

# FastCourse Microsoft® Excel 2016 Level 1

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**LABYRINTH**  
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Berkeley, CA

*FastCourse Microsoft Excel 2016: Level 1*

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EVALUATION ONLY

**EXCEL 2016**

# Tracking Customer Data

In this chapter, you will use Excel to enter detailed information about customers into a worksheet. You will learn about fundamental Excel features as you create and modify a simple worksheet. By the end of the chapter, you will have a solid grasp of the basic tools used to create worksheets in Excel.

## LEARNING OBJECTIVES

- Enter data into a worksheet
- Format a worksheet
- Apply number and date formats
- Enter a series of related data
- Perform simple calculations
- Create cell references and use cell references in formulas
- Print a worksheet

## CHAPTER TIMING

- Concepts/Develop Your Skills: 2 hrs
- Self-Assessment: 20 mins
- Total: 2 hrs 20 mins

## PROJECT: TRACKING CUSTOMER INVOICES

Airspace Travel is a company that provides luxurious travel packages to tropical destinations. It is a small, family-run business, and the owners want your help tracking their customer accounts using Excel. You will use Excel to calculate the total amount each customer owes for each trip.

Some of the important information to include for each customer is the airline, destination, number of guests, and cost per person.

# Introducing Excel

Microsoft Excel is a very popular tool used by millions of people every day. Why do people like it? Partly because it makes work easier! Excel is a worksheet program that allows you to work with numbers and data much more quickly and efficiently than with the pen-and-paper method.

Excel can perform instant calculations and process, analyze, and store large amounts of data. It can perform a variety of tasks such as:

- Creating payment schedules and budgets
- Creating sales reports and performing analysis
- Tracking invoices and controlling inventory
- Creating databases or analyzing data imported from a database

The more you learn about and become skilled at using Excel, the more ways you will discover to make work fast and easy.

## DEVELOP YOUR SKILLS: E1-D1

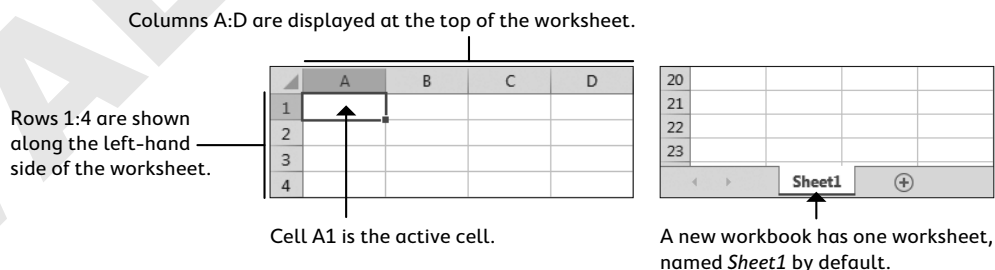
*In this exercise, you will start Excel and open a blank workbook.*

1. Click **Start**.
2. Type **Ex** and then choose **Excel 2016** from the list of suggestions.
3. Click the **Blank Workbook** template on the Excel Start screen.

## What Is a Worksheet?

An Excel file is called a workbook, and it is comprised of one or more worksheets (also called spreadsheets), which can be used for small tasks or to create large databases of information. Each worksheet is made up of rows and columns of individual cells that contain data. When you open a new blank workbook, the selected cell is A1. Cell A1 is referred to this way because this is where column A meets row 1.

The selected cell, also known as the active cell, is indicated by the thick box around it. The active cell is where you can type data or insert objects into your worksheet.



## Cell Ranges

For many tasks, you want to select a group of cells instead of a single cell. A group of cells is referred to as a range. The cells in a range can be adjacent (side by side) or nonadjacent.

	A	B	C
1			
2			
3			
4			
5			

Range A1:A4

	A	B	C
1			
2			
3			
4			
5			

Range A2:B4

	A	B	C
1			
2			
3			
4			
5			

Nonadjacent ranges A1:C1, A3:C3

## Entering and Editing Data

Data is easily entered into Excel by simply selecting a cell and typing. If a cell already contains data, you can double-click the cell to edit it. Text is used for headings or descriptive data, and numbers can either be typed into a cell or calculated with a formula.

Name Box—displays the name of the active cell (A1)

Formula Bar—displays the active cell entry

Cancel and Enter—cancel or complete the entry

## Completing Cell Entries

After typing or editing data in a cell, you need to complete the entry before you can continue. The method you use to complete the entry will determine where the active cell moves.

Excel is in Ready mode when a cell is selected and Enter mode when data is being inserted. The difference between Enter and Ready modes is that many Excel features are unavailable while you are entering data.

Tapping , , or any of the arrow keys (, , , ) will complete the entry as shown in the table below. Another option is to use the Enter  button on the Formula Bar, which will keep the current cell active.

COMPLETING A CELL ENTRY	
Completion Method	New Active Cell Location
<input type="text" value="Enter"/>	Moves one cell down
<input type="text" value="Tab"/>	Moves one cell to the right
<input type="text" value="→"/> , <input type="text" value="←"/> , <input type="text" value="↑"/> , <input type="text" value="↓"/>	Moves to the next cell in the direction of the arrow key
<input type="text" value="×"/>	Cancels the entry (or modification) and keeps the current cell active
<input type="checkbox"/>	Completes the entry without moving

## Navigating Around a Worksheet

Navigating around your worksheet quickly is an important skill to master. The following table lists some useful keystrokes for changing the active cell. You can also click with the mouse to select the desired cell or type a cell name into the Name Box to quickly jump to it. A worksheet has up to 1,048,576 rows and up to 16,384 columns, so for large amounts of data, you definitely want a quicker way to get around than simply scrolling!

NAVIGATION METHODS	
Keystroke(s)	How the Active Cell Changes
<input type="text" value="→"/> , <input type="text" value="←"/> , <input type="text" value="↑"/> , <input type="text" value="↓"/>	One cell right, left, up, or down
<input type="text" value="Home"/>	Beginning (column A) of current row
<input type="text" value="Ctrl+Home"/>	Home cell, usually cell A1
<input type="text" value="Ctrl+End"/>	Last cell in active part of worksheet
<input type="text" value="Page Down"/>	Down one visible screen
<input type="text" value="Page Up"/>	Up one visible screen
<input type="text" value="Alt+Page Down"/>	One visible screen right
<input type="text" value="Alt+Page Up"/>	One visible screen left
<input type="text" value="Ctrl+G"/>	Displays Go To dialog box

## DEVELOP YOUR SKILLS: E1-D2

*In this exercise, you will enter the data for your worksheet title and headings.*

*Before You Begin:* Be sure to visit the Learning Resource Center at [labyrinthlab.com/lrc](http://labyrinthlab.com/lrc) to retrieve the exercise files for this course before beginning this exercise.

1. Save your workbook as **E1-D2 - Invoices** in your **Excel Chapter 1** folder.
2. Type **Airspace Travel Company** in cell **A1** and tap  to complete the entry.
3. Type **Monthly Customer Invoices** in cell **A2** and tap  to complete the entry.



4. Type **First Name** in **cell A3** and tap **Tab** to complete the entry and move one cell to the right.
5. Type **Last Name** in **cell B3** and tap **Tab**.
6. Type **Provider** in **cell C3** and tap **Tab**.
7. Type **Destination** in **cell D3** and tap **Tab**.
8. Type **# of Guests** in **cell E3**, but this time click **Enter**  on the Formula Bar to complete the entry.

	A	B	C	D	E	F
1	Airspace Travel Company					
2	Monthly Customer Invoices					
3	First Name	Last Name	Provider	Destination	# of Guests	

9. Save the workbook.

## Data Consistency in a Database

When inputting data, the consistency of the information is extremely important. If you are entering employee records in a large database, you want to ensure that information such as department names and position titles is entered accurately; for example, you wouldn't want some employees to be listed in the "Financial" department and others to be listed in the "Finance" department because that would create problems when looking up, sorting, and filtering your data.

Excel has a feature that helps with this problem and also saves a lot of time when you need to enter the same text repeatedly. AutoComplete will suggest text for you as you type, using data from the same column. For example, if you type "Accounting" for a department name in one cell and then farther down in the same column type the letter "A," AutoComplete will suggest "Accounting," and you can either accept the suggestion or ignore it and keep typing.

### DEVELOP YOUR SKILLS: E1-D3

*In this exercise, you will enter the customer data below each of the column headings.*

1. Save your workbook as **E1-D3 - Invoices**.
2. Click **cell A4** to select it and then enter the following data for Eric Snow in **row 4** using the **Tab** key to complete each entry:

3	First Name	Last Name	Provider	Destination	# of Guest
4	Eric	Snow	Sunwind	Jamaica	

3. Type **2** in **cell E4** and tap **Enter** to complete the entry.

4. Type **Alison** in cell **A5**, **Lobosco** in cell **B5**, and type only the letter **s** in cell **C5**.

3	First Name	Last Name	Provider	Destination	# of Guests
4	Eric	Snow	Sunwind	Jamaica	2
5	Alison	Lobosco	Sunwind		

5. Tap the **Tab** key to accept the suggestion and continue entering the rest of the customer information in the following table, starting from cell **D5**.



	A	B	C	D	E
3	First Name	Last Name	Provider	Destination	# of Guests
4	Eric	Snow	Sunwind	Jamaica	2
5	Alison	Lobosco	Sunwind	Mexico	2
6	Lacy	Henrich	TrueBlue	Dominican Republic	4
7	Will	Johns	Eastjet	Cuba	3
8	Nicki	Hollinger	Sunwind	Mexico	1
9	Lennard	Williams	TrueBlue	Brazil	6
10	Kerri	Knechtel	TrueBlue	Columbia	4
11	Karynn	Alida	Sunwind	Bahamas	2
12	David	Monton	Eastjet	Dominican Republic	2
13	Amanda	Campbell	Sunwind	Jamaica	7

6. Save the workbook.

## Adjust Column Width and Row Height

To create enough space to properly see your text, you may need to adjust the column width and row height. A key step is to select the desired row(s) or column(s) before adjusting the size. Column width and row height can be set precisely using Ribbon commands or adjusted manually by dragging with the mouse. Even better, AutoFit can adjust the size to accommodate the largest entry in the column or row.

In a new workbook, column width is 8.43 and row height is 15.00; however, you might notice that cells are wider than they are tall. This is because column width is measured in characters and row height is measured in points, similar to font size. One character is bigger than one point.

☰ Home → Cells → Format → Column Width  or Row Height  | Right-click column/row heading → Column Width or Row Height

☰ Home → Cells → Format → AutoFit | Double-click column/row heading borders

## DEVELOP YOUR SKILLS: E1-D4


In this exercise, you will adjust the column widths using various methods in order to properly display the text in the cells.

1. Save your workbook as **E1-D4 - Invoices**.
2. Follow these steps to manually adjust the width of column A:

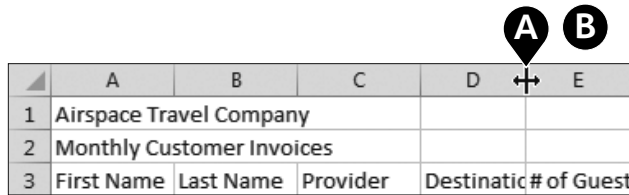
	A	B	C	D	E
1	Airspace Travel Company				
2	Monthly Customer Invoices				
3	First Name	Last Name	Provider	Destinatic# of Guest	

- Move the mouse pointer over the line between the column A and B headings to display the Adjust pointer.
  - Press and hold the **left mouse button**, and notice the ScreenTip displays the current width of column A.
  - Continue holding the left mouse button and drag right until the text *First Name* is fully visible in cell A3. Release the mouse button.
3. Widen column B until *Last Name* is visible in **cell B3** or try to set the width to **10.00**.
  4. Widen column C slightly or try to set the width to **10.00**.
  5. Follow these steps to select columns A:C:

	A	B	C	D	E
1	Airspace Travel Company				
2	Monthly Customer Invoices				
3	First Name	Last Name	Provider	Destinatic# of Guest	

- Position the mouse pointer on the column A heading and press and hold the **left mouse button**.
  - Drag right until **columns A:C** are selected and release the mouse button.
6. Choose **Home**→**Cells**→**Format**→**Column Width**  to display the Column Width box.
  7. If necessary, type the number **10** in the box and click **OK** to set the widths of columns A:C to 10.

8. Follow these steps to use AutoFit to adjust the width of column D:



	A	B	C	D	E
1	Airspace Travel Company				
2	Monthly Customer Invoices				
3	First Name	Last Name	Provider	Destinatic#	of Guest


- Ⓐ Point between the column D and E headings to display the Adjust pointer.
  - Ⓑ Double-click to AutoFit column D. The width of column D will adjust to fit the widest entry.
9. Save the workbook.


## Formatting Cells

You may notice that unformatted data does not look very pleasing. The columns are too narrow, and the black-and-white color is very plain and boring. Formatting is important not simply to make worksheets more appealing, but also to make it easier to read and interpret the data they contain. A textbook would be very hard to read if all the text was the same font and size, with all text the same color on a white page. Likewise, it is much easier to understand a worksheet if it is properly formatted.

### Borders and Fill

Adding some color to your worksheet can accentuate the column headings and helps the data stand out. In addition to changing the font, style, and color of the text, you can use Fill Color to add color or shading inside a cell and use Borders to add lines around the cells. The drop-down menu buttons (▼) give you more choices for lines and colors.

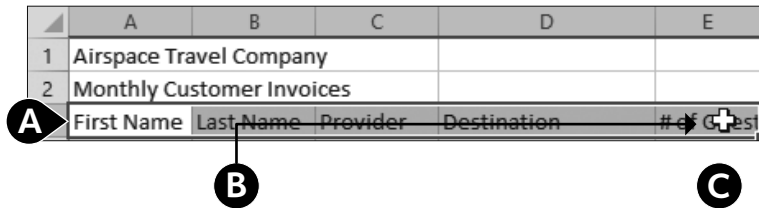
☰ Home → Font → Borders  | Right-click → Format Cells → Borders

☰ Home → Font → Fill Color  | Right-click → Format Cells → Fill

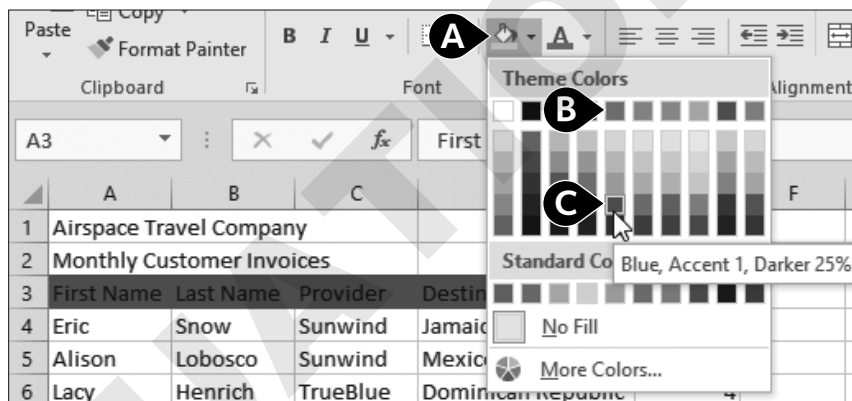
## DEVELOP YOUR SKILLS: E1-D5



In this exercise, you will add some color to your worksheet using Fill Color, Borders, and Font Color.

1. Save your workbook as **E1-D5 - Invoices**.
2. Follow these steps to select the column headings in the **range A3:E3**:



- A Point to the middle of **cell A3** and press and hold down the **left mouse button**.
  - B Continue to hold the left mouse button as you drag right, along row 3, until the **range A3:E3** is selected.
  - C Release the mouse button to complete the selection.
3. Follow these steps to explore the Fill Color palette and apply a color:



- A Click the **Fill Color** menu button ▼ to display the palette.
  - B Notice the ScreenTip tells you the name of the color as you mouse over each one. The top row under Theme Colors gives you 10 options, with different shades for each color listed in the column below.
  - C Choose **Blue, Accent 1, Darker 25%** (fifth column, fifth row).
4. With the **range A3:E3** still selected, choose **Home**→**Font**→**Border**  menu button ▼.
  5. Choose **Thick Outside Borders** to apply a thick border around the selected range.
  6. For the same range choose **Home**→**Font**→**Font Color**  menu button ▼ and choose **White, Background 1** (first column, first row).
  7. Then use the keyboard shortcut **Ctrl** + **B** to apply **Bold** format.
  8. Select **cell A1** and increase the Font Size to **18**, select **cell A2**, and increase the Font Size to **14**.







9. Next select the **range A1:A2**, apply the Font Color **Blue, Accent 1, Darker 50%** (fifth column, sixth row), and apply **Bold B** format.
10. Select the **range A4:B13** and apply **Bold B**.
11. Click anywhere outside your data to deselect it; then, save the file. Your worksheet should now look like this.

	A	B	C	D	E
1	<b>Airspace Travel Company</b>				
2	<b>Monthly Customer Invoices</b>				
3	<b>First Name</b>	<b>Last Name</b>	<b>Provider</b>	<b>Destination</b>	<b># of Guest</b>
4	Eric	Snow	Sunwind	Jamaica	2
5	Alison	Lobosco	Sunwind	Mexico	2

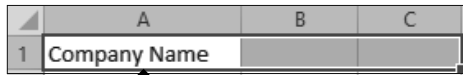
12. Save the workbook.

## Cell Alignment

Excel's alignment tools let you adjust the arrangement of entries within cells. The default alignment for text data is left-aligned inside the cell, and the default for numerical data is right-aligned, as seen in column E in the previous exercise. The Alignment group on the Home tab provides you with the following options.

ALIGNMENT BUTTONS	
Button	What It Does
	Aligns entries vertically at top, middle, or bottom of cells
	Aligns entries horizontally at left, center, or right of cells
	Decreases or increases the indent
Wrap Text 	Splits long text entries into multiple lines
Merge & Center 	Combines cells and centers content
 menu button ▼	Adjusts the angle or rotation of your text

Merge & Center is a one-step method for simultaneously merging multiple cells into one cell and centering the content. This is often used for worksheet titles at the top of your sheet. You can also add an indent to the contents of a cell, which increases the distance of the text from the cell border. This adds more space, making it easier to read the data.



Before, with three cells selected



After applying Merge & Center, one cell spans the three columns.

☰ Home → Alignment | Right-click → Format Cells → Alignment

## Clear Formatting and Clear All

Occasionally you may want to keep text in a cell or range but clear all formatting, and you can do this by using the Clear Formatting feature. You can also remove text and formatting at the same time with Clear All.

☰ Home → Editing → Clear

### DEVELOP YOUR SKILLS: E1-D6

*In this exercise, you will adjust the alignment for your headings and data and use Merge & Center for your titles.*

1. Save your workbook as **E1-D6 - Invoices**.
2. Select the **range A3:E3** and choose **Home → Alignment → Wrap Text** .
3. With the **range A3:E3** still selected, choose **Home → Alignment → Middle Align** .
4. With the headings still selected, choose **Home → Alignment → Center** .
5. Select the **range E4:E13** (the number of guests data) and apply **Center** alignment .
6. In the top row, select the **range A1:E1**.
7. Choose **Home → Alignment → Merge & Center** (do not click the menu button ▼) to center the company name over the data below.
8. **Merge & Center** the **range A2:E2** in the second row to center the Monthly Customer Invoices title as well.
9. Select the **range A4:A13** and choose **Home → Alignment → Increase Indent** .
10. Save the workbook.

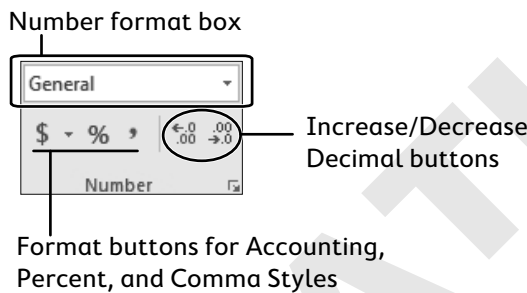
# Working with Numbers and Dates

Because Excel is often used to perform calculations, it is important to understand how to enter numerical data properly. A number that is entered into Excel can be formatted many ways—with a dollar sign, percent symbol, decimals, or no decimals—but the numerical entry in the cell does not change. Typically to enter a numerical value into a cell, you want to simply type in the digits and adjust formatting after.

The default Number Format is General, which has no specific format. When a number format is applied to a cell, it remains with the cell even if the contents are changed or deleted. The table below provides some basic number format examples.

Number	Format	Result
2317.25	General	2317.25
2317.25	Comma Style	2,317.25
2317.25	Currency	\$2,317.25
2317.25	Accounting	\$ 2,317.25
0.25	Percent	25%

The Number Format for the current cell is visible in the Number Format box.



Be aware that the numerical entry in the cell does not change when you increase or decrease the decimal (or when you change the Number Format). Doing so changes only the *appearance* of that number. Numbers with decimals can still have the decimals removed (decreased), but the number would then appear rounded up or rounded down from the actual entry, as shown in the table below. If the cell were used in a formula, the formula would still use the actual numerical entry in the cell, not the rounded version displayed on the screen.

Number	Decimal Places	Result	
23.64	3	23.640	Extra zero
23.64	2	23.64	No change
23.64	1	23.6	Rounded down
23.64	0	24	Rounded up

☰ Home → Number | Right-click → Format Cells → Number



## Negative Numbers

Working with negative numbers is no different from other numbers, except that there are more options for displaying the negative values. Negative numbers have the currency, comma, and decimal options, but they can also be represented by a – (minus) symbol, red digits, brackets, or both red digits and brackets.

-12	12	(12)	(12)
-----	----	------	------

Formatting examples for negative twelve

## Date Entries

Date formatting is another kind of number formatting. After a cell has a date entered into it, you can change the display without changing the actual cell entry. Excel can also use dates to perform calculations in a formula.

Dates can be entered many ways. However, the best way is to enter it in the format MM/DD for the current year or MM/DD/YY for any other year. For example, 10/15 would be entered for Oct. 15 of this year, and 10/15/14 would be entered for Oct. 15, 2014.


### DEVELOP YOUR SKILLS: E1-D7

In this exercise, you will enter two new columns of information using currency and date formatting.

1. Save your workbook as **E1-D7 - Invoices**.
2. Select **cell F3**, enter the heading **Price Per Person**, and then tap **[Tab]**.
3. Enter the heading **Invoice Date** in **cell G3**.
4. Select the **range F3:G3** and apply the **Thick Outside Border**.
5. Select **cell F4**, type the digits **899**, and then tap **[Tab]**.
6. In **cell G4** type **9/8** and then click **Enter** on the Formula Bar.
7. Continue entering the following data in columns F and G, respectively, starting in **cell F5**.

	F	G
5	770	9/7
6	1200	9/1
7	950	9/9
8	875	9/8
9	800	9/8
10	560	9/5
11	870	9/8
12	650	9/6
13	900	9/9

8. In column F, select the range **range F4:F13** (the cells with the prices you just entered).
9. Choose **Home**→**Number**→**Accounting** **\$** (not the menu button ▼) to apply the Accounting format to the selection.


10. With the range **F4:F13** still selected, click **Home**→**Number**→**Decrease Decimal**  twice.
  11. Save the workbook.
- 

## Enter a Series Using AutoFill

When entering data into a worksheet, it is common to enter a series of data, which is a sequence of text, numbers, or dates. Rather than type each item line by line, you can use AutoFill to quickly enter an entire column of data. To use AutoFill, you can either drag the fill handle or double-click the fill handle.



The fill handle

After you use AutoFill, the AutoFill Options  appear below the filled cells. AutoFill Options allow you to modify the way the data was filled, and the options change depending on the type of data that was filled. For example, filling in a series of dates allows you to choose days, weekdays, months, or years.




View the video “Using AutoFill to Fill a Series.”



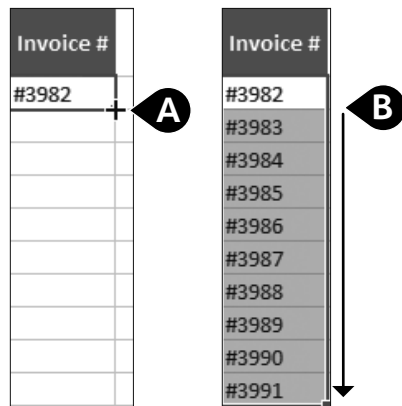
View the video “Using AutoFill Options.”

### DEVELOP YOUR SKILLS: E1-D8

*In this exercise, you will enter the Invoice numbers for each customer using AutoFill.*

1. Save your workbook as **E1-D8 - Invoices**.
2. Type the column heading **Invoice #** in **cell H3** and then tap **Enter**.
3. In **cell H4** type **#3982** and then click **Enter**  on the Formula Bar so that cell H4 remains active.

4. Follow these steps to use AutoFill to enter the rest of the invoice numbers:



- A** In the active cell, place the mouse over the fill handle so that your pointer changes to the black cross.
- B** Drag down to **cell H13** to fill in the rest of the series.

5. Save the workbook.

## Perform Worksheet Calculations

Excel uses formulas to perform calculations, which are written as mathematical problems. To create a formula, you should always begin by typing the = sign in the cell. Then you list the numbers or cells to use in the formula, along with the operation to be performed.

The Formula Bar always displays the formula, but the cell displays the results.

The formula  $=2*250$  is entered in cell D2 and is displayed in the Formula Bar.

	A	B	C	D
1	Name	# of Guests	Price Per Person	Total
2	John Smith	2	250	500

The result of the formula, 500, is displayed in cell D2.

## Mathematical Operators

Common operations include addition, subtraction, multiplication, and division. The following table shows the corresponding keystroke for each operation.

OPERATION	KEYSTROKE
Addition	+
Subtraction	-
Multiplication	*
Division	/

## BEDMAS

When there is more than one operation in a formula, Excel must decide which operation to perform first. Excel follows the standard order of operations, commonly remembered by the acronym BEDMAS. That is, *Brackets first (also called parentheses), then Exponents, Division, Multiplication, Addition, and Subtraction.*



In Excel, you type formulas with rounded brackets/parentheses ( ) and not square brackets [ ]. For this reason, the BEDMAS rule is also known as the PEMDAS rule, which is often remembered with the phrase "Please Excuse My Dear Aunt Sally."

It's important to understand the order of operations because it can significantly change the outcome of your formula. The formula  $=2+3*5$  would result in 17 because  $3*5$  is the first operation and then  $2+15$  is 17. The formula  $=(2+3)*5$  on the other hand results in 25, because  $(2+3)$  is the first operation and then  $5*5$  is 25.



View the video "Using Simple Formulas."



View the video "Understanding the BEDMAS Rule."

## Cell References

Rather than typing numbers into your formulas, it is a good idea to use cell references whenever possible. A cell reference takes the place of a number in a formula and makes it easier to copy formulas down a column or across a row. So instead of  $=2*250$ , you could use  $=B2*C2$  with the value 2 in cell B2, and the value 250 in cell C2.

D2		X ✓ fx		=B2*C2
	A	B	C	D
1	Name	# of Guests	Price Per Person	Total
2	John Smith	2	250	=B2*C2

The formula in cell D2 references cells B2 and C2.

D2		X ✓ fx		=B2*C2
	A	B	C	D
1	Name	# of Guests	Price Per Person	Total
2	John Smith	2	250	500

The formula result is 500.

Cell references can be typed, using upper- or lowercase letters, or you can simply click with the mouse on the cell you want to use.

Another advantage of cell references is that Excel automatically recalculates the formula if the value in the cell reference changes. In the example above, if the value in cell C2 is changed to

350, the formula in **cell D2** is automatically updated to show the new result, 700, without any effort required.

C2		350	
	A	B	C
1	Name	# of Guests	Price Per Person
2	John Smith	2	350

The formula result in cell D2 is updated immediately when cell C2 is changed.

### DEVELOP YOUR SKILLS: E1-D9

In this exercise, you will add a column with a formula to calculate the subtotal for each customer.

1. Save your workbook as **E1-D9 - Invoices**.
2. Select **cell I3**, type **Subtotal**, and then tap **Enter**.
3. In **cell I4** type **=E4\*F4** and then tap **Enter**.
4. In **cell I5** type **=**, click **cell E5** to select it, type **\*** and click **cell F5** to select it, and then click **Enter**.
5. Point to the fill handle in **cell I5** and drag down to **cell I13**.
6. Select the **range I4:I13** and click **Home**→**Number**→**Increase Decimal**  twice.
7. Select **cell J3**, type **Tax**, and then tap **Enter**.
8. In **cell J4** type **=**, click **cell I4** to select it, type **\*8%**, and click **Enter**.
9. Point to the fill handle in **cell J4**, and this time double-click the fill handle.
10. Select **cell K3**, type **Total**, and then tap **Enter**.
11. In **cell K4** type **=I4+J4** and click **Enter**.
12. Point to the fill handle in **cell K4** and double-click to fill the Tax formula down Column K.

	A	B	C	D	E	F	G	H	I	J	K
1	<b>Airspace Travel Company</b>										
2	<b>Monthly Customer Invoices</b>										
3	First Name	Last Name	Provider	Destination	# of Guests	Price Per Person	Invoice Date	Invoice #	Subtotal	Tax	Total
4	Eric	Snow	Sunwind	Jamaica	2	\$ 899	8-Sep	#3982	\$1,798.00	\$ 143.84	\$1,941.84
5	Alison	Lobosco	Sunwind	Mexico	2	\$ 770	7-Sep	#3983	\$1,540.00	\$ 123.20	\$1,663.20
6	Lacy	Henrich	TrueBlue	Dominican Republic	4	\$ 1,200	1-Sep	#3984	\$4,800.00	\$ 384.00	\$5,184.00
7	Will	Johns	Eastjet	Cuba	3	\$ 950	9-Sep	#3985	\$2,850.00	\$ 228.00	\$3,078.00
8	Nicki	Hollinger	Sunwind	Mexico	1	\$ 875	8-Sep	#3986	\$ 875.00	\$ 70.00	\$ 945.00
9	Lennard	Williams	TrueBlue	Brazil	6	\$ 800	8-Sep	#3987	\$4,800.00	\$ 384.00	\$5,184.00
10	Kerri	Knechtel	TrueBlue	Columbia	4	\$ 560	5-Sep	#3988	\$2,240.00	\$ 179.20	\$2,419.20
11	Karynn	Alida	Sunwind	Bahamas	2	\$ 870	8-Sep	#3989	\$1,740.00	\$ 139.20	\$1,879.20
12	David	Monton	Eastjet	Dominican Republic	2	\$ 650	6-Sep	#3990	\$1,300.00	\$ 104.00	\$1,404.00
13	Amanda	Campbell	Sunwind	Jamaica	7	\$ 900	9-Sep	#3991	\$6,300.00	\$ 504.00	\$6,804.00

13. Save the workbook.

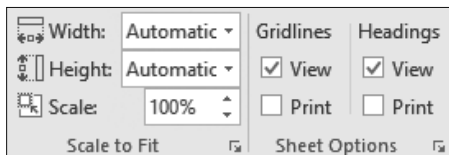
# Print a Worksheet

Now that the worksheet has all of the required information entered, you may want to print your data. Although printing is becoming less common in the digital age, occasionally you still need a paper copy. Printing a worksheet is simple, although sometimes adjustments need to be made so the cells, columns, and rows fit on a page nicely.

It is important to understand that printing in Excel prints the contents of the cells as displayed on the screen, not the formulas in the Formula Bar.

To adjust the way your worksheet prints, you can use the Scale to Fit feature. This will automatically resize your content to print the desired number of pages.

Excel will normally not print the gridlines around the cells or the row and column headings. However, if you wanted to print either Gridlines or Headings, you would simply check off these boxes in Sheet Options.



Because Excel can contain multiple worksheets, there are three options for printing. You can print the active worksheet, which is the default option, you can print the whole workbook, or you can print only the selected cells.






☰ File→Print→Settings



☰ Page Layout→Scale to Fit

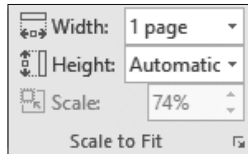
☰ Page Layout→Sheet Options

## DEVELOP YOUR SKILLS: E1-D10

*In this exercise, you will begin with some formatting adjustments to put the finishing touches on your worksheet, access the print preview, and prepare your worksheet to be printed.*

1. Save your worksheet as **E1-D10-Invoices**.
2. Select the **range K4:K13** (customer totals) and choose **Bold** .
3. Select the **range A3:K3** and choose **Home→Font→Border**  **menu button ▼→No Border**.
4. With the **range A3:K3** still selected, choose **Home→Font→Border**  **menu button ▼→Thick Outside Borders**.
5. In the top row select the **range A1:K1** and click **Home→Alignment→Merge & Center**  twice.
6. In row 2 select the **range A2:K2** and again click **Home→Alignment→Merge & Center**  twice.

7. Choose **File**→**Print** to access the Print Preview.
8. Click **Back**  to return to your worksheet.
9. Choose **Page Layout**→**Scale to Fit**→  Width: Automatic ▾ menu button ▼→**1 page**.



10. Select the **range A1:K8** (the titles, headings, and data for the first five customers) and then choose **File**→**Print** to access Print Preview again.
  11. Below Settings choose **Print Active Sheets**→**Print Selection**.
  12. Below Settings choose **Portrait Orientation**→**Landscape Orientation**.
  13. Save the workbook and close Excel.
-

# Self-Assessment

Check your knowledge of this chapter's key concepts and skills by completing the Self-Assessment. The answers to these questions can be found at the back of this book.

1. Excel is a quick and efficient program for tasks like creating sales reports, budgets, and invoices. True False
2. A group of cells is referred to as a range. True False
3. Column width can only be set manually, by dragging with the mouse. True False
4. Tapping **Enter** is the only way to complete a cell entry. True False
5. Cell alignment can be adjusted both vertically and horizontally. True False
6. BEDMAS stands for Brackets, Equations, Division, Multiplication, Addition, Subtraction. True False
7. A formula always begins with the = sign in the cell. True False
8. Cell references in a formula can be typed, using upper- or lowercase letters, or selected with the mouse. True False
9. When entering text in a cell, which feature suggests text for you as you type? True False
  - A. AutoFit
  - B. AutoComplete
  - C. AutoText
  - D. AutoFill
10. What does number formatting allow you to add or change?
  - A. The \$ sign
  - B. The % symbol
  - C. The number of decimals
  - D. The \$ sign, % symbol, and the number of decimals
11. Which feature is helpful if you have to enter a series of text, numbers, or dates?
  - A. AutoFit
  - B. AutoComplete
  - C. AutoText
  - D. AutoFill
12. What does Excel allow you to print?
  - A. The active worksheet
  - B. The entire workbook
  - C. Selected cells
  - D. The active worksheet, entire workbook, or selected cells



EXCEL 2016

# Recording Student Grades

In this chapter, you will use Excel to work with multiple worksheets created to record student grades. You will learn about managing and organizing worksheets to insert, delete, or even hide data and also make your data easier to find. You will also learn about using functions in your formulas and the difference between a relative and an absolute reference.

## LEARNING OBJECTIVES

- Rearrange data on a worksheet
- Manage multiple worksheets
- Use functions to perform calculations
- Use relative and absolute cell references in formulas

## CHAPTER TIMING

- Concepts/Develop Your Skills: 1 hr 45 mins
- Self-Assessment: 20 mins
- Total: 2 hrs 5 mins

## PROJECT: TRACKING PROGRESS

LearnFast College is a school that provides fast-paced learning programs for college students. As an instructor there, you need to keep track of your student grades for an Introduction to Business course. Excel will help you record marks and quickly calculate final grades for the course using a variety of formulas.

# Rearrange Data on a Worksheet

When using a worksheet there may be times when you need to do more than simply enter data row by row. You may need to insert more information in the middle of existing data, remove chunks of data already entered, or move cells or entire sections of data around. You can also sort your data to put it into a more usable arrangement.

## Insert and Delete Rows, Columns, and Cells


To add more data into your existing data, it might make sense to insert a new cell, column, or row. You can add one cell, row, or column at a time, or several at once. Columns are inserted to the left of your selected column and rows are inserted above your selected row. Inserting a cell or cells allows you to choose to shift the existing data either right or down.

☰ Home → Cells → Insert  | Right-click column/row heading → Insert


☰ Home → Cells → Delete  | Right-click column/row heading → Delete

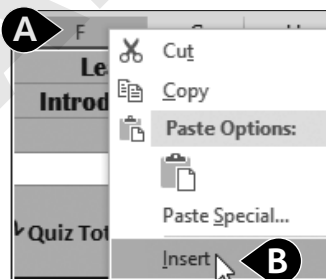
### DEVELOP YOUR SKILLS: E2-D1

In this exercise, you will insert and delete both rows and columns and insert cells to enter additional student data into the gradebook.


1. Start Excel, open **E2-D1-Grades** from your **Excel Chapter 2** folder, and save it as **E2-D1-NewGrades**.
2. Select the cell with *Pedro's* name, **cell A12**, and choose **Home** → **Cells** → **Insert**  **menu button** ▼ → **Insert Sheet Rows**.
3. Enter the following data for a new student in **row 12**:

First	Last	Student ID#	Quiz 1	Quiz 2	Quiz Total	Project 1	Project 2
Robert	Moreira	53846	96	88		90	95

4. Select the cell with *Todd's* name, **cell A15**, and then choose **Home** → **Cells** → **Delete**  **menu button** ▼ → **Delete Sheet Rows**.
5. Follow these steps to insert a new column between **columns E** and **F**:



- A Right-click the **column F** heading.
- B Choose **Insert** from the menu.

6. Select the cell with the *Quiz 2* heading, **cell E5**, and use the fill handle to drag one cell to the right, inserting the heading name **Quiz 3** into **cell F5**.
7. Select the cell with *Exam* heading, **cell K5**, and then choose **Home**→**Cells**→**Insert** →**Insert Cells**.
8. In the Insert dialog box, choose **Shift Cells Right** and then click **OK**.
9. With **cell K5** still selected, type **Participation** as the new heading and then complete the entry.
10. Save the workbook.


## Hide and Unhide Rows and Columns

Sometime you may want to save data in your worksheet but have the information in certain rows or columns hidden from view. For example, a retailer might use an item's cost in one column to calculate the sale price in another. The cost column can be hidden from view to prevent customers from seeing how much profit the retailer is making, but the information is still saved and can still be used in a formula. Hidden rows and columns will not print, and a hidden row or column can easily be made visible using Unhide.

Hidden rows and columns can be identified by the gap in the column or row headings, as shown in the figure below.


	A	C
1		
3		

Row 2 and column B are hidden.

☰ Home→Cells→Format →Hide & Unhide | Right-click column/row heading→Hide/Unhide



## Sort Data by Column

Excel can easily sort your data in either alphabetic or numeric order, using any column of data. For example, you might want to sort by name, date, item number, or dollar amount. A sort keeps any adjacent data with the row, so data such as the address or phone numbers stays with the name.

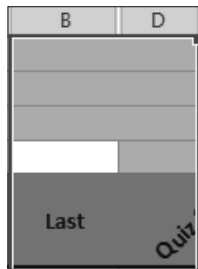
☰ Home→Editing→Sort & Filter 


### DEVELOP YOUR SKILLS: E2-D2

*In this exercise, you will hide and unhide a column and then sort the students by first name.*

1. Save your workbook as **E2-D2-NewGrades**.
2. Point to the column heading for **column C**, right-click, and choose **Hide**.
3. Select **cell A6** and then choose **Home**→**Editing**→**Sort & Filter** →**Sort A to Z** .

- Point to the **column B** heading, press and hold the left mouse button, and then drag to the right to select **columns B:D**.



- Choose **Home**→**Cells**→**Format** →**Hide & Unhide**→**Unhide Columns**.
- Save the workbook.

## Managing Multiple Worksheets

By default, an Excel workbook contains one worksheet. You can however add multiple worksheets to be saved in the same workbook. This can make it easier to access different worksheets that are related to the same topic. You can also organize a workbook by deleting worksheets you don't need anymore, renaming the worksheets and changing the color of the sheet tab, and moving worksheets.

### Insert and Delete Worksheets

Adding a new worksheet is as simple as clicking on the New Sheet button at the bottom of a workbook.



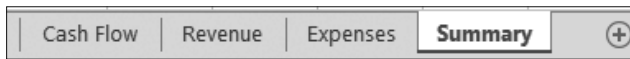
To delete a worksheet, you have to be more careful because, once deleted, you can't recover any of the data from the removed worksheet. Even the Undo button can't fix that problem. For safety, Excel does ask you to confirm the action to delete a worksheet, but only if the worksheet does in fact contain data. A good practice is to save your workbook before deleting a worksheet so there is still a recoverable version if you later change your mind.

-  **Home**→**Cells**→**Insert**  menu button ▼→**Insert Sheet** | Right-click sheet tab→**Insert Sheet**
-  **Home**→**Cells**→**Delete**  menu button ▼→**Delete Sheet** | Right-click sheet tab→**Delete**

### Rename Worksheets

The default names for your worksheets don't really help someone understand what data is on the worksheet or what it is being used for. When you start adding more and more worksheets, you need to quickly find the sheet with the information you need, so it becomes important to name your sheets.

Names should be short and describe the purpose of the worksheet as clearly as possible. Certain characters, such as ? and /, are restricted, so it is best to stick to text and numbers. To rename a sheet, simply double-click the sheet tab and type the new name.



Examples of good worksheet names that are short, simple, and descriptive





## DEVELOP YOUR SKILLS: E2-D3

In this exercise, you will insert a new sheet, delete a sheet, and rename a sheet.

1. Save your workbook as **E2 - D3 - NewGrades**.
2. Follow these steps to insert a new worksheet:



- A Click the **New Sheet** button.
  - B Notice that a new worksheet is inserted to the right of the active sheet, **New**. The default worksheet name is **Sheet** with a number, which continues to increase each time you add a new sheet.
  - C Click on the **old** worksheet tab to activate the sheet.
3. Choose **Home**→**Cells**→**Delete**  **menu button** ▼→**Delete Sheet** and click the **Delete** button or tap **Enter** when prompted in the dialog box.
4. Double-click the **Sheet1** tab that was just created, type **Participation**, and then tap **Enter**.
5. Change the name of the **New** worksheet to **Final Grades**.
6. Select the title in the merged **cell A2** and press **Ctrl** + **C** to copy the title *Introduction to Business*.
7. Click the **Participation** worksheet tab, ensure **cell A1** is the selected cell, and press **Ctrl** + **V** to paste the text.
8. Select **cell A2** below the class title, type **Participation Grades**, and then tap **Enter**.
9. Select **cell A1**, choose **Home**→**Clipboard**→**Format Painter** , and then click **cell A2** to apply the formatting from cell A1.
10. Save the workbook.

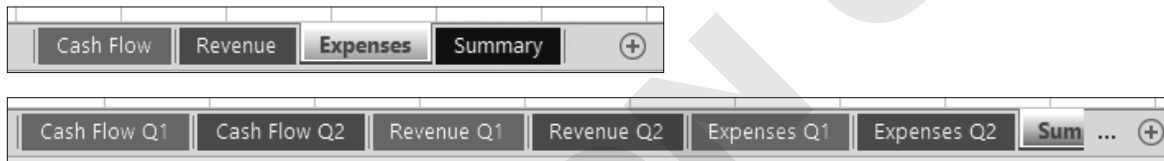
## Move a Worksheet

To organize your sheets better, you may want to rearrange the order of the sheets at the bottom of the workbook. Excel doesn't have a feature for sorting worksheets, but you can simply drag worksheet tabs left or right to rearrange the order. You can also rearrange or duplicate the sheets using the Move or Copy dialog box.

☰ Home → Cells → Format → Move or Copy Sheet | Right click worksheet tab → Move or Copy Sheet

## Change the Worksheet Tab Color

Finding the right worksheet can also be a lot quicker if you use a system of colors for different worksheets. Colors could be assigned based on department, function, importance, or any method you choose. Adding a color to a worksheet tab is available from the Ribbon or by right-clicking the tab.



These are some examples of using Tab Colors to organize worksheets; notice the selected worksheet appears only lightly shaded.

☰ Home → Cells → Format → Tab Color | Right-click worksheet tab → Tab Color

## Hide a Worksheet

Similar to hiding rows and columns, you may want to save a worksheet's information but have it hidden from view. Hiding a worksheet can also help organize your workbook if you have a lot of tabs or if the end-user will use only some of the worksheets. In this case, hiding the unused worksheets makes it a more user-friendly workbook. Once hidden, it is easy enough to unhide a worksheet when you need to use it again.

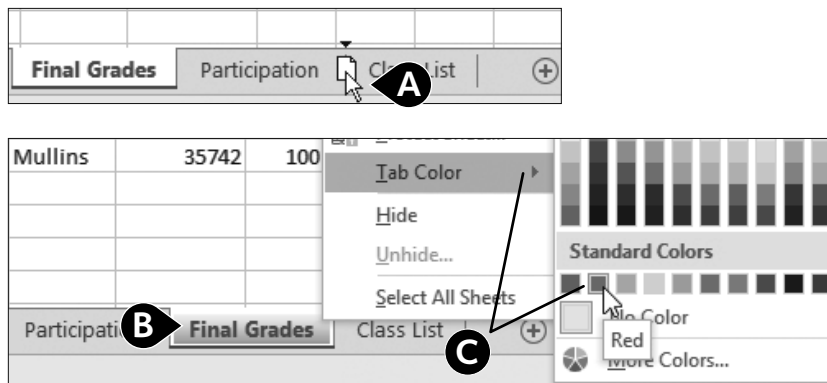
☰ Home → Cells → Format → Hide & Unhide | Right-click worksheet tab → Hide/Unhide

### DEVELOP YOUR SKILLS: E2-D4

*In this exercise, you will reorganize and color the worksheet tabs.*

1. Save your workbook as **E2-D4-NewGrades**.

2. Follow these steps to move the Final Grades worksheet and add a tab color:



- A** Drag the **Final Grades** sheet to the right side past the **Participation** sheet as shown here.
  - B** Right-click the **Final Grades** sheet.
  - C** Choose **Tab Color**→**Standard Color Red**.
3. Change the color of the **Participation** sheet tab to **Standard Color Blue**.
  4. Right-click the **Class List** worksheet tab and choose **Hide**.
  5. Save the workbook.

## Create a Cell Reference to Another Worksheet

When using multiple worksheets, you can use common information across different sheets. Excel allows you to link cells from different worksheets in the same workbook or in other workbooks. Linking places values from a source worksheet into a destination worksheet. For example, you may want to have a revenue worksheet and a profit worksheet; the profit worksheet can use the values from the revenue worksheet. If the revenue worksheet values ever change, the profit worksheet values will update automatically.

Referencing another worksheet requires the actual cell reference as well as the worksheet name and an exclamation point as shown below. Cell references to other workbooks require the workbook name, sheet name, and cell reference. Cell references to other worksheets or workbooks can be used to simply link the data or can be used in a formula.

A3 is the cell reference on the Revenue worksheet.

=Revenue!A3

Revenue is the name of the worksheet in the current workbook, followed by an exclamation point.

In this example, the Revenue worksheet is in a different workbook, and the name of the workbook, 2015Financial.xlsx, is placed inside square brackets.

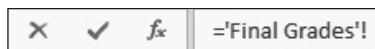
=[2015Financial.xlsx]Revenue!A3

It is possible to manually type a cell reference to another worksheet or workbook; however, it is simpler and much more accurate to use the point-and-click method. If you point and click, Excel inserts all of the necessary formatting, such as brackets and exclamation points.

## DEVELOP YOUR SKILLS: E2-D5

In this exercise, you will use linking formulas to add student names to a worksheet.

1. Save your workbook as **E2 -D5 -NewGrades**.
2. Activate the **Participation** worksheet by clicking its tab and then select **cell A4**.
3. Enter the heading **First** in **cell A4**, tap **[Tab]**, enter the heading **Last** in **cell B4**, and tap **[Enter]**.
4. In **cell A5** type **=** and then click the **Final Grades** worksheet tab.



5. Select **cell A6** and then click **Enter**  on the Formula Bar.
6. With **cell A5** still selected, use the fill handle to drag one cell to the right, inserting the last name for Ashley into **cell B5**.
7. With the **range A5:B5** selected (the cells with Ashley's first and last names), drag the fill handle down to **row 16**.
8. Go to the **Final Grades** sheet and select *Felicia's* first name in **cell A10**.
9. Edit the name by changing the second *e* to an **i** and then complete the entry.
10. Go back to the **Participation** worksheet and notice Felicia's name has now been updated in **cell A9**.

4	First	Last
5	Ashley	Ronayne
6	Atif	Khalil
7	Austin	Farrell
8	Crystal	Robinson
9	Felicia	Murray
10	Jessica	McInnis

11. Save the workbook.

## Create a Copy of a Worksheet

Rather than starting with a new blank worksheet, you can save a lot of time by using an existing worksheet that already has some of the information you need or has the structure and formatting you want. Creating a copy of a worksheet does not affect the original worksheet. The new worksheet will have the same name but with (2) added to the end to indicate it is a second version.

☰ Home → Cells → Format → Move or Copy Sheet | Right-click worksheet tab → Move or Copy Sheet



## Edit Multiple Sheets at One Time

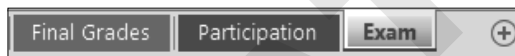
It is also possible to select several worksheets at the same time. While multiple sheets are selected you can modify all of the selected sheets by making changes to one of them. You can enter text or formulas or change cell format in the same cell in all of the selected sheets simultaneously. You need to be very careful with this feature, however, to ensure you are not replacing existing data in one of the worksheets you can't see!

Multiple sheets can be selected (or grouped) by holding the **[Ctrl]** key while clicking additional sheet tabs. To deselect (or ungroup) the multiple worksheets, either select a different sheet or right-click one of the sheet tabs and choose Ungroup Sheets.

### DEVELOP YOUR SKILLS: E2-D6

*In this exercise, you will create a new worksheet by copying the Participation sheet and make changes to both at once.*

1. Save your workbook as **E2 -D6 -NewGrades**.
2. Right-click the **Participation** worksheet tab and choose **Move or Copy**.
3. Click the checkbox to select **Create a Copy**. Under Before Sheet choose **Move to End** and **OK**.
4. Right-click the **Participation** sheet tab again and choose **Move or Copy**.
5. This time *do not* click the Create a Copy box. Under Before Sheet choose **Participation (2)** and **OK**.
6. Double-click the **Participation (2)** sheet tab, rename it **Exam**, and then tap **[Enter]**.



7. Select the merged **cell A2** and double-click the word *Participation* in the Formula Bar.
8. Type **Exam** and complete the entry, so the subtitle in **cell A2** now reads *Exam Grades*.
9. With the *Exam* worksheet still active, press and hold the **[Ctrl]** key and click the **Participation** worksheet tab.

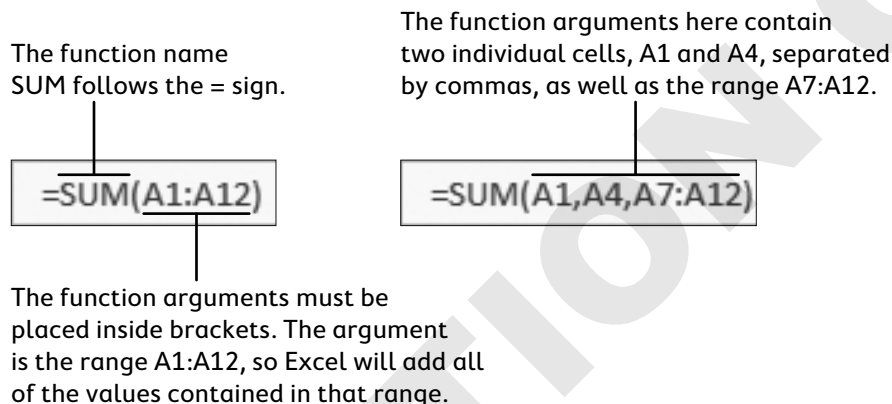


10. With both sheets selected and the *Exam* worksheet still active, select the **range A4:B4**.
11. Apply **Bold** format, increase the Font Size to **12**, and apply **Center** alignment.
12. Add a **Thick Bottom Border** and Fill Color **Green, Accent 6, Lighter 40%** (last column, fourth row).
13. Click the **Participation** worksheet tab to confirm your changes were made to both sheets and then click the **Final Grades** worksheet tab to deselect the other two sheets.
14. Save the workbook.

# Using Functions in Formulas

Functions are an important part of Excel. Functions allow you to do much more than simple mathematical operations. For example, adding two or three cells would not be a problem; however, if you needed to add hundreds or even thousands of cells, it would be quite the tedious task to use a formula such as  $=A1+A2+A3+A4\dots$  and so on. The Sum Function allows you to specify a range instead of individual cells, and then the function tells Excel what operation to perform on the range, in this case addition.

Functions can be typed directly into the cell or inserted in a number of ways. Functions are available from the Formulas tab, by using AutoSum, or by using Insert Function. The most common functions are available in the AutoSum drop-down menu. Formulas with functions are typically made up of the function name and one or more arguments. An argument is the name for the numbers, cells, or ranges that are used in the function.



## Use the AutoSum Feature


The AutoSum feature not only makes it easy to find some of the simplest functions, but it also helps identify and enter the range of cells you are most likely to use in your function. Often when you have a column of numbers, you want to add a total at the bottom of the column. In a row, the total would be placed on the right side of the row.

AutoSum will automatically search for adjacent data, either directly above or to the left of the selected cell. Therefore, selecting the cell at the bottom of a column or the right side of a row and clicking AutoSum will very quickly enter the SUM function, which will add all of the numbers in that column or row. If necessary, you can alter the range that Excel has selected by dragging to select the desired cells before completing the entry. Another option is to select the data in the row or column first and then click AutoSum.

## Sum, Average, Count, Max, and Min

The Sum function is just one of the AutoSum options; other frequently used functions can also be found via the AutoSum drop-down menu. These functions will take a set of numbers identified in the arguments and find the average, locate the highest or lowest value, or simply count how many numbers are in the set. Similar to AutoSum, these functions will automatically search for adjacent data, either directly above or to the left of the selected cell.

AUTOSUM FUNCTIONS	
Function Name	Description
SUM	Adds the values in the cells
AVERAGE	Calculates the average of the values in the cells
COUNT	Counts the number of cells that contain numerical values; cells containing text and blank cells are ignored
MAX	Returns the highest value
MIN	Returns the lowest value

☰ Home→Editing→AutoSum  menu button ▼

## Use Insert Function


For more complex functions, the Insert Function button opens up a dialog box that allows you to explore options and enter arguments. In the Insert Function dialog box, you can search by keyword or browse by category. After choosing the function, the Function Arguments dialog box opens, which allows you to enter the numbers, cell references, or criteria to use in the function.




View the video “Entering a Formula Using the Insert Function.”

## DEVELOP YOUR SKILLS: E2-D7

In this exercise, you will insert functions to calculate the total each student earned on projects and quizzes and the average grade in the class.


1. Save your workbook as **E2 -D7 -NewGrades**.
2. On the **Final Grades** worksheet, select the empty cell under *Project Total* for the first student, **cell J6**.
3. Choose **Home→Editing→AutoSum** .

Project 1	Project 2	Project Total	Participation
96	93	=SUM(H6:I6)	
83	88	SUM(number1, [number2], ...)	

4. Click **Enter**  to finish the entry, and the result of the formula displayed in **cell J6** is 189.
5. Use the fill handle to copy the formula in **cell J6** down the column for the rest of the students.

6. Follow these steps to enter the SUM function for the three quizzes:

Student ID#	Quiz 1	Quiz 2	Quiz 3	Quiz Total	Project 1	Project 2
53844	91	81		=SUM(C6:F6)	96	
45894	90	99		SUM(number1, [number2], ...)		

- A** Select **cell G6** under the heading Quiz Total and choose **Home**→**Editing**→**AutoSum** .
- B** Move the mouse pointer over the sizing handle in the bottom-left corner of **cell C6** to display the resize pointer.
- C** Drag the handle right to the bottom left of **cell D6**, ensure the formula displays `=SUM(D6:F6)`, and click **Enter** on the Formula Bar.
7. Use the fill handle in **cell G6** to copy the formula down the column for the rest of the students.
8. Follow these steps to remove the error:

!	172	96	9
---	-----	----	---

Formula Omits Adjacent Cells


Update Formula to Include Cells

Help on this error

Ignore Error **B**

Edit in Formula Bar

Error Checking Options...

- A** Point to the yellow warning sign with the exclamation point and click the **menu** button ▼ that appears.
- B** Choose **Ignore Error** from the list.
9. Select the **range B18:C18** below the last student and choose **Home**→**Alignment**→**Merge & Center**.
10. In the merged cell enter the text **Class Average** and tap **Tab**.
11. In **cell D18** choose **Home**→**Editing**→**AutoSum**  **menu button** ▼→**Average**.
12. Complete the entry in **cell D18** and then use the fill handle to copy the average formula from **cell D18** to the right into **cell E18**.
13. Select the **range B18:E18** (the averages and the row heading) and apply **Bold** format.
14. The class average functions should now look like this.

<b>Class Average</b>	<b>88.917</b>	<b>87.583</b>
----------------------	---------------	---------------

15. Save the workbook and close Excel.

# Understanding Relative and Absolute Cell References

Cell references make it easier to copy formulas when you want to reuse the same formula structure. A relative cell reference is one in which the location of the cell remains relative to the cell that contains the formula. For example, if the formula `=A3-B3` is in cell C3, the relative position of A3 is two cells to the left of C3, and B3 is one cell to the left of C3.

When you copy the formula to another cell, the cell references will change to be in the same position relatively. So if you copy the formula down to the next row in cell C4, the new formula is `=A4-B4`. Excel updates the new cell references so they are in the same relative position in regards to cell C4; that is, two cells to the left and one cell to the left.

	A	B	C
3	64	21	43
4	68	32	

The original formula is seen in the Formula Bar, with relative references to both cells A3 and B3.

	A	B	C
3	64	21	43
4	68	32	36

The copied formula is displayed with the new cell references A4 and B4.



View the Video “Using Relative and Absolute Cell References.”

## Absolute Cell References

In some situations, you do *not* want the cell reference to change when you move or copy the formula. To ensure the cell reference does not change, you can use an absolute cell reference. You can think of an absolute cell reference as being “locked in place”; that is, the cell reference will not change when copied. To make a cell reference absolute, you take a relative cell reference such as A1 and add a dollar sign in front of the column and row component of the cell reference so it looks like this: `$A$1`. If the formula `=$A$3-B3` is entered in cell C3 and then copied to cell C4, the formula in cell C4 would then be `=$A$3-B4`. `$A$3` is an absolute reference, so it does not change, and B3 is a relative reference, so it changes to B4.

To create an absolute cell reference, you simply type the cell reference and include the dollar signs in front of the column and row references. Alternatively, you can click to select the cell you want to use in the reference and then tap the `F4` key on the keyboard, which will insert both dollar signs into the cell reference.

	A	B	C
3	100	25	75
4		35	

The original formula is seen in the Formula Bar and contains an absolute reference to cell `$A$3`.

	A	B	C
3	100	25	75
4		35	65

After the formula is copied, the absolute reference `$A$3` does not change.

## Mixed Cell References

You can also mix relative and absolute references. For example, \$A3 is a reference to cell A3 where the column reference is absolute (the column will not change when copied) and the row reference is relative (it will change when copied). This can be useful when copying a formula both across a row and down a column.

After you have tapped the **[F4]** key once, tapping it a second time will make the absolute reference a mixed reference with only a \$ sign in front of the row reference. A third tap of **[F4]** places the \$ in front of only the column reference, and a fourth tap removes all \$ signs so it is again a relative reference.

## Display and Print Formulas


To see a formula you have entered, you must select the cell first, and then the Formula Bar displays the formula while the result of the formula is displayed in the worksheet. This means that to check your formulas, you would have to click each cell and check them one at a time. However, when you have many cells with formulas, this would be very hard to do. An easier way is to display all formulas at once. When you choose to display formulas, Excel automatically widens columns to show more of the cell contents. You can also edit the formulas or print the worksheet while the formulas are displayed.

✕ ✓ f <sub>x</sub> =C1+D1		
C	D	E
650	220	870

Normally the cell must be selected for you to see the formula.

✕ ✓ f <sub>x</sub>		
C	D	E
650	220	=C1+D1

After clicking Show Formulas, the formula displays in the worksheet without you selecting the cell.

☰ Formulas → Formula Auditing → Show Formulas 

### DEVELOP YOUR SKILLS: E2-D8

*In this exercise, you will use formulas with absolute references to find the percentage grade each student scored on the exam.*

1. Open **E2-D8-NewGrades** from your **Excel Chapter 2** folder and save it as **E2-D8-NewGradesRevised**.
2. Ensure you are on the **Exam** worksheet and insert a formula in **cell H5** that will add up the five different sections of the exam. (Hint: Use AutoSum.)
3. Copy the formula in **cell H5** down the column for the rest of the students.

- Go to the **Final Grades** worksheet and select **cell L6**.
- Type **=** and click the **Exam** worksheet tab, select **cell H5**, and complete the entry.
- Copy the formula in **cell L6** down the column for the other students.

Total /150	Exam
123	123
120	120
125	125

Total column on the Exam worksheet.

Exam grades on the Final Grades sheet

- Select **cell L6** and choose **Home**→**Cells**→**Insert**→**Insert Sheet Rows**.
- Select the **range A6:M6** and apply the **Thick Bottom Border**.
- In **cell C6** enter **Out Of** for the row heading.
- In **cell G6** enter **300**, in **cell J6** enter **200**, and in **cell L6** enter **150**.
- Select **cell M5** and choose **Home**→**Cells**→**Insert**→**Insert Sheet Column**.
- In **cell M5** enter **Exam %** for the column heading.

Student ID#	Quiz 1	Quiz 2	Quiz 3	Quiz Total	Project 1	Project 2	Project Total	Participation	Exam	Exam %	Final Grade
Out Of				300			200		150		

- Follow these steps to enter a formula with an absolute cell reference:

L	M
Exam	Exam %
150	
123 =L7/L6	
120	

L	M
Exam	Exam %
150	
123 =L7/\$L\$6	
120	

- In **cell M7** enter the formula **=L7/L6** but *do not* complete the entry yet.
- While still editing the formula, tap the **[F4]** key on the keyboard, which will make the reference for **cell L6** *absolute* (the \$ signs in front of the column and row), and then complete the entry.
- Apply the **Percent Style** **%** number format to **cell M7** and copy the formula down the column for the other students.
- Select **cell M8** to ensure the formula copied correctly; the formula should be **=L8/\$L\$6** with the result being **80%** for Atif.
- Select **cell H5**, insert a new column, and then enter **Quiz %** as the column heading.

17. Select **cell L5**, insert a column, and enter **Project %** as the column heading.
18. Enter two formulas: In **cell H7** the formula to calculate Quiz percentage is **=G7/\$G\$6**, and in **cell L7** the formula for Project percentage is **=K7/\$K\$6**.
19. Use the **Format Painter** to copy the format from the Exam % column to the two formulas you just entered and then copy the formula down both columns.

LearnFast College															
Introduction to Business															
Sep-16															
First	Last	Student ID#	Quiz 1	Quiz 2	Quiz 3	Quiz Total	Quiz %	Project 1	Project 2	Project Total	Project %	Participation	Exam	Exam %	Final Grade
Out Of			300				200			150					
Ashley	Ronayne	53844	91	81		172	57%	96	93	189	95%		123	82%	
Atif	Khalil	45894	100	99		199	66%	83	88	171	86%		120	80%	
Austin	Farrell	50572	81	85		166	55%	94	89	183	92%		125	83%	
Crystal	Robinson	47088	92	81		173	58%	80	95	175	88%		132	88%	
Felicia	Murray	45003	88	87		175	58%	87	82	169	85%		130	87%	
Jessica	Mcinnis	45537	85	93		178	59%	81	99	180	90%		116	77%	
John	Aikens	51028	93	82		175	58%	94	100	194	97%		116	77%	
Linda	Jefferies	39695	80	95		175	58%	91	88	179	90%		133	89%	
Pamela	Clark	46389	65	83		148	49%	62	90	152	76%		132	88%	
Pedro	Espinosa	37059	96	94		190	63%	86	96	182	91%		130	87%	
Robert	Moreira	53846	96	88		184	61%	90	95	185	93%		130	87%	
Sarah	Mullins	35742	100	83		183	61%	85	89	174	87%		120	80%	
Class Average			88.917	87.583											

20. Save the workbook and close Excel.



# Self-Assessment

Check your knowledge of this chapter's key concepts and skills by completing the Self-Assessment. The answers to these questions can be found at the back of this book.

1. To insert a new column between Last and Student ID#, you would select column B. True False

A	B	C
First	Last	Student ID#

2. If you hide rows 3:5 in your worksheet, row 4 will not print. True False
3. To rename a worksheet, you can double-click the sheet tab and type the new name without pressing **Delete** or **Backspace**. True False
4. While multiple sheets are selected, you can modify all of the selected sheets by making changes to one of them. True False
5. Functions can be entered only by typing them directly into a cell. True False
6. Selecting a blank cell at the bottom of a column and clicking AutoSum will enter the SUM function, which will add all of the numbers in that column. True False
7. The **F5** key can be used to edit a cell reference to be a relative reference, an absolute reference, or a mixed reference. True False
8. If you don't unhide a hidden worksheet before you close a file, the worksheet is deleted from the workbook. True False
9. After sorting the Quiz 1 grades in column D from highest to lowest, what would be the correct order of the students? True False

	A	B	D
5	First	Last	Quiz 1
6	Sarah	Mullins	100
7	Crystal	Robinson	92
8	Austin	Farrell	81
9	John	Aikens	93
10	Jessica	McInnis	85

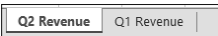
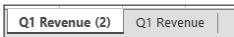
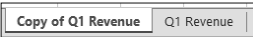

- A. Sarah, Crystal, Austin, John, Jessica  
 B. Jessica, John, Sarah, Austin, Crystal  
 C. Sarah, John, Jessica, Austin, Crystal  
 D. Sarah, John, Crystal, Jessica, Austin

(continued)

10. What cell reference should you enter if you want to create a formula that refers to cell A3 on the Expenses worksheet?

- A. Expenses!A3
- B. Exp!A3
- C. ExpensesA3
- D. Expenses!A3!

11. Which of the following images displays the correct sheet tabs after you have copied the Q1 Revenue sheet?

- A. 
- B. 
- C. 
- D. 

12. What would be the result of the formula in cell A4 below?

	A
1	5
2	5
3	5
4	=SUM(A1,A3)

- A. 5
- B. 10
- C. 15
- D. 20

13. Which formula will appear in cell E6 if the formula in cell E5 is copied to cell E6?

E5		fx				=SUM(B5:D5)*\$C\$1
	A	B	C	D	E	
1	Commission Rate		10%			
2						
3	Monthly Sales					
4	Sales Rep	January	February	March	Total Commission	
5	Brian Simpson	5,000	20,000	19,000	4,400	
6	Jessica Brown	7,800	2,300	32,000		
7	Barry Seymour	2,500	15,000	45,000		

- A. =SUM(B5:D5)\*\$C\$1
- B. =SUM(B5:D5)\*C1
- C. =SUM(B6:D6)\*\$C\$1
- D. =SUM(B6:D6)\*\$D\$6

(continued)

14. Which of the following best describes what would occur in cell E5 if the rate in cell C1 were changed to 15%?

E5					=SUM(B5:D5)*\$C\$1
	A	B	C	D	E
1	Commission Rate		10%		
2					
3	Monthly Sales				
4	Sales Rep	January	February	March	Total Commission
5	Brian Simpson	5,000	20,000	19,000	4,400
6	Jessica Brown	7,800	2,300	32,000	
7	Barry Seymour	2,500	15,000	45,000	

- A. The rate in cell C1 cannot be changed because it is a percentage.
- B. The formula result in cell E5 would remain the same because the formula uses an absolute cell reference to cell C1.
- C. The formula in cell E5 would need to be reentered before the new commission percentage could be calculated.
- D. The result would be updated to reflect the new commission percentage of 15%.
15. Which of the following CANNOT be done when multiple worksheets are grouped?
- A. Enter a date on a sheet without affecting the others in the group.
- B. Edit text on all sheets by changing it on one sheet.
- C. Enter and format cells on one sheet to affect all grouped sheets.
- D. Create a formula for all grouped sheets.

EVALUATION ONLY

**EXCEL 2016**

# Data Visualization and Images

In this chapter, you will learn a variety of ways to create visually interesting worksheets. This chapter will help you understand when to create charts, which chart types to use, and how they are useful in understanding relationships between numbers in a worksheet.

## LEARNING OBJECTIVES

- Insert charts
- Use chart tools to modify charts
- Move and size charts
- Edit chart data

## CHAPTER TIMING

- Concepts/Develop Your Skills: 1 hr
- Self-Assessment: 20 mins
- Total: 1 hr 20 mins

## PROJECT: REPORTING COMPANY SALES DATA

Airspace Travel has put together a report of sales figures for the year and has asked you to help create some charts. You have to decide what data to use to create the charts and the chart types that will best help the company understand how it is performing. You want to show sales comparisons month by month, illustrate the contributions of each travel agent to compare them side by side, and highlight the top and bottom performers throughout the year.

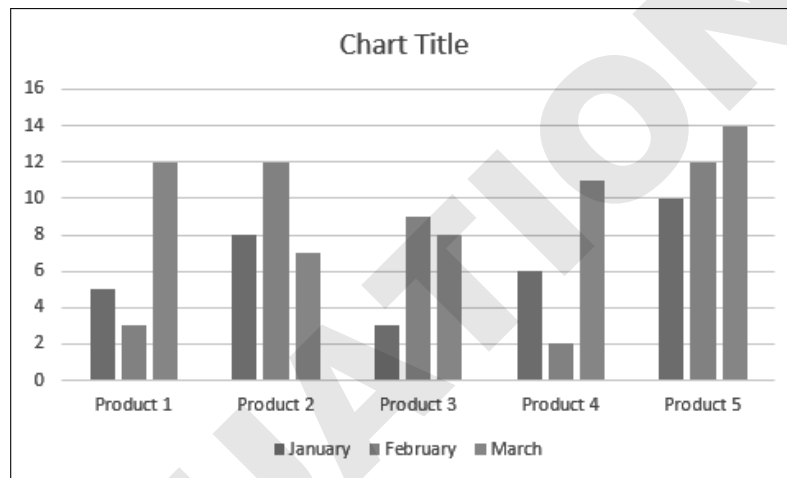
# Create Charts to Compare Data

There are many situations in which we are presented with numerical data, and it would be easier to interpret the data if we could visualize it in chart form. Charts are created from worksheet data, and similar to a formula the data is linked so that if the data changes, the chart changes as well. Creating a chart is as easy as selecting the data and chart type, and Excel does the rest. After the chart is created, you can add or modify chart elements to change the way your chart looks.

## Choosing a Chart Type

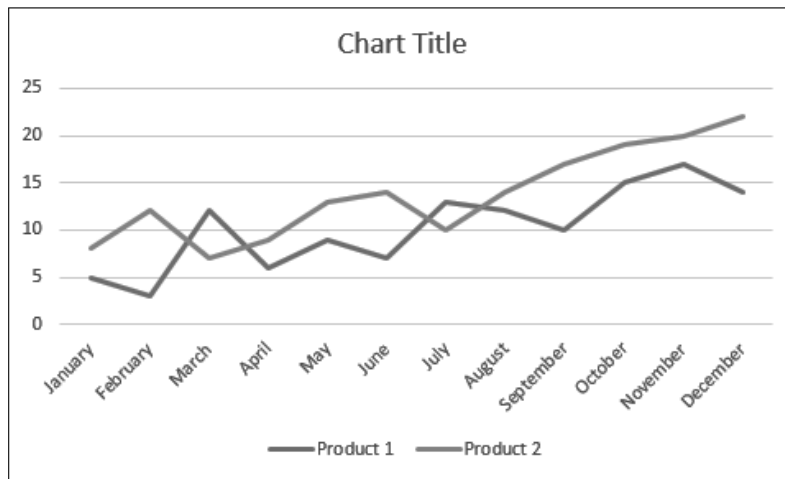
Excel has more than a dozen different types of charts to choose from, with variations of each chart type as well. However, it is important to remember that the purpose of a chart is to simplify data and not make it more complicated. The most common options to use are a column or bar chart, a line chart, or a pie chart.

### Column Chart and Bar Chart



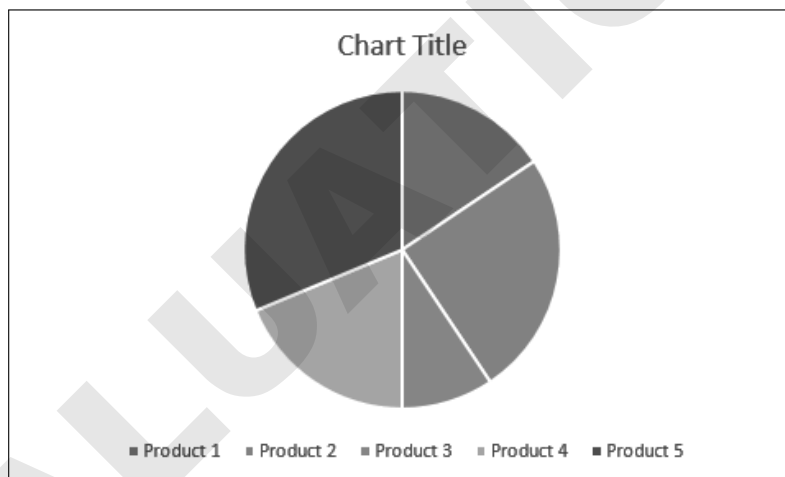
A column chart displays data in columns across the horizontal axis. A bar chart displays data in bars across the vertical axis, so they are basically the same chart, simply vertical up and down or horizontal left to right. Column charts are useful to compare data across several categories.

## Line Chart



A line chart displays your series of data in a line or several lines and is useful for showing trends in data over time, such as days, months, or years. Line charts are best for a large amount of data and when the order of data, for example chronological, is important. Line charts are very similar to column charts and have most of the same features.

## Pie Chart



A pie chart shows a comparison of your data as parts of the whole. Pie charts are best for a small amount of data; too many pieces will be hard to see in a pie chart. Pie charts can contain only one series of data, and they do not have a horizontal or vertical axis like column charts and line charts.

Excel also has a Recommended Charts option that will list the top chart options for you based on the data you have selected. The Insert Chart window shows a preview of what your chart will look like before you decide which one to use.

☰ Insert→Charts

☰ Insert→Charts→Recommended Charts

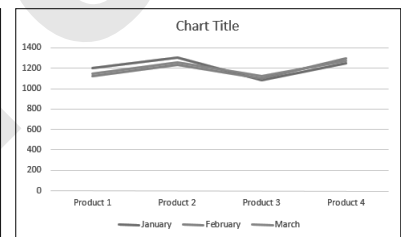
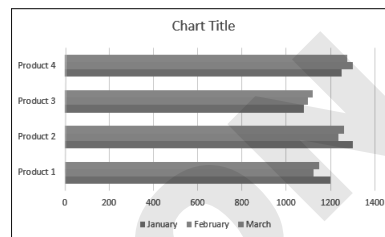
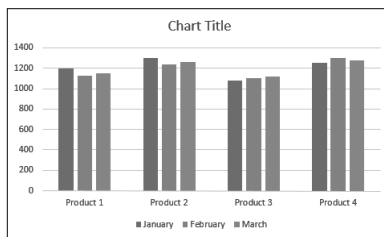
## Selecting Chart Data

Choosing the right data is very important to make sure Excel can create the chart correctly. The best method is to always select the data and include the appropriate row and column headings.

To create a column, bar, or line chart, the data selection is the same.

Q1 Revenue			
	January	February	March
Product 1	1200	1123	1150
Product 2	1301	1235	1260
Product 3	1080	1100	1120
Product 4	1250	1300	1275

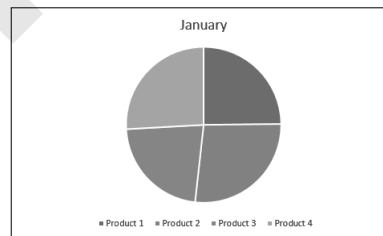
The data, including row and column headings, is selected to create your chart; notice the blank cell in the top-left corner is also included.



These three charts result from the same selection of data.

To create a pie chart, you can only select one data series.

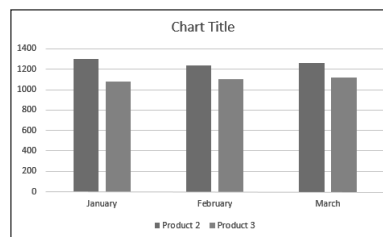
Q1 Revenue			
	January	February	March
Product 1	1200	1123	1150
Product 2	1301	1235	1260
Product 3	1080	1100	1120
Product 4	1250	1300	1275



Only the January data series is selected to create the pie chart.

If you want to create charts showing only some of the data, use the **Ctrl** key to select the desired data.

Q1 Revenue			
	January	February	March
Product 1	1200	1123	1150
Product 2	1301	1235	1260
Product 3	1080	1100	1120
Product 4	1250	1300	1275



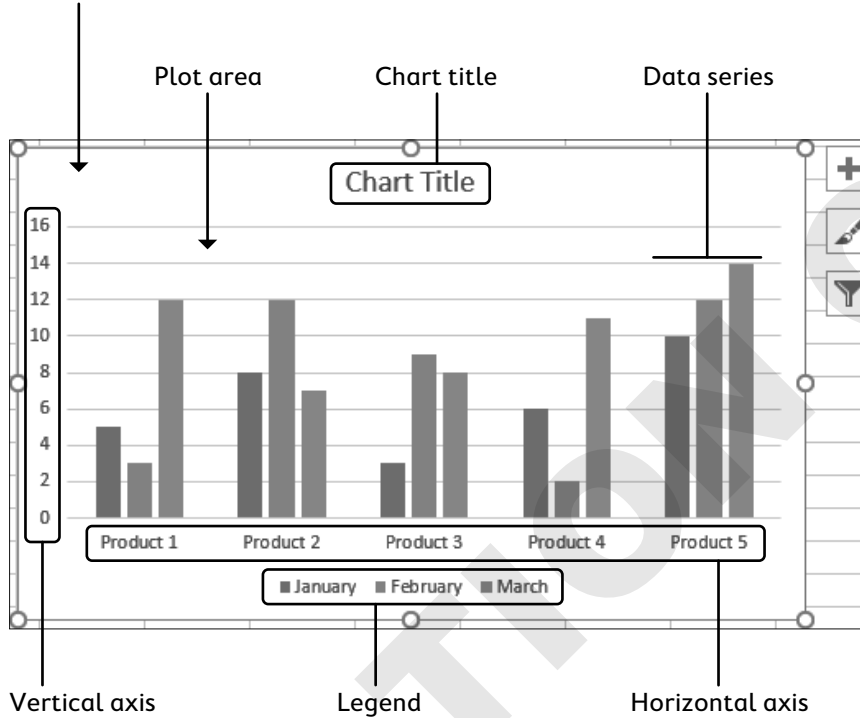
For a column, bar, or line chart showing only Products 2 and 3, you would select the three rows of data as shown, again including the blank cell.



## Chart Elements

A chart is made up of different elements that can be added, removed, or modified. These elements can help others understand the information on the chart or accentuate certain aspects of the data. There is a wide range of options for changing the look and style of your chart with each of the chart elements.

Chart area (the whole chart window, where the chart elements are located)



### DEVELOP YOUR SKILLS: E3-D1

*In this exercise, you will select data and use it to create a chart.*

1. Start Excel, open **E3-D1-Sales** from the **Excel Chapter 3** folder, and save it as **E3-D1-SalesCharts**.

2. Follow these steps to insert a column chart:

Agent	JAN	FEB	MAR	APR	MA
Adam Landry	13,629	14,841	19,611	19,737	15,208
Debra Cutler	13,904	17,040	12,207	9,044	18,237
Elizabeth Betts	11,907	12,685	23,329	15,208	20,287
Hope Mooney	12,083	14,490	22,446	12,670	16,237
Tim McKay	23,272	20,287	12,161	21,237	16,237

- Ⓐ Select the **range A3:D8** to compare the results for all agents for the first three months of the year.
- Ⓑ Choose **Recommended Charts** from the Ribbon.
- Ⓒ Excel recommends a clustered column chart. Click **OK** to accept and insert the chart.

3. Save the workbook.

## Working with Chart Tools

There are countless ways of formatting a chart; your chart can be as simple or as creative as you like. The way you format it will likely depend on your purpose and how much time you want to spend working on it. The Chart Tools are contextual tabs, meaning they are only available while a chart is selected. You can also use the Format pane on the right side of the screen to format chart elements, and the formatting options change for each chart element.

☰ Chart Tools → Format → Current Selection → Format Selection | Right-click → Format (Selection)

### Chart Design Tools

You can use Design Tools to quickly and easily change the way your chart looks, using features like Chart Styles and Layouts. Styles modify the colors, shading, and layout of the various chart elements in one easy step. To change the appearance of a chart, there are many other design options, including changing the chart type, changing colors, or adding and removing the various chart elements.

View the Video "Using the Chart Design Tools."

### Using the Chart Formatting Buttons

The chart formatting buttons can add elements to your chart, change the style, or filter the data visible on the chart.

One of the great new features of Excel charts is the ability to filter your data without changing the data selection or creating a new chart. You can simply filter the data to focus on the sets of data you want to compare and then add or remove the other series or categories as desired.

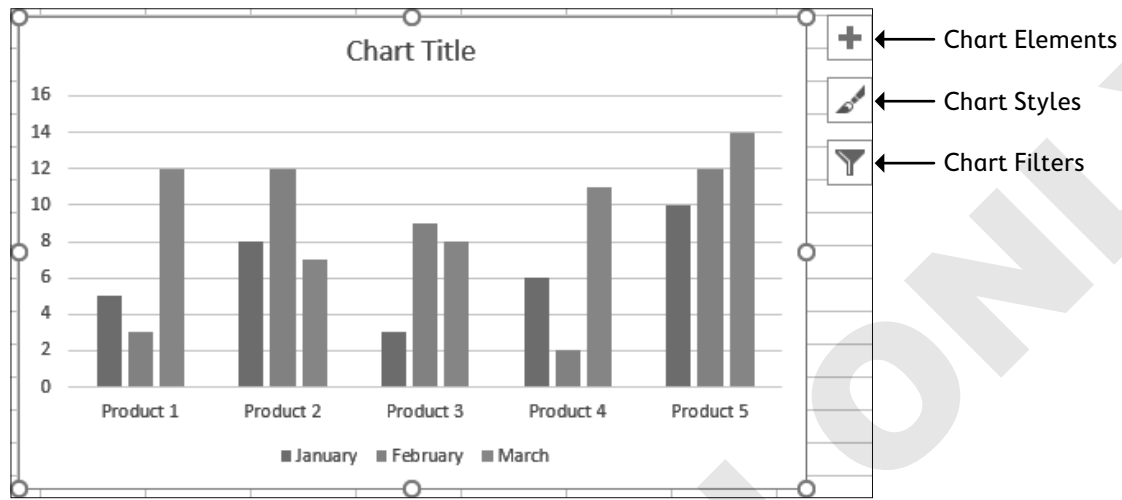
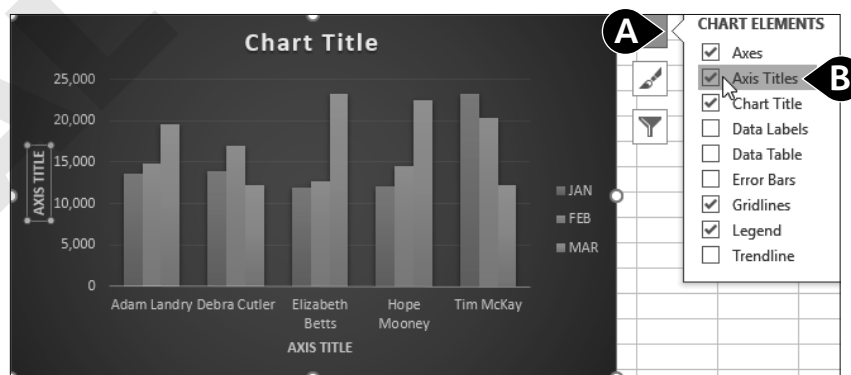


Chart Tools → Design

## DEVELOP YOUR SKILLS: E3-D2

In this exercise, you will adjust the appearance of your chart using the style, layout, and other chart design tools.

1. Save your workbook as **E3-D2-SalesCharts**.
2. If necessary, click anywhere on the column chart to select it, which displays the Chart Tools on the Ribbon.
3. Choose **Chart Tools** → **Design** → **Chart Styles** → **Style 8** to apply the new style.
4. Choose **Chart Tools** → **Design** → **Chart Layouts** → **Quick Layout** → **Layout 1** to apply the layout, which moves the Legend to the right side of the chart.
5. Follow these steps to add axis titles to your chart:



- A Click on the **Chart Elements** button.
- B Click to check the box beside **Axis Titles**.

6. Point to the **Vertical Axis Title** you just added and triple-click to select the entire text.
7. Type **Monthly Sales** for the axis title.
8. Select the **Horizontal Axis Title** and replace the text with **Agent** for the title.
9. Replace the **Chart Title** with the title **Airspace Q1 Sales**.
10. Follow these steps to change the chart type:



- A Select **Change Chart Type** from the Ribbon to open the dialog box.
- B Go to **Recommended Charts**.
- C Choose the second option, **Stacked Column**, and then click **OK**.

11. Save the workbook.

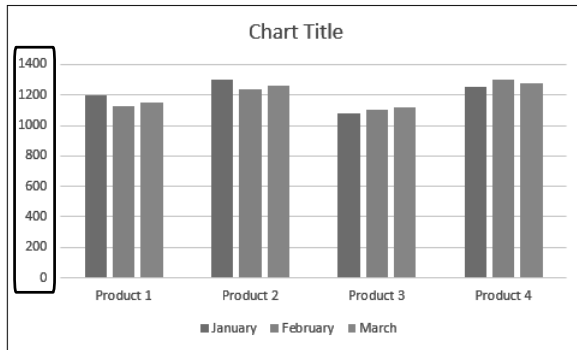
## Chart Format Tools

Beyond changing the basic style of a chart you may want to choose your own colors for the chart area, plot area, or data series. This can be done by modifying the Fill or Outline of a specific chart element. The Fill could be a color, gradient, texture, or even a picture. Other possibilities include adding shapes or WordArt to a chart.

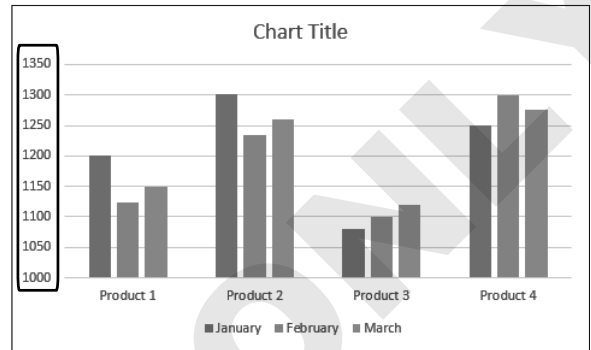
## Axis Options

You may want to adjust your axes to focus your data on significant differences or to simply adjust the appearance of the axes. One of the axis options is the minimum and maximum value

displayed on the axis. For example, if the data you are charting all falls between 1000 and 1300, you can set your minimum at 1000 to highlight the differences because the first 1000 units are the same for all the data points. Another useful option is to change the Number Format for the axis; for example, to Currency, Data, and Percentage.



The data looks very similar with the axis values ranging from 0 to 1400.



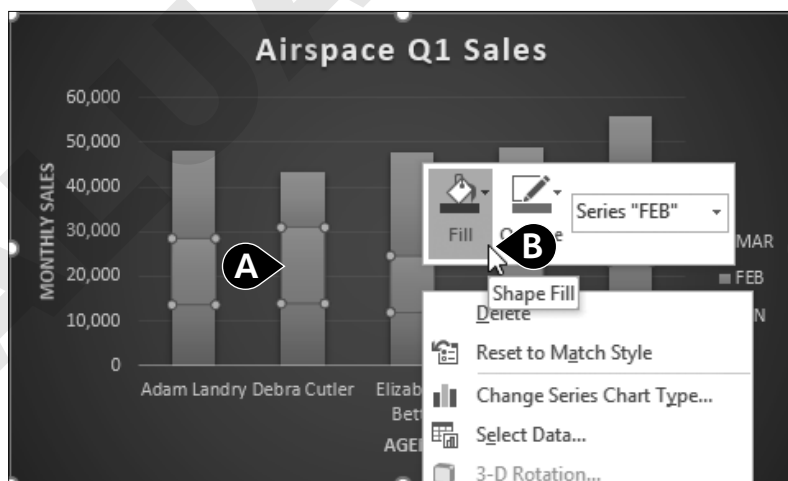
The Product differences are much easier to see with the axis values starting at 1000.

☰ Chart Tools → Format → Current Selection → Format Selection | Right-click axis → Format Axis

### DEVELOP YOUR SKILLS: E3-D3

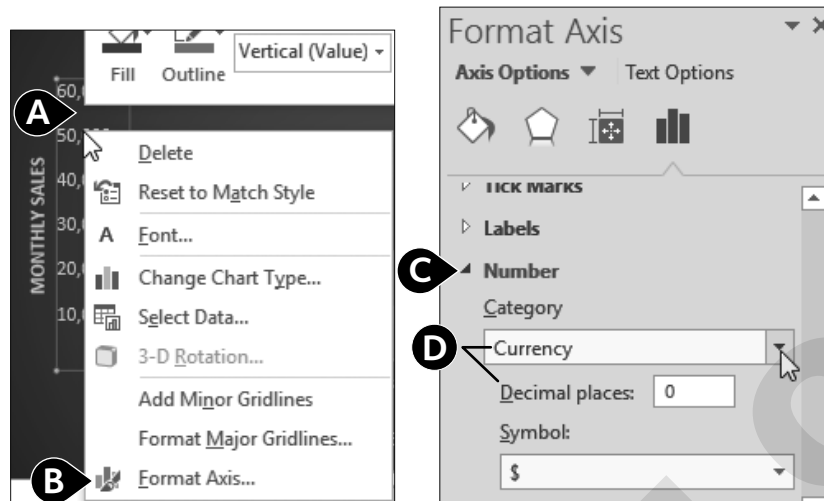
In this exercise, you will adjust the chart colors and axis numbering.

1. Save your workbook as **E3-D3-SalesCharts**.
2. Continuing with the **Airspace Q1 Sales** column chart, follow these steps to adjust the color of the FEB series:



- A Click once on any orange block to select the FEB Data series.
- B Right-click, click on **Fill** in the shortcut menu, and then choose **Red** from the Standard Colors.

3. Adjust the Fill Color for the MAR series to **Standard Color Purple**.
4. Follow these steps to adjust the vertical axis:



- A Point to a number on the vertical axis and then right-click to display the shortcut menu.
  - B Choose the **Format Axis** command.
  - C In the Format Axis pane, scroll to the bottom and click on **Number** to expand (then you may need to scroll down to see Number options).
  - D Choose **Currency** from the Category list using the menu button ▼ and, if necessary, change the Decimal places to **0**.
5. Save the workbook.

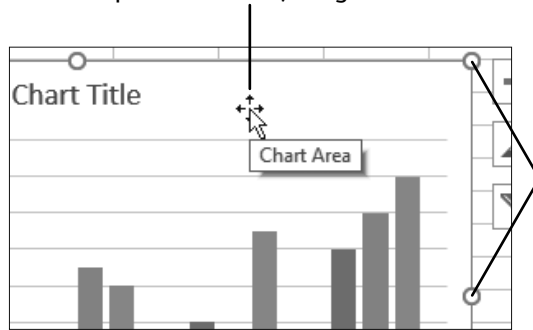
## Move and Size Charts

Charts can be moved around on a worksheet or moved to a different worksheet. A chart can be moved on the same sheet by a simple drag, but be sure you click the chart area and not another chart element, or you will be moving that element.

Because charts take up a lot of space, and you may want more than one chart in your workbook, it's often a good idea to move charts onto a separate sheet. Charts that are moved onto their own sheet are referred to as Chart Sheets because they don't contain any rows, columns, or cells—just the chart itself.

To resize a chart, the chart must first be selected. Then you can drag any of the sizing handles to resize appropriately. You can also resize the chart from the Ribbon to specify the exact height and width. Charts on a chart sheet, however, can't be resized.

The mouse pointer over the chart area displays the four-pointed arrow; drag to move the chart.




The sizing handles can be used to increase or decrease the chart size.

☰ Chart Tools → Design → Location → Move Chart | Right-click chart area → Move Chart

☰ Chart Tools → Format → Size

## DEVELOP YOUR SKILLS: E3-D4

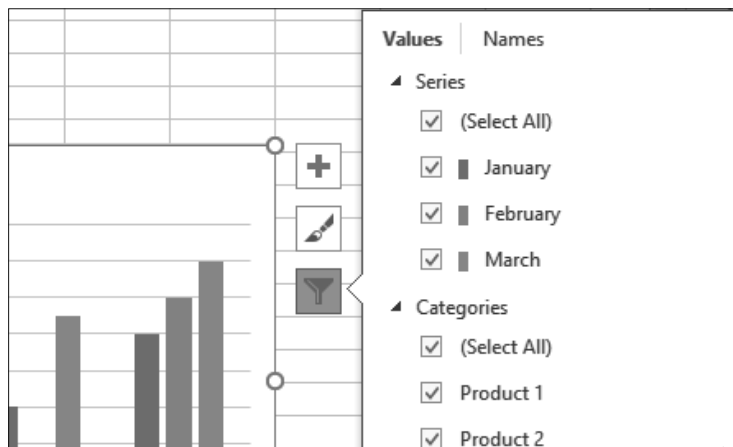
*In this exercise, you will move the existing chart, create another chart, and resize it.*

1. Save your workbook as **E3-D4-SalesCharts**.
2. With the **Airspace Q1 Sales** chart selected, choose **Chart Tools** → **Design** → **Location** → **Move Chart** to open the Move Chart dialog box.
3. In the dialog box choose **New Sheet**, in the New Sheet box type **Q1 Sales** for the name of the new sheet, and then click **OK**.
4. Go to the **Sales** worksheet to create a new chart.
5. Select the **range A3:G6**, which holds the data for Adam, Debra, and Elizabeth.
6. Choose **Insert** → **Charts** → **Insert Line or Area Chart**  menu button ▼ → **Line** (the first option on the top row in the 2-D Line group).
7. Drag the chart so it is directly below the data.
8. Rename the Chart Title **Semiannual Sales**.
9. Save the workbook.

## Edit Chart Data

After a chart has been created, the data is linked, so that if you change the data in the worksheet source, the chart is automatically updated. You can also add or remove data from the chart or filter the chart to change which data is displayed. The easiest way to change the chart data is to reselect the entire range to be used, but you can also add or remove individual data series, points, or labels. You can also modify your chart data by swapping the Horizontal Axis and the Legend categories using the Switch Row/Column button.

Sometimes a better option is to keep all existing data in the chart but use a filter to display only the data you want to see. The Chart Filters feature allows you to quickly filter specific series and category values and then remove the filter later to display all the data again.




The Chart Filter feature lets you check off the Series or Category you wish to display and uncheck the ones to hide.

☰ Chart Tools→Design→Data→Select Data

☰ Chart Tools→Design→Data→Switch Row/Column

## DEVELOP YOUR SKILLS: E3-D5

*In this exercise, you will edit the chart to include all five Sales Agents and then filter the data in the chart.*

1. Save your workbook as **E3-D5-SalesCharts**.
2. Ensure the **Semiannual Sales** chart is selected on the **Sales** worksheet.
3. Right-click anywhere in the chart and choose **Select Data**.
4. The Chart data range is already selected, so drag across the worksheet range **A3:G8** to select the new data and click **OK**.
5. Click the **Chart Filters**  button; click the checkbox next to **Adam, Elizabeth, and Tim** to remove the check and filter out their data; and then click **Apply**.
6. Adjust the Number format for the vertical axis to display **Currency** with no decimals.
7. Save and close the workbook. Exit Excel.



# Self-Assessment

Check your knowledge of this chapter's key concepts and skills by completing the Self-Assessment. The answers to these questions can be found at the back of this book.

1. Changing the style does not change the layout (the position of the elements on the chart area). True False
2. Number formatting options for an axis include Currency, Date, and Percentage. True False
3. When you move a chart to a new sheet, you cannot change the sheet name. True False
4. The Chart Filters feature allows you to remove values from your chart, and then later you can choose to display all the data again. True False
5. The best chart type to use for comparing one series of data is a line chart with a trend line. True False
6. You should create a column or bar chart to compare your data by categories. True False
7. What chart type is useful for showing trends in data over time, such as days, months, or years?
  - A. Pie
  - B. Bar
  - C. Column
  - D. Line
8. What range of data would you select to create a pie chart of Product 1 sales for January to March?

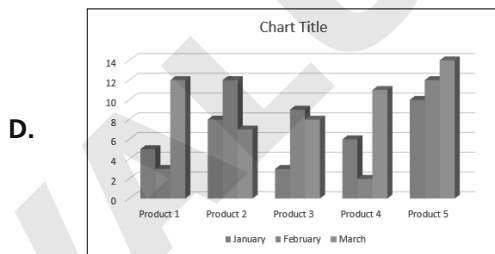
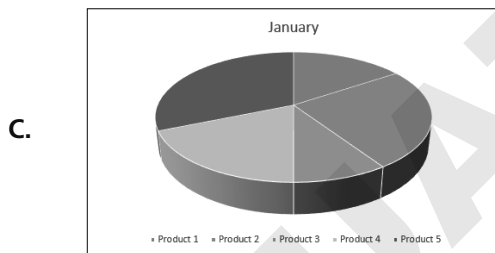
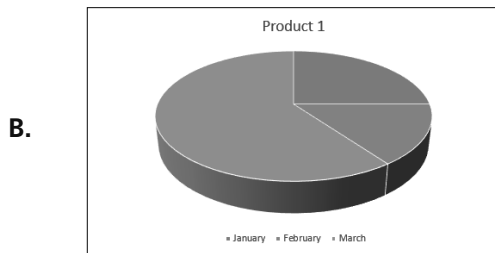
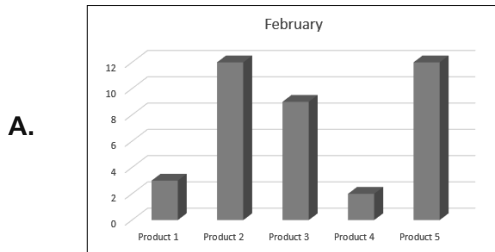
	A	B	C	D
1		January	February	March
2	Product 1	5	3	12
3	Product 2	8	12	7
4	Product 3	3	9	8
5	Product 4	6	2	11
6	Product 5	10	12	14

- A. A1:B6
  - B. A1:D2
  - C. A2:D2
  - D. A1:D6
9. Which of the following is NOT one of the chart elements?
    - A. The chart title
    - B. The legend
    - C. The horizontal axis
    - D. The pivot area

(continued)

10. The selection of data shown in the image below could produce which of the following charts?

	January	February	March
Product 1	5	3	12
Product 2	8	12	7
Product 3	3	9	8
Product 4	6	2	11
Product 5	10	12	14

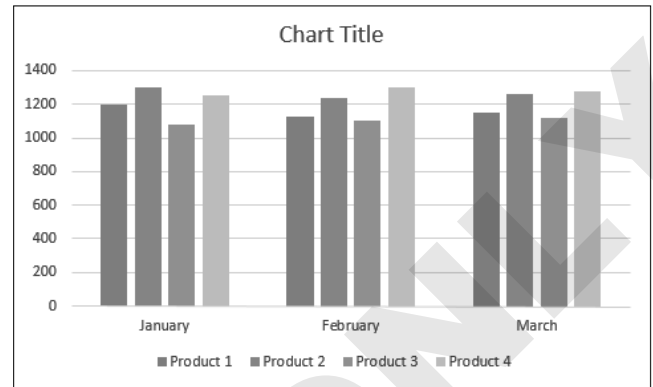
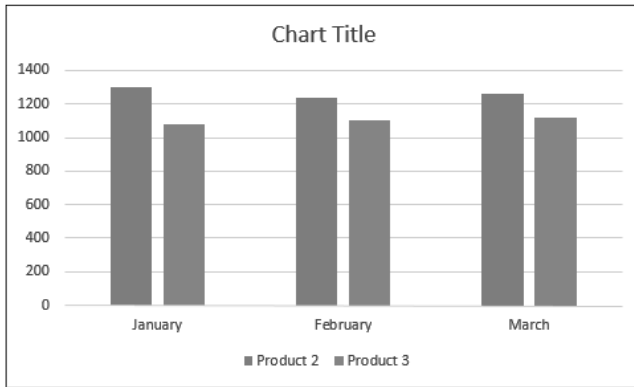


11. After moving a chart to a chart sheet, which of the following is true?

- A. You can't resize the chart.
- B. You can no longer make any changes to the chart.
- C. You can't move the chart again.
- D. You can move but not edit the chart.

(continued)

12. Which feature could have been used to modify the first chart to look like the second?



- A. Change Chart Type
- B. Select Data
- C. Chart Filters
- D. Either Select Data or Chart Filters

EVALUATION ONLY

EVALUATION ONLY

EXCEL 2016

# Organizing Large Amounts of Data

In this chapter, you will learn about managing large amounts of data and how to utilize different sources of data. You will learn some of the more advanced Excel tools used for organizing data, performing calculations, and restricting data entry.

## LEARNING OBJECTIVES

- Start a workbook from a template
- Import and export data
- Change worksheet view options
- Sort and filter data
- Create IF functions
- Apply data validation rules
- Use the Scale to Fit options

## CHAPTER TIMING

- Concepts/Develop Your Skills: 1 hr 45 mins
- Self-Assessment: 20 mins
- Total: 2 hrs 5 mins

## PROJECT: PREPARING COMPANY PAYROLL DATA

Every two weeks, Airspace Travel goes through the process of compiling the data from hours worked and commissions earned to calculate employee paychecks. You have been asked to take over, which means taking the data and importing it into a template and then inserting the required formulas into the sheet that will calculate gross pay. You will also need to organize the data so it is presentable, easy to read, and easy to print if necessary.

# Starting with a Template

Using templates in Excel is a way to save yourself a lot of work. Templates allow you to use a preexisting workbook, which usually has the formatting, headings, and certain other aspects of the workbook already created for you. Excel offers a large collection of online templates, which you can search through to find something suitable for your purpose.

Another option is to create your own template. Creating your own template means creating a workbook and inserting the headings and format you desire but not filling in any actual data. Then when you save the workbook, you change the type of file to an Excel Template.

File name:	Book1	File name:	Book1
Save as type:	Excel Workbook	Save as type:	Excel Template

The default file type when saving your work is Excel Workbook, which can be changed to Excel Template.

When you start Excel, you have the option of either opening a workbook, starting a Blank Workbook, or using a template.

PAYROLL CALCULATOR		GENERATE PAY STUBS		PERIOD ENDING: 4/8/2013						
ID	Employee Name	Reg Hours Worked	Vacation Hours	Sick Hours	Overtime Hours	Overtime Rate	Gross Pay	Taxes and Ded's	Other Ded's	Net Pay
1001	Tony Smith	50	5	1			\$560.00	\$273.08	\$20.00	\$266.92
1002	David Jones	40					\$320.00	\$131.76		\$188.24
1003	Denise Smith	35	3				\$532.00	\$240.43		\$291.57
1008	Sebastien Motte	50	5	1			\$1,120.00	\$441.16		\$678.84
1011	Isabelle Scemia	40			2	\$15.00	\$430.00	\$223.62		\$206.39
1012	David Bristol	40	5	1			\$552.00	\$270.04		\$281.96
1025	Anne Weiler	36		2	1	\$18.00	\$474.00	\$225.36	\$25.00	\$223.64
1032	Luka Abrus	40	5	1			\$460.00	\$175.03	\$50.00	\$234.97
1049	David Ludwig	40	1				\$615.00	\$259.01	\$23.00	\$332.99
Totals	9	371	24	6	3		\$5,063.00	\$2,239.47	\$118.00	\$2,705.53

An example of a template used for payroll calculations already has the structure, formatting, and formulas in place; however, be aware that some templates require users to have advanced Excel knowledge.

## DEVELOP YOUR SKILLS: E4-D1

In this exercise, you will start Excel, browse templates, and start a new workbook from a template.

1. Start Excel.
2. Go to Search for Online Templates at the top of the screen, click inside the box, and type **Payroll**. Then tap **Enter**.
3. Close Excel and use File Explorer to open **E4-D1-PayrollTemplate** from your **Excel Chapter 4** folder.
4. Use **Save As** to save the workbook as **E4-D1-PayrollP17**.

# Importing and Exporting Data

Excel is certainly a very useful program, but companies use many other programs for a variety of business-related tasks. This means that data needs to be transferable between programs that are used for different purposes; for example, a business might use accounting software to perform certain bookkeeping tasks and then use the financial data from the accounting software in Excel to create financial forecasts.

To accomplish this, data can be saved in one of several common formats that most programs understand. Doing this allows you to import and export data in and out of various programs that are otherwise incompatible. One of the more common file formats for importing and exporting data is the CSV (.csv) format, which stands for comma separated values. Data in a CSV file typically comes from a database, which has text and numerical data entered in fields, and each field is then separated by a comma.

Characters such as the comma, space, or tab can be used as delimiters, which are any character used to specify a boundary between separate regions (also called fields) when working with data. You can use CSV files to import and export data between Word, Excel, Access, and many more programs, including most accounting and database software.


In Excel, any file can be saved as a CSV version from the *Save as Type* option in the *Save As* window. Other popular formats in which to save an Excel file include PDF, for a read-only file, and HTML, to create a web page. To import data into Excel from another source, there is an Import Wizard that walks you through the process in just a few steps.

☰ File→Save As→Save as Type

☰ Data→Get External Data

## DEVELOP YOUR SKILLS: E4-D2

*In this exercise, you will import the payroll data for this period into Excel.*

1. Save your workbook as **E4-D2-PayrollP17**.
2. Click to select **cell A6**, if necessary.
3. Choose **Data→Get External Data→From Text** .
4. Navigate to the **Excel Chapter 4** folder, select the **E4-D2-PayrollPeriod17data** CSV file, and then click **Import**.
5. Click **Next**.
6. Click the checkbox next to **Comma**.
7. Click **Next**.
8. Click **Finish**.
9. Ensure **cell A6** is the cell where the data will be placed and click **OK**.

10. Set the following columns to the listed column widths so that the full headings can be seen.

Heading	Width
Employee ID#	9
Hours	6
Rate	6
Commissions	12

11. In cell A3 add the pay period number so the cell reads **Period: 17**.

12. Save the workbook.

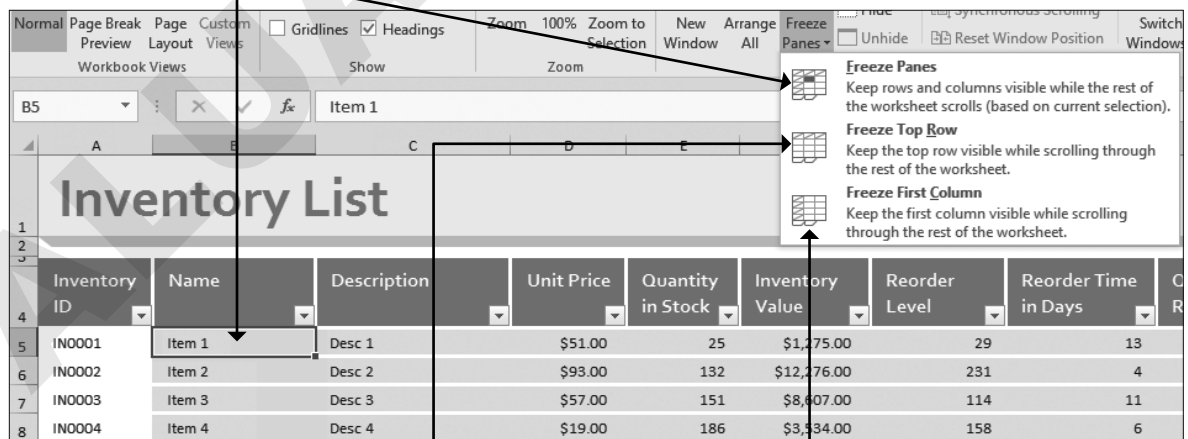
## Adjust View Options for Large Worksheets

When you have large amounts of data, it can be difficult to see it all and do what you need to do. When you scroll down, you will no longer see your headings, so you can also lose track of what information is in each column. Using different view options can help make it easier to work with these large worksheets.

### Freeze Panes

To keep the headings of your worksheet visible while you scroll down or across through your data, you can use the Freeze Panes feature. You can Unfreeze the panes again at any time.

If cell B5 is selected, this option would freeze column A and rows 1:4, so the Inventory ID and all column headings would always remain visible.



This option freezes row 1 only.

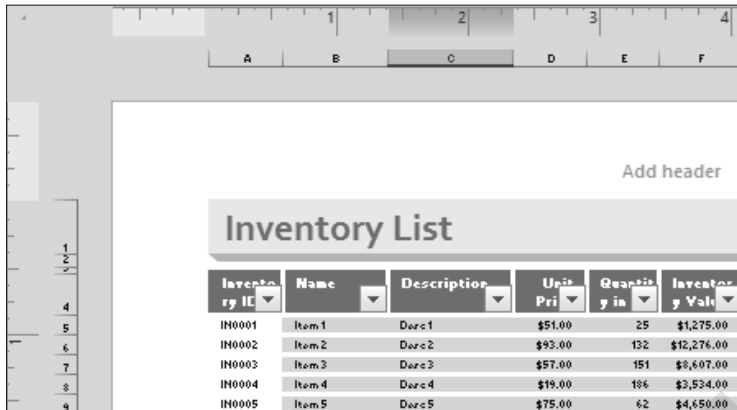
This freezes column A only; you cannot use Freeze Top Row and Freeze First Column at the same time.

☰ View → Window → Freeze Panes



## Change the Workbook View

Another issue with large worksheets is understanding how your worksheet will look when it is printed. To see how your worksheet will look when printed, or to see where the page breaks will occur, you can use the Page Break Preview or Page Layout view.





Inventory ID	Name	Description	Unit Price	Quantity	Inventory Value
IN0001	Item 1	Desc 1	\$51.00	25	\$1,275.00
IN0002	Item 2	Desc 2	\$93.00	132	\$12,276.00
IN0003	Item 3	Desc 3	\$57.00	151	\$8,607.00
IN0004	Item 4	Desc 4	\$19.00	186	\$3,534.00
IN0005	Item 5	Desc 5	\$75.00	62	\$4,650.00

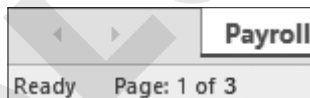
Page Layout view shows the ruler and allows you to view and edit the margins and header and footer sections.


☰ View → Workbook Views

### DEVELOP YOUR SKILLS: E4-D3

In this exercise, you will make adjustments to view the worksheet several different ways.

1. Save your workbook as **E4-D3-Payroll1P17**.
2. Select **cell C6** and choose **View → Window → Freeze Panes**  → **Freeze Panes**.
3. Change the view by choosing **View → Workbook Views → Page Layout** .
4. Click **OK** to continue.
5. Use the page display in the Status Bar to scroll to and view the second page of your document.



6. Switch back to the **Normal**  view.
7. Save the workbook.

# Sort and Filter to Organize Data

When you have large amounts of data, you need tools to help you make sense of it. Sorting gives you the ability to rearrange your data in the way that makes the most sense for your purpose. Filtering then allows you to narrow down your data to focus on certain parts of it.

## Sort Data

Sorting can be performed on any column, using text values, numerical values, or even cell color or font color. Values can be sorted A to Z or Z to A for text, and smallest to largest or largest to smallest for numbers. You can also add multiple levels to your sorting; for example, you might have an employee database with information like department, job titles, location, sales performance, and how long employees have been with the company, and you might decide to sort the data based on department first and then by length of time with the company.

## Filter Data

Filtering allows you to choose what data to include and what data to filter out. You can also filter by text or numbers. For text you can create many filters to find data; for example, to find text that begins with or ends with a letter or that contains a certain string of text. For numeric values there are also numerous different ways to create rules to find values that are greater than, less than, equal to, and so on. Using the same company example, you could filter the list multiple ways to view only employees in the sales department, with five or more years of experience, and with less than \$10,000 in sales last month.

A customer list with no sort or filter applied

Customers	Country
Carol Gregory	USA
Natasha Dyas	Canada
James Norman	Mexico
Joshua Garcia	USA
Sarah Mckinnon	USA
Shannon Miller	Mexico
Katrina Kormylo	Canada
Susan Colley	USA
William Emerson	Canada
Eugene Fink	USA

A customer list sorted by Country and then by Customers

Customers	Country
Katrina Kormylo	Canada
Natasha Dyas	Canada
William Emerson	Canada
James Norman	Mexico
Shannon Miller	Mexico
Carol Gregory	USA
Eugene Fink	USA
Joshua Garcia	USA
Sarah Mckinnon	USA
Susan Colley	USA

A customer list filtered to show only customers in the USA

Customers	Country
Carol Gregory	USA
Eugene Fink	USA
Joshua Garcia	USA
Sarah Mckinnon	USA
Susan Colley	USA


View the video "Using Sort and Filter."

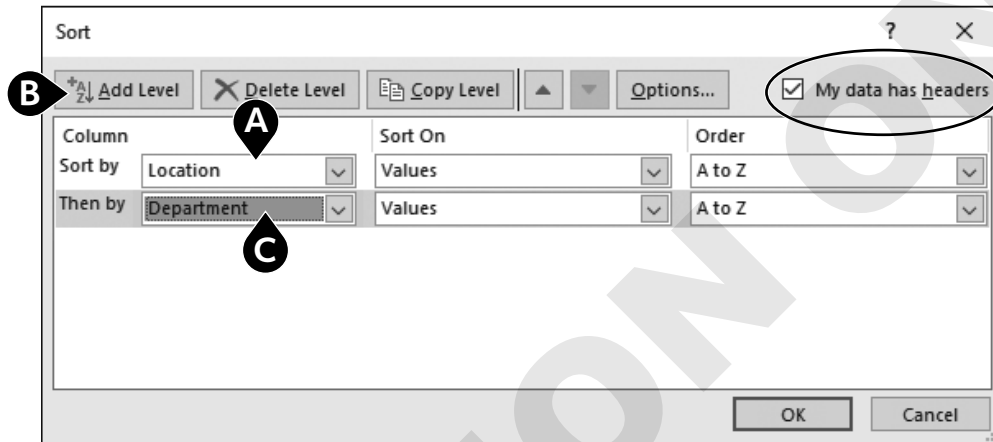
☰ Data → Sort & Filter → Sort 

☰ Data → Sort & Filter → Filter 

## DEVELOP YOUR SKILLS: E4-D4


In this exercise, you will use Sort & Filter to organize the employee data and edit the Rate for some of the employees.

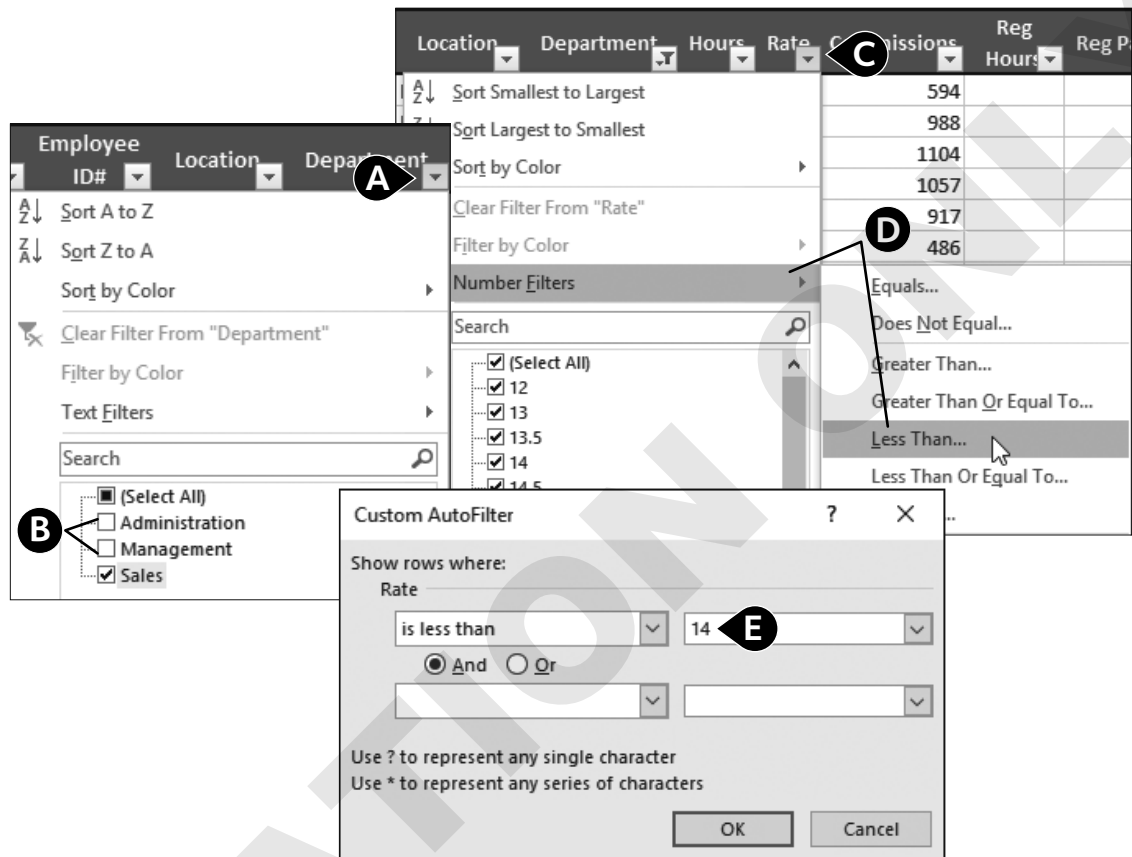
1. Save your workbook as **E4-D4-PayrollP17**.
2. Select any cell that contains data within the **range A6:H63**.
3. Choose **Data**→**Sort & Filter**→**Sort** .
4. Follow these steps to sort the data with multiple levels:




- A Choose **Sort by Location**.
- B Click **Add Level** to perform an additional sort.
- C Choose **Then by Department** and then click **OK**.

First Name	Last Name	Employee ID#	Location	Department
Jasmin	Newton	13651	Los Angeles	Administration
Tim	Parker	17232	Los Angeles	Administration
Carol	Gregory	16688	Los Angeles	Management
Kobe	Curry	20303	Los Angeles	Sales
Tracy	Bryant	14917	Los Angeles	Sales
Cam	Owens	22404	Los Angeles	Sales
Ashley	Bradford	17571	Miami	Administration
Deborah	Secrett	16735	Miami	Administration
Adel	Kahlmeier	13089	Miami	Administration
Brett	Aberle	22113	Miami	Administration
Tony	Duncan	12743	Miami	Administration
James	Norman	13733	Miami	Management
Melissa	Coelho	21635	Miami	Management
Sophia	Maria	13365	Miami	Management
Steven	Samuel	15563	Miami	Sales

5. Ensure once again that you have a cell selected within the sorted list.
6. Choose **Data**→**Sort & Filter**→**Filter** .
7. Follow these steps to filter your data:



- A Click the **Department menu** button ▼.
- B Filter the Department column to include only Sales employees by removing the checks next to **Administration** and **Management** and then click **OK**.
- C Click the **Rate menu** button ▼.
- D Choose **Number Filters**→**Less Than** to open the dialog box.
- E Type **14** to the right of *Show Rows Where Rate Is Less Than* and then click **OK**.
8. The company decides to pay all Sales employees a minimum of \$14 per hour, so adjust the Rate for the six employees to **14**.
9. Choose **Data**→**Sort & Filter**→**Filter**  to remove all filters and redisplay all data.
10. Save the workbook.

# Perform Advanced Calculations

There are many functions available in the Excel Function Library, but most of us use only a handful of these on a regular basis. Once you understand simple functions like SUM and AVERAGE, you can start exploring additional, more advanced functions. As you learn more about functions, it becomes easier to understand which functions to use and how to insert the function with the correct arguments.

## The IF Function

Another fairly common function that can be quite useful is the IF Function. The IF function allows you to determine the value of a cell based on the outcome of a logical test. The IF function also provides the basis for many other formulas, such as COUNTIF and SUMIF. Although the IF function seems rather challenging at first, with some practice it becomes much easier, almost like forming a sentence in the form of a question.

The IF function is useful in situations in which there are two possible outcomes, and there are defined criteria to determine the outcome. For example, if you offer sales employees a \$100 bonus if they achieve \$5,000 in sales for the month, you can use an IF function to determine which employees qualify. In this case, \$5,000 is the criterion, which needs to be written as a logical test.



View the video "Using the IF Function."

THE IF FUNCTION		
Arguments	Description	Examples
Logical_Test	This is a question or criterion, which must be a yes/no, true/false question and which usually includes at least one cell reference.	D2>5000 D2>=A1
There are two possible outcomes, so you need to enter two values.		
Value_If_True	If the answer is true, this determines what result is placed in the cell after completing the formula. The result can be text, numbers, cell references, or even another formula.	100 "Yes" D2*10%
Value_If_False	If the answer is not true, it must be false, so what will the result be? Again, the result can be text, numbers, cell references, or a formula.	0 "No" D2*2%


- The Logical\_Test: Is cell D2 greater than 5000?
- The Value\_If\_True: If D2 is greater than 5000, the employee gets a \$100 bonus.
- The Value\_If\_False: If D2 is *not* greater than 5000, the employee does not get any bonus (\$0).

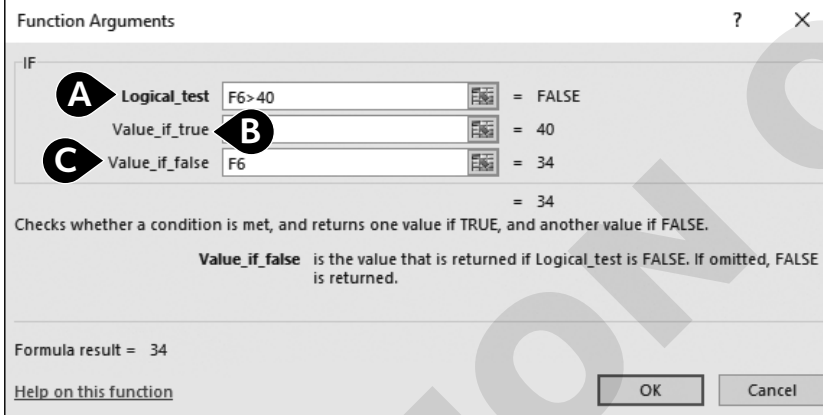
=IF(D2>5000,100,0)	
D	E
Monthly Sales	Bonus
\$6,500	\$100
\$4,000	\$0
\$7,150	\$100
\$5,800	\$100
\$3,720	\$0

— The formula results

## DEVELOP YOUR SKILLS: E4-D5

In this exercise, you will create several formulas using the IF function to calculate the number of regular hours and overtime hours each employee worked. You will then calculate total Gross Pay.

1. Save your workbook as **E4-D5-PayrollP17**.
2. Select **cell I6** and click **Insert Function**  on the Formula Bar.
3. Choose the **IF** function (under the Logical category, if necessary) and then click **OK**.
4. Follow these steps to create a formula using the IF function to calculate the number of Regular Hours for employees:



The screenshot shows the 'Function Arguments' dialog box for the IF function. It has three input fields: 'Logical\_test' with the value 'F6>40', 'Value\_if\_true' with the value '40', and 'Value\_if\_false' with the value 'F6'. Below the fields, there is a description: 'Checks whether a condition is met, and returns one value if TRUE, and another value if FALSE. Value\_if\_false is the value that is returned if Logical\_test is FALSE. If omitted, FALSE is returned.' At the bottom, it shows 'Formula result = 34' and buttons for 'OK' and 'Cancel'.

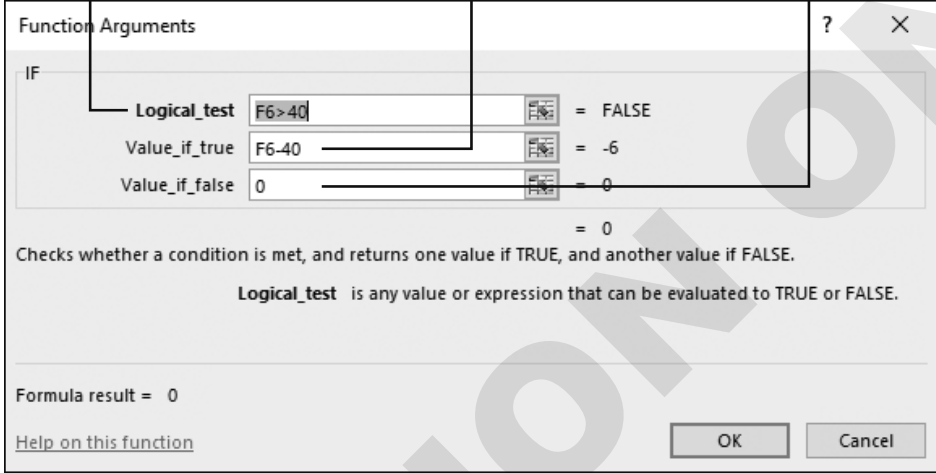
- A** In the **Logical\_Test** box enter **F6>40**, which will determine whether the employee worked more than 40 hours.
  - B** In the **Value\_If\_True** box enter **40**, because if the employee did in fact work more than 40 hours, that person would receive regular pay for 40 hours and the rest would be considered overtime.
  - C** In the **Value\_If\_False** box enter **F6**, because if the employee worked 40 hours or less, all of the hours worked would be considered regular hours. Then click **OK**.
5. Select **cell K6**, type the formula **=IF (F6>40 , F6 - 40 , 0 )**, and then complete the entry.

6. Click **Insert Function**  and compare your screen to the following.

The Logical\_Test box has the same logical test,  $F6 > 40$ , which determines whether the employee worked more than 40 hours.

The Value\_If\_True box contains  $F6 - 40$ , because if the employee did in fact work more than 40 hours, that employee would receive overtime pay for the total number of hours less 40, the first 40 of which would be paid at the regular rate.

The Value\_If\_False box says 0, because if the employee worked 40 hours or less, that employee does not receive any overtime pay.



Function Arguments

IF

Logical\_test:  $F6 > 40$  = FALSE

Value\_if\_true:  $F6 - 40$  = -6

Value\_if\_false: 0 = 0

Checks whether a condition is met, and returns one value if TRUE, and another value if FALSE.

Logical\_test is any value or expression that can be evaluated to TRUE or FALSE.

Formula result = 0

Help on this function

OK Cancel

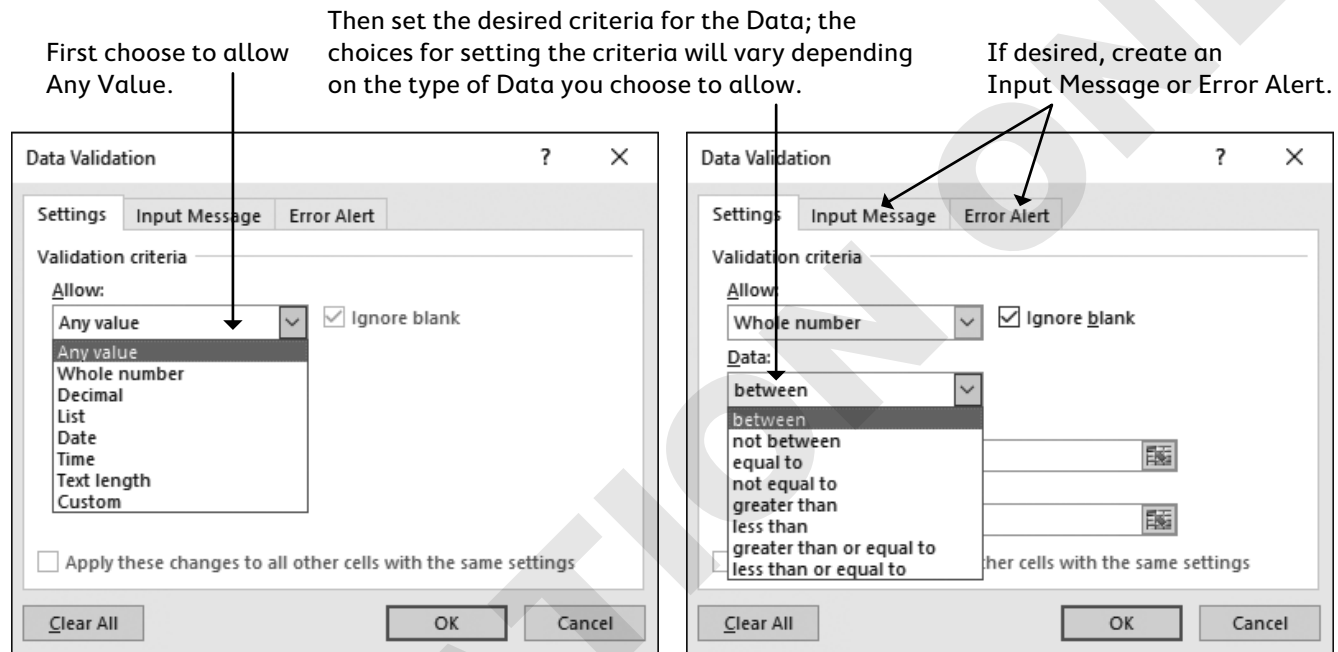
7. Click **OK** to close the window.
8. Select **cell J6**, enter the formula  $=I6 * G6$ , and then tap **Tab** twice.
9. In **cell L6** enter the formula  $=K6 * G6 * 1.5$  and then tap **Tab** once.
10. Enter the formula for Gross Pay, which is  $=J6 + L6 + H6$ , and complete the entry.
11. With **cell M6** active, choose **Home** → **Number** → **Number Format** → **Currency** and then choose **Home** → **Font** → **Bold**.
12. Select the **range I6:M6** and double-click the fill handle to fill down the formulas for all employees.
13. Save and close the workbook.

## Controlling Data Entry with Data Validation

When entering values into an Excel worksheet, it is important to be consistent and accurate. However, mistakes can be made, especially if you ask someone else to do the data entry for you. To ensure accuracy and consistency, you can use data validation to create criteria for cells that limit the possible entries into those cells.

Normally you would set up data validation before entering the values because creating criteria for a cell that already contains data won't tell you if it has been correctly entered. You also need to create the criteria for all cells, so you would select the entire range where you intend to enter the data.

The criteria you choose can restrict the type of data as well as the range of acceptable values. For example, you could restrict data entry to whole numbers between 0 and 100, or you could restrict data entry to a text list. You can also create a custom Input Message to assist the user in entering the acceptable data and an Error Alert if they enter an unacceptable value.



☰ Data → Data Tools → Data Validation

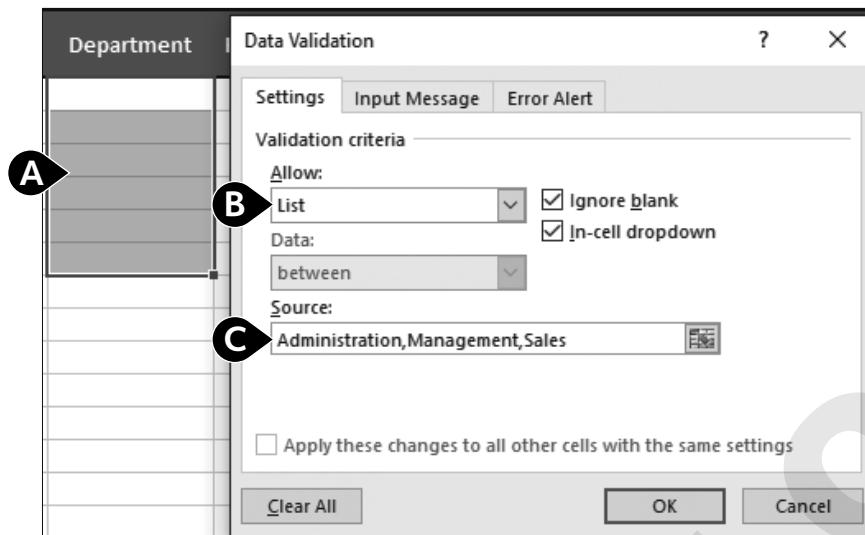
## DEVELOP YOUR SKILLS: E4-D6

*In this exercise, you will create data validation criteria to choose the Department for each employee from a list and to restrict the number of hours that can be entered.*

1. Open **E4-D6-Payroll** from the **Excel Chapter 4** folder and save it as **E4 -D6 - PayrollRevised**.



2. Follow these steps to create the data validation rule:



- A Select the cells where data will be entered, which is in the **range E6:E11**, and then choose **Data→Data Tools→Data Validation**.
  - B Select **List** using the **Allow menu** button ▼.
  - C In the **Source** box type **Administration,Management,Sales** separated by commas but no spaces and then click **OK**.
3. Select **cell E6**.
  4. Type **Admin** and then tap **Enter**.
  5. Click **Cancel**.
  6. Use the **menu** button ▼ to select **Administration** from the list of Departments for Jasmin in **cell E6**.
  7. Insert the following Departments for the other five employees:

First Name	Last Name	Employee ID#	Location	Department	Hours
Jasmin	Newton	13651	Los Angeles	Administration	
Tim	Parker	17232	Los Angeles	Administration	
Carol	Gregory	16688	Los Angeles	Management	
Kobe	Curry	20303	Los Angeles	Sales	
Tracy	Bryant	14917	Los Angeles	Sales	
Cam	Owens	22404	Los Angeles	Sales	

8. Select the **range F6:F11** to create data validation criteria for the Hours to be entered.
9. Choose **Data→Data Tools→Data Validation** and then set the criteria to allow only a **Whole Number** between **0** (Minimum) and **60** (Maximum).




10. Click the **Input Message** tab and enter the **Input Message** as follows:

The screenshot shows the 'Data Validation' dialog box with the 'Input Message' tab selected. The 'Settings' tab is also visible. The 'Show input message when cell is selected' checkbox is checked. Below this, there is a text box for the input message, which contains the text 'Hours must be between 0 and 60 with no decimal.' There are also fields for 'Title' and 'When cell is selected, show this input message:'.

11. Click **OK** to complete the settings and then select **cell F6**.
12. Test the data validation by typing **61** in **cell F6** and then tapping **Enter**. Read the message and then click **Retry**. Test it again by typing **40.5**, tap **Enter**, and then click **Cancel** to stop editing the cell.
13. Save and close the workbook.

## Printing Options for Large Worksheets

To print large worksheets in a presentable format, you may need to make some adjustments to your worksheet. For example, you may want to ensure that column headings are visible on all pages, you may want to choose how your data is divided across several pages, or you may want to add additional information that isn't part of the worksheet itself to the top or bottom of each printed page. Using Page Break Preview is the best view for adding and adjusting page breaks.

PRINTING OPTIONS	
Feature	Description
Print Titles 	This option enables you to print the same headings on all pages by repeating either the same rows or the same columns on all pages.
Print Area 	This option enables you to print only a specific area of your worksheet, rather than the whole thing.
Breaks 	This option enables you to determine where one page ends and the next page begins for printing purposes. Page breaks in Excel are both horizontal and vertical. Existing Page Breaks can be moved, or new ones can be inserted.
Scale to Fit	This option enables you to force your data onto a desired number of pages, using width and height, by scaling or shrinking the size of the worksheet contents.

View the video "Printing a Large Worksheet."


☰ Page Layout → Page Setup

## Add a Header or Footer

When you are printing a worksheet, you may want information included on the printout that doesn't need to be shown on the screen. This might include information such as a title, company name, your own name, the page number, or perhaps the date.

In Excel, both the Header and Footer have three sections. These are not part of the worksheet, so they do not have a cell address like the worksheet cells.


Header					
Employee Name	Department				
Carol Gregory	Sales				
Natasha Dyas	Admin.				

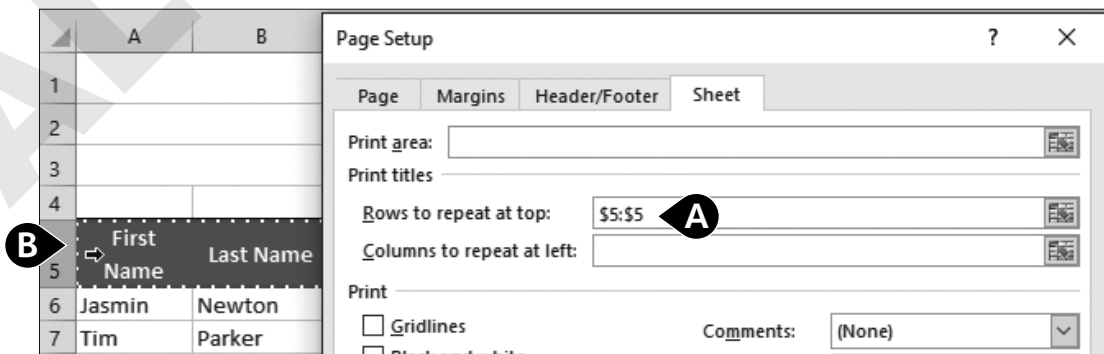
☰ Insert→Text→Header & Footer 

☰ View→Workbook Views→Page Layout 



### DEVELOP YOUR SKILLS: E4-D7

In this exercise, you will set up the Print Area, repeat the column headings, and adjust other print settings.





1. Open **E4-D5-PayrollP17** from your **Excel Chapter 4** folder and save it as **E4-D7-PayrollP17**.
2. Go to **File→Print** to view the Print Preview.
3. Use the **Back** button to go back to your worksheet.
4. Choose **Page Layout→Scale to Fit→Width→1 page**.
5. Go back to the **Print Preview** and see that the worksheet now prints on two pages; one page wide and two pages long.
6. Use the **Back** button to go back to your worksheet.
7. Choose **Page Layout→Page Setup→Print Titles** .
8. Follow these steps to print repeating headings:



- A Select the box next to **Rows to Repeat at Top**.
- B Click anywhere in **row 5**.

9. Click **OK**.
10. Choose **File**→**Print** and below the Print Preview use the right-pointing arrow to advance to page two.
11. Use the **Back** button to go back to your worksheet.
12. Select the **range A5:M11**.
13. Choose **Page Layout**→**Page Setup**→**Print Area** →**Set Print Area**.
14. Go to **Print Preview** to view the change and then return to your worksheet..
15. Choose **Page Layout**→**Page Setup**→**Print Area** →**Clear Print Area**.
16. Switch your view to **Page Break Preview**.
17. Place the mouse pointer over the Page Break line to display the two-way arrow as shown below and then drag the **Page Break** up to below **row 11**, where the data for Los Angeles employees ends and Miami begins.

32	Jaime	Burgess	16340	Ne
33	Shaq	McGrady	15695	Ne
34	Sara	McKinnon	13041	Ne
35	Kristen	Chambers	17641	Ne
36	Terrence	King	14767	Ne
37	Lorraine	Martinez	12731	Ne

18. Drag the new **Page Break** up below **row 28**, where the data for Miami employees ends.
19. Excel inserts another new Page Break, so drag the new **Page Break** up below **row 37**, where the data for New York employees ends.
20. Select **cell A52** and then choose **Page Layout**→**Page Setup**→**Breaks** →**Insert Page Break**.
21. Switch the view back to **Normal** and go to the **Print Preview**.
22. Return to your worksheet and then change the view to **Page Layout** and select the left header section.
23. Choose **Header & Footer Tools Design**→**Header & Footer Elements**→**File Name** .
24. Insert the **Page Number**  in the center Header section.
25. Insert the **Current Date**  in the right Header section.
26. Click on the worksheet outside of the header area, switch the view back to **Normal**, and then go to the **Print Preview** one last time.

First Name	Last Name	Employee ID#	Location	Department	Hours	Rate	Commissions	Reg Hours	Reg Pay	OT Hours	OT Pay	Gross Pay
Jasmin	Newton	13651	Los Angeles	Administration	34	17	0	34	578	0	0	\$578.00
Tim	Parker	17232	Los Angeles	Administration	27	13	0	27	351	0	0	\$351.00
Carol	Gregory	16688	Los Angeles	Management	40	31	0	40	1240	0	0	\$1,240.00
Kobe	Curry	20905	Los Angeles	Sales	36	21.5	594	36	774	0	0	\$1,368.00
Tracy	Bryant	14817	Los Angeles	Sales	30	15	988	30	450	0	0	\$1,438.00
Cam	Owens	22404	Los Angeles	Sales	47	20	1104	40	800	7	210	\$2,114.00

27. Save the workbook and close Excel.

# Self-Assessment

Check your knowledge of this chapter's key concepts and skills by completing the Self-Assessment. The answers to these questions can be found at the back of this book.

1. Sarah spends a lot of time cutting and pasting titles and headings and adjusting the formatting each month to create a report for her boss; Sarah would be better off creating a template for herself. True False
2. Freezing Panes allows you to view four different areas of your worksheet at once. True False
3. A filter can be applied to the following list to show only guests whose name starts with J to obtain the result shown. True False

	A	B	C
1	<b>Guest</b>	<b>Industry</b>	<b>Attending</b>
2	Sarah Mullins	Auto	Yes
3	Crystal Robinson	Finance	Yes
4	Austin Farrell	Marketing	No
5	John Aikens	Retail	No
6	Jessica McInnis	Auto	Yes
7	Atif Khalil	Finance	Yes
8	Pedro Espinosa	Marketing	Yes
9	Felecia Murray	Retail	No

	A	B	C
1	<b>Guest</b>	<b>Industry</b>	<b>Attending</b>
6	Jessica McInnis	Auto	Yes
9	John Aikens	Retail	No

4. The IF Function is useful in situations in which there are two, three, or four possible outcomes. True False
5. Data Validation sets out the criteria for a cell or cells, which limits the possible entries in that cell. True False
6. If you have a large list of employees sorted by department, and you want each department to print on a separate page, you should go to Page Break Preview and insert Page Breaks between the departments. True False
7. You can ONLY sort text and numbers, but you can add multiple sorting levels. True False
8. What is a character such as a comma, space, or tab that is used to specify a boundary between fields in a data file called?
  - A. Parameter
  - B. Delimiter
  - C. Unlimited
  - D. Decliner

(continued)

9. Greg imported his data, but it does not look right, as shown here. Greg made the following mistake when importing his data.

	A
1	Employee Name,Department,Salary
2	Carol Gregory,Sales,"\$40,000"
3	Natasha Dyas,Admin.,"\$34,500"
4	James Norman,Management,"\$68,000"
5	Joshua Garcia,Sales,"\$46,000"
6	Sarah Mckinnon,Sales,"\$42,750"
7	Shannon Miller,Management,"\$52,000"
8	Katrina Kormylo,Admin.,"\$48,000"
9	Susan Colley,Sales,"\$44,800"
10	William Emerson,Admin.,"\$41,000"
11	Eugene Fink,Sales,"\$37,000"

- A. He did not import the right file.
  - B. He did not choose the right cell.
  - C. He did not choose the right column format.
  - D. He did not select the correct delimiter, the comma.
10. What view allows you to view and edit margins, headers, and footers?
- A. Page Layout view
  - B. Page Break Preview
  - C. Normal view
  - D. Print Preview

(continued)

11. The following Guest list was filtered to show Guests who responded Yes to Attending and also sorted by Industry. Which figure shows the correct result?

	A	B	C
1	<b>Guest</b>	<b>Industry</b>	<b>Attending</b>
2	Sarah Mullins	Auto	Yes
3	Crystal Robinson	Finance	Yes
4	Austin Farrell	Marketing	No
5	John Aikens	Retail	No
6	Jessica McInnis	Auto	Yes
7	Atif Khalil	Finance	Yes
8	Pedro Espinosa	Marketing	Yes
9	Felecia Murray	Retail	No

A.

	A	B	C
1	<b>Guest</b>	<b>Industry</b>	<b>Attending</b>
2	Sarah Mullins	Auto	Yes
3	Jessica McInnis	Auto	Yes
4	Crystal Robinson	Finance	Yes
5	Atif Khalil	Finance	Yes
6	Austin Farrell	Marketing	No
7	Pedro Espinosa	Marketing	Yes
8	John Aikens	Retail	No
9	Felecia Murray	Retail	No

B.

	A	B	C
1	<b>Guest</b>	<b>Industry</b>	<b>Attending</b>
2	Atif Khalil	Finance	Yes
3	Crystal Robinson	Finance	Yes
6	Jessica McInnis	Auto	Yes
7	Pedro Espinosa	Marketing	Yes
8	Sarah Mullins	Auto	Yes

C.

	A	B	C
1	<b>Guest</b>	<b>Industry</b>	<b>Attending</b>
2	Sarah Mullins	Auto	Yes
3	Jessica McInnis	Auto	Yes
6	Crystal Robinson	Finance	Yes
7	Atif Khalil	Finance	Yes
8	Pedro Espinosa	Marketing	Yes

D.

	A	B	C
1	<b>Guest</b>	<b>Industry</b>	<b>Attending</b>
4	Austin Farrell	Marketing	No
5	Felecia Murray	Retail	No
9	John Aikens	Retail	No

(continued)

12. Jessica wants to determine the amount of raise to give each of her employees. Employees with the company longer than 10 years get a 4% raise, and everyone else gets a smaller raise. If the formula for Sarah was written  $=IF(D3>10,B3*4\%,B3*2\%)$ , what would Felecia's raise be?

	A	B	C	D	E
1					
2	<b>Employee</b>	<b>Salary</b>	<b>Department</b>	<b>Years</b>	<b>Raise</b>
3	Sarah Mullins	\$28,000	Marketing	11	\$1,120
4	Crystal Robinson	\$36,000	Finance	7	\$720
5	Austin Farrell	\$30,000	Retail	5	\$600
6	Felecia Murray	\$30,000	Retail	12	
7	Jessica McInnis	\$47,000	Marketing	3	
8	Atif Khalil	\$62,500	Finance	6	
9	Pedro Espinosa	\$27,900	Marketing	2	
10	John Aikens	\$44,000	Retail	19	

- A. \$300  
 B. \$3,000  
 C. \$1,000  
 D. \$1,200
13. If the following Data Validation rule were created, which value would NOT be an acceptable entry?

The screenshot shows the Data Validation dialog box with the following settings:

- Validation criteria: Allow: Decimal, Ignore blank (checked)
- Data: between
- Minimum: 1
- Maximum: 10

- A. 3  
 B. 7.5  
 C. 0  
 D. 10
14. If Samantha has a workbook that is four pages long, and she wants to print the headings in row 3 at the top of each page, which feature should she use?
- A. Print Titles  
 B. Print Area  
 C. Breaks  
 D. Scale to Fit



# Self-Assessment Answer Key

## CHAPTER 1: TRACKING CUSTOMER DATA

Item	Answer	Page Number
1	True	2
2	True	3
3	False	6
4	False	4
5	True	10
6	False	16
7	True	15
8	True	16
9	B	5
10	D	12
11	D	14
12	D	18

## CHAPTER 2: RECORDING STUDENT GRADES

Item	Answer	Page Number
1	False	22
2	True	23
3	True	25
4	True	29
5	False	30
6	True	30
7	False	34
8	False	26
9	D	23
10	A	27
11	B	28
12	B	30
13	C	33
14	D	17
15	A	29

## CHAPTER 3: DATA VISUALIZATION AND IMAGES

Item	Answer	Page Number
1	False	46
2	True	49
3	False	51
4	True	52
5	False	43
6	True	42
7	D	43
8	B	44
9	D	45
10	C	44
11	A	50
12	D	51

## CHAPTER 4: ORGANIZING LARGE AMOUNTS OF DATA

Item	Answer	Page Number
1	True	58
2	False	60
3	True	62
4	False	65
5	True	67
6	True	70
7	False	62
8	B	59
9	D	59
10	A	61
11	C	62
12	D	65
13	C	68
14	A	70

EVALUATION ONLY

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Note: Index entries ending in “V” indicate that a topic is discussed in the video referenced on that page.

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