CHAPTER 6: EXCEL

Budgeting with Calculations and Charts

In this chapter, you will dive into calculations, one of Excel's most useful features. Like a calculator, Excel can add, subtract, multiply, and divide. You will also build eye-catching column and pie charts that summarize data and reveal numeric trends. Picturing your data in charts makes it easy to understand that data at a glance.

LEARNING OBJECTIVES

- Use Excel's mathematical operators
- Build formulas
- Perform calculations using Excel's built-in functions
- Copy formulas and functions
- Create charts to visualize your data

🗁 Project: Tracking Inventory Expenses

Ken Turner owns a marine supply store on the San Francisco Bay. He carefully tracks his inventory costs to make sure he keeps his expenses in line.
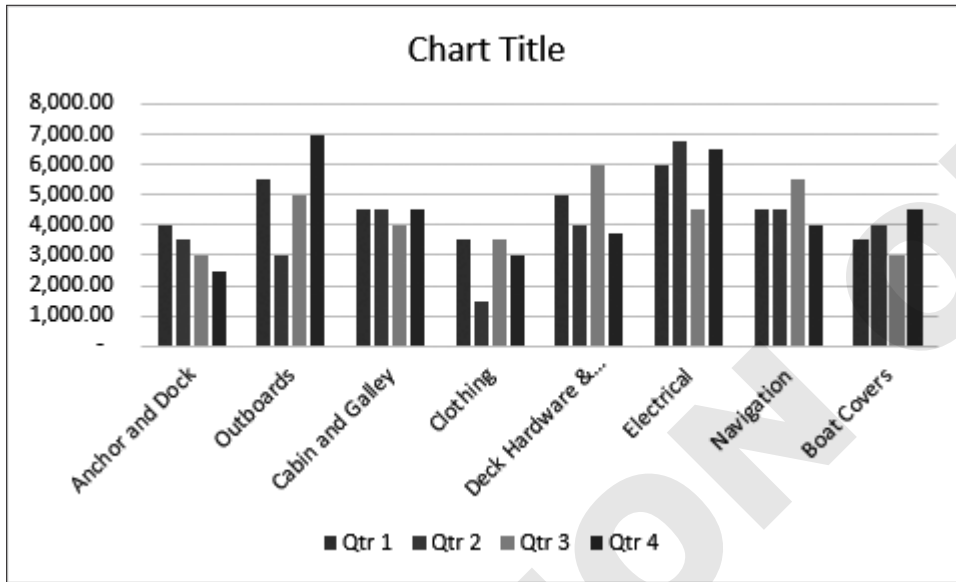
Ken's year-end inventory analysis shows that his inventory expenses have remained pretty steady throughout the year.

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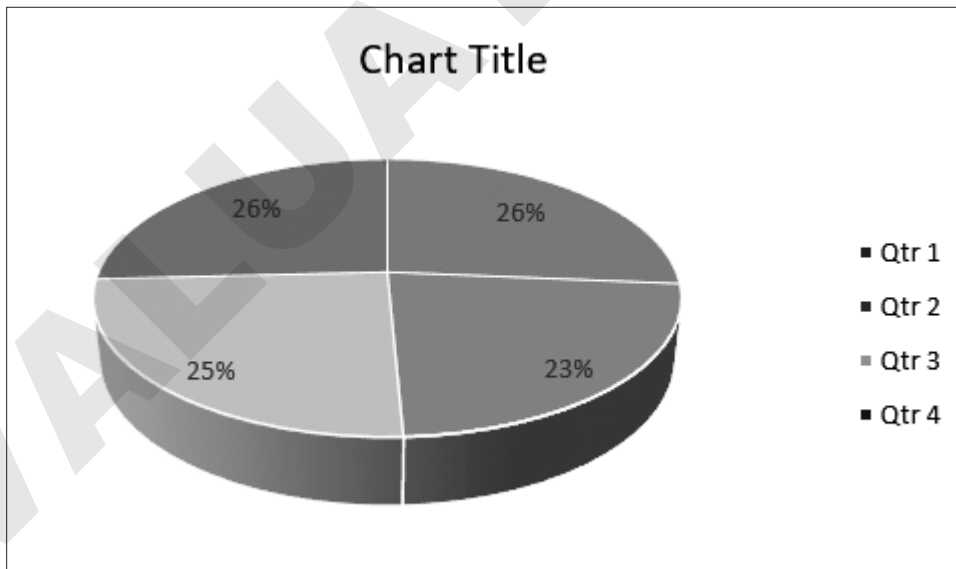
What Is a Formula?

Does the word *formula* make you hyperventilate? If the answer is yes, you may be one of those unfortunate people who had an unpleasant introduction to math. Did you know that 2+2 is a formula? Okay, now you can relax.

Just because you use a spreadsheet to perform calculations, it doesn't mean you will suddenly use some strange branch of mathematics. You're going to use the kind of math you have always used; you're just going to do it electronically.

Excel's Mathematical Operators

There are a few slight differences in performing calculations electronically versus on paper, but they are not difficult to understand. You are no doubt familiar with the signs used for addition, subtraction, multiplication, and division. If you look around on your keyboard for the multiplication and division signs you normally use, you won't find them, and because of this, in Excel you use the forward slash (/) for the division sign and the asterisk (*) for the multiplication sign.

MATHEMATICAL OPERATORS IN EXCEL

Operation	Symbol
Add	+
Subtract	-
Multiply	*
Divide	/

An easy way to remember the operators is to look at the number pad (if your computer has one) on the right side of the keyboard. You can use the keys shown in the following illustration when you create formulas. There are also duplicates

of these keys on the main part of the keyboard. You can use whichever keys you prefer—or even a combination of them—as they work the same way.
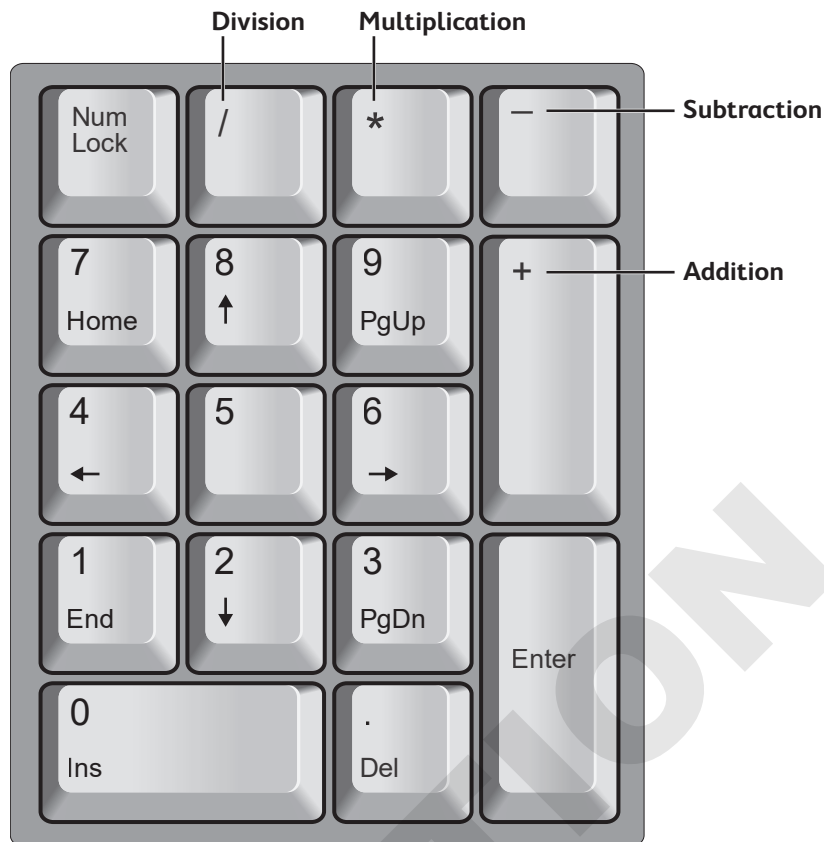
How to Type a Formula

You need to take a slightly different approach when creating electronic formulas than you do when jotting down a formula on a notepad. For example, the placement of the equals (=) sign is different from what you might expect, and in addition to using numbers in formulas, you can use cell addresses, which is typically the preferred method.

Where's the Equals Sign?

In Excel, you use the same equals (=) sign you've always used; it's just that you place it at the beginning of the formula rather than at the end.

Instead of typing

    2+2=

You type

    =2+2

Why? When you enter data in a spreadsheet, your computer is watching to see what kind of data it is. If the first thing it sees is a number or an alphabetic character, it assumes that standard data is coming down the line and that it doesn't have to do anything complex. If your computer sees an equals (=) sign first, it figures, "Hey, this is a formula. I'd better pay attention because I have some work to do. I have to figure out the answer to this formula."

Numbers or Cell Addresses?

You can create formulas using numbers as in the preceding =2+2 example; however, most of the time you should use cell addresses, such as =A1+A2. The reason for this is that if you use numbers in a formula and later decide to change one of those numbers in the spreadsheet, the formula *will not recalculate*. If you use cell addresses, the formula *will recalculate*.

HANDS-ON 6.1 Enter Formulas in a Spreadsheet

In this exercise, you will create formulas in a budget spreadsheet using two techniques. You will begin by calculating the Qtr 1 Budget Total for Other Expenses. Later you will total the entire column, but for now you will just use the four numbers in Other Expenses to keep the task simple.

1. If necessary, start Excel.

2. Open **Pacific Marine Expense Budget** from your **Chapter 06** folder.

3. Take a moment to look over the spreadsheet and then select **cell B17**.
   Always start a formula by selecting the cell that will contain the answer.
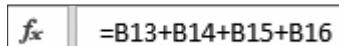
Tip! When you type cell addresses in a formula, you can use uppercase or lowercase letters, as Excel will automatically convert lowercase addresses to uppercase.

4. Type the formula **=B13+B14+B15+B16** and then tap Enter.
   The answer 6,200.00 appears in cell B17.

5. Select **cell B17** and look at the Formula Bar.
   While the answer appears in cell B17, the formula behind the answer appears in the Formula Bar. This makes it easy to double-check your formulas for accuracy.

fx	=B13+B14+B15+B16

   Now you'll try another formula, but this time you'll use the mouse to help you select cells. You will calculate the Qtr 1 Actual Total for Other Expenses. Again, you are just using four numbers for now to keep it simple.

6. Follow these steps to create a formula using the mouse:

12	**Other Expenses**		
13	Rent	4,500.00	4,500.00 ⓑ
14	Office Supplies	600.00 ⓒ→	650.00
15	Advertising	600.00	450.00 ⓓ
16	Miscellaneous	500.00 ⓔ→	300.00
17	**Total**	6,200 ⓐ→	=C13
18			

ⓐ Select **cell C17** and type an equals (**=**) sign to begin the formula.

ⓑ Click **cell C13** and notice that *C13* appears in the formula. Type a plus (**+**) sign.

ⓒ Click **cell C14** and notice that this cell address is added to the formula. Type a plus (**+**) sign.

ⓓ Click **cell C15** and type a plus (**+**) sign.

ⓔ Click **cell C16** and tap ⎡Enter⎤ to finish the formula.

Using the mouse to help you create formulas is easy and reduces the likelihood that you will make a typo.

7. Select **cell C17** and look at the Formula Bar.

The answer appears in cell C17, and the formula appears in the Formula Bar.

Edit a Number That Appears in a Formula

You just discovered that the Actual figure for Miscellaneous expenses should be $400.00 instead of $300.00. Bear in mind that the current answer in cell C17 is $5,900.00.

8. Select **cell C16**, type **400**, and tap ⎡Enter⎤.

Look at the answer in cell C17 (6,000.00). The formula automatically recalculated. Remember, if you use cell addresses in formulas instead of numbers, the formulas recalculate automatically. In the next topic, you'll learn a slicker way to add a column of numbers that prevents you from having to enter formulas.

9. Click and drag to select **cells B17** and **C17**, then tap ⎡Delete⎤.

10. Save the file.

Always leave your file open unless directed otherwise.

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Using Built-in Functions

There is another approach you can use to perform calculations. Excel has built-in functions that contain formulas that you don't have to write from scratch. These are real time-savers! Here are some of Excel's most popular functions.

COMMON EXCEL FUNCTIONS

Function	Description
=SUM(A1:A100)	Adds all numbers in the range A1 through A100
=MAX(A1:A100)	Finds the largest number in the range A1 through A100
=MIN(A1:A100)	Finds the smallest number in the range A1 through A100
=AVERAGE(A1:A100)	Finds the average for the numbers in the range A1 through A100

How Functions Are Constructed

Functions are built in a specific manner:

- Like formulas, functions begin with an equals (=) sign.

- Next to be inserted is the name of the function, such as SUM or AVERAGE.

- After that is a set of parentheses that usually contains one or more arguments. An *argument* is information necessary for a calculation. The range A1:A100 is the argument in each of the examples in the preceding table.

The Sum Button

Probably the most frequently used function is SUM; therefore, Excel provides the convenient Sum button on the Ribbon to automatically calculate sums for you.

Note! Depending on your screen's resolution, this button may be labeled AutoSum. The ToolTip labels the button as Sum, so the button will be described as the Sum button in this course.
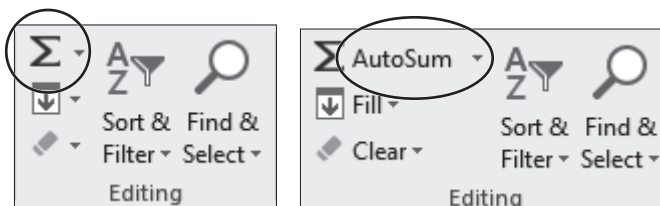
What Do the Pound Signs Mean?

When you have alphabetic or alphanumeric data that is too wide for a cell and there is data to the right of that cell, Excel visually chops off the text. In situations such as this, it's pretty obvious that the column is too narrow, and you can choose to widen it. When it comes to the answers to formulas, though, if Excel chops off part of the number, you may not realize it—and you might assume that what you see is correct. To prevent that possible confusion, Excel places pound signs in the cell as a warning that the column needs to be widened to see the entire number.

######
650.00
450.00
400.00
######

HANDS-ON 6.2 Use the SUM Function

In this exercise, you will use the SUM function to add a series of numbers in the Budget and Actual columns for the first quarter. First, you will manually type the function, and then you will use the Sum button to automatically enter the function. Finally, you will create a subtraction formula from scratch.

Note! Ignore the prompts that pop up when you type functions. You will not use them in this chapter.

1. Select **cell B17**.

2. Type the function **=SUM(B4:B16)** and then tap ⎡Enter⎤ to complete the function.

   Remember, in the last exercise you only added the four numbers in rows 13 through 16 to avoid typing lots of cell addresses. With the convenient SUM function, you can easily indicate a range of cell addresses rather than typing each cell address. This method is particularly convenient when adding a long row or column of numbers. Now you will use the Sum button to automatically create a formula.

3. Select **cell C17**.

4. Choose **Home→Editing→Sum** Σ.

   The Sum feature adds a flashing marquee around cells C13 through C16. Sum only went up to C13 because of the blank cell in C12. This isn't correct; you want to add the entire column, C4:C16. No problem; you can easily override Sum's decision.

5. Follow these steps to total the entire column:

Actual	Difference
4,000.00	
5,500.00	
4,500.00	
3,500.00	
5,000.00	
6,000.00	
4,500.00	
3,500.00	
4,500.00	
650.00	
450.00	
300.00	
=SUM(C13:C16)	
SUM(**number1**, [numbe	

Ⓐ Place the mouse pointer on the square in the upper-right corner of the box around the **range C13:C16**. The pointer changes to a double-headed arrow.

Ⓑ Click and drag up to the top of **cell C4** to place the box around the entire column of numbers; release the mouse button.

The formula is now =SUM(C4:C16).

6. Tap ⎡Enter⎤ to complete the formula.

Excel places pound signs in the cell. That's because the answer to the formula is too wide to fit in the cell.

7. Position the mouse pointer on the border between the column headers for **columns C** and **D**. When the mouse pointer changes to a double-headed arrow, double-click to adjust the column width.

Note! Continue to use this technique when you need to widen columns throughout this chapter.

Here's another technique to make sure Sum adds the numbers you want it to.

8. Click and drag to select the **range E4:E17**.

You're selecting the column of numbers you want to add plus a blank cell at the bottom of the column. This tells Excel to place the answer in the blank cell.

9. Choose **Home→Editing→Sum** ∑.

Excel places the answer in cell E17.

10. Click **cell E17** and check out the formula in the Formula Bar.

11. Widen **column E**.

12. Use the same technique to add the numbers in **column F** and then widen the column.

    You can also use that technique with multiple columns at the same time.

13. Select the **range H4:I17**.

14. Choose **Home→Editing→Sum** Σ.

    Excel placed answers in cells H17 and I17.

15. Check out the formulas in the Formula Bar and then widen the columns.

16. Use the same technique to add the numbers in **columns K** and **L** at the same time and then widen the columns.

Enter a Subtraction Formula

There is no built-in function for a simple subtraction problem, so you need to create this formula yourself—but you can get the mouse to give you a hand (paw).

17. Select **cell D4** and type an equals (**=**) sign.

18. Click **cell B4** and type a minus (**−**) sign.

19. Click **cell C4**, and then tap Enter to finish the formula.

20. Click **cell D4** and check the Formula Bar.

    The Actual Anchor and Dock inventory expense was $500.00 over budget; therefore, the answer is in parentheses to indicate a negative number.

    You don't have to retype this formula for all the numbers in columns B and C. Later you will learn to copy formulas—another big time-saver in Excel.

21. Select **cell G4** and type an equals (**=**) sign.

22. Click **cell E4** and type a minus (**−**) sign.

23. Click **cell F4** and then tap Enter to finish the formula.

24. Use the same technique to enter subtraction formulas in **cells J4** and **M4**.

    The parentheses in the answers indicate that you were over budget for Anchor and Dock supplies for the first three quarters and then under budget for the fourth quarter.

25. Save the file.

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Calculate with AVERAGE, MAX, and MIN

The AVERAGE function calculates the average of a range of cells. The MAX function finds the largest number in a range, while MIN determines the smallest number in a range.

HANDS-ON 6.3 Use AVERAGE, MAX, and MIN

In this exercise, you will use the AVERAGE, MAX, and MIN functions to quickly analyze inventory data in your workbook.

1. Click the **Inventory Analysis** tab at the bottom of the workbook to switch to that spreadsheet.

   First you will calculate the average for the four quarters. Again, you will get the mouse to help you.

2. Select **cell F2** and type **=AVERAGE(**, but don't type the cell addresses.

3. Click and drag to select the **range B2:E2**.

   Notice that the range addresses automatically appear in the formula. You don't have to type the right (closed) parenthesis; Excel will do that for you.

4. Tap Enter.

5. Select **cell F2** and look at the Formula Bar.

   Now you can see that Excel put the right parenthesis in the formula for you.

6. Select **cell G2** and type **=MAX(** , but don't type the cell addresses.

7. Click and drag to select the **range B2:E2** and then tap Tab to finish the function and make **cell H2** active.

8. Type **=MIN(** in **cell H2**.

9. Click and drag to select the **range B2:E2** and then tap Enter.

   You're going to learn to copy formulas soon, so you won't have to create these formulas for every row.

10. Save the file.

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Copying Formulas and Functions

You can copy formulas and functions because Excel automatically changes cell addresses in a copied formula *relative to* where it is copied. For example, if the

=*SUM(A1:A100)* function is copied one column to the right (column B), the function changes to =*SUM(B1:B100)*.

Here's another example: If you copy the function =*SUM(B9:H9)* down one row (row 10), the function changes to =*SUM(B10:H10)*. This is known as *relative referencing*, and it's one of the great powers of electronic spreadsheets. Without relative referencing, you would have to create formulas and functions one at a time.

You can use the same Copy button to copy formulas that you use to copy other types of data.

HANDS-ON 6.4 Copy Functions and Formulas

In this exercise, you will copy functions and formulas in both spreadsheets in your workbook. You will start with the =*AVERAGE* function in cell F2 of the Inventory Analysis worksheet.

1. Select **cell F2**.

2. Choose **Home→Clipboard→Copy** 📋.
    Excel places a flashing marquee around the cell you are copying.

3. Select the **range F3:F9**.

4. Choose **Home→Clipboard→Paste** 📋.

5. Tap ⎡Esc⎤ to turn off the marquee.

6. Click **cell F2** and examine the formula; click **cell F3** and examine the formula.
    Notice that the range of cells inside the parentheses changed from B2:E2 to B3:E3. Excel changed the cell addresses relative to where the formula was copied. Now you will copy the MAX and MIN functions.

7. Select **cell G2**.

8. Choose **Home→Clipboard→Copy** 📋 and then select the **range G3:G9**.

9. Choose **Home→Clipboard→Paste** 📋.

10. Select **cell H2**; copy the function and then paste it into **H3:H9**.
    Now you will calculate the inventory totals for all four quarters at once.

11. Select the **range B2:E10**.

12. Choose **Home→Editing→Sum** Σ.
    Excel places the total for each selected column in row 10.

Copy the Formulas in the Difference Columns

13. Click the **Expense Budget** tab at the bottom of the workbook to switch to that spreadsheet.

14. Select **cell D4**.

15. Choose **Home→Clipboard→Copy** 📋 and then select the **range D5:D16**.

Note that you won't copy the formula to cell D17 since row 17 is labeled as a Total row. You are not totaling the Difference column; you are copying the subtraction formula.

16. Choose **Home→Clipboard→Paste** 📋.

Take a moment to examine a couple of copied formulas and notice that the cell addresses changed in a relative fashion.

Row 12 should be blank, so now you will delete the formula in cell D12.

17. Select **cell D12** and tap Delete.

18. Use the same technique to copy the Difference formulas in **columns G**, **J**, and **M** and then delete **cells G12**, **J12**, and **M12**.

19. Save the file.

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Using Charts to Visualize Data

Excel's charting features make charting data easy, and the results are stunning. Depicting your data with charts allows you to easily see trends and make comparisons in your data.

Excel offers a variety of chart types. Two of the most common are column and pie charts. Column charts compare categories of data using vertical columns. Each column represents values from a data series in the spreadsheet. Pie charts are round (like pies) and are used for comparing parts (slices) of the whole (pie).

Which Cells Do I Select?

To create a chart, you start by selecting the data you want to represent. Knowing which cells to select prior to creating the chart is important.

Column Charts

Column charts compare values across categories. For a column chart, you select the data but typically not a total row or total column. The following data selection allows

you to compare the various Inventory categories to each other by quarter, but it does not include the totals from row 10.

	A	B	C	D	E	F
1	Actual Inventory Expense	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Avg of Qtrs
2	Anchor and Dock	4,000.00	3,500.00	3,000.00	2,500.00	3,250.00
3	Outboards	5,500.00	3,000.00	5,000.00	7,000.00	5,125.00
4	Cabin and Galley	4,500.00	4,500.00	4,000.00	4,500.00	4,375.00
5	Clothing	3,500.00	1,500.00	3,500.00	3,000.00	2,875.00
6	Deck Hardware & Fastener	5,000.00	4,000.00	6,000.00	3,750.00	4,687.50
7	Electrical	6,000.00	6,750.00	4,500.00	6,500.00	5,937.50
8	Navigation	4,500.00	4,500.00	5,500.00	4,000.00	4,625.00
9	Boat Covers	3,500.00	4,000.00	3,000.00	4,500.00	
10	Total	36,500.00	31,750.00	34,500.00	35,750.00	

The following chart was created from the data selected in the previous illustration. It compares the inventory categories across four quarters. For example, you can see that Qtr 1 had the highest inventory cost for Anchor and Dock supplies, while Qtr 4 had the highest inventory cost for Outboards.

Columns represent values from the various data series. The first data series is the Quarter 1 numbers in column B. The first column in each inventory category represents the Quarter 1 data, the second column represents the Quarter 2 data, and so forth.

Excel created these labels after it determined the range of values included in the chart.
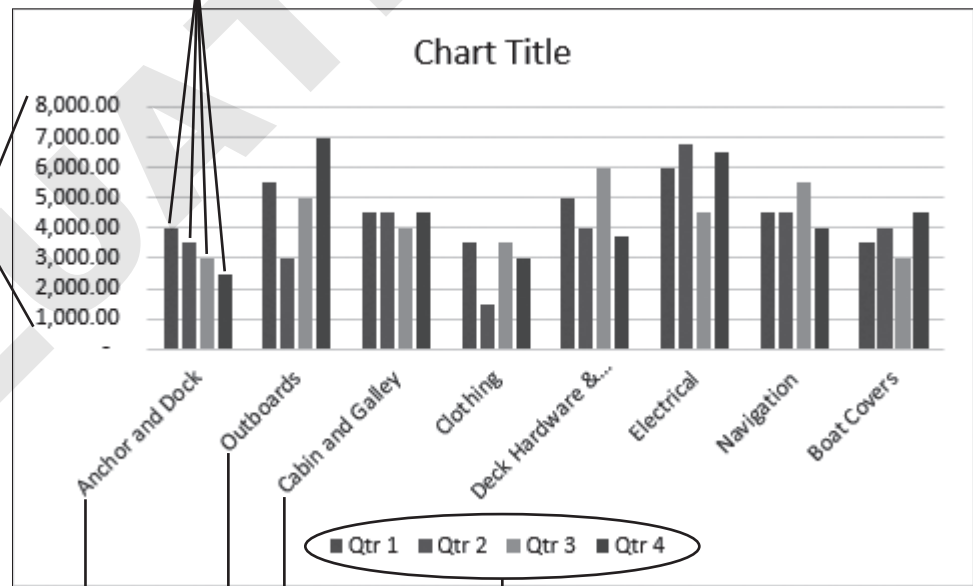
These labels (Anchor and Dock, Outboards, Cabin and Galley, etc.) come from column A of the selected cells.

This legend identifies the columns. The legend text (Qtr 1, Qtr 2, Qtr 3, Qtr 4) comes from the first row of selected cells.

Pie Charts

Pie charts compare pieces of the whole. You typically select two sets of data: the values to be represented by the slices of the pie (totals in row 10 in the following example) and the legend data needed to identify the slices (row 1 in the following example).

Tip!   To select nonadjacent ranges of cells, select the first range and then press ⌈Ctrl⌉ while dragging over additional ranges.

Legend labels

	A	B	C	D	E
1	Actual Inventory Expense	Qtr 1	Qtr 2	Qtr 3	Qtr 4
2	Anchor and Dock	4,000.00	3,500.00	3,000.00	2,500.00
3	Outboards	5,500.00	3,000.00	5,000.00	7,000.00
4	Cabin and Galley	4,500.00	4,500.00	4,000.00	4,500.00
5	Clothing	3,500.00	1,500.00	3,500.00	3,000.00
6	Deck Hardware & Fastener	5,000.00	4,000.00	6,000.00	3,750.00
7	Electrical	6,000.00	6,750.00	4,500.00	6,500.00
8	Navigation	4,500.00	4,500.00	5,500.00	4,000.00
9	Boat Covers	3,500.00	4,000.00	3,000.00	4,500.00
10	Total	36,500.00	31,750.00	34,500.00	35,750.00

Values represented by the slices of the pie

This chart was created from the data selected in the previous illustration. The slices compare the total inventory expense for each of the four quarters. In this case, the inventory expenses for each quarter are almost equal.


Chart Title

■ Qtr 1 ■ Qtr 2 ■ Qtr 3 ■ Qtr 4
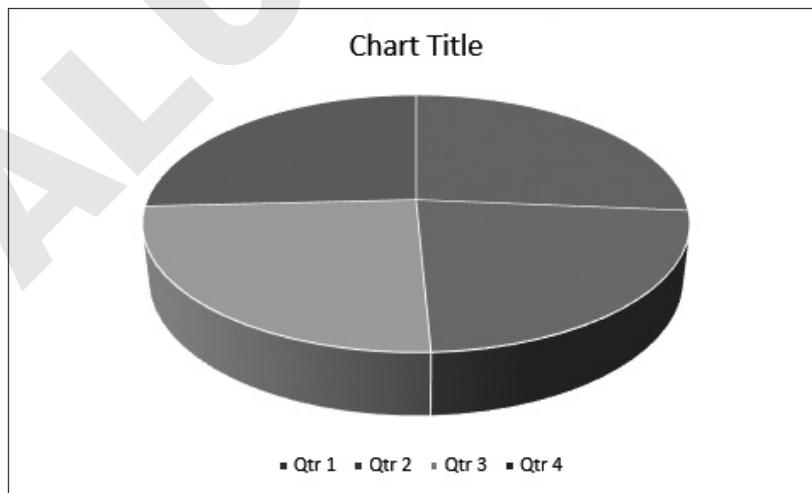
Embedded Charts Compared to Chart Sheets

A chart can either be embedded with the data in the spreadsheet or placed on a separate sheet in the workbook. An embedded chart provides the benefit of making it easy to compare the data in the spreadsheet with the columns or slices in the chart. On the other hand, you may prefer to examine trends and comparisons without focusing on numeric details. A separate chart sheet works well for that and also makes it easy to print only the chart without the surrounding data.

HANDS-ON 6.5 Visualize Your Data with Charts

In this exercise, you will create two charts—a column chart and a pie chart—and you will create both an embedded chart and a chart sheet.

1. Click the **Inventory Analysis** tab and select the **range A1:E9**.

2. Choose **Insert→Charts→Insert Column or Bar Chart** 📊.
    The chart gallery opens, which allows you to choose various types of column charts.

3. Choose the first chart type in the 2-D Column category.
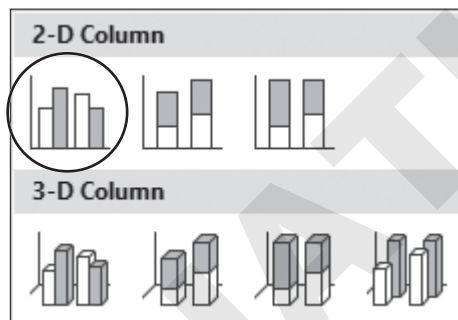
The chart appears in the spreadsheet. The border surrounding the chart indicates it's selected. The chart must be selected if you want to make changes to it. Notice the contextual Chart Tools tabs (Design and Format) that appear on the Ribbon when the chart is selected.

4. Click in the spreadsheet to deselect the chart.
    The chart's surrounding border disappears, as well as the Chart Tools on the Ribbon.

5. Click the outer edge of the chart and the border reappears.
    Now you will move the embedded chart to its own chart sheet.

6. Choose **Chart Tools→Design→Location→Move Chart** 📊.
    The Move Chart dialog box appears. Here you can specify to move the chart to a New Sheet. The Object In *option in the dialog box refers to embedding a chart as an object in the spreadsheet, which is the option currently in effect.*

**7.** Choose **New Sheet** and then click **OK**.
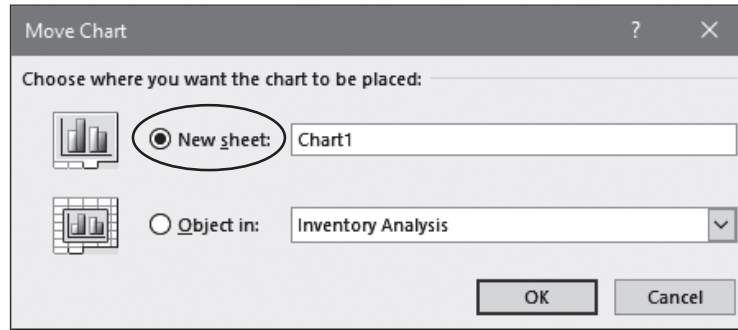
The chart now has its own sheet in the workbook. Notice the Chart 1 tab at the bottom of the workbook.

8. Click the **Inventory Analysis** tab to return to the inventory data.

Notice that the embedded chart no longer appears in the spreadsheet.

Create a Pie Chart

Now you will select data from the Total row to be represented by pie slices. You will also select the column headings, which will appear in the legend. Remember that you can select multiple nonadjacent ranges by holding down Ctrl when selecting the second and subsequent ranges.

9. Select the **range B1:E1**.

10. Press Ctrl and select the **range B10:E10**; release the Ctrl key.

The numbers in the range B10:E10 will determine the size of the slices. The entries in the range B1:E1 will become the entries in the legend, describing the meanings of the slices.

11. Choose **Insert→Charts→Insert Pie or Doughnut Chart** .

The pie chart gallery appears.

12. Choose the chart type in the 3-D Pie category.
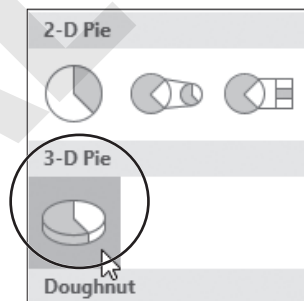
The pie chart now appears, embedded in the spreadsheet.

13. Save the file.

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Moving and Resizing an Embedded Chart

You can move an embedded chart within a spreadsheet by dragging it with the mouse pointer when the pointer looks like a four-headed arrow. You can resize the chart when the mouse pointer looks like a double-headed arrow.

When the mouse pointer is on the border (but not on the circular resizing handles), it changes to the move pointer. You can then drag the chart to a new location.

You must select a chart before moving/resizing it. This border indicates that the chart is selected.
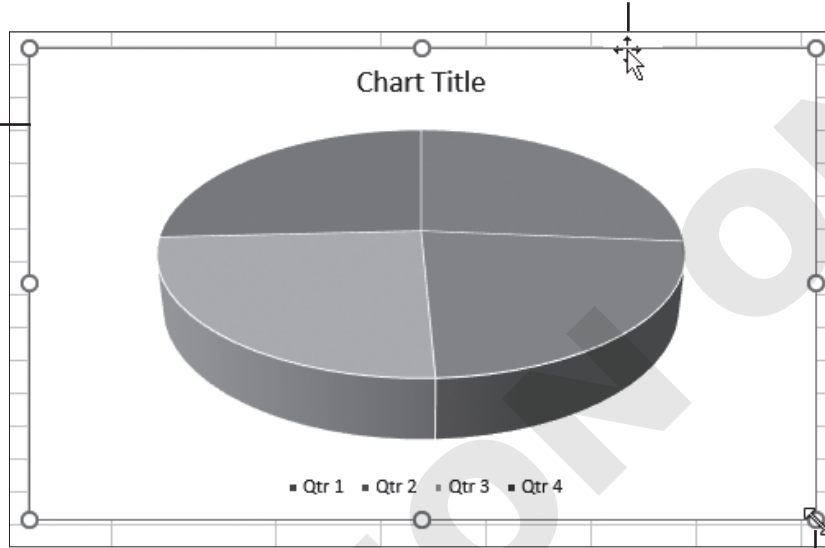
Placing the mouse pointer on the resizing handle changes it to this resizing pointer. You can then drag to change the size of the object. This process is similar to that used for resizing graphic objects in Word.

HANDS-ON 6.6 Move and Resize an Embedded Chart

In this exercise, you will move the embedded pie chart below the spreadsheet data. Then you will resize it.

1. If necessary, click the outer edge of the chart to select it.

2. Follow these steps to move the chart:

Labyrinth Learning http://www.lablearning.com
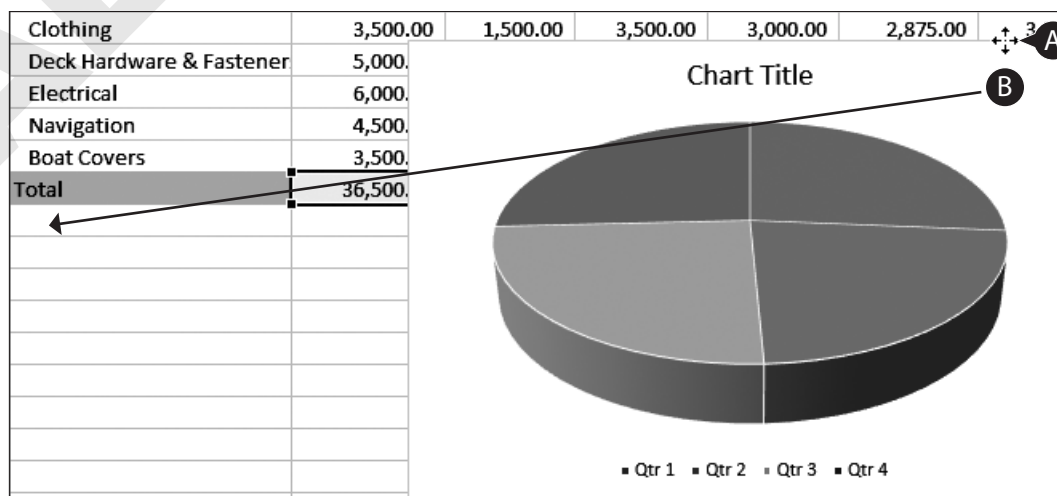
A Place the mouse pointer on the chart border (but not on a resizing handle) and notice that it changes to a four-headed arrow.

B Press and hold the mouse button, and drag the chart to position its upper-left corner as shown (in Column A and below the Total row). Release the mouse button.

Now you'll resize the chart.

3. Place the mouse pointer on the bottom-right resizing handle and notice that the pointer changes to a two-headed arrow.
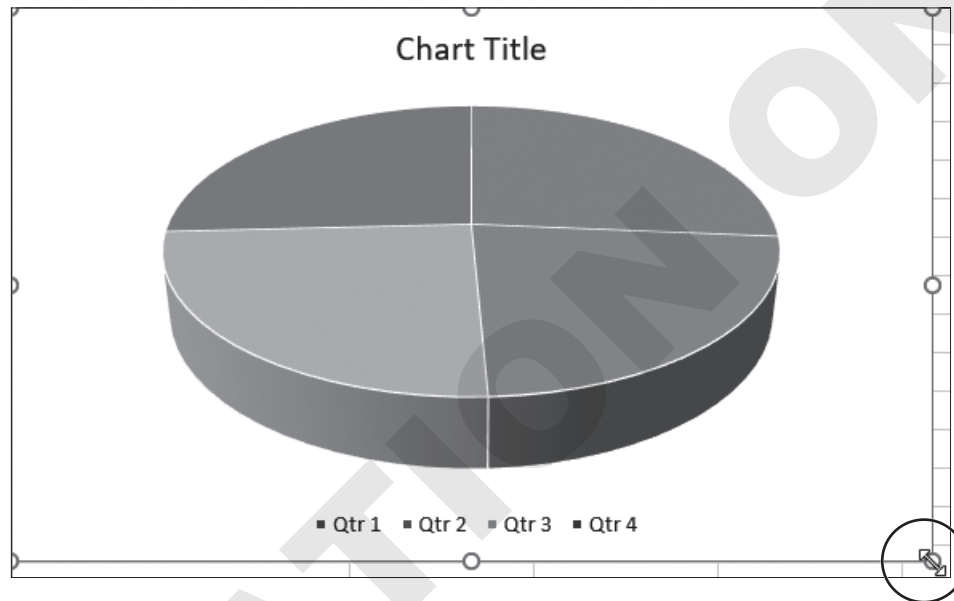
4. Drag up and to the left about half an inch to make the chart smaller.

5. Click in the spreadsheet to deselect the chart.

6. Save the file.

Design Tools

When you select a chart, two new Chart Tools tabs appear on the Ribbon: Design and Format. In this part of the chapter, you will spend some time working with the Design tab, which contains some appealing features for modifying your chart.

Switch Row/Column Data

Switching the row and column data in a column chart provides an interesting change of perspective on analyzing your data. This illustration displays the quarters as the legend and the inventory categories as the labels for the columns in the chart.

Column labels
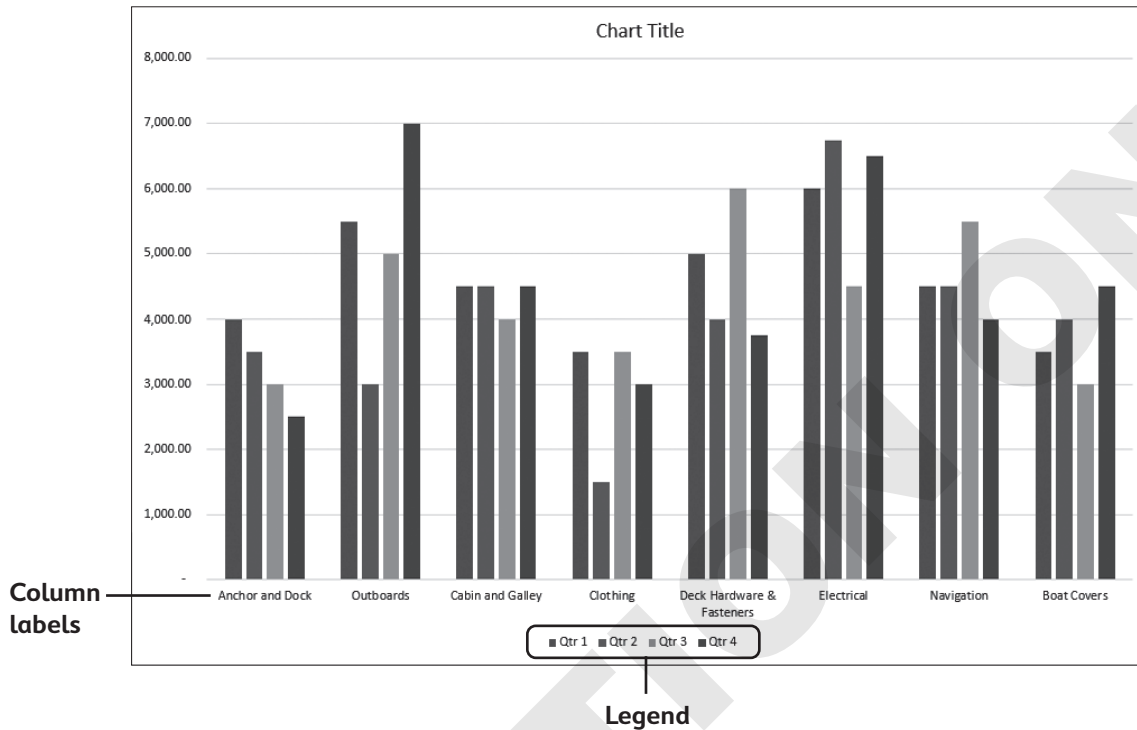
Legend

Switching the row and column data provides the following new perspective. Notice that the quarters now appear as column labels and the categories make up the legend.
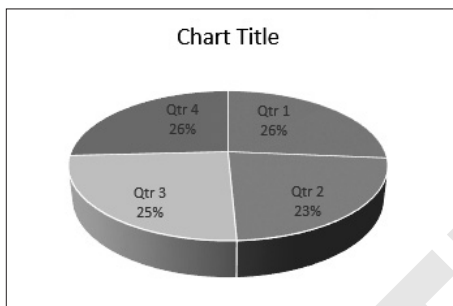
Column labels

Legend
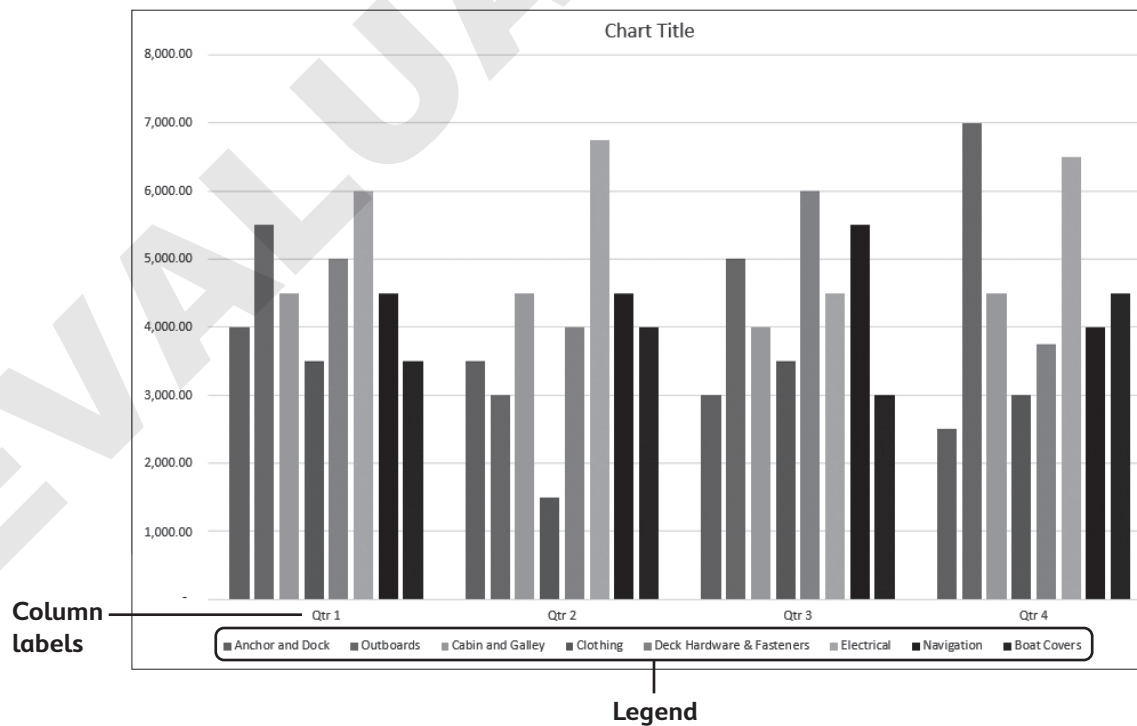
Chart Layouts

The Chart Layouts group on the Design tab provides various methods for labeling pieces of a chart, including numeric values and percentages of the whole.
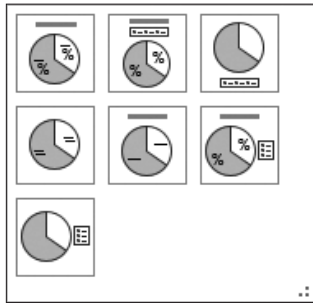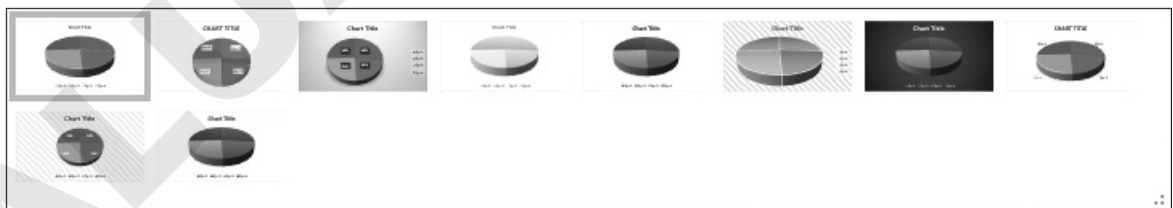
In this example, the chosen layout displays the slices of the pie as percentages of the whole. Excel has added a Chart Title object that you can modify with your own words.
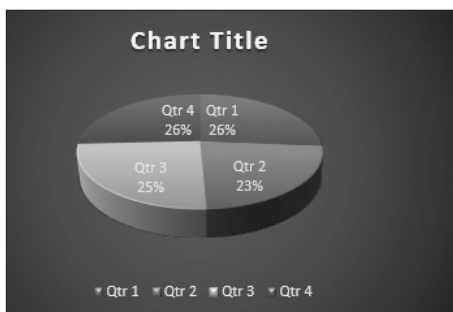
Chart Styles

The Chart Styles gallery offers attractive design and color combinations you can apply to your charts.

This dramatic change to the chart style was accomplished with a simple click of the mouse.

HANDS-ON 6.7 Modify the Chart Design

In this exercise, you will modify the design of charts by switching the row and column data, applying a new layout, and applying a new chart style.

1. Click the **Chart 1** tab at the bottom of the workbook to display the column chart.

    Observe the labels at the bottom of the columns and the legend below that. They will switch places when you switch the row and column data.

2. Click the border of the chart to select it.

3. Choose **Chart Tools→Design→Data→Switch Row/Column** 🔁.

    Observe the changes to the chart. The quarters appear at the bottom of the columns and the legend is below them. Now you will change a chart layout.

4. Click the **Inventory Analysis** tab at the bottom of the workbook to return to the pie chart.
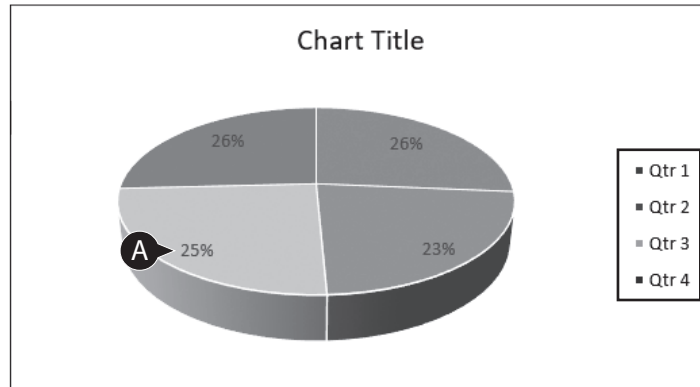
5. If necessary, click the outer edge of the chart to select it.

6. Choose **Chart Tools→Design→Chart Layouts→Quick Layout** 📊 to display various layouts.

7. Choose **Layout 6**.

8. Follow these steps to observe the changes to the chart:

A Notice that Excel displays the percent of the total for each slice of the pie.

B Notice that the legend moved from the bottom of the chart to the right of the chart.

Now you will type a new chart title.

9. Click the **Chart Title** object to select it.

10. Type **Yearly Inventory Expense** as the new chart title; the title appears in the Formula Bar as you type.

11. Tap Enter.

Change the Chart Style

12. Choose **Chart Tools→Design→Chart Styles**.

13. Click the **More** button at the right edge of the Chart Styles gallery to display the entire gallery.

14. Choose **Style 3**.
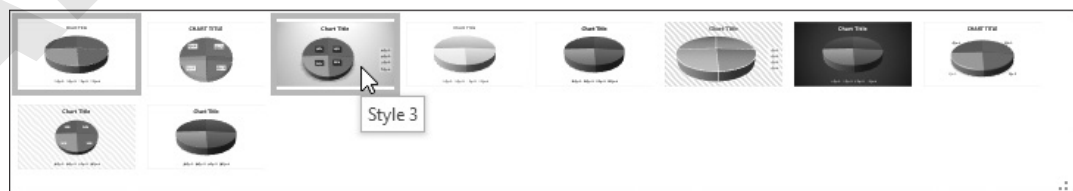
Tip! Use ToolTips to assist you if necessary.

The chart now has a dramatic new look.

15. Save and close the file.

Using Charts to Visualize Data **157**

Self-Assessment

Check your knowledge of this chapter's key concepts and skills by completing the Self-Assessment.

Page number

1. Using charts allows you to easily see trends and make comparisons about your data.

   true false _____

2. All formulas begin with an equals (=) sign.

   true false _____

3. The multiplication symbol used in Excel is *x*.

   true false _____

4. Excel automatically changes the cell addresses in a copied formula relative to where it's copied.

   true false _____

5. If you want formulas to recalculate when a number changes, use numbers and not cell addresses.

   true false _____

6. An Excel chart can be embedded in a spreadsheet or appear on a separate chart sheet.

   true false _____

7. Which of these is NOT a built-in Excel function?

   A. MAX

   B. SUBTRACT

   C. AVERAGE

   D. SUM

   Page number: _____

8. Which of these is a mathematical operator in Excel?

   A. ?

   B. /

   C. &

   D. #

   Page number: _____

9. Which of these are Excel chart types?

   A. Pie and column

   B. Pie and Budget

   C. Medical and Column

   D. Medical and Pie

   Page number: _____

10. Why do Excel formulas begin with an equals sign?

    A. It's easier to type the equals sign at the beginning of the formula than at the end.

    B. Excel uses a different branch of mathematics than what you learned in school.

    C. It indicates to Excel that the data is a formula.

    D. It's the only key on the keyboard not reserved for other purposes.

    Page number: _____

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(H) Skill Builders

SKILL BUILDER 6.1 Track the Men's Championship Golf Tournament

In this exercise, you will use some of Excel's built-in functions. You are in charge of keeping track of the golf scores for the men's championship. It's the perfect opportunity for you to get more experience with entering and copying functions.

1. Open **sb-Golf Scores** from your **Chapter 06** folder.

2. Enter the data as shown for **rows 6–11**:

	A	B	C	D	E	F	G	H	I
1	Golf Week Men's Championship								
2									
3									
4									
5	Name	Day 1	Day 2	Day 3	Day 4	Tournament Total	Tournament Avg	Tournament Max	Tournament Min
6	Mukesh Patel	70	66	67	68				
7	Roger Kashner	72	68	69	71				
8	Moses LeVan	71	70	73	73				
9	Jose Menendez	70	69	76	75				
10	Albert Schultz	73	71	71	76				
11	Arnold Alvarez	69	75	75	72				

Now you'll use the SUM function to calculate the tournament total for each player.

3. Select **cell F6**.

4. Choose **Home→Editing→Sum Σ**.
   Excel places a marquee around Mukesh Patel's scores for the four days of the tournament.

5. Click the **Enter ✓** button on the Formula Bar to finish entering the function.
   Now you will copy the function down so it can be used for the rest of the players. Cell F6 should still be active.

6. Choose **Home→Clipboard→Copy** 📋 and then select the **range F7:F11**.

7. Choose **Home→Clipboard→Paste** 📋.

8. Tap $\boxed{\text{Esc}}$ to remove the flashing marquee.
   Mukesh Patel is our winner! He has the lowest score for the four-day tournament. Next you will calculate Mukesh's average score.

Use the AVERAGE, MAX, and MIN Functions

9. Select **cell G6** and type: **=AVERAGE (**

10. Select the **range B6:E6** and tap Tab to complete the formula.
    Now you will calculate Mukesh's maximum and minimum scores.

11. With **cell H6** as the active cell, type: **=MAX (**

12. Select the **range B6:E6** and tap Tab to finish entering the formula.

13. With **cell I6** as the active cell, type: **=MIN (**

14. Select the **range B6:E6** and tap Enter.
    Now you will copy all three functions to the rest of the players at the same time.

15. Select the **range G6:I6**.

16. Choose **Home→Clipboard→Copy** 🗐 and then select the **range G7:I11**.

17. Choose **Home→Clipboard→Paste** 📋.
    Now you see the average, maximum, and minimum scores for all of the players.

18. Tap Esc to turn off the marquee.

19. Save and close the file.

. . . .

### SKILL BUILDER 6.2 Calculate Nutrients and Chart the Data

Your doctor is concerned about your fondness for junk food. She wants you to have more calcium, protein, and fiber (and less cholesterol and saturated fats) in your diet. In this exercise, you will examine the nutritional value of various foods and use a chart to depict the data.

1. Open **sb-Counting Nutrients** from the **Chapter 06** folder.
   You will use the MAX and MIN functions to determine which foods are the highest and lowest in various nutrient categories.

2. Select **cell C12** and type: **=MAX (**

3. Select the **range C5:C10** and tap Enter.

4. Type **=MIN (** in **cell C13**.

5. Select the **range C5:C10** and tap Enter.
   Now you will copy the formulas.

6. Select the **range C12:C13**.

7. Choose **Home→Clipboard→Copy** 📋 and then select the **range D12:G13**.

8. Choose **Home→Clipboard→Paste** 📋.

9. Tap ⎡Esc⎤ to turn off the marquee.

   Now you see the maximum and minimum values for each nutrient category.

Chart the Nutrients

10. Select the **range B4:G10**.

11. Choose **Insert→Charts→Insert Column or Bar Chart** 📊.

12. Choose the first chart type in the 3-D category.
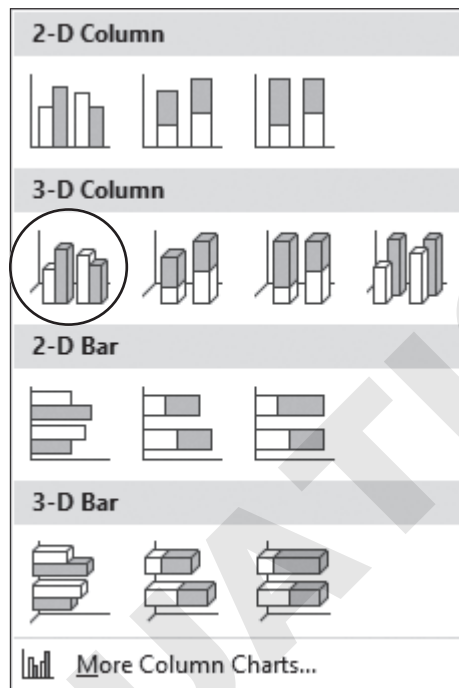
Notice which of the foods are high and low in the various nutrient categories. Broccoli wins in the Calcium category.

13. Drag the chart below the data and position it where you think it looks best.

14. Click in the spreadsheet to deselect the chart.

15. Save and close the file.

....

SKILL BUILDER 6.3 Create a Household Budget

In this exercise, you will use your Excel skills to add formulas to your household budget. First you will compute the total monthly income and then you will find the total for all expense categories. Finally, you will subtract total expenses from total income to determine if you are over or under budget for the month.

1. Open **sb-Household Budget** from the **Chapter 06** folder.

2. Select **cell C8**.

3. Choose **Home→Editing→Sum** Σ and then tap Enter to complete the formula.

   This is your total monthly income. Let's hope it's enough to cover the expenses.

4. Select **cell C14**.

5. Choose **Home→Editing→Sum** Σ and then tap Enter to complete the formula.

6. Use the **Sum** Σ button to enter the totals for the remaining expense categories in **cells C22**, **C30**, and **C35**.

   Next you will compute the Total Expenses for January.

Create Formulas from Scratch

7. Select **cell C38** and use the mouse to help you create this formula:

   `=C14+C22+C30+C35`

8. Tap Enter to complete the formula.

   Now you will determine whether you are under or over budget.

9. With **cell C39** active, enter the formula **=C8−C38** and tap Enter.

   Congratulations! You are well under budget for the month.

10. Save and close the file.

•••

SKILL BUILDER 6.4 Track Your Stocks

In this exercise, you will track a stock you are thinking about investing in. You want to examine its performance over time to see how it's doing.

1. Open **sb–Stock Tracker** from your **Chapter 06** folder.

    Seven weeks ago the XYZ stock closed at 36. You want to see how you would have fared if you had purchased 100 shares of the stock, so you start by calculating the total purchase price by multiplying the original price per share by the number of shares owned.

2. Select **cell E4** and type the formula **=C4*D4**.

3. Click the **Enter** ☑ button on the Formula Bar.

4. Copy the formula in **cell E4** down through **cell E9**.

5. Use this information to enter end-of-week prices in the **range B4:B9**:

|	
Week 1	38
Week 2	39
Week 3	42
Week 4	35
Week 5	37
Week 6	39

    Now you will calculate the value for each week by multiplying the end-of-week price by the number of shares.

6. Select **cell F4** and type the formula **=B4*D4**.

7. Click the **Enter** ☑ button to complete the formula.

8. Copy the formula in **cell F4** down through **cell F9**.

    Now you will calculate the value for each week by multiplying the end-of-week price by the number of shares.

9. Click **cell G4**, type the formula **=F4-E4**, and click **Enter** ☑.

10. Copy the formula in **cell G4** down through **cell G9**.

11. Tap Esc to turn off the marquee.

Chart Your Data

12. Select the **range F3:G9**.

13. Choose **Insert→Charts→Insert Column or Bar Chart** 📊.

14. Choose the first chart type in the 3-D Column category.
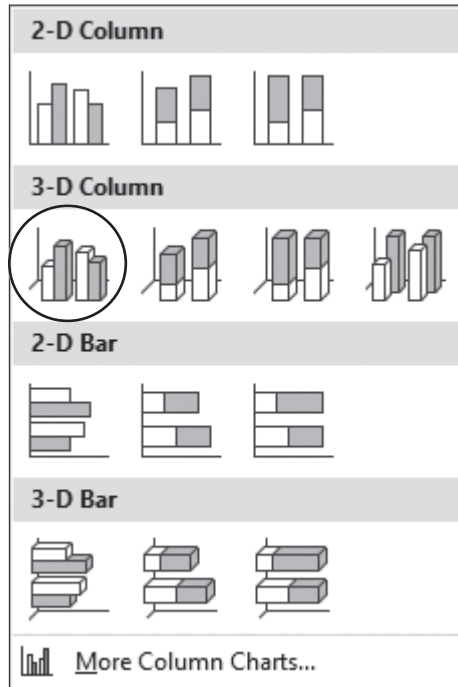
15. Drag the chart below the data.

16. Click in the spreadsheet to deselect the chart.

17. Save and close the file.

. . . .

SKILL BUILDER 6.5 Graph a Giraffe

In this exercise, you will create a giraffe graph. You are pursuing a degree in animal care and technology, and you think it would be interesting to track the heights of giraffes at your local zoo. The zookeeper has provided you with the height of each of their giraffes.

1. Open **sb-Giraffe Heights** from the **Chapter 06** folder.

There are nine giraffes at the zoo: two adult males, three adult females, two yearlings, and two babies.

2. Select the **range A3:D6** and choose **Insert→Charts→ Insert Column or Bar Chart** 📊.

3. Choose the first chart type in the 3-D Column category.

Now you will move the chart to its own sheet.

4. With the chart selected, choose **Chart Tools→Design→Location→ Move Chart** 🗔.

5. Choose the **New Sheet** option in the Move Chart dialog box and click **OK**.
   The chart now appears on its own page in the workbook.

6. Save and close the file.

7. Exit Excel.