

# Microsoft Excel

## Advanced

### Training Book

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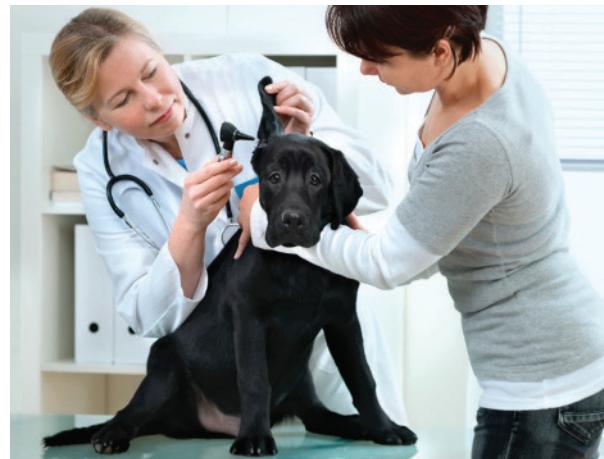
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# 8 Managing Worksheets

## LESSON SKILL MATRIX

Skills	Exam Objective	Objective Number
Organizing Worksheets	Copy and move worksheets.	1.1.6
	Change worksheet order.	1.2.3
	Change worksheet tab color.	1.3.1
	Hide worksheets.	1.4.1
	Add worksheets to existing workbooks.	1.1.5
Using Zoom and Freeze to Change the Onscreen View	Demonstrate how to use zoom.	1.4.9
	Freeze panes.	1.4.11
Finding and Replacing Data	Search for data within a workbook.	1.2.1
	Find and replace data.	2.1.2
	Demonstrate how to use Go To.	1.2.4

## KEY TERMS

- **Find command**
- **freeze**
- **hide**
- **pane**
- **Replace command**
- **unhide**
- **zoom**



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You work for an office management service whose clients include a local athletic club. Inside the club is a spa, which maintains its books separately from the rest of the club. The way the spa organizes its records, each day's clients are recorded on an individual Excel worksheet, and each week's transactions are recorded in a workbook file. Each new week begins with a kind of "template," containing one form for Monday's clients. Your job is to record the transactions for each client on its own line of a worksheet, so that the totals for that sheet reflect the final totals for the day. For each new day of the week, it's up to you to add new sheets to the workbook using Monday's sheet as a form. So you need to know how to add, move, and change the components of an Excel workbook, as well as change your view of the data in the worksheets of that workbook, to make them easier for you to manage.

## SOFTWARE ORIENTATION

### Worksheet Management

Think of an Excel workbook as a collection of the types of things you used to see recorded on paper and stored in a folder that was then filed in a cabinet. A workbook does not have to include the contents of the entire cabinet, just the records that pertain to one subject. Business transactions that take place during a period of time, such as a specific week or month, might make up a workbook. If you're keeping track of time that clients spend, you might create a workbook that breaks down how your clients spend their time into categories, and have one tab for each category. If your clients are billed on different cycles, then you might need a workbook that shows you when each client should be billed.

*(continued on next page)*

**Figure 8-1**

Commands to organize worksheets

Manage worksheets shortcut menu

Delete worksheets from a workbook

Insert worksheet

The screenshot shows an Excel spreadsheet titled "08 Pet Store Daily Sales 130309.xlsx - Excel". The worksheet contains data for "Pet Care Plus" sales on Sunday, March 10, 2013. The "Manage worksheets" drop-down menu is open, revealing various options for managing the current worksheet and other sheets in the workbook. Labels on the left point to specific items in the menu:

- "Commands to organize worksheets" points to the top of the menu.
- "Manage worksheets shortcut menu" points to the "Manage worksheets" option in the ribbon.
- "Delete worksheets from a workbook" points to the "Delete" option in the menu.
- "Insert worksheet" points to the "Insert" option in the menu.
- "Manage worksheets drop-down menu" points to the "Format" button in the ribbon, which is the source of the open menu.
- "Hide and unhide worksheets" points to the "Hide & Unhide" option in the menu.
- "Move and copy worksheets" points to the "Move or Copy Sheet..." option in the menu.

## SOFTWARE ORIENTATION (continued)

One good way to divide that workbook into sheets is to subcategorize transactions into days, such as the records for a spa. Another option is to have each sheet represent a certain sales department. This assumes your workbook is used as a ledger, and Excel can also be used for many other purposes besides keeping track of business accounts.

In this lesson, you become familiar with how a workbook contains worksheets, and how you manipulate those worksheets within a workbook the way you might reorganize the contents of a folder in your desk drawer. Unlike the old desk drawer, though, you have a few tools that will remind you that you're using a computer, such as the Find command to help you search for certain contents. You find the commands for this lesson located in the Cells group and Editing group, which are both located on the HOME tab (see Figure 8-1).

### ORGANIZING WORKSHEETS

#### Bottom Line

When you create a new Excel workbook, by default, it has one blank worksheet. You might need only one, though you can add more when you need multiple worksheets that pertain to the same topic. There's no practical limit to how many worksheets a workbook can contain. The order of worksheets in a workbook is determined by the sequence of tabs along the bottom of the Excel window. You use these tabs to switch between worksheets in the window. In this way, you can arrange worksheets in a sensible order that helps you find them easier and keep related content grouped together.

#### Copying a Worksheet

There's a clear difference between copying the contents of a worksheet into another worksheet and copying worksheets in their entirety. This objective covers the latter task, and one big reason you'd want to do this is to create a new form that's identical in style and format to an existing one, so you can enter new data. Imagine a kind of ledger form that you publish for yourself, one sheet at a time. You might need to delete some or all of the copied data in the newly produced worksheet, depending on how much data you've already entered and how much of it also applies to the new worksheet. Copying a worksheet duplicates everything, including formatting, data, and formulas.

#### STEP BY STEP

#### Copy a Worksheet

GET READY. Before you begin these steps, LAUNCH Microsoft Excel.



1. OPEN the **08 Spa Services** workbook for this lesson.
2. SAVE the workbook in the Lesson 8 folder as **08 Spa Services Week of 2-18-13 Solution**.
3. With the Monday worksheet active, click the **HOME** tab, in the Cells group, click **Format**.
4. Click **Move or Copy Sheet**. The dialog box shown in Figure 8-2 opens. Here, the Before sheet list shows the current sequence of worksheets in the workbook even if there's only one. The sheet selected represents the place you want to put the copied sheet in front of.
5. In the Before sheet list, select **(move to end)**. Next, select the **Create a copy** box, as shown in Figure 8-2, and then click **OK**. A copy of the Monday worksheet is inserted at the end of the sequence, to the right of Lookup. The new worksheet is given the default name **Monday (2)**.

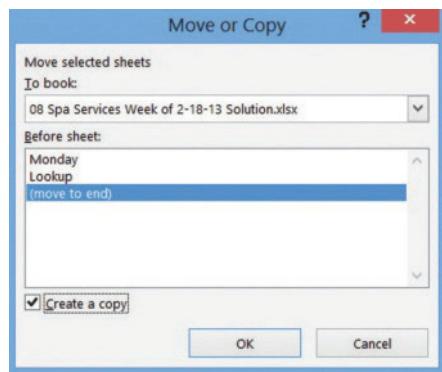
#### CERTIFICATION READY?

**1.1.6**

How do you copy and move worksheets?

**Figure 8-2**

Move or Copy dialog box

**Another Way**

You can also right-click a worksheet's tab to display the shortcut menu, and then click Move or Copy to display the Move or Copy dialog box.



6. Click the **Monday** worksheet tab. Next, click and hold the **Monday** tab, and then press and hold **Ctrl**. The pointer changes from an arrow to a paper with a plus sign in it.
7. Drag the pointer to the right until the down-arrow just above the tabs bar points to the divider to the right of Monday (2). Release the mouse button and **Ctrl** key. A new worksheet is created, with its tab located just to the right of where the down-arrow was pointing. Its name is Monday (3).
8. With Monday (3) active, click cell **B4** and type the date **2/19/2013**.
9. Select cells **B8:H13**.
10. Beginning in cell **B8**, type the following data, skipping over cells without an "x" or a number (see Figure 8-3):

<b>Sarah</b>	<b>351</b>	<b>x</b>	<b>x</b>	<b>0.5</b>
<b>Elena</b>	<b>295</b>	<b>x</b>	<b>x</b>	<b>x</b>
<b>Clarisse</b>	<b>114</b>			<b>x</b>
<b>Genevieve</b>	<b>90</b>	<b>x</b>	<b>x</b>	<b>x</b>
<b>Abhayankari</b>	<b>205</b>	<b>x</b>	<b>x</b>	<b>x</b>
<b>Regina</b>	<b>34</b>			<b>x</b>

**Figure 8-3**

The completed Spa Services worksheet

Michigan Avenue Athletic Club Spa Services													
Date:	2/19/2013												
	Client Name	Member #	Massage			Herbal			Facial	Revitalizer	Invoice Total		
			M	H	W	F	R	Duration					
8	Sarah	351	x		x			0.5	50	0	75	0	125
9	Elena	295	x	x	x	x		1	100	65	75	175	415
10	Clarisse	114		x					0	0	75	0	75
11	Genevieve	90	x	x	x			1	100	65	75	0	240
12	Abhayankari	205	x	x	x	x		1	100	65	75	175	415
13	Regina	34		x					0	0	75	0	75
14									0	0	0	0	0
15									0	0	0	0	0
16									0	0	0	0	0
17									0	0	0	0	0

**11. SAVE the workbook.**

PAUSE. LEAVE it open to use in the next exercise.

When you need a new worksheet that has the styles, formatting, and formulas that work well in an existing worksheet, it's easy to just copy the existing one and place it where it needs to go in the workbook. When it's convenient, you should copy the existing one before you add data to it, but that's not always possible. Your copied worksheet contains a duplicate of whatever data the existing one contains, but you can easily delete just the data without removing the formatting you wanted to copy in the first place.

In the preceding exercise, you used two methods to copy a worksheet, resulting in a workbook with three sheets. Excel gives each copied sheet a name, though probably just a temporary one with the name of the copied sheet followed by a number in parentheses, such as Monday (3). Selecting the Move or Copy Sheet command from the Format menu is more explicit, showing you a dialog box with all your options.

The second method is more of a shortcut, where you hold the pointer down over the worksheet tab while pressing Ctrl, and move the copied sheet to its new location. In Figure 8-4, you can see how the mouse pointer helps you by signaling to you symbolically that you're copying a worksheet. You can use whichever method you prefer.

**Figure 8-4**

Copying a worksheet using the mouse



## Renaming a Worksheet

The name Excel gives a newly copied worksheet is supposed to be temporary, because Excel can't guess the name you intend for it to be. In the example, obviously we don't want multiple Mondays, and the day for which you just entered transactions happens to be Tuesday.

### STEP BY STEP

### Rename a Worksheet

GET READY. USE the workbook from the previous exercise.

1. Double-click the **Monday (3)** worksheet tab to select its name.
2. Type **Tuesday** and press **Enter**. The new name appears on the tab.
3. Repeat this process for the **Monday (2)** worksheet tab, renaming it **Wednesday**.
4. With the Wednesday worksheet active, select cell **B4** and type the date **2/20/2013**.
5. Select cells **B8:H15**.
6. Beginning in cell **B8**, enter the following data, skipping over cells without an "x" or a number (see Figure 8-5):



### Another Way

You can also right-click a worksheet's tab to display the shortcut menu, and then click Rename.

<b>Regina</b>	<b>210</b>	<b>x</b>				
<b>Angela</b>	<b>44</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>1.5</b>	
<b>Ariel</b>	<b>191</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>1</b>
<b>Micaela</b>	<b>221</b>	<b>x</b>	<b>x</b>		<b>x</b>	<b>1</b>
<b>Julie</b>	<b>118</b>			<b>x</b>	<b>x</b>	
<b>Yolanda</b>	<b>21</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>1</b>
<b>Gwen</b>	<b>306</b>	<b>x</b>	<b>x</b>	<b>x</b>		<b>1</b>
<b>Elizabeth H.</b>	<b>6</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>1</b>

**Figure 8-5**

The completed Wednesday worksheet

Client Name	Member #	M	H	W	F	R	Massage Duration	Massage Cost	Herbal Wrap	Facial	Revitalizer	Invoice	Total
Regina	210	x					0	65	0	0	0	65	
Angela	44	x	x	x			1.5	150	65	75	0	290	
Ariel	191	x	x	x	x		1	100	65	75	175	415	
Micaela	221	x	x		x		1	100	65	0	175	340	
Julie	118		x	x			0	0	75	175		250	
Yolanda	21	x	x	x	x		1	100	65	75	175	415	
Gwen	306	x	x	x			1	100	65	75	0	240	
Elizabeth H.	6	x	x	x	x		1	100	65	75	175	415	
								0	0	0	0	0	
								0	0	0	0	0	

PAUSE. SAVE the workbook and LEAVE it open to use in the next exercise.

## Repositioning the Worksheets in a Workbook

If you were to hand a manila file folder full of important documents to someone important, such as your boss, the sequence of papers in that folder would be important. You wouldn't want to just shove a bunch of papers in the folder, because your boss might be the type of person who reads the folder's contents from top to bottom or in chronological order. The same principle applies to organizing worksheets in a workbook. Not having a proper sequence of organization, even if it's not obvious at first and you had to come up with such a sequence on your own, doesn't really help you.

### STEP BY STEP

### Reposition the Worksheets in a Workbook

GET READY. USE the workbook from the previous exercise.

1. Click the **Tuesday** worksheet tab. On the HOME tab, in the Cells group, click **Format**.
2. Click **Move or Copy Sheet**. The Move or Copy dialog box opens.
3. To make sure Tuesday appears before Wednesday, in the Before sheet list, click **Wednesday** and then click **OK**.
4. Click and hold the **Lookup** worksheet tab. The pointer changes from an arrow to a paper without a plus sign.
5. Drag the pointer to the right until the down-arrow just above the tabs bar points to the divider to the right of Wednesday. Release the mouse button. The Lookup worksheet is repositioned at the end of the sequence, and nothing inside the worksheet itself is changed.
6. Click the **Monday** worksheet tab.
7. Select cells **B8:H11**.
8. Beginning in cell B8, enter the following data, skipping over cells without an "x" or a number:

Barbara C.	15	x	x	x	x	1
Regina	210	x		x		1
Ellen	301		x		x	
Genevieve	213	x	x	x	x	1

### CERTIFICATION READY? 1.2.3

How do you change the order of worksheets?

**9. SAVE** the workbook.

PAUSE. LEAVE it open to use in the next exercise.

**Take Note** The worksheet you see when you first open a workbook is whichever sheet was active when you last saved the workbook, regardless of where that sheet falls in the tab order.

### Changing the Color of a Worksheet Tab

In Excel 2013, the “tabs” that denote the names of worksheets in a workbook don’t quite look like tabs in the real world. One feature that tabs have in the real world, especially when you use them to divide paperwork into folders, is color. If your business already uses color coding to denote categories of documents you’d find in the file cabinet or if you just need a splash of color to help you better distinguish worksheets from one another in a workbook, you can apply a stripe of color underneath each worksheet tab’s label.

#### STEP BY STEP

#### Change the Color of a Worksheet Tab

GET READY. USE the workbook from the previous exercise.

##### CERTIFICATION READY? 1.3.1

How do you change the color of worksheet tabs?

1. Right-click the **Monday** worksheet tab.
2. In the shortcut menu, click **Tab Color**.
3. In the popup menu, under Standard Colors, click **Red**. Excel gives a slightly red tint to the Monday worksheet tab.
4. Click the **Tuesday** worksheet tab. Notice the Monday worksheet tab is now the bold red color you chose. Excel applies only the gradient tint to the tab for the currently visible worksheet to make it stand out above the others.
5. Repeat the color selection process for the **Tuesday** and **Wednesday** worksheet tabs, choosing **Orange** and **Yellow**, respectively.
6. Click the **Lookup** worksheet tab. Your tabs bar should now appear as shown in Figure 8-6.

**Figure 8-6**  
Colored worksheet tabs

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Service type	Fee											
2	Massage	\$100											
3	Herbal Wrap	\$65											
4	Facial	\$75											
5	Revitalizer	\$175											
6													
7													
8													
9													
10													
11													
12													
13													
14													
15													
16													
17													
18													
19													
20													
21													
22													

The tabs at the bottom are Monday (red), Tuesday (orange), Wednesday (yellow), and Lookup (green).

PAUSE. SAVE the workbook and LEAVE it open to use in the next exercise.

**Take Note** When you copy a worksheet whose tab has been given a color, that color is copied to the new worksheet along with its contents and formatting.

## Hiding and Unhiding Worksheets

Not every element of data in a workbook is something you need to be visible to every user, especially if you're training a new computer user to work with Excel and you don't want to confuse that person. For example, many workbooks contain lookup tables and other auxiliary data. It might need to be updated from time to time, but it doesn't need to always display to those using the workbook. For this reason, you can **hide** a worksheet and **unhide** it to work with it again. Hiding a worksheet does not make it confidential, because all worksheets are easy to unhide, and certainly Excel knows it's still in the workbook. Hiding simply gets stuff out of your way just as filing something away in a desk drawer keeps it out of sight.

### STEP BY STEP

#### Hide and Unhide a Worksheet

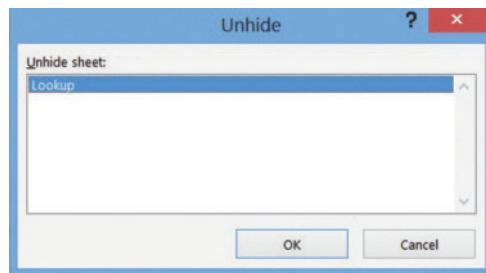
GET READY. USE the workbook from the previous exercise.

**CERTIFICATION  
READY?** **1.4.1**

How do you hide a worksheet?

- With the Lookup worksheet tab active, on the HOME tab, in the Cells group, click **Format**.
- Click **Hide & Unhide** and then click **Hide Sheet**. The Lookup worksheet is no longer visible.
- Click **Format**, click **Hide & Unhide**, and then click **Unhide Sheet**. The Unhide dialog box appears (see Figure 8-7).

**Figure 8-7**  
Unhide dialog box



- Make sure **Lookup** is chosen in the Unhide sheet list, and then click **OK**. The Lookup worksheet reappears and is activated.
- In the Lookup worksheet, select cell **B3**.
- Type **70** and press **Enter**.
- Right-click the **Lookup** worksheet tab, and click **Hide**. The Lookup worksheet disappears again, although the change you made to one price is reflected in the other sheets that refer to it.

PAUSE. SAVE the workbook and LEAVE it open to use in the next exercise.

**Take Note**

When a workbook contains hidden worksheets, the **Unhide Sheet** command is enabled in the **Format** menu, and the **Unhide** command is enabled in the shortcut menu when you right-click any tab.

To hide several worksheets at the same time, hold down **Ctrl**, click the tab for each sheet you want to hide, then right-click any of these tabs and click **Hide** in the shortcut menu. However, you can unhide only one worksheet at a time. You can right-click any visible tab and click **Unhide** to

bring up the Unhide dialog box with the Unhide sheet list, where you choose a worksheet to make visible.

## Inserting a New Worksheet into a Workbook

When you create a new workbook, the latest version of Excel inserts only one worksheet. For most everyday tasks, you'll be surprised how often you need more than one. There's no way a workbook can become too full, at least from Excel's perspective. You could keep adding worksheets forever, though in practice, you'll find it easier to keep the number down to a handful. If your tasks become so complex that you need dozens of worksheets at a time, you might consider dividing sheets among multiple workbooks. Excel recognizes cell references that cross workbook boundaries, so your workbooks are not limited to worksheets that relate just to one another.

### STEP BY STEP

### Insert a New Worksheet into a Workbook

#### CERTIFICATION READY? 1.1.5

How do you add worksheets to an existing workbook?

GET READY. USE the workbook from the previous exercise.

1. Click the **Wednesday** tab.
2. On the HOME tab, in the Cells group, click the **down-arrow next to Insert** (see Figure 8-8).

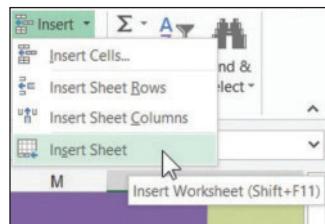
**Figure 8-8**

Insert menu



#### Another Way

Excel has a process for inserting a number of different things into a workbook, with a worksheet being one of the selections. Right-click the tab to the right of the spot you want the new worksheet, and then click Insert. To insert a blank worksheet (as opposed to an existing sheet with something in it), choose Worksheet from the Insert dialog box as shown in Figure 8-9. Some examples of preconfigured worksheets appear under the Spreadsheet Solutions tab.

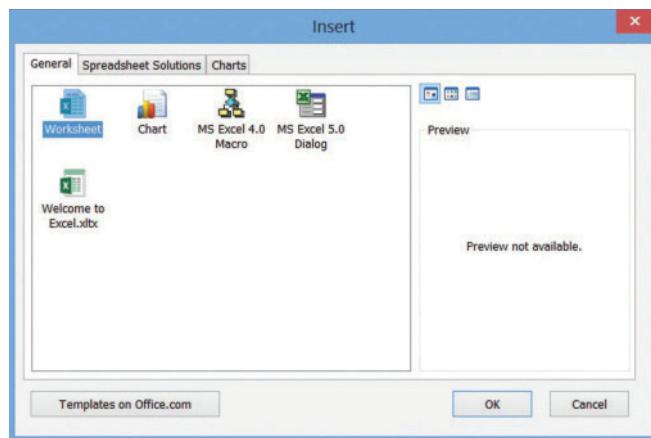


3. Click **Insert Sheet**. A new, blank worksheet is created, and its tab is inserted before the tab of the active sheet (Wednesday). Excel gives it a temporary name, beginning with *Sheet* followed by a number.
4. Move the new worksheet to the end of the tab sequence.
5. Rename the new worksheet **Survey**.
6. Click the **Wednesday** worksheet tab again.
7. Click the **+** button to the right of the worksheet tabs. Another new worksheet is created with a temporary name, and this time, its tab is inserted after Wednesday.
8. Rename this new worksheet **Totals**.

PAUSE. SAVE the workbook and LEAVE it open to use in the next exercise.

**Figure 8-9**

Insert dialog box

**Take Note**

In addition to common elements of Excel such as a worksheet and chart, the Insert dialog box might also contain templates you have created yourself or downloaded from online. This way, if you build a worksheet into a reusable form, you can save that form as a template and insert new copies of that form into a workbook as you need them.

### Deleting a Worksheet from a Workbook

Removing a worksheet from a workbook and its sequence of tabs is a simple process, at least up front. Any problems will likely come later, if you have to reconcile formulas that might have referred to data on the deleted sheet. Be certain the contents of a worksheet you're about to delete are not referred to or required by any element inside another worksheet.

**STEP BY STEP****Delete a Worksheet from a Workbook**

GET READY. USE the workbook from the previous exercise.

1. Click the **Totals** worksheet tab.
2. On the HOME tab, in the Cells group, click the down-arrow next to **Delete**.
3. Click **Delete Sheet**. The Totals worksheet is removed and its tab disappears.
4. Right-click the **Survey** tab, and click **Delete**. The Survey worksheet is removed and its tab disappears.

**Take Note**

You can use the tabs bar to delete more than one worksheet at a time. To select a block of worksheets whose tabs are adjacent to one another, click the tab at one end of the block, then while holding down the Shift key, click the tab at the other end. To select a group of worksheets that might not be adjacent, click one worksheet's tab, then while holding down the Ctrl key, click each tab for the others. Once all the tabs you want to delete are highlighted, right-click any of those tabs and in the shortcut menu, and then click Delete.

5. SAVE the workbook.

PAUSE. LEAVE it open to use in the next exercise.

**Troubleshooting**

Although Excel offers a reliable way to undo many of the things you do to workbooks by accident (press Ctrl + Z to step back over mistakes you made, for instance), you cannot undo the deletion of a worksheet from a workbook. To protect yourself against losing hours of work, save your workbook often. That way, if you do accidentally delete a worksheet, you can at least recover a slightly older version from a saved file.

## WORKING WITH MULTIPLE WORKSHEETS

### Bottom Line

One benefit of having multiple worksheets in a workbook that are based on the same form is that whenever data appears in the same cell or cells in each one, you can select them all, make changes to that data once, and have it reflected on all the sheets simultaneously. Excel doesn't know in advance which worksheets look alike, or mostly alike, so you have to select them yourself first and enroll them into a group. You know Excel has grouped sheets together when the word *[Group]* appears in its title bar. When you see *[Group]*, everything you type into one sheet in the group, or certain changes you make to one sheet in the group, is replicated to all the others. To resume working with each worksheet individually, you need to ungroup the worksheets first.

### Working with Multiple Worksheets in a Workbook

You can actually view portions of several worksheets in a workbook simultaneously. This is handy when you need to make comparisons between the data that appears on these sheets. You don't have to close one window and open the other, go back and forth, and rely on your memory to fill in the details of what you don't see. In this next exercise, you group a handful of worksheets together in preparation to make changes that affect all of them, and you arrange them onscreen to compare contents.

### STEP BY STEP

### Work with Multiple Worksheets in a Workbook

GET READY. USE the workbook from the previous exercise.

1. SAVE the workbook in the Lesson 8 folder as **08 Spa Services Week of 2-18-13 Solution 2**.
2. Right-click any worksheet's tab and click **Select All Sheets**. The title bar now reads *Spa Services Week of 2-18-13 Solution 2.xlsx [Group]*. All visible worksheets are enrolled in this group, whereas hidden worksheets are excluded. Although all the worksheets' tabs are now boldface, the active worksheet remains highlighted in green.
3. Select cells **I8:M33**.
4. On the HOME tab, in the Number group, click **\$** (Accounting Number Format). The cell formats for the range switch to a currency style where the dollar sign is aligned left, and the value aligned right with dollars and cents. Column K (Facial) is too narrow for its contents, so its values currently read ####.

### Take Note

You can paste data from the Clipboard to multiple worksheets simultaneously when they're grouped like this. You cannot, however, paste linked or embedded data (see Lesson 6, "Formatting Cells and Ranges") to multiple worksheets, only to one.

5. Adjust the width of column **K** to fit its contents (see Lesson 7, "Formatting Worksheets").
6. Select column **M**.
7. In the Font group, click **B** (Bold). All cells in column M are now boldfaced.
8. Click the tab for a worksheet other than Wednesday. The worksheets are now ungrouped, but the changes you made to the previous sheet are reflected in all three worksheets, as demonstrated by the reformatted Wednesday worksheet in Figure 8-10.

**Figure 8-10**

Reformatted worksheet

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
2	Michigan Avenue Athletic Club Spa Services													
3														
4	Date: 2/20/2013													
5														
6														
7	Client Name	Member #	M	HW	F	R	Massage Duration	Massage Cost	Wrap	Facial	Revitalizer	Invoice	Total	
8	Regina	210	x				\$ -	\$ 70.00	\$ -	\$ -	\$ -	\$ 70.00		
9	Angela	44	x	x			1.5 \$ 150.00	\$ 70.00	\$ 75.00	\$ -	\$ -	\$ 295.00		
10	Ariel	191	x	x	x		1 \$ 100.00	\$ 70.00	\$ 75.00	\$ 175.00	\$ -	\$ 420.00		
11	Micaela	221	x	x	x		1 \$ 100.00	\$ 70.00	\$ -	\$ 175.00	\$ -	\$ 345.00		
12	Julie	118		x	x		\$ -	\$ -	\$ 75.00	\$ 175.00	\$ -	\$ 250.00		
13	Yolanda	21	x	x	x		1 \$ 100.00	\$ 70.00	\$ 75.00	\$ 175.00	\$ -	\$ 420.00		
14	Gwen	306	x	x	x		1 \$ 100.00	\$ 70.00	\$ 75.00	\$ -	\$ -	\$ 245.00		
15	Elizabeth H.	6	x	x	x		1 \$ 100.00	\$ 70.00	\$ 75.00	\$ 175.00	\$ -	\$ 420.00		
16							\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
17							\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
18							\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		

**Another Way**

Another way to ungroup a group of worksheets is to right-click any tab in the group, and then click Ungroup Sheets.

9. Select the **Monday** worksheet.

10. On the **VIEW** tab, in the **Window** group, click **New Window**. A new Excel window appears, also containing the **Monday** worksheet.

11. With the new window active, select the **Tuesday** worksheet.

12. Click the **View** tab and click **New Window** again. Another window appears.

13. With this new window active, select the **Wednesday** worksheet.

14. On the **VIEW** tab, in the **Windows** group, click **Arrange All**. The **Arrange Windows** dialog box opens.

15. In the dialog box, click **Vertical**, and then click **OK**. Excel rearranges your three windows to appear as shown in Figure 8-11.

**Figure 8-11**

Vertically tiled worksheets

	A	B	C	D	E	F	G	H	I							
1	Michigan Avenue Athletic Club Spa S															
2	Date: 2/20/2013															
3																
4	Client Name	Member #	M	HW	F	R	Massage Duration	Massage Cost	Massage	Cost	Client Name	Member #	M	HW	Duration	Cost
5	Regina	210	x				\$ -	\$ 70.00	0.5 \$ 50.00		Barbara C.	15	x	x	1 \$ 100.00	
6	Angela	44	x	x			1.5 \$ 150.00				Rogina	210	x			\$ 100.00
7	Ariel	191	x	x	x		1 \$ 100.00				Ellen	301	x	x		\$ -
8	Micaela	221	x	x	x		1 \$ 100.00				Genevieve	213	x	x	x	1 \$ 100.00
9	Julie	118	x	x			\$ 100.00				Abhayenkari	205	x	x	x	\$ -
10	Yolanda	21	x	x	x		1 \$ 100.00				Regina	34	x			\$ -
11	Gwen	306	x	x	x		1 \$ 100.00									\$ -
12	Elizabeth H.	6	x	x	x		1 \$ 100.00									\$ -
13							\$ -									\$ -
14							\$ -									\$ -
15							\$ -									\$ -
16							\$ -									\$ -
17							\$ -									\$ -
18							\$ -									\$ -
19							\$ -									\$ -
20							\$ -									\$ -
21							\$ -									\$ -
22							\$ -									\$ -
23							\$ -									\$ -
24							\$ -									\$ -
25							\$ -									\$ -
26							\$ -									\$ -

PAUSE. LEAVE the workbook open to use in the next exercise.

Suppose you grouped several worksheets together, as you learned previously. When you try to copy or cut data from any one worksheet in a group, Excel assumes you're trying to extract that data

from the entire group. So when you try to paste that data into a single, ungrouped worksheet—perhaps in another book—you can't. The reason is because Excel expects the area to which you're pasting data to be the same size as the cut or copied data, which in this case comes from multiple sheets. Now, if you try to paste into a *group* of worksheets that's the same number as the cut or copied area comes from, you can.

**Take Note** When there is too little space for all the visible worksheet tabs to appear in the tabs bar, as is the case in Figure 8-11, left and right scroll arrows appear next to one another in the lower left corner of each window. Use these arrows to slide the tabs left and right until you find the one you're looking for.

When you save a workbook that has a number of windows open, and then close the workbook, when you reopen that workbook later, it will open the same number of windows. So you don't have to create multiple windows with the New Window command all over again.

### Hiding and Unhiding Worksheet Windows in a Workbook

There are two ways to think about the elements you're working with in this lesson: as worksheets in an Excel workbook and as windows on your Desktop. You've already seen how to hide worksheets, and the reason for doing that might be to get data that doesn't need to be seen all the time out of the way. The difference in this exercise is that you're simply changing your view of the workbook at the present time, not the contents of the workbook itself.

#### STEP BY STEP

#### Hide and Unhide Worksheet Windows in a Workbook

GET READY. USE the workbook from the previous exercise.

1. With all three non-hidden worksheets visible, click the title bar of the window containing the Monday worksheet.
2. On the VIEW tab, in the Window group, click **Hide**. The Monday window is closed.
3. In either of the visible windows, on the VIEW tab, in the Window group, click **Unhide**. The Unhide dialog box appears.
4. In the Unhide workbook list, choose the hidden window and click **OK**.

PAUSE. SAVE the workbook and LEAVE it open to use in the next exercise.

---

The Unhide dialog box shows the titles of windows as they would appear in their respective title bars. Unfortunately, these titles are comprised of the names of the *workbook* in which the worksheets appear, not the worksheet titles as they appear on the tabs bar. If you've hidden more than one window, you might have to guess which one has the contents you intend to unhide, unless you remember the number that Excel assigned to the window when you invoked the New Window command. That's not a problem, of course, if you've hidden only one window. Just know that if you've hidden more than one, you can't negatively impact the workbook if you guess wrong.

**Take Note** Hiding an Excel worksheet and minimizing a window in Windows appear to have the same effect. But they're not quite the same act. Specifically, when you hide an Excel window, it disappears from the Windows Taskbar, and you cannot restore it from there—only from Excel itself. If you try to hide every Excel window, however, Excel leaves one open anyway. There won't be any worksheets in it, but it will contain the ribbon tabs so you can still operate the program. You need at least the VIEW tab to eventually unhide a window.



# Workplace Ready

## IDEAS FOR ARRANGING WORKSHEETS IN EXCEL

You've seen how to build a workbook so that it includes multiple worksheets and how to arrange the worksheets like pages in a folder. What arrangements do certain people—especially office managers—expect to see in a workbook? You may know how to arrange the contents of a written report, but which workbook arrangements are considered "right" and which ones are considered "wrong?"

There's no set of answers that hold true for every professional office, although there are certain guidelines you can follow, depending on the type of work your Excel workbooks are designed to perform.

For example, not all Excel workbooks are digital versions of old, written ledgers. Assume you've been asked to assemble a financial report for your boss, or the boss of your boss. Executives typically do not like to scroll down or wade through pages and pages of data just to find the results they're looking for, someplace along the end. Granted, many of the formulas you'll enter will refer to cells that happen to be above them, but that's for when you're creating the formulas. When you *present* them, you might consider moving or copying the results to a special page at the "front" (the far left side of the tabs). This way, when the boss opens the file, the summary data is right in front of her.

Perhaps a workbook you're working on is a special assignment, something that may help you to produce a one-time report. The data you might be demonstrating at a meeting may not necessarily be the entire workbook, especially if you plan to add charts (see Lesson 12). In such a situation, it might be preferable for you to create one separate worksheet in your workbook that contains all the presentable data, including the charts, so you can keep track of what you're copying. It's easy to locate copies of your charts in PowerPoint, but it's not always easy to find the original charts in Excel if they're scattered throughout the workbook.

The screenshot shows a Microsoft Excel window titled "Nov-Dec Employees.xlsx - Excel". The ribbon menu is visible with tabs for FILE, HOME, INSERT, PAGE LAYOUT, FORMULAS, DATA, REVIEW, VIEW, DEVELOPER, and TEAM. The HOME tab is selected. The main content area displays a table of employee data across several rows and columns. The columns are labeled A through J, and the rows are numbered 1 through 13. The data includes columns for Last Name, First Name, Borough, Total hours worked, and various pay components like Gross Pay, Fed, SS, State, 401-K, and Net Pay. Formulas are used in the table to calculate totals for each row. The bottom of the screen shows the taskbar with icons for Windows, Internet Explorer, Word, Excel, and File Explorer, along with the system clock showing 6:12 PM and the date 5/6/2013.

	A	B	C	D	E	F	G	H	I	J
1										
2										
3		Last Name	First Name							
4	Data	Altare	Altare Total	Borough	Borough Total	Brown	Brown Total	Carroll	Carroll Total	Chen
5	Carlos			Jan		Shakur		Janine		Carol
6	Sum of Hours Worked	32	32	62	62	78.5	78.5	58	58	
7	Sum of Gross Pay	\$1,108.25	\$1,108.25	\$2,226.00	\$2,226.00	\$2,648.56	\$2,648.56	\$2,208.30	\$2,208.30	\$2,6
8	Sum of Fed	\$210.57	\$210.57	\$422.94	\$422.94	\$503.23	\$503.23	\$419.58	\$419.58	\$5
9	Sum of SS	\$85.89	\$85.89	\$172.52	\$172.52	\$205.26	\$205.26	\$171.14	\$171.14	\$2
10	Sum of State	\$66.50	\$66.50	\$133.56	\$133.56	\$158.91	\$158.91	\$132.50	\$132.50	\$1
11	Sum of 401-K	\$7.56	\$7.56	\$51.95	\$51.95	\$52.97	\$52.97	\$51.37	\$51.37	\$1
12	Sum of Net Pay	\$734.49	\$734.49	\$1,436.79	\$1,436.79	\$1,724.93	\$1,724.93	\$1,426.71	\$1,426.71	\$1,6
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										

At the bottom of the screen, the taskbar shows icons for Windows, Internet Explorer, Word, Excel, and File Explorer, along with the system clock showing 6:12 PM and the date 5/6/2013.

**Bottom Line****USING ZOOM AND FREEZE TO CHANGE THE ONSCREEN VIEW**

Microsoft Windows has a general approximation of how big your screen is. Most of the time, it tries to render the contents of documents such as Excel worksheets at relatively the same size as it would appear if you printed it onto a piece of paper from your printer. That approximate size is what Excel calls “100%.” So, 50% magnification equals roughly half the size that your worksheet would appear if printed, whereas 200% equals twice the size. You can adjust or **zoom** this display magnification at any time to make contents easier for you to read, or to fit more contents onto the screen at one time, without impacting the size of the worksheet when you print it. When you save the workbook, Excel saves the magnification of each of its worksheets.

You’re familiar with a pane of glass on the window of your house. In some Windows applications, including Excel, a **pane** is a portion of a divided window. Oftentimes with worksheets that are serving as forms, you reserve a row of cells for use as labels. But when the amount of data you add to that form gets too big, you can lose sight of that labels row when you need to scroll down. Excel gives you a way to **freeze** portions of a worksheet onscreen so that when you do scroll down, or even when you change magnification, you don’t lose track of which elements the labels refer to.

**STEP BY STEP****Use Zoom and Freeze to Change the Onscreen View**

GET READY. USE the workbook from the previous exercise.

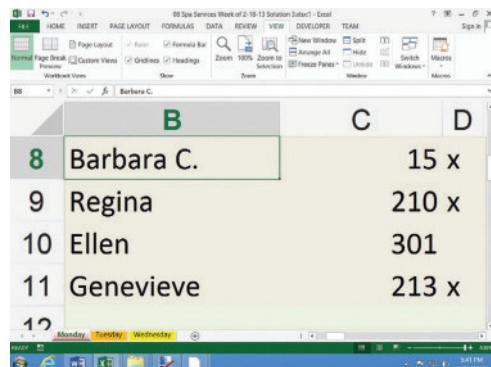
1. SAVE the workbook in the Lesson 8 folder as **08 Spa Services Week of 2-18-13 Solution 3**.
2. Maximize the window containing the Monday worksheet.
3. Select cell **B8**.
4. To increase magnification, click and hold the zoom control in the lower right corner (see Figure 8-12) and slide the pointer to the right. The maximum zoom is 400%. Notice the window zooms in on the cell you select.

**CERTIFICATION  
READY? 1.4.9**

How do you use zoom?

**Figure 8-12**

Maximum zoom on a worksheet

**Another Way**

To choose a precise screen magnification, rather than just eyeballing it, click **Zoom** on the **View** tab, and in the **Zoom** dialog box, under **Magnification**, in the **Custom** box, type a number, and click **OK**.

5. Click the **VIEW** tab, and in the **Zoom** group, click **100%**. The worksheet returns to standard magnification. Scroll to the top of the worksheet so that row 1 is visible again. If you need to, scroll left so you can also see column A again.
6. On the **VIEW** tab, in the **Window** group, click **Freeze Panes**, and then click **Freeze Panes** in the menu that appears. Cells above and to the left of the selected cell (B8) are now frozen in place for scrolling.
7. Scroll down so that row 33 comes close to the labels in row 7. Notice that rows 1 through 7 remain in place (see Figure 8-13).

**Figure 8-13**

Worksheet with frozen panes

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1														
2		Michigan Avenue Athletic Club Spa Services												
3		Date:	2/18/2013											
4														
5														
6														
7		Client Name	Member #	M	H	W	F	R	Duration	Massage Cost	Herbal Wrap	Facial	Revitalizer	Invoice Total
32										\$ -	\$ -	\$ -	\$ -	\$ -
33	Totals									\$ 300.00	\$ 210.00	\$ 225.00	\$ 525.00	\$ 1,260.00
34														
35														
36														
37														
38														
39														
40														
41														
42		Monday	Tuesday	Wednesday										

Vertical freeze line

Horizontal freeze line

**CERTIFICATION  
READY? 1.4.11**

How do you freeze panes?

8. Press **Ctrl + Home** to scroll the worksheet to the top. In the Window group, click **Freeze Panes**, and then click **Unfreeze Panes**. The thin lines denoting the frozen borders of the worksheet disappear.

PAUSE. LEAVE the workbook open to use in the next exercise.

If you're accustomed to using the wheel of your mouse to scroll up and down, you can use the same wheel while holding down the Ctrl key to zoom in (up) and out (down) of a worksheet.

**Take Note**

The Freeze Top Row and Freeze First Column commands in the Freeze Panes menu of the Window group do not work in complement to one another. Choosing Freeze First Column, for instance, unfreezes anything that was frozen previously, including the top row with Freeze Top Row.

**FINDING AND REPLACING DATA****Bottom Line**

If you've used a word processor before, such as Microsoft Word, then you've probably used the **Find command**, which locates a passage of text. And if you've written a letter or a memo, maybe you've used Find and Replace to change the spelling of a word throughout a document. Excel has a Find command and a Replace command that work similarly, only they navigate through cells instead of paragraphs.

**Locating Data with the Find Command**

With Excel, you can use the Find command to search for text you've entered as data, such as a person's name, as well as values that happen to be the results of formulas. That's important, because if you're certain that \$10,000 comes up in a cell someplace but you've never typed those digits into the system directly, you can still find it, even if it's the sum of a column or the result of a formula.

**Take Note**

The Find command does not match contents in a hidden worksheet.

**STEP BY STEP****Locate Data with the Find Command****Another Way**

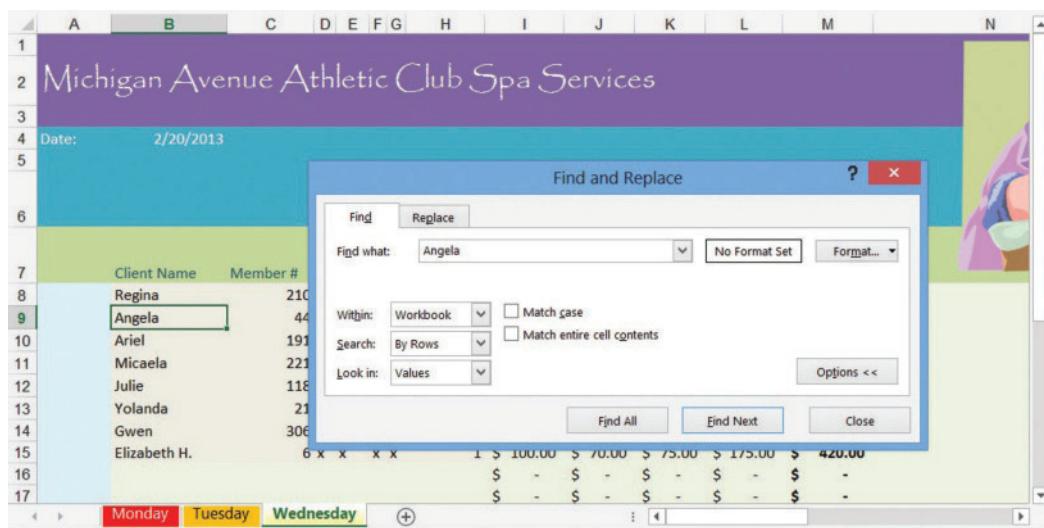
You can also open the Find and Replace dialog box with the keyboard shortcut **Ctrl+F**.

GET READY. USE the workbook from the previous exercise.

1. Select the **Monday** worksheet. Select cell **B8**.
2. On the **HOME** tab, in the **Editing** group, click **Find & Select** (the binoculars button). Click **Find**. The Find and Replace dialog box appears.
3. In the dialog box, click **Options**. The dialog box expands.
4. Click the **Within** down arrow, and in the drop-down list, click **Workbook**.
5. Click the **Look in** down arrow, and in the drop-down list, click **Values**.
6. Click the **Find what** text box, delete any contents that might appear there, and type **Angela**. Click **Find Next**. The workbook window moves to Wednesday, and automatically selects *Angela* in cell B9. Meanwhile, the dialog box appears as shown in Figure 8-14.

**Figure 8-14**

Find and Replace dialog box

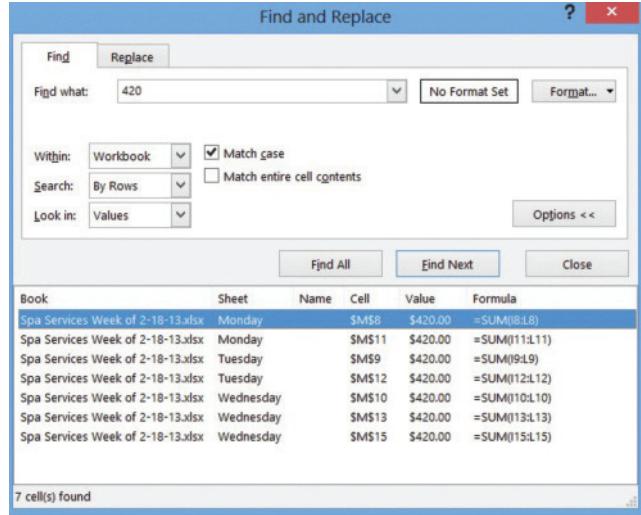

**CERTIFICATION  
READY? 1.2.1**

How do you search for data within a workbook?

7. Double-click the **Find what** text box, press **Delete**, and then type **Beth**. Click **Find Next**. Excel highlights cell B15, whose contents include "beth" in the middle of the cell and in a non-matching case.
8. Select cell **B9**.
9. In the dialog box, click **Match case**, and then click **Find Next**. This time, Excel reports the text can't be found, because it's looking for a name that begins with a capital "B." Click **OK** to dismiss the message.
10. Double-click the **Find what** text box, press **Delete**, and then type **420**. Click **Find All**. The dialog box shows a detailed report listing all the cells in the workbook that contain the value 420 (see Figure 8-15). In this case, it points to all the locations where customers paid "the works" for all the services together.

**Figure 8-15**

Find and Replace dialog box  
after Find All



### Troubleshooting

If you can't see the complete list shown here, you can scroll the list up or down using the scroll bar along the right side of the list, or you can expand the dialog box to make it bigger, as in Figure 8-15. Click and hold on the lower right corner of the frame, and then drag down to stretch the frame larger.

11. Click the first item in the list whose Sheet entry is marked Tuesday. Excel brings up the Tuesday worksheet and selects cell M9, which contains an entry for \$420.00.
12. Click **Close** to dismiss the dialog box.
13. CLOSE the other two open workbook windows.

PAUSE. LEAVE the workbook open to use in the next exercise.



### Troubleshooting

When you choose the Match entire cell contents option in the Find and Replace dialog box, Excel skips over cells whose contents do not match the text in the Find what box in their entirety. For instance, in this case a search for "Elizabeth" would skip the cell containing "Elizabeth H." if the Match entire cell contents option is checked.

### Take Note

Excel searches for text or values in a worksheet or workbook by scanning from the current cell pointer location down, not up. So if the active cell is below the text you're searching for, it might locate a cell down the list first. As you keep clicking Find Next, eventually Excel will wrap around to the beginning and will find the text above the original cell pointer location. But it does matter where you start.

## Replacing Data with the Replace Command

The functions for finding and for replacing text are located in the same dialog box, even though Excel gives you two ways to bring it up. You might have already noticed the Find tab at the top of the Find and Replace dialog box. The Replace tab is next to it. The **Replace command** differs from Find only in one important respect—it adds a text box for the contents you intend to insert in place of any matches Excel finds. This way, if you misspell a name throughout a workbook, you can correct it once only and have that correction be reflected everywhere.

**STEP BY STEP****Replace Data with the Replace Command****Another Way**

You can also display the Find and Replace box by pressing **Ctrl + H**.

**CERTIFICATION  
READY?****2.1.2**

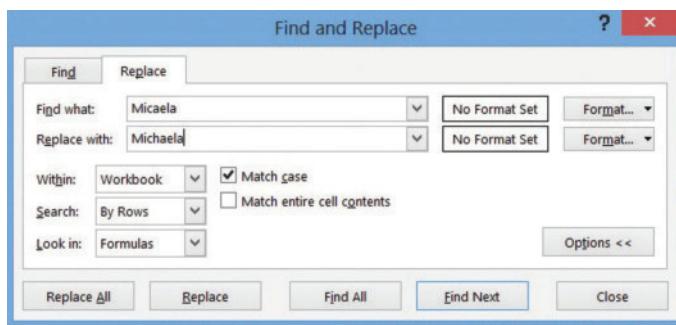
How do you find and replace data?

GET READY. USE the workbook from the previous exercise.

1. Select the **Wednesday** worksheet. Select cell **B8**.
2. On the **HOME** tab, in the **Editing** group, click **Find & Select**. Click **Replace** in the menu. The Find and Replace dialog box appears (see Figure 8-16).
3. Make sure the dialog box is expanded and that **Workbook** is the selected option for **Within**.
4. If the **Find what** text box shows the contents of the previous search, then double-click the text box and press **Delete** to erase its contents.
5. Click in the **Find what** text box and type **Micaela**.
6. Click in the **Replace with** text box and type **Michaela**. The dialog box should now appear as shown in Figure 8-16.

**Figure 8-16**

Find and Replace dialog box with Replace tab chosen



7. Click **Replace All**. Excel searches for all instances of *Micaela* and adds an "h" to the middle (correcting this client's spelling), and then will notify you when the job is done. Excel makes one replacement.
8. Click **OK**, and then click **Close**.

**SAVE** the workbook. **CLOSE** Excel.

**Troubleshooting**

Use Replace All only when you are certain you need to replace every instance of a passage of text or an item of data. There will be times when you need to replace only some instances but not all of them, and it's impossible to explain to Excel how to choose which ones change and which don't. In such a case, you can review each instance one-by-one in a list, and make the decision yourself. Click **Find Next** to have Excel bring up the next instance, and then click **Replace** if you do need to replace it or **Find Next** again to skip it and go to the next one.

**Take Note**

When you need to search and replace only text or parts of a formula within a part of a worksheet, select the range of cells to search first. When you open the Find and Replace dialog box, do not use Replace All—that will search the entire worksheet or workbook (depending on the option set). Instead, click Replace to have Excel replace the instance of the matched text in the active cell, and then automatically search for the next instance within the block. Watch the location of the active cell carefully. Keep clicking Replace only until the current cell reaches the end of the block.

## SKILL SUMMARY

In this lesson you learned how:	Exam Objective	Objective Number
To organize worksheets	Copy a worksheet.	1.1.6
	Rename a worksheet.	1.2.3
	Reposition the worksheets in a workbook.	1.3.1
	Change the color of a worksheet tab.	1.4.1
	Hide and unhide a worksheet.	1.1.5
	Insert a new worksheet into a workbook.	
	Delete a worksheet from a workbook.	
To work with multiple worksheets	Work with multiple worksheets in a workbook.	
	Hide and unhide worksheet windows in a workbook.	1.4.1
To use Zoom and Freeze to change the onscreen view	Use Zoom and Freeze to change the onscreen view.	1.4.9
	Freeze Panes	1.4.11
To find and replace data	Locate data with the Find command.	1.2.1
	Replace data with the Replace command.	2.1.2
	Navigate data with the Go To command.	1.2.4

## Knowledge Assessment

### Multiple Choice

Select the best response for the following statements.

1. Which of the following procedures is *not* a way to delete a worksheet from a workbook?
  - a. Right-click a worksheet tab and click Delete.
  - b. Press Ctrl + A to select all cells in the worksheet and press Delete.
  - c. Click the down arrow next to Delete on the HOME menu tab and click Delete Sheet.
  - d. Select a group of worksheets, right-click the group, and click Delete.
2. Which of the following statements about hidden and unhidden worksheets is correct?
  - a. Unhidden worksheets cannot contain formulas that refer to hidden worksheets.
  - b. When you click Find All, the Find and Replace dialog box will show matched contents within hidden worksheets as well as unhidden ones.
  - c. A hidden worksheet cannot be inadvertently deleted.
  - d. Excel creates a minimized window for each hidden worksheet.

3. Why would you need to copy a worksheet within a workbook?
  - a. It's the easiest way to make a backup before making changes.
  - b. It lets you repeat formats and working formulas into a new sheet.
  - c. It helps Excel learn where your data ranges are located.
  - d. You should keep one worksheet hidden in case of an error.
4. To render twice the normal amount of worksheet for any given area of the screen, what would you change the Zoom to?
  - a. 200%
  - b. 120%
  - c. 75%
  - d. 50%
5. How do you change the color of a worksheet tab?
  - a. On the PAGE LAYOUT tab, in the Themes group, select Colors.
  - b. Right-click the tab and select Tab Color.
  - c. Use the Fill Color tool on the HOME tab.
  - d. You cannot change the color of a worksheet tab.
6. Which of the following steps is required for hiding a worksheet window?
  - a. On the VIEW tab, in the Window group, click Hide.
  - b. Select the visible area of the worksheet.
  - c. Right-click the worksheet's tab and click Hide.
  - d. Enter the name of the worksheet in the Hide dialog box.
7. Which of the following steps is *not* a method for inserting a worksheet into a workbook?
  - a. Right-click the tab to the right of the spot where you want to insert a worksheet, and then click Insert.
  - b. On the HOME tab, click Insert, and then click Insert Sheet.
  - c. On the INSERT tab, click Worksheet.
  - d. In the Insert dialog box, click Worksheet, and then click OK.
8. In order for you to freeze the first column of a worksheet into a frozen pane:
  - a. The entire contents of the column must be visible.
  - b. The first row of the column must be non-blank.
  - c. Duplicate worksheets must also be able to have their first columns frozen.
  - d. You can click Freeze First Column in the Freeze Panes menu.
9. You just created a copy of a worksheet named *August*. Which name does Excel give it?
  - a. September
  - b. August (2)
  - c. Sheet2
  - d. July
10. When you click the + button (New Sheet) on the tabs bar, where is a worksheet always inserted?
  - a. At the beginning of the tabs sequence
  - b. Before the active worksheet
  - c. After the active worksheet
  - d. At the end of the tabs sequence

#### True / False

Circle T if the statement is true or F if it is false.

- T F** 1. The Arrange All command lets you stack Excel's open windows horizontally or vertically.
- T F** 2. The Find and Replace button displays the Find and Replace dialog box.
- T F** 3. When you insert a new worksheet into a workbook, a new window appears.
- T F** 4. You unhide a hidden worksheet window with the Unhide Sheet command.
- T F** 5. Find & Select, by default, locates Carol in a search for Caroline, but will not locate Mike in a search for Michael.

- T F 6.** Freezing a row or column creates what Windows calls a *pane*.
- T F 7.** Changing the magnification of the display does not change the magnification for printing.
- T F 8.** Select all the cell blocks in each worksheet of a group individually, before changing the formatting for those blocks.
- T F 9.** You can use the Insert dialog box to insert forms you created in advance.
- T F 10.** When searching for dollar amounts, use a dollar sign in the Find What text box.

## Competency Assessment

### Project 8-1: Music Store Annual Sales Sheet

You are performing accounting for a chain of sheet music and collectable CD stores throughout the state. In this project, you rename a worksheet, use the Name box to navigate a worksheet, and copy an existing worksheet.

GET READY. LAUNCH Excel if it is not already running.



- 1. OPEN** *08 Brooks Music Annual Sales* from the data files for this lesson.w
- 2. SAVE** the workbook as *08 Brooks Music Annual Sales 2013 Solution*.
- 3.** On the HOME tab, in the Cells group, click **Format**. Click **Rename Sheet**.
- 4.** Type **Q1** and press **Enter**.
- 5.** Click **Format** again, and then click **Move or Copy Sheet**.
- 6.** In the Move or Copy dialog box, click **(move to end)**, click **Create a copy**, and then click **OK**.
- 7.** Rename the **Q1 (2)** sheet as **Q2**.
- 8.** In the Q2 worksheet, select cell **C5**.
- 9.** Delete the text **Jan** and replace it with **Apr**.
- 10.** Use AutoFill to change the next two months' column headings, and then change **Qtr 1** to **Qtr 2**.
- 11.** Click the **Name** box, and then enter the cell reference **C6:E10**. Press **Enter**, and then press **Delete**.
- 12.** For the months in the second quarter, enter the following values:

\$22,748.00	\$21,984.00	\$20,194.00
\$22,648.00	\$21,068.00	\$21,698.00
\$24,971.00	\$23,498.00	\$23,011.00
\$23,400.00	\$24,681.00	\$23,497.00
\$21,037.00	\$20,960.00	\$19,684.00

- 13.** If necessary, adjust the width of each column so that the entries are legible.

SAVE and CLOSE the workbook. LEAVE Excel open for the next project.

### Project 8-2: Photo Store Accessory Sales Tracker

You're helping a photo development kiosk at a local office supplies store to keep track of the extra sales its employees have to produce in order to keep a development shop open in the digital camera era. In this lesson, you rename worksheets, unhide a hidden form worksheet, arrange windows onscreen, and make changes.

GET READY. LAUNCH Excel if it is not already running.



1. OPEN **08 Photo Weekly Product Tracker** from the data files for this lesson.
2. SAVE the workbook as **08 Photo Weekly Product Tracker 130407 Solution**.
3. Click the **Sheet1** worksheet tab.
4. On the HOME tab, in the Cells group, click **Format**. In the menu, click **Rename Sheet**.
5. In the worksheet tab for Sheet1, type **Akira** (the first name of the sales associate in cell A7) and press **Enter**.
6. Repeat this process for the sales associates in **Sheet2** and **Sheet3**.
7. On the HOME tab, in the Cells group, click **Format**. In the menu, click **Hide & Unhide**, and click **Unhide Sheet**.
8. In the Unhide dialog box, choose **Form** and click **OK**.
9. With the Form sheet active, click **Format** again, and then click **Move or Copy Sheet**.
10. In the Move or Copy dialog box, in the Before sheet list, click **Form**. Click **Create a copy**. Click **OK**.
11. Click cell **A7**. Type the name **Jairo Campos**.
12. Edit cell **B4** to reflect the date shown in the other worksheets.
13. Rename the Form (2) worksheet **Jairo**.
14. Right-click the **Form** tab. Click **Hide**.
15. In the Jairo worksheet, select cells **B9:H13** and type the following values for each of the days shown in the following table, skipping blank cells as indicated:

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
<b>2</b>		<b>3</b>		<b>4</b>		<b>2</b>
<b>10</b>	<b>1</b>		<b>2</b>		<b>6</b>	
		<b>4</b>			<b>2</b>	
<b>400</b>		<b>75</b>		<b>150</b>		<b>200</b>
<b>3</b>	<b>4</b>			<b>2</b>	<b>1</b>	<b>2</b>

16. Select the **Akira** worksheet.
17. On the **VIEW** tab, in the **Window** group, click **New Window**.
18. In the new window, select the **Taneel** worksheet.
19. Again, on the **VIEW** tab, in the **Window** group, click **New Window**.
20. In the new window, select the **Kere** worksheet.
21. Once again, on the **VIEW** tab, in the **Window** group, click **New Window**.
22. In this new window, select the **Jairo** worksheet.
23. In the Jairo worksheet, on the **VIEW** tab, in the **Window** group, click **Arrange All**.
24. In the Arrange Windows dialog box, click **Tiled**. Click **Windows of active workbook**. Click **OK**.

SAVE this workbook and CLOSE all windows related to it. LEAVE Excel open for the next project.

## Proficiency Assessment

### Project 8-3: Pet Store Daily Sales Tally, Part 1

You have been asked to build a daily accounting system for a pet supplies store, which has been keeping its receipt records on paper. In this project, you insert one new worksheet, make a copy of another, and adjust the view to show multiple worksheets at one time.

GET READY. LAUNCH Excel if it is not already running.



1. OPEN **08 Pet Store Daily Sales** from the data files for this lesson.
2. SAVE the workbook as **08 Pet Store Daily Sales 130309 Solution**.
3. Right-click the **Sheet1** tab on the tabs bar. Click **Rename**.
4. Type **March 9** and press **Enter**.
5. On the HOME tab, in the Cells group, click the down arrow next to **Insert**. Click **Insert Sheet**.
6. In the tabs bar, drag the new worksheet to the end of the sequence after **March 9**.
7. Click the **March 9** tab. Use the Name box to select cells **B52:E67**.
8. On the HOME tab, in the Clipboard group, click **Cut**.
9. Click the tab for the new worksheet. On the HOME tab, click **Paste**.
10. Adjust the width of columns **A** through **D** to fit their contents (see Lesson 7).
11. Rename the new worksheet **Recap**.
12. Click the **March 9** tab. On the HOME tab, in the Cells group, click **Format**. Click **Move or Copy Sheet**.
13. In the Move or Copy dialog box, in the Before sheet list, click **Recap**.
14. Click **Create a copy**. Click **OK**.
15. Rename **March 9 (2)** to **March 10**.
16. Right-click the **Recap** tab. Click **Hide** in the menu.
17. Click the **March 9** tab.
18. On the VIEW tab, in the Window group, click **New Window**.
19. In the newly opened window, click the **March 10** tab.
20. On the VIEW tab, click **Arrange All**.
21. In the Arrange Windows dialog box, click **Vertical**. Click **OK**.
22. In the **March 10** worksheet, edit the date to reflect **Sunday, March 10**.
23. Select cells **B10:F49** and press **Delete**.
24. Select cells **B10:F17** and type the following data:

41897	Golden Retriever puppy	Dog	Bob Cook	\$201.50
51649	Leash	Accessory	Bob Cook	\$13.95
34781	Puppy food	Feed	Bob Cook	\$38.95
52995	Kitty litter	Accessory	Bob Cook	\$21.95
32185	Fish food	Feed	Alice Harper	\$11.21
48552	Persian kitten	Cat	Alice Harper	\$185.75
55468	Food bowl	Accessory	Alice Harper	\$7.85
34211	Kitten food	Feed	Alice Harper	\$38.55

SAVE this workbook and LEAVE it and Excel open for the next project.

### Project 8-4: Pet Store Daily Sales Tally, Part 2

You have a handful of worksheets to work with now, but they look a bit dull. In this project, you make changes to one worksheet and have them reflected in another, and then copy formulas in one worksheet to another range of the worksheet and use Find and Replace to edit those formulas to reflect a different day.

GET READY. LAUNCH Excel if it is not already running.

1. SAVE the workbook as **08 Pet Store Daily Sales 130309 Solution 2**.
2. Arrange separate windows for the **March 9** and **March 10** worksheets, if they are not already arranged this way.
3. In any open window, right-click any worksheet's tab and click **Select All Sheets** in the shortcut menu.
4. Select column **A** in its entirety.
5. On the **HOME** tab, in the **Cells** group, click **Delete**.
6. Select rows **1** through **6**.
7. On the **HOME** tab, in the **Font** group, click the **Fill Color** arrow button. In the palette, click the swatch of color labeled **Blue, Accent 1, Lighter 60%**.
8. Right-click a worksheet tab on either worksheet. Click **Ungroup Sheets**.
9. Right-click a worksheet tab again, and this time click **Unhide**. In the **Unhide** dialog box, choose **Recap**. Click **OK**.
10. Click cell **B1**. Type **Saturday** and press **Enter**.
11. In the Name box, type **B1:D16** and press **Enter**.
12. On the **HOME** tab, in the **Clipboard** group, click the **Copy** button.
13. Select cell **B20**.
14. Click the **Paste** button.
15. Select cell **B20** again. Type **Sunday** and press **Enter**.
16. Select cells **B21:D35**.
17. On the **HOME** tab, in the **Editing** group, click **Find & Select**. Click **Replace**.
18. In the **Find and Replace** dialog box, if the options are not showing, click **Options**. Click the **Within** list box down arrow and choose **Sheet**. For the **Look in** list box, choose **Formulas**.
19. In the **Find what** box, type **March 9**. In the **Replace with** box, type **March 10**.
20. Click **Find Next**. When C21 is the active cell, click **Replace**.
21. Keep clicking **Replace** until after cell **D35** has been processed. (The cell contents should change from \$35.90 to \$163.45.) Close the dialog box at that point.

SAVE this workbook and CLOSE all windows associated with it.

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## Mastery Assessment

### Project 8-5: Bakery Sales Template

You've been given the task of bookkeeping for a not-for-profit bakery. It has one location but is soon to open a second. You've been handed a workable format for a daily retail tally sheet. Your instructions are to create a daily form that employees can use for an entire week's worth of daily sales tallies. In this project, you take one day's worksheet, hide rows that need to be seen only on occasion, and create enough copies for an entire work week.

GET READY. LAUNCH Excel if it is not already running.



1. OPEN **08 Whole Grains Daily Sales 130520** from the data files for this lesson.

2. Open a blank workbook.
3. Use the VIEW tab to adjust the view so that both windows appear in the workspace side-by-side.
4. Adjust the magnification of the original workbook window so that you can see columns A through R all at once.
5. Adjust the magnification of the blank workbook window (which probably has Book1 in its title bar) to the same value.
6. In the original workbook window, copy the entire sheet's contents to the Clipboard.
7. In the blank workbook window, click cell A1 and paste the entire contents.
8. In the Book1 window, delete cells A22:L45, cells N22:N45, and cells Q22:R45.
9. In the Book1 window, click the File tab. Click Save As, and then in Backstage, click Browse.
10. In the Save As dialog box, click the Save as type box, and choose Excel Template (\*.xltx).
11. Click New folder. Type Whole Grains and press Enter.
12. Click in the File name box, and SAVE the template as **08 Whole Grains Daily Sales Solution.xltx**.
13. In the template workbook, hide rows 11 through 18.
14. Rename Sheet1 to Monday.
15. Make five copies of the Monday worksheet within the workbook template, and name them Tuesday through Saturday.
16. Arrange the worksheets by days of the week if necessary.

SAVE the workbook template and LEAVE both windows open for the next project.

### Project 8-6: Bakery Sales Error Correction

Something's not tallying properly with the workbooks you've been given by your contact with the bakery. You learn that there's an error in the formula used to calculate sales throughout an entire column. In this project, you use Find and Replace to make a complex formula correction, and you test the results on a daily worksheet made from your template.

GET READY. LAUNCH Excel if it is not already running.



1. OPEN **08 Whole Grains Daily Sales Form Solution.xltx** and **08 Whole Grains Daily Sales 130520.xlsx** if they are not already open.
2. Arrange the two files in side-by-side vertical windows, if they are not already so arranged.
3. In the template window (the one with blank worksheets), group the six worksheets together, and then select cells M22:M45.



#### Troubleshooting

The nature of the error here is that the formula confuses "wheat rolls" with "white rolls," and vice versa. Though you study much more about formulas in the lessons to follow, here all you need to know is that the terms for these pastries are juxtaposed with one another, and you can use Find and Replace to make them switch places.

4. Open the **Find and Replace** dialog box.
5. Set the options so that the search process looks through formulas in the entire workbook.
6. Make sure **Match entire cell contents** is deselected.
7. Click in the **Find what** box, and then type **whiteroll**.
8. Click in the **Replace with** box, and then type **XXXXX**.
9. Click **Replace All**. Some 144 replacements should have been made. Click **OK** to dismiss the notice.
10. Repeat the process, this time replacing **wheatroll** with **whiteroll**.
11. Repeat one more time, replacing **XXXXX** with **wheatroll**. Click **Close**.

12. Ungroup the worksheets in the workbook template.
13. **SAVE** and **CLOSE** the workbook template.
14. Click the **File** tab, and then click **New**.
15. In Backstage, click **Personal**. Double-click the **Whole Grains** folder.
16. Double-click the **Whole Grains Daily Sales Form** Solution template. A new workbook opens with the title "Whole Grains Daily Sales Form1 Solution."
17. **SAVE** the new workbook in the Lesson 8 folder as **08 WG Sales 130520 Solution**.
18. Arrange the two open workbooks to be side-by-side.
19. In the new workbook, open the **Monday** tab.
20. Copy the contents of cells **A22:L45** from the original worksheet, to the new **Monday** worksheet. Cell M46 should read \$453.29 (correct), not \$452.93 (incorrect) as in the original worksheet.
21. Select the **Saturday** worksheet.
22. Select rows **10** through **19**, including the hidden rows. Right-click the selection and click **Unhide**.
23. Change the price for a cinnamon bagel for Saturday to **75¢**.
24. Hide rows **11** through **18** again.

SAVE the **08 WG Sales 130520 Solution** workbook and CLOSE both workbooks. CLOSE Excel.

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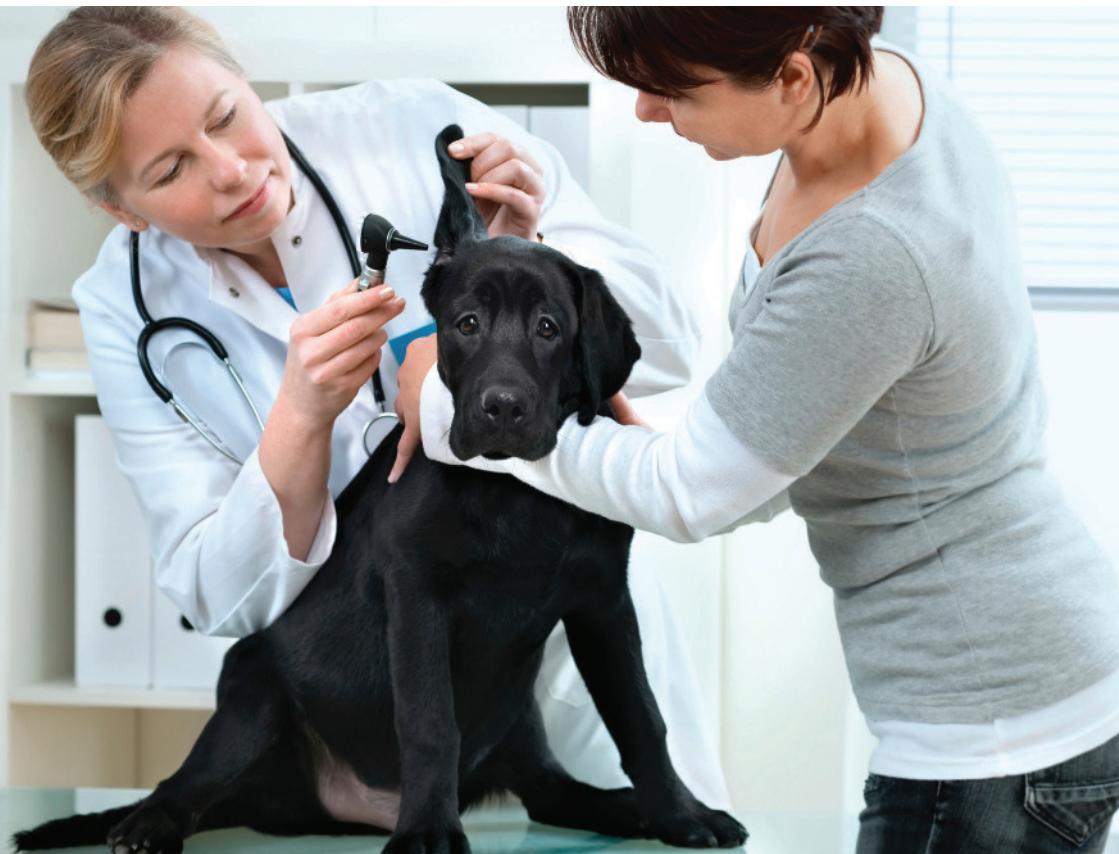
# Working with Data and Macros

## 9

### LESSON SKILL MATRIX

Skills	Exam Objective	Objective Number
Importing Data	Open non-native files directly in Excel.	1.1.4
	Import files.	1.1.3
	Append data to worksheets.	2.1.1
Ensuring Your Data's Integrity	Set data validation.	1.3.8
Sorting Data		
Filtering Data		
Outlining and Subtotaling Data	Create outlines.	2.3.5
	Collapse groups of data in outlines.	2.3.6
	Insert subtotals.	2.3.7

(continued on next page)



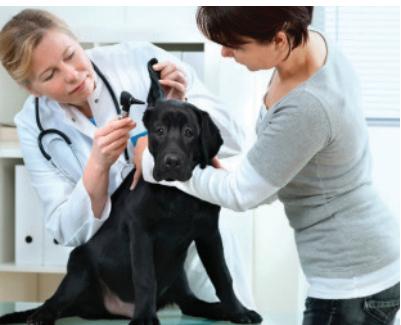
©AlexRaths /iStockphoto

### KEY TERMS

- auto-outline
- AutoFilter
- collapse
- criterion
- data file
- database
- delimiter
- filter
- grouping
- macro
- outline
- outline symbol
- parse
- quick format
- slicer
- subtotal
- table
- validation

## LESSON SKILL MATRIX (*continued*)

Skills	Exam Objective	Objective Number
Setting Up Data in a Table Format	Apply styles to tables.	3.2.1
	Band rows and columns.	3.2.2
	Remove styles from tables.	3.2.4
	Define titles.	3.1.3
	Insert total rows.	3.2.3
	Add and remove cells within tables.	3.1.2
	Filter records.	3.3.1
	Sort data on multiple columns.	3.3.2
	Change the sort order.	3.3.3
	Remove duplicates.	3.3.4
	Move between tables and ranges.	3.1.1
Saving Work with Macros	Assign shortcut keys.	1.4.12
	Record simple macros.	1.4.7
	Manage macro security.	1.4.5



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You've been hired to keep the books at a local veterinary clinic. Its clientele is a bit unusual in terms of bookkeeping. Although the patients have characteristics that your co-workers need to keep track of, none of them are paying customers. Those who pay on your patients' behalf might be responsible for more than one patient at a time.

Although Excel technically is not a database manager program, it's used for database management purposes in more offices than any other program. People appreciate the convenience of keeping individual records aligned by single rows, so everything you need to record about a certain feline or canine patient, for example,

is recorded in a single row. This way, you can have Excel sort an entire database by patients' names or show only certain records whose contents meet criteria that you specify (only the cats, for instance, or only the spaniels) without disrupting the integrity of the database itself or changing the workbook.

## SOFTWARE ORIENTATION

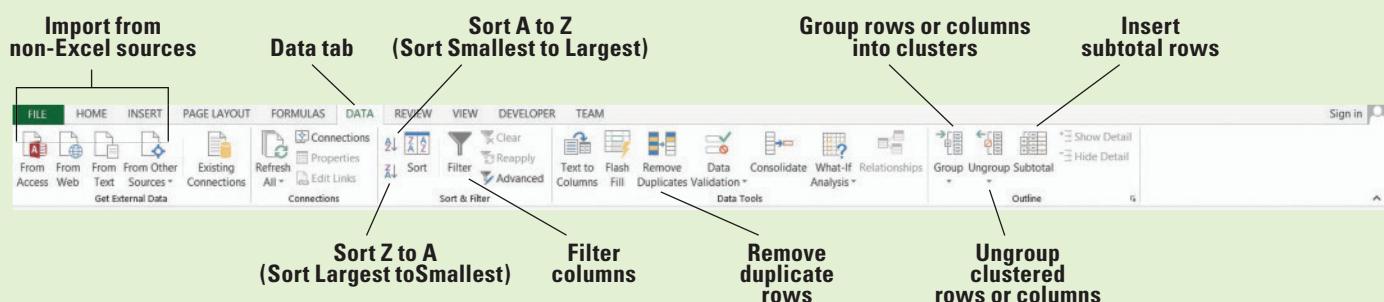
### Data Tab

Most of the exercises in this lesson use the DATA tab. Although spreadsheet programs such as Excel were originally intended to serve as calculation engines, it's often convenient to have recordkeeping and calculation in the same program. Although you might imagine data entry tasks as about as dull and repetitive as a marathon of city council meetings on public access television, Excel actually makes data easy to import from sources other than your own fingertips, and it makes it easy to arrange and manage that data properly once you bring it into a workbook.

**Figure 9-1**

The DATA tab

Figure 9-1 shows the DATA tab on a maximized Excel window, with many of the features you use in this lesson pointed out.



## IMPORTING DATA

### Bottom Line

When you work with a workbook that requires a large amount of data, one thing you can fervently wish for is that the data already exists in some form and that you don't have to type it manually. If the data you need for a workbook is sourced outside of Excel, then what Excel needs is to be able to receive that data in such a way that it can make sense of where cells begin and end and where records begin and end. Even simple text files where values are separated (delimited) by commas can be imported, because commas act like fence posts, and Excel recognizes fence posts. Complex relational databases are comprised of multiple tables, and thus can't be imported directly. So the trick is to be able to open a connection to the database (such as a communications channel) and stream the specific tables you need into Excel, in a manner that Excel can readily **parse** (interpret character-by-character).

### Opening Non-Native Files Directly in Excel

Excel has two main data formats: an older one that was owned and operated by Microsoft and whose files end with the .XLS extension and a newer, XML-based .XLSX format whose specifications have been shared publicly. Because the newer format is public, there are more programs and services now that publish data to a format that Excel accepts. But not all of them do; many services provide data in a basic XML format that Excel can import. In that case, there's no guarantee that the columns will all be aligned properly or that the headings will be in the place Excel expects them to be for a table. The "lowest common denominator" for file compatibility is the .CSV file, which is straight text that uses certain characters, such as commas and quotation marks, as **delimiters**—characters that separate data entries from one another—and that Excel will not interpret as part of a cell entry.

**STEP BY STEP****Open a Non-Native File Directly in Excel**

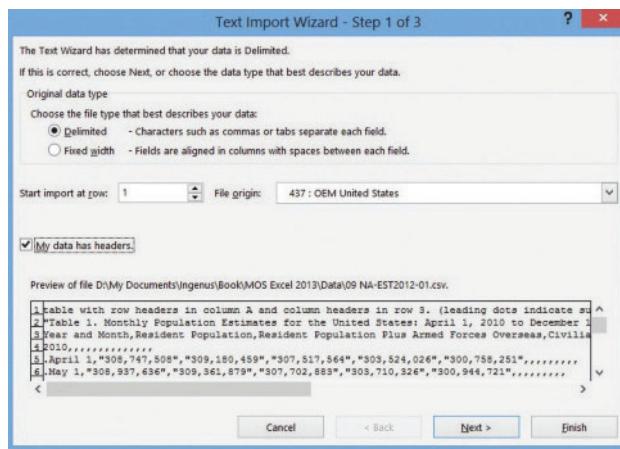
GET READY. Before you begin these steps, LAUNCH Microsoft Excel.



1. If the active workbook is not a new, blank workbook, then click the **FILE** tab. In Backstage, click **New**, and then click the thumbnail marked **Blank workbook**.
2. On the **DATA** tab, in the Get External Data group, click **From Text**.
3. In the Import Text File dialog box, locate and click **09 NA-EST2012-01.csv**. Click **Import**.
4. In Step 1 of the Text Import Wizard, notice the preview at the bottom (see Figure 9-2). This is Excel's best guess, for the moment, as to how the data should be formatted. There are population figures rendered in "quotation marks" with commas between each figure. Here, each comma acts as the delimiter, and it's difficult to judge whether each figure between the commas will be the same length. Under Choose the file type that best describes your data, choose **Delimited**, and select **My data has headers**.

**Figure 9-2**

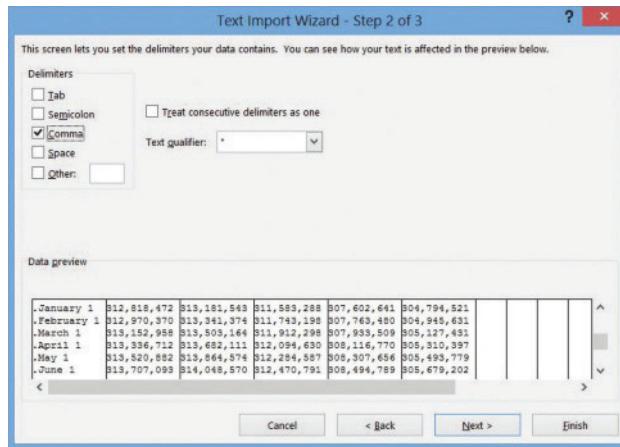
Text Import Wizard, step 1



5. The preview shows the headers starting on row 3. Thus, for the Set import at row option, choose **3**. Click **Next**.
6. In Step 2 of the wizard, shown in Figure 9-3, uncheck **Tab** because the preview does not indicate long spaces between the figures. Check **Comma**. Set Text qualifier to **"** (quotation mark). Scroll down the **Data preview** pane, and notice now that Excel has found the column separations between figures. Click **Next**.

**Figure 9-3**

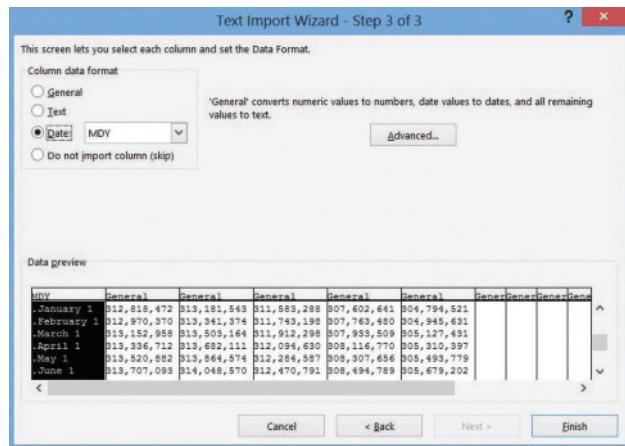
Text Import Wizard, step 2



7. Step 3 of the wizard, shown in Figure 9-4, lets you establish the data type for each discovered column. Click the first column in the **Data preview** pane. Then, under Column data format, click **Date**. Click **Finish**.

**Figure 9-4**

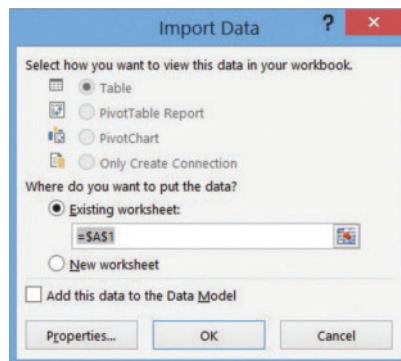
Text Import Wizard, step 3



- 8.** In the Import Data dialog box that appears next (see Figure 9-5), leave Where do you want to put the data? set to **Existing worksheet**. Click **OK**.

**Figure 9-5**

Import Data dialog box



## CERTIFICATION READY? 1.1.4

How do you open a non-native file directly in Excel?

- 9.** Shorten the width of column A to **16**.

- 10.** The worksheet that Excel has generated, shown in Figure 9-6, shows United States population estimates for each month from April 2010 to December 2012. Excel could not make sense of the dates in column A, so it left the data type set to General for most of the cells. However, it did make an error in attempting to convert the year in cell A25. To correct it, begin by deleting rows **2, 12**, and **25**.

**Figure 9-6**

Freshly imported census data worksheet

A	B	C	D	E	F
Year and Month	Resident Population	Resident Population Plus Armed Forces Overseas	Civilian Population	Civilian Noninstitutionalized Population	Household Population
2010					
3. April 1	308,747,508	309,180,459	307,517,564	303,524,026	300,758,251
4. May 1	308,937,636	309,361,879	307,702,883	303,710,326	300,944,721
5. June 1	309,122,451	309,544,899	307,889,928	303,898,353	301,125,879
6. July 1	309,326,225	309,745,660	308,091,141	304,100,547	301,325,995
7. August 1	309,540,608	309,956,485	308,313,027	304,322,798	301,538,796
8. September 1	309,768,270	310,173,518	308,531,330	304,541,466	301,764,876
9. October 1	309,994,453	310,395,556	308,761,399	304,771,900	301,989,477
10. November 1	310,179,397	310,589,914	308,957,140	304,968,006	302,127,839
11. December 1	310,353,742	310,774,403	309,141,425	305,152,656	302,345,602
2011					
13. January 1	310,544,109	310,951,978	309,326,771	305,338,367	302,534,387
14. February 1	310,704,719	311,109,109	309,479,260	305,491,221	302,693,415
15. March 1	310,851,993	311,268,198	309,638,124	305,650,450	302,839,107
16. April 1	311,035,995	311,444,450	309,811,745	305,824,436	303,021,527
17. May 1	311,220,789	311,624,208	309,994,764	306,007,820	303,204,739
18. June 1	311,387,209	311,805,500	310,171,775	306,185,196	303,369,577
19. July 1	311,587,816	312,004,661	310,370,316	306,384,095	303,568,593
20. August 1	311,794,537	312,210,438	310,578,786	306,593,494	303,774,526
21. September 1	312,017,861	312,422,810	310,794,410	306,810,047	303,997,062
22. October 1	312,232,049	312,640,035	311,021,669	307,038,235	304,210,462
23. November 1	312,427,243	312,829,503	311,211,110	307,228,605	304,404,868
24. December 1	312,619,619	313,009,235	311,394,871	307,413,295	304,596,456
2/1/2011					
26. January 1	312,818,472	313,181,543	311,583,288	307,602,641	304,794,521
27. February 1	312,970,370	313,341,374	311,743,198	307,763,480	304,945,631
28. March 1	313,152,958	313,503,164	311,912,296	307,933,509	305,127,431
29. April 1	313,336,712	313,682,111	312,094,630	308,116,770	305,310,397
30. May 1	313,520,882	313,864,574	312,284,587	308,307,656	305,493,779
31. June 1	313,707,088	314,048,570	312,470,791	308,494,759	305,679,202

11. Click cell A2, type April 2010, and press Enter.
12. Drag the fill handle from cell A2 down to cell A34 and release. Excel changes the entries in column A to proper months.
13. Delete rows 35 through 40.
14. SAVE the workbook in the Lesson 9 folder as **09 Monthly Census Data Solution**.

CLOSE the workbook and leave Excel open for the next exercise.

## Getting External Data

In the world of computers, there are databases and data files. Because databases are typically stored in files, a rational question is, “What’s the difference?” A **data file** stores a series of records in a relatively simple format, and Excel is a program that uses data files in this manner. A **database** is a comparatively complex system that can store a large amount of related data, which requires a program to be able to assess and render that data. So when Excel imports data from a database as opposed to a data file (as in the previous exercise), it actually launches a program, begins a communications process with that program, and instructs the program to stream the data it requires.

### Take Note

In this exercise, you use a file from Microsoft Access, although you do not need Access installed on your computer to follow along.

### STEP BY STEP

### Get External Data

#### CERTIFICATION READY?

**1.1.3**

How do you import files?

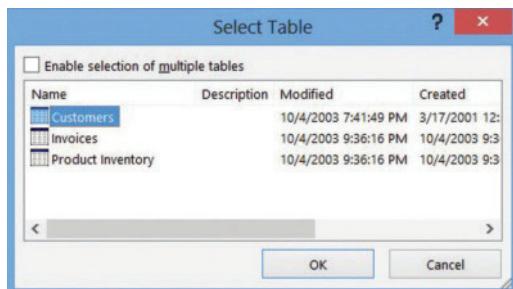


GET READY. LAUNCH Excel if it is not already running.

1. If the active workbook is not a new, blank workbook, then click the FILE tab. In Backstage, click New, and then click the thumbnail marked Blank workbook.
2. On the DATA tab, in the Get External Data group, click From Access.
3. In the Select Data Source dialog box, locate the **09 GMcC Customer contacts.accdb** database file. Select it and click Open.
4. In the Select Table dialog box shown in Figure 9-7, click **Customers** (the table we want to import), and then click OK.

**Figure 9-7**

Select Table dialog box



5. In the Import Data dialog box (refer to Figure 9-5), click Table. Under Where do you want to put the data, click Existing Worksheet and ensure the text box reads =!\$A\$1.
6. Click OK. Excel takes a moment to query the database. Soon, it displays a fully formatted table (see Figure 9-8), complete with AutoFilter buttons in the headers, which you learn more about later in this lesson in “Using AutoFilter.”

**Figure 9-8**

Mismatched, freshly imported XML data

The screenshot shows a Microsoft Excel spreadsheet with data imported from an XML file. The data is displayed in columns A through I. The first few rows of data are as follows:

A	B	C	D	E	F	G	H	I
8	Woo, Kim	7008 Maple Ave.	Edmond	OK	73115	849-1515		
9	Hu, Jim	725 Ash Street	Oklahoma City	OK	73184	975-0115		
10	Woo, Lily	800 Vale Drive	Oklahoma City	OK	73101	290-1024		
11	Loc, Wu	5407 N. Maywood Driv	Del City	OK	73120	257-1025		
12	Woo, Michaela	2141 E. 21st Street	Oklahoma City	OK	73154	855-0124		
13	Wade, Connor	3001 Fox Creek	Norman	OK	73158	345-1048		
14	Whitney, Amaris	2414 Hidden Valley Rd	Del City	OK	73121	257-1005		
15	Waters, Alyce	800 Hill Ct.	Edmond	OK	73159	291-0014		
16	Russell, Mallie	1325 Ritzbey Dr.	Oklahoma City	OK	73139	946-3141		
17	Howe, John	7621 N. 100th Way	Norman	OK	73164	291-0075		
18	Wade, Venessia	1001 Penn H	Norman	OK	73190	345-1001		
19	Scott, Kate	210 Dean Rd.	Oklahoma City	OK	73136	253-1002		
20	Leominster, Carl	5012 Fox Court	Oklahoma City	OK	73101	853-1048		
21	Owners							
22	1_Owners	/x0014_9Owners/Address/_x0014_9Owners/City/_x0014_9Owners/First/_x0014_9Owners/Fis	/x0014_9Owners/Hous	/x0014_9Owners/ID/_x0014_9Owners/Name/_x0014_9Owners/Phon	/x0014_9Owners/Zip/_x0014_9Owners/Phone/_x0014			
23	1_Owners	12 W. 35th	Rita	1	1	1-Arcade	OK	
24	1_Owners	4101 N. 100th	Oklahoma City	2	2	2-Arcade	975-0125	OK
25	1_Owners	9801 W. Alameda Ave.	Midwest	3	3	3-Ashkenazi	975-0009	OK
26	1_Owners	9420 Main, Apt. B	Oklahoma City	4	4	4-Broussard	946-7878	OK
27	1_Owners	14029 Senator Way	Raintree	5	5	5-Damir	844-9977	OK
28	1_Owners	1901 Cloud St.	Oklahoma City	6	6	6-Eccles	946-1854	OK
29	1_Owners	1022 Pine Drives	Shady	7	7	7-Echart	849-5125	OK
30	1_Owners	1120 N. 10th	Maple	8	8	8-Edwards	571-0107	OK
31	1_Owners	2141 11th Street	Maple	9	9	9-Edwards	872-1894	OK
32	1_Owners	4904 Wonder Wood Lane	Kabotina	10	10	10-Flynn	542-0021	OK
33	1_Owners	987 Aspen Way	Edmond	11	11	11-Hanslow	257-1849	OK
34	1_Owners	8173 Maple Ave.	Frolik	12	12	12-Hassan	722-1487	OK
35	1_Owners	225 Ash Street	Oklahoma City	13	13	13-Hu	975-2415	OK
36	1_Owners	2141 E. 21st Street	Mikala	14	14	14-Jones	875-0214	OK

### 7. SAVE the workbook in the Lesson 9 folder as **09 2005 Customers Solution**.

CLOSE the workbook and leave Excel open for the next exercise.

## Appending Data to a Worksheet

After you import data from another format or database into a worksheet, you'll probably spend a good deal of time reconciling that data with existing records. In the previous two exercises, you were lucky enough to import data into blank worksheets. In a more real-life situation, you'll bring data from other sources into a full worksheet and make the effort to make it fit somehow.

### STEP BY STEP

### Append Data to a Worksheet

GET READY. OPEN the **09 Owners.xls** workbook for this lesson.



1. Click cell **A21**.
2. On the DATA tab, in the Get External Data group, click **From Other Sources**, and then click **From XML Data Import**.
3. In the Select Data Source dialog box, locate and select the **09 2010\_Owners.xml** data file. Click **Open**.
4. In the Import Data dialog box, click **Existing worksheet**, and then click **OK**. Although a list of customers is appended to the end of the worksheet, the columns don't line up, as Figure 9-9 clearly indicates. This is typical of appended data. A dialog marked Error in XML might appear at this point. If so, click **OK** to dismiss the dialog box and proceed.

### CERTIFICATION READY? 2.1.1

How do you append data to a worksheet?



### Troubleshooting

In the course of history, the folders where old data files used to reside may cease to exist. This is indeed the case with the original XML file from which you imported data into the worksheet. Some versions of the Microsoft XML parser will see this as an "error," and others will not. Any number of factors may contribute to which XML parser your PC actually has. In either case, it isn't really an error, and you don't need to worry about it.

**Figure 9-9**

Mismatched, freshly imported XML data

The screenshot shows an Excel spreadsheet titled "09\_Car\_Owners.xlsx" with the tab "Compatibility Model - Excel". The data consists of 30 rows of information, each containing 11 columns labeled A through K. The data is imported from XML, as indicated by the file path in the title bar. The first few rows show the following data:

A	B	C	D	E	F	G	H	I	J	K
8. Wink, Kim	7905 Maple Ave.	Edmond	OK	73115	849-1515					
9. Hu, Jim	225 Allen Street	Oklahoma City	OK	73194	975-2415					
10. Woo, Lily	807 Vale Drive	Oklahoma City	OK	73101	290-1024					
11. Lee, Wu	9027 Pecan Ridge Drive	Oklahoma City	OK	73100	237-1221					
12. Jones, Maria	2141 E. 21st Street	Oklahoma City	OK	73104	570-1214					
13. Walker, Connie	5281 Fair Oaks	Moore	OK	73150	354-1848					
14. Whitney, Adrienne	2414 Hidden Valley Rd.	Okl City	OK	73121	257-0500					
15. Waters, Alyce	608 Hill Ct.	Edmond	OK	73159	291-0014					
16. Russell, Nedra	1325 Ralchay Dr.	Oklahoma City	OK	73139	946-2141					
17. Davis, Jonie	10th Heaven Way	Midwest City	OK	73154	291-3876					
18. Johnson, Venesia	1001 Main St.	Norman	OK	73101	423-1001					
19. Scott, Kato	218 Dean Rd.	Oklahoma City	OK	73136	253-1495					
20. Leonhardt, Carl	8012 Fun Court	Oklahoma City	OK	73101	853-1948					

5. To correct the problem, begin by moving the first names from cell range **E23:E75** to **B23:B75**. Overwrite the existing contents in column B.
6. Move the last names from cell range **H23:H75** to **A23:A75**. Overwrite the existing contents in column A.
7. Repeat the process for the states in column **J** that should be in column **E**, the ZIP codes in column **K** that should be in column **F**, and the phone numbers in column **I** that should be in column **G**.
8. Delete columns **H** through **L**.
9. Delete rows **21** and **22**.
10. Replace all 11 instances of **Dell City** in column D with **Del City**.

SAVE the workbook in the Lesson 9 folder as **09 Car Owners Solution.xlsx**. CLOSE the workbook and leave Excel open for the next exercise.



## Workplace Ready

### WORKING WITH DATABASES

The most commonly distributed definition for the word “database” is “an organized collection of data.” Technically, that’s wrong. If this definition was correct, any book could be a database because books contain data—even blank books.

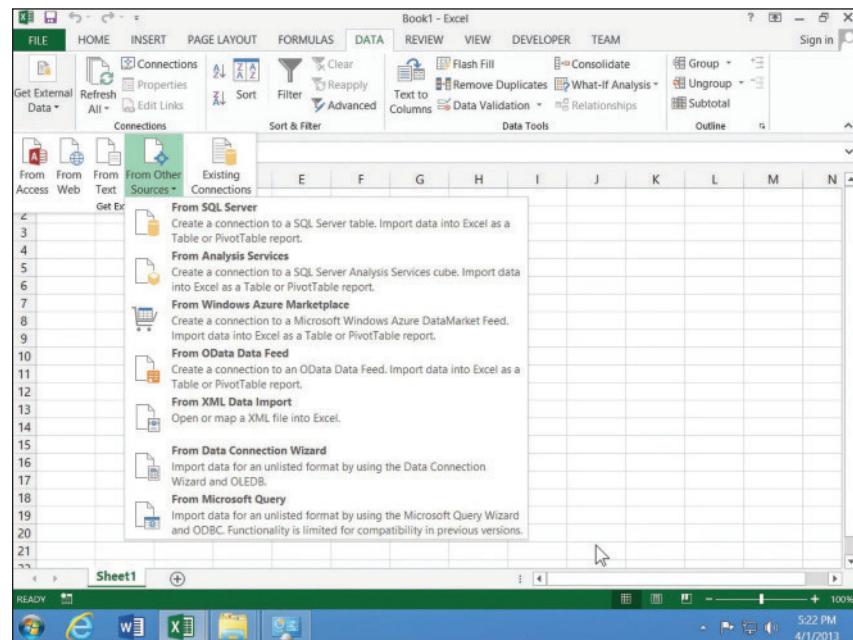
The reason why this matters is because you will likely acquire data from multiple sources for use in the worksheets you produce. To be accurate, a database is anything you can use as a *source* for data. When you import data from a database into an Excel spreadsheet, if that data is stored by a relational database manager, it might not actually exist as a file yet. So the file you “import” into Excel might communicate with the database manager to produce the data that ends up appearing in your worksheet.

This is important, because a financial database manager usually produces information in real-time—meaning, as close to “right now” as possible. So you might import data into a worksheet that’s actually accurate up-to-the-second.

However, depending on how the database is set up, it might produce separate files that serve as “snapshots” of the data’s state for a given point in time. When you import this type of data, you need to know if it’s old and just how old it is. On occasion, you might not actually be able to im-

port files because the database manager program has locked them to prevent inadvertent loss of data. In these situations, you might need to have the person overseeing the database export a separate file for you to import. While you're at it, you can ask for that export file to be in a regular format, such as comma-separated values (CSV) or even a worksheet format such as Excel's old XLS.

The example you used in “Getting External Data” involves a kind of snapshot file produced by Microsoft Access, a database manager that’s part of some versions of Office. In a real-world setting, even though such a file exists, it might not always be available, for the reasons just explained. In these cases, you need to ask for help—perhaps for someone in the IT department to produce an export file and meet you halfway.



## ENSURING YOUR DATA’S INTEGRITY

### Bottom Line

It isn’t obvious on the surface, but an Excel workbook is actually a kind of program in itself. You don’t just feed it data, run off a few formulas, and tabulate the result. You actually can create rules for each workbook, which Excel might enforce, helping you and others to enter the right data properly. When typing in new data from paper—especially several records at once—it’s easy for anyone to type the wrong digits or characters, especially in a field where a single character denotes a *type*, such as a senior citizen or a child, or such as a dog or a cat. Quickly, ask yourself this: Should “C” in a vet clinic stand for “cat” or “canine?” **Validation** ensures data gets entered correctly, before it gets processed incorrectly. Excel’s data validation tools can help you set up rules that keep you or anyone else from entering invalid or unusable data, or from failing to enter data when it’s required.

### Restricting Cell Entries to Certain Data Types

Perhaps the most common form of rule you’ll create for Excel workbooks will set certain expectations for data being typed in. For example, in North America (where local business clients will tend to reside anyway), a telephone area code has three digits. You can set up a rule that pings the user whenever he types a two- or four-digit code by mistake. The user may then respond by dismissing the message and starting over, or cancelling altogether if the problem is that the user didn’t mean to type anything into this cell in the first place.

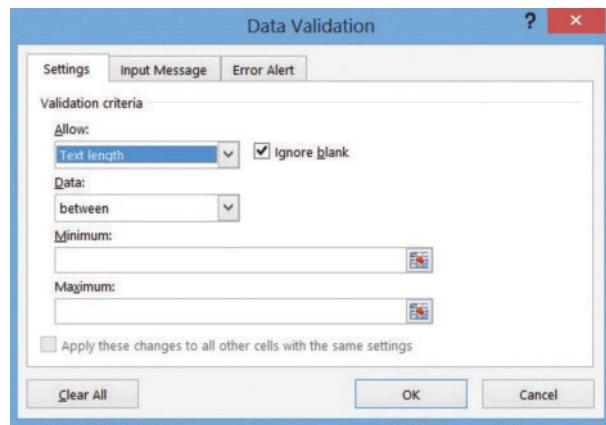
**STEP BY STEP****Restrict Cell Entries to Certain Data Types**

GET READY. OPEN the **09 Vet Clinic Patients** workbook for this lesson.

1. Click the **FILE** tab and select **Save As**. SAVE the workbook in the Lesson 9 folder as **09 Vet Clinic Patients (Active) Solution**.
2. Freeze rows **1** through **5** in both worksheets in the workbook.
3. In the Client list worksheet, select column **L** (Area Code).
4. On the **DATA** tab, in the Data Tools group, click **Data Validation**. The Data Validation dialog box opens.
5. Click the **Settings** tab.
6. In the Allow list box, choose **Text length**. This is the first step in the creation of a rule governing how many characters each new entry should contain. The dialog box should now appear as depicted in Figure 9-10.

**Figure 9-10**

Set up validation rules for input data

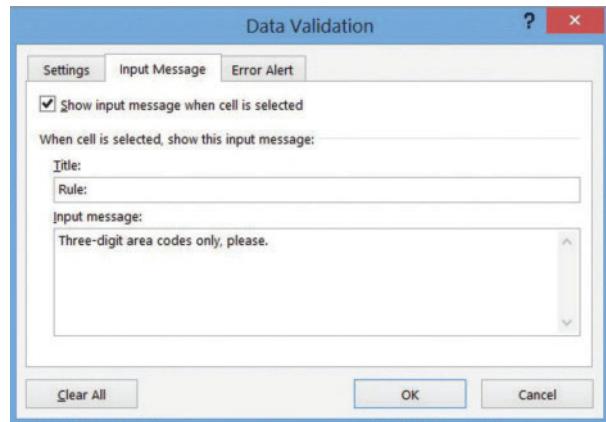

**CERTIFICATION  
READY? 1.3.8**

How do you set data validation?

7. In the Data list box, choose **equal to**.
8. Click the **Length** box and type **3**.
9. Click the **Input Message** tab. This tab displays a ScreenTip whenever you select a cell in this specially validated area.
10. Click the **Title** box and type **Rule**:
11. Click the **Input message** box and type **Three-digit area codes only, please**. The Data Validation dialog box should now appear as shown in Figure 9-11.

**Figure 9-11**

Have Excel notify the user about your validation rule



12. Click the **Error Alert** tab. Excel notifies a user who missed your ScreenTip that the data he has entered is invalid.
13. Click the **Title** box and type **Data Entry Error**.
14. Click the **Error message** box and type **Only three-digit area codes are recognized**. This message is displayed in a dialog box whenever an invalid entry is made in column L. The dialog box should now appear as shown in Figure 9-12.

**Figure 9-12**

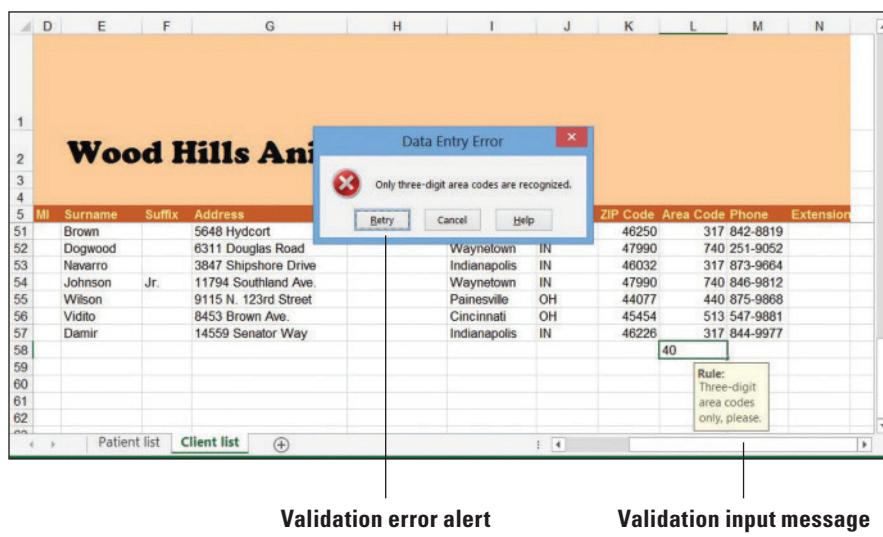
Set up a warning for when the validation rule is violated.



15. Click **OK**.
16. To test the new validation rule, click cell **L58**. You should see the notification message you typed into the Input Message tab.
17. Type **40** and press **Enter**. Excel displays an alert dialog box with the message you created (see Figure 9-13).

**Figure 9-13**

Worksheet with validation rule enforced



18. Click **Cancel**. The partial entry in cell L58 is erased.

PAUSE. SAVE the workbook and leave it open to use in the next exercise.

#### Take Note

Excel's validation rules pertain to only new data as you enter it into the workbook, not to data that existed in the workbook prior to creating the rules. Don't rely on validation rules to correct errors that might already exist, but to catch any new errors that might arise.

## Allowing Only Specific Values to Be Entered in Cells

A typical piece of information you'll find in a database is often a single letter that represents a characteristic, such as gender or political party affiliation or the work shift to which one is assigned. In data entry, it's easy for someone to slip and enter an invalid character. If that error isn't caught and the person who entered the data is replaced, would her replacement be able to rectify it? You can preempt events like this by building a rule that restricts entry to a handful of valid characters.

### STEP BY STEP

### Allow Only Specific Values to Be Entered in Cells

GET READY. USE the workbook from the previous exercise.

1. Click the **FILE** tab and select **Save As**. SAVE the workbook in the Lesson 9 folder as **09 Vet Clinic Patients (Active) Solution 2**.
2. Click the **Patient list** tab.
3. Select column **D**.
4. On the **DATA** tab, in the Data Tools group, click **Data Validation**.
5. In the Data Validation dialog box, click the **Settings** tab.
6. In the Allow list box, choose **List**. The Source box appears at the bottom of the dialog box.
7. Click the **Source** box. Type **M,F,N** being careful to include the commas.
8. Uncheck the **Ignore blank** box.
9. Click the **Input Message** tab. Click the **Input message** box and type **Male, Female, or Neutered**.
10. Click **OK**. Now anyone entering a new patient into the database must specify the animal's gender.
11. Select column **E** (Owner #).
12. In the Data Tools group, click **Data Validation**.
13. Click the **Settings** tab. In the Allow list box, click **List**.
14. On the right side of the Source box, click the **Collapse Dialog** button.
15. With the Data Validation dialog box collapsed, click the **Client list** worksheet tab.
16. Select column **A** (Client #).
17. At the end of the Source box, click the **Expand Dialog** button. The full dialog box returns, and the Source box should now read **='Client list'!\$A:\$A**.
18. Unselect the **Ignore blank** and **In-cell dropdown** boxes.
19. Click the **Error Alert** tab. Choose **Warning** from the Style box.
20. In the Error message box, type **Owner must be the number for a pre-existing client**.
21. Click **OK**. Now the Owner # column may contain only numbers for clients who appear in the Client # column of the Client list worksheet.
22. To make sure your new validation rules are working, in the Patient list worksheet, at the bottom of the list, click cell **A58** and attempt to type the following data:  
**Murdock Dog Rottweiler B 61**
23. After you attempt to enter **B** into column D, respond to the error dialog box by clicking **Retry** and by typing **M**.
24. After you attempt to enter **61** into column E, respond to the error dialog box shown in Figure 9-14 by clicking **No** and typing **31**.

**Figure 9-14**

Excel attempts to enforce a validation rule.



PAUSE. SAVE the workbook and leave it open to use in the next exercise.

### Take Note

It's still feasible for an invalid value to remain in a worksheet after the user has been warned that it's invalid. For example, in the previous step if you were to click Yes instead of No, the value 61 would remain in column E, even though there is no client numbered 61 in column A of the Client list worksheet. Conceivably, this way you can purposefully enter a new canine patient into the list without an owner, if you intend to add the owner's information later.

## Removing Duplicate Rows from a Worksheet

In many databases, it's important that each record (each row of an Excel database table) is unique. If an entry appears twice, Excel might treat them as separate entries even if they somehow (especially by accident) contain identical information. The difficulty then comes when you try to reconcile any other records or subsequent data that might refer to either of these duplicate entries. As a means of cleansing your database, you can have Excel search for duplicate entries and purge them before too much damage is done.

### STEP BY STEP

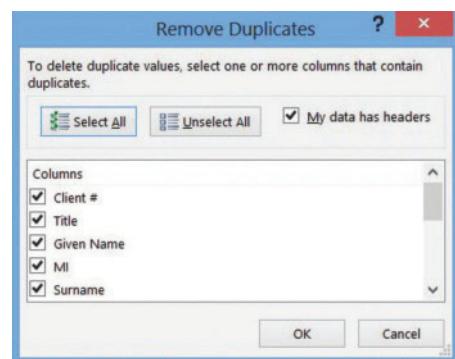
### Remove Duplicate Rows from a Worksheet

GET READY. USE the workbook from the previous exercise.

1. SAVE the current workbook as **09 Vet Clinic Patients (Active) Solution 3**.
2. Click the **Client list** worksheet tab.
3. Click cell **A58** and in row 58, type the following data in the appropriate columns:  
**Mrs. Mary Jane Brink 704 Fairway Drive Cincinnati OH 255-1655**
4. Select the cell range **A5:N58**.
5. On the DATA tab, in the Data Tools group, click **Remove Duplicates**. The Remove Duplicates dialog box appears (see Figure 9-15).

**Figure 9-15**

Remove Duplicates dialog box



6. In the Columns list, remove the check beside **Client #**. If duplicate names and addresses appear in the list, it's likely their client index numbers were not duplicated.
7. Leave the **My data has headers** box checked. This way, Excel won't treat row 5 as though it contains data.
8. Click **OK**. Excel responds with a dialog box stating one duplicate value set (the one you just entered) was removed.
9. Click **OK** to dismiss the dialog box. Note the second (lowermost) instance of the duplicate entry was removed, from row 58.

PAUSE. SAVE the workbook and leave it open to use in the next exercise.

## SORTING DATA

### Bottom Line

After you enter data into a data range or, as you see later in this lesson, a formal database table, the number of the row each record appears on doesn't matter at all. In fact, it's important for you to remember that data entries in Excel are not indexed by their row numbers, because they're subject to change. Sorting a data range helps *you* to locate the precise data you need. In a few respects, it can also help Excel to look up certain data for inputs into formulas (see Lesson 5), but for the most part sorting is for your benefit. You might want, for example, to keep people sorted in a table by their surname rather than some arbitrary customer number you won't remember. So when you enter a new customer whose surname begins with something earlier than "Z," you might find it easier to enter the name at the bottom of the list, and then resort alphabetically. This way, you don't have to manually insert a blank row in the middle of the worksheet, at the appropriate alphabetical location.

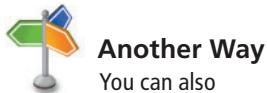
### Sorting Data on a Single Criterion

You've probably heard the word "criteria" more often than its singular form, **criterion**. Both words relate to elements that are referred to in the course of executing a function. For instance, the White Pages of a telephone directory is sorted by phone owners' last names (or rather, in this more culturally expansive society, by their surnames). The surname is one criterion of the sort. Because many people share the same surname, lists of surname-sharing phone owners are then sorted by their first names (given names), and then by their middle initials when they're used. This leads to three different criteria for such a sort. When individuals in a database are indexed by number, however, and that number is guaranteed to be unique, it forms a single criterion for a common sort operation.

### STEP BY STEP

### Sort Data on a Single Criterion

GET READY. USE the workbook from the previous exercise.



#### Another Way

You can also quickly sort the data in a range in alphabetical order, even without selecting the entire range first, by right-clicking one cell in the column you want to sort, clicking Sort, and then clicking Sort A to Z (or Sort Smallest to Largest).

1. SAVE the current workbook as **09 Vet Clinic Patients (Active) Solution 4**.
2. In the **Patient list** worksheet, click cell **E6**. Note this is the top row of the Owner # column and its entries are all numerical.
3. Hold the **Shift** key down while clicking cell **A58**. This selects the entire range you wish to sort.
4. On the DATA tab, in the Sort & Filter group, click the **Sort Smallest to Largest** button (with A on top of Z, and an arrow pointing down). The list is now sorted in ascending numerical order (despite the presence of the alphabet on the button) by Order #, which was the first column you clicked in when selecting the range.
5. Click cell **A6**.
6. Hold the **Shift** key down while clicking cell **E58**.
7. Click the sorting button again, whose ScreenTip is now the **Sort A to Z** button (because you're sorting alphanumeric text). This time, the list is sorted by Patient Name, and

again, the first column you clicked in when selecting the range. Murdock the Rottweiler, which you previously added to row 58, now appears on row 45.

PAUSE. SAVE the workbook and leave it open to use in the next exercise.

**Take Note** The Sort A to Z button (also known as Sort Smallest to Largest) and Sort Z to A button (also known as Sort Largest to Smallest) assume that the column you wish to use as your sorting criterion is the one that contains the active cell. In selecting a range, whether you hold down Shift to select the opposite corner (as you did in this exercise) or whether you drag the pointer from one corner to the opposite corner, the (or Sort Smallest to Largest) the cell that you clicked on first.



### Troubleshooting

Before sorting a range, make sure you select the entire range first, including the rightmost column(s). Excel leaves any contents outside the selected sort range exactly as they are, which leaves you with out-of-order contents should you fail to select the entire width of the range.

## Sorting Data on Multiple Criteria

A proper database containing records of people divides each element of their names into, at the very least, last and first names, and preferably includes optional elements such as middle initials and prefixes and suffixes. For this reason, any time you sort a database, range, or table by names, you want to sort by multiple criteria.

### STEP BY STEP

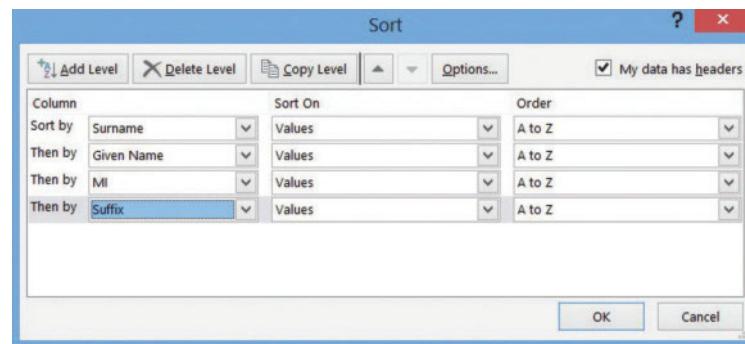
### Sort Data on Multiple Criteria

GET READY. USE the workbook from the previous exercise.

1. Click the **Client list** tab.
2. Select the range **A5:N57**.
3. Name the range **Clients**.
4. On the DATA tab, in the Sort & Filter group, click **Sort**. The Sort dialog box appears.
5. In the Sort by list box, under Column, choose **Surname**.
6. Click **Add Level**.
7. In the Then by list box that appears, choose **Given Name**.
8. Click **Add Level**.
9. In the next Then by list box, choose **MI** (middle initial).
10. Click **Add Level** again.
11. In the next Then by list box, choose **Suffix**. The dialog box should now appear as depicted in Figure 9-16.

**Figure 9-16**

Sort dialog box



12. Leave **My data has headers** checked, so that Excel won't treat the headers row as a data entry.

13. Click **OK**. The clients list is now sorted alphabetically, with people sharing the same surname sorted alphabetically by first name. Although the client numbers appear all out of sort, the data is unchanged and the database itself retains its full integrity.

PAUSE. SAVE the workbook and leave it open to use in the next exercise.

## Sorting Data Using Cell Attributes

In Lesson 6, you saw how Excel can apply special formatting to cells based on their ascertained contents (for example, shading a temperature column extra-red when the number climbs above 90 degrees). Excel is capable of sorting records based on the conditional formatting that is applied to their cells. This is important because Excel does not have a “conditional sort” feature, where you create a rule or a formula that Excel evaluates to group or arrange rows. Instead, you create rules that apply specific formats or graphics to cells based on their contents. Then Excel can sort and group those records whose cells have these special formats applied to them.

### STEP BY STEP

### Sort Data Using Cell Attributes

GET READY. USE the workbook from the previous exercise.

1. On the Patient list worksheet, select column **E**.
2. Right-click the column, and then click **Insert** in the shortcut menu.
3. With column **E** selected, on the DATA tab, in the Data Tools group, click **Data Validation**.
4. In the Data Validation dialog box, click **Clear All**. Click **OK**.



### Troubleshooting

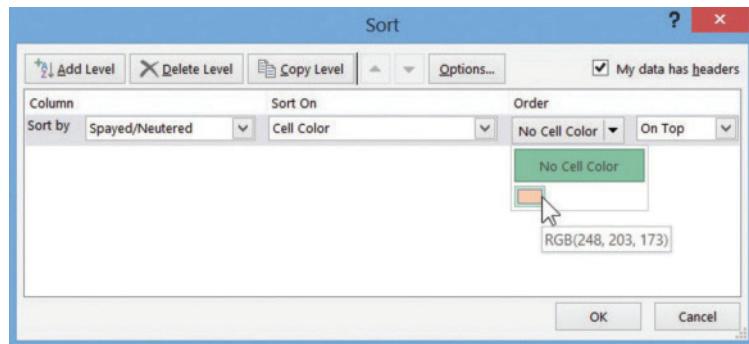
When creating a new column to the right of one governed by a data validation rule, the new column acquires that same rule even if it's intended for a different purpose. To clear this rule, select the new column, bring up the Data Validation dialog box, and click Clear All as demonstrated previously.

5. Click cell **E5** and type **Spayed/Neutered**.
6. In column E, type **S** for the following row numbers: 7, 22, 23, 26, 35, 38, 47, and 51.
7. In column E, type **N** for the following row numbers: 6, 8, 9, 10, 11, 13, 14, 16, 17, 18, 20, 21, 25, 28, 30, 31, 32, 33, 36, 37, 39, 42, 43, 44, 46, 48, 49, 50, 53, 55, 56, 57, and 58.
8. Select column **E**.
9. On the DATA tab, in the Data Tools group, click **Data Validation**.
10. In the Data Validation dialog box, click the **Settings** tab. Under Allow, choose **List**.
11. In the Source box, type **N,S**.
12. Click the **Input Message** tab. In the Input message box, type **S = Spayed, N = Neutered**. Click **OK**.
13. Select the range **E6:E100**. On the HOME tab, in the Styles group, click **Conditional Formatting**. Click **New Rule**.
14. In the New Formatting Rule dialog box, choose **Format only cells that contain** in the Select a Rule Type list.
15. In the list box, under Format only cells with, choose **No Blanks**.
16. Click **Format**.
17. In the Format Cells dialog box, click the **Fill** tab. Choose the sixth color swatch from the left in the third row. Click **OK**.
18. Click **OK**. Now both spayed and neutered animals should appear shaded.
19. Select the range **A5:F58**. Name the range **Patients**.
20. On the DATA tab, in the Sort & Filter group, click **Sort**.
21. In the Sort dialog box, in the Sort by list, choose **Spayed/Neutered**.
22. In the Sort On list, choose **Cell Color**.

23. Click the down arrow next to **No Cell Color**. As Figure 9-17 shows, the list box that appears shows only those colors that are actually in use for conditional formatting—in this case, only one swatch. Click the color swatch.

**Figure 9-17**

Sort dialog box showing conditional format color choice



24. Click **OK**. The sorted worksheet should now appear as shown in Figure 9-18. All the “N” and “S” animals are grouped together at the top, with the two types mingling among each other. All the non-operated-on animals are bunched toward the bottom.

**Figure 9-18**

Worksheet with conditional format-based sort applied

Wood Hills Animal Clinic					
Patient Name	Cat or Dog?	Breed	Sex	Spayed/ Neutered	Owner #
Nikki	Cat	DSH	F	N	4
Pearl	Dog	Pug	F	S	8
Pyewackett	Cat	DSH	M	N	51
Rahjah	Cat	Persian	M	N	50
Rayna	Dog	Great Dane	F	N	11
Sagwa	Cat	Siamese	F	S	47
Shamrock	Dog	Labrador Retriever	M	N	20
Snowball	Dog	Bichon Frise	M	N	21
Spice Cat	Cat	Siamese	F	N	13
Tamami	Dog	Akita Inu	F	N	45
Wheatley	Dog	Lhasa Apso	M	N	49
Bogart	Cat	British SH	M		48
Demi	Dog	Newfoundland	F		34
Gizmo	Dog	Yorkshire Terrier	M		17
Hazel	Cat	DSH	F		37
Kahlua	Cat	Russian Blue	F		38
Kayto	Cat	Siamese	F		43
Kwanzaa	Cat	DSH	M		34
Mai Tai	Cat	Himalayan	M		42
Maimoto	Cat	Korat	M		39

PAUSE. SAVE the workbook and leave it open to use in the next exercise.



### Troubleshooting

Any table you intend for Excel to sort must not contain merged cells (see Lesson 6). For Excel to be able to exchange cell contents between positions evenly, each row must have an identical number of cells. Each of the cells in a column may be formatted differently, though their widths may not vary.

## FILTERING DATA

### Bottom Line

When you search for information online, what you expect to happen is for the search engine to return the most relevant data to your search at the top of the list. Similarly with any database, when you make a request or a query for just the records that meet particular criteria, you expect to

see only the relevant data, and for irrelevant or non-matching data to be filtered out. With Excel, there's a way for you to formally specify the boundaries of your database table—to say, “*This part of my worksheet is to be treated like a database*”—and to then have Excel **filter** out just those rows that don't pertain to what you're searching for. This does not change the database, and you don't delete any rows with a filter. You just hide them temporarily.

## Using AutoFilter

An **AutoFilter** is the quickest means for you to set up a table so that it displays only rows that meet simple criteria (for example, just the clients who live in-state, or just the clients who have signed up for monthly newsletters). If the criteria for your search involves information that is readily assessable through a simple read of the existing data in the cells, you can use an AutoFilter to set up your search with very little trouble. There are ways for you to set up more complex, advanced filters that replicate data to a separate location (often a new worksheet) using advanced criteria based on formulas. But for simple assessments of the data, an AutoFilter requires much less effort. This converts the headings row of your table into a set of controls, which you then use to choose your criteria and select the data you want to see.

### STEP BY STEP

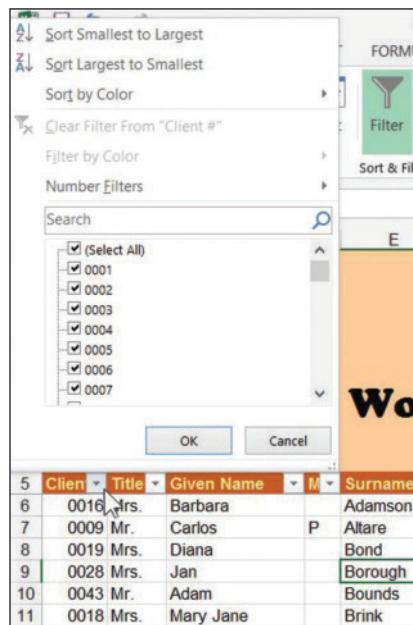
### Use AutoFilter

GET READY. USE the workbook from the previous exercise.

1. SAVE the current workbook as **09 Vet Clinic Patients (Active) Solution 5**.
2. Click the **Client list** worksheet tab. In the Name box, type **Clients** and press **Enter**. Excel highlights the data range for the Clients table.
3. On the DATA tab, in the Sort & Filter group, click **Filter**. Excel adds down arrow buttons to the field names in all of the columns in the list.
4. Click the down arrow beside the **Client #** heading in column A. Excel displays the AutoFilter menu shown in Figure 9-19.

**Figure 9-19**

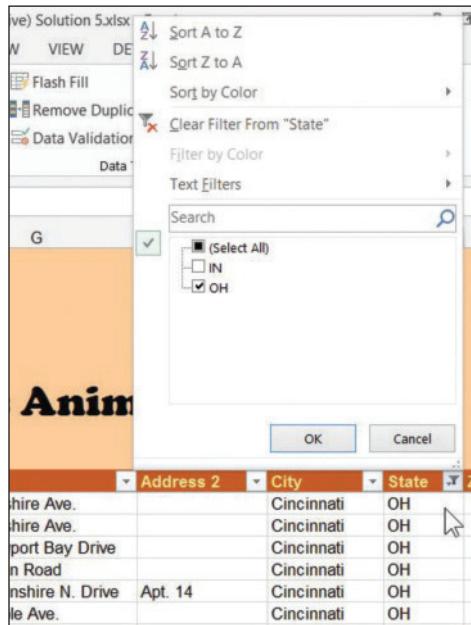
AutoFilter menu for a numeric column



5. To sort the table by client number, click **Sort Smallest to Largest**. This gives you a shortcut for sorting that bypasses the menu.

6. To show just the clients with addresses in Ohio, click the down arrow beside **State**. In the AutoFilter menu that appears (shown in Figure 9-20), uncheck the **(Select All)** box to clear all check boxes, and then check **OH** and click **OK**.

**Figure 9-20**  
AutoFilter menu for a text column



PAUSE. SAVE the workbook and leave it open to use in the next exercise.

When an AutoFilter is active, so that you see filtered results rather than the complete table, Excel applies special notation to the AutoFilter buttons and to the row numbers. As Figure 9-21 shows, the button for the column used in the sort now contains a long up-arrow, whereas the button for the column used in the filter contains a funnel symbol, like the thing you pour motor oil through.

**Figure 9-21**  
Symbols in a filtered table

Wood Hills Animal Clinic																				
Clien	-	Title	-	Given Name	-	M	Surname	-	Suffix	-	Address	-	Address 2	-	City	-	State	-	ZIP Code	-
9	0004	Mr.	Chu	Y	Lee		Nguyen				5821 Wishire Ave.				Cincinnati	OH	45240			
10	0005	Mrs.	Jennifer		Flynn						9876 Wishire Ave.				Cincinnati	OH	45240			
12	0007	Mrs.	Betty		High						7543 Newport Bay Drive				Cincinnati	OH	45250			
16	0011	Mr.	Chu Gi		Reed						8794 Dean Road				Cincinnati	OH	45240			
17	0012	Mrs.	Liz		Hassan						7554 Ballinshire N. Drive	Apt. 14			Cincinnati	OH	45254			
18	0013	Mr.	Eram								8123 Maple Ave.				Cincinnati	OH	45250			
21	0016	Mrs.	Barbara								7770 Dean Road				Cincinnati	OH	45240			
22	0017	Mrs.	Corrine	C	Walters						3281 Fen Court				Cincinnati	OH	45250			
23	0018	Mrs.	Mary Jane		Brink						704 Fairway Drive				Cincinnati	OH	45250			
26	0021	Mr.	Shamir		Lewis	Jr.					11684 Bay Colony Drive				Painesville	OH	44077			
33	0028	Mrs.	Jay		Borough						7556 Hilltop Way				Cincinnati	OH	45254			
39	0034	Ms.	Suzanne		Punch						9114 Cimmebar Drive				Painesville	OH	44077			

Also, notice the row numbers are colored blue and are not consecutive. If you look closely, you'll see that where nonmatching rows are hidden, Excel puts a double-border between the numbers for matching rows—for instance, between rows 18 and 21 and between 47 and 55.

## Creating a Custom AutoFilter

A custom AutoFilter uses a rule that you create, instructing Excel how to evaluate the entries in each row. The result of that evaluation determines whether rows are displayed or filtered out. With a simple AutoFilter, Excel looks for contents based on actual samples from the column. For example, with the previous task, Ohio (OH) and Indiana (IN) were choices because both were featured in the State column; no other states were listed. By contrast, with a custom AutoFilter, you can devise a rule instructing the worksheet to display only records whose values in one given column are above or below a certain amount. Essentially, your rule tells Excel to compare each value in the column against something else. Whether that value is displayed depends on the terms of the comparison—is it equal? Higher? Lower? Is it among the ten highest or lowest? The custom AutoFilter is among Excel’s most powerful tools.

### STEP BY STEP

### Create a Custom AutoFilter

GET READY. USE the workbook from the previous exercise.

1. Insert a new column into the Patient list worksheet, between the existing columns **D** and **E**.
2. Clear the validation rules from the new column **E**.
3. Add the title **Hepatitis inoculation** to row 5.
4. Type the following dates into the cells shown:  
**E9**    1/18/2012  
**E12**    8/16/2011  
**E14**    5/15/2012  
**E19**    3/1/2009  
**E23**    10/19/2010  
**E27**    7/5/2012  
**E33**    2/2/2011  
**E38**    8/15/2012  
**E39**    7/14/2011  
**E44**    9/1/2012
5. Select the **Patients** data range. The range should have automatically stretched to include the new column.
6. On the DATA tab, in the Sort & Filter group, click **Filter**.
7. Click the down arrow beside **Hepatitis inoculation**. In the menu, click **Date Filters**, and then click **Custom Filter**. The Custom AutoFilter dialog box opens.
8. In the first list box just below Hepatitis inoculation, choose **is before**. In the box to the right, type **1/1/2012**.
9. Click the **Or** button between the two rows of list boxes.
10. In the second list box below Or, choose **equals**. Leave the list box blank (literally meaning “blank” or “nothing”). The dialog box should now appear as depicted in Figure 9-22.

**Figure 9-22**

Custom AutoFilter dialog box



11. Click **OK**. After the dialog box disappears, Excel filters out all entries in the patient list where the patient is known to have had a hepatitis inoculation in 2012 or later. What

remains are both the animals known to have been inoculated in 2011 or earlier, or whose inoculation dates are not known.

12. Click the filter button beside Hepatitis inoculation again. In the menu, click **Date Filters**, and then click **Custom Filter**.
13. In the second list box that currently reads equals, choose the blank entry at the top of the list. The box should now be empty.
14. Click **OK**. The list should now show only the five animals known to have been inoculated in 2011 or earlier (see Figure 9-23).

**Figure 9-23**

Worksheet with custom filter applied

	A	B	C	D	E	F	G	H	I
1									
2									
3									
4									
5	Patient Name	Cat or Dog?	Breed	Sex	Hepatitis inoculation	Spayed/Neutered	Owner		
12	Bon Chat	Cat	Himalayan	F	8/16/2011 N		44		
19	Harlow	Cat	DSH	F	3/1/2009 S		44		
23	K'ao Kung	Cat	Balinese	N	10/19/2010 N		28		
33	Marshall	Cat	Maine Coon	M	2/2/2011 N		31		
39	Rahjah	Cat	Persian	M	7/14/2011 N		50		
60									
61									
62									
63									
	Patient list	Client list	(+)						

15. Click the filter button beside **Hepatitis inoculation** again. In the menu, choose **Clear Filter from "Hepatitis inoculation"**.

PAUSE. SAVE the workbook and leave it open to use in the next exercise.

## Filtering Data Using Cell Attributes

When conditional formatting is applied to a column of cells, that formatting is something that Excel can “get a handle on.” In other words, it’s just as good as a value in giving the filtering system something to look for. So you can easily have a filter hide rows where cells in a column don’t have a particular format, such as a shaded background or a font color.

### STEP BY STEP

### Filter Data Using Cell Attributes

GET READY. USE the workbook from the previous exercise.

1. In the Patient list worksheet, click the **Spayed/Neutered** button down arrow.
2. In the menu, click **Filter by Color**.
3. In the popup menu, choose the **pink swatch**. Excel now shows only those animals that have been spayed or neutered.

PAUSE. SAVE the workbook and leave it open for the next exercise.

## OUTLINING AND SUBTOTALING DATA

### Bottom Line

Up to this point, you’ve been working with data that’s arranged as tables full of records, where each row represents an entry of related elements. Another purpose for worksheets is to serve as lists of values and their related descriptions. Imagine an inventory list showing the sale price of items arranged by department. In its most basic form, you need only two columns: one for the description and the other for the price. For this list to be useful to you, however, you’ll want a way to break

down items into their respective departments—for example, by listing their location on the shelf. These descriptive categories help subdivide data into groups, and then **collapse** those groups into single-row headings called **outlines**. Excel uses outlines to generate reports that provide you with meaningful data about the items in each group collectively. The most important, and probably the most frequently used of these reports shows you **subtotals** for the values that are grouped together.

## Grouping and Ungrouping Data

The simplest form of data **grouping** involves taking a row of cells that have one related attribute, clustering them together, and then collapsing the cluster like a folder that can be reopened later. The point of doing this is to reduce the size of long reports to make them easier to read. The trick to doing this properly is leaving behind one row, after the group is collapsed, to represent the group as a whole so someone reading the worksheet will know what to open later.

Whenever you group rows together or perform an operation (such as auto-outlining or auto-subtotaling) in which groups are automatically created, Excel adds controls next to the row and column headings. Excel calls these controls **outline symbols**.

Boxes marked with minus and plus symbols are placed at the bottom of grouped rows or to the right of grouped columns. Each one acts like a clasp that can collapse or expand the group's contents. In the upper left corner are number buttons that let you show or hide all of the group contents for a particular level. When you have two groups that are just beside one another, you have only two levels: the collapsed view and the expanded one. But you can have groups within groups, and for each grouping level you create, Excel adds another number to this bank of outline symbols.

**Take Note** The rows and columns that you enroll into a group should be those that you do *not* want to see when the group is collapsed. Field name rows that identify cells and total rows that include subtotals should not be included in groups.

### STEP BY STEP

### Group and Ungroup Data

GET READY. USE the workbook from the previous exercise.

1. SAVE the current workbook as **09 Vet Clinic Patients 130114 Solution**. Grouping data is best reserved for final reports and not for active databases where new data might be entered later.

**Take Note**

Enrolling a set of records into a group changes the behavior of AutoFilters that might incorporate that group. For example, when you try to sort a column, only the records that are not members of a group are sorted. Once records are grouped, their order is fixed and their usefulness as parts of an active database is reduced, especially if you add subtotal rows to the middle. For this reason, you should reserve grouping and outlining for workbooks that are presented as final (unchanging) reports for a particular point in time.

2. With the Patient list worksheet active, on the DATA tab, in the Sort & Filter group, click **Clear**.
3. Next to Cat or Dog?, click the **down arrow button**. In the menu, click **Sort A to Z**. Now, all the cats are clustered together at the top, and dogs at the bottom.
4. Right-click the heading for row **30**, the row where the first dog appears. Click **Insert** in the shortcut menu.
5. Select cell **H30**. Type **Number of cats**.
6. Select cell **G30**. On the HOME tab, in the Font group, click the **Bold** button. This makes this particular number stand out.
7. On the HOME tab, in the Editing group, click the **AutoSum** down arrow. In the menu, click **Count Numbers**, and then press **Enter**. Excel inserts a function into the cell that counts the number of contiguous cells in the column just above it that contains numbers—in this case, the owner numbers for clients.

8. Add a similar function for counting the number of dogs to row 60. (Bypass the validation rule by clicking Yes in the dialog box.)
9. Select rows 6 through 29 (all the cats).
10. On the DATA tab, in the Outline group, click the **Group** button. A group indicator line is added to the left of the row markers and an outline symbol on the row just below the end of the group (see Figure 9-24).

**Figure 9-24**

Worksheet with groups applied



### Another Way

To collapse all the groups in a worksheet, select the entire worksheet first, and then click **Hide Detail** in the Outline group of the DATA menu tab. To expand all groups, click **Show Detail**.

11. Repeat the process in Steps 9 and 10 for the dogs in rows 31 through 59. Format cell G60 as **Bold**. In cell H60, type **Number of dogs**.
12. To collapse the cats group, click the minus box (shown in Figure 9-24) beside row 30, which contains the cats count. The control becomes a plus box, indicating that when you click on it, it expands to show hidden rows.
13. Collapse the dogs group with the minus box in row 60. The worksheet now appears fully collapsed (see Figure 9-25).

**Figure 9-25**

Worksheet with collapsed groups

14. Click the **Select All** button. On the DATA tab, in the Outline group, click **Show Detail**.
15. Select columns B through F.
16. In the Outline group, click the **Group** button. A new column group is created.
17. Click the minus box over column G to collapse the column group. Click the plus box that takes its place to expand it.
18. Select columns B through G.
19. In the Outline group, click the **Ungroup** button. The columnar group disappears.

**SAVE** and **CLOSE** the workbook. Leave Excel open for use in the next exercise.

## Auto-Outline Data

Grouping data is an easy process when you have only a few groups in your worksheet that really matter, such as cats and dogs. For a complex report, such as a balance sheet with assets and liabilities broken down into departments and sub-departments, the task gets much more tedious. For this reason, Excel has offered to make things somewhat simpler. Suppose you inserted total value cells along the bottom rows of related cells, or along the right column beside related cells—or perhaps both. You probably need to do this anyway for a formal balance sheet, or for a table with names of salespeople in rows and sales for days of the week in columns—here, you total for each salesperson along the right column, and for each day along the bottom row. Excel can detect when and why you set up your worksheet like this, so when you **auto-outline** a table or a worksheet full of tables, it creates the groups automatically and spares you the trouble.

### STEP BY STEP

#### Auto-Outline Data



GET READY. OPEN the **09 Critical Care Expenses** workbook for this lesson.

1. SAVE the workbook in the Lesson 9 folder as **09 Critical Care Expenses 0315 Solution**.
2. Select cell **H18**. On the HOME tab, in the Font group, click the **Bold** button. Then, in the Editing group, click the **AutoSum** button and press **Enter**. The grand total appears as bold in the cell.
3. Repeat the grand total process for cell **H28** and apply **Bold** to the cell.
4. Select the cell range **B10:H28**, covering both groups of expenses in their entirety.
5. On the DATA tab, in the Outline group, click the down arrow next to **Group**. In the menu, click **Auto Outline**. As Figure 9-26 shows, Excel automatically groups rows 12 through 17 and rows 22 through 27, having spotted the Total Expenses row along the bottom of each cluster. Excel also groups together the columns for March 15 through 19, having spotted the weekly totals columns along the right.

### CERTIFICATION READY? 2.3.5

How do you create outlines?

**Figure 9-26**

Outlined worksheet

		Actual Expenses						
		15-Mar	16-Mar	17-Mar	18-Mar	19-Mar	Totals	
10	A							
11	B	\$315.00	\$ 28.00	\$287.00	\$ 76.00	\$144.00	\$ 850.00	
12	Mileage	\$ 35.00		\$ 32.00		\$ 27.00	\$ 94.00	
13	Gasoline							
14	Hotel	\$ 78.75	\$ 78.75	\$ 81.95	\$ 81.25		\$ 320.70	
15	Pharmaceuticals	\$ 51.75	\$ 9.75	\$ 71.19	\$ 36.25	\$ 18.75	\$ 187.69	
16	Meals	\$ 11.21	\$ 18.98	\$ 10.97	\$ 12.95	\$ 17.78	\$ 71.89	
17	Supplies	\$ 21.98	\$ 31.52	\$ 18.97	\$ 37.75		\$ 110.22	
18	Total Expenses per Day	\$513.69	\$167.00	\$502.08	\$244.20	\$207.53	\$1,634.50	
19								
20								
21								
22	Reimbursable Expenses							
23		15-Mar	16-Mar	17-Mar	18-Mar	19-Mar	Totals	
24	Mileage	\$104.74	\$ 9.31	\$ 95.43	\$ 25.27	\$ 47.88	\$ 282.63	
25	Gas	\$ 35.00		\$ 32.00		\$ 27.00	\$ 94.00	
26	Hotel	\$ 78.75	\$ 78.75	\$ 81.95	\$ 81.25		\$ 320.70	
27	Pharmaceuticals	\$ 51.75	\$ 9.75	\$ 71.19	\$ 36.25	\$ 18.75	\$ 187.69	
28	Meals	\$ 11.21	\$ 15.00	\$ 10.97	\$ 12.95	\$ 15.00	\$ 65.13	
29	Supplies	\$ 21.98	\$ 25.00	\$ 18.97	\$ 25.00	\$ -	\$ 90.95	
30	Total Expenses per Day	\$303.43	\$137.81	\$310.51	\$180.72	\$108.63	\$1,041.10	

**SAVE** the workbook and **LEAVE** Excel open for the next exercise.

## Collapsing Groups of Data in an Outline

When you create an outline around groups of data in a worksheet, outline symbols appear for each group of rows and columns. You use these devices to collapse and then expand the outline, thus switching between summary and detailed views of the worksheet.

### STEP BY STEP

### Collapse Groups of Data in an Outline

GET READY. USE the workbook from the previous exercise.

1. Click all three minus boxes to collapse their respective groups. The worksheet should now appear shrunken to just the grand totals cells you created with the appropriate labels (see Figure 9-27).

**Figure 9-27**

Outlined worksheet with collapsed groups

	A	B	H	I
1				
2				
3				
4				
5				
6				
7				
8				
9				
10		Actual Expenses	Totals	
11		Total Expenses per Day	\$1,634.50	
18				
19				
20		Reimbursable Expenses	Totals	
21		Total Expenses per Day	\$1,041.10	
28				
29				
30				
31				
32				
33				
	Critical care expenses 0315			

2. Click any of the plus boxes (which replaced the minus boxes) to expand the group to which it's attached.
3. To remove the outline entirely, on the DATA tab, in the Outline group, click the **Ungroup** button arrow. In the menu, click **Clear Outline**.

### CERTIFICATION READY? 2.3.6

How do you collapse groups of data in an outline?

SAVE and CLOSE the workbook. Leave Excel open for the next exercise.

## Subtotaling Data in Outlines

Suppose a worksheet serves as a report of certain activity that takes place on given days with respect to specific divisions of the company in particular regions of the country. These three categories represent levels of information. When you sort a worksheet so that these levels are in a precise order, as you've already seen how to do, then Excel can accept each of these levels as tiers in an outline. An outline gives you the complete summary while hiding the details until you request them.

### STEP BY STEP

### Subtotal Data in Outlines

GET READY. OPEN the **09 Server Usage Stats** workbook for this lesson.



1. SAVE the workbook in the Lesson 9 folder as **09 Server Usage Stats 130831 Solution**.
2. Select the range **A5:G140**.
3. On the DATA tab, in the Sort & Filter group, click **Sort**.

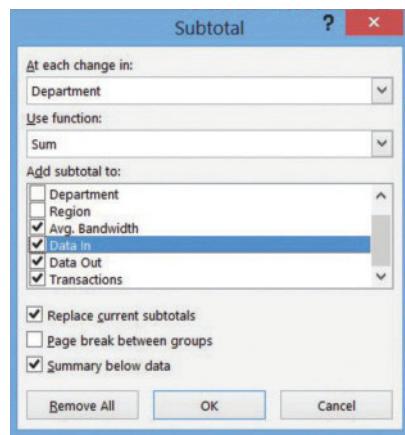
**CERTIFICATION  
READY?**    **2.3.7**

How do you insert  
subtotals?

4. In the Sort dialog box, in the Sort by line, choose **Date, Oldest to Newest**. Click **OK**.
5. On the DATA tab, in the Outline group, click **Subtotal**. The Subtotal dialog box appears.
6. In the At each change in list box, click **Department**.
7. If necessary, in the Use function list box, choose **Sum**.
8. In the list of columns marked Add subtotal to, select the boxes for **Avg. Bandwidth**, **Data In**, **Data Out**, and **Transactions**.
9. Check the **Summary below data** and **Replace current subtotals** check boxes, if necessary. The dialog box should now appear as depicted in Figure 9-28.

**Figure 9-28**

Subtotal dialog box



10. Click **OK**. Excel inserts subtotal rows for each company division, grouping together data consumption values for all three corporate regions. It places each of these division row clusters into groups. It then creates a broader group for the entire range and adds a grand total row at the bottom. The result is a subtotal-endowed worksheet with a three-tier outline (see Figure 9-29).

**Figure 9-29**

Automatically subtitled worksheet with three-tier outline

Usage statistics						
Giant Frog Supermarkets - District # 0855						
Period of 1 July - 31 August 2013						
Date	Department	Region	Avg. Bandwidth Kib/sec	Mb Data In	Mb Data Out	Transactions
1 Jul	Accounting	Central	214.7	3169	21661	81355
1 Jul	Accounting	North	114.5	2601	12359	64135
1 Jul	Accounting	South	84.6	1684	9467	46810
	Accounting Total		413.8	7454	43487	192300
10	Distribution	Central	12.4	674	943	4121
11	Distribution	North	38.6	1551	2064	9102
12	Distribution	South	16.4	876	1643	8460
	Distribution Total		67.4	3101	4650	21683
14	Merchandising	Central	51.6	495	2943	9103
15	Merchandising	North	56.5	518	3106	10312
16	Merchandising	South	48.5	406	2674	8513
	Merchandising Total		156.6	1419	8723	27928
18	Point of sale	Central	109.9	1974	15464	65467
19	Point of sale	North	213.9	3164	26492	103454
20	Point of sale	South	184.0	2649	19733	78669
	Point of sale Total		507.8	7787	61689	247590
22	Purchasing	Central	89.1	1064	3946	29431
23	Purchasing	North	110.4	1304	6103	35406
24	Purchasing	South	59.8	964	4766	25164
	Purchasing Total		259.3	3332	14815	90001
26	Accounting	Central	205.6	3024	20461	79404
27	Accounting	North	106.4	2564	11643	62164
28	Accounting	South	88.5	1794	9501	46795
	Accounting Total		400.5	7382	41605	188363

SAVE and CLOSE the workbook. Leave Excel open for the next exercise.

**Take Note**

When you remove an outline from an automatically subtotalized range, the subtotal rows that Excel inserted automatically remain. So to return a worksheet to its pre-subtotalized state, you must delete each subtotal row manually.

**SETTING UP DATA IN A TABLE FORMAT****Bottom Line**

Up to now in this lesson, you might think most of the data you used in worksheets has been, for all intents and purposes, tables. How could they not be tables? They have headings along the top, they have unique entries that identify rows, and some even have indexes. From a typesetting perspective, they're certainly tables. But Excel has a special relevance for a class of data that it formally calls a **table**. When you format a single, rectangular range with a row of headers along the top, and columns beneath the headers, converting that range to a table enables Excel to treat it like a database. Processing a table's data is faster, including for sorting. And Excel can apply an elaborate **quick format** that makes the table look sleek and professional. When you compose formulas, formal tables let you refer to field names explicitly (for example, "Price" and "Markup") rather than by their cell reference (for example, B7).

**Formatting a Table with a Quick Style**

Let's be honest: Big worksheets are hard to read. When you look at a well-laid out document that contains a table full of figures, you can see how typesetters apply graphic tools to make the table easier to read—tools such as alternating bands across every other line. You can (meticulously) apply such a style to a normal range, but what would happen when you sorted the range? The cell formatting would move along with the cells, and your alternating bands would be jumbled up. By denoting which part of a worksheet is a table, Excel can apply some formatting independently of contents. So a properly banded table *stays* properly banded when you sort the table, or when you insert and delete rows.

**STEP BY STEP****Format a Table with a Quick Style**

GET READY. OPEN the **09 Pet Pharma Sales** workbook for this lesson.

1. SAVE the workbook in the Lesson 9 folder as **09 Pet Pharma Sales August Solution**.
2. In the August Sales worksheet, select the data range **A6:K93**.
3. On the HOME tab, in the Styles group, click **Format as Table**. Excel brings up a colorful menu full of sample layouts (see Figure 9-30).

**Figure 9-30**

Table format menu

**CERTIFICATION  
READY?** **3.2.1**

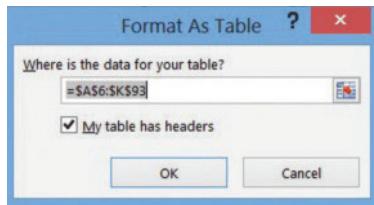
How do you apply styles to tables?



4. Click the sample in row 4, column 7 (**Table Style Medium 7**). The Format As Table dialog box appears (see Figure 9-31).

**Figure 9-31**

Format As Table dialog box

**Take Note**

You can change the format of a table at any time using the Format as Table command. You only see the Format As Table dialog box the *first* time you format a table, which effectively changes a standard range to a table. Afterwards, you only need to select a cell inside the table to tell Excel which table you want to reformat.

**CERTIFICATION READY? 3.2.2**

How do you band rows and columns?

- Because the cell reference under Where is the data for your table? is accurate, don't make any changes and click **OK**. Excel converts the data range into a formal table and applies the style you chose, which includes automatically banded rows that maintain their banding even when rows become sorted. AutoFilter controls are also added to the field names row.
- To automatically boldface the rightmost column in the table (Total Sales), click any cell inside the table. On the DESIGN tab, in the Table Style Options group, click **Last Column**.

**Take Note**

The Table Style Options group also contains an option for banding columns instead of rows. Uncheck Banded Rows from this group, and then check Banded Columns.

**SAVE** the workbook and **LEAVE** it open for the next exercise.

**Take Note**

When you scroll down a data table so that the field names row disappears, as long as the active cell stays within the table area, the usual column headings (A, B, C, and so on) are replaced with the complete field names, as Figure 9-32 depicts. The AutoFilter buttons also move to the headings row. This way, you don't need to freeze the field names row in place to keep the names themselves visible. When you move the active cell outside the table area, the standard column headings reappear.

**Figure 9-32**

Field names display in the headings row.

Drug	For use on	To treat	No. of Cases	Items per Case	Loose Items	Items on Hand	Items Remaining	No. Sold	Item Price	Total Sales
27 Dronamax	Anti-inflammatory	Dog	10	12	8	128	67	61	\$ 62.50	\$ 3,812.50
28 Drontal Tapewormer	De-wormer	Dog or Cat	6	100	88	688	432	256	\$ 29.95	\$ 7,411.20
29 Drontal Allwormer	De-wormer	Cat	8	100	98	898	318	580	\$ 8.50	\$ 4,930.00
30 Drontal Allwormer	De-wormer	Puppy	6	25	9	159	127	32	\$ 9.50	\$ 304.00
31 Drontal Allwormer	De-wormer	Dog	8	18	7	151	131	20	\$ 68.50	\$ 1,366.00

Field names replace column labels

**Removing Styles from a Table**

If you're at a point where you want to create a custom style for your table, or for multiple tables in your workbook, you might want to begin by removing the formatting that's already present. The table style removal feature in Excel is a bit buried and needs to be uncovered to be used.

**STEP BY STEP****Remove Styles from a Table**

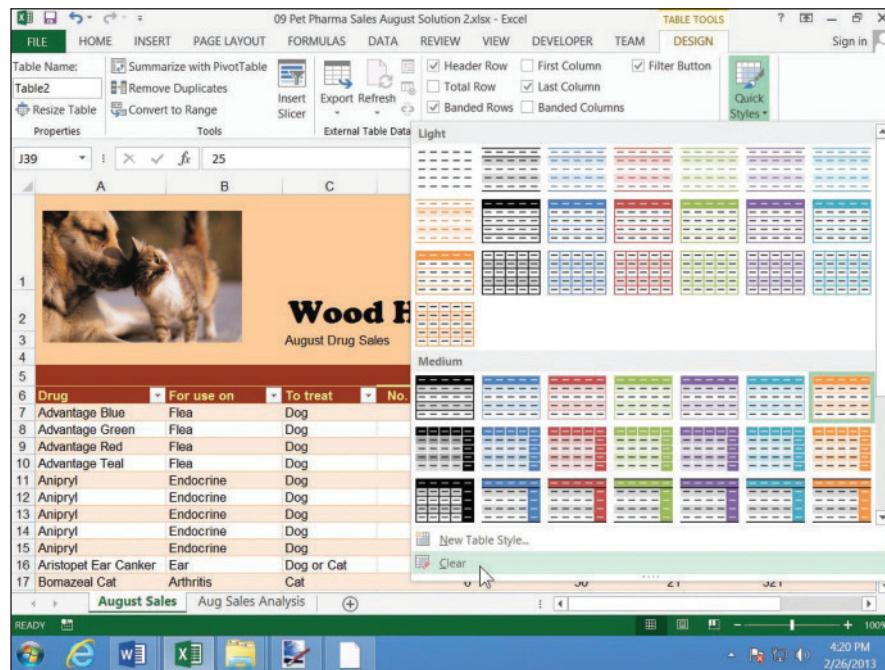
**CERTIFICATION  
READY?** **3.2.4**

How do you remove styles from tables?

GET READY. USE the workbook from the previous exercise.

1. SAVE the workbook in the Lesson 9 folder as **09 Pet Pharma Sales August Solution 2**.
2. In the August Sales worksheet, click anywhere inside the table.
3. On the DESIGN tab, in the Table Styles group, click the **More** down arrow button. (Or if you see only the **Quick Styles** button, click that instead.)
4. In the menu, as indicated in Figure 9-33, click **Clear**. The automatic formatting is removed.

**Figure 9-33**  
Table Styles menu on the DESIGN tab

**Troubleshooting**

There are two places to find the table styles menu in Excel. One is under the Format as Table button on the HOME tab. The other is in the Table Styles group of the DESIGN menu tab. At first, both menus look the same. But only the one on the DESIGN tab has the Clear button to remove styles from a table.

5. To change the table style to something that contrasts against the others in this series, bring up the Quick Styles menu again, and this time, choose **Table Style Light 6** (upper right corner).
6. To automatically apply boldface to the rightmost column, in the Table Style Options group, ensure **Last Column** is checked. To do the same for the leftmost column, check **First Column**.

SAVE the workbook and LEAVE it open for the next exercise.

**Defining a Title for a Table**

Up to now, you've seen some nuanced and subtle differences between tables and ordinary data ranges. The one big difference between the two lay with the table's ability to be given a title, so that it and its constituent columns can be referred to by name instead of by reference location. This changes everything when you write formulas that refer to parts of the table, because now you don't have to know where they're located, just what they're called.

Once a table is given a title, all the names of its columns can be used in place of cell references in a formula. The result is not only a formula that's easier to conceive, but easier to read and even easier to type. So instead of an absolute cell reference such as \$B\$2:\$B\$55 (which starts on the second row, of course, because the headers are always on the first row), you can use a reference such as `Inventory[Sale Price]`. Excel already knows not to treat the first row as values, and whenever records are added to the table, the results of the formula are adjusted without the formula itself even having to change its appearance.

The syntax of a reference to fields in an Excel table is as follows:

**TableName[FieldName]**

Component	Meaning
TableName	An arbitrary name you give to a table, in place of its reference as a range. You can have more than one table on a worksheet, although it might not always be convenient. Examples: Customers, Back Orders, Comics issues
FieldName	The field name from the header row of the table. The name refers to the set of all cells that comprise the named column in the table. You do not need to specify the start and end cell. The field name is always denoted with [square brackets]. Examples: Surname, Issue date, Sale price

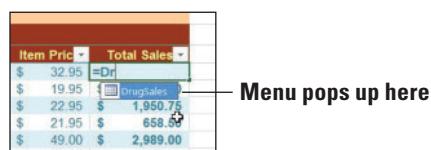
Note: Excel recognizes four constants that refer to the same general area of a table, which you may use here when applicable to replace the field name:

#All	The set of all cells in the table
#Data	The set of all cells that contain data, excluding the header row at the top and any total or subtotal rows that might appear at the bottom
#Headers	The set of all cells in the first row in the table
#Totals	The set of all cells where totals appear; usually the rightmost column of the table where a SUM function is employed

When you type a table-style reference inside a formula, Excel gives you a shortcut. After you type the second character of the table name, Excel displays a list of names you can add to the formula (including named ranges). Figure 9-34 shows you what it looks like. Instead of typing in the rest of the name, you can use the arrow keys on the keyboard to navigate this menu until the name you want (the table name) is highlighted, and then you press Tab. The entire name is entered into the formula, saving you a few seconds of time.

**Figure 9-34**

IntelliSense menu for the table name



With the table name entered, when it's time to refer to a field name in the table, you can start with the left square bracket ( [ ). Excel displays a list of all the field names already in the table. You use

the arrow keys to highlight the one you're looking for, and then press Tab. Then type the right square bracket ( ] ) to complete the reference.

Similarly, whenever you want to use one of the four constants (#All, #Data, #Headers, or #Totals), you just start with the pound sign #. Excel displays the list, and then you highlight the one you want and press Tab. Microsoft markets this feature as *IntelliSense*, and you see it referred to as such in the Help system.



### Troubleshooting

When you highlight the entry you want on the IntelliSense menu, make sure to press Tab, not Enter. The Enter key tells Excel the formula is complete, and at this point, it's often not.

### Take Note

When referring to a field name by name in a formula that's used inside the same table as the field name, you can omit the table name. For example, the reference Customers[*Surname*] can be substituted with just *Surname* when the reference is inside the Customers table.

## STEP BY STEP

### Define a Title for a Table

GET READY. USE the workbook from the previous exercise.

#### CERTIFICATION READY? 3.1.3

How do you define titles in a table?

1. SAVE the workbook in the Lesson 9 folder as **09 Pet Pharma Sales August Solution 3**.
2. In the August Sales worksheet, click anywhere inside the table.
3. On the DESIGN tab, in the Properties group, click the text box under Table Name.
4. Type **DrugSales** (all one word) and press **Enter**. You have given a name to the table. Now you can replace the strange-looking formulas at the bottom of the August Sales worksheet with formulas that are easier to read, yet yield the same results.
5. Select cell **D97** (Total Sales).
6. Type **=sum(Dr**
7. When DrugSales appears in the list, press **Tab**.
8. Type **I** (left square bracket).
9. Use the arrow keys to select **Total Sales** from the list, and then press **Tab**.
10. Type **] (right square bracket), followed by **)** (right parenthesis) and **Enter**. If you enter the formula properly, the result should be identical to what was there before.**
11. Replace the formula in cell **D98** with the following:  
**=SUMIF(DrugSales[To treat], "Dog", DrugSales[Total Sales])**
12. Replace the formula in cell **D99** with one based on the formula in **D98**, but searching for **Cat** instead of **Dog**.

SAVE the workbook and leave it open for the next exercise.

### Using the Total Row Command in a Table

Once Excel recognizes a formal table, it can automatically place an automatic totals row along the bottom. It's not the same as a subtotal row that falls after a group. However, once you choose a table style, Excel automatically applies boldface to the totals row to make it stand out—so it's obvious from a distance that it contains totals, and so it serves as a “bookend” for all the data in the middle.

## STEP BY STEP

### Use the Total Row Command in a Table

GET READY. USE the workbook from the previous exercise.

#### CERTIFICATION READY? 3.2.3

How do you insert total rows in a table?

1. Select any cell in the table. Excel adds the DESIGN tab to the ribbon.
2. With the August Sales worksheet active, on the DESIGN tab, in the Table Style Options group, select the **Total Row** box. Excel adds a total row to the bottom, as shown in

Figure 9-35, with a label in the leftmost column and the grand total in the rightmost column.

**Figure 9-35**

Total row added below table

09 Per Pharma Order August Solution Table - Excel											
Total Row											
79	Rimadyl Chewable	Arthritis	Dog	10	\$ 49.00	30	16	258	216	\$ 49.00	\$ 2,058.00
80	Rimadyl Chewable	Arthritis	Dog	10	\$ 32.50	22	22	522	193	\$ 32.50	\$ 4,972.50
81	Beta-2 Agonist	Hypothyroidism	Dog or Cat	18	\$ 89.00	17	37	337	51	\$ 89.00	\$ 4,635.00
82	Selosine	Hypothyroidism	Dog or Cat	21	\$ 40.00	20	4	424	108	\$ 40.00	\$ 4,320.00
83	Selosine	Hypothyroidism	Dog or Cat	8	\$ 20.00	20	18	138	98	\$ 20.00	\$ 1,096.10
84	Selosine	Hypothyroidism	Dog or Cat	8	\$ 20.00	20	8	116	74	\$ 20.00	\$ 1,520.00
85	Hydrocortisone	Hormone	Dog or Cat	9	\$ 100.00	10	5	105	105	\$ 100.00	\$ 1,000.00
86	Selosine	Hypothyroidism	Dog or Cat	10	\$ 20.00	20	8	208	143	\$ 20.00	\$ 1,080.00
87	Selosine	Hypothyroidism	Dog or Cat	12	\$ 20.00	14	2	254	104	\$ 20.00	\$ 2,330.00
88	Hydrocortisone	Hormone	Dog or Cat	10	\$ 100.00	10	4	244	203	\$ 100.00	\$ 1,990.00
89	Enzyme	Hypothyroidism	Dog or Cat	15	\$ 90.00	20	23	479	358	\$ 90.00	\$ 4,200.00
90	Tear Stain Remover	Eye	Dog or Cat	9	\$ 25.00	25	12	237	186	\$ 25.00	\$ 214.20
91	Vitamin	Supplements	Dog or Cat	9	\$ 25.00	25	14	239	193	\$ 25.00	\$ 482.70
92	Flea and Tick	Dog	Dog	5	\$ 10.00	100	34	514	329	\$ 10.00	\$ 3,290.00
93	Flea and Tick	Dog	Dog	4	\$ 10.00	100	91	491	277	\$ 10.00	\$ 1,850.00
94	Total										\$ 261,808.56
95											
96											
97	Sales Analysis										
98	Total Sales										\$261,808.56
99	Sales of dog only products										\$157,691.75
100	Sales of cat only products										\$105,932.31
101											
102	Sales of flea products										\$17,480.00
103	Sales of flea and tick products										\$1,748.00
104	Sales of kennel products										\$600.70
105	Other sales										\$105,900.81
106											
107											
108											
109											
110											
111											

3. To add other subtotals or formulas to the Total Row, you can choose one from a drop-down menu. Click the cell in the total row at the bottom of the Item Price column.

4. Click the down arrow that appears to the right of the blank cell. In the popup menu (see Figure 9-36), click **Average**. Excel calculates the average price per sales item.

**Figure 9-36**

Adding formulas to the total row

old	Item Price	Total Sales	L
42	\$ 49.00	\$ 2,058.00	
153	\$ 32.50	\$ 4,972.50	
326	\$ 36.95	\$ 12,045.70	
238	\$ 40.00	\$ 9,520.00	
38	\$ 27.95	\$ 1,062.10	
52	\$ 38.50	\$ 2,002.00	
63	\$ 29.95	\$ 1,886.85	
61	\$ 32.50	\$ 1,982.50	
90	\$ 25.95	\$ 2,335.50	
19	\$ 89.00	\$ 1,691.00	
121	\$ 49.00	\$ 5,929.00	
51	\$ 4.20	\$ 214.20	
46	\$ 10.95	\$ 503.70	
209	\$ 4.45	\$ 930.05	
184	\$ 4.45	\$ 818.80	
		261,808.56	
	None		
	Average		
	Count		
	Count Numbers		
	Max		
	Min		
	Sum		
	StdDev		
	Var		
	More Functions...		

5. Repeat the process to find the maximum number of items sold in one order by choosing the **Max** function for the **No. Sold** column.

SAVE the workbook and leave it open for the next exercise.

## Adding and Removing Rows or Columns in a Table

Databases are never *finished*. When you maintain data in an ordinary range, one problem you frequently face is how and where to insert a new row. There's no rule that says you have to insert a new record in alphabetical order, when the range is sorted alphabetically. You can add it to the end and sort again. Here's the problem: If you've named your range already, when you add the record to the end, you might need to reassign the range name. With a formal table, not only does the range for the table stay named properly, but when you insert rows (as well as delete them) the named range covered by the table is adjusted to fit automatically. And any formulas you use inside each of the rows in the table are copied and adjusted to the new rows you add.

### STEP BY STEP

### Add and Remove Rows and Columns in a Table



#### Another Way

To insert multiple contiguous rows in a table, start by selecting a block of cells that's as tall as the number of rows you want to insert.

#### CERTIFICATION READY? 3.1.2

How do you add and remove cells within tables?

GET READY. USE the workbook from the previous exercise.

1. SAVE the workbook in the Lesson 9 folder as **09 Pet Pharma Sales August Solution 4**.
2. In the August Sales worksheet, select cell **A88** (in the Drug column).
3. On the HOME tab, in the Cells group, click the **Insert** down arrow. In the menu, click **Insert Table Rows Above**.
4. Type the following values into cells **A88:F88**:  
**Soloxine   Hyperthyroidism   Dog or Cat   7   20   2**
5. Note that the value in the Items on Hand column is automatically updated, because Excel copied the formula into the new row.
6. Select cell **H88** (in the Items Remaining column) and type the value **41**. Cell I88 is updated.
7. Select cell **J88** (in the Item Price column) and type the value **25.95**. Cell K88 is updated.
8. Select any cell in row **32**.
9. On the HOME tab, in the Cells group, click the **Delete** down arrow. In the menu, click **Delete Table Rows**. Row 32 is deleted, and the table shrinks to fit.
10. Select any cell in column **I** (No. Sold).
11. On the HOME tab, in the Cells group, click the **Delete** down arrow, and then click **Delete Table Columns**. Column I is removed, and for the time being, #REF! errors are generated throughout the Total Sales column, which contain formulas that referred to No. Sold.
12. With a cell in column I still selected, click the down arrow next to Insert in the Cells group, and in the menu, click **Insert Table Columns to the Left**.
13. Change the header in cell **I7** to read **No. Sold**.
14. Click cell **I7** and enter the formula **=[Items on Hand]-[Items Remaining]**. Use the "IntelliSense" menus when you type each left bracket [ to expedite your entry. Notice when you press **Enter** that Excel automatically copies the formula down the remainder of the column. You normally don't have to do this manually for a table.
15. Click cell **K7** and enter the formula **=[No. Sold]\*[Item Price]**. This time when you press **Enter**, Excel does *not* fill the formula down the column, because it will not autofill over nonblank cells.
16. Fill the new Total Sales formula down to row **93**, making sure to stop short of the total row. The grand total formula in cell K94 is now fixed.
17. Click cell **L7**, outside the table.
18. Enter the formula **=[Total Sales]/AVERAGE([Total Sales])**. Notice you don't get the "IntelliSense" menus this time, because the active cell is not inside the table. After you press **Enter**, Excel not only creates the formula but extends the table one column to the right, and copies the formula down the entire column L. For now, Excel gives the new column the temporary name *Column1* (see Figure 9-37).

**Figure 9-37**

Appended column to a table

		Starting Inventory		Ending Inventory											
6	Items per Case	7	Loose Item	8	Items on Hand	9	Items Remaining	10	No. Sold	11	Item Price	12	Total Sales	13	Column
7	20	6	246	8	268	9	234	10	30	11	\$ 32.95	\$ 922.60	12	0	
8	25	14	564	9	319	10	221	11	61	12	\$ 19.95	\$ 5,905.20	13	2	
9	20	19	319	10	221	11	191	12	85	13	\$ 22.95	\$ 1,950.75	14	1	
10	25	21	221	11	110	12	107	13	30	14	\$ 21.95	\$ 658.50	15	0	
11	20	11	171	12	184	13	135	14	61	15	\$ 49.00	\$ 2,989.00	16	1	
12	20	4	184	13	171	14	49	15	49	16	\$ 60.00	\$ 2,940.00	17	1	
13	20	4	204	14	259	15	152	16	33	17	\$ 50.00	\$ 1,650.00	18	1	
14	20	19	259	15	202	16	107	17	253	18	\$ 53.00	\$ 5,671.00	19	2	
15	20	6	246	16	424	17	44	18	3.90	19	\$ 55.00	\$ 2,420.00	20	1	
16	50	24	424	17	321	18	268	19	253	20	\$ 3.90	\$ 986.70	21	0	
17	50	21	321	18	53	19	53	20	53	21	\$ 17.15	\$ 908.95	22	0	

Automatically generated column

**Take Note** Excel doesn't apply its autofill IntelliSense feature for table field names while you enter data outside the table.

19. Rename the new column **% of Avg.**.
20. Select cell range **L7:L93** and give the range a percent style. Excel does not automatically copy custom cell styles down a column, so you must select the range manually first. Note how Excel has moved the last column's boldfaced format from Total Sales to % of Avg.
21. Click any cell in **% of Avg.**, and then click the down arrow next to **Delete**. Click **Delete Table Columns**. As the appended column disappears, the boldfacing is returned to Total Sales.

SAVE the workbook and leave it open for the next exercise.

## Filtering Records in a Table

The filtering/sorting buttons that appear beside the field names at the top row of a table work the same way as the filtering/sorting buttons for a range where AutoFilter is applied. The big difference with tables concerns the total row. The values in a subtotal row change to reflect only what's visible in the table after the filter is applied.

### STEP BY STEP

### Filter Records in a Table

**CERTIFICATION READY? 3.3.1**

How do you filter records in a table?

GET READY. USE the workbook from the previous exercise.

1. In the August Sales worksheet, click the **Total Sales** down arrow.
2. In the menu (see Figure 9-38), click **Number Filters**, and then click **Top 10**. The Top 10 AutoFilter dialog box appears.

**Figure 9-38**

AutoFilter menu for records in a table



### Another Way

A quick way to filter a column by the contents of one of the visible cells in that column is to right-click that cell, click Filter in the menu, and then click Filter by Selected Cell's Value.

### Take Note

The Top 10 items filter always results in 10 items displayed (unless the table has fewer than 10 records to begin with). By comparison, the Top 10 percent filter displays however many records comprise the top 10 percent of the values in the filtered column.

The total row of a filtered table adjusts its contents so that its formulas reflect only the visible (filtered) cells. As Figure 9-39 demonstrates, the averaging formula in cell J94 is adjusted to show the average item price among just the top 10. However, look further down at the analysis section. The formulas for Total Sales, Sales of dog only products, and so on, still refer to the *entire table*, not just the filtered portion. So any analysis you want to perform using filtering should be entered on a total row, which is included within the filtered area.

**Figure 9-39**

Changed and unchanged filtered table



### Troubleshooting

The exceptions to the rule about references to a table outside a filtered table are the # constants. If the formula in cell D98 of the example is =SUM(DrugSales[#Totals]) instead of =SUM(DrugSales[Total Sales]), the formula would adjust itself to tally only the visible, filtered records.

## Sorting Data on Multiple Columns in a Table

With a table, as with an AutoFiltered range, you can apply a filter and a sort order at the same time; for instance, you can show only the records that contain a particular entry (all motorcycles, all dogs, and so on), sorted in alphabetical order by name.

### STEP BY STEP

### Sort Data on Multiple Columns in a Table

GET READY. RE-OPEN the *09 Car Owners Solution* workbook from earlier in this lesson.

1. SAVE the workbook in the Lesson 9 folder as *09 Car Owners Solution 2*.
2. Select the range **A1:G73**.
3. On the HOME tab, in the Styles group, click **Format as Table**. In the menu, click **Table Style Medium 14**.
4. In the Format As Table dialog box, click **OK**.
5. Because this range contains data appended from an outside source (see the “Appending Data to a Worksheet” section earlier in this lesson), the query data related to that outside source is still attached to the range. Click **Yes** in the dialog box to have Excel remove those connections.
6. Click the **Name** box and rename the table **Owners**.
7. Resize columns **B**, **E**, and **F** to more appropriately fit their contents.
8. Change the font for the entire table to **Cambria, 11 pt**.
9. Left-justify column **G**.
10. With the Owners table selected, on the DATA tab, in the Sort & Filter group, click **Sort**. The Sort dialog box appears (refer to Figure 9-16).
11. In the Sort by list box under Column, choose **Last Name**.
12. Click **Add Level**.
13. In the Then by list box that appears under Column, choose **First Name**. Click **OK**.

SAVE the workbook and leave it open for the next exercise.

## Changing Sort Order in a Table

Once you set the sort order for a table, you can change it in two ways. First, any sorting choice you make with the AutoFilter buttons override the current sort order, including when the table is sorted by multiple columns. Second, in the Sort dialog box, delete the existing order and enter a new one.

### STEP BY STEP

### Change Sort Order in a Table

GET READY. USE the workbook from the previous exercise.

1. With the active cell in the Owners table, on the DATA tab, in the Sort & Filter group, click **Sort**.
2. In the Sort dialog box, click **Delete Level**, and then click **Delete Level** again, to remove the existing sort order.
3. Click **Add Level**.
4. In the Sort by list box that appears, click **ZIP**. Click **OK**.

SAVE the workbook and leave it open for the next exercise.

### CERTIFICATION READY?

### 3.3.3

How do you change the sort order in a table?

## Removing Duplicates in a Table

When you import data and append it to the end of an existing table or range, you might end up with duplicate entries—cases where a person appears twice, or perhaps more. Rather than go through the list by hand, Excel has a way to excise duplicate entries from a table more intelligently.

### STEP BY STEP

#### CERTIFICATION READY? 3.3.4

How do you remove duplicates in a table?



#### Another Way

After Excel finds duplicate rows, it removes the lowermost duplicates from the table, leaving the row on top. This is important when you remove rows based on some, not all, the fields in the rows. Excel does not automatically reconcile the contents of rows deemed to be duplicates, so any data in the lowermost rows that does not appear in the uppermost duplicate row will be deleted without asking you first.

### Remove Duplicates in a Table

GET READY. USE the workbook from the previous exercise.

1. Click any cell inside the table.
2. On the DESIGN tab, in the Tools group, click **Remove Duplicates**.
3. The Remove Duplicates dialog box (refer to Figure 9-15) lets you determine how much of a record needs to be duplicated before it qualifies as a duplicate. For instance, two or more customers might have the same name, though they probably don't share the same address or phone number. In the Columns list, uncheck **City**, **State**, and **ZIP**.
4. Click **OK**. Excel shows a dialog box reporting how many duplicate entries were removed. Click **OK** to dismiss.

SAVE and CLOSE the workbook and leave Excel open for the next exercise.

## Using a Slicer to View Table Data

There are two ways to filter a table so that it shows only records containing a certain object. One way is through the AutoFilter. Another makes the table more easily accessible to a novice user. It's called the **slicer**, and it's a selection panel that floats above a worksheet (the way a chart does). This panel includes buttons labeled with each of the contents of one of the columns in the table. When you click a button, the table is filtered to show only rows that match the selection. When designing the worksheet, each slicer is like a window with a title bar. You can relocate a slicer by dragging it by its title bar, which you need to do because it begins its life in the middle of the worksheet. Each slicer also has white handles along its edges. You drag one of these handles to resize the slicer in the direction you're dragging.

### STEP BY STEP

### Use a Slicer to View Table Data

GET READY. RE-OPEN the **09 Pet Pharma Sales August Solution 4** workbook for this lesson.

1. SAVE the workbook in the Lesson 9 folder as **09 Pet Pharma Sales August Solution 5**.
2. On the DATA tab, in the Sort & Filter group, click **Clear**. Click any cell inside the table.
3. On the DESIGN tab, in the Tools group, click the **Insert Slicer** button.
4. The Insert Slicers dialog box contains empty check boxes for each of the fields for which you can create buttons (see Figure 9-40). Click **For use on** and **To treat**.

Figure 9-40

Insert Slicers dialog box



5. Click **OK**. As the dialog box disappears, the two slicer tools appear as graphic objects in the center of the worksheet. They're not actually inside the table.
6. Relocate the **For use on** slicer by dragging its title bar toward the upper right of the worksheet. As you drag toward the edge of the window, the worksheet automatically scrolls to reveal space where you can drop the slicer. Drop the slicer when it's to the right of the table, just beneath the headers row.
7. Repeat the process with the **To treat** slicer, dragging it below the **For use on** slicer. The worksheet should look similar to Figure 9-41.

Figure 9-41

Worksheet with slicers added

Drug	For use on	To treat	Starting Inventory			Ending Inventory			Total Sales
			No. of Cases	Name per Case	Loose Items	Name on Hand	Items Remaining	No. Sold	
7 Advantix Blue	For use on	Dog	37	25	14	246	318	295	\$ 923.40
6 Advantix Green	For use on	Dog	22	25	19	564	781	796	\$ 1,945.20
9 Advantix Red	For use on	Dog	15	20	19	319	524	515	\$ 1,903.20
10 Advantage Teal	For use on	Dog	0	25	21	321	191	30	\$ 21.25
11 Ampryl	Endocrine	Dog	8	20	11	171	110	61	\$ 49.00
12 Ampryl	Endocrine	Dog	9	20	4	184	120	49	\$ 62.00
13 Ampryl	Endocrine	Dog	10	20	4	204	177	10	\$ 16.00
14 Ampryl	Endocrine	Dog	12	20	19	259	152	107	\$ 93.00
15 Ampryl	Endocrine	Dog	12	20	6	246	202	47	\$ 56.00
16 Antisept Ear Cleaner	For use on	Dog or Cat	8	24	24	424	171	253	\$ 3.90
17 Antisept Ear Cleaner	For use on	Dog	8	24	24	424	171	253	\$ 3.90
18 Benadryl Senior	Anti-hist.	Dog	8	10	31	201	398	398	\$ 988.70
19 Benadryl Senior	Anti-hist.	Dog	16	40	42	742	360	5	\$ 24.95
20 Benadryl Senior	Anti-hist.	Dog	7	10	5	131	100	20	\$ 29.00
21 Benadryl Senior	Anti-hist.	Dog	9	10	5	169	140	19	\$ 39.20
22 Cosequin Chewable	Joint	Dog	8	30	3	243	219	28	\$ 47.20
23 Cosequin Double	Joint	Dog	8	30	21	261	188	93	\$ 49.50
24 Cosequin for Cats	Joint	Cat	8	30	27	267	152	115	\$ 24.30
25 Cosequin Double	Joint	Dog	8	30	14	334	81	253	\$ 47.20
26 Dernoxine	Anti-inflammatory	Dog	9	17	7	115	89	26	\$ 38.45
27 Dernoxine	Anti-inflammatory	Dog	10	12	8	178	87	81	\$ 87.50
28 Dronal Tylosin	De-wormer	Dog or Cat	6	100	66	604	437	250	\$ 20.00
29 Dronal Tylosin	De-wormer	Cat	8	100	99	998	318	680	\$ 4,634.00
30 Dronal Tylosin	De-wormer	Dog	6	25	8	159	127	32	\$ 9.20
31 Dronal Tylosin	De-wormer	Dog	8	18	7	151	131	20	\$ 68.30
32 Dronal Tylosin	De-wormer	Dog	20	48	6	365	255	110	\$ 17.00
33 Dronal Tylosin 3X	De-wormer	Dog or Cat	59	12	9	387	274	83	\$ 15.00
34 Enzimid	Hairball	Dog or Cat	11	30	14	314	158	158	\$ 14.20
35 Enzimid	Hairball	Dog or Cat	8	30	8	180	106	87	\$ 41.00
36 Enzimid	Hairball	Dog or Cat	8	22	8	101	24	24	\$ 30.00

8. To see just the treatments that apply to dogs only, click **Dog** on the **To treat** slicer. Note that the AutoFilter button for the **To treat** column shows a filter has been applied.
9. To show just the treatments that apply to the endocrine system, click **Endocrine** on the **For use on** slicer. Note that the filters from both slicers apply simultaneously, so you should see endocrine system treatments for dogs only. The slicer highlights only the criterion in use for the current filter.
10. To clear the filters using the slicers, click the **Clear Filter** button in the upper right corner of each slicer.

SAVE and CLOSE the workbook and leave Excel open for the next exercise.

**Troubleshooting**

When an AutoFilter button for a column is used to filter a table and a slicer exists for that same column, the slicer shows the criteria currently in use for that filter. However, the Clear Filter button for the slicer is disabled. To clear this filter, you have to use the AutoFilter button.

**Converting a Table into a Range**

To append more data to a table from an outside source, it might be convenient for you to remove the “table-ness” from the table, if only temporarily, and reapply it once the new data is imported and the data is cleaned up. Also, before you export a workbook file to a new format (for instance, for importing by someone else into a database), you might need to convert tables to ranges, because Excel treats data stored in tables differently than data stored in ordinary worksheets.

**STEP BY STEP****Convert a Table to a Range****CERTIFICATION  
READY?** **3.1.1**

How do you move between tables and ranges?

GET READY. RE-OPEN the *09 2005 Customers Solution* workbook for this lesson.

1. Near the top of the Excel window, respond to the security warning by clicking **Enable Content**.
2. SAVE the workbook in the Lesson 9 folder as *09 2005 Customers Solution 2*.
3. Click any cell inside the table.
4. On the DESIGN tab, in the Tools group, click **Convert to Range**.
5. Excel opens a dialog box to verify this conversion is what you want. Click **OK**. The AutoFilter buttons are removed from the header row and entries are left sorted as they were. Subtotals and total rows remain (if applicable), and formatting is left as it was. The DESIGN tab is no longer displayed.

SAVE and CLOSE the workbook and leave Excel open for the next exercise.

**Bottom Line****SAVING WORK WITH MACROS**

Some of the first spreadsheet programs used lists of functions, typed down some tucked away column in an unseen edge of the sheet as multiple-step calculations that had the added virtue of executing commands automatically. These were the first macros, and the fact that they were considered “big functions” is how they got their name. Over the years, the number of different categories of macros that Excel can execute has grown, and the categories themselves vary so widely that a complete discussion of them would require another book. For the purposes of this lesson, we concentrate on one type: a recording of a sequence of commands and typed entries that you can then replay elsewhere in the worksheet. This way, you can perform the same sequences of commands in different places, cutting down the time it takes to complete redundant work.

**Recording a Basic Macro**

What makes a recorded macro useful is the fact that it can be replayed on whatever cell is the active cell. A recorded **macro** is a series of steps that can be repeated and that you might want to repeat frequently to save you time. As you’ve seen, there are ways to automate the formatting of cells that are actually easier than recording and playing back macros. So the kinds of steps you want to record are the repetitious kind that you would otherwise have to repeat yourself dozens of times or more.

**Troubleshooting**

Excel records only those steps that have a direct impact on the contents of the worksheet. To be accurate, it records the impact those steps have, not actually the commands that led to the impact. For example, if you select several rows and columns, Excel records the act of the rows and columns being grouped. But if you expand or collapse that group, it does not record that fact because doing so does not impact the worksheet itself. Exceptions include filtering and sorting ranges and tables, which Excel does record.



# Workplace Ready

## PLANNING TO RECORD A MACRO

To ensure that the macro you record is useful to you in a variety of situations, you should consider whether you need it to record absolute or relative cell references. This is because Excel keeps track of every change in the position of the active cell during macro recording. When that change is made, Excel needs to know whether it's more important for it to know the exact address of the new cell's location (absolute) or the number of cells left or right or up or down that the pointer was moved from its previous location (relative).

When you're recording absolute references, record a macro, and then click on cell A5, the recording always moves to A5. But if you use the arrow keys on the keyboard to move to another cell instead, the recording takes note of each arrow key pressed. So if you record the macro on A5 and use the down arrow key to move two cells down, and the macro replays from cell Y5, the macro moves to Y7.

By comparison, when you record relative references and then click a new location on the worksheet, Excel records the distance to the new cell. This makes the starting cell location critical to the macro. If you start with a cell selected in column D, and you click on a cell on the same row in column A, Excel records a movement three cells to the left. That is *not* the same thing as moving to the leftmost column, which you normally can do by pressing the Home key. However, in relative recording mode, pressing Home records the distance covered in getting to column A. So when you replay this macro, you could end up starting in a cell in column F and end up moving to column C when you expect to move to column A. Or, you can start in column B and trip an error condition when Excel tries to move too far to the left of column A.

For this reason, it's important to map out your precise cell movements (if any) prior to recording a macro, and then slowly repeat that sequence during the recording process. The recording does not account for how much time you take, so if you're nice and slow, the playback won't be any slower.

```

Microsoft Visual Basic for Applications - 09-Strong Tour Revenues Solution.xlsxm - [Module1 (Code)] - <--> x
File Edit View Insert Format Debug Run Tools Add-In Window Help
Project - VBAProject (09-Strong Tour Revenues Solution)
  Microsoft Excel Obj
    Sheet (Revenue)
      ThisWorkbook
        Modules
          Module1
  Modules (Nov-Do
Properties - Module1
Module1 Module
Alphabetic Categorized
Name: Module1
General
Sub CustomSubtotals()
    ' CustomSubtotals Macro
    ' Keyboard Shortcut: Ctrl+Shift+S
    Application.WindowState = xlMinimized
    Application.WindowState = xlNormal
    ActiveCell.Range("A1:A2").Select
    Selection.EntireRow.Insert
    Application.WindowState = xlMinimized
    Application.WindowState = xlNormal
    ActiveCell.Select
    Application.WindowState = xlMinimized
    Application.WindowState = xlNormal
    ActiveCell.FormulaR1C1 = "=SUM(R[-16]C:R[-1]C[1])"
    ActiveCell.Offset(0, 1).Range("A1").Select
    Application.WindowState = xlMinimized
    Application.WindowState = xlNormal
    ActiveCell.FormulaR1C1 = "=MAX(R[-16]C[-1]:R[-1]C[-1])"
    ActiveCell.Offset(0, 1).Range("A1").Select
    Application.WindowState = xlMinimized
    Application.WindowState = xlNormal
    ActiveCell.Offset(0, -1).Range("A1").Select
    Selection.Style = "Currency"
    Application.WindowState = xlMinimized
    Application.WindowState = xlNormal
End Sub

```

**STEP BY STEP****Record a Basic Macro**

GET READY. OPEN the **09 4Strong Tour Revenues** workbook for this lesson.

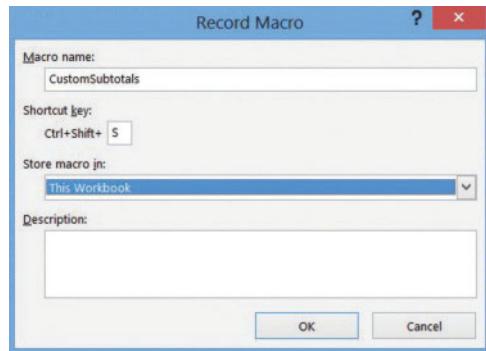
1. Click the **FILE** tab, and then click **Options**.
2. In the Excel Options dialog box, click **Customize Ribbon**.
3. In the Main Tabs list on the right, check the **Developer** box if it is not already checked. This adds the DEVELOPER tab to Excel, enabling you to record macros. Click **OK**.
4. The macro that you record creates a custom subtotal row at the place you define, rather than at some place Excel determines. The rule you follow is that the user (you) must select the cell where you want the subtotal to appear, and then run the macro. So to prepare for recording, click cell **D21**.
5. On the DEVELOPER tab, in the Code group, find **Use Relative References**. If it is not highlighted, click to select it. You want relative references for this macro.
6. In the Code group, click **Record Macro**.
7. In the Record Macro dialog box, click the **Macro name** box and type **CustomSubtotals**.
8. In the Shortcut key box beside Ctrl +, type the capital **S**. This changes the shortcut key to Ctrl + Shift + S. Leave Store macro in set to This Workbook. The dialog box should now appear as depicted in Figure 9-42.

**CERTIFICATION  
READY? 1.4.12**

How do you assign a shortcut key?

**Figure 9-42**

Record Macro dialog box



9. Click **OK**. You are now recording a macro.

**Troubleshooting**

If you mess up a step during the macro recording, don't worry. Click **Stop Recording** in the Code group of the DEVELOPER tab. Then start again from Step 6. Use the same name, and when Excel asks whether you want to overwrite the existing macro with the same name, respond with Yes.

**CERTIFICATION  
READY? 1.4.7**

How do you record a simple macro?

10. Press **Shift + Down Arrow**.
11. On the HOME tab, in the Cells group, click the **Insert arrow**. In the menu, click **Insert Sheet Rows**.
12. Press **Shift + Up Arrow**.
13. In the Editing group, click **AutoSum**. Do not press Enter yet.
14. In the Clipboard, click **Copy**.
15. Press **Tab**.
16. Type the partial formula **=max(**.
17. In the Clipboard group, click **Paste**.
18. Type **)** (end parenthesis) and press **Tab**.
19. Press **Left Arrow**.
20. Click **\$** (Accounting Number Format) in the Number group.
21. On the DEVELOPER tab, in the Code group, click **Stop Recording**.

- 22.** Now that you're not recording, adjust the width of column E to fit its contents. As Figure 9-43 shows, the macro generates a total for the bottom of the arbitrary cluster of records, and also tabulates the highest value in that cluster in the cell adjacent to the subtotal.

**Figure 9-43**

Custom subtotals generated with macro

A	B	C	D	E	F
7	5/10/2013	Cleveland	Clothing	\$ 375,814.52	
8	5/10/2013	Cleveland	Accessories	\$ 265,978.41	
9	5/12/2013	Indianapolis	Tickets	\$ 47,500.00	
10	5/12/2013	Indianapolis	Concessions	\$ 28,734.25	
11	5/12/2013	Indianapolis	Clothing	\$ 360,382.00	
12	5/12/2013	Indianapolis	Accessories	\$ 205,198.10	
13	5/14/2013	Chicago	Tickets	\$ 84,000.00	
14	5/14/2013	Chicago	Concessions	\$ 39,415.82	
15	5/14/2013	Chicago	Clothing	\$ 684,991.25	
16	5/14/2013	Chicago	Accessories	\$ 312,948.71	
17	5/15/2013	Cincinnati	Tickets	\$ 32,950.00	
18	5/15/2013	Cincinnati	Concessions	\$ 21,435.00	
19	5/15/2013	Cincinnati	Clothing	\$ 275,118.00	
20	5/15/2013	Cincinnati	Accessories	\$ 192,412.32	
21				\$ 3,017,122.32	\$ 684,991.25
22					
23	5/17/2013	Louisville	Tickets	\$ 41,883.00	
24	5/17/2013	Louisville	Concessions	\$ 29,147.31	
25	5/17/2013	Louisville	Clothing	\$ 325,184.82	
26	5/17/2013	Louisville	Accessories	\$ 215,948.63	
27	5/21/2013	Dayton	Tickets	\$ 28,552.00	
28	5/21/2013	Dayton	Concessions	\$ 19,045.19	

Custom subtotals generated with macro



### Another Way

In the green status bar along the bottom of the Excel window, there's an icon that looks like a worksheet with a dot in the upper left corner, as shown in Figure 9-44. Click this to bypass the ribbon and immediately start recording a new macro. Click the same spot again to stop recording.

- 23.** Click the FILE tab, and then click Save As.

- 24.** In Backstage, locate the Lesson 9 folder.

- 25.** In the Save As dialog box, under Save as type, choose **Excel Macro-Enabled Workbook (\*.xlsm)**.

SAVE the workbook as **09 4Strong Tour Revenues Solution.xlsm** and leave it open for the next exercise.

**Figure 9-44**

Alternate record macro button



Record macro

For security reasons, Excel no longer saves macros in its regular .XLS and .XLSX files. This is due to how often the macros feature was maliciously used by people sending Excel workbooks to others via e-mail attachments. Now, the only way to save a macro-enabled workbook is to give it the special .XLSM file type. This way, companies that want to avoid any possibility of spreading malware can enforce policies preventing .XLSM files from being attached to or received within e-mails.

### Running a Macro

A recorded macro follows the steps you gave Excel during the recording process. For that reason, it's up to you to prepare the worksheet and select the cell you want before you begin. You can play back any macro by selecting it from the Macro dialog box. But it's generally easier to assign it to a keystroke, as you did in the previous exercise, and simply launch it from the keyboard.

**STEP BY STEP****Run a Macro**

GET READY. USE the workbook from the previous exercise.

1. Click cell **D39**.
2. On the DEVELOPER tab, in the Code group, click **Macros**.
3. In the Macro dialog box, click **CustomSubtotals**. Click **Run**. The custom subtotals row is added immediately, with a one-row gap between the clusters.
4. Click cell **D57**.
5. Press **Ctrl + Shift + S**. The custom subtotals row appears here immediately.

SAVE the workbook and leave it open for the next exercise.

## Managing Macro Security

Because of the proliferation of malicious software, Microsoft has set up Excel so that after it's installed, you cannot execute macros from a file you open (even an explicitly macro-enabled workbook) until you read the notification and click Enable Content. If you never plan to run macros or if you're skeptical about your office colleagues, you can turn off macros completely. You can also turn off the notifications and enable all macros, if you work in an office such as a financial services provider where macros are in use constantly, you trust the source of the Excel workbooks, and notifications would only get in the way.

**STEP BY STEP****Manage Macro Security**
**CERTIFICATION  
READY?** **1.4.5**

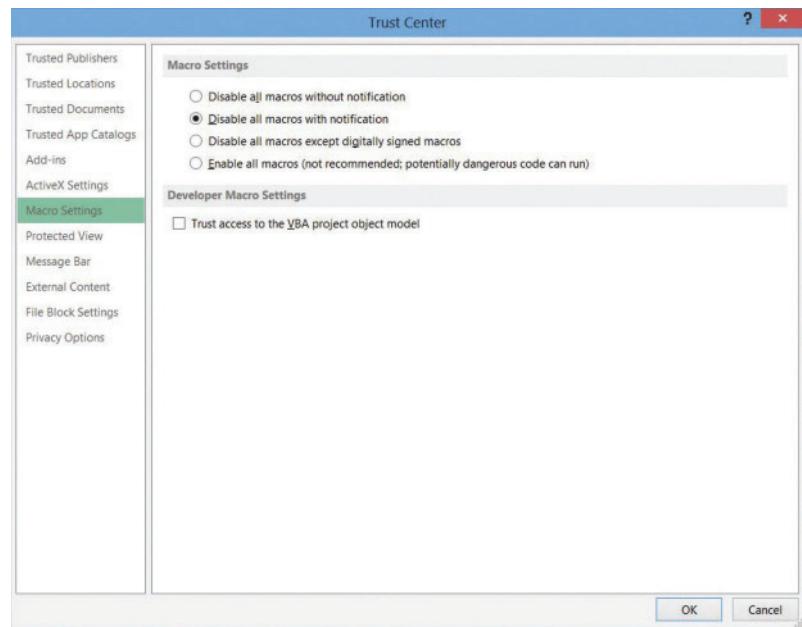
How do you manage macro security?

GET READY. USE the workbook from the previous exercise.

1. On the DEVELOPER tab, in the Code group, click **Macro Security**.
2. In the Trust Center dialog box (see Figure 9-45), click **Disable all macros with notification** to have Excel warn you whenever an opened workbook contains macros, enabling you to turn those macros on or off based on your decision.

**Figure 9-45**

Trust Center with macro protection settings



3. Click **OK**.

CLOSE the workbook. CLOSE Excel.

## SKILL SUMMARY

In this lesson you learned how:	Exam Objective	Objective Number
To import data.	Open non-native files directly in Excel.	1.1.4
	Import files.	1.1.3
	Append data to worksheets.	2.1.1
To ensure your data's integrity.	Set data validation.	1.3.8
To sort data.		
To filter data.		
To outline and subtotal data.	Create outlines.	2.3.5
	Collapse groups of data in outlines.	2.3.6
	Insert subtotals.	2.3.7
To set up data in a table format.	Apply styles to tables.	3.2.1
	Band rows and columns.	3.2.2
	Remove styles from tables.	3.2.4
	Define titles.	3.1.3
	Insert total rows.	3.2.3
	Add and remove cells within tables.	3.1.2
	Filter records.	3.3.1
	Sort data on multiple columns.	3.3.2
	Change sort order.	3.3.3
	Remove duplicates.	3.3.4
	Move between tables and ranges.	3.1.1
To save work with macros.	Assign shortcut keys.	1.4.12
	Record simple macros.	1.4.7
	Manage macro security.	1.4.5

## Knowledge Assessment

### Multiple Choice

Select the best response for the following statements.

1. Which of the following procedures is *not* a way to sort a table by the contents of one column?
  - a. Click the Sort button in the Sort & Filter group of the DATA tab.
  - b. Click an AutoFilter button in the total row.
  - c. Click an AutoFilter button in the field names row.
  - d. Click the Filter button in the Sort & Filter group of the DATA tab.

2. Which is a valid reason you'd want to convert a table to a range?
  - a. To clear the sorting criteria and start over.
  - b. To prepare for deleting a column.
  - c. To prepare for importing new data from a non-Excel file.
  - d. To prepare to change its conditional formatting.
3. Which of the following is the difference between an Auto Outlined worksheet and a worksheet with multiple groups?
  - a. None.
  - b. Only an Auto Outlined worksheet may contain total rows.
  - c. An Auto Outlined worksheet contains only one button for collapsing and expanding.
  - d. Only a multi-grouped worksheet can cluster rows and columns.
4. Which of the following is a correct reference to the cell in the Total Sale column on the rightmost side of a table called Auction Items?
  - a. Table[Auction Items(Total Sale)]
  - b. Auction Items(Total Sale)
  - c. Auction Items[#Totals]
  - d. #Totals[Total Sale]
5. Which of the following procedures is *not* a way to filter a table by the contents of one column?
  - a. Click the criterion button on the slicer.
  - b. Right-click the cell whose contents you want for the criterion, and click Filter in the menu.
  - c. Click the Filter button in the Sort & Filter group of the DATA tab.
  - d. Click the AutoFilter button in the total row at the bottom.
6. Which of the following attributes is *not* a potential criterion for an AutoFilter sort?
  - a. Font color
  - b. Font style
  - c. Cell color
  - d. Cell icon
7. Which is the difference between an AutoFiltered range of records in a list and a table?
  - a. None.
  - b. A table maintains its sort order after you close and then open it again.
  - c. A table given a title enables its field names to be used in formulas in place of cell references.
  - d. A table enables special subtotal functions for total rows.
8. Which characters may not be used to begin a field name in a table?
  - a. = @ -
  - b. \$ = (
  - c. % { [
  - d. \$ % @
9. Which is the reason you would want to record a macro with absolute references rather than relative?
  - a. You want to preserve the integrity of any cells referenced by formulas in the macro.
  - b. You want the values of any cells copied to the macro to be accurate.
  - c. You want the results of any formulas produced by the macro to be accurate.
  - d. You want the macro to reproduce its results in the same place each time.
10. From which of the following does Excel *not* have features for importing data?
  - a. An active database
  - b. A Web page
  - c. A Web search
  - d. An XML file

### True / False

Circle T if the statement is true or F if the statement is false.

- T   F   1. You remove duplicate rows from a table the same way you would for a named range of AutoFiltered records.
- T   F   2. You cannot sort a table in alphabetical or numerical order for one column and by conditional formatting for another column at the same time.

- T F** 3. When importing data from a text file, you can tell Excel to recognize a character other than a comma as a field delimiter.
- T F** 4. You can have no more than two criteria in a custom AutoFilter.
- T F** 5. Immediately after you group together a cluster of adjacent rows, Excel prompts you to create a total row beneath it.
- T F** 6. Once you remove an automatic style from a table, it is no longer a table.
- T F** 7. The title given to a table appears above the field names row.
- T F** 8. The @ character is required before any reference to a specific value in a named row.
- T F** 9. Field names in a table, as opposed to a named range, must begin with an alphabetic character.
- T F** 10. Excel will not let any macro run in a worksheet without the user's direct approval, unless the option for that notification is explicitly turned off.

## Competency Assessment

### Project 9-1: Home Buying Comparison

You've created a list of homes available for sale in your neighborhood with some important characteristics you want to compare with one another. You're wondering whether your realtor is asking as much for your house as she could be asking. In this project, you'll generate a table, filter the table by multiple criteria, and calculate the average asking price for homes in the neighborhood that meet the criteria.

GET READY. LAUNCH Excel if it is not already open.



1. OPEN **09 Homes for Sale** from the files for this lesson.
2. SAVE the workbook as **09 Homes for Sale 3-19 Solution**.
3. Click any cell in the data range. On the HOME tab, in the Styles group, click **Format as Table**. Give the table the style **Table Style Light 19**. Click **OK**.
4. On the DESIGN tab, in the Table Style Options group, click **First Column**.
5. Click cell **A23**.
6. On the HOME tab, in the Editing group, click the down arrow button next to **AutoSum**. In the menu, click **Average**.
7. Click the filter button for **Fireplace**. In the menu, clear the checked boxes and then check the box for **Y**. Click **OK**.
8. Repeat this process for the **Great Room** column.
9. Click the down arrow beside **Sq. Ft.** In the menu, click **Number Filters**, and then click **Greater Than Or Equal To**.
10. In the Custom AutoFilter dialog box, next to **is greater than or equal to**, type **1900**. Click **OK**. The table now shows all homes for sale in the neighborhood with a fireplace and a great room, and with 1,900 square feet or more. The total row shows the average asking price for only the six houses shown.

SAVE and CLOSE this workbook. Leave Excel open for the next project.

### Project 9-2: Fundraising Revenue Summary

You're a volunteer for a charity that generates money for worthwhile causes by gathering together famous athletes for public events. In this project, you will generate collapsible subtotal rows for a list of moneys raised at various tour stops.

GET READY. LAUNCH Excel if it is not already open.



1. OPEN **09 4Strong Tour Revenues.xlsx** from the files for this lesson. Note that this is *not* the .xlsm solution file you created during the Recording a Basic Macro exercise.
2. SAVE the workbook as **09 4Strong Tour Revenues Summary Solution.xlsx**.
3. Select the range **A4:D232**.
4. On the DATA tab, in the Outline group, click **Subtotal**.
5. In the Subtotal dialog box, set **At each change in** to **Tour Stop Date**. Set **Use function** to **Sum**. Check only the **Sales** box under **Add subtotal to**. Check **Summary below data**. Click **OK**.
6. After the groups are all added, in the Outline group, click **Hide Detail**.
7. Expand column **D** if necessary to make room for the Grand Total at the bottom.

SAVE and CLOSE this workbook. Leave Excel open for the next project.

## Proficiency Assessment

### Project 9-3: Hot Sauce Sales Report

You work in the accounting department of a nonprofit organization that manufactures jars of various recipes of homemade hot sauce, for resale by charity groups. In this project, you combine three sheets worth of data into a single sheet that can be expanded and collapsed, and that shows subtotals for each month.

GET READY. LAUNCH Excel if it is not already open.



1. OPEN **09 Hot Sauce Sales Q1** from the files for this lesson.
2. SAVE the workbook as **09 Hot Sauce Sales Q1 Report Solution**.
3. Click the **February** tab.
4. Select cell range **A6:J30**.
5. Copy the range to the **January** worksheet starting at cell **A32**.
6. Adjust the formulas in Gross Sales for the copied region to point to the correct cells in the **Unit Prices** worksheet, starting with cell **B9**.
7. Repeat the process, copying the range in the **March** worksheet to **January**, with the top left cell in **A58**. Be sure to correct the Gross Sales formulas.
8. Adjust the height of rows with column headers to more appropriately fit their contents.
9. Click cell **B4** and type **First quarter 2013**.
10. Click cell **A6** and type **January**. Repeat this for the respective cells in the other two months' tables.
11. Delete the **February** and **March** worksheets.
12. Rename the **January** worksheet **First quarter**.
13. Select row **17** and insert a new row.
14. Create AutoSum formulas for January Unit Sales columns **B** through **J**, giving a special boldface to **J17**.
15. Copy row **17** and insert it below the Unit Sales tables for the other two months.
16. Create AutoSum formulas for January Gross Sales columns **B** through **I**. Copy these formulas to February and March.
17. Select rows **8** through **16**. On the DATA tab, in the Outline group, click the **Group** button.
18. Repeat this process for the remaining five tables.
19. Select columns **B** through **I**. Click the **Group** button.

20. Select the entire worksheet. In the Outline group, click **Hide Detail**. Both rows and columns are collapsed to reveal just the sales summaries. Widen column J, if necessary.

SAVE and CLOSE this workbook. Leave Excel open for the next project.

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### Project 9-4: Employee Archive Rescue

You're helping a colleague to restore some lost data, by reconstructing it from old backups. One of these backup files is an .MDB format database file. In this project, you'll import the data from that file into an Excel table, and correcting the formulas inside that table.

GET READY. LAUNCH Excel if it is not already open.

1. OPEN a **Blank workbook**.
2. On the DATA tab, in the Get External Data group, click **From Access**.
3. In the Select Data Source dialog box, locate and select **09CMKPAY.mdb**. Click **Open**.
4. In the Import Data dialog box, leave the settings for a new Table in an Existing worksheet. Set the target location to the upper left corner cell. Click **OK**.
5. After the table is imported, use the Name Manager dialog box to rename the table from **Table\_09\_CMKPAY** to **Employees**.
6. Change all the contents of columns **D** through **L** to Accounting number format.
7. Insert a new column between **LTD** and **NET\_PAY** and name it **Total Deductions**.
8. Click cell **L2** and type the following formula:  
**=SUM(Employees[@[FED\_TAX]:[LTD]])**
9. Note how the colon in-between the two field names FED\_TAX and LTD makes this reference into a range, just as it would if you entered D2:K2. The formula you entered automatically fills down the rest of the column.
10. For cell **M2**, type the following formula:  
**=[GROSS\_PAY]-[Total deductions]**
11. Note that when the formula is used *inside* the table, which is the case here, you can omit the @ prefix from the reference, which otherwise means "on this row."
12. Because the rest of the column is nonblank, use the fill handle to fill the new formula down to cell **M11**.
13. Group columns **E** through **K** together and collapse them.

SAVE the workbook as **09 Charter Employees Solution**. Leave the workbook open for the next project.

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## Mastery Assessment

### Project 9-5: Macro for Table Reconciliation

The remainder of the employees file you're trying to reconstruct resides in an old Excel worksheet. The problem is that the data in that worksheet is all comprised of totals from consolidation formulas, and each employee record is a header for a collapsed group. When you copy the records, you end up copying everything except the data used in the consolidation, resulting in a sheet full of #REF! errors. You need a copying function that Excel doesn't have. In this project, you'll record a macro that fulfills the job of copying just the data you need, saving you the hassle of copying all the errors and weeding them out.

GET READY. USE the workbook from the previous project.

1. OPEN **09 2006+ Employees.xls** from the data files for this lesson. Dismiss the usual security warning.



2. Arrange the **2006+ Employees** and **Charter Employees** windows side-by-side.
3. In the 2006+ Employees window, click the **Sheet1** tab. Click cell **A7** (ID).
4. In the Charter Employees window, create a new worksheet **Sheet2**. Click cell **A1**.
5. In the Charter Employees window, on the DEVELOPER tab, click the **Code** group to ensure **Use Relative References** is highlighted.
6. In the Code group, click **Record Macro**.
7. In the Record Macro dialog box, name the macro **CopyValRecord**. Assign it the keystroke **Ctrl + Shift + C**. Click **OK** to begin recording.
8. Switch to the **2006+ Employees** window.
9. Hold down **Shift** and click cell **P7** to select the entire row.
10. On the HOME tab, in the Clipboard group, click **Copy**.
11. Switch to the **Charter Employees** window.
12. In the Clipboard group, click **Paste Values**. The headings row should appear in the worksheet.
13. Press **Left Arrow**, and then press **Down Arrow**. Cell **A2** should be the active cell.
14. Switch to the **2006+ Employees** window. Press **Left Arrow**, and then press **Down Arrow**.
15. Switch to the **Charter Employees** window. On the DEVELOPER tab, in the Code group, click **Stop Recording**.
16. To test the macro's effectiveness, leave the same cells selected in both worksheets, and press **Ctrl + Shift + C**. In a moment, Excel should have copied over the next row, ID# 38448, which is actually three rows down in the old employees' worksheet.
17. Keep pressing **Ctrl + Shift + C** until the last customer, ID #55412, has been copied into row **36**.

SAVE the newly loaded workbook as **09 Charter Employees Solution.xlsxm**. CLOSE the 2006+ Employees workbook and leave Charter Employees open for the next project.

## Project 9-6: Reconciling Tables

You now have two employee tables of different ages imported into separate worksheets. You need to reconcile them into a single table, but the problem is that you need to keep some aspects of both tables and discard certain aspects of others. The solution is to make the tables structurally equivalent to one another, copy the data from one into the other, and then trim any unwanted parts from the product.

GET READY. USE the **09 Charter Employees Solution.xlsxm** workbook from the previous project.

1. OPEN **Sheet2**. Change the number formats for cell ranges **F2:L36** and **N2:P36** to **Accounting**. Change the number formats for **M2:M36** to **Percentage with two decimal places**.
2. OPEN **Sheet1** and expand the group. Change the heading for column **J** to **401K**. Add a new column to the left of 401K named **401K rate**. Add three columns to the right of Employee Name called **Title**, **First name**, and **Last name**. Move **Employee ID** to column **B**. Rename the **REGULAR\_HO** column **Hours**. Add a column to the right of Hours named **Rate**. Delete the **Total Deductions** column. Leave **NET\_PAY** erroneous for the moment.
3. Copy the contents of **Sheet2** to the end of the table in **Sheet1** so that their **Employee ID** fields align with one another.
4. Relocate the rows with full-name entries in the **Employee Name** column to the bottom of the table in **Sheet1**, so that the relocated cells are automatically given the table format.
5. Click any cell in the table. On the DATA tab, in the Data Tools group, click **Remove Duplicates**.
6. In the Remove Duplicates dialog box, deselect all fields except the unique **Employee ID** number. Click **OK**. Excel reports the number of duplicate employee records that were removed. Click **OK** to dismiss the notice.

7. Because all the old employees were apparently duplicated, delete the **Employee Name** column.
8. Re-insert the **Total deductions** column and just before the **NET\_Pay** column, type its formula, this time being careful to omit **401K rate** from the calculation.
9. Enter a new formula for the **NET\_PAY** column starting at the top row and filling down, subtracting **Total deductions** from **GROSS\_PAY**.
10. Widen any partly-visible columns if necessary.
11. Apply boldface to the final column of the table.

SAVE the workbook as **09 Charter Employees Solution 2.xlsxm**. CLOSE Excel.

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## Circling Back 2

The Graphic Design Institute tracks many different types of data on its students, such as name, country of origin, the general type of program (accelerated or regular), tuition costs, and the month in which the student starts his or her program. In addition, instructors must maintain grade books, which track grades for each student for each course taken. In this set of projects, you apply formatting to cells and entire worksheets, search and replace text in individual worksheets and across a workbook, and sort, filter, and subtotal data tables.

### Project 1: Formatting Cells and Ranges

In this project, you format cells using character attributes, cell styles, and a number of other techniques to give the Student Roster workbook a professional finish.

GET READY. LAUNCH Excel if it is not already running.



1. OPEN **Student Roster**.
2. Select cells **A1:E1**. On the HOME tab, in the Alignment group, click the **Merge & Center** button.
3. Select cells **A2:E2**. On the HOME tab, in the Alignment group, click the **Merge & Center** button.
4. Select cells **A3:E3**. Right-click and select **Delete**. In the Delete dialog box, ensure **Shift cells up** is selected and click **OK**.
5. Select cells **A3:E3**. On the HOME tab, in the Font group, click the **Bold** button.
6. Select columns **C** and **D**. On the HOME tab, in the Alignment group, click the **Center** button.
7. Click cell **A1**. On the HOME tab, in the Styles group, click the **Cell Styles** button arrow to display the gallery.
8. Select the **Title** style.
9. Select cell **A2**. On the HOME tab, in the Styles group, click the **Cell Styles** button arrow, and then under Themed Cell Styles, select **Accent1**.
10. Apply bold to cell **A2**.
11. Select cells **D4:D46**. On the HOME tab, in the Number group, open the **Number Format** drop-down menu and select **Accounting**.
12. In the Number group, click the **Decrease Decimal** button until no decimal places display.
13. Click cell **A4**. Click the **VIEW** tab, and in the Window group, click the **Freeze Panes** button arrow and select **Freeze Panes**.
14. SAVE the workbook as **Student Roster 1 Solution** in the Circling Back folder.

LEAVE the workbook open for the next project.

### Project 2: Formatting Worksheets

Apply the formatting skills you learned in Lesson 6 to adjust the size of rows and columns in the Student Roster worksheet, add a header and footer, and fix the formatting of a repeated word using the Replace feature.

GET READY. USE the workbook you saved in the previous project.

1. Double-click the border between the rows 1 and 2 headings to automatically resize row 1 to fit the contents.

2. Select row 2. On the HOME tab, in the Cells group, click the **Format** button arrow, select **Row Height**, in the Row Height text box, type **18.75**, and then click **OK**.
3. Double-click the border between the columns D and E headings to automatically resize column D to fit the contents.
4. Click the **PAGE LAYOUT** tab, and in the Themes group, click the **Themes** button arrow to open the gallery. Select the **Integral** theme.
5. Click cell **A1**. Click the **HOME** tab, and in the Font group, change the font size to **24**.
6. Change the font size of the content in cell **A2** to **14**.
7. Select cells **A3:E46**. Change the font size to **12**.
8. Adjust the size of each column as follows:
  - Column A: **20**
  - Column B: **15**
  - Column C: **12**
  - Column D: **10**
  - Column E: **13**
9. Click the **VIEW** tab, and in the Window group, click the **Freeze Panes** button arrow, and then select **Unfreeze Panes**.
10. Click the **INSERT** tab, and in the Text group, click the **Header & Footer** button.
11. Click the **HEADER & FOOTER TOOLS DESIGN** tab, in the Header & Footer group, click the **Header** button arrow, and then select **Sheet1, Confidential, Page 1**.
12. Click anywhere in the header. On the HEADER & FOOTER TOOLS DESIGN tab, in the Navigation group, click the **Go to Footer** button.
13. In the Header & Footer group, click the **Footer** button arrow and select the **file name** option, which is the sixth option in the list.
14. Press **Ctrl + H** to open the Find and Replace dialog box to the Replace tab. In the Find What box, type **accelerated** and press **Tab**. In the Replace With box, type **Accelerated**. Click the **Options** button and select the **Match case** checkbox. Click the **Replace All** button. After the words are replaced, click **OK**, and then click **Close**.
15. On the status bar, click the **Normal** view button to return to Normal view.
16. SAVE the workbook as **Student Roster 2 Solution** in the Circling Back folder, and then CLOSE the file.

LEAVE Excel open for the next project.

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### Project 3: Managing Worksheets

In this project, you help an instructor add the GPA worksheet to a grade book and reorganize the worksheets within the grade book. You will also show the instructor how easy it is to find and replace data across worksheets in a workbook.

GET READY. LAUNCH Excel if it is not already running.



1. OPEN **Grade Book** and **GPA**.
2. In the **GPA** workbook, right-click **Sheet1** and select **Move or Copy**.
3. In the Move or Copy dialog box, open the **To Book** drop-down menu and select **Grade Book.xlsx**.
4. Under Before Sheet, select **(move to end)** and click **OK**. The GPA worksheet is added to the Grade Book workbook, and the GPA workbook closes.
5. In the **Grade Book** workbook, right-click the **Sheet1** tab, select **Rename**, and type **Graphic Design 1**.
6. Rename the Sheet2 tab to **Digital Media 1**.
7. Rename the Sheet3 tab to **Typography 1**.

8. Rename the last sheet tab to **GPA**.
9. Click and hold the **Digital Media 1** tab. Drag and drop it after the **Typography 1** tab.
10. Right-click the **GPA** sheet tab, point to **Tab Color**, and under Standard Colors, select the **Purple color** box.
11. You must replace every instance of **Herp** in the Last Name column and **Jesper** in the First Name column with **Byham** and **Richard A.**, respectively. The change must be made to the first three worksheets. To do so, select the **Graphic Design 1**, **Typography 1**, and **Digital Media 1** sheet tabs. You can select all of them by pressing the **Shift** key while you click each sheet tab.
12. Press **Ctrl + H** to open the Find and Replace dialog box to the Replace tab.
13. In the Find What box, type **Herp**. In the Replace With box, type **Byham**. Click **Replace All** and then click **OK**.
14. In the Find and Replace dialog box, in the Find What box, type **Jesper** and in the Replace With box, type **Richard A.**. Click **Replace All** and then click **OK**. Click **Close** to close the Find and Replace dialog box.
15. Right-click any of the grouped sheet tabs and select **Ungroup Sheets**.
16. Click each of the three sheet tabs and verify that the names were replaced appropriately.
17. SAVE the workbook as **Grade Book Solution** in the Circling Back folder, and then CLOSE the file.

LEAVE Excel open for the next project.

## Project 4: Working with Data

The chief financial officer created a new worksheet based on the Contributions worksheet. She would like you to create two groups—one for organizations and another for individuals. In each group, she wants you to sort by the type of fund and then the contribution amount (highest to lowest), and provide subtotals for each fund in both groups.

GET READY. LAUNCH Excel if it is not already running.



1. OPEN **Contributions 2**.
2. Before row 4, insert a blank row. In cell A4, type **Organizations** and press **Enter**.
3. Insert two blank rows before row 23 (just before the row that contains “Voss, Florian”). In cell A24, type **Individuals** and press **Enter**.
4. Bold the content in cell **A24**. Select **A24:C24**. If necessary, click the **HOME** tab, in the **Clipboard** group, click the **Format Painter** button. Copy the formatting from cells **A24:C24** to **A4:C4**.
5. Select rows **4:22**.
6. Click the **DATA** tab, and in the **Outline** group, click the **Group** button. A group indicator line is added to the left of the row markers and an outline symbol on the row just below the end of the group.
7. Select rows **24** through **35** (all of the individuals in the Contributions worksheet).
8. On the **DATA** tab, in the **Outline** group, click the **Group** button.
9. Select rows **5:22**.
10. On the **DATA** tab, in the **Sort & Filter** group, click **Sort**.
11. In the **Sort** dialog box, clear the **My Data has Headers** check box if it is selected. In the **Sort By** drop-down menu, select **Column B**. In the **Order** drop-down menu, ensure **A to Z** appears. Click the **Add Level** button. In the **Then By** drop-down menu, select **Column C**, and in the **Order** drop-down menu, select **Largest to Smallest**. Click **OK**.
12. Select rows **25:35** and repeat steps 10 and 11.
13. Select rows **3:35**. Be sure the column headings (in row 3) are included in the selection.

14. On the DATA tab, in the Outline group, click **Subtotal**. The Subtotal dialog box appears.
15. In the At Each Change In list box, select **Fund**.
16. In the Use Function list box, verify that **Sum** appears.
17. In the Add Subtotal To list box, verify that only **Amount** is selected.
18. Near the bottom of the dialog box, verify that only **Replace Current Subtotals** and **Summary Below Data** are selected.
19. Click **OK**. Excel inserts subtotal rows after each type of fund in both groups.
20. Highlight row **45** (the Total Contributions row). Use the Format Painter to copy formatting from row **45** to row **44**.
21. Delete row **45**.
22. SAVE the workbook as **Contributions Sorted Solution** in the Circling Back folder, and then CLOSE the file.

CLOSE Excel.

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# Using Advanced Formulas 10

## LESSON SKILL MATRIX

Skills	Exam Objective	Objective Number
Using Formulas to Conditionally Summarize Data	Demonstrate how to apply the SUMIF function.	4.3.1
	Demonstrate how to apply the COUNTIF function.	4.3.3
	Demonstrate how to apply the AVERAGEIF function.	4.3.2
Using Formulas to Look up data in a workbook		
Adding Conditional Logic Functions to Formulas		
Using Formulas to Modify Text	Demonstrate how to use the RIGHT, LEFT, and MID functions.	4.4.1
	Demonstrate how to use the TRIM function.	4.4.2
	Demonstrate how to use the UPPER and LOWER functions.	4.4.3
	Demonstrate how to use the CONCATENATE function.	4.4.4

## KEY TERMS

- arguments
- conditional formula
- criteria
- lookup functions
- table
- table array





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Fabrikam, Inc. uses several of Excel's analytical tools to review sales data during strategic planning activities. Fabrikam's owners created a bonus program as part of the company's employee-retention efforts and to encourage individual sales agents and all employees to support the total sales goals. The bonus is based on years of service and when an agent reaches his or her sales goal for the year. Fabrikam realizes that all back office employees support the sales agents and so it gives a bonus to the entire staff if the total sales goal is met. To determine which agents and employees will receive the performance bonus, Fabrikam's accountants must create formulas to analyze the company's sales data. Excel's built-in formulas are the perfect solution to compute and display all the calculations the accountants need. You learn to apply these formulas in the exercises in this lesson.

## SOFTWARE ORIENTATION

### The FORMULAS Tab

In this lesson, you use commands on the FORMULAS tab to create formulas to conditionally summarize data, look up data, apply conditional logic, and modify text. The FORMULAS tab is shown in Figure 10-1.

Use to Apply conditional logic (IF, AND, OR...).	Use to modify text.	Use to create VLOOKUP and HLOOKUP formulas.	Create and use named ranges in formulas.
Math & Trigs contains SUM and SUMIF.			
	Use Statistical Formulas choice for COUNTIF, COUNTIFS, AVERAGEIF, AVERAGEIFS.		
		Define Name, Name Manager, Create from Selection.	
		Trace Precedents, Trace Dependents, Remove Arrows.	
		Error Checking, Evaluate Formula.	
		Watch Window, Calculation Options.	Calculate Now, Calculate Sheet.

**Figure 10-1**  
FORMULAS tab

Math & Trigs contains  
SUM and SUMIF.

Use Statistical Formulas choice  
for COUNTIF, COUNTIFS,  
AVERAGEIF, AVERAGEIFS.

The FORMULAS tab contains the command groups you use to create and apply advanced formulas in Excel. Use this illustration as a reference throughout the lesson. Table 10-1 summarizes the functions covered in this lesson and includes where the functions are located on the FORMULAS tab.

**Table 10-1**

Location and description of functions in this Lesson	Function	Category	Syntax	Description
	SUMIF	Math & Trig	SUMIF(Range, Criteria, [Sum_Range])	Adds the cells in Range or Sum_Range specified by a given Criteria.
	SUMIFS	Math & Trig	SUMIFS(Sum_Range, Criteria_Range1, Criteria1, [Criteria_Range2, Criteria2], ...)	Adds the cells in Sum_Range that meet multiple Criteria.
	COUNTIF	More Functions > Statistical	COUNTIF(Range, Criteria)	Counts the number of cells within Range that meet the Criteria.
	COUNTIFS	More Functions > Statistical	COUNTIFS(Criteria_Range1, Criteria1, [Criteria_Range2, Criteria2], ...)	Counts the number of cells within multiple Criteria_Range# that meet Criteria#.
	AVERAGEIF	More Functions > Statistical	AVERAGEIF(Range, Criteria, [Average_Range])	Returns the arithmetic mean of cells in Range or Average_Range that meet a Criteria.
	AVERAGEIFS	More Functions > Statistical	AVERAGEIFS(Average_Range, Criteria_Range1, Criteria1, [Criteria_Range2, Criteria2], ...)	Returns the mean of cells in Average_Range that meet multiple Criteria.
	VLOOKUP	Lookup & Reference	VLOOKUP(Lookup_Value, Table_Array, Col_Index_Num, [Range_Lookup])	Searches for a value in the first column of Table_Array and returns a value in the same row from Col_Index_Num.
	HLOOKUP	Lookup & Reference	HLOOKUP(Lookup_Value, Table_Array, Row_Index_Num, [Range_Lookup])	Searches for a value in the top row of Table_Array and returns a value in the same column from Row_Index_Num.
	IF	Logical	IF(Logical_Test, [Value_If_True], [Value_If_False])	When Logical_Test is TRUE, returns Value_If_True; otherwise, it returns Value_If_False.
	AND	Logical	AND(Logical1, [Logical2], ...)	Returns TRUE if all Logical1... are TRUE; returns FALSE if any Logical1... is FALSE.
	OR	Logical	OR(Logical1, [Logical2], ...)	Returns TRUE if any Logical1... is TRUE; returns FALSE if all Logical1... are FALSE.
	NOT	Logical	NOT(Logical)	If Logical is TRUE, it returns FALSE and if Logical is FALSE, it returns TRUE.
	IFERROR	Logical	IFERROR(Value, Value_If_Error)	Returns Value_If_Error if a formula evaluates to an error; otherwise, it returns Value.
	LEFT	Text	LEFT(Text, [Num_Chars])	Returns the left Num_Chars from text.

**Table 10-1**

Location and description of functions in this Lesson

Function	Category	Syntax	Description
RIGHT	Text	RIGHT(Text,[Num_Chars])	Returns the right Num_Chars from text.
MID	Text	MID(Text, Start_Num, Num_Chars)	Returns Num_Chars from the Text starting at Start_Num.
TRIM	Text	TRIM(Text)	Removes spaces at beginning and end of text.
PROPER	Text	PROPER(Text)	Capitalizes the first letter in each word of text.
UPPER	Text	UPPER(Text)	Converts text to uppercase.
LOWER	Text	LOWER(Text)	Converts text to lowercase.
CONCATENATE	Text	CONCATENATE(Text1, [Text2], ...)	Joins Text1 Text2...
FIND	Text	FIND(Find_Text, Within_Text, [Start_Num])	Gives number where Within_Text starts inside of Find_Text.
SUBSTITUTE	Text	SUBSTITUTE(Text, Old_Text, New_Text, [Instance_Num])	Substitutes New_Text for Old_Text in text.



## Workplace Ready

### BEGIN YOUR EXCEL PORTFOLIO

If you are just beginning your career, you may get the question, “How well do you know Excel?” How do you answer a general question like that? Instead of a general response such as, “I know Excel fairly well,” it might be more helpful to both you and your potential employer if you have specifics about what features of Excel you’ve used. For some employers, the number of functions you know and can use is a good indication of an answer to that question. Some people never use more than SUM and AVERAGE and perhaps a couple of other functions. One recommendation is to create a spreadsheet that lists the features and functions you use, such as the one that follows, and keep a notebook (electronic and three-ring binder) of the workbooks that illustrate those features. In addition to providing a great visual example of your work, you then have a much more meaningful answer to the “How well do you know Excel?” question.

In addition to Excel, you might want to expand this list to include all applications you use.

Date	Feature	SubFeature	For	Document
3/29/2014	Functions	MAX, MIN	Contoso Pharmaceuticals	2013 Advertising Summary.xlsx
4/5/2014	Functions	SUMIF, COUNTIF, IF	Fabrikam, Inc.	2013 Employee Bonuses.xlsx
4/16/2014	Formatting	Conditional	Lucerne Publishing	2013 Author Deadlines.xlsx
4/29/2014	Charts	Stocks	Trey Research	10 Top Stock.xlsx
5/20/2014	Functions	FIND, PROPER, CONCATENATE	Margie's Travel	2014 1st Qtr top Destinations.xlsx

## USING FORMULAS TO CONDITIONALLY SUMMARIZE DATA

### Bottom Line

As you learn in Lesson 4, “Using Basic Formulas,” a formula is an equation that performs calculations—such as addition, subtraction, multiplication, and division—on values in a worksheet. When you enter a formula in a cell, the formula is stored internally and the results are displayed in the cell. Formulas give results and solutions that help you assess and analyze data. As you learned in Lesson 6, “Formatting Cells and Ranges,” you can use a conditional format—which changes the appearance of a cell range based on a criterion—to help you analyze data, detect critical issues, identify patterns, and visually explore trends.

Conditional formulas add yet another dimension to data analysis by summarizing data that meets one or more criteria. **Criteria** can be a number, text, or expression that tests which cells to sum, count, or average. A conditional formula is one in which the result is determined by the presence or absence of a particular condition. Conditional formulas used in Excel include the functions SUMIF, COUNTIF, and AVERAGEIF that check for one criterion, or their counterparts SUMIFS, COUNTIFS, and AVERAGEIFS that check for multiple criteria.

### Using SUMIF

The SUMIF function calculates the total of only those cells that meet a given criterion or condition. The syntax for the SUMIF function is `SUMIF(Range, Criteria, Sum_range)`. The values that a function uses to perform operations or calculations in a formula are called **arguments**. Thus, the arguments of the SUMIF function are Range, Criteria, and Sum\_range, which, when used together, create a conditional formula in which only those cells that meet a stated Criteria are added. Cells within the Range that do not meet the criterion are not included in the total. If you use the numbers in the range for the sum, the *Sum\_range* argument is not required. However, if you are using the criteria to test which values to sum from a different column, then the range becomes the tested values and the *Sum\_range* determines which numbers to total in the same rows as the matching criteria. In this chapter, optional arguments will be in italics.

### STEP BY STEP

### Use the SUMIF Function

Table 10-2 explains the meaning of each argument in the SUMIF syntax. Note that if you omit *Sum\_range* from the formula, Excel evaluates and adds the cells in the range if they match the criterion.

**Table 10-2**

Arguments in the SUMIF syntax

Argument	Explanation
Range	The range of cells that you want the function to evaluate. Also add the matched cells if the <i>Sum_range</i> is blank.
Criteria	The condition or criterion in the form of a number, expression, or text entry that defines which cells will be added.
Sum_range	The cells to add if the corresponding row's cells in the Range match the criteria. If this is blank, use the Range for both the cells to add and the cells to evaluate the criteria against.

GET READY. LAUNCH Excel.



- OPEN the **10 Fabrikam Sales** file for this lesson, and SAVE it to the Lesson 10 folder as **10 Fabrikam Sales Solution**.

2. Select C20. Click the FORMULAS tab and in the Function Library group, click Math & Trig. Scroll and click SUMIF. The Function Arguments dialog box opens with text boxes for the arguments, a description of the formula, and a description of each argument.
3. In the Function Arguments dialog box, click the Collapse Dialog button for the Range argument. This allows you to see more of the worksheet. Select the cell range C5:C16. Press Enter. By doing this, you apply the cell range that the formula will use in the calculation.
4. In the Criteria box, type >200000 and press Tab. Figure 10-2 shows that the Sum\_range text box is not bold. This means that this argument is optional. If you leave the Sum\_range blank, Excel sums the cells you enter in the Range box. You now applied your criteria to sum all values that are greater than \$200,000.

**Figure 10-2**

The Function Arguments dialog box guides you in building SUMIF formulas.

Select worksheet cells or type range that will be evaluated by the criteria

**Bold = required arguments**

**Dimmed = optional argument**

**Collapsible Dialog buttons**

Identifies purpose of current text box argument

Look in Range and sum only values that match this Criteria

**Take Note**

In your workbook, cells in column C are not highlighted and the text and amount in cells C19, E19, and E20 are empty. Figure 10-2 has been modified to show you which cells in the C5:C16 range meet the >200000 criteria (275,000+209,000+258,000+359,500+250,000+305,600) and that the total is the sum of these individual cells or 1,657,100. If you want to conditionally highlight a range, see Lesson 6.

**Troubleshooting**

It is not necessary to type dollar signs or commas when entering dollar amounts in the Function Arguments dialog box. If you type them, Excel removes them from the formula and returns an accurate value.

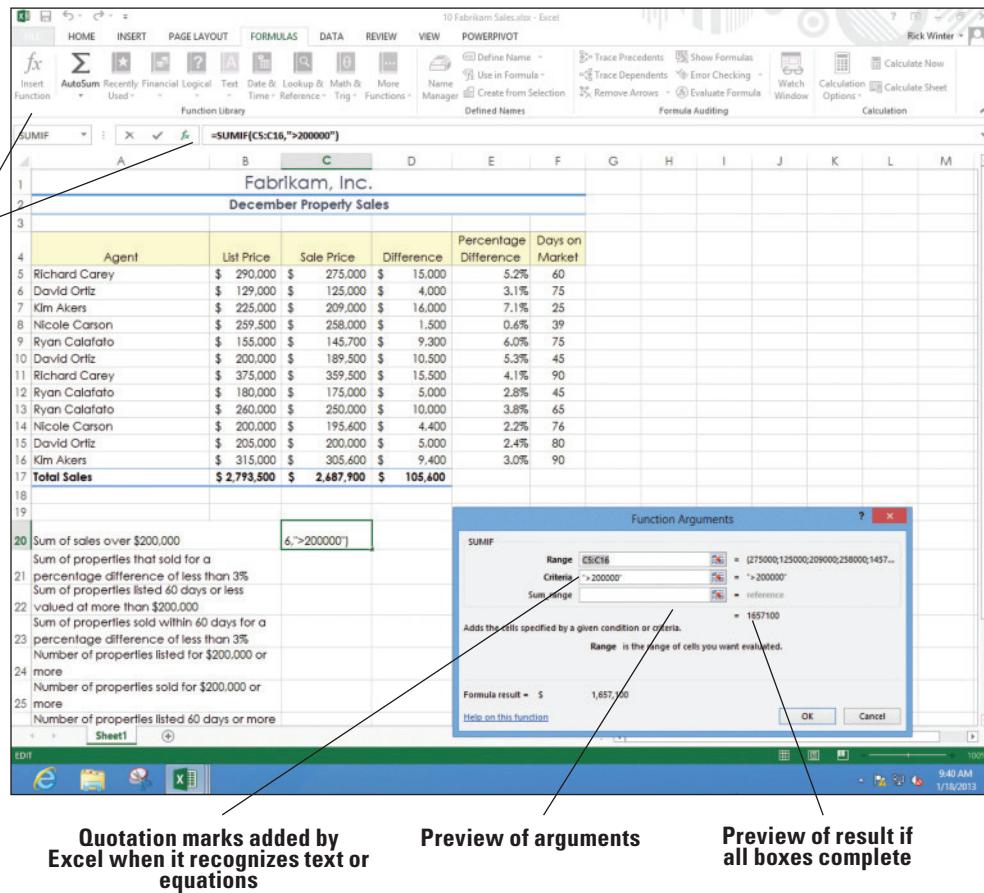
5. Click OK to accept the changes and close the dialog box. You see that \$1,657,100 of Fabrikam's December revenue came from properties valued in excess of \$200,000.

6. If for some reason you need to edit the formula, select the cell that contains the function, and on the FORMULAS tab, or in the Formula Bar, click the **Insert Function** button to return to the Function Arguments dialog box (see Figure 10-3).

**Figure 10-3**

Insert Function buttons allow you to return to the Function Arguments dialog box.

Insert function buttons



Quotation marks added by Excel when it recognizes text or equations

Preview of arguments

Preview of result if all boxes complete

### Take Note

The result of the SUMIF formula in C20 does not include the property value in C15 because the formula specified values greater than \$200,000. To include this value, the criterion needs to be  $\geq$  (greater than or equal to).

7. Click **OK** or press **Esc** if you have no changes.

8. Select cell **C21**, and in the Function Library group, click **Recently Used**, and then click **SUMIF** to once again open the Function Arguments dialog box. The insertion point should be in the Range box.

### Take Note

When you click Recently Used, the last function that you used appears at the top of the list. Similarly, when you click Insert Function, the Insert Function dialog box opens with the last used function highlighted.

9. In the Range field, select cells **E5:E16**. The selected range is automatically entered into the text box. Press **Tab**.

You do not need to collapse the dialog box as you did in Step 3. You can directly highlight the range if the dialog box is not in the way. Another option is to move the dialog box by dragging the title bar.

10. In the Criteria box, type **<3%** and press **Tab**. You enter the criteria to look at column E and find values less than 3%.
11. In the Sum\_range field, select cells **C5:C16**. The formula in C21 is different than the formula in C20. In C21, the criteria range is different than the sum range. In C20, the

### CERTIFICATION READY? 4.3.1

How do you create a formula that sums only those values that meet criteria?

criteria range and the sum range are the same. In C21, SUMIF checks for values in column E that are less than 3% (E8 is the first one) and finds the value in the same row and column C (C8 in this case) and adds this to the total. Click **OK** to accept your changes and close the dialog box. Excel returns a value of \$1,134,200.

**12. SAVE the workbook.**

**PAUSE. LEAVE the workbook open for the next exercise.**

## Using SUMIFS

The SUMIFS function adds cells in a range that meet multiple criteria. It is important to note that the order of arguments in this function is different from the order used with SUMIF. In a SUMIF formula, the Sum\_range argument is the third argument; in SUMIFS, however, it is the first argument. In this exercise, you create and use two SUMIFS formulas, each of which analyzes data based on two criteria. The first SUMIFS formula adds the selling price of the properties that Fabrikam sold for more than \$200,000 and that were on the market 60 days or less. The second formula adds the properties that sold at less than 3% difference from their listed price within 60 days.

### STEP BY STEP

### Use the SUMIFS Function



#### Another Way

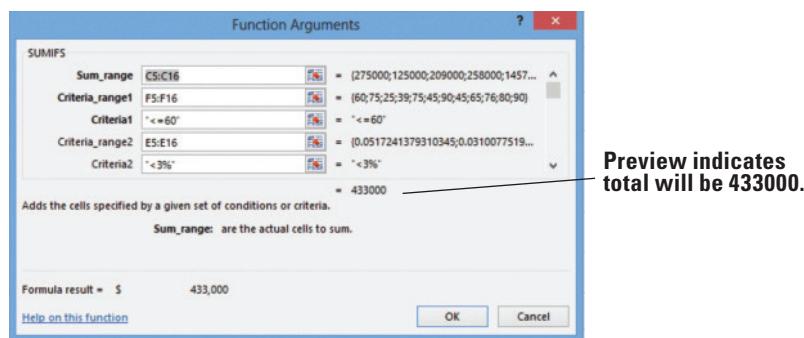
You can use the Insert Function button to find a function or one of the function buttons in the Function Library if you know the function category and name.

GET READY. USE the workbook from the previous exercise.

1. Click cell **C22**. On the FORMULAS tab, in the Function Library group, click **Insert Function**.
2. In the Search for a function box, type **SUMIFS**, and then click **Go**. SUMIFS is highlighted in the Select a function box.
3. Click **OK** to accept the function.
4. In the Function Arguments dialog box, in the Sum\_range box, select cells **C5:C16**. This adds your cell range to the argument of the formula.
5. In the Criteria\_range1 box, select cells **F5:F16**. In the Criteria1 box, type **<=60**. This specifies that you want to calculate only those values that are less than or equal to 60. When you move to the next text box, notice that Excel places quotation marks around your criteria. It applies these marks to let itself know that this is a criterion and not a calculated value.
6. In the Criteria\_range2 box, select cells **C5:C16**. You are now choosing your second cell range.
7. In the Criteria2 box, type **>200000**. Click **OK**. You now applied a second criterion that will calculate values greater than 200,000. Excel calculates your formula, returning a value of \$742,000.
8. Select **C23** and in the Function Library group, click **Recently Used**.
9. Select **SUMIFS**. In the Sum\_range box, select **C5:C16**.
10. In the Criteria\_range1 box, select cells **F5:F16**. Type **<=60** in the Criteria1 box.
11. In the Criteria\_range2 box, select cells **E5:E16**. Type **<3%** in the Criteria2 box and press **Tab**. To see all arguments, scroll back to the top of the dialog box. The Function Arguments dialog box should look like Figure 10-4.

**Figure 10-4**

SUMIFS formula applies two or more criteria.



### Troubleshooting

It is a good idea to press Tab after your last entry and preview the result of the function to make sure you entered all arguments correctly.

12. Click **OK**. After applying this formula, Excel returns a value of \$433,000.
13. **SAVE** the workbook.

**PAUSE.** LEAVE the workbook open for the next exercise.

The formulas you use in this exercise analyze the data on two criteria. You can continue to add up to 127 criteria on which data can be evaluated.

Because the order of arguments is different in SUMIF and SUMIFS, if you want to copy and edit these similar functions, be sure to put the arguments in the correct order (first, second, third, and so on).

## Using COUNTIF

In a conditional formula, the COUNTIF function counts the number of cells in a given range that meet a specific condition. The syntax for the COUNTIF function is COUNTIF(Range, Criteria). The Range is the range of cells to be counted by the formula, and the Criteria are the conditions that must be met in order for the cells to be counted. The condition can be a number, expression, or text entry. In this exercise, you practice using the COUNTIF function twice to calculate values of homes sold and listed  $\geq 200,000$ . The ranges you specify in these COUNTIF formulas are prices of homes. The criterion selects only those homes that are \$200,000 or more.

### STEP BY STEP

#### Use the COUNTIF Function

 **Another Way**  
You can also choose Insert Function and Search for the function by

#### CERTIFICATION READY? 4.3.3

How do you create a formula that counts the number of cells within a range that meets a criterion?

**GET READY.** USE the workbook from the previous exercise.

1. Select **C24**. In the Function Library group, click **More Functions**, select **Statistical**, and click **COUNTIF**.
2. In the Function Arguments dialog box, in the Range box, select cells **B5:B16**.
3. In the Criteria box, type **>=200000** and press **Tab**. Preview the result and click **OK**. You set your criteria of values greater than or equal to \$200,000. Excel returns a value of 9.
4. Select **C25** and in the Function Library group, click **Recently Used**.
5. Select **COUNTIF**. In the Functions Arguments box, in the Range box, select cells **C5:C16**.
6. In the Criteria box, type **>=200000** and press **Tab**. Preview the result and click **OK**. Excel returns a value of 7 when the formula is applied to the cell.

**7. SAVE the workbook.**

PAUSE. LEAVE the workbook open for the next exercise.

## Using COUNTIFS

The COUNTIFS formula counts the number of cells within a range that meet multiple criteria. The syntax is COUNTIFS(Criteria\_range1, Criteria1, Criteria\_range2, Criteria2, and so on). You can create up to 127 ranges and criteria. In this exercise, you perform calculations based on multiple criteria for the COUNTIFS formula.

### STEP BY STEP

### Use the COUNTIFS Function

GET READY. USE the workbook from the previous exercise.

1. Select **C26**. In the Function Library group, click **Insert Function**.
2. In the Search for a function box, type **COUNTIFS** and then click **Go**. COUNTIFS is highlighted in the Select a function box.
3. Click **OK** to accept the function and close the dialog box.
4. In the Function Arguments dialog box, in the Criteria\_range1 box, type **F5:F16**. You selected your first range for calculation.
5. In the Criteria1 box, type **>=60** and press **Tab**. The descriptions and tips for each argument box in the Function Arguments dialog box are replaced with the value when you navigate to the next argument box (see Figure 10-5). The formula result is also displayed, enabling you to review and make corrections if an error message occurs or an unexpected result is returned. You now set your first criterion. Excel shows the calculation up to this step as a value of 8.



#### Another Way

In previous examples, you collapse the dialog box and select the range, select the range without collapsing the dialog box, and you can also type the range as in this example.

**Figure 10-5**

Arguments and results for COUNTIFS formula

Preview formula result. Watch this change as each criterion is added.

6. In the Criteria\_range2 box, select cells E5:E16. You selected your second range to be calculated.
7. In the Criteria2 box, type  $>=5\%$  and press Tab to preview. Click OK. Excel returns a value of 2.
8. SAVE the workbook.

PAUSE. LEAVE the workbook open for the next exercise.

A cell in the range you identify in the Function Arguments dialog box is counted only if all of the corresponding criteria you specified are TRUE for that cell. If a criterion refers to an empty cell, COUNTIFS treats it as a 0 value.

#### Take Note

When you create formulas, you can use the wildcard characters, question mark (?) and asterisk (\*), in your criteria. A question mark matches any single character; an asterisk matches any sequence of characters. If you want to find an actual question mark or asterisk, type a grave accent (`) preceding the character. You apply this technique later in the lesson.

### Using AVERAGEIF

The AVERAGEIF formula returns the arithmetic mean of all the cells in a range that meet a given criteria. The syntax is similar to SUMIF and is AVERAGEIF(Range, Criteria, Average\_range). In the AVERAGEIF syntax, Range is the set of cells you want to average. For example, in this exercise, you use the AVERAGEIF function to calculate the average number of days that properties valued at \$200,000 or more were on the market before they were sold. The range in this formula is B5:B16 (cells that contain the listed value of the homes that were sold). The criterion is the condition against which you want the cells to be evaluated, that is,  $>=200000$ . Average\_range is the actual set of cells to average—the number of days each home was on the market before it was sold. As in the SUMIF formula, the last argument, Average\_range, is optional if the range contains the cells that both match the criteria and are used for the average. In this exercise, you first find the average of all cells in a range and then find a conditional average.

#### STEP BY STEP

#### Use the AVERAGEIF Function

GET READY. USE the workbook from the previous exercise.

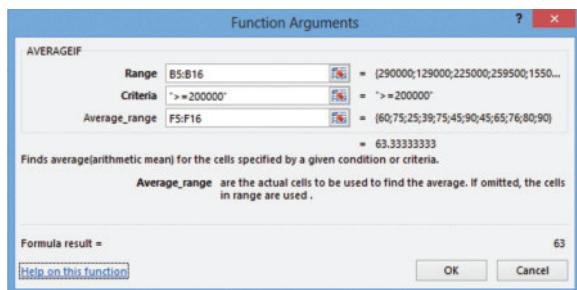
1. Select C27 and in the Function Library group, click More Functions. Select Statistical and click AVERAGE.
2. In the Number1 box, type B5:B16 and click OK. A mathematical average for this range is returned.
3. Select C28 and in the Function Library group, click Insert Function.
4. Select AVERAGEIF from the function list or use the function search box to locate and accept the AVERAGEIF function. The Function Arguments dialog box opens.
5. In the Function Arguments dialog box, in the Range box, select cells B5:B16.
6. In the Criteria box, type  $>=200000$ .
7. In the Average\_range box, select F5:F16 and press Tab to preview the formula. In the preview, Excel returns a value of 63.33 (see Figure 10-6).

#### CERTIFICATION READY? 4.3.2

How do you create a formula that averages the number of cells within a range that meets a criterion?

**Figure 10-6**

Results for AVERAGEIF formula



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

**9.** **SAVE** the workbook.

**PAUSE.** LEAVE the workbook open for the next exercise.

## Using AVERAGEIFS

An AVERAGEIFS formula returns the average (arithmetic mean) of all cells that meet multiple criteria. The syntax is AVERAGEIFS(Average\_range, Criteria\_range1, Criteria1, Criteria\_range2, Criteria2, and so on). You learn to apply the AVERAGEIFS formula in the following exercise to find the average of a set of numbers where two criteria are met.

### STEP BY STEP

### Use the AVERAGEIFS Function

**GET READY.** USE the workbook from the previous exercise.

- 1.** Click cell **C29**. In the Function Library group, click **Insert Function**.
- 2.** Type **AVERAGEIFS** in the Search for a function box and click **Go**. AVERAGEIFS is highlighted in the Select a function box.
- 3.** Click **OK** to accept the function and close the dialog box.
- 4.** In the Function Arguments dialog box, in the Average\_range box, select cells **F5:F16**. Press **Tab**.
- 5.** In the Criteria\_range1 box, select cells **B5:B16** and press **Tab**. You selected your first criteria range.
- 6.** In the Criteria1 box, type **<200000**. You set your first criteria.
- 7.** In the Criteria\_range2 box, select cells **E5:E16** and press **Tab**. You have selected your second criteria range.
- 8.** In the Criteria2 box, type **<=5%** and press **Tab**. Click **OK**. Excel returns a value of 60.
- 9.** **SAVE** the *10 Fabrikam Sales Solution* workbook, and then close it.

**PAUSE.** LEAVE Excel open for the next exercise.

You entered only two criteria for the SUMIFS, COUNTIFS, and AVERAGEIFS formulas you created in the previous exercises. However, in large worksheets, you often need to use multiple criteria in order for the formula to return a value that is meaningful for your analysis. You can enter up to 127 conditions that data must match in order for a cell to be included in the conditional summary that results from a SUMIFS, COUNTIFS, or AVERAGEIFS formula.

The following statements summarize how values are treated when you enter an AVERAGEIF or AVERAGEIFS formula:

- If Average\_range is omitted from the function arguments, the range is used.
- If a cell in Average\_range is an empty cell, AVERAGEIF ignores it.
- If the entire range is blank or contains text values, AVERAGEIF returns the #DIV0! error value.
- If no cells in the range meet the criteria, AVERAGEIF returns the #DIV/0! error value.

## USING FORMULAS TO LOOK UP DATA IN A WORKBOOK

### Bottom Line

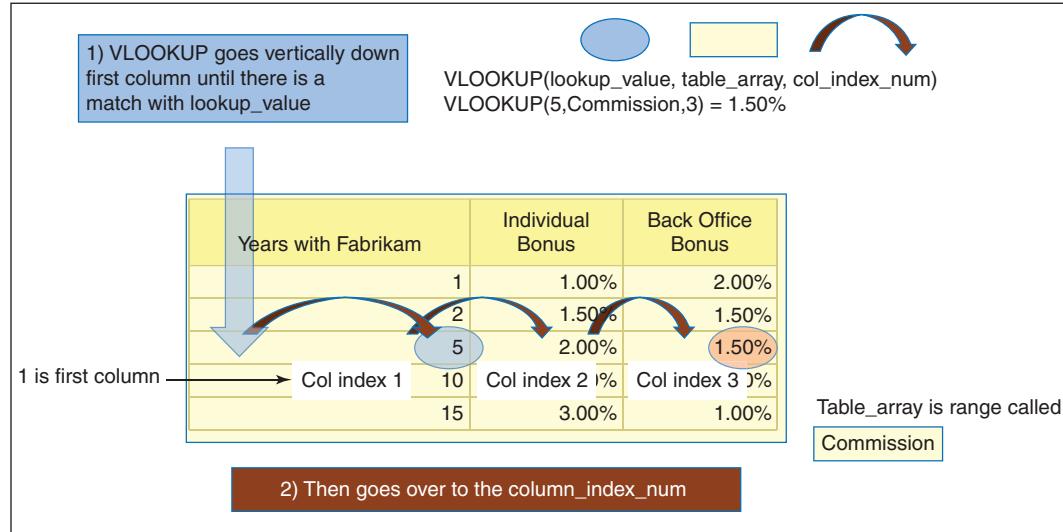
When worksheets contain long and sometimes cumbersome lists of data, you need a way to quickly find specific information within these lists. This is where Excel's lookup functions come in handy. **Lookup functions** are an efficient way to search for and insert a value in a cell when the desired value is stored elsewhere in the worksheet or even in a different workbook. VLOOKUP and HLOOKUP are the two lookup formulas that you use in this section. These functions can return the contents of the found cell. As you work through the following exercises, note that the term **table** refers to a range of cells in a worksheet that can be used by a lookup function.

### Using VLOOKUP

The "V" in VLOOKUP stands for vertical. This formula is used when the comparison value is in the first column of a table. Excel goes down the first column until a match is found and then looks in one of the columns to the right to find the value in the same row. The VLOOKUP function syntax is `VLOOKUP(lookup_value, Table_array, Col_index_num, Range_lookup)`. See Figure 10-7 for a graphical explanation of the function.

**Figure 10-7**

Vertical lookup (VLOOKUP)



Table\_array is a table of text, numbers, or values that you use for the formula. It can either be a range of cells (A1:D5) or a range name (Commission). The data in a **table array** must be arranged in rows and columns. In the next exercise, you apply this formula to calculate employee bonuses. When working with VLOOKUP functions and arguments, there are several key points to keep in mind:

- If Lookup\_value is smaller than the smallest value in the first column of Table\_array, VLOOKUP returns the #N/A error value.
- Table\_array values can be text, numbers, or logical values. Uppercase and lowercase text is equivalent.
- The values in the first column of the Table\_array selection must be placed in ascending sort order; otherwise, VLOOKUP might not give the correct value. The lookup table you use in this exercise lists years of service in ascending order.
- Range\_lookup is an optional fourth argument not shown in Figure 10-7.
- If the Range\_lookup argument is True or omitted, an exact or approximate match is returned. If VLOOKUP cannot find an exact match, it returns the next largest value that is less than the value you specified in Lookup\_value.
- If Range\_lookup is False, VLOOKUP finds only an exact match. If an exact match is not found, the error value #N/A is returned.

**Take Note** Range names or cell references used in VLOOKUP or HLOOKUP are not case sensitive, so you can type them in uppercase, lowercase, or any combination of uppercase and lowercase characters. Also, the VLOOKUP and HLOOKUP function names are not case sensitive.

### STEP BY STEP

### Use the VLOOKUP Function



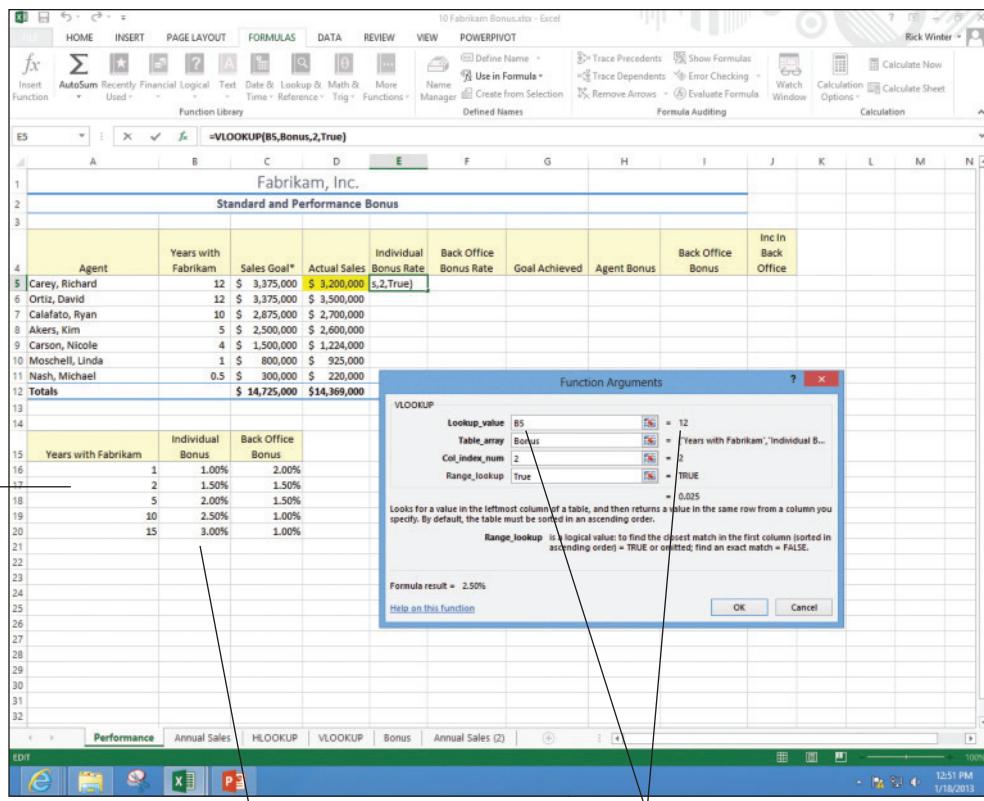
GET READY. LAUNCH Excel if it is not already open.

1. OPEN the **10 Fabrikam Bonus** file for this lesson.
2. With the Performance sheet active, select cells **A15:C20** in the worksheet. Click the **FORMULAS** tab, and in the Defined Names group, click **Define Name**. The New Name dialog box opens.
3. In the New Name dialog box, in the Name box, type **Bonus**. Click **OK** to close the dialog box. You defined the range name.
4. Click cell **E5**, in the Function Library group, click **Lookup & Reference**, and select **VLOOKUP**.
5. In the Lookup\_value text box, type **B5** and press **Tab**. The insertion point moves to the Table\_array box.
6. In the Table\_array box, click the **Collapse Dialog** button. In the Defined Names group, click **Use in Formula** and select **Bonus**. Press **Enter** and **Tab**. The insertion point moves to the next text box.
7. In the Col\_index\_num box, type **2**, which is the column containing the individual bonus amounts. Press **Tab**.
8. In the Range\_lookup box, type **True**, which means that VLOOKUP can check for the nearest value that does not go over the number in the first column; the same bonus is paid for a range of years, so you enter **True** in the Range\_lookup box so that a value will be returned for all agents. The Function Arguments dialog box should look similar to the one shown in Figure 10-8. Click **OK**. Excel returns a value of 2.5%.

**Figure 10-8**

VLOOKUP Function Arguments dialog box

**Look in Table\_array called Bonus**



**Find in column number 2 value is in same row as 10 (closest without going over 12). Answer is 0.025 or 2.5%.**

**Lookup\_value is B5 (which is 12)**

9. Using the fill handle in cell E5, copy the formula to the range E6:E11. This calculates bonus rates for the other sales agents. The #N/A error message appears in cell E11 because a value is not available for agents who have been employed for less than one year. (Agents become eligible for a bonus only after a full year of service.) You change this error message in another exercise.
10. Click in cell F5 and type =VLOOKUP(B5,Bonus,3). Notice that the ScreenTip gives you information and help as you go. This looks up values in the third column of the Bonus range. Press Enter.
11. Copy the formula from F5 to the range F6:F11.
12. SAVE the workbook as **10 Fabrikam Bonus Solution**.

PAUSE. LEAVE the workbook open for the next exercise.

#### Take Note

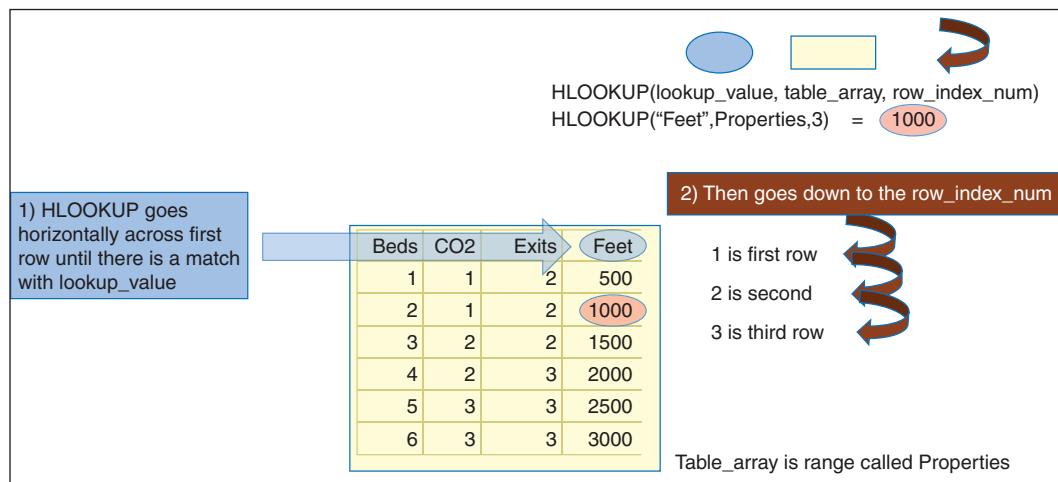
Entering True in the Range\_lookup box returns the closest value. False returns only an exact value. If you leave the Range\_lookup box empty as it is in Step 10 in the previous exercise, Excel enters True when you click OK.

## Using HLOOKUP

The "H" in HLOOKUP stands for horizontal. HLOOKUP searches horizontally for a value in the top row of a table or an array and then returns a value in the same column from a row you specify in the table or array. Use HLOOKUP when the comparison values are located in a row across the top of a table of data and you want to look in a specified row (see Figure 10-9). In the following exercise, you use an HLOOKUP formula to search standards for a house.

**Figure 10-9**

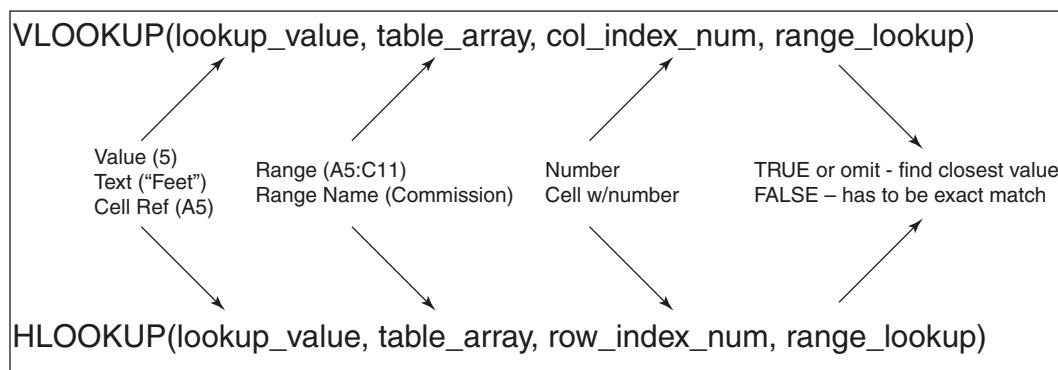
Horizontal lookup (HLOOKUP)



HLOOKUP and VLOOKUP are similar in format. Figure 10-10 and Table 10-3 compare the syntax of the two functions.

**Figure 10-10**

Comparing VLOOKUP and HLOOKUP



**Table 10-3**

Function Syntax for VLOOKUP and HLOOKUP

Argument	Notes
Lookup_value	The value to be found in the first column or row; this can be a constant value, a text value enclosed in quotation marks, or the address or name of a cell that contains a numeric or text constant.
Table_array	Two or more columns of data. Use a reference to a range or a range name. The values in the first column of Table_array are the values searched by Lookup_value in VLOOKUP. The values in the first row are values searched by Lookup_value in HLOOKUP.
Col_index_num	The numeric position of the column that is to be searched for by VLOOKUP. The column number in Table_array from which the matching value must be returned. A Col_index_num of 1 returns the value in the first column in Table_array; a Col_index_num of 2 returns the value in the second column in Table_array, and so on.
Row_index_num	The numeric position of the row that is to be searched for by HLOOKUP.
Range_lookup	A logical value that specifies whether it is ready for VLOOKUP or HLOOKUP to find an approximate match. If the function is to return the nearest value, even when there is no match, this value should be set to True; if an exact match is required, this value should be set to False; if this argument is not included, the function assumes the value to be True.

**STEP BY STEP****Use the HLOOKUP Function**

GET READY. USE the workbook from the previous exercise.

1. Click on the **Standards** worksheet tab to move to the Standards worksheet.
2. Click cell **F11**, and in the Function Library group, click **Lookup & Reference**, and select **HLOOKUP**.
3. In the **Lookup\_value** text box, type **E11**. This is the cell you will change and the box previews to Feet because that is what is currently typed in cell E11.
4. In the **Table\_array** text box, type **A1:D7**. This will be the range of cells you will look in.
5. In the **Row\_index\_num**, type **D11+1**. This currently evaluates to 3. If you just do the number of beds that is in D11, you don't come down enough rows because of the labels in the first row of the Table\_array. The number of beds is actually one row more than the number of beds because the labels (Beds, CO2, Exits, and Feet) count as the first row and row 2 is for 1 bed.
6. In **Range\_lookup**, type **FALSE** because you want an exact match. The screen should look like Figure 10-11. Click **OK**. In the following steps, you will change the values in D11 and D11 and see what happens when there are different values and when there is not an exact match.

**Figure 10-11****HLOOKUP Function Arguments**

**Go to column headed by Feet and count down starting with the first row and you get 1000.**

The screenshot shows an Excel spreadsheet titled "10 Employee Information - Excel". The formula bar at the top contains the formula `=HLOOKUP("Feet",Properties,2)+HLOOKUP(E11,A1:D7,D11+1, FALSE)`. The spreadsheet has columns A through U. Rows 1 through 7 contain data for beds (1-6) and feet (500, 1000, 1500, 2000, 2500, 3000). Row 10 is labeled "Column" with "Beds" under "head" and "Result" under "2 Feet". Cell F11 contains the formula `=HLOOKUP("Feet",Properties,2)+HLOOKUP(E11,A1:D7,D11+1, FALSE)`. A callout box points to the text "Go to column headed by Feet and count down starting with the first row and you get 1000." A callout box also points to the "Function Arguments" dialog box, which is displayed over the spreadsheet. The dialog box shows the HLOOKUP function with the following arguments:

- Lookup\_value: E11 (Feet)
- Table\_array: A1:D7 (Beds, CO2, Exits, Feet)
- Row\_index\_num: D11+1 (3)
- Range\_lookup: FALSE

The formula result is 1500. The dialog box includes a tip: "Looks for a value in the top row of a table or array of values and returns the value in the same column from a row you specify." It also includes a note about Range\_lookup: "Range\_lookup is a logical value: to find the closest match in the top row [sorted in ascending order] = TRUE or omitted; find an exact match = FALSE."

7. In cell D11, type **5** and notice that the result in F11 changes to 2500.
8. In cell E11, type **CO2** and notice that the result changes to the result for the CO2 column for 5 beds, which is 3.
9. Click cell **D11**, and then type **7**. Notice that you get a #REF! error because the table goes up to five beds.
10. In cell D11, type **1**. Cell F11 displays a result of 1.
11. **SAVE** the workbook.

**PAUSE.** LEAVE the workbook open for the next exercise.

It might be difficult to remember the syntax for an HLOOKUP or VLOOKUP function. You can always use the Function Arguments dialog box to help you remember the order of the arguments for any and all formulas. When you click in each field, review the tips that appear on the right side of each box, as well as the explanation below the argument boxes that tells the purpose of each argument in the formula.

## ADDING CONDITIONAL LOGIC FUNCTIONS TO FORMULAS

### Bottom Line

You can use the AND, OR, and NOT functions to create **conditional formulas** that result in a logical value, that is, True or False. Such formulas test whether a series of conditions evaluate to true or false. In addition, you can use the IF conditional formula that checks if a calculation evaluates as true or false. You can then tell IF to return one value (text, number, or logical value) if the calculation is true or a different value if it is false.

## Using IF

The result of a conditional formula is determined by the state of a specific condition or the answer to a logical question. An IF function sets up a conditional statement to test data. An IF formula returns one value if the condition you specify is true and another value if it is false. The IF function requires the following syntax: IF(Logical\_test, Value\_if\_true, Value\_if\_false). In this exercise, you use an IF function to determine who achieved his goal and is eligible for the performance bonus.

### STEP BY STEP

### Use the IF Function

GET READY. USE the workbook from the previous exercise.

1. Click the **Performance** worksheet tab to make it the active worksheet.
2. Click cell **G5**. In the Function Library group, click **Logical** and click **IF**. The Function Arguments dialog box opens.
3. In the Logical\_test box, type **D5>=C5**. This component of the formula determines whether the agent has met his or her sales goal.
4. In the Value\_if\_true box, type **Yes**. This is the value returned if the agent met his or her goal.
5. In the Value\_if\_false box, type **No** and click **OK**.
6. With G5 still selected, use the fill handle to copy the formula to **G6:G12**. Excel returns the result that three agents earned the performance award by displaying Yes in the cells (see Figure 10-12).

**Figure 10-12**  
Using the IF function

The IF formula in the Formula bar

Agent	Years with Fabrikam	Sales Goal*	Actual Sales	Individual Bonus Rate	Back Office Bonus Rate	Goal Achieved	Agent Bonus	Back Office Bonus	Inc in Back Office
Carey, Richard	12	\$ 3,375,000	\$ 3,200,000	2.50%	1.00%	No			
Ortiz, David	12	\$ 3,375,000	\$ 3,500,000	2.50%	1.00%	Yes			
Calafato, Ryan	10	\$ 2,675,000	\$ 2,700,000	2.50%	1.00%	No			
Akers, Kim	5	\$ 2,500,000	\$ 2,600,000	2.00%	1.50%	Yes			
Carson, Nicole	4	\$ 1,500,000	\$ 1,224,000	1.50%	1.50%	No			
Moschell, Linda	1	\$ 800,000	\$ 925,000	1.00%	2.00%	Yes			
Nash, Michael	0.5	\$ 300,000	\$ 220,000	#N/A	#N/A	No			
<b>Totals</b>		<b>\$ 14,725,000</b>	<b>\$ 14,369,000</b>			<b>No</b>			

### Take Note

The entire company is evaluated on making the goal, and bonuses are awarded to the back office staff if the company goal is met. The result in G12 is used for the formulas in column I. When you copy, the formatting is included.

7. Click the **Auto Fill Options** button in the bottom right corner of the range and choose **Fill Without Formatting**.
8. In cell H5, type **=IF(G5="Yes",E5\*D5,0)**. Before you complete the formula, notice the ScreenTip, the cells selected, and the colors (see Figure 10-13). Move the mouse pointer to each of the arguments and they become a hyperlink. E5 is the individual bonus rate and D5 is the actual sales. The bonus is the rate times the sales.

**Figure 10-13**

Help items as you type a formula

Performance Bonus							
Actual Sales	Individual Bonus Rate	Back Office Bonus Rate	Goal Achieved	Agent Bonus	Back Office Bonus	Inc In Back Office	
\$ 3,200,000	2.50%	1.00%	No	=if(G5="Yes",E5*D5,0)			
\$ 3,500,000	2.50%	1.00%	Yes				
\$ 2,700,000	2.50%	1.00%	No				
\$ 2,600,000	2.00%	1.50%	Yes				
\$ 1,224,000	1.50%	1.50%	No				
\$ 925,000	1.00%	2.00%	Yes				
\$ 220,000	#N/A	#N/A	No				
\$14,369,000							

E5 in formula and outline of cell in red

D5 in formula and outline of cell in violet

G5 in formula in blue as well as outline around cell G5

Mouse pointer highlights each argument in ScreenTip. Click on highlight to move to argument in formula.

9. Press **Enter** to finish the formula.

#### Take Note

In some cases, Excel completes the formula. In Step 8, the closing parenthesis was not added, and Excel was able to complete the formula.

10. Use the fill handle in H5 to copy the formula from to **H6:H11**.

11. In I5, type **=IF(\$G\$12="Yes",F5\*D5,0)**, and then press **Enter**.



Remember that dollar signs before the column and row indicate an absolute reference. When you copy the formula, \$G\$12 remains the same in every cell.

12. Use the fill handle in I5 to copy the formula from cto **I6:I11**. Notice that Richard Carey, the Senior Partner, did not receive an Agent Bonus and there was no bonus for Back Office.

13. The final pending sale of \$700,000 of the year came through. In D5, type **\$3,900,000**. Notice that H5 and the amounts in column I go from 0 to bonuses (see Figure 10-14).

**Figure 10-14**

Bonuses change by adding sales to D5.

Agent	Years with Fabrikam	Sales Goal*	Actual Sales	Individual Bonus Rate	Back Office Bonus Rate	Goal Achieved	Agent Bonus	Back Office Bonus	Inc In Back Office
5 Carey, Richard	12	\$ 3,375,000	\$ 3,900,000	2.50%	1.00%	Yes	\$ 97,500	\$ 39,000	
6 Ortiz, David	12	\$ 3,375,000	\$ 3,500,000	2.50%	1.00%	Yes	\$ 87,500	\$ 35,000	
7 Calafato, Ryan	10	\$ 2,875,000	\$ 2,700,000	2.50%	1.00%	No	\$ -	\$ 27,000	
8 Akers, Kim	5	\$ 2,500,000	\$ 2,600,000	2.00%	1.50%	Yes	\$ 52,000	\$ 39,000	
9 Carson, Nicole	4	\$ 1,500,000	\$ 1,224,000	1.50%	1.50%	No	\$ -	\$ 18,360	
10 Moschell, Linda	1	\$ 800,000	\$ 925,000	1.00%	2.00%	Yes	\$ 9,250	\$ 18,500	
11 Nash, Michael	0.5	\$ 300,000	\$ 220,000	#N/A	#N/A	No	\$ -	#N/A	
12 Totals		\$ 14,725,000	\$15,069,000			Yes	\$ 246,250	#N/A	
Now Actual Sales > Sales Goal									
\$3,900,000 in D5 changes total in D12.									
G12 now is Yes.									

14. SAVE the workbook.

PAUSE. LEAVE the workbook open for the next exercise.

#### Using AND

The AND function returns True if all its arguments are true, and False if one or more arguments are false. The Syntax is AND(Logical1, Logical2, and so on). In this exercise, you use the AND function to determine whether Fabrikam's total annual sales met the strategic goal and whether the sales goal exceeded the previous year's sales by 5 percent.

**STEP BY STEP****Use the AND Function****Another Way**

Because you type only one condition in this formula, another option is to type  $=B3 \leq B16$  directly in the cell without the AND function.

GET READY. USE the workbook from the previous exercise.

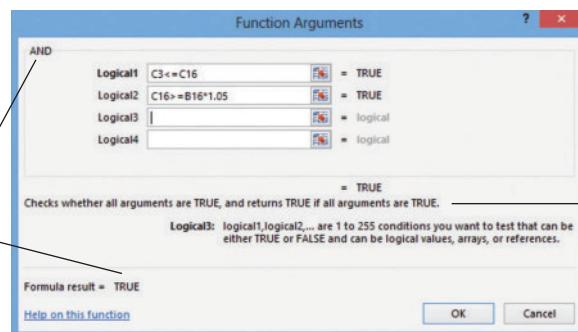
1. Click the **Annual Sales** worksheet tab. Click the **FORMULAS** tab if necessary.
2. Click cell **B6**. In the Function Library group, click **Logical** and click the **AND** option. The Function Arguments dialog box opens with the insertion point in the Logical1 box.
3. Click cell **B3**, type  $\leq$ , select cell **B16**, and press **Enter**. This argument represents the first condition: Did actual sales equal or exceed the sales goal? Because this is the first year, only one logical test is entered.
4. Select cell **C6**, click the **Recently Used** button, and click **AND**. In the Logical1 box, type **C3 \leq C16**. This is the same as the condition in Step 3 (sales exceed or equals sales goal).
5. In the Logical2 box, type **C16 \geq B16 \* 1.05** and press **Tab**. The preview of the formula returns True, which means that both conditions in the formula have been met. The AND function arguments are illustrated in Figure 10-15.

**Figure 10-15**

AND function arguments

AND condition

Result to be returned



Formula description

6. Click **OK** to complete the formula.

7. Select cell **C6** and copy the formula to **D6:F6** (see Figure 10-16).

**Figure 10-16**

The completed Annual Sales worksheet

Fabrikam, Inc.					
	Year 1	Year 2	Year 3	Year 4	Year 4
Sales Goal	\$10,000,000	\$12,000,000	\$13,200,000	\$14,400,000	\$14,400,000
Sales Met: Sales Increased by 5%	TRUE	TRUE	FALSE	TRUE	FALSE
Agent	Year 1	Year 2	Year 3	Year 4	Year 4
Carey, Richard	\$ 2,855,000	\$ 2,900,000	\$ 3,075,000	\$ 3,350,000	\$ 3,425,000
Ortiz, David	\$ 2,855,000	\$ 3,000,000	\$ 3,000,000	\$ 3,100,000	\$ 3,500,000
Calafato, Ryan	\$ 2,250,000	\$ 2,000,000	\$ 2,500,000	\$ 2,500,000	\$ 2,700,000
Akers, Kim	\$ 1,750,000	\$ 1,899,000	\$ 2,000,000	\$ 2,600,000	\$ 2,600,000
Carson, Nicole	\$ 1,290,000	\$ 1,400,000	\$ 1,325,000	\$ 1,450,000	\$ 1,224,000
Moschell, Linda		\$ 900,000	\$ 900,000	\$ 1,250,000	\$ 925,000
Nash, Michael				\$ 200,000	\$ 220,000
<b>Totals</b>	<b>\$ 11,000,000</b>	<b>\$ 12,099,000</b>	<b>\$ 12,800,000</b>	<b>\$ 14,450,000</b>	<b>\$ 14,594,000</b>

Completed AND formula in C6

8. SAVE the workbook.

PAUSE. LEAVE the workbook open for the next exercise.

Again, the AND function returns a True result only when both conditions in the formula are met. For example, consider the results you achieved in the preceding exercise. Sales in the second year exceeded sales for the previous year; therefore, the first condition is met. Year 2 sales also exceeded Year 1 sales by 5 percent. Because both conditions are met, the formula returns a True result.

Now consider the arguments for the logical tests for Year 3 (the formula in D6). Sales did not exceed the sales goal; therefore, the first argument returns a False value. However, sales did exceed the previous year's sales by 5 percent. When only one condition is met, the formula returns False.

## Using OR

Although all arguments in an AND function have to be True for the function to return a True value, only one of the arguments in the OR function has to be True for the function to return a True value. The syntax for an OR formula is similar to that for an AND formula. With this formula, the arguments must evaluate to logical values such as True or False or references that contain logical values. In this exercise, you create a formula that evaluates whether sales agents are eligible for the back office bonus when they are new or when they did not get the sales bonus (less than 4 years with the company or did not get the agent bonus). The OR formula returns True if either of the conditions are True.

### STEP BY STEP

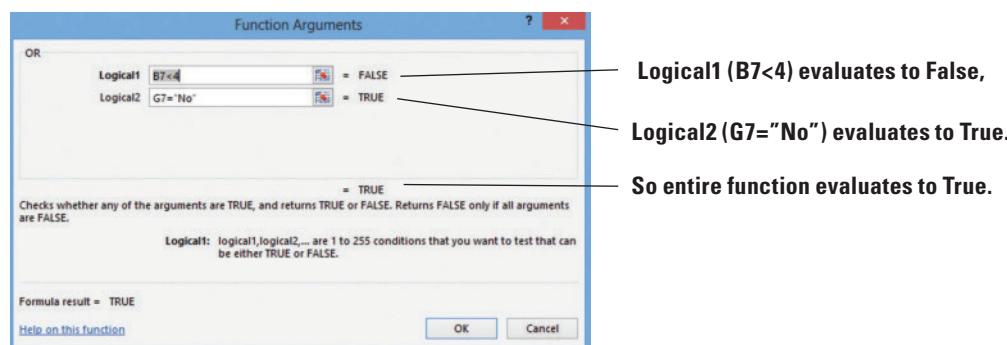
### Use the OR Function

GET READY. USE the workbook from the previous exercise.

1. Click on the **Performance** worksheet tab to activate this worksheet. Select **J5** and in the Function Library group, click **Logical**.
2. Click **OR**. The Function Arguments dialog box opens. You create a formula that answers the following question: Has Carey worked with the company for less than 4 years?
3. In the Logical1 box, type **B5<4** and press **Tab**.
4. In the Logical2 box, type **G5="No"** and press **Tab**. This argument answers the second question: Did Carey not achieve the sales goal? Each of the arguments evaluates to false and so the entire function evaluates to false.
5. Click **OK** to close the dialog box.
6. Select cell **J5** and copy the formula to **J6** through **J11**.
7. Cell J7 is the first in the column that returns a True value. To see each of the arguments, click cell **J7** and then click the **Insert Function** button and you return to the Function Arguments dialog box (see Figure 10-17).

**Figure 10-17**

OR Function Arguments



8. Click **OK** to close the dialog box and return to the workbook.
9. SAVE the workbook.

#### Take Note

As you add arguments, the Logical fields in the Function Arguments dialog box expand to allow you to enter multiple arguments.

PAUSE. LEAVE the workbook open for the next exercise.

## Using NOT

The NOT function reverses the value of its arguments. Use NOT when you want to make sure a value is not equal to one particular value. If the logical value is FALSE, NOT returns TRUE. In the following exercise, you use the NOT function to answer the following question: Do we exclude this agent from the back office bonus?

### STEP BY STEP

### Use the NOT Function

GET READY. USE the workbook from the previous exercise. The Performance worksheet should still be active.

1. Copy cell **J4** to cell **K4** and edit the label to say **Not In Back Office**.
2. Click cell **K5**. In the Function Library group, click the **Logical** button.
3. Select **NOT** from the list of logical formulas.
4. In the Function Arguments dialog box, type **J5** and press **Enter**.
5. Copy cell **K5** to cells **K6** through **K11**. Notice that the values in K5 through K11 are the opposite of the values in column J.
6. SAVE the workbook.

PAUSE. LEAVE the workbook open for the next exercise.

## Using IFERROR

An error message is returned when a formula does not contain sufficient or valid arguments to return a value. Use the IFERROR function to trap and handle errors in a formula. This function returns a value you specify if a formula evaluates to an error; otherwise, it returns the result of the formula. The syntax is IFERROR(Value, Value\_if\_error). In the IFERROR syntax, Value is the argument that is checked for an error. In the next exercise, you use this formula to determine eligible bonuses.

For this example, you change the functions in the Performance worksheet to no longer show #N/A because of the VLOOKUP function.

### STEP BY STEP

### Use the IFERROR Function

GET READY. USE the workbook from the previous exercise and make sure the Performance worksheet is active.

1. Select cell **E11** and click to place the insertion point after the = in the formula bar to edit the formula. You add the IFERROR formula to correct the formula error that gave the #N/A result in a previous exercise.
2. Type **IFERROR(** before VLOOKUP. Leave the existing formula intact. Press **End** to take you to the end of the formula.

#### Take Note

Notice that we write function names such as IFERROR and VLOOKUP in all uppercase. These names are not case sensitive, but Microsoft always writes them in uppercase in the function lists and Help system because doing so makes reading functions much easier. Thus, it is best to get in the habit of using function names in uppercase.

3. At the end of the original formula, type **,0)**. As shown in Figure 10-18, the complete formula is =IFERROR(VLOOKUP(B11,Bonus,2,True),0). Be sure to include the closing parenthesis and the preceding comma or Excel returns an error that the formula is incorrect.

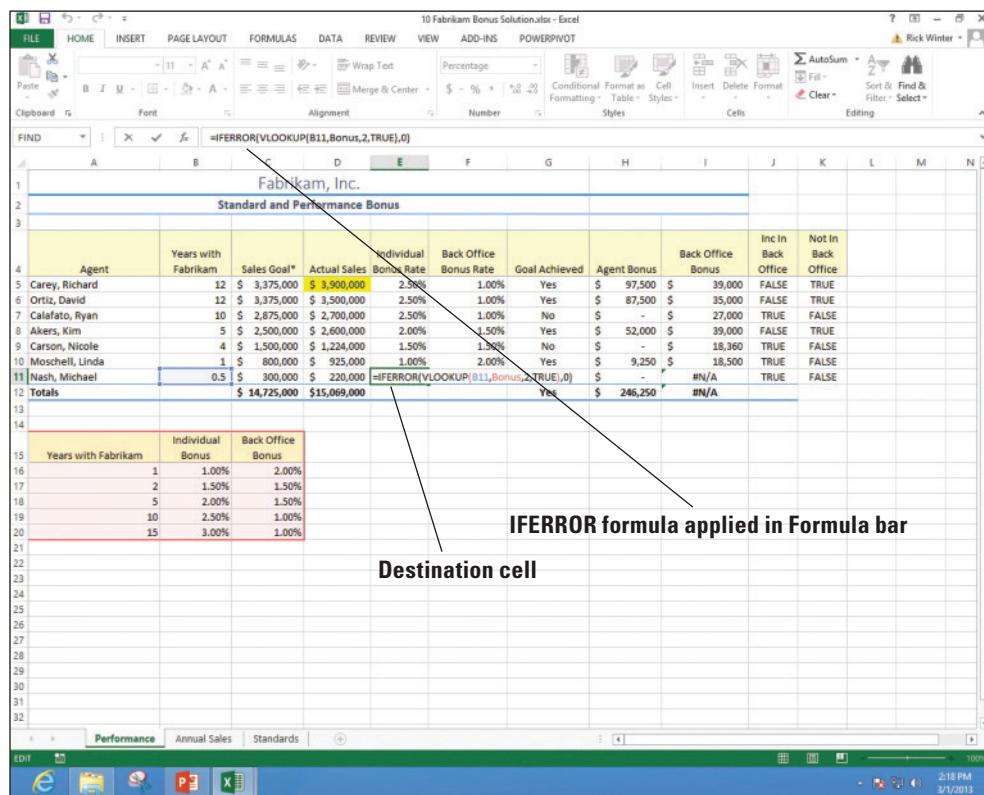


#### Troubleshooting

When you start creating more complex formulas including functions within other functions, ensure that you use the same number of open parentheses as close parentheses.

**Figure 10-18**

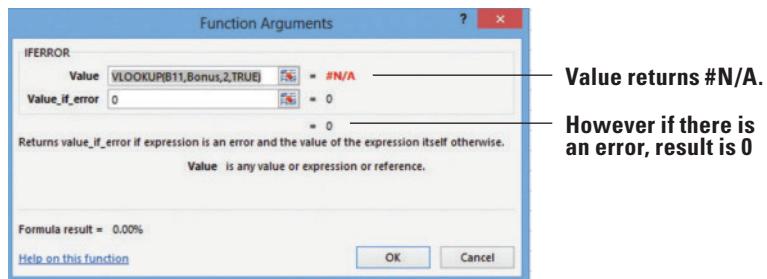
Editing a formula to enter 0 when an error occurs



4. Press **Enter**. The #N/A error message is replaced by 0. If you select cell **E11** and click the **Insert Function** button next to the formula bar, the original VLOOKUP formula appears in the Value box (first argument) in the IFERROR formula. As illustrated in Figure 10-19, that argument returned a #N/A error. The Value\_if\_error box contains the 0 that replaces the error message.

**Figure 10-19**

IFERROR function arguments



5. Click cell **F11** and edit the formula to include the IFERROR function  
**=IFERROR(VLOOKUP(B11,Bonus,3),0)**.
6. Copy the formulas in **E11:F11** to **E5** through **F10**. The workbook doesn't look like it changes, but you should verify that this worked by changing B6 to 0 (as shown in Figure 10-20).

**Figure 10-20**

Test of worksheet

Fabrikam, Inc.										
Standard and Performance Bonus										
Agent	Years with Fabrikam	Sales Goal*	Actual Sales	Individual Bonus Rate	Back Office Bonus Rate	Goal Achieved	Agent Bonus	Back Office Bonus	Inc in Back Office	Not In Back Office
5 Carey, Richard	12	\$ 3,375,000	\$ 3,900,000	2.50%	1.00%	Yes	\$ 97,500	\$ 39,000	FALSE	TRUE
6 Ortiz, David	6	\$ 3,375,000	\$ 3,500,000	0.00%	0.00%	Yes	\$ -	\$ -	TRUE	FALSE
7 Calafato, Ryan	10	\$ 2,875,000	\$ 2,700,000	2.40%	2.00%	No	\$ -	\$ 27,000	TRUE	FALSE
8 Akers, Kim	5	\$ 2,500,000	\$ 2,600,000	2.00%	1.50%	Yes	\$ 52,000	\$ 39,000	FALSE	TRUE
9 Carson, Nicole	1	\$ 1,500,000	\$ 1,224,000	50%	1.50%	No	\$ -	\$ 18,360	TRUE	FALSE
10 Moschell, Linda	1	\$ 800,000	\$ 925,000	1.00%	2.00%	Yes	\$ 9,250	\$ 18,500	TRUE	FALSE
11 Nash, Michael	0.5	\$ 300,000	\$ 220,000	0.00%	0.00%	No	\$ -	\$ -	TRUE	FALSE
<b>Totals</b>		<b>\$ 14,725,000</b>	<b>\$ 15,069,000</b>			<b>Yes</b>	<b>\$ 158,750</b>	<b>\$ 141,860</b>		
Years with Fabrikam		Individual Bonus	Back Office Bonus							
16	1	1.00%	2.00%							
17	2	1.50%	1.50%							
18	5	2.00%	1.50%							
19	10	2.50%	1.00%							
20	15	3.00%	1.00%							

0 typed in B6 changed E6, F6, H6, and I6 to 0

7. Click **Undo** to reverse the change to cell B6 and return the worksheet to the proper values.

8. **SAVE** the workbook.

PAUSE. CLOSE the workbook and LEAVE Excel open for the next exercise.

IFERROR recognizes and evaluates the following errors: #N/A, #VALUE!, #REF!, #DIV/0!, #NUM!, #NAME?, or #NULL!. In this exercise, you replace the #N/A error message with "0".

## USING FORMULAS TO MODIFY TEXT

### Bottom Line

When you get files from other people or programs, you often have to do a significant amount of manipulation of the file. For example, sometimes you receive files in a text format with commas separating what should go in columns. The text is often not in the format that you need to use in Excel. Some text can be combined into one long string or other text can be all in lowercase or uppercase.

You might be familiar with Microsoft Word's Convert Text command that enables you to change the capitalization of text. Similarly, in Excel, you can use PROPER, UPPER, and LOWER formulas to capitalize the first letter in each word of a text string or to convert all characters to uppercase or lowercase. This section presents you with a text file from the alarm company. There is a lot of useful information in the file, but it is coded for the alarm system rather than for use in a spreadsheet. The company's president has asked you to keep the file confidential because it contains the codes for each employee, but he has also asked you to use your Excel knowledge to convert the information into a usable format.

### Converting Text to Columns

You can use the Convert Text to Columns Wizard to separate simple cell content, such as first names and last names, into different columns. Depending on how your data is organized, you can split the cell contents based on a delimiter (divider or separator), such as a space or a comma, or based on a specific column break location within your data. In the following exercise, you convert the data in column A to two columns.

**STEP BY STEP****Convert Text to Columns**

LAUNCH Excel if necessary.



1. Open the **10 Fabrikam Alarm Codes** workbook. Figure 10-21 shows what the file looks like before you convert the rows to column and Figure 10-22 shows the same data after the conversion.

**Figure 10-21**

10 Fabrikam Alarm Codes  
original file

	A	B	C	D	E	F	G	H	I
1									
2	425oopn15210	david	ortiz	37291	Iaaksdjbfl;akjsdfjlkafapr	0000000000	0000000000		
3	327sanp49612	kim	akers	39868	IjksAbdfib;jkasfmar	000000000000	0000000000		
4	329sap151276	linda	moschell	41301	coibusdfaJikkeaug	0000000000	0000000000		
5	330psp047373	michael	nash	41530	ozixcjAuadlbfkjedec	0000000000	0000000000		
6	328sanp37624	nicole	carson	40241	IkbbueoAiajdcjljl	0000000000	0000000000		
7	424oopn77612	richard	carey	37367	Alajsdfjlkasbdfjan	0000000000	0000000000		
8	426esnp56690	ryan	calafato	38050	I;Ajdkfalsd;jkbmay	0000000000	0000000000		
9									

Comma will convert  
text to columns

File is difficult to read

2. Select cells **A2:A8**. Click the **DATA** tab and in the Data Tools group, click **Text to Columns**.
3. The Convert Text to Columns Wizard opens with Delimited selected as the default, because Excel recognizes that the data in the selected range is separated with commas. Click **Next** to move to the next step in the wizard.
4. Select **Comma** as the delimiter. If other delimiters are checked, deselect them.
5. Click **Next**, and then click **Finish**.
6. Data is separated into seven columns. To help identify the columns, type the text in row 1 and increase the column widths so you can see the cell contents (see Figure 10-22).

**Figure 10-22**

Converted text

A	B	C	D	E	F	G
1	ExtCodeEmpID	SpFirst	SpLast	Hire Date	Alarm	
2	425oopn15210	david	ortiz	37291	Iaaksdjbfl;akjsdfjlkafapr	0000000000
3	327sanp49612	kim	akers	39868	IjksAbdfib;jkasfmar	000000000000
4	329sap151276	linda	moschell	41301	coibusdfaJikkeaug	0000000000
5	330psp047373	michael	nash	41530	ozixcjAuadlbfkjedec	0000000000
6	328sanp37624	nicole	carson	40241	IkbbueoAiajdcjljl	0000000000
7	424oopn77612	richard	carey	37367	Alajsdfjlkasbdfjan	0000000000
8	426esnp56690	ryan	calafato	38050	I;Ajdkfalsd;jkbmay	0000000000
9						

Type column headers.

Double-click column borders  
to change column widths to  
match the widest column  
entries.

**Another Way**

You can also use text functions such as LEFT, MID, and RIGHT to convert text data from one column to multiple columns.

7. **SAVE** the workbook as **10 Fabrikam Alarm Codes Solution**.

**PAUSE.** LEAVE the workbook open for the next exercise.

**USING LEFT**

The LEFT function evaluates a string and takes any number of characters on the left side of the string. The format of the function is `LEFT(Text, Num_chars)`. The first string in the Alarm Data workbook contains the employee's phone extension and floor number, which you grab by using the LEFT function.

**STEP BY STEP****Use the LEFT Function**

GET READY. USE the workbook from the previous exercise.

1. Click cell **H1**, type **Ext**, and in **I1**, type **Floor** to label the columns.

2. Select cell H2.
3. Click the **FORMULAS** tab. In the Function Library group, click **Text** and choose **LEFT**. The Function Arguments dialog box opens.
4. In the Text box, click A2 and press **Tab**.
5. In the Num\_chars box, type 3 and press **Tab**. The preview of the result shows 425 (see Figure 10-23).

**Figure 10-23**

LEFT function arguments

The screenshot shows a Microsoft Excel spreadsheet titled "10 Fabrikam Alarm Codes Solution.xlsx". The data is in columns A through H. Column A contains Employee IDs, column B contains Surnames, and column C contains First Names. Column D contains Birth Dates, and column E contains Alarm codes. Columns F and G contain converted codes. Column H contains the result of the LEFT function. The formula bar shows =LEFT(A2,3). The Function Arguments dialog box is displayed, with "Text" set to A2 and "Num\_chars" set to 3. The preview in the dialog box shows the result as 425.

A	B	C	D	E	F	G	H
ExtCodeEmpID	SpFirst	SlastName	Hire Date	Alarm	OCode1	Ocode2	Ext Floor
425conp15210	david	ortiz	37291	AAksdjfbft;akjsdfjlkafapr	0000000000	0000000000	=LEFT(A2,3)
327sanp49612	kim	akers	39668	ljkasbdfb;jkasfmar	0000000000	0000000000	
329sanp151276	linda	moschell	41301	colubasdfljkllkeuig	0000000000	0000000000	
330sanp047373	michael	nash	41530	ozrxQAuadlbkjdec	0000000000	0000000000	
328sanp37624	nicole	carson	40241	IkbbueoAiajdckljul	0000000000	0000000000	
424conp77612	richard	carey	37267	Alajdfifjkaobdfjan	0000000000	0000000000	
426esnp56690	ryan	calafato	38050	I;Ajdkafasd;jkbmay	0000000000	0000000000	

### CERTIFICATION READY? 4.4.1

How do you create a formula that extracts a certain number of characters on the left of a string?

### Take Note

The result of this exercise on the LEFT function and the following exercises on the RIGHT and MID functions are shown in Figure 10-24.

7. Select cell I2, click the **Recently Used** button, and select **LEFT**.
8. In the Text box, type A2, press **Tab**, and in the Num\_chars box, type 1. Click **OK**.
9. Copy the formula in I2 from I3 to I8.
10. **SAVE** the workbook.

PAUSE. LEAVE the workbook open for the next exercise.

## USING RIGHT

The RIGHT function is almost identical to the LEFT function except that the function returns the number of characters on the right side of the text string. In the Alarm codes file, the first converted column contains the five-digit employee ID at the end, and the Alarm code in column E contains the employee's birth month.

### STEP BY STEP

### Use the RIGHT Function

GET READY. USE the workbook from the previous exercise.

1. Click cell J1, and then type **Birthday**. In cell K1, type **EmpID** to label the columns.
2. Select cell J2.
3. Click the **FORMULAS** tab and in the Function Library group, click **Text** and choose **RIGHT**. The Function Arguments dialog box opens.
4. In the Text box, click E2 and press **Tab**.

**CERTIFICATION  
READY?**    **4.4.1**

How do you create a formula that extracts a certain number of characters on the right of a string?

5. In the Num\_chars box, type **3** and press **Tab**. The preview of the result shows *apr*.
6. Click **OK** and copy the formula in J2 from **J3** to **J8**.
7. Select cell **K2**, type **=RIGHT(A2,5)**, and press **Enter**.
8. Copy the formula in K2 from **K3** to **K8**.
9. **SAVE** the workbook.

**PAUSE.** LEAVE the workbook open for the next exercise.

## Using MID

Whereas LEFT and RIGHT return the number of the characters on either side of a text string, MID returns characters in the middle. For this reason, your arguments need to include the Text string and then a starting point (Start\_num) and number of characters (Num\_chars). In the first column of the Alarm file, there are codes indicating two different categories of employees.

**STEP BY STEP**

## Use the Mid Function

**GET READY.** USE the workbook from the previous exercise.

1. Click cell **L1**, and then type **empcat1**, and in cell M1, type **empcat2** to label the columns.
2. Select cell **L2**.
3. Click the **FORMULAS** tab and in the Function Library group, click **Text** and choose **MID**. The Function Arguments dialog box opens.
4. In the Text box, click **A2** and press **Tab**.
5. The starting point of the empcat1 value is the fourth character of (425oopn15210), so type a **4** in the Start\_num text box.
6. In the Num\_chars box, type **2**. The preview of the result shows *oo*.
7. Click **OK** and copy the formula in L2 from **L3** to **L8**.
8. Select cell **M2**, and type **=MID(A2,6,2)**, and press **Enter**.
9. Copy the formula in M2 from **M3** to **M8**.
10. **SAVE** the workbook. The worksheet should look like Figure 10-24.

**Figure 10-24**

Alarm Data workbook after the MID functions are entered and copied

**PAUSE.** LEAVE the workbook open for the next exercise.

## Using TRIM

Sometimes there are extra spaces in a cell—either at the end or the beginning of the string, especially after converting a text file like the alarm file—see the SPFirst and SPLast columns. The TRIM function removes characters at both ends of the string. There is only one argument: Text. Thus the syntax of the function is TRIM(Text).

**STEP BY STEP****Use the TRIM Function**

GET READY. USE the workbook from the previous exercise.

1. Click cell **N1**, type **first**, and in cell **O1**, type **last** to label the columns.
2. Click cell **N2**.
3. Click the **FORMULAS** tab and in the Function Library group, click **Text** and choose **TRIM**. The Function Arguments dialog box opens.
4. In the Text box, click **B2**. If you look closely, you see that the original value of cell B2 is “david” with a space before the first name.
5. Click **OK** and copy the formula in N2 from **N3** to **N8**.
6. Select cell **O2**, type **=TRIM(C2)**, and press **Enter**.
7. Copy the formula in O2 from **O3** to **O8**.
8. **SAVE** the workbook. The results of the next few exercises appear in Figure 10-25.

**CERTIFICATION  
READY?**    **4.4.2**

How do you create a formula that removes blank characters at the beginning and/or end a string?

PAUSE. LEAVE the workbook open for the next exercise.

**Using PROPER**

The PROPER function capitalizes the first letter in a text string and any other letters in text that follow any character other than a letter. All other letters are converted to lowercase. In the PROPER(Text) syntax, Text can be text enclosed in quotation marks, a formula that returns text, or a reference to a cell containing the text you want to capitalize. In this exercise, you use PROPER to change lowercase text to initial capitals.

**STEP BY STEP****Use the PROPER Function**

GET READY. USE the workbook from the previous exercise.

1. Click cell **A11**, and then type **First**. In cell **B11**, type **Last**, and in cell **C11**, type **Birthday** to label the columns.
2. Select cell **A12**.
3. Click the **FORMULAS** tab and in the Function Library group, click **Text** and choose **PROPER**. The Function Arguments dialog box opens.
4. In the Text box, click **N2**. You see that *david* is converted to *David*.
5. Click **OK** and copy the formula in A12 from **A12** through **B18** (both First and Last name columns).
6. Select cell **C12**, type **=PROPER(J2)**, and press **Enter**.
7. Copy the formula in C12 from **C13** to **C18**.
8. **SAVE** the workbook.

**Take Note**

You can see the results of this and the next few exercises in Figure 10-25 later in the lesson.

PAUSE. LEAVE the workbook open for the next exercise.

The PROPER function capitalizes the first letter in each word in a text string. All other letters are converted to lowercase. If you have an apostrophe such as David’s, Excel recognizes the apostrophe as a break and capitalizes the result as David’S.

**Using UPPER**

The UPPER function allows you to convert text to uppercase (all capital letters) text. The syntax is UPPER(Text), with Text referring to the text you want converted to uppercase. Text can be a reference or a text string. In this exercise, you convert the employee category (empcat1 and emp-cat2) to uppercase.

**STEP BY STEP****Use the UPPER Function**

GET READY. USE the workbook from the previous exercise.

1. Click cell **D11**, type **EmpCat1**, and in cell **E11**, type **EmpCat2** to label the columns.
2. Click cell **D12**.
3. Click the **FORMULAS** tab and in the Function Library group, click **Text** and choose **UPPER**. The Function Arguments dialog box opens.
4. In the Text box, click **L2**. You see that *oo* is converted to *Oo*.
5. Click **OK** and copy the formula in D12 from **D12** through **E18** (both EmpCat1 and EmpCat2 columns).
6. **SAVE** the workbook.

PAUSE. LEAVE the workbook open for the next exercise.

**CERTIFICATION  
READY? 4.4.3**

How do you create a formula that capitalizes all characters in a string?

**Using LOWER**

The LOWER function converts all uppercase letters in a text string to lowercase. LOWER does not change characters in text that are not letters. You use the LOWER formula in the following exercise to apply lowercase text in order to more easily tell an O (letter O) from a 0 (zero).

**STEP BY STEP****Use the LOWER Function**

GET READY. USE the workbook from the previous exercise.

1. Click cell **F11** and type **oCode1**. In cell **G11**, type **oCode2** to label the columns.
2. Click cell **F12**.
3. Click the **FORMULAS** tab and in the Function Library group, click **Text** and choose **LOWER**. The Function Arguments dialog box opens.
4. In the Text box, click **F2**. You see that *0000000000* is converted to *00o0o0o000*.
5. Click **OK** and copy the formula in F12 from cell **F12** through **G18** (both oCode1 and oCode2 columns).
6. **SAVE** the workbook.

PAUSE. LEAVE the workbook open for the next exercise.

**CERTIFICATION  
READY? 4.4.3**

How do you create a formula that changes all the characters of a string to lowercase?

**Using CONCATENATE**

In some cases, you need to combine text strings together. Use CONCATENATE for this purpose. The syntax of the function is CONCATENATE(Text1, Text2, Text3 ... up to Text30). In this case, you combine the first and last names into two different formats for future mail merges. In the first format, you use a comma to separate the last and first name but because the character can change to a semi-colon or other character, you type the comma in a cell and use the cell reference in the CONCATENATE formula.

**STEP BY STEP****Use the CONCATENATE Function**

GET READY. USE the workbook from the previous exercise.

1. Click cell **H11** and type **,** (a comma followed by a space), and in cell **I11**, type **First Last** to label the columns.
2. Click cell **H12**.
3. Click the **FORMULAS** tab and in the Function Library group, click **Text** and choose

**CONCATENATE.** The Function Arguments dialog box opens.

4. In the Text box, click cell **B12** and press **Tab**. Click cell **H11**, press **Tab**, and click **A12**. In the preview area, you see "Ortiz, David."
5. Click **OK** and copy the formula in cell H12 from cell **H13** through cell **H18**. The result is an error (see Figure 10-25). Notice that the string gets longer and longer and Ortiz is in every string.
6. In the Formula Bar, click the cell H11 reference and press **F4** (Absolute). Cell H11 should become \$H\$11.

**Figure 10-25**

Copy formula for Last and First did not work.

			=CONCATENATE(B12,\$H\$11,A12)						G	H	I	J	K	L	M	N	O	P
LEFT	A	B	C	[CONCATENATE(text1,[text2],[text3],[text4],...)]		G	H	I	J	K	L	M	N	O	P			
1	ExtCodeEmpID	SpFirst	SpLast	Hire Date Alarm	OCode1	Ocode2	Ext	Floor	Birthday	EmpID	empcat1	empcat2	first	last				
2	425conp15210	david	ortiz	37291 IAaksdjbf;akjsdflijkaor	0000000000	0000000000	425	4	apr	15210	oo	np	david	ortiz				
3	3275amp49612	kim	akers	39668 ljsksbdffbjksfmar	0000000000	0000000000	327	3	mar	49612	sa	np	kim	akers				
4	329sap151276	linda	moschell	41301 colubasdjlkkeaug	0000000000	0000000000	329	3	aug	51276	sa	p1	linda	moschell				
5	330sp047373	michael	nash	41530 ozixcAuadlbkjedec	0000000000	0000000000	330	3	dec	47373	ps	p0	michael	nash				
6	328sanp37624	nicole	carson	40241 lkbbueoAiajckjlul	0000000000	0000000000	328	3	jul	37624	sa	np	nicole	carson				
7	424conp77612	richard	carey	37367 Alajsdfljkasbdfjan	0000000000	0000000000	424	4	jan	77612	oo	np	richard	carey				
8	426esnp56690	ryan	calafato	38050 tAjdkfalsd;jkbsmay	0000000000	0000000000	426	4	may	56690	es	np	ryan	calafato				
9																		
10																		
11	First	Last	Birthday	EmpCat1	EmpCat2	oCode1	oCode2											
12	David	Ortiz	Apr	OO	NP	0000000000	0000000000	\$H\$11,A12										
13	Kim	Akers	Mar	SA	NP	0000000000	0000000000											
14	Linda	Moschell	Aug	SA	P1	0000000000	0000000000											
15	Michael	Nash	Dec	PS	P0	0000000000	0000000000											
16	Nicole	Carson	Jul	SA	NP	0000000000	0000000000											
17	Richard	Carey	Jan	OO	NP	0000000000	0000000000											
18	Ryan	Calafato	May	ES	NP	0000000000	0000000000											

Comma string (H11) needs to become absolute.

7. Press **Enter** and copy the formula in cell H12 from cell **H13** through cell **H18** again. This time the formula is copied correctly.
8. Type a ; (a semi-colon followed by a space) in H11, and notice that all values in the column now have semi-colons instead of commas.
9. Select cell **I12** and type **=CONCATENATE(A12," ",B12)**. Notice that the second argument is a quote, space, and a quote. This separates the first and last names.
10. Press **Enter** and copy the formula in cell I12 from cell **I13** through cell **I18**.
11. **SAVE** the workbook.

PAUSE. LEAVE the workbook open for the next exercise.

## CERTIFICATION READY? 4.4.4

How do you create a formula that combines two strings together to form one string?

## Using FIND

Use the FIND function to locate a specific string in a text string. The syntax of the function is **FIND(Find\_text, Within\_text, Start\_num)**. The Find\_text argument can be one character as in this example or a longer string. The Within\_text is usually a longer string and most often is a cell reference with a string. The Start\_num argument tells you which position in the Within\_text string to begin the counting. This argument is optional and if left off assumes you will begin searching at the beginning of the string. In the Alarm Data file, there are two hidden letters in one of the strings (A and B) whose position actually tells you the digits of the first entry code. The second entry is the month number of the employee's birthday.

## STEP BY STEP

### Use the FIND Function

GET READY. USE the workbook from the previous exercise.

1. Click cell **J11** and type **APos**, and in cell **K11**, type **bPos** to label the columns.
2. Click cell **J12**.
3. Click the **FORMULAS** tab and in the Function Library group, click **Text** and choose **FIND**. The Function Arguments dialog box opens.

4. In the Find\_text box, type **A** and press **Tab**. Notice that the preview shows “A” (with quotes) in the row.
5. In the Within\_text box, click **E2**. Notice that the result returns a 3 for the function. The first character in the string is a space, the second is an l (lowercase “L”), and the third is a capital A.
6. Click **OK** and copy the formula in cell J11 from cell **J12** through cell **J18**.
7. Select cell **K12**, type **=FIND("b",E2)**, and press **Enter**. In this case, you are looking for a lowercase b—the argument is case sensitive.
8. Copy the formula in cell K12 from cell **K13** to cell **K18**.
9. SAVE the workbook.

PAUSE. LEAVE the workbook open for the next exercise.

## Using SUBSTITUTE

Excel’s SUBSTITUTE function is especially useful when you need to edit data and you want to substitute new text for existing text in a text string. Use SUBSTITUTE when you want to replace specific text in a text string; use REPLACE when you want to replace any text that occurs in a specific location in a text string, such as when a name change occurs. In the Alarm Data file, the employee category fields can identify probationary employees and the level of probation. The syntax of the function is **SUBSTITUTE(Text, Old\_text, New\_text, Instance\_num)**. The Text argument is the string you will search. In this exercise you will replace the Old\_text with New\_text.

### STEP BY STEP

### Use the SUBSTITUTE Function

GET READY. USE the workbook from the previous exercise.

1. Click cell **L11** and type **S1**, and in M11, type **Probationary Level** to label the columns.
2. Select cell **L12**.
3. Click the **FORMULAS** tab and in the Function Library group, click **Text** and choose **SUBSTITUTE**. The Function Arguments dialog box opens.
4. In the Text box, click **E12** and press **Tab**.
5. In the Old\_text box, type **NP**. This is a code for employees who are not probationary.
6. In the New\_text box, type **Non** and press **Tab**. Because the first value is NP, the result of the formula will be Non.
7. Click **OK** and copy the formula in L11 from **L12** through **L18**.
8. Select cell **M12** and type **=SUBSTITUTE(L12,"P","Probationary Level ")** and press **Enter**. In this case, you are looking for the letter P and changing the string to Probationary Level with a space at the end because a number will follow.
9. Copy the formula in cell M12 from cell **M13** to cell **M18**. See Figure 10-26 to see the worksheet values.

**Figure 10-26**

Text exercises

ExtCodeEmpID	SpFirst	Splast	Hire Date	Alarm	OCode1	Ocode2	Ext	Floor	Birthday	EmpID	empCat1	empCat2	first	last
425conp15210	david	ortiz	37291	Iaaksdjfl;kajksdflj;kafap	0000000000	0000000000	425	4	apr	15210	oo	np	david	ortiz
3273anp49612	kim	akers	39686	Ijksabdfbf;ksfmfar	0000000000	0000000000	327	3	mar	49612	sa	np	kim	akers
4 329anp151276	linda	moschell	41301	coibausdfAljkseug	0000000000	0000000000	329	3	aug	51276	sa	p1	linda	moschell
330anp047373	michael	nash	41330	oizx;Auadlbkjedec	0000000000	0000000000	330	3	dec	47373	ps	p0	michael	nash
6 328anp37624	nicole	carson	40241	lkbbueoAiajdckjl	0000000000	0000000000	328	3	jul	37624	sa	np	nicole	carson
7 424conp77612	richard	carey	37367	Alajsdfljkasbdfjan	0000000000	0000000000	424	4	jan	77612	oo	np	richard	carey
8 426esnp56690	ryan	calafato	38050	IaJokfaIsd;jkbmay	0000000000	0000000000	426	4	may	56690	es	np	ryan	calafato
9														
10														
11	First	Last	Birthday	EmpCat1	EmpCat2	oCode1	oCode2	:	First	Last	APos	bPos	s1	Probationary Level
12	David	Ortiz	Apr	OO	NP	0000000000	0000000000	Ortiz; David	David	Ortiz	3	9	Non	Non
13	Kim	Akers	Mar	SA	NP	0000000000	0000000000	Akers; Kim	Kim	Akers	6	7	Non	Non
14	Linda	Moschell	Aug	SA	P1	0000000000	0000000000	Moschell; L Linda Mos	Linda	Moschell	11	6	P1	Probationary Level 1
15	Michael	Nash	Dec	PS	P0	0000000000	0000000000	Nash; Micha Michael N	Micha	Nash	8	13	P0	Probationary Level 0
16	Nicole	Carson	Jul	SA	NP	0000000000	0000000000	Carson; Nico Nicole Car	Nico	Carson	9	4	Non	Non
17	Richard	Carey	Jan	OO	NP	0000000000	0000000000	Carey; Richa Richard Cr	Richa	Carey	2	14	Non	Non
18	Ryan	Calafato	May	ES	NP	0000000000	0000000000	Calafato; RY Ryan Cala	RY	Calafato	4	16	Non	Non
19														
20														
21														
22														
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36														

- 10.** Press **Ctrl +** to display the formulas, as shown in Figure 10-27. Press **Ctrl +** again to switch back to the formula results.

**Figure 10-27**

Text exercise worksheet formulas

ExtCodeEmpID	SpFirst	Splast	Hire Date	Alarm	OCode1	Ocode2	Ext	Floor	Birthday	EmpID	empCat1	empCat2	first	last
425conp15210	david	ortiz	37291	Iaaksdjfl;kajksdflj;kafap	0000000000	0000000000	=LEFT(A2,3)	=RIGHT(A2,5)	=RIGHT(B2,3)	=MD(42,2)	=MD(42,6,2)	=TRIM(B2)	=TRIM(C2)	
3273anp49612	kim	akers	39686	Ijksabdfbf;ksfmfar	0000000000	0000000000	=LEFT(A3,3)	=LEFT(A3,5)	=RIGHT(T1,3)	=MD(43,2)	=MD(43,6,2)	=TRIM(B3)	=TRIM(C3)	
4 329anp151276	linda	moschell	41301	coibausdfAljkseug	0000000000	0000000000	=LEFT(A4,3)	=LEFT(A4,5)	=RIGHT(T4,3)	=MD(44,2)	=MD(44,6,2)	=TRIM(B4)	=TRIM(C4)	
330anp047373	michael	nash	41330	oizx;Auadlbkjedec	0000000000	0000000000	=LEFT(A5,3)	=LEFT(A5,1)	=RIGHT(T5,1)	=MD(45,2)	=MD(45,6,2)	=TRIM(B5)	=TRIM(C5)	
6 328anp37624	nicole	carson	40241	lkbbueoAiajdckjl	0000000000	0000000000	=LEFT(A6,3)	=LEFT(A6,1)	=RIGHT(T6,1)	=MD(46,2)	=MD(46,6,2)	=TRIM(B6)	=TRIM(C6)	
7 424conp77612	richard	carey	37367	Alajsdfljkasbdfjan	0000000000	0000000000	=LEFT(A7,3)	=LEFT(A7,1)	=RIGHT(T7,1)	=MD(47,2)	=MD(47,6,2)	=TRIM(B7)	=TRIM(C7)	
8 426esnp56690	ryan	calafato	38050	IaJokfaIsd;jkbmay	0000000000	0000000000	=LEFT(A8,3)	=LEFT(A8,1)	=RIGHT(T8,1)	=MD(48,2)	=MD(48,6,2)	=TRIM(B8)	=TRIM(C8)	
9														
10														
11	First	Last	Birthday	EmpCat1	EmpCat2	oCode1	oCode2	:	First	Last	APos	bPos	s1	Probationary Level
12	David	Ortiz	Apr	OO	NP	0000000000	0000000000	Ortiz; David	David	Ortiz	3	9	Non	Non
13	Kim	Akers	Mar	SA	NP	0000000000	0000000000	Akers; Kim	Kim	Akers	6	7	Non	Non
14	Linda	Moschell	Aug	SA	P1	0000000000	0000000000	Moschell; L Linda Mos	Linda	Moschell	11	6	P1	Probationary Level 1
15	Michael	Nash	Dec	PS	P0	0000000000	0000000000	Nash; Micha Michael N	Micha	Nash	8	13	P0	Probationary Level 0
16	Nicole	Carson	Jul	SA	NP	0000000000	0000000000	Carson; Nico Nicole Car	Nico	Carson	9	4	Non	Non
17	Richard	Carey	Jan	OO	NP	0000000000	0000000000	Carey; Richa Richard Cr	Richa	Carey	2	14	Non	Non
18	Ryan	Calafato	May	ES	NP	0000000000	0000000000	Calafato; RY Ryan Cala	RY	Calafato	4	16	Non	Non
19														
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21														
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- 11.** SAVE the workbook.

CLOSE Excel.

To use existing text with small changes, you can use the SUBSTITUTE function. In the Function Arguments dialog box, Text can be the actual text you want to substitute, or it can be a cell reference.

## SKILL SUMMARY

In this lesson you learned how:	Exam Objective	Objective Number
To use formulas to conditionally summarize data.	Demonstrate how to apply the SUMIF function.	4.3.1
	Demonstrate how to apply the COUNTIF function.	4.3.3
	Demonstrate how to apply the AVERAGEIF function.	4.3.2
To use formulas to look up data in a workbook.		
To use formulas to modify text.	Demonstrate how to use the RIGHT, LEFT, and MID functions.	4.4.1
	Demonstrate how to use the TRIM function.	4.4.2
	Demonstrate how to use the UPPER and LOWER functions.	4.4.3
	Demonstrate how to use the CONCATENATE function.	4.4.4

## Knowledge Assessment

### Multiple Choice

Select the best response for the following statements.

1. Which of the following functions would you use to convert text from uppercase to title case?
  - a. UPPER
  - b. PROPER
  - c. LOWER
  - d. SUBSTITUTE
2. Which function automatically counts cells that meet multiple conditions?
  - a. COUNTIF
  - b. COUNT
  - c. COUNTIFS
  - d. SUMIFS
3. Which function automatically counts cells that meet a specific condition?
  - a. COUNTIF
  - b. COUNT
  - c. COUNTIFS
  - d. SUMIFS
4. In the formula =SUMIFS(C5:C16, F5:F16, “<=60”, B5:B16, “>200000”), what is the range of cells to be added?
  - a. a.= C5:C16
  - b. = F5:F16
  - c. = B5:B16
  - d. = C5:F16

5. In the formula =SUMIFS(C5:C16, F5:F16,"<=60", B5:B16, ">200000"), what does <=60 mean?  
a. If the value in C5:C16 is greater than or equal to 60, the value in C5:C16 will be included in the total.  
b. If the value in F5:F16 is greater than or equal to 60, the value in C5:C16 will be included in the total.  
c. If the value in B5:B16 is less than or equal to 60, the value in C5:C16 will be included in the total.  
d. If the value in F5:F16 is less than or equal to 60, the value in C5:C16 will be included in the total.
6. What does criteria range in a formula refer to?  
a. The worksheet data to be included in the formula's results  
b. The range containing a condition that must be met in order for data to be included in the result  
c. The type of formula being used for the calculation  
d. The type of data contained in the cells to be included in the formula
7. Which function returns one value if a condition is true and a different value when the condition is not true?  
a. a.AND  
b. OR  
c. IF  
d. IFERROR
8. Which function returns a value if all conditions are met?  
a. AND  
b. OR  
c. IF  
d. IFERROR
9. Which function checks to see whether the result is something like #N/A (not available) and can return something else instead?  
a. AND  
b. OR  
c. NOT  
d. IFERROR
10. Which function reverses the value of the function arguments?  
a. AND  
b. NOT  
c. IF  
d. IFERROR

### Matching

Match each term with its definition.

- |                         |       |   |
|-------------------------|-------|---|
| a. AND function         | _____ | 1. A function used to look up information stored in the first column of an Excel table in the worksheet.                                  |
| b. arguments            | _____ | 2. A function in which a True result is returned if data meets any condition specified in the formula.                                    |
| c. CONCATENATE function | _____ | 3. The values that a function uses to perform operations or calculations.   |
| d. COUNTIF              | _____ | 4. A function in which a True result is returned if data meets all conditions specified in the formula.                                   |
| e. HLOOKUP              | _____ | 5. A function that combines two or more strings together.   |
| f. OR function          | _____ | 6. A formula component used to build single formulas that produce multiple results.   |
| g. SUMIF                | _____ | 7. A function in which the result is determined by the state of multiple criteria.  |
| h. SUMIFS               | _____ | 8. A function that references the first row of an Excel table in the worksheet in order to look up information stored in the same column. |
| i. table                | _____ | 9. A function that returns the total number of cells that meet one condition.   |
| j. VLOOKUP              | _____ | 10. A function in which the result is determined by the state of a particular condition.  |

## Competency Assessment

### Project 10-1: Separating Text into Columns

In this project, you take a text file of student grades and separate the information into seven columns rather than one.

GET READY. LAUNCH Excel if it is not already running.



1. OPEN the **10 SFA Grades Import** file.
2. Select cells **A4:A41**. Click the **DATA** tab and in the Data Tools group, click **Text to Columns**.
3. The Convert Text to Columns Wizard opens with Delimited selected as the default, because Excel recognized that the data in the selected range is separated with delimiters. Click **Next**.
4. Select **Comma** and **Space** as the delimiters. If other delimiters are checked (such as Tab), deselect them and click **Next**. Click **Finish**.
5. Label each of the columns in row 3 (A3 through G3): **Last, First, Initial, ID, Final, Quarter, Semester**.
6. SAVE the workbook in the Lesson 10 folder as **10 SFA Grades Import Solution**. CLOSE the workbook.

LEAVE Excel open for the next project.

---

### Project 10-2: Creating SUMIF and SUMIFS Formulas to Conditionally Summarize Data

Salary information for Contoso, Ltd. has been entered in a workbook so the office manager can analyze and summarize the data. In the following exercise, you calculate sums with conditions.

GET READY. LAUNCH Excel if it is not already running.



1. OPEN the **10 Contoso Salaries** data file for this lesson.
2. Select cell **C35**. Click the **FORMULAS** tab and in the Function Library group, click **Insert Function**.
3. If the SUMIF function is not visible, type **SUMIF** in the Search for a function box and click **Go**. From the Select a function list, click **SUMIF**. Click **OK**.
4. In the Function Arguments dialog box, in the Range field select **C4:C33**.
5. In the Criteria box, type **>100000**.
6. Click **OK**. Because the range and sum range are the same, it is not necessary to enter a Sum\_range argument.
7. Select **C36** and click **Insert Function**. Select **SUMIFS** and click **OK**.
8. In the Function Arguments dialog box, select **C4:C33** as the sum range.
9. Select **D4:D33** as the first criteria range.
10. Type **>=10** as the first criterion.
11. Select **C4:C33** as the second criteria range.
12. Type **<60000** as the second criterion. Click **OK** to finish the formula.
13. SAVE the workbook as **10 Contoso Salaries Solution**. CLOSE the file.

LEAVE Excel open for the next project.

---

## Proficiency Assessment

### Project 10-3: Using a Formula to Format Text

Use a formula to format text for employees to decide on 401K investments for Fabrikam, Inc.

GET READY. LAUNCH Excel if it is not already running.



1. OPEN the **10 Fabrikam Investments** data file for this lesson.
2. Enter formulas in column F to convert the text in column A to title case.
3. Copy the values from column F to column A and delete column F.
4. SAVE the workbook in the Lesson 10 folder as **10 Fabrikam Investments Solution** and then CLOSE the file.

LEAVE Excel open for the next project.

---

### Project 10-4: Create COUNTIF and AVERAGEIF Formulas

In this exercise, you enter COUNTIF and AVERAGEIF formulas to analyze and summarize grades for a course at the School of Fine Arts.

GET READY. LAUNCH Excel if it is not already running.



1. OPEN the **10 SFA Grades** data file for this lesson.
2. In cell J2 enter a formula that counts the total number of students.
3. In the grades table on the right side of the worksheet, create formulas using COUNTIF that will count how many students got an A for the Final, Quarter, and Semester. In the Range field, use an absolute reference.
4. Create formulas for each of the other grades in the grades table.
5. SAVE the workbook as **10 SFA Grades Solution** and then CLOSE the file.

LEAVE Excel open for the next project.

---

## Mastery Assessment

### Project 10-5: Creating Conditional Logic Formulas

Professor Garrett Young has asked you to create formulas to identify the highest and lowest achieving students on his first test.

GET READY. LAUNCH Excel if it is not already running.



1. OPEN the **10 SFA Test Grades** file for this lesson.
2. In column F, use a function that will place the word "High" in each cell when the Test1 result is greater than 90. There will be a blank for all other values in this column.
3. In column G, use a function that will place the word "Low" in each cell when the test result is less than 70. There will be a blank for all other values in this column.
4. In cell A43, type **Count**, and then create two formulas that will count the High and Low labels in columns F and G. Best Practice Hint: Use the labels in F3 and G3 in your formulas instead of the word High or Low.
5. SAVE the workbook in the Lesson 10 folder as **10 SFA Test Grades Solution** and then CLOSE the file.

LEAVE Excel open for the next project.

---

### Project 10-6: Creating COUNTIF, AVERAGEIF, and LOOKUP Formulas

In this project, you use a lookup table to determine an employee's end-of-year bonus.

GET READY. LAUNCH Excel if it is not already running.



1. OPEN the **10 Contoso Bonus** data file for this lesson.
2. In the table starting in row 35, create formulas to count the number of employees in each position in column B and the average salary of each position in column C.
3. Calculate the bonus by multiplying the Average salary by the rate/100.
4. Starting in F4, create a formula and copy it down that will look up the bonus for each position and put it in column F.
5. SAVE the workbook in the Lesson 10 folder as **10 Contoso Bonus Solution**, and then CLOSE the file.

CLOSE Excel.

---

# Securing and Sharing Workbooks

# 11

## LESSON SKILL MATRIX

Skills	Matrix Skill	Skill Number
Securing Your Work Before Sharing It with Others		
Distributing a Workbook by Email and the Cloud		
Tracking Changes to a Workbook		
Adding Comments to a Workbook		



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## KEY TERMS

- change history
- password
- shared workbook
- strong password
- tracking changes



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Contoso, Ltd sees many patients every day. The clinic keeps confidential records about patient visits, medications, and medical issues. In addition, for employees, information about salaries, national identification numbers (social security numbers in the US, social insurance numbers in Canada, or national insurance numbers in the UK), and performance appraisals is stored. The back office staff must be able to share information, but it is critical that much of the information be kept confidential. In this lesson, you learn about Excel's tools for protecting and distributing documents, sharing them, tracking changes, and adding comments.

## SOFTWARE ORIENTATION

### The REVIEW Tab

Microsoft Excel provides several layers of security and protection that enable you to control who can access and change your Excel data. Commands on the REVIEW tab (Figure 11-1) enable you to protect an entire workbook file so that only authorized users can view or modify your data (the highest level of protection). You can also protect certain worksheet or workbook elements to prevent users from accidentally or deliberately changing, moving, or deleting important data. Data protection is especially important when files are shared and edited by multiple users.

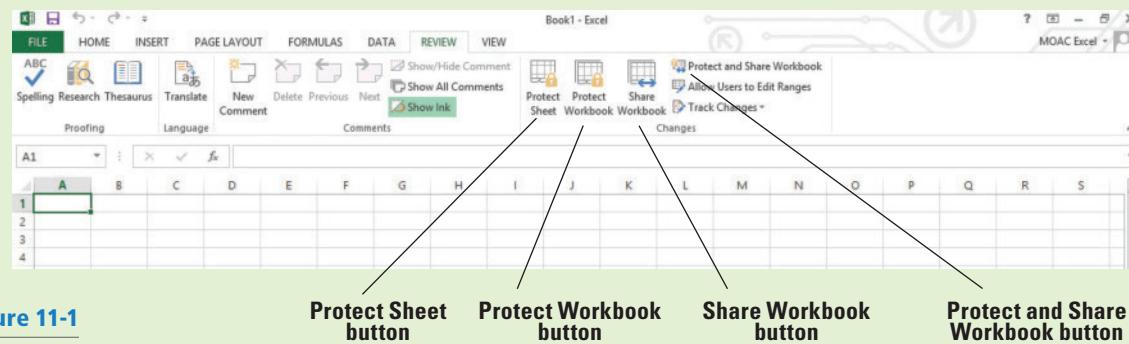


Figure 11-1

REVIEW tab

Protect Sheet button

Protect Workbook button

Share Workbook button

Protect and Share Workbook button

Use this illustration as a reference throughout this lesson as you learn to share and edit files using Excel's security and protection options.

## SECURING YOUR WORK BEFORE SHARING IT WITH OTHERS

### Bottom Line

A **password** is text that must be entered before a user can access a workbook, worksheet, or worksheet elements. You can secure an entire workbook by restricting who can open and/or use the workbook data and by requiring a password to view and/or save changes to the workbook. You can also provide additional protection for certain worksheets or workbook elements with or without applying a password.

### Protecting a Worksheet

In a work environment, workbooks are frequently used by more than one employee. When you create a worksheet that is accessed by multiple users, you often need to protect it so that a user does not accidentally or intentionally change, move, or delete important data. In the next exercise, you use the RAND and RANDBETWEEN formulas to create unique ID numbers.

Excel has two random number functions: RAND and RANDBETWEEN. RAND does not require function arguments, so you cannot specify the number of digits you want in the number returned by a RAND formula. In contrast, RANDBETWEEN allows you to determine the beginning and ending numbers.

### STEP BY STEP

### Protect a Worksheet



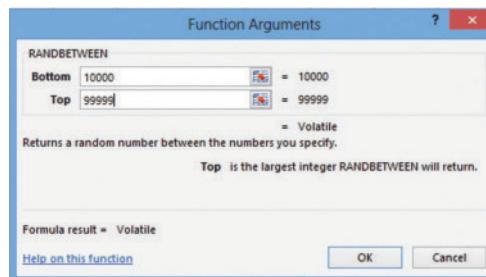
GET READY. LAUNCH Excel.



1. OPEN **11 Contoso Employees** from the data files for this lesson.
2. On the SSN worksheet, select cell **G4**.
3. Click the **FORMULAS** tab, choose **Math & Trig** and select **RANDBETWEEN**. This formula creates a random number for each employee that can be used for identification purposes.
4. In the Function Arguments dialog box, in the Bottom box, type **10000** and in the Top box, type **99999**, as shown in Figure 11-2. Click **OK**. As one of the first steps in information security, employees are usually assigned an Employee ID number that can replace Social Security numbers for US employees, Social Insurance numbers for Canadian employees, and National Insurance numbers for UK employees on all documents.

**Figure 11-2**

Generating a five-digit random number



5. Double-click the fill handle in cell G4 to copy the range to G5:G33. Each employee is now assigned a random five-digit ID number.
6. With the range **G4:G33** already selected, on the HOME tab, click **Copy**. Click the **Paste** arrow, and then click **Paste Values**.



### Troubleshooting

The RANDBETWEEN formula generates a new random number each time a workbook is opened or modified. To retain the Employee ID numbers created by the formula, you must replace the formula with the values.

7. With G4:G33 selected, on the HOME tab, click **Format** and then select **Format Cells**. Click the **Protection** tab and verify that Locked is checked. This prevents employee ID numbers from being changed when the worksheet has been protected. Click **OK**.
8. On the HOME tab, click the **Sort & Filter** button and select **Sort Smallest to Largest**. On the Sort Warning dialog box, select **Continue with the current selection**, and then click **Sort**.
9. Select cells C4:D33. On the HOME tab, click **Format**. Notice that the **Lock Cell** command appears selected, meaning the cells are locked by default. Click **Lock Cell** to turn off the protection on these cells to allow these cells to change.
10. Click on the **REVIEW** tab, and in the Changes group, click **Protect Sheet**.
11. In the Password to unprotect sheet box, type **L11!e01**. The password is not displayed in the Password to unprotect sheet box. Instead, asterisks (\*) are displayed as shown in Figure 11-3. Click **OK**.

**Figure 11-3**

The Protect Sheet dialog box displays asterisks (\*) as you type, to protect the password.



12. You are asked to confirm the password. Type **L11!e01** again and click **OK**. You have just created and confirmed the password that will lock the worksheet. Passwords are meant to be secure. This means that all passwords are case sensitive. Thus, you must type exactly what has been assigned as the password—uppercase and lowercase letters, numbers, and symbols.
13. **SAVE** the workbook as **11 Payroll Data Solution**. **CLOSE** the workbook.

**PAUSE.** LEAVE Excel open for the next exercise.

#### Take Note

Workbook and worksheet element protection should not be confused with workbook-level password security. Element protection cannot protect a workbook from users who have malicious intent.

### Protecting a Workbook

Assigning a password is an effective way to prevent any user who does not know the password from opening a workbook. To protect an entire workbook, you can require a password to open and view the workbook. You can also require one password to open and view the workbook and a second password to modify workbook data. Passwords that apply to an entire workbook provide optimal security for your data.

Currently, the 11 Payroll Data Solution workbook you saved in the previous exercise can be viewed by anyone who has access to the computer system. You restricted the modification of the file, but you did not restrict access to the data. In this exercise, you will limit access to the workbook by requiring a password to open the document.

Excel passwords can contain up to 255 letters, numbers, spaces, and symbols. Passwords are case sensitive, so you must type uppercase and lowercase letters correctly. If possible, select a strong password that you can remember so that you do not have to write it down. A **strong password**

is one that combines uppercase and lowercase letters, numbers, and symbols—consider the example password of L11!e01 that you used in the previous exercise. A password that uses 14 or more characters, however, is considered to be more secure. Passwords that use birthdates, house numbers, pet names, and so on. provide little protection for anyone who can look up this information on social networks or the Internet.

**Take Note**

**It is vitally important that you remember passwords assigned to workbooks or worksheets. If you forget your password, Microsoft cannot retrieve it. If necessary, write down passwords and store them in a secure place away from the information you want to protect.**

When you protect a worksheet, you can hide any formulas that you do not want to be visible in the formula bar. Select the cells that contain the formulas you want to hide. Then, on the Protection tab of the Format Cells dialog box, select the Hidden check box.

**STEP BY STEP****Protect a Workbook**

GET READY. OPEN the **11 Payroll Data Solution** workbook that you saved and closed in the previous exercise.

1. Click cell **G11** and try to type a new value in the cell. A dialog box informs you that you are unable to modify the cell because the worksheet is protected. Click **OK** to continue.
2. Click cell **D4** and change the number to **1**. You can make changes to cells in columns C and D because you unlocked the cells before you protected the worksheet. Click **Undo** to reverse the change.
3. Click the **Performance** worksheet tab and select cell **D4**.
4. On the HOME tab, in the Cells group, click the **Delete** arrow, and click **Delete Sheet Rows**. Dr. Bourne's data is removed from the worksheet because this worksheet was left unprotected.
5. Click **Undo** to return Dr. Bourne's data.
6. Click the **SSN** worksheet tab. Click the **REVIEW** tab, and in the Changes group, click **Unprotect Sheet**.
7. Type **L11!e01** (the password you created in the previous exercise) and click **OK**.
8. Click cell **D11**. Type **8**, press **Tab** three times, and then type **17000** (see Figure). Press **Tab**.

**Figure 11-4**

G11 is changed to 17000.

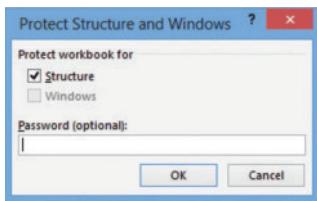
Contoso, Ltd.						
Last Name	First Name	Salary	Years	Job Title	SSN	ID
Banal	Yossi	\$ 292,800	17	Physician	788-288-718	10376
Barnhill	Josh	\$ 30,000	7	Billing Clerk	194-651-816	11854
Bourne	Stephanie	\$ 246,000	15	Physician	684-754-990	13234
Da Silva	Sergio	\$ 83,000	9	Physician Assistant	328-874-858	14448
Delaney	Aidan	\$ 33,675	8	Receptionist	363-130-194	17000
Dellamore	Luca	\$ 41,000	17	Medical Assistant	377-542-826	19614
Giest	Jenny	\$ 35,000	13	Office Manager	640-739-331	20559
Gottfried	Jim	\$ 26,695	7	Receptionist	967-415-725	32561
Hamilton	David	\$ 28,000	11	Medical Assistant	123-788-538	36777
Hensien	Kari	\$ 24,500	1	File Clerk	553-991-446	39781
Hezi	Mor	\$ 352,475	24	Physician	961-515-413	50600
Hicks	Cassie	\$ 481,750	32	Physician	085-224-132	50951
Hoeling	Helge	\$ 42,000	18	Medical Assistant	706-956-751	51817
Holliday	Nicole	\$ 360,000	25	Physician	675-714-302	52446
Iragavarapu	Srinivas	\$ 324,500	21	Physician	911-144-729	55525
Kane	John	\$ 63,350	17	Registered Nurse	586-185-435	57309

9. On the REVIEW tab, in the Changes group, click **Protect Sheet**. In the two dialog boxes, type the original password for the sheet **L11!e01** to again protect the SSN worksheet.

10. On the REVIEW tab, in the Changes group, click **Protect Workbook**. The Protect Structure and Windows dialog box shown in Figure 11-5 opens. Select the **Protect workbook for Structure** check box in the dialog box, if it isn't already selected.

**Figure 11-5**

Protecting the structure of a workbook



11. In the Password box, type **L11&E02**, and then click **OK**. Confirm the password by typing it again and click **OK**.

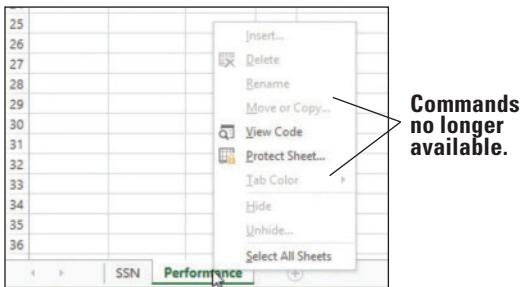
**Take Note**

The workbook password is optional, but if you do not supply a password, any user can unprotect the workbook and change the protected elements.

12. To verify that you cannot change worksheet options, right-click the **Performance** worksheet tab and notice the dimmed commands shown in Figure 11-6.

**Figure 11-6**

Right-click on Performance worksheet and notice dimmed commands.

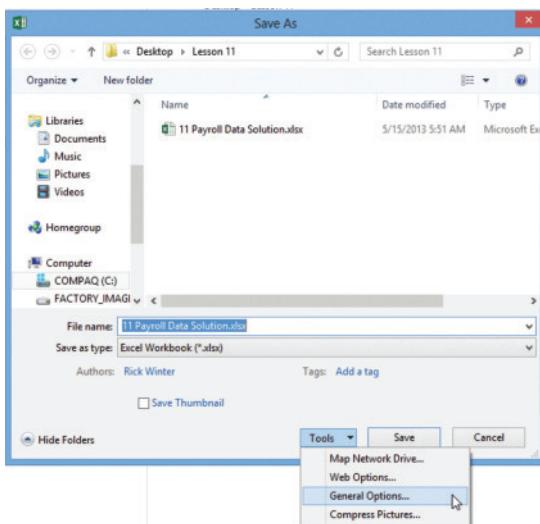


13. Press **Esc** and click the **FILE** tab. Select **Save As**, and then click the **Browse** button.

14. In the Save As dialog box, click the **Tools** button. The shortcut menu opens (see Figure 11-7).

**Figure 11-7**

Use the Tools options in the Save As dialog box to restrict access to the workbook.



15. Select **General Options**. The General Options dialog box opens. In the General Options dialog box, in the Password to open box, type **L11&E02**. Asterisks appear in the text box as you type. Click **OK**.
16. In the Confirm Password dialog box, reenter the password, and then click **OK**. You must type the password exactly the same each time.
17. Click **Save** and click **Yes** to replace the document. As the document is now saved, anyone who has the password can open the workbook and modify data contained in the Performance worksheet because that worksheet is not protected. However, to modify the SSN worksheet, the user must also know the password you used to protect that worksheet in the first exercise.



### Troubleshooting

When you confirm the password to prevent unauthorized viewing of a document, you are reminded that passwords are case-sensitive. If the password you enter in the Confirm Password dialog box is not identical to the one you entered in the previous dialog box, you will receive an error message. Click **OK** to close the error message and reenter the password in the Confirm Password dialog box.

18. CLOSE the workbook and OPEN it again.
19. In the Password box, type **111** and click **OK**. This is an incorrect password to test the security. You receive a dialog box warning that the password is not correct. Click **OK**.

PAUSE. LEAVE Excel open for the next exercise.

When you saved the Payroll Data Solution workbook in the first exercise in this section, it could be viewed by anyone with access to your computer system or network. As you saw when you opened the file in this exercise, the workbook could be viewed, but the SSN worksheet could not be modified except for the cells that were unlocked. If you saved the file with a different name, that file also would be protected, and you could not alter the data without the password that protects that worksheet.

Protecting the structure of a workbook prevents users from viewing worksheets that you have hidden; inserting new worksheets; or moving, deleting, hiding, or changing the names of worksheets. Selecting the Windows box on the Protect Structure and Windows dialog box (refer to Figure 11-5) prevents the user from changing the size and position of the windows when the workbook is opened.



## Workplace Ready

### PASSWORDS AND SECURITY

As you learned in this lesson, assigning a strong password is an important security precaution.

Visit <http://www.microsoft.com/security/default.aspx> and click Create better passwords, and then click Create stronger passwords to learn more about creating a strong password. The link also has valuable information about protecting yourself from hoaxes and spyware, and about protecting your privacy.

Based on your review of the suggestions for creating strong password, in a new workbook create a list of passwords that you need to change to secure your personal information and protect the integrity of data you create. Do not list your actual passwords; instead, identify the password usage. For example, you might indicate that you need to change the password that you use to access your college email account or your personal email account. Determine a safe storage vehicle for the new passwords you create (in case you forget them).

On the workbook, add a sheet similar to the one that follows that allows you to have your own strong password checklist. The passwords should have eight characters or more and include letters, punctuation, numbers, and symbols. In addition, you should change your passwords often, not share them with anyone unless absolutely required, and do not save individuals passwords or lists in a location that is easily accessed.

	A	B	C	D
1	Strong Password Checker	Goodol&1984^boys!		
2				
3	Objective	Criteria	My password	Meet?
4	Characters	8	17	yes
5	Letters	<Characters	10	yes
6	Punctuation	1	1	yes
7	Numbers	1	4	yes
8	Symbols	1	2	yes++
9	Change frequency (days)	90	No	No
10				
11				

## Allowing Multiple Users to Edit a Workbook Simultaneously

Creating and updating workbooks is frequently a collaborative process. A worksheet or workbook is often routed to other employees so that they can verify data or make changes. In Excel, you can create a **shared workbook**, which is set up to allow multiple users on a network to view and make changes at the same time. When a user opens a shared workbook, he or she can see the changes made and saved by other users. The Protect and Share Workbook command prevents a user from disabling the Track Changes option.

For example, the workbook you create in this exercise is used by the medical assistants, who record all sample medications the physicians prescribe for patients. Sharing this workbook means that more than one medical assistant can access the workbook and enter data at the same time. In this exercise, you learn how to allow users to simultaneously edit workbooks.

### STEP BY STEP

### Allow Multiple Users to Edit a Workbook Simultaneously

GET READY. LAUNCH Excel if it is not already running.

1. CREATE a new blank workbook.
2. In cell A1, type **Sample Drugs Dispensed** and press **Tab**.
3. Select cells **A1:D1**. On the HOME tab, in the Alignment group, click **Merge & Center**.
4. Select cell **A1**, click **Cell Styles**, and in the Cell Styles gallery that appears, click **Heading 1**.
5. Beginning in cell A3, enter the following data:

Medical Assistant	Drug	Patient Date
Dellamore, Luca	Cipro	Chor, Anthony
Hamilton, David	Ketek	Brundage, Michael
Hoeing, Helge	Lipitor	Charles, Matthew
Murray, Billie Jo	Altace	Bishop, Scott
Dellamore, Luca	Zetia	Anderson, Nancy
Hamilton, David	Cipro	Coleman, Pat
Hoeing, Helge	Avelox	Nayberg, Alex
Murray, Billie Jo	Norvasc	Kleinerman, Christian

6. In the Date column, apply today's date to the previous records.
7. Select cells **A3:D3** and apply the **Heading 3** style.

8. Increase the column widths to see all the data.
9. SAVE the workbook as **11 Sample Medications Solution**.
10. Click the REVIEW tab, and then, in the Changes group, click **Share Workbook**.
11. In the Share Workbook dialog box, click **Allow changes by more than one user at the same time**. Your identification will appear in the Who has this workbook open now box, as shown in Figure w. Click **OK**.

**Figure 11-8**  
Sharing a workbook



12. Click **OK** when prompted and the action will save the workbook.
13. In the Changes group, click **Protect Shared Workbook**. Select the **Sharing with track changes** check box in the Protect Shared Workbook dialog box. Click **OK**.
14. Notice that **[Shared]** appears in the title bar.
15. SAVE and CLOSE the workbook.

PAUSE. LEAVE Excel open for the next exercise.

In a shared workbook, information is maintained about changes each user makes when they edit the workbook. The **change history** includes the name of the person who made each change, when the change was made, and what data was changed.



Changes can also be turned on and off through the Track Changes button on the REVIEW tab. For more information and to see the result of track changes, see the “Tracking Changes to a Workbook” section later in this lesson.

A shared workbook does not support all Excel features. For example, you can include merged cells, conditional formats, data validation, charts, and so on before a workbook is shared, but these features cannot be added by those who edit a shared workbook.

When you protected your shared workbook, you prevented those who use the workbook from removing the change history. By default, changes made in the workbook will be retained for 30 days. You can increase that time frame on the Advanced tab of the Share Workbook dialog box (refer back to Figure 11-8).



### Troubleshooting

If you want to assign a password to a shared workbook, you must assign it before the workbook is shared. You can also unshare a workbook and add the password. However, when you unshare a shared workbook, the change history is lost.

## Using the Document Inspector

Before you share an important document with colleagues or individuals outside your organization, you should always spell check, proofread, and review the contents to ensure that everything is correct and the document does not contain anything you do not want to share with others. You should also review the document for hidden data or personal information that might be stored in the workbook or in the document properties. In Excel, the Document Inspector displays several different options that enable you to find and remove hidden data and personal information that is specific to Excel workbooks. The Document Inspector also locates custom XML data, hidden worksheets, and invisible content.

Several types of hidden data and personal information can be saved in an Excel workbook. This information might not be immediately visible when you view the document, but it still may be possible for others to view or retrieve the information. This information includes the following:

- **Comments and annotations:** This information enables other people to see the names of people who worked on your workbook, their comments, and changes that were made to the workbook.
- **Document properties and personal information:** Document properties include the author, subject, and title, as well as the name of the person who most recently saved the workbook and the date the workbook was created.
- **Headers and footers:** Headers and footers can include the author's name, the date the file was created, and so on.
- **Hidden rows, columns, and worksheets:** Columns can be hidden to protect salary and social security (US), social insurance (Canada), or national insurance (UK) data. Before removing hidden rows or columns, be sure that their removal will not change calculations in your worksheet.

### STEP BY STEP

#### Use the Document Inspector

GET READY. OPEN **11 Contoso Employee IDs** from the files for this lesson.



1. Click the **FILE** tab, click **Save As**, click **Browse**, and navigate to the Lesson 11 folder. In the File name box, type **11 Employee ID Doc Inspect Solution** to save a copy of the workbook. Click the **SAVE** button.



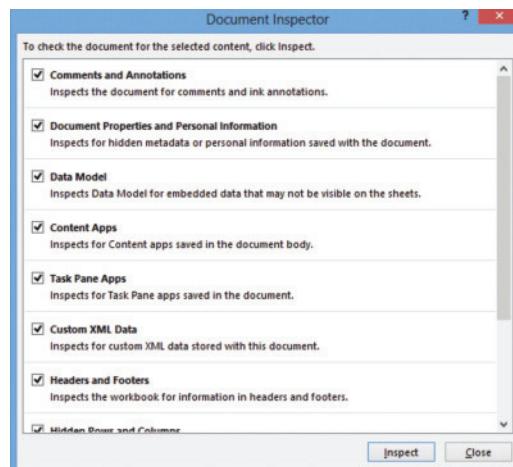
#### Troubleshooting

It is a good idea to perform an inspection on a copy of your workbook because you might not be able to restore hidden content that you remove in the inspection process. If you attempt to inspect a document that has unsaved changes, you will be prompted to save the document before completing the inspection.

2. Click the **FILE** tab. Then, with **Info** selected, click the **Check for Issues** button in the middle pane of the Backstage view. Next, click **Inspect Document**. The Document Inspector dialog box opens, as shown in Figure 11-9.

**Figure 11-9**

Document Inspector dialog box



3. Click **Inspect**. The Document Inspector changes to include some Remove All buttons.
4. Click **Remove All** for Comments and Annotations.

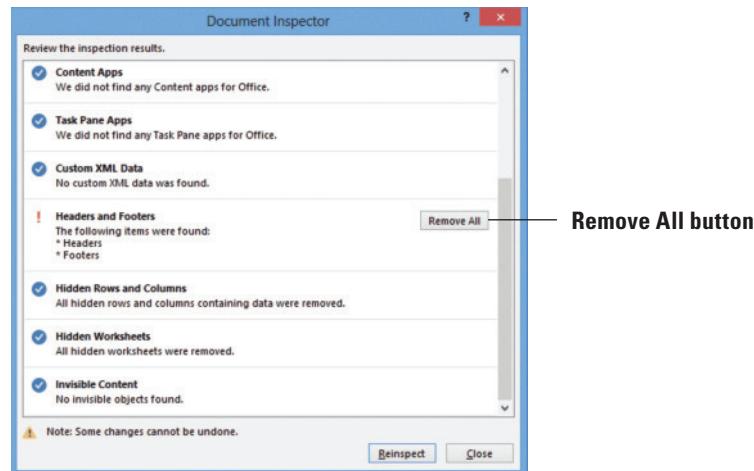
#### Take Note

You must remove each type of hidden data individually. You can inspect the document again after you remove items.

5. Click **Remove All** three times for Document Properties and Personal Information, Hidden Rows and Columns, and Hidden Worksheets. Headers and Footers should be the only hidden item remaining (see Figure 11-10).

**Figure 11-10**

Remove All button for Headers and Footers



6. Click the **Close** button to close the Document Inspector dialog box.
7. **SAVE** the workbook.

**PAUSE. CLOSE** the workbook.

When you opened the file in this exercise, it contained hidden columns as well as other information that you didn't want to share with others. You first created a copy of your original workbook because it is not always possible to restore data that the Document Inspector removes. For that reason, you removed sensitive information from the copy; the complete data is retained in the original workbook. If the original workbook was protected, the copy would also be protected, and some of the items in the workbook would not be able to be changed through the Document Inspector. You would have to unprotect the workbook first to run the Document Inspector.

## Marking a Document as Final

Before you share a workbook with other users, you can use the Mark as Final command to make the document read-only and discourage changes to the document. Marking a document as final communicates that you are sharing a completed version of the document, and it helps prevent reviewers or readers from making inadvertent changes to the document.

### STEP BY STEP

### Mark a Document as Final

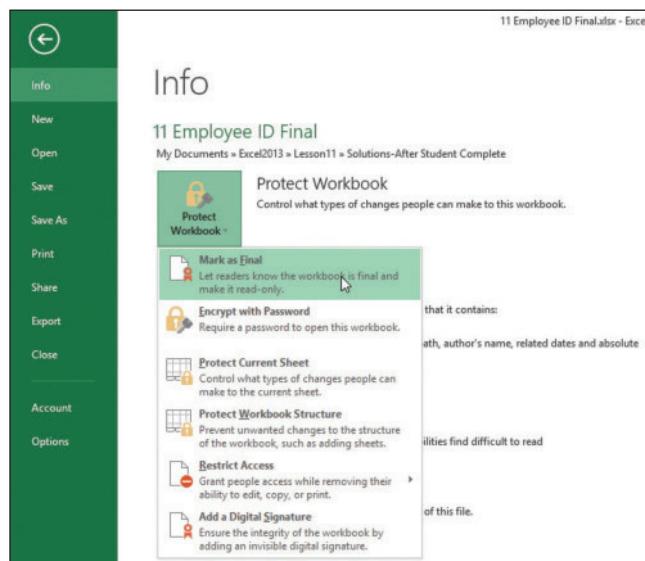


GET READY. OPEN **11 Contoso Employee IDs**.

1. SAVE the workbook in the Lesson 11 folder as **11 Employee ID Final Solution**.
2. Click the **FILE** tab and in Backstage view, click the **Protect Workbook** button. Click **Mark as Final**, as shown in Figure 11-11.

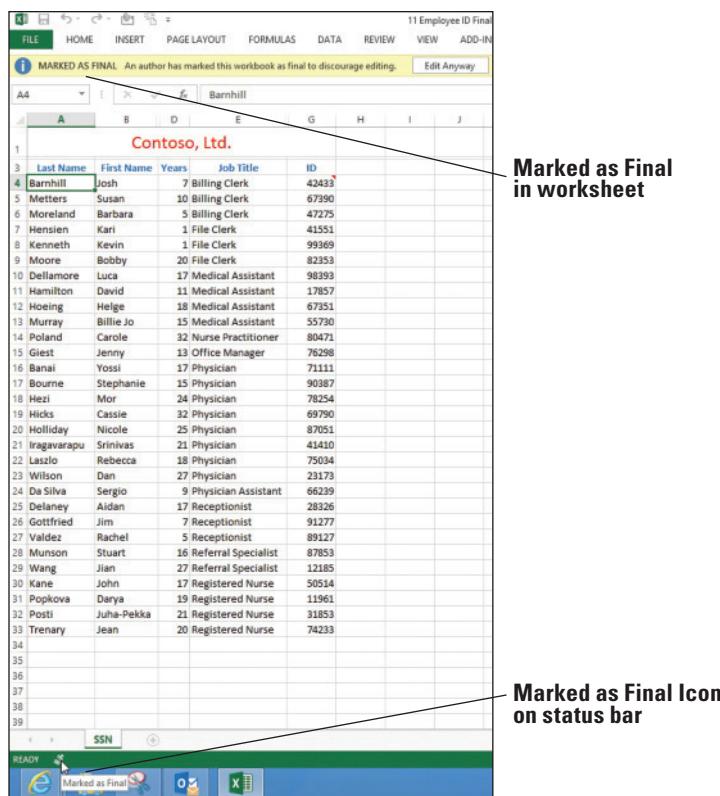
**Figure 11-11**

Mark as Final



3. An Excel message box opens, indicating that the workbook will be marked as final and saved. Click **OK**.
4. Another Excel message box explains that the document has been marked as final. This also means that the file has become read-only, meaning you can't edit it unless you click the Edit Anyway button. Click **OK**. Notice a Marked as Final icon appears in the status bar (See Figure 11-12).

**Figure 11-12**  
Marked as Final icon on the status bar



PAUSE. LEAVE the workbook open for the next exercise.

The Mark as Final command is not a security feature. Anyone who opens a workbook that has been marked as final can edit the document by removing the Mark as Final status from the document by clicking the Edit Anyway button.

## DISTRIBUTING A WORKBOOK BY EMAIL AND THE CLOUD

### Bottom Line

The most common ways to share Excel data are by sending workbooks through email, by faxing workbooks, and by printing and distributing hard copies. Email allows you to share a workbook by routing it to one user who can make changes or add comments and then route the workbook to the next user. Changes can then be incorporated into a final document. You can email a workbook as an attachment from Excel or from your email program. You can also send a worksheet as an email message rather than as an attachment.

### Distributing a Workbook by Email

The option to send a worksheet as an email message is available only from the Send to Mail Recipient command on the Quick Access Toolbar. When you add this command to the toolbar, you also can use this option as a shortcut to send a workbook as an attachment. In the next set of exercises, you will learn how to send a workbook as part of the message body and send a workbook as an attached file.

**STEP BY STEP****Distribute a Workbook by Email From Excel**

GET READY. USE the workbook from the previous exercise. Note that you must have an email program and Internet connection to complete the following exercises.

1. Click the **FILE** tab and click **Share**. In the Share window, click **Email**. Click the **Send as Attachment** button. When you have Office 2013 installed, this feature will open Outlook by default. If you have changed your environment, your own personal email program will open. Notice that Excel automatically attaches the workbook to your email message.
2. In the To field, type **[your instructor's email address]**.
3. In the subject line, replace the current entry with **Employee Final Attached as per request**.
4. In the email message body, type **The Employee ID Final workbook is attached**.
5. Click **Send**. Your email with the workbook attached to it will now be sent to your instructor.

CLOSE the workbook. LEAVE Excel open for the next exercise.

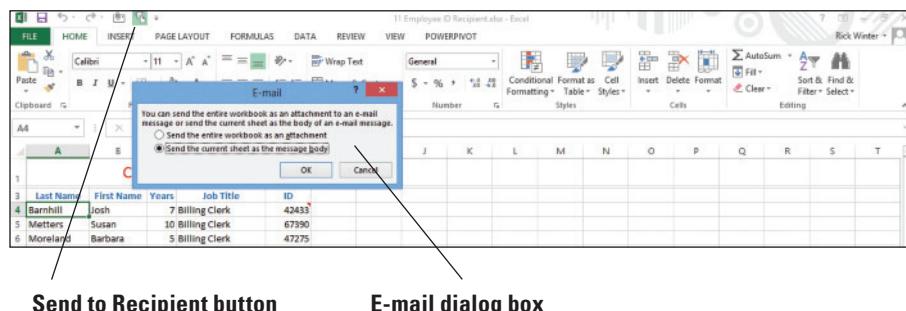
**STEP BY STEP****Distribute a Worksheet as an Email Message**

GET READY. OPEN the **11 Contoso Employee IDs** file.

1. SAVE the file in the Lesson 11 folder as **11 Employee ID Recipient Solution**.
2. Click the **FILE** tab and click **Options**. The Excel Options dialog box opens.
3. Click **Quick Access Toolbar**. In the Choose commands from field, click **Email**. In the center bar between the left and right fields, click **Add**. This step adds the Email button to the Quick Access Toolbar.
4. In the Choose commands from drop-down box, click **All Commands**. Click in the list and type the letter **s**, and then scroll and find **Send to Mail Recipient** and click to highlight it. In the center bar between the left and right fields, click **Add**. This step adds this command to the Quick Access Toolbar.
5. Click **OK** to save both commands to the Quick Access Toolbar.
6. On the Quick Access Toolbar, click **Send to Mail Recipient**. The E-mail dialog box opens as shown in Figure 11-13.

**Figure 11-13**

E-mail dialog box



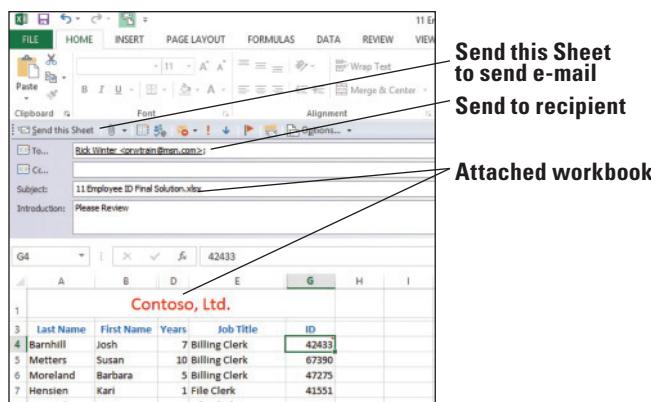
**Send to Recipient button  
on Quick Access Toolbar**

**E-mail dialog box**

7. Click the **Send the current sheet as the message body** option, and then click **OK**. The email window is now embedded in your Excel screen with the current worksheet visible as the body of the email.
8. In the To field, type **[your instructor's email address]** and keep the name of the file in the Subject line. This is automatically added for you.
9. In the Introduction, type **Please Review** (see Figure 11-14).

**Figure 11-14**

Send to recipient

Send this Sheet  
to send e-mail

Send to recipient

Attached workbook

**10.** Click the **Send this Sheet** button, as illustrated in Figure 11-14. Click **OK**.

**11.** There might be a message about hidden rows or columns. If prompted to continue, click **OK**.

**12.** SAVE the workbook.

CLOSE the workbook. LEAVE Excel open for the next exercise.

### STEP BY STEP

### Distribute a Workbook from within your Email Program

GET READY. LAUNCH your email program.

- 1.** Create a new email message.
- 2.** In the To field, type **[your instructor's email address]**.
- 3.** In the Subject line, type **Employee ID Final ready to send**.
- 4.** Click **Attach File**.
- 5.** Navigate to the Lesson 11 folder where you saved **Employee ID Final**. Click the filename, and then click **Insert**.
- 6.** Click **Send**.

CLOSE the email program. LEAVE Excel open for the next exercise.



### Troubleshooting

Some email programs will not send a document as an attachment if the document is open on your computer. If you receive such a message, close the document, and click Send again. Also, the menu choices may be named differently than above for attaching a document. The example is for Outlook 2013.

### Sharing a Workbook in the Cloud

If you click on an Excel workbook while in your SkyDrive.com account, the workbook opens directly in your browser. Windows Live SkyDrive is a virtual online storage area in the cloud where users are able to store, access, and share thousands of documents, photos, and Microsoft Office files. SkyDrive also can password-protect your files so you control who has access to them. Your workbooks look the same in the Web browser as they do in Excel. You can also manage and manipulate your worksheets in the browser using the familiar look and feel of Excel. When you work in the browser, you can change data, enter or edit formulas, and apply basic formatting to the spreadsheet. You can also work with others on the same workbook at the same time.

When you save a document in Windows Live SkyDrive, your document is stored in a central location that you can access from almost anywhere. Even if you're away from your primary computer, you can work on your document whenever you have a connection to the Web even if you don't have Excel on that computer.

Saving a document in SkyDrive also makes it simple to share the document with others. You can send a link directly to them, rather than sending an attachment. This way, you preserve just a single copy of the document. If someone needs to make modifications, they do so in the same copy, with no need to merge multiple versions and copies of the document.

Saving Word, Excel, PowerPoint, and OneNote documents in SkyDrive enables you and others to view and manage the documents in a Web browser using Office Web Apps. This means you can share your document with people without worrying about what application they have installed because they view and edit the documents in their browsers.

## STEP BY STEP

### Share a Workbook in the Cloud

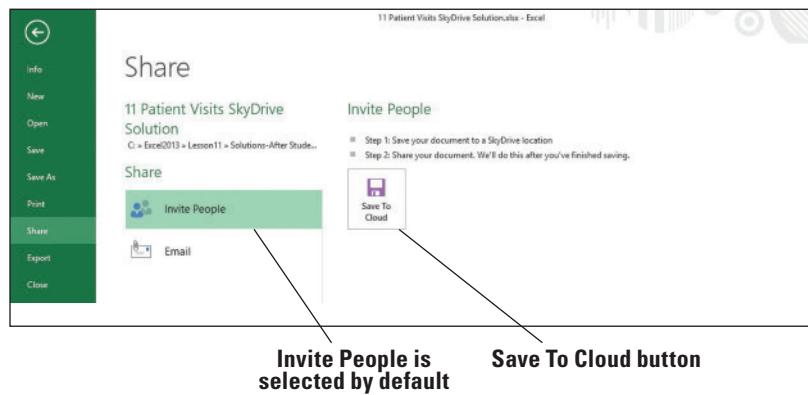


GET READY. OPEN **11 Contoso Patient Visits**.

1. SAVE the workbook to the Lesson 11 folder as **11 Patient Visits SkyDrive Solution**.
2. You will save this again to the SkyDrive. Click **FILE** and then click **Share**. There are two options to choose from before the file is saved to the SkyDrive. **Invite People** is selected by default, as shown in Figure 11-15.

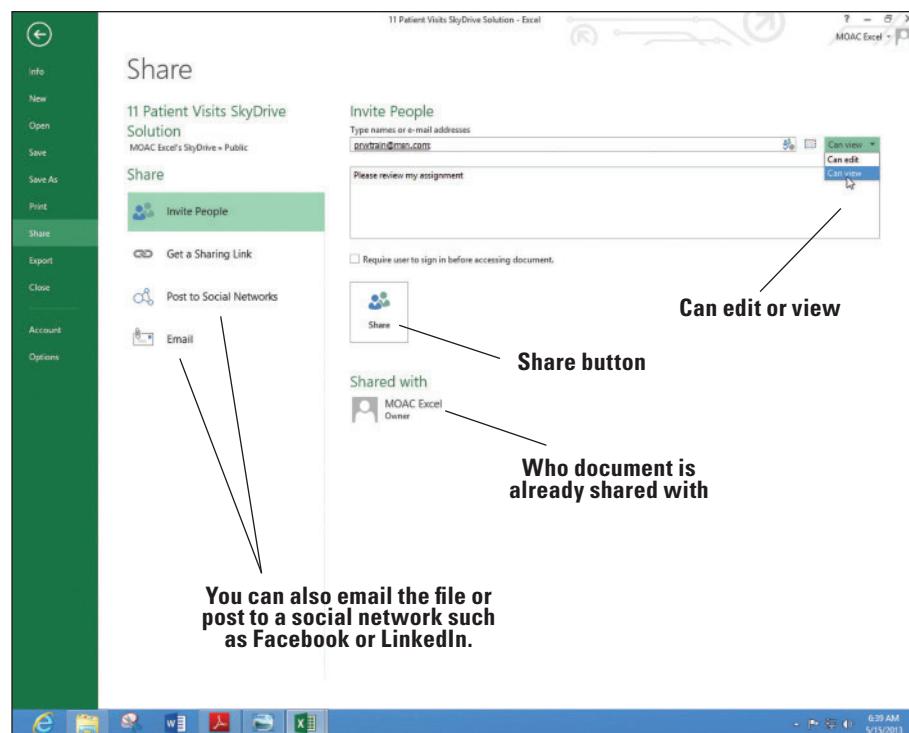
**Figure 11-15**

Share options.



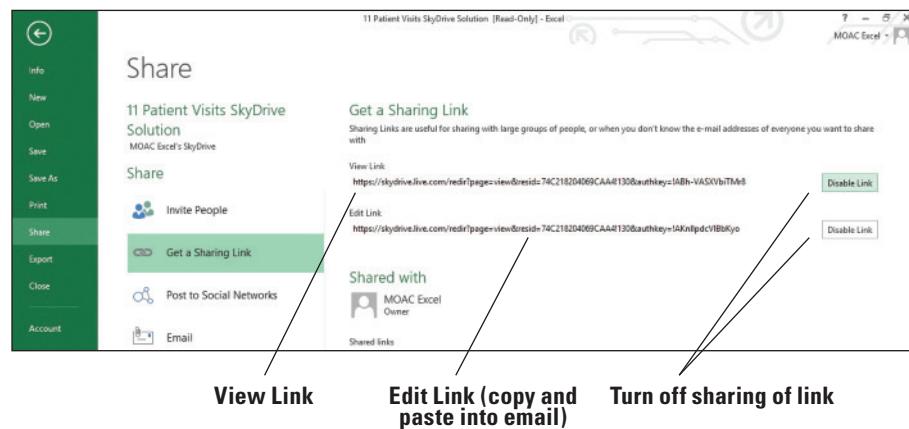
3. Click the **Save To Cloud** button. The Save As pane opens.
4. Click the **SkyDrive** option and click the **Browse** button.
5. In the Save As dialog box, scroll down to the **Public** folder and click **SAVE** to save the file on your Public SkyDrive folder.
6. In the Type names or e-mail addresses box, type **[the email address of your instructor]**.
7. In the next box, type **Please review my assignment**.
8. You can choose whether the instructor can view or edit the Excel file. Click on the arrow after **Can edit** and change this to **Can view** (see Figure 11-16).

**Figure 11-16**  
Invite People option



9. Click the **Share** button.
10. Open a new email message in your email program and address the email to yourself with a CC to your instructor. Type **Patient Visits** for the Subject. In the Body of the message, type **View**, press **Enter**, and type **Edit**.
11. Return to Excel and click the **Get a Sharing Link** button.
12. Under View Link, click the **Create Link** button, and then after the word **View**, **COPY** and **PASTE** the link shown to your email message, and then press **Enter** after the link in the email. The link should change to a hyperlink depending on your email program.
13. Return to Excel. Under Edit Link, click the **Create Link** button. Both links show on the screen (see Figure 11-17).

**Figure 11-17**  
Get a Sharing Link options



14. **COPY** and **PASTE** the **Edit Link** after the word **Edit** in your email message and press **Enter** after the link. **SEND** the email message.

15. When the message comes to your Inbox, click the **Edit Link** to take you to the Internet and the Excel Web app. If necessary, click the **EDIT WORKBOOK** menu item and choose **Edit in Excel Web App**. Explore the Web interface as shown in Figure 11-18.

**Figure 11-18**

Document open in Internet Explorer

The screenshot shows a Microsoft Excel Web App window titled "11 Patient Visits SkyDrive Solution.xlsx". The table has columns: Last, First, Time, Purpose, and Doctor. The data includes entries like Jelita Jacek at 8:19:52 AM Annual Phys by Hezi, and many other patients with various symptoms and doctors. The browser address bar shows the URL: https://skydrive.live.com/view.aspx?resid=7AC21320408RC4AA&id=130&app=Excel&authkey=.

Patient Visits				
Last	First	Time	Purpose	Doctor
Jelita	Jacek	8:19:52 AM	Annual Phys	Hezi
Singhi	Soumya	8:21:12 AM	GI Problems	Wilson
Pivilla	Pilar	8:25:51 AM	GI Problems	Lazlo
Fontana	Olivier	8:31:39 AM	Annual Phys	Iragavarapu
Strome	David	8:38:19 AM	Annual Phys	Holiday
Hess	Christian	8:53:10 AM	Concussion	Hicks
Hroch	Michal	9:02:23 AM	Broken Leg	Hezi
Mahood	Justin	9:14:39 AM	Annual Phys	Holiday
Jump	Dan	9:16:06 AM	Annual Phys	Hicks
Bebington	Mark	9:41:50 AM	Med Check	Hezi
Tóth	András	9:56:30 AM	Annual Phys	Bourne
Martens	Ben	10:10:40 AM	Annual Phys	Banai
Wenzel	Maria	10:14:00 AM	Annual Phys	Bourne
Carlson	Jason	10:18:38 AM	Annual Phys	Banai
Kozleski	Jason	10:39:05 AM	Cough	Wilson
Hassouneh	Aziz	10:43:11 AM	Cough	Wilson
Andrews	Usa	10:43:48 AM	Annual Phys	Lazlo
Mahadevan	Vidhya	10:46:11 AM	Annual Phys	Iragavarapu
Jacques	Etienne	10:54:37 AM	Headache	Holiday
Kothari	Anikur	11:01:01 AM	Annual Phys	Lazlo
Basil	Shai	11:19:23 AM	Broken Arm	Iragavarapu
Yuan	Joanne	12:30:00 PM	Fever	Hezi
Cook	Patrick	1:21:31 PM	Annual Phys	Bourne
Vietnam	Nina	1:35:55 PM	Annual Phys	Banai
Hullett	Aaron	2:20:42 PM	Annual Phys	Hicks
Ripo	Florence	2:49:30 PM	Annual Phys	Hezi
Hernady	Robert	3:18:56 PM	Cough	Bourne
Kalyanaraman	Karthik	3:23:25 PM	Annual Phys	Banai

16. CLOSE the Web browser without saving the document, close your email program, and click the **Return to Document** button in Excel.

SAVE and CLOSE the workbook. LEAVE Excel open for the next exercise.

## TRACKING CHANGES TO A WORKBOOK

**Tracking changes** is the ability to mark who makes what changes that have been made to a workbook. The ability to track changes is especially helpful in a workbook that is shared and modified by multiple users. When you turn on Track Changes, the workbook automatically becomes a shared workbook. You can customize the Track Changes feature to track specific types of changes, you can allow the feature to be turned on and off at will by various users, or you can specify a password to protect the changes. You also can decide whether to accept or reject changes to your original workbook data. When you turn off change tracking, the workbook is no longer a shared workbook.

### Turning Track Changes On and Off

You can turn on change tracking using the Track Changes command, the Share Workbook command, or the Protect and Share Workbook command (all located on the REVIEW tab). The Protect and Share Workbook command provides the highest level of security because you can add a password. When workbooks are shared, it is often important to know what changes were made by each user. The owner (creator) of the workbook can use change-tracking functions to manage the data in a shared workbook. The owner can use the change history record to manage the shared workbook by adding or removing users and resolving conflicting changes. In the next exercise, you will learn to track changes.

**STEP BY STEP****Turn Track Changes On and Off**

GET READY. OPEN the **11 Contoso Assignments** workbook for this lesson.

1. SAVE the workbook as **11 Assignments Solution** in the Lesson 11 folder.
2. On the REVIEW tab, in the Changes group, click the **Protect and Share Workbook** button. The Protect Shared Workbook dialog box opens.
3. In the dialog box, click **Sharing with track changes**. When you choose this option, the Password text box becomes active. You can assign a password at this time, but it is not necessary. Click **OK**.
4. Click **OK** when asked if you want to continue and save the workbook. You have now marked the workbook to save tracked changes.

PAUSE. LEAVE the workbook open for the next exercise.

You can turn change tracking off by clicking the Unprotect Shared Workbook button, which was named Protect Shared Workbook before you completed the preceding exercise.



**Cross Ref** The Track Changes command enables you to manage how changes are displayed on your screen. You use this option in an upcoming exercise.

**Take Note**

Turning off Track Changes removes the change history and removes the shared status of the workbook, but changes already shown in the document will remain until you accept or reject them.

**Setting Track Change Options**

The Advanced tab of the Share Workbook dialog box allows you to customize the shared use of the workbook. These options are normally set by the workbook author before the workbook is shared. In this exercise, you modify these options.

**STEP BY STEP****Set Track Change Options**

GET READY. USE the workbook from the previous exercise.

1. On the **REVIEW** tab, in the Changes group, click **Share Workbook**. The Share Workbook dialog box opens.
2. Click the **Advanced** tab (see Figure 11-19).

**Figure 11-19**

Share Workbook Advanced tab

Last Name	First Name	Job Title	Task
Barnhill	Josh	Billing Clerk	Remove old billing files to long-term file storage
Delaney	Aidan	Receptionist	Clean reception area
Giest	Jenny	Office Manager	Supervise all tasks, organize celebration when done
Gottfried	Jim	Receptionist	Clean kitchen
Hensien	Kari	File Clerk	Remove old patient files to long-term file storage
Kenneth	Kevin	File Clerk	Organize/inventory long-term file storage
Metters	Susan	Billing Clerk	Organize/inventory long-term file storage
Moore	Bobby	File Clerk	Contact all former patients regarding expiring files
Moreland	Barbara	Billing Clerk	Learn new system and prepare training for all
Valdez	Rachel	Receptionist	Clean all corridors
Dellamore	Luca	File Clerk	Redo Mailboxes
Murray	Billie Jo	Receptionist	Remove all old contacts

3. In the Keep change history for box, click the scroll arrow to display 35.
4. Click the **Automatically every** option button so the file automatically saves every 15 minutes (the default).
5. Click **OK** to accept the default settings for the remainder of the options.

**PAUSE.** SAVE the workbook and LEAVE it open for the next exercise.

The Advanced tab contains four options:

- **Track changes** determines whether a change history is kept and the length of time it is kept. In a shared workbook, the change history documents changes made in past editing sessions. The information includes the name of the person who made each change, when the changes were made, and what data was changed. The default setting is 30 days. Contoso maintains a monthly record of the distribution of samples. Setting the change history to 35 days ensures that the office manager has sufficient time to review the workbook and resolve any conflicting changes before the change history is deleted.
- **Update changes** controls when changes made to the shared workbook are incorporated into the workbook.
- **Conflicting changes between users** determines whose edits become part of the file if two or more people attempt to edit at the same time. The workbook owner's changes usually take precedence.
- **Include in personal view** enables each user who edits the workbook to see a personal view of the workbook.

## Inserting Tracked Changes

When you open a shared workbook, Track Changes is automatically turned on. In most cases, the workbook owner has entered a password to prevent a user from turning off Track Changes. Thus, any text you type in the workbook is tracked.

### STEP BY STEP

### Insert Tracked Changes



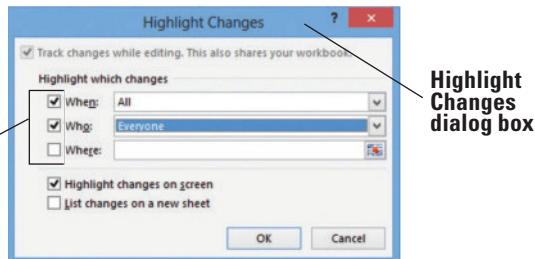
GET READY. USE the workbook from the previous exercise.

1. On the **REVIEW** tab, in the Changes group, click **Track Changes**. In the drop-down list that appears, click **Highlight Changes**. The Highlight Changes dialog box appears.
2. The Track changes while editing box is inactive because Track Changes was activated when you shared the workbook. In the When drop-down box, click the **down arrow**, and then click **All**. In the Who check box and drop-down list, check the box and select **Everyone**. The dialog box should appear as shown in Figure 11-20.

**Figure 11-20**

Inserting tracked changes

Track Changes options



3. The Highlight changes on screen option is already selected. Click **OK**. If a warning box appears, click **OK** to accept.

4. Click the FILE tab and click Options. The Excel Options dialog box opens.
5. In the General category, under Personalize your copy of Microsoft Office, in the User name box, type **Luca Dellamore**. Click OK. You have changed the document user name that will be listed in the Track Changes.

**Take Note**

Make a note of the name that you remove. You will restore the original user name at the end of this lesson.

6. Click cell A14 and type the following information in each of the columns:  
**Dellamore      Luca      File Clerk      Redo Mailboxes**
7. As you enter these changes, a colored triangle and comment box appear for each entry made. This makes it easy to view the changes later.
8. On the Quick Access Toolbar, click Save to save the changes you made under the user name Luca Dellamore.
9. Click the FILE tab and select Options.
10. In the User name box, type **Billie Jo Murray**. Click OK. You are once again changing the user name and applying it to the document.
11. Click cell A15 and type the following information in each of the columns:  
**Murray      Billie Jo      Receptionist      Remove all old contacts**
12. Move the mouse pointer to cell D15. The person's name who made the change, the date of the change, and the change itself appear in a ScreenTip as shown in Figure 11-21.

**Figure 11-21**

Tracked changes in a worksheet

The screenshot shows a Microsoft Excel spreadsheet titled "11 Assignments Solution [Shared] - Excel". The ribbon is visible with the "Changes" group highlighted. The "Show Ink" button in the ribbon is also highlighted. The spreadsheet contains a list of names, titles, and descriptions. Cell D15 contains the text "Remove all old contacts". A callout points from the "Changes" group in the ribbon to this cell. A ScreenTip for cell D15 displays the text "Billie Jo Murray, 3/15/2013 11:06 AM: Changed cell D15 from '<blank>' to 'Remove all old contacts'." Another callout points from the "Show Ink" button in the ribbon to this ScreenTip.

A	B	C	D	E	F	G	H	I	J
6	Giest	Jenny	Office Manager	Supervise all tasks, organize celebration when done					
7	Gottfried	Jim	Receptionist	Clean kitchen					
8	Hensien	Kari	File Clerk	Remove old patient files to long-term file storage					
9	Kenneth	Kevin	File Clerk	Organize inventory long-term file storage					
10	Metters	Susan	Billing Clerk	Organize/inventory long-term file storage					
11	Moore	Bobby	File Clerk	Contain all former patients regarding expiring files					
12	Moreland	Barbara	Billing Clerk	Learn new system and prepare training for all					
13	Valdez	Rachel	Receptionist	Clean all corridors					
14	Dellamore	Luca	File Clerk	Redo Mailboxes					
15	Murray	Billie Jo	Receptionist	Remove all old contacts					
16									
17									
18									
19									

Show Ink button highlighted when tracking changes

Tracked changes with comments

13. Look at the ScreenTips for the other cells in rows 14 and 15.

PAUSE. SAVE the workbook and LEAVE it open for the next exercise.

On a network, you do not see changes made by other users until both they and you save your changes. To save your changes to a shared workbook and to see the changes that other users have saved since your last save, click Save on the Quick Access Toolbar or choose other save options such as Ctrl + S. Note that when you work in a network environment, you can click Share Workbook in the Changes group and see a list of other users who have the workbook open.

Sometimes conflicts occur when two users edit a shared workbook and try to save changes that affect the same cell. When the second user tries to save the workbook, Excel displays the Resolve Conflicts dialog box. Depending on the options established when the workbook was created and shared, you can either keep your change or accept the change made by the other user.

You can also display a list that shows how past conflicts have been resolved. These can be viewed on a separate worksheet that displays the name of the person who made the change, when and where it was made, what data was deleted or replaced, and how conflicts were resolved.

## Deleting Your Changes

As noted previously, the changes you make in a shared workbook are not visible to other users until you save your work. Changes become a part of the change history only when you save. If you change your mind before saving, you can edit or delete changes. Changes must be saved before you can accept or reject them. If you do not save, Excel displays a message that the workbook must be saved before you can accept or reject changes. When you have saved your workbook and you want to delete a change, you can either enter new data or reject the change you made before saving.

### STEP BY STEP

### Delete Your Changes

GET READY. USE the workbook from the previous exercise.

1. Click the **FILE** tab and click **Options**.
2. In the **General** category, under Personalize your copy of Microsoft Office, in the User name box, type **Erin Hagens**. Click **OK**. You have again changed the user of the workbook for change tracking purposes.
3. Select cell **A16** and type the following information in each of the columns:  
**Hagens**   **Erin**   **Receptionist**   **Clean all corridors**
4. Click cell **D13**, and then edit the cell so **corridors** is spelled correctly. Change **corredors** to **corridors**.

**Take Note** Undo is inactive in a shared workbook. If you accidentally replace your data or another user's data, you need to reject the change to restore the data you replaced.

5. On the **REVIEW** tab, click **Track Changes**, and then from the drop-down menu that displays, click **Accept/Reject Changes**. Excel displays a message box confirming that you want to save the workbook. Click **OK**. The **Select Changes to Accept or Reject** dialog box opens.
6. In the **Select Changes to Accept or Reject** dialog box, click the **Who** drop-down arrow and select **Erin Hagens**, and then click **OK**. You have just asked Excel to return only the tracked changes made by Erin Hagens (see Figure 11-22). Excel highlights row 16 with green dashes where Hagens' information is typed in.

**Figure 11-22**

Select Changes to Accept or Reject dialog box



**Take Note**

The order of the accept or reject changes may appear differently. Accept the change in D13 but reject all other changes.

7. Click **Reject**. All four entries are removed.
8. When cell D13 is selected for the correction of the spelling of **corridors**, click **Accept**.

**PAUSE.** **SAVE** the workbook and **LEAVE** it open for the next exercise.

If you replace another user's data and you want to restore the original data, you should reject your change. If you instead delete text you entered as a replacement for other text, you will leave the cell or range blank. Rejecting your change restores the entry that you replaced.

## Accepting Changes from Another User

After a shared workbook has been edited, you can easily identify which cells have been changed and determine whether you want to keep or reject the changes. You can choose to accept or reject all changes at one time without reviewing each change, or you can accept or reject them individually. In the following exercise you will learn how to accept changes from other users.

### STEP BY STEP

#### Accept Changes from Another User

GET READY. USE the workbook from the previous exercise.

1. Click the **FILE** tab and click **Options**.
2. In the General category, under Personalize your copy of Microsoft Office, in the User name box, type **Jim Giest**. Click **OK**.
3. Click **Track Changes** and select **Accept/Reject Changes** from the drop-down list.
4. Not yet reviewed will be selected by default. In the Who box, select **Luca Dellamore**. Click **OK**. The Accept or Reject Changes dialog box is displayed.
5. Click **Accept** to accept each of the changes Luca made. The Accept or Reject Changes dialog box closes when you have accepted all changes made by Luca Dellamore.

PAUSE. SAVE the workbook and LEAVE it open for the next exercise.

You can also click the Collapse Dialog button in the Where box on the Select Changes to Accept or Reject dialog box and select the cells that contain changes. You can then accept or reject the changes in their entirety. In this exercise, some changes were highlighted by cell and others were highlighted by row, and you could accept or reject changes to the selected cell or range.

## Rejecting Changes from Another User

As the owner of the Assignments workbook, the office manager in the following exercise has the authority to accept or reject changes by all users. Rejecting changes, however, does not prohibit a user from changing the data again. When all users have made the necessary changes, the owner can remove users and unshare the workbook.

### STEP BY STEP

#### Reject Changes from Another User

GET READY. USE the workbook from the previous exercise.

1. Click **Track Changes** and click **Accept/Reject Changes**.
2. On the right side of the Where box, click the **Collapse Dialog** button.
3. Select the data in row 15 and click the **Expand Dialog** button. Click **OK** to close the Select Changes to Accept or Reject dialog box. The Accept or Reject Changes dialog box is displayed.
4. Click **Reject All**. A dialog box will open to ask you if you want to remove all changes and not review them. Click **OK**. The data is removed and row 15 is now blank.
5. SAVE the workbook in the Lesson 11 folder as **11 Assignments Edited Solution**.

PAUSE. LEAVE the workbook open for the next exercise.

When you have the opportunity to work with a shared workbook that is saved on a network, you will likely encounter conflicts when you attempt to save a change that affects the same cell as another user's changes. In the Resolve Conflicts dialog box, you can read the information about each change and the conflicting changes made by another user. The options set on the Advanced tab of the Share Workbook dialog box determine how conflicts are resolved.

## Removing Shared Status from a Workbook

Before you stop sharing a workbook, make sure that all other users have completed their work and that you have accepted or rejected all changes. Any unsaved changes will be lost when you stop sharing and the history worksheet is deleted. Thus, before you remove the shared status from a workbook, you should print the history worksheet and/or copy it to another workbook. In this exercise, you remove shared status from a workbook.

### STEP BY STEP

#### Remove Shared Status from a Workbook

GET READY. USE the workbook from the previous exercise.

1. On the **REVIEW** tab, in the Changes group, click **Track Changes**, and then click **Highlight Changes**.
2. In the When box, All is selected by default. This tells Excel to search through all tracked changes made to the worksheet.
3. Clear the Who and Where check boxes if they are selected.
4. Click the **List changes on a new sheet** check box. Click **OK**. A History sheet is added to the workbook.
5. On the History worksheet, in the corner of the worksheet adjacent to the first column and first row, click the **Select All** button. Click the **HOME** tab, and then in the Clipboard group, click the **Copy** button.
6. Press **Ctrl + N** to open a new workbook.
7. In the new workbook, on the **HOME** tab, in the Clipboard group, click **Paste**.
8. SAVE the new workbook as **11 Assignments History Solution**. CLOSE the workbook.

### Take Note

It is a good idea to print the current version of a shared workbook and the change history, because cell locations in the copied history may no longer be valid if additional changes are made.

9. In the shared workbook, click on the **REVIEW** tab, click **Unprotect Shared Workbook** and then click **Share Workbook**. The Share Workbook dialog box is displayed. On the Editing tab, make sure that Jim Giest (the last user name changed in File Options) is the only user listed in the Who has this workbook open now list.
10. Clear the **Allow changes by more than one user at the same time**. Click **OK** to close the dialog box.
11. A dialog box opens to prompt you about removing the workbook from shared use. Click **Yes** to turn off the workbook's shared status. The word Shared is removed from the title bar.
12. SAVE and CLOSE the workbook.

PAUSE. LEAVE Excel open for the next exercise.

When shared status has been removed from a workbook, changes can be made like they are made in any workbook. You can, of course, turn change tracking on again, which will automatically share the workbook.

## ADDING COMMENTS TO A WORKBOOK

In Excel, you can add a note to a cell by inserting a comment. You can also edit the text in comments and delete any comments that you no longer need. Comments are marked by a red triangle in the upper-right corner of the cell. When you point to this triangle, the comment appears in a box next to the cell, along with the name of the user logged on to the computer at the time the comment was created.

### Inserting a Comment

Comments are a useful technique for calling attention to important or significant data and providing insights from the user that explain more about the data. For example, say that Contoso's employees are evaluated on three performance measures. The manager uses comments to note incidents related to these measures. In this exercise, you learn how to insert comments.

#### STEP BY STEP

#### Insert a Comment

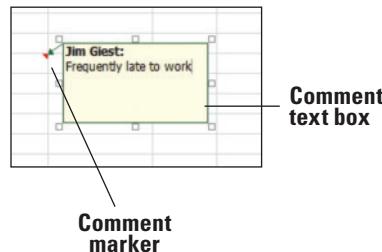


GET READY. OPEN the **11 Contoso Personnel Evaluations** file for this lesson.

1. Select cell **E11**. On the **REVIEW** tab, in the **Comments** group, click **New Comment**. The comment text box opens for editing.
2. Type **Frequently late to work** as shown in Figure 11-23.

**Figure 11-23**

New comment text box



3. Click cell **D8**. Press **Shift + F2** and type **Currently completing Masters degree program for additional certification**. Click outside the comment box. The box disappears and a red triangle remains in the upper-right corner of the cell the comment was placed in.
4. Click cell **E4**. Click **New Comment** and type **Adjusted hours for family emergency**.
5. Click cell **F10**. Click **New Comment** and type **Consider salary increase**.
6. SAVE the file as **11 Evaluations Solution**.

PAUSE. SAVE the workbook and LEAVE it open for the next exercise.

As previously mentioned, Contoso, Ltd. conducts an annual employee performance review. In this workbook, the manager uses comments to note events or actions that he wants to recall when he conducts employees' annual reviews. When you add comments, Excel automatically displays the name that appears in the Name box under General Office settings in the Excel Options dialog box. If you don't want to use a name, you can select it in the comment and press Delete.

## Viewing a Comment

When you rest your pointer over the red triangle that indicates that a cell has a comment attached to it, the comment is displayed. You can keep selected comments visible as you work, or you can display all comments using commands in the Comments group on the REVIEW tab. The Show/Hide Comment and Show All Comments commands allow you to display or hide comments as needed. The Previous and Next commands allow you to move from one comment to another without selecting the cells.

### STEP BY STEP

### View a Comment

GET READY. USE the workbook from the previous exercise.

1. Click cell **F10** and on the REVIEW tab, in the Comments group, click **Show/Hide Comment**. Note that the comment remains visible when you click outside the cell.
2. Click cell **E4** and click **Show/Hide Comment**. Again, the comment remains visible when you click outside the cell.
3. Click cell **F10** and click **Show/Hide Comment**. The comment is hidden.
4. In the Comments group, click **Next** twice to navigate to the next available comment. The comment in cell E11 is displayed.
5. In the Comments group, click **Show All Comments**. All comments are displayed.
6. In the Comments group, click **Show All Comments** again to hide all comments and make sure they are no longer displayed.

PAUSE. SAVE the workbook and LEAVE it open for the next exercise.

## Editing a Comment

Comments can be edited and formatted as needed. You can format a comment using most of the formatting options on the HOME tab in the Font group. However, the Fill Color and Font Color buttons on the HOME tab are not available for comment text. To edit a comment, select the cell containing the comment and click **Edit Comment**.

### STEP BY STEP

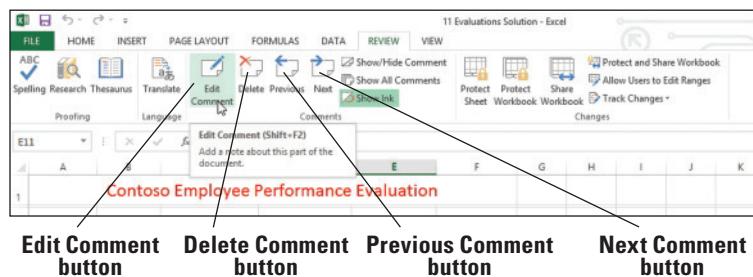
### Edit a Comment

GET READY. USE the workbook from the previous exercise.

1. Click cell **E11** and move the mouse pointer to the **Edit Comment** button on the REVIEW tab. The ScreenTip also shows Shift + F2 as an option, as shown in Figure 11-24.

**Figure 11-24**

Edit Comment button and ScreenTip



2. Click the **Edit Comment** button.
3. Following the existing comment text, type a . (period) followed by a **space** and then **Placed on probation**. Then click any cell between F4 and D8.
4. Click **Next**. The comment in D8 is displayed.
5. Select the existing comment text in D8 and type **MA completed; can now prescribe medications**.
6. Click cell **E4** and click **Edit Comment**.
7. Select the text in the comment attached to E4. On the **HOME** tab, click **Bold**.
8. Click cell **E11**, click the **REVIEW** tab, and click **Edit Comment**.
9. Select the name and the comment text. Click the **HOME** tab and notice that the Fill Color and Font Color options are dimmed. **Right-click** on the selected text and select **Format Comment**.
10. In the Format Comment dialog box, click the arrow in the **Color** box and click **Red**. Click **OK** to apply the format and close the dialog box. There is no fill option for the comment box.

**PAUSE.** SAVE the workbook and LEAVE it open for the next exercise.

## Deleting a Comment

Of course, you can delete comments from a workbook when they are no longer needed. Unless the workbook is protected, any user can delete comments, so you should consider protecting a workbook that contains sensitive or confidential information. In this exercise, you learn to delete a comment.

### STEP BY STEP

### Delete a Comment

 **Another Way**  
To delete a comment, you can click Show/Hide Comment on the REVIEW tab to display the comment and then select the edge of the comment text box and press Delete.

**GET READY.** USE the workbook from the previous exercise.

1. Click cell **E4**. The comment for this cell is displayed.
2. On the **REVIEW** tab, in the Comments group, click **Delete**.

**PAUSE.** SAVE the workbook and LEAVE it open for the next exercise.

## Printing Comments in a Workbook

Anyone with access to a workbook can view the comments made by all users. As you learned in a previous exercise, comments can be removed from a workbook before the workbook is shared or copies are distributed. Comments can also be printed as they appear in the worksheet or on a separate page following the workbook. You will learn how to print comments in this exercise.

### STEP BY STEP

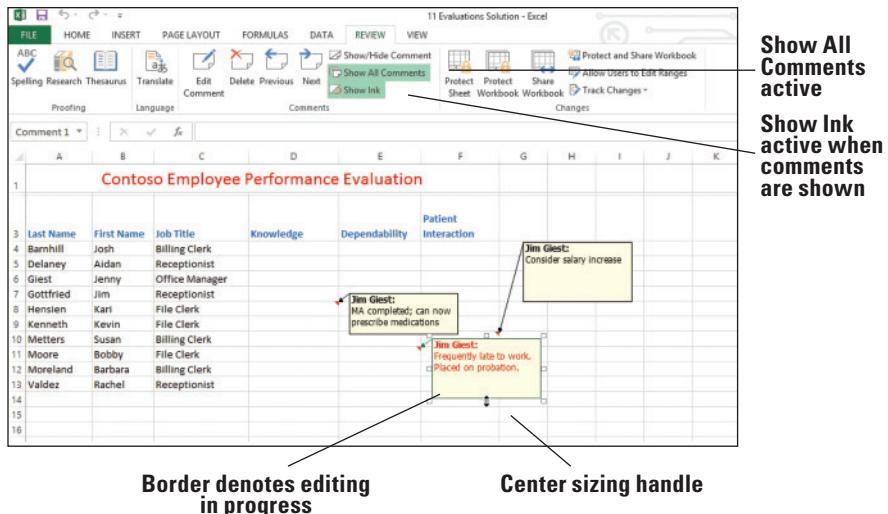
### Print Comments in a Workbook

**GET READY.** USE the workbook from the previous exercise.

1. On the **REVIEW** tab, click **Show All Comments**. Notice that the comments slightly overlap each other.
2. In cell D8, click the border of the comment box. Select the center sizing handle at the bottom of the box and drag upward until the comment in cell E11 is completely visible.
3. Move the mouse pointer until it is a four-headed arrow on the border of the comment in cell F10. Drag the comment so it no longer overlaps the comment in cell E11 (see Figure 11-25).

**Figure 11-25**

Setting up a workbook to print with comments



4. Click the **PAGE LAYOUT** tab, and in the Page Setup group, click **Orientation**. Click **Landscape**.
5. In the Page Setup group, click the **Page Setup dialog box launcher**.
6. On the Sheet tab, in the Comments box, click **As displayed on sheet**.
7. Click **Print Preview**. The Print Options window in Backstage opens.
8. Click **Print**.
9. **SAVE** and **CLOSE** the workbook.

**CLOSE** Excel.

When you print comments as they appear on the worksheet, the data in some cells may be covered. To print comments on a separate page, select **At end of sheet** in the Comments box on the Sheet tab of the Page Setup dialog box.

## SKILL SUMMARY

In this lesson, you learned how:	Exam Objective	Objective Number
To secure your work before sharing it with others.		
To distribute a workbook by email and the cloud.		
To track changes to a workbook.		
To add comments to a workbook.		

## Knowledge Assessment

### Multiple Choice

Select the best response for the following statements.

1. Adding, deleting, moving, and viewing comments are performed from the commands on which ribbon tab?  
 a. COMMENTS  
 b. REVIEW  
 c. FILE  
 d. VIEW
2. The Protect and Share Workbook button is on which ribbon tab?  
 a. COMMENTS  
 b. REVIEW  
 c. FILE  
 d. VIEW
3. Which is NOT an option in the Comments group?  
 a. New Comment  
 b. Delete  
 c. Show Ink  
 d. Edit Comment
4. You can turn on track changes with all of the following EXCEPT:  
 a. Track Changes button  
 b. Share Workbook button  
 c. Protect Sheet button  
 d. Protect and Share Workbook button
5. All of the following are on the REVIEW tab except which of the following?  
 a. Track Changes button  
 b. Share Workbook button  
 c. Protect Cells button  
 d. Protect and Share Workbook button
6. Which of the following would be the strongest password?  
 a. 02Feb2011 (your dog's birthdate)  
 b. DenVer (the city in which you were born, with odd capitalization)  
 c. 679KrDj! (the last three digits of your social security or social insurance number and first names of each of your siblings with an exclamation point)  
 d. BruinsO6 (your high school mascot and year you graduated using the letter O for a zero)
7. In Excel, you can require a password for all of the following except which of the following?  
 a. Opening a file  
 b. Formatting cells, columns, and rows on a worksheet  
 c. Adding a new worksheet, deleting a worksheet  
 d. Deleting a file

8. You can send a workbook to someone by all of the following methods except which of the following?
  - a. Use the FILE, Insert, Email command from Backstage view.
  - b. Open a third-party email program and attach the Excel file.
  - c. Save the workbook on SkyDrive and send a link to the file for viewing only.
  - d. Through a Send to Mail Recipient button you've added to the Quick Access Toolbar.
9. Which of the following functions allows you to have Excel put any number in by chance from 10000 to 99999?
  - a. RAND()
  - b. RANDBETWEEN(10000,99999)
  - c. BYCHANCE(10000,99999)
  - d. RANDOM(10000,99999)
10. You can do all of the following with comments except which of the following?
  - a. Format the text using a different color
  - b. Change the background comment box color
  - c. Not include the user name who made the comment
  - d. Hide the comment

### Fill in the Blank

Complete the following sentences by writing the correct word or words in the blanks provided.

1. A strong \_\_\_\_\_ protects the document because it contains upper and lower case letters, numbers, and symbols.
2. The \_\_\_\_\_ feature allows you to see what each user adds, deletes, or edits in a workbook.
3. The \_\_\_\_\_ includes the name of the person who made each change, when the change was made, and what data was changed.
4. The \_\_\_\_\_ tab contains commands for comments, protecting the worksheet and workbook, sharing the workbook, and track changes.
5. If you want Excel to assign number by chance from 100 to 999, use the \_\_\_\_\_ function.
6. When you want to add a note to a cell without entering cell contents, use cell \_\_\_\_\_.
7. If you want to check the document for hidden properties or personal information, use the \_\_\_\_\_.
8. Use the \_\_\_\_\_ option on the Backstage view to send an email message.
9. You can use the Shift+F2 or \_\_\_\_\_ button to add a note to a cell.
10. The \_\_\_\_\_ tab of the Page Setup dialog box allows you to print comments.

## Competency Assessment

### Project 11-1: Protect a File with a Password

In this project, the office manager has asked you to create an inventory of company credit cards and save the file with a password.

GET READY. LAUNCH Excel if it is not already open.

1. Open a Blank workbook and type **Contoso Credit Card Inventory** in cell **A1**.
2. Type and format the information in Figure 11-26. The title in cell A1 is merged and centered, with Cell Style Heading 1 applied. The labels in row 3 are centered, with Cell Style Heading 3 applied.

**Figure 11-26**

Creating the Credit Cards workbook.

A	B	C	D	E
1	Contoso Credit Card Inventory			
2	Issuer	Name on Card	Exp Date	Card
4	MasterCard	Jenny E. Giest	1/1/2015 9806-7415-9741-7237	274
5	MasterCard	Cassie A. Hicks	12/31/2020 7491-8877-4743-3608	798
6	MasterCard	Dan A. Wilson	1/1/2017 9512-1164-4689-8911	703
7	MasterCard	Mor O. Hezi	1/2/2017 1925-4341-8239-4914	787
8	MasterCard	Nicole I. Holliday	5/9/2019 9357-8825-4945-3995	614
9	Visa	Rebecca E. Laszlo	2/6/2016 8283-1378-3595-8119	569
10	Visa	Srinivas R. Iragavarapu	4/25/2018 1259-3980-3012-4877	661
11	Visa	Stephanie T. Bourne	7/21/2017 2716-2332-2847-3247	142
12	Visa	Yossi O. Banai	12/26/2017 1621-4398-6763-2687	918
13				
14				
15	MasterCard Customer Service 1-800-732-9194			
16	Visa Customer Service 1-800-537-7783			
17				

3. SAVE the file as **11 Credit Cards Solution** for use in each of the other exercises.
4. Click the **FILE** tab and Info is automatically selected; click **Protect Workbook** and choose **Encrypt with Password**.
5. In the Encrypt Document dialog box, type **11P1!s5** and reenter the same password in the Confirm Password dialog box.
6. SAVE and CLOSE the workbook.

LEAVE Excel open for the next project.

## Project 11-2: Email and Save a File to SkyDrive

In this project, you will email your workbook to your instructor and save the file to the SkyDrive.

GET READY. LAUNCH Excel if it is not already open.

1. OPEN the **11 Credit Cards Solution** file you created in the first project. Use the password you created in Project 11-1.
2. SAVE the file as **11 Credit Cards Email Solution**.
3. Select the **FILE** tab, and then **Share**.
4. Invite People is already selected. Click **Save to Cloud**.
5. Click on your **SkyDrive** icon and then **Browse**, and select the SkyDrive folder for this lesson.
6. Click **Save**. You return to the Share screen.
7. Type the **[email address of your instructor]**, in the personal message box, type **Project 2 Assignment** and click the **Share** button **SEND** the email message.

CLOSE the workbook and LEAVE Excel open for the next project.

## Proficiency Assessment

### Project 11-3: Send Links for Editing and Viewing a File on the Web

In this project, you will send the links for viewing and editing the file on the Web to your instructor and yourself.

GET READY. LAUNCH Excel if it is not already open.

1. OPEN the **11 Credit Cards Solution** file you created in the first project. Use the password you created in Project 11-1.

2. SAVE the file as **11 Credit Cards Links Solution**.
3. Use the **Share** option on the Backstage view to save the file to the cloud.
4. Open your email program and add your instructor's email address. In the body of the message, type **View** and press **Enter** and then type **Edit**.
5. Return to Excel's Backstage view Share page and click **Get a Sharing Link** for viewing, copy this in the email message after the word View, and then copy the link for editing and copy this in the email message after the word Edit. **SEND** the email message.
6. SAVE and CLOSE all open workbooks.

LEAVE Excel open for the next project.

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#### Project 11-4: Add Comments to a File

In this project, you will add comments to a file.

GET READY. LAUNCH Excel if it is not already open.

1. OPEN the **11 Credit Cards Solution** file you created in the first project. Use the password you created in Project 11-1.
2. SAVE the file as **11 Credit Cards Comments Solution**.
3. In cell **B4**, type a new comment **Initial E will be removed on next card**.
4. In cell **D9**, type a new comment **Card lost – need to cancel if not found by tomorrow**.
5. In cell **B12**, type a new comment **Yossi will be leaving at the end of the quarter – make sure to cancel card**.
6. Edit the comment in **D9** to just say **Card lost and found [today's date]**.
7. Make sure all comments are hidden.
8. PRINT the worksheet with the comments displayed at the end of the sheet.
9. SAVE and CLOSE the workbook.

LEAVE Excel open for the next project.

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## Mastery Assessment

#### Project 11-5: Track Changes

In this project, you will open the credit card file and track changes with different users.

GET READY. LAUNCH Excel if it is not already open.

1. OPEN the **11 Credit Cards Solution** file you created in the first project. Use the password you created in Project 11-1.
2. SAVE the file as **11 Credit Cards Changes Solution**.
3. In cell F3, type **Balance** and continue the formatting for row 3.
4. Format column F to be **Accounting Number Format**.
5. Change the label in row 1 to be merged and centered across A1:F1.
6. Track changes for all users.

7. Change the username prior to each change to be the user whose name is on the card in row 4 and enter the balances below for each user in column F. SAVE the workbook after each balance is entered.

Jenny E. Geist	\$3,533.15
Cassie A. Hicks	\$9,929.25
Dan A. Wilson	\$952.92
Mor O. Hezi	\$9,768.55
Nicole I. Holliday	\$1,669.72
Rebecca E. Laszlo	\$166.00
Srinivas R. Iragavarapu	\$6,186.08
Stephanie T. Bourne	\$8,662.97
Yossi O. Banai	\$1,621.48

8. List the changes on a new sheet.  
 9. Create a copy of the History sheet to a new workbook and save the workbook as **11 Credit User Changes Solution**.  
 10. Accept everyone's changes except Dan's in F6 and Rebecca's in F9.  
 11. SAVE and CLOSE both workbooks.

LEAVE Excel open for the next project.

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### Project 11-6: Lock Cells and Protect Worksheet Elements

This project will put together various features of worksheet security and annotation, and then have you share the workbook with other users.

GET READY. LAUNCH Excel if it is not already open.

1. OPEN the **11 Credit Cards Solution** file you created in the first project. Use the password you created in Project 11-1.
2. SAVE the file as **11 Credit Cards Passwords Solution**.
3. Turn off the password for the file (delete all characters).
4. Add a label in F3: **Birthday** and one in G3: **Mom Name**. Format these two labels the same as other labels in the row and increase column width to fit.
5. Change the title of the workbook in A1 to read **Contoso Credit Card Passwords** and center across **A1:G1**.
6. Add a label in A17: **Password is Birthday in yyyyymmdd format + first 4 characters of Mom's Maiden name**.
7. Unlock the input for Birthday and Mom Name columns (**F4:G12**).
8. **Protect Sheet** with the password of the company name: **Contoso**.
9. Send this workbook in an email to your instructor. The subject should read: CC Passwords. The body text should read Go to your row. In column F type **your birth date**. In column G type **your mother's maiden name**. After you complete these changes, make sure to email the workbook back to me on Friday.
10. The following will simulate getting each workbook back. Enter the following data:

Name on Card	Birthday	Mom Name
Jenny E. Geist	4/7/1955	Soon
Cassie A. Hicks	11/6/1953	Banti
Dan A. Wilson	11/27/1949	Meadows
Mor O. Hezi	5/27/1950	Mayo
Nicole I. Holliday	7/20/1952	Kim
Rebecca E. Laszlo	2/23/1970	Untch
Srinivas R. Iragavarapu	2/1/1959	Chia
Stephanie T. Bourne	6/10/1945	Brauninger
Yossi O. Banai	7/5/1948	Posti

11. In the Excel Options dialog box, change the User name to the original name for this computer.
12. Put a comment in cell G4: **Password would look like 19550407Soon.**
13. Click the **FILE** tab, choose **Options**, select **Quick Access Toolbar**, click the **Reset** button, and select the **Reset all customizations** option to return your Excel settings to normal.
14. Send an email to your instructor with a critique of this worksheet. In the email text, tell your instructor how you would improve the worksheet or the process of creating it.

CLOSE Excel.

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