As an example, consider a worksheet that contains a two-column Excel table named *Exceptions*. The first column is labeled *Route*; the second is labeled *Count*.

	A	B
1	Route	Count
2	101	8
3	102	5
4	103	8
5	104	12
6	105	5
7	106	2
8	107	4
9	108	4
10	109	2
11	110	7
12		

You refer to a table by entering the table name, followed by the column or row name in square brackets. For example, the table reference *Exceptions[Count]* would refer to the Count column in the Exceptions table.

To create a formula that finds the total number of exceptions by using the *SUM* function, you begin by entering =*SU*. When you enter the letter *S*, Formula AutoComplete lists functions that begin with the letter *S*; when you enter the letter *U*, Excel narrows the list down to the functions that start with the letters *SU*.

	A	B	C	D	E	F	G	H
1	Route	Count		=SU				
2	101	8		SUBSTITUTE	Replaces existing text with new text in a text string			
3	102	5		SUBTOTAL				
4	103	8		SUM				
5	104	12		SUMIF				
6	105	5		SUMIFS				
7	106	2		SUMPRODUCT				
8	107	4		SUMSQ				
9	108	4		SUMX2MY2				
10	109	2		SUMX2PY2				
11	110	7		SUMXMY2				
12								

To add the *SUM* function (followed by an opening parenthesis) to the formula, click *SUM* and then press Tab. To begin adding the table reference, enter the letter *E*. Excel displays a list of available functions, tables, and named ranges that start with the letter *E*. Click Exceptions, and press Tab to add the table reference to the formula. Then, because you want to summarize the values in the table's Count column, enter a left square bracket and then, in the list of available table items, click Count. To finish creating the formula, enter a right square bracket followed by a closing parenthesis to create the formula *=SUM(Exceptions[Count])*.

If you want to include a series of contiguous cells in a formula, but you haven't defined the cells as a named range, you can click the first cell in the range and drag to the last cell. If the cells aren't contiguous, hold down the Ctrl key and select all of the cells to be included. In both cases, when you release the mouse button, the references of the cells you selected appear in the formula.

3

TIP Excel highlights each cell range used in a formula in one of several colors.

	A	B	C	D	E	F	G	H	I	J	K
1											
2		Conveyer									
3		350' track	$14,012.00								
4		Catch bin	$ 895.00								
5		Motor	$ 1,249.00								
6		Chain drive	$ 1,495.00			=sum(C3,C6,C14,C17					
7		Sorting table	$ 675.00			SUM(number1, [number2], [number3], **[number4]**, [number5], …)					
8		Subtotal		$ 18,326.00							
9											
10		Loading Dock									
11		Concrete	$ 2,169.00								
12		Labor	$ 4,500.00								
13		Posts	$ 300.00								
14		Excavation	$ 2,500.00								
15		Drain	$ 1,800.00								
16		Rails	$ 495.00								
17		Stairs	$ 1,295.00								
18		Subtotal		$ 13,059.00							
19											
20		Build Total		$ 31,385.00							
21		Labor Percentage									

In addition to using the Ctrl key to add cells to a selection, you can expand a selection by using a wide range of keyboard shortcuts.

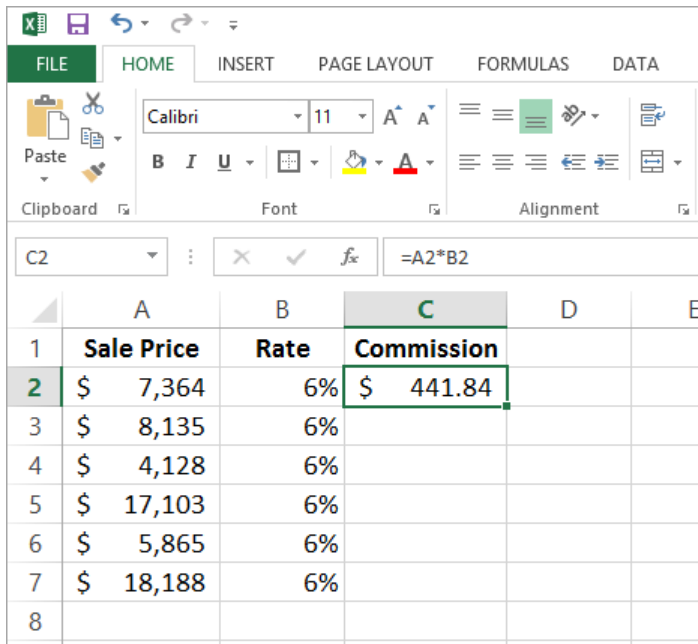The following table summarizes many of those shortcuts.

Key sequence	Description
Shift+Right Arrow	Extend the selection one cell to the right.
Shift+Left Arrow	Extend the selection one cell to the left.
Shift+Up Arrow	Extend the selection up one cell.
Shift+Down Arrow	Extend the selection down one cell.
Ctrl+Shift+Right Arrow	Extend the selection to the last non-blank cell in the row.
Ctrl+Shift+Left Arrow	Extend the selection to the first non-blank cell in the row.
Ctrl+Shift+Up Arrow	Extend the selection to the first non-blank cell in the column.
Ctrl+Shift+Down Arrow	Extend the selection to the last non-blank cell in the column.
Ctrl+*	Select the entire active region.
Shift+Home	Extend the selection to the beginning of the row.
Ctrl+Shift+Home	Extend the selection to the beginning of the worksheet.
Ctrl+Shift+End	Extend the selection to the end of the worksheet.
Shift+Page Down	Extend the selection down one screen.
Shift+Page Up	Extend the selection up one screen.

SEE ALSO For a complete list of keyboard shortcuts, see "Keyboard shortcuts" at the end of this book.
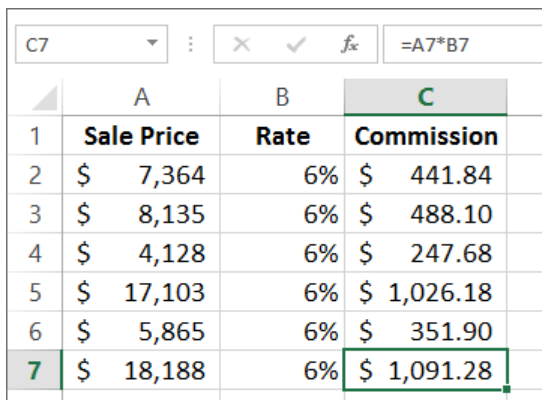
After you create a formula, you can copy it and paste it into another cell. When you do, Excel tries to change the formula so that it works in the new cells. For instance, suppose you have a worksheet in which cell D8 contains the formula =*SUM(C2:C6)*. Clicking cell D8, copying the cell's contents, and then pasting the result into cell D16 writes =*SUM(C10:C14)* into cell D16. Excel has reinterpreted the formula so that it fits the surrounding cells! Excel knows it can reinterpret the cells used in the formula because the formula uses a relative reference, or a reference that can change if the formula is copied to another cell. Relative references are written with just the cell row and column (for example, *C14*).

Relative references are useful when you summarize rows of data and want to use the same formula for each row. As an example, suppose you have a worksheet with two columns of data, labeled *SalePrice* and *Rate*, and you want to calculate your sales representative's commission by multiplying the two values in a row. To calculate the commission for the first sale, you would enter the formula =*A2*B2* in cell C2.

Selecting cell C2 and dragging the fill handle through cell C7 copies the formula from cell C2 into each of the other cells. Because you created the formula by using relative references, Excel updates each cell's formula to reflect its position relative to the starting cell (in this case, cell C2.) The formula in cell C7, for example, is =A7*B7.

You can use a similar technique when you add a formula to an Excel table column. If the sale price and rate data were in an Excel table and you created the formula =A2*B2 in cell C2, Excel would apply the formula to every other cell in the column. Because you used relative references in the formula, the formulas would change to reflect each cell's distance from the original cell.

	A	B	C
1	Sale Price	Rate	Commission
2	$ 7,364	6%	$ 441.84
3	$ 8,135	6%	$ 488.10
4	$ 4,128	6%	$ 247.68
5	$ 17,103	6%	$ 1,026.18
6	$ 5,865	6%	$ 351.90
7	$ 18,188	6%	$ 1,091.28

If you want a cell reference to remain constant when the formula using it is copied to another cell, you can use an absolute reference. To write a cell reference as an absolute reference, enter *$* before the row letter and the column number. For example, if you want the formula in cell D16 to show the sum of values in cells C10 through C14 regardless of the cell into which it is pasted, you can write the formula as *=SUM($C$10:$C$14)*.

TIP Another way to ensure that your cell references don't change when you copy the formula to another cell is to click the cell that contains the formula, copy the formula's text in the formula bar, press the Esc key to exit cut-and-copy mode, click the cell in which you want to paste the formula, and press Ctrl+V. Excel doesn't change the cell references when you copy your formula to another cell in this manner.

One quick way to change a cell reference from relative to absolute is to select the cell reference in the formula box and then press F4. Pressing F4 cycles a cell reference through the four possible types of references:

- Relative columns and rows (for example, C4)
- Absolute columns and rows (for example, $C$4)
- Relative columns and absolute rows (for example, C$4)
- Absolute columns and relative rows (for example, $C4)

In this exercise, you'll create a formula manually, revise it to include additional cells, create a formula that contains an Excel table reference, create a formula with relative references, and change the formula so it contains absolute references.

SET UP **You need the ITExpenses workbook located in the Chapter03 practice file folder to complete this exercise. Open the workbook, and then follow the steps.**

1 If necessary, display the **Summary** worksheet. Then, in cell **F9**, enter **=C4**, and press **Enter** to create the formula and display the value **$385,671.00** in cell **F9**.

2 Select cell **F9** and enter **=SU** to erase the existing formula and display the **Formula AutoComplete** list, which contains possible functions to use in the formula.

3 In the **Formula AutoComplete** list, click **SUM**, and then press **Tab** to change the contents of the formula bar to **=SUM(**.

4 Click cell **C3**, press **Ctrl+Shift+Down Arrow** to extend the selection to cell **C8**, enter **)** (a closing parenthesis) to make the formula bar's contents **=SUM(C3:C8)**, and then press **Enter** to display the value **$2,562,966.00** in cell **F9**.

5 In cell **F10**, enter **=SUM(C4:C5)**, and then press **Enter**.

6 In cell **D4**, enter **=SUM($C$3:C4)** and press **Enter** to add the formula to the cell.

7 Click cell **D4** and then drag the cell's fill handle until the selection covers cell **D8**. The formulas keep the cell reference **$C$3** absolute, but change the second cell reference to reflect the new cells' positions relative to the original formula.

8 On the tab bar, click the **JuneLabor** sheet tab to display the **JuneLabor** worksheet.

9 In cell **F13**, enter **=SUM(J** to display **JuneSummary**, the name of the table in the **JuneLabor** worksheet, in the **Formula AutoComplete** list.

10 Press **Tab** to extend the formula to read **=SUM(JuneSummary**.

11 Enter **[**, and then in the **Formula AutoComplete** list, click **Labor Expense**, and press **Tab** to extend the formula to read **=SUM(JuneSummary[Labor Expense**.
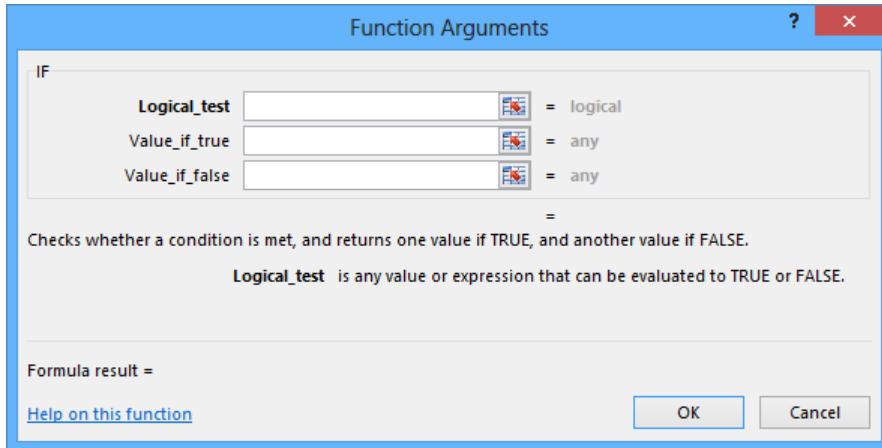

3

12   Enter **])** to complete the formula, and then press **Enter** to display the value **$637,051.00** in cell **F13**.

✖ CLEAN UP **Close the ITExpenses workbook, saving your changes if you want to.**

Summarizing data that meets specific conditions

Another use for formulas is to display messages when certain conditions are met. For instance, Consolidated Messenger's VP of Marketing, Craig Dewar, might have agreed to examine the rates charged to corporate customers who were billed for more than $100,000 during a calendar year. This kind of formula is called a *conditional formula*; one way to create a conditional formula in Excel is to use the *IF* function. To create a conditional formula, you click the cell to hold the formula and open the Insert Function dialog box. From within the dialog box, click *IF* in the list of available functions, and then click OK. When you do, the Function Arguments dialog box opens.

When you work with an *IF* function, the Function Arguments dialog box has three boxes: Logical_test, Value_if_true, and Value_if_false. The Logical_test box holds the condition you want to check. If the customer's year-to-date shipping bill appears in cell G8, the expression would be *G8>100000*.

Now you need to have Excel display messages that indicate whether Craig Dewar should evaluate the account for a possible rate adjustment. To have Excel print a message from an *IF* function, you enclose the message in quotes in the Value_if_true or Value_if_false box. In this case, you would enter *"High-volume shipper—evaluate for rate decrease"* (including the quotation marks) in the Value_if_true box and *"Does not qualify at this time."* in the Value_if_false box.

Excel also includes several other conditional functions you can use to summarize your data, as shown in the following table.

Function	Description
AVERAGEIF	Finds the average of values within a cell range that meet a specified criterion
AVERAGEIFS	Finds the average of values within a cell range that meet multiple criteria
COUNT	Counts the number of cells in a range that contain a numerical value
COUNTA	Counts the number of cells in a range that are not empty
COUNTBLANK	Counts the number of cells in a range that are empty
COUNTIF	Counts the number of cells in a range that meet a specified criterion
COUNTIFS	Counts the number of cells in a range that meet multiple criteria
IFERROR	Displays one value if a formula results in an error and another if it doesn't
SUMIF	Finds the sum of values in a range that meet a single criterion
SUMIFS	Finds the sum of values in a range that meet multiple criteria

You can use the *IFERROR* function to display a custom error message, instead of relying on the default Excel error messages to explain what happened. For example, you could use an *IFERROR* formula when looking up the CustomerID value from cell G8 in the Customers table by using the *VLOOKUP* function. One way to create such a formula is by using *=IFERROR(VLOOKUP(G8,Customers,2,false),"Customer not found")*. If the function finds a match for the CustomerID in cell G8, it displays the customer's name; if it doesn't find a match, it displays the text *Customer not found*.

SEE ALSO For more information about the VLOOKUP function, see "Looking up information in a worksheet" in Chapter 6, "Reordering and summarizing data."

Just as the *COUNTIF* function counts the number of cells that meet a criterion and the *SUMIF* function finds the total of values in cells that meet a criterion, the *AVERAGEIF* function finds the average of values in cells that meet a criterion. To create a formula by using the *AVERAGEIF* function, you define the range to be examined for the criterion, the criterion, and, if required, the range from which to draw the values. As an example, consider a worksheet that lists each customer's ID number, name, state, and total monthly shipping bill.

	A	B	C	D
1	CustomerID	CustomerName	State	Total
2	OD100	Contoso	WA	$118,476.00
3	OD101	Fabrikam	WA	$125,511.00
4	OD102	Northwind Traders	OR	$103,228.00
5	OD103	Adventure Works	WA	$ 86,552.00
6				

If you want to find the average order value for customers from the state of Washington (abbreviated in the worksheet as WA), you can create the formula *=AVERAGEIF(C2:C5, "=WA", D2:D5)*.

The *SUMIFS*, *AVERAGEIFS*, and *COUNTIFS* functions extend the capabilities of the *SUMIF*, *AVERAGEIF*, and *COUNTIF* functions to allow for multiple criteria. If you want to find the sum of all orders of at least $100,000 placed by companies in Washington, you can create the formula *=SUMIFS(D2:D5, C2:C5, "=WA", D2:D5, ">=100000")*.

The *AVERAGEIFS* and *SUMIFS* functions start with a data range that contains values that the formula summarizes; you then list the data ranges and the criteria to apply to that range. In generic terms, the syntax runs *=AVERAGEIFS(data_range, criteria_range1, criteria1[,criteria_range2, criteria2...])*. The part of the syntax in square brackets (which aren't used when you create the formula) is optional, so an *AVERAGEIFS* or *SUMIFS* formula that contains a single criterion will work. The *COUNTIFS* function, which doesn't perform any calculations, doesn't need a data range—you just provide the criteria ranges and criteria. For example, you could find the number of customers from Washington who were billed at least $100,000 by using the formula *=COUNTIFS(C2:C5, "=WA", D2:D5, ">=100000")*.

In this exercise, you'll create a conditional formula that displays a message if a condition is true, find the average of worksheet values that meet one criterion, and find the sum of worksheet values that meet two criteria.

➡️ SET UP **You need the PackagingCosts workbook located in the Chapter03 practice file folder to complete this exercise. Open the workbook, and then follow the steps.**

1   In cell **G3**, enter the formula **=IF(F3>=35000, "Request discount", "No discount available")**, and press **Enter** to create the formula, which displays *Request discount* if the value in cell F3 is at least 35,000 and displays *No discount available* if not. The value **Request discount** appears in cell **G3**.

2   Click cell **G3**, and drag the fill handle down until it covers cell **G14**. Excel copies the formula in cell **G3** to cells **G4:G14**, adjusting the formula to reflect the cells' addresses. The results of the copied formulas appear in cells **G4:G14**.

3   In cell **I3**, enter the formula **=AVERAGEIF(C3:C14, "=Box", F3:F14)** and press **Enter** to display the average cost per category of boxes, **$46,102.50**, in cell **I3**.

4   In cell **I6**, enter **=SUMIFS(F3:F14, C3:C14, "=Envelope", E3:E14, "=International")**, and press **Enter** to display the value **$45,753.00**, which represents the total cost of all envelopes used for international shipments, in cell **I6**.

❌ CLEAN UP **Close the PackagingCosts workbook, saving your changes if you want to.**

Working with iterative calculation options and automatic workbook calculation

Excel formulas use values in other cells to calculate their results. If you create a formula that refers to the cell that contains the formula, you have created a circular reference. Under most circumstances, Excel treats circular references as a mistake for two reasons. First, the vast majority of Excel formulas don't refer to their own cell, so a circular reference is unusual enough to be identified as an error. The second, more serious consideration is that a formula with a circular reference can slow down your workbook. Because Excel repeats, or iterates, the calculation, you need to set limits on how many times the program repeats the operation.

You can control your workbook's calculation options by clicking the File tab on the ribbon, clicking Options to open the Excel Options dialog box, clicking Formulas to display that page of the Excel Options dialog box, and selecting the calculation option you want.
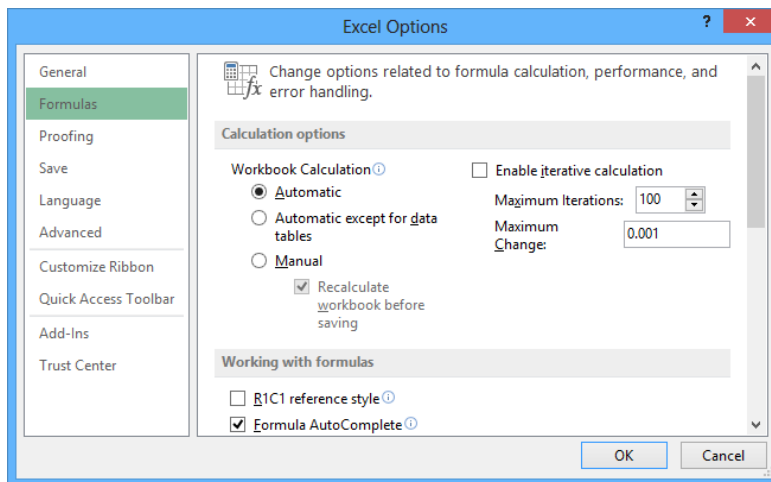
The Calculation Options section of the Formulas page in the dialog box has three available settings:

- **Automatic** The default setting, which recalculates a worksheet whenever a value affecting a formula changes

- **Automatic except for data tables** Recalculates a worksheet whenever a value changes but doesn't recalculate data tables

- **Manual** Requires you to press **F9** or click the **Formulas** tab and click the **Calculate Now** button to recalculate your worksheet

In the Calculation Options section, you can also choose to allow or disallow iterative calculations. Selecting the Enable Iterative Calculation check box lets Excel repeat calculations for cells that contain formulas with circular references. The default Maximum Iterations value of 100 and Maximum Change of 0.001 are appropriate for all but the most unusual circumstances. Click OK to accept your changes.

TIP You can also have Excel recalculate its formulas by clicking the Formulas tab on the ribbon, clicking the Calculation Options button, and selecting the behavior you want.

In this exercise, you'll create a formula that has a circular reference and then change the program's iterative calculation options to find the result.

➡ SET UP **You need the SavingsIncentive workbook located in the Chapter03 practice file folder to complete this exercise. Open the workbook, and then follow the steps.**

1   Click the **Formulas** tab, click the **Calculation Options** button, and then click **Manual**.

2   In cell **B6**, enter the formula **=B7*B9** and press **Enter** to display the initial result of the formula, which is **$1,600.00**. Note that this result is incorrect because the Gross Savings minus the Savings Incentive should equal the Net Savings value, which it does not.

3   Press **F9** to recalculate the worksheet. When you do, Excel displays a message box indicating that you have created a circular reference.

4   Click **OK** to close the message box.

5   Click the **File** tab and then click **Options** to open the **Excel Options** dialog box.

6   Click the **Formulas** category label.

7   Select the **Enable iterative calculation** check box, and then click **OK** to close the **Excel Options** dialog box.

8   Press **F9** to recalculate the worksheet. The correct values of **$1,481.48** and **$18,518.52** appear in cells **B6** and **B7**, respectively.

9   Click the **Formulas** tab, click the **Calculation Options** button, and then click **Automatic**.

❌ CLEAN UP **Close the PackagingCosts workbook, saving your changes if you want to.**

Using array formulas

Most Excel formulas calculate values to be displayed in a single cell. For example, you could add the formulas *=B1*B4*, *=B1*B5*, and *=B1*B6* to consecutive worksheet cells to calculate shipping insurance costs based on the value of a package's contents.

	A	B	C
1	**Insurance Rate**	2.5%	
2			
3	**PackageID**	**Value**	**Premium**
4	PK000352	$ 591.00	
5	PK000353	$1,713.00	
6	PK000354	$3,039.00	
7			

Rather than add the same formula to multiple cells one cell at a time, you can add a formula to every cell in the target range at once by creating an array formula. To create an array formula, you enter the formula's arguments and press Ctrl+Shift+Enter to identify the formula as an array formula. To calculate package insurance rates for values in the cell range B4:B6 and the rate in cell B1, you would select a range of cells with the same shape as the value range and enter the formula *=B1*B4:B6*. In this case, the values are in a three-cell column, so you must select a range of the same shape, such as C4:C6.

	A	B	C
1	**Insurance Rate**	2.5%	
2			
3	**PackageID**	**Value**	**Premium**
4	PK000352	$ 591.00	=B1*B4:B6
5	PK000353	$1,713.00	
6	PK000354	$3,039.00	
7			

IMPORTANT If you enter the array formula into a range of the wrong shape, Excel displays duplicate results, incomplete results, or error messages depending on how the target range differs from the value range.

When you press Ctrl+Shift+Enter, Excel creates an array formula in the selected cells. The formula appears within a pair of curly braces to indicate it is an array formula. In this case, the formula in cells C4:C6 is *{=B1*B4:B6}*.

IMPORTANT You can't add curly braces to a formula to make it an array formula—you must press Ctrl+Shift+Enter to create it.

In addition to creating an array formula that combines a single cell's value with an array, you can create array formulas that use two separate arrays. For example, Consolidated Messenger might establish a goal to reduce sorting time in each of four distribution centers.

	A	B	C	D
1	Center	Previous Time	Target Percentage	Target Time
2	North	145	85%	
3	South	180	90%	
4	East	195	75%	
5	West	205	70%	
6				

This worksheet stores the previous sorting times in minutes and percentage target in cells B2:B5 and C2:C5, respectively. The array formula to calculate the targets for each of the four centers is *=B2:B5*C2:C5*, which, when entered into cells D2:D5 by pressing Ctrl+Shift+Enter, would appear as *{= B2:B5*C2:C5}*.

To edit an array formula, you must select every cell that contains the array formula, click the formula bar to activate it, edit the formula on the formula bar, and then press Ctrl+Shift+Enter to re-enter the formula as an array formula.

TIP Many operations that used to require an array formula can now be calculated by using functions such as *SUMIFS* and *COUNTIFS*.

In this exercise, you'll create and edit array formulas.

➡ SET UP **You need the FuelSurcharges workbook located in the Chapter03 practice file folder to complete this exercise. Open the workbook, and then follow the steps.**

1 If necessary, click the **Fuel** sheet tab to display the **Fuel** worksheet.

2 Select cells **C11:F11**.

3 Enter the formula **=C3*C9:F9** and then press **Ctrl+Shift+Enter** to add the formula **{=C3*C9:F9}** to cells **C11:F11**.

4 With cells **C11:F11** still selected, click the formula bar, edit the formula so it reads **=C3*C10:F10**, and then press **Ctrl+Shift+Enter** to change the array formula to **{=C3*C10:F10}**.

5 Click the **Volume** sheet tab to display the **Volume** worksheet.

6 Select cells **D4:D7**.

7 Enter the formula **=B4:B7*C4:C7** and then press **Ctrl+Shift+Enter** to add the formula **{=B4:B7*C4:C7}** to cells **D4:D7**.

✖ CLEAN UP **Close the FuelSurcharges workbook, saving your changes if you want to.**

Finding and correcting errors in calculations

Including calculations in a worksheet gives you valuable answers to questions about your data. As is always true, however, it is possible for errors to creep into your formulas. With Excel, you can find the source of errors in your formulas by identifying the cells used in a particular calculation and describing any errors that have occurred. The process of examining a worksheet for errors is referred to as *auditing*.

Excel identifies errors in several ways. The first way is to display an error code in the cell holding the formula that is generating the error.

	A	B	C	D	E	F
1						
2		Category	Expenses			
3		Hardware	$1,469,002.00			
4		Desktop Software	$ 385,671.00			
5		Server Software	$ 599,101.00			
6		Maintenance	$ 64,703.00			
7		Cable	$ 11,240.00			
8		Backup Power Supply	$ 33,249.00			
9					Total	#NAME?
10					Software Total	
11						

When a cell with an erroneous formula is the active cell, an Error button is displayed next to it. Pointing to the Error button causes it to display an arrow on the button's right edge. Clicking the arrow displays a menu with options that provide information about the error and offer to help you fix it.

The following table lists the most common error codes and what they mean.

| Error code	Description
#####	The column isn't wide enough to display the value.
#VALUE!	The formula has the wrong type of argument (such as text in a cell where a numerical value is required).
#NAME?	The formula contains text that Excel doesn't recognize (such as an unknown named range).
#REF!	The formula refers to a cell that doesn't exist (which can happen whenever cells are deleted).
#DIV/0!	The formula attempts to divide by zero.
#N/A!	The formula attempts to use a value that is not available in the target range. This error often occurs when a user enters an invalid lookup value in a VLOOKUP formula.

Another technique you can use to find the source of formula errors is to ensure that the appropriate cells are providing values for the formula. For example, you might want to calculate the total number of deliveries for a service level, but you could accidentally create a formula referring to the service levels' names instead of their package quantities. You can identify the source of an error by having Excel trace a cell's *precedents*, which are the cells that have values used in the active cell's formula. To do so, click the Formulas tab, and then in the Formula Auditing group, click Trace Precedents. When you do, Excel identifies those cells by drawing a blue tracer arrow from the precedents to the active cell.

You can also audit your worksheet by identifying cells that contain formulas that use a value from a given cell. For example, you might use one region's daily package total in a formula that calculates the average number of packages delivered for all regions on a given day. Cells that use another cell's value in their calculations are known as *dependents*, meaning that they depend on the value in the other cell to derive their own value. As with tracing precedents, you can click the Formulas tab, and then in the Formula Auditing group, click Trace Dependents to have Excel draw blue arrows from the active cell to those cells that have calculations based on that value.

◢	A	B	C	D	E	F
1						
2		Category	Expenses			
3		Hardware	$1,469,002.00			
4		Desktop Software	$ •385,671.00			
5		Server Software	$ 599,101.00			
6		Maintenance	$ 64,703.00			
7		Cable	$ 11,240.00			
8		Backup Power Supply	$ 33,249.00			
9					Total	$ 2,562,966.00
10					Software Total	$ 984,772.00
11						

If the cells identified by the tracer arrows aren't the correct cells, you can hide the arrows and correct the formula. To hide the tracer arrows on a worksheet, display the Formulas tab, and then in the Formula Auditing group, click Remove Arrows.

If you prefer to have the elements of a formula error presented as text in a dialog box, you can use the Error Checking dialog box to view the error and the formula in the cell in which the error occurs. To open the Error Checking dialog box, display the Formulas tab, and then in the Formula Auditing group, click the Error Checking button. You can use the controls in the Error Checking dialog box to move through the formula one step at a time, to choose to ignore the error, or to move to the next or the previous error. If you click the Options button in the dialog box, you can also use the controls in the Excel Options dialog box to change how Excel determines what is an error and what isn't.
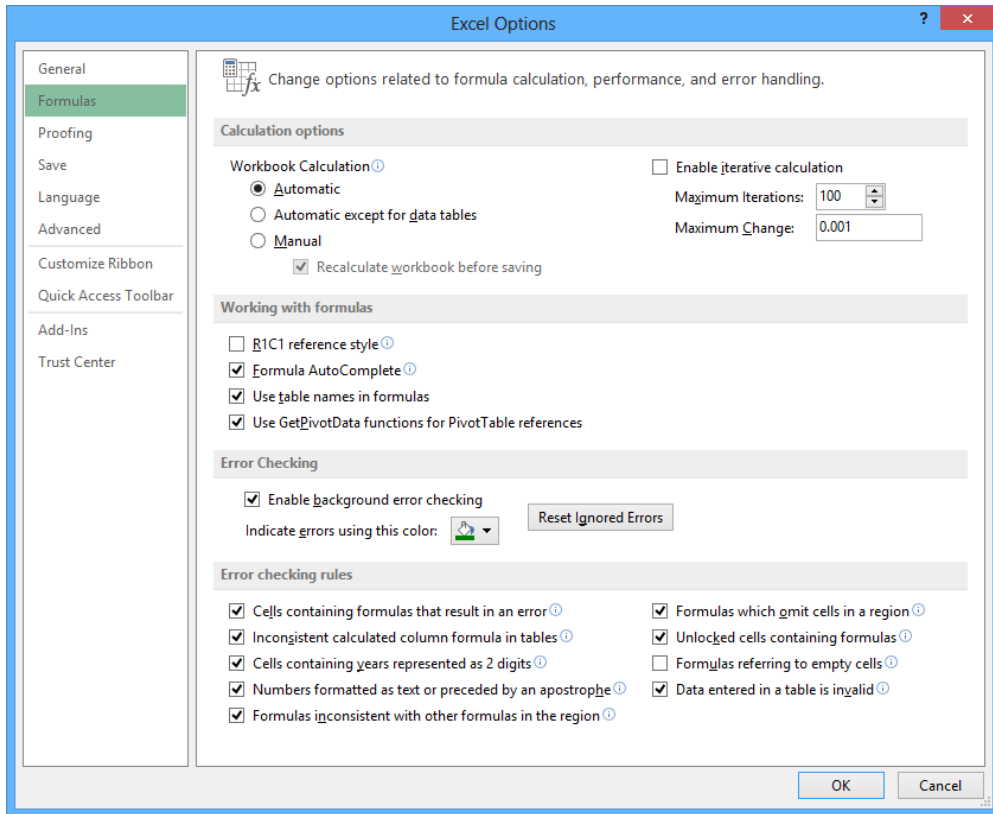
TIP You can have the Error Checking tool ignore formulas that don't use every cell in a region (such as a row or column). If you clear the Formulas Which Omit Cells In A Region check box, you can create formulas that don't add up every value in a row or column (or rectangle) without Excel marking them as an error.

For times when you just want to display the results of each step of a formula and don't need the full power of the Error Checking tool, you can use the Evaluate Formula dialog box to move through each element of the formula. To open the Evaluate Formula dialog box, you display the Formulas tab and then, in the Formula Auditing group, click the Evaluate Formula button. The Evaluate Formula dialog box is useful for examining formulas that don't produce an error but aren't generating the result you expect.

Finally, you can monitor the value in a cell regardless of where in your workbook you are by opening a Watch Window that displays the value in the cell. For example, if one of your formulas uses values from cells in other worksheets or even other workbooks, you can set a watch on the cell that contains the formula and then change the values in the other cells.

To set a watch, click the cell you want to monitor, and then on the Formulas tab, in the Formula Auditing group, click Watch Window. Click Add Watch to have Excel monitor the selected cell.

As soon as you enter the new value, the Watch Window displays the new result of the formula. When you're done watching the formula, select the watch, click Delete Watch, and close the Watch Window.

In this exercise, you'll use the formula-auditing capabilities in Excel to identify and correct errors in a formula.

➡ SET UP **You need the ConveyerBid workbook located in the Chapter03 practice file folder to complete this exercise. Open the workbook, and then follow the steps.**

1　Click cell **D21**.

2　On the **Formulas** tab, in the **Formula Auditing** group, click **Watch Window** to open the **Watch Window**.
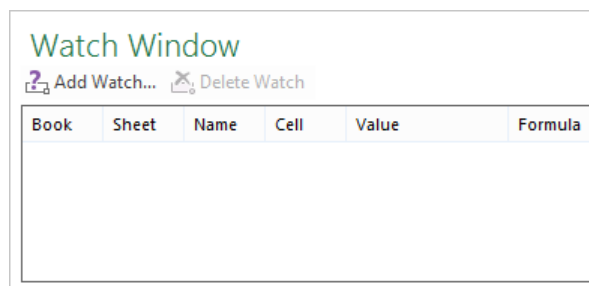
3　Click **Add Watch**, and then in the **Add Watch** dialog box, click **Add** to add cell **D21** to the watch list.

4　Click cell **D8**, which activates the cell and displays **=SUM(C3:C7)** in the formula bar.

5　On the **Formulas** tab, in the **Formula Auditing** group, click the **Trace Precedents** button to display a blue arrow that begins at the cell range **C3:C7** and points to cell **D8**, indicating that the cells in the range **C3:C7** provide the values for the formula in cell **D8**.

6   On the **Formulas** tab, in the **Formula Auditing** group, click the **Remove Arrows** button to remove the tracer arrow.

7   Click cell **A1**.

8   On the **Formulas** tab, in the **Formula Auditing** group, click the **Error Checking** button to open the **Error Checking** dialog box, which displays the error found in cell D21.
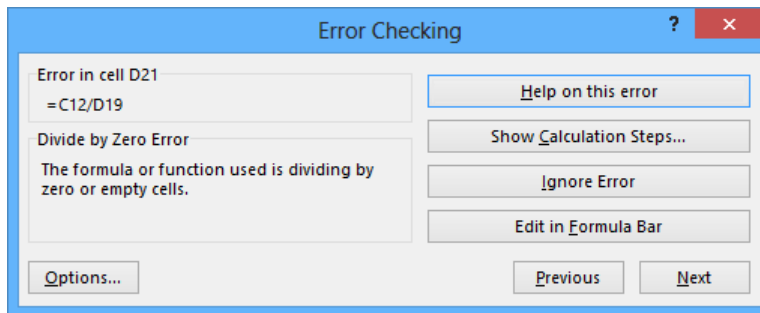
9   Click **Next** to move to the next error. Excel displays a message box indicating that there are no more errors in the worksheet.

10   Click **OK** to close both the message box and the **Error Checking** dialog box.

11   On the **Formulas** tab, in the **Formula Auditing** group, click the **Error Checking** arrow, and then in the list, click **Trace Error**. Blue arrows appear, pointing to cell **D21** from cells **C12** and **D19**. These arrows indicate that using the values (or lack of values, in this case) in the indicated cells generates the error in cell D21.

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12 On the **Formulas** tab, in the **Formula Auditing** group, click **Remove Arrows** to hide the arrows.

13 In the formula box, delete the existing formula, enter **=C12/D20**, and then press **Enter**. The value **14%** appears in cell **D21** and the change is reflected in the Watch Window.

14 Click cell **D21**.

15 On the **Formulas** tab, in the **Formula Auditing** group, click the **Evaluate Formula** button to open the **Evaluate Formula** dialog box, which displays the formula from cell **D21**.
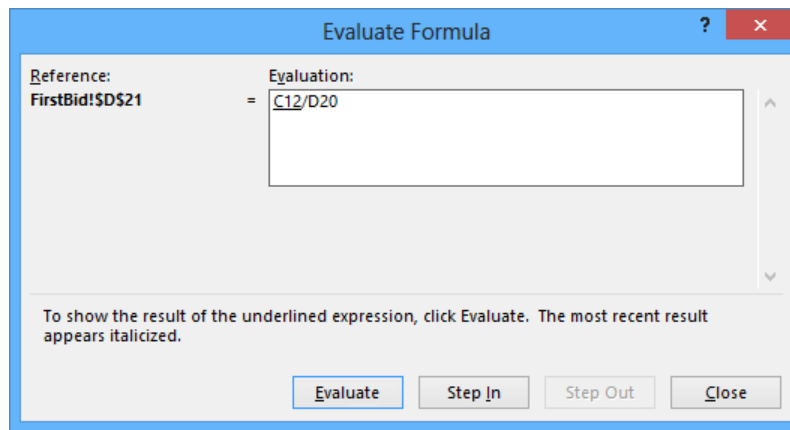
16 Click **Evaluate** three times to step through the formula's elements, and then click **Close** to close the **Evaluate Formula** dialog box.

17 In the **Watch Window**, click the watch in the list.

18 Click **Delete Watch** to erase the watch.

19 On the **Formulas** tab, in the **Formula Auditing** group, click **Watch Window** to close the **Watch Window**.

✖ CLEAN UP **Close the ConveyerBid workbook, saving your changes if you want to.**

Key points

- You can add a group of cells to a formula by entering the formula, and then at the spot in the formula in which you want to name the cells, selecting the cells.

- By creating named ranges, you can refer to entire blocks of cells by using a single term, saving you lots of time and effort. You can use a similar technique with Excel table data, referring to an entire Excel table or one or more table columns.

- When you write a formula, be sure you use absolute referencing ($A$1) if you want the formula to remain the same when it's copied from one cell to another, or use relative referencing (A1) if you want the formula to change to reflect its new position in the worksheet.

- Instead of entering a formula from scratch, you can use the Insert Function dialog box to help you.

- With iterative calculations, you can manage formulas that have circular references.

- You can use array formulas to summarize ranges of values by creating a single formula.

- You can monitor how the value in a cell changes by adding a watch to the Watch Window.

- To find out which formulas refer to the values in the selected cell, use Trace Dependents; if you want to find out which cells provide values for the formula in the active cell, use Trace Precedents.

- You can step through the calculations of a formula in the Evaluate Formula dialog box or go through a more rigorous error-checking procedure by using the Error Checking tool.

3

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Changing workbook appearance

4

IN THIS CHAPTER, YOU WILL LEARN HOW TO

- Format cells.

- Define styles.

- Apply workbook themes and Excel table styles.

- Make numbers easier to read.

- Change the appearance of data based on its value.

- Add images to worksheets.

Entering data into a workbook efficiently saves you time, but you must also ensure that your data is easy to read. Microsoft Excel 2013 gives you a wide variety of ways to make your data easier to understand; for example, you can change the font, character size, or color used to present a cell's contents. Changing how data appears on a worksheet helps set the contents of a cell apart from the contents of surrounding cells. The simplest example of that concept is a data label. If a column on your worksheet contains a list of days, you can easily set apart a label (for example, *Day*) by presenting it in bold type that's noticeably larger than the type used to present the data to which it refers. To save time, you can define several custom formats and then apply them quickly to the desired cells.

You might also want to specially format a cell's contents to reflect the value in that cell. For example, Lori Penor, the chief operating officer of Consolidated Messenger, might want to create a worksheet that displays the percentage of improperly delivered packages from each regional distribution center. If that percentage exceeds a threshold, she could have Excel display a red traffic light icon, indicating that the center's performance is out of tolerance and requires attention.

In this chapter, you'll change the appearance of data, apply existing formats to data, make numbers easier to read, change data's appearance based on its value, and add images to worksheets.

Formatting cells

Excel spreadsheets can hold and process lots of data, but when you manage numerous spreadsheets it can be hard to remember from a worksheet's title exactly what data is kept in that worksheet. Data labels give you and your colleagues information about data in a worksheet, but it's important to format the labels so that they stand out visually. To make your data labels or any other data stand out, you can change the format of the cells that hold your data.

	A	B	C	D
1				
2		**Call Volume**		
3		Northeast	13,769	
4		Atlantic	19,511	
5		Southeast	11,111	
6		North Central	24,972	
7		Midwest	11,809	
8		Southwest	20,339	
9		Mountain West	20,127	
10		Northwest	12,137	
11		Central	20,047	
12				

Most of the tools you need to change a cell's format can be found on the Home tab. You can apply the formatting represented on a button by selecting the cells you want to apply the style to and then clicking that button. If you want to set your data labels apart by making them appear bold, click the Bold button. If you have already made a cell's contents bold, selecting the cell and clicking the Bold button will remove the formatting.

TIP Deleting a cell's contents doesn't delete the cell's formatting. To delete a selected cell's formatting, on the Home tab, in the Editing group, click the Clear button (which looks like an eraser), and then click Clear Formats. Clicking Clear All from the same list will remove the cell's contents and formatting.

Buttons in the Home tab's Font group that give you choices, such as Font Color, have an arrow at the right edge of the button. Clicking the arrow displays a list of options accessible for that button, such as the fonts available on your system or the colors you can assign to a cell.
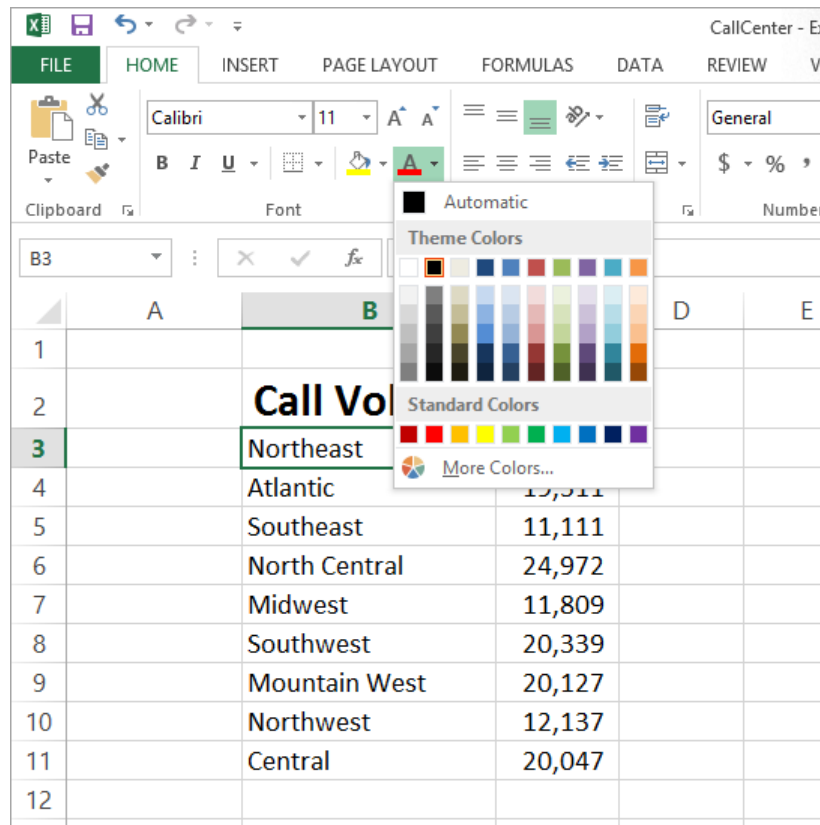
Another way you can make a cell stand apart from its neighbors is to add a border around the cell. To place a border around one or more cells, select the cells, and then choose the border type you want by selecting from the Border list in the Font group. Excel does provide more options: to display the full range of border types and styles, in the Border list, click More Borders. The Border page of the Format Cells dialog box contains the full range of tools you can use to define your cells' borders.
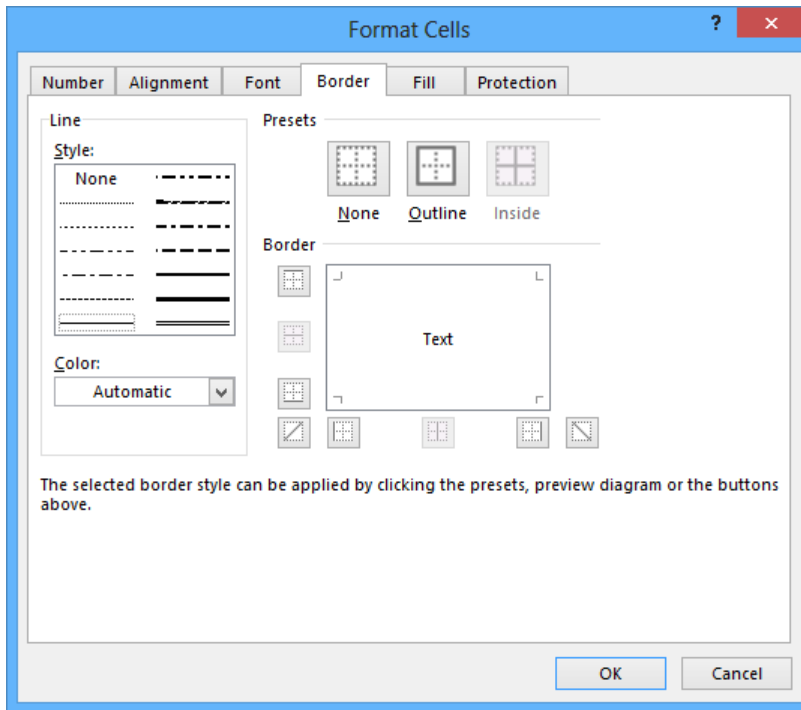
You can also make a group of cells stand apart from its neighbors by changing its shading, which is the color that fills the cells. On a worksheet that tracks total package volume for the past month, Lori Penor could change the fill color of the cells holding her data labels to make the labels stand out even more than by changing the labels' text formatting.

TIP You can display the most commonly used formatting controls by right-clicking a selected range. When you do, a Mini Toolbar containing a subset of the Home tab formatting tools appears above the shortcut menu.

If you want to change the attributes of every cell in a row or column, you can click the header of the row or column you want to modify and then select the format you want.

One task you can't perform by using the tools on the Home tab is to change the standard font for a workbook, which is used in the Name box and on the formula bar. The standard font when you install Excel is Calibri, a simple font that is easy to read on a computer screen and on the printed page. If you want to choose another font, click the File tab, and then click Options. On the General page of the Excel Options dialog box, set the values in the Use This Font and Font Size list boxes to pick your new display font.

IMPORTANT The new standard font doesn't take effect until you exit Excel and restart the program.

In this exercise, you'll emphasize a worksheet's title by changing the format of cell data, and you'll add a border to a cell range and then change a cell range's fill color. After those tasks are complete, you'll change the default font for the workbook.

➡️ SET UP **You need the VehicleMileSummary workbook located in the Chapter04 practice file folder to complete this exercise. Open the workbook, and then follow the steps.**

1 Click cell **D2**.

2 On the **Home** tab, in the **Font** group, click the **Bold** button to display the cell's contents in bold type.

3 In the **Font** group, click the **Font Size** arrow, and then in the list, click **18** to increase the size of the text in cell **D2**.

	A	B	C	D	E	F	G	H	I
1									
2				Vehicle Mile Summary					
3									
4			Day						
5		VehicleID	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	
6		V101	159	144	124	108	125	165	
7		V102	113	106	111	116	119	97	
8		V103	87	154	124	128	111	100	
9		V104	137	100	158	96	127	158	
10		V105	86	132	154	97	154	165	
11		V106	159	163	155	101	89	160	
12		V107	111	165	155	92	91	94	
13		V108	101	162	123	87	93	140	
14		V109	164	159	116	97	149	120	
15		V110	100	107	143	144	152	132	

4 Click cell **B5**, hold down the **Ctrl** key, and click cell **C4** to select the noncontiguous cells.

5 On the **Home** tab, in the **Font** group, click the **Bold** button to display the cells' contents in bold type.

6 Select the cell ranges **B6:B15** and **C5:H5**.

7   In the **Font** group, click the **Italic** button to display the cell's contents in italic type.

⬚	A	B	C	D	E	F	G	H
1								
2				**Vehicle Mile Summary**				
3								
4			Day					
5		VehicleID	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
6		V101	159	144	124	108	125	165
7		V102	113	106	111	116	119	97
8		V103	87	154	124	128	111	100
9		V104	137	100	158	96	127	158
10		V105	86	132	154	97	154	165
11		V106	159	163	155	101	89	160
12		V107	111	165	155	92	91	94
13		V108	101	162	123	87	93	140
14		V109	164	159	116	97	149	120
15		V110	100	107	143	144	152	132
16								

8   Select the cell range **C6:H15**.

9   In the **Font** group, click the **Border** arrow, and then in the list, click **Outside Borders** to place a border around the outside edge of the selected cells.

10   Select the cell range **B4:H15**.

11   In the **Border** list, click **Thick Box Border** to place a thick border around the outside edge of the selected cells.

12   Select the cell ranges **B4:B15** and **C4:H5**.

13   In the **Font** group, click the **Fill Color** arrow, and then in the **Standard Colors** palette, click the yellow swatch to change the selected cells' background color to yellow.

14   Click the **File** tab, and then click **Options** to open the **Excel Options** dialog box.

15   If necessary, click **General** to display the **General** page.

16   In the **When creating new workbooks** area, in the **Use this as the default font** list, click **Verdana**. **Verdana** appears in the **Use This Font** field.

17   Click **Cancel** to close the **Excel Options** dialog box without saving your change.

✖ CLEAN UP **Close the VehicleMileSummary workbook, saving your changes if you want to.**

Defining styles

As you work with Excel, you will probably develop preferred formats for data labels, titles, and other worksheet elements. Instead of adding a format's characteristics one element at a time to the target cells, you can have Excel store the format and recall it as needed. You can find the predefined formats by displaying the Home tab, and then in the Styles group, clicking Cell Styles.
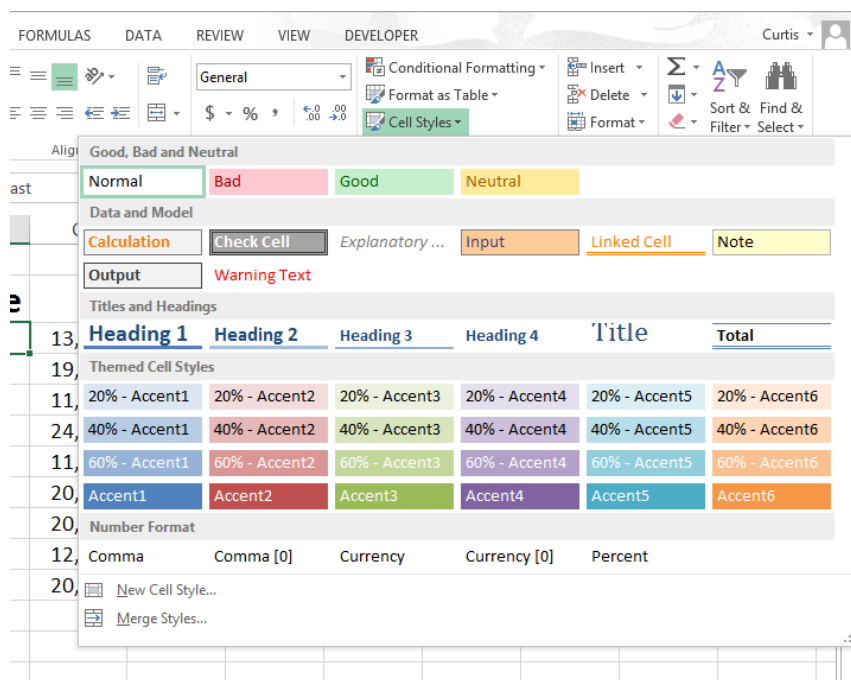
Clicking a style from the Cell Styles gallery applies the style to the selected cells, but Excel also displays a live preview of a format when you point to it. If none of the existing styles is what you want, you can create your own style by clicking New Cell Style below the gallery to display the Style dialog box. In the Style dialog box, enter the name of your new style in the Style Name field, and then click Format. The Format Cells dialog box opens.
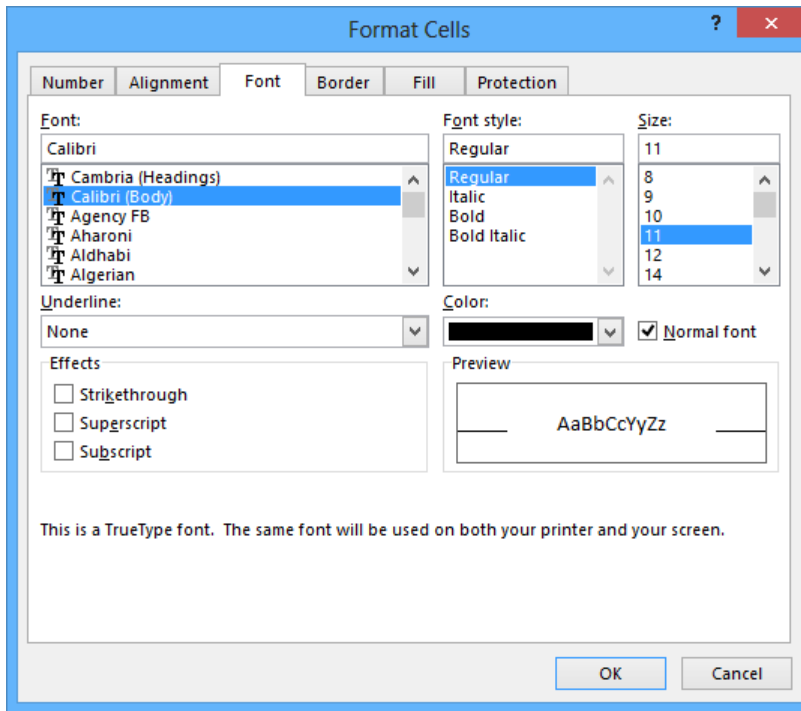
After you set the characteristics of your new style, click OK to make your style available in the Cell Styles gallery. If you ever want to delete a custom style, display the Cell Styles gallery, right-click the style, and then click Delete.

The Style dialog box is quite versatile, but it's overkill if all you want to do is apply formatting changes you made to a cell to the contents of another cell. To do so, use the Format Painter button, found in the Home tab's Clipboard group. Just click the cell that has the format you want to copy, click the Format Painter button, and select the target cells to have Excel apply the copied format to the target range.

TIP If you want to apply the same formatting to multiple cells by using the Format Painter button, double-click the Format Painter button and then click the cells to which you want to apply the formatting. When you're done applying the formatting, press the Esc key.

In this exercise, you'll create a style and apply the new style to a data label.

➡️ SET UP **You need the HourlyExceptions workbook located in the Chapter04 practice file folder to complete this exercise. Open the workbook, and then follow the steps.**

1   On the **Home** tab, in the **Styles** group, click **Cell Styles**, and then click **New Cell Style** to open the **Style** dialog box.
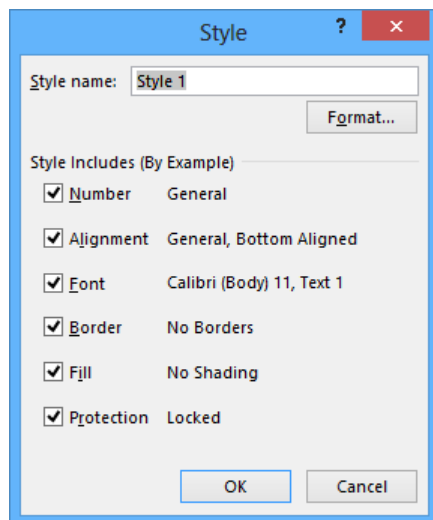
2   In the **Style name** field, enter **Crosstab Column Heading**.

3   Click the **Format** button to open the **Format Cells** dialog box.

4   Click the **Alignment** tab.
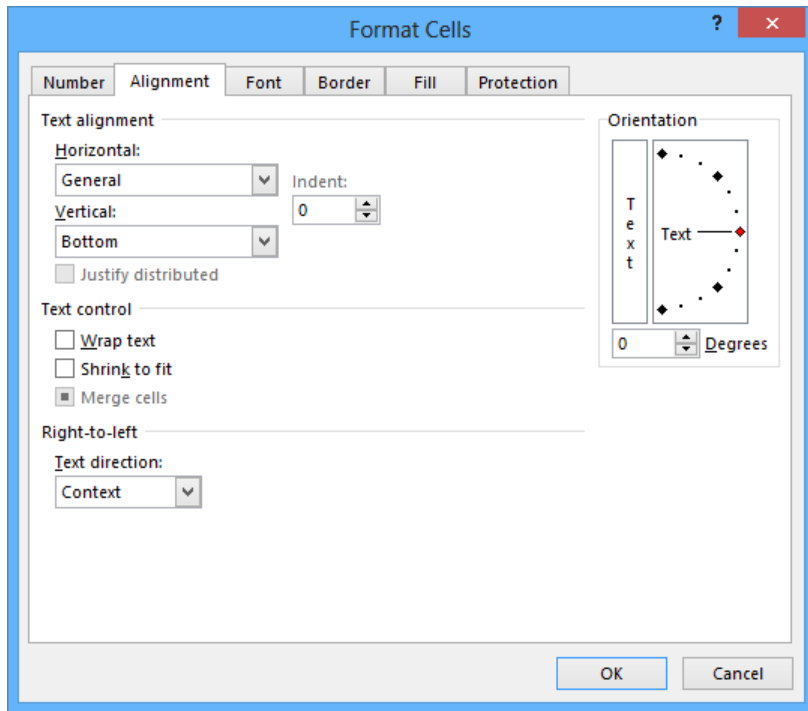
5 In the **Horizontal** list, click **Center**. **Center** appears in the **Horizontal** field.

6 Click the **Font** tab.

7 In the **Font style** list, click **Italic** to display the text in the **Preview** pane in italicized text.
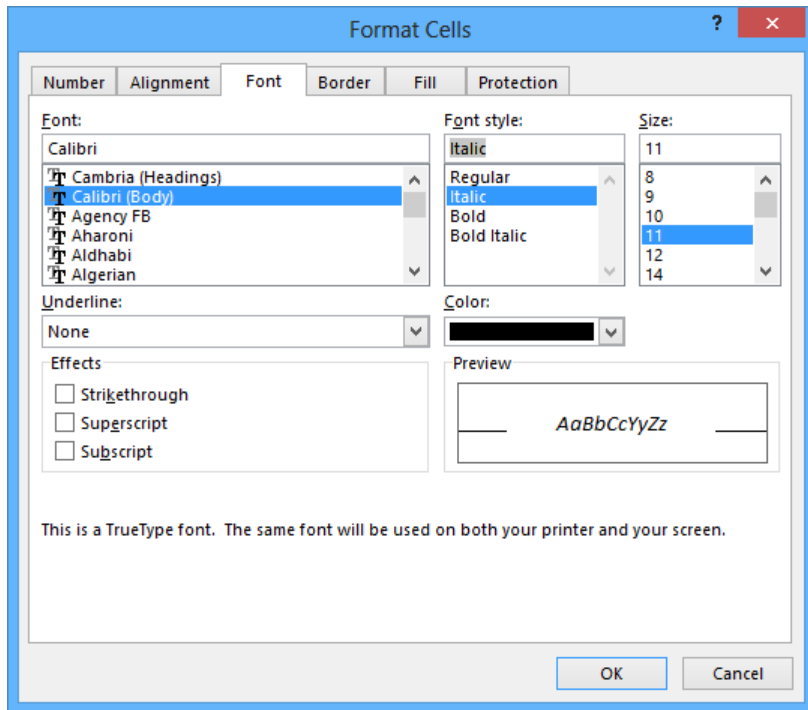
8   Click the **Number** tab to display the **Number** page of the **Format Cells** dialog box.

9   In the **Category** list, click **Time** to display the available time formats.

10   In the **Type** pane, click **1:30 PM**.

11   Click **OK** to save your changes. The **Format Cells** dialog box closes, and your new style's definition appears in the **Style** dialog box.

12   Click **OK** to close the **Style** dialog box.

13   Select cells **C4:N4**.

14   On the **Home** tab, in the **Styles** group, click **Cell Styles**. Your new style appears at the top of the gallery, in the **Custom** area.

Custom					
Crosstab Col...					
Good, Bad and Neutral					
Normal	Bad	Good	Neutral		
Data and Model					
Calculation	Check Cell	*Explanatory ...*	Input	Linked Cell	Note
Output	Warning Text				
Titles and Headings					
Heading 1	Heading 2	Heading 3	Heading 4	Title	Total
Themed Cell Styles					
20% - Accent1	20% - Accent2	20% - Accent3	20% - Accent4	20% - Accent5	20% - Accent6
40% - Accent1	40% - Accent2	40% - Accent3	40% - Accent4	40% - Accent5	40% - Accent6
60% - Accent1	60% - Accent2	60% - Accent3	60% - Accent4	60% - Accent5	60% - Accent6
Accent1	Accent2	Accent3	Accent4	Accent5	Accent6
Number Format					
Comma	Comma [0]	Currency	Currency [0]	Percent	

▦ New Cell Style...
▤ Merge Styles...

15   Click the **Crosstab Column Heading** style to apply your new style to the selected cells.

✖ CLEAN UP **Close the HourlyExceptions workbook, saving your changes if you want to.**

Applying workbook themes and Excel table styles

Microsoft Office 2013 includes powerful design tools that you can use to create attractive, professional documents quickly. The Excel product team implemented the new design capabilities by defining workbook themes and Excel table styles. A theme is a way to specify the fonts, colors, and graphic effects that appear in a workbook. Excel comes with many themes installed.

To apply an existing workbook theme, display the Page Layout tab. Then, in the Themes group, click Themes, and click the theme you want to apply to your workbook. By default, Excel applies the Office theme to your workbooks.
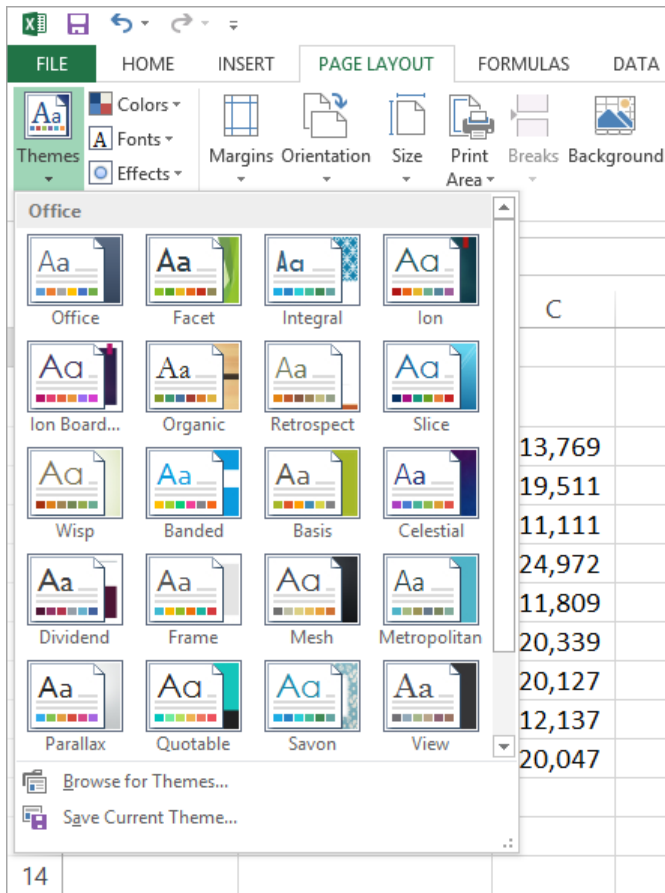
When you apply formatting to a workbook element, Excel displays colors that are available within the active theme. For example, selecting a worksheet cell and then clicking the Font Color button's arrow displays a menu containing two palettes of colors you can use. The theme colors appear in the Theme Colors palette, the standard colors appear in the Standard Colors palette, and the More Colors link, which displays the Colors dialog box, appears at the bottom of the menu. If you format workbook elements by using colors from the Theme Colors palette, applying a different theme changes that object's colors.
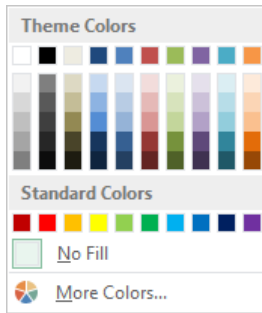
You can change a theme's colors, fonts, and graphic effects by displaying the Page Layout tab and then, in the Themes group, selecting new values from the Colors, Fonts, and Effects lists. To save your changes as a new theme, display the Page Layout tab, and in the Themes group, click Themes, and then click Save Current Theme. Use the controls in the Save Current Theme dialog box that opens to record your theme for later use. Later, when you click the Themes button, your custom theme will appear at the top of the gallery.

TIP When you save a theme, you save it as an Office Theme file. You can apply the theme to other Office 2013 documents as well.

Just as you can define and apply themes to entire workbooks, you can apply and define Excel table styles. You select an Excel table's initial style when you create it; to create a new style, display the Home tab, and in the Styles group, click Format As Table. In the Format As Table gallery, click New Table Style to open the New Table Style dialog box.
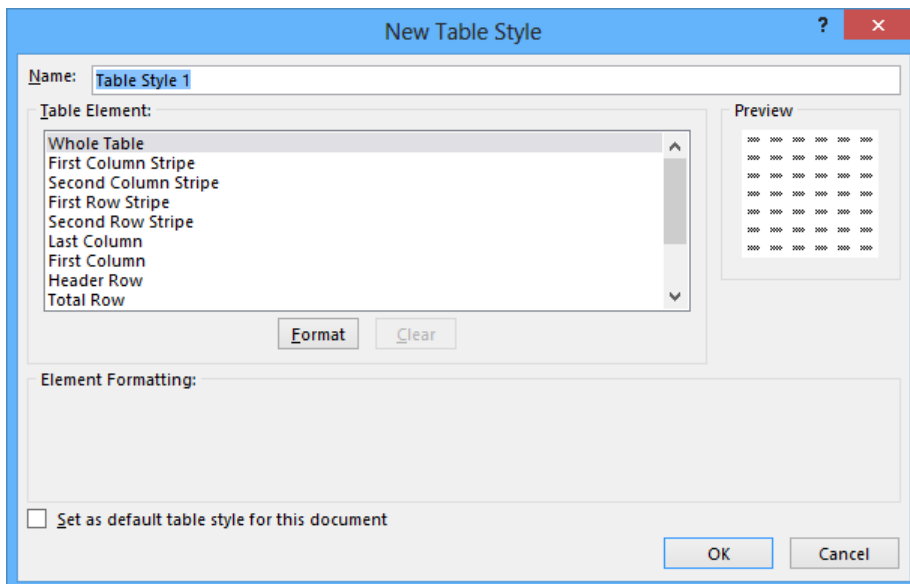
Enter a name for the new style, select the first table element you want to format, and then click Format to display the Format Cells dialog box. Define the element's formatting, and then click OK. When the New Table Style dialog box reopens, its Preview pane displays the overall table style and the Element Formatting area describes the selected element's appearance. Also, in the Table Element list, Excel displays the element's name in bold to indicate it has been changed. To make the new style the default for new Excel tables created in the current workbook, select the Set As Default Table Style For This Document check box. When you click OK, Excel saves the new table style.

TIP To remove formatting from a table element, click the name of the table element and then click the Clear button.

In this exercise, you'll create a new workbook theme, change a workbook's theme, create a new table style, and apply the new style to an Excel table.

➡ SET UP **You need the HourlyTracking workbook located in the Chapter04 practice file folder to complete this exercise. Open the workbook, and then follow the steps.**

1   If necessary, click any cell in the Excel table to make the table active.

2   On the **Home** tab, in the **Styles** group, click **Format as Table**, and then click the style at the upper-left corner of the **Table Styles** gallery. Doing so applies the style to the table.

3   On the **Home** tab, in the **Styles** group, click **Format as Table**, and then click **New Table Style** to open the **New Table Style** dialog box.

4   In the **Name** field, enter **Exception Default**.

5   In the **Table Element** list, click **Header Row**.

6   Click **Format** to open the **Format Cells** dialog box.

7   Click the **Fill** tab to display the **Fill** page.
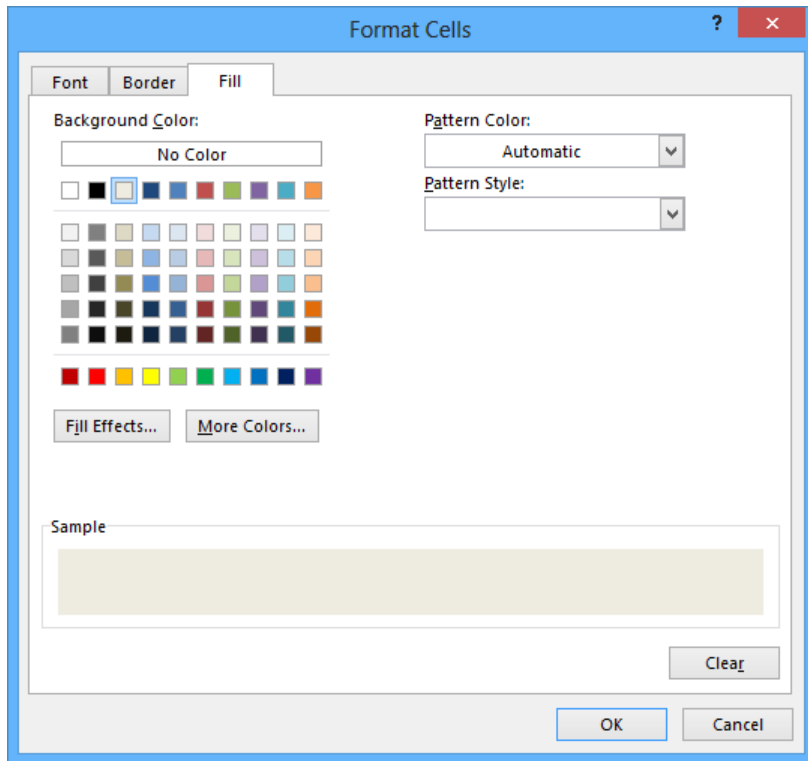
8   In the first row of color swatches, just below the **No Color** button, click the third swatch from the left to display that new background color in the **Sample** pane of the dialog box.

9   Click **OK** to close the **Format Cells** dialog box. When the **New Table Style** dialog box reopens, the **Header Row** table element appears in bold, and the **Preview** pane's header row is shaded.

10   In the **Table Element** list, click **Second Row Stripe**, and then click **Format** to open the **Format Cells** dialog box.

11   Just below the **No Color** button, click the third swatch from the left again to have the new background color appear in the **Sample** pane of the dialog box.

12   Click **OK** to close the **Format Cells** dialog box. When the **New Table Style** dialog box reopens, the **Second Row Stripe** table element appears in bold, and every second row is shaded in the **Preview** pane.
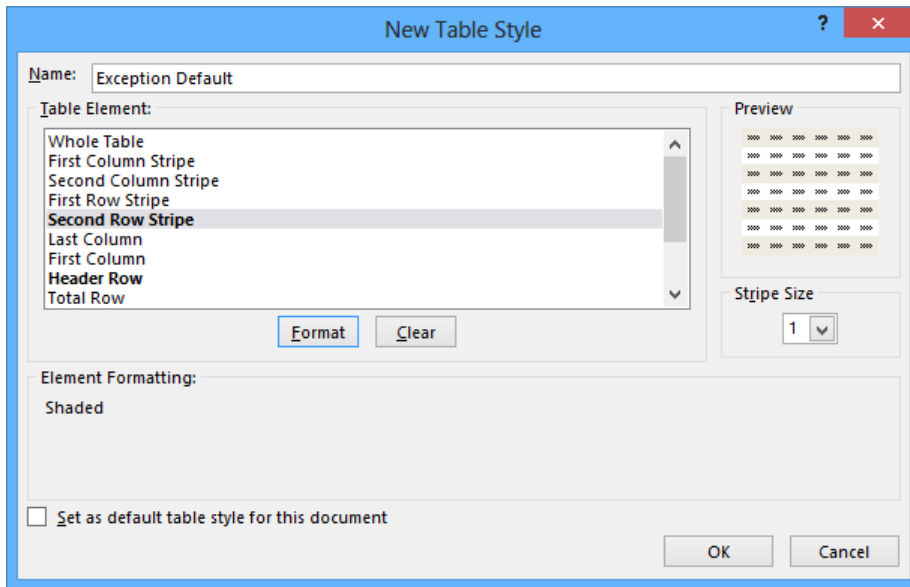
13   Click **OK** to close the **New Table Style** dialog box.

14   On the **Home** tab, in the **Styles** group, click **Format as Table**. In the gallery, in the **Custom** area, click the new format to apply it to your table.

15   On the **Page Layout** tab, in the **Themes** group, click the **Fonts** arrow, and then in the list, click **Consolas-Verdana** to change the theme's font.

	A	B	C	D	E
1					
2		Day	Region	Hour	Exceptions
3		7/29/2013	Northeast	5:00 PM	104
4		7/29/2013	Atlantic	5:00 PM	37
5		7/29/2013	Southeast	5:00 PM	22
6		7/29/2013	North Central	5:00 PM	19
7		7/29/2013	Midwest	5:00 PM	37
8		7/29/2013	Southwest	5:00 PM	72
9		7/29/2013	Mountain West	5:00 PM	8
10		7/29/2013	Northwest	5:00 PM	35
11		7/29/2013	Central	5:00 PM	14
12		7/29/2013	Northeast	6:00 PM	119
13		7/29/2013	Atlantic	6:00 PM	44
14		7/29/2013	Southeast	6:00 PM	37
15		7/29/2013	North Central	6:00 PM	28
16		7/29/2013	Midwest	6:00 PM	45
17		7/29/2013	Southwest	6:00 PM	75
18		7/29/2013	Mountain West	6:00 PM	10
19		7/29/2013	Northwest	6:00 PM	44
20		7/29/2013	Central	6:00 PM	17

16   In the **Themes** group, click the **Themes** button, and then click **Save Current Theme** to open the **Save Current Theme** dialog box.
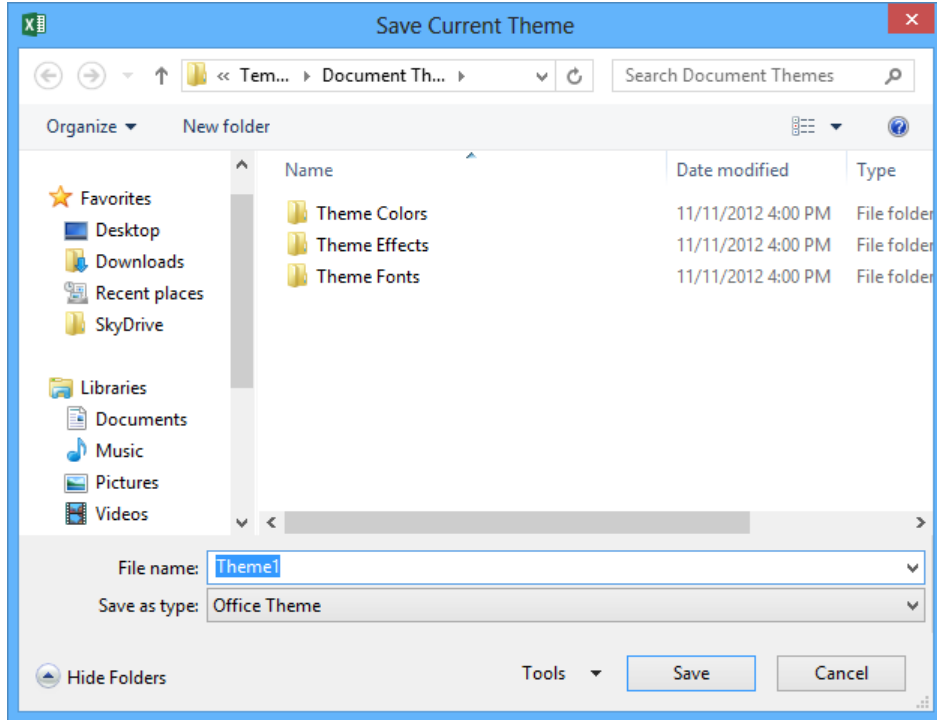
17   In the **File name** field, enter **Verdana Office**, and then click **Save** to save your theme.

18   In the **Themes** group, click the **Themes** button, and then click **Organic** to apply the new theme to your workbook.

✖ CLEAN UP **Close the HourlyTracking workbook, saving your changes if you want to.**

Making numbers easier to read

Changing the format of the cells in your worksheet can make your data much easier to read, both by setting data labels apart from the actual data and by adding borders to define the boundaries between labels and data even more clearly. Of course, using formatting options to change the font and appearance of a cell's contents doesn't help with idiosyncratic data types such as dates, phone numbers, or currency values.

As an example, consider US phone numbers. These numbers are 10 digits long and have a 3-digit area code, a 3-digit exchange, and a 4-digit line number written in the form (###) ###-####. Although it's certainly possible to enter a phone number with the expected formatting in a cell, it's much simpler to enter a sequence of 10 digits and have Excel change the data's appearance.

You can tell Excel to expect a phone number in a cell by displaying the Number page of the Format Cells dialog box and displaying the formats available for the Special category.
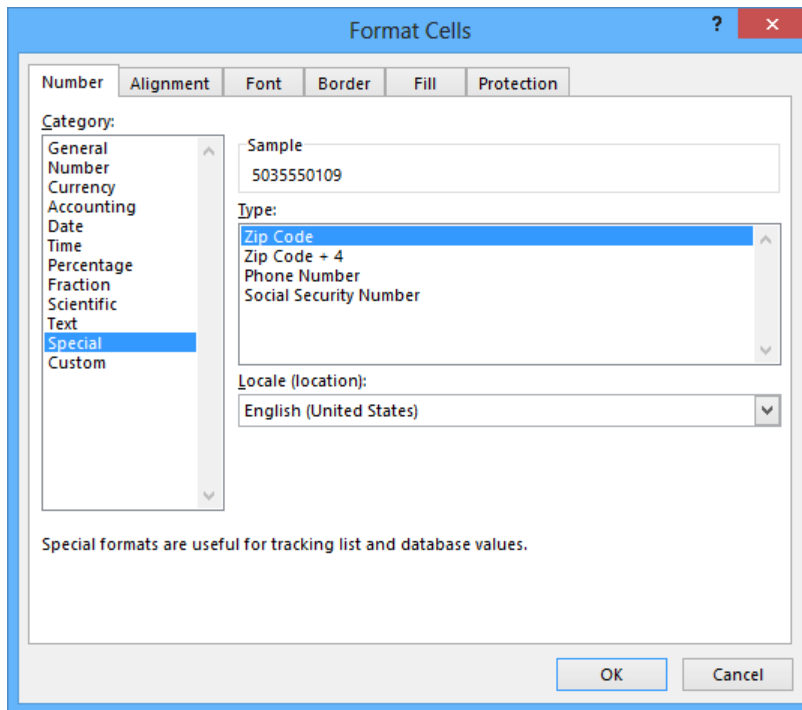
Clicking Phone Number in the Type list tells Excel to format 10-digit numbers in the standard phone number format. You can view this in operation if you compare the contents of the active cell and the contents of the formula box for a cell with the Phone Number formatting.

TROUBLESHOOTING If you enter a 9-digit number in a field that expects a phone number, no error message will appear; instead, a 2-digit area code appears. For example, the number 425550012 would be displayed as (42) 555-0012. An 11-digit number would be displayed with a 4-digit area code. If the phone number doesn't look right, you probably left out a digit or included an extra one, so you should make sure your entry is correct.

Just as you can instruct Excel to expect a phone number in a cell, you can also have it expect a date or a currency amount. You can make those changes from the Format Cells dialog box by choosing either the Date category or the Currency category. Using the Date category, you can pick the format for the date (and determine whether the date's appearance changes due to the Locale setting of the operating system on the computer viewing the workbook). In a similar vein, selecting the Currency category displays controls to set the number of places after the decimal point, the currency symbol to use, and the way in which Excel should display negative numbers.

TIP With the Excel user interface, you can make the most common format changes by displaying the Home tab of the ribbon and then, in the Number group, either clicking a button representing a built-in format or selecting a format from the Number Format list.

You can also create a custom numeric format to add a word or phrase to a number in a cell. For example, you can add the phrase *per month* to a cell that has a formula that calculates average monthly sales for a year to ensure that you and your colleagues will recognize the figure as a monthly average. To create a custom number format, click the Home tab, and then click the Number dialog box launcher (found at the lower-right corner of the Number group on the ribbon) to display the Format Cells dialog box. Then, if necessary, click the Number tab.

In the Category list, click Custom to display the available custom number formats in the Type list. You can then click the base format you want and modify it in the Type box. For example, clicking the 0.00 format causes Excel to format any number in a cell with two digits to the right of the decimal point.

TIP The zeros in the format indicate that the position in the format can accept any number as a valid value.

To customize the format, click in the Type box and add any symbols or text you want to the format. For example, entering a dollar ($) sign to the left of the existing format and then entering *"per month"* (including quote marks) to the right of the existing format causes the number 1,500 to be displayed as *$1500.00 per month*.

IMPORTANT You need to enclose any text to be displayed as part of the format in quotes so that Excel recognizes the text as a string to be displayed in the cell.

In this exercise, you'll assign date, phone number, and currency formats to ranges of cells.
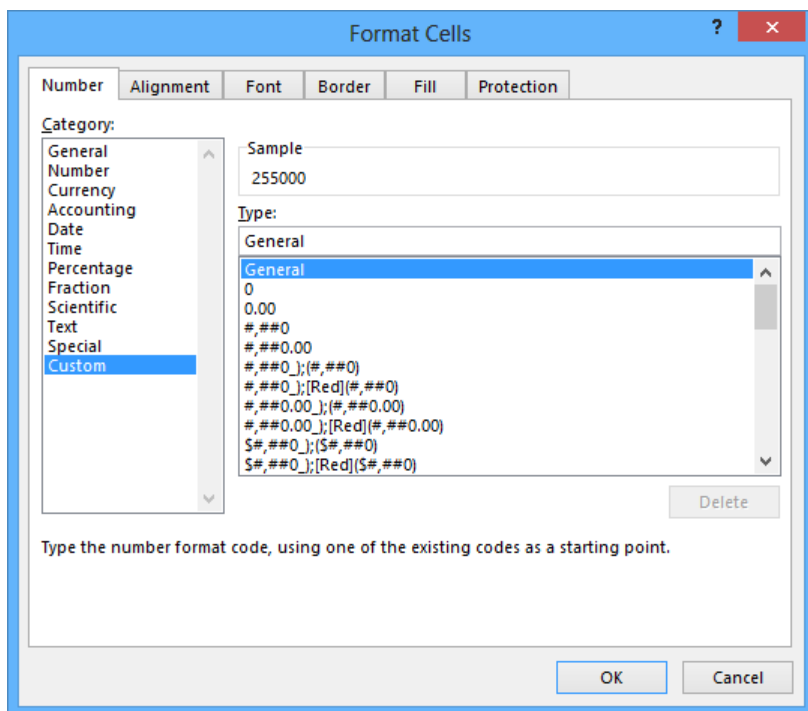
SET UP **You need the ExecutiveSearch workbook located in the Chapter04 practice file folder to complete this exercise. Open the workbook, and then follow the steps.**

1   Click cell **A3**.

2   On the **Home** tab, click the **Font** dialog box launcher to open the **Format Cells** dialog box.

3   If necessary, click the **Number** tab.

4   In the **Category** list, click **Date** to display the available date formats in the **Type** list.
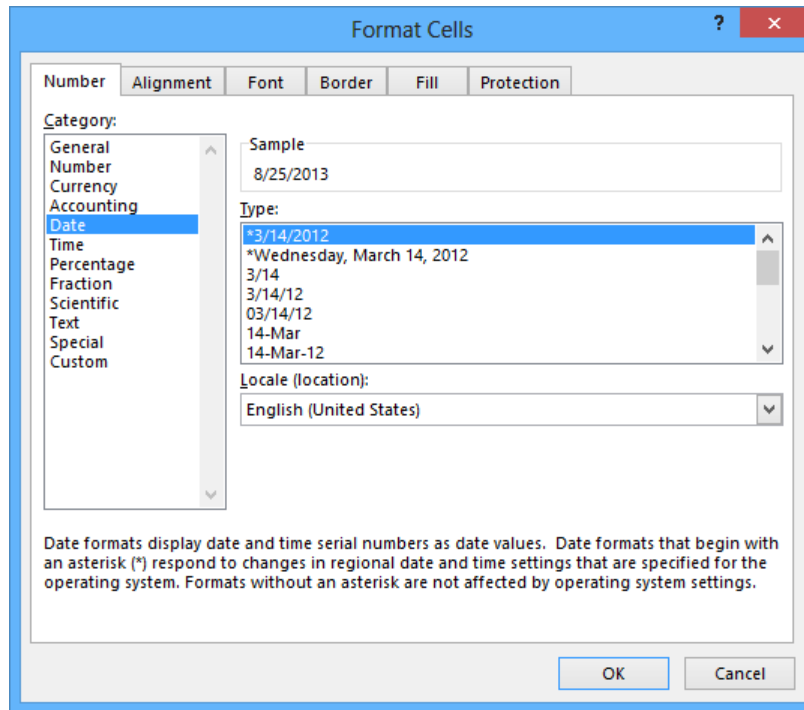
5   In the **Type** list, click **3/14/12**.

6   Click **OK** to display the contents of cell **A3** using the new format.

7   Click cell **G3**.

8   On the **Home** tab, in the **Number** group, click the **Number Format** arrow, and then click **More Number Formats**.

9   If necessary, click the **Number** tab in the **Format Cells** dialog box.

10   In the **Category** list, click **Special** to display the available special formats in the **Type** list.

11   In the **Type** list, click **Phone Number**, and then click **OK** to display the contents of the cell as **(425) 555-0102**, matching the format you selected, and to close the **Format Cells** dialog box.

12   Click cell **H3**.

13   Click the **Font** dialog box launcher.

14   If necessary, click the **Number** tab in the **Format Cells** dialog box.

15 In the **Category** list, click **Custom** to display the available custom formats in the **Type** list.

Format Cells

| Number | Alignment | Font | Border | Fill | Protection |

Category:

General
Number
Currency
Accounting
Date
Time
Percentage
Fraction
Scientific
Text
Special
Custom

Sample

255000

Type:

General

General
0
0.00
#,##0
#,##0.00
#,##0_);(#,##0)
#,##0_);[Red](#,##0)
#,##0.00_);(#,##0.00)
#,##0.00_);[Red](#,##0.00)
$#,##0_);($#,##0)
$#,##0_);[Red]($#,##0)

Delete

Type the number format code, using one of the existing codes as a starting point.

OK   Cancel

16 In the **Type** list, click the **#,##0** item to display #,##0 in the **Type** box.

17 In the **Type** box, click to the left of the existing format, and enter **$**. Then click to the right of the format, and type **" before bonuses"** (note the space after the opening quote).

18 Click **OK** to close the dialog box.

D	E	F	G	H	I
City	**State**	**ZIP**	**Phone**	**CurrentSalary**	
Redmond	WA	22841	(425) 555-0102	$255,000 before bonuses	

❌ CLEAN UP **Close the ExecutiveSearch workbook, saving your changes if you want to.**

Changing the appearance of data based on its value

By recording package volumes, vehicle miles, and other business data in a worksheet, you can make important decisions about your operations. As explained earlier in this chapter, you can change the appearance of data labels and the worksheet itself to make interpreting your data easier.

Another way you can make your data easier to interpret is to have Excel change the appearance of your data based on its value. These formats are called *conditional formats* because the data must meet certain conditions, defined in conditional formatting rules, to have a format applied to it. For example, if chief operating officer Lori Penor wanted to highlight any Thursdays with higher-than-average weekday package volumes, she could define a conditional format that tests the value in the cell recording total sales and changes the format of the cell's contents when the condition is met.

To create a conditional format, you select the cells to which you want to apply the format, display the Home tab, and then in the Styles group, click Conditional Formatting to display a menu of possible conditional formats. In Excel, you can define conditional formats that change how the program displays data in cells that contain values above or below the average values of the related cells, that contain values near the top or bottom of the value range, or that contain values duplicated elsewhere in the selected range.

When you select which kind of condition to create, Excel opens a dialog box that contains fields and controls that you can use to define your rule. To display all of the rules for the selected cells, display the Home tab, and then in the Styles group, click Conditional Formatting. On the menu, click Manage Rules to display the Conditional Formatting Rules Manager dialog box.

4
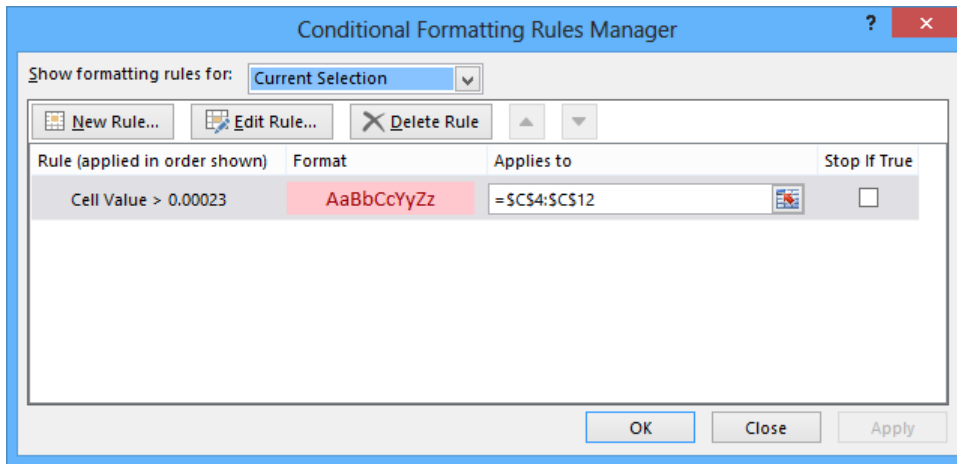
With the Conditional Formatting Rules Manager, you can control your conditional formats in the following ways:

- Create a new rule by clicking the **New Rule** button.

- Change a rule by clicking the rule and then clicking the **Edit Rule** button.

- Remove a rule by clicking the rule and then clicking the **Delete Rule** button.

- Move a rule up or down in the order by clicking the rule and then clicking the **Move Up** button or **Move Down** button.

- Control whether Excel continues evaluating conditional formats after it finds a rule to apply by selecting or clearing a rule's **Stop If True** check box.

- Save any new rules and close the **Conditional Formatting Rules Manager** by clicking **OK**.

- Save any new rules without closing the **Conditional Formatting Rules Manager** by clicking **Apply**.

- Discard any unsaved changes by clicking **Cancel**.

TIP Clicking the New Rule button in the Conditional Formatting Rules Manager opens the New Formatting Rule dialog box. The commands in the New Formatting Rule dialog box duplicate the options displayed when you click the Conditional Formatting button in the Styles group on the Home tab.

After you create a rule, you can change the format applied if the rule is true by clicking the rule and then clicking the Edit Rule button to display the Edit Formatting Rule dialog box.

In that dialog box, click the Format button to display the Format Cells dialog box. After you define your format, click OK to display the rule.
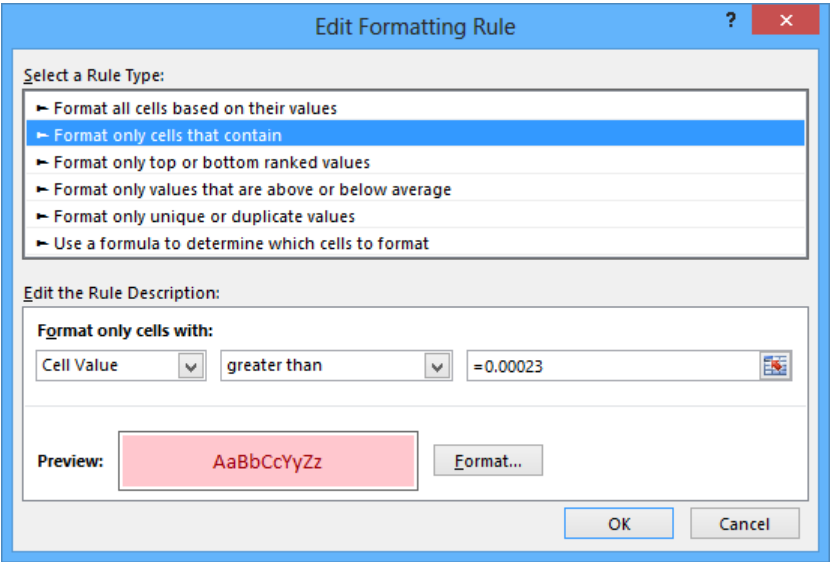
IMPORTANT Excel doesn't check to make sure that your conditions are logically consistent, so you need to be sure that you plan and enter your conditions correctly.

Using Excel, you can also create three other types of conditional formats: data bars, color scales, and icon sets. Data bars summarize the relative magnitude of values in a cell range by extending a band of color across the cell.