

# 3 Excel 365

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#### IN THIS CHAPTER

- » Creating an Excel workbook
- » Entering text as well as numeric, date, and time data
- » Using the AutoFill command to enter lists and serial data
- » Setting up data-validation rules

## Chapter 1

# Up and Running with Excel

This chapter introduces *Microsoft Excel*, the official number cruncher of Office 365. The purpose of Excel is to track, analyze, and tabulate numbers. Use the program to project profits and losses, formulate a budget, or analyze Elvis sightings in North America. Doing the setup work takes time, but after you enter the numbers and tell Excel how to tabulate them, you're on Easy Street. Excel does the math for you. All you have to do is kick off your shoes, sit back, and see how the numbers stack up.

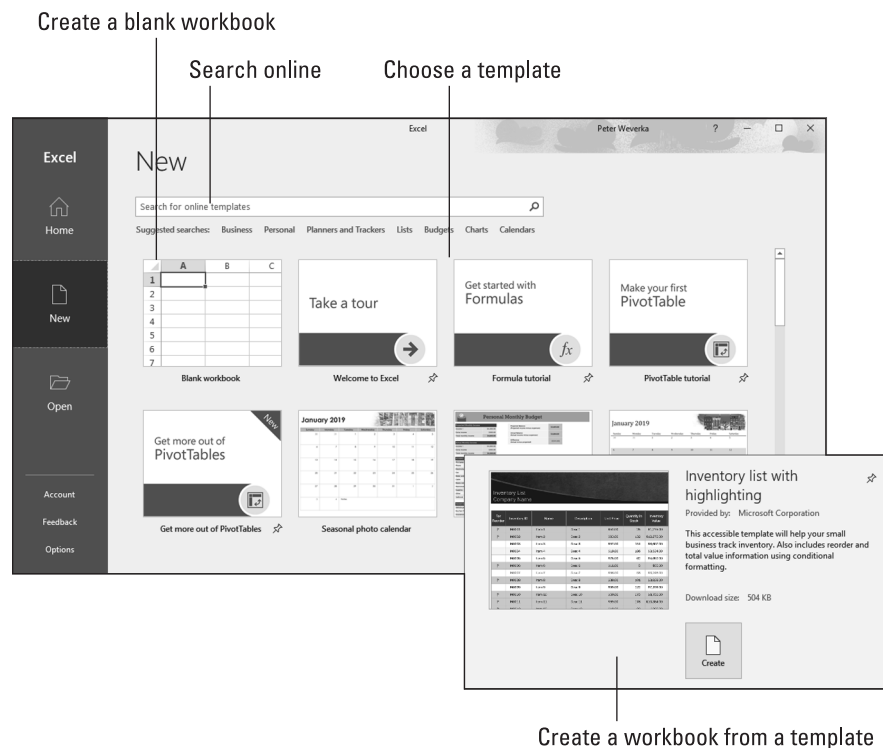
This chapter explains what a workbook and a worksheet is, and how rows and columns on a worksheet determine where cell addresses are. You also discover tips and tricks for entering data quickly in a worksheet and how to construct data-validation rules to make sure that data is entered accurately.

## Creating a New Excel Workbook

*Workbook* is the Excel term for the files you create with Excel. When you create a workbook, you are given the choice of creating a blank workbook or creating a workbook from a template.

A *template* is a preformatted workbook designed for a specific purpose, such as budgeting, tracking inventories, or tracking purchase orders. Creating a workbook from a template is mighty convenient if you happen to find a template that suits your purposes, but in my experience, you almost always have to start from a generic, blank workbook because your data is your own. You need a workbook that you create yourself, not one created from a template by someone else.

To create a workbook, begin by going to the File tab and choosing New. You see the New window, shown in Figure 1-1. This window offers templates for creating workbooks and the means to search for templates online.



**FIGURE 1-1:**  
Create a workbook by starting in the New window.

Use these techniques in the New window to choose a template and create a workbook:

» **Choose the blank workbook template.** Choose Blank Workbook to create a plain template.

Press **Ctrl+N** to create a new, blank workbook without opening the New window.



**TIP**

- » **Choose a template.** Select a template to examine it in a preview window (refer to Figure 1-1). If you like what you see, click the Create button in the preview window to create a document from the template.
- » **Search online for a template.** Enter a search term in the Search box and click the Start Searching button (or click a suggested search term). New templates appear in the New window. Click a template to preview it (see Figure 1-1). Click the Create button in the preview window to create a document from the template.

Book 1, Chapter 1 explains how to save files after you create them, as well as how to open a file, including an Excel workbook.

## Getting Acquainted with Excel

If you've spent any time in an Office application, much of the Excel screen may look familiar to you. The buttons on the Home tab — the Bold and the Align buttons, for example — work the same in Excel as they do in Word. The Font and Font Size drop-down lists work the same as well. Any command in Excel that has to do with formatting text and numbers works the same in Excel and Word.

As mentioned earlier, an Excel file is a *workbook*. Each workbook comprises one or more worksheets. A *worksheet*, also known as a *spreadsheet*, is a table into which you enter data and data labels. Figure 1-2 shows a worksheet with data about rainfall in different counties.

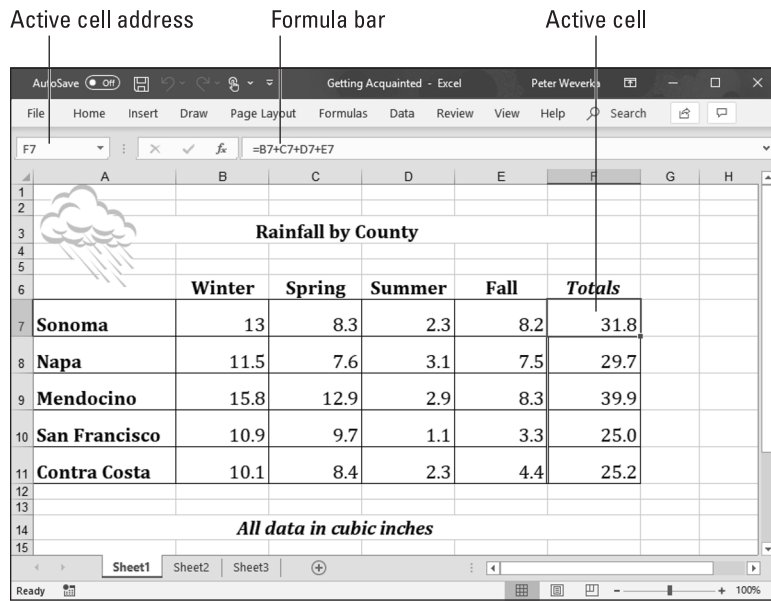
A worksheet works like an accountant's ledger — only it's much easier to use. Notice how the worksheet is divided by gridlines into columns (A, B, C, and so on) and rows (1, 2, 3, and so on). The rectangles where columns and rows intersect are *cells*, and each cell can hold one data item, a formula for calculating data, or nothing at all.

Each cell has a different cell address. In Figure 1-2, cell B7 holds 13, the number of inches of rain that fell in Sonoma County in the winter. Meanwhile, as the Formula bar at the top of the screen shows, cell F7, the *active cell*, holds the formula  $=B7+C7+D7+E7$ , the sum of the numbers in cells — you guessed it — B7, C7, D7, and E7.



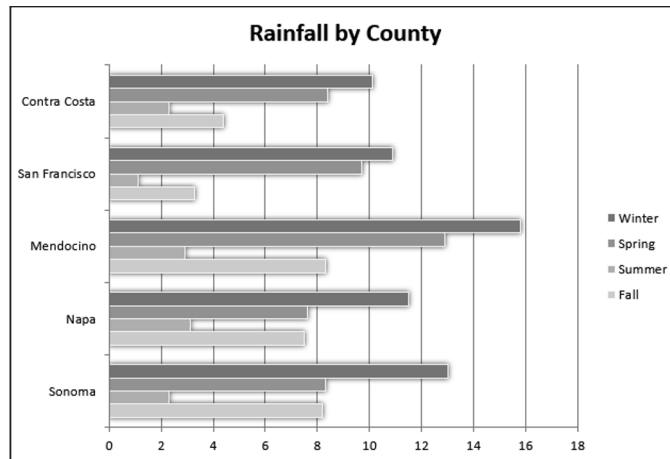
REMEMBER

The beauty of Excel is that the program does all the calculations and recalculations for you after you enter the data. If I were to change the number in cell B7, Excel would instantly recalculate the total amount of rainfall in Sonoma County in cell F7. People like myself who struggled in math class will be glad to know that you don't have to worry about the math because Excel does it for you. All you have to do is make sure that the data and the formulas are entered correctly.



**FIGURE 1-2:**  
The Excel screen.

After you enter and label the data, enter the formulas, and turn your worksheet into a little masterpiece, you can start analyzing the data. For example, you can generate charts like the one in Figure 1-3. Do you notice any similarities between the worksheet in Figure 1-2 and the chart in Figure 1-3? The chart is fashioned from data in the worksheet, and it took me about half a minute to create that chart. (Book 8, Chapter 1 explains how to create charts in Excel, Word, and PowerPoint.)



**FIGURE 1-3:**  
A chart generated  
from the data in  
Figure 1-2.

## Rows, columns, and cell addresses

Not that anyone needs them all, but an Excel worksheet has numerous columns and more than 1 million rows. The rows are numbered, and columns are labeled A to Z, then AA to AZ, then BA to BZ, and so on. The important thing to remember is that each cell has an address whose name comes from a column letter and a row number. The first cell in row 1 is A1, the second is B1, and so on. You need to enter cell addresses in formulas to tell Excel which numbers to compute.

To find a cell's address, either make note of which column and row it lies in or click the cell and glance at the Formula bar (refer to Figure 1-2). The left side of the Formula bar lists the address of the *active cell*, the cell that is selected in the worksheet. In Figure 1-2, cell F7 is the active cell.

## Workbooks and worksheets

By default, each workbook includes one worksheet, called Sheet1, but you can add more worksheets (and rename worksheets, too). Think of a workbook as a stack of worksheets. Besides calculating the numbers in cells across the rows or down the columns of a worksheet, you can make calculations throughout a workbook by using numbers from different worksheets in a calculation. Chapter 2 of this minibook explains how to add worksheets, rename worksheets, and do all else that pertains to them.

# Entering Data in a Worksheet

Entering data in a worksheet is an irksome activity. Fortunately, Excel offers a few shortcuts to take the sting out of it. These pages explain how to enter data in a worksheet, what the different types of data are, and how to enter text labels, numbers, dates, and times.

## The basics of entering data

What you can enter in a worksheet cell falls into four categories:

- » Text
- » A value (numeric, date, or time)
- » A logical value (True or False)
- » A formula that returns a value, logical value, or text

Still, no matter what type of data you're entering, the basic steps are the same:

**1. Click the cell where you want to enter the data or text label.**

As shown in Figure 1-4, a square appears around the cell to tell you that the cell you clicked is now the active cell. Glance at the left side of the Formula bar if you're not sure of the address of the cell you're about to enter data in. The Formula bar lists the cell address.

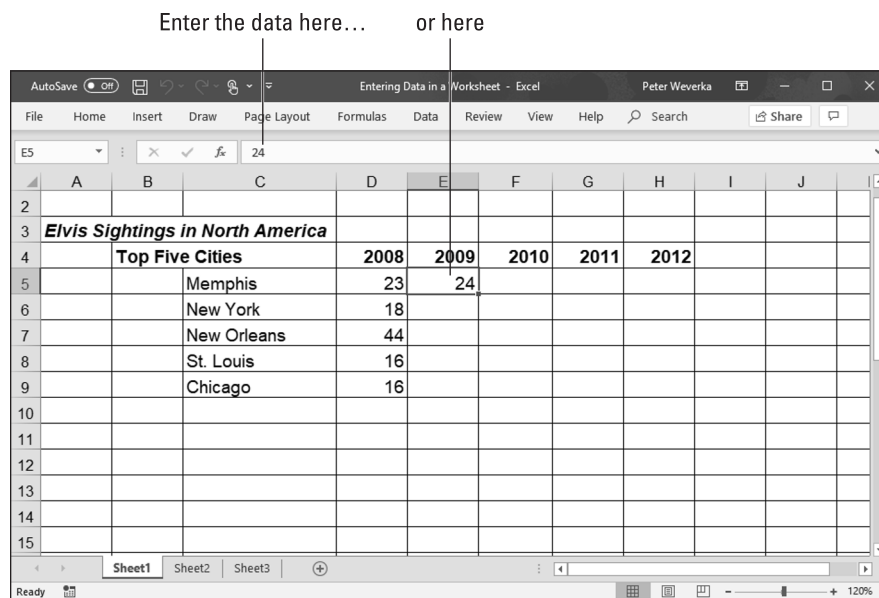
**2. Type the data in the cell.**

If you find typing in the Formula bar easier, click and start typing there.

**3. Press the Enter key to enter the number or label.**

Besides pressing the Enter key, you can also press an arrow key (←, ↑, →, ↓), press Tab, click the Enter button (the check mark) on the Formula bar, or click elsewhere on the worksheet.

If you change your mind about entering data, click the Cancel button or press Esc to delete what you entered and start over. The Cancel button (an X) is located on the Formula bar next to the Enter button (a check mark) and the Insert Function button (labeled *fx*).



**FIGURE 1-4:**  
Entering data.



Chapter 3 of this minibook explains how to enter logical values and formulas. The next several pages describe how to enter text labels, numeric values, date values, and time values.

## Entering text labels

Sometimes a text entry is too long to fit in a cell. How Excel accommodates text entries that are too wide depends on whether data is in the cell to the right of the one you entered the text in:

- » If the cell to the right is empty, Excel lets the text spill into the next cell.
- » If the cell to the right contains data, the entry gets cut off. Nevertheless, the text you entered is in the cell. Nothing gets lost when it can't be displayed onscreen. You just can't see the text or numbers except by glancing at the Formula bar, where the contents of the active cell can be seen in their entirety.

Use these techniques to solve the problem of text that doesn't fit in a cell:

- » Widen the column to allow room for more text.
- » Shorten the text entry.
- » Reorient the text (Chapter 4 of this minibook explains how to do it).
- » Wrap the contents of the cell. *Wrapping* means to run the text down to the next line, much the same way as the text in a paragraph runs to the next line when it reaches the right margin. Excel makes rows taller to accommodate wrapped text in a cell. To wrap text in cells, select the cells, go to the Home tab, and click the Wrap Text button (found in the Alignment group).

## Entering numeric values



REMEMBER

When a number is too large to fit in a cell, Excel displays pounds signs (###) instead of a number or displays the number in scientific notation (8.78979E+15). You can always glance at the Formula bar, however, to find out the number in the active cell. As well, you can always widen the column to display the entire number.

To enter a fraction in a cell, enter a 0 or a whole number, a blank space, and the fraction. For example, to enter  $\frac{3}{8}$ , type a 0, press the spacebar, and type  $\frac{3}{8}$ . To enter  $\frac{53}{8}$ , type 5, press the spacebar, and type  $\frac{3}{8}$ . For its purposes, Excel converts fractions to decimal numbers, as you can see by looking in the Formula bar after you enter a fraction. For example,  $\frac{53}{8}$  displays as 5.375 in the Formula bar.



TIP

Here's a little trick for entering numbers with decimals quickly in all the Excel files you work on. To spare yourself the trouble of pressing the period key (.), you can tell Excel to enter the period automatically. Instead of entering **12.45**, for example, you can simply enter **1245**. Excel enters the period for you: 12.45. To perform this trick, go to the File tab, choose Options, visit the Advanced category in the Excel Options dialog box, click the Automatically Insert a Decimal Point check box, and in the Places text box, enter the number of decimal places you want for numbers. Deselect this option when you want to go back to entering numbers the normal way.

## Entering date and time values

Dates and times can be used in calculations, but entering a date or time value in a cell can be problematic because these values must be entered in such a way that Excel can recognize them as dates or times, not text.



TECHNICAL STUFF

Not that you necessarily need to know it, but Excel converts dates and times to serial values for the purpose of being able to use dates and times in calculations. For example, July 31, 2004, is the number 38199. July 31, 2004, at noon is 38199.5. These serial values represent the number of whole days since January 1, 1900. The portion of the serial value to the right of the decimal point is the time, represented as a portion of a full day.

### Entering date values

You can enter a date value in a cell in just about any format you choose, and Excel understands that you're entering a date. For example, enter a date in any of the following formats and you'll be all right:

<i>m/d/yy</i>	7/31/19
<i>m-d-yyyy</i>	7-31-2019
<i>d-mmm-yy</i>	31-Jul-19

Here are some basic things to remember about entering dates:

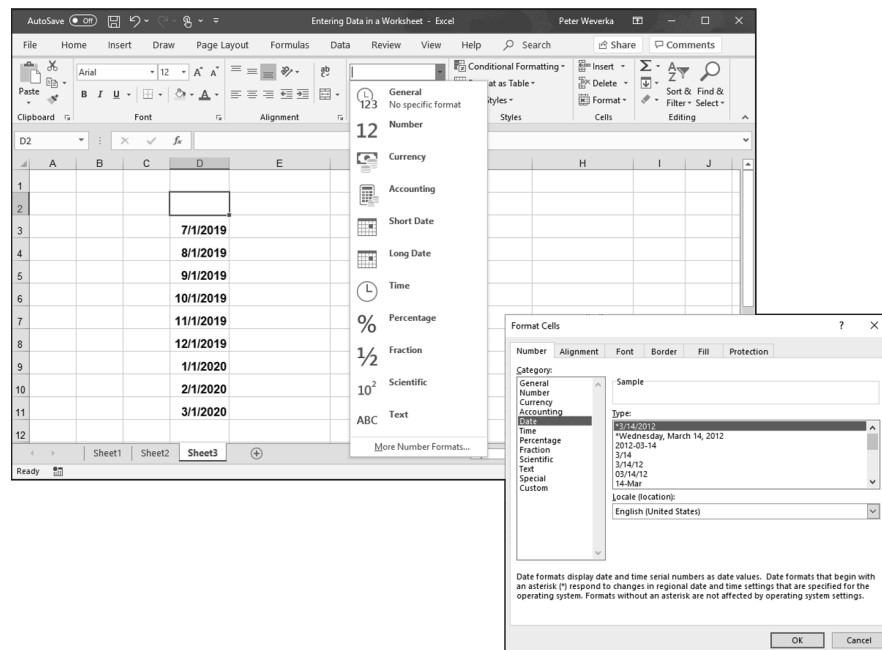
- » **Date formats:** You can quickly apply a format to dates by selecting cells and using one of these techniques:
  - On the Home tab, open the Number Format drop-down list and choose Short Date (*m/d/yyyy*; 7/31/2016) or Long Date (*day of the week, month, day, year*; Wednesday, July 31, 2016), as shown in Figure 1-5.

- On the Home tab, click the Number group button to open the Number tab of the Format Cells dialog box. As shown in Figure 1-5, choose the Date category and then choose a date format.

- » **Current date:** Press Ctrl+; (semicolon) to enter the current date.
- » **Current year's date:** If you don't enter the year as part of the date, Excel assumes that the date you entered is in the current year. For example, if you enter a date in the *m/d* (7/31) format during the year 2019, Excel enters the date as 7/31/19. As long as the date you want to enter is the current year, you can save a little time when entering dates by not entering the year because Excel enters it for you.
- » **Dates on the Formula bar:** No matter which format you use for dates, dates are displayed in the Formula bar in the format that Excel prefers for dates: *m/d/yyyy* (7/31/2019). How dates are displayed in the worksheet is up to you.
- » **Twentieth and twenty-first century two-digit years:** When it comes to entering two-digit years in dates, the digits 30 through 99 belong to the twentieth century (1930–1999), but the digits 00 through 29 belong to the twenty-first century (2000–2029). For example, 7/31/13 refers to July 31, 2013, not July 31, 1910. To enter a date in 1929 or earlier, enter four digits instead of two to describe the year: **7-31-1929**. To enter a date in 2030 or later, enter four digits instead of two: **7-31-2030**.



REMEMBER



**FIGURE 1-5:** Format dates and numbers on the Number Format drop-down list or Format Cells dialog box.

Up and Running with  
Excel



»» **Dates in formulas:** To enter a date directly in a formula, enclose the date in quotation marks. (Make sure that the cell where the formula is entered has been given the Number format, not the Date format.) For example, the formula `=TODAY()-"1/1/2019"` calculates the number of days that have elapsed since January 1, 2019. Formulas are the subject of Chapter 3 of this minibook.

## Entering time values

Excel recognizes time values that you enter in the following ways:

<i>h:mm</i> AM/PM	3:31 AM
<i>h:mm:ss</i> AM/PM	3:31:45 PM

Here are some things to remember when entering time values:

- »» **Use colons:** Separate hours, minutes, and seconds with a colon (:).
- »» **Time formats:** To change to the *h:mm:ss* AM/PM time format, select the cells, go to the Home tab, open the Number Format drop-down list, and choose Time (see Figure 1-5). You can also change time formats by clicking the Number group button on the Home tab and selecting a time format on the Number tab of the Format Cells dialog box.
- »» **AM or PM time designations:** Unless you enter AM or PM with the time, Excel assumes that you're operating on military time. For example, 3:30 is considered 3:30 a.m.; 15:30 is 3:30 p.m. Don't enter periods after the letters *am* or *pm* (don't enter a.m. or p.m.).
- »» **Current time:** Press Ctrl+Shift+; (semicolon) to enter the current time.
- »» **Times on the Formula bar:** On the Formula bar, times are displayed in this format: *hours:minutes:seconds*, followed by the letters AM or PM. However, the time format used in cells is up to you.

## Combining date and time values

You can combine dates and time values by entering the date, a blank space, and the time:

- »» 7/31/13 3:31 am
- »» 7-31-13 3:31:45 pm

## ENTERING DATA WITH FLASH FILL

Don't look now, but Excel is peering over your shoulder to see whether it can enter data for you with Flash Fill, a mechanism whereby Excel recognizes the data you want to enter and offers to enter it on your behalf. When Excel recognizes a pattern in the data and thinks it can fill in a column for you, a ghostly image of the data Excel wants to enter appears in the column. Press Enter if you want to enter this data.

After you press Enter, the Flash Fill Options button appears. Click it to open a menu with options for Undoing Flash Fill and selecting cells.

Flash Fill is useful for cleaning up worksheets with data that you imported from a comma- or tab-delimited file. Often this data arrives in a mishmash with data from different categories in the same column.

Date	Transaction	Score	Name		
2/2/2013	Weverka-4971	48	Weverka		
2/2/2013	Johnson-891	42	Johnson		
2/3/2013	McKeil- 497	78	McKeil		
2/4/2013	Munoz-9071	23	Munoz		
2/4/2013	Hong-9781	12	Hong		
2/5/2013	Chester-9714	34	Chester		

## Quickly Entering Lists and Serial Data with the AutoFill Command

Data that falls into the “serial” category — month names, days of the week, and consecutive numbers and dates, for example — can be entered quickly with the AutoFill command. Believe it or not, Excel recognizes certain kinds of serial data and enters it for you as part of the AutoFill feature. Instead of laboriously entering this data one piece at a time, you can enter it all at one time by dragging the mouse. Follow these steps to “autofill” cells:

- 1. Click the cell that is to be first in the series.**

For example, if you intend to list the days of the week in consecutive cells, click where the first day is to go.

2. Enter the first number, date, or list item in the series.
3. Move to the adjacent cell and enter the second number, date, or list item in the series.

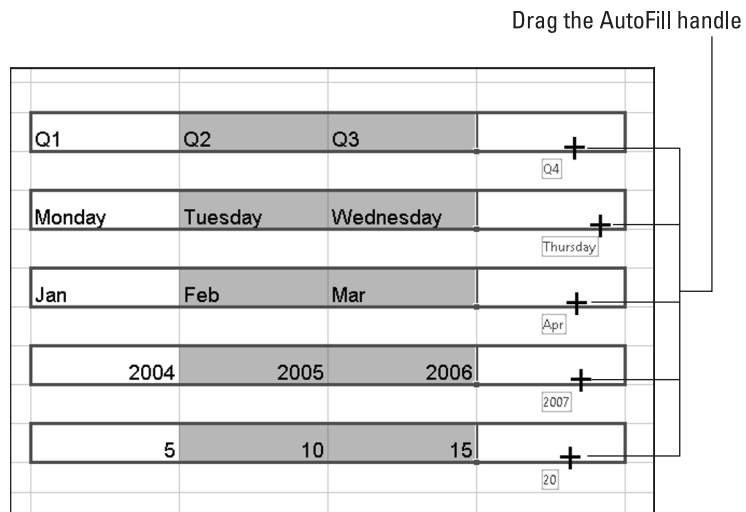
If you want to enter the same number or piece of text in adjacent cells, taking this step isn't necessary, but Excel needs the first and second items in the case of serial dates and numbers so that it can tell how much to increase or decrease the given amount or time period in each cell. For example, entering **5** and **10** tells Excel to increase the number by 5 each time so that the next serial entry is 15.

4. Select the cell or cells you just entered data in.

To select a single cell, click it; to select two, drag over the cells. Chapter 2 of this minibook describes all the ways to select cells in a worksheet.

5. Click the **AutoFill** handle and start dragging in the direction in which you want the data series to appear on your worksheet.

The *AutoFill handle* is the little green square in the lower-right corner of the cell or block of cells you selected. As you drag, the serial data appears in a pop-up box, as shown in Figure 1-6.



**FIGURE 1-6:** Entering serial data and text.

The AutoFill Options button appears after you enter the serial data. Click it and choose an option if you want to copy cells or fill the cells without carrying along their formats.

## CREATING YOUR OWN AUTOFILL LIST

As you probably know, Excel is capable of completing lists on its own with the AutoFill feature. You can enter the days of the week or month names simply by entering one day or month and dragging the AutoFill handle to enter the others. Here's some good news: The AutoFill command can also reproduce the names of your coworkers, the roster of a softball team, street names, or any other list that you care to enter quickly and repeatedly in a worksheet.

Follow these steps to enter items for a list so that you can enter them in the future by dragging the AutoFill handle:

**1. If you've already entered items for the list on your worksheet, select the items.**

If you haven't entered the items yet, skip to Step 2.

**2. On the File tab, choose Options to open the Excel Options dialog box.**

**3. Go to the Advanced category.**

**4. Click the Edit Custom Lists button (you have to scroll down to find it).**

You see the Custom Lists dialog box.

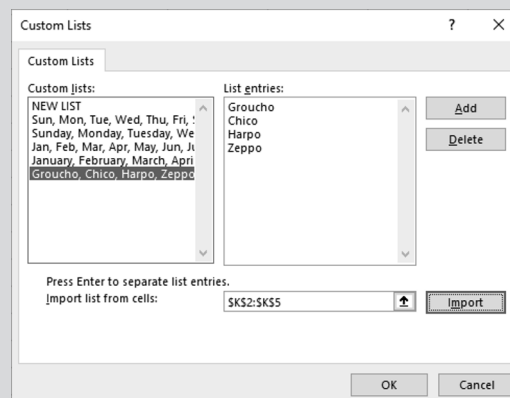
**5. In the List Entries box, do one of the following:**

If you selected the items in Step 1, click the Import button. The items you selected appear in the List Entries box.

If you need to enter items for the list, enter them in the List Entries box, with one item on each line.

**6. Click the Add button.**

**7. Click OK.**





TIP

To enter the same number or text in several empty cells, drag over the cells to select them or select each cell by holding down the Ctrl key as you click. Then type a number or some text and press Ctrl+Enter.

## Formatting Numbers, Dates, and Time Values

When you enter a number that Excel recognizes as belonging to one of its formats, Excel assigns the number format automatically. Enter **45%**, for example, and Excel assigns the Percentage number format. Enter **\$4.25**, and Excel assigns the Currency number format. Besides assigning formats by hand, however, you can assign them to cells from the get-go and spare yourself the trouble of entering dollar signs, commas, percent signs, and other extraneous punctuation. All you have to do is enter the raw numbers. Excel does the window dressing for you.

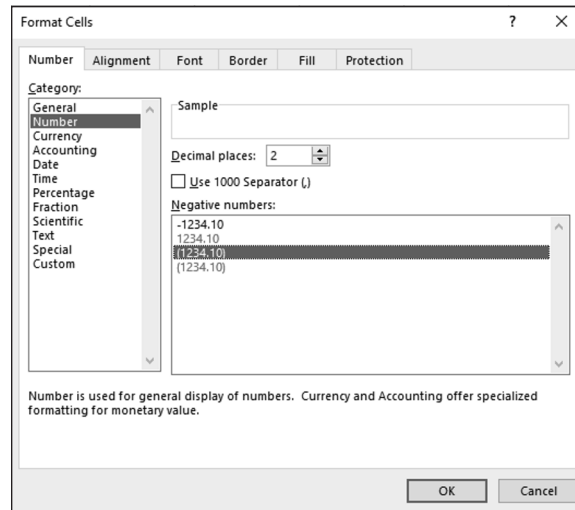
Excel offers five number-formatting buttons on the Home tab. Select cells with numbers in them and click one of these buttons to change how numbers are formatted:

- » **Accounting Number Format:** Places a dollar sign before the number and gives it two decimal places. You can open the drop-down list on this button and choose a currency symbol apart from the dollar sign.
- » **Percent Style:** Places a percent sign after the number and converts the number to a percentage.
- » **Comma Style:** Places commas in the number.
- » **Increase Decimal:** Increases the number of decimal places by one.
- » **Decrease Decimal:** Decreases the number of decimal places by one.

To choose among many formats and to format dates and time values as well as numbers, go to the Home tab, click the Number group button, and make selections on the Number tab of the Format Cells dialog box. Figure 1-7 shows this dialog box. Choose a category and select options to describe how you want numbers or text to appear.

To strip formats from the data in cells, select the cells, go to the Home tab, click the Clear button, and choose Clear Formats.





**FIGURE 1-7:**  
The Number  
category of the  
Format Cells  
dialog box.



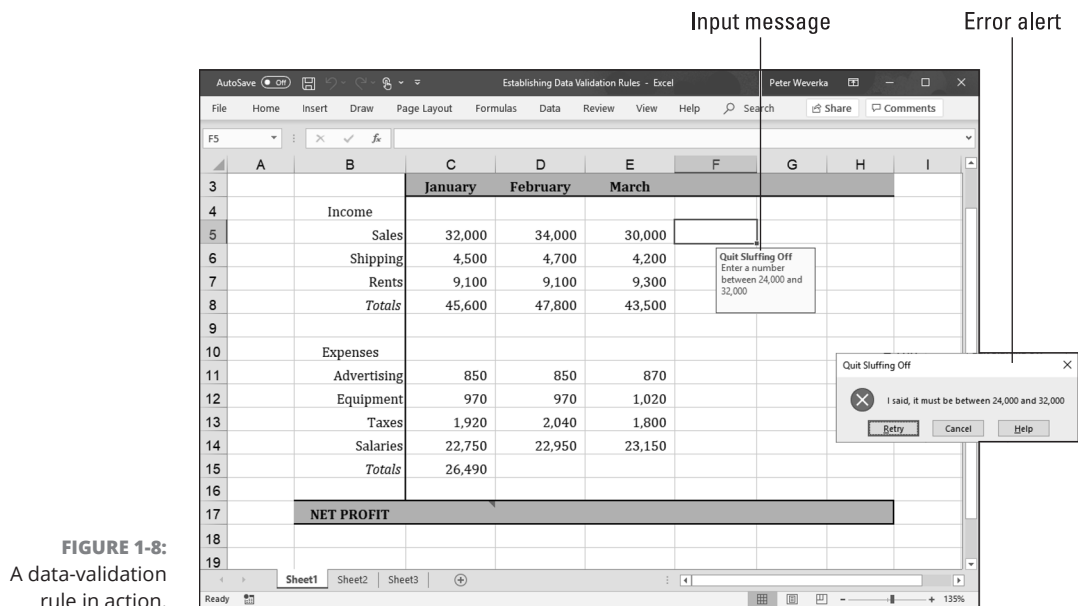
TIP

Entering ZIP codes can be problematic because Excel strips the initial zero from the number if it begins with a zero. To get around this problem, visit the Number tab of the Format Cells dialog box (see Figure 1-7), choose Special in the Category list, and select a ZIP code option.

## Establishing Data-Validation Rules

By nature, people are prone to enter data incorrectly because the task of entering data is so dull. This is why data-validation rules are invaluable. A *data-validation rule* is a rule concerning what kind of data can be entered in a cell. When you select a cell that has been given a rule, an input message tells you what to enter, as shown in Figure 1-8. And if you enter the data incorrectly, an error alert tells you as much, also shown in Figure 1-8.

Data-validation rules are an excellent defense against sloppy data entry and that itchy feeling you get when you're in the middle of an irksome task. In a cell that records date entries, you can require dates to fall in a certain time frame. In a cell that records text entries, you can choose an item from a list instead of typing it yourself. In a cell that records numeric entries, you can require the number to fall within a certain range. Table 1-1 describes the different categories of data-validation rules.



**FIGURE 1-8:**  
A data-validation rule in action.

**TABLE 1-1** Data-Validation Rule Categories

Rule	What Can Be Entered
Any Value	Anything whatsoever. This is the default setting.
Whole Number	Whole numbers (no decimal points allowed). Choose an operator from the Data drop-down list and values to describe the range of numbers that can be entered.
Decimal	Same as the Whole Number rule except numbers with decimal points are permitted.
List	Items from a list. Enter the list items in cells on a worksheet, either the one you're working in or another. Then reopen the Data Validation dialog box, click the Range Selector button (you can find it on the right side of the Source text box), and select the cells that hold the list. The list items appear in a drop-down list on the worksheet.
Date	Date values. Choose an operator from the Data drop-down list and values to describe the date range. Earlier in this chapter, "Entering date and time values" describes the correct way to enter date values.
Time	Time values. Choose an operator from the Data drop-down list and values to describe the date and time range. Earlier in this chapter, "Entering date and time values" describes the correct way to enter a combination of date and time values.
Text Length	A certain number of characters. Choose an operator from the Data drop-down list and values to describe how many characters can be entered.
Custom	A logical value (True or False). Enter a formula that describes what constitutes a true or false data entry.

Follow these steps to establish a data-validation rule:

1. **Select the cell or cells that need a rule.**
2. **On the Data tab, click the Data Validation button.**

As shown in Figure 1-9, you see the Settings tab of the Data Validation dialog box.

3. **On the Allow drop-down list, choose the category of rule you want.**

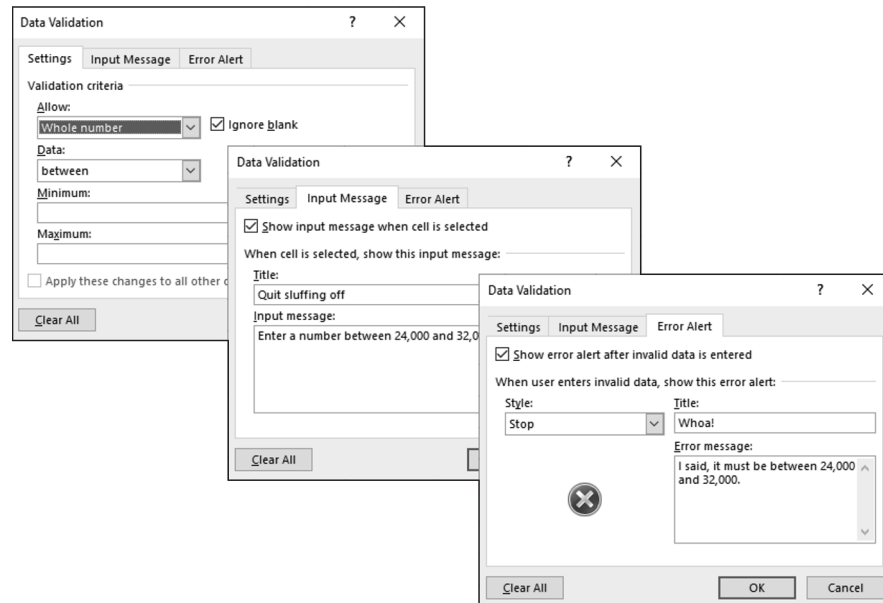
Table 1-1, earlier in this chapter, describes these categories.

4. **Enter the criteria for the rule.**

What the criteria is depends on what rule category you're working in. Table 1-1 describes how to enter the criteria for rules in each category. You can refer to cells in the worksheet by selecting them. To do that, either select them directly or click the Range Selector button and then select them.

5. **On the Input Message tab, enter a title and input message.**

You can see a title ("Quit Sluffing Off") and input message ("Enter a number between 24,000 and 32,000") in Figure 1-8. The title appears in boldface. Briefly describe what kind of data belongs in the cell or cells you selected.



**FIGURE 1-9:**  
Creating a  
data-validation  
rule.

**6. On the Error Alert tab, choose a style for the symbol in the Message Alert dialog box, enter a title for the dialog box, and enter a warning message.**

In the error message in Figure 1-8, shown previously, the Stop symbol was chosen. The title you enter appears across the top of the dialog box, and the message appears beside the symbol.

**7. Click OK.**

To remove data-validation rules from cells, select the cells, go to the Data tab, click the Data Validation button, and on the Settings tab of the Data Validation dialog box, click the Clear All button, and click OK.

#### IN THIS CHAPTER

- » Changing worksheet data
- » Making notes and commenting on a worksheet
- » Copying and moving data
- » Hiding and protecting worksheets so that they can't be altered

## Chapter 2

# Refining Your Worksheet

This chapter delves into the workaday world of worksheets (say that three times fast). It explains how to edit worksheet data and move quickly here and there in a worksheet. For the purposes of collaboration, you find out how to make notes and comments on worksheets. You also discover techniques for entering data quickly, selecting cells, and copying and moving data in cells. This chapter describes how to move, delete, and rename worksheets as well as protect them from being edited or altered.

## Editing Worksheet Data

Not everyone enters data correctly the first time. To edit data you entered in a cell, do one of the following:

- » **Double-click the cell.** Doing so places the cursor squarely in the cell, where you can start deleting or entering numbers and text.
- » **Click the cell and press F2.** This technique also lands the cursor in the cell.
- » **Click the cell you want to edit.** With this technique, you edit the data on the Formula bar.



TIP

If nothing happens when you double-click, or if pressing F2 lands the cursor in the Formula bar rather than a cell, somebody has been fooling with the Options settings. On the File tab, choose Options, select the Advanced category in the Excel Options dialog box, and select the Allow Editing Directly in Cells check box.

## Moving around in a Worksheet

Going from place to place gets progressively more difficult as a worksheet gets larger. Luckily for you, Excel offers keyboard shortcuts for jumping around. Table 2-1 describes these keyboard shortcuts.

TABLE 2-1

### Keyboard Shortcuts for Getting around in Worksheets

Press. . .	To Move the Selection. . .
Home	To column A
Ctrl+Home	To cell A1, the first cell in the worksheet
Ctrl+End	To the last cell in the last row with data in it
←, →, ↑, ↓	To the next cell
Ctrl+←, →, ↑, ↓	In one direction toward the nearest cell with data in it or to the first or last cell in the column or row
PgUp or PgDn	Up or down one screen's worth of rows
Ctrl+PgUp or Ctrl+PgDn	Backward or forward through the workbook, from worksheet to worksheet

As well as pressing keys, you can use the following techniques to get from place to place in a worksheet:

- » **Scroll bars:** Use the vertical and horizontal scroll bars to move to different areas. Drag the scroll box to cover long distances. To cover long distances very quickly, hold down the Shift key as you drag the scroll box on the vertical scroll bar.
- » **Scroll wheel on the mouse:** If your mouse is equipped with a scroll wheel, turn the wheel to quickly scroll up and down.
- » **Name box:** Enter a cell address in the Name box and press Enter to go to the cell. The Name box is found to the left of the Formula bar.

- »» **The Go To command:** On the Home tab, click the Find & Select button and choose Go To on the drop-down list (or press Ctrl+G or F5). You see the Go To dialog box. Enter a cell address in the Reference box and click OK. Cell addresses you've already visited with the Go To command are already listed in the dialog box. Click the Special button to open the Go To Special dialog box and visit a formula, comment, or other esoteric item.
- »» **The Find command:** On the Home tab, click the Find & Select button and choose Find on the drop-down list (or press Ctrl+F). Enter the data you seek in the Find What box and click the Find Next button. Click the Find All button to find all instances of the item you're looking for. A list of the items appears at the bottom of the dialog box; click an item to go to it.



TIP

To scroll to the active cell if you no longer see it onscreen, press Ctrl+Backspace.

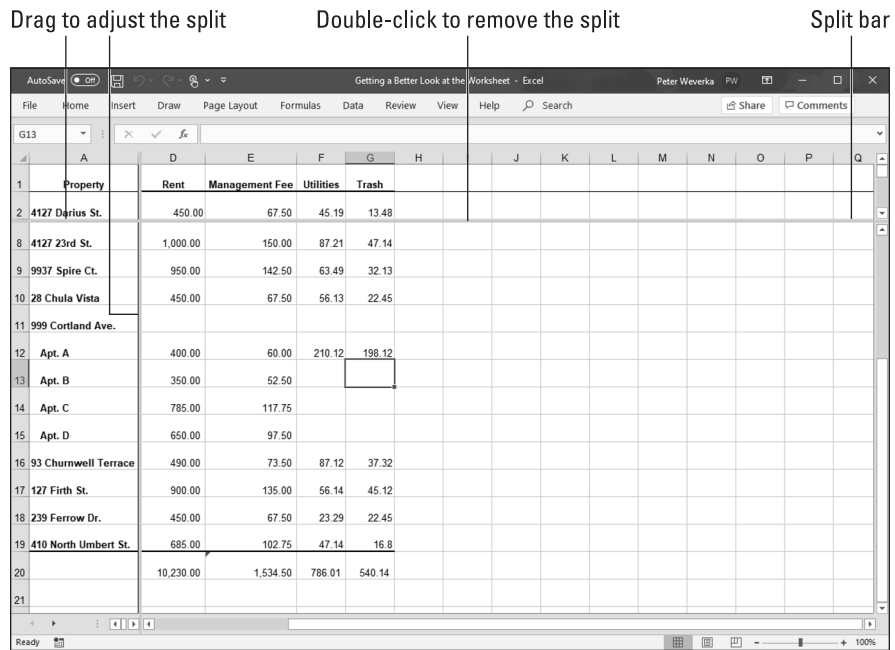
## Getting a Better Look at the Worksheet

Especially when you're entering data, it pays to get a good look at the worksheet. You need to know which column and row you're entering data in. These pages explain techniques for changing your view of a worksheet so that you always know where you are. Read on to discover how to freeze, split, and hide columns and rows. (On the subject of changing views, Book 1, Chapter 3 explains an essential technique for changing views: zooming in and zooming out.)

### Freezing and splitting columns and rows

Sometimes your adventures in a worksheet take you to a faraway cell address, such as X31 or C39. Out there in the wilderness, it's hard to tell where to enter data because you can't see the data labels in the first column or first row that tell you where to enter data on the worksheet.

To see one part of a worksheet no matter how far you stray from it, you can *split* the worksheet or *freeze* columns and rows onscreen. In Figure 2-1, I split the worksheet so that column A (Property) always appears onscreen, no matter how far I scroll to the right; similarly, row 1 (Property, Rent, Management Fees, and so on) also appears at the top of the worksheet no matter how far I scroll down. Notice how the row numbers and column letters are interrupted in Figure 2-1. Because I split the screen, I always know what data to enter in a cell because I can clearly see property names in the first column and the column headings along the top of the worksheet.



**FIGURE 2-1:**  
Splitting a  
worksheet.

Freezing columns or rows on a worksheet works much like splitting except that lines instead of gray bars appear onscreen to show which columns and rows are frozen, and you can't adjust where the split occurs by dragging the boundary where the worksheet is split.

## Giving the Split or Freeze Panes command

Follow these steps to split or freeze columns and rows onscreen:

1. **Click the cell that is directly below the row you want to freeze or split and is in the column to the right of the column that you want to freeze or split.**

In other words, click where you want the split to occur.

2. **On the View tab, split or freeze the columns and rows.**

Go to the View tab and use one of these techniques:

- **Splitting:** Click the Split button and then click and drag the split bars to split the screen horizontally or vertically (refer to Figure 2-1). The other way to split a worksheet is to grab hold of a *split bar*, the little division markers directly above the vertical scroll bar and directly to the right of the horizontal scroll bar (in the lower-right corner of your screen). You can tell where split bars are because the pointer turns into a double arrow when it's over a split bar.



- **Freezing:** Click the Freeze Panes button and choose one of three Freeze options on the drop-down list. The second and third options, respectively, freeze the top row or first column. The first option, Freeze Panes, freezes the column(s) to the left and the row(s) above the cell you selected in Step 1.

Bars or lines appear onscreen to show which row(s) and column(s) have been frozen or split. Move where you will in the worksheet. The column(s) and row(s) you froze or split stay onscreen.

## Unsplitting and unfreezing

Use one of these techniques to keep your worksheet from splitting or freezing to death:

- » **Unsplitting:** Click the Split button again; double-click one of the split bars to remove it; or drag a split bar into the top or left side of the worksheet window.
- » **Unfreezing:** On the View tab, click the Freeze Panes button and choose Unfreeze Panes on the drop-down list.

## Hiding columns and rows

Another way to take the clutter out of a worksheet is to temporarily hide columns and rows:

- » **Hiding columns or rows:** Drag over the column letters or row numbers of the columns or rows that you want to hide. Dragging this way selects entire columns or rows. Then press Ctrl+0 (zero) to hide the columns or Ctrl+9 to hide the rows. You can also go to the Home tab, click the Format button, choose Hide & Unhide, and choose Hide Columns or Hide Rows.
- » **Unhiding columns and rows:** Select columns to the right and left of the hidden columns, or select rows above and below the hidden rows. To select columns or rows, drag over their letters or numbers. Then go to the Home tab, click the Format button, choose Hide & Unhide, and choose Unhide Columns or Unhide Rows.



TIP

It's easy to forget where you hid columns or rows. To make sure all columns and rows in your worksheet are displayed, click the Select All button (or press Ctrl+A) to select your entire worksheet. Then go to the Home tab, click the Format button and choose Hide & Unhide ⇄ Unhide Columns; click the Format button again and choose Hide & Unhide ⇄ Unhide Rows.

## YOUR OWN CUSTOMIZED VIEWS

After you go to the trouble of freezing the screen or zooming in to a position you're comfortable with, you may as well save your view of the screen as a customized view. That way, you can call upon the customized view whenever you need it. View settings, the window size, the position of the grid onscreen, and cells that are selected can all be saved in a customized view.

Follow these steps to create a customized view:

**1. On the View tab, click the Custom Views button.**

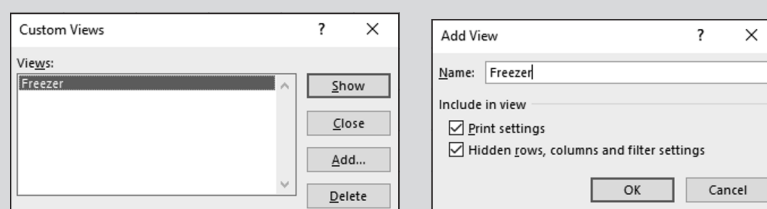
You see the Custom Views dialog box. It lists views you've already created, if you've created any.

**2. Click the Add button.**

The Add View dialog box appears.

**3. Enter a name for the view and click OK.**

To switch to a customized view, click the Custom Views button, select a view in the Custom Views dialog box, and click the Show button.



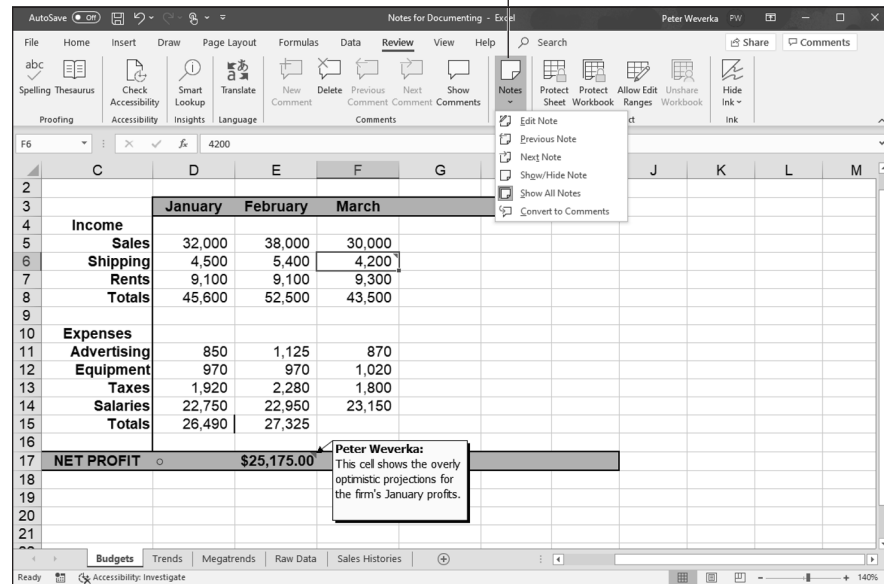
## Notes for Documenting Your Worksheet

It may happen that you return to your worksheet days or months from now and discover to your dismay that you don't know why certain numbers or formulas are there. For that matter, someone else may inherit your worksheet and be mystified as to what the heck is going on. To take the mystery out of a worksheet, document it by entering notes here and there.

A *note* is a little explanation that describes part of a worksheet. Each note is connected to a cell. You can tell where a note is because a small red triangle appears in the upper-right corner of cells to which notes are attached. Move the pointer

over one of these triangles and you see the pop-up box, a note, and the name of the person who entered the note, as shown in Figure 2-2. Click the Notes button on the Review tab and choose Show All Notes to see every note in a worksheet.

Click the Notes button to handle notes



**FIGURE 2-2:** Notes explain what's what in a worksheet.

Starting on the Review tab, follow these instructions to handle notes:

- » **Entering a note:** Click the cell that deserves a note, click the Notes button, and choose the New Note on the drop-down list (refer to Figure 2-2). Enter your note in the pop-up box. Click in a different cell when you finish entering your note.
- » **Reading a note:** Move the pointer over the small red triangle and read the note in the pop-up box (refer to Figure 2-2). You can also right-click a cell and choose Show/Hide Note.
- » **Showing and hiding notes:** Click the Notes button and choose Show All Notes on the drop-down list to see or hide all the notes in a worksheet. To show or hide an individual note, right-click its cell and choose Show/Hide Note.
- » **Finding notes:** Click the Notes button and then choose the Previous Note or Next Note on the drop-down list to go from note to note.

- » **Editing a note:** Select the cell with the comment, click the Notes button, and choose Edit Note. You can also right-click the cell and choose Edit Note.
- » **Deleting notes:** Right-click the cell with the note and choose Delete Note. To delete several notes, select them by Ctrl+clicking and then right-click and choose Delete Note.



TIP

If your name doesn't appear in the pop-up box after you enter a note and you want it to appear there, go to the File tab, choose Options, select the General category in the Excel Options dialog box, and enter your name in the User Name text box.

## Comments for Collaborating with Others on a Workbook

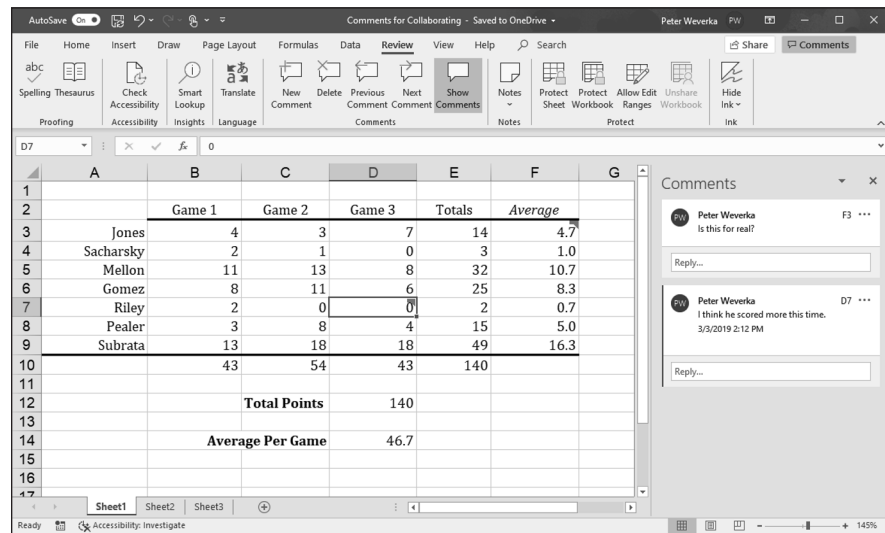
When constructing a workbook is a team affair, consider writing comments to discuss with team members how to make the workbook better. Comments are meant for workbooks being shared on OneDrive (Book 10, Chapter 2 describes file sharing on OneDrive). Each comment is attached to a cell. You can tell where a comment is because a purple comment icon appears in the upper-right corner of cells that have been commented on. Write comments to suggest ways to make a workbook better and to reply to others' suggestions.

Starting on the Review tab, follow these instructions to comment on a workbook you share with others on OneDrive:

- » **Entering a comment:** Click the cell that needs a comment and then click the New Comment button. A pop-up box appears for entering a comment. Enter your comment and click the Post button to post it on OneDrive where others can see it. To edit a comment you made, click its icon, click the Edit button in the pop-up box, and make your edits.
- » **Displaying a single comment:** Click the purple icon in the cell where the comment is to see the comment in a pop-up box.
- » **Displaying all comments:** Click the Show Comments button on the Review tab or the Comments button in the upper-right corner of the screen. The Comments pane opens, as shown in Figure 2-3. From there you can read, reply to, and enter comments.
- » **Replying to a comment:** Display the comment and enter your replay in the Reply text box. Click the Post button when you finish replying.

- » **Going from comment to comment:** Click the Previous Comment or Next Comment button. You can also scroll through comments in the Comments pane.
- » **Deleting comments:** Select the cell with the comment and click the Delete button on the Review tab. To delete a comment and all its replies, display it in the Comments pane, click the More Thread Actions button, and choose Delete Thread.

**FIGURE 2-3:**  
Click the  
Comments or  
Show Comments  
button to read  
comments.



## Selecting Cells in a Worksheet

To format, copy, move, delete, and format numbers and words in a worksheet, you have to select the cells in which the numbers and words are found. Here are ways to select cells and the data inside them:

- » **A block of cells:** Drag diagonally across the worksheet from one corner of the block of cells to the opposite corner. You can also click in one corner and Shift+click the opposite corner.
- » **Adjacent cells in a row or column:** Drag across the cells.
- » **Cells in various places:** While holding down the Ctrl key, click different cells.

- » **A row or rows:** Click a row number to select an entire row. Click and drag down the row numbers to select several adjacent rows.
- » **A column or columns:** Click a column letter to select an entire column. Click and drag across letters to select adjacent columns.
- » **Entire worksheet:** Click the Select All button, the square to the left of the column letters and above the row numbers; press Ctrl+A; or press Ctrl+Shift+Spacebar.



TIP

Press Ctrl+Spacebar to select the column that the active cell is in; press Shift+Spacebar to select the row where the active cell is.

You can enter the same data item in several different cells by selecting cells and then entering the data in one cell and pressing Ctrl+Enter. This technique comes in very handy, for example, when you want to enter a placeholder zero (0) in several different cells.

## Deleting, Copying, and Moving Data

In the course of putting together a worksheet, it is sometimes necessary to delete, copy, and move cell contents. Here are instructions for doing these chores:

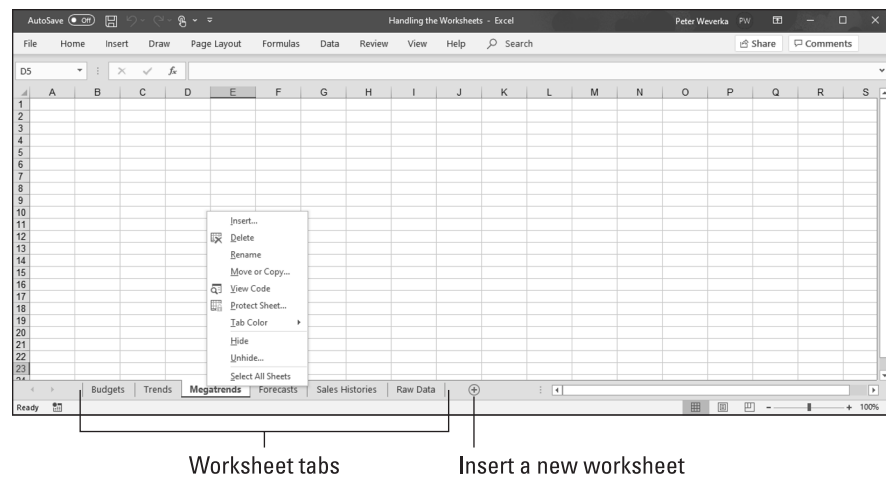
- » **Deleting cell contents:** Select the cells and then press the Delete key; on the Home tab, click the Clear button and choose Clear Contents; or right-click and choose Clear Contents.
- » **Copying and moving cell contents:** Select the cells and use one of these techniques:
  - **Cut or Copy and Paste commands:** When you paste the data, click where you want the first cell of the block of cells you're copying or moving to go. (Book 1, Chapter 2 explains copying and moving data in detail.) Be careful not to overwrite cells with data in them when you copy or move data. After you paste data, you see the Paste Options button. Click this button and choose an option from the drop-down list to format the data in different ways.
  - **Drag and drop:** Move the pointer to the edge of the cell block, click when you see the four-headed arrow, and start dragging. Hold down the Ctrl key to copy the data.

# Handling the Worksheets in a Workbook

A workbook can hold more than one worksheet. Keeping more than one worksheet in the same workbook has advantages. For example, in a workbook that tracks monthly income from rental properties, you can record monthly income on 12 worksheets, 1 for each month. By constructing formulas that calculate income data across the 12 worksheets, you can track annual income from the properties.

As Figure 2-4 shows, Excel places a tab at the bottom of the screen for each worksheet in a workbook. Initially, worksheets are named Sheet1, Sheet2, and so on as you add them, but you can rename worksheets. Click a tab to go from worksheet to worksheet. Right-click a tab to open a shortcut menu with commands for handling worksheets.

**FIGURE 2-4:**  
You can have multiple worksheets in a workbook.

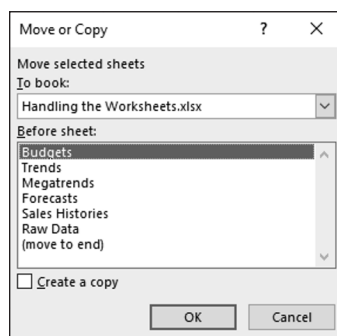


Follow these instructions to move among, add, delete, rename, and change the order of worksheets:

- » **Inserting a new worksheet:** Click the New Sheet button (you can find it in the lower-left corner of the screen to the right of the worksheet tab); press Shift+F11; or on the Home tab, open the drop-down list on the Insert button and choose Insert Sheet.
- » **Moving among worksheets:** To go from one worksheet to another, click a worksheet tab along the bottom of the screen. If you can't see a tab, click one of the scroll arrows to the left of the worksheet tabs.

- » **Renaming a worksheet:** Right-click the worksheet tab, choose Rename on the shortcut menu, type a new name, and press Enter. You can also go to the Home tab, click the Format button, choose Rename Sheet on the drop-down list, and enter a new name. Spaces are allowed in names, and names can be 31 characters long. Brackets ([]) are allowed in names, but you can't use these symbols: / \ : ? and \*.
- » **Selecting worksheets:** Click the worksheet's tab to select it. To select several worksheets, Ctrl-click their tabs or click the first tab and then Shift+click the last tab in the set. To select all the worksheets, right-click a tab and choose Select All Sheets on the shortcut menu.
- » **Rearranging worksheets:** Drag the worksheet tab to a new location. As you drag, a tiny black arrow and a page icon appear to show you where the worksheet will land after you release the mouse button. You can also select a sheet, go to the Home tab, click the Format button, and choose Move or Copy Sheet on the drop-down list. The Move or Copy dialog box appears, as shown in Figure 2-5. Select the sheet in the Before Sheet list where you want the worksheet to go and click OK.
- » **Deleting a worksheet:** Select the sheet, and on the Home tab, open the drop-down list on the Delete button and choose Delete Sheet. You can also right-click a worksheet tab and choose Delete. Be careful, because you can't restore your deleted worksheet by pressing the Undo button.
- » **Copying a worksheet:** Select the sheet, hold down the Ctrl key, and drag the worksheet tab to a new location.
- » **Moving a worksheet to another workbook:** Make sure that the other workbook is open, open the drop-down list on the Format button, and choose Move or Copy Sheet. Then select the other workbook's name in the Move or Copy dialog box and click OK.
- » **Color-coding a worksheet:** Right-click a worksheet tab and choose Tab Color. Then select a color in the submenu, or choose More Colors and select a color in the Colors dialog box.

**FIGURE 2-5:**  
Besides dragging  
it, you can move  
a worksheet  
by using this  
dialog box.







TIP

You can change the size of columns or apply numeric formats to the same addresses in different worksheets by selecting all the sheets first and then formatting one worksheet. The formats apply to all the worksheets that you select. Being able to format several different worksheets simultaneously comes in handy, for example, when your workbook tracks monthly data and each worksheet pertains to one month. Another way to handle worksheets with similar data is to create the first worksheet and copy it to the second, third, and fourth worksheets with the Copy and Paste commands.

## Keeping Others from Tampering with Worksheets

People with savvy and foresight sometimes set up workbooks so that one worksheet holds raw data and the other worksheets hold formulas that calculate the raw data. This technique prevents others from tampering with the raw data. Furthermore, if the worksheet with raw data is hidden, the chance that it will be tampered with is lower; and if the worksheet is protected, people can't tamper with it unless they have a password. These pages explain how to hide a worksheet so that others are less likely to find it. I also tell you how to protect a worksheet from being edited.

### Hiding a worksheet

Follow these instructions to hide and unhide worksheets:

- » **Hiding a worksheet:** Right-click the worksheet's tab and choose Hide on the shortcut menu. You can also go to the Home tab, click the Format button, and choose Hide & Unhide ⇨ Hide Sheet.
- » **Unhiding a worksheet:** Right-click any worksheet tab and choose Unhide; or go to the Home tab, click the Format button, and choose Hide & Unhide ⇨ Unhide Sheet. Then, in the Unhide dialog box, select the sheet you want to unhide and click OK.

### Protecting a worksheet

*Protecting* a worksheet means to restrict others from changing it — from formatting it, inserting new rows and columns, or deleting rows and columns, among other tasks. You can also prevent any editorial changes whatsoever from being

made to a worksheet. Follow these steps to protect a worksheet from tampering by others:

**1. Select the worksheet that needs protection.**

**2. On the Review tab, click the Protect Sheet button.**

You see the Protect Sheet dialog box, shown in Figure 2-6. You can also open this dialog box by going to the Home tab, clicking the Format button, and choosing Protect Sheet.

**3. Enter a password in the Password to Unprotect Sheet box if you want only people with the password to be able to unprotect the worksheet after you protect it.**

**4. On the Allow All Users of This Worksheet To list, select the check box next to the name of each task that you want to permit others to do.**

For example, select the Format Cells check box if you want others to be able to format cells.

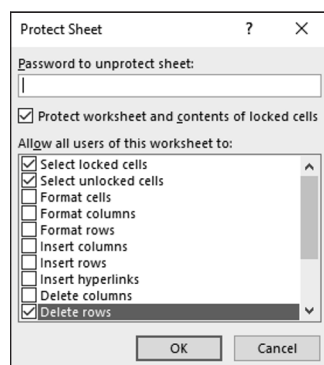


TIP

Deselect the Select Locked Cells check box to prevent any changes from being made to the worksheet. By default, all worksheet cells are locked, and by preventing others from selecting locked cells, you effectively prevent them from editing any cells.

**5. Click OK.**

If you entered a password in Step 3, you must enter it again in the Confirm Password dialog box and click OK.



**FIGURE 2-6:** Select what you want others to be able to do.

To unprotect a worksheet that you protected, go to the Review tab and click the Unprotect Sheet button. You must enter a password if you elected to require others to have a password before they can unprotect a worksheet.

#### IN THIS CHAPTER

- » Constructing a formula
- » Copying formulas to other columns and rows
- » Preventing errors in formulas
- » Using functions in formulas

## Chapter **3**

# Formulas and Functions for Crunching Numbers

**F**ormulas are where it's at as far as Excel is concerned. After you know how to construct formulas, and constructing them is pretty easy, you can put Excel to work. You can make the numbers speak to you. You can turn a bunch of unruly numbers into meaningful figures and statistics.

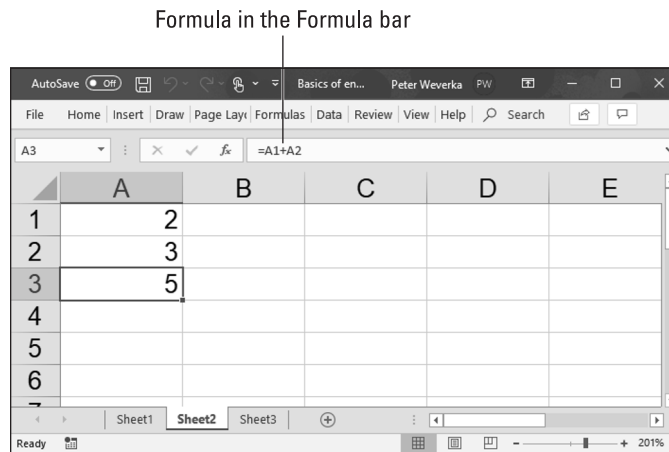
This chapter explains what a formula is, how to enter a formula, and how to enter a formula quickly. You also discover how to copy formulas from cell to cell and how to keep formula errors from creeping into your workbooks. Finally, this chapter explains how to make use of the hundred or so functions that Excel offers.

## How Formulas Work

A *formula*, you may recall from the sleepy hours you spent in math class, is a way to calculate numbers. For example,  $2+3=5$  is a formula. When you enter a formula in a cell, Excel computes the formula and displays its results in the cell. Click in cell A3 and enter  $=2+3$ , for example, and Excel displays the number 5 in cell A3.

## Referring to cells in formulas

As well as numbers, Excel formulas can refer to the contents of different cells. When a formula refers to a cell, the number in the cell is used to compute the formula. In Figure 3-1, for example, cell A1 contains the number 2; cell A2 contains the number 3; and cell A3 contains the formula  $=A1+A2$ . As shown in cell A3, the result of the formula is 5. If I change the number in cell A1 from 2 to 3, the result of the formula in cell A3 ( $=A1+A2$ ) becomes 6, not 5. When a formula refers to a cell and the number in the cell changes, the result of the formula changes as well.



**FIGURE 3-1:**  
A simple formula.

To see the value of using cell references in formulas, consider the worksheet shown in Figure 3-2. The purpose of this worksheet is to track the budget of a school's Parent Teacher Association (PTA):

- »» Column C, Actual Income, lists income from different sources.
- »» Column D, Projected Income, shows what the PTA members thought income from these sources would be.
- »» Column E, Over/Under Budget, shows how actual income compares to projected income from the different sources.

As the figures in the Actual Income column (column C) are updated, figures in the Over/Under Budget column (column E) and the Total Income row (row 8) change instantaneously. These figures change instantaneously because the formulas refer to the numbers in cells, not to unchanging numbers (known as *constants*).

		Actual Income	Projected Income	Over/Under Budget
Income				
Book Fair		4,876.40	5,500.00	-623.60
Dances		1,476.95	1,800.00	-323.05
Fundraising		13,175.00	5,000.00	8,175.00
Merchandise Sales		5,888.50	7,000.00	-1,111.50
Membership Fees		3,918.00	3,000.00	918.00
<b>Total Income</b>		<b>\$29,334.85</b>	<b>\$22,300.00</b>	<b>\$7,034.85</b>

**FIGURE 3-2:**  
Using formulas in  
a worksheet.

Figure 3-3 shows the formulas used to calculate the data in the worksheet in Figure 3-2. In column E, formulas deduct the numbers in column D from the numbers in column C to show where the PTA over- or under-budgeted for the different sources of income. In row 8, you can see how the SUM function is used to total cells in rows 3 through 7. The end of this chapter explains how to use functions in formulas.

Formulas and Functions  
for Crunching Numbers

		Actual Income	Projected Income	Over/Under Budget
Income				
Book Fair		4876.4	5500	=C3-D3
Dances		1476.95	1800	=C4-D4
Fundraising		13175	5000	=C5-D5
Merchandise Sales		5888.5	7000	=C6-D6
Membership Fees		3918	3000	=C7-D7
<b>Total Income</b>		=SUM(C3:C7)	=SUM(D3:D7)	=SUM(E3:E7)

**FIGURE 3-3:**  
The formulas  
used to generate  
the numbers in  
Figure 3-2.



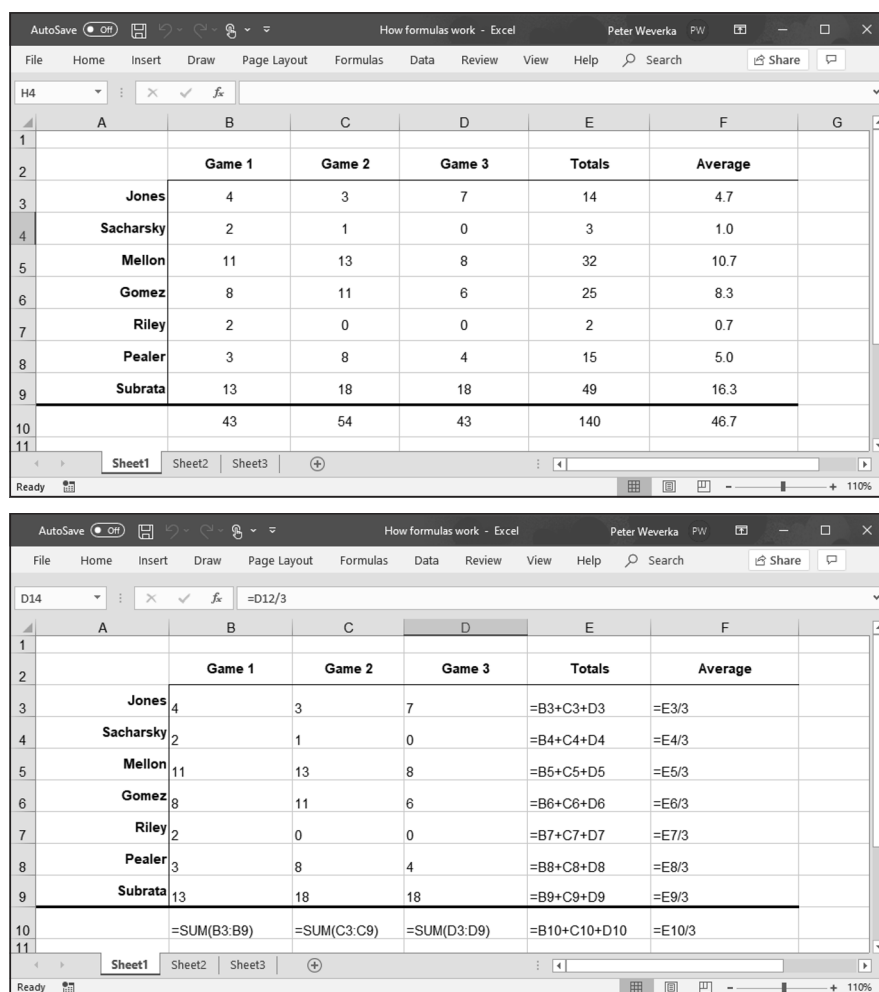
REMEMBER

Excel is remarkably good about updating cell references in formulas when you move cells. To see how good Excel is, consider what happens to cell addresses in formulas when you delete a row in a worksheet. If a formula refers to cell C1 but you delete row B, row C becomes row B and the value in cell C1 changes addresses from C1 to B1. You would think that references in formulas to cell C1 would be out of date, but you would be wrong. Excel automatically adjusts all formulas that refer to cell C1. Those formulas now refer to cell B1 instead.

In case you're curious, you can display formulas in worksheet cells instead of the results of formulas, as was done in Figure 3-3, by pressing Ctrl+' (apostrophe) or clicking the Show Formulas button on the Formulas tab. (You may have to click the Formula Auditing button first, depending on the size of your screen.) Click the Show Formulas button a second time to see formula results again.

## Referring to formula results in formulas

Besides referring to cells with numbers in them, you can refer to formula results in a cell. Consider the worksheet shown in Figure 3-4. The purpose of this worksheet is to track scoring by the players on a basketball team over three games:



**FIGURE 3-4:**  
Using formula  
results as other  
formulas.

- »» The Totals column (column E) shows the total points each player scored in the three games.
- »» The Average column (column F), using the formula results in the Totals column, determines how much each player has scored on average. The Average column does that by dividing the results in column E by 3, the number of games played.

In this case, Excel uses the results of the total-calculation formulas in column E to compute average points per game in column F.

## Operators in formulas

Addition, subtraction, and division aren't the only operators you can use in formulas. Table 3-1 explains the arithmetic operators you can use and the key you press to enter each operator. In the table, operators are listed in the order of precedence (see the "The order of precedence" sidebar for an explanation of precedence).

**TABLE 3-1** Arithmetic Operators for Use in Formulas

Precedence	Operator	Example Formula	Returns
1	% (Percent)	=50%	50 percent, or 0.5
2	^ (Exponentiation)	=50^2,	50 to the second power, or 2500
3	* (Multiplication)	=E2*4	The value in cell E2 multiplied by 4
3	/ (Division)	=E2/3	The value in cell E2 divided by 3
4	+ (Addition)	=F1+F2+F3,	The sum of the values in those cells
4	- (Subtraction)	=G5-8,	The value in cell G5 minus 8
5	& (Concatenation)	= "Part No. "&D4	The text <i>Part No.</i> and the value in cell D4
6	= (Equal to)	=C5=4,	If the value in cell C5 is equal to 4, returns TRUE; returns FALSE otherwise
6	<> (Not equal to)	=F3<>9	If the value in cell F3 is <i>not</i> equal to 9, returns TRUE; returns FALSE otherwise
6	< (Less than)	=B9<E11	If the value in cell B9 is less than the value in cell E11, returns TRUE; returns FALSE otherwise
6	<= (Less than or equal to)	=A4<=9	If the value in cell A4 is less than or equal to 9, returns TRUE; returns FALSE otherwise

(continued)

**TABLE 3-1** (continued)

Precedence	Operator	Example Formula	Returns
6	> (Greater than)	=E8>14	If the value in cell E8 is greater than 14, returns TRUE; returns FALSE otherwise
6	>= (Greater than or equal to)	=C3>=D3	If the value in cell C3 is greater than or equal to the value in cell D3, returns TRUE; returns FALSE otherwise

Another way to compute a formula is to make use of a function. As “Working with Functions” explains, later in this chapter, a function is a built-in formula that comes with Excel. SUM, for example, adds the numbers in cells. AVERAGE finds the average of different numbers.

## THE ORDER OF PRECEDENCE

When a formula includes more than one operator, the order in which the operators appear in the formula matters a lot. Consider this formula:

=2+3\*4

Does this formula result in 14 (2+[3\*4]) or 20 ([2+3]\*4)? The answer is 14 because Excel performs multiplication before addition in formulas. In other words, multiplication takes precedence over addition.

The order in which calculations are made in a formula that includes different operators is called the *order of precedence*. Be sure to remember the order of precedence when you construct complex formulas with more than one operator:

1. Percent (%)
2. Exponentiation (^)
3. Multiplication (\*) and division (/); leftmost operations are calculated first
4. Addition (+) and subtraction (-); leftmost operations are calculated first
5. Concatenation (&)
6. Comparison (<, <=, >, >=, and <>)

To get around the order-of-precedence problem, enclose parts of formulas in parentheses. Operations in parentheses are calculated before all other parts of a formula. For example, the formula =2+3\*4 equals 20 when it is written this way: =(2+3)\*4.



# The Basics of Entering a Formula

No matter what kind of formula you enter, and no matter how complex the formula is, follow these basic steps to enter it:

1. **Click the cell where you want to enter the formula.**
2. **Click in the Formula bar if you want to enter the data there rather than the cell.**
3. **Enter the equals sign (=).**



REMEMBER

You must be sure to enter the equals sign before you enter a formula. Without it, Excel thinks you're entering text or a number, not a formula.

4. **Enter the formula.**

For example, enter `=B1*.06`. Make sure that you enter all cell addresses correctly. By the way, you can enter lowercase letters in cell references. Excel changes them to uppercase after you finish entering the formula. The next section in this chapter explains how to enter cell addresses quickly in formulas.

5. **Press Enter or click the Enter button (the check mark on the Formula bar).**

The result of the formula appears in the cell.

## Speed Techniques for Entering Formulas

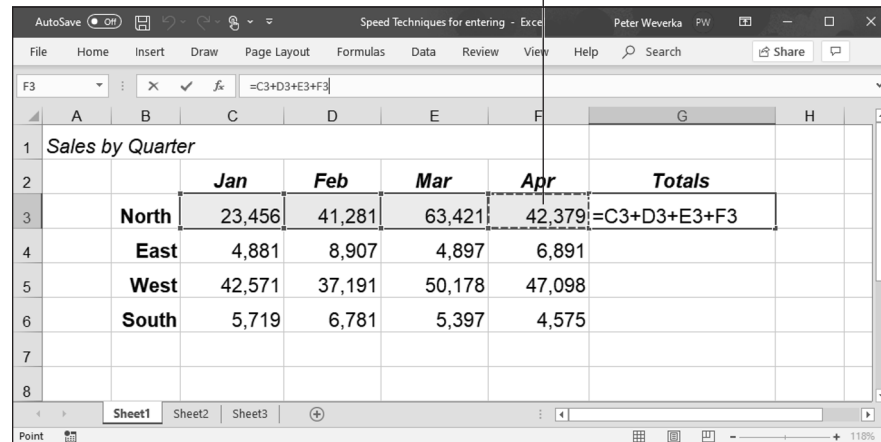
Entering formulas and making sure that all cell references are correct is a tedious activity, but fortunately for you, Excel offers a few techniques to make entering formulas easier. Read on to find out how ranges make entering cell references easier and how you can enter cell references in formulas by pointing and clicking. You also find instructions here for copying formulas.

### Clicking cells to enter cell references

The hardest part about entering a formula is entering the cell references correctly. You have to squint to see which row and column the cell you want to refer to is in. You have to carefully type the right column letter and row number. However, instead of typing a cell reference, you can click the cell you want to refer to in a formula.

In the course of entering a formula, simply click the cell on your worksheet that you want to reference. As shown in Figure 3-5, shimmering marquee lights appear around the cell that you clicked so that you can clearly see which cell you're referring to. The cell's reference address, meanwhile, appears in the Formula bar. In Figure 3-5, I clicked cell F3 instead of entering its reference address on the Formula bar. The reference F3 appears on the Formula bar, and the marquee lights appear around cell F3.

Click a cell to enter its cell reference address in a formula



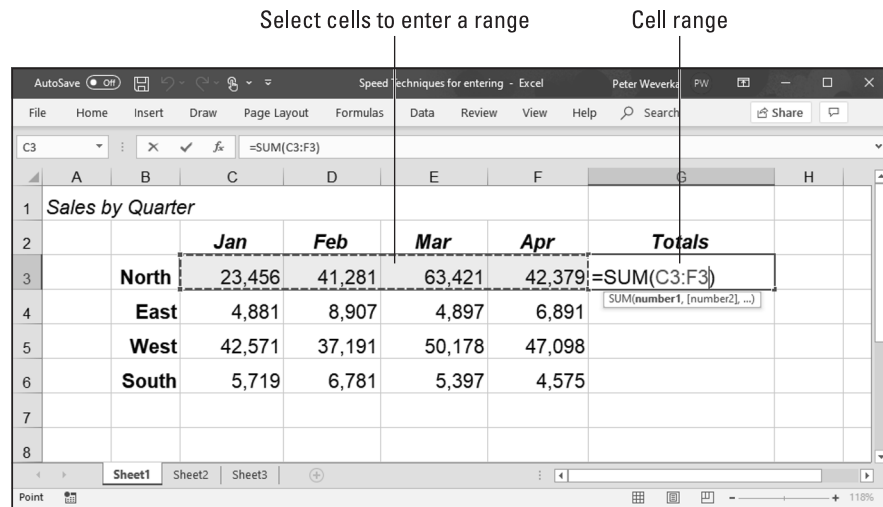
**FIGURE 3-5:**  
Clicking to enter a cell reference.

Get in the habit of pointing and clicking cells to enter cell references in formulas. Clicking cells is easier than typing cell addresses, and the cell references are entered more accurately.

## Entering a cell range

A *cell range* is a line or block of cells in a worksheet. Instead of typing cell reference addresses one at a time, you can simply select cells on your worksheet. In Figure 3-6, I selected cells C3, D3, E3, and F3 to form cell range C3:F3. This spares me the trouble of entering one at a time the cell addresses that I want in the range. The formula in Figure 3-6 uses the SUM function to total the numeric values in cell range C3:F3. Notice the marquee lights around the range C3:F3. The lights show precisely which range you're selecting. Cell ranges come in especially handy where functions are concerned (see "Working with Functions," later in this chapter).

To identify a cell range, Excel lists the outermost cells in the range and places a colon (:) between cell addresses:



**FIGURE 3-6:** Using a cell range in a formula.

- » A cell range comprising cells A1, A2, A3, and A4 is listed this way: A1:A4.
- » A cell range comprising a block of cells from A1 to D4 is listed this way: A1:D4.

You can enter cell ranges on your own without selecting cells. To do so, type the first cell in the range, enter a colon (:), and type the last cell.

## Naming cell ranges so that you can use them in formulas

Whether you type cell addresses yourself or drag across cells to enter a cell range, entering cell address references is a chore. Entering `=C1+C2+C3+C4`, for example, can cause a finger cramp; entering `=SUM(C1:C4)` is no piece of cake, either.

To take the tedium out of entering cell ranges in formulas, you can name cell ranges. Then, to enter a cell range in a formula, all you have to do is select a name in the Paste Name dialog box or click the Use in Formula button on the Formulas tab, as shown in Figure 3-7. Naming cell ranges has an added benefit: You can choose a name from the Name Box drop-down list and go directly to the cell range whose name you choose, as shown in Figure 3-7.

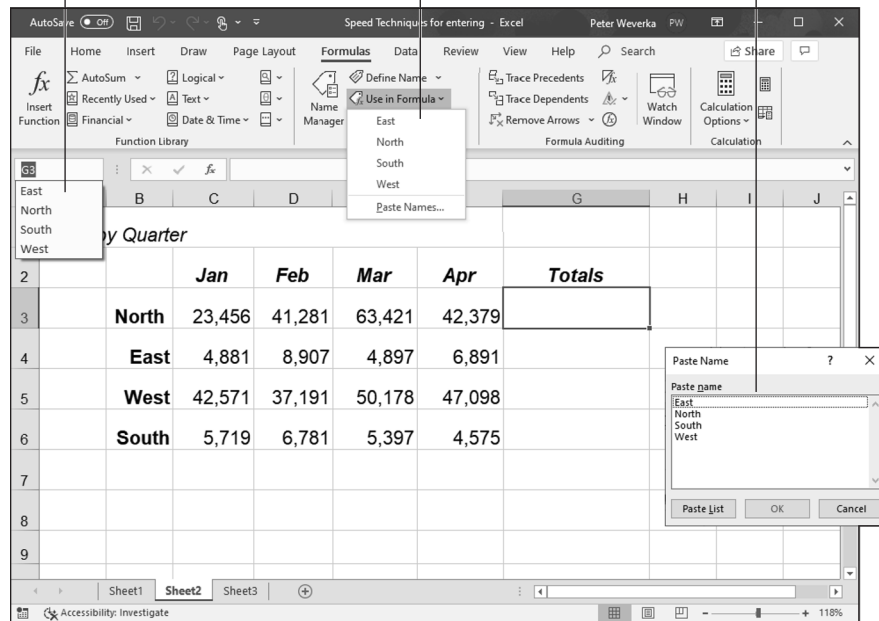


**WARNING**

Naming cell ranges has one disadvantage, and it's a big one. Excel doesn't adjust cell references when you copy a formula with a range name from one cell to another. A range name always refers to the same set of cells. Later in this chapter, "Copying Formulas from Cell to Cell" explains how to copy formulas.

Choose a name to move there

Enter a named cell range in a formula



**FIGURE 3-7:** Choosing a named cell range.

## Creating a cell range name

Follow these steps to create a cell range name:

1. **Select the cells that you want to name.**
2. **On the Formulas tab, click the Define Name button.**

You see the New Name dialog box.

3. **Enter a descriptive name in the Name box.**

Names can't begin with a number or include blank spaces.

4. **On the Scope drop-down list, choose Workbook or a worksheet name.**

Choose a worksheet name if you intend to use the range name you're creating only in formulas that you construct in a single worksheet. If your formulas will refer to cell range addresses in different worksheets, choose Workbook so that you can use the range name wherever you go in your workbook.

5. **Enter a comment to describe the range name, if you want.**

Enter a comment if doing so will help you remember where the cells you're naming are located or what type of information they hold. As I explain shortly, you can read comments in the Name Manager dialog box, the place where you go to edit and delete range names.

6. **Click OK.**



TIP

In case you're in a hurry, here's a fast way to enter a cell range name: Select the cells for the range, click in the Name Box (you can find it on the left side of the Formula bar, as shown in Figure 3-7), enter a name for the range, and press the Enter key.

## Entering a range name as part of a formula

To include a cell range name in a formula, click in the Formula bar where you want to enter the range name and then use one of these techniques to enter the name:

- » On the Formulas tab, click the Use in Formula button and choose a cell range name on the drop-down list (refer to Figure 3-7).
- » Press F3 or click the Use in Formula button and choose Paste Names on the drop-down list. You see the Paste Name dialog box (refer to Figure 3-7). Select a cell range name and click OK.

## Quickly traveling to a cell range that you named

To go quickly to a cell range you named, open the drop-down list on the Name Box and choose a name (refer to Figure 3-7). The Name Box drop-down list is located on the left side of the Formula bar.



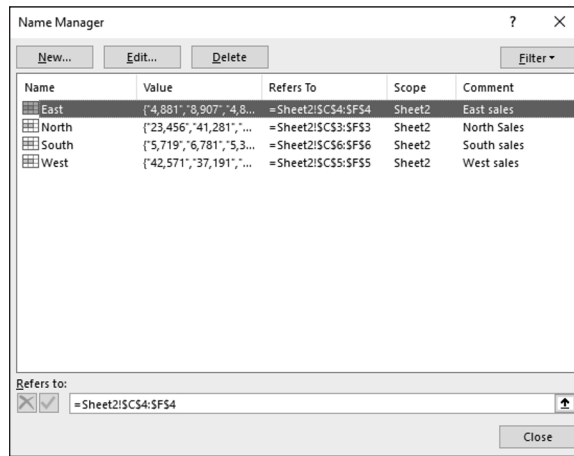
REMEMBER

To make this trick work, the cursor can't be in the Formula bar. The Name Box drop-down list isn't available when you're constructing a formula.

## Managing cell range names

To rename, edit, or delete cell range names, go to the Formulas tab and click the Name Manager button. You see the Name Manager dialog box, as shown in Figure 3-8. This dialog box lists names, cell values in names, the worksheet on which the range name is found, and whether the range name can be applied throughout a workbook or only in one worksheet. To rename, edit, or delete a cell range name, select it in the dialog box and use these techniques:

- » **Renaming:** Click the Edit button and enter a new name in the Edit Name dialog box.
- » **Reassigning cells:** To assign different cells to a range name, click the Edit button. You see the Edit Name dialog box. To enter a new range of cells, either enter the cells' addresses in the Refers To text box or click the Range Selector button (it's to the right of the text box), drag across the cells on your worksheet that you want for the cell range, and click the Cell Selector button again to return to the Edit Name dialog box.
- » **Deleting:** Click the Delete button and click OK in the confirmation box.



**FIGURE 3-8:**  
The Name  
Manager  
dialog box.

## Referring to cells in different worksheets

Excel gives you the opportunity to use data from different worksheets in a formula. If one worksheet lists sales figures from January and the next lists sales figures from February, you can construct a “grand total” formula in either worksheet to tabulate sales in the two-month period. A reference to a cell on a different worksheet is called a *3D reference*.

Construct the formula as you normally would, but when you want to refer to a cell or cell range in a different worksheet, click a worksheet tab to move to the other worksheet and select the cell or range of cells there. Without returning to the original worksheet, complete your formula in the Formula bar and press Enter. Excel returns you to the original worksheet, where you can see the results of your formula.



REMEMBER

The only odd thing about constructing formulas across worksheets is the cell references. As a glance at the Formula bar tells you, cell addresses in cross-worksheet formulas list the sheet name and an exclamation point (!) as well as the cell address itself. For example, this formula in Sheet 1 adds the number in cell A4 to the numbers in cells D5 and E5 in Sheet 2:

```
=A4+Sheet2!D5+Sheet2!E5
```

This formula in Sheet 2 multiplies the number in cell E18 by the number in cell C15 in Worksheet 1:

```
=E18*Sheet1!C15
```

This formula in Sheet 2 finds the average of the numbers in the cell range C7:F7 in Sheet 1:

```
=AVERAGE(Sheet1!C7:F7)
```

## Copying Formulas from Cell to Cell

Often in worksheets, you use the same formula across a row or down a column, but different cell references are used. For example, in the worksheet shown in Figure 3-9, column F totals the rainfall figures in rows 7 through 11. To enter formulas for totaling the rainfall figures in column F, you could laboriously enter formulas in cells F7, F8, F9, F10, and F11. But a faster way is to enter the formula once in cell F7 and then copy the formula in F7 down the column to cells F8, F9, F10, and F11.



REMEMBER

When you copy a formula to a new cell, Excel adjusts the cell references in the formula so that the formula works in the cells to which it has been copied. Astounding! Opportunities to copy formulas abound on most worksheets. And copying formulas is the fastest and safest way to enter formulas in a worksheet.

Follow these steps to copy a formula:

1. **Select the cell with the formula you want to copy down a column or across a row.**
2. **Drag the AutoFill handle across the cells to which you want to copy the formula.**

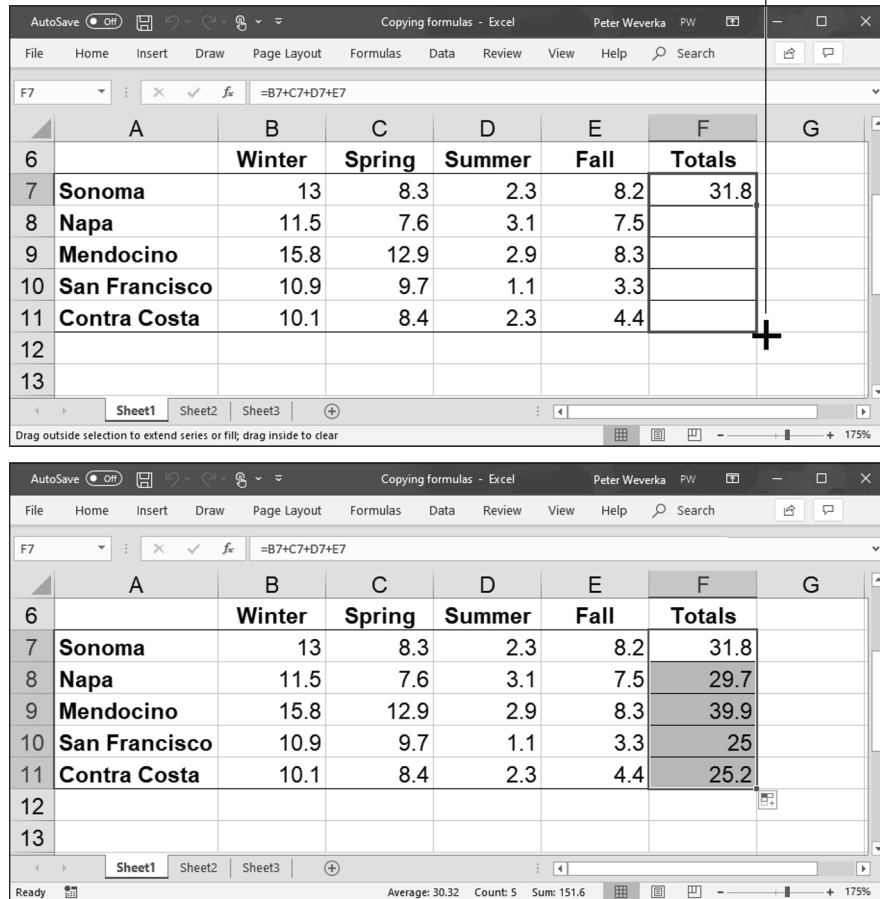
This is the same AutoFill handle you drag to enter serial data (see Chapter 1 of this minibook about entering lists and serial data with the AutoFill command). The AutoFill handle is the small green square in the lower-right corner of the cell. When you move the mouse pointer over it, it changes to a black cross. Figure 3-9 shows a formula being copied.

3. **Release the mouse button.**

If I were you, I would click in the cells to which you copied the formula and glance at the Formula bar to make sure that the formula was copied correctly. I'd bet you it was.

You can also copy formulas with the Copy and Paste commands. Just make sure that cell references refer correctly to the surrounding cells.

Drag the AutoFill handle



**FIGURE 3-9:**  
Copying a  
formula.

## Detecting and Correcting Errors in Formulas

It happens. Everyone makes an error from time to time when entering formulas in cells. Especially in a worksheet in which formula results are calculated into other formulas, a single error in one formula can spread like a virus and cause miscalculations throughout a worksheet. To prevent that calamity, Excel offers several ways to correct errors in formulas. You can correct them one at a time, run the error checker, and trace cell references, as the following pages explain.





TIP

By the way, if you want to see formulas in cells instead of formula results, go to the Formulas tab and click the Show Formulas button or press Ctrl+' (apostrophe). Sometimes seeing formulas this way helps to detect formula errors.

## Correcting errors one at a time

When Excel detects what it thinks is a formula that has been entered incorrectly, a small green triangle appears in the upper-left corner of the cell where you entered the formula. And if the error is especially egregious, an *error message*, a cryptic three- or four-letter display preceded by a pound sign (#), appears in the cell. Table 3-2 explains common error messages.

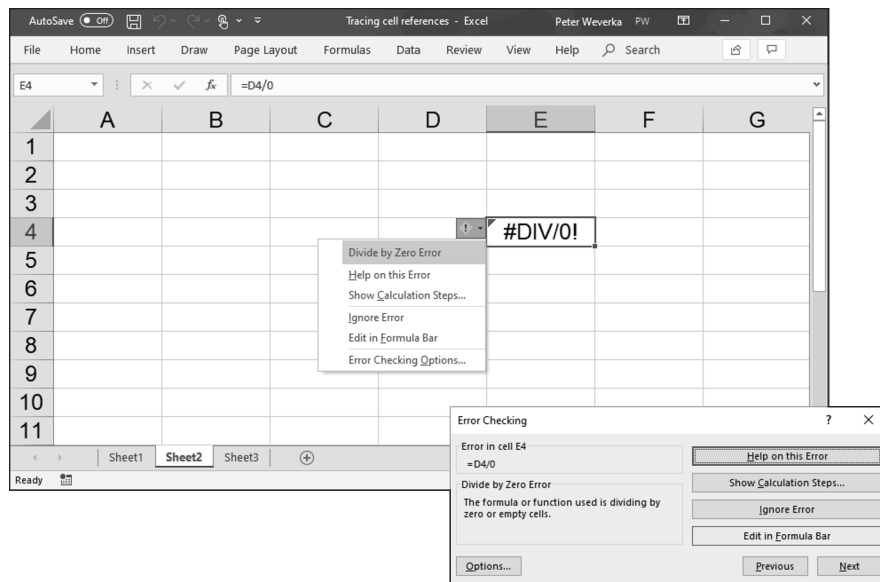
**TABLE 3-2** Common Formula Error Messages

Message	What Went Wrong
#DIV/0!	You tried to divide a number by a zero (0) or an empty cell.
#NAME	You used a cell range name in the formula, but the name isn't defined. Sometimes this error occurs because you type the name incorrectly. (Earlier in this chapter, "Naming cell ranges so that you can use them in formulas" explains how to name cell ranges.)
#N/A	The formula refers to an empty cell, so no data is available for computing the formula. Sometimes people enter N/A in a cell as a placeholder to signal the fact that data isn't entered yet. Revise the formula or enter a number or formula in the empty cells.
#NULL	The formula refers to a cell range that Excel can't understand. Make sure that the range is entered correctly.
#NUM	An argument you use in your formula is invalid.
#REF	The cell or range of cells that the formula refers to isn't there.
#VALUE	The formula includes a function that was used incorrectly, takes an invalid argument, or is misspelled. Make sure that the function uses the right argument and is spelled correctly.

To find out more about a formula error and perhaps correct it, select the cell with the green triangle and click the Error button. This small button appears beside a cell with a formula error after you click the cell, as shown in Figure 3-10. The drop-down list on the Error button offers opportunities for correcting formula errors and finding out more about them.

## Running the error checker

Another way to tackle formula errors is to run the error checker. When the checker encounters what it thinks is an error, the Error Checking dialog box tells you what the error is, as shown in Figure 3-10.



**FIGURE 3-10:**  
Ways to detect  
and correct  
errors.

To run the error checker, go to the Formulas tab and click the Error Checking button (you may have to click the Formula Auditing button first, depending on the size of your screen).

If you see clearly what the error is, click the Edit in Formula Bar button, repair the error in the Formula bar, and click the Resume button in the dialog box (you find this button at the top of the dialog box). If the error isn't one that really needs correcting, either click the Ignore Error button or click the Next button to send the error checker in search of the next error in your worksheet.

## Tracing cell references

In a complex worksheet in which formulas are piled on top of one another and the results of some formulas are computed into other formulas, it helps to be able to trace cell references. By tracing cell references, you can see how the data in a cell figures into a formula in another cell; or, if the cell contains a formula, you can see which cells the formula gathers data from to make its computation. You can get a better idea of how your worksheet is constructed, and in so doing, find structural errors more easily.

Figure 3-11 shows how cell tracers describe the relationships between cells. A *cell tracer* is a blue arrow that shows the relationships between cells used in formulas. You can trace two types of relationships:

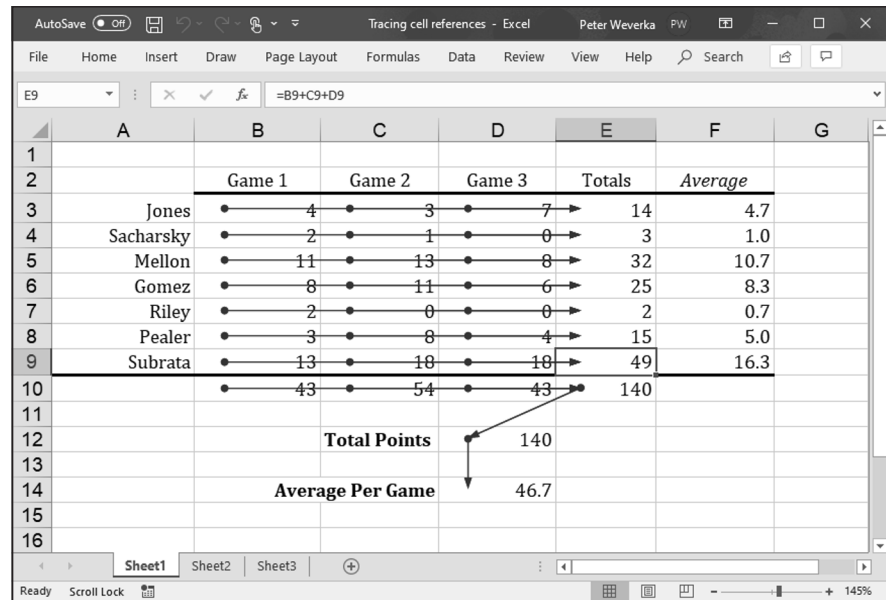
» **Tracing precedents:** Select a cell with a formula in it and trace the formula's *precedents* to find out which cells are computed to produce the results of the formula. Trace precedents when you want to find out where a formula gets its computation data. Cell tracer arrows point from the referenced cells to the cell with the formula results in it.

To trace precedents, go to the Formulas tab and click the Trace Precedents button. (You may have to click the Formula Auditing button first, depending on the size of your screen.)

» **Tracing dependents:** Select a cell and trace its *dependents* to find out which cells contain formulas that use data from the cell you selected. Cell tracer arrows point from the cell you selected to cells with formula results in them. Trace dependents when you want to find out how the data in a cell contributes to formulas elsewhere in the worksheet. The cell you select can contain a constant value or a formula in its own right (and contribute its results to another formula).

To trace dependents, go to the Formulas tab and click the Trace Dependents button (you may have to click the Formula Auditing button first, depending on the size of your screen).

To remove the cell tracer arrows from a worksheet, go to the Formulas tab and click the Remove Arrows button. You can open the drop-down list on this button and choose Remove Precedent Arrows or Remove Dependent Arrows to remove only cell-precident or cell-dependent tracer arrows.



**FIGURE 3-11:** Tracing the relationships between cells.

# Working with Functions

A *function* is a canned formula that comes with Excel. Excel offers hundreds of functions, some of which are very obscure and fit for use only by rocket scientists or securities analysts. Other functions are very practical. For example, you can use the `SUM` function to quickly total the numbers in a range of cells. Rather than enter `=C2+C3+C4+C5` on the Formula bar, you can enter `=SUM(C2:C5)`, which tells Excel to total the numbers in cells C2, C3, C4, and C5. To obtain the product of the number in cell G4 and .06, you can use the `PRODUCT` function and enter `=PRODUCT(G4, .06)` on the Formula bar.

These pages explain how to use functions in formulas. You discover how to construct the arguments, enter function names, and get Excel's help with entering functions. Later in this chapter, "A Look at Some Very Useful Functions" examines how to use specific functions in formulas.



TIP

To get an idea of the numerous functions that Excel offers, go to the Formulas tab and click the Insert Function button. You see the Insert Function dialog box, shown in Figure 3-12. (Later in this chapter, I show you how this dialog box can help with using functions in formulas.) Choose a function category in the dialog box, choose a function name, and read the description. You can click the Help on This Function link to go online to a web page with a thorough description of the function and how it's used.

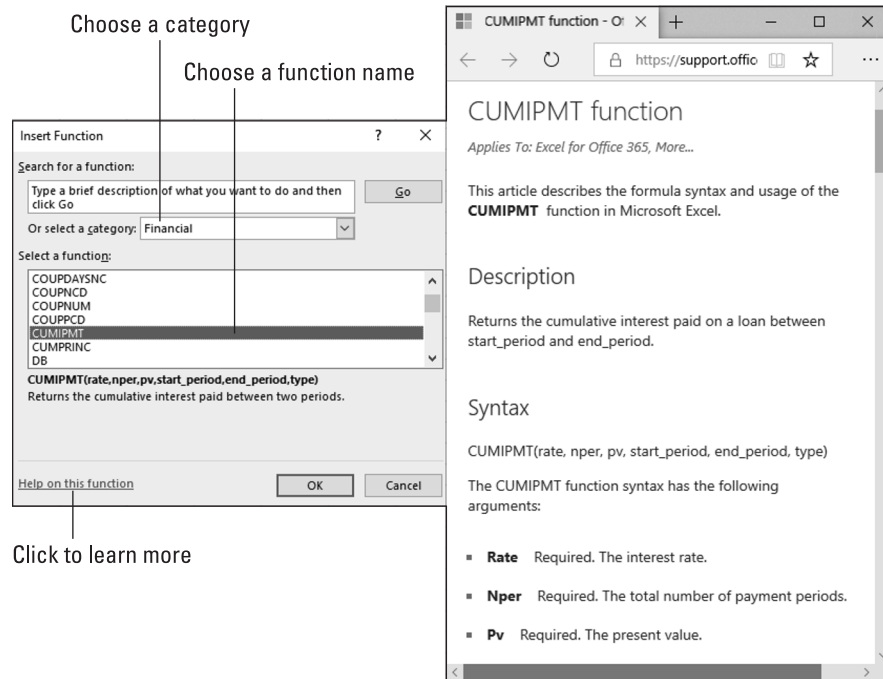


FIGURE 3-12:  
The Insert  
Function  
dialog box.

Click to learn more

## Using arguments in functions



REMEMBER

Every function takes one or more *arguments*. Arguments are the cell references or numbers, enclosed in parentheses, that the function acts upon. For example, `=AVERAGE(B1:B4)` returns the average of the numbers in the cell range B1 through B4; `=PRODUCT(6.5,C4)` returns the product of multiplying the number 6.5 by the number in cell C4. When a function requires more than one argument, enter a comma between the arguments (enter a comma without a space).

## Entering a function in a formula

To enter a function in a formula, you can enter the function name by typing it in the Formula bar, or you can rely on Excel to enter it for you. Enter function names yourself if you're well acquainted with a function and comfortable using it.

No matter how you want to enter a function as part of a formula, start this way:

1. **Select the cell where you want to enter the formula.**
2. **In the Formula bar, type an equals sign (=).**



REMEMBER

Please, please, please be sure to start every formula by entering an equals sign (=). Without it, Excel thinks you're entering text or a number in the cell.

3. **Start constructing your formula, and when you come to the place where you want to enter the function, type the function's name or call upon Excel to help you enter the function and its arguments.**

The upcoming section, "Manually entering a function" shows how to type in the function yourself; "Getting Excel's help to enter a function" shows how to get Excel to do the work.

If you enter the function on your own, it's up to you to type the arguments correctly; if you get Excel's help, you also get help with entering the cell references for the arguments.

## Manually entering a function

Be sure to enclose the function's argument or arguments in parentheses. Don't enter a space between the function's name and the first parenthesis. Likewise, don't enter a comma and a space between arguments; enter a comma, nothing more:

```
=SUM(F11,F14,23)
```



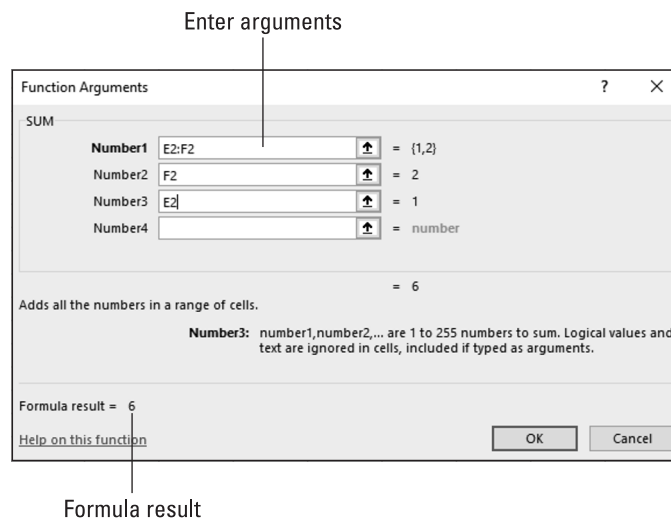
TIP

You can enter function names in lowercase. Excel converts function names to uppercase after you click the Enter button or press Enter to complete the formula. Entering function names in lowercase is recommended because doing so gives you a chance to find out whether you entered a function name correctly. If Excel

doesn't convert your function name to uppercase, you made a typing error when you entered the function name.

## Getting Excel's help to enter a function

Besides entering a function by typing it, you can do it by way of the Function Arguments dialog box, as shown in Figure 3-13. The beauty of using this dialog box is that it warns you if you enter arguments incorrectly. What's more, the Function Arguments dialog box shows you the results of the formula as you construct it so that you can tell whether you're using the function correctly.



**FIGURE 3-13:** The Function Arguments dialog box.

Follow these steps to get Excel's help with entering a function as part of a formula:

### 1. On the Formulas tab, tell Excel which function you want to use.

You can do that with one of these techniques:

- **Click a Function Library button.** Click the button whose name describes what kind of function you want and choose the function's name on the drop-down list. You can click the Financial, Logical, Text, Date & Time, Lookup & Reference, Math & Trig, or More Functions buttons.
- **Click the Recently Used button.** Click this button and choose the name of a function you used recently.
- **Click the Insert Function button.** Clicking this button opens the Insert Function dialog box (refer to Figure 3-12). Find and choose the name of a function. You can search for functions or choose a category and then scroll the names until you find the function you want.

You see the Function Arguments dialog box (refer to Figure 3-13). It offers boxes for entering arguments for the function to compute.

**2. Enter arguments in the spaces provided by the Function Arguments dialog box.**

To enter cell references or ranges, you can click or select cells in your worksheet. If necessary, click the Range Selector button (you can find it to the right of an argument text box) to shrink the Function Arguments dialog box and get a better look at your worksheet.

**3. Click OK when you finish entering arguments for your function.**

I hope you didn't have to argue too strenuously with the Function Arguments dialog box.

## QUICKLY ENTERING A FORMULA AND FUNCTION

Excel offers the AutoSum button and Quick Analysis button for quickly entering formulas that include a function.

Click the cell where you want the results of your formula to appear and try these techniques for constructing formulas with the AutoSum button:

- On the Home or Formulas tab, click the AutoSum button to total nearby cells.
- On the Home or Formulas tab, open the drop-down list on the AutoSum button and choose Sum, Average, Count Numbers, Max, or Min. Respectively, these functions total, average, obtain the number of, obtain the highest value in, or obtain the lowest value in nearby cells.

Excel takes an educated guess as to which cells need totaling, averaging, or whatever, and quickly enters a formula for you.

Use the Quick Analysis button to construct a formula with the SUM, AVERAGE, or COUNT function, or one of their variations:

**1. Select the cells that will be used as arguments by the function.**

The Quick Analysis button appears.

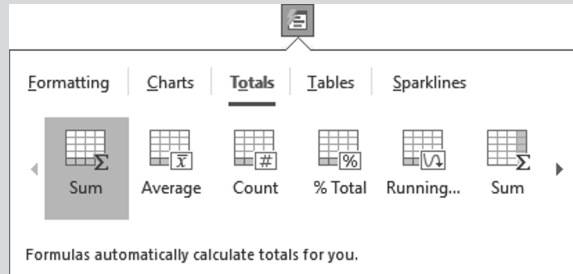
**2. Click the Quick Analysis button.**

**3. Choose Totals in the pop-up window.**

*(continued)*

(continued)

4. Move the pointer over the various functions and glance at your worksheet to see the results of your formulas.
5. Select a function.



## A Look at Some Very Useful Functions

Starting with Table 3-3, the remainder of this chapter looks into functions that I consider especially useful or interesting. After you spend some time constructing formulas, you'll come up with your own list of useful or interesting functions.

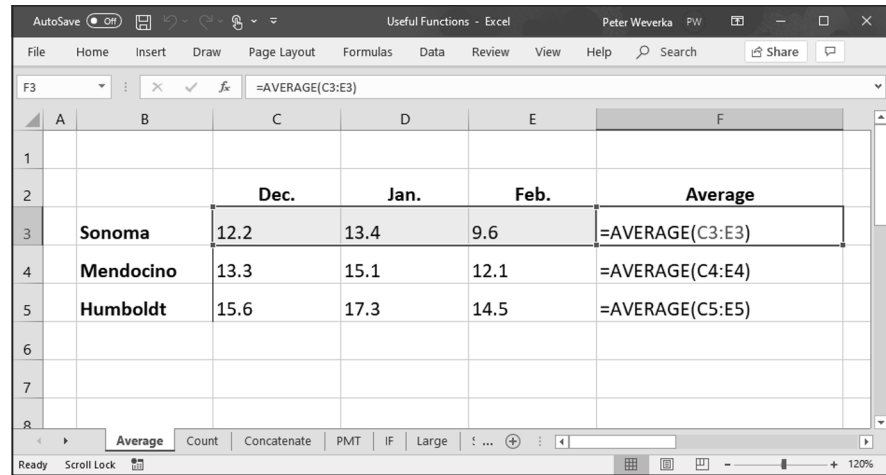
**TABLE 3-3** Common Functions and Their Use

Function	Returns
AVERAGE( <i>number1,number2,..</i> )	The average of the numbers in the cells listed in the arguments
COUNT( <i>value1,value2,..</i> )	The number of cells that contain the numbers listed in the arguments
MAX( <i>number1,number2,..</i> )	The largest value in the cells listed in the arguments
MIN( <i>number1,number2,..</i> )	The smallest value in the cells listed in the arguments
PRODUCT( <i>number1,number2,..</i> )	The product of multiplying the cells listed in the arguments
STDEV( <i>number1,number2,..</i> )	An estimate of standard deviation based on the sample cells listed in the argument
STDEVP( <i>number1,number2,..</i> )	An estimate of standard deviation based on the entire sample cells listed in the arguments
SUM( <i>number1,number2,..</i> )	The total of the numbers in the arguments
VAR( <i>number1,number2,..</i> )	An estimate of the variance based on the sample cells listed in the arguments
VARP( <i>number1,number2,..</i> )	A variance calculation based on all cells listed in the arguments



## AVERAGE for averaging data

Might as well start with an easy one. The AVERAGE function averages the values in a cell range. In Figure 3-14, for example, AVERAGE is used to compute the average rainfall in a three-month period in three different counties.



		Dec.	Jan.	Feb.	Average
3	Sonoma	12.2	13.4	9.6	=AVERAGE(C3:E3)
4	Mendocino	13.3	15.1	12.1	=AVERAGE(C4:E4)
5	Humboldt	15.6	17.3	14.5	=AVERAGE(C5:E5)

**FIGURE 3-14:**  
Using AVERAGE  
to find average  
rainfall data.

Use AVERAGE as follows:

```
AVERAGE(cell range)
```

Excel ignores empty cells and logical values in the cell range; cells with 0 are computed.

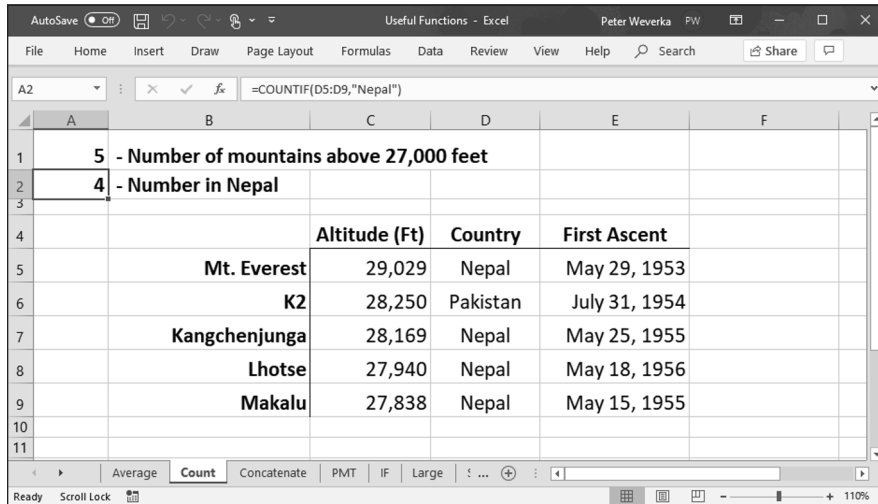
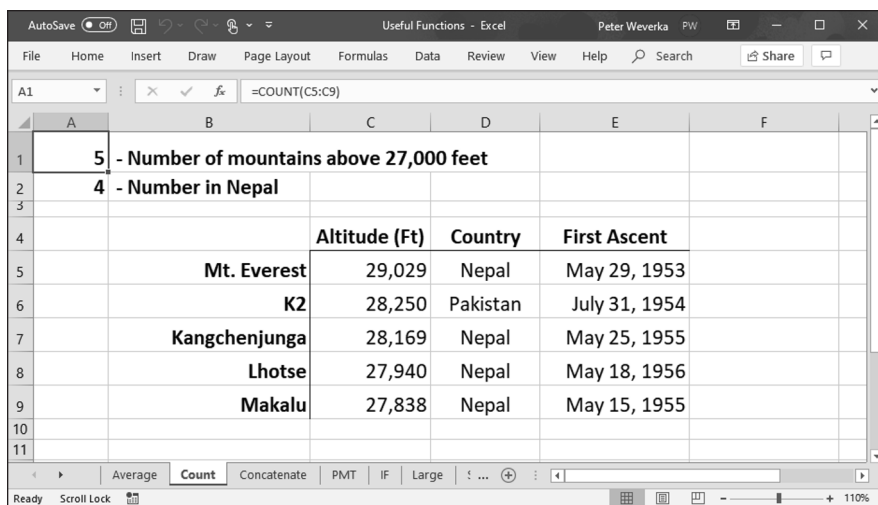
## COUNT and COUNTIF for tabulating data items

Use COUNT, a statistical function, to count how many cells have data in them. Numbers and dates, not text entries, are counted. The COUNT function is useful for tabulating how many data items are in a range. In the spreadsheet at the top of Figure 3-15, for example, COUNT is used to compute the number of mountains listed in the data:

```
COUNT(C5:C9)
```

Use COUNT as follows:

```
COUNT(cell range)
```



**FIGURE 3-15:**  
The COUNT  
(above) and  
COUNTIF (below)  
function at work.

Similar to COUNT is the COUNTIF function. It counts how many cells in a cell range have a specific value. To use COUNTIF, enter the cell range and a criterion in the argument, as follows. If the criterion is a text value, enclose it in quotation marks.

```
COUNTIF(cell range, criterion)
```

At the bottom of Figure 3-15, the formula determines how many of the mountains in the data are in Nepal:

```
=COUNTIF(D5:D9, "Nepal")
```

## CONCATENATE for combining values

CONCATENATE, a text function, is useful for combining values from different cells into a single cell. In the spreadsheet at the top of Figure 3-16, for example, values from three columns are combined in a fourth column to list peoples' names in their entirety.

The screenshot shows an Excel spreadsheet with the following data:

	A	B	C	D	E	F	G
1							
2		Last Name	First Name	Initial	City		
3		Munoz	John	Q	Boston	John Q. Munoz	
4		Hart	Sally	T	El Paso	Sally T. Hart	
5		Davidson	Hellen	Z	Austin	Hellen Z. Davidson	
6		Chong	Bill	W	Tucson	Bill W. Chong	
7							
8							
9							
10		Last Name	First Name	Initial	City		
11		Munoz	John	Q	Boston	John Q. Munoz lives in Boston.	
12		Hart	Sally	T	El Paso	Sally T. Hart lives in El Paso.	
13		Davidson	Hellen	Z	Austin	Hellen Z. Davidson lives in Austin.	
14		Chong	Bill	W	Tucson	Bill W. Chong lives in Tucson.	
15							
16							

The formula bar shows the formula: `=CONCATENATE(C3," ",D3,".",",",B3)`

**FIGURE 3-16:** Use the CONCATENATE function to combine values from cells.

Use CONCATENATE as follows:

```
CONCATENATE(text1, text2, text3. . .)
```

To include blank spaces in the text you're combining, enclose a blank space between quotation marks as an argument. Moreover, you can include original text in the concatenation formula as long as you enclose it in quotation marks and enter it as a separate argument. In Figure 3-16, I had to include a period after the middle initial, so in the formula, I entered a period in quotation marks as an argument:

```
=CONCATENATE(C3," ",D3,".",",",B3)
```

In the spreadsheet shown at the bottom of Figure 3-16, I used the CONCATENATE function to write sentences ("John Q. Munoz lives in Boston."). I included the words "lives in" in the formula, as follows:

```
=CONCATENATE(C11," ",D11,".",",",B11," ","lives in"," ",E11,".")
```

## PMT for calculating how much you can borrow

If you're looking to buy a house, a car, or another expensive item for which you have to borrow money, the question to ask yourself is: How much can I borrow and make the monthly payment on the loan without stressing my budget unnecessarily? Can you safely make a monthly payment of \$1,000, \$1,500, \$2,000? How much you can afford to pay each month to service a loan determines how much you can realistically borrow.

Use the PMT (payment) function to explore how much you can borrow given different interest rates and different amounts. PMT determines how much you have to pay annually on different loans. After you determine how much you have to pay annually, you can divide this amount by 12 to see how much you have to pay monthly.

Use the PMT function as follows to determine how much you pay annually for a loan:

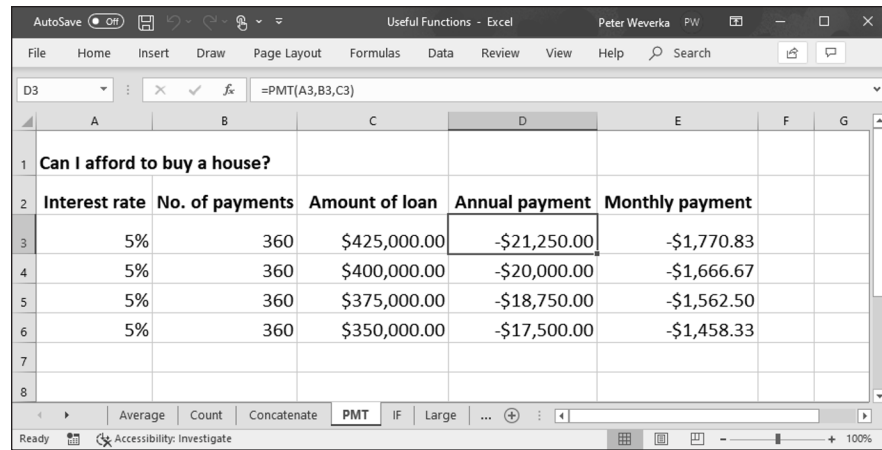
```
PMT(interest rate, number of payments, amount of loan)
```

As shown in Figure 3-17, set up a worksheet with five columns to explore loan scenarios:

- » **Interest rate (column A):** Because the interest rate on loans is expressed as a percentage, format this column to accept numbers as percentages (click the Percent Style button on the Home tab).
- » **No. of payments (column B):** Typically, loan payments are made monthly. For a 30-year home loan mortgage, enter 360 in this column (12 months × 30 years); for a 15-year mortgage, enter 180 (12 months × 15 years). Enter the total number of loan payments you will make during the life of the loan.
- » **Amount of loan (column C):** Enter the amount of the loan.
- » **Annual payment (column D):** Enter a formula with the PMT function in this column to determine how much you have to pay annually for the loan. In Figure 3-17, the formula is  

```
=PMT(A3,B3,C3)
```
- » **Monthly payment (column E):** Divide the annual payment in column D by 12 to determine the monthly payment:  

```
=D3/12
```

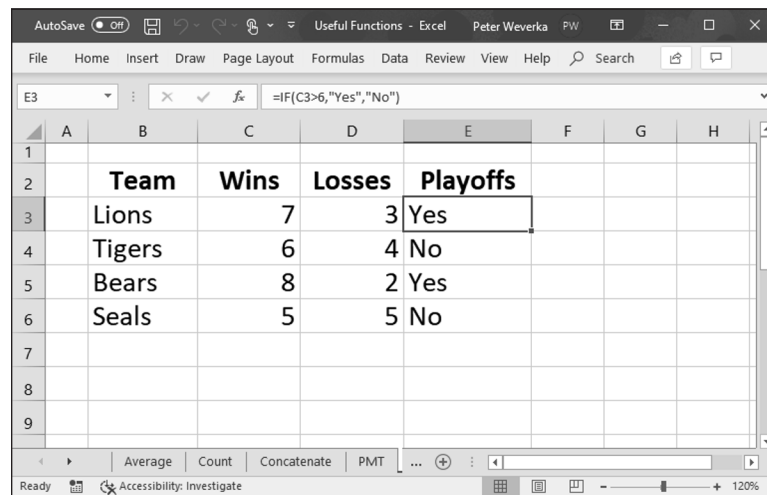


**FIGURE 3-17:** Exploring loan scenarios with the PMT function.

After you set up the worksheet, you can start playing with different loan scenarios — different interest rates and amounts — to find out how much you can comfortably borrow and comfortably pay each month to pay back the loan.

## IF for identifying data

The IF function examines data and returns a value based on criteria you enter. Use the IF function to locate data that meets a certain threshold. In the worksheet shown in Figure 3-18, for example, the IF function is used to identify teams that are eligible for the playoffs. To be eligible, a team must have won more than six games. The IF function identifies whether a team has won more than six games and, in the Playoffs column, enters the word *Yes* or *No* accordingly.



**FIGURE 3-18:** Exploring data with the IF function.

Use the IF function as follows:

```
IF(logical true-false test, value if true, value if false)
```

Instructing Excel to enter a value if the logical true-false test comes up false is optional; you must supply a value to enter if the test is true. Enclose the value in quotation marks if it is a text value such as the word *Yes* or *No*.

In Figure 3-18, the formula for determining whether a team made the playoffs is as follows:

```
=IF(C3>6, "Yes", "No")
```

If the false “No” value was absent from the formula, teams that didn’t make the playoffs would not show a value in the Playoffs column; these teams’ Playoffs column would be empty.

## LEFT, MID, and RIGHT for cleaning up data

Sometimes when you import data from another software application, especially if it’s a database application, the data arrives with unneeded characters. You can use the LEFT, MID, RIGHT, and TRIM functions to remove these characters:

- » LEFT returns the leftmost characters in a cell to the number of characters you specify. For example, in a cell with *CA\_State*, this formula returns *CA*, the two leftmost characters in the text:

```
=LEFT(A1, 2)
```

- » MID returns the middle characters in a cell starting at a position you specify to the number of characters you specify. For example, in a cell with *http://www.dummies.com*, this formula uses MID to remove the extraneous seven characters at the beginning of the URL and get *www.dummies.com*:

```
=MID(A1, 7, 50)
```

- » RIGHT returns the rightmost characters in a cell to the number of characters you specify. For example, in a cell containing the words *Vitamin B1*, this formula returns *B1*, the two rightmost characters in the name of the vitamin:

```
=RIGHT(A1, 2)
```

- » TRIM, except for single spaces between words, removes all blank spaces from inside a cell. Use TRIM to remove leading and trailing spaces. This formula removes unwanted spaces from the data in cell A1:

```
=TRIM(A1)
```

## PROPER for capitalizing words

The PROPER function makes the first letter of each word in a cell uppercase. As are LEFT and RIGHT, it is useful for cleaning up data you imported from elsewhere. Use PROPER as follows:

```
PROPER(cell address)
```

## LARGE and SMALL for comparing values

Use the LARGE and SMALL functions, as well as their cousins MIN, MAX, and RANK, to find out where a value stands in a list of values. For example, use LARGE to locate the ninth oldest man in a list, or MAX to find the oldest man. Use MIN to find the smallest city by population in a list, or SMALL to find the fourth smallest. The RANK function finds the rank of a value in a list of values.

Use these functions as follows:

- » MIN returns the smallest value in a list of values. For the argument, enter a cell range or cell array. In the worksheet shown in Figure 3-19, the following formula finds the fewest number of fish caught at any lake on any day:

```
=MIN(C3:G7)
```

- » SMALL returns the *n*th smallest value in a list of values. This function takes two arguments: first, the cell range or cell array, and next, the position, expressed as a number, from the smallest of all values in the range or array. In the worksheet shown in Figure 3-19, this formula finds the second smallest number of fish caught in any lake:

```
=SMALL(C3:G7, 2)
```

- » MAX returns the largest value in a list of values. Enter a cell range or cell array as the argument. In the worksheet shown in Figure 3-19, this formula finds the most number of fish caught in any lake:

```
=MAX(C3:G7)
```

- » LARGE returns the *n*th largest value in a list of values. This function takes two arguments: first, the cell range or cell array, and next, the position, expressed as a number, from the largest of all values in the range or array. In the worksheet shown in Figure 3-19, this formula finds the second largest number of fish caught in any lake:

```
=LARGE(C3:G7, 2)
```

» RANK returns the rank of a value in a list of values. This function takes three arguments:

- The cell with the value used for ranking
- The cell range or cell array with the comparison values for determining rank
- Whether to rank in order from top to bottom (enter **0** for descending) or bottom to top (enter **1** for ascending)

In the worksheet shown in Figure 3-19, this formula ranks the total number of fish caught in Lake Temescal against the total number of fish caught in all five lakes:

```
=RANK(H3,H3:H7,0)
```

The screenshot shows an Excel spreadsheet with the following data:

Fish Caught by Lake								
	Lake	8/1	8/2	8/3	8/4	8/5	Totals	Rank
3	Temescal	29	31	44	51	23	178	4
4	Elsinore	98	114	87	111	78	488	2
5	Hemet	114	187	176	124	101	702	1
6	Hidden	14	23	28	31	34	130	5
7	Fulmore	78	72	69	88	64	371	3

Below the table, the following text is displayed:

- 187 = Most fish caught in one day at any lake (MAX)
- 176 = Second most fish caught in one day at any lake (LARGE)
- 14 = Fewest fish caught in one day at any lake (MIN)
- 23 = Second fewest fish caught in one day at any lake (SMALL)

**FIGURE 3-19:** Using functions to compare values.

## NETWORKDAY and TODAY for measuring time in days

Excel offers a couple of date functions for scheduling, project planning, and measuring time periods in days.



NETWORKDAYS measures the number of workdays between two dates (the function excludes Saturdays and Sundays from its calculations). Use this function for scheduling purposes to determine the number of workdays needed to complete a project. Use NETWORKDAYS as follows:

```
NETWORKDAYS(start date, end date)
```

TODAY gives you today's date, whatever it happens to be. Use this function to compute today's date in a formula. The TODAY function takes no arguments and is entered like so, parentheses included:

```
TODAY()
```

To measure the number of days between two dates, use the minus operator and subtract the latest date from the earlier one. For example, this formula measures the number of days between 1/1/2019 and 6/1/2019:

```
="6/1/2019"-1/1/2019"
```

The dates are enclosed in quotation marks to make Excel recognize them as dates. Make sure that the cell where the formula is located is formatted to show numbers, not dates.

## LEN for Counting Characters in Cells

Use the LEN (length) function to obtain the number of characters in a cell. This function is useful for making sure that characters remain under a certain limit. The LEN function counts blank spaces as well as characters. Use the LEN function as follows:

```
LEN(cell address)
```



#### IN THIS CHAPTER

- » Aligning numbers and text
- » Applying cell styles to data in cells
- » Splashing color on a worksheet
- » Preparing a worksheet before you print it

## Chapter **4**

# Making a Worksheet Easier to Read and Understand

**T**his short and pithy chapter explains how to dress a worksheet in its Sunday best in case you want to print and present it to others. It explains how to align numbers and text, insert rows and columns, and change the size of rows and columns. You find out how to decorate a worksheet with colors and borders as well as create and apply styles to make formatting tasks go more quickly. Finally, this chapter describes everything you need to know before you print a worksheet, including how to make it fit on one page and repeat row labels and column names on all pages.

## Laying Out a Worksheet

Especially if you intend to print your worksheet, you may as well make it look sharp. And you can do a number of things to make worksheets easier to read and understand. You can change character fonts. You can draw borders around or shade important cells. You can also format the numbers so that readers know,

for example, whether they're staring at dollar figures or percentages. This part of Chapter 4 is dedicated to the proposition that a worksheet doesn't have to look drab and solemn.

## Aligning numbers and text in columns and rows

To start with, numbers in worksheets are right aligned in cells, and text is left aligned. Numbers and text sit squarely on the bottom of cells. You can, however, change the way that data is aligned. For example, you can make data float at the top of cells rather than rest at the bottom, and you can center or justify data in cells. Figure 4-1 illustrates different ways to align text and numbers. How text is aligned helps people make sense of your worksheets. In Figure 4-1, for example, Income and Expenses are left-aligned so that they stand out and clarify what the right-aligned column labels below are all about.

		Budget Data for Quarter 1					
		January	February	March	April	Totals	Average
<b>Income</b>							
Sales		32,000	34,000	30,000	31,000	127,000	31,750
Shipping		4,500	4,700	4,200	4,300	17,700	4,425
Rents		9,100	9,100	9,300	9,300	36,800	9,200
Totals		45,600	47,800	43,500	44,600	181,500	45,375
<b>Expenses</b>							
Advertising		850	850	870	870	3,440	860
Equipment		970	970	1,020	1,020	3,980	995
Taxes		1,920	2,040	1,800	1,860	7,620	1,905
Salaries		22,750	22,950	23,150	23,300	92,150	23,038
Totals		26,490	26,810	26,840	27,050	107,190	26,798
<b>NET PROFIT</b>		<b>\$19,110</b>	<b>\$20,990</b>	<b>\$16,660</b>	<b>\$17,550</b>	<b>\$74,310</b>	<b>\$18,578</b>

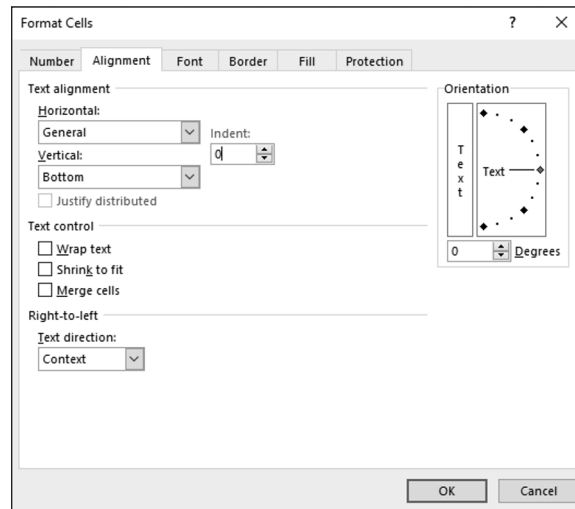
**FIGURE 4-1:**  
Ways to align data.

Select the cells whose alignment needs changing and follow these instructions to realign data in the cells:

» **Changing the horizontal (side-to-side) alignment:** On the Home tab, click the Align Left, Center, or Align Right button. You can also click the Alignment group button, and on the Alignment tab of the Format Cells dialog box,

choose an option on the Horizontal drop-down list. Figure 4-2 shows the Format Cells dialog box.

- » **Changing the vertical (top-to-bottom) alignment:** On the Home tab, click the Top Align, Middle Align, or Bottom Align button. You can also click the Alignment group button to open the Format Cells dialog box (refer to Figure 4-2) and choose an option on the Vertical drop-down list. The Justify option makes all the letters or numbers fit in a cell, even if it means wrapping text to two or more lines.
- » **Reorienting the cells:** On the Home tab, click the Orientation button and choose an option on the drop-down list. (For Figure 4-2, I chose the Angle Counterclockwise option.) You can also click the Alignment group button, and on the Alignment tab of the Format Cells dialog box (refer to Figure 4-2), drag the diamond in the Orientation box or enter a number in the Degrees text box.



**FIGURE 4-2:**  
The Alignment  
tab of the Format  
Cells dialog box.



**TIP**

Changing the orientation of text in cells is an elegant solution to the problem of keeping a worksheet from getting too wide. Numbers are usually a few characters wide, but heading labels can be much wider than that. By changing the orientation of a heading label, you make columns narrower and keep worksheets from growing too wide to fit on the screen or page.

## MERGING AND CENTERING TEXT ACROSS SEVERAL CELLS

In the illustration shown here, “Sales Totals by Regional Office” is centered across four different cells. Normally, text is left aligned, but if you want to center it across several cells, drag across the cells to select them, go to the Home tab, and click the Merge & Center button. Merging and centering allows you to display text across several columns.

To “unmerge and uncenter” cells, select the text that you merged and centered, open the drop-down list on the Merge & Center button, and choose Unmerge Cells. You can also deselect the Merge Cells check box in the Format Cells dialog box (refer to Figure 4-2).

B	C	D	E	F	G	
	Sales Totals by Regional Office					
	North	West	East	South		

## Inserting and deleting rows and columns

At some point, everybody has to insert new columns and rows and delete ones that are no longer needed. Make sure before you delete a row or column that you don't delete data that you really need. Do the following to insert and delete rows and columns:

- » **Deleting rows or columns:** Drag across the row numbers or column letters of the rows or columns you want to delete; then right-click and choose Delete, or, on the Home tab, open the drop-down list on the Delete button and select Delete Sheet Rows or Delete Sheet Columns.
- » **Inserting rows:** Select the row below the row you want to insert; then, on the Home tab, open the drop-down list on the Insert button and choose Insert Sheet Rows, or right-click the row you selected and choose Insert on the shortcut menu. For example, to insert a new row above row 11, select the current row 11 before choosing Insert Sheet Rows. You can insert more than one row at a time by selecting more than one row before giving the Insert Sheet Rows command.

» **Inserting columns:** Select the column to the right of where you want the new column to be; then, on the Home tab, open the drop-down list on the Insert button and choose Insert Sheet Columns, or right-click the column you selected and choose Insert on the shortcut menu. You can insert more than one column this way by selecting more than one column before giving the Insert command.



TIP

A fast way to insert several rows or columns is to insert one and keep pressing F4 (the Repeat command) until you insert all the rows or columns you need.

After you insert rows or columns, the Insert Options button appears. Click it and choose an option from the drop-down list if you want your new row or column to have the same or different formats as the row or column you selected to start the Insert operation.



REMEMBER

To insert more than one row or column at a time, select more than one row number or column letter before giving the Insert command.

## Changing the size of columns and rows

By default, columns are 8.43 characters wide. To make columns wider, you have to widen them yourself. Rows are 15 points high, but Excel makes them higher when you enter letters or numbers that are taller than 15 points (72 points equal one inch). Excel offers a bunch of different ways to change the size of columns and rows. You can start on the Home tab and choose options on the Format button drop-down list, as shown in Figure 4-3, or you can rely on your wits and change sizes manually by dragging or double-clicking the boundaries between row numbers or column letters.

Before you change the size of columns or rows, select them (Chapter 2 of this minibook explains how). Click or drag across row numbers to select rows; click or drag across column letters to select columns.

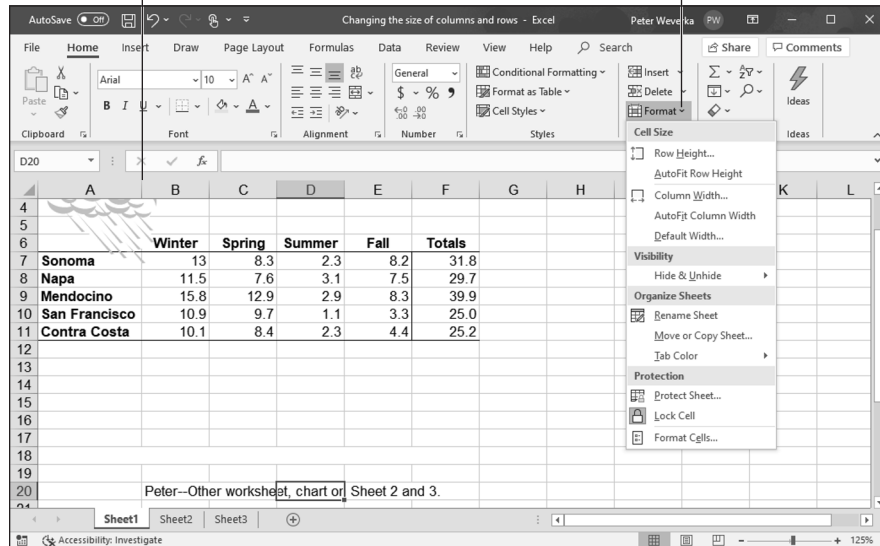
### Adjusting the height of rows

Here are ways to change the height of rows:

» **One at a time:** Move the mouse pointer onto the boundary between row numbers and, when the pointer changes to a cross, drag the boundary between rows up or down. A pop-up box tells you how tall the row will be after you release the mouse button.

Drag a boundary...

or choose a Format option



**FIGURE 4-3:**  
Ways to  
change the size  
of columns  
and rows.

- » **Several at a time:** Select several rows and drag the boundary between one of the rows. When you do so, all rows change height. You can also go to the Home tab, click the Format button, choose Row Height, and enter a measurement in the Row Height dialog box.
- » **Tall as the tallest entry:** To make a row as tall as its tallest cell entry, double-click the border below a row number (after you've selected a row) or go to the Home tab, click the Format button, and choose AutoFit Row Height.

## Adjusting the width of columns

Here are ways to make columns wider or narrower:

- » **One at a time:** Move the mouse pointer onto the boundary between column letters, and when the pointer changes to a cross, drag the border between the columns. A pop-up box tells you what size the column is.
- » **Several at a time:** Select several columns and drag the boundary between one of the columns; all columns adjust to the same width. You can also go to the Home tab, click the Format button, choose Column Width, and enter a measurement in the Column Width dialog box.
- » **As wide as their entries:** To make columns as wide as their widest entries, select the columns, go to the Home tab, click the Format button, and choose



AutoFit Column Width on the drop-down list. You can also double-click the right border of a column letter. By “auto-fitting” columns, you can be certain that the data in each cell in a column appears onscreen.



TIP

To change the 8.43-character standard width for columns in a worksheet, go to the Home tab, click the Format button, choose Default Width on the drop-down list, and enter a new measurement in the Standard Width dialog box.

## Decorating a Worksheet with Borders and Colors

The job of gridlines is simply to help you line up numbers and letters in cells. By default, gridlines aren't printed, and because gridlines aren't printed, drawing borders on worksheets is absolutely necessary if you intend to print your worksheet. Use borders to steer the reader's eye to the most important parts of your worksheet — the totals, column labels, and heading labels. You can also decorate worksheets with colors. This part of the chapter explains how to put borders and colors on worksheets.

### Cell styles for quickly formatting a worksheet

A *style* is a collection of formats — boldface text, a background color, or a border around cells — that can be applied all at one time to cells without having to visit a bunch of different dialog boxes or give a bunch of different commands. Styles save time. If you find yourself choosing the same formatting commands time and time again, consider creating a style. That way, you can apply all the formats simultaneously and go to lunch earlier. Excel comes with many built-in styles, and you can create styles of your own, as the following pages explain.

#### Applying a built-in cell style

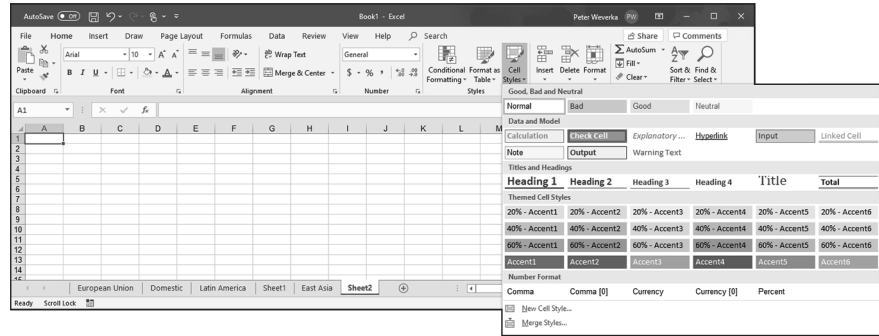
By way of the Cell Styles gallery on the Home tab, you can choose from any number of attractive styles for cells in a worksheet. Excel offers styles for titles and headings, styles for calling attention to what kind of data is in cells, and styles to accent cells. Follow these steps to reformat cells by choosing a cell style:

1. **Select the cells that need a new look.**
2. **On the Home tab, click the Cell Styles button.**

As shown in Figure 4-4, the Cell Styles gallery opens.

### 3. Select a cell style.

The Cell Styles gallery is divided into categories. Find a style that suits your purposes.



**FIGURE 4-4:** Choosing a new style from the Cell Styles gallery.



**TIP**

To remove a style from cells, select the cells, open the Cell Styles gallery, and choose Normal. (You find Normal in the “Good, Bad and Neutral” category.)

## Creating your own cell style

The names of cell styles you create on your own are placed at the top of the Cell Styles gallery under the Custom heading. Create a cell style if you’re the creative type or if no built-in style meets your high standards. Follow these steps to create a cell style:

### 1. Apply the formatting commands you want for your style to a single cell.

For example, left-align cell data. Or apply a fill color to the cells (see “Decorating worksheets with colors,” later in this chapter). Or change fonts and font sizes. Knock yourself out. Choose all the formatting commands you want for your new style.

### 2. On the Home tab, click the Cell Styles button to open the Cell Styles gallery.

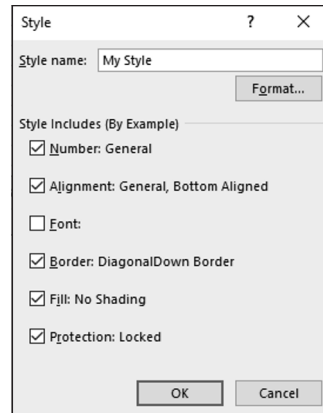
Depending on the size of your screen, you may have to click the Styles button and then click the More button first.

### 3. Choose New Cell Style at the bottom of the gallery.

You see the Style dialog box shown in Figure 4-5. It lists formatting specifications that you chose for the cell you selected in Step 1. If these specifications aren’t what you’re after, or if you want to change a specification, you can click the Format button and construct your new style in the Format Cells dialog box.

4. Enter a descriptive name for your style in the Style Name text box.
5. Click OK.

Next time you open the Cell Styles gallery, you see the name of your style at the top under Custom.



**FIGURE 4-5:**  
Creating a new  
style for the Cell  
Styles gallery.

To remove a style you created from the Cell Styles gallery, right-click its name in the gallery and choose Delete on the shortcut menu.

## Formatting cells with table styles

Especially if your worksheet data is arranged neatly into columns and rows so that it looks like a conventional table, one of the easiest ways to decorate cells is to take advantage of table styles. Excel offers many preformatted table styles that you can apply to columns and rows on a worksheet.

Follow these steps to experiment with table styles:

1. Select the cells you want to format as a table.
2. On the Home tab, click the Format As Table button and select a table style in the gallery.  
The Format As Table dialog box appears.
3. If the cells you want to format include headers, the labels at the top of column rows that describe the data in the columns below, select the My Table Has Headers check box.

#### 4. Click OK in the Format As Table dialog box.

You can go to the (Table Tools) Design tab to refine your table. Choose a different table style in the gallery if you don't care for the style you chose.

To remove a table style from cells, select the cells, go to the (Table Tools) Design tab, and choose Clear in the Table Styles gallery.

As Chapter 5 of this minibook explains, choosing the Format As Table command can be a way to filter and sort table data. This is why the Format As Table command places filter buttons in the first row of tables. To remove these filter buttons, deselect the Filter Button check box on the (Table Tools) Design tab.

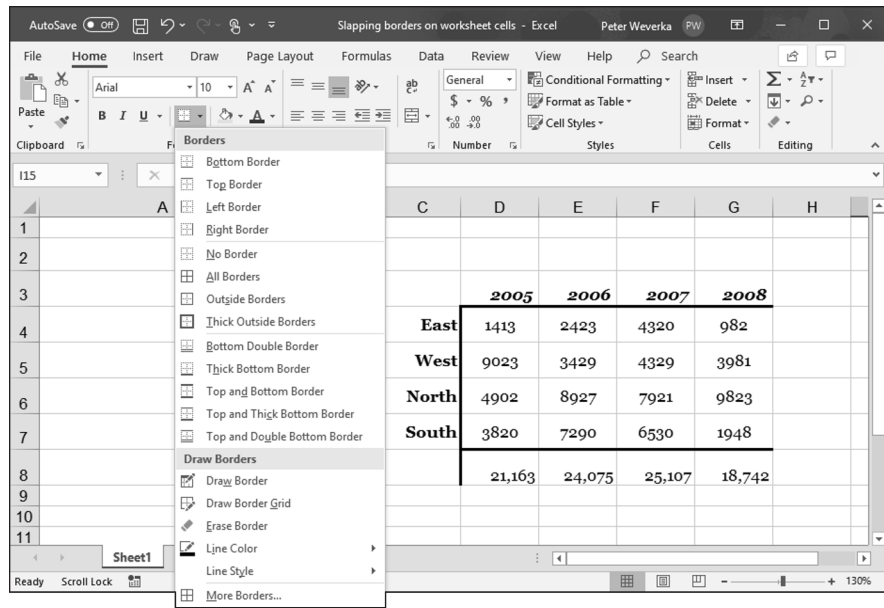
## Slapping borders on worksheet cells

Put borders on worksheet cells to box in cells, draw lines beneath cells, or draw lines along the side of cells. Borders can direct people who review your worksheet to its important parts. Typically, for example, a line appears above the Totals row of a worksheet to separate the Totals row from the rows above and help readers locate cumulative totals.

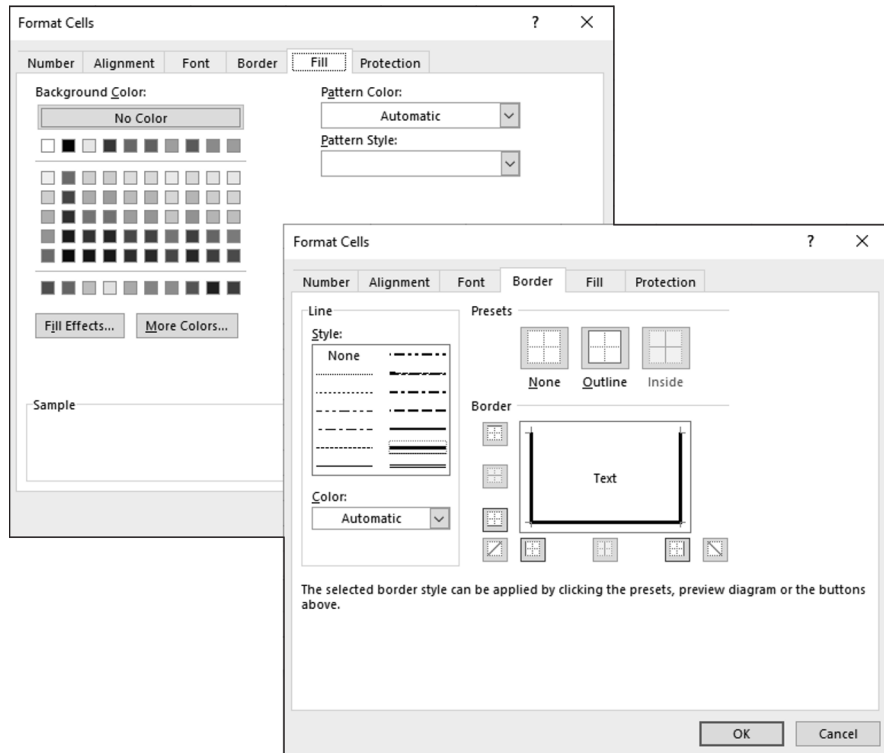
To draw borders on a worksheet, start by selecting the cells around which or through which you want to place borders. Then do one of the following to draw the borders:

- » **Borders button:** On the Home tab, open the drop-down list on the Borders button (it's in the Font group) and choose a border, as shown in Figure 4-6.
- » **Drawing:** On the Home tab, open the drop-down list on the Borders button and choose Draw Border or Draw Border Grid. Then drag on the screen to draw the borders. Press Esc when you finish drawing.
- » **Format Cells dialog box:** On the Home tab, click the Format button and choose Format Cells, or choose More Borders on the Borders button drop-down list. The Format Cells dialog box opens, as shown in Figure 4-7. On the Border tab, select a border style and either click in the Border box to tell Excel where to draw the border or click a Presets button. The Border tab offers different lines for borders and colors for borderlines as well.

To remove the border from cells, select the cells, open the drop-down list on the Borders button, and choose No Border.



**FIGURE 4-6:** Drawing a border with the Borders button.



**FIGURE 4-7:** Go to the Format Cells dialog box to apply color (left) or draw borders (right).

Making a Worksheet Easier to Read and Understand

## Decorating worksheets with colors

Apply background colors to cells to make them stand out or help the people who review your worksheets understand how they are laid out. Select the cells that need a background color and use these techniques to splash color on your worksheet:

- » On the Home tab, click the Format button and choose Format Cells on the drop-down list. You see the Format Cells dialog box. On the Fill tab, select a color and click OK. Figure 4-7 shows what the Fill tab looks like.
- » On the Home tab, open the drop-down list on the Fill Color button and select a color.

## Getting Ready to Print a Worksheet

Printing a worksheet isn't simply a matter of giving the Print command. A worksheet is a vast piece of computerized sprawl. Most worksheets don't fit neatly on a single page. If you simply click the Print button to print your worksheet, you wind up with page breaks in unexpected places, both on the right side of the page and the bottom. Read on to discover how to set up a worksheet so that the people you hand it to can read and understand it.

### Making a worksheet fit on a page

Unless you tell it otherwise, Excel prints everything from cell A1 to the last cell with data in it in the southeast corner of the worksheet. Usually, it isn't necessary to print all those cells because some of them are blank. And printing an entire worksheet often means breaking the page up in all kinds of awkward places. To keep that from happening, following are some techniques for making a worksheet fit tidily on one or two pages.



TIP

As you experiment with the techniques described here, switch occasionally to Page Layout view. In this view, you get a better idea of what your worksheet will look like when you print it. To switch to Page Layout view, click the Page Layout button on the status bar or View tab.

### Printing part of a worksheet

To print part of a worksheet, select the cells you want to print, go to the Page Layout tab, click the Print Area button, and choose Set Print Area on the drop-down list. This command tells Excel to print only the cells you selected. On the

worksheet, a box appears around cells in the print area. To remove the box from your worksheet, click the Print Area button and choose Clear Print Area on the drop-down list.

## Printing a landscape worksheet

If your worksheet is too wide to fit on one page, try turning the page on its side and printing in landscape mode. In landscape mode, pages are wider than they are tall. Landscape mode is often the easiest way to fit a worksheet on a page.

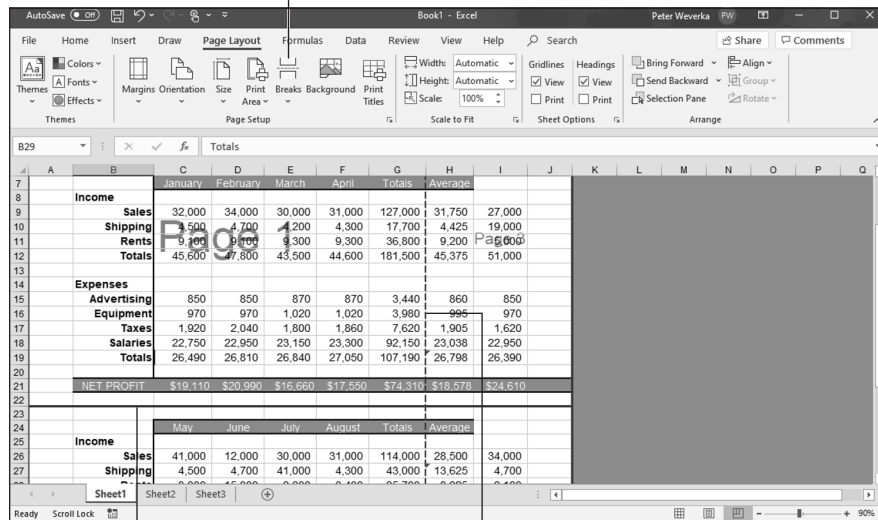
To make yours a landscape worksheet instead of a portrait worksheet, go to the Page Layout tab, click the Orientation button, and choose Landscape on the drop-down list.

## Seeing and adjusting the page breaks

Reading a worksheet is extremely difficult when it's broken awkwardly across pages. Where one page ends and the next begins is a *page break*. Use these techniques to see where page breaks occur, adjust the position of page breaks, and insert and remove page breaks:

- » **Viewing where page breaks occur:** Click the Page Break Preview button on the status bar or View tab. As shown in Figure 4-8, you switch to Page Break Preview view. In this view, page numbers appear clearly on the worksheet and dashed lines show you where Excel wants to break the pages.
- » **Adjusting page break positions:** In Page Break Preview view, drag a dashed line to adjust the position of a page break. After you drag a dashed line, it ceases being a default page break and becomes a manual page break. Manual page breaks are marked by solid lines, not dashed lines (see Figure 4-8). You can drag them, too. Excel shrinks the numbers and letters on your worksheet if you try to squeeze too much data on a worksheet by dragging a page break.
- » **Inserting a page break:** Select the cell directly below where you want the horizontal break to occur and directly to the right of where you want the vertical break to be, go to the Page Layout tab, click the Breaks button, and choose Insert Page Break. Drag a page break to adjust its position.
- » **Removing a page break:** Select a cell directly below or directly to the right of the page break, go to the Page Layout tab, click the Breaks button, and choose Remove Page Break.
- » **Removing all manual page breaks:** To remove all manual page breaks you inserted, go to the Page Layout tab, click the Breaks button, and choose Reset All Page Breaks.

## Insert and remove page breaks



**FIGURE 4-8:**  
Deciding where  
page breaks.

Manual page break

Default page break

Switch to Page Layout or Normal view after you're done fooling with page breaks. You can clearly see page breaks in Page Layout view. In Normal view, page breaks are marked by a dotted line.

## "Scaling to fit" a worksheet

To scale the numbers and letters in a worksheet and make them a bit smaller so that they fit on a page, you can experiment with the Scale to Fit options. These options are located on the Page Layout tab. Starting in Page Layout view, go to the Page Layout tab and test-drive these options to make your worksheet fit on a single page or a certain number of pages:

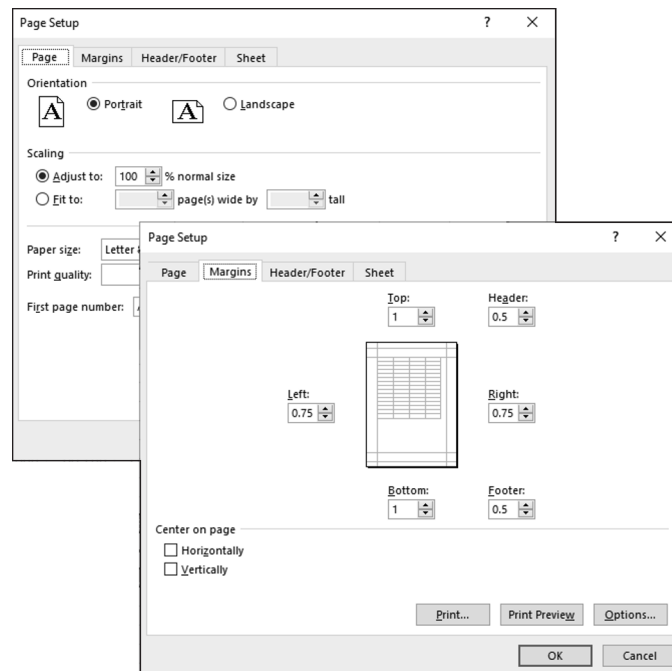
- » **Scaling by width:** Open the Width drop-down list and choose an option to make your worksheet fit across one or more pages. Choose the 1 Page option, for example, to squeeze a worksheet horizontally so that it fits on one page.
- » **Scaling by height:** Open the Height drop-down list and choose an option to make your worksheet fit across a select number of pages. For example, choose the 2 Pages option to shrink a worksheet vertically so that it fits on two pages.
- » **Scaling by percentage:** Enter a percentage measurement in the Scale box to shrink a worksheet vertically and horizontally. To scale this way, you must choose Automatic in the Width and Height drop-down lists.





TIP

You can also fit a worksheet on a select number of pages by going to the Page Setup dialog, box shown in Figure 4-9. With this technique, you get a chance to “print-preview” your worksheet and get a better look at it after you change the scale. On the Page Layout tab, click the Page Setup group button to open the Page Setup dialog box. On the Page tab of the dialog box, select the Fit To option button and enter the ideal number of pages you want for your worksheet in the Page(s) Wide By and Tall text boxes. Excel shrinks the data as much as is necessary to make it fit on the number of pages you asked for. Click the Print Preview button to preview your worksheet in the Print window and find out whether shrinking your worksheet this way helps.



**FIGURE 4-9:**  
The Page (left)  
and Margins  
(right) of the Page  
Setup dialog box.

Making a Worksheet Easier  
to Read and Understand

## Adjusting the margins

Another way to stuff all the data onto one page is to narrow the margins a bit. Go to the Page Layout tab and use either of these techniques to adjust the size of the margins:

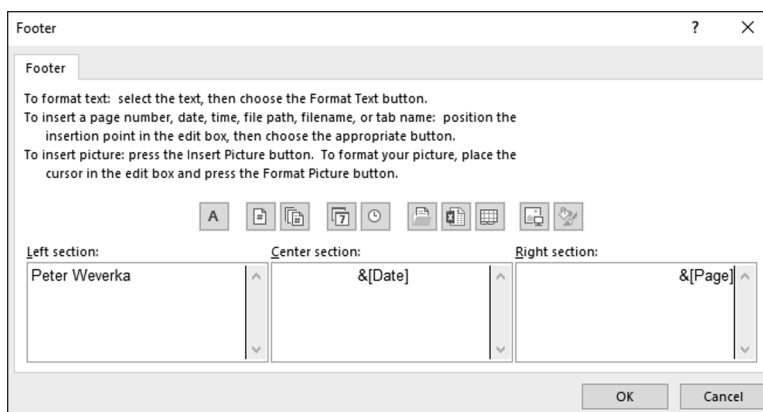
- » Click the Margins button and choose Narrow on the drop-down list.
- » Click the Page Setup group button, and on the Margins tab of the Page Setup dialog box, change the size of the margins, as shown in Figure 4-9. By clicking the Print Preview button, you can preview your worksheet in the Print window

and adjust margins there by dragging them. Select the Show Margins button to display the margins. (This little button is in the lower-right corner of the Print window.)

## Making a worksheet more presentable

Before you print a worksheet, visit the Page Setup dialog box and see what you can do to make your worksheet easier for others to read and understand. To open the Page Setup dialog box, go to the Page Layout tab and click the Page Setup group button. Here are your options:

- » **Including page numbers on worksheets:** On the Page tab of the Page Setup dialog box (refer to Figure 4-9), enter **1** in the First Page Number text box. Then, on the Header/Footer tab, open the Header or Footer drop-down list and choose an option that includes a page number. Choosing the Page 1 of ? option, for example, enters the page number and the total number of pages in the worksheet in your header or footer.
- » **Putting headers and footers on pages:** On the Header/Footer tab of the Page Setup dialog box, choose options from the Header and Footer drop-down lists. You can find options for listing the file name, page numbers, the date, and your name. By clicking the Custom Header or Custom Footer button, you can open the Header or Footer dialog box and construct a header or footer there. Figure 4-10 shows the Footer dialog box.
- » **Centering worksheet data on the page:** On the Margins tab of the page Setup dialog box, select Horizontally or Vertically to center the worksheet relative to the top or bottom or sides of the page. You can select both check boxes. The preview screen shows what your choices mean in real terms.



**FIGURE 4-10:** Constructing a fancy footer.

» **Printing gridlines, column letters, and row numbers:** By default, the gridlines, column letters, and row numbers that you know and love in a worksheet aren't printed, but you can print them by going to the Sheet tab of the Page Setup dialog box and selecting the Gridlines check box as well as the Row and Column Headings check box.

## Repeating row and column headings on each page

If your worksheet is a big one that stretches beyond one page, you owe it to the people who view your worksheet to repeat row and column headings from page to page. Without these headings, no one can tell what the data in the worksheet means. Follow these steps to repeat row and column headings from page to page:

**1. On the Page Layout tab, click the Print Titles button.**

You see the Sheet tab of the Page Setup dialog box.

**2. Select the Row and Column Headings check box.**

You can find this check box under Print.

**3. To repeat rows, click the Range Selector button next to the Rows to Repeat at Top text box; to repeat columns, click the Range Selector button next to the Columns to Repeat at Left text box.**

These buttons are located on the right side of the dialog box. The dialog box shrinks so that you can get a better look at your worksheet.

**4. Select the row or column with the labels or names you need.**

As long as they're next to each other, you can select more than one row or column by dragging over the row numbers or column letters.

**5. Click the Range Selector button to enlarge the dialog box and see it again.**

The text box now lists a cell range address.

**6. Repeat Steps 3 through 5 to select column or row headings.**

**7. Click OK to close the Page Setup dialog box.**

If I were you, I would click the Print Preview button in the Page Setup dialog box first to make sure that row and column headings are indeed repeating from page to page.

To remove row and column headings, return to the Sheet tab of the Page Setup dialog box and delete the cell references in the Rows to Repeat at Top text box and the Columns to Repeat at Left text box. You can also press Ctrl+F3 and delete Print\_Titles in the Name Manager dialog box.



#### IN THIS CHAPTER

- » Using conditional formats to call attention to data
- » Sorting and filtering information in a worksheet list
- » Performing what-if analyses with data tables
- » Examining data with a PivotTable

## Chapter 5

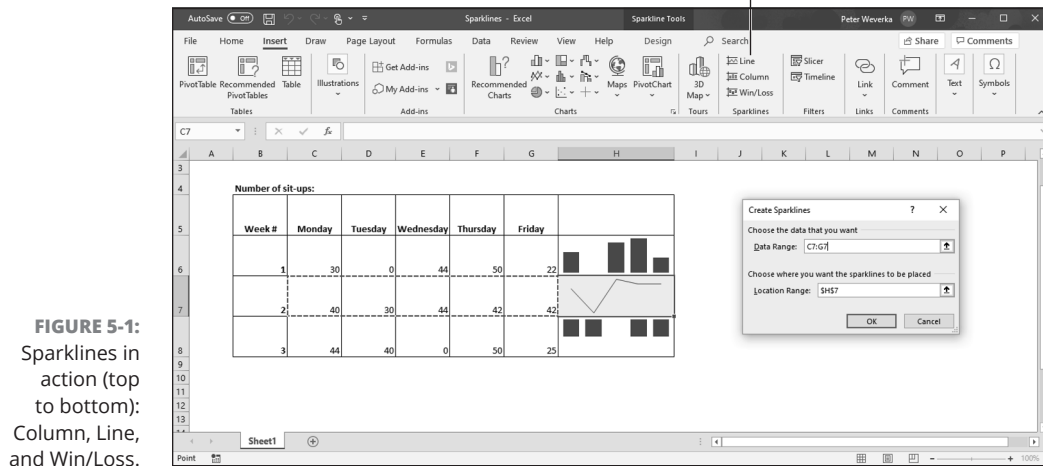
# Advanced Techniques for Analyzing Data

This chapter offers a handful of tricks for analyzing the data that you so carefully and lovingly enter in a worksheet. Delve into this chapter to find out what sparklines are and how to manage, sort, and filter data in lists. You also discover how conditional formats can help data stand out, how the Goal Seek command can help you target values in different kinds of analyses, and how you can map out different scenarios with data by using one- and two-input data tables. Finally, this chapter explains how a PivotTable can help turn an indiscriminate list into a meaningful source of information.

## Seeing What the Sparklines Say

Maybe the easiest way to analyze information in a worksheet is to see what the sparklines say. Figure 5-1 shows examples of sparklines. In the form of a tiny line or bar chart, sparklines tell you about the data in a row or column.

Choose a sparkline



**FIGURE 5-1:** Sparklines in action (top to bottom): Column, Line, and Win/Loss.

Follow these steps to create a sparkline chart:

1. **Select the cell where you want the chart to appear.**
2. **On the Insert tab, click the Line, Column, or Win/Loss button.**

The Create Sparklines dialog box appears.

3. **Drag in a row or column of your worksheet to select the cells with the data you want to analyze.**
4. **Click OK in the Create Sparklines dialog box.**

To change the look of a sparkline chart, go to the (Sparkline Tools) Design tab. There you will find commands for changing the color of the line or bars, choosing a different sparkline type, and doing one or two other things to pass the time on a rainy day. Click the Clear button to remove a sparkline chart.



TIP

You can also create a sparkline chart with the Quick Analysis button. Drag over the cells with the data you want to analyze. When the Quick Analysis button appears, click it, choose Sparklines in the pop-up window, and then choose Line, Column, or Win/Loss.

## Conditional Formats for Calling Attention to Data

A *conditional format* is one that applies when data meets certain conditions. To call attention to numbers greater than 10,000, for example, you can tell Excel to

highlight those numbers automatically. To highlight negative numbers, you can tell Excel to display them in bright red. Conditional formats help you analyze and understand data better.

Select the cells that are candidates for conditional formatting and follow these steps to tell Excel when and how to format the cells:

**1. On the Home tab, click the Conditional Formatting button (you may have to click the Styles button first, depending on the size of your screen).**

**2. Choose Highlight Cells Rules or Top/Bottom Rules on the drop-down list.**

You see a submenu with choices about establishing the rule for whether values in the cells are highlighted or otherwise made more prominent:

- **Highlight Cells Rules:** These rules are for calling attention to data if it falls in a numerical or date range, or it's greater or lesser than a specific value. For example, you can highlight cells that are greater than 400.
- **Top/Bottom Rules:** These rules are for calling attention to data if it falls within a percentage range relative to all the cells you selected. For example, you can highlight cells with data that falls in the bottom 10-percent range.

**3. Choose an option on the submenu.**

You see a dialog box similar to the ones in Figure 5-2.

**4. On the left side of the dialog box, establish the rule for flagging data.**

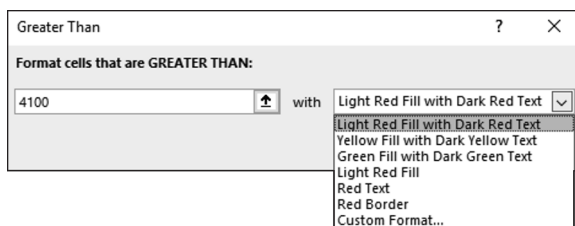
**5. On the With drop-down list, choose how you want to call attention to the data.**

For example, you can display the data in red or yellow. You can choose Custom Format on the drop-down list to open the Format Cells dialog box and choose a font style or color for the text.

**6. Click OK.**

To remove conditional formats, select the cells with the formats, go to the Home tab, click the Conditional Formatting button, and choose Clear Rules⇨ Clear Rules from Selected Cells.

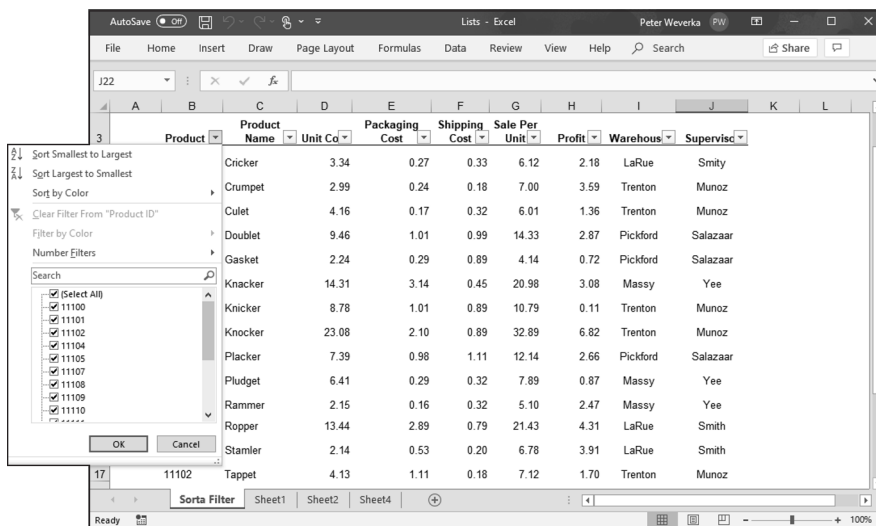
You can also establish conditional formats by selecting cells and pressing Ctrl+Q or clicking the Quick Analysis button (which appears next to cells after you select them). In the pop-up window, choose Formatting and then click Greater Than or Top 10% to create a highlight-cell or top/bottom rule.



**FIGURE 5-2:**  
Establishing a  
condition format  
for data.

## Managing Information in Lists

Although Excel is a spreadsheet program, many people use it to keep and maintain lists, such as the list shown in Figure 5-3. Addresses, inventories, and employee data are examples of information that typically is kept in lists. These pages explain how to sort and filter a list to make it yield more information. Sort a list to put it in alphabetical or numeric order; filter a list to isolate the information you need.



**FIGURE 5-3:**  
A list in a  
worksheet.





REMEMBER

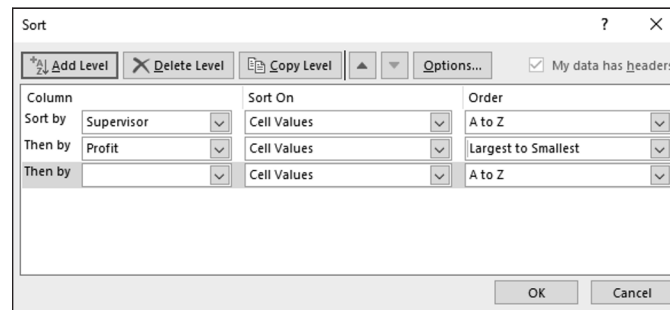
Before you attempt a sort or filter operation, use the Format As Table command to capture the data you want to sort or filter in a list. Chapter 4 of this mini-book explains how to format cells so that they form a table. (*Hint:* Select the cells, click the Format As Table button on the Home tab, and select a table style in the gallery.)

## Sorting a list

*Sorting* means to rearrange the rows in a list on the basis of data in one or more columns. Sort a list on the Last Name column, for example, to arrange the list in alphabetical order by last name. Sort a list on the ZIP Code column to arrange the rows in numerical order by ZIP code. Sort a list on the Birthday column to arrange it chronologically from earliest born to latest born.

Here are all the ways to sort a list:

- » **Sorting on a single column:** Click any cell in the column you want to use as the basis for the sort. For example, to sort item numbers from smallest to largest, click in the Item Number column. Then use one of these techniques to conduct the sort operation:
  - On the Data tab, click the Sort Smallest to Largest or Sort Largest to Smallest button. These buttons are located in the Sort & Filter group.
  - Open the drop-down menu on the column heading and choose Sort Smallest to Largest or Sort Largest to Smallest on the drop-down menu (see Figure 5-3). Click the Filter button on the Data tab if you don't see the drop-down menus.
- » **Sorting on more than one column:** Click the Sort button on the Data tab. You see the Sort dialog box, as shown in Figure 5-4. Choose which columns you want to sort with and the order in which you want to sort. To add a second or third column for sorting, click the Add Level button.



**FIGURE 5-4:** Sort to arrange the list data in different ways.

## Filtering a list

*Filtering* means to scour a worksheet list for certain kinds of data. To filter, you tell Excel what kind of data you're looking for, and the program assembles rows with that data to the exclusion of rows that don't have the data. You end up with a shorter list with only the rows that match your filter criteria. Filtering is similar to using the Find command except that you get more than one row in the results of the filtering operation. For example, in a list of addresses, you can filter for addresses in California. In a price list, you can filter for items that fall within a certain price range.



WARNING

To filter data, your list needs column headers, the descriptive labels in the first row that describe what is in the columns below. Excel needs column headers to identify and be able to filter the data in the rows. Each column header must have a different name.

To filter a list, start by going to the Data tab and clicking the Filter button. As shown in Figure 5-5, a drop-down list appears beside each column header.

Click the Filter button

Product Name	Unit Cost	Packaging Cost	Shipping Cost	Sale Price	Profit	Warehouse	Supervisor
		0.27	0.33	6.12	2.18	LaRue	Smity
		0.24	0.18	7.00	3.59	Trenton	Munoz
		0.17	0.32	6.01	1.36	Trenton	Munoz
		1.01	0.99	14.33	2.87	Pickford	Salazaar
		0.29	0.89	4.14	0.72	Pickford	Salazaar
		3.14	0.45	20.98	3.08	Massy	Yee
		1.01	0.89	10.79	0.11	Trenton	Munoz
		2.10	0.89	32.89	6.82	Trenton	Munoz
		0.98					
		0.29					
		0.16					

Filter by exclusion

Filter with criteria

**FIGURE 5-5:**  
Filter a worksheet  
to isolate data.

Your next task is to open a drop-down list in the column that holds the criteria you want to use to filter the list. For example, if you want to filter the list to show items that cost more than \$100, open the Cost column drop-down list; if you want

to filter the list so that only the names of employees who make less than \$30,000 annually appear, open the Salary drop-down list.

After you open the correct column drop-down list, tell Excel how you want to filter the list:

» **Filter by exclusion:** On the drop-down list, deselect the Select All check box and then select the check box next to each item you *don't* want to filter out. For example, to filter an Address list for addresses in Boston, Chicago, and Miami, deselect the Select All check box and then select the check boxes next to Boston, Chicago, and Miami on the drop-down list. Your filter operation turns up only addresses in those three cities.

» **Filter with criteria:** On the drop-down list, choose Number Filters, and then choose a filter operation on the submenu (or simply choose Custom Filter). You see the Custom AutoFilter dialog box.

Choose an operator (equals, is greater than, or another) from the drop-down list, and either enter or choose a target criterion from the list on the right side of the dialog box. You can search by more than one criterion. Select the And option button if a row must meet both criteria to be selected, or select the Or option button if a row can meet either criterion to be selected.

Click the OK button on the column's drop-down list or the Custom AutoFilter dialog box to filter your list.



REMEMBER

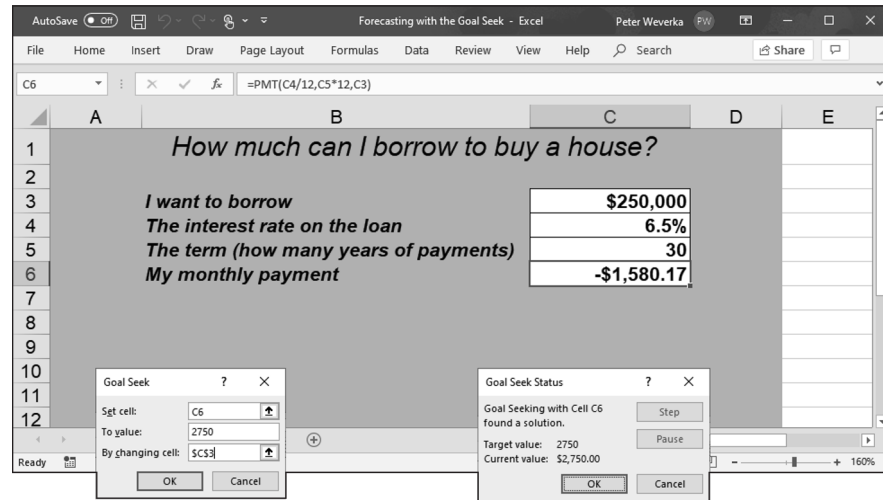
To see all the data in the list again — to *unfilter* the list — click the Clear button on the Data tab.

## Forecasting with the Goal Seek Command

In a conventional formula, you provide the raw data, and Excel produces the results. With the Goal Seek command, you declare what you want the results to be, and Excel tells you the raw data that you need to produce those results. The Goal Seek command is useful in analyses when you want the outcome to be a certain way and you need to know which raw numbers will produce the outcome that you want.

Figure 5-6 shows a worksheet designed to find out the monthly payment on a mortgage. With the PMT function, the worksheet determines that the monthly payment on a \$250,000 loan with an interest rate of 6.5 percent and to be paid over a 30-year period is \$1,580.17. Suppose, however, that the person who calculated this monthly payment determined that he or she could pay more than \$1,580.17

per month. Suppose that the person could pay \$1,750 or \$2,000 per month. Instead of an outcome of \$1,580.17, the person wants to know how much he or she could borrow if monthly payments — the outcome of the formula — were increased to \$1,750 or \$2,000.



**FIGURE 5-6:**  
Experimenting  
with the Goal  
Seek command.

To make determinations such as these, you can use the Goal Seek command. This command lets you experiment with the arguments in a formula to achieve the results you want. In the case of the worksheet in Figure 5-6, you can use the Goal Seek command to change the argument in cell C3, the total amount you can borrow, given the outcome you want in cell C6, \$1,750 or \$2,000, the monthly payment on the total amount.

Follow these steps to use the Goal Seek command to change the inputs in a formula to achieve the results you want:

- 1. Select the cell with the formula whose arguments you want to experiment with.**
- 2. On the Data tab, click the What-If Analysis button and choose Goal Seek on the drop-down list.**

You see the Goal Seek dialog box, shown in Figure 5-6. The address of the cell you selected in Step 1 appears in the Set Cell box.

**3. In the To Value text box, enter the target results you want from the formula.**

In the example in Figure 5-6, you enter **-1750** or **-2000**, the monthly payment you can afford for the 30-year mortgage.

**4. In the By Changing Cell text box, enter the address of the cell whose value is unknown.**

To enter a cell address, go outside the Goal Seek dialog box and click a cell on your worksheet. In Figure 5-6, you select the address of the cell that shows the total amount you want to borrow.

**5. Click OK.**

The Goal Seek Status dialog box appears, as shown in Figure 5-6. It lists the target value that you entered in Step 3.

**6. Click OK.**

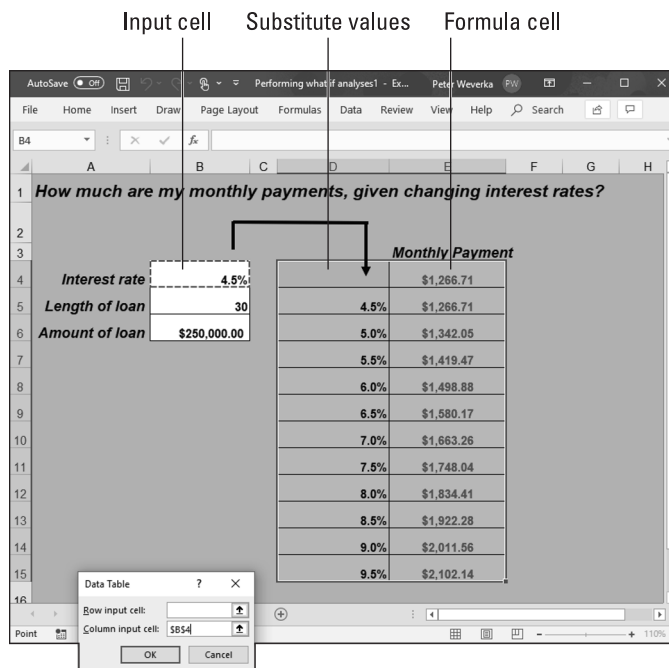
On your worksheet, the cell with the argument you wanted to alter now shows the target you're seeking. In the case of the example worksheet in Figure 5-6, you can borrow \$316,422 at 6.5 percent, not \$250,000, by raising your monthly mortgage payments from \$1,580.17 to \$2,000.

## Performing What-If Analyses with Data Tables

For something a little more sophisticated than the Goal Seek command (which I describe in the preceding section), try performing what-if analyses with data tables. With this technique, you change the data in input cells and observe what effect changing the data has on the results of a formula. The difference between the Goal Seek command and a data table is that with a data table, you can experiment simultaneously with many different input cells and in so doing experiment with many different scenarios.

### Using a one-input table for analysis

In a *one-input table*, you find out what the different results of a formula would be if you changed one *input cell* in the formula. In Figure 5-7, that input cell is the interest rate on a loan. The purpose of this data table is to find out how monthly payments on a \$250,000, 30-year mortgage are different, given different interest rates. The interest rate in cell B4 is the input cell.



**FIGURE 5-7:**  
A one-input data table.

Follow these steps to create a one-input table:

- 1. On your worksheet, enter values that you want to substitute for the value in the input cell.**



**REMEMBER**

To make the input table work, you have to enter the substitute values in the right location:

- **In a column:** Enter the values in the column starting one cell below and one cell to the left of the cell where the formula is located. In Figure 5-7, for example, the formula is in cell E4 and the values are in the cell range D5:D15.
  - **In a row:** Enter the values in the row starting one cell above and one cell to the right of the cell where the formula is.
- 2. Select the block of cells with the formula and substitute values.**

Select a rectangle of cells that encompasses the formula cell, the cell beside it, all the substitute values, and the empty cells where the new calculations will soon appear.

- **In a column:** Select the formula cell, the cell to its left, all the substitute-value cells, and the cells below the formula cell.
- **In a row:** Select the formula cell, the cell above it, the substitute values in the cells directly to the right, and the now-empty cells where the new calculations will appear.

**3. On the Data tab, click the What-If Analysis button and choose Data Table on the drop-down list.**

You see the Data Table dialog box (refer to Figure 5-7).

**4. In the Row Input Cell or Column Input Cell text box, enter the address of the cell where the input value is located.**

To enter this cell address, go outside the Data Table dialog box and click the cell. The input value is the value you're experimenting with in your analysis. In the case of the worksheet shown in Figure 5-7, the input value is located in cell B4, the cell that holds the interest rate.

If the new calculations appear in rows, enter the address of the input cell in the Row Input Cell text box; if the calculations appear in columns (refer to Figure 5-7), enter the input cell address in the Column Input Cell text box.

**5. Click OK.**

Excel performs the calculations and fills in the table.

To generate the one-input table, Excel constructs an array formula with the TABLE function. If you change the cell references in the first row or plug in different values in the first column, Excel updates the one-input table automatically.

## Using a two-input table for analysis

In a two-input table, you can experiment with two input cells rather than one. Getting back to the example of the loan payment in Figure 5-7, you can calculate not only how loan payments change as interest rates change but also how payments change if the life of the loan changes. Figure 5-8 shows a two-input table for examining monthly loan payments given different interest rates and two different terms for the loan: 15 years (180 months) and 30 years (360 months).

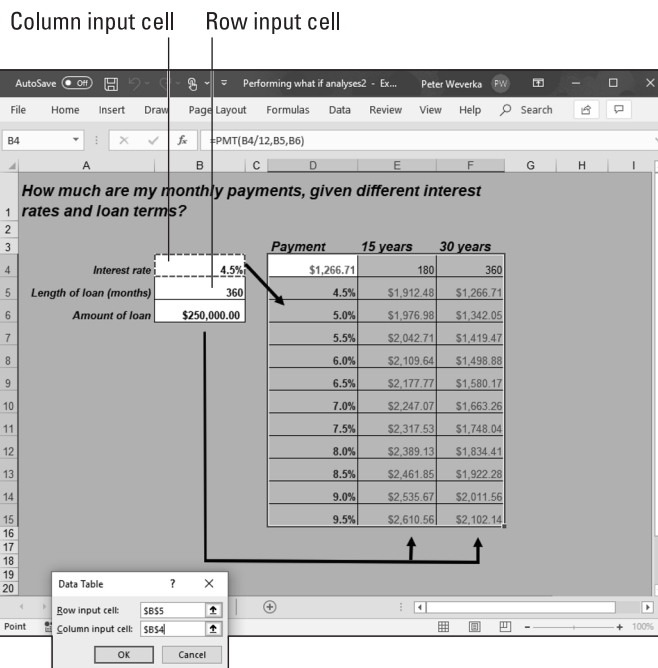
Follow these steps to create a two-input data table:

**1. Enter one set of substitute values below the formula in the same column as the formula.**

In Figure 5-8, different interest rates are entered in the cell range D5:D15.

**2. Enter the second set of substitute values in the row to the right of the formula.**

In Figure 5-8, 180 and 360 are entered. These numbers represent the number of months of the life of the loan.



**FIGURE 5-8:** A two-input data table.

### 3. Select the formula and all substitute values.

Do this correctly and you select three columns, including the formula, the substitute values below it, and the two columns to the right of the formula. You select a big block of cells (the range D4:F15, in this example).

### 4. On the Data tab, click the What-If Analysis button and choose Data Table on the drop-down list.

The Data Table dialog box appears (refer to Figure 5-8).

### 5. In the Row Input Cell text box, enter the address of the cell referred to in the original formula where substitute values to the right of the formula can be plugged in.

Enter the cell address by going outside the dialog box and selecting a cell. In Figure 5-8, for example, the rows to the right of the formula are for length-of-loan substitute values. Therefore, I select cell B5, the cell referred to in the original formula where the length of the loan is listed.

### 6. In the Column Input Cell text box, enter the address of the cell referred to in the original formula where substitute values below the formula are.

In Figure 5-8, the substitute values below the formula cell are interest rates. Therefore, I select cell B4, the cell referred to in the original formula where the interest rate is entered.



## 7. Click OK.

Excel performs the calculations and fills in the table.

# Analyzing Data with PivotTables

*PivotTables* give you the opportunity to reorganize data in a long worksheet list and in so doing analyze the data in new ways. You can display data such that you focus on one aspect of the list. You can turn the list inside out and perhaps discover things you didn't know before.

When you create a PivotTable, what you really do is turn a multicolumn list into a table for the purpose of analysis. For example, the four-column list in Figure 5-9 records items purchased in two grocery stores over a four-week period. The four columns are

- » **Item:** The items purchased
- » **Store:** The grocery store (Safepath or Wholewalmart) where the items were purchased
- » **Cost:** The cost of the items
- » **Week:** When the items were purchased (Week 1, 2, 3, or 4)

This raw list doesn't reveal anything; it's hardly more than a data dump. However, as Figure 5-9 shows, by turning the list into PivotTables, you can tease the list to find out, among other things:

- » How much was spent item by item in each grocery store, with the total spent for each item (Sum of Cost by Item and Store)
- » How much was spent on each item (Sum of Cost by Item)
- » How much was spent at each grocery store (Sum of Cost by Store)
- » How much was spent each week (Sum of Cost by Week)



REMEMBER

Make sure that the list you want to analyze with a PivotTable has column headers. Column headers are the descriptive labels that appear across the top of columns in a list. Excel needs column headers to construct PivotTables.

Item	Store	Cost	Week
Cereal 14oz box	Safepath	3.99	1
Cheddar Cheese 1 lb.	Safepath	4.62	1
Chicken 1 whole	Safepath	8.99	1
Coffee 1 lb.	Safepath	6.98	1
Crackers 1 box	Safepath	1.25	1
Eggs 1 doz.	Safepath	2.59	1
Lettuce 2 heads	Safepath	3.5	1
Milk 1/2 gal.	Safepath	2.85	1
Soup 3-12 oz cans	Safepath	2.98	1
Tortillas 2 doz.	Safepath	1.99	1
Yogurt 1 quart	Safepath	5.69	1
Cereal 14oz box	Wholewalmart	4.25	2
Cheddar Cheese 1 lb.	Wholewalmart	8.75	2
Chicken 1 whole	Wholewalmart	17.5	2
Coffee 1 lb.	Wholewalmart	10.75	2
Crackers 1 box	Wholewalmart	2.29	2
Eggs 1 doz.	Wholewalmart	4.99	2
Lettuce 2 heads	Wholewalmart	5.5	2
Milk 1/2 gal.	Wholewalmart	3.99	2
Soup 3 12 oz cans	Wholewalmart	4.44	2
Tortillas 2 doz.	Wholewalmart	3.75	2
Yogurt 1 quart	Wholewalmart	8.99	2
Cereal 14oz box	Safepath	3.99	3
Cheddar Cheese 1 lb.	Safepath	5.25	3
Chicken 1 whole	Safepath	6.5	3
Coffee 1 lb.	Safepath	4.98	3
Crackers 1 box	Safepath	2.29	3
Eggs 1 doz.	Safepath	3.99	3
Lettuce 2 heads	Safepath	4	3
Milk 1/2 gal.	Safepath	1.75	3
Soup 3 12 oz cans	Safepath	2.98	3
Tortillas 2 doz.	Safepath	1.5	3
Yogurt 1 quart	Safepath	4.99	3
Cereal 14oz box	Wholewalmart	2.5	4
Cheddar Cheese 1 lb.	Wholewalmart	6.75	4
Chicken 1 whole	Wholewalmart	17.5	4
Coffee 1 lb.	Wholewalmart	12.33	4
Crackers 1 box	Wholewalmart	2.29	4
Eggs 1 doz.	Wholewalmart	8.5	4

**FIGURE 5-9:**  
A raw multicolumn list (left) turned into meaningful PivotTables (right).

Sum of Cost	Column Labels	Safepath	Wholewalmart	Grand Total
Cereal 14oz box		7.98	6.75	14.73
Cheddar Cheese 1 lb.		9.87	15.5	25.37
Chicken 1 whole		15.49	35	50.49
Coffee 1 lb.		11.96	23.08	35.04
Crackers 1 box		3.54	4.58	8.12
Eggs 1 doz.		6.58	15.49	22.07
Lettuce 2 heads		7.5	9	16.5
Milk 1/2 gal.		4.6	6.49	11.09
Soup 3 12 oz cans		2.98	8.88	11.86
Soup 3 -12 oz cans		2.98		2.98
Tortillas 2 doz.		3.49	8.25	11.74
Yogurt 1 quart		10.68	17.98	28.66
<b>Grand Total</b>		<b>87.65</b>	<b>151</b>	<b>238.65</b>

Row Labels	Sum of Cost
Cereal 14oz box	14.73
Cheddar Cheese 1 lb.	25.37
Chicken 1 whole	50.49
Coffee 1 lb.	35.04
Crackers 1 box	8.12
Eggs 1 doz.	22.07
Lettuce 2 heads	16.5
Milk 1/2 gal.	11.09
Soup 3 12 oz cans	11.86
Soup 3 -12 oz cans	2.98
Tortillas 2 doz.	11.74
Yogurt 1 quart	28.66
<b>Grand Total</b>	<b>238.65</b>

Row Labels	Sum of Cost
Safepath	87.65
Wholewalmart	151
<b>Grand Total</b>	<b>238.65</b>

Row Labels	Sum of Cost
1	45.43
2	77.2
3	42.22
4	73.8
<b>Grand Total</b>	<b>238.65</b>

## Getting a PivotTable recommendation from Excel

The easiest way to create a PivotTable is to let Excel do the work. Follow these steps:

1. Select a cell anywhere in your data list.
2. On the Insert tab, click the Recommended PivotTables button.

The Recommended PivotTables dialog box appears, as shown in Figure 5-10. This dialog box presents a number of PivotTables.

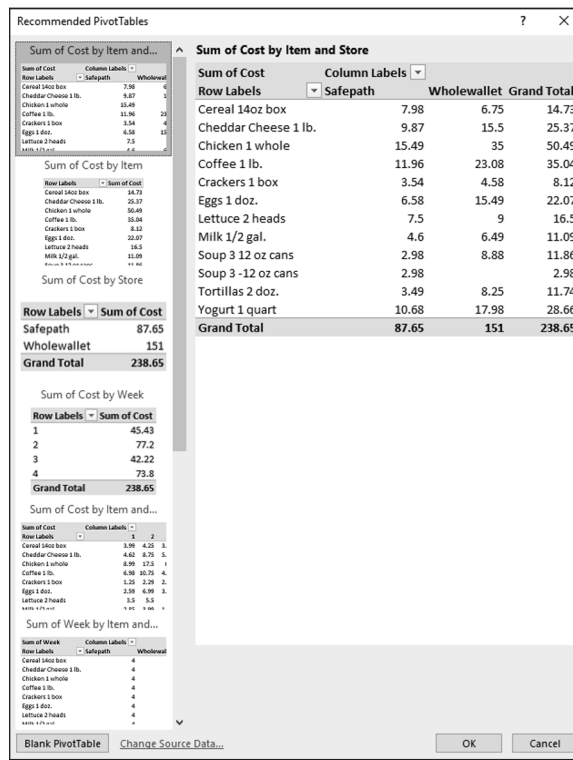
3. Scroll the list of PivotTables on the left side of the dialog box, selecting each one and examining it on the right side of the dialog box.
4. Select a PivotTable and click OK.

The PivotTable appears on a new worksheet.

## Creating a PivotTable from scratch

Follow these steps to create a PivotTable on your own:

1. Select a cell anywhere in your data list.
2. On the Insert tab, click the PivotTable button.



**FIGURE 5-10:** These PivotTables come highly recommended.

Excel selects what it believes is your entire list, and you see the Create PivotTable dialog box. If the list isn't correctly selected, click outside the dialog box and select the data you want to analyze.

### 3. Choose the New Worksheet option and click OK.

You can choose the Existing Worksheet option and select cells on your worksheet to show Excel where you want to place the PivotTable, but in my experience, creating it on a new worksheet and moving it later is the easier way to go.

The (PivotTable Tools) Analyze tab and PivotTable Fields task pane appear, as shown in Figure 5-11. The task pane lists the names of fields, or column headings, from your table.

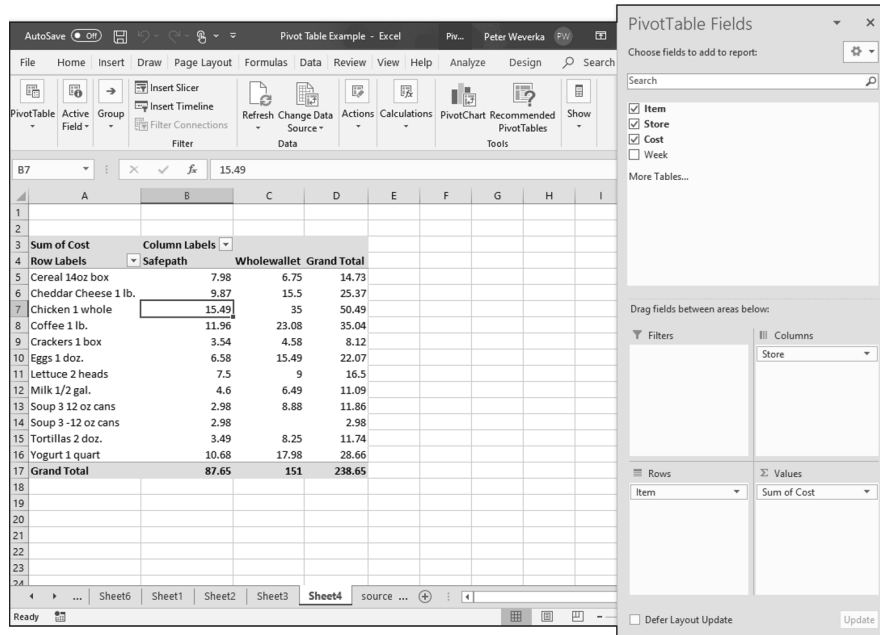
### 4. In the PivotTable Fields task pane, drag field names into the four areas (Filters, Columns, Rows, and Values) to construct your PivotTable.

As you construct your table, you see it take shape onscreen. You can drag fields in and out of areas as you please. Drag one field name into each of these areas:

- **Rows:** The field whose data you want to analyze.
- **Columns:** The field by which you want to measure and compare data.

- **Values:** The field with the values used for comparison.
- **Filters (optional):** A field you want to use to sort table data. (This field's name appears in the upper-left corner of the PivotTable. You can open its drop-down list to sort the table; see "Sorting a list," earlier in this chapter.)

**FIGURE 5-11:**  
Constructing a  
PivotTable on the  
(PivotTable Tools)  
Analyze tab.



## Putting the finishing touches on a PivotTable

Go to the (PivotTable Tools) Design tab to put the finishing touches on a PivotTable:

- » **Grand Totals:** Excel totals columns and rows in PivotTables. If you prefer not to see these "grand totals," click the Grand Totals button and choose an option to remove them from rows, columns, or both.
- » **Report Layout:** Click the Report Layout button and choose a PivotTable layout on the drop-down list.
- » **PivotTable Styles:** Choose a PivotTable style to breathe a little color into your PivotTable.



TIP

To construct a chart from a PivotTable, go to the (PivotTable Tools) Analyze tab and click the PivotChart button. The Insert Chart dialog box opens. Book 8, Chapter 1 explains how to navigate this dialog box.