved as a .jpg or .png file, in Excel, Access, Word, HTML, and in a host of other programs. Let's create a graphic using Excel's WordArt, and Paint.

1. **Open** *a* **Blank workbook** *in* **Excel**.
2. *Click on the* **Insert** *tab, click on* **Insert WordArt** *in the* **Text** *group, and choose the fourth "***A***" in the second row labeled* **Fill: White; Outline: Blue; Accent color 1; Glow: Blue, Accent color 1**. *(The WordArt descriptions change, so if this is not available, find something close).*
3. *Replace* **Your Text Here** *with* ***Nitey-Nite Mattresses***
4. *Make the font size* **20**.
5. *Leave the default style* **Calibri (Body)**.
6. *On the* **Format** *tab of the* **Drawing Tools** *contextual tab, click on the* **Text Effects** *button of the* **WordArt Styles** *group.*
7. *Place your cursor over* **Transform**, *scroll down and hover your cursor over the* **Double Wave: Down-Up** *icon, and click.*
8. *Click anywhere outside the graphic.*

You should get a graphic that looks as follows:

Figure 15.1

9. *Open* **Paint** *(click on* **Cortana**, *type* ***Paint***, *and select* **Paint Desktop App** *below the* **Best Match** *heading). If needed, click My Stuff instead of searching the Web.*

> *Note:* **Cortana** *is designed to be a computer-based search engine bridge of sorts, so you may see options from the* **Store**, **Documents**, **Web**, *or by different categories on your computer. If you have been using your computer for a while, your results will probably vary slightly depending on use and updates. If you have* **Paint 3D** *available, more options are available to make your logo look nicer, including making the background transparent.*

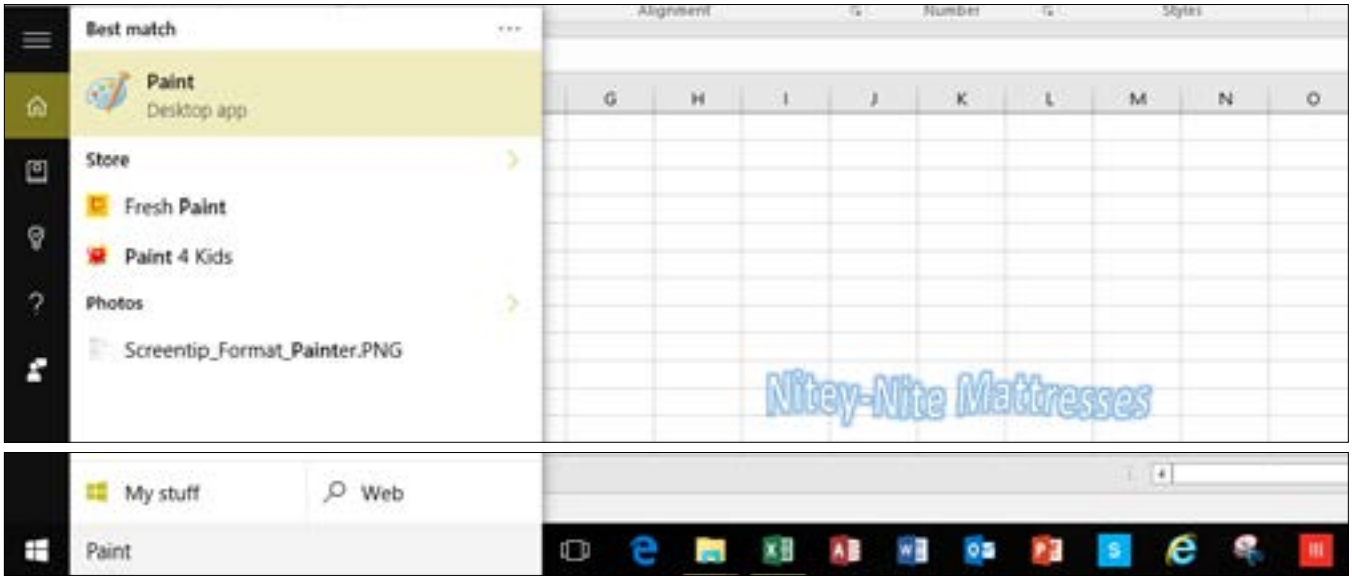


Figure 15.2

10. *Go back to* **Excel**, *make sure the graphic is selected (handle bars will appear around the graphic), and copy the graphic (***[Ctrl]+*c**).
11. *Toggle over to* **Paint** *and paste it (***[Ctrl]+*v**).
12. *Resize the graphic in* **Paint** *(using the blue handle at the bottom-right) to match as below.*

Figure 15.3

13. **Save** *the* **Paint** *file as* **C:\ExcelCEO\Excel 2016\Chapter15\logo.jpg**.
14. **Close Paint**.
15. **Close** *the blank* **Excel** *file without saving it.*

Now you have a logo that you can use in your reports. Let's place the graphic in a file.

16. **Open** *the* **mySales_2016.xlsx** *file in the* **C:\ExcelCEO\Excel 2016\Chapter14** *folder.*
17. **Save As mySales_2016.xlsx** *(the same name) in* **C:\ExcelCEO\Excel 2016\Chapter15**.

18. *Click on* **Cell G1** *on the* Assumptions *tab.*
19. *Click on the* **Insert** *tab, choose* **Pictures** *in the* **Illustrations** *group, navigate to* **C:\ExcelCEO\Excel 2016\Chapter15\logo.jpg**, *click on the logo file, and click* **Insert**.

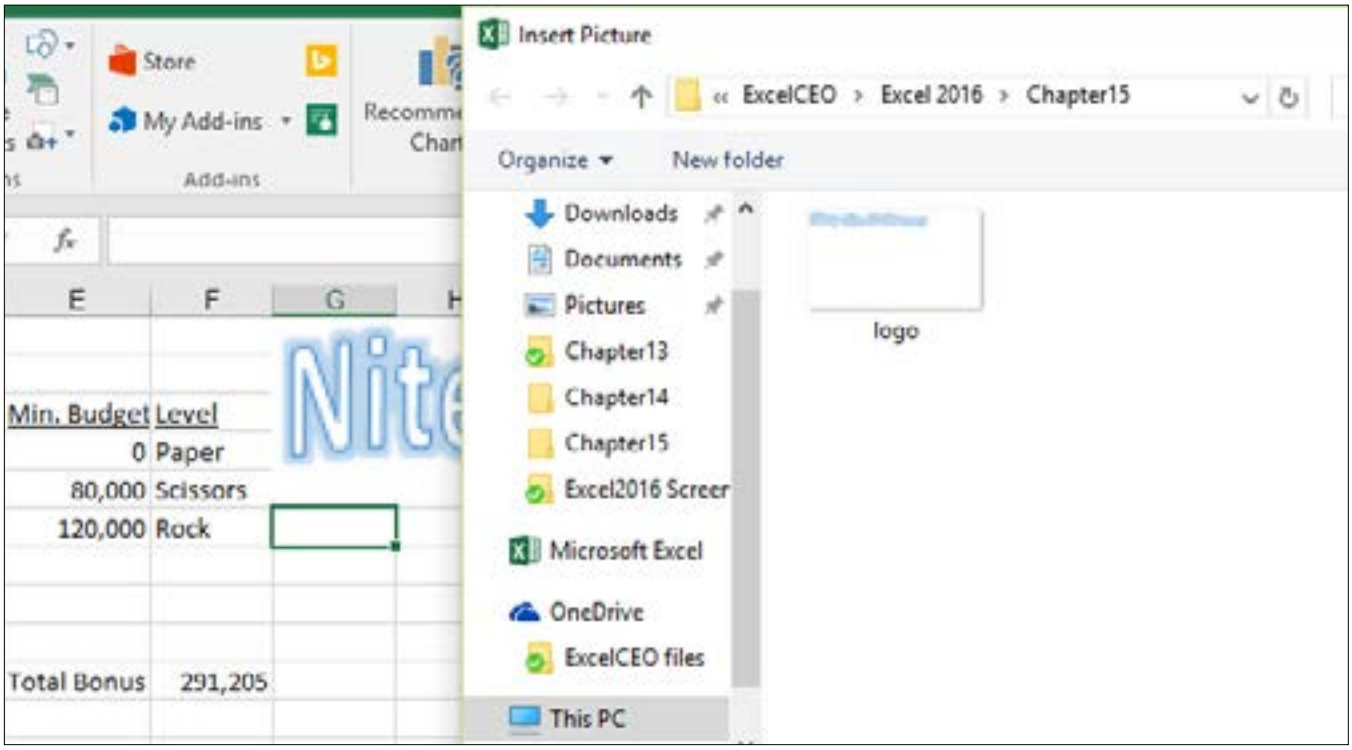


Figure 15.4

20. *Click anywhere outside the logo to deselect it. Right-click to Crop, if necessary.*

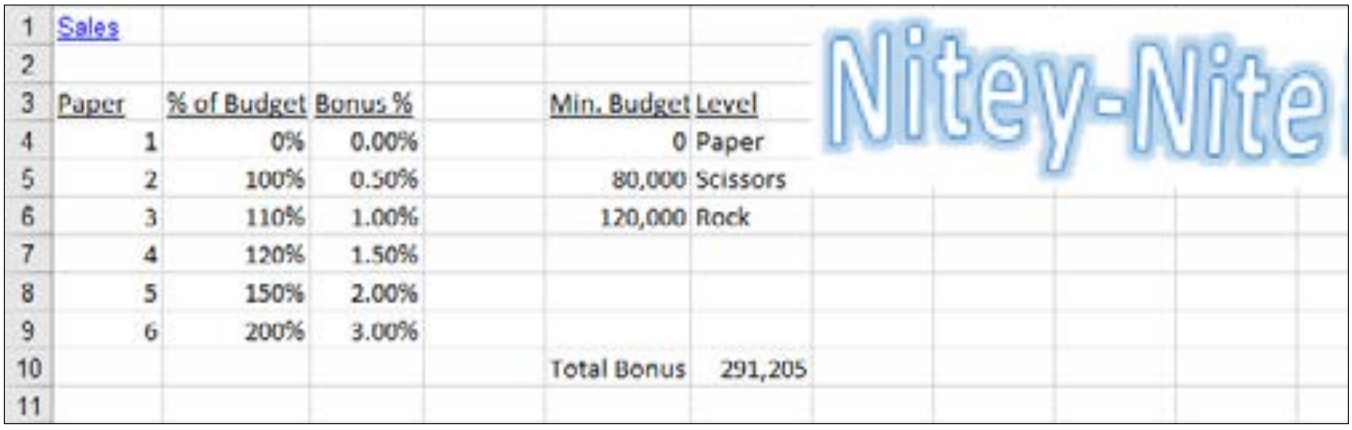


Figure 15.5

With the image on the spreadsheet, you can now drag it to any place in the document you wish. Pretty easy, huh?

Protection

Once you have a spreadsheet designed just the way you want it, you need to ***protect*** it. In the Sarbanes-Oxley awareness world in which we live, it is vitally important to protect the formulas and analyses in your spreadsheets. One great way of protecting your spreadsheet is by using the Protection tools available in Excel 2016.

1. *While on the* Assumptions *tab of the file, click on the* **Review** *tab, then click on the* **Protect Sheet** *button in the* **Changes** *group.*

	A	B	C	D	E	F	G	H	I	J
1	Sales									
2										
3	Paper	% of Budget	Bonus %		Min. Budget	Level				
4	1	0%	0.00%		0	Paper				
5	2	100%	0.50%		80,000	Scissors				
6	3	110%	1.00%		120,000	Rock				
7	4	120%	1.50%							
8	5	150%	2.00%							
9	6	200%	3.00%							
10					Total Bonus	291,205				
11										
12	Scissors	% of Budget	Bonus %							
13	1	0%	0.00%							
14	2	100%	0.50%							
15	3	110%	1.00%							
16	4	125%	1.25%							
17	5	145%	1.50%							
18	6	175%	2.00%							

Figure 15.6

The Protect Sheet dialog box appears. There are multiple items you can protect or leave unprotected. For this exercise, we want to protect the entire spreadsheet. Note that this action protects only the spreadsheet you are currently on. To protect the entire workbook, use Protect Workbook from the Review tab.

2. *In the* **Password to unprotect sheet** *box, type:* ***abc*** *and click* **OK**.
3. *Retype the* ***abc*** *password in the* **Confirm Password** *dialog box, and click* **OK**.

Now if you try to change anything on the spreadsheet, you will get a message telling you it is protected. This works great if you want to protect the entire spreadsheet, but what if you want to allow the user the ability to change selected cells in the spreadsheet? In the next example, we want users to be able to change the values in certain cells in Columns B, C and E, but nothing else. To do this, we first have to unprotect the sheet.

4. *Click on the* **Unprotect Sheet** *button in the* **Changes** *group of the* **Review** *tab.*

Figure 15.7

5. *Type* ***abc*** *in the* **Unprotect Sheet** *dialog box, and click* **OK**.
6. *On the* **Assumptions** *tab, select the* **cell ranges B4-C9**, **B13-C18**, **B22-C27**, *and* **E4-E6** *(i.e.- all of the cells that users could possibly change).*

	A	B	C	D	E	F	G	H	I	J
1	Sales									
2										
3	Paper	% of Budget	Bonus %		Min. Budget	Level				
4	1	0%	0.00%		0	Paper				
5	2	100%	0.50%		80,000	Scissors				
6	3	110%	1.00%		120,000	Rock				
7	4	120%	1.50%							
8	5	150%	2.00%							
9	6	200%	3.00%							
10					Total Bonus	291,205				
11										
12	Scissors	% of Budget	Bonus %							
13	1	0%	0.00%							
14	2	100%	0.50%							
15	3	110%	1.00%							
16	4	125%	1.25%							
17	5	145%	1.50%							
18	6	175%	2.00%							
19										
20										
21	Rock	% of Budget	Bonus %							
22	1	0%	0.00%							
23	2	100%	0.50%							
24	3	105%	0.75%							

Figure 15.8

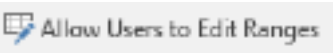
7. *Click on the* **Allow Users to Edit Ranges**  *option in the* **Changes** *group.*

Figure 15.9

8. *In the* **Allow Users to Edit Ranges** *dialog box, click* **New…**

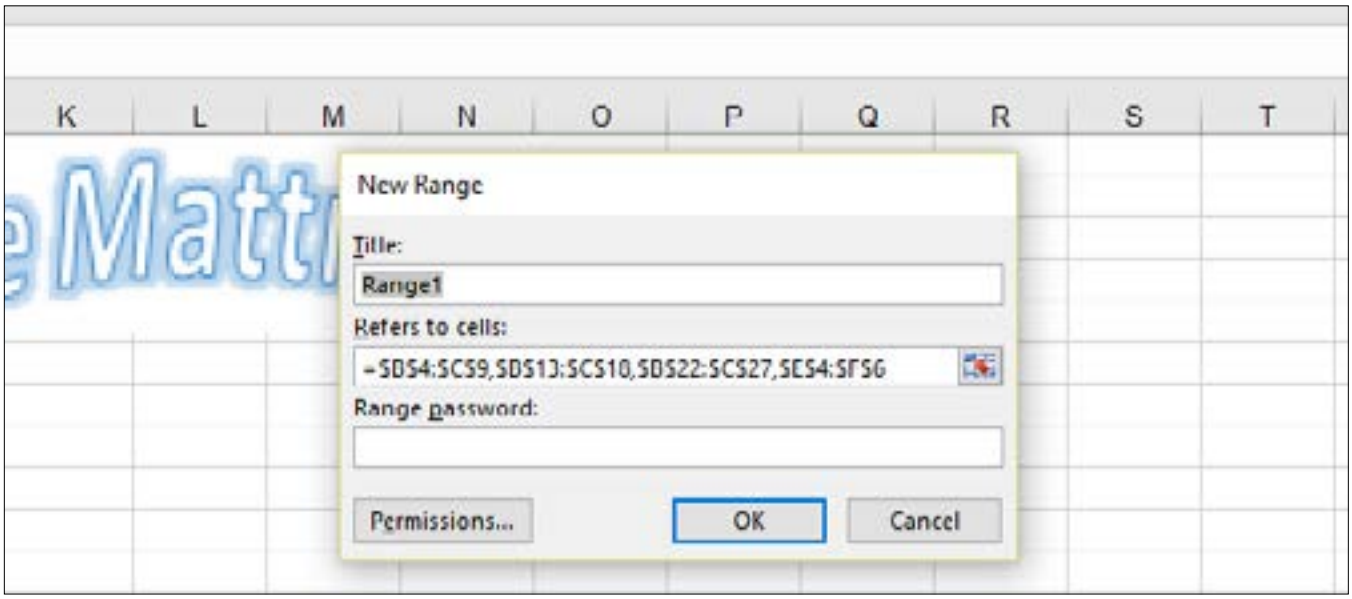


Figure 15.10

9. *Leave* **Range1** *as the title of the named range, do not enter a password in the range password box, and click* **OK**.

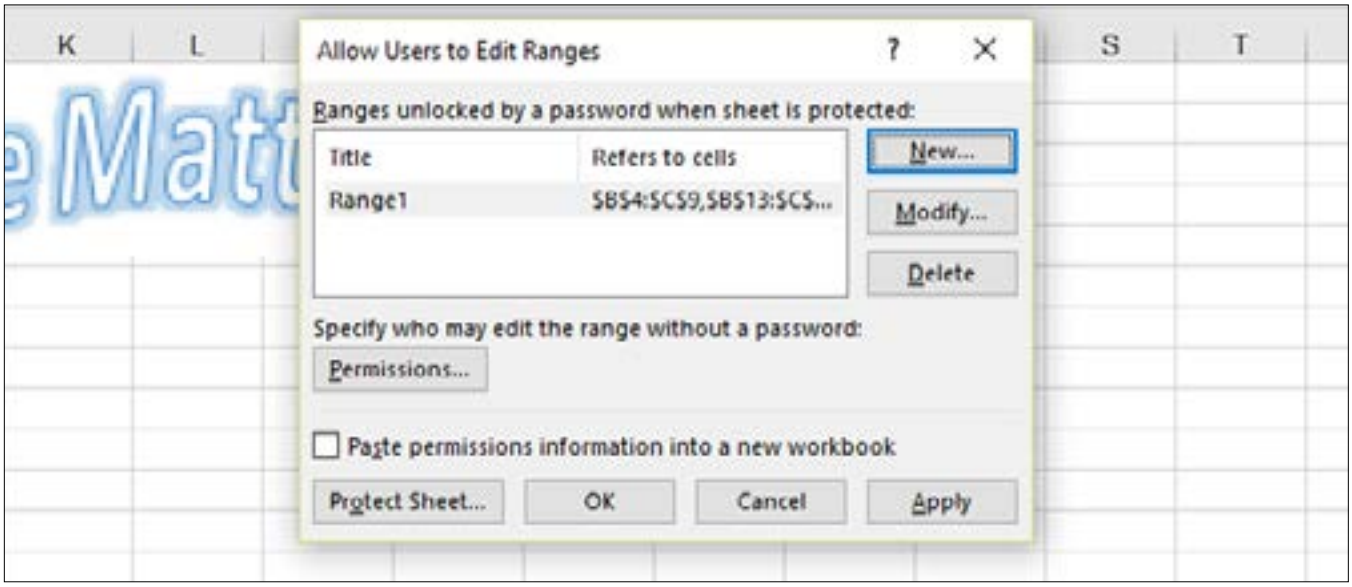


Figure 15.11

10. *Click* **Protect Sheet…** *in the* **Allow Users to Edit Ranges** *dialog box.*
11. *Use the* ***abc*** *password in each of the next two dialog boxes.*
12. *Now* **Password Protect** *the entire* Sales *tab with the same password.*

Now you have a file that your users can manipulate without the worry of anyone changing the formulas.

You can also ***lock*** and ***hide*** cells in the Format Cells dialog box. A locked cell cannot be changed when protection is turn on, and a hidden cell hides the formulas in a spreadsheet.

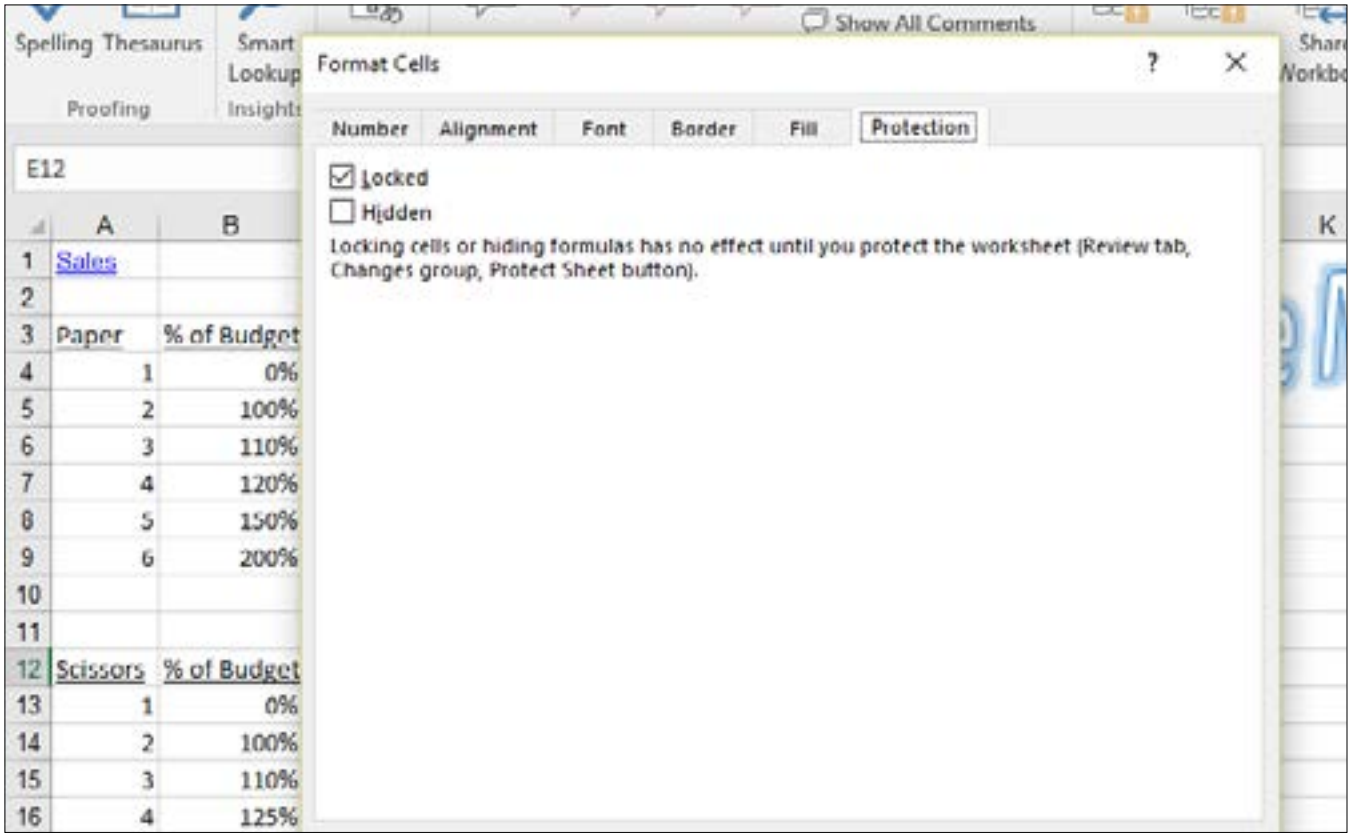


Figure 15.12

The exercises we just completed were designed to teach you how to protect data within an Excel file. You can also protect the entire file.

13. *On the* **File** *tab, click on* **Save As**, *and choose* **Chapter 15** *under* **Current Folder**.
14. *Click on the* **Tools** *option inside the* **Save As** *dialog box and click on the* **General Options...** *option.*

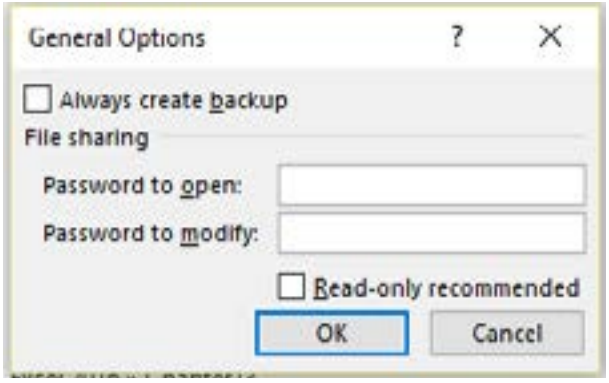


Figure 15.13

15. *In the* **Password to open** *box, type* ***123*** *and click* **OK**.

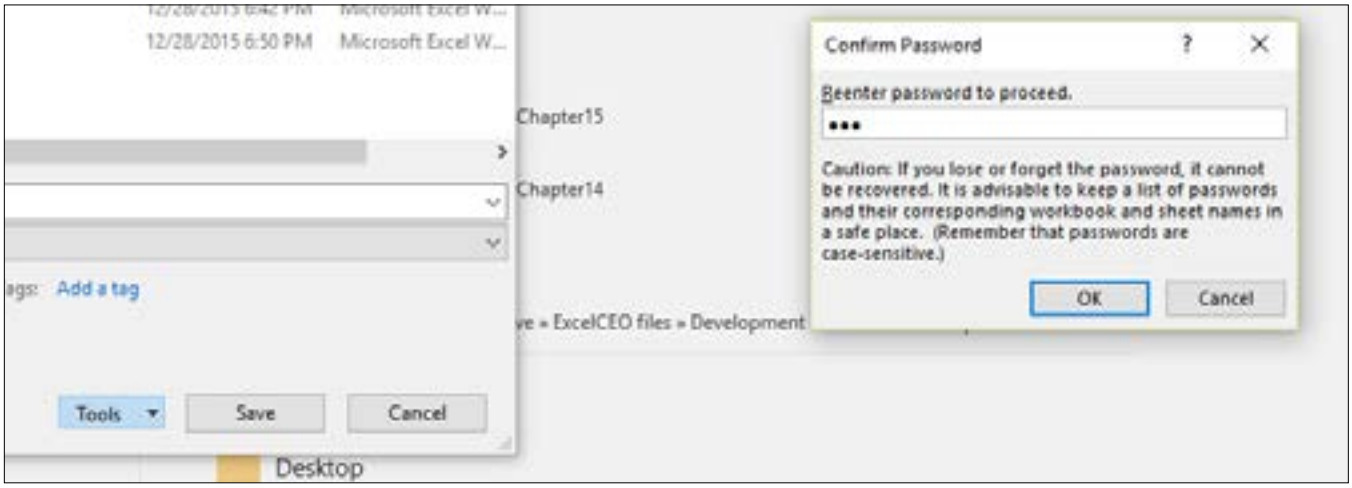


Figure 15.14

16. *Type* ***123*** *in the* **Confirm Password** *dialog box.*
17. **Save** *the* **mySales_2016.xlsx** *file, and click* **Yes** *in the* **Confirmation Save As** *dialog box.*

> ***Note**: This simple password exercise is for illustrative and education purposes only. While you should choose a password you will remember when securing a file like the one you have just worked with, I recommend you choose a file password that is unique for you that will protect your own files.*

Passwords

A few words of caution about passwords: DO NOT FORGET THE PASSWORD. In the past, if you forgot the password, you could not get it open again. However, in today's tech-savvy world, there are a number of applications you can buy on the Internet to recover a lost password. But it would be a lot easier on yourself to just not forget the password, or at least write it down somewhere. Remember that Excel passwords are ***case-sensitive***, so typing ABC will not work to unprotect our worksheet. Note that if you use password protection in an Excel 2010 — 2016 file and allow users to edit a range, it will not work in some earlier versions of Excel.

The best passwords consist of a lot of characters and will contain upper- and lower-case characters, as well as numbers and special characters. Typically, the longer the password, the harder it is to hack into it. I like to create a file, paper or electronic, with all of my user IDs and passwords in it. There are so many applications out there where you have to use a user ID and password to sign on, and many of them require the user IDs and passwords be set up in a certain way. There is no guarantee that your standard user ID or password you use for everything will work in all applications. In fact, it most likely won't. Therefore, it's a good idea to keep those user IDs and passwords documented and in a safe place.

> ***Review Questions**: It is now time to complete the hands-on Review Questions. Log on to www.ExcelCEO.com with your Email address and Password, click on the* **Excel 2016 Review Questions, Chapter 15, Section 1 of 2** *option in your Main Menu, and complete the Review Questions.*

Sharing a Workbook

When a user opens a standard Excel file that is stored on a shared drive, they typically open it with exclusive rights, meaning that no one else can make changes to it while they have it open. However, sometimes it is necessary for more than one person to work with the same spreadsheet at the same time. This presents a problem, as most workbooks are setup where only one person at a time can work on it. To solve this issue, you can turn on Excel's sharing capability. When a workbook is ***shared***, multiple users can use it at the same time. The owner of the workbook can then review and track the changes made and accept or reject the changes he/she wants.

1. *Click on the* **Share Workbook** *button in the* **Changes** *group of the* **Review** *tab.*

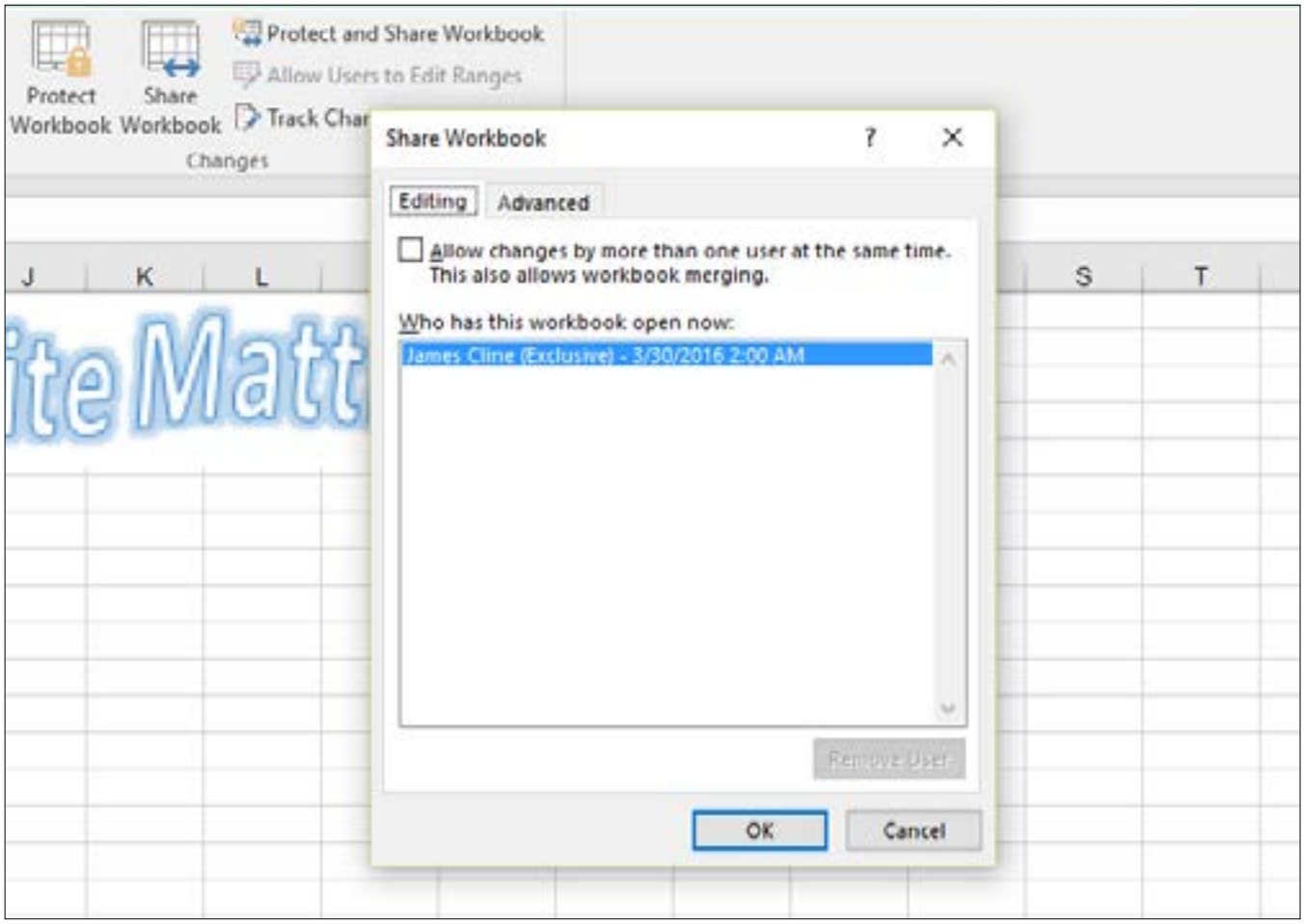


Figure 15.15

2. *Check the* **Allow changes by more than one user at the same time** *check box, and click the* **Advanced** *tab.*

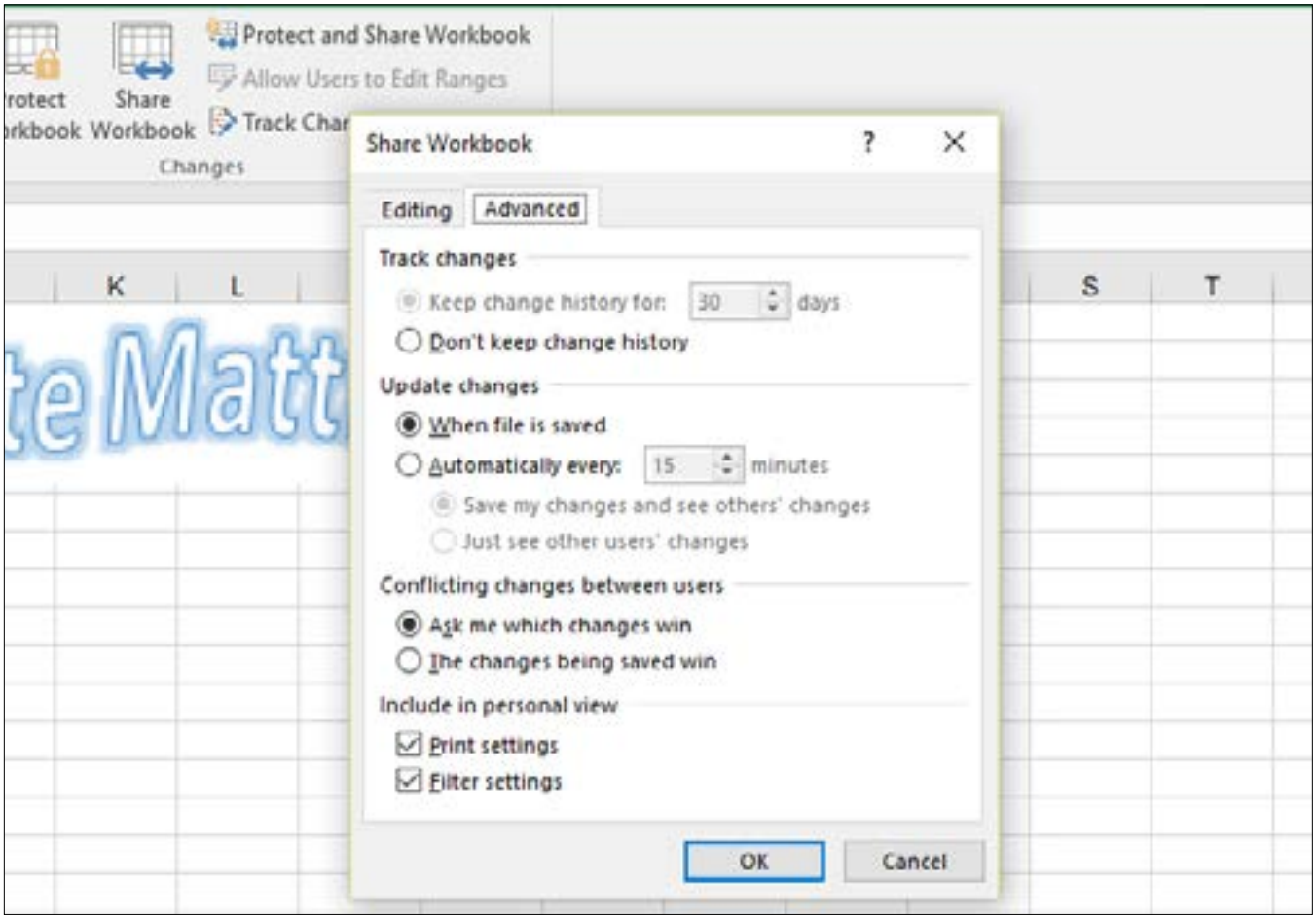


Figure 15.16

There are many settings on the Advanced tab, but the two that are most used concern keeping history and conflicting changes. I typically keep these default settings.

3. *Leave the default settings, and click* **OK**.

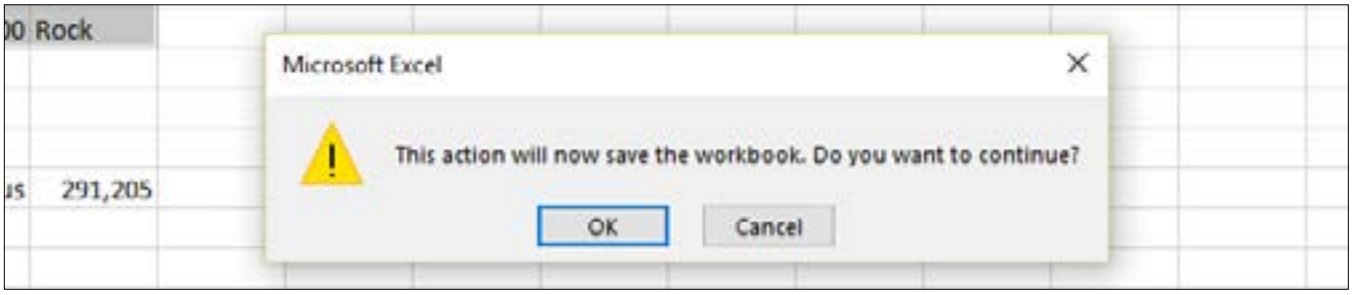


Figure 15.17

4. *Click* **OK** *in the* **Microsoft Excel** *caution dialog box.*
5. **Save** *and* **close** *the* **mySales_2016.xlsx** *file.*

Tracking Changes to a Shared Workbook

Excel allows you to track and review changes that you made and changes that others have made to a shared file. In this next exercise, you will open the Sales_2016_Changes.xlsx file and work with it to see how changes are captured in a shared file.

1. **Open** *the* **Sales_2016_Changes.xlsx** *file at* **C:\ExcelCEO\Excel 2016\Chapter15**.
2. *Unprotect* **Sales_2016_Changes.xlsx** *with password* ***123***.
3. **Save As C:\ExcelCEO\Excel 2016\Chapter15*mySales_2016_Changes.xlsx***.

Note: *This file is essentially a continuation of the file you just closed (with a few changes), so the password used to protect that file will unprotect this one.*

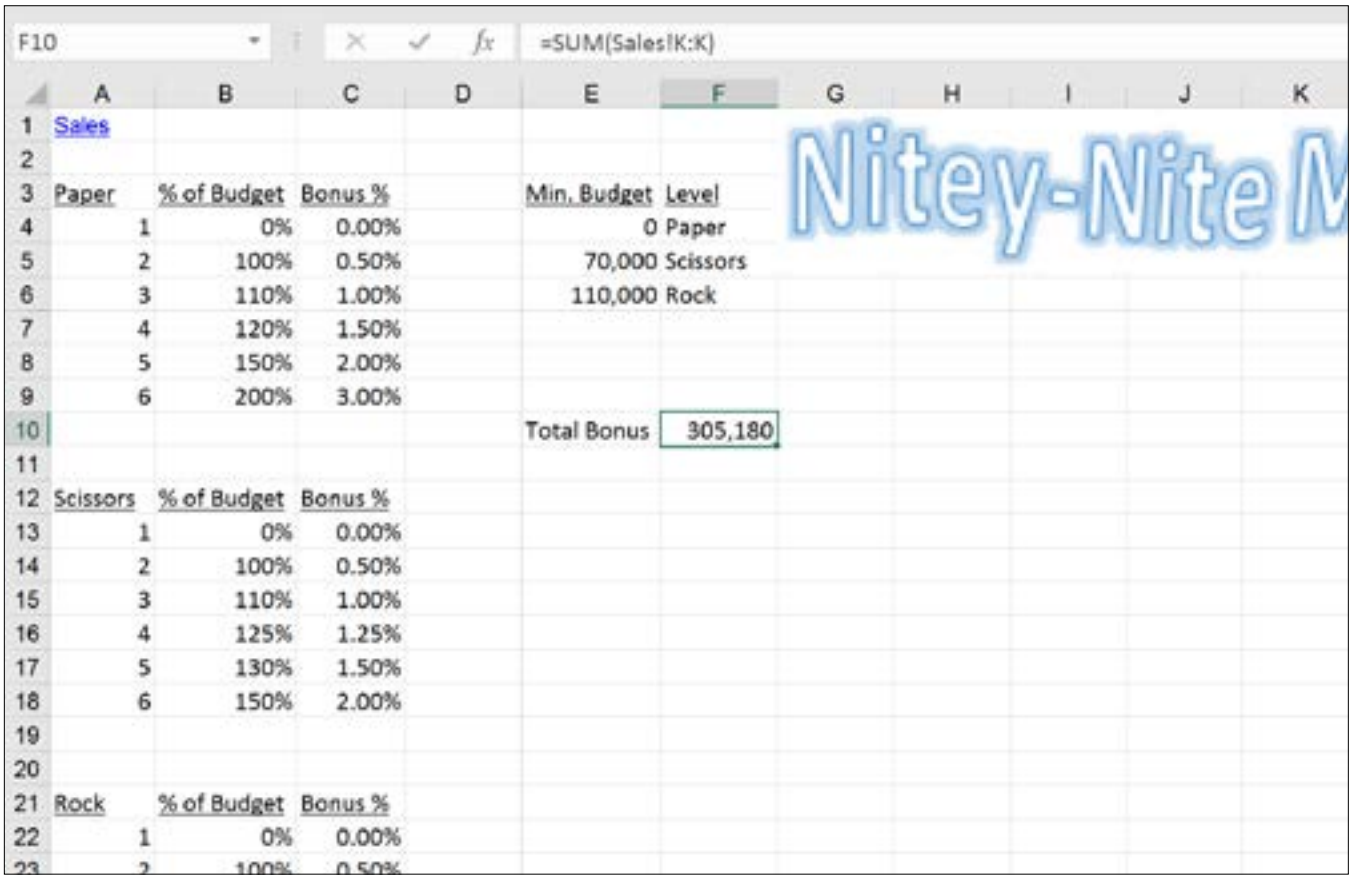


Figure 15.18

In this exercise, you will pretend your name is Joe Smith. Whenever Joe logs on to his computer, his computer name is Joe Smith.

4. *Click on the* **File** *tab and choose* **Options**.
5. *In the* **General** *section of the* **Excel Options** *dialog box, change the user name to* ***Joe Smith****, and click* **OK**.

You are now operating your computer as if you were Joe Smith. Now you will turn on the tracking changes functionality.

6. *In the* **Changes** *group of the* **Review** *tab, click on the* **Track Changes** *button, and choose* **Highlight Changes…**
7. *Click the* **Track changes while editing...** *checkbox, set* **When:** *to* **All**, *and click* **OK**.

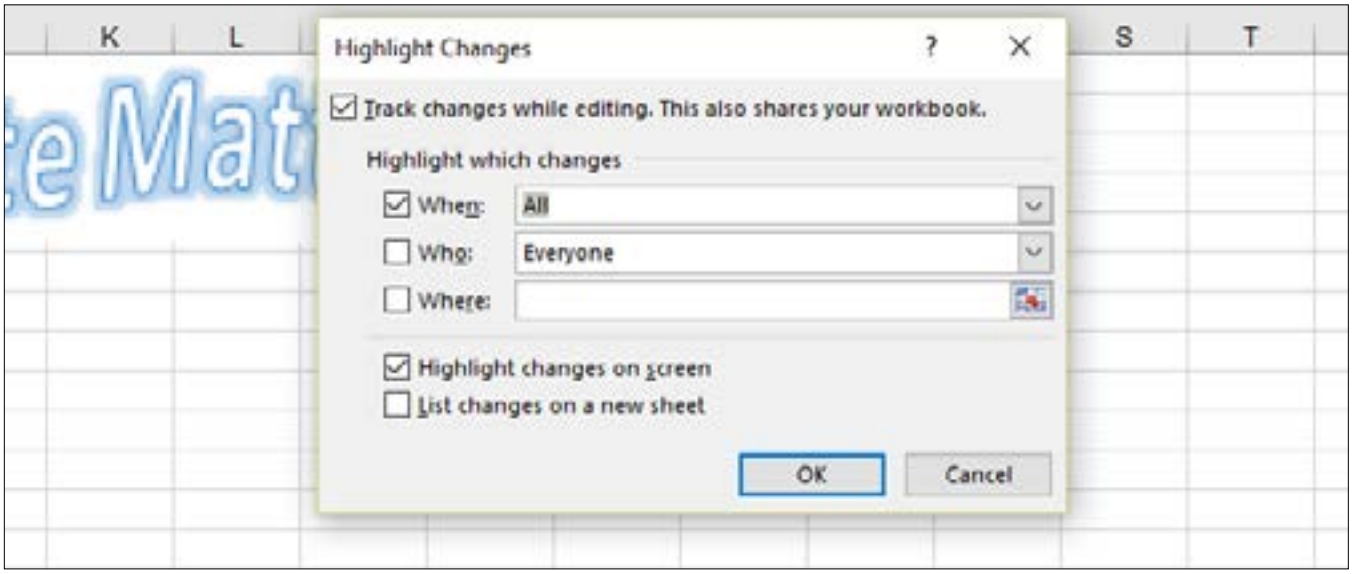


Figure 15.19

8. *Click* **OK** *in the warning dialog box that appears. This action saves the workbook and shares it.*

Notice that the name of the file at the top of the title bar appears as **mySales_2016_Changes [Shared]**. The **[Shared]** indicates that the sharing functionality is turned on.

9. *In the spreadsheet, change* **Cell B8** *to* ***130%***, **Cell B9** *to* ***150%***, **Cell E5** *to* ***80,000***, *and* **Cell E6** *to* ***120,000***.

When you make a change to a cell, a thin blue line surrounds the cell, and Excel creates a flag in the upper-left corner of the cell. This is a type of comment. When you hold your cursor over the cell, the comment box appears telling you who made the last change, and what the changes were.

10. **Save** *the* **mySales_2016_Changes.xlsx**, *but don't close it yet.*
11. *Change the user name (***Steps 3 and 4***) back to your user name.*
12. *In the spreadsheet, change* **Cell E5** *to* ***75,000*** *and* **Cell E6** *to* ***115,000***.
13. **Save mySales_2016_Changes.xlsx**.
14. *In the* **Changes** *group of the* **Review** *tab, click on* **Track Changes**, *then choose* **Highlight Changes…**

The Highlight Changes dialog box appears. It is in this box where you will define what changes are tracked by whom and where. You can also choose where to review the changes — either on the screen or on a new sheet.

15. *In addition to the default settings as shown in Figure 15.19, check the* **List changes on a new sheet** *box and click* **OK**.

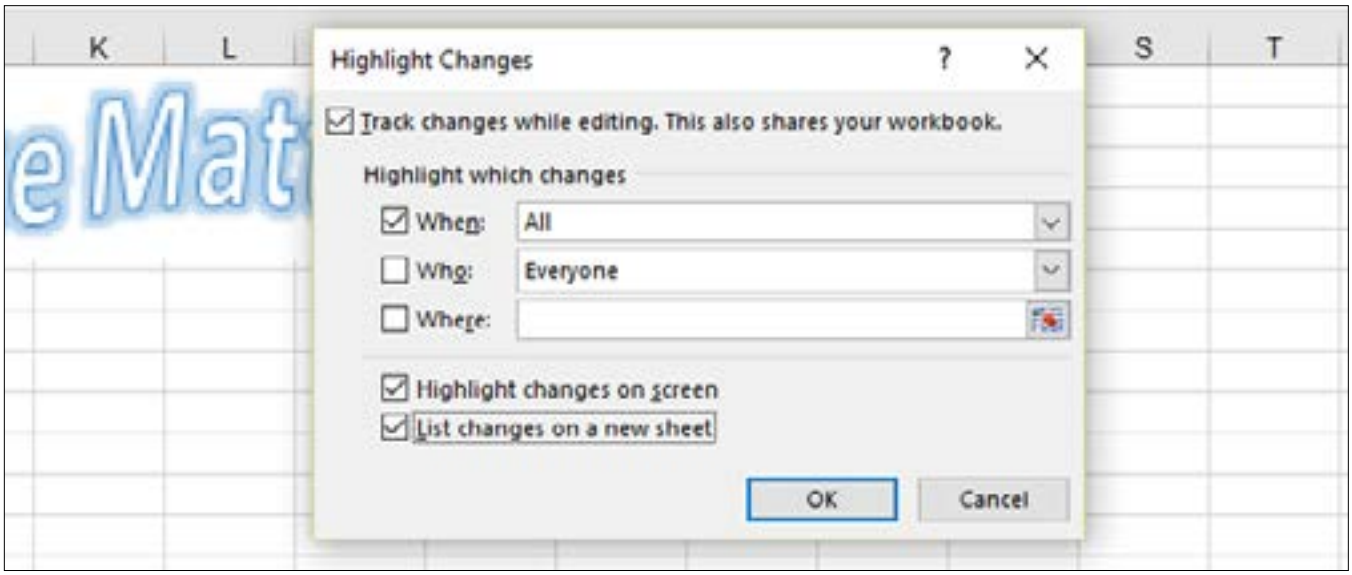


Figure 15.20

The Highlight Changes dialog box disappears. Additionally, a new tab called History was created in the file. This new tab records the changes that were made by others since you last saved it. If you click on the History tab, you will see that four changes were made by Joe Smith and two changes were made by you. You will have the chance in this exercise to accept or reject those changes.

16. *Click on the* History *tab, if you were not taken there already.*
17. *Click on the* **Track Changes** *button from the* **Changes** *group, then click on the* **Accept/Reject Changes** *button.*

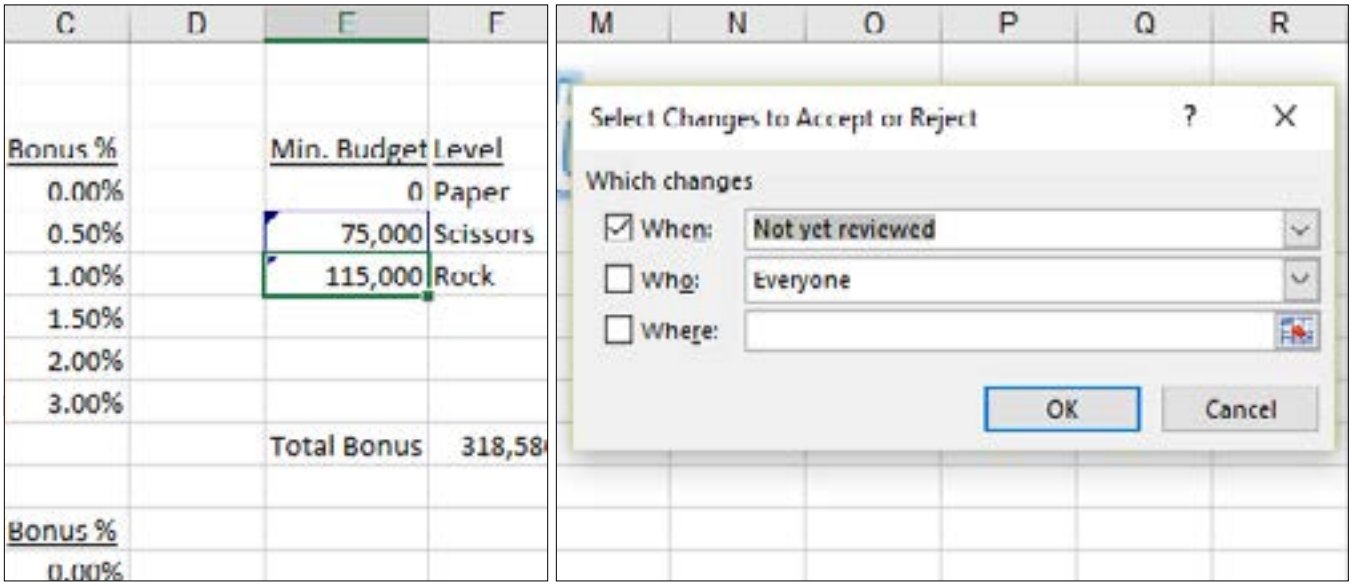


Figure 15.21

18. Click **OK** *in the next dialog box.*

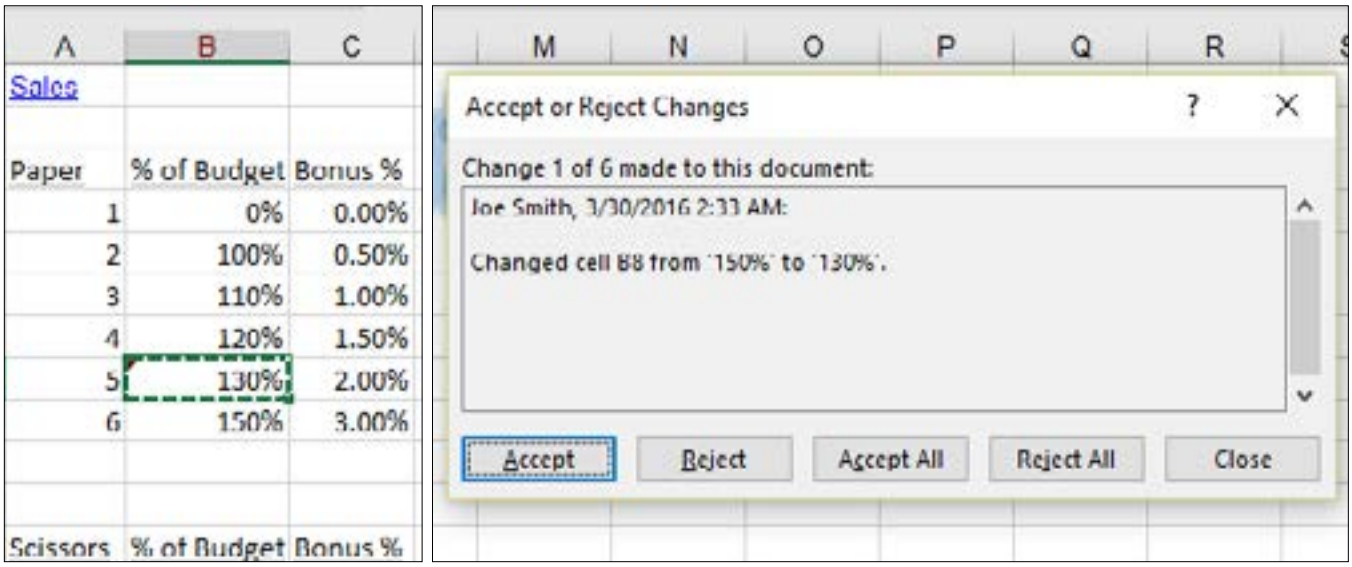


Figure 15.22

These next few dialog boxes walk you through all of the changes that have been made to the workbook. In these dialog boxes, you can accept or reject changes made to the file. In this first dialog box, you see that there were six changes made to the file. For the first change, Joe Smith changed Cell B8 from 150% to 130%. Joe Smith is the User Name of the computer that made the change. Typically, people use their own name as their computer's User Name. That value is OK with us, so let's keep Joe's 130% number.

19. Click **Accept**.

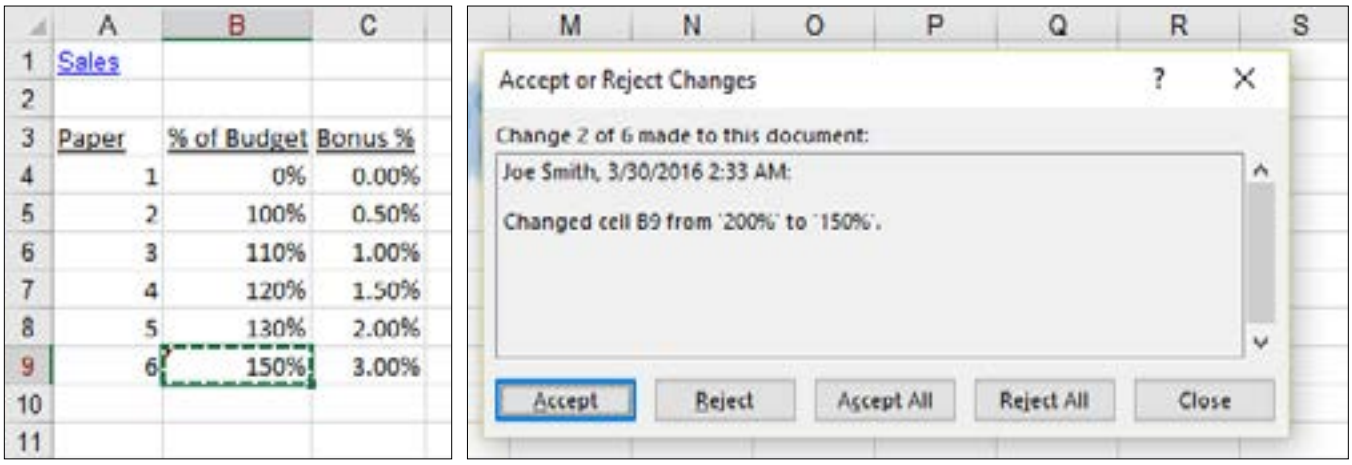


Figure 15.23

Once you click Accept, it changes the worksheet to accept the new figure and then goes to the next change. Let's accept the second change that Joe Smith did as well.

20. On the change for **Cell B9**, *click* **Accept**.

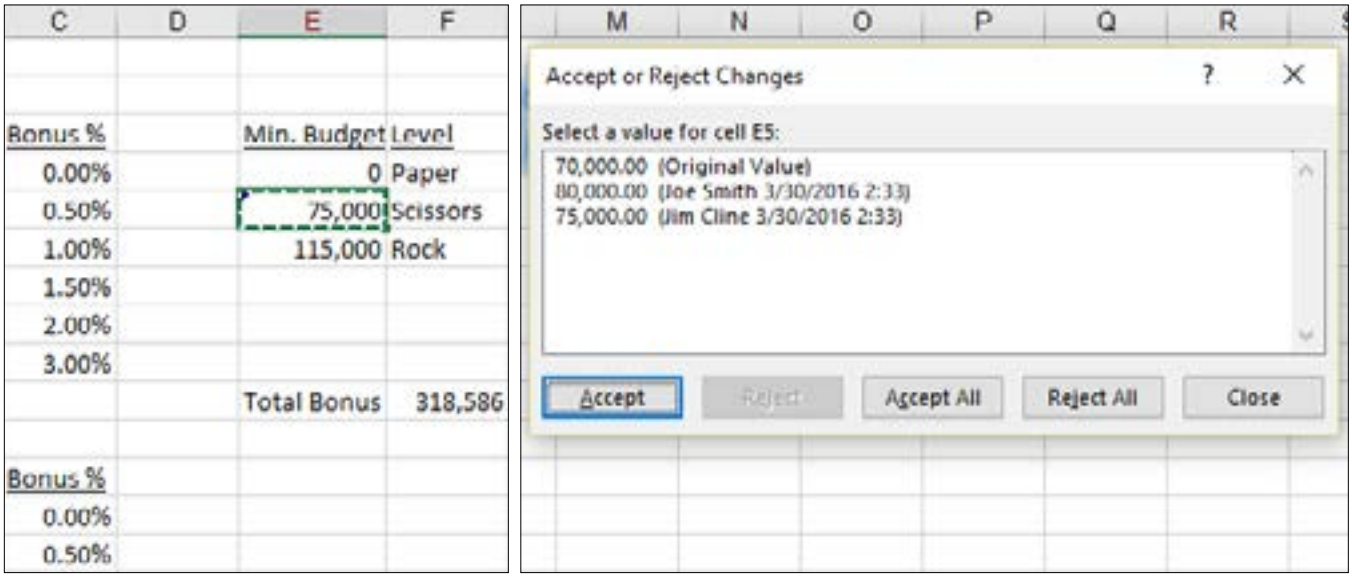


Figure 15.24

The next dialog box is a little different. This cell has been changed more than once, and all of the changes are listed in the dialog box. We see that Cell E5's original value was 70,000, then Joe Smith changed it to 80,000, then ExcelCEO (or your computer name) changed it to 75,000. Since we control the file, we also control which changes to accept or reject. In this case, we'll accept the 75,000 number.

21. Click on the **75,000** *line and click* **Accept**.

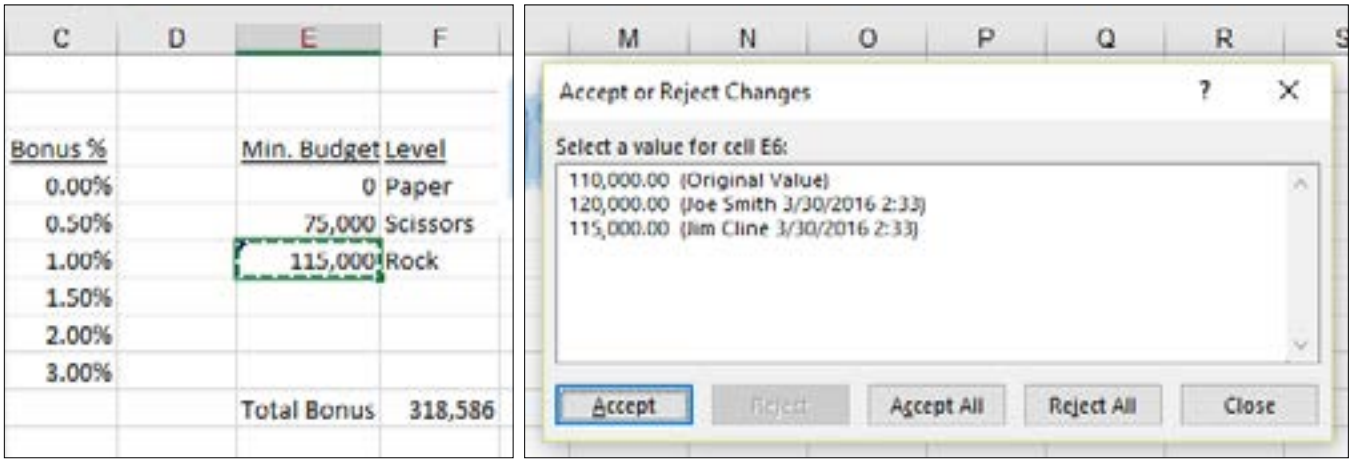


Figure 15.25

22. *In the last dialog box for the changes to* **Cell E6**, *click on the* **110,000 (Original Value)** *line, and click* **Accept**.

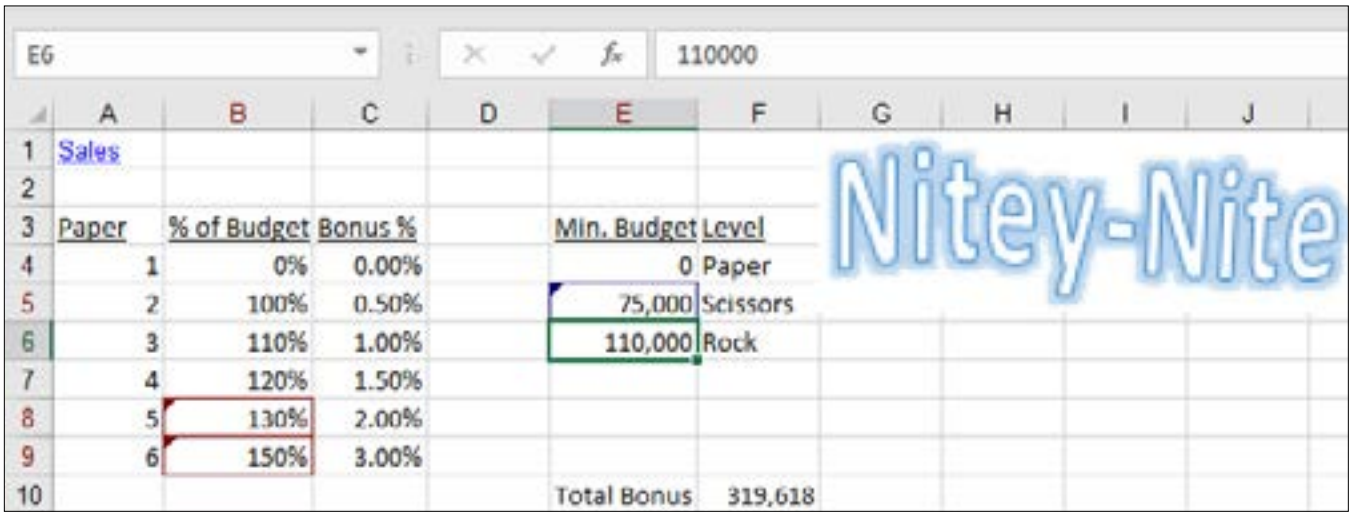


Figure 15.26

All of the changed figures are now incorporated into the new file.

23. **Save** *and* **close** *the* **mySales_2016_Changes.xlsx** *file.*

Consolidating Data

Many times, you will get data from different people, and you need to put all of the data in one place. In our next example, you will open three files that contain data for three months and consolidate the data in another file for the quarter. This process is called ***data consolidation***. I personally don't use data consolidation much. I prefer to load all of the data into one table and create a PivotTable to do my analysis. However, there are many people who use data consolidation, so we'll do an example of it. If it works for you, then use it.

1. *Click on the* **Open** *icon, and navigate to* **C:\ExcelCEO\Excel 2016\Chapter15**.
2. *Click on the* **Q1_Sales.xlsx** *file, hold down the* **[Ctrl]** *key, and click on the* **Jan_Sales.xlsx**, **Feb_Sales.xlsx**, *and* **Mar_Sales.xlsx** *files and click* **Open** *to open all four files simultaneously.*
3. *Activate the* **Q1_Sales.xlsx** *file.*

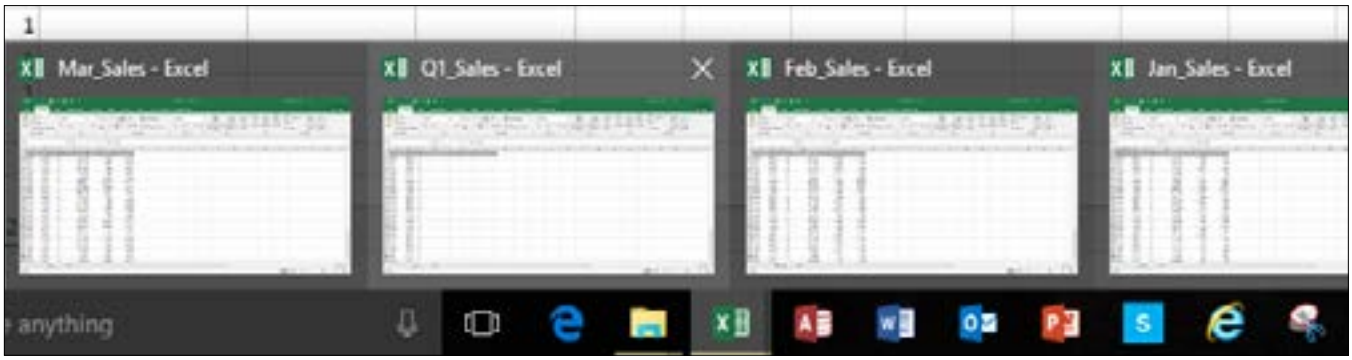


Figure 15.27

The Q1_Sales.xlsx file will hold the summed results of the Jan, Feb, and Mar files.

4. *Click on* **Cell D2** *and click the* **Consolidate**  *button from the* **Data Tools** *group on the* **Data** *tab.*

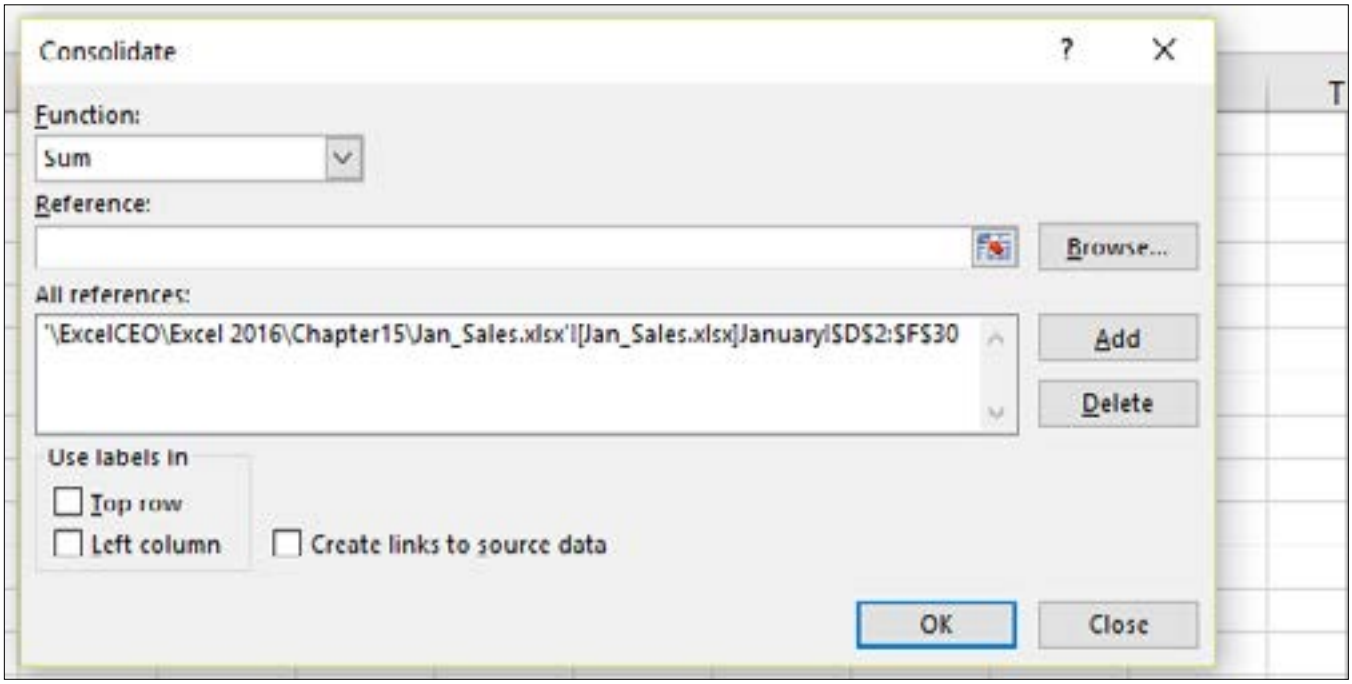


Figure 15.28

The Consolidate dialog box appears. In this dialog box, you will define the ranges you want to consolidate.

5. *Make sure the selected function is* **Sum**.
6. *With your cursor in the* **Reference** *box, toggle over to the* **Jan_Sales** *file (to activate it), select* **Cells D2 through F30** *in the* **Jan_Sales** *file, and click* **Add**.

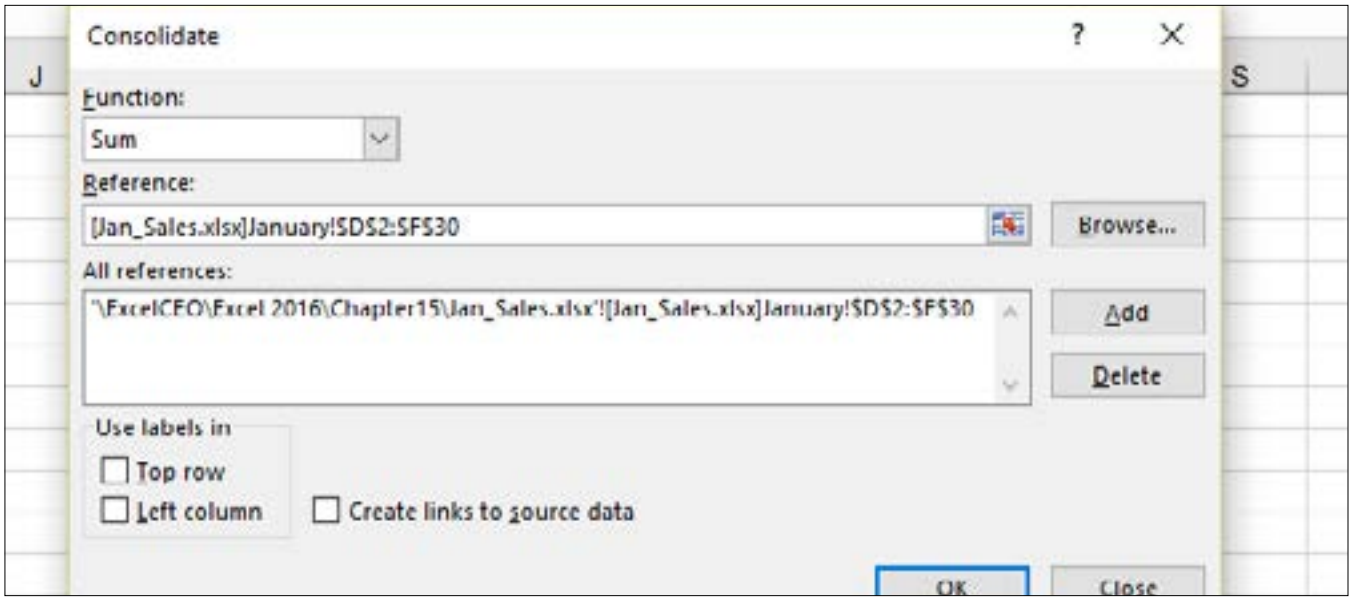


Figure 15.29

7. *Perform the same procedure to add the range* **D2 to F30** *in the* **Feb** *and* **Mar** *files into the* **All references** *section of the* **Consolidate** *dialog box.*

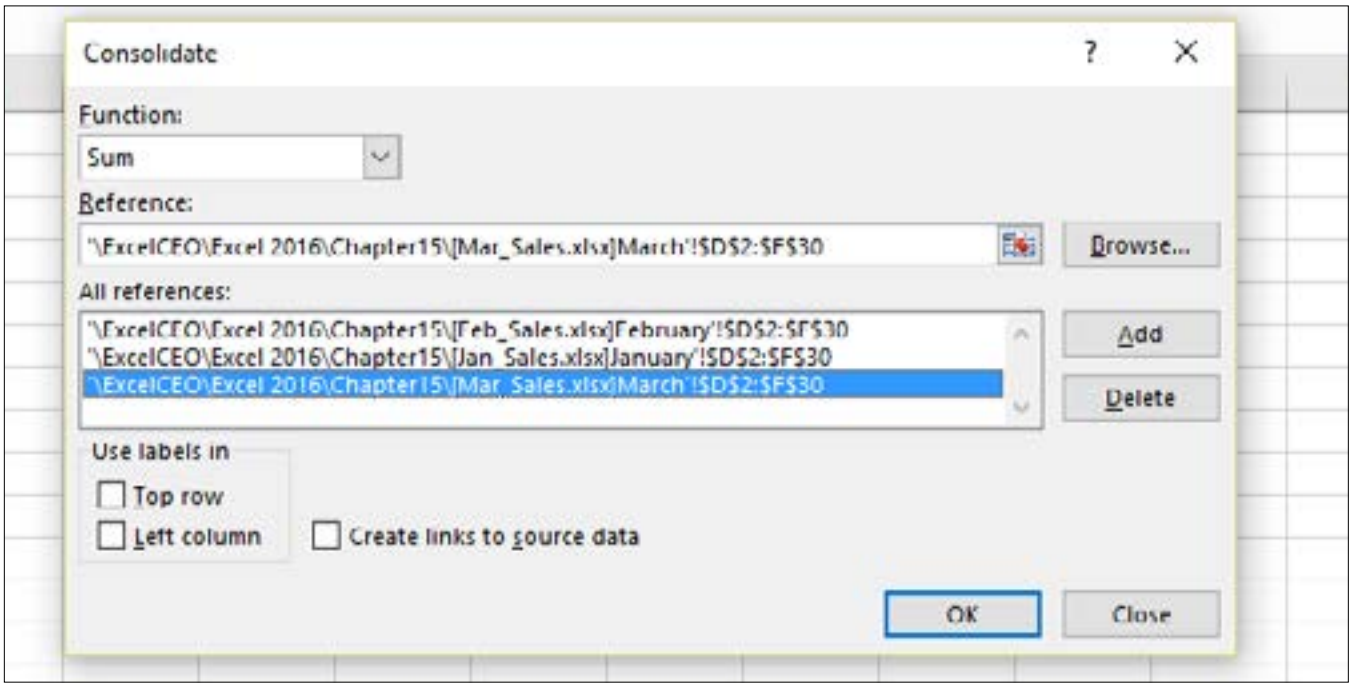


Figure 15.30

8. *After the* **Consolidate** *dialog box looks as above, click* **OK**.

The data from all three files is now consolidated into one file. One rule that you must remember is that the data must be in the same format and in the same order in all data sources when you perform a data consolidation procedure. For that reason, I prefer to copy/import the data into a PivotTable. In a PivotTable, you have much more control in manipulating the data.

D2 166723.85

	A	B	C	D	E	F	G	H	I
1	Store_No	Year	Qtr	Merchandise Sales	Warranty Sales	Delivery Sales			
2	1001	2016	1	166,724	2,800	4,015			
3	1002	2016	1	182,791	3,320	6,105			
4	1005	2016	1	280,648	5,360	7,865			
5	1009	2016	1	149,174	3,360	3,795			
6	1011	2016	1	252,809	5,480	8,085			
7	1012	2016	1	259,503	5,680	7,150			
8	1018	2016	1	305,171	6,240	7,535			
9	1019	2016	1	220,738	4,480	5,720			
10	1021	2016	1	87,905	1,840	2,145			
11	1024	2016	1	259,998	4,840	7,535			

Figure 15.31

9. **Save As C:\ExcelCEO\Excel 2016\Chapter15*myQ1_Sales.xlsx*** *and* **close** *it (leaving the other three files open).*

Linking Data

Let me show you another way to consolidate data – linking files. If you prefer to use the keyboard instead of the mouse, this may be a preferable alternative. In this exercise, we will link the data in all three files into the Q1_Sales file by simply clicking on the data.

1. **Open** *the* **Q1_Sales.xlsx** *file again.*
2. *Click on* **Cell D2**, *type the "=" key, toggle over to the* **Jan_Sales** *file, click on* **Cell D2** *of the* **Jan_Sales** *file, press the* **[F4]** *key three times, and press* **[Enter]**.

D2 =[Jan_Sales.xlsx]January!D2

	A	B	C	D	E	F	G	H	I
1	Store_No	Year	Qtr	Merchandise Sales	Warranty Sales	Delivery Sales			
2	1001	2016	1	35,430					
3	1002	2016	1						

Figure 15.32

The formula in Cell D2 in the Q1_Sales file should now look Figure 15.32. Pressing the [F4] key should make the formula a relative reference (i.e.- no dollar sign anchors around the cell reference) to Cell D2 in the Jan_Sales file. We need to make that cell a relative reference as we will be copying the cell soon. Now all we have to do is to add in February and March to the same cell.

3. *Click in the* **Formula Bar**, *click to the right of the formula, type the "+" key, click on* **Cell D2** *of the* **Feb_Sales** *file, make it a* **relative reference**, *type the "+" key again, click on* **Cell D2** *of the* **Mar_Sales** *file, make it a* **relative reference**, *and press* **[Enter]**.
4. *Make sure all of the* **D2** *references are* **relative values**.

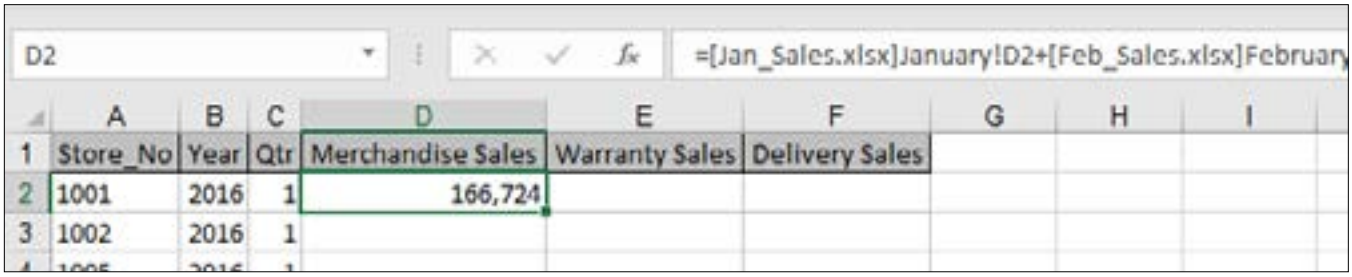


Figure 15.33

5. *Drag right to copy the formula in* **Cell D2** *to the* **Warranty Sales** *and* **Delivery Sales** *columns, then down to all cells below using* **Data Fill**.

	A	B	C	D	E	F	G	H	I
1	Store_No	Year	Qtr	Merchandise Sales	Warranty Sales	Delivery Sales			
2	1001	2016	1	166,724	2,800	4,015			
3	1002	2016	1	182,791	3,320	6,105			
4	1005	2016	1	280,648	5,360	7,865			
5	1009	2016	1	149,174	3,360	3,795			
6	1011	2016	1	252,809	5,480	8,085			
7	1012	2016	1	259,503	5,680	7,150			
8	1018	2016	1	305,171	6,240	7,535			
9	1019	2016	1	220,738	4,480	5,720			
10	1021	2016	1	87,905	1,840	2,145			
11	1024	2016	1	259,998	4,840	7,535			

Figure 15.34

All of your data is now consolidated in one file.

6. **Save As *myQ1_Sales_Link.xlsx***, *and* **close** *all four files.*
7. **Open** *the* **myQ1_Sales_Link.xlsx** *file again.*
8. *Click* **Enable Content**, *if necessary.*

Look at the formula in in Cell E2. It should read:

='C:\ExcelCEO\Excel 2016\Chapter15\[Jan_Sales.xlsx]January'!E2+'C:\ExcelCEO\Excel 2016\Chapter15\[Feb_Sales.xlsx]February'!E2+'C:\ExcelCEO\Excel 2016\Chapter15\[Mar_Sales.xlsx]March'!E2

This formula now displays the full path of the linked files. I've seen many files like this where these links are set up and then someone moves or deletes the supporting files. When that happens, you will see an error message like the figure below:

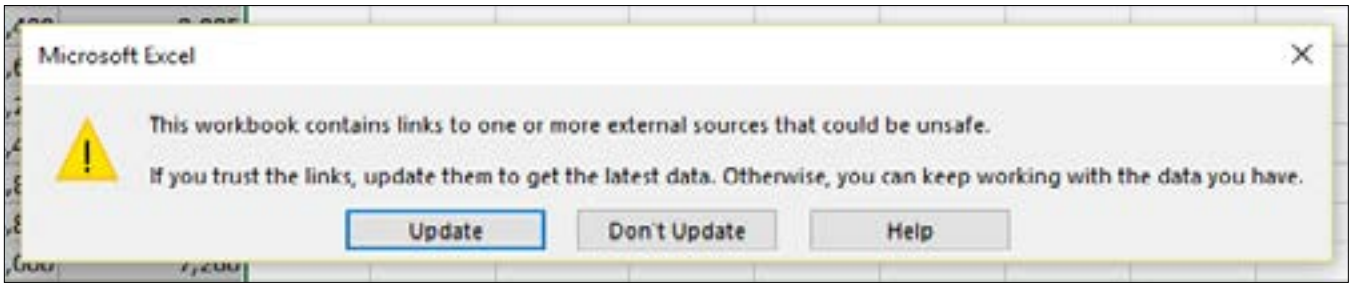


Figure 15.35

The data will be the same as it was the last time you saved it, but you may want to save the original values and get rid of the links. That's really easy to do using the Edit Links dialog box. In the Connections group of the data tab, you should now see the Edit Links icon activated. With this link, you can manage links to external Excel files.

8. *Click the* **X** *on the upper-right of the* **Microsoft Excel** *caution dialog box to close it, if needed.*
9. *On the* **Data** *tab, click the* **Edit Links** Edit Links *icon in the* **Connections** *group.*

Using this dialog box, you can update the values, change the source, open the source, break the link(s) or check the status. In this case, we want to break the link.

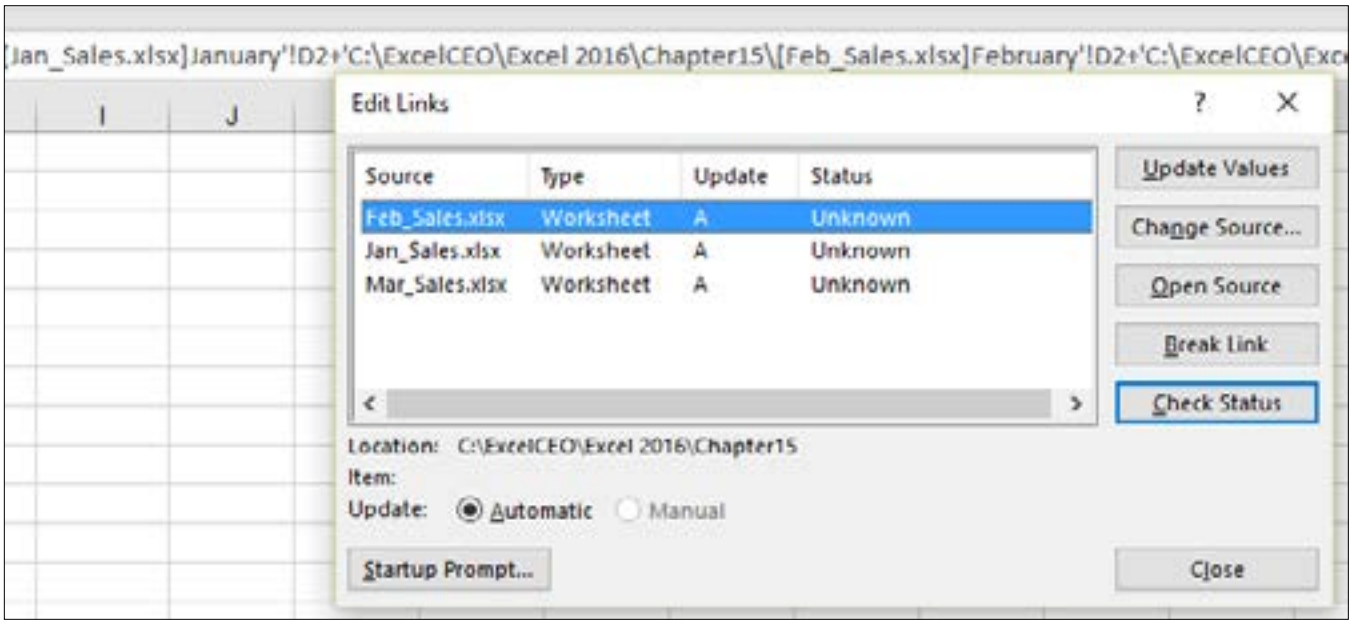


Figure 15.36

10. *With the* **Feb_Sales.xlsx** *link selected, hold down the* **[Ctrl]** *key, click on the* **Jan_Sales.xlsx**, *and the* **Mar_Sales.xlsx** *links, and click on the* **Break Link** *button.*

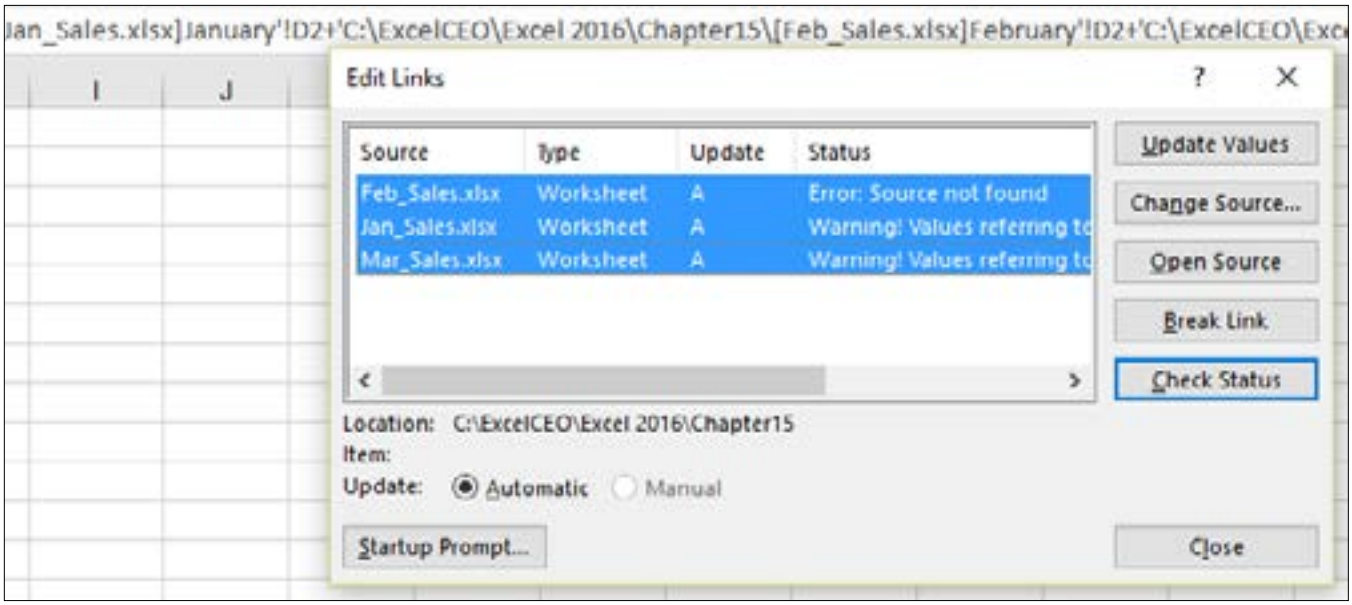


Figure 15.37

11. *Click on the* **Break Links** *button in the* **Edit Links** *dialog box.*

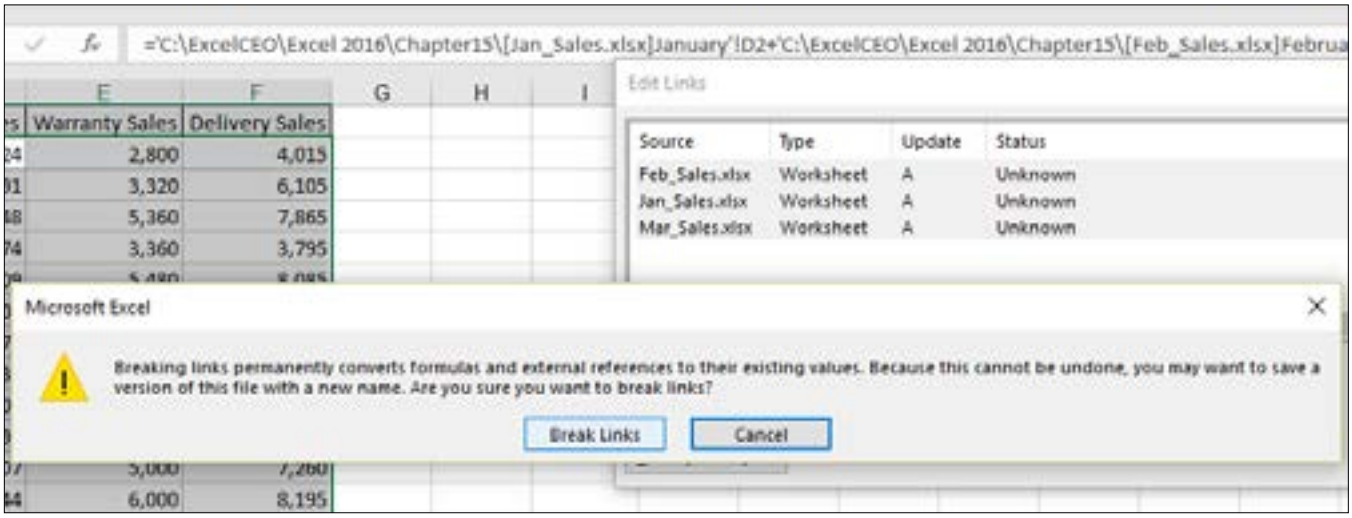


Figure 15.38

12. *Click on the* **Close** *button in the* **Edit Links** *dialog box.*

The links are now broken and all of the data remains intact, but it is not linked to any source. Clicking on the different cells, you can now see the data is not formula-based anymore. You can tell how a link is broken as in Figure 15.37 above. In this case, Feb_Sales was actually moved from the location Excel

linked to while the file was still linked. Since we're breaking the link anyway, that doesn't matter here, but remember that moving files that are linked to other files will also break the link.

13. **Save** *and* **close** *the* **myQ1_Sales_Link.xlsx** *file.*

> ***Review Questions**: It is now time to complete the hands-on Review Questions. Log on to www.ExcelCEO.com with your Email address and Password, click on the* **Excel 2016 Review Questions, Chapter 15, Section 2 of 2** *option in your Main Menu, and complete the Review Questions.*

Conclusion

In this chapter, you created graphics using Paint and you learned how to work with Excel's protection features. You learned how to share a workbook with multiple users and track the changes the users made. Finally, you consolidated similar data from multiple files into one file using two different methods.

Chapter Exam

To take the examination for this chapter, you must have successfully completed the examination for the previous chapter. You can now go to www.ExcelCEO.com, click on Sign In, log in and take the exam. Make sure that you take the exam on the same computer on which you completed the practice files, as some of the questions on the exam may refer to some of the completed projects. Chapter exams are intended to be hands-on.

Excel® 2016

Complete Self-study Course

ExcelCEO

Chief Excel Officer

CHAPTER SIXTEEN — MACROS AND THE DEVELOPER TAB

Chapter Objectives:

- Identify macro security settings
- Recognize VBA (Visual Basic for Applications) to evaluate steps within a macro
- Determine how to create, edit, run, and delete a macro
- Identify Relative References in macros
- Recognize the working parts of a macro with Step Into functionality
- Choose Shortcut Keys for executing macros
- Determine how to create a Command Button and link it to a macro
- Identify a macro in the Quick Access Toolbar
- Recognize how to create and use Spin Buttons to adjust spreadsheet variables
- Determine how to form a Check Box for including and excluding formula variables

Projects You Will Complete During This Chapter:

- *mySales_2016.xlsm*

CPE Credits possible for this chapter: 3

Introduction

The first thing I want to discuss in this chapter is Macros. A ***macro*** is simply a mini-program that executes a task. Anytime you have a task that is repeated over and over again, a macro may be in order. Excel provides a great way to create and run macros. I want to caution you, however. It is my belief that macros can be over-used. Anytime you find yourself creating a lot of macros in a spreadsheet, you should step back and consider whether Excel is the right tool for the project. If you are continuously updating a report, you may want to think about putting that report in Access or on the Internet in a web-based application where it can be more easily automated, and data can be more easily refreshed. One of my best Excel students was very interested in doing EVERYTHING with Excel, but his projects had progressed to a point where they really needed to be in a database. He can write macros and VBA code "*until the cows come home*", but that misses the point when it comes to report functionality.

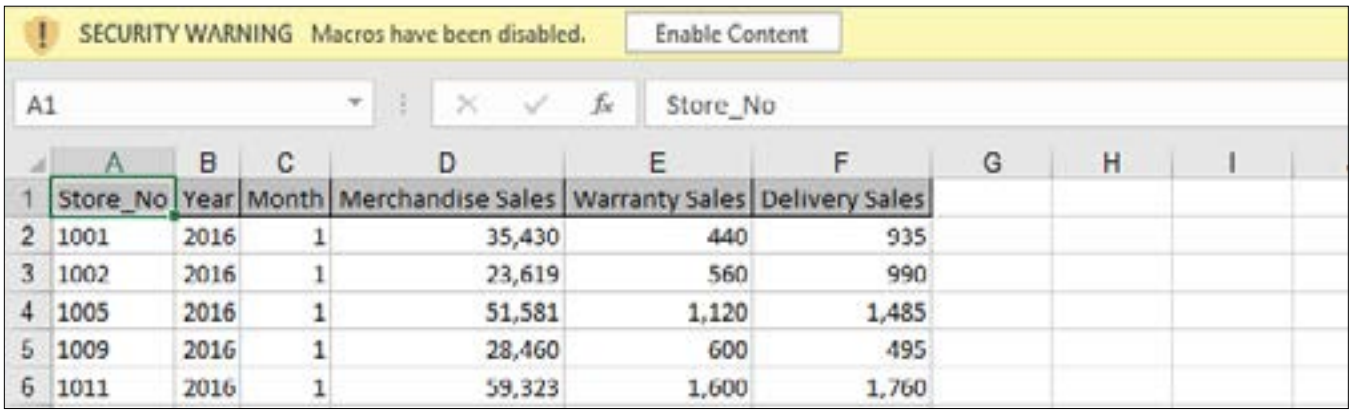
Macro Security

Before we open a file that contains macros, let's discuss Macro Security. Excel 2016 has a number of file types that determine whether or not a macro can be run on the file. The following table illustrates the different types of files.

File Extension	Description
.xlsx	Macro-*disabled* Excel workbook
.xlsm	Macro-*enabled* Excel workbook
.xltx	Macro-*disabled* template
.xltxm	Macro-*enabled* Excel template
.xlsb	Macro-*enabled* Excel binary workbook

Macros can be run only on Excel files that are saved as macro-enabled workbooks. In the exercises in this chapter, we will concentrate on the .xlsm file type of Excel workbook. From here on out, when I refer to a macro enabled workbook, I mean macro-enabled workbook or template. When you first open an Excel enabled workbook, you may get a message telling you that the macros have been disabled.

1. **Open** *the file at* **C:\ExcelCEO\Excel 2016\Chapter16\Macro.xlsm**.

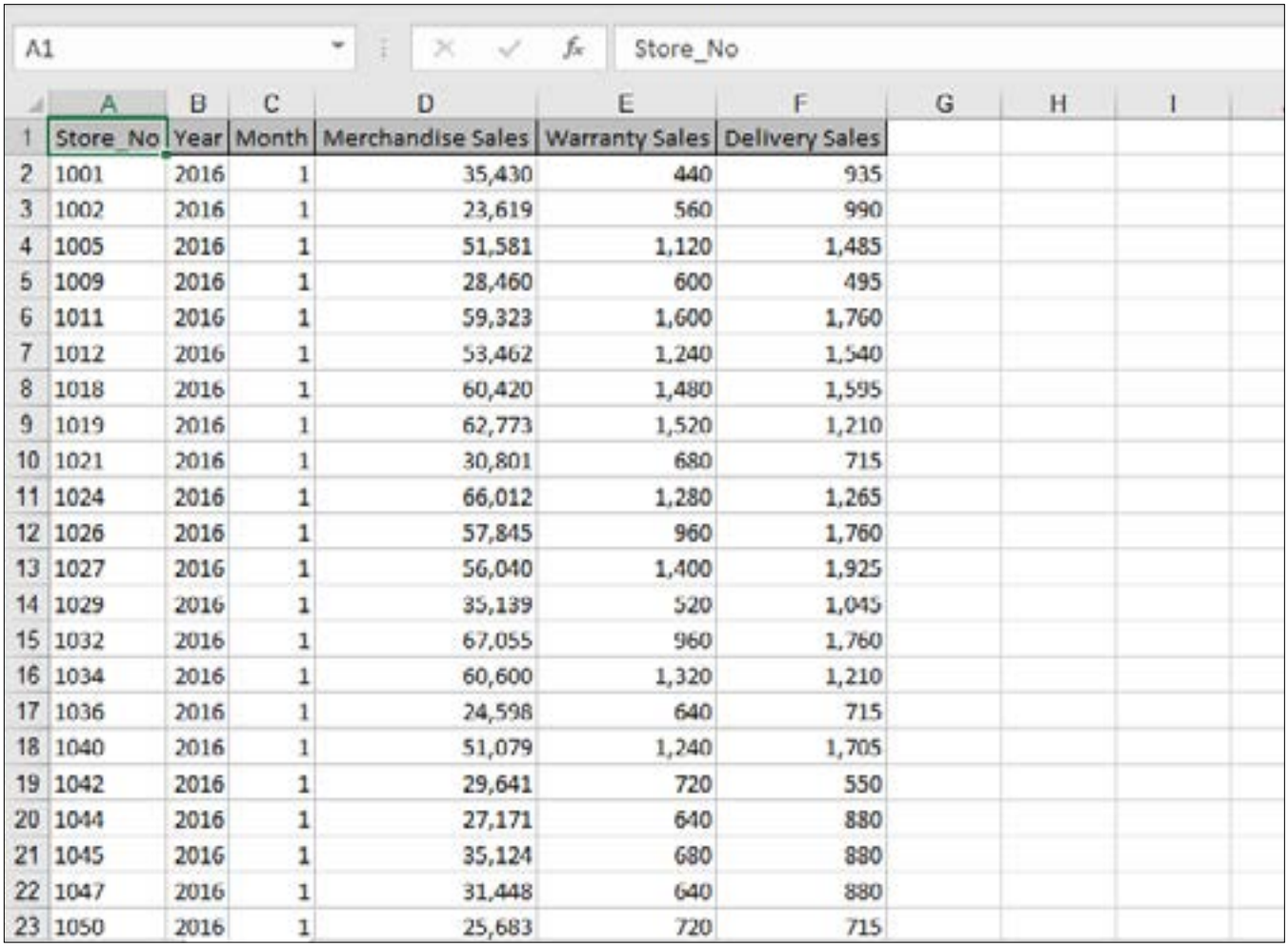


	A	B	C	D	E	F	G	H	I
1	Store_No	Year	Month	Merchandise Sales	Warranty Sales	Delivery Sales			
2	1001	2016	1	35,430	440	935			
3	1002	2016	1	23,619	560	990			
4	1005	2016	1	51,581	1,120	1,485			
5	1009	2016	1	28,460	600	495			
6	1011	2016	1	59,323	1,600	1,760			

Figure 16.1

This security warning means that your security settings have been set to disable some or all macros in the workbook. When you click on the Enable Content button, you will enable the macros for that specific workbook.

2. *Click on the* **Enable Content** *button, if it appears.*



A1 | Store_No

	A	B	C	D	E	F	G	H	I
1	Store_No	Year	Month	Merchandise Sales	Warranty Sales	Delivery Sales			
2	1001	2016	1	35,430	440	935			
3	1002	2016	1	23,619	560	990			
4	1005	2016	1	51,581	1,120	1,485			
5	1009	2016	1	28,460	600	495			
6	1011	2016	1	59,323	1,600	1,760			
7	1012	2016	1	53,462	1,240	1,540			
8	1018	2016	1	60,420	1,480	1,595			
9	1019	2016	1	62,773	1,520	1,210			
10	1021	2016	1	30,801	680	715			
11	1024	2016	1	66,012	1,280	1,265			
12	1026	2016	1	57,845	960	1,760			
13	1027	2016	1	56,040	1,400	1,925			
14	1029	2016	1	35,139	520	1,045			
15	1032	2016	1	67,055	960	1,760			
16	1034	2016	1	60,600	1,320	1,210			
17	1036	2016	1	24,598	640	715			
18	1040	2016	1	51,079	1,240	1,705			
19	1042	2016	1	29,641	720	550			
20	1044	2016	1	27,171	640	880			
21	1045	2016	1	35,124	680	880			
22	1047	2016	1	31,448	640	880			
23	1050	2016	1	25,683	720	715			

Figure 16.2

The Security Warning goes away, and the macros are enabled for this workbook only. To permanently change the settings for all workbooks you open, you need to go to the Macro Security Settings. To work with macros, you will need to have access to the Developer tab in your Office Ribbon. If you do not see the Developer tab, open the Options dialog box (under the File tab), click on Customize Ribbon, and check the "Developer" box. Let's do that now.

3. *If you don't see the* **Developer** *tab in the* **Office Ribbon**, *click on the* **File** *tab, click on* **Options**, *click on* **Customize Ribbon**, *then check the* **Developer** *box in the right section of the* **Excel Options** *dialog box.*

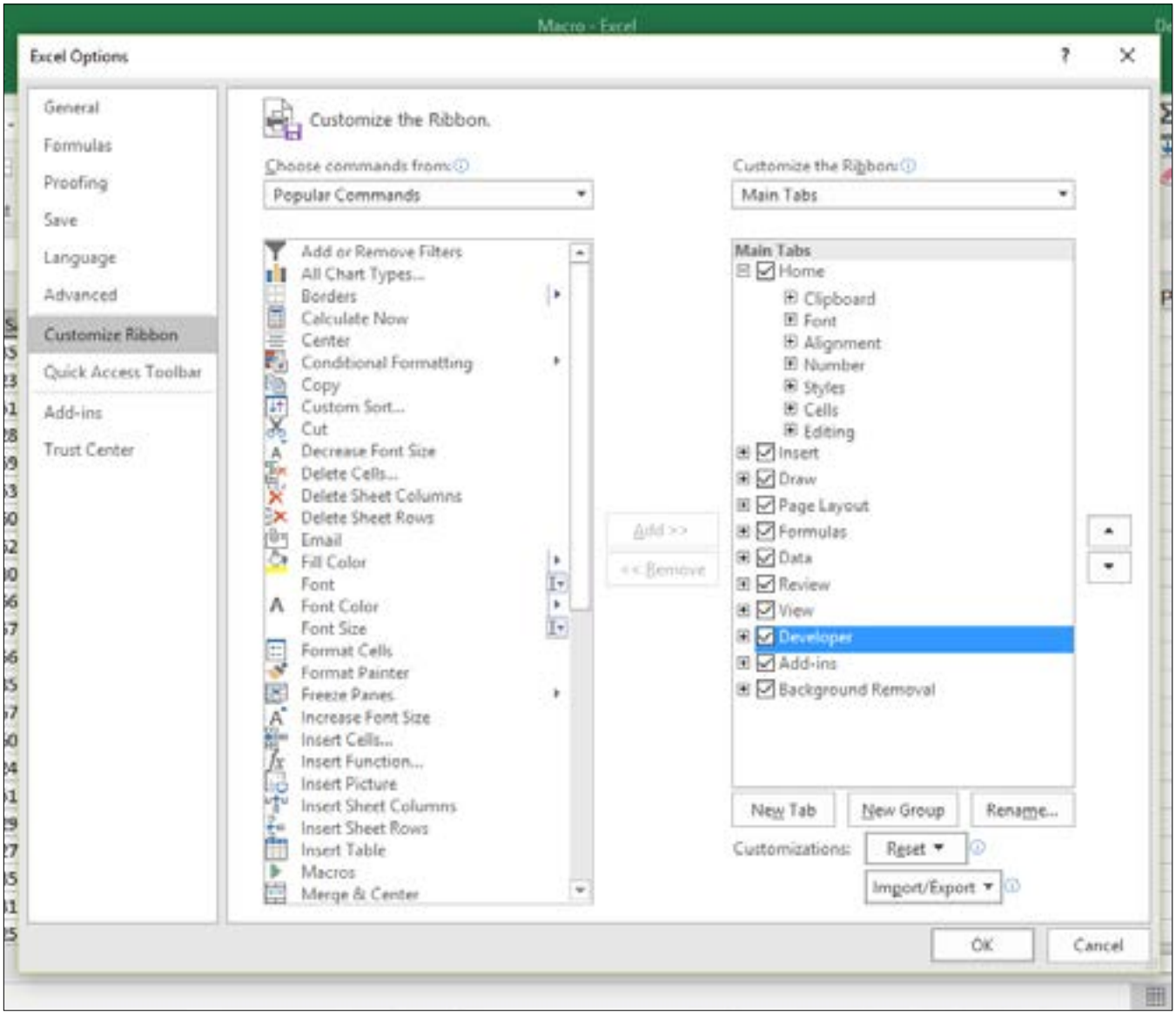


Figure 16.3

4. *Click* **OK**.

The Developer tab now appears at the top of the Office Ribbon. Let's now view your macro settings.

5. **Open** *the* **Excel Options** *dialog box, click on* **Trust Center**, *click on* **Trust Center Settings…**, *and click on* **Macro Settings**.

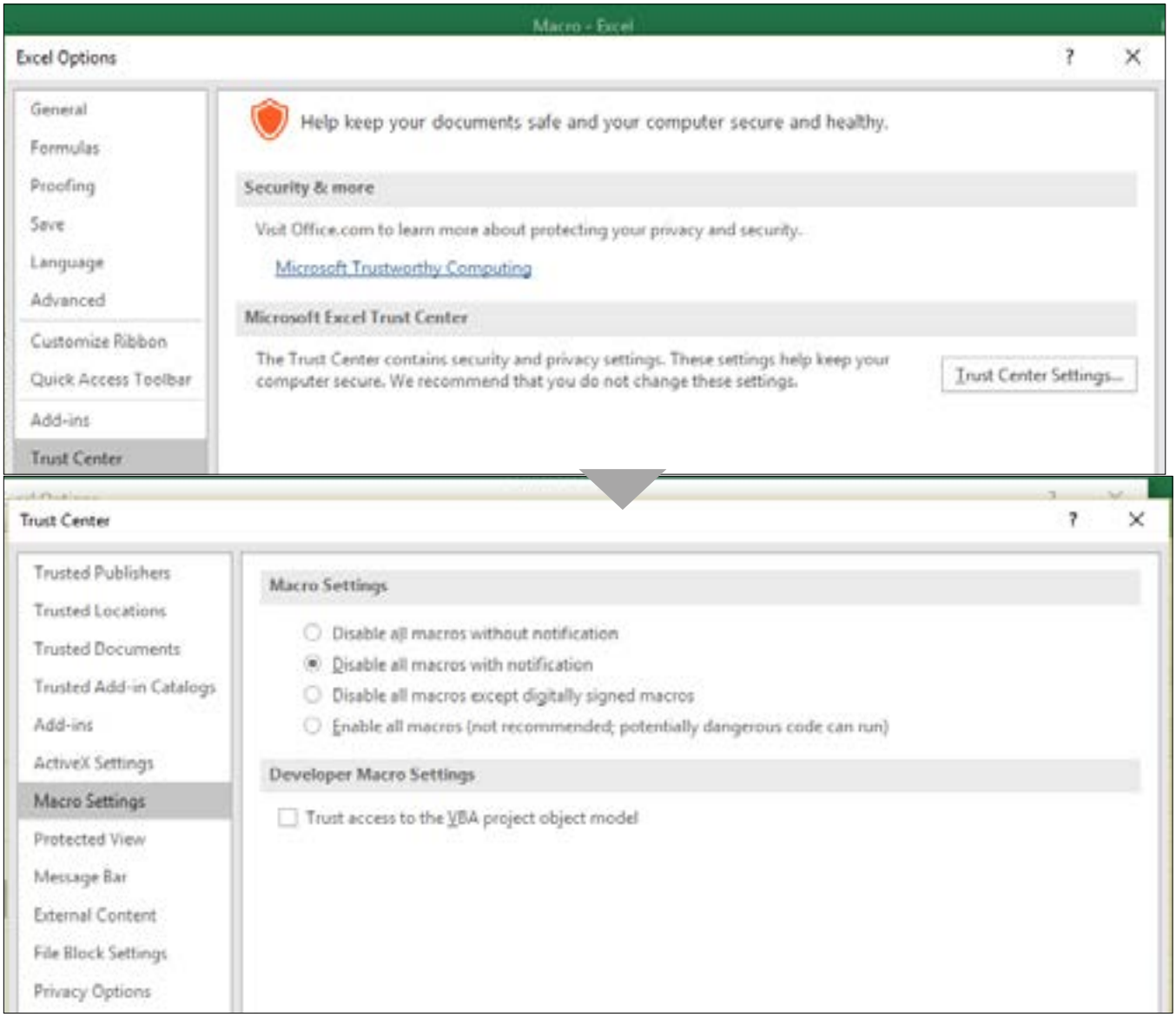


Figure 16.4

I like to keep this setting on **Disable all macros with notification**. Believe it or not, there are some unethical people out there who like to write macros that will harm your computer. Microsoft can't catch all of the harmful macros which can be easily written. Macros can be written to execute whenever the file is opened, so to be safe, I like to disable all macros until I can review the file to determine if it is safe. Before you enable the macros, you should know who the file is being sent from, and you should be certain that person wouldn't send you a file with potentially harmful macros in it. For this reason, you should NEVER set the Macro Security Setting to Enable All Macros.

6. *Make sure the security level is set to* **Disable all macros with notification** *and click* **OK** *in both dialog boxes.*
7. **Close** *the* **Macro.xlsm** *file without saving it.*

With that introduction, let's explore some simple macros.

1. **Open** *the file* **C:\ExcelCEO\Excel 2016\Chapter16\Sales_2016.xlsm**.
2. *Click the* **Enable Content** *button.*
3. **Save As C:\ExcelCEO\Excel 2016\Chapter16*mySales_2016.xlsm*** *(make sure you save it as a* **Macro-enabled workbook** *in the* **Save As** *dialog box)*

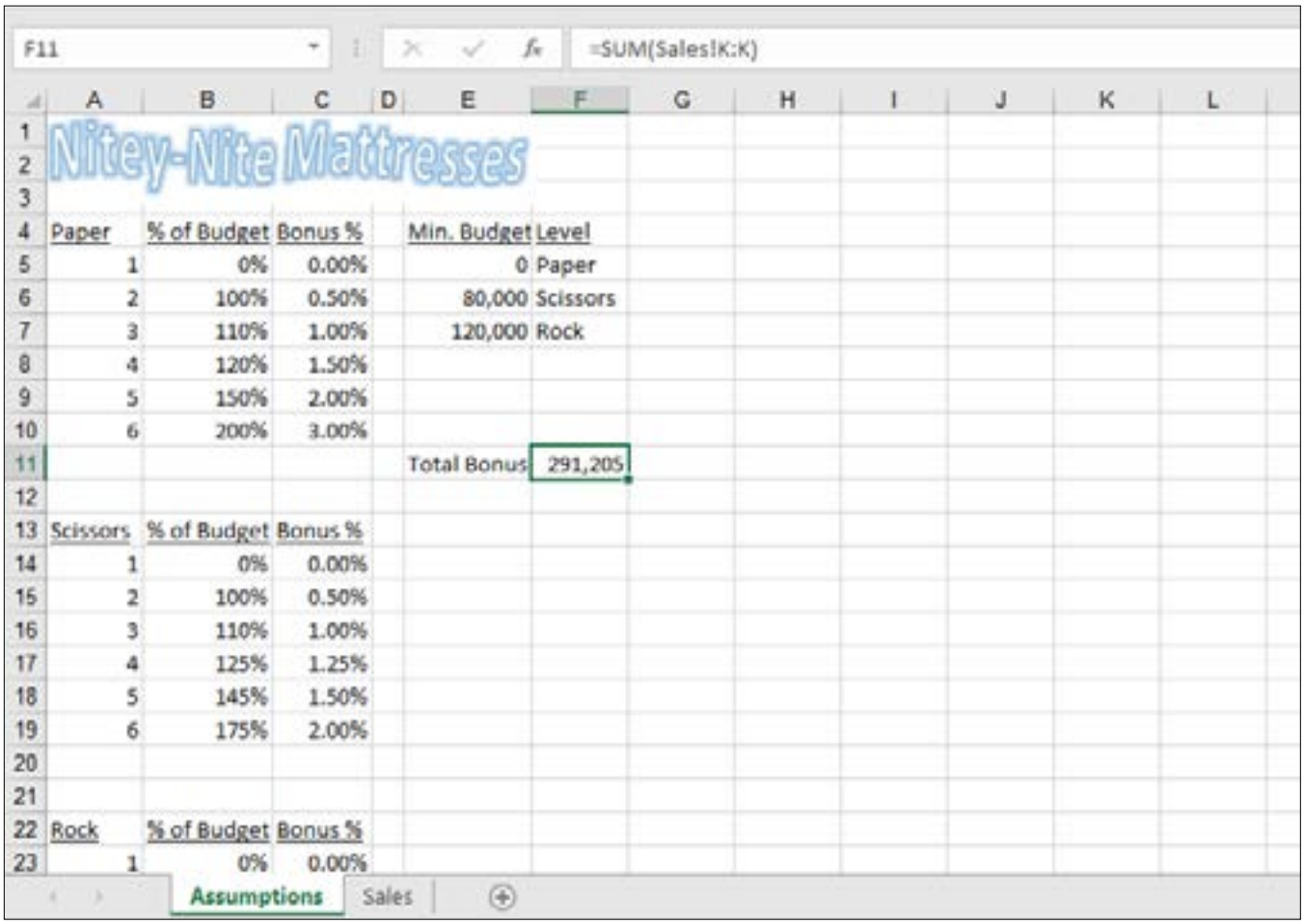


Figure 16.5

This file calculates Store Manager bonuses for all stores. The Assumptions tab allows you to change the assumptions and see what the bonus calculates to. It is essentially the same file you used in Chapter 15.

VBA

Macros in Excel are written in a language called **Visual Basic for Applications (VBA)**. The macro that is already created on this file does some formatting changes, like bold and italicize some of the cells in the spreadsheet. Although you generally don't need to know how to program with VBA to write macros, it does help to be exposed to it. Before we get too deep into macros, let's open up the code to see how it looks.

4. *In the* **Macros** *group on the* **View** *tab, click on the drop-down arrow below* **Macros** *and choose* **View Macros** View Macros .

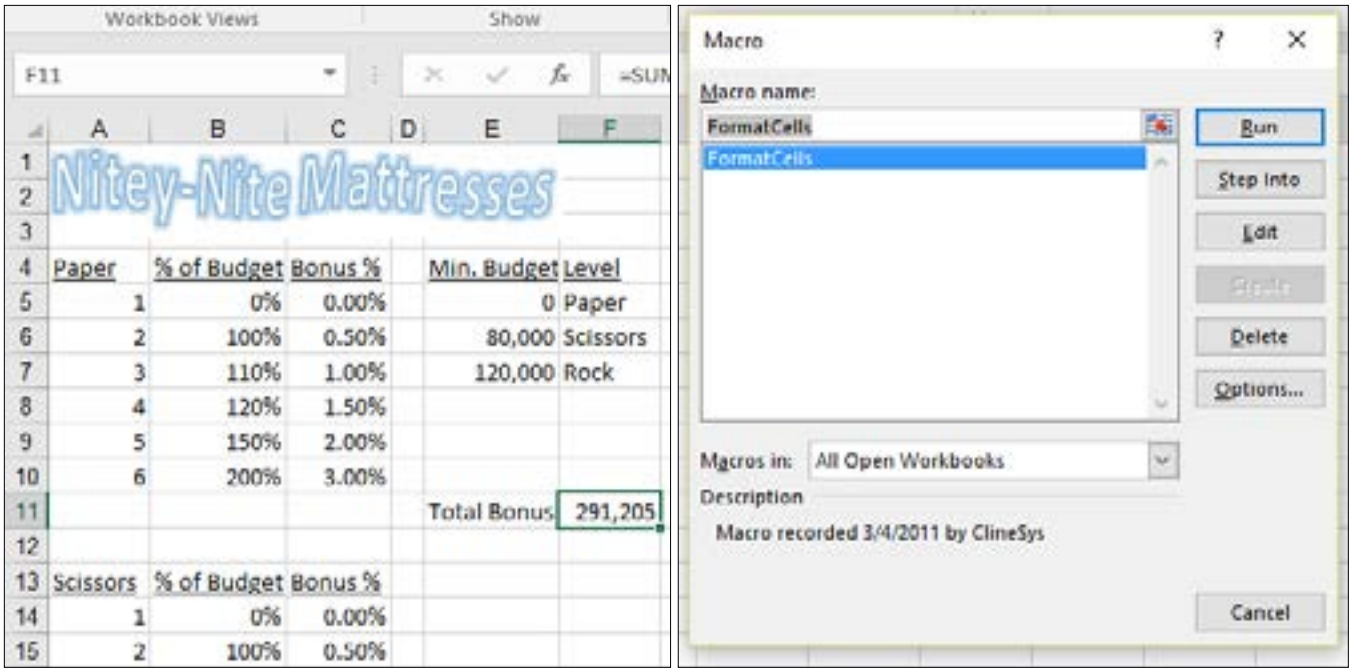


Figure 16.6

In the Macro dialog box, you can choose to run the macro, run it in steps (Step Into), edit it, delete it, and/or assign it a shortcut key (the Options... button). Since this is an existing macro, the Create button is diabled. Let's look at the VBA code behind the macro.

5. *In the* **Macro** *dialog box, make sure the* **FormatCells** *macro is selected, and click the* **Edit** *button.*

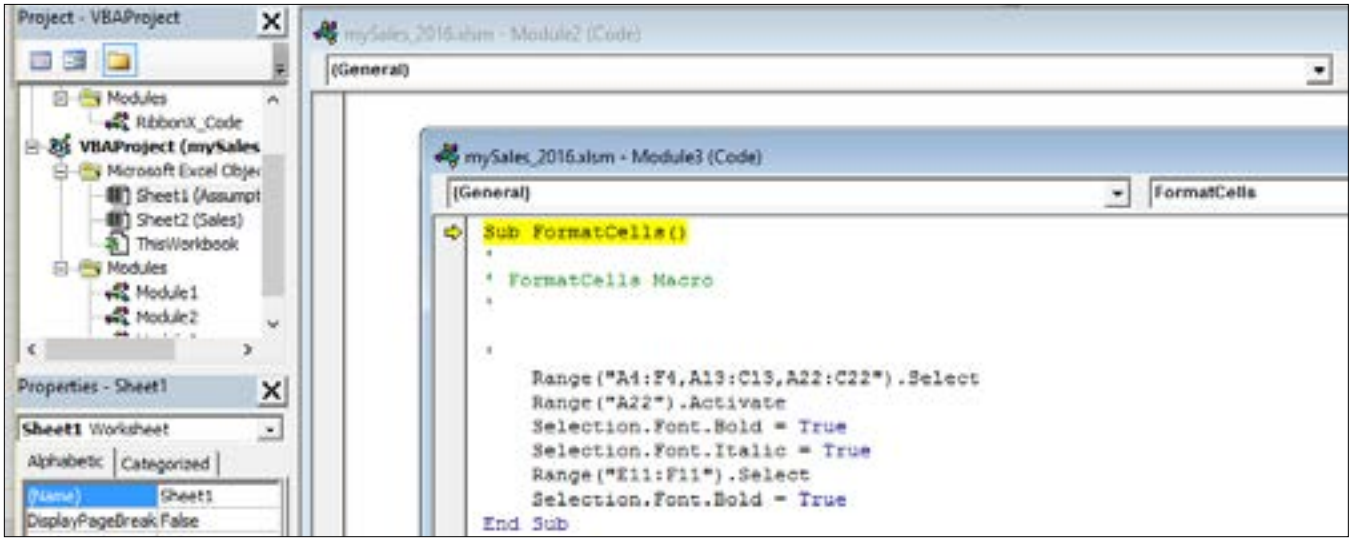


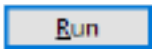
Figure 16.7

When creating and dealing with macros, you don't have to know how to write VBA code, but it does help to become somewhat familiar with the code screen as you'll see in an exercise later. You can probably read the code and figure out what the macro is supposed to do. VBA is written with mostly English words and you can learn how to write the code with little training. This macro selects a few cells, bolds and italicizes them, then selects the range E11 – F11 and bolds that range.

6. **Close** *the* **Microsoft Visual Basic** *screen.*

Running a Macro

You now return to the spreadsheet. To see how the macro works, let's run it.

7. *Click the* **Macros**  *button and choose* **Run**  *in the* **Macro** *dialog box.*

E11 | Total Bonus

	A	B	C	D	E	F	G	H	I	J	K
1	Nitey-Nite Mattresses										
2											
3											
4	Paper	% of Budget	Bonus %		Min. Budget	Level					
5	1	0%	0.00%		0	Paper					
6	2	100%	0.50%		80,000	Scissors					
7	3	110%	1.00%		120,000	Rock					
8	4	120%	1.50%								
9	5	150%	2.00%								
10	6	200%	3.00%								
11					Total Bonus	291,205					
12											
13	Scissors	% of Budget	Bonus %								
14	1	0%	0.00%								
15	2	100%	0.50%								
16	3	110%	1.00%								
17	4	125%	1.25%								
18	5	145%	1.50%								
19	6	175%	2.00%								

Figure 16.8

And just like that, the macro selected certain cells and formatted them with bold and/or italics. After you run the macro, notice that the Undo button is not available, so if you run the macro, you have to manually undo the changes or close out of the file and reopen it. We want to start over on our macro lesson, so let's close the file without saving it and reopen it.

8. **Close** *the* **mySales_2016.xlsm** *file without saving it, then* **reopen** *it.*

9. **Enable** *the macros.*

Shortcut Keys

I hate to admit it, but it really is kind of a pain to run the macro, isn't it? You have to go into the View tab, click on Macros, then run it. Inexperienced users would have a hard time remembering how to do that. Therefore, Microsoft made it easier to run a macro by using shortcut keys. A ***shortcut key*** is the keyboard shortcut to run the macro. Let's create a shortcut key to run this macro.

1. *Click on the* **Macros** *drop-down menu, choose* **View Macros**, *make sure* **FormatCells** *is selected, and click the* **Options…** *button.*

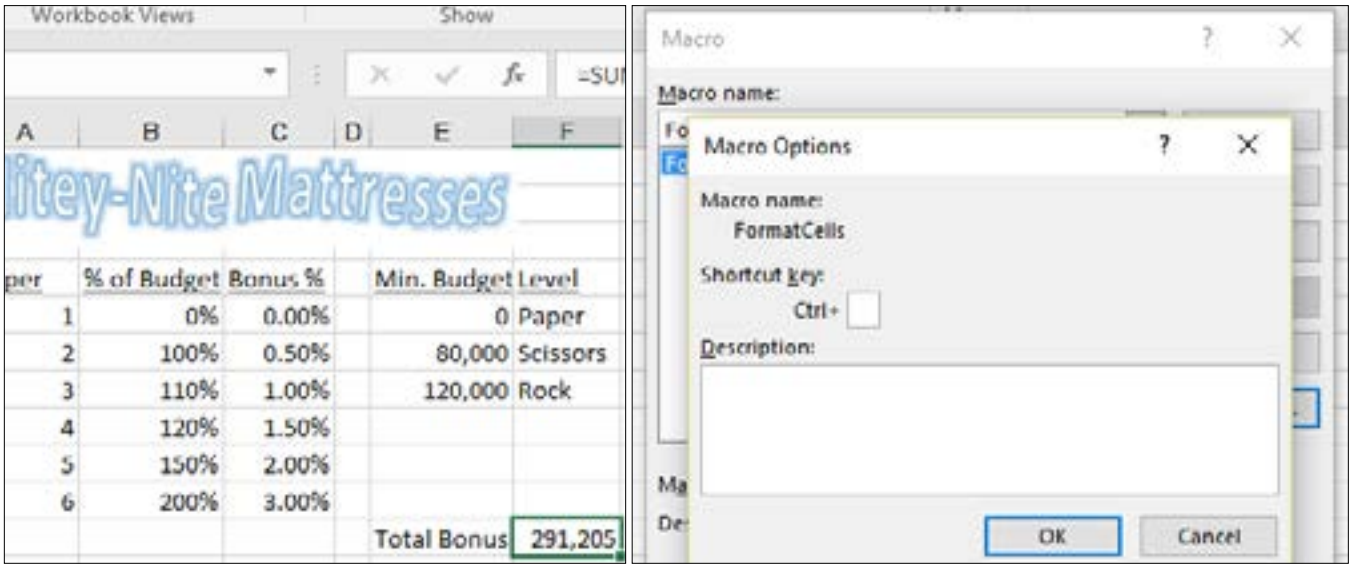


Figure 16.9

The Macro Options dialog box appears. In this screen, you can assign almost any key as the shortcut key. The macro runs when you press [Ctrl] and the shortcut key. The only thing you need to remember is that you shouldn't assign a standard shortcut key, like [Ctrl]+c to copy or [Ctrl]+f to find. Let's assign a shortcut key of 'a' to this macro.

2. *In the* **Macro Options** *dialog box, type the letter* ***a*** *(lower-case) in the* **Shortcut key** *box, and click* **OK**.
3. **Close** *out of the* **Macro** *dialog box.*
4. *Press* **[Ctrl]**+***a*** *to run the macro.*

Step Into

If you blinked, you may not have seen it, but the macro ran. You can tell it ran because some of the cells changed their formatting and the range E11 through F11 is now selected. Sometimes when you run a macro, Excel returns an ugly error message. Unfortunately, it doesn't tell you exactly what the problem is. In these cases, you will want to run each step of the macro until you figure out where the problem is. The

Macro dialog box allows you to run the macro in steps by using the Step Into option. Let's try it.

5. *Manually* **Undo** *all of the bolding and italics.*
6. *Press* **[Alt]+[F8]** *(or [Alt]+[Fn]+[F8], depending on your keyboard) - the shortcut key to open the* **Macro** *dialog box.*
7. *Make sure* **FormatCells** *is selected and click the* **Step Into** *button.*
8. *Rearrange the windows to make it look like the image below:*

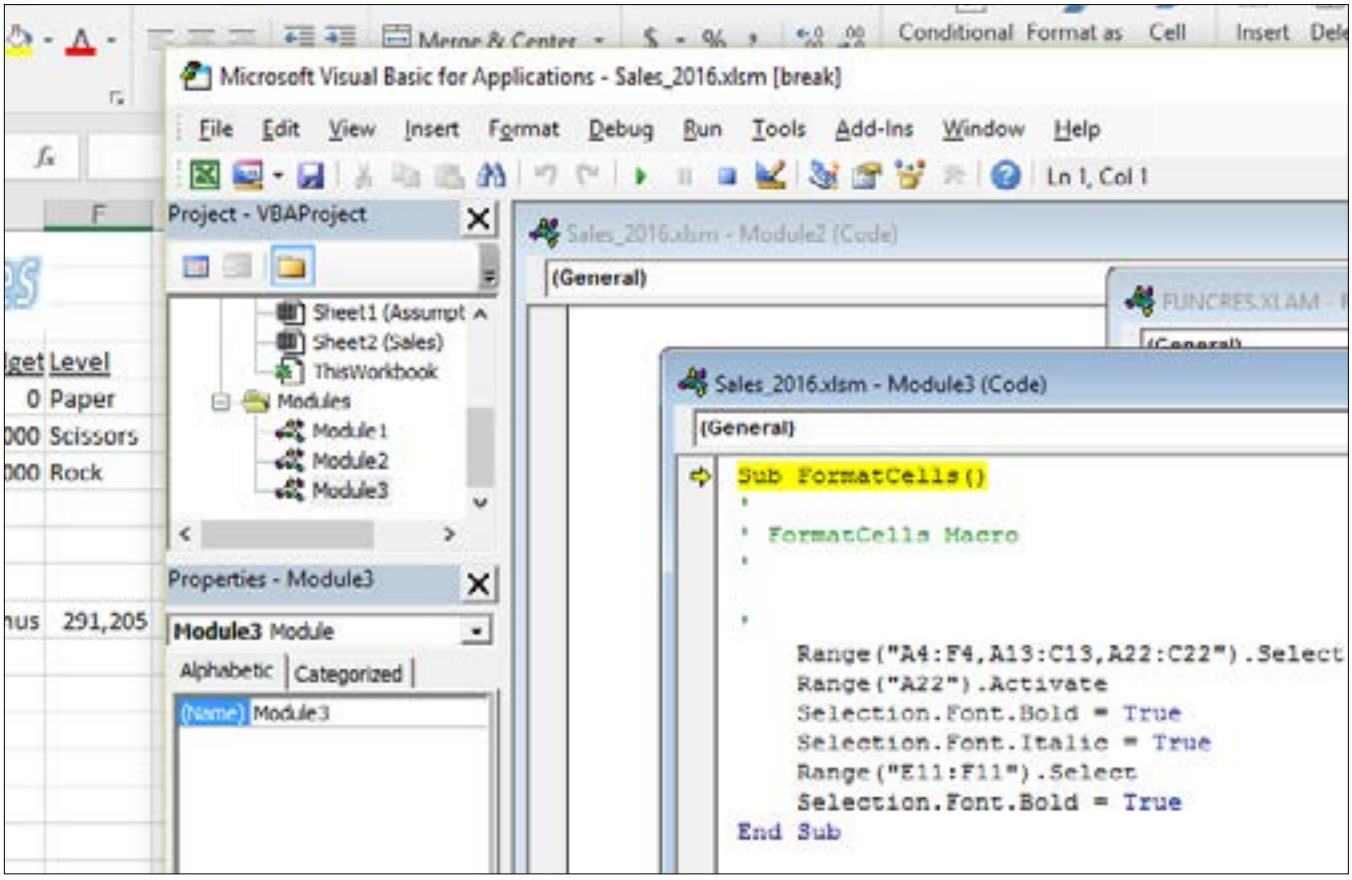


Figure 16.10

Notice that the text Sub FormatCells() is highlighted in yellow with a right arrow to the left of the text. The current step the macro is on is always highlighted in yellow. This means that this is the step that will execute next. All this step tells you is that we're about to run the macro. To go to the next step, press the [F8] key.

9. *Press the* **[F8]** *key (or Fn+[F8] - use whichever applies to your keyboard throughout).*

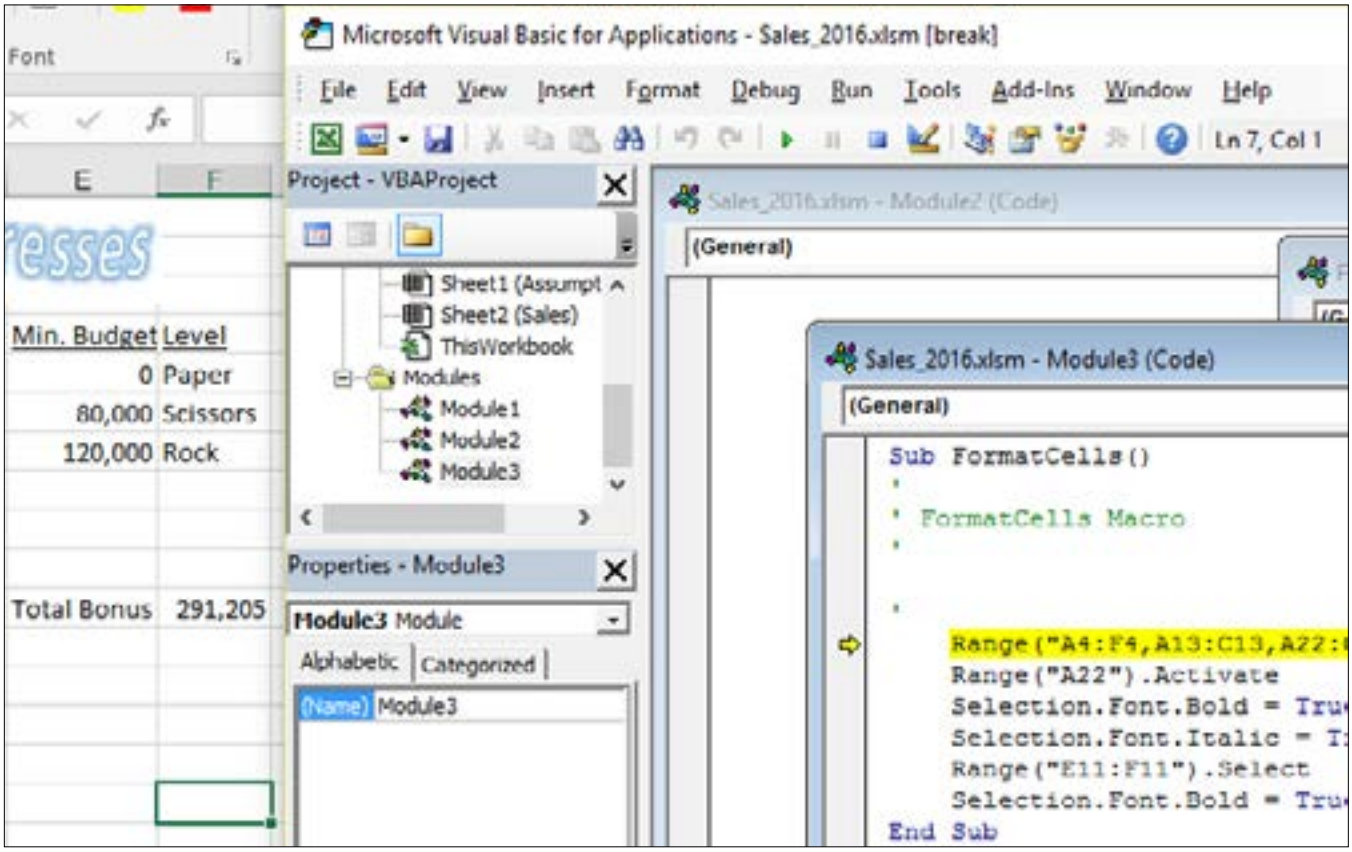


Figure 16.11

The first few lines that begin with an apostrophe are comments. VBA skips over these lines. This is how you can type any comment to document what the code is doing. It is a good idea to document as much of your code as you can with comments like these.

The first step in the macro is to select the range. This is reflected in the VBA code as highlighted in yellow. Once a line is executed by clicking [F8], then the action shows on the spreadsheet.

10. *Press the* **[F8]** *key over and over to step through each of the steps while watching the results in the Excel* **mySales_2016.xlsm** *spreadsheet in the background.*

Once you get to the last step, close the Microsoft Visual Basic screen.

11. *Once the steps have completed, and there are no more yellow highlighted lines,* **close** *the* **Microsoft Visual Basic** *screen.*
12. *Click* **OK** *when prompted that the command will stop the debugger.*

***Review Questions**: It is now time to complete the hands-on Review Questions. Log on to www.ExcelCEO.com with your Email address and Password, click on the* **Excel 2016 Review Questions, Chapter 16, Section 1 of 2** *option in your Main Menu, and complete the Review Questions.*

Create a Macro

For me, the easiest way in Excel to create a macro is to use the ***macro recorder.*** The recorder is just that — functionality you use to record your actions and save them. In the next exercise, you will create a macro that adjusts the column widths after the formatting changes you did in the FormatCells macro. The command is very simple to do – just select all columns and double-click on the column lines.

1. *With the* Assumptions *tab selected, click on the* **Macros** *drop-down menu in the* **View** *tab, and make sure the* **Use Relative References** *icon button is not selected (it will be highlighted if it is selected). If it is highlighted, click on it to deselect it.*
2. *Click on* **Record Macro…** Record Macro...

The Record Macro dialog box opens.

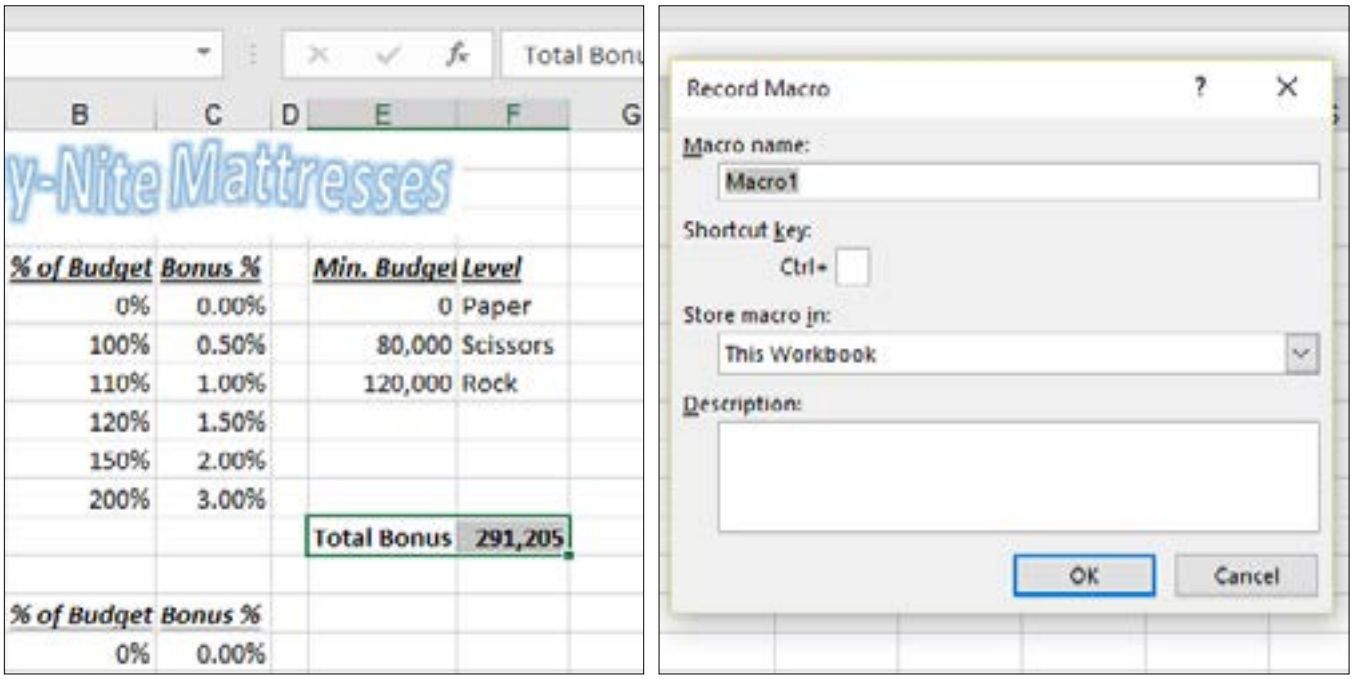
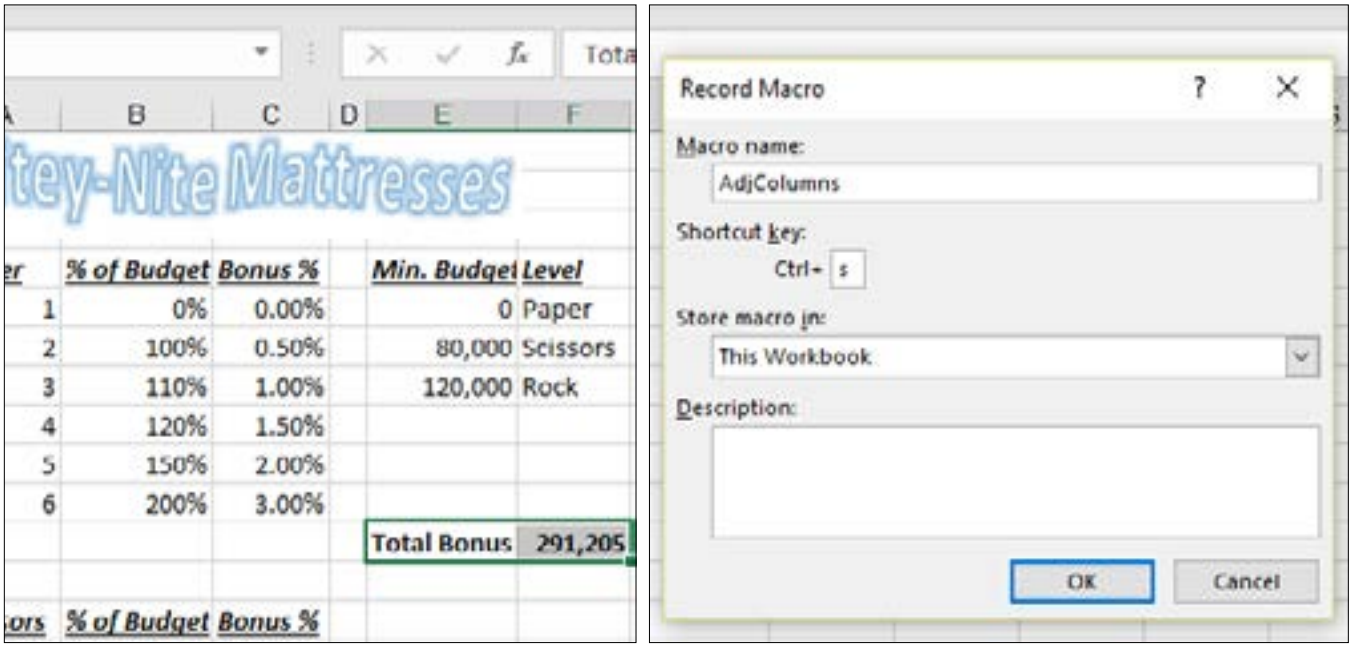


Figure 16.12

Note that when you click on the Macros drop-down menu, you will see an option called **Use Relative References** that can be turned off and on. When the Use Relative References button is not selected (i.e., not highlighted), the macro actions are recorded at the cell's actual address (like Cell A4). When it is selected, it records the macro in reference to the position of the cursor. For example, let's suppose you had recorded a macro that began at Cell A1 and moved the cursor down two cells to Cell A3 with the Use Relative References not selected. Before running the macro, you moved your cursor to Cell B1. When you run the macro, Excel would go directly to Cell A3. If the Relative Reference button was selected, it would go down two cells from Cell B1 to Cell B3.

3. *In the* **Record Macro** *dialog box, replace* **Macro1** *in the* **Macro name:** *box with* ***AdjColumns***
4. *In the* **Shortcut key:** *box, type a lower-case letter "****s****".*



	B	C	D	E	F
				tey-Nite Mattresses	
er	% of Budget	Bonus %		Min. Budget	Level
1	0%	0.00%		0	Paper
2	100%	0.50%		80,000	Scissors
3	110%	1.00%		120,000	Rock
4	120%	1.50%			
5	150%	2.00%			
6	200%	3.00%			
				Total Bonus	291,205
ors	% of Budget	Bonus %			

Figure 16.13

5. *Leave all other boxes with the default values, and click* **OK**.

21			
22	Rock	% of Budget	Bonus %
23	1	0%	0.00%
24	2	100%	0.50%
25	3	105%	0.75%
26	4	115%	1.25%
27	5	130%	1.50%
28	6	150%	2.00%
29			

Assumptions | Sales

Ready

Figure 16.14

On the bottom-left corner of your screen next to the Ready text, you should see a small box. Hold your cursor over the box and you will see a screentip that reads, "*A macro is currently recording. Click to stop recording.*" Every keystroke and action made with the mouse is now being recorded. Excel is recording and converting all of the keystrokes and clicks in VBA code, which is saved in the macro. Let's record our first macro then stop it. All we want this macro to do is to select the entire spreadsheet and adjust the column widths.

6. *Select the entire spreadsheet by clicking on the box with the* **gray triangle** *in the upper-left corner of the spreadsheet where the columns meet the rows.*

7. *Double-click on any column line to auto adjust the width of all columns.*
8. *Click on* **Cell F11** *of the* 

tab and click the **Stop Recording** *button.*

The Stop Recording button disappears, but in the background you have a recorded macro. Let's try out the macro by using the shortcut key you defined.

9. *Adjust the width of* **Column E** *to be much larger, like* ***20.00*** *(145 pixels) and click on* **Cell A4**.
10. *Press* **[Ctrl]**+***s***.

In a split second, you can see the screen blip and the width of Column E is adjusted, and your cursor moves to Cell F11. This indicates the macro is working.

Editing a Macro

To format our spreadsheet, the user has to run two macros, the FormatCells and AdjColumns macros. Do you think we could combine them into one macro? Sure we can. There are two ways to do it. First, you could create a third macro that runs the first two macros. Even though it's easy to do, I don't like to do that, as you end up with three macros when you should have just one. I prefer the second method, which is to copy the VBA code from one macro, and paste it into the other. Let's do that now. In this next exercise, you will copy the AdjColumns macro code into the FormatCells macro.

1. **Open** *the* **Macro** *dialog box.*
2. *Select the* **AdjColumns** *macro, and click the* **Edit** *button.*

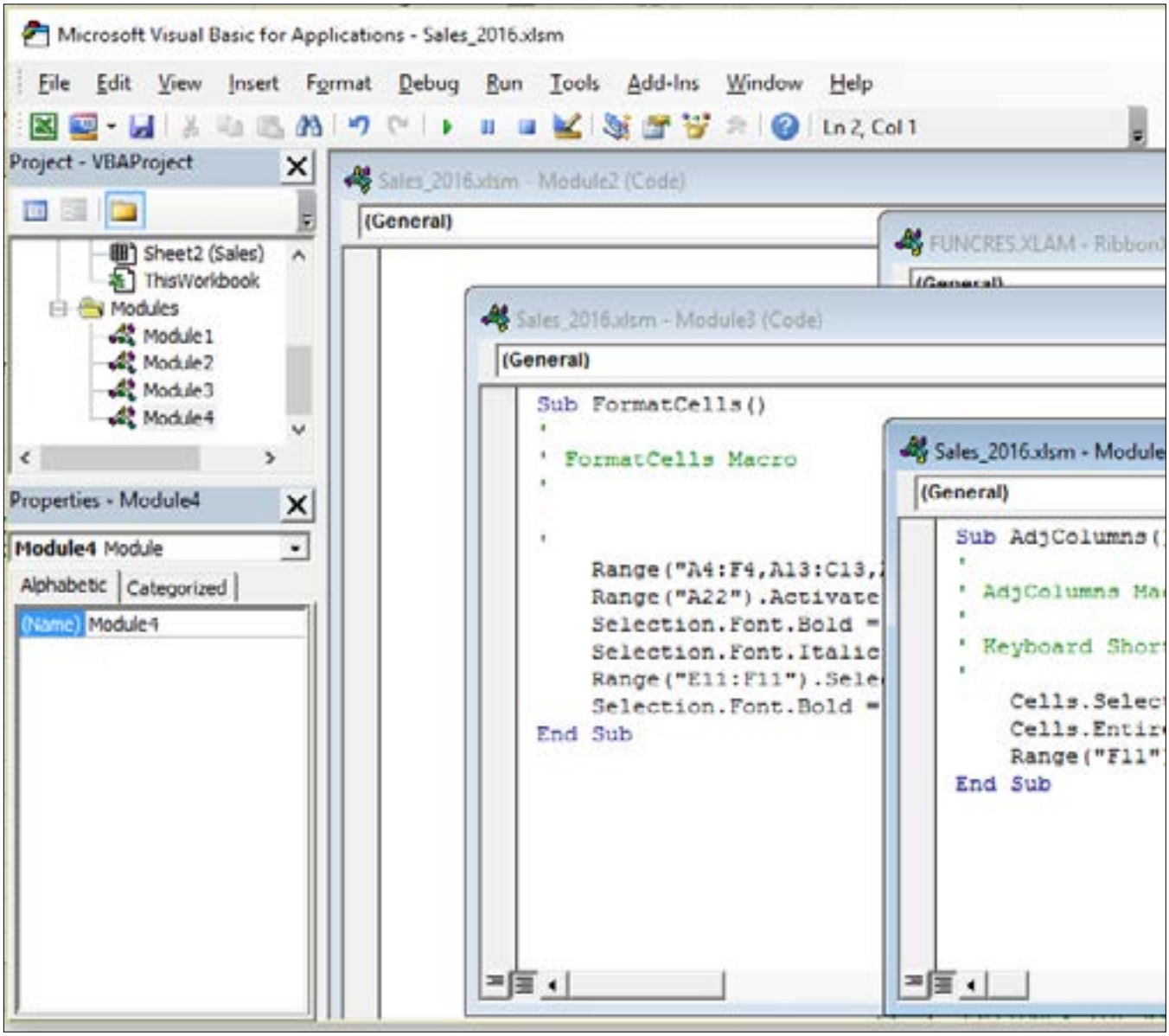


Figure 16.15

The VBA Editor opens up with the FormatCells Macro and AdjColumns Macro boxes visible.

3. *In the* **AdjColumns Macro** *window, select the three lines in black that make up the text of the macro (***Cells.Select** *through* **Range("F11").Select***) and copy the text into memory.*
4. *Click the* **VBA Editor** *screen with the* **Sub FormatCells()** *macro in it.*

> ***Note**: The number of* **VBA module code** *windows displayed depends on how many Excel files you have open. Each is searchable in the* **Project - VBAProject** *menu. Each is labeled according to the workbook and module it relates to. You can click the module window directly or use the Project pane to select a specific one to work with.*

5. *Go to the last line of the macro, just before the* **End Sub** *statement, and paste the text from the* **AdjColumns** *macro.*

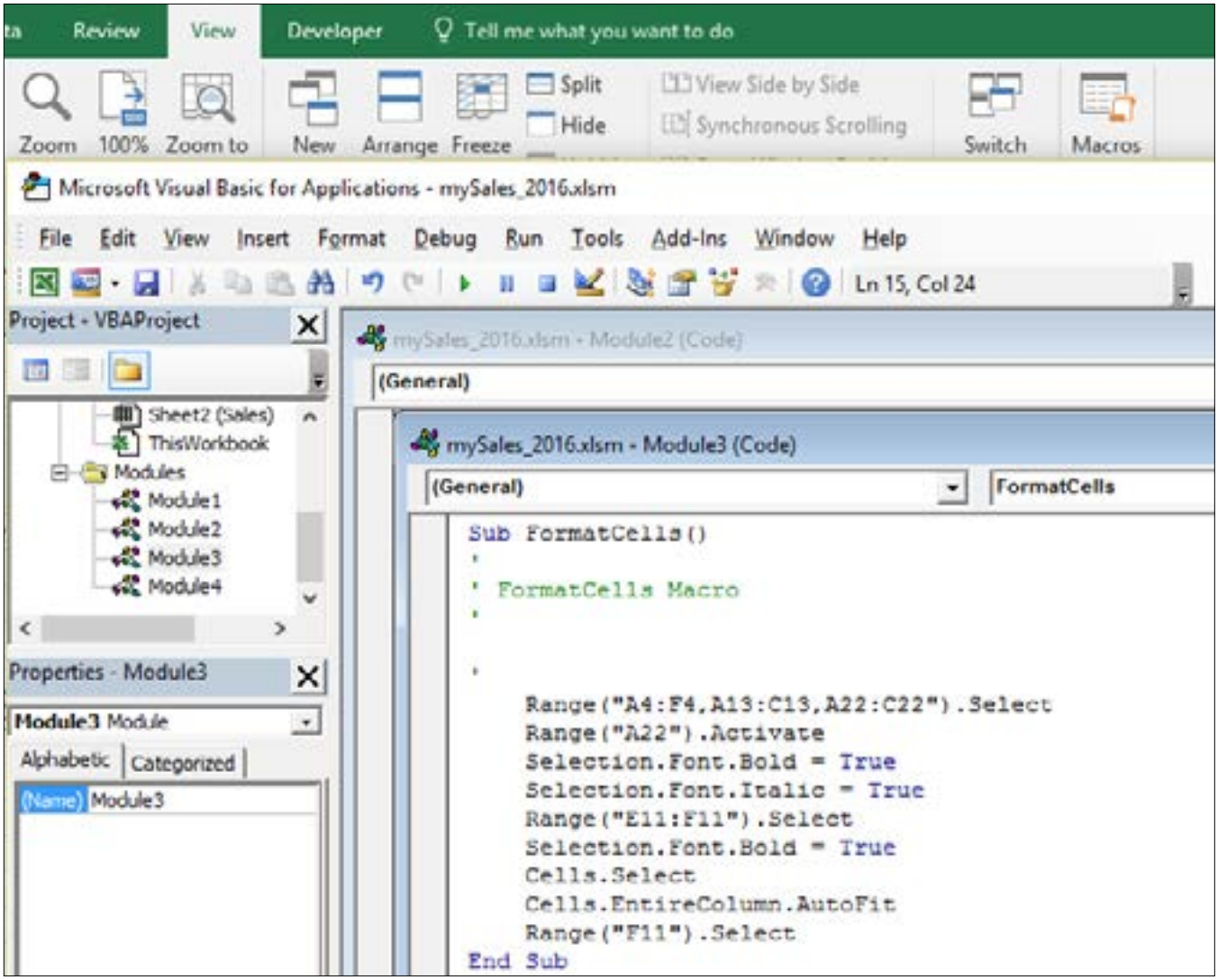


Figure 16.16

6. **Close** *the* **VBA Editor** *screen.*
7. *Make sure the "***a***" shortcut is still valid in the* **Macro Options** *dialog box for the* **Format Cells** *macro. (Sometimes VBA resets the shortcut to nothing when changes are made to the macro.)*
8. *Adjust the column width of* **Column E** *to be something much larger than it currently is, un-bold the bolded cells, and press* **[Ctrl]+*a*** *to run the* **FormatCells** *macro.*

As you will see, the width of Column E is now shorter and all of the cells in the FormatCells macro have changed their formatting. This is the evidence you needed to confirm that both macros are now combined into one. Now that they are combined, you don't need the AdjColumns macro.

9. **Open** *up the* **Macro** *dialog box, click on the* **AdjColumns** *macro, and click the* **Delete** *button.*

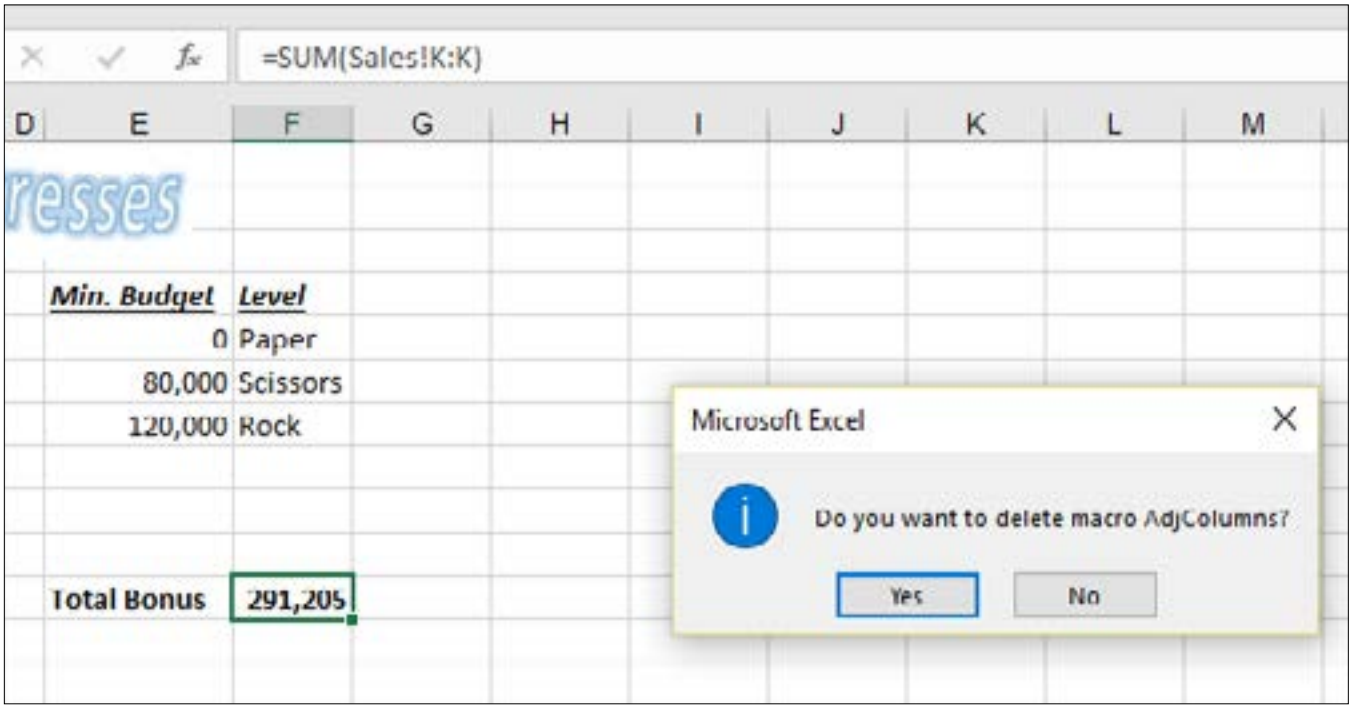


Figure 16.17

10. *Click* **Yes** *to confirm the deletion of the macro.*
11. **Save** *the* **mySales_2016.xlsm** *file.*

One problem with the way we currently have our spreadsheet set up is that the user has to remember to use [Ctrl]+a to run the macro. We could type the instructions somewhere on the Assumptions page, but that could take up a lot of space. One way to make it "*bone stupid simple*" is to use a Command Button. I really like Command Buttons, and since this is my course, we'll do some now.

Command Buttons

You are probably already familiar with a Command Button. A ***Command Button*** is a button that does something when you click on it. There are many examples of Command Buttons on almost every Internet page. You can create Command Buttons in Excel, Access, HTML, and many other programs. When you open a macro-enabled workbook, you see the Enable Content button, which is an example of a Command Button. In our example, we'll create a command button that executes the FormatCells macro. Command Buttons, as well as other tools we'll use later in this chapter, are contained in the Developer tab.

1. *While on the* Assumptions *tab, click on the* **Developer** *tab.*
2. *In the* **Controls** *group, click on the* **Insert** *icon.*
3. *Click on the* **Button (Form Control)** *icon .*
4. *With your mouse, draw a rectangle at about* **Cell E13** *below the* **Total Bonus** *row, and release.*

When you release the mouse, the Assign Macro dialog box appears.

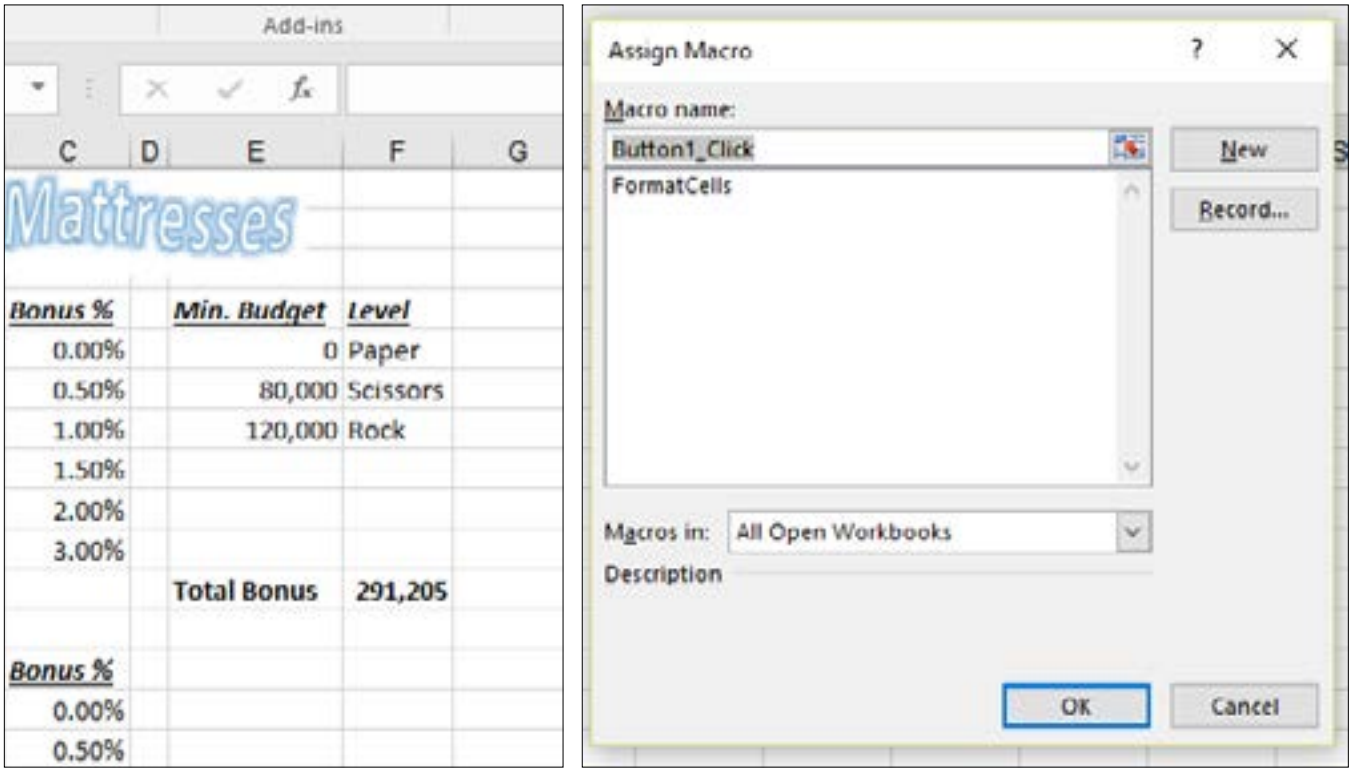


Figure 16.18

5. *Select* **FormatCells** *in the* **Macro name:** *box and click* **OK**.

Excel creates a button that looks like this:

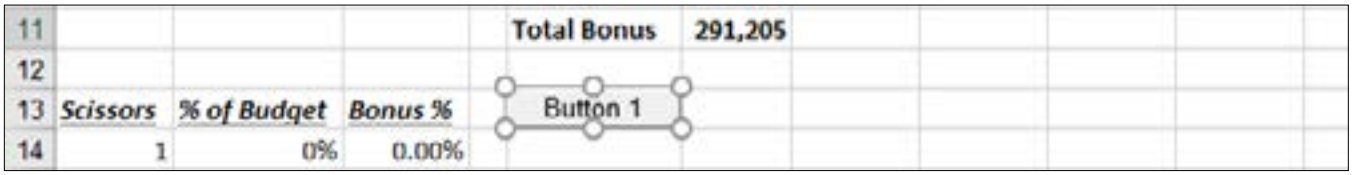


Figure 16.19

6. *While the* **Command Button** *is selected (i.e., handles appear around it), select the text* **Button 1** *inside the button, and replace it with* ***Format Cells****.*
7. *Resize the* **Command Button** *to where all of the text is visible, if necessary.*
8. *Click the* **[Esc]** *key to exit out of the button* **Design Mode**.

To edit the button, move it around, reassign the macro or resize it, simply right-click on the button and either choose an option from the list or click [Esc]. If you left-click on the button, it will execute the macro that you assigned to it.

9. *Right-click on the* **Format Cells** *command button, press* **[Esc]**, *and position your cursor over the button's shaded area where the cursor turns to a four arrow symbol.*

10. Drag the button just to the right of the **Nitey-Nite Mattresses** *graphic, and release.*

11. Click anywhere outside of the button (to exit **Design Mode***).*

	A	B	C	D	E	F	G	H	I	J
1	Nitey-Nite Mattresses									
2						Format Cells				
3										
4	Paper	% of Budget	Bonus %		Min. Budget	Level				
5	1	0%	0.00%		0	Paper				
6	2	100%	0.50%		80,000	Scissors				
7	3	110%	1.00%		120,000	Rock				
8	4	120%	1.50%							
9	5	150%	2.00%							
10	6	200%	3.00%							
11					Total Bonus	291,205				
12										

Figure 16.20

12. Adjust the width of **Column E** *to be much larger, and click on the* **Format Cells** *command button to test the macro.*

> ***Tip****: To keep the command Button from moving with column adjustments, click the* **Don't move or size with cells** *radio button in the* **Properties** *tab of the* **Format Control** *dialog box.*

13. **Save** *the* **mySales_2016.xlsm** *file.*

Macros in the Quick Access Toolbar

Another way to store a macro in your spreadsheet is to put it in the Quick Access Toolbar. This comes in particularly handy when you have lots of macros and you want to organize them in an easy-to-use fashion. In this next example, we'll put the FormatCells macro in the Quick Access Toolbar.

1. Click on the **Customize Quick Access Toolbar** *drop-down arrow and choose* **More Commands…**

The Excel Options dialog box appears, and the Customize section of the dialog box is activated.

2. Make sure the **Choose commands from:** *box is set to* **Popular Commands**.

3. Scroll to the bottom of the list and click on **View Macros**.

4. Click **Add >>**

The View Macros object is moved over to the section that displays all of the icons currently available in the Quick Access Toolbar.

5. *Click on the* **Choose commands from:** *drop-down menu and choose* **Macros**.

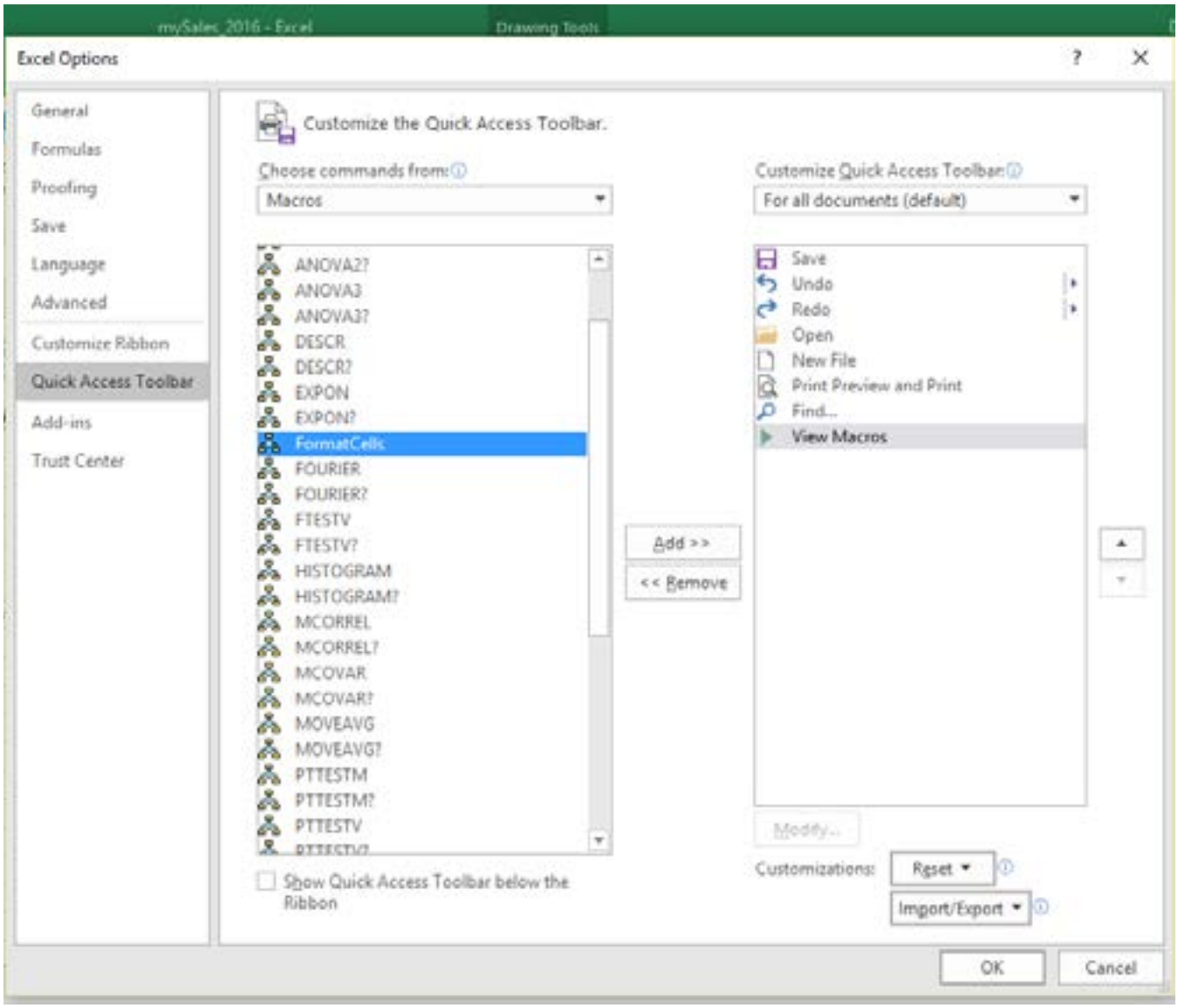


Figure 16.21

6. *Click on the* **FormatCells** *macro and click* **Add >>**
7. *Click on the* **FormatCells** *macro in the right section, and click the* **Modify...** *button at the bottom of the section.*

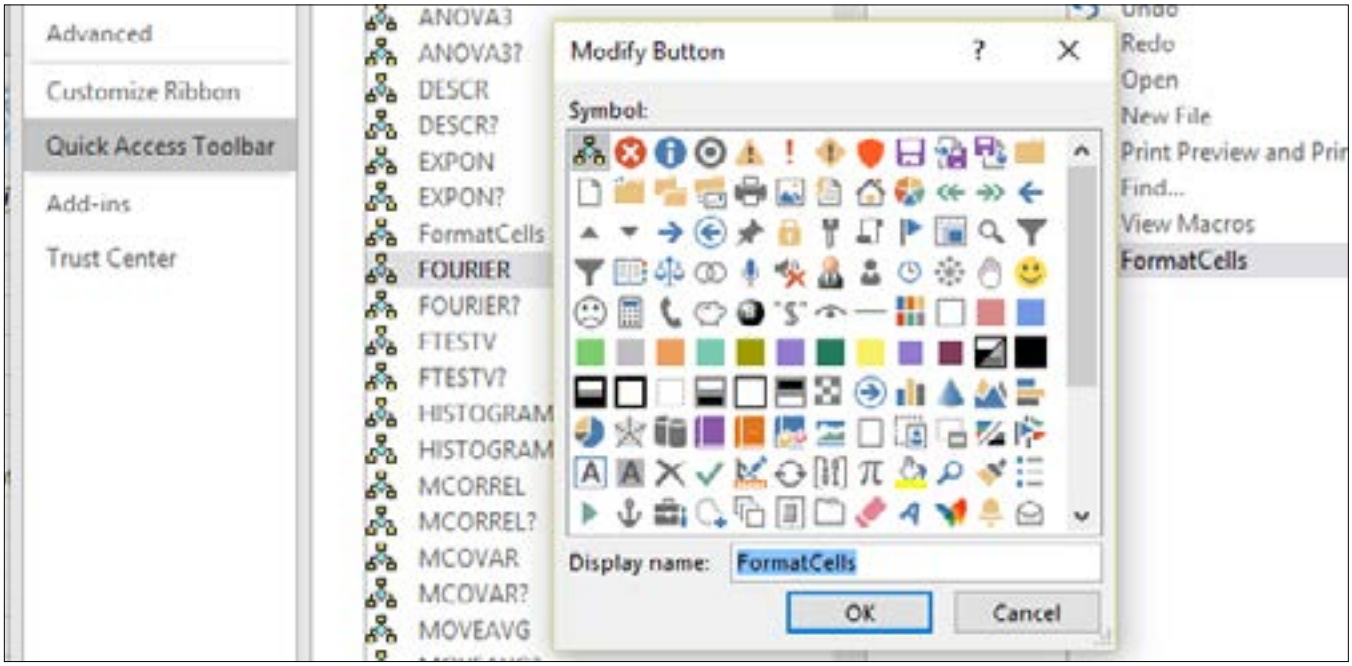


Figure 16.22

The Modify Button dialog box appears.

8. *Click on the button in the ninth row that looks like a paintbrush, and click* **OK** *to close the* **Modify Button** *dialog box, then click* **OK** *again to close the* **Excel Options** *dialog box.*

You have now assigned that image to the FormatCells macro. Whenever you want to use that macro, simply click on that image.

Figure 16.23

9. *Click on the brush icon to run the* **FormatCells** *macro, and make sure it works.*

Spin Buttons

Another object from the Developer tab that I use a lot is the ***Spin Button***, sometimes called a **Spin Box** or **Spinner Button**. Users, particularly upper management, like to see what happens with the bottom line with each unit change in a variable. At Nitey-Nite Mattresses, there is an on-going argument over the entry point at which management wants to pay bonuses. Some management people say that each store must reach 100% before making a bonus. Others say you can make more sales if the entry point is more lenient, like at 90%, and yet other hard-core individuals believe 100% is the minimum acceptable to keep your job and that the bonus entry point should be at about 110%. With a Spin Button, you can create the

functionality to show the end result (Total Bonus Payable) with every percentage point change in the entry point without having to type in each assumption. It's so simple to use that even upper management people who have little experience with Excel can use it and they LOVE it! Let's create a Spin Button.

1. *Make sure you are on the* Assumptions *tab of the* **mySales_2016.xlsm** *file, and click on the* **Insert** *button of the* **Controls** *group of the* **Developer** *tab.*
2. *In the* **Form Controls** *box, click on the* **Spin Button (Form Control)**.
3. *Draw a vertically shaped rectangle box on the left inside of* **Cells F14 and F15**, *and release.*
4. *Right-click on the* **Spin Button** *and choose* **Format Control…**

The Format Control dialog box appears.

5. *Click on the* **Control** *tab.*

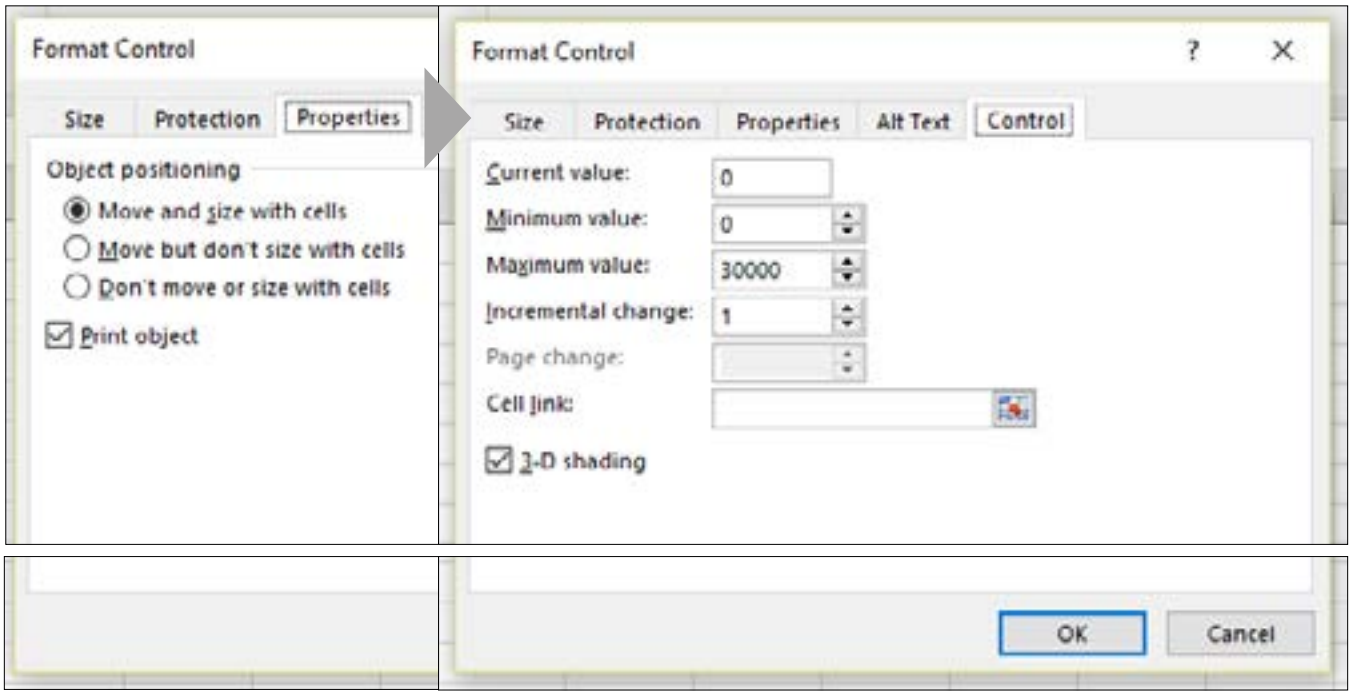


Figure 16.24

6. *Click inside the* **Cell link:** *box then click on* **Cell F14** *(you may have to move the dialog box out of the way to click on* **Cell F14***) and click* **OK**.
7. *Click outside the* **Spin Button** *to take it out of design mode.*
8. *Click on the up and down arrows of the* **Spin Button**, *and you will see the value in* **Cell F14** *go up and down accordingly.*

With the spin button set up, all we have to do is write a formula using the number in Cell F14 to calculate the change in the entry point. If you look at the values in Cells B15 and B24, you will see that all of the percentages are based on the value in Cell B6, which is currently set to 100%. We want to write a formula that will take the number in Cell B6 up and down by one percentage point. Notice that the Spin Button's

value in Cell F14 can go up a lot but stops at 0 when clicking the down arrow. It would seem that we can't go below zero, but we can change around some assumptions in the dialog box that will solve that issue.

9. *Right-click on the* **Spin Button** *and choose* **Format Control…**
10. *Change the* **Current Value** *to* ***100****, leave the* **Minimum Value** *at* ***0****, change the* **Maximum Value** *to* ***200****, leave the* **Incremental change** *at* ***1*** *(you can't go below 0 on the Incremental value – that's why we have to write a formula), click* **OK** *and exit out of the Spin Button's design mode.*

The value in Cell F14 changes to 100. Click on the up and down arrows of the Spin Button and you will see that you can go up to 200 and down to 0.

11. *Replace the value in* **Cell B6** *with this formula:* ***=F14/100****.*
12. *Hide the contents of* **Cell F14** *(use a* **Custom format** *of* ***;;;*** *in the* **Format Cells** *dialog box).*
13. *Type* ***Entry Point*** *in* **Cell E14.**
14. *In* **Cell E15**, *type* ***=F14/100*** *and format it as* **Percent**, **zero decimal places.**
15. *Take the* **Entry Point** *down to* **95%** *using the* **Spin Button.**

1					
2	Nitey-Nite Mattresses			Format Cells	
3					
4	Paper	% of Budget	Bonus %	Min. Budget	Level
5	1	0%	0.00%	0	Paper
6	2	95%	0.50%	80,000	Scissors
7	3	105%	1.00%	120,000	Rock
8	4	115%	1.50%		
9	5	145%	2.00%		
10	6	195%	3.00%		
11				Total Bonus	317,496
12					
13	Scissors	% of Budget	Bonus %		
14	1	0%	0.00%	Entry Point	
15	2	95%	0.50%	95%	
16	3	105%	1.00%		
17	4	120%	1.25%		
18	5	140%	1.50%		

Figure 16.25

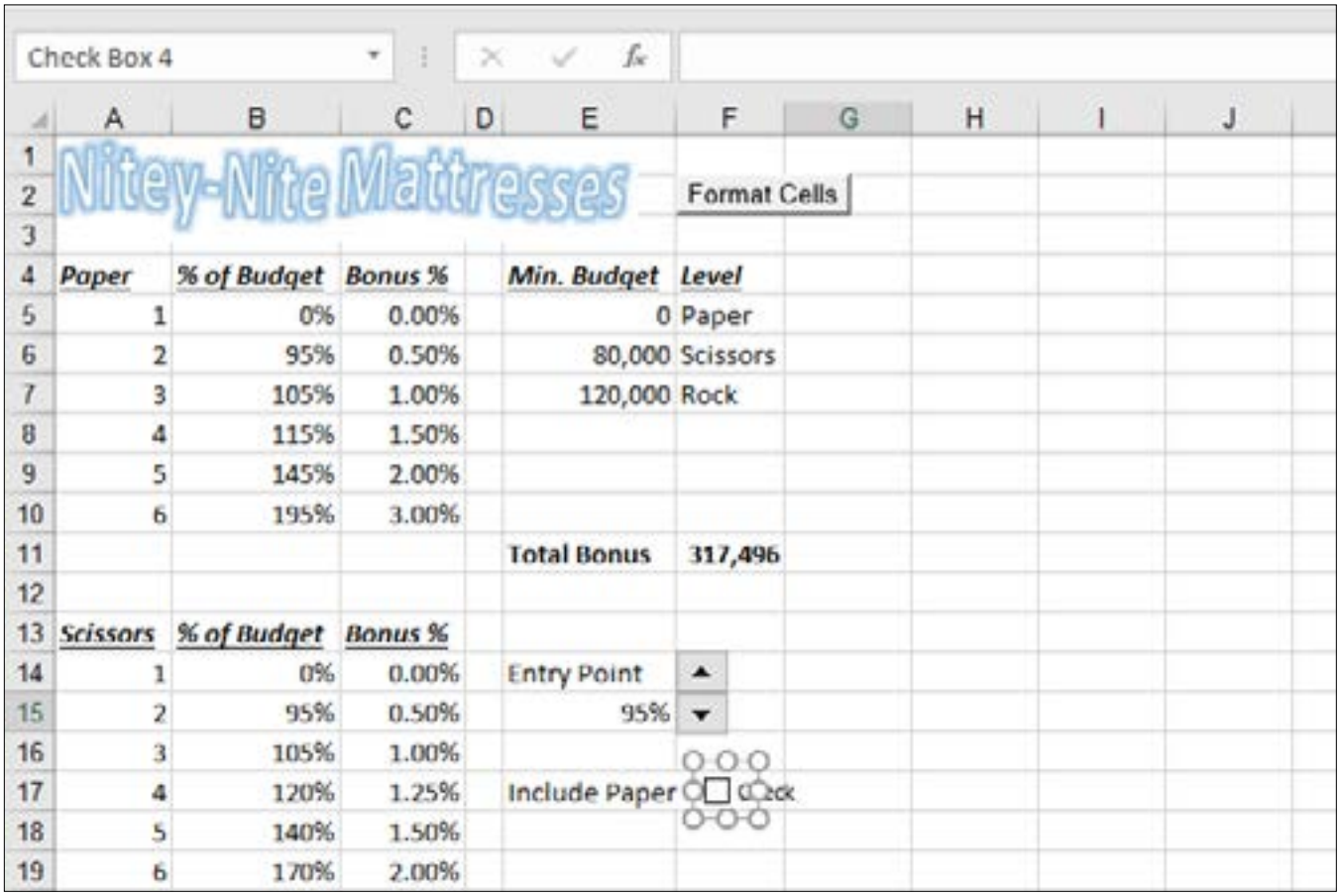
The Total Bonus becomes $317,496. Notice that the % of Budget numbers are all based on the Entry Point in Cell B6. With every click on the Spin Button, there is instantaneously a new Total Bonus value. If you can create Spin Buttons on your spreadsheets that are given to upper management or clients, they will think you are the Excel master of all masters!

Check Boxes

The next object in the Developer tab I think is very useful is the ***check box***. If you've spent any time in computer programs or on the Internet, you're probably already familiar with check boxes. A check box is used when you want the user to simply check and uncheck an assumption, or in other words, turn an assumption off and on. In our example, let's assume there are discussions with upper management as to whether or not Paper stores should be eligible for a bonus, as they are smaller stores that don't contribute much to the bottom line of the company. We will create a check box to include them as eligible for a bonus when checked, or uncheck the box, if they are not eligible and see the difference in the Total Bonus. Let's do it.

1. *In* **Cell E17**, *type:* ***Include Paper***
2. *Click on the* **Check Box** *icon* ☑ *in* **Form Controls**.
3. *With your cursor, draw a small box in the middle of* **Cell F17**.

You should get something similar to the following:



	A	B	C	D	E	F	G	H	I	J
1										
2										
3										
4	*Paper*	*% of Budget*	*Bonus %*		*Min. Budget*	*Level*				
5	1	0%	0.00%		0	Paper				
6	2	95%	0.50%		80,000	Scissors				
7	3	105%	1.00%		120,000	Rock				
8	4	115%	1.50%							
9	5	145%	2.00%							
10	6	195%	3.00%							
11					**Total Bonus**	**317,496**				
12										
13	*Scissors*	*% of Budget*	*Bonus %*							
14	1	0%	0.00%		Entry Point					
15	2	95%	0.50%		95%					
16	3	105%	1.00%							
17	4	120%	1.25%							
18	5	140%	1.50%							
19	6	170%	2.00%							

Figure 16.26

4. *Delete the text to the immediate right of the check box within the object.*
5. *Right-click on the check box and choose* **Format Control…**

6. *On the* **Control** *tab, click inside the* **Cell link:** *box.*
7. *Click on* **Cell F17** *on the spreadsheet or type* ***F17****.*

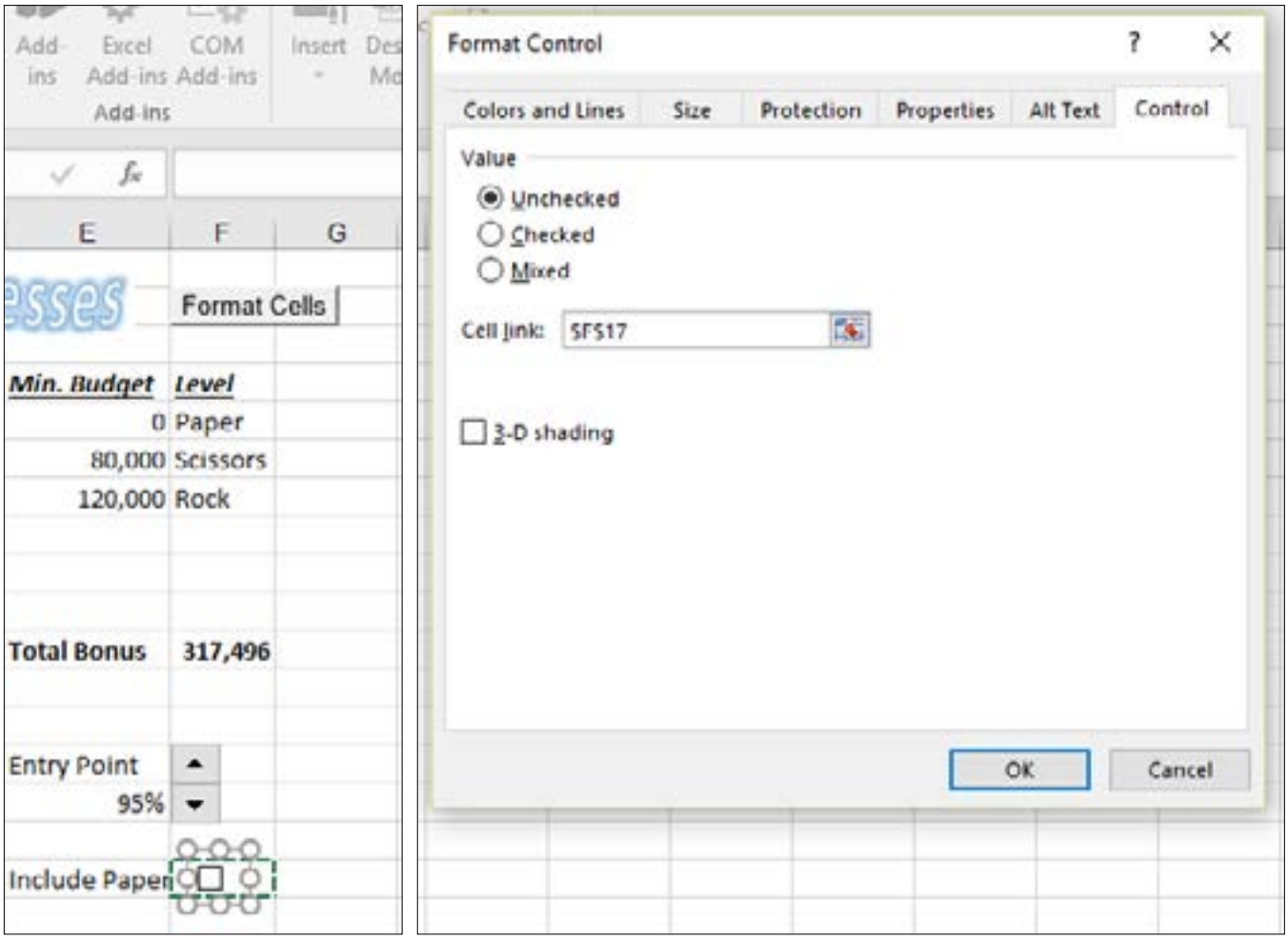


Figure 16.27

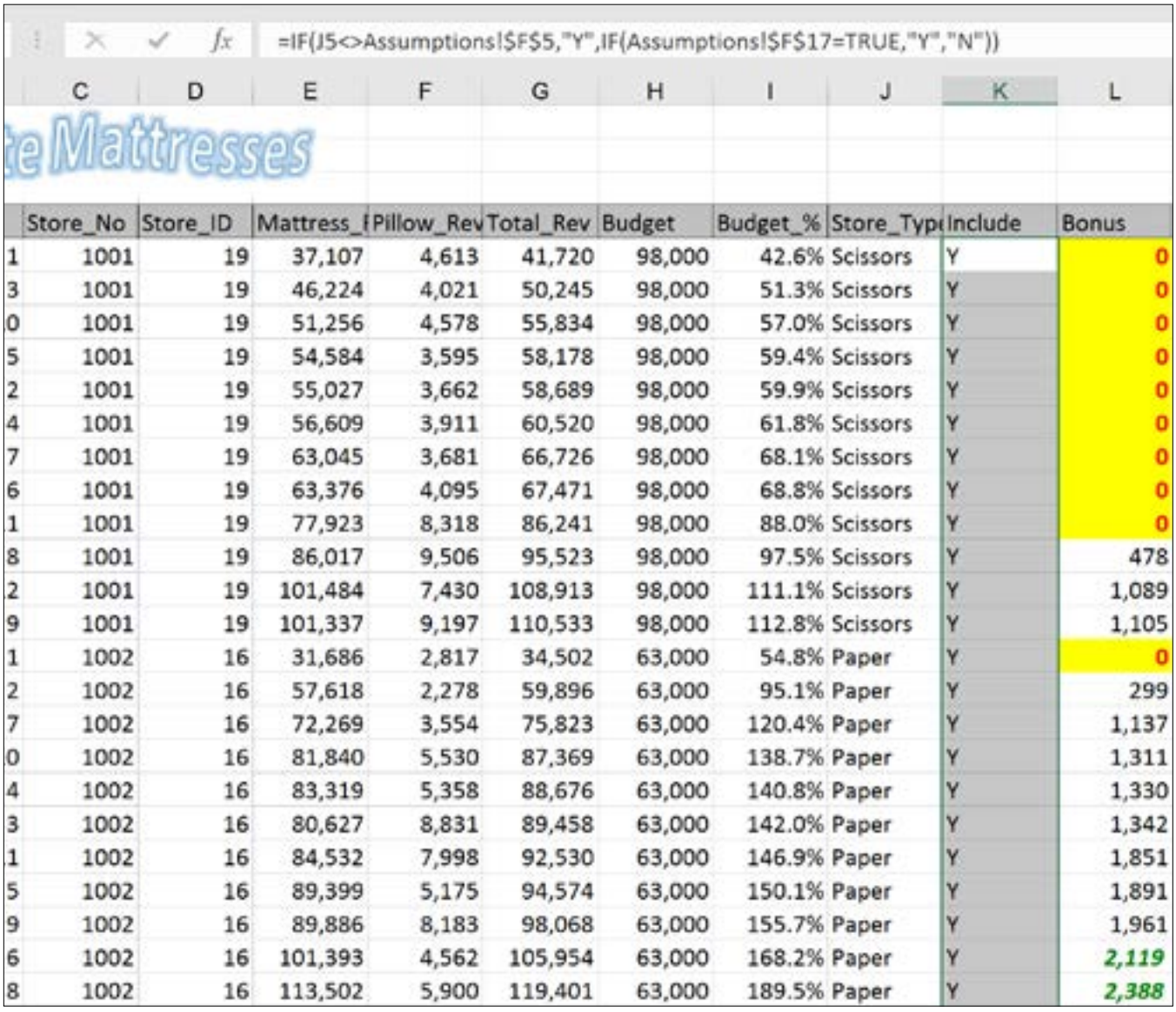
8. *Leave all default values, and click* **OK**.
9. *Exit out of the check box design mode.*

Check and uncheck the check box. You will see that Cell F17 returns TRUE when it is checked and FALSE when it is unchecked.

10. *Make sure the check box is unchecked.*
11. *Format* **Cell F17** *(the cell, not the check box) as hidden.*
12. *Resize* **Column E**, *if necessary.*
13. *Go to the* Sales *page.*
14. *Insert a column between the* **Store_Type** *and* **Bonus** *fields. The new column should be* **Column K**. *Name it* ***Include****.*

15. *In* **Cell K5**, *write a formula that says if the* **Store_Type** *is not Paper, return a Y, else, if* **Cell F17** *on the* Assumptions *tab is TRUE, then return a Y, else, return N.*

16. *Copy the formula down to all cells below.*



=IF(J5<>Assumptions!$F$5,"Y",IF(Assumptions!$F$17=TRUE,"Y","N"))

	C	D	E	F	G	H	I	J	K	L
	Store_No	Store_ID	Mattress_I	Pillow_Rev	Total_Rev	Budget	Budget_%	Store_Type	Include	Bonus
1	1001	19	37,107	4,613	41,720	98,000	42.6%	Scissors	Y	0
3	1001	19	46,224	4,021	50,245	98,000	51.3%	Scissors	Y	0
0	1001	19	51,256	4,578	55,834	98,000	57.0%	Scissors	Y	0
5	1001	19	54,584	3,595	58,178	98,000	59.4%	Scissors	Y	0
2	1001	19	55,027	3,662	58,689	98,000	59.9%	Scissors	Y	0
4	1001	19	56,609	3,911	60,520	98,000	61.8%	Scissors	Y	0
7	1001	19	63,045	3,681	66,726	98,000	68.1%	Scissors	Y	0
6	1001	19	63,376	4,095	67,471	98,000	68.8%	Scissors	Y	0
1	1001	19	77,923	8,318	86,241	98,000	88.0%	Scissors	Y	0
8	1001	19	86,017	9,506	95,523	98,000	97.5%	Scissors	Y	478
2	1001	19	101,484	7,430	108,913	98,000	111.1%	Scissors	Y	1,089
9	1001	19	101,337	9,197	110,533	98,000	112.8%	Scissors	Y	1,105
1	1002	16	31,686	2,817	34,502	63,000	54.8%	Paper	Y	0
2	1002	16	57,618	2,278	59,896	63,000	95.1%	Paper	Y	299
7	1002	16	72,269	3,554	75,823	63,000	120.4%	Paper	Y	1,137
0	1002	16	81,840	5,530	87,369	63,000	138.7%	Paper	Y	1,311
4	1002	16	83,319	5,358	88,676	63,000	140.8%	Paper	Y	1,330
3	1002	16	80,627	8,831	89,458	63,000	142.0%	Paper	Y	1,342
1	1002	16	84,532	7,998	92,530	63,000	146.9%	Paper	Y	1,851
5	1002	16	89,399	5,175	94,574	63,000	150.1%	Paper	Y	1,891
9	1002	16	89,886	8,183	98,068	63,000	155.7%	Paper	Y	1,961
6	1002	16	101,393	4,562	105,954	63,000	168.2%	Paper	Y	2,119
8	1002	16	113,502	5,900	119,401	63,000	189.5%	Paper	Y	2,388

Figure 16.28

Notice that in my outline of the formula, I did not hard-code in the word "Paper". I referred to Cell F5 on the Assumptions tab. This way, if Nitey-Nite every decided to change the names Paper, Scissors, Rock to Bronze, Silver, Gold (or something similar), all they would have to do is make the change on the Assumptions page and all of the formulas would continue to work.

17. *Edit the formula in* **Cell L5** *to return* ***0*** *if the* **Include** *column is* **N**.

18. *Copy the new formula down to all cells below.*

The new formula in Cell L5 should be as follows:

*=IF(K5="N",0,IF(J5=Assumptions!$F$5,VLOOKUP(MATCH(I5,Assumptions!$B$5:$B$10,1),Assumptions!$A$5:$C$10,3,FALSE)*G5,IF(J5=Assumptions!$F$6,VLOOKUP(MATCH(I5,Assumptions!$B$14:$B$19,1),Assumptions!$A$14:$C$19,3,FALSE)*G5,VLOOKUP(MATCH(I5,Assumptions!$B$23:$B$28,1),Assumptions!$A$23:$C$28,3,FALSE)*G5)))*

The only real change to the formula is "IF(K5=0,"N",0,", and adding an ending parenthesis at the end.

19. Go to the Assumptions *tab.*

20. Check and uncheck the check box.

You should see that the Total Bonus is $317,496 when it is checked and $198,556 when it is unchecked. You now have a fully functional application that will allow management to change almost any assumption in the Sales program. Trust me, management and clients LOVE this kind of analysis. It gives them the opportunity to make any change they want and immediately see the results.

21. **Save** *and* **close** *the* **mySales_2016.xlsm** *file.*

> ***Review Questions**: It is now time to complete the hands-on Review Questions. Log on to www.ExcelCEO.com with your Email address and Password, click on the* **Excel 2016 Review Questions, Chapter 16, Section 2 of 2** *option in your Main Menu, and complete the Review Questions.*

Conclusion

In this chapter, you learned about macro security and why you should be cautious about receiving files containing macros from others. We reviewed the VBA (Visual Basic for Applications) programming language, which is the language behind macros. You learned how to create, edit, run, step into and delete a macro, as well as how to work with relative references as it applies to macros. You learned about shortcut keys and created a shortcut key within a macro. You added a macro to the Quick Access Toolbar and finally you created a Command Button, a Spin Button and a Check Box using Form Controls.

Chapter Exam

To take the examination for this chapter, you must have successfully completed the examination for the previous chapter. You can now go to www.ExcelCEO.com, click on Sign In, log in and take the exam. Make sure that you take the exam on the same computer on which you completed the practice files, as some of the questions on the exam may refer to some of the completed projects. Chapter exams are intended to be hands-on.

Excel® 2016

Complete Self-study Course

ExcelCEO

Chief Excel Officer

CHAPTER SEVENTEEN — THE WEB AND MORE COOL EXCEL STUFF

Chapter Objectives:

- Recognize how to create a simple HTML page using NotePad
- Identify how to save an Excel file as an HTML file and view the workbook using a web browser
- Determine how to extract data from the internet using a Web Query
- Recognize how to delete records in a table but not in the worksheet
- Identify the components of advanced Date filtering
- Determine the steps to insert a Background into a spreadsheet

Projects You Will Complete During This Chapter:

- *hello.html*
- *myNew2016.xlsx*
- *myWebQuery.xlsx*
- *Q1_Sales.mht*

CPE Credits possible for this chapter: 2

Working with the Web

One enhancement that was made in more recent versions of Excel is its capability of saving documents to the World Wide Web (Web). When a document is saved on the Web, it can be viewable to everyone or just to people that you allow access to it. One of the great points about saving documents to the web is the distribution of the document or report. Once it is on the Web, all you have to do is tell people where it is, usually by sending them a link in an email, and they can click on the link to access it. Even though you can make an Excel file itself available via the Web, that is sometimes not a good idea, particularly if that person is accessing the Web using a slower connection. Sometimes large files can take a lot of time to open. One change that was made is that users no longer are required to have their own copy of Microsoft Excel for simply viewing an Excel document, thanks to Excel Web Access. Office 365 provides subscription-based access as well for those who prefer always up-to-date applications for a price. Microsoft SharePoint as well as cloud-based storage such as OneDrive has made collaboration, even simultaneous collaboration, easier than ever for teams who share access to specific files, but do not want those files made made open to the public. For now, let's focus on saving an Excel file to the Internet.

To make an Excel file viewable on a browser (like Microsoft Internet Explorer), it is necessary to save the file in some type of browser-viewable format. The basic format for viewing documents on the web is in an HTML format. ***HTML*** stands for Hypertext Markup Language. An HTML file is a page that is programmed to make it readable for a browser. Although programming HTML is beyond the scope of this course, it would be helpful to know at least some basics.

Create a Simple HTML Page

An HTML file is programmed with ***tags*** which tell the browser how to display its contents. HTML is not a programming language per se, but a markup language, and is very easy to learn how to code. You don't even need any special software to program it – just open Notepad or Word and start programming. Let's create a simple HTML file using NotePad.

1. **Open** *a blank* **NotePad** *file (***Cortana***, type* ***NotePad****, and select* **NotePad Desktop app** *using Windows 10, or* **Start Menu***, and type* ***NotePad*** *using Windows 8/8.1).*
2. *In the* **NotePad** *file, type the text as shown in the image below.*
3. **Save As C:\ExcelCEO\Excel 2016\Chapter17*hello.html***. (Make sure to save the file name as* ***hello.html****, and the* **Save as type** *box set to* **All Files***. You may have to manually type the file tag as .html)*

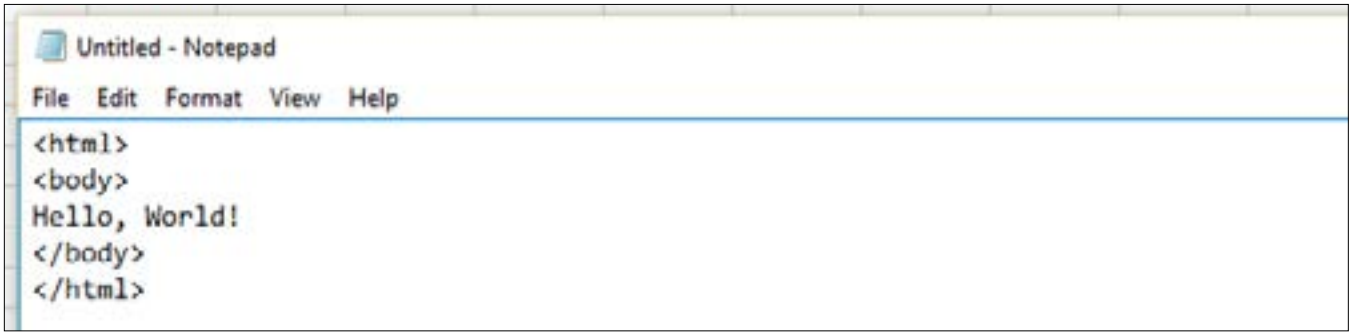


Figure 17.1

In this file, there are five lines of code. The text surrounded by the "<" and ">" signs are called tags. ***Tags*** are the basics behind HTML files. There is only one required tag in an HTML file. That tag is the <html> tag, which tells the browser that this is an HTML page. All other tags are optional. The last tag, </html>, tells the browser it is the end of the HTML page. The <body> tag begins what is contained in the body of the page, and the </body> tag ends the <body> tag, or ends the body of the page. You must save an HTML file with the extension .htm or .html.

4. **Open** *your* **Excel 2016 Chapter 17** *folder.*
5. *Right-click on* **hello.html**, **Open with** *click on your preferred* **Browser** *(Edge, Chrome, Opera, Internet Explorer, etc.) icon from the menu of options shown.*

> ***Tip**: If you use* **Internet Explorer**, *you can either right-click on the browser tab area under* **File**, **Open...**, *and navigate to the* **.html** *file. If* **File** *is not visible, click* **[Alt]** *to open the* **Menu Bar** *temporarily, or activate it by right-clicking on the browser header bar and selecting Menu Bar. If you are using* **Edge**, **Chrome**, **Opera**, *etc., you can open the file by navigating to the Chapter 17 folder, right-clicking the file, selecting* **Open with...**, *and then selecting your preferred browser.*

Figure 17.2

Again, this is a very simple HTML page that is viewable currently only by you since it is on your computer's hard drive. If you want the whole world to see it, you would have to copy the file on to a web server, which is simply a computer that is connected to the web.

At this point, you can start changing some of the text and tags to make it more useful, meaningful, or to just pretty it up.

6. *In the* **NotePad** *file, add the* **<*b*>** *and* **</*b*>** *tags around the word* **Hello**.
7. **Save** *the* **NotePad** *file.*

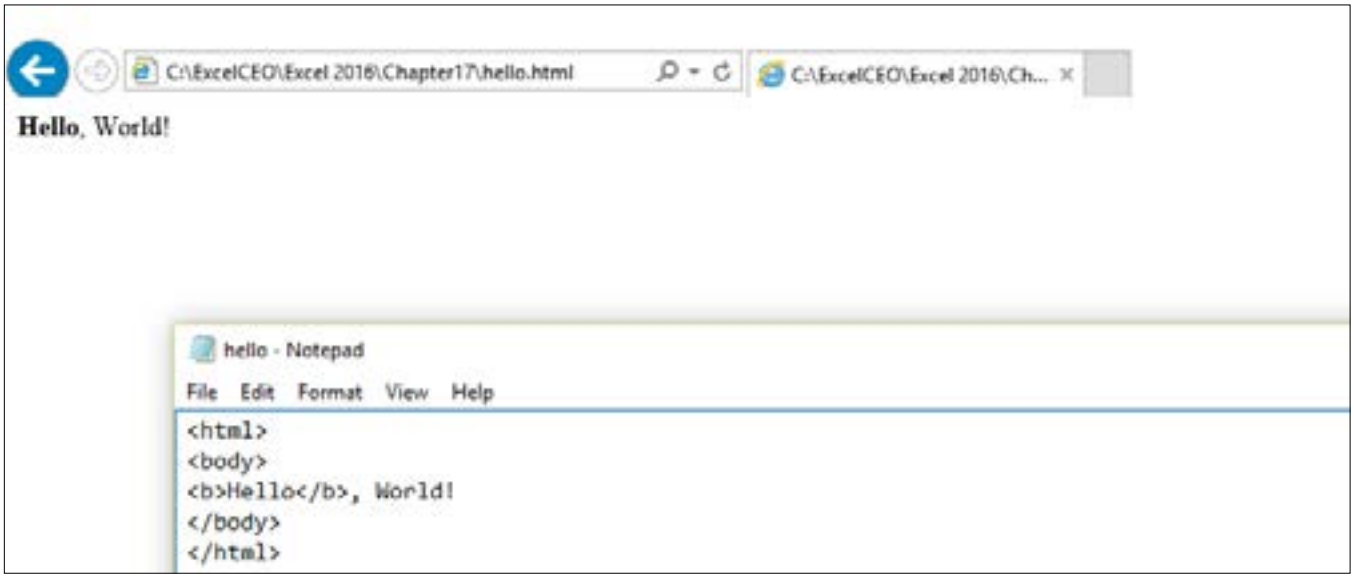


Figure 17.3

The and tags tell the browser to display a bold format starting with the letter H in Hello and end the bold after the letter o. To see how it looks on your browser, just click the Refresh icon after you save the NotePad file. You can also use the tag to bold text, which is also recognized by most browsers.

8. *Click the* **Refresh** *icon on your browser.*

Figure 17.4

Now you see that the word Hello is in a bold format. It is beyond the scope of this course to give a complete lesson on creating HTML files, but learning to write HTML is essential if you want to learn web development, and it is relatively easy to learn, and now you have some basics.

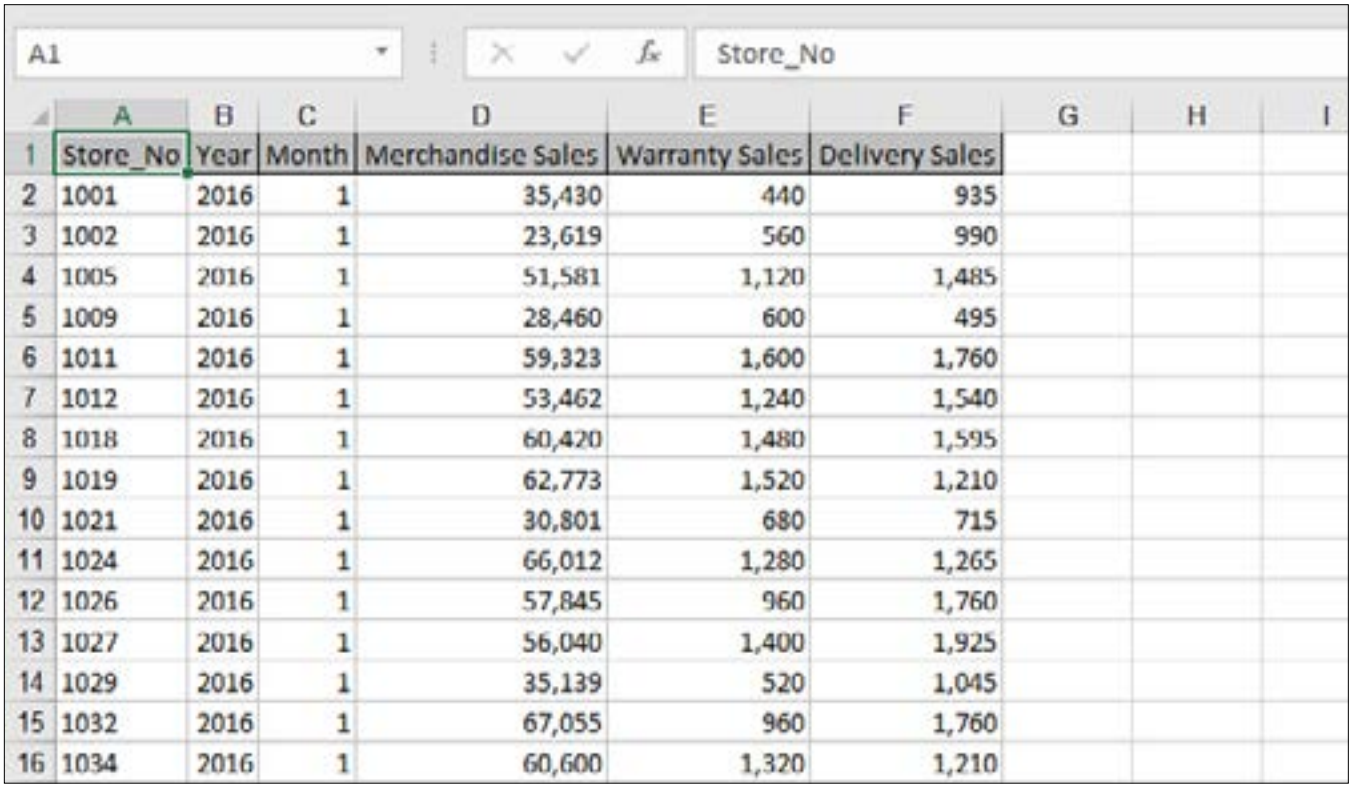
9. **Close** *your* **Internet browser** *and* **NotePad**.

Save as Single File Web Page

There are many types of web page languages that can be used to create web pages. Other languages include ASP, ASPX (or ASP.Net), PHP, JSP, and CFM, just to name a few. In this next exercise, you will open an Excel file and save the file as a web page. When you save an Excel file as a single **web page** using

Excel's publishing tools, it is created with an mht (MHTML, or Microsoft HTML) extension. Creating this kind of file is not much more than clicking File, Save As… and choose a Save as format. Let's do it.

1. *In* **Excel**, **open** *the* **Q1_Sales.xlsx** *file located at* **C:/ExcelCEO/Excel 2016/Chapter17**.



A1 | Store_No

	A	B	C	D	E	F	G	H	I
1	Store_No	Year	Month	Merchandise Sales	Warranty Sales	Delivery Sales			
2	1001	2016	1	35,430	440	935			
3	1002	2016	1	23,619	560	990			
4	1005	2016	1	51,581	1,120	1,485			
5	1009	2016	1	28,460	600	495			
6	1011	2016	1	59,323	1,600	1,760			
7	1012	2016	1	53,462	1,240	1,540			
8	1018	2016	1	60,420	1,480	1,595			
9	1019	2016	1	62,773	1,520	1,210			
10	1021	2016	1	30,801	680	715			
11	1024	2016	1	66,012	1,280	1,265			
12	1026	2016	1	57,845	960	1,760			
13	1027	2016	1	56,040	1,400	1,925			
14	1029	2016	1	35,139	520	1,045			
15	1032	2016	1	67,055	960	1,760			
16	1034	2016	1	60,600	1,320	1,210			

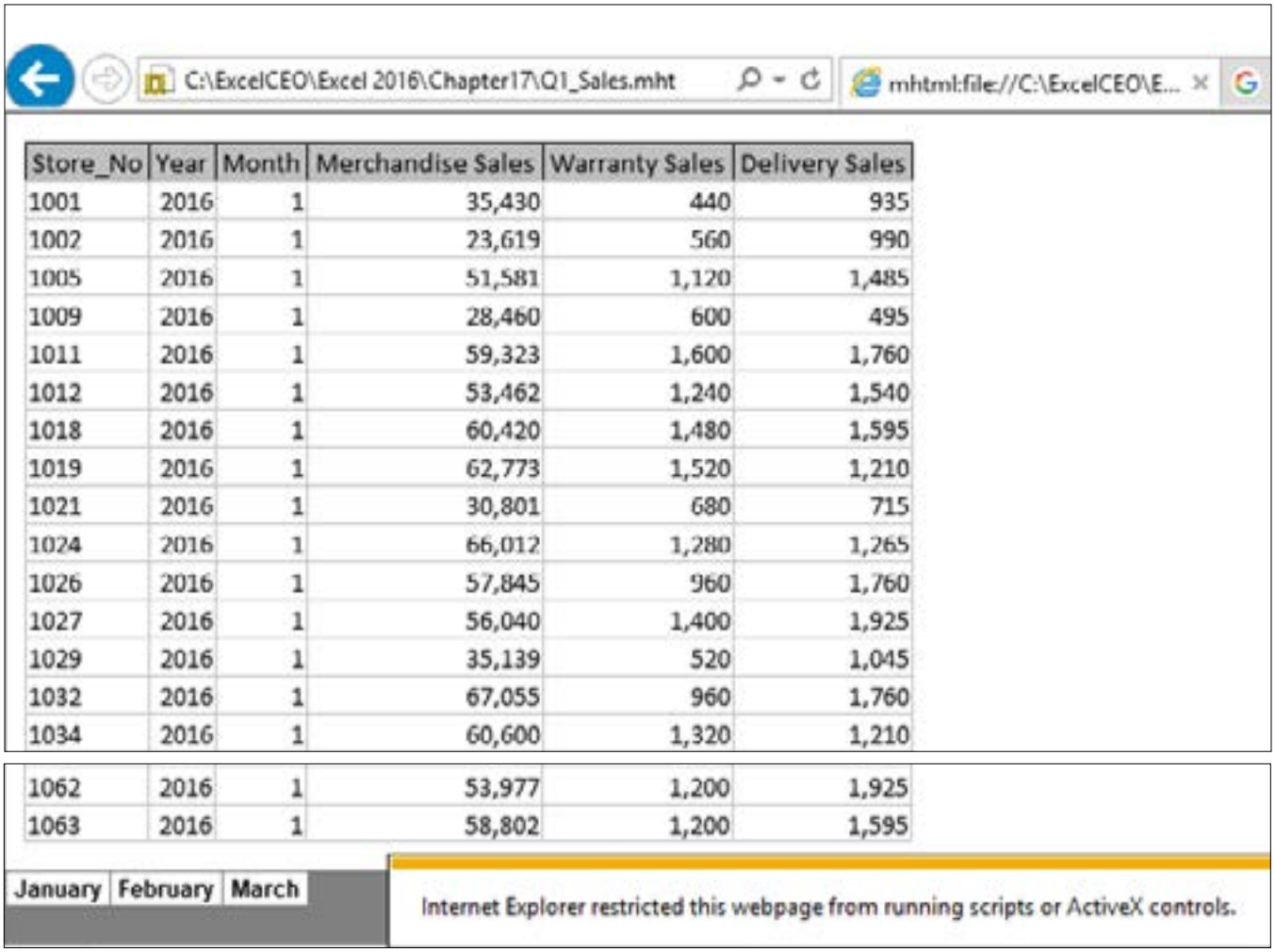
Figure 17.5

This is a simple file we've worked with before. It contains three tabs: January, February, and March. Each tab contains sales data by store and merchandise type.

2. *Click on the* **File** *tab, then click on the* **Chapter 17** *folder on the* **Save As** *screen.*
3. *In the* **Save As** *dialog box, click on the* **Save as type** *drop-down menu, and choose* **Single File Web Page**.
4. *Make sure the* **Entire Workbook** *radio button is selected.*
5. *Click* **Save**.
6. *Click* **Yes** *in the* **Warning** *dialog box (as all we're trying to do is create a static web page).*

It may not look like anything happened, but you just saved the file as a web page viewable via your browser.

7. **Open Internet Explorer**.
8. *Click* **File**, **Open…**, *navigate to* **C:\ExcelCEO\Excel 2016\Chapter17\Q1_Sales.mht**, *and* **open** *the file.*



Store_No	Year	Month	Merchandise Sales	Warranty Sales	Delivery Sales
1001	2016	1	35,430	440	935
1002	2016	1	23,619	560	990
1005	2016	1	51,581	1,120	1,485
1009	2016	1	28,460	600	495
1011	2016	1	59,323	1,600	1,760
1012	2016	1	53,462	1,240	1,540
1018	2016	1	60,420	1,480	1,595
1019	2016	1	62,773	1,520	1,210
1021	2016	1	30,801	680	715
1024	2016	1	66,012	1,280	1,265
1026	2016	1	57,845	960	1,760
1027	2016	1	56,040	1,400	1,925
1029	2016	1	35,139	520	1,045
1032	2016	1	67,055	960	1,760
1034	2016	1	60,600	1,320	1,210
1062	2016	1	53,977	1,200	1,925
1063	2016	1	58,802	1,200	1,595

Figure 17.6

9. **Close** *the* **ActiveX Security** *message in yellow, if necessary.*

You should see something like the figure above. Depending on your browser, you may see a warning message telling you that the browser restricted access to the file. Since it is on your computer and no one else sees it, it is OK to allow access to it.

10. *Click on the*] February [*tab at the bottom-left of your screen to see the numbers change to February data.*

A note on Web reporting: Microsoft is changing the way users share their Excel files and the way we interact with them, meaning allowing users to update the data via the Web. Creating a web page from an Excel file like we just did is simply putting the data in a read-only format. If you are interested in sharing data over the web and allowing users to interact with the data in reports that sort, filter, and update data, I suggest you explore other web tools such as Microsoft SharePoint Services or ASP.Net. There are also some good non-Microsoft tools that have that functionality, like PHP, JSP, and ColdFusion. If you want to simply report numbers in a formatted report that is printable (i.e., the headers and footer appear on each

page and you can control the margins) but cannot update, add or delete records in a database, I suggest using tools like MacroMedia's Business Objects (Crystal Reports) or my favorite, Microsoft SQL Server Reporting Services (SSRS). A discussion of these tools is beyond the scope of this course. However, if you complete the Excel course AND the subsequent Access and SQL course, you will be adequately prepared to start learning to use any one of these tools.

11. **Close** *your browser, and* **close** *the* **Q1_Sales.mht** *file.*

***Review Questions**: It is now time to complete the hands-on Review Questions. Log on to www.ExcelCEO.com with your Email address and Password, click on the* **Excel 2016 Review Questions, Chapter 17, Section 1 of 2** *option in your Main Menu, and complete the Review Questions.*

Create a Web Query

While there is an enormous amount of data on the Web, it doesn't do you any good unless you can access it and manipulate it in a way that is meaningful to you. Excel has the capability of creating a web query by letting you copy the data on a web page and pasting it into an Excel spreadsheet. Once you paste it into the spreadsheet, a Paste Options button will appear that allows you to create and save the query so you can run it over and over again (assuming the data changes). Let's create a web query on a simple web page I built.

1. **Open** *a* **Blank workbook** *in* **Excel**, *then open your preferred* **Internet browser**.
2. *Type this address into the address bar of your browser:* ***www.ExcelCEO.com/dates.asp***.

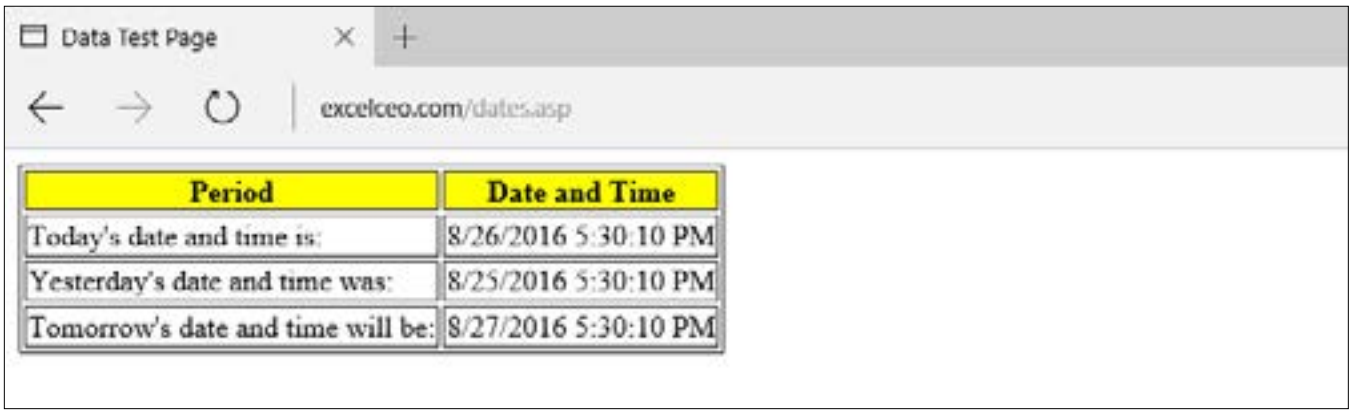


Figure 17.7

3. *In the* **Blank workbook**, *click* **New Query** *in the* **Get & Transform** *group of the* **Data** *tab, select* **From Other Sources**, *then* **From Web**.

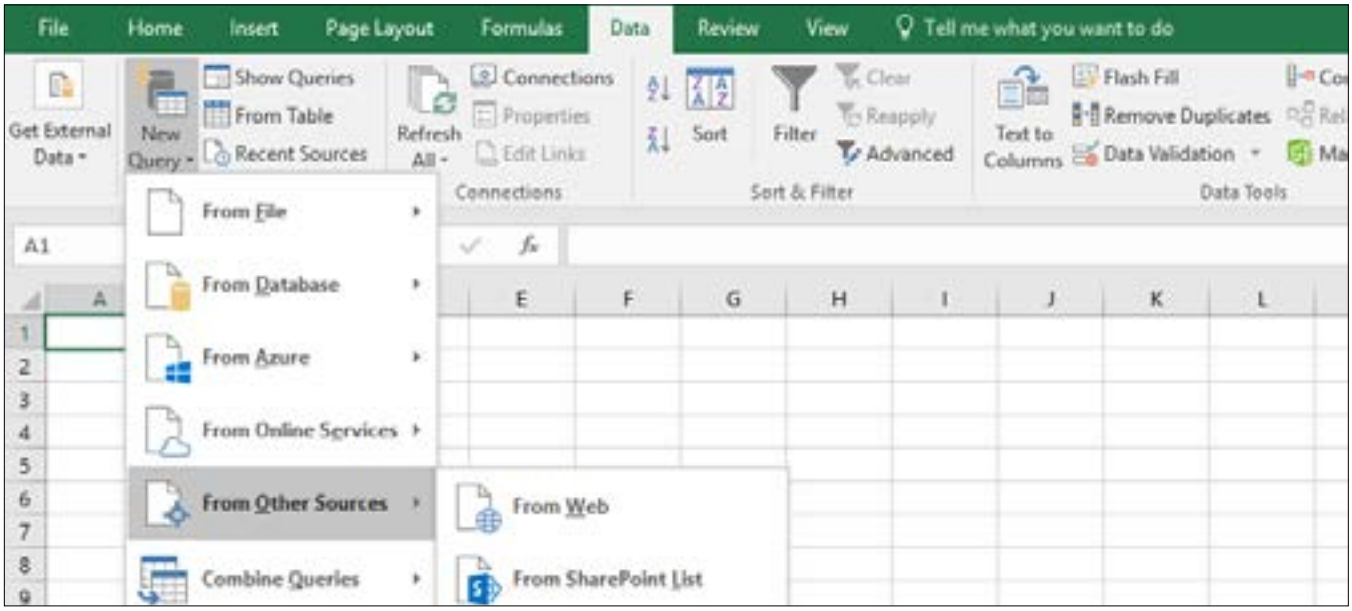


Figure 17.8

The From Web dialog box appears to allow you to select the URL from which your query will be return data. You will be querying the page you opened on the ExcelCEO website.

4. *Type* ***ExcelCEO.com/dates.asp*** *in the* **URL** *box of the* **From Web** *dialog box then click* **OK**.

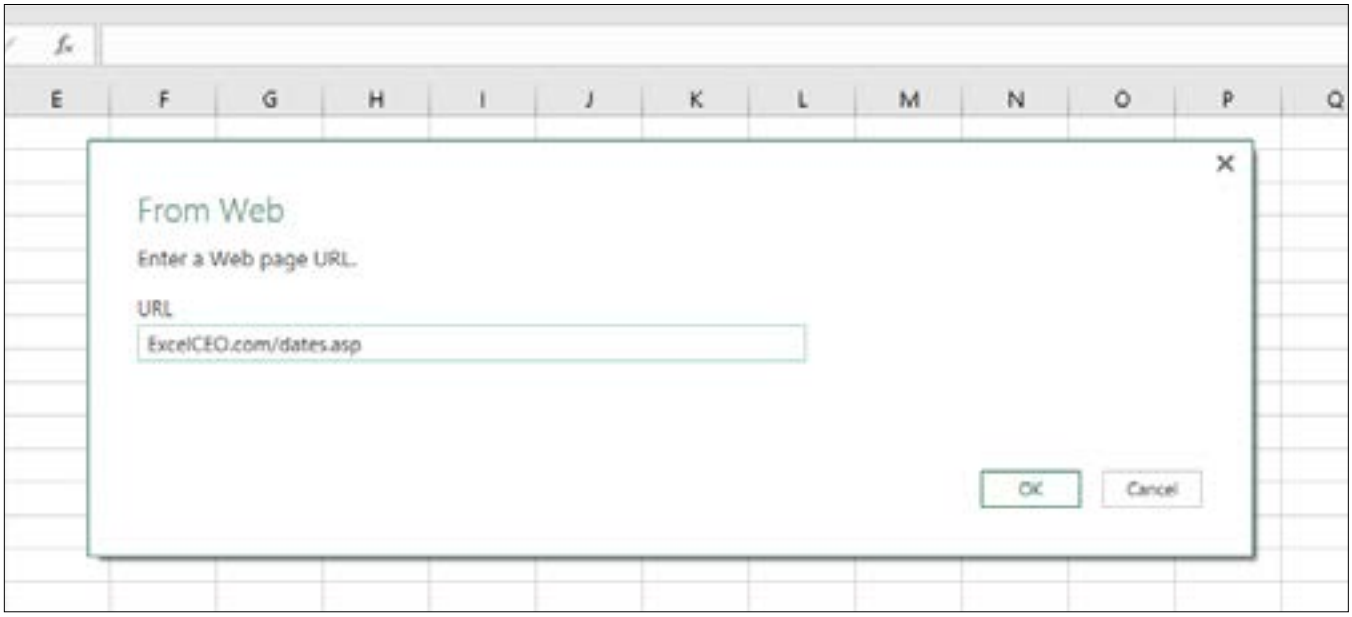


Figure 17.9

The Navigator dialog box appears with a folder identifying content from the URL and a preview window.

5. *Click on the* **Table 0** *in the* **Navigator** *dialog box and review the table data.*

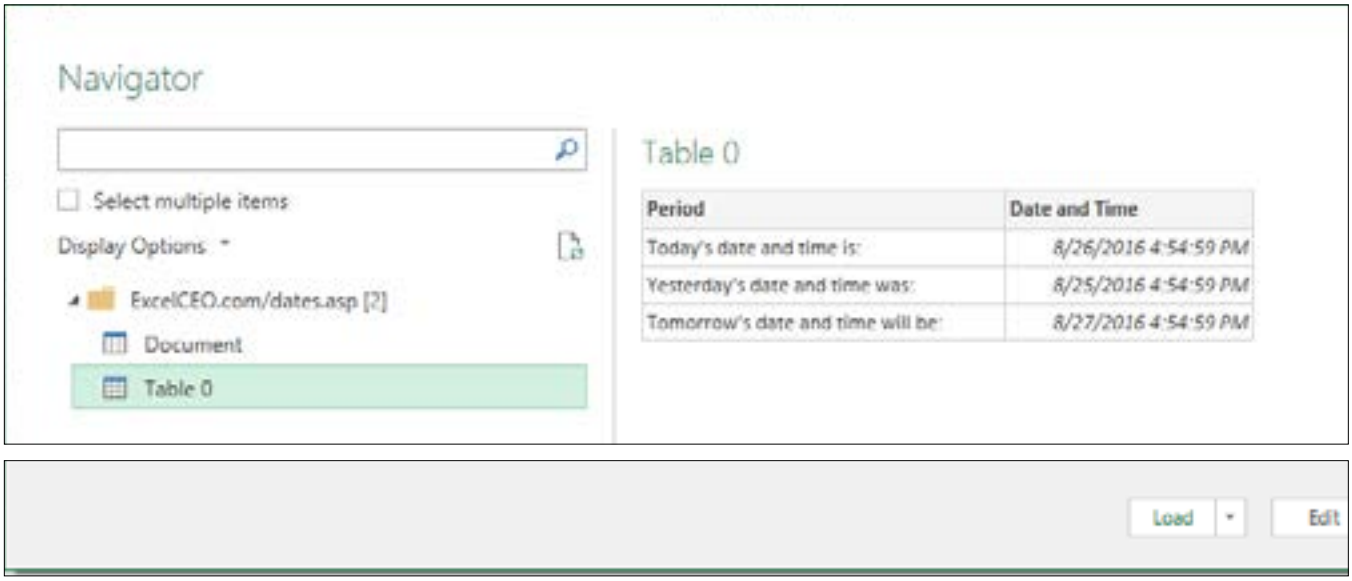


Figure 17.10

Now you can choose where to import the table data within the Blank workbook.

6. *Click on the* **Load** *drop-down arrow and click* **Load To...**
7. *In the* **Load To** *dialog box, click the* **Existing worksheet:** *radio button and click* **Load**.

The web query is created. To refresh the data in the spreadsheet, just right-click anywhere on the table in Excel, and choose Refresh. You can also click Refresh in the Office Ribbon for linked query updates.

7. *Right-click anywhere in the table, and choose* **Refresh**.

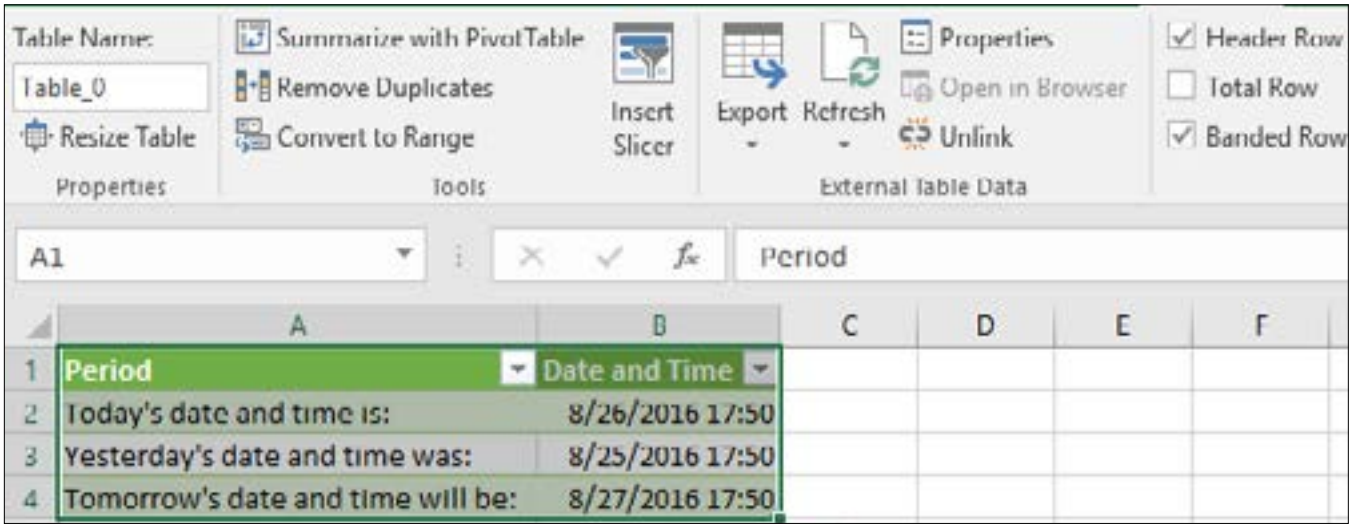


Figure 17.11

The data will change according to the time on the webpage's server (it is in United States Pacific time).

The great thing about this kind of query is that you can set it up to pull data from any site you have permission to on the Web, and you don't have to continually go to the web site to copy the data. Just refresh the Excel file and your data is updated in real time. You can even set the query to refresh on a time interval basis. How about using this for some stock quotes?

8. **Save As C:\ExcelCEO\Excel 2016\Chapter17*myWebQuery.xlsx***, and* **close** *it.*

More Cool Stuff in Excel

To conclude this chapter, let's look at some of the miscellaneous new things that have been built into Excel 2016. I chose to include some of the new things incorporated into Excel 2010 — 2013 as well because I realize some people may be upgrading from Excel 2003 or 2007 straight to Excel 2016. Most of these enhancements came out with the release of Excel 2013, and I will note those things that are specific to 2016. There is already a list of new items for Excel 2016 in the Introduction section of this course, and I encourage you to review that list again now that you are coming to the end of the course. Let's start off this discussion reviewing Excel 2016 Tables.

Excel 2016 Tables

1. **Open** *the file at* **C:\ExcelCEO\Excel 2016\Chapter17\New2016.xlsx**.
2. **Save As C:\ExcelCEO\Excel 2016\Chapter17*myNew2016.xlsx***.*
3. *Click* **Enable Content***, if necessary.*

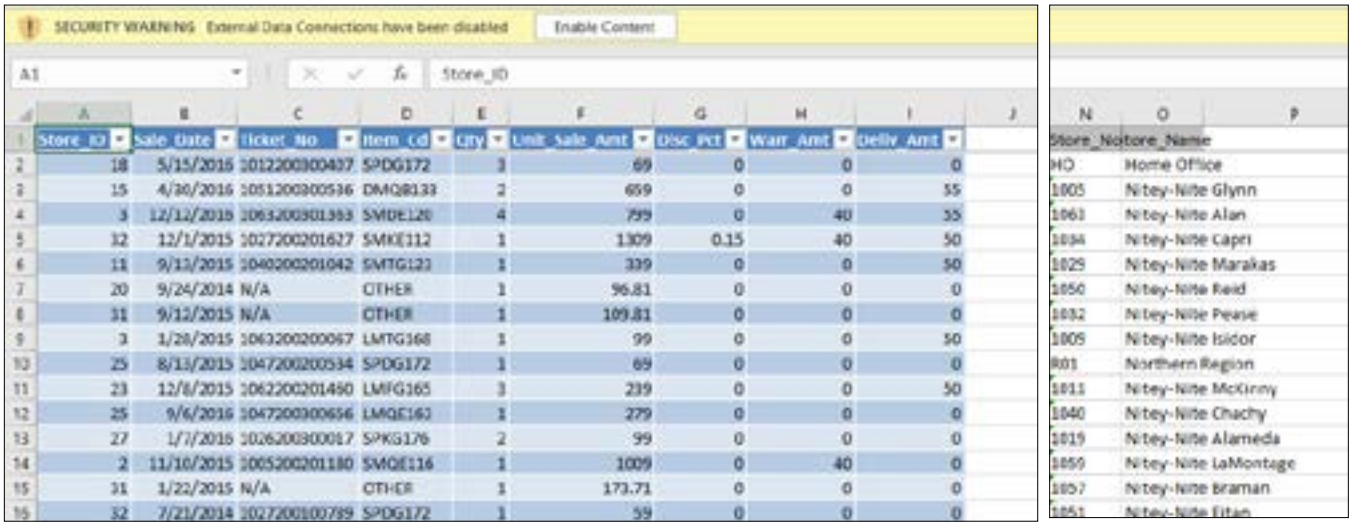
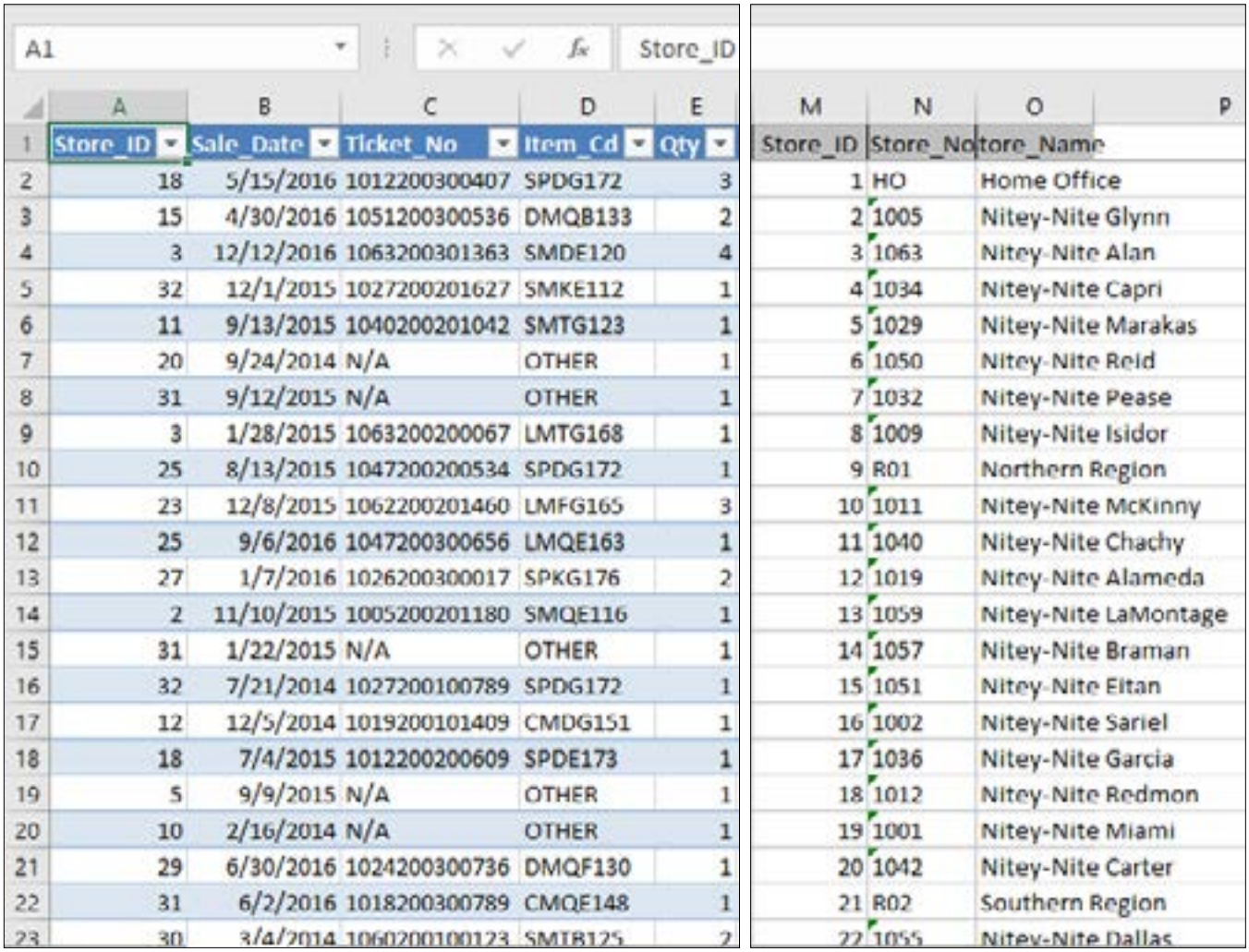


Figure 17.12

The Tickets tab of this file is an import from an Access database of records (sales) for each store. It also contains another table of data off to the right that we'll use in a few minutes. When records are imported from an Access database, Excel sets up the record set and formats it as a table. This is important to understand because a table in Excel 2016 has additional features as compared with a simple record set of data. You can also define a table by using the Format as Table functionality in the Home tab. Let's do that now.

4. *Click on* **Cell A1** *(or any cell in the table).*
5. *On the* **Home** *tab in the* **Styles** *group, click on the* **Format as Table** *button.*
6. *Choose* **Table Style Medium 2**.



	A	B	C	D	E
1	Store_ID	Sale_Date	Ticket_No	Item_Cd	Qty
2	18	5/15/2016	1012200300407	SPDG172	3
3	15	4/30/2016	1051200300536	DMQB133	2
4	3	12/12/2016	1063200301363	SMDE120	4
5	32	12/1/2015	1027200201627	SMKE112	1
6	11	9/13/2015	1040200201042	SMTG123	1
7	20	9/24/2014	N/A	OTHER	1
8	31	9/12/2015	N/A	OTHER	1
9	3	1/28/2015	1063200200067	LMTG168	1
10	25	8/13/2015	1047200200534	SPDG172	1
11	23	12/8/2015	1062200201460	LMFG165	3
12	25	9/6/2016	1047200300656	LMQE163	1
13	27	1/7/2016	1026200300017	SPKG176	2
14	2	11/10/2015	1005200201180	SMQE116	1
15	31	1/22/2015	N/A	OTHER	1
16	32	7/21/2014	1027200100789	SPDG172	1
17	12	12/5/2014	1019200101409	CMDG151	1
18	18	7/4/2015	1012200200609	SPDE173	1
19	5	9/9/2015	N/A	OTHER	1
20	10	2/16/2014	N/A	OTHER	1
21	29	6/30/2016	1024200300736	DMQF130	1
22	31	6/2/2016	1018200300789	CMQE148	1
23	30	3/4/2014	1060200100123	SMTB125	2

	M	N	O	P
	Store_ID	Store_No	Store_Name	
	1	HO	Home Office	
	2	1005	Nitey-Nite Glynn	
	3	1063	Nitey-Nite Alan	
	4	1034	Nitey-Nite Capri	
	5	1029	Nitey-Nite Marakas	
	6	1050	Nitey-Nite Reid	
	7	1032	Nitey-Nite Pease	
	8	1009	Nitey-Nite Isidor	
	9	R01	Northern Region	
	10	1011	Nitey-Nite McKinny	
	11	1040	Nitey-Nite Chachy	
	12	1019	Nitey-Nite Alameda	
	13	1059	Nitey-Nite LaMontage	
	14	1057	Nitey-Nite Braman	
	15	1051	Nitey-Nite Eitan	
	16	1002	Nitey-Nite Sariel	
	17	1036	Nitey-Nite Garcia	
	18	1012	Nitey-Nite Redmon	
	19	1001	Nitey-Nite Miami	
	20	1042	Nitey-Nite Carter	
	21	R02	Southern Region	
	22	1055	Nitey-Nite Dallas	

Figure 17.13

The data table is now formatted with a new, lighter style. Let's write a VLOOKUP() function that looks up the Store Number based on the Store ID.

7. *In* **Cell J1**, *type* ***Store_Name***.

As Column J is a column adjacent to the data table, Excel automatically recognizes the column as part of the data table and applies the Medium 2 formatting to it.

8. *In* **Cell J2**, *write a* **VLOOKUP()** *formula that looks up the* **Store_No** *on* **Store_ID** *based on the lookup table to the right of the data table. When writing the formula, choose the* **Cell A2** *with your mouse or with the arrow keys (do not type A2 in the formula).*

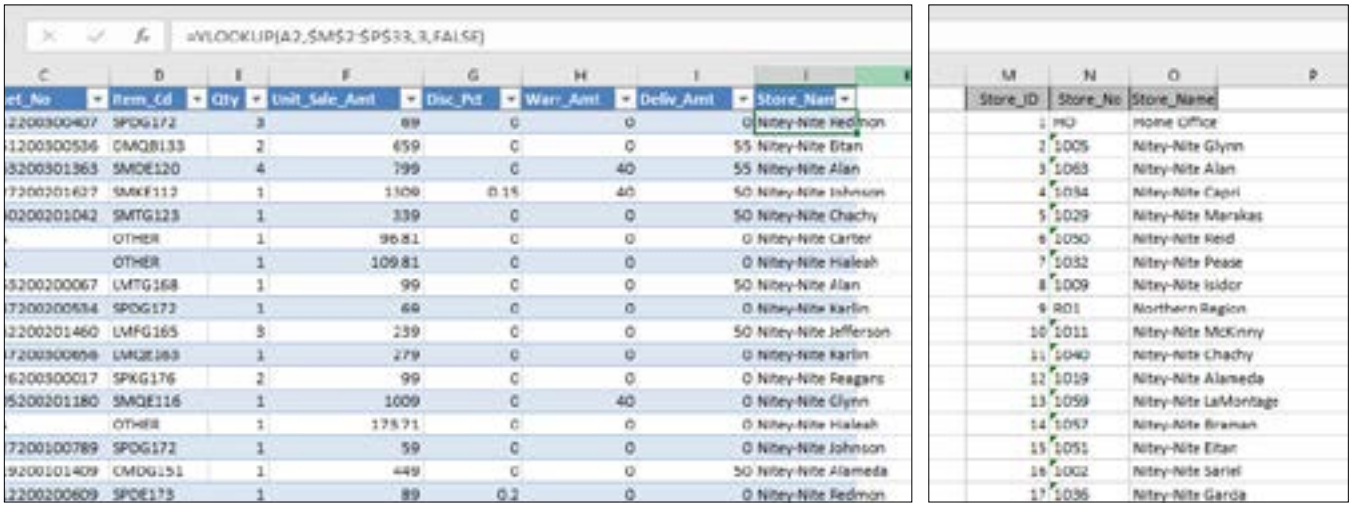


Figure 17.14

Notice how the formula reflects the name of the data table (Excel automatically named the table when we formatted it) and a reference to the Store_ID field instead of the A2 reference. Additionally, Excel assumes you will apply that formula to all cells beneath it, so it populated all cells in the data table for you. Let's assume that the boss told us to delete Rows 7 and 8 in the data table. We could encounter a problem doing that because of the lookup table to the right of the data table. If you delete Rows 7 and 8 in the data table, it will delete Store_IDs 6 and 7 in the lookup table. Versions of Excel since 2007 have a feature that allows you delete rows and columns in the data table without affecting any other tables beside or beneath it.

9. *With your mouse, select* **Cells A7 and A8**.
10. *On the* **Home** *tab in the* **Cells** *group, click on the drop-down arrow on the* **Delete** *button*

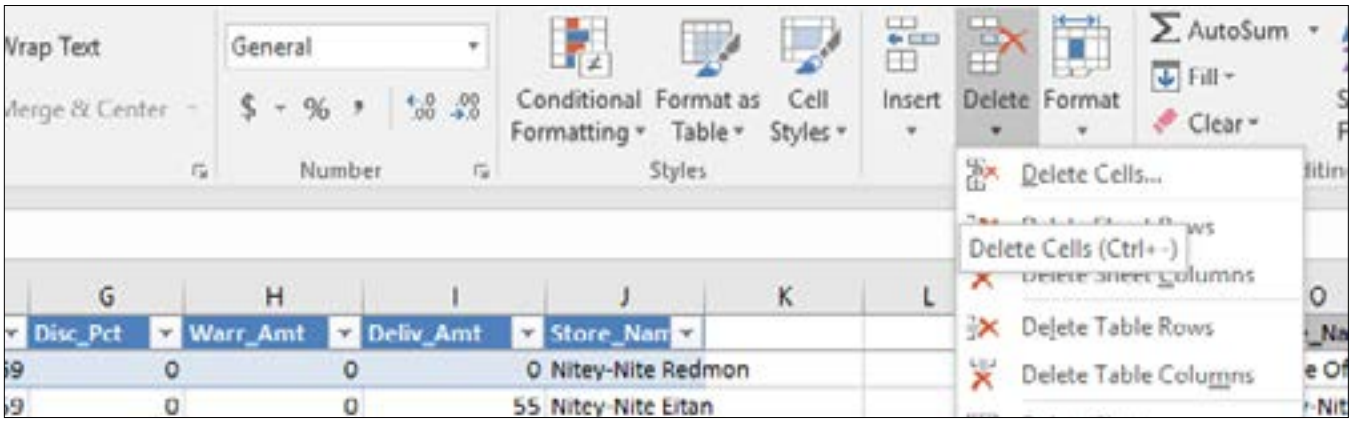


Figure 17.15

11. *Click on* **Delete Table Rows**  Delete Table Rows.

When you clicked on Delete Table Rows, Excel deleted the rows in the table, but not in the lookup table to the right. You can delete rows and columns from tables using this new functionality.

Zoom In and Zoom Out

Another nifty feature is the Zoom functionality. Zoom In and Zoom Out buttons are located at the bottom-right of your screen. You can click these buttons to see larger and smaller views of the spreadsheet.

Figure 17.16

1. *Click on the* **Zoom Out button** *until you can see all columns in both the data and lookup tables, but can no longer read the text.*
2. *Click on the* **Zoom In** *button until the data table columns take up your entire screen.*
3. *Return the view of the data table to* **100%**.
4. *Click on the* **100%** *image.*

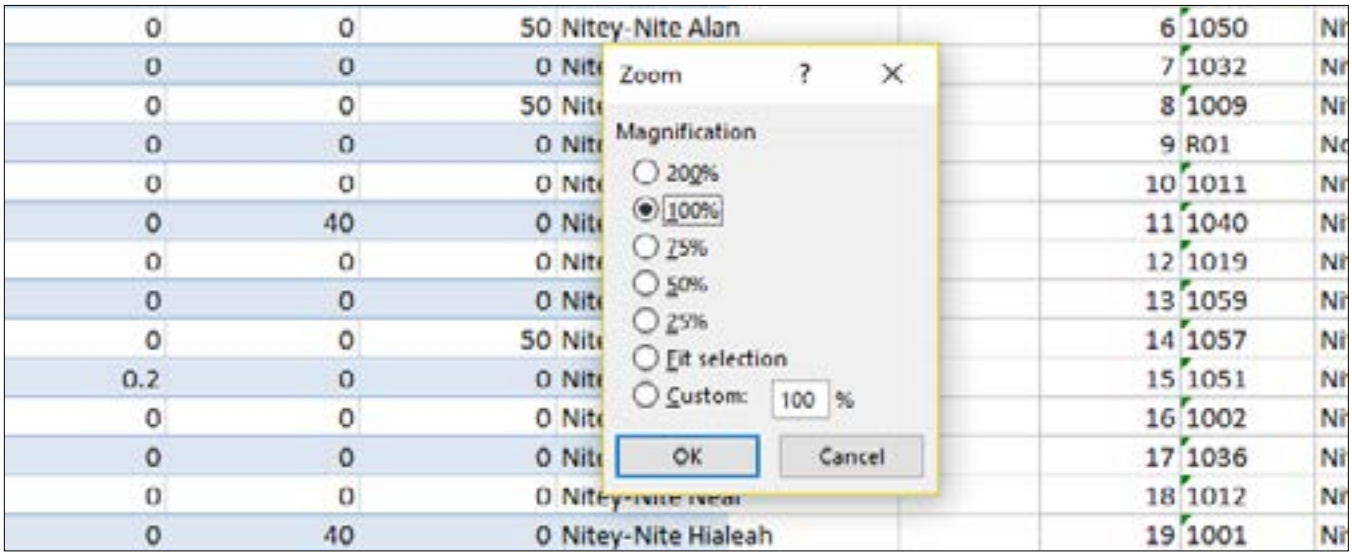


Figure 17.17

The Zoom dialog box appears. Using this dialog box, you can customize the size of the data to any size you want. The Zoom features are MUCH easier than playing around with the display in Control Panel to adjust the size of your screen.

5. **Cancel** *out of the* **Zoom** *dialog box.*

Filtering on Dates

From Excel 2007 on, a feature was added that makes it easier to filter on dates. This functionality is available whenever the data in a column is formatted as a date, and Filter is turned on.

1. *If the* **Filter** *is not turned on in the data table, turn it on.*

2. *Click on the drop-down arrow next to* **Sale_Date**.

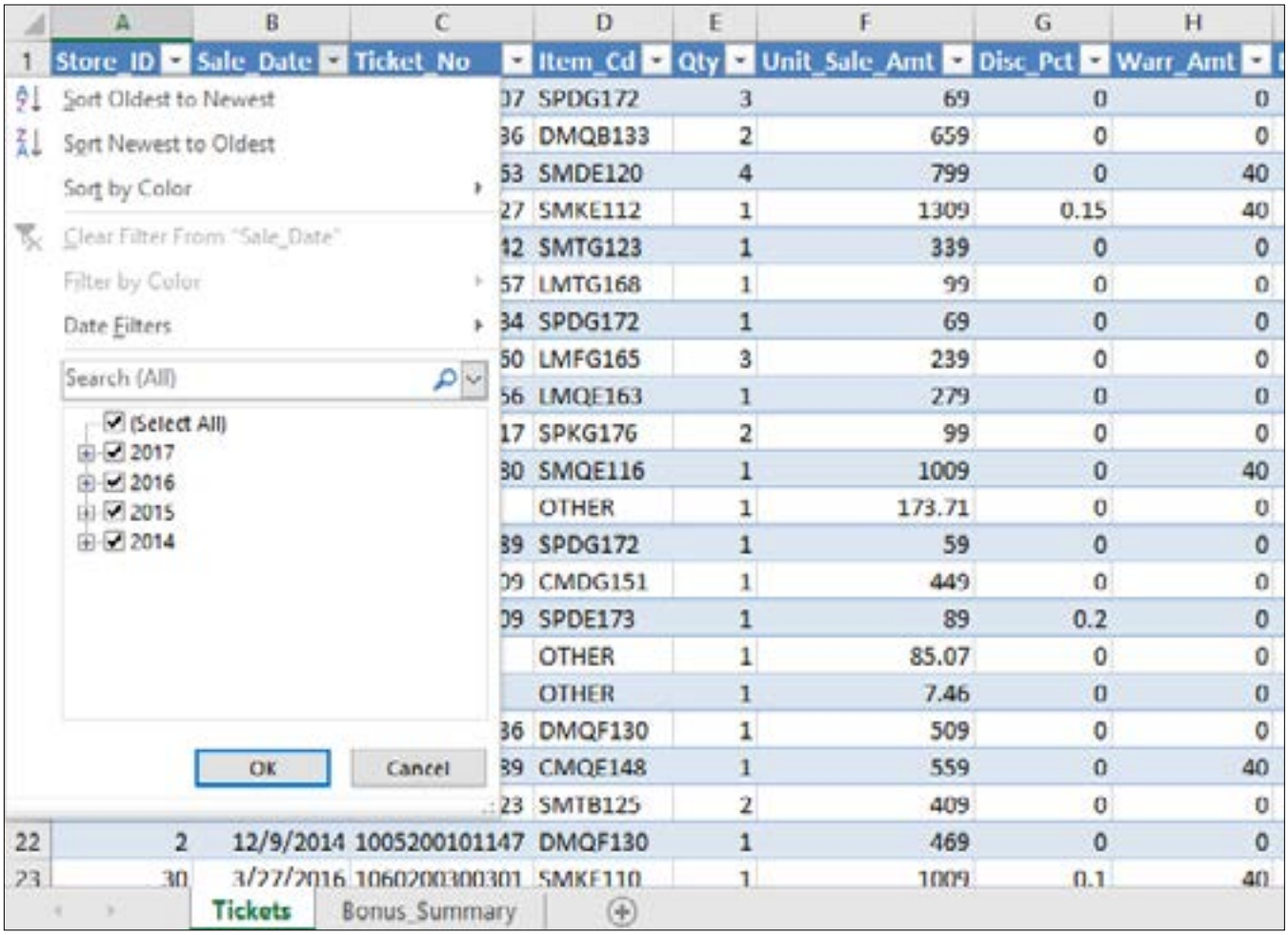
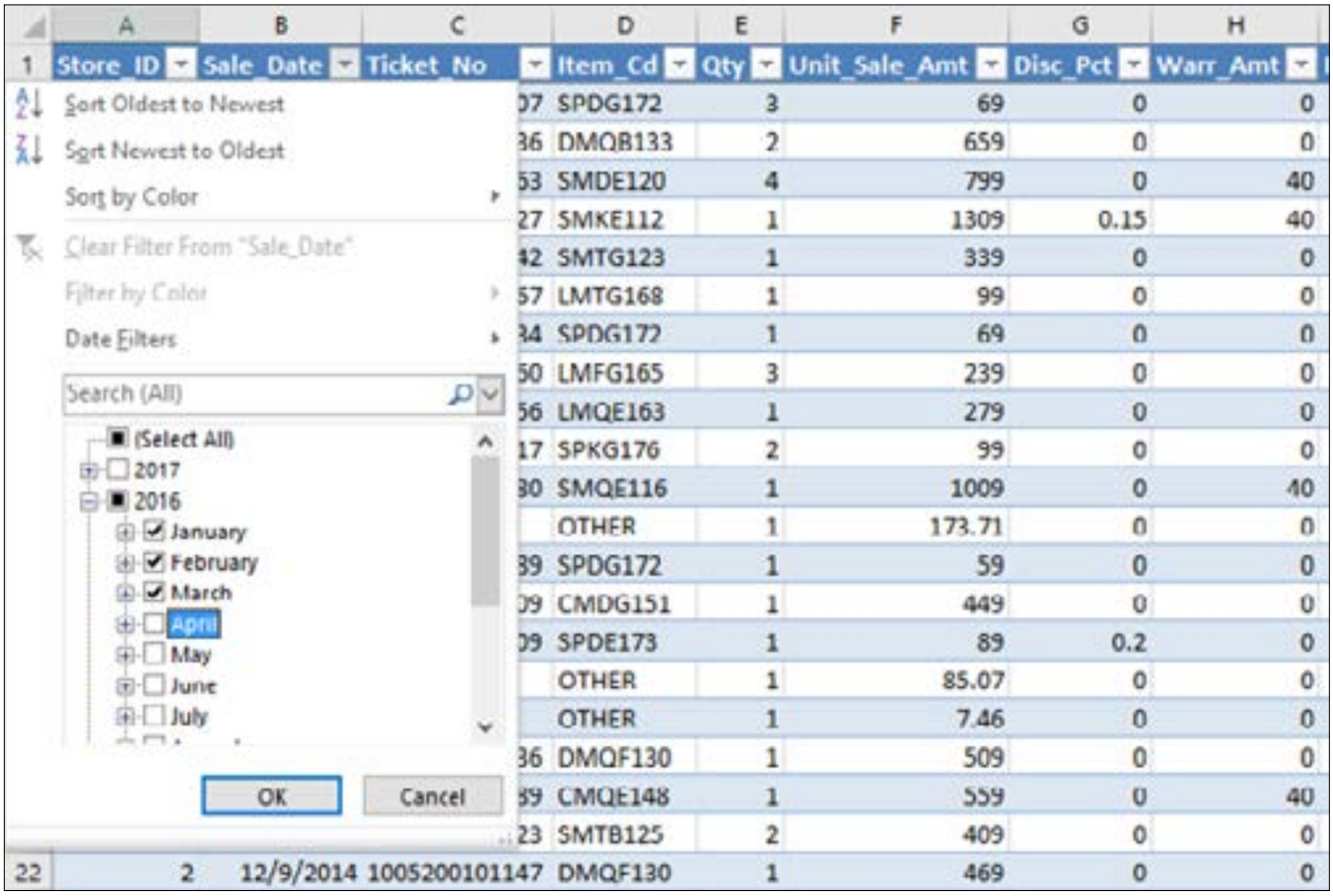


Figure 17.18

Notice the ⊞ boxes next to each year. You can click on the boxes to filter for specific years, months and/or days.

3. *Uncheck the* **2014**, **2015**, *and* **2017** *check boxes.*
4. *Click on the* ⊞ *box next to* **2016**, *and deselect all boxes except for* **January**, **February**, *and* **March**, *and click* **OK**.



	A	B	C	D	E	F	G	H
1	Store_ID	Sale_Date	Ticket_No	Item_Cd	Qty	Unit_Sale_Amt	Disc_Pct	Warr_Amt
				07 SPDG172	3	69	0	0
				36 DMQB133	2	659	0	0
				53 SMDE120	4	799	0	40
				27 SMKE112	1	1309	0.15	40
				42 SMTG123	1	339	0	0
				57 LMTG168	1	99	0	0
				34 SPDG172	1	69	0	0
				50 LMFG165	3	239	0	0
				56 LMQE163	1	279	0	0
				17 SPKG176	2	99	0	0
				30 SMQE116	1	1009	0	40
				OTHER	1	173.71	0	0
				39 SPDG172	1	59	0	0
				09 CMDG151	1	449	0	0
				09 SPDE173	1	89	0.2	0
				OTHER	1	85.07	0	0
				OTHER	1	7.46	0	0
				36 DMQF130	1	509	0	0
				59 CMQE148	1	559	0	40
				23 SMTB125	2	409	0	0
22	2	12/9/2014	1005200101147	DMQF130	1	469	0	0

Figure 17.19

The data table is now filtered for data in the first quarter (January, February, and March) of 2016. This is similar in effect to a Slicer for a PivotTable.

Background Images

Have you ever seen a Word document that has a "***watermark***" on it? These are documents that usually have something like "***Draft***" or "***Tentative***" pasted as a background so the user of the report knows that it is not a final document. You can include such a background in an Excel 2016 spreadsheet as well. I created a simple "Draft" .jpg file with WordArt and included it in the Chapter17 folder. Let's use that as a background.

1. *Click on the* Bonus_Summary *tab of the* **myNew2016.xlsx** *file.*
2. *Click on the* **Page Layout** *tab.*
3. *In the* **Sheet Options** *group, deselect the* **View** *box under* **Gridlines**.
4. *Click on the* **Background** *button in the* **Page Setup** *group.*
5. *In the* **Insert Pictures** *dialog box, click on* **Browse** *from the* **From a file** *row, and navigate to the* **C:\ExcelCEO\Excel2016\Chapter17** *folder, and double-click on the* **draft.jpg** *file.*

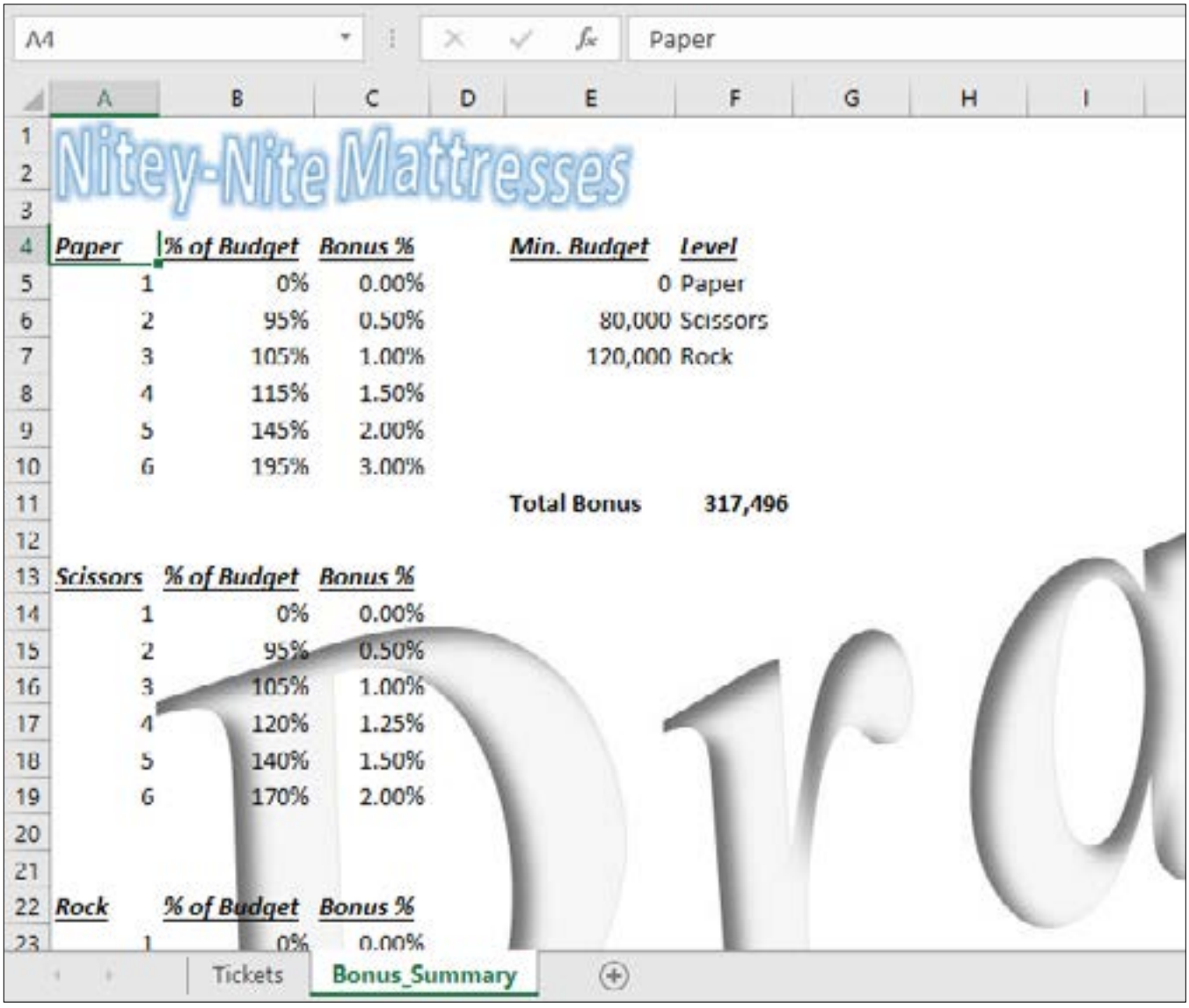


Figure 17.20

Notice that the background repeats in all columns and rows of the spreadsheet.

6. **Save** *and* **close** *the* **myNew2016.xlsx** *file.*

Microsoft has gone to great lengths to try to improve Excel. As you continue to use Excel 2016, take some time to play around with features that pop up on the right-click menu, or button in the Ribbon that you haven't used before.

> ***Review Questions**: It is now time to complete the hands-on Review Questions. Log on to www.ExcelCEO.com with your Email address and Password, click on the* **Excel 2016 Review Questions, Chapter 17, Section 2 of 2** *option in your Main Menu, and complete the Review Questions.*

Conclusion

In this chapter, you created a simple HTML page by using NotePad. You learned how to save an Excel file as a web file to make it readable on a browser. You saved an Excel file as an MHTML file and created a web query. You also explored some of the new features of Excel 2016, like working with tables and filtering on dates. You deleted rows in a data table without deleting the data in another table on the same spreadsheet. You finished the chapter by including a background in your file so that users of the file would know it is still in Draft mode.

Chapter Exam

To take the examination for this chapter, you must have successfully completed the examination for the previous chapter. You can now go to www.ExcelCEO.com, click on Sign In, log in and take the exam. Make sure that you take the exam on the same computer on which you completed the practice files, as some of the questions on the exam may refer to some of the completed projects. Chapter exams are intended to be hands-on.

Excel® 2016

Complete Self-study Course

ExcelCEO

Chief Excel Officer

SECTION IV: THE EXCEL 2016 MASTER

It is this section of the course that goes beyond the traditional Excel learning. This last chapter of the course is hard. In fact, it is by far the hardest chapter in the entire course. But the knowledge that you will gain by completing this chapter is unparalleled in the market today. If you can complete this chapter, then you are truly an Excel Master, and upon completion, I will send you an Excel Master Certification to prove to the world how good you really are. Additionally, your name will be registered as an Excel Master in the Graduate Verification section of the ExcelCEO Home page. I made this available so you can prove to your current or prospective employer that you have successfully completed the ExcelCEO coursework, and that you are certified as an Excel Master.

If you have completed ALL of the exercises in the previous chapters, you are now ready to start the ExcelCEO Excel 2016 Comprehensive Project. At the beginning of this course, I asked you to complete all of the exercises herein because the tasks I will ask you to do in the Comprehensive Project contain Beginning, Intermediate, and Advanced skills you should have learned throughout the course. Many students complete through Chapter 17 by just getting by and barely passing the tests. These students pick up a number of tricks, but they don't master Excel enough to be able to complete the Comprehensive Project and the Chapter 18 exam. Some of them just give up. Others go back and work the exercises they skipped over to be able to complete this project. I hope you have completed all of the exercises up to this point, and I encourage you to continue on.

The Comprehensive Project is a project where I will give you basic instructions on how to complete it, but I will not give you the instructions on how to complete the tasks like I have before. Actually, I don't care how you get the right answer, as long as you get it. In that sense, the project is much more like an actual project you will get on the job. All of the questions on the Chapter 18 exam are based on the completed project, so it is imperative that you complete it exactly as I explain it. To further assist you, I will give you some check figures along the way just to make sure you are on the right path.

> ***Note**: There are no Review Questions checkpoints in Chapter 18, and this chapter does not count for CPE credits. All 40 CPE credits possible have been available to award by the end of Chapter 17. All chapter exam questions will refer to your Comprehensive Project. Completing the Comprehensive Project and passing Chapter 18 is to achieve the* **ExcelCEO Excel Master** *status, earn a printed certificate, and become listed in the* **ExcelCEO Graduate Verification** *at ExcelCEO.com.*

As I have stated many times in this course, I believe the three most important things an Excel user should know are 1) how to write a nested IF() statement; 2) how to create and use PivotTables and 3) how to write a VLOOKUP() function. With those three pieces of knowledge, you can do almost unlimited analyses in Excel. The Comprehensive Project will test your ability to follow simple and complex logic using all three of these tools, as well as using other functions and formula-writing skills learned in this course. With that said, let's get started, and GOOD LUCK!

Excel® 2016

Complete Self-study Course

ExcelCEO

Chief Excel Officer

THE COMPREHENSIVE PROJECT

Chapter Objectives:

- Use VLOOKUP(), nested IF() logic, PivotTables, the many other skills you have acquired in the preceding chapters to complete the Comprehensive Project

Projects You Will Complete During This Chapter:

- *myComp_Project.xlsx*

The Comprehensive Project

The data for the Comprehensive Project will come from the file located at C:\ExcelCEO\Excel 2016\Chapter18\Comp_Project.xlsx.

1. **Open** *the* **Comp_Project.xlsx** *file located at* **C:\ExcelCEO\Excel 2016\Chapter18**
2. **Save As** ***myComp_Project.xlsx*** *in the same folder.*

This file contains three tabs of data. The format of this data is probably very similar to databases you will find at your own company. The first tab is called Stores. It contains information about each store. We've used this data in other exercises, so you should be familiar with the data and the format. As you will learn if and when you take the ExcelCEO Access course, each table in a database should contain a Primary Key. A ***Primary Key*** is a field of data in a table that serves as a unique identifier for each record. For programming purposes, it is typically better for the primary key to be a number field instead of a text field. Using a number field as a primary key generally improves the speed when querying the tables. In the Stores tab, the Store_ID is the Primary Key field.

Let me take some time to explain how the Stores table is set up. All of the fields in the table are probably self-explanatory, except for the Parent_ID field. The Parent_ID field records the rollup structure of all stores in the organization. In relational databases, you will become familiar with a ***parent/child relationship***, and this is a good example of how that relationship works. Take for example Store_ID 12, which is Store_No 1019, Nitey-Nite Alameda. This store is located in Baltimore, Maryland. You can also see the store's address, city, state, ZIP Code, phone number, and area in square feet. It would be easy to query or filter for Store No 1019, or even for all stores in the city of Baltimore, or the state of Maryland, or any other city or state. However, Nitey-Nite's stores are also organized in regions, namely, the Northern and Southern Regions. The organization of stores in regions is maintained in the Parent_ID field. For Store No 1019, you see that the Parent_ID is 21. The Parent_ID of 21 is the "parent", or one level higher, than Store_ID 12. If you look down the Store_ID field, you will see that Store_ID 21 is Store No R02, which is the Southern Region. Store_ID 21's "parent" is Store_ID 1, which is the Home Office.

Using the Store_ID in this manner, a database programmer can maintain several levels of structures with just two fields called the parent and child fields. This could also be accomplished by maintaining a separate field for each level, and that usually works best when working with a flat file like Excel. Most relational databases are set up using a parent/child structure, also referred to as a ***hierarchical structure***. It is important for you to understand a parent/child relationship or hierarchical structure for database programming, and in the Comprehensive Project you will turn parent/child fields into a flat file to make it easier to work with in Excel.

The second tab is called Accounts. It represents a simple chart of accounts, and includes the Account_ID, Level, Rollup_ID, Account and Acct_Desc fields. The Account_ID field is the primary key for this table. This table is another example of a parent/child relationship. For example, Account 190-3: Employee Discounts has an Account_ID of 1043 and a Rollup_ID (or parent ID) of 1007. The programmer included a field called Level simply to make the table easier to read and understand the rollup levels. Account ID 1007 is Discounts, which rolls up to Rollup_ID 1002, Revenue, which rolls up to Net Income. Level 4, therefore, is at the lowest level of the account structure, and level 1 is the highest level, Net Income. In actuality, companies usually have more than four rollup levels, but I created this simple table to show you theoretically how hierarchical files work.

The third tab, **Finl_Data**, is the meat of the file. The data in this tab is kind of scary when you first look at it, but it becomes easier to understand when you grasp the concept of parent/child relationships and Primary Keys. The first field in the Finl_Data tab is Month. That one is easy to understand. The Month is simply the month in which the transaction occurred. As you can see, the first record occurred in Month 08, or August.

The second field, **Store_ID**, gets more complicated, but not to worry -- we can work through it. This field refers to the Store_ID field in the **Stores** tab. When creating a database, it is usually a good idea to name parent/child fields with the same names in the tables they relate to. Sometimes that is feasible and sometimes not. It is good practice to try to do so whenever possible. The first record in the Finl_Data tab has a Store_ID of 30. Store_ID 30 in the Stores tab is Store No 1060: Nitey-Nite Elamin in Baltimore, MD. All you have to do is to write a VLOOKUP() formula to pull in the store number and name.

The third field, **Acct_ID**, refers to the **Account_ID** field in the **Accounts** tab. The first record in the Finl_Data tab has an Acct_ID of 1021, which is Account 103-4: Double Fair in the Accounts tab.

The next three columns in the **Finl_Data** tab, **Amt_2016**, **Amt_2015**, and **Amt_2014** are the dollar amounts of each month, store and account activity. Based on the references that we've discussed, that first record in the Finl_Data tab tells us that Store No 1060 (Store ID 30) had amounts $7,850, $12,673, and $3,557 in August of 2016, 2015, and 2014, respectively. The tables also tell us that Store No 1060 rolls up to the Southern Region which rolls up to the Home Office, and that Account 103-4 rolls up to Mattress Revenue, which rolls up to Revenue which rolls up to Net Income. That's a lot of information contained in very few fields of data.

The last column in the table is **Bgt_2016**. You will populate that field with budget numbers toward the end of the Comprehensive Project.

I hope you are beginning to grasp the concept of relational databases and parent/child or hierarchical structures. You have become an expert in writing formulas, including VLOOKUP() and many other useful functions. In the following steps, I will ask you to create a budget for each store at Nitey-Nite Mattresses, record that budget in a table, and analyze the company's performance based on that budget. **If you have not completed all of the exercises in this course accurately, this will not be an easy project to do, and most likely it will be impossible**. Again, I will not give you step-by-step instructions on how to complete the project, as in previous chapters, but I will give you general guidance, hints, and tips, and leave it up to you to decide on how this project is to be accomplished.

In the following exercises, you will be creating a lot of formulas and PivotTables. Try not to hard-code anything, as the exam questions require you to change some of the data and assumptions that are dependent on those formulas. With that said, let's get started!

3. *Copy the* Finl_Data *tab, and rename the new tab* ***myFinl_Data****.*

4. **Insert** *a column in the* myFinl_Data *tab to the right of* **Store_ID**, *and call that column* ***Store****.*

5. *Populate the* **Store** *field with a concatenated* **VLOOKUP()** *formula that looks up the* **Store No** *followed by a* **space**, *a* **dash**, *a* **space**, *then the* **name of the store**, *based on the* **Store_ID**

field and the data in the Stores *tab. Adjust cell alignment, and remove text wrap.*

6. *Insert a column between* **Month** *and* **Store_ID**, *and call it* ***City***.
7. *Write a* **VLOOKUP()** *formula that brings in the name of the* **city**.
8. **Insert** *a column between* **Month** *and* **City**, *and call it* ***Region***.
9. *Populate that field with the name of the* **Region** *for each record.*

> ***Tip**: The* **Northern** *and* **Southern Region** *offices roll up to the* **Home Office**, *NOT into their own regions.*

10. **Insert** *a column between* **Acct_ID** *and* **Amt_2016**, *and call it* ***Account***.
11. *Write a formula that shows the* **Account**, *followed by a* **colon** *and a* **space**, *then the* **Acct_Desc** *based on the* **Acct_ID** *and the* **Accounts** *tab (example: 101-1: King Best).*
12. **Insert** *two columns between the* **Acct_ID** *and* **Account** *columns. Call the new fields* ***Lvl3_ID*** *and* ***Lvl3_Acct***. *(This is the first rollup level of accounts.)*
13. *Write formulas that lookup the* **Level 3 Acct_ID** *and* **Acct_Desc** *in the* Accounts *tab (such as Mattress Revenue or Variable Expenses).*

Format and spot-check your file with the image below. Your myFinl_Data tab should have 15,863 rows of data.

F	G	H	I	J	K	L	
Acct_ID	Lvl3_ID	Lvl3_Acct	Account	Amt_2016	Amt_2015	Amt_2014	Bg
1021	1004	Mattress Revenue	103-4: Double Fair	7850	12673	3557	
1098	1009	Fixed Expenses	330-0: Utilities Expense	-612	-674	-641	
1039	1006	Other Revenue	130-1: Warranty Sales	3996	4427	3542	
1084	1009	Fixed Expenses	308-0: Rent Expense	-1556	-1451	-1217	
1020	1004	Mattress Revenue	103-3: Double Good	6848	3250	5191	
1063	1008	Variable Expenses	205-1: COM-Twin	-897	-540	-975	
1019	1004	Mattress Revenue	103-2: Double Excellent	3688	5070	4190	
1055	1008	Variable Expenses	203-1: COM-Double	-4740	-5715	-2662	
1013	1004	Mattress Revenue	101-4: King Fair	3245	10195	8399	
1028	1004	Mattress Revenue	105-3: Twin Good	417	2558	3672	
1018	1004	Mattress Revenue	103-1: Double Best	6026	10208	8844	
1027	1004	Mattress Revenue	105-2: Twin Excellent	4864	1604	4768	
1015	1004	Mattress Revenue	102-2: Queen Excellent	9333	9323	7359	
1096	1009	Fixed Expenses	326-0: Office Supplies	-22	-7	-61	
1032	1005	Pillow Revenue	112-1: Pillow Queen Excellent	289	179	76	

Figure 18.1

14. **Insert** *two columns between* **Acct_ID** *and* **Lvl3_ID**. *Call the new fields* ***Lvl2_ID*** *and* ***Lvl2_Acct***.

15. Write a formula that looks up the **Lvl2_ ID** *and* **Lvl2_Acct** *in the* Accounts *tab*

***Hint**: It will be either Expense or Revenue as those are the only level 2 accounts.*

D	E	F	G	H	I	J	
Store_ID	Store	Acct_ID	Lvl2_ID	Lvl2_Acct	Lvl3_ID	Lvl3_Acct	
30	1060 - Nitey-Nite Elamin	1021	1002	Revenue	1004	Mattress Revenue	103-4: Double
23	1062 - Nitey-Nite Jefferson	1098	1003	Expense	1009	Fixed Expenses	330-0: Utilitie
7	1032 - Nitey-Nite Pease	1039	1002	Revenue	1006	Other Revenue	130-1: Warra
7	1032 - Nitey-Nite Pease	1084	1003	Expense	1009	Fixed Expenses	308-0: Rent E
3	1063 - Nitey-Nite Alan	1020	1002	Revenue	1004	Mattress Revenue	103-3: Double
5	1029 - Nitey-Nite Marakas	1063	1003	Expense	1008	Variable Expenses	205-1: COM-T
16	1002 - Nitey-Nite Sariel	1019	1002	Revenue	1004	Mattress Revenue	103-2: Double
5	1029 - Nitey-Nite Marakas	1055	1003	Expense	1008	Variable Expenses	203-1: COM-D
19	1001 - Nitey-Nite Miami	1013	1002	Revenue	1004	Mattress Revenue	101-4: King F
22	1055 - Nitey-Nite Dallas	1028	1002	Revenue	1004	Mattress Revenue	105-3: Twin C
23	1062 - Nitey-Nite Jefferson	1018	1002	Revenue	1004	Mattress Revenue	103-1: Double
23	1062 - Nitey-Nite Jefferson	1027	1002	Revenue	1004	Mattress Revenue	105-2: Twin E
27	1026 - Nitey-Nite Reagans	1015	1002	Revenue	1004	Mattress Revenue	102-2: Queen
26	1021 - Nitey-Nite Lincoln	1096	1003	Expense	1009	Fixed Expenses	326-0: Office

Figure 18.2

16. Create tabs that contain the **Budget** *numbers as per the following instructions.*

Budget Rules

Revenue

Revenue Budgets at Nitey-Nite are simple. They are calculated by first taking the average of the previous two years (in this case, the two previous years are 2014 and 2015). You then calculate the percent achievement of the previous year and apply that growth rate (with a cap and a floor) to the average revenue. Discount budgets are a little more complex, but doable.

Mattress Revenue Budget

a) Create a **PivotTable** *based on the* myFinl_Data *tab. Name the new tab* ***Bgt_Mattress**.*

In the following steps, you will create a number of calculated fields. Do all of the calculated fields within the PivotTable, except where indicated to do them outside the PivotTable.

b) Use **Lvl3_Acct** *as a* **Filter**, *and set it to* **Mattress Revenue**.

c) Bring in the **Store** *field in the* **Rows** *section.*

d) In a calculated field, calculate the average of **2015** *and* **2014** *revenue by store. Call the formula* ***Avg_Amt****. Name that field* ***Avg Mattress Rev*** *in the* **PivotTable**.

e) In another calculated field, calculate the percent of **2015 Revenue** *(Amt_2015) divided by* **2014 Revenue** *(Amt_2014) by store. Call the calculated field* ***Pct_2014****. In the* **PivotTable**, *name the field* ***Pct of 2014***.

f) Create another field called ***Bgt_Pct****. For stores with a* **Pct of 2014 more than 120%**, *return* **120%**; *for stores* **less than 100%**, *return* **100%**; *and for all other stores, return the* **actual percent**. *In this formula, use a nested IF() statement. In the PivotTable, call that field* ***Budget Percent***.

g) In another calculated field, multiply the **Bgt_Pct** *by the* **Avg_Amt** *column,* **rounded** *to the nearest thousand. Name the calculation* ***Annual_Bgt****. In the* **PivotTable**, *call it* ***Annual Budget***.

h) Create another calculated field called ***Mo_Bgt****. The* **Monthly Budget** *number is* **Annual_Bgt** *divided by* **12**.

i) Format all columns appropriately, and sort by **Store**.

Check your Mattress Budget numbers with the following image:

A	B	C	D	E	F
Lvl3_Acct	Mattress Revenue				
Row Labels	Avg Mattress Rev	Pct of 2014	Budget Percent	Annual Budget	Sum of Mo_Bgt
1001 - Nitey-Nite Miami	720,518	100.2%	100.2%	722,000	60,167
1002 - Nitey-Nite Sariel	822,447	120.0%	120.0%	987,000	82,250
1005 - Nitey-Nite Glynn	1,053,151	121.8%	120.0%	1,264,000	105,333
1009 - Nitey-Nite Isidor	503,205	155.4%	120.0%	604,000	50,333
1011 - Nitey-Nite McKinny	1,195,858	84.9%	100.0%	1,196,000	99,667
1012 - Nitey-Nite Redmon	1,111,825	98.1%	100.0%	1,112,000	92,667
1018 - Nitey-Nite Hialeah	1,178,386	130.3%	120.0%	1,414,000	117,833
1019 - Nitey-Nite Alameda	1,073,057	111.6%	111.6%	1,198,000	99,833
1021 - Nitey-Nite Lincoln	238,273	130.5%	120.0%	286,000	23,833
1024 - Nitey-Nite Neal	971,988	139.2%	120.0%	1,166,000	97,167
1026 - Nitey-Nite Reagans	966,383	106.2%	106.2%	1,026,000	85,500
1027 - Nitey-Nite Johnson	1,277,466	122.3%	120.0%	1,533,000	127,750
1029 - Nitey-Nite Marakas	333,127	104.7%	104.7%	349,000	29,083
1032 - Nitey-Nite Pease	1,271,298	109.8%	109.8%	1,396,000	116,333
1034 - Nitey-Nite Capri	1,197,456	126.0%	120.0%	1,437,000	119,750
1036 - Nitey-Nite Garcia	350,015	101.9%	101.9%	357,000	29,750
1040 - Nitey-Nite Chachy	1,327,830	109.5%	109.5%	1,453,000	121,083

Figure 18.3

Pillow and Other Revenue

Calculating the Pillow and Other Revenue budgets uses the same theory as the Mattress Revenue Bgt, except use the Pillow and Other Revenue numbers. Therefore, you can copy the **Bgt_Mattress** tab twice, and rename the new tabs **Bgt_Pillow** and **Bgt_Other**. Change the Lvl3_Acct Page Header and column names appropriately.

A	B	C	D	E	F
Lvl3_Acct	Pillow Revenue				
Row Labels	Avg Pillow Rev	Pct of 2014	Budget Percent	Annual Budget	Sum of Mo_Bgt
1001 - Nitey-Nite Miami	59,568	107.6%	107.6%	64,000	5,333
1002 - Nitey-Nite Sariel	57,848	128.7%	120.0%	69,000	5,750
1005 - Nitey-Nite Glynn	40,066	136.3%	120.0%	48,000	4,000
1009 - Nitey-Nite Isidor	33,947	167.1%	120.0%	41,000	3,417
1011 - Nitey-Nite McKinny	62,419	84.8%	100.0%	62,000	5,167
1012 - Nitey-Nite Redmon	58,841	107.5%	107.5%	63,000	5,250
1018 - Nitey-Nite Hialeah	78,138	130.3%	120.0%	94,000	7,833
1019 - Nitey-Nite Alameda	87,687	127.9%	120.0%	105,000	8,750
1021 - Nitey-Nite Lincoln	17,553	112.0%	112.0%	20,000	1,667
1055 - Nitey-Nite Dallas	81,136	108.3%	108.3%	88,000	7,333
1057 - Nitey-Nite Braman	60,458	129.1%	120.0%	73,000	6,083
1059 - Nitey-Nite LaMontage	43,505	128.5%	120.0%	52,000	4,333
1060 - Nitey-Nite Elamin	50,439	145.4%	120.0%	61,000	5,083
1062 - Nitey-Nite Jefferson	64,270	106.5%	106.5%	68,000	5,667
1063 - Nitey-Nite Alan	57,383	135.7%	120.0%	69,000	5,750
Grand Total	**1,603,669**	**124.8%**	**120.0%**	**1,924,000**	**160,333**

Figure 18.4

A	B	C	D	E	F
Lvl3_Acct	Other Revenue				
Row Labels	Avg Mattress Rev	Pct of 2014	Budget Percent	Annual Budget	Sum of Mo_Bgt
1001 - Nitey-Nite Miami	80,399	109.9%	109.9%	88,000	7,333
1002 - Nitey-Nite Sariel	92,644	130.8%	120.0%	111,000	9,250
1005 - Nitey-Nite Glynn	115,221	121.0%	120.0%	138,000	11,500
1009 - Nitey-Nite Isidor	58,586	154.0%	120.0%	70,000	5,833
1011 - Nitey-Nite McKinny	132,421	92.8%	100.0%	132,000	11,000
1012 - Nitey-Nite Redmon	123,449	101.6%	101.6%	125,000	10,417
1018 - Nitey-Nite Hialeah	131,385	131.3%	120.0%	158,000	13,167
1019 - Nitey-Nite Alameda	116,442	115.2%	115.2%	134,000	11,167
1021 - Nitey-Nite Lincoln	25,439	131.4%	120.0%	31,000	2,583
1024 - Nitey-Nite Neal	108,126	148.3%	120.0%	130,000	10,833
1026 - Nitey-Nite Reagans	110,666	112.1%	112.1%	124,000	10,333
1027 - Nitey-Nite Johnson	136,323	121.2%	120.0%	164,000	13,667
1029 - Nitey-Nite Marakas	36,871	106.0%	106.0%	39,000	3,250
1032 - Nitey-Nite Pease	142,862	109.2%	109.2%	156,000	13,000
1034 - Nitey-Nite Capri	128,892	126.1%	120.0%	155,000	12,917

Figure 18.5

Discounts

a) Copy the **Bgt_Mattress** *tab, and rename the copy* ***Bgt_Discounts****.*

b) In the **Bgt_Discounts** *PivotTable, take out all existing amount and calculated fields from the* **Values** *section, and bring in the* **Avg_Amt** *field as the only data item.*

c) Pivot the **Lvl3_Acct Report Filter** *to be in* **Columns**, *containing only* **Mattress Revenue**, **Pillow Revenue**, **Other Revenue**, *and* **Discounts** *fields, in that order. Remove Grand Totals*

> ***Hint**: To change the order of a field, right-click on the field and point to* **Move**. *You can also click the column header border, and drag it to its new location). Steps d-g will be outside the PivotTable.*

d) Rename the **Sum of Avg_Amt** *field to be* ***Avg Rev**, and format it appropriately.*

e) Create the ***Discount %*** *field as (***Discounts** */ Sum of (***Mattress Revenue** + **Pillow Revenue** + **Other Revenue**)) **less 0.5%**. Calculate this and the following outside the PivotTable.*

f) Each store's ***Annual Discount Bgt*** *is calculated by using the sum of (***Annual Mattress Bgt** *plus* **Annual Pillow Bgt** *plus* **Annual Other Bgt**) *each multiplied by the* **Discount %**, **rounded** *to the* **nearest thousand**.

> ***Hint**: Use the budget (***Bgt_**) table numbers, not* **Revenue** *figures.*

g) Create the ***Monthly Discount Bgt*** *field and format all fields appropriately.*

n Labels						
ss Revenue	Pillow Revenue	Other Revenue	Discounts	Discount %	Annual Discount Bgt	Monthly Discount Bgt
720,518	59,568	80,399	-31,971	-3.2%	-28,000	-2,333
822,447	57,848	92,644	-33,893	-3.0%	-35,000	-2,917
1,053,151	40,066	115,221	-41,327	-2.9%	-42,000	-3,500
503,205	33,947	58,586	-21,451	-3.1%	-22,000	-1,833
1,195,858	62,419	132,421	-49,981	-3.1%	-43,000	-3,583
1,111,825	58,841	123,449	-44,550	-2.9%	-38,000	-3,167
1,178,386	78,138	131,385	-49,270	-3.0%	-51,000	-4,250
1,073,057	87,687	116,442	-45,629	-3.1%	-44,000	-3,667
238,273	17,553	25,439	-10,033	-3.1%	-10,000	-833
971,988	49,848	108,126	-37,074	-2.8%	-38,000	-3,167
966,383	48,920	110,666	-37,892	-2.9%	-35,000	-2,917
1,277,466	74,790	136,323	-53,456	-3.1%	-55,000	-4,583
333,127	39,639	36,871	-15,717	-3.3%	-15,000	-1,250
1,271,298	63,845	142,862	-45,200	-2.6%	-42,000	-3,500
1,197,456	59,068	128,892	-49,510	-3.1%	-51,000	-4,250
350,015	43,853	41,865	-15,400	-3.0%	-14,000	-1,167

Figure 18.6

> ***Note**: When you create calculations on a PivotTable outside of the PivotTable, be careful! If you use the arrow keys to scroll over to a data item, or use the cursor to click on a data item, you will get a =GETPIVOTDATA() function that does not copy down properly. To overcome this, you have to manually type the cell reference in the formula instead of scrolling over to the cell.*

> ***Tip**: Actual and budgeted expense numbers will typically carry a minus "-" sign.*

Fixed Expenses

The ***Fixed Expenses*** budget for all stores is calculated by taking the average of the **2014** and **2015** Fixed Expenses increased by 3%, rounded to the nearest thousand.

a) Copy the Bgt_Mattress *tab, and name the new tab* ***Bgt_FixedExp****.*

b) Change the **Report Filter** *to* **Fixed Expenses***, and take out all data fields, except for the* **Avg Mattress Rev** *field, and rename it* ***Avg Fixed Expenses*** *in the* **PivotTable***.*

c) Calculate the **Fixed Expenses** *budget in a calculated field according to the instructions above.*

	A	B	C	D	E
1	Lvl3_Acct	Fixed Expenses			
2					
3	**Row Labels**	**Avg Fixed Expenses**	**Annual Fixed Exp Bgt**	**Monthly Fixed Exp Bgt**	
4	1001 - Nitey-Nite Miami	-125,415	-129,000	-10,750	
5	1002 - Nitey-Nite Sariel	-149,248	-154,000	-12,833	
6	1005 - Nitey-Nite Glynn	-193,316	-199,000	-16,583	
7	1009 - Nitey-Nite Isidor	-121,602	-125,000	-10,417	
8	1011 - Nitey-Nite McKinny	-180,074	-185,000	-15,417	
9	1012 - Nitey-Nite Redmon	-173,239	-178,000	-14,833	
10	1018 - Nitey-Nite Hialeah	-218,244	-225,000	-18,750	
11	1019 - Nitey-Nite Alameda	-165,242	-170,000	-14,167	
12	1021 - Nitey-Nite Lincoln	-87,738	-90,000	-7,500	

Figure 18.7

> ***Note****: There will be a fixed expense budget for the* **Home Office***, as well as for the* **Northern** *and* **Southern Region** *offices.*

Variable Expenses

a) Create a **new PivotTable** *based on the* myFinl_Data *tab. Call the new tab* ***Bgt_VarExp****.*

b) Calculate the ***Variable Expense ratio*** *for each store (***Variable Expenses** */ sum of* **Total Revenue** *(including* **Discounts***)) for* **2014** *and* **2015** *separately. Name the column* ***Ratios w/ Weighting****.*

c) Management tells us that the budget for variable expenses is more representative in 2015 than they were in 2014, so assign a **75%** *weight to the* **2015** *ratio and a* **25%** *weight to the* **2014** *ratio,* **less one percentage point***. Name this column* ***Sum Ratios -1%****.*

d) The Variable Expense budget for each store is the sum of the category annual budgets (except fixed expenses), **rounded** *to the nearest thousand. Name this column* ***Rev Budgets****.*

> ***Tip****: Remember all those* **Bgt_** *category tabs you just finished creating. This would be a good time to use them.*

e) **Annual Var Exp** *budget is the* **sum ratios** *multiplied by the* **Rev Budgets** *rounded to the nearest thousand.* **Monthly Bgt** *is a monthly division of the* **Annual Var Exp** *budgets.*

***Note**: Many of these calculations can be done outside of the PivotTable.*

f) Make sure your PivotTable matches with the following figure.

Column Labels / Mattress Revenue	Pillow Revenue	Other Revenue	Discounts	Variable Expenses	Ratios w/ Weighting	Sum Ratios -1%	Rev Budgets	Annual Var Exp	Monthly Bgt
						-32.4%	846,000	-274,000	-22,833
721,253	61,761	84,187	-31,176	-276,487	-24.8%				
719,782	57,374	76,611	-32,766	-280,874	-8.6%				
						-34.0%	1,132,000	-385,000	-32,083
897,072	65,108	105,008	-39,507	-357,659	-26.1%				
747,821	50,587	80,279	-28,278	-301,632	-8.9%				
						-31.1%	1,408,000	-438,000	-36,500
1,156,785	46,217	126,170	-48,759	-406,918	-23.8%				
949,517	33,914	104,271	-33,894	-349,276	-8.3%				
						-31.0%	693,000	-215,000	-17,917
612,324	42,473	71,049	-23,190	-222,790	-23.8%				
394,086	25,420	46,123	-19,712	-147,292	-8.3%				
						-33.2%	1,347,000	-447,000	-37,250
1,098,200	57,302	127,465	-45,989	-420,606	-25.5%				
1,293,515	67,535	137,377	-53,973	-503,396	-8.7%				
						-32.1%	1,262,000	-405,000	-33,750
1,101,420	60,978	124,408	-43,103	-412,917	-24.9%				
1,122,229	56,704	122,489	-45,996	-409,910	-8.2%				
						-33.6%	1,615,000	-542,000	-45,167
1,333,638	88,411	149,154	-54,990	-523,005	-25.9%				
1,023,134	67,864	113,616	-43,550	-404,677	-8.7%				
						-31.9%	1,393,000	-445,000	-37,083
1,131,969	98,431	124,684	-45,760	-430,295	-24.6%				
1,014,145	76,942	108,199	-45,498	-382,665	-8.3%				
						-31.1%	327,000	-102,000	-8,500
269,814	18,546	28,892	-12,383	-98,120	-24.1%				
206,732	16,559	21,985	-7,682	-75,998	-8.0%				
						-34.4%	1,318,000	-454,000	-37,833
1,131,404	63,178	129,167	-45,478	-456,919	-26.8%				
812,572	36,517	87,084	-28,669	-313,341	-8.6%				
						-31.6%	1,174,000	-371,000	-30,917

Figure 18.8

For budgeting purposes, management wants to assign the monthly budget amounts for each category (**mattress**, **pillow**, **other**, **discounts**, **fixed** and **variable** expenses) to ONE account within each category, as illustrated in the table in Step 17 (Remember that the budgets are based on total category revenues).

17. In the **myFinl_Data** *tab, populate the monthly calculated budget numbers for each store in each month to the following accounts under the* **Bgt_2016** *column, as follows:*

Budget Category	Account
Mattress Revenue	101-1
Pillow Revenue	111-1
Other Revenue	120-1
Discounts	190-4
Fixed Expenses	308-0
Variable Expenses	201-1

***Hint**: You will most likely have to use a nested IF() statement to make this work correctly. If done correctly, most accounts will show a zero. Only the accounts above will be populated with budget numbers.*

	A	B	I	J	K	L	M	N	O
1	Month	Region	Lvl3_ID	Lvl3_Acct	Account	Amt_2016	Amt_2015	Amt_2014	Bgt_2016
2	08	Southern Region	1004	Mattress Revenue	103-4: Double Fair	7850	12673	3557	0
3	10	Southern Region	1009	Fixed Expenses	330-0: Utilities Expense	-612	-674	-641	0
4	05	Northern Region	1006	Other Revenue	130-1: Warranty Sales	3996	4427	3542	0
5	09	Northern Region	1009	Fixed Expenses	308-0: Rent Expense	-1556	-1451	-1217	-16083
6	07	Northern Region	1004	Mattress Revenue	103-3: Double Good	6848	3250	5191	0
7	01	Southern Region	1008	Variable Expenses	205-1: COM-Twin	-897	-540	-975	0
8	10	Northern Region	1004	Mattress Revenue	103-2: Double Excellent	3688	5070	4190	0
9	03	Southern Region	1008	Variable Expenses	203-1: COM-Double	-4740	-5715	-2662	0
10	05	Northern Region	1004	Mattress Revenue	101-4: King Fair	3245	10195	8399	0
11	10	Northern Region	1004	Mattress Revenue	105-3: Twin Good	417	2558	3672	0
12	10	Southern Region	1004	Mattress Revenue	103-1: Double Best	6026	10208	8844	0
13	09	Southern Region	1004	Mattress Revenue	105-2: Twin Excellent	4864	1604	4768	0
14	12	Southern Region	1004	Mattress Revenue	102-2: Queen Excellent	9333	9323	7359	0
15	03	Southern Region	1009	Fixed Expenses	326-0: Office Supplies	-22	-7	-61	0
16	05	Southern Region	1005	Pillow Revenue	112-1: Pillow Queen Excellent	289	179	76	0
17	02	Southern Region	1004	Mattress Revenue	105-1: Twin Best	4549	883	1561	0
18	08	Northern Region	1004	Mattress Revenue	102-1: Queen Best	18645	5311	3197	0
19	09	Southern Region	1004	Mattress Revenue	103-2: Double Excellent	13225	5692	2550	0
20	03	Southern Region	1009	Fixed Expenses	308-0: Rent Expense	-2292	-2171	-2105	-7500
21	08	Northern Region	1005	Pillow Revenue	112-2: Pillow Queen Good	827	255	0	0

Figure 18.9

Make sure to keep the VLOOKUP() formulas intact, as you will be changing some of the assumptions in the Budget Rules when you are taking the exam. You will need to refresh the various PivotTables to get the correct answers flowing through.

18. *Create a* **PivotTable** *based on the* **myFinl_Data** *tab that summarizes the* **Lvl2_Acct** *column and the* **Amt_2016** *and* **Bgt_2016** *columns. Make the* **Revenue** *numbers appear first in the PivotTable. Create a calculated field formula in the PivotTable that calculates the* **percent of budget** *and call it* ***act_pct_bgt****. Format the numbers appropriately. Your numbers should match the figure below.*

	A	B	C	D
1				
2				
3	**Row Labels**	**Amt 2016**	**Bgt 2016**	**Pct of Budget**
4	Revenue	34,243,136	32,452,000	105.5%
5	Expenses	-22,866,569	-20,328,000	112.5%
6	**Grand Total**	**11,376,567**	**12,124,000**	**93.8%**

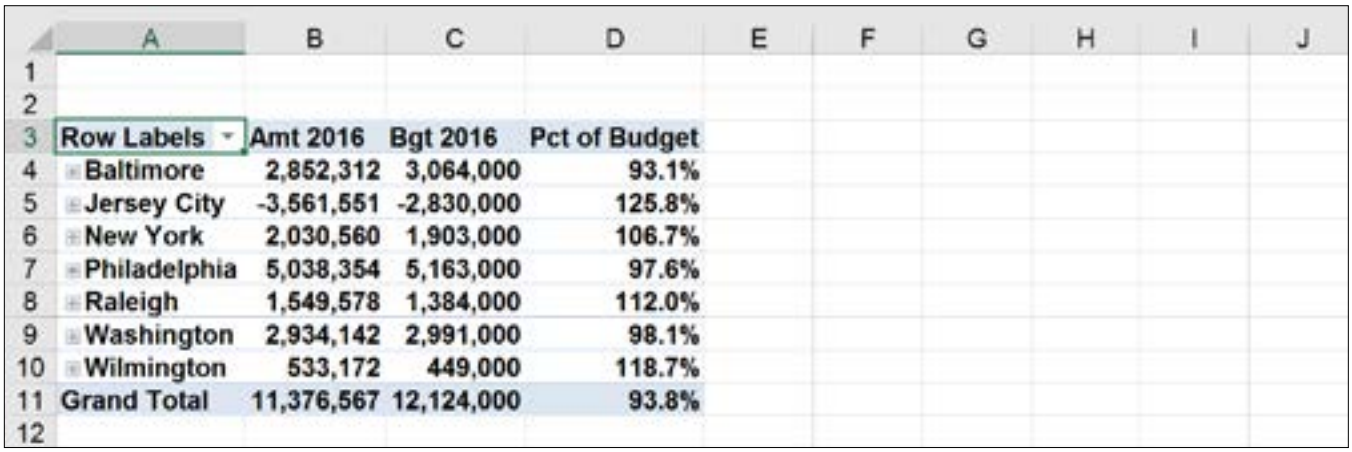
Figure 18.10

19. *Name the new tab* ***Actual_Budget****.*

Tip*: If your* **Bgt_2016** *formula returns an error the first time, or comes back blank, make sure* **Column O** *from Figure 18.9 is formatted as* **Number***, and not General. Then* **Refresh** *the* **PivotTable***. This check on formatting could save you significant headaches on this project, and in the future. Numbers formatted as text will not calculate in a PivotTable.*

I anticipate you will spend quite a bit of time getting the project to this point. Let's play around with this PivotTable a bit more.

20. *Remove the* **Lvl2_Acct** *field from the* **PivotTable** *(this essentially brings in* **Net Income***), and bring in* **City** *and* **Store** *as* **Rows***. Collapse the entire field to hide the detail for the* **Store** *field.*

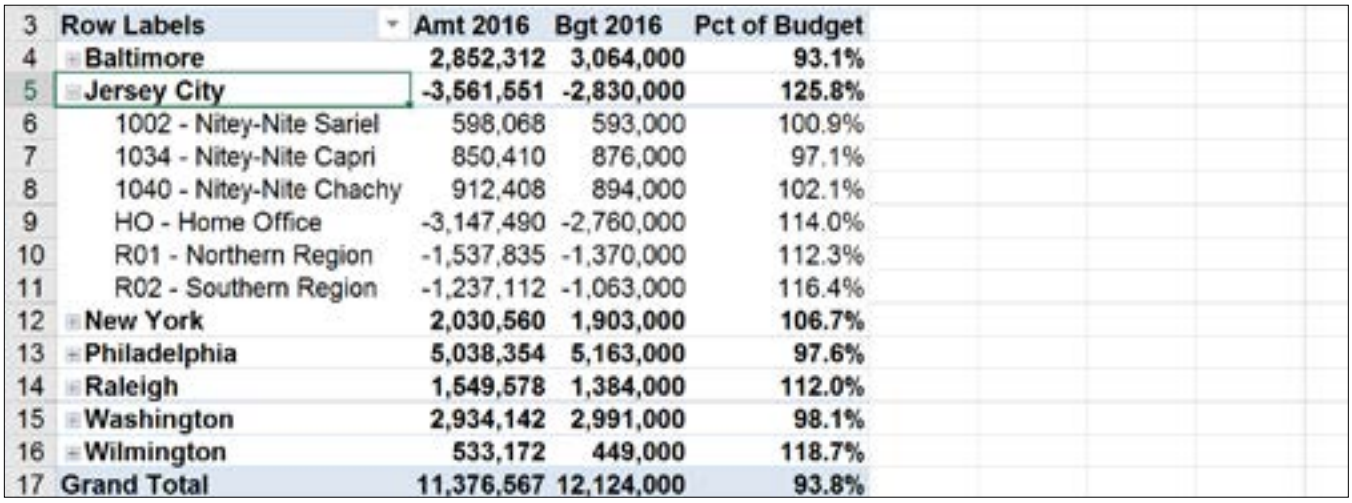


Row Labels	Amt 2016	Bgt 2016	Pct of Budget
Baltimore	2,852,312	3,064,000	93.1%
Jersey City	-3,561,551	-2,830,000	125.8%
New York	2,030,560	1,903,000	106.7%
Philadelphia	5,038,354	5,163,000	97.6%
Raleigh	1,549,578	1,384,000	112.0%
Washington	2,934,142	2,991,000	98.1%
Wilmington	533,172	449,000	118.7%
Grand Total	11,376,567	12,124,000	93.8%

Figure 18.11

Why does Jersey City have negative net numbers?

21. *Expand* **Jersey City** *to see all locations under it.*



Row Labels	Amt 2016	Bgt 2016	Pct of Budget
Baltimore	2,852,312	3,064,000	93.1%
Jersey City	-3,561,551	-2,830,000	125.8%
1002 - Nitey-Nite Sariel	598,068	593,000	100.9%
1034 - Nitey-Nite Capri	850,410	876,000	97.1%
1040 - Nitey-Nite Chachy	912,408	894,000	102.1%
HO - Home Office	-3,147,490	-2,760,000	114.0%
R01 - Northern Region	-1,537,835	-1,370,000	112.3%
R02 - Southern Region	-1,237,112	-1,063,000	116.4%
New York	2,030,560	1,903,000	106.7%
Philadelphia	5,038,354	5,163,000	97.6%
Raleigh	1,549,578	1,384,000	112.0%
Washington	2,934,142	2,991,000	98.1%
Wilmington	533,172	449,000	118.7%
Grand Total	11,376,567	12,124,000	93.8%

Figure 18.12

It looked strange because the Home Office and Northern and Southern Regional office numbers were included in Jersey City. When you analyze the performance of the entire company, it is probably necessary to include those "overhead" type numbers, but in this analysis we want to look at only the operating stores, so let's take out the overhead numbers.

22. *Deselect the* **Home Office**, **Northern Region**, *and* **Southern Region** *from the* **Stores** *field, as in the following figure.*

3	Row Labels	Amt 2016	Bgt 2016	Pct of Budget
4	Baltimore	2,852,312	3,064,000	93.1%
5	Jersey City	2,360,886	2,363,000	99.9%
6	1002 - Nitey-Nite Sariel	598,068	593,000	100.9%
7	1034 - Nitey-Nite Capri	850,410	876,000	97.1%
8	1040 - Nitey-Nite Chachy	912,408	894,000	102.1%
9	New York	2,030,560	1,903,000	106.7%
10	Philadelphia	5,038,354	5,163,000	97.6%
11	Raleigh	1,549,578	1,384,000	112.0%
12	Washington	2,934,142	2,991,000	98.1%
13	Wilmington	533,172	449,000	118.7%
14	Grand Total	17,299,004	17,317,000	99.9%

Figure 18.13

23. *Modify the* **PivotTable** *to remove the* **City**, **2016 Budget**, *and* **Pct of Budget** *fields.*
24. *Bring in* **Month** *as a* **Columns** *label.*
25. *Check to make sure your numbers match as illustrated below:*

3	Amt 2016	Column Labels										
4	Row Labels	01	02	03	04	05	09	10	11	12	Grand Total
5	1001 - Nitey-Nite Miami	2,687	25,623	20,033	22,266	25,120	53,924	23,756	45,335	44,715	374,088
6	1002 - Nitey-Nite Sariel	-65	27,708	74,732	48,382	55,221	51,447	48,004	48,948	80,767	598,068
7	1005 - Nitey-Nite Glynn	3,747	56,788	76,897	65,488	53,644	91,758	58,598	85,572	102,971	792,464
8	1009 - Nitey-Nite Isidor	10,465	32,821	37,556	44,005	36,501	-1,556	300	0	0	304,067
9	1011 - Nitey-Nite McKinny	2,364	23,460	39,830	20,001	55,423	48,863	31,087	65,117	81,565	498,901
10	1012 - Nitey-Nite Redmon	14,286	20,479	58,472	45,948	31,823	51,116	41,791	56,861	86,145	559,600
11	1018 - Nitey-Nite Hialeah	8,990	47,398	102,422	52,075	72,153	93,029	59,494	80,095	128,179	900,241
12	1019 - Nitey-Nite Alameda	25,754	24,009	64,538	52,472	58,615	75,123	64,623	62,799	112,050	726,625
13	1021 - Nitey-Nite Lincoln	12,117	9,372	15,717	12,069	24,124	10,236	15,227	10,041	21,798	180,682
14	1024 - Nitey-Nite Neal	17,654	32,788	61,833	60,826	78,763	79,399	69,308	87,205	112,863	808,413
15	1026 - Nitey-Nite Reagans	19,494	41,296	68,264	40,804	68,702	76,867	65,699	50,433	111,015	728,628
16	1027 - Nitey-Nite Johnson	343	41,344	93,078	78,154	90,822	107,007	66,543	81,453	137,827	918,995
17	1029 - Nitey-Nite Marakas	23,549	11,920	19,530	17,422	19,873	24,927	26,267	11,494	33,867	239,613
18	1032 - Nitey-Nite Pease	32,981	44,146	92,728	69,216	64,316	92,950	58,235	101,584	110,539	910,344
19	1034 - Nitey-Nite Capri	4,564	40,207	72,209	58,349	61,369	79,373	68,469	91,800	133,465	850,410
20	1036 - Nitey-Nite Garcia	6,698	1,674	10,943	9,170	10,650	4,810	2,350	7,271	27,850	104,714
21	1040 - Nitey-Nite Chachy	16,154	46,351	77,100	76,647	77,029	135,083	70,597	83,856	126,606	912,408
22	1042 - Nitey-Nite Carter	5,899	28,247	75,267	22,106	50,851	64,628	33,232	46,933	73,773	535,055
23	1044 - Nitey-Nite Riasca	5,791	29,125	66,606	28,002	64,819	55,782	51,350	43,160	87,324	621,238
24	1045 - Nitey-Nite Williams	12,600	34,370	39,764	31,470	38,141	48,696	41,981	50,679	87,030	517,382
25	1047 - Nitey-Nite Karlin	18,178	14,777	30,202	41,380	33,204	35,659	42,749	38,278	54,983	410,958
26	1050 - Nitey-Nite Reid	6,219	12,196	21,221	20,941	26,588	34,126	24,689	23,214	36,852	264,027
27	1051 - Nitey-Nite Eitan	25,477	32,473	70,749	78,285	67,077	109,650	69,249	90,936	112,683	898,346
28	1055 - Nitey-Nite Dallas	31,356	39,688	78,006	53,469	69,070	70,520	59,798	60,309	96,412	756,231
29	1057 - Nitey-Nite Braman	11,401	34,629	43,070	43,243	30,740	57,902	32,402	53,837	74,012	533,172
30	1059 - Nitey-Nite LaMontage	9,635	10,519	46,645	25,905	35,237	43,482	33,607	25,801	47,784	386,451
31	1060 - Nitey-Nite Elamin	20,381	40,982	76,131	52,909	65,150	56,851	46,521	65,174	99,914	736,695
32	1062 - Nitey-Nite Jefferson	980	25,930	55,429	57,400	46,215	51,560	62,789	54,850	75,237	570,782
33	1063 - Nitey-Nite Alan	14,682	40,872	56,041	49,258	56,369	74,024	51,535	75,346	104,512	660,406
34	Grand Total	364,381	871,192	1,645,013	1,277,662	1,467,609	1,777,236	1,320,250	1,598,381	2,402,738	17,299,004

Figure 18.14

26. **Save** *and* **close myComp_Project.xlsx**.

Make absolutely sure that the numbers in your file match with the numbers throughout the Comprehensive Project - the screenshots are provided as checks to make sure your formulas are populating data correctly. You will be using this Comprehensive Project file to answer all the questions in the final exam, so it's essential you start off with the right file. Again, if the numbers are not matching and you don't know why, rework it following each instruction exactly.

> ***My last piece of advice**: When you are taking the last exam, note that the questions are not cumulative, meaning you will have to reset the file to its original state each time you answer a question.*

Conclusion

In this chapter, you completed the Comprehensive Project. The primary objective of the Comprehensive Project was to test your ability and understanding of PivotTables, using VLOOKUP() functions, and writing formulas using nested functions.

In this course, I have taught you the Excel tools that are most helpful in business situations. All of the tools require you to use a certain degree of logic, and I've attempted to teach you those thought patterns as well. However, I cannot anticipate all of the situations that you may encounter. You will have to depend on your own creativity and ingenuity to solve those issues. As you use the tools taught in this course for your own projects, the concepts should solidify and further improve your understanding and Excel mastery.

Remember that your education does not stop here. There are many different areas of Excel you can explore, like VBA (Visual Basic for Applications - the programming language behind Excel), and discovering other functions. Continue to learn. Buy other books, search the Internet, do everything you can to expand your Excel knowledge (especially buying the new releases of the ExcelCEO courses) and you will quickly be regarded as the Excel expert of your office.

By going through this course, you've learned the basics and advanced basics. From here on out, you can use a reference book to research most of your questions. Another good source for researching Excel issues is the Internet. I have found answers to many of my questions by going to the Internet and researching what others have done. Whenever I think that someone must have had my same problem, usually they have.

Chapter Exam

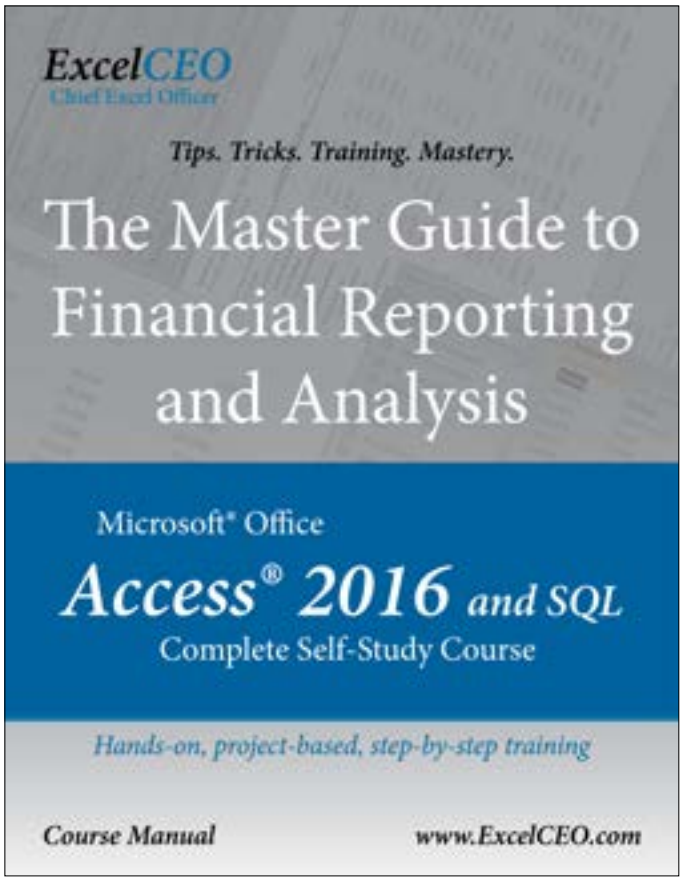
To take the examination for this chapter, you must have successfully completed the examination for the previous chapter. You can now go to www.ExcelCEO.com, click on Sign In, log in and take the exam. Make sure that you take the exam on the same computer on which you completed the Comprehensive Project, as all of the questions in this exam refer to the completed project.

Mastered Excel? Check your status at ExcelCEO.com on the:

ExcelCEO Graduate Verification

Have **feedback** on your ExcelCEO Excel 2016 training experience or a **success story** to share? We'd love to hear it!

Want even more skills? Register for **Access 2016 and SQL** *to become an ExcelCEO* **Reporting and Analysis Master!**



Topics covered:

- *Tables*
- *Queries*
- *Macros*
- *Reports*
- *Forms*
- *External Data Sources*
- *Intro to SQL*
- *Tie Access into Excel with Microsoft Query*

Excel® 2016

Complete Self-study Course

ExcelCEO

Chief Excel Officer

GLOSSARY

Term	Definition
#DIV/0! Error	An error message returned when a numeric calculation is setup to divide by zero - a mathematical impossibility.
#N/A Error	An error message returned when the search value is not available as formatted, or not available at all.
3-D Reference	A three-part reference to a workbook file path when referencing a different workbook. Parts of the reference include the [workbook_name]Spreadsheet_Name! and the cell range (Ex: $A$1:$D$5).
Absolute Reference	A cell reference in a formula that does not change when copied to other cells. This is identified by having a $ before AND after the column letter, which acts as an anchor for both column and row. The $ anchors whichever cell reference part (column or row) before which it is placed.
Active Field	The selected area of a spreadsheet when content is in a state to be modified.
Align Left	Text formatting that locates cell contents toward the left-hand side of the cell.
Align Right	Text formatting that locates cell contents toward the right-hand side of the cell.
Amortization Schedule	A table representing a payment plan from a set time until a future payoff period. Tracked are interest rate, payment amount, interest and principle payments, and remaining balances per period.
AutoFill	A text fill function, available through an icon that pops up after a tool like DataFill has been used, that allows the Excel user to define how data will be copied, with or without originating cell formatting, or using Flash Fill.
AutoFilter	An Excel filtering feature that allows you to select filtering options using a dialog box accessed from column filter drop-down arrows that allow you to select specific values using checkboxes and menus.
AutoSum	A function on the Home tab used for quickly creating a sum for a contiguous group of numerically formatted cells. Average, Count, and other functions are also available in the AutoSum drop-down menu.
AVERAGE()	A statistical function for taking the combined middle of a defined group of numbers in numeric formats.
AVERAGEIFS()	A multiple option criteria-based function for finding the mean of given arguments.
Blank workbook	An Excel workbook not containing any user-inputted data. This is also an option icon when opening Excel for users who want to start a new project, or a quick calculation.

Bold	Text formatting that adds visual weight to the characters for the intent of standing out.
Borders	Formatting that applies line characteristics to the exterior of the cell.
Bottom Align	A cell location format that causes cell content to be situated toward the bottom of that cell.
Calculated Field	A PivotTable function that allows elements of the PivotTable to be manipulated using formulas to develop new solutions not contained in the source data.
Cell	The intersection of a column and a row is called a cell. A cell is a rectangular space - named first by column, then by row position in the spreadsheet - where calculations or data can be inputted and analyzed.
Cell Style	A formatting option that allows the Excel user to create a named format for quick access. Options include background color and font attributes.
CELL() Function	A function that returns details about a given cell, based on an Info_type, including "address", or location of the cell, "contents","Filename", and more.
Center	A cell location format that causes cell content to be situated toward the vertical middle of a defined cell.
Chapter Examination	An exam that is administered at the end of each chapter to test whether or not the participant has learned the material well enough from the given chapter. Each Review Questions checkpoint in the chapter must be completed prior to taking the exam. A passing grade of 70% or above must be obtained before continuing to the next chapter, and a maximum of two retakes are possible for claiming CPE credit for the specific chapter. Projects outlined and completed within the chapter will be referenced in the chapter exams, so having the projects accurate, completed, and available during the exam is vital to passing each exam.
Chart Elements	This is a new-for-Excel 2013 feature that replaces the Layout contextual tab from Chart Tools. Chart Elements is a highly interactive and visual chart-building group of tools.
Columns	Vertical groups of spreadsheet cells named with alphabetical letters above the spreadsheet.
Command Button	An interactive overlay feature that can have functions connected to carry out a defined action when clicked.
Compact View	Part of PivotTables, and recognizable from + and - boxes for showing more or less data, Compact View allows the Excel user to expand the view of lower levels of detail, or hide them for higher-level information.
Conditional Formatting	Cell formatting applied based on pre-defined criteria, ranging from text formats to cell background colors.

Contextual Tab	A tab related to a specific function, and represented above the Office Ribbon in Microsoft programs.
Copy	To record defined cell or worksheet content for placement in another location while leaving that same content in the original location.
COUNT() Function	A data function designed to return the number of cells containing a specified value.
COUNTIF()	A count function that allows the Excel user to select a range, and a specific criteria total based on a cell reference.
CPE	Continuing Professional Education. A course by which people maintain their knowledge and skills for a particular profession.
Custom Format	A user-defined cell appearance that is returned when certain criteria is recognized
Custom Sort	Functionality in Excel that allows the user to organize data based on column, criteria, and order. Multiple levels are also available for more detailed sorting.
Cut	To record defined cell or worksheet content for placement in another location, removing the content from the original location.
Data Consolidation	The process of combining worksheets from separate workbooks into a common workbook or file.
Data Labels	Descriptive or otherwise identifying information, usually for use in charts, to customize appearance of, or draw attention to key details.
Data Source	A name given to the connection set up to a database from a server. The name is commonly used when creating a query to the database.
Data Validation	A method for requiring a user to select from pre-defined options in a drop-down menu, or from a chosen range. This is preferred when the choice affects formula performance.
DataFill	Related to AutoFill. A cell content feature shown as a bold black box on the bottom-right corner of an active cell, or group of cells, that allows for dragging formulas to adjacent cells, or through double-click on the AutoFill/DataFill box, copying the cell content formula or pattern to all adjacent cells in a specific column below.
Dates	A numeric text format that applies a calendar day format to a specified number from a base of one representing January 1, 1900.
DAY()	One of three arguments in the DATE() function, or a function for extracting the day number from a date formatted cell.
DCOUNT()	A database function similar to the regular COUNT() used for counting data that meets specified criteria.
Decrease Decimal	An icon on the Home tab Number group used for reducing the visible amount of numbers following the decimal.
Descriptive Statistics	An Excel add-in returns common statistical details about the data range chosen.

Dialog Box	A pop-up window on a computer screen that communicates information to the user and prompts them for a response.
Dialog Expander	A small, downward facing arrow in a box letting the Excel user know more options are available in the tool group.
Direct Capitalization Method	One method for estimating the value of a business, an investment, or income-producing property that divides net income from the investment by the capitalization rate.
Discounted Cash Flow (DCF) Method	A method for assessing the value of an investment or income by discounting each year's projected income back to the present value.
DSUM()	A database function used for summing data that meets specific criteria
Expenses	A term representing outgoing payments, particularly in an income statement
External Data Sources	Data contained in a location outside of Excel which can be accessed for analysis
Filter	A tool for narrowing and defining the search for data within a given range or criteria
Find and Replace	A tool that locates user-defined content within a selected range, and replaces that matching content with content of the user's choosing.
FIND()	The function that allows the user to quickly search for specific content in a selected range. To work effectively, formatting must also match.
Fixed Expenses	A financial outgo of capital that does not change based on product or service output, material costs, etc. These expenses remain constant, or sunk, regardless of ability to generate income.
Flowcharting	A SmartArt tool for visually organizing processes, positions, or decision-making criteria. Flowcharting is characterized by connecting lines between defined and labeled shapes.
Format Cells	A dialog box where you can apply number, text, and color formats to a cell, or group of cells within a workbook.
Format Painter	A formatting tool with a paintbrush icon that allows the Excel user to copy the format of a cell within a workbook, and apply it to a single cell (on single-click), or multiple cells (double-click) with point-and-click ease. Pressing [Esc] will cancel the double-click option.
Formula	A logic-based equation that performs which evaluates specified arguments on values, dates, or text strings from referenced cells in an Excel worksheet, or an Access database.
Freeze Panes	A view in Excel that allows the user to scroll without losing visibility to column headers or row labels. Options include: Freeze top row, freeze panes, and freeze first column.

Function Keys	Keys on a keyboard that allow the user to perform certain functions that allow the user to use the keyboard instead of a mouse to increase speed and maneuverability. Function keys are typically keys that begin with the letter "F" and are located along the top of the keyboard. Also called Action keys.
FV() Function	An accounting function in Excel for calculating the future value of an investment based on periodic, constant payments with a constant interest rate.
Goal Seek	Sometimes called a "What-if" analysis, Goal Seek is setup as a group of criteria for finding an unknown answer through allowed changes in known data.
Graphics	Images that can be Inserted or created in a spreadsheet to customize the appearance of the work.
Handles	Small, opaque squares surrounding an active object that allow for adjustment in vertical or horizontal size, or a combination of the two. A circular handle can also be available for rotating some objects.
Hard-coded	Data inputted directly into a cell without formula. Hard-coded data does not update without manual adjustment.
Hide Detail	A box with a "-" sign inside used for covering low-level details, often leaving summary levels.
Hierarchical Structure	A parent/child structure in a database that establishes relationships between data.
HLOOKUP()	A lookup function for searching a table by column, and returning a value based on the row number specified in the formula.
HTML	Stands for Hyper Text Markup Language. HTML is a language, not particularly programming, that identifies how text or images should be displayed by a web, or other HTML-compatible browser.
Hyperlinks	An interactive connection, through text or image, that allows a user to move from one virtual location to another through mouse click. Hyperlinks can be used to move between spreadsheets or cells within an Excel workbook, to internet pages, or to email client windows.
Icon	A pictorial representation of an object. When clicked, the icon performs a predesigned task.
IFERROR()	A function that has been fixed for Excel that allows the user to pre-emptively handle formula errors with pre-defined response text or numbers. Prior to Excel 2013, ISERROR() handled this function.
Images	Another term for graphics, images are visible representations of data, scenery, etc., and can be inputted into Excel workbooks to enhance interaction, display, or presentation.
Increase Decimal	A number icon that expands the total count of numbers visible to the right of a decimal, up to the total amount available in the cell, or group of cells.

Insert Function	A button to the left of the formula bar identified with "*fx*", which can open a dialog box for explaining functions step-by-step, and inserting the selected formula into the selected cell.
INT() Function	A math function for rounding the numeric contents of a cell down to the nearest whole integer.
IRR() Function	Short for Internal Rate of Return, this function analyzes investment, or potential investment. The first number in the range should be negative, representing the initial investment amount, and the final percentage displayed represents the interest rate at which the net present value of the investment equals zero. The higher the percentage, the more desirable the investment would be considered, contingent on accuracy.
ISERROR()	Similar to IFERROR(), ISERROR() is an error-handling formula that allows an Excel user to specify a formula result in the event of an error, or to calculate the formula when no error would be returned.
Keyboard shortcut	Defined keystroke combinations in a program that allow a user quick access to specific formulas, functions, menus, or macros associated with the combination. (Ex: [Ctrl]+c is the equivalent keyboard shortcut for clicking the Copy icon from the Clipboard group in the Excel Home tab, and selecting the cell contents to copy to the clipboard memory for pasting in another location.)
LEFT()	A text function designed to return a specified number of characters beginning from the left-most side of a designated cell.
LEN()	A text function that returns the length in total characters in a defined cell, including spaces before, after, and between character groups (words, numbers, etc.)
LOOKUP()	A search function with two arguments: the value to be found, and the range for return value. The range will always be two columns, and the return value will always be the value in the second column to the right of the lookup value, or the next lowest value available.
LOWER()	A text function that returns an all lower-case equivalent of the text in a specified cell.
Macro	A mini-program that executes a programmed task, which can be linked to buttons or keystrokes. Caution should be exercised in knowing the source and intended function of a macro before enabling it for use, as macros can perform functions extending beyond the program written in.
Macro Recorder	A small box icon (also available through a dialog box) that can be used to define a macro's function by executing it visually on the screen. Once recording has begun, a Stop box is available on the lower-left of the Excel window for ending step recording to be associated with the macro.
MATCH() Function	A text function that returns the relative row position in a table or array for a defined criteria.

MAX()	A statistical function that returns the greatest numeric value in a given range.
MEDIAN()	A statistical function that returns the value in the middle of a given range where half the values are more, and half are less. Not to be confused with the AVERAGE() function.
MID()	A text function that returns characters from a cell based on user-defined beginning point, and maximum count.
Middle Align	A text alignment tool that vertically locates cell contents in the middle of a given cell.
MIN()	A statistical function that returns the numerically least value in a specified range or array.
Mixed Reference	A formula tool for anchoring a cell reference either by column, or by row, by placing a "$" sign in front of the column letter, or the row number. Cell references can also be toggled using the [F4] key.
MODE()	A statistical function that returns the most commonly occurring numeric data point in a selected range.
MONTH()	A text function that returns the month number from a specified cell with the number content formatted as a any type of number, based on a beginning point of one being 01 JAN 1900.
Named Range	A table or database option for identifying a workbook range by a user-specified label in addition to column/row names for quick reference in formula-writing or locating. Names for ranges can be viewed and written in the Name Box to the left of the Insert Function icon and the Formula Bar.
Nesting Functions	Text functions that operate based on logical arguments when evaluating data for best solution to return.
Non-contiguous Ranges	Data ranges with column or row breaks between non-blank cells. When intentional, these provide useful barriers for separating non-related data. If breaks between related data are present, DataFill formula copying will not populate beyond the data breaks without manual intervention.
NOW()	A time function that returns the computer-provided time in the given cell. This function updates upon refresh.
NPV() Function	A financial function that returns the present value of projected future income values for an initial investment.
Operator	Sometimes referred to as a Comparison Operator. Characters or a set of characters used in conditional statements to test arguments. The six operators are Equals (=), Less than (<), Greater than (>), Less than or equal to (<=), Greater than or equal to (>=), Not equal to (<>).
Orientation	A Page Layout tool divided between Portrait and Landscape used for displaying information as it would print on paper, etc.

Page Break	A Page Layout detail that defines where the end of a page would be when printed, based on margin values compared to cell dimensions. As a selected option, a spreadsheet will display Page Breaks with virtual perforations.
Paint	A Windows-based program outside of Excel where graphics/images can be view, modified, created, and/or saved.
Parent/child relationship	A relational database term for identifying how data is connected to other data between ranges.
Password	A case-sensitive login credential for accessing the student training portal at ExcelCEO.com. A temporary password is initially assigned for first-time access, which can be changed once logged into the specific profile using the access boxes to the upper-right of ExcelCEO.com. After periods of inactivity, or for other reasons, a registered ExcelCEO student can have their password sent to the email address associated with the profile using the [Forgot Your Password?] link below the login area.
Paste	A text function that takes cut or copied data from the Clipboard, and locates it in a specified cell, or group of cells.
PivotChart	An advanced Excel feature that displays PivotTable Data in a graphical format. New in Excel 2013, PivotChart data can be built without first creating a PivotTable, and the chart can update when/if linked data changes. A PivotTable is still built in the background.
PivotTable	An advanced Excel feature for in-depth analysis and organization of data that does not alter the original data. Data can be displayed using filters, slicers, and modified column and row information identified in the original source data, or through user-created Calculated Fields.
PivotTable Field List	A listing of available column headers in the original source data and any Calculated Fields, as well as a four-part grid that allows the user to adapt filters, column and row data, and value formats to display.
PivotTable Fields	Column headers from the source data, or Calculated Fields, that can be inputted in the PivotTable organization grid through checking boxes, or drag-and-drop ability. Additional data ranges can be utilized through the Excel Data Model.
PMT() Function	A financial function for determining the amount a payment would be based on an initial value, number of periods payments would be due, and the interest rate for the initial value. This is a required component for an amortization schedule.
Precedent Cell	Used in Data Validation to identify cell references affected by formula errors
Primary Key	A relational database unique identifier for how data in one range relates to another range when analyzing specific data contained in one range that is not available in another related range.

Print Preview	A visual representation of the way data in a specified range would display on a printed page.
Progress Report	An emailed reported at a user-specified interval that tracks online progress through the course(s) for which the ExcelCEO student is registered.
PROPER()	A text function that takes text from a defined cell, returning the text with the first letter capitalized, and the remaining letters in lower-case format.
Protect	An option within Excel for locking certain aspects of a cell or range against changes to formulas or data without inputting the assigned password.
PV() Function	A financial function for establishing the value of an investment based on the total of future investment payments in present-day dollars, based on a specified discount rate — often the expected inflation rate reversed.
Quick Access Toolbar	A customizable group of icons that enables the Excel user to quickly access commonly used features. Default icons include Save, Undo, and Redo
Quick Analysis	A new feature since Excel 2013, available through an icon that appears after a range is selected, for seeing visual representations of the data from a group of tool options.
RAND()	A number function that returns a random numeric value without regard to integer constraints. In other words, the value returned would be fully random.
RANDBETWEEN()	A function similar to RAND() that provides the ability for the Excel user to define minimum and maximum random values.
RANK() Function	An analysis function that allows the Excel user to learn the relative location of a specified value in a user-defined range, with the option to sort in Ascending or Descending order.
Recommended Charts	A new chart element since Excel 2013 that provides visual previews of how selected data would appear in a variety of chart formats.
Redo	A right-facing arrow icon with a curved shaft that is designed to reapply the last step that was removed.
Relative reference	A column/row name in a formula without any anchors to specific cells, columns, or rows (anchors being identified as "$" before the column letter, or row number).
Revenue	A measurement of received payments that do not take into account any related fixed or variable expenses applied to the unit sold.

Review Questions	A hands-on learning component of the ExcelCEO student experience in the online profile at ExcelCEO.com (for students registered for a complete course) where the student is given questions that test their knowledge of the Excel program taught directly up to that point, or peripheral knowledge that can be gained at the time the question is given, in order to further enhance learning opportunities. Each section of Review Questions is delivered sequentially, not graded, but must be completed in order to move forward in the online portion of ExcelCEO training, and each section of Review Questions must be completed prior to the Main Menu text link updating to display that chapter's exam link. Each option selection provides an answer and explanation.
RIGHT()	A text function that returns/extracts a specified number of characters from a defined cell, counting from the right-most character in that cell.
ROUND() Function	A number function that takes numeric values in cells, and provides the closest whole number to the specified space, filling in the rest with zeroes. The rounding space number is defined from the decimal placement, with positive numbers being to the right of the decimal, and negative numbers applying to number slots to the left of the decimal.
Rows	Horizontal groups of spreadsheet cells named numerically in Ascending order.
Screen tip	A temporary window seen when hovering over an object in the workbook. Screen tips include shortcut key stroke combinations, and brief descriptions of object capabilities.
SEARCH()	A text function that returns the numeric starting place in a defined cell where the user-defined text is located, from the given beginning point.
Show Detail	A box with a "+" sign inside used for showing (or expanding) low-level details, allowing the Excel user to see more than summary levels for the Data.
Slicers	An Excel feature new since Excel 2010 that provides data manipulation capability where the user can filter specific ranges of data, and see a visual representation of which data is being displayed.
Solver	A "What-if Analysis" mini-program that can take multiple user-defined constraints, and find an answer to a problem that satisfies those requirements.
Sparklines	A chart feature new since Excel 2010 that allows the user to apply miniature charts to rows to identify Data trends applicable to that specific data. Options include: line, bar, and win/loss charts.
Spin Button	A Developer tab add-in that allows data to be modified graphically at user-defined intervals through use of up/down buttons tied to a specific cell rather than through manually typing the change.

Spreadsheet	A grid of columns and rows that can be used for organizing, calculating, sorting, summarizing, etc. In Microsoft Excel, Columns are identified alphabetically, and rows are identified numerically.
Status Bar	A customizable feature to the bottom of the Excel window that shows details such as the AutoSum of selected cells, average, and count. To access the Status Bar options list, right-click the colored bar on the Excel window.
Subtotal	A database function that can apply summary data labels and values for specific groups of data.
SUM()	A number function that provides the mathematical total for the cell range provided using addition or subtraction.
SUMIF()	A conditional number function that returns a mathematical total for cells in a range that meet a defined criteria.
SUMIFS()	A conditional number function that returns a mathematical total for cells in a range that meet a defined criteria or condition.
Tags	HTML markers identified by web browsers to display the enclosed text or object(s) in a pre-defined way
Text Functions	A group of Excel tools designed to interact with specified data using logical arguments and conditions to return the first true value available.
Text to Columns	An external database tool for inputting data from other sources and formats based on user-identifed separators, or delimiters, that determine column, row, and cell breaks. This method is not formula-based.
Title Bar	The area at the top-center of the workbook that identifies the file name and program. Unsaved file names will begin with “Book”, such as Book1.
TODAY()	A text function that identifies the calendar date when written, or updated, and is absent of a defined time, as provided with the NOW() function.
Top Align	A cell text feature that aligns text vertically at the top of the selected cell.
Trendline	A chart feature new since Excel 2010 that allows the user to apply present and forecasted lines that represent they way data now displays, and how it would look if the data remained constant through the future periods chosen.
TRIM()	A text function designed to remove seen and unseen spaces surrounding cell data, which can otherwise affect formula performance and/or displayed appearance.
Underline	A text feature that places a solid line below a specified cell’s data, and is used for separation, isolation, or attention purposes.

Underscore	A single-character displayed as a line at the bottom of the text field, often as the visual representation of a space, or to improve functionality for programs that do not easily recognize unmarked spaces.
Undo	A left-facing arrow icon with a curved shaft that is designed to remove the most recent function or input application.
UPPER()	A text function that returns the contents of a chosen cell in all capital format.
User ID	An identifying credential for logging into a website. ExcelCEO students provide email addresses for User IDs, which can be changed in the student profile Main Menu, as needed. [Forgot Your Password?] requests are setup to send the information to that address as well.
Variable Expense	A financial outgo of capital that changes based on product or service output, material or labor costs, etc.
VBA	Visual Basic for Applications. A programming language used for executing macros and executable tasks.
Validation Rules	User-defined criteria for inputting data in a cell that requires specific values for dependent Formulas to perform properly.
VALUE()	A text function that returns the static, displayed characters from a specified cell without formula dynamics applied.
VLOOKUP()	A vertical lookup function that searches for a defined number, text string, value, or formula result in a specified data range, and returns a related value from a specified column number within that range. The value returned can be user-defined as exact or relative.
WEEKDAY()	A number function that returns the numeric position of the calendar day of the week for a date-formatted number, or number identified as a date is located. Several weekday options are available.
WordArt	A graphical text function used to format text in a variety of display options in a Text Box.
YEAR()	A date function that returns the year number from a numerically-formatted target cell, based on the number 1 representing 01 JAN 1900.

INDEX

Symbols

A

B

C

D

E

F

G

H

I

K

L

M

N

O

P

Q

R

S

T

U

V

W

Y