

Microsoft EXCEL

Introduction

In this course participants will explore Excel activities that go beyond the basic. After successful completion of this session, participants can expect to have the skills required to work efficiently in an existing worksheet and to also create new worksheets from a template and from scratch.

Topics Include

- Create a basic worksheet by entering text, values, and formulas.
- Change the appearance of worksheet data by using a variety of formatting techniques.
- Create formulas by using some of Excel's built-in functions.
- Filter and sort Excel data.
- Plan, create and modify charts.

Software

Requirements

Windows operating systems or MAC operating system

Microsoft Excel 2013, Microsoft Excel 2010 (Windows)

Microsoft Excel 2011 (MAC)

Note to the students

These notes cover majority of the key functions and operations done in MS. Excel. Therefore, they are the most suitable guide to help you in becoming an expert in Ms. Excel. Just like MS. Word, Excel is also a practical session, thus, you are highly advised to participate in practical exercise both in class (Lab Sessions) and out of class (Library Computers and personal laptops) in order to gain mastery of concepts. The skills that you acquire here will be useful all through your career life and/or business life since Ms. Excel is the most widely used business software.

1. Opening Excel

Using Windows 7

1. Click on the Start Button.
2. In the Search Program and Files box type Excel.
3. Click on Excel 2013 from the Program results.
4. The Microsoft Excel 2013 program will open.

Using Windows 8

1. Press the Windows key on the keyboard.
2. Type Excel.
3. Click on Excel 2013 under the Apps results.

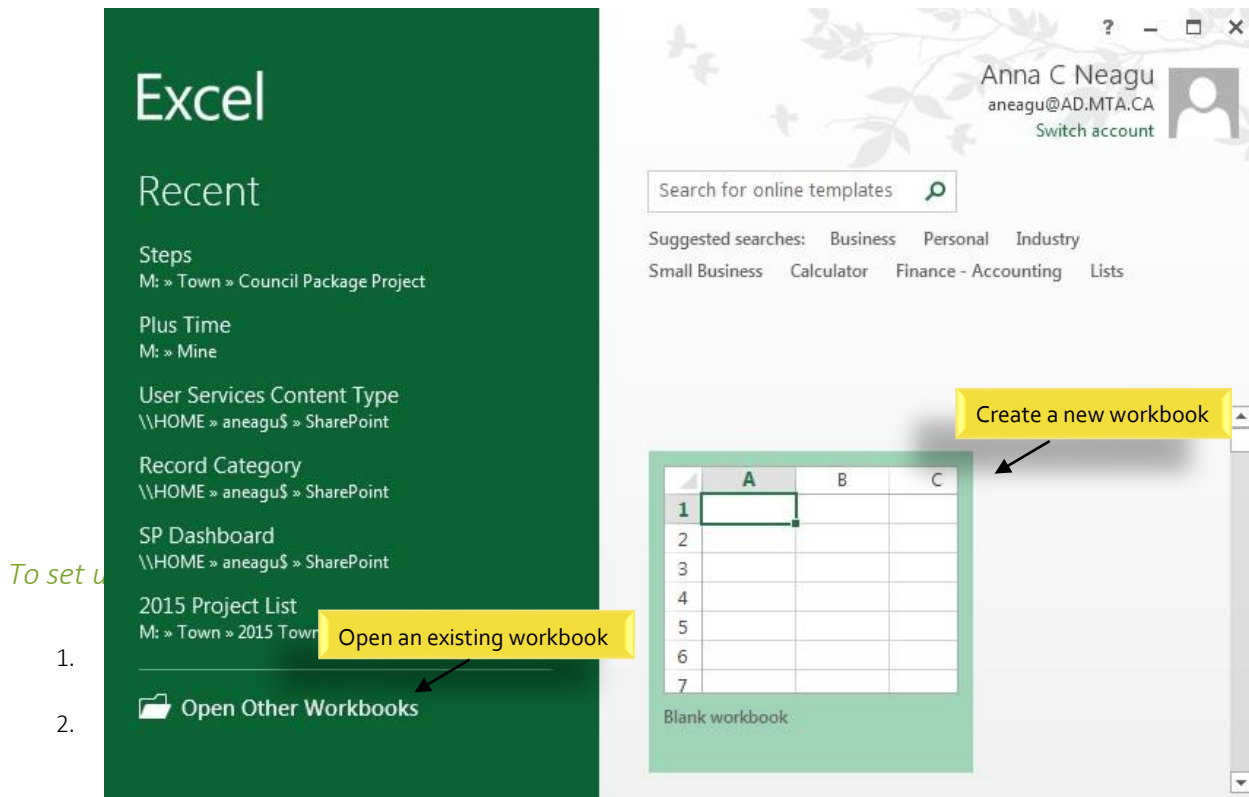
Using iOS 7

1. Click on Launchpad.
2. Select Microsoft Excel.

2. Getting Started

When you open Excel 2013 for the first time, the Excel Start Screen will appear. From here, you'll be able to create a new workbook, choose a template, and access your recently edited workbooks.

1. From the Excel Start Screen, locate and select Blank workbook to access the Excel interface.
2. Click Open Other Workbooks to work on an existing workbook.



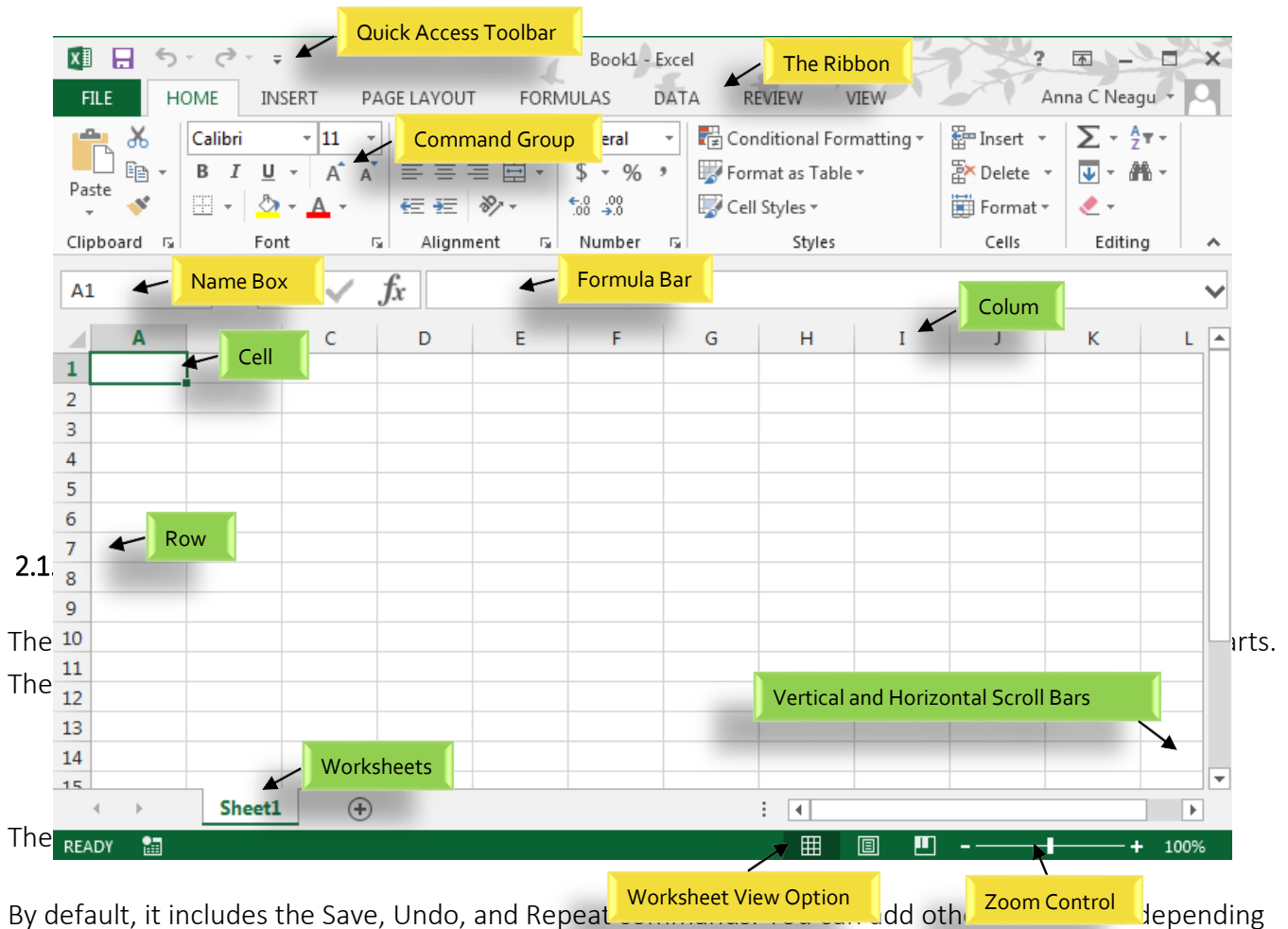
- 1.
- 2.
3. The next time you start Excel, it opens a blank workbook automatically similar to older versions of Excel.

2.1. The Excel Interface

After starting Excel, you will see two windows - one within the other. The outer window is the Application Window and the inner window is the Workbook Window. When maximized, the Excel Workbook Window blends in with the Application Window.

After completing this module, you should be able to:

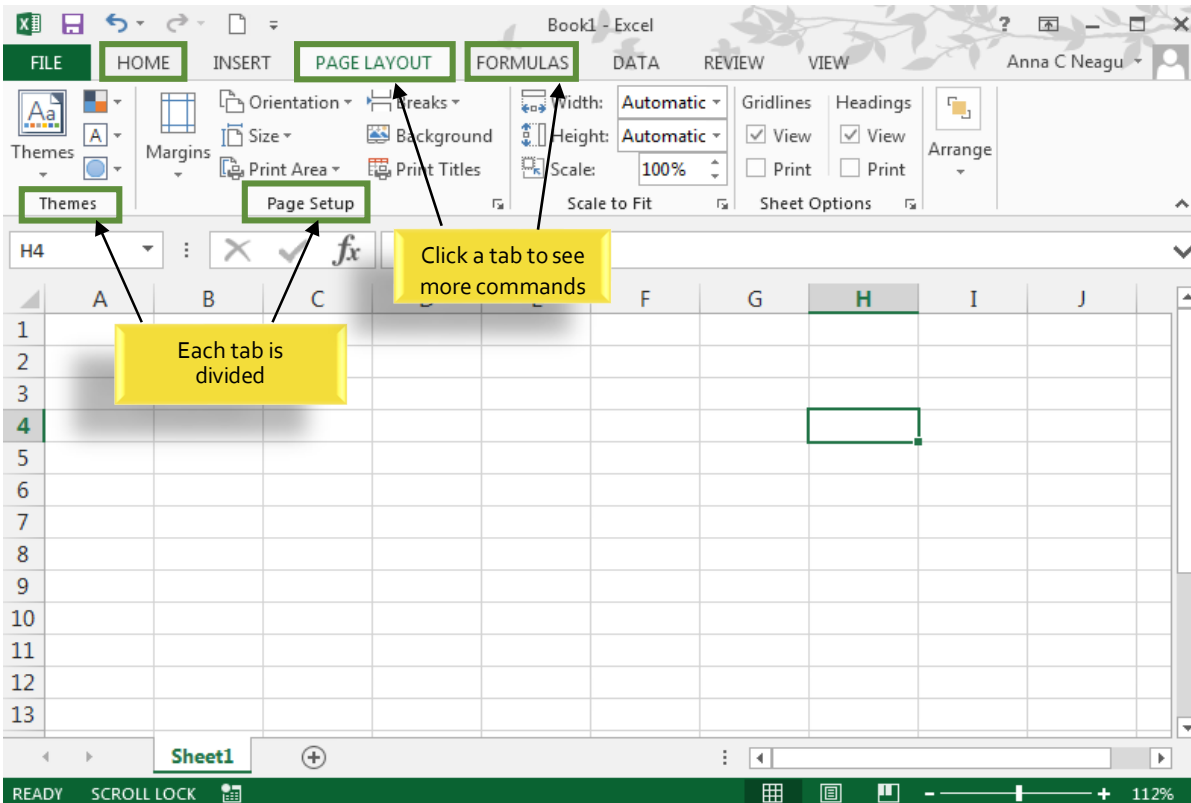
- Identify the components of the Application Window.
- Identify the components of the Workbook Window.



By default, it includes the Save, Undo, and Repeat commands. You can add other commands depending on your preference.

□ The Ribbon

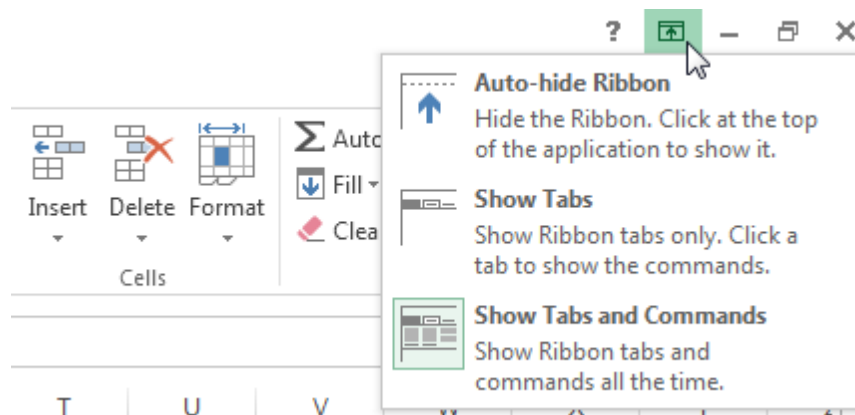
Excel 2013 uses a tabbed Ribbon system instead of traditional menus. The Ribbon contains multiple tabs, each with several groups of commands. You will use these tabs to perform the most common tasks in Excel.



To minimize and maximize the Ribbon

The Ribbon is designed to respond to your current task, but you can choose to minimize it if you find that it takes up too much screen space.

1. Click the Ribbon Display Options arrow in the upper-right corner of the Ribbon.

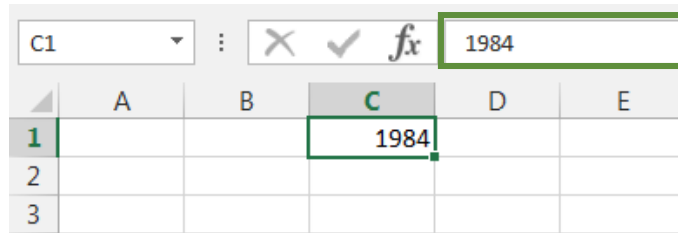


2. Select the desired minimizing option from the drop-down menu:

☐ The Formula Bar

In the formula bar, you can enter or edit data, a formula, or a function that will appear in a specific cell.

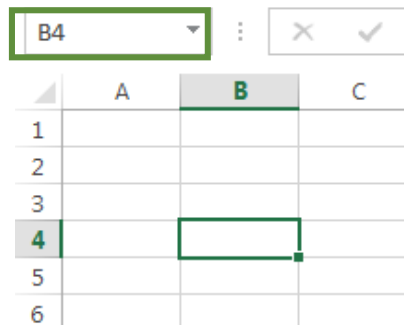
In the image below, cell C1 is selected and 1984 is entered into the formula bar. Note how the data appears in both the formula bar and in cell C1.



☐ The Name Box

The Name box displays the location, or "name" of a selected cell.

In the image below, cell B4 is selected. Note that cell B4 is where column B and row 4 intersect.



Challenge!

1. Open Excel 2013.
2. Click through all of the tabs, and review the commands on the Ribbon.
3. Try minimizing and maximizing the Ribbon.
4. Try switching worksheet views.
5. Close Excel (you do not have to save the workbook).

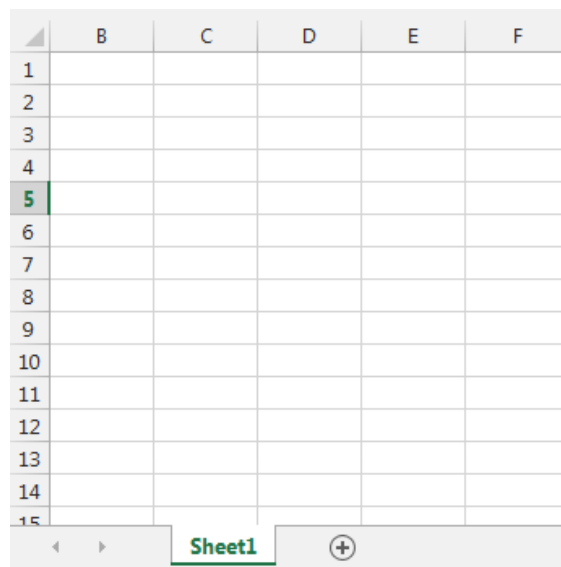
2.1.2. The Workbook Window

In Excel 2013, when you open up a new workbook it now contains only 1 worksheet. There can be a max of 1,048,576 rows and 16,384 columns in an excel work sheet.

❏ The Worksheet

Excel files are called workbooks. Each workbook holds one or more worksheets (also known as "spreadsheets").

Whenever you create a new Excel workbook, it will contain one worksheet named Sheet1. A worksheet is a grid of columns and rows where columns are designated by letters running across the top of the worksheet and rows are designated by numbers running down the left side of the worksheet.

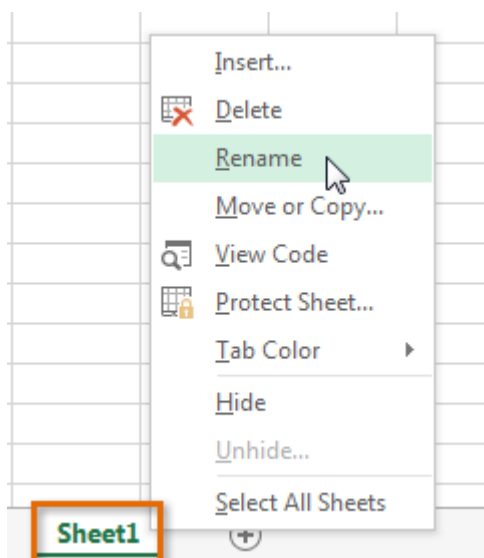


When working with a large amount of data, you can create multiple worksheets to help organize your workbook and make it easier to find content. You can also group worksheets to quickly add information to multiple worksheets at the same time.

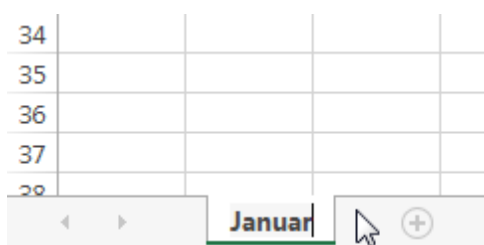
To rename a worksheet

Whenever you create a new Excel workbook, it will contain one worksheet named Sheet1. You can rename a worksheet to better reflect its content. In our example, we will create a training log organized by month.

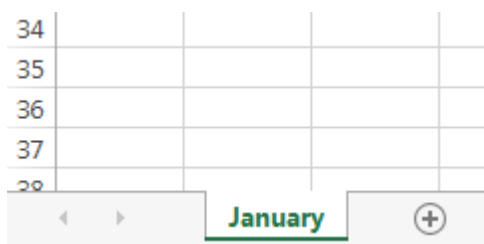
1. Right-click the worksheet you wish to rename, then select Rename from the worksheet menu.



2. Type the desired name for the worksheet.



3. Click anywhere outside of the worksheet, or press Enter on your keyboard. The worksheet will be renamed.




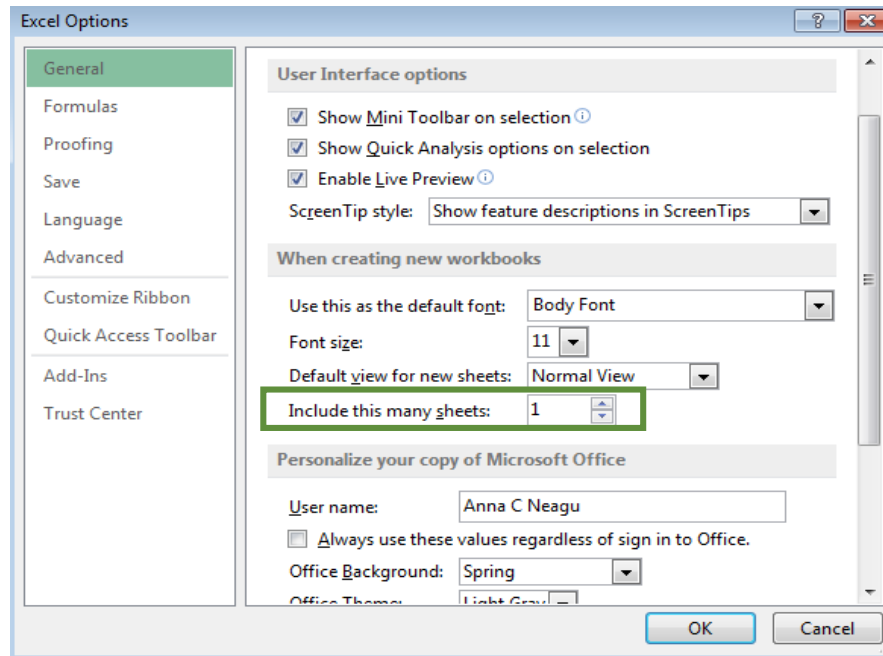
To insert a new worksheet

1. Locate and select the New sheet button.



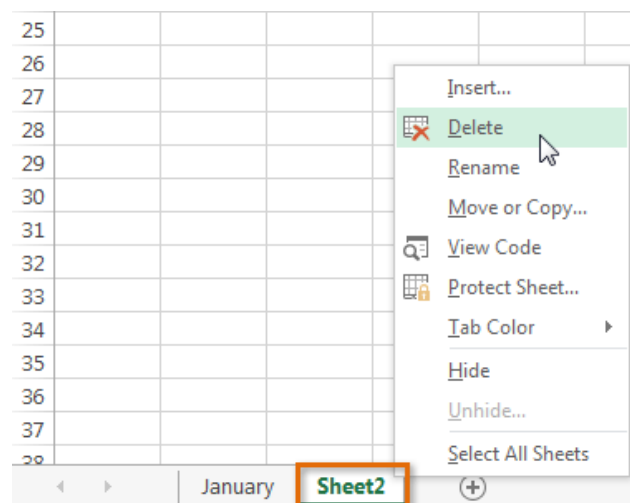
2. A new, blank worksheet will appear.

 **TIP:** To change the default number of worksheets, navigate to Backstage view, click Options, and then choose the desired number of worksheets to include in each new workbook.

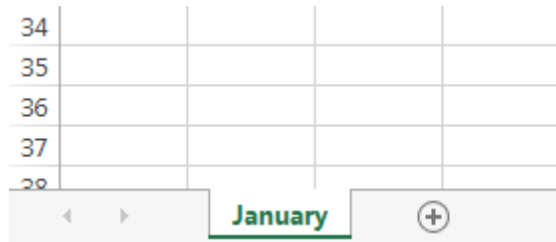


To delete a worksheet

1. Right-click the worksheet you wish to delete, then select Delete from the worksheet menu.



2. The worksheet will be deleted from your workbook.



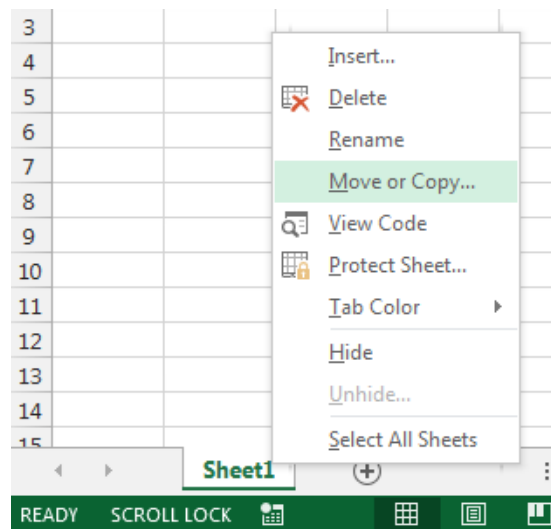
Alternatively, from the Home Tab in the Cells Group click on Delete and select Delete Sheet.

Warning: The Undo button will not undo the deletion of a worksheet.

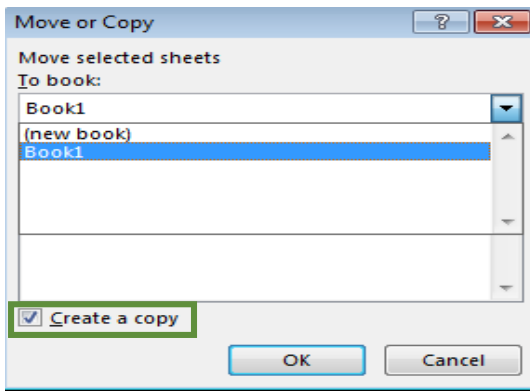
To copy a worksheet

If you need to duplicate the content of one worksheet to another, Excel allows you to copy an existing worksheet.

1. Right-click the worksheet you want to copy, then select Move or Copy from the worksheet menu.

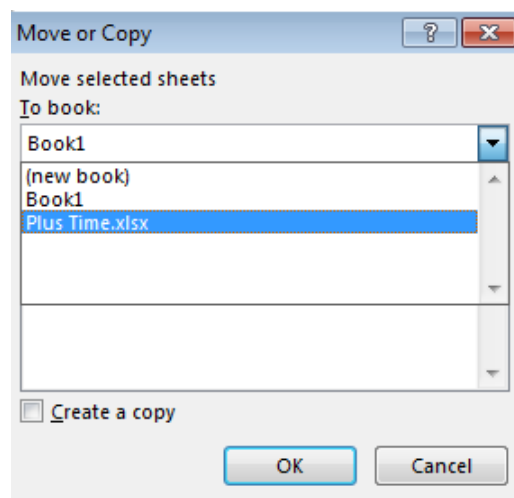


2. The Move or Copy dialog box will appear. Choose where the sheet will appear in the Before sheet: field. In our example, we'll choose (move to end) to place the worksheet to the right of the existing worksheet.
3. Check the box next to Create a copy, then click OK.




- The worksheet will be copied. It will have the same title as the original worksheet, as well as a version number.

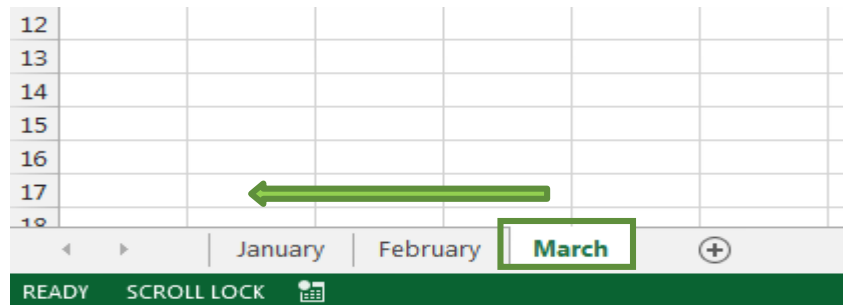
TIP: You can also copy a worksheet to an entirely different workbook. You can select any workbook that is currently open from the To book: drop-down menu.



To move a worksheet

Sometimes you may want to move a worksheet to rearrange your workbook.

- Select the worksheet you wish to move. The cursor will become a small worksheet icon .
- Hold and drag the mouse until a small black arrow appears above the desired location.

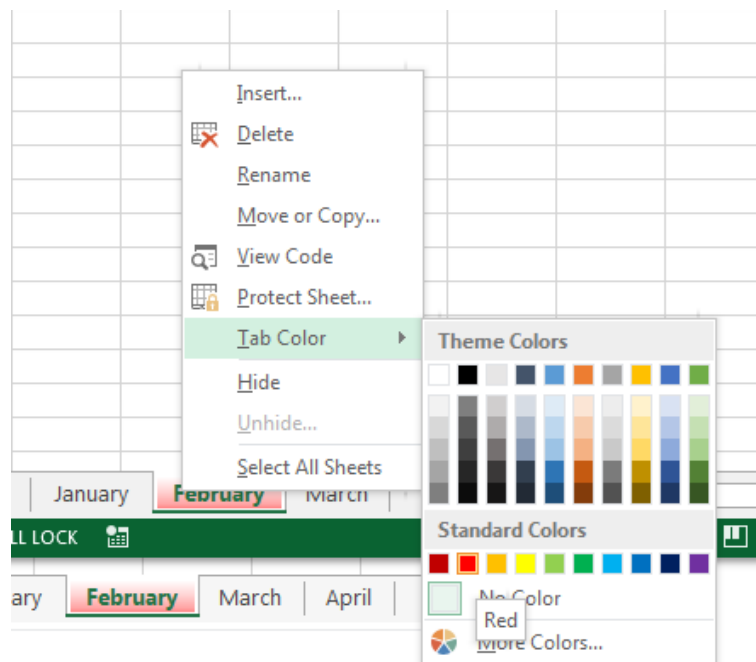


3. Release the mouse. The worksheet will be moved.

To change the worksheet color

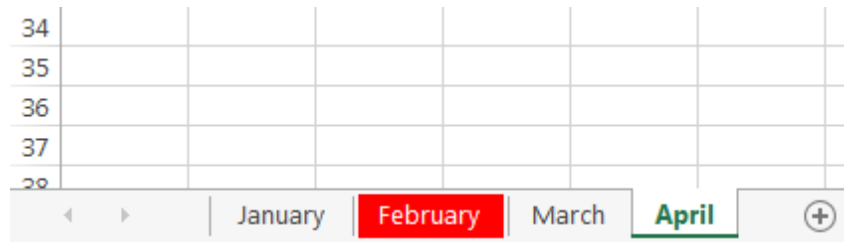
You can change a worksheet's color to help organize your worksheets and make your workbook easier to navigate.

1. Right-click the desired worksheet, and hover the mouse over Tab Color. The Color menu will appear.
2. Select the desired color. A live preview of the new worksheet color will appear as you hover the mouse over different options. In our example, we'll choose Red.



3. The worksheet color will be changed.

The worksheet color is considerably less noticeable when the worksheet is selected. Select another worksheet to see how the color will appear when the worksheet is not selected.



Challenge!

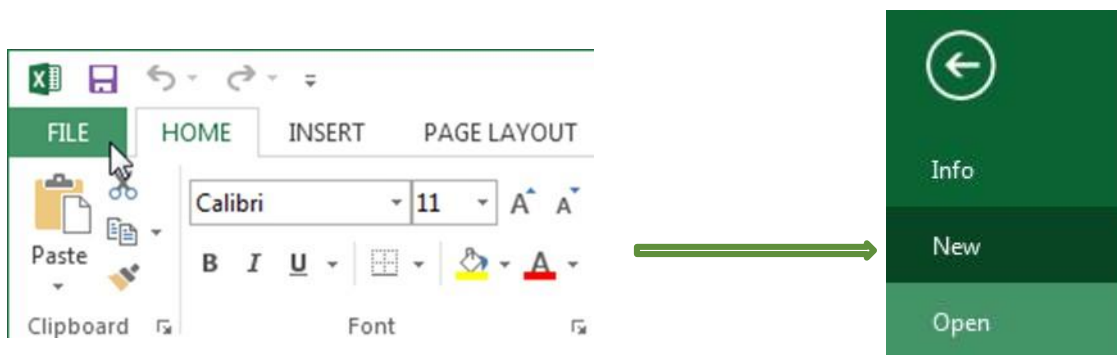
1. Open an existing Excel workbook.
2. Insert a new worksheet and rename it.
3. Delete a worksheet.
4. Move a worksheet.
5. Copy a worksheet.

2.2. Creating and Opening Workbooks

Excel files are called workbooks. Whenever you start a new project in Excel, you'll need to create a new workbook. There are several ways to start working with a workbook in Excel 2013. You can choose to create a new workbook—either with a blank workbook or a predesigned template—or open an existing workbook.

2.2.1. Create a new blank workbook

1. Select the File tab. Backstage view will appear.

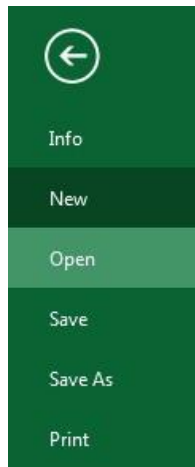


2. Select New, then click Blank workbook.
3. A new blank workbook will appear.

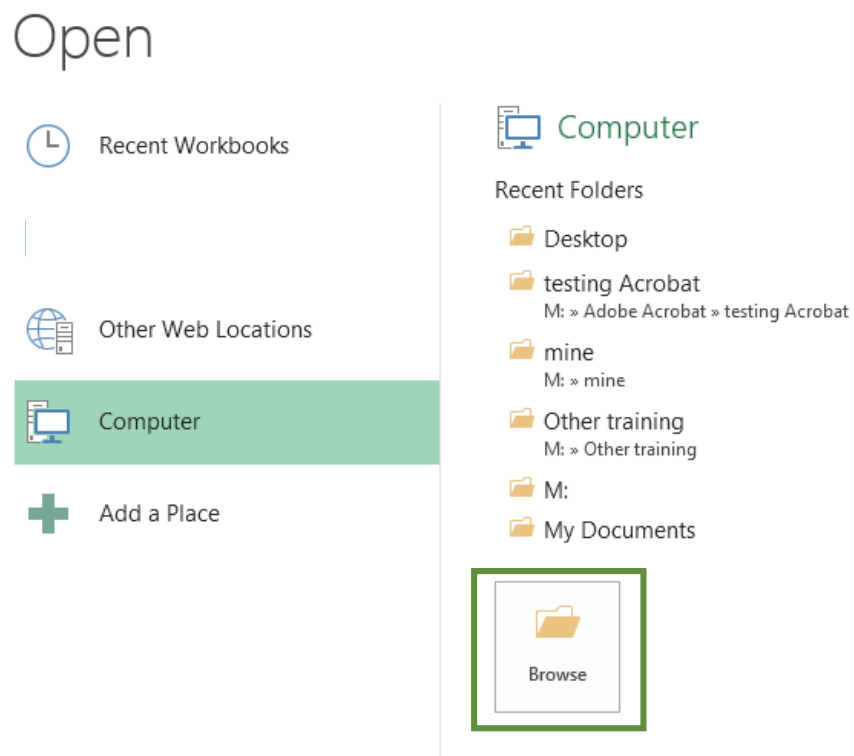
2.2.2. Open an existing workbook

In addition to creating new workbooks, you'll often need to open a workbook that was previously saved.

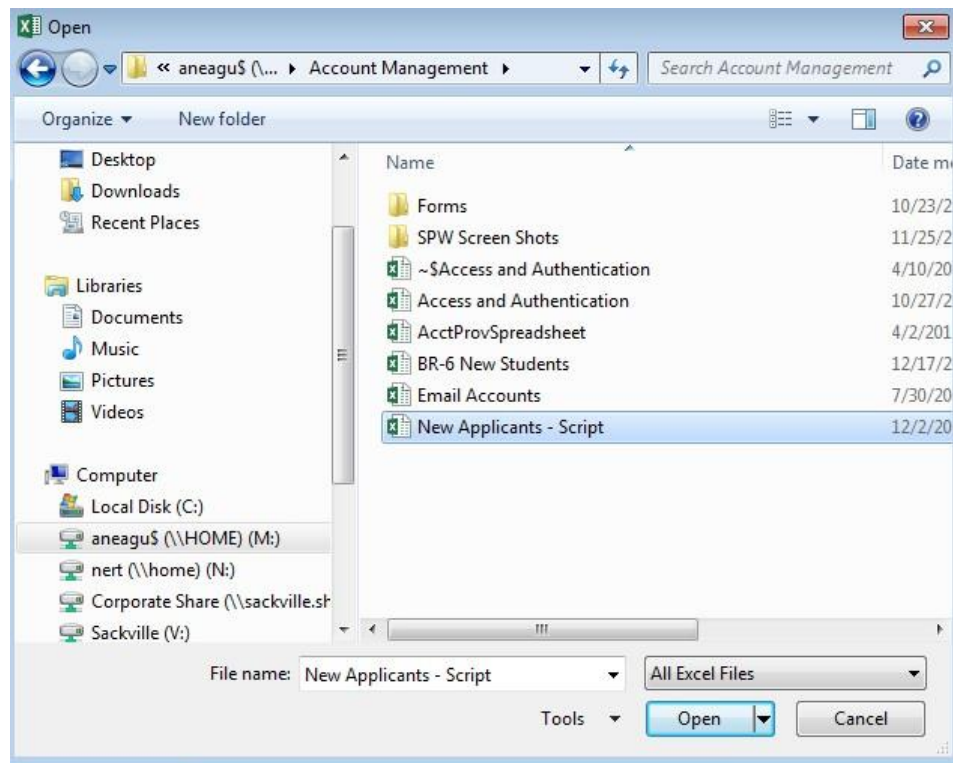
1. Navigate to Backstage view, then click Open.



2. Select Computer, and then click Browse.

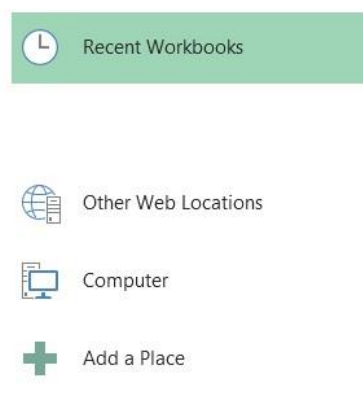


3. The Open dialog box will appear. Locate and select your workbook, then click Open.



- TIP:** If you've opened the desired workbook recently, you can browse your Recent Workbooks rather than searching for the file.

Open

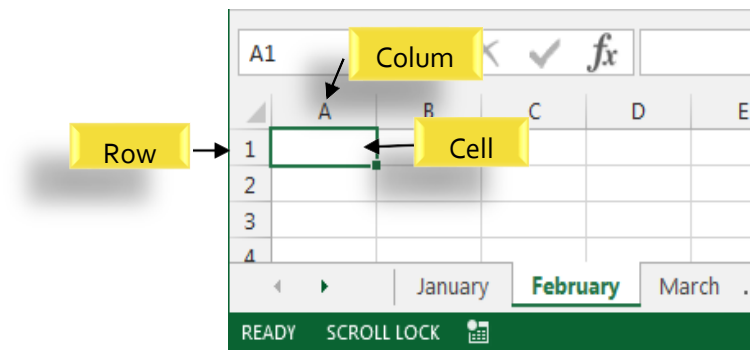


3. Cell Basics

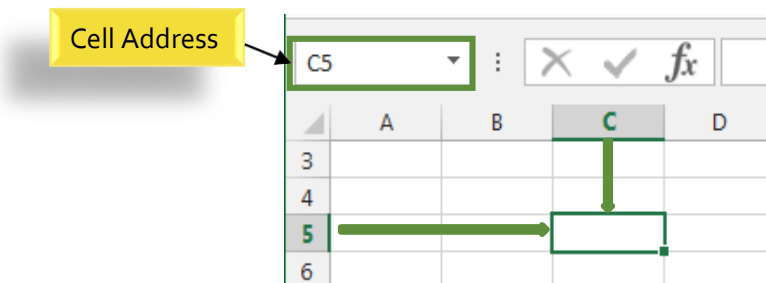
Whenever you work with Excel, you'll enter information, or content, into cells. Cells are the basic building blocks of a worksheet. You'll need to learn the basics of cells and cell content to calculate, analyze, and organize data in Excel.

3.1. Understanding Cells

Every worksheet is made up of thousands of rectangles, which are called cells. A cell is the intersection of a row and a column. Columns are identified by letters (A, B, C), while rows are identified by numbers (1, 2, 3).



Each cell has its own name, or cell address, based on its column and row. In this example, the selected cell intersects column C and row 5, so the cell address is C5. The cell address will also appear in the Name box. Note that a cell's column and row headings are highlighted when the cell is selected.

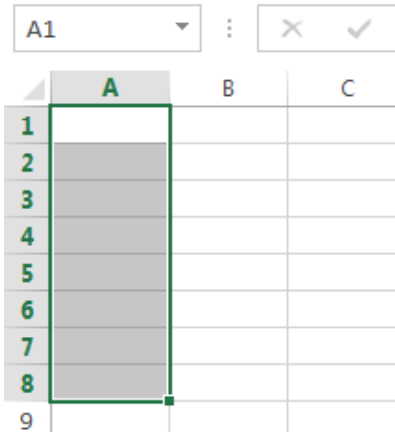


You can also select multiple cells at the same time. **A group of cells is known as a cell range.** Rather than a single cell address, you will refer to a cell range using the cell addresses of the first and last cells in the cell range, separated by a colon. For example, a cell range that included cells A1, A2, A3, A4, and A5 would be

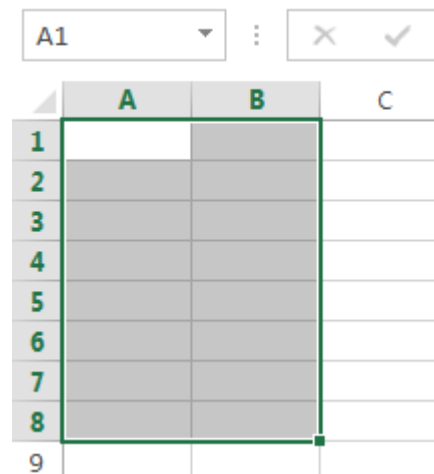
written as A1:A5.

In the images below, two different cell ranges are selected:

- Cell range A1:A8



- Cell range A1:B8



To select a cell range

Sometimes you may want to select a larger group of cells, or a cell range.

1. Click, hold, and drag the mouse until all of the adjoining cells you wish to select are highlighted.
2. Release the mouse to select the desired cell range. The cells will remain selected until you click another cell in the worksheet.

3.2. Cell Content

Any information you enter into a spreadsheet will be stored in a cell. Each cell can contain several different

kinds of content, including text, formatting, formulas, and functions.

❑ Text

Cells can contain text, such as letters, numbers, and dates.

	A	B	C
1	Date	Sales	Percentage of Total
2	5/6/2013	65	0.71
3	5/7/2013	78	0.78
4	5/8/2013	112	0.86
5	5/9/2013	54	0.28
6	5/10/2013	99	0.49
7	5/11/2013	189	0.65
8	5/12/2013	120	0.57
9			

❑ Formatting Attributes

Cells can contain formatting attributes that change the way letters, numbers, and dates are displayed. For example, percentages can appear as 0.15 or 15%. You can even change a cell's background color. Some of the formatting attributes that are used in MS. Word also apply to MS. Excel

❑ Formulas and Functions

Cells can contain formulas and functions that calculate cell values. In our example, SUM (B4:B7) adds the value of each cell in cell range B4:B7 and displays the total in cell B8.

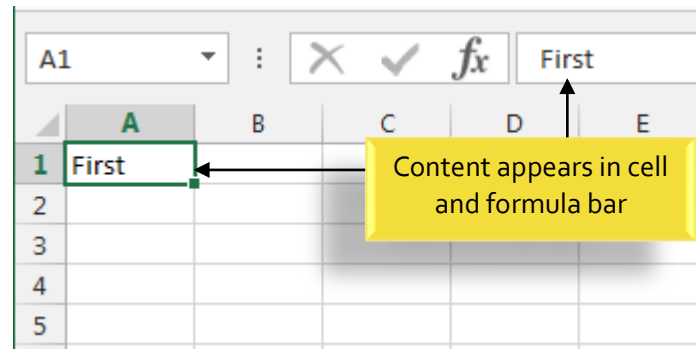
B8 : =SUM(B4:B7)					
	A	B	C	D	E
3	Date	Students	Percentage		
4	1/2/2015	36	36%		100
5	1/3/2015	50	50%		
6	1/4/2015	14	14%		
7	1/5/2015	55	55%		
8		155			

To insert content

1. Click a cell to select it.

	A	B	C
1			
2			

2. Type content into the selected cell, then press Enter on your keyboard. The content will appear in the cell and the formula bar. You can also input and edit cell content in the formula bar.



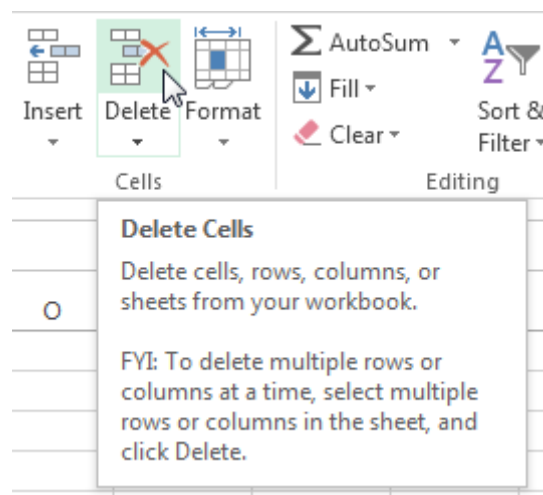
To delete cell content

1. Select the cell with content you wish to delete.
2. Press the Delete or Backspace key on your keyboard. The cell's contents will be deleted.

To delete cells

There is an important difference between deleting the content of a cell and deleting the cell itself. If you delete the entire cell, the cells below it will shift up and replace the deleted cells.

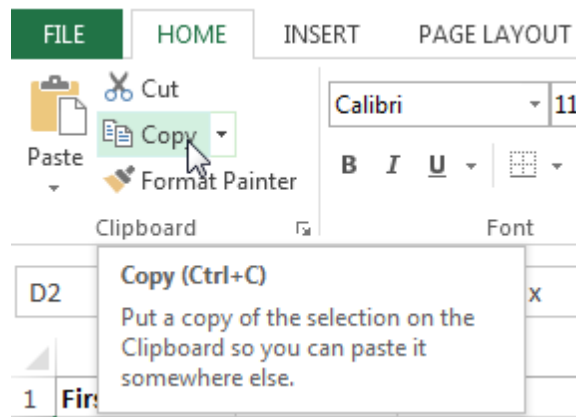
1. Select the cell(s) you wish to delete.
2. Select the Delete command from the Home tab on the Ribbon.
3. The cells below will shift up.




To copy and paste cell content

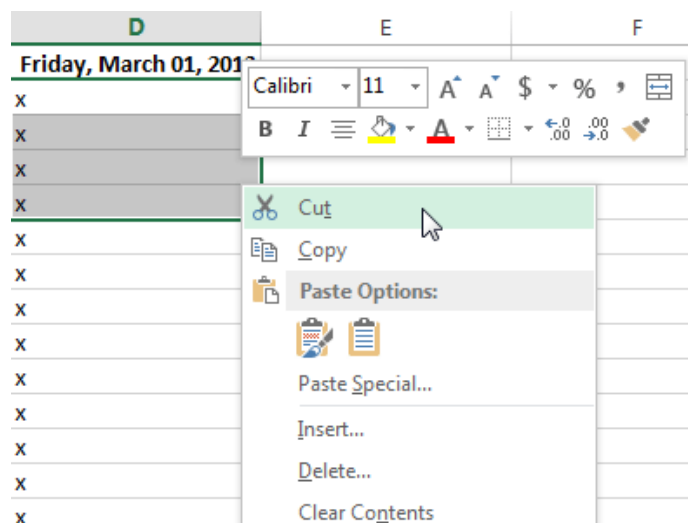
Excel allows you to copy content that is already entered into your spreadsheet and paste that content to other cells, which can save you time and effort.

1. Select the cell(s) you wish to copy.
2. Click the Copy command on the Home tab, or press Ctrl+C on your keyboard.



3. Select the cell(s) where you wish to paste the content. The copied cells will now have a dashed box around them.
4. Click the Paste command on the Home tab, or press Ctrl+V on your keyboard.
5. The content will be pasted into the selected cells.

 **TIP:** Rather than choosing commands from the Ribbon, you can access commands quickly by right-clicking. Simply select the cell(s) you wish to format, then right-click the mouse. A drop-down menu will appear, where you'll find several commands that are also located on the Ribbon.



To drag and drop cells

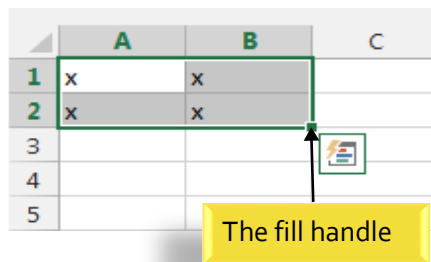
Rather than cutting, copying, and pasting, you can drag and drop cells to move their contents.

1. Select the cell(s) you wish to move.
2. Hover the mouse over the border of the selected cell(s) until the cursor changes from a white cross to a black cross with four arrows.
3. Click, hold, and drag the cells to the desired location.
4. Release the mouse, and the cells will be dropped in the selected location.

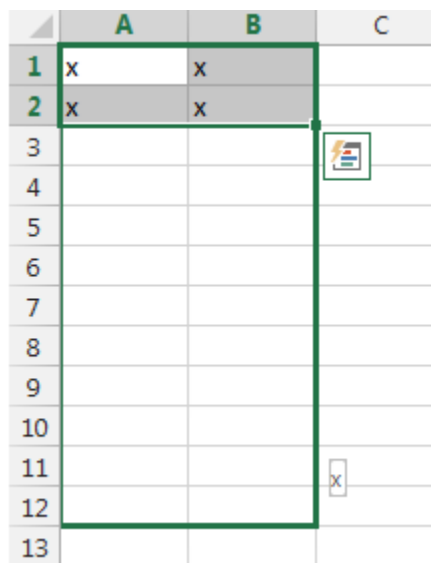
To use the fill handle

There may be times when you need to copy the content of one cell to several other cells in your worksheet. You could copy and paste the content into each cell, but this method would be very time consuming. Instead, you can use the fill handle to quickly copy and paste content to adjacent cells in the same row or column.

1. Select the cell(s) containing the content you wish to use. The fill handle will appear as a small square in the bottom-right corner of the selected cell(s).



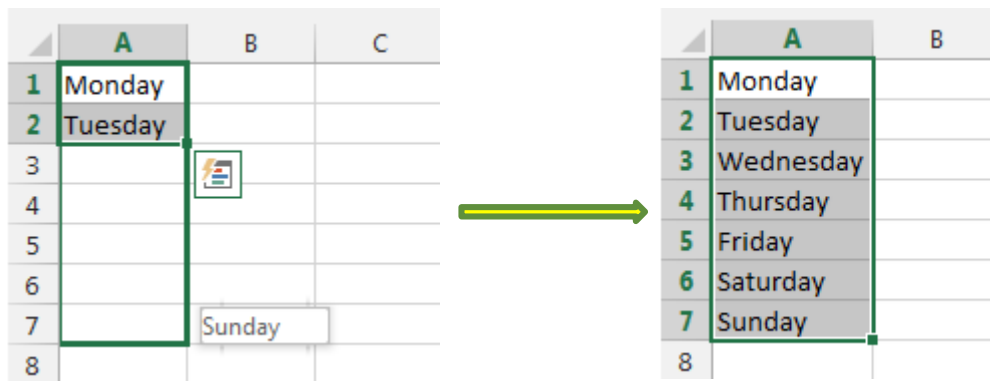
2. Click, hold, and drag the fill handle until all of the cells you wish to fill are selected.



3. Release the mouse to fill the selected cells.

To continue a series with the fill handle

The fill handle can also be used to continue a series. Whenever the content of a row or column follows a sequential order, like numbers (1, 2, 3) or days (Monday, Tuesday, Wednesday), the fill handle can guess what should come next in the series. In many cases, you may need to select multiple cells before using the fill handle to help Excel determine the series order. In our example below, the fill handle is used to extend a series of dates in a column.

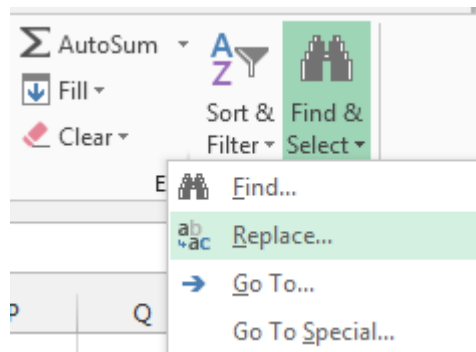


3.3. Find and Replace

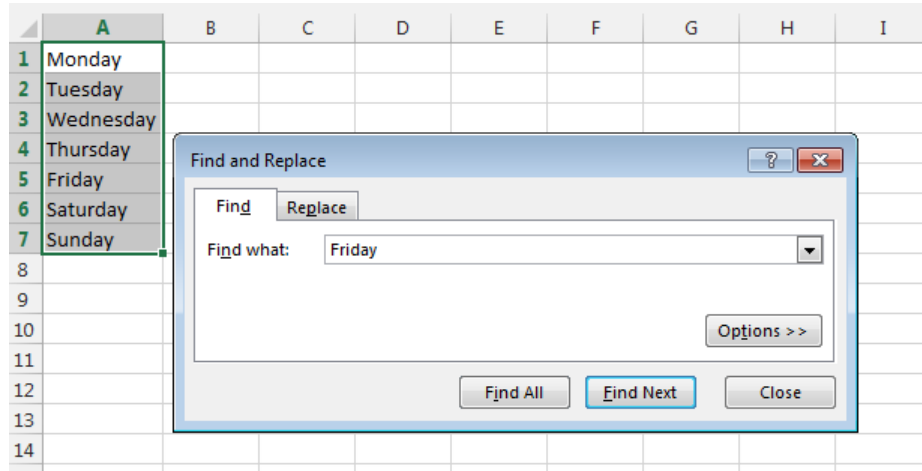
When working with a lot of data in Excel, it can be difficult and time consuming to locate specific information. You can easily search your workbook using the Find feature, which also allows you to modify content using the Replace feature.

To find content

1. From the Home tab, click the Find and Select command, then select Find... from the drop-down menu.



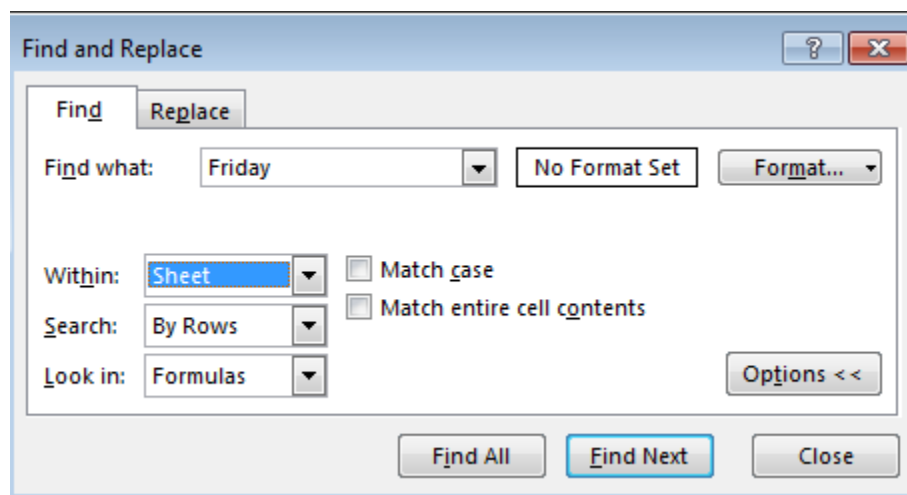
2. The Find and Replace dialog box will appear. Enter the content you wish to find.
3. Click Find Next. If the content is found, the cell containing that content will be selected.



4. Click Find Next to find further instances or Find All to see every instance of the search term.
5. When you are finished, click Close to exit the Find and Replace dialog box.

 TIP: You can also access the Find command by pressing Ctrl+F on your keyboard.

 TIP: Click Options to see advanced search criteria in the Find and Replace dialog box.



To replace cell content

At times, you may discover that you've repeatedly made a mistake throughout your workbook (such as

misspelling someone's name), or that you need to exchange a particular word or phrase for another. You can use Excel's Find and Replace feature to make quick revisions.

1. From the Home tab, click the Find and Select command, then select Replace... from the drop-down menu.
2. The Find and Replace dialog box will appear. Type the text you wish to find in the Find what: field.
3. Type the text you wish to replace it with in the Replace with: field, then click Find Next.
4. If the content is found, the cell containing that content will be selected.
5. Review the text to make sure you want to replace it.
6. If you wish to replace it, select one of the replace options:
 - Replace will replace individual instances.
 - Replace All will replace every instance of the text throughout the workbook. In our example, we'll choose this option to save time.
7. A dialog box will appear, confirming the number of replacements made. Click OK to continue.
8. When you are finished, click Close to exit the Find and Replace dialog box.

Challenge!

1. Open an existing Excel 2013 workbook.
2. Select cell D3. Notice how the cell address appears in the Name box and its content appears in both the cell and the Formula bar.
3. Select a cell, and try inserting text and numbers.
4. Delete a cell, and note how the cells below shift up to fill in its place.
5. Cut cells and paste them into a different location.
6. Try dragging and dropping some cells to other parts of the worksheet.
7. Use the fill handle to fill in data to adjoining cells both vertically and horizontally.
8. Use the Find feature to locate content in your workbook.

4. Formatting Cells

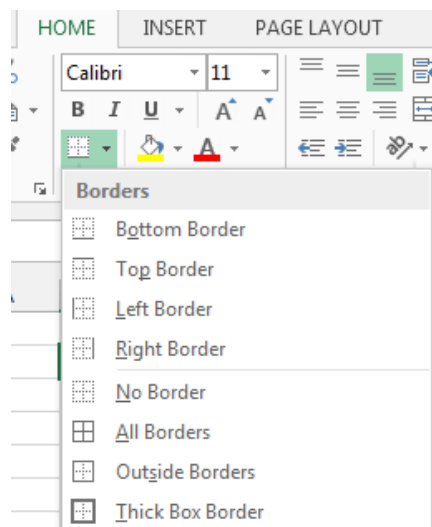
All cell content uses the same formatting by default, which can make it difficult to read a workbook with a lot of information. Basic formatting can customize the look and feel of your workbook, allowing you to draw attention to specific sections and making your content easier to view and understand. You can also apply number formatting to tell Excel exactly what type of data you're using in the workbook, such as percentages (%), currency (\$), and so on.

4.1. Cell borders and fill colors


Cell borders and fill colors allow you to create clear and defined boundaries for different sections of your worksheet.

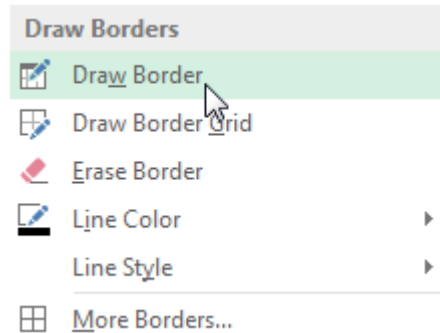
To add a border

1. Select the cell(s) you wish to modify.
2. Click the drop-down arrow next to the Borders command on the Home tab. The Borders drop-down menu will appear.



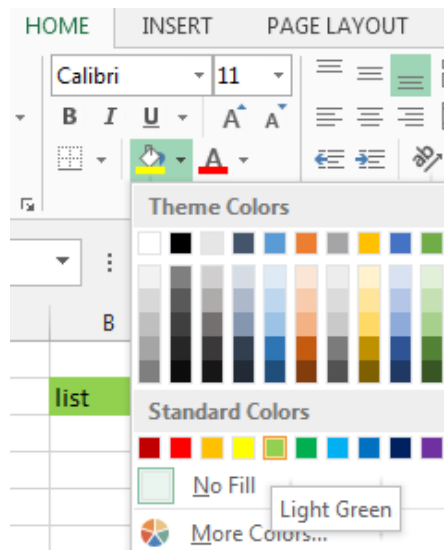
3. Select the border style you want to use.
4. The selected border style will appear.

 **TIP:** You can draw borders and change the line style and color of borders with the Draw Borders tools at the bottom of the Borders drop-down menu.



To add a fill color

1. Select the cell(s) you wish to modify.
2. Click the drop-down arrow next to the Fill Color command on the Home tab. The Fill Color menu will appear.
3. Select the fill color you want to use. A live preview of the new fill color will appear as you hover the mouse over different options. In our example, we'll choose Light Green.



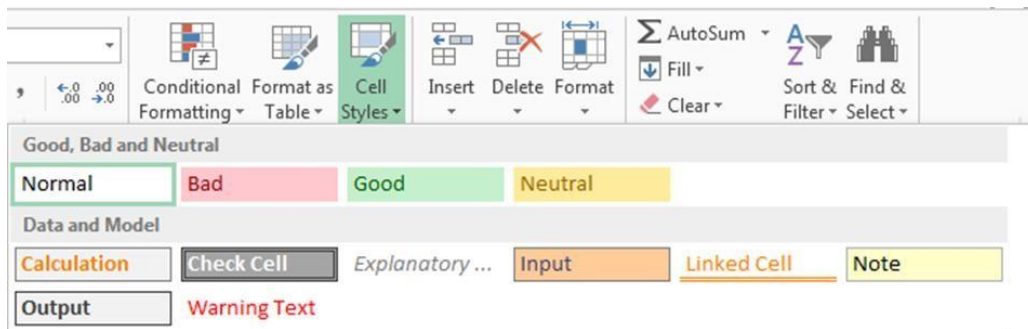
4. The selected fill color will appear in the selected cells.

4.2. Cell styles


Rather than formatting cells manually, you can use Excel's predefined cell styles. Cell styles are a quick way to include professional formatting for different parts of your workbook, such as titles and headers.

To apply a cell style

1. Select the cell(s) you wish to modify.
2. Click the Cell Styles command on the Home tab, then choose the desired style from the drop-down menu.



3. The selected cell style will appear.

 **TIP:** Applying a cell style will replace any existing cell formatting except for text alignment. You may not want to use cell styles if you've already added a lot of formatting to your workbook.

4.3. Formatting text and numbers

One of the most powerful tools in Excel is the ability to apply specific formatting for text and numbers. Instead of displaying all cell content in exactly the same way, you can use formatting to change the appearance of dates, times, decimals, percentages (%), currency (\$), and much more.

To apply number formatting

1. Select the cells(s) you wish to modify.
2. Click the drop-down arrow next to the Number Format command on the Home tab. The Number Formatting drop-down menu will appear.
3. Select the desired formatting option.
4. The selected cells will change to the new formatting style.





Challenge!

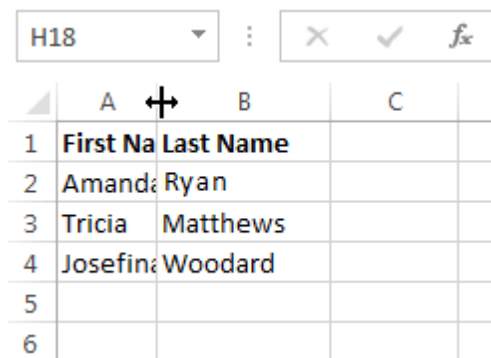
1. Open an existing Excel 2013 workbook.
2. Select a cell and change the font style, size, and color of the text.
3. Apply bold, italics, or underline to a cell.
4. Try changing the vertical and horizontal text alignment for some cells.
5. Add a border to a cell range.
6. Change the fill color of a cell range.
7. Try changing the formatting of a number.

5. Modifying Columns, Rows and Cells

By default, every row and column of a new workbook is always set to the same height and width. Excel allows you to modify column width and row height in different ways, including wrapping text and merging cells.


To modify column width

1. Position the mouse over the column line in the column heading so the white cross  becomes a double arrow .





	A	B	C
1	First Name	Last Name	
2	Amanda	Ryan	
3	Tricia	Matthews	
4	Josefine	Woodard	
5			
6			


2. Click, hold, and drag the mouse to increase or decrease the column width.
3. Release the mouse. The column width will be changed.

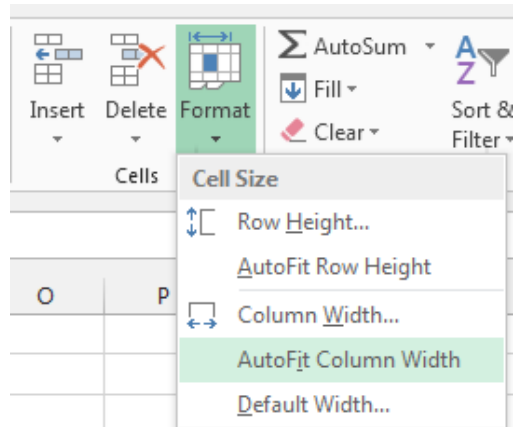
 **TIP:** If you see pound signs (#####) in a cell, it means that the column is not wide enough to display the cell content. Simply increase the column width to show the cell content.

To AutoFit column width



The AutoFit feature will allow you to set a column's width to fit its content automatically.

1. Position the mouse over the column line in the column heading so the white cross  becomes a double arrow .
2. Double-click the mouse. The column width will be changed automatically to fit the content.

 **TIP:** You can also AutoFit the width for several columns at the same time. Simply select the columns you would like to AutoFit, then select the AutoFit Column Width command from the Format drop-down menu on the Home tab. This method can also be used for Row height.




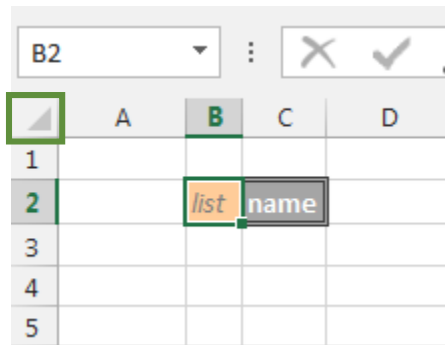
To modify row height



1. Position the cursor over the row line so the white cross  becomes a double arrow .
2. Click, hold, and drag the mouse to increase or decrease the row height.
3. Release the mouse. The height of the selected row will be changed.

To modify all rows or columns

Rather than resizing rows and columns individually, you can modify the height and width of every row and column at the same time. This method allows you to set a uniform size for every row and column in your worksheet.

1. Locate and click the Select All button  just below the formula bar to select every cell in the worksheet.



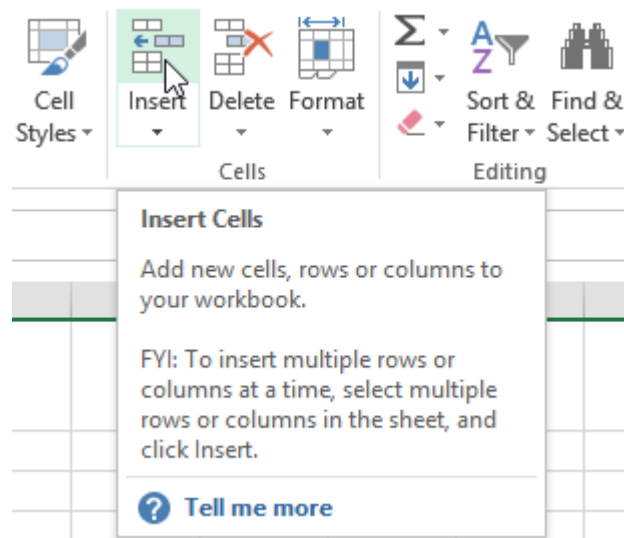
2. Position the mouse over a row line so the white cross  becomes a double arrow .
3. Click, hold, and drag the mouse to increase or decrease the row height.
4. Release the mouse when you are satisfied with the new row height for the worksheet.

5.1. Inserting, deleting, moving, and hiding rows and columns



After you've been working with a workbook for a while, you may find that you want to insert new columns or rows, delete certain rows or columns, move them to a different location in the worksheet, or even hide them.

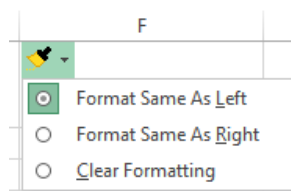
To insert rows

1. Select the row heading below where you want the new row to appear.
2. Click the Insert command on the Home tab.



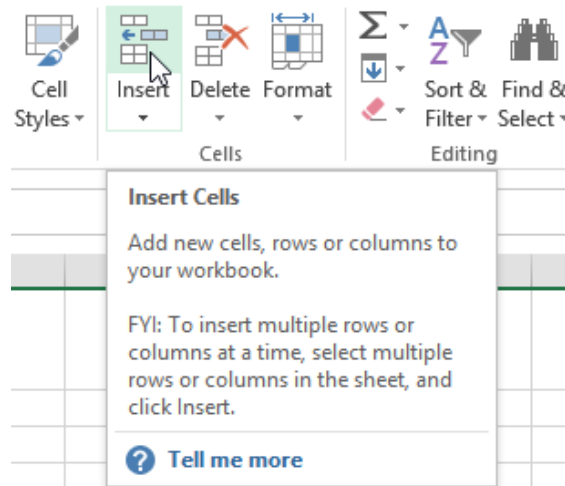
3. The new row will appear above the selected row.

 **TIP:** When inserting new rows, columns, or cells, you will see the Insert Options button  next to the inserted cells. This button allows you to choose how Excel formats these cells. By default, Excel formats inserted rows with the same formatting as the cells in the row above. To access more options, hover your mouse over the Insert Options button, then click the drop-down arrow.




To insert columns

1. Select the column heading to the right of where you want the new column to appear.
2. Click the Insert command on the Home tab.



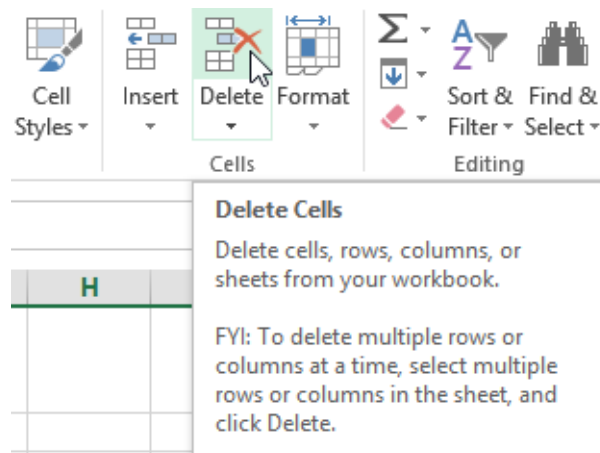
3. The new column will appear to the left of the selected column.

 **TIP:** When inserting rows and columns, make sure you select the entire row or column by clicking the heading. If you select only a cell in the row or column, the Insert command will only insert a new cell.

To delete rows

It's easy to delete any row that you no longer need in your workbook.

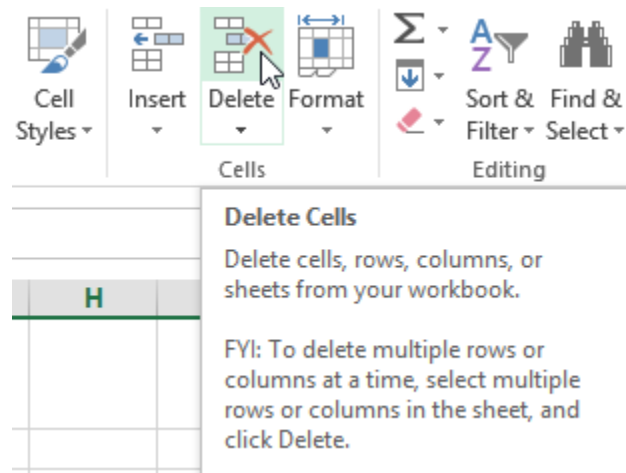
1. Select the row(s) you want to delete.
2. Click the Delete command on the Home tab.




3. The selected row(s) will be deleted, and the rows below will shift up.

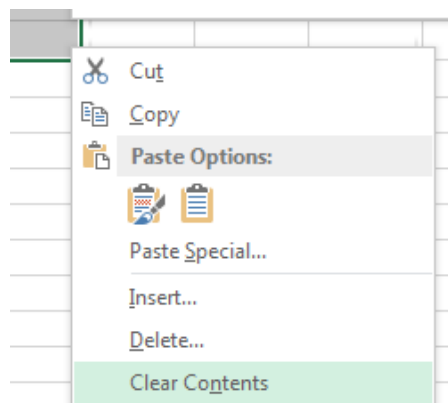
To delete columns

1. Select the column(s) you want to delete.
2. Click the Delete command on the Home tab.



3. The selected column(s) will be deleted, and the columns to the right will shift left.

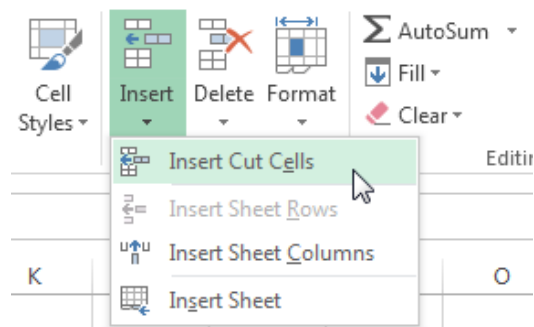
 **TIP:** It's important to understand the difference between deleting a row or column and simply clearing its contents. If you want to remove the content of a row or column without causing others to shift, right-click a heading, then select Clear Contents from the drop-down menu.




To move a row or column

Sometimes you may want to move a column or row to rearrange the content of your worksheet.

1. Select the desired column heading for the column you wish to move, then click the Cut command on the Home tab or press Ctrl+X on your keyboard.
2. Select the column heading to the right of where you want to move the column. For example, if you want to move a column between columns B and C, select column C.
3. Click the Insert command on the Home tab, then select Insert Cut Cells from the drop-down menu.



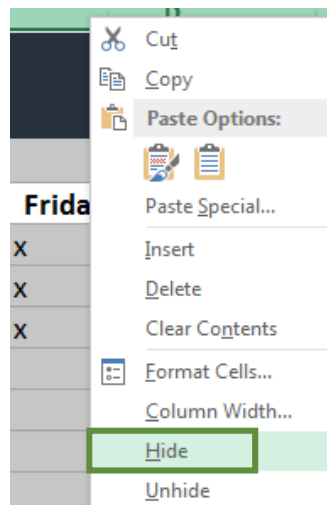
4. The column will be moved to the selected location, and the columns to the right will shift right.

 **TIP:** You can also access the Cut and Insert commands by right-clicking the mouse and then selecting the desired commands from the drop-down menu.

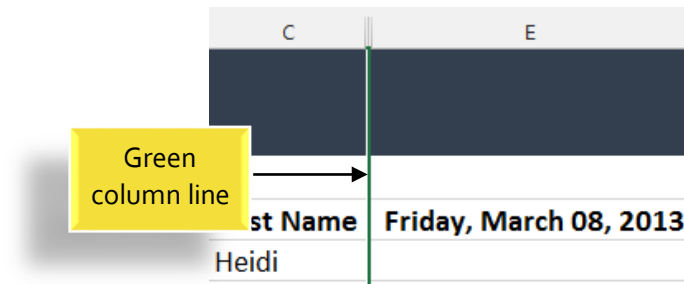
To hide and unhide a row or column

At times, you may want to compare certain rows or columns without changing the organization of your worksheet. Excel allows you to hide rows and columns as needed.

1. Select the column(s) you wish to hide, right-click the mouse, then select Hide from the formatting menu.



- The columns will be hidden. The green column line indicates the location of the hidden columns.

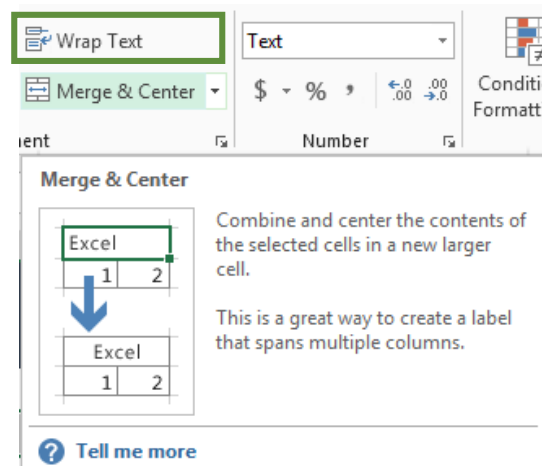


- To unhide the columns, select the columns to the left and right of the hidden columns (in other words, the columns on both sides of the hidden columns).
- Right-click the mouse, then select Unhide from the formatting menu. The hidden columns will reappear.


5.2. Wrapping text and merging cells

Whenever you have too much cell content to be displayed in a single cell, you may decide to wrap the text or merge the cell rather than resizing a column. Wrapping the text will automatically modify a cell's row height, allowing cell contents to be displayed on multiple lines. Merging allows you to combine a cell with adjacent, empty cells to create one large cell.

- Select the cells you wish to wrap.
- Select the Wrap Text command on the Home tab.

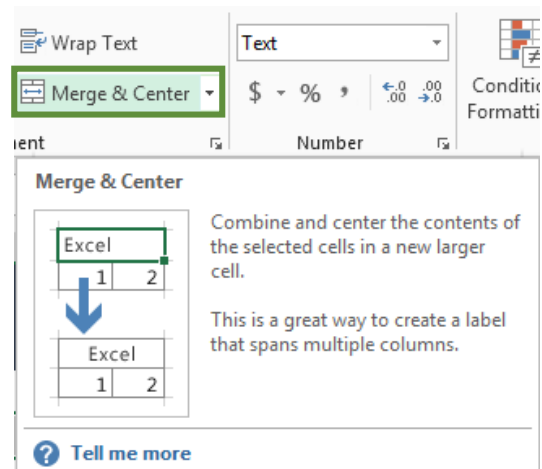


3. The text in the selected cells will be wrapped.

 TIP: Click the Wrap Text command again to unwrap the text.

To merge cells using the Merge & Center command

1. Select the cell range you want to merge together.
2. Select the Merge & Center command on the Home tab.

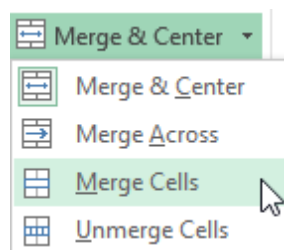


3. The selected cells will be merged, and the text will be centered.

To access more merge options

Click the drop-down arrow next to the Merge & Center command on the Home tab. The Merge drop-down menu will appear. From here, you can choose to:

- Merge & Center: Merges the selected cells into one cell and centers the text
- Merge Across: Merges the selected cells into larger cells while keeping each row separate
- Merge Cells: Merges the selected cells into one cell, but does not center the text
- Unmerge Cells: Unmerges selected cells



Challenge!

1. Open an existing Excel 2013 workbook.
2. Modify the width of a column.
3. Insert a column between column A and column B, then insert a row between row 3 and row 4.
4. Delete a column or a row.
5. Move a column or row.
6. Try using the Text Wrap command on a cell range.
7. Try merging some cells together.

6. Formulas and Functions

One of the most powerful features in Excel is the ability to calculate numerical information using formulas.

6.1. Simple Formulas

Just like a calculator, Excel can add, subtract, multiply, and divide. In this lesson, we'll show you how to use cell references to create simple formulas.

Mathematical operators

Excel uses standard operators for formulas, such as a plus sign for addition (+), a minus sign for subtraction (-), an asterisk for multiplication (*), a forward slash for division (/), and a caret (^) for exponents.

Addition	+
Subtraction	-
Multiplication	*
Division	/
Exponents	^

All formulas in Excel must begin with an equal's sign (=). This is because the cell contains, or is equal to, the formula and the value it calculates.

Understanding cell references

While you can create simple formulas in Excel manually (for example, $=2+2$ or $=5*5$), most of the time you will use cell addresses to create a formula. This is known as making a cell reference. Using cell references will ensure that your formulas are always accurate because you can change the value of referenced cells without having to rewrite the formula.

The first screenshot shows an Excel spreadsheet with columns A and B, and rows 1, 2, and 3. Cell A1 contains the value 10, and cell A2 contains the value 5. Cell A3 is selected, and the formula bar shows $=A1+A2$. A yellow callout box points to the formula bar with the text: "The formula in cell A3 refers to the value in cell A1 plus the value in cell A2".

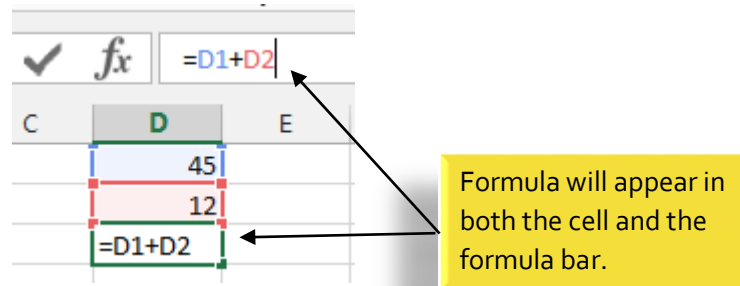
The second screenshot shows the same spreadsheet, but now cell A3 displays the result 15. A yellow callout box points to cell A3 with the text: "The formula calculates and displays the answer to the equation A1 plus A2".


By combining a mathematical operator with cell references, you can create a variety of simple formulas in Excel. Formulas can also include a combination of cell references and numbers, as in the examples below:

$=A1+A2$	Adds cells A1 and A2
$=C4-3$	Subtracts 3 from cell C4
$=E7/J4$	Divides cell E7 by J4
$=N10*1.05$	Multiplies cell N10 by 1.05
$=R5^2$	Finds the square of cell R5

To create a formula


1. Select the cell that will contain the formula.
2. Type the equals sign (=). Notice how it appears in both the cell and the formula bar.



1. Type the cell address of the cell you wish to reference first in the formula: cell D1 in our example. A blue border will appear around the referenced cell.
 2. Type the mathematical operator you wish to use. In our example, we'll type the addition sign (+).
 3. Type the cell address of the cell you wish to reference second in the formula: cell D2 in our example. A red border will appear around the referenced cell.
 4. Press Enter on your keyboard. The formula will be calculated, and the value will be displayed in the cell.
-  **TIP:** If the result of a formula is too large to be displayed in a cell, it may appear as pound signs (#####) instead of a value. This means that the column is not wide enough to display the cell content. Simply increase the column width to show the cell content.


Modifying values with cell references



The true advantage of cell references is that they allow you to update data in your worksheet without having to rewrite formulas.


-  **TIP:** Excel will not always tell you if your formula contains an error, so it's up to you to check all of your formulas.

To edit a formula

Sometimes you may want to modify an existing formula. In the example below, we've entered an incorrect cell address in our formula, so we'll need to correct it.

1. Select the cell containing the formula you wish to edit.
2. Click the formula bar to edit the formula. You can also double-click the cell to view and edit the formula directly within the cell.
3. A border will appear around any referenced cells.
4. When finished, press Enter on your keyboard or select the Enter command  in the formula bar.
5. The formula will be updated, and the new value will be displayed in the cell.

 **TIP:** If you change your mind, you can press the Esc key on your keyboard or click the Cancel command  in the formula bar to avoid accidentally making changes to your formula.

 **TIP:** To show all of the formulas in a spreadsheet, you can hold the Ctrl key and press ` (grave accent). The grave accent key is usually located in the upper-left corner of the keyboard. You can press Ctrl+` again to switch back to the normal view.

Challenge!

1. Open an existing Excel workbook.
2. Create a simple addition formula using cell references.
3. Try modifying the value of a cell referenced in a formula.
4. Try using the point-and-click method to create a formula.
5. Edit a formula using the formula bar.

6.2. Complex Formulas

A simple formula is a mathematical expression with one operator, such as 7+9. A complex formula has more than one mathematical operator, such as 5+2*8. When there is more than one operation in a formula, the order of operations tells Excel which operation to calculate first. In order to use Excel to calculate complex formulas, you will need to understand the order of operations.

Order of operations

Excel calculates formulas based on the following order of operations:


1. Operations enclosed in parentheses
2. Exponential calculations (3^2 , for example)

3. Multiplication and division, whichever comes first
4. Addition and subtraction, whichever comes first

Creating complex formulas

In the example below, we will demonstrate how Excel solves a complex formula using the order of operations. Here, we want to calculate the cost of sales tax for an invoice. To do this, we'll write our formula as $=(D2+D3)*0.075$ in cell D4. This formula will add the prices of our items together and then multiply that value by the 7.5% tax rate (which is written as 0.075) to calculate the cost of sales tax.

SUM ✕ ✓ <i>fx</i> $=(D2+D3)*0.075$				
	A	B	C	D
1	Menu Item	Price	Quantity	Total
2	Item 1	\$2.29	20	\$45.80
3	Item 2	\$2.29	30	\$68.70
4	Tax			$=(D2+D3)*0.075$
5	Total			

 **TIP:** It is especially important to enter complex formulas with the correct order of operations. Otherwise, Excel will not calculate the results accurately. In our example, if the parentheses are not included, the multiplication is calculated first and the result is incorrect. Parentheses are the best way to define which calculations will be performed first in Excel.

Challenge!

1. Open an existing Excel workbook.
2. Create a complex formula that will perform addition before multiplication.

6.2.1. Relative and Absolute Cell References

There are two types of cell references: relative and absolute. Relative and absolute references behave differently when copied and filled to other cells. Relative references change when a formula is copied to another cell. Absolute references, on the other hand, remain constant, no matter where they are copied.

6.2.2. Relative cell references

By default, all cell references are relative references. *When copied across multiple cells, they change based on the relative position of rows and columns.* For example, if you copy the formula $=A1+B1$ from row 1 to

row 2, the formula will become =A2+B2. Relative references are especially convenient whenever you need to repeat the same calculation across multiple rows or columns.

To create and copy a formula using relative references

In the following example, we want to create a formula that will multiply each item's price by the quantity. Rather than creating a new formula for each row, we can create a single formula in cell D2 and then copy it to the other rows. We'll use relative references so the formula correctly calculates the total for each item.

1. Select the cell that will contain the formula. In our example, we'll select cell D2.
2. Enter the formula to calculate the desired value. In our example, we'll type =B2*C2.

	A	B	C	D
1	Item	Price	Quantity	Total
2	Item 1	\$2.00	4	=B2*C2
3	Item 2	\$4.00	2	
4	Item 3	\$6.00	1	
5	Item 4	\$3.00		
6	Item 5	\$2.00	5	
7	Item 6	\$8.00	3	
8	Item 7	\$2.00	3	
9	Item 8	\$1.00	6	
10	Item 9	\$9.00	2	
11	Item 10	\$7.00	5	
12	Total			

3. Press Enter on your keyboard. The formula will be calculated, and the result will be displayed in the cell.
4. Locate the fill handle in the lower-right corner of the desired cell. In our example, we'll locate the fill handle for cell D2.

	A	B	C	D
1	Item	Price	Quantity	Total
2	Item 1	\$2.00	4	\$8.00
3	Item 2	\$4.00	2	
4	Item 3	\$6.00	1	
5	Item 4	\$3.00		
6	Item 5	\$2.00	5	
7	Item 6	\$8.00	3	
8	Item 7	\$2.00	3	
9	Item 8	\$1.00	6	
10	Item 9	\$9.00	2	
11	Item 10	\$7.00	5	
12	Total			


The fill handle

5. Click, hold, and drag the fill handle over the cells you wish to fill.

1	Item	Price	Quantity	Total
2	Item 1	\$2.00	4	\$8.00
3	Item 2	\$4.00	2	
4	Item 3	\$6.00	1	
5	Item 4	\$3.00		
6	Item 5	\$2.00	5	
7	Item 6	\$8.00	3	
8	Item 7	\$2.00	3	
9	Item 8	\$1.00	6	
10	Item 9	\$9.00	2	
11	Item 10	\$7.00	5	
12	Total			

Click, hold and drag the fill handle to copy the formula to adjacent cells

6. Release the mouse. The formula will be copied to the selected cells with relative references, and the values will be calculated in each cell.

 **TIP:** You can double-click the filled cells to check their formulas for accuracy. The relative cell references should be different for each cell, depending on their rows.

	A	B	C	D
1	Item	Price	Quantity	Total
2	Item 1	\$2.00	4	\$8.00
3	Item 2	\$4.00	2	\$8.00
4	Item 3	\$6.00	1	\$6.00
5	Item 4	\$3.00		\$0.00
6	Item 5	\$2.00	5	=B6*C6
7	Item 6	\$8.00	3	\$24.00
8	Item 7	\$2.00	3	
9	Item 8	\$1.00	6	
10	Item 9	\$9.00	2	
11	Item 10	\$7.00	5	
12	Total			


6.2.3. Absolute cell references

There may be times when you do not want a cell reference to change when filling cells. Unlike relative references, *absolute references do not change when copied or filled*. You can use an absolute reference to keep a row and/or column constant.

An absolute reference is designated in a formula by the addition of a dollar sign (\$). It can precede the column reference, the row reference, or both.

\$A\$2	The column and the row do not change when copied
A\$2	The row does not change when copied
\$A2	The column does not change when copied

You will generally use the \$A\$2 format when creating formulas that contain absolute references. The other two formats are used much less frequently.

 **TIP:** When writing a formula, you can press the F4 key on your keyboard to switch between relative and absolute cell references. This is an easy way to quickly insert an absolute reference.

To create and copy a formula using absolute references

In our example, we'll use the 7.5% sales tax rate in cell E1 to calculate the sales tax for all items in column D. We'll need to use the absolute cell reference \$E\$1 in our formula. Since each formula is using the same tax rate, we want that reference to remain constant when the formula is copied and filled to other cells in column D.

1. Select the cell that will contain the formula. In our example, we'll select cell D3.
2. Enter the formula to calculate the desired value. In our example, we'll type =(B3*C3)*\$E\$1.

- Press Enter on your keyboard. The formula will calculate, and the result will display in the cell.

	A	B	C	D	E
1	Sales Tax				7.50%
2	Item	Price	Quantity	Total	Tax
3	Item 1	\$2.00	4	\$8.00	= (B3*C3)*\$E\$1
4	Item 2	\$4.00	2	\$8.00	
5	Item 3	\$6.00	1	\$6.00	
6	Item 4	\$3.00		\$0.00	
7	Item 5	\$2.00	5	\$10.00	
8	Item 6	\$8.00	3	\$24.00	
9	Item 7	\$2.00	3	\$6.00	
10	Item 8	\$1.00	6	\$6.00	
11	Item 9	\$9.00	2	\$18.00	
12	Item 10	\$7.00	5	\$35.00	
13	Total				

- Locate the fill handle in the lower-right corner of the desired cell.
- Release the mouse. The formula will be copied to the selected cells with an absolute reference, and the values will be calculated in each cell.

Challenge!

- Open an existing Excel workbook.
- Create a formula that uses a relative reference. Double-click a cell to see the copied formula and the relative cell references.
- Create a formula that uses an absolute reference.

6.3. Functions

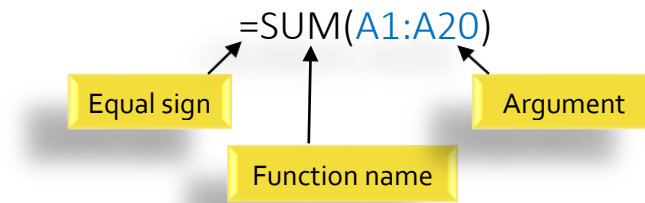
A function is a predefined formula that performs calculations using specific values in a particular order. Excel includes many common functions that can be useful for quickly finding the sum, average, count, maximum value, and minimum value for a range of cells. In order to use functions correctly, you'll need to understand the different parts of a function and how to create arguments to calculate values and cell references.

Formula =A1+A2+A3+A4+A5+A6+A7+A8

Function =SUM(A1:A8)

The parts of a function

In order to work correctly, a function must be written a specific way, which is called the syntax. The basic syntax for a function is an equals sign (=), the function name (SUM, for example), and one or more arguments. Arguments contain the information you want to calculate.



Working with arguments

Arguments can refer to both individual cells and cell ranges and must be enclosed within parentheses. You can include one argument or multiple arguments, depending on the syntax required for the function.

For example, the function =AVERAGE (B1:B9) would calculate the average of the values in the cell range B1:B9. This function contains only one argument.

COUNTA		:	X	✓	<i>f_x</i>	=AVERAGE(B1:B9)
	A		B		C	
1			5			
2			8			
3			9			
4			7			
5			5			
6			1			
7			3			
8			2			
9			7			
10			=AVERAGE(B1:B9)			
11						

Multiple arguments must be separated by a comma. For example, the function =SUM(A1:A3, C1:C2, E2) will add the values of all the cells in the three arguments.

SUM		:	X	✓	<i>fx</i>	=SUM(A1:A3,C1:C2,E1)	
	A	B	C	D	E	F	
1	34		65		6		
2	21		23				
3	56						
4							
5	=SUM(A1:A3,C1:C2,E1)						
6							

6.3.1. Creating a function

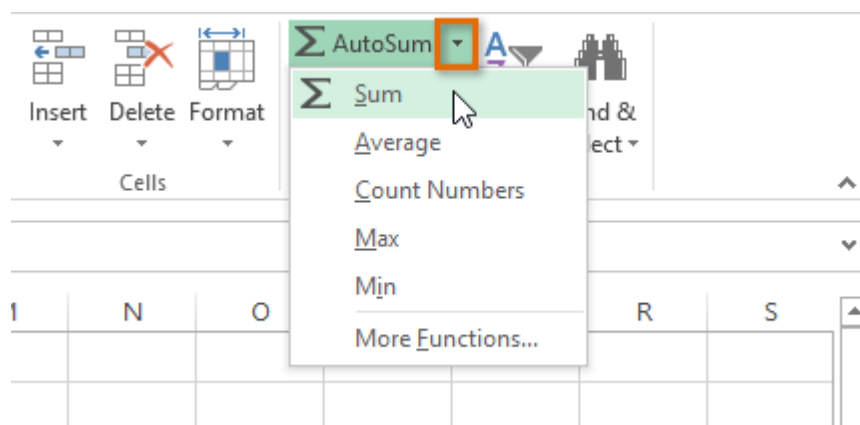
Excel has a variety of functions available. Here are some of the most common functions you'll use:

- **SUM:** This function adds all of the values of the cells in the argument.
- **AVERAGE:** This function determines the average of the values included in the argument. It calculates the sum of the cells and then divides that value by the number of cells in the argument.
- **COUNT:** This function counts the number of cells with numerical data in the argument. This function is useful for quickly counting items in a cell range.
- **MAX:** This function determines the highest cell value included in the argument.
- **MIN:** This function determines the lowest cell value included in the argument.

To create a function using the AutoSum command

The AutoSum command allows you to automatically insert the most common functions into your formula, including SUM, AVERAGE, COUNT, MIN, and MAX. In our example below, we'll create a function to calculate the total cost for a list of recently ordered items using the SUM function.

1. Select the cell that will contain the function.
2. In the Editing group on the Home tab, locate and select the arrow next to the AutoSum command and then choose the desired function from the drop-down menu. In our example, we'll select Sum.



- The selected function will appear in the cell. If logically placed, the AutoSum command will automatically select a cell range for the argument. You can also manually enter the desired cell range into the argument.

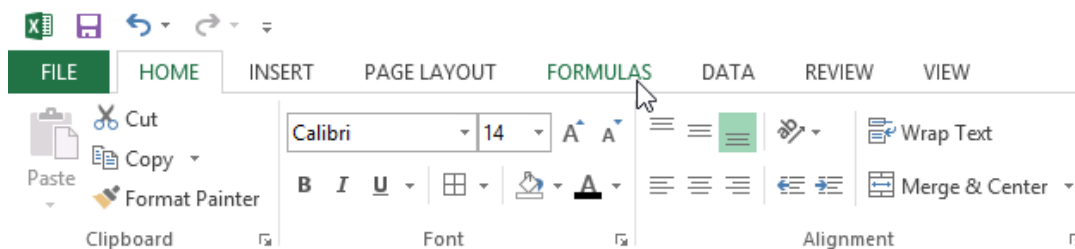
	A	B	C	D	E
1	Sales Tax				
2	Item	Price	Quantity	Total	Tax
3	Item 1	\$2.00	4	\$8.00	
4	Item 2	\$4.00	2	\$8.00	
5	Item 3	\$6.00	1	\$6.00	
6	Item 4	\$3.00		\$0.00	
7	Item 5	\$2.00	5	\$10.00	
8	Item 6	\$8.00	3	\$24.00	
9	Item 7	\$2.00	3	\$6.00	
10	Item 8	\$1.00	6	\$6.00	
11	Item 9	\$9.00	2	\$18.00	
12	Item 10	\$7.00	5	\$35.00	
13				=SUM(D3:D12)	

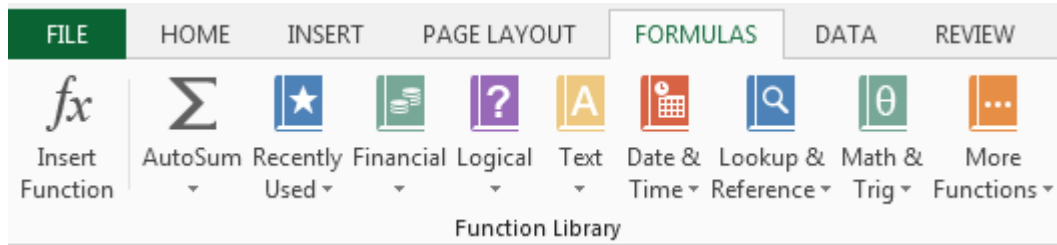
- Press Enter on your keyboard.

6.3.2. The Function Library

While there are hundreds of functions in Excel, the ones you use most frequently will depend on the type of data your workbooks contain. There is no need to learn every single function, but exploring some of the different types of functions will be helpful as you create new projects. You can search for functions by category, such as Financial, Logical, Text, Date & Time, and more from the Function Library on the Formulas tab.

- ☒ To access the Function Library, select the Formulas tab on the Ribbon. The Function Library will appear.

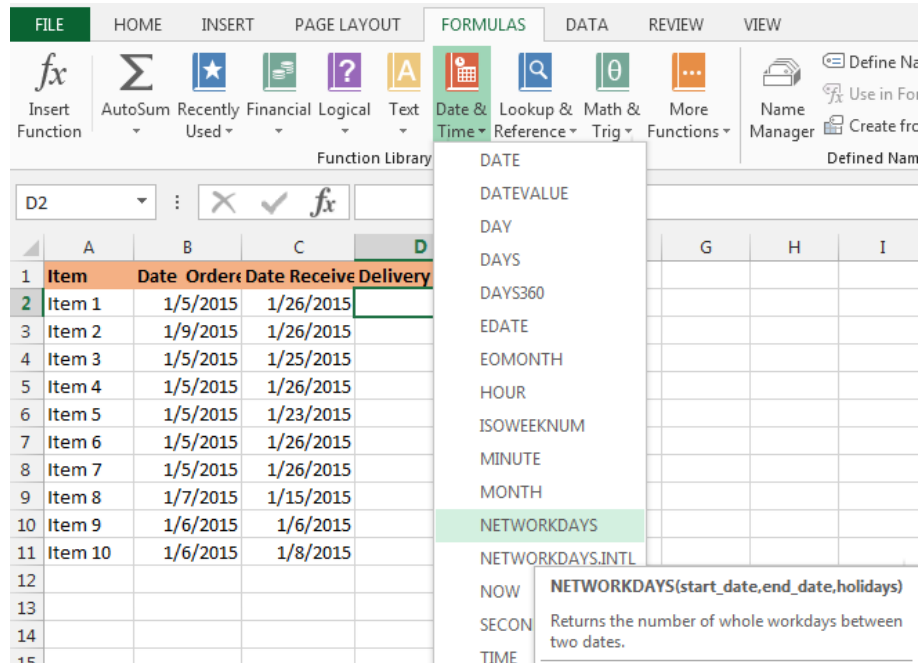




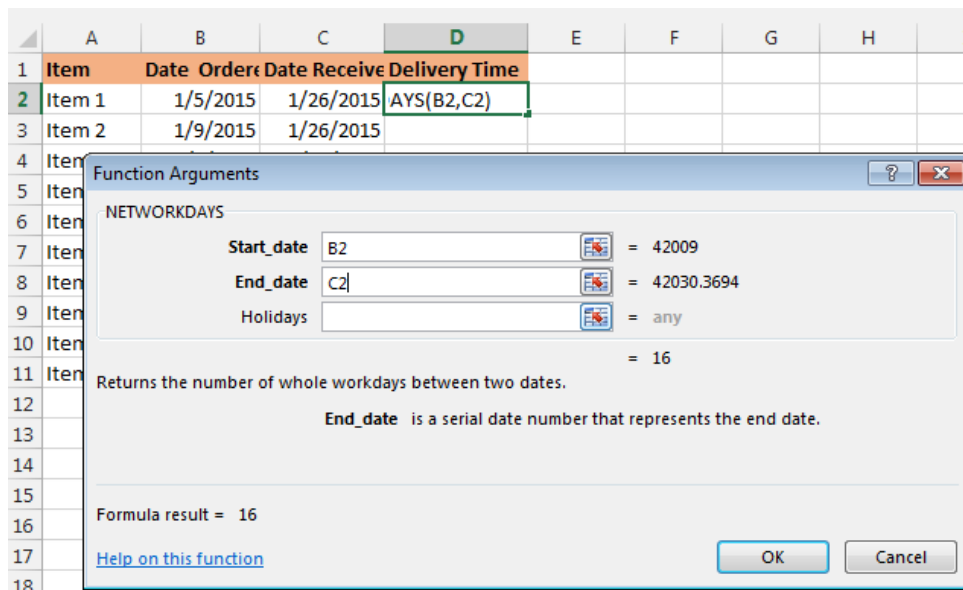
- ☐ If you're having trouble finding the right function, the Insert Function command allows you to search for functions using keywords.
- ☐ The AutoSum command allows you to automatically return results for common functions, like SUM, AVERAGE, and COUNT.
- ☐ The Recently Used command gives you access to functions that you have recently worked with.
- ☐ The Financial category contains functions for financial calculations like determining a payment (PMT) or interest rate for a loan (RATE).
- ☐ Functions in the Logical category check arguments for a value or condition. For example, if an order is over \$50 add \$4.99 for shipping, but if it is over \$100, do not charge for shipping (IF).
- ☐ The Text category contains functions that work with the text in arguments to perform tasks, such as converting text to lowercase (LOWER) or replacing text (REPLACE).
- ☐ The Date & Time category contains functions for working with dates and time and will return results like the current date and time (NOW) or the seconds (SECOND).
- ☐ The Lookup & Reference category contains functions that will return results for finding and referencing information. For example, you can add a hyperlink (HYPERLINK) to a cell or return the value of a particular row and column intersection (INDEX).
- ☐ The Math & Trig category includes functions for numerical arguments. For example, you can round values (ROUND), find the value of Pi (PI) multiply (PRODUCT), subtotal (SUBTOTAL), and much more.
- ☐ More Functions contains additional functions under categories for Statistical, Engineering, Cube, Information, and Compatibility.

To insert a function from the Function Library

1. Select the cell that will contain the function.
2. Click the Formulas tab on the Ribbon to access the Function Library.
3. From the Function Library group, select the desired function category.
4. Select the desired function from the drop-down menu.






5. The Function Arguments dialog box will appear. From here, you'll be able to enter or select the cells that will make up the arguments in the function.



6. When you're satisfied with the arguments, click OK.
7. The function will be calculated, and the result will appear in the cell.

Like formulas, functions can be copied to adjacent cells. Hover the mouse over the cell that contains the function, then click, hold, and drag the fill handle over the cells you wish to fill. The function will be copied, and values for those cells will be calculated relative to their rows or columns.

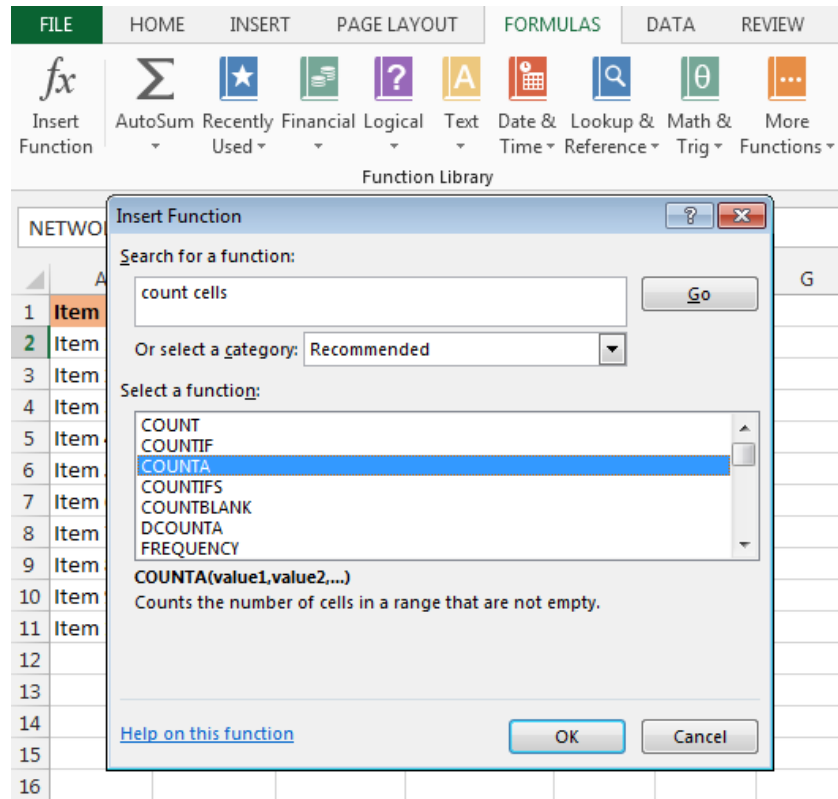
D2		:				=NETWORKDAYS(B2,C2)
	A	B	C	D	E	
1	Item	Date Order	Date Receive	Delivery Time		
2	Item 1	1/5/2015	1/26/2015	16		
3	Item 2	1/9/2015	1/26/2015	12		
4	Item 3	1/5/2015	1/25/2015	15		
5	Item 4	1/5/2015	1/26/2015	16		
6	Item 5	1/5/2015	1/23/2015	15		
7	Item 6	1/5/2015	1/26/2015	16		
8	Item 7	1/5/2015	1/26/2015	16		
9	Item 8	1/7/2015	1/15/2015	7		
10	Item 9	1/6/2015	1/6/2015	1		
11	Item 10	1/6/2015	1/8/2015	3		
12						

6.3.3. The Insert Function command

If you're having trouble finding the right function, the Insert Function command allows you to search for functions using keywords. While it can be extremely useful, this command is sometimes a little difficult to use. If you don't have much experience with functions, you may have more success browsing the Function Library instead. For more advanced users, however, the Insert Function command can be a powerful way to find a function quickly.

To use the Insert Function command

1. Select the cell that will contain the function.
2. Click the Formulas tab on the Ribbon, then select the Insert Function command.
3. The Insert Function dialog box will appear.
4. Type a few keywords describing the calculation you want the function to perform, then click Go.
5. Review the results to find the desired function, then click OK.



6. The Function Arguments dialog box will appear.
7. When you're satisfied, click OK.
8. The function will be calculated, and the result will appear in the cell.

Challenge!

1. Open an existing Excel workbook.
2. Create a function that contains one argument. If you're using the example, use the SUM function in cell B16 to calculate the total quantity of items ordered.
3. Use the AutoSum command to insert a function.
4. Explore the Function Library, and try using the Insert Function command to search for different types of functions.

Excel Formulas You Should Definitely Know

1. SUM

Formula: =SUM(5, 5) or =SUM(A1, B1) or =SUM(A1:B5)

The SUM formula does exactly what you would expect. It allows you to add 2 or more numbers together. You can use cell references as well in this formula.

2. COUNT

Formula: =COUNT(A1:A10)

The count formula counts the number of cells in a range that have numbers in them.

	A	B	C	D
1	1		Formula Result	9
2	2		Formula	=COUNT(A1:A10)
3	3			
4	4			
5	5			
6	6			
7	7			
8	8			
9	doesn't work with text			
10	10			

It only counts the cells where there are numbers.

3. COUNTA

Formula: =COUNTA(A1:A10)

Counts the number of non-empty cells in a range. It will count cells that have numbers and/or any other characters in them.

The COUNTA Formula works with all data types.

	A	B	C	D
1	1		Formula Result	10
2	2		Formula	=COUNTA(A1:A10)
3	3			
4	4			
5	5			
6	6			
7	7			
8	8			
9	This works with text			
10	10			

It counts the number of non-empty cells no matter the data type.

4. LEN

Formula: =LEN(A1)

The LEN formula counts the number of characters in a cell. This includes spaces!

	A	B	C	D
1	I love Excel		Formula Result	12
2	IloveExcel		Formula	=LEN(A1)
3				
4			Formula Result	10
5			Formula	=LEN(A2)

Notice the difference in the formula results: 10 characters without spaces in between the words, 12 with spaces between the words.

5. IF Statements

Formula: =IF(logical statement, return this if logical statement is true, return this if logical statement is false).

Example

Let's say a salesperson has a quota to meet. You used VLOOKUP to put the revenue next to the name. Now you can use an IF statement that says: "IF the salesperson met their quota, say "Met quota", if not say "Did not meet quota"

=IF(C3>D3, "Met Quota", "Did Not Meet Quota")

This IF statement will tell us if the first salesperson met their quota or not. We would then copy and paste this formula along all the entries in the list. It would change for each sales person.

	A	B	C	D	E
1	Master List				
2	Sales Person ID	Sales Person Name	Sales Person Revenue	Quota	Met Quota?
3	1	John	\$ 232,103.00	\$ 500,000.00	Did Not Meet Quota
4	2	Joe	\$ 835,477.00	\$ 500,000.00	Met Quota
5	3	Jen	\$ 116,371.00	\$ 500,000.00	Did Not Meet Quota
6	4	Frank	\$ 393,841.00	\$ 500,000.00	Did Not Meet Quota
7	5	Mark	\$ 989,303.00	\$ 500,000.00	Met Quota
8	6	Amanda	\$ 641,883.00	\$ 500,000.00	Met Quota
9	7	Erik	\$ 525,894.00	\$ 500,000.00	Met Quota
10	8	Mike	\$ 732,195.00	\$ 500,000.00	Met Quota
11	9	Matt	\$ 513,372.00	\$ 500,000.00	Met Quota
12	10	Josh	\$ 961,561.00	\$ 500,000.00	Met Quota
13	11	Shea	\$ 235,652.00	\$ 500,000.00	Did Not Meet Quota
14					
15			Formula		
16		=IF(C3>D3, "Met Quota", "Did Not Meet Quota")			

6. Working with Data

Whenever you're working with a lot of data, it can be difficult to compare information in your workbook.

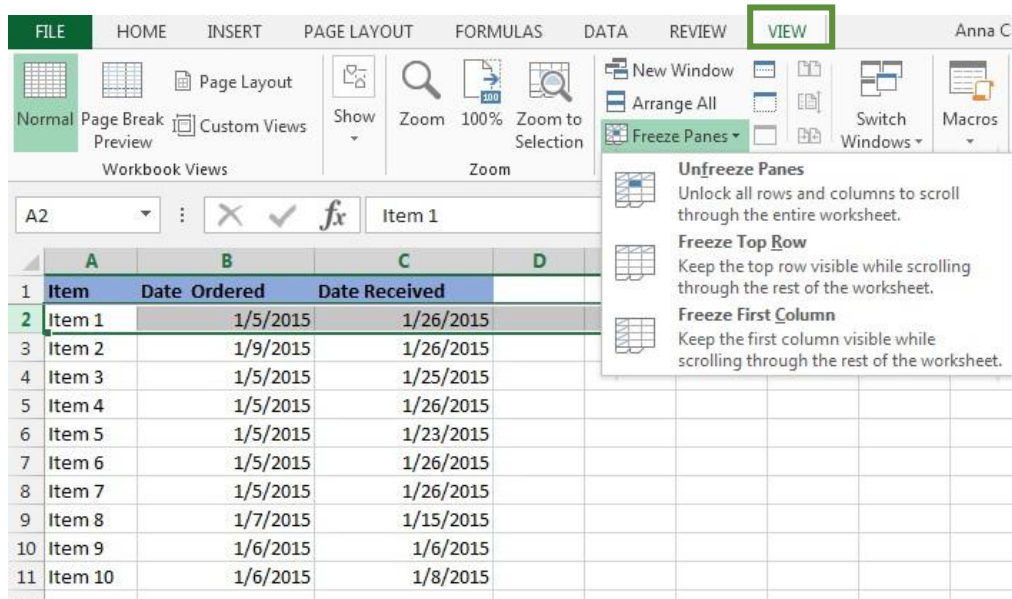
6.1 Freezing Panes and View Options

Excel includes several tools that make it easier to view content from different parts of your workbook at the same time, such as the ability to freeze panes and split your worksheet.

To freeze rows

You may want to see certain rows or columns all the time in your worksheet, especially header cells. By freezing rows or columns in place, you'll be able to scroll through your content while continuing to view the frozen cells.

1. Select the row below the row(s) you wish to freeze.
2. Click the View tab on the Ribbon.
3. Select the Freeze Panes command, then choose Freeze Panes from the drop-down menu.



The rows will be frozen in place, as indicated by the gray line. You can scroll down the worksheet while continuing to view the frozen rows at the top.

To freeze columns

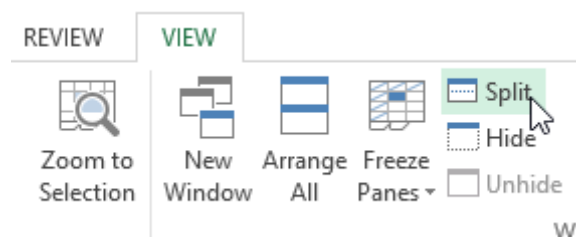
1. Select the column to the right of the column(s) you wish to freeze.
2. Click the View tab on the Ribbon.
3. Select the Freeze Panes command, then choose Freeze Panes from the drop-down menu.
4. The column will be frozen in place, as indicated by the gray line. You can scroll across the worksheet while continuing to view the frozen column on the left.

To unfreeze rows or columns, click the Freeze Panes command, then select Unfreeze Panes from the drop-down menu.

To split a worksheet

Sometimes you may want to compare different sections of the same workbook without creating a new window. The Split command allows you to divide the worksheet into multiple panes that scroll separately.

1. Select the cell where you wish to split the worksheet.
2. Click the View tab on the Ribbon, then select the Split command.



3. The workbook will be split into different panes. You can scroll through each pane separately using the scroll bars, allowing you to compare different sections of the workbook.

To remove the split, click the Split command again.

Challenge!

1. Open an existing Excel workbook.
2. Try freezing a row or column in place.
3. Use the Split command to split your worksheet into multiple panes.

6.2 Sorting Data

As you add more content to a worksheet, organizing that information becomes especially important. You can quickly reorganize a worksheet by sorting your data. For example, you could organize a list of contact information by last name. Content can be sorted alphabetically, numerically, and in many other ways.

When sorting data, it's important to first decide if you would like the sort to apply to the entire worksheet or just a cell range.



- Sort sheet organizes all of the data in your worksheet by one column.
- Sort range sorts the data in a range of cells, which can be helpful when working with a sheet that contains several tables. Sorting a range will not affect other content on the worksheet.

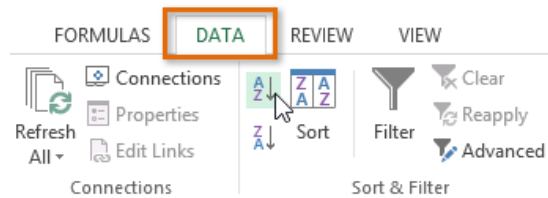
To sort a sheet

In our example, we'll sort a T-shirt order form alphabetically by Last Name (column C).

1. Select a cell in the column you wish to sort by. In our example, we'll select cell C2.

C2	:	X	✓	<i>fx</i>	Chen	
	A	B	C	D	E	F
1	Homeroom #	First Name	Last Name	T-Shirt Size	Payment Method	
2	105	Christiana	Chen	Medium	Cash	
3	105	Melissa	White	Small	Debit Card	
4	105	Esther	Yaron	Small	Check	
5	135	Anisa	Naser	Small	Check	
6	135	Chantal	Weller	Medium	Cash	
7	220-A	Juan	Flores	X-Large	Pending	
8	220-B	Malik	Reynolds	Small	Cash	
9	220-B	Avery	Kelly	Medium	Debit Card	
10	105	Derek	MacDonald	Large	Cash	

2. Select the Data tab on the Ribbon, then click the Ascending command  to Sort A to Z, or the Descending command  to Sort Z to A. In our example, we'll click the Ascending command.



- The worksheet will be sorted by the selected column. In our example, the worksheet is now sorted by last name.

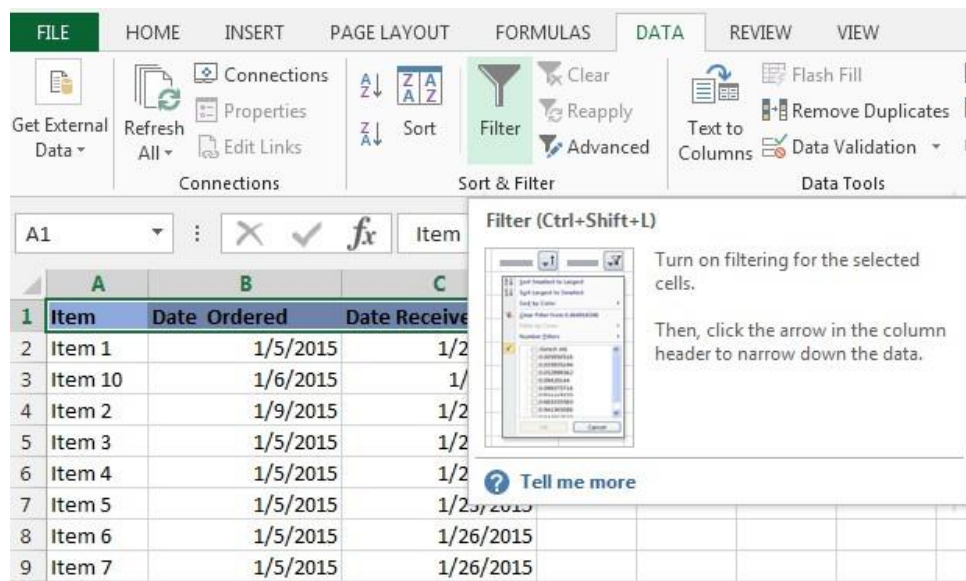
C2						
	A	B	C	D	E	F
1	Homeroom #	First Name	Last Name	T-Shirt Size	Payment Method	
2	110	Kris	Ackerman	Large	Money Order	
3	105	Nathan	Albee	Medium	Check	
4	220-B	Samantha	Bell	Medium	Check	
5	110	Matt	Benson	Medium	Money Order	
6	105	Christiana	Chen	Medium	Cash	
7	110	Gabriel	Del Toro	Medium	Cash	
8	220-A	Brigid	Ellison	Small	Cash	
9	220-A	Juan	Flores	X-Large	Pending	
10	220-B	Tyrese	Hanlon	X-Large	Debit Card	


6.3 Filtering Data

If your worksheet contains a lot of content, it can be difficult to find information quickly. Filters can be used to narrow down the data in your worksheet, allowing you to view only the information you need.

To filter data

- In order for filtering to work correctly, your worksheet should include a header row, which is used to identify the name of each column.
- Select the Data tab, then click the Filter command.



3. A drop-down arrow  will appear in the header cell for each column.
4. Click the drop-down arrow for the column you wish to filter.
5. The Filter menu will appear.
6. Uncheck the box next to Select All to quickly deselect all data.
7. Check the boxes next to the data you wish to filter, then click OK.

To remove all filters from your worksheet, click the Filter command on the Data tab.

8. Working with Charts

Creating a chart in Microsoft Office Excel is quick and easy. Excel provides a variety of chart types that you can choose from when you create a chart. Excel offers Pie, Line, Bar, and Column charts to name but a few. Showing data in a chart can make it clearer, more interesting and easier to read. Charts can also help you evaluate your data and make comparisons between different values.

8.1. Understanding charts

Excel has several different types of charts, allowing you to choose the one that best fits your data. In order to use charts effectively, you'll need to understand how different charts are used.

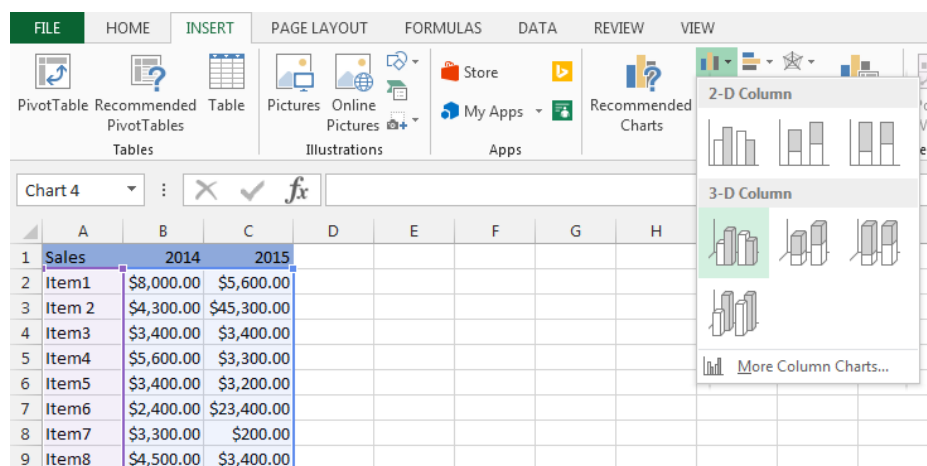
Types of Charts:

- ☐ Column charts use vertical bars to represent data. They can work with many different types of data, but they're most frequently used for comparing information.

- ☐ Line charts are ideal for showing trends. The data points are connected with lines, making it easy to see whether values are increasing or decreasing over time.
- ☐ Pie charts make it easy to compare proportions. Each value is shown as a slice of the pie, so it's easy to see which values make up the percentage of a whole.
- ☐ Bar charts work just like Column charts, but they use horizontal bars instead of vertical bars.
- ☐ Area charts are similar to line charts, except that the areas under the lines are filled in.
- ☐ Surface charts allow you to display data across a 3D landscape. They work best with large data sets, allowing you to see a variety of information at the same time.

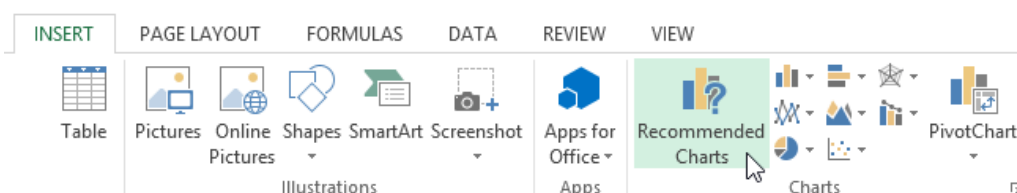
To insert a chart

1. Select the cells you want to chart, including the column titles and row labels. These cells will be the source data for the chart.
2. From the Insert tab, click the desired Chart command.
3. Choose the desired chart type from the drop-down menu.



4. The selected chart will be inserted in the worksheet.

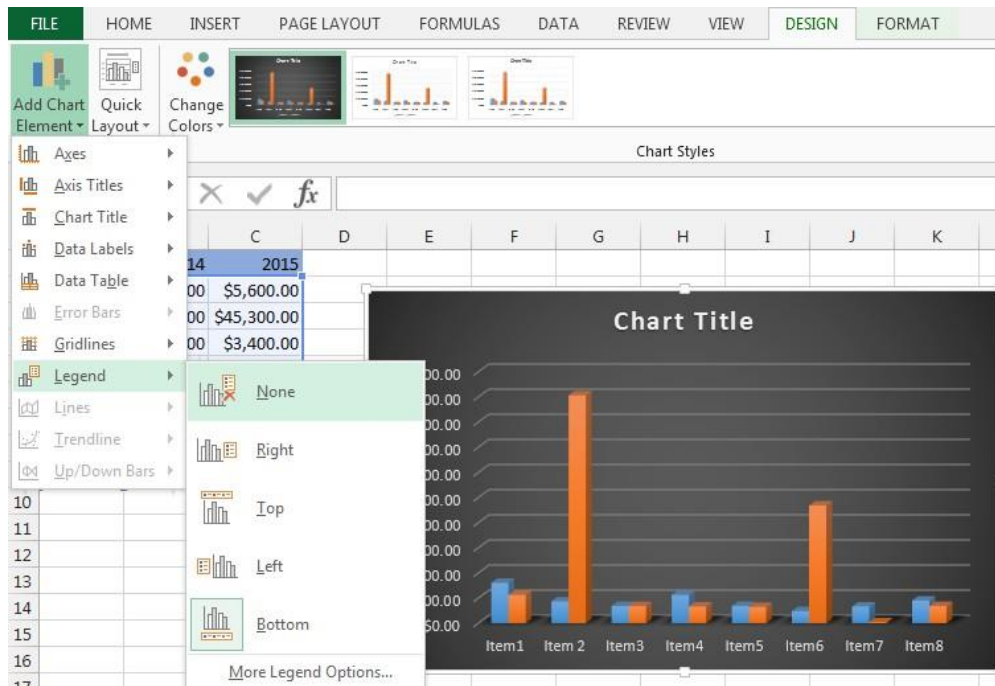
TIP: If you're not sure which type of chart to use, the Recommended Charts command will suggest several different charts based on the source data.



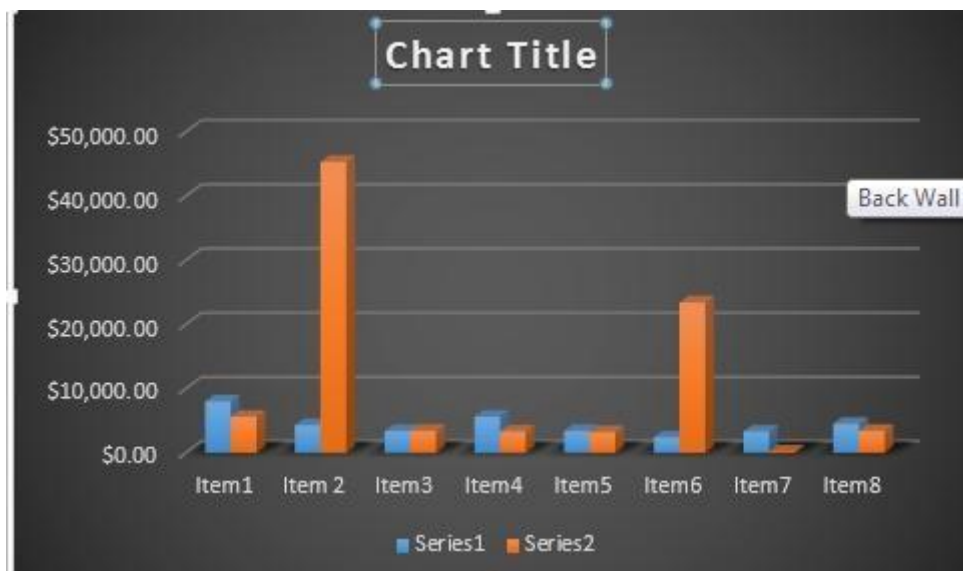
8.2. Chart layout and style

After inserting a chart, there are several things you may want to change about the way your data is displayed. It's easy to edit a chart's layout and style from the Design tab.

- ☑ Excel allows you to add chart elements—such as chart titles, legends, and data labels—to make your chart easier to read. To add a chart element, click the Add Chart Element command on the Design tab, then choose the desired element from the drop-down menu.




- ☑ To edit a chart element, like a chart title, simply double-click the placeholder and begin typing.



- ☑ If you don't want to add chart elements individually, you can use one of Excel's predefined layouts. Simply click the Quick Layout command, then choose the desired layout from the drop-down menu.
- ☑ Excel also includes several different chart styles, which allow you to quickly modify the look and feel of your chart. To change the chart style, select the desired style from the Chart styles group.



-  **TIP:** You can also use the chart formatting shortcut buttons to quickly add chart elements, change the chart style, and filter the chart data.



8.3. Other chart options

There are lots of other ways to customize and organize your charts. For example, Excel allows you to rearrange a chart's data, change the chart type, and even move the chart to a different location in the workbook.

To switch row and column data

Sometimes you may want to change the way charts group your data. For example, in the chart below, the

Book Sales data are grouped by year, with columns for each genre. However, we could switch the rows and columns so the chart will group the data by genre, with columns for each year. In both cases, the chart contains the same data—it's just organized differently.

1. Select the chart you wish to modify.
2. From the Design tab, select the Switch Row/Column command.



3. The rows and columns will be switched.

To change the chart type

If you find that your data isn't well suited to a certain chart, it's easy to switch to a new chart type. In our example, we'll change our chart from a Column chart to a Line chart.

1. From the Design tab, click the Change Chart Type command.

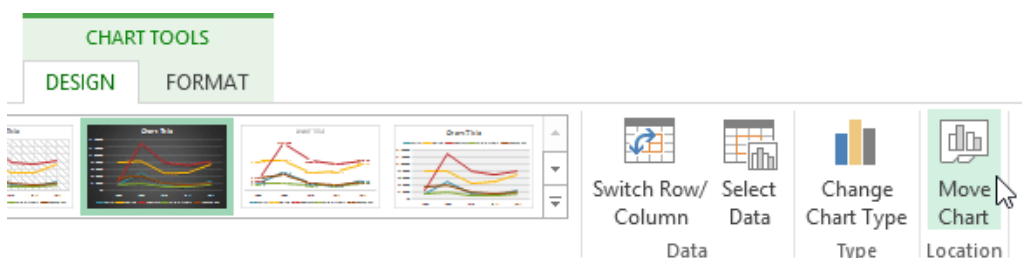


2. The Change Chart Type dialog box will appear.
3. The selected chart type will appear.

To move a chart

Whenever you insert a new chart, it will appear as an object on the same worksheet that contains its source data. Alternatively, you can move the chart to a new worksheet to help keep your data organized.

1. Select the chart you wish to move.
2. Click the Design tab, then select the Move Chart command.



3. The Move Chart dialog box will appear. Select the desired location for the chart.
4. Click OK.
5. The chart will appear in the selected location.

Challenge!

1. Open an existing Excel workbook.
 2. Use worksheet data to create a chart.
 3. Change the chart layout.
 4. Apply a chart style.
 5. Move the chart.
- 1.