

## COM 140 Module 3 Lecture Notes

In this module we will begin working in Excel 2013. While Word is designed to allow you to type and format documents, Excel is designed to allow you to work with numbers. First we will discuss the main elements of an Excel spreadsheet. Then we will cover the mechanics of specifying cell ranges in Excel formulas.

### Elements of an Excel Spreadsheet

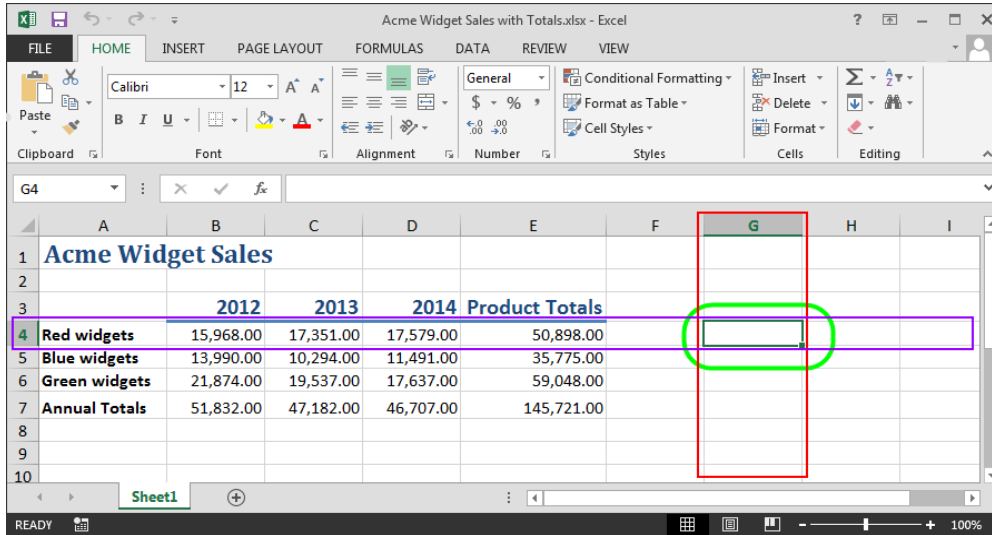
Most of an Excel window is composed of a grid of cells.

	2012	2013	2014	Product Totals
Red widgets	15,968.00	17,351.00	17,579.00	50,898.00
Blue widgets	13,990.00	10,294.00	11,491.00	35,775.00
Green widgets	21,874.00	19,537.00	17,637.00	59,048.00
Annual Totals	51,832.00	47,182.00	46,707.00	145,721.00

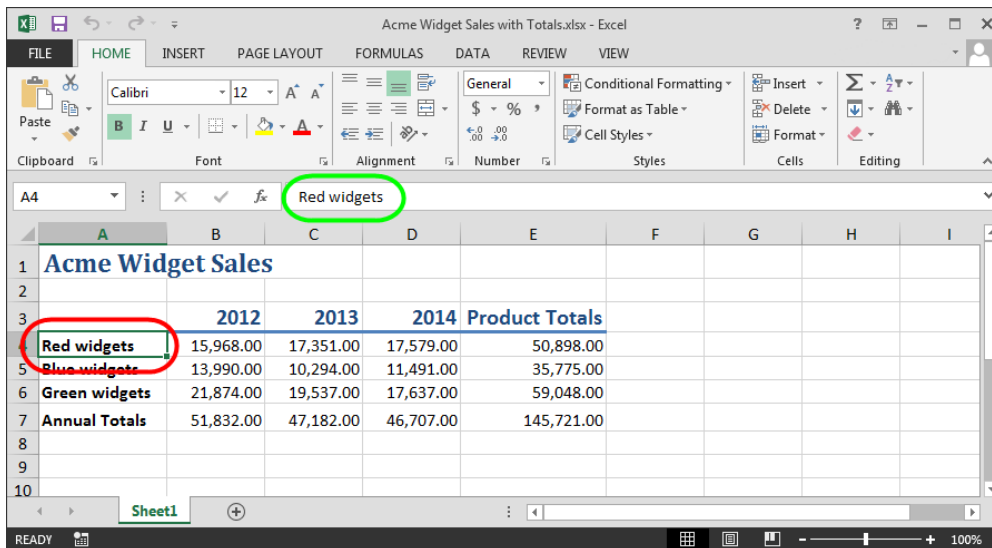
Each cell is located at the intersection of a column and row.

	2012	2013	2014	Product Totals
Red widgets	15,968.00	17,351.00	17,579.00	50,898.00
Blue widgets	13,990.00	10,294.00	11,491.00	35,775.00
Green widgets	21,874.00	19,537.00	17,637.00	59,048.00
Annual Totals	51,832.00	47,182.00	46,707.00	145,721.00

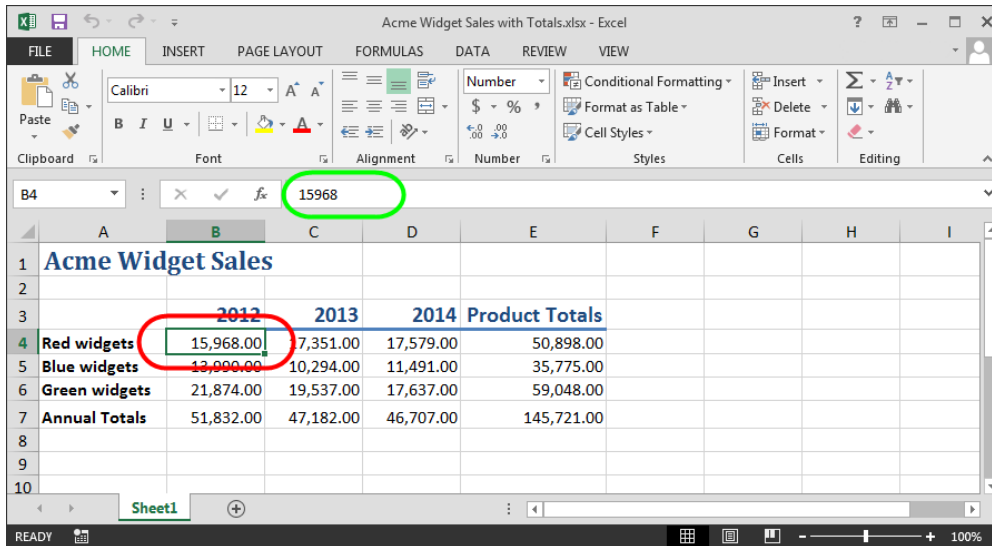
Columns are identified by letters and rows are identified by numbers. When the columns reach Z, they start over with AA, go to AZ, and then start over with BA and so on. A cell address is composed of the letter of the column of the cell, followed by the number for the row of the cell. Examples of cell addresses include A11, F23, or BC52.



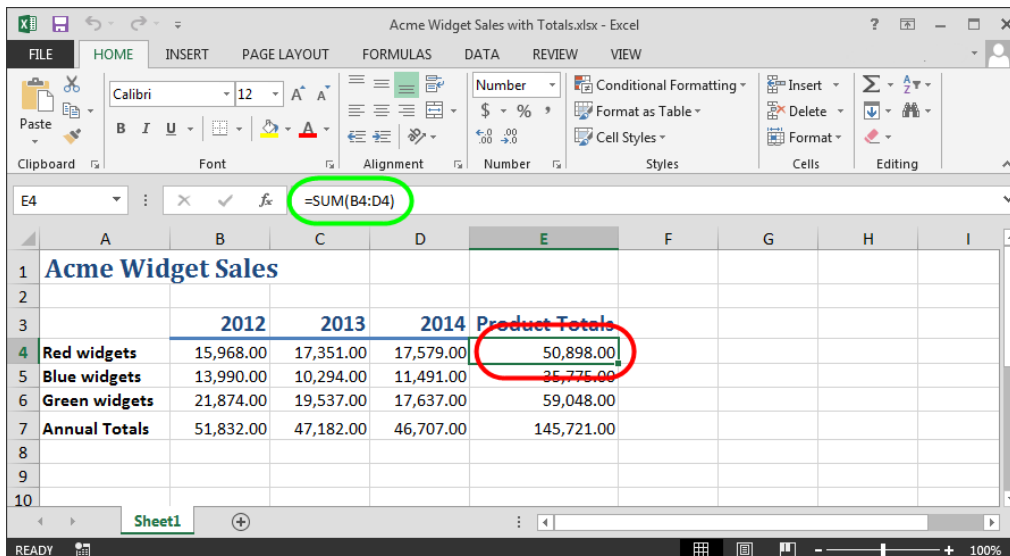
There are three things that you can put in a cell. The first of these is a *label*. Labels are text and are placed next to numbers to explain what those numbers represent.



The second thing you can put in a cell is a *value*. Values are numbers. Excel provides many options for formatting numbers.



The third thing that can go into a cell is a *formula*. Notice that the cell displays the result of a formula, while the formula bar displays the formula that is stored in the cell.



## Formula Examples

Formulas in Excel begin with the equal sign. A simple formula would be  $=2+3$ . The plus sign is used for addition, the minus sign is used for subtraction, the asterisk is used for multiplication, and the forward slash is used for division. Excel uses the standard order of operations to evaluate formulas. In other words, multiplication and division are performed before addition and

subtraction when a formula is calculated. Parentheses can be used to specify which parts of a formula should be performed first.

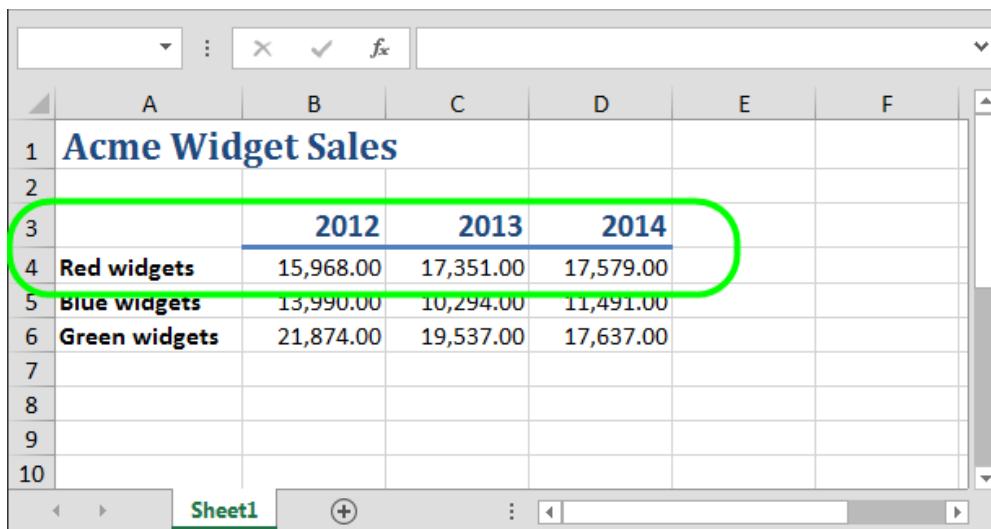
In addition to using numbers in formulas, you can also use cell references to have Excel use the values in those cells when evaluating the formula (for example, = B4+C4). Using cell references in a formula is a powerful and flexible feature. You can update the numbers in individual cells and Excel will automatically recalculate any formulas that reference those cells.

Finally, you can use functions in a formula. Functions allow you to perform advanced operations in a formula, like calculating a square root. One of the most commonly used functions is the SUM function, for example, =SUM(B4:D4), which adds the values of a group of numbers or cells.

One feature in Excel that students struggle with is how to specify ranges of cells when writing a formula. A range of cells can be specified with either a colon or a comma in between the cell references, depending on what you need.

### Cell Ranges in Excel

As an example of how to specify ranges of cells, we will manipulate a spreadsheet that lists annual widget sales for red, blue, and green widgets in the years 2012, 2013, and 2014.



	A	B	C	D	E	F
1	<b>Acme Widget Sales</b>					
2						
3		<b>2012</b>	<b>2013</b>	<b>2014</b>		
4	<b>Red widgets</b>	15,968.00	17,351.00	17,579.00		
5	<b>Blue widgets</b>	13,990.00	10,294.00	11,491.00		
6	<b>Green widgets</b>	21,874.00	19,537.00	17,637.00		
7						
8						
9						
10						

*Row of values:* Use a colon to specify a rectangular range of cells with this format: the left-most cell reference, a colon, and then the right-most cell reference. For example, to calculate the total sales of **red** widgets for all three years, you need to total the values in cells B4, C4, and D4.

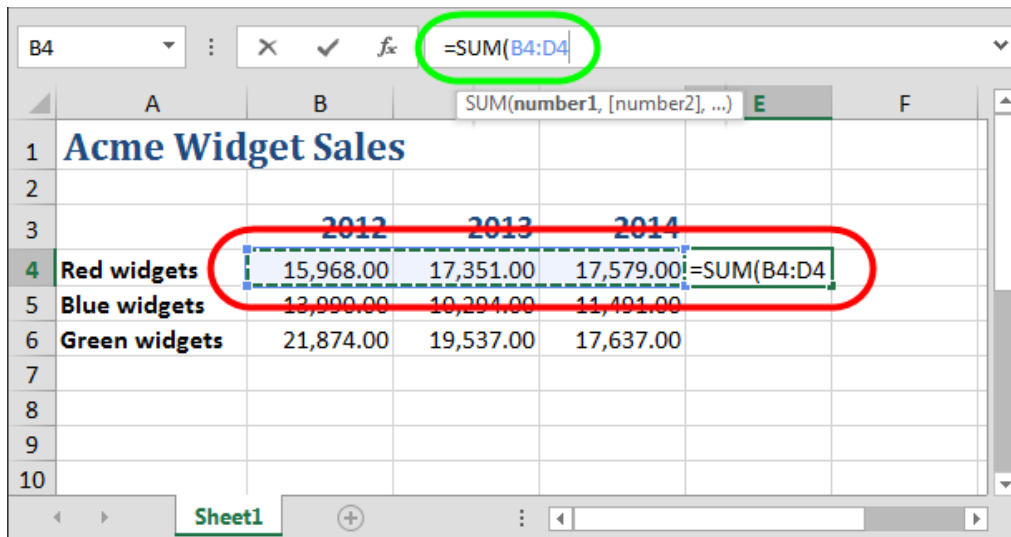
	2012	2013	2014
<b>Red widgets</b>	15,968.00	17,351.00	17,579.00
<b>Blue widgets</b>	13,990.00	10,294.00	11,491.00
<b>Green widgets</b>	21,874.00	19,537.00	17,637.00

You can perform calculations on a row of data by specifying the left-most cell, colon, and then the right-most cell. The range to specify these three cells is B4, colon, D4.

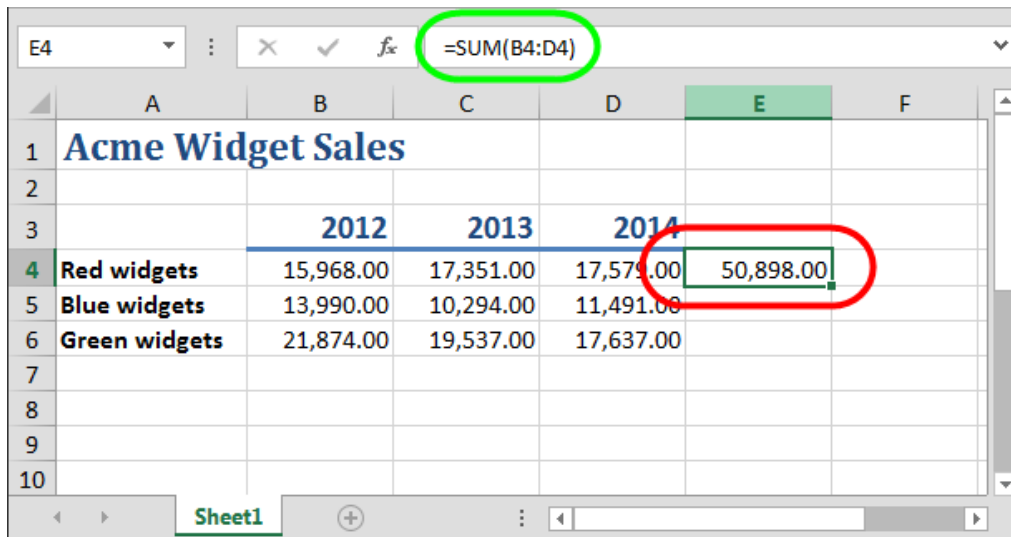
First, in cell E4 you would type: =SUM(.

	2012	2013	2014	
<b>Red widgets</b>	15,968.00	17,351.00	17,579.00	=SUM(
<b>Blue widgets</b>	13,990.00	10,294.00	11,491.00	
<b>Green widgets</b>	21,874.00	19,537.00	17,637.00	

Then click on cell B4, keep the button depressed, and drag to cell D4. Release the button upon reaching cell D4.



Finally, press **Enter** on your keyboard to complete the formula. The range specified in the formula is B4, colon, D4 and includes the values in cells B4, C4, and D4 in the sum, even though cell C4 is not explicitly listed in the formula.



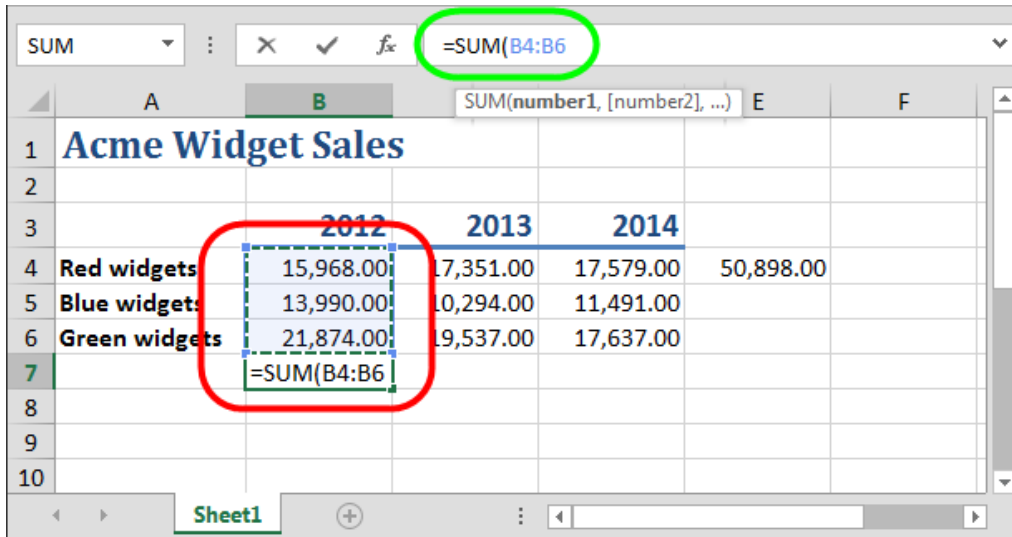
*Column of values:* To calculate the total sales of all widgets in the year 2012, you need to total the values in cells B4, B5, and B6. You can perform calculations on a column of data by specifying the top-most cell, a colon, and then the bottom-most cell. The range to specify these three cells is B4, colon, B6.

	2012	2013	2014
Red widgets	15,968.00	17,351.00	17,579.00
Blue widgets	13,990.00	10,294.00	11,491.00
Green widgets	21,874.00	19,537.00	17,637.00

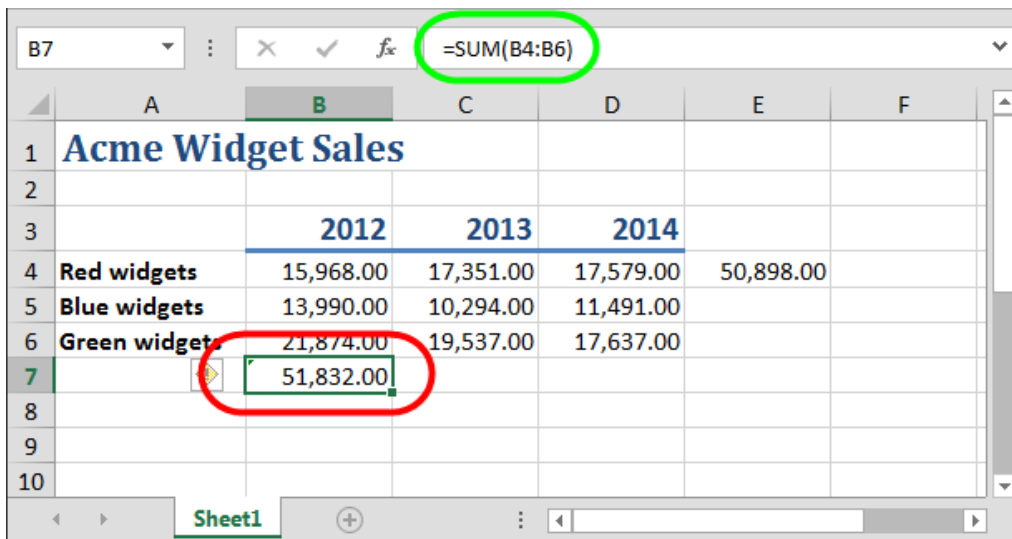
To complete this action, first you would select cell B7 and you would type: =SUM(.

	2012	2013	2014	
Red widgets	15,968.00	17,351.00	17,579.00	50,898.00
Blue widgets	13,990.00	10,294.00	11,491.00	
Green widgets	21,874.00	19,537.00	17,637.00	
	=SUM(			

Then, you would click on cell B4, keep the button depressed, and drag to cell B6. Release the button upon reaching cell B6.



Finally, press **Enter** on your keyboard to complete the formula. The range specified in the formula is B4, colon, B6 and includes the values in cells B4, B5, and B6 in the sum, even though cell B5 is not explicitly listed in the formula.





*Multiple rows and/or columns:* You can also specify multiple rows and/or columns. For example, to calculate the total sales of all widgets in the years 2012 and 2013, you need to total the values in cells B4, B5, and B6, as well as cells C4, C5, and C6. In this case, the range starts with the cell in the upper left-hand corner (or cell B4), followed by a colon, and then the cell in the lower right-hand corner (or cell C6). The range to specify these six cells is B4, colon, C6.

	2012	2013	2014
Red widgets	15,968.00	17,351.00	17,579.00
Blue widgets	13,990.00	10,294.00	11,491.00
Green widgets	21,874.00	19,537.00	17,637.00

To complete this action, first you would select cell C7 and then you would type: =SUM(.

	2012	2013	2014	
Red widgets	15,968.00	17,351.00	17,579.00	50,898.00
Blue widgets	13,990.00	10,294.00	11,491.00	
Green widgets	21,874.00	19,537.00	17,637.00	
	51,831.00	=SUM(		

Then, you would click on cell B4, keep the button depressed, and drag to cell C6. Release the button upon reaching cell C6.

	A	B	C	D	E	F
1	<b>Acme Widget Sales</b>					
2						
3		<b>2012</b>	<b>2013</b>	<b>2014</b>		
4	<b>Red widgets</b>	15,968.00	17,351.00	17,579.00	50,898.00	
5	<b>Blue widgets</b>	13,990.00	10,294.00	11,491.00		
6	<b>Green widgets</b>	21,874.00	19,537.00	17,637.00		
7		51,831.00	=SUM(B4:C6)			
8						
9						
10						

Finally, press **Enter** on your keyboard to complete the formula. The range specified in the formula is B4, colon, C6 and includes the values in cells B4, B5, and B6, as well as the values in cells C4, C5, and C6 in the sum.

	A	B	C	D	E	F
1	<b>Acme Widget Sales</b>					
2						
3		<b>2012</b>	<b>2013</b>	<b>2014</b>		
4	<b>Red widgets</b>	15,968.00	17,351.00	17,579.00	50,898.00	
5	<b>Blue widgets</b>	13,990.00	10,294.00	11,491.00		
6	<b>Green widgets</b>	21,874.00	19,537.00	17,637.00		
7		51,831.00	99,014.00			
8						
9						
10						

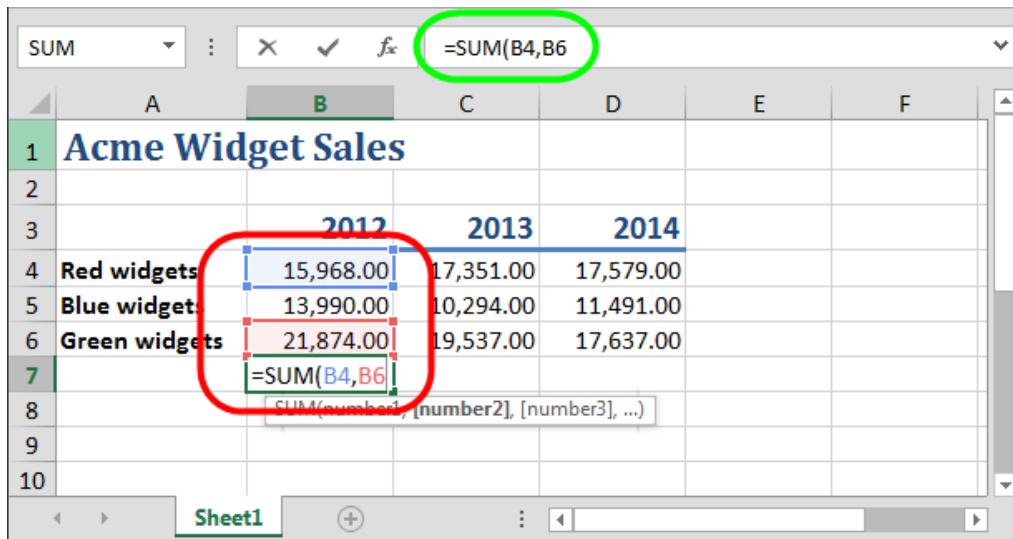
*Nonadjacent cells:* Lastly, it is possible to specify a range of cells that are not adjacent to each other with a comma, instead of a colon. For example, to calculate the total sales of red and green widgets in the year 2012, you need to total the values in cells B4 and B6. The range to specify these two cells is B4, comma, B6. Notice that the range B4, colon, B6 includes any cells in between cells B4 and B6 in the range, so cell B5 is included in the range. However, if you use a comma in the range, then only cells B4 and B6 are included.

	2012	2013	2014
Red widgets	15,968.00	17,351.00	17,579.00
Blue widgets	13,990.00	10,294.00	11,491.00
Green widgets	21,874.00	19,537.00	17,637.00

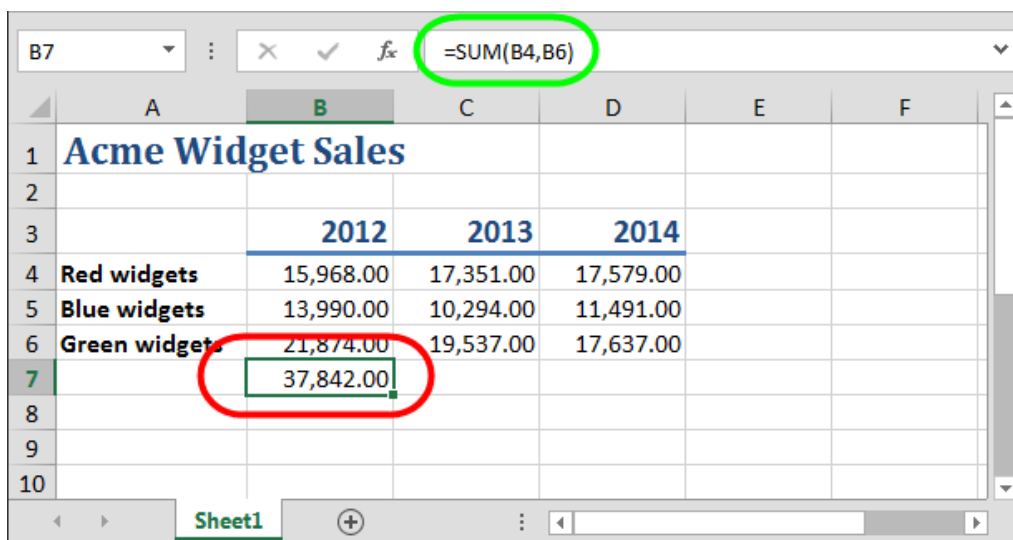
To see this in action, you would return to cell B7, delete the previous formula and type: =SUM(.

	2012	2013	2014
Red widgets	15,968.00	17,351.00	17,579.00
Blue widgets	13,990.00	10,294.00	11,491.00
Green widgets	21,874.00	19,537.00	17,637.00
	=SUM(		

Then, you would click on cell B4, hold down on the **Ctrl** key, click on cell B6, and then release the **Ctrl** key.



Finally, press **Enter** on your keyboard to complete the formula. The range specified in the formula is B4, comma, B6, and only includes the values in cells B4 and B6 in the sum because a comma was used in between the cell references instead of a colon.



To sum things up, we discussed how an Excel spreadsheet is composed of a grid of cells. Each cell may contain a label, a value, or a formula. Functions may be used in formulas to perform more advanced operations. We also covered the basics of working with cell ranges in formulas in Excel using either a comma or a colon to specify whether the cells in the range are adjacent or nonadjacent to each other.