

**Microsoft EXCEL Training**  
Level 1

## ***Introduction***

In this introductory course to Excel, 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.
- Prepare a document for printing by using a variety of printing options.

## ***Prerequisite***

Comfortable with Windows 7, or OSX

## ***Platform***

Windows, OSX

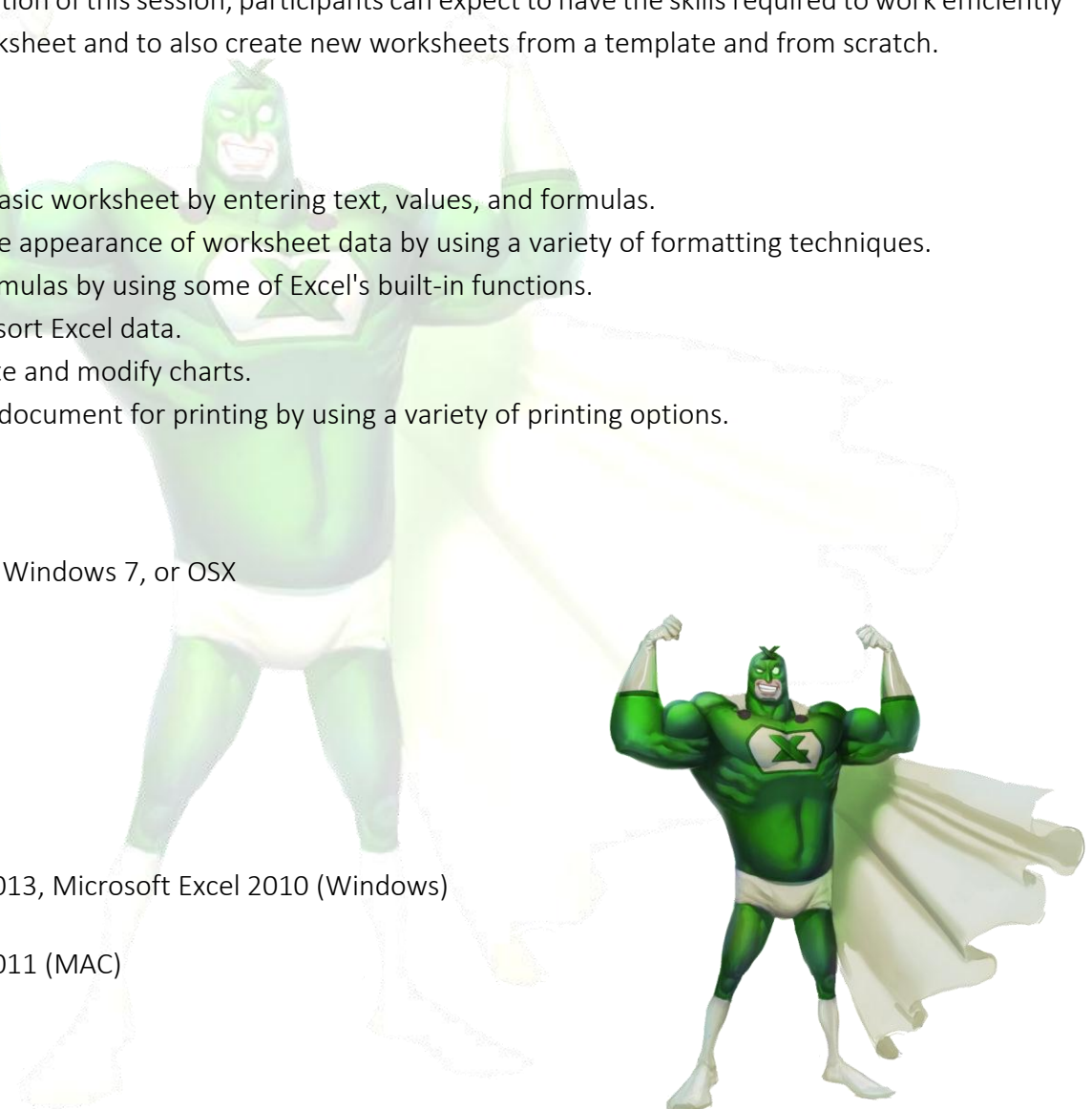
## ***Software***

Microsoft Excel 2013, Microsoft Excel 2010 (Windows)

Microsoft Excel 2011 (MAC)

## ***Instructor***

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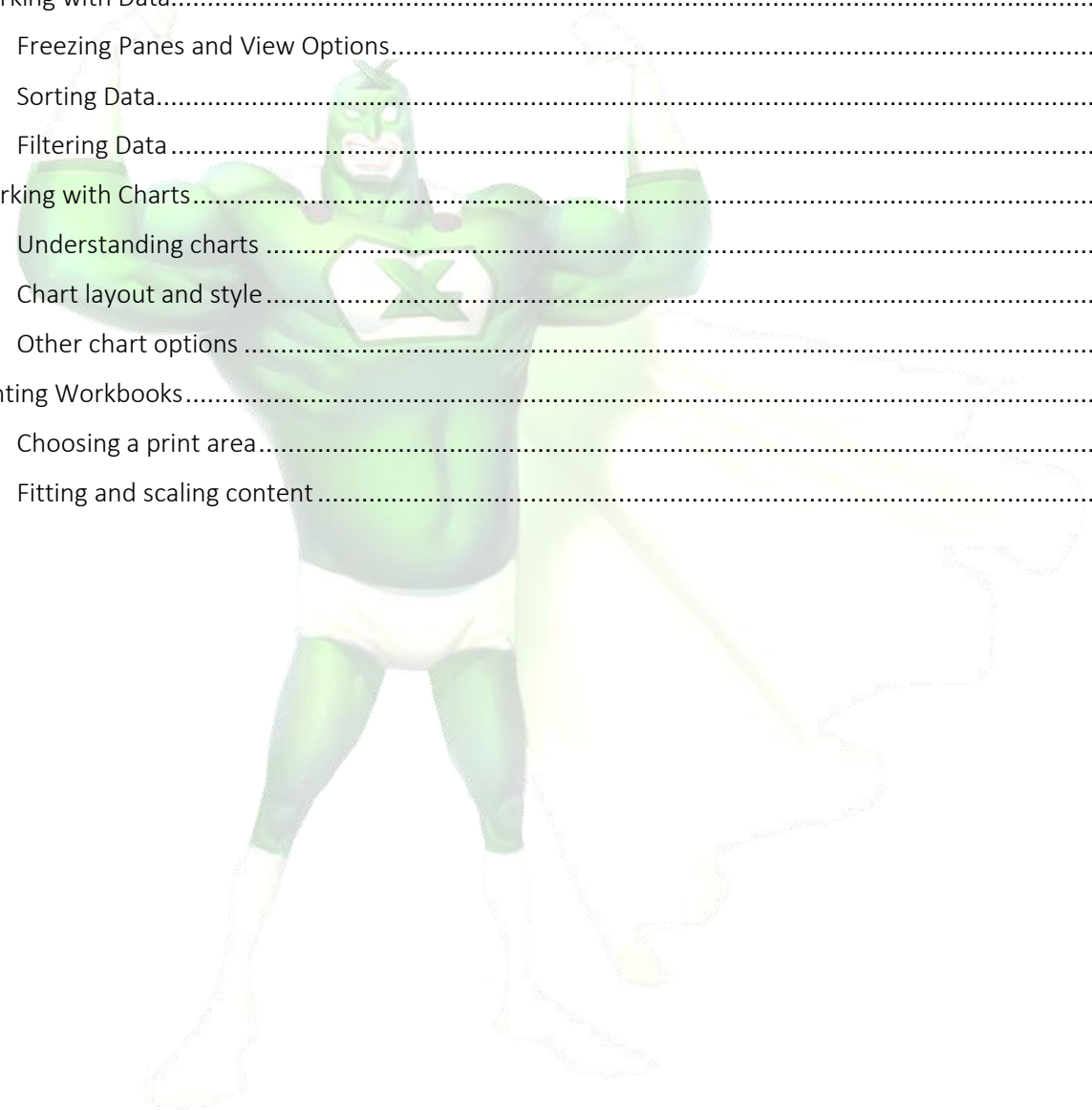
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## 1. Opening Excel

### *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.

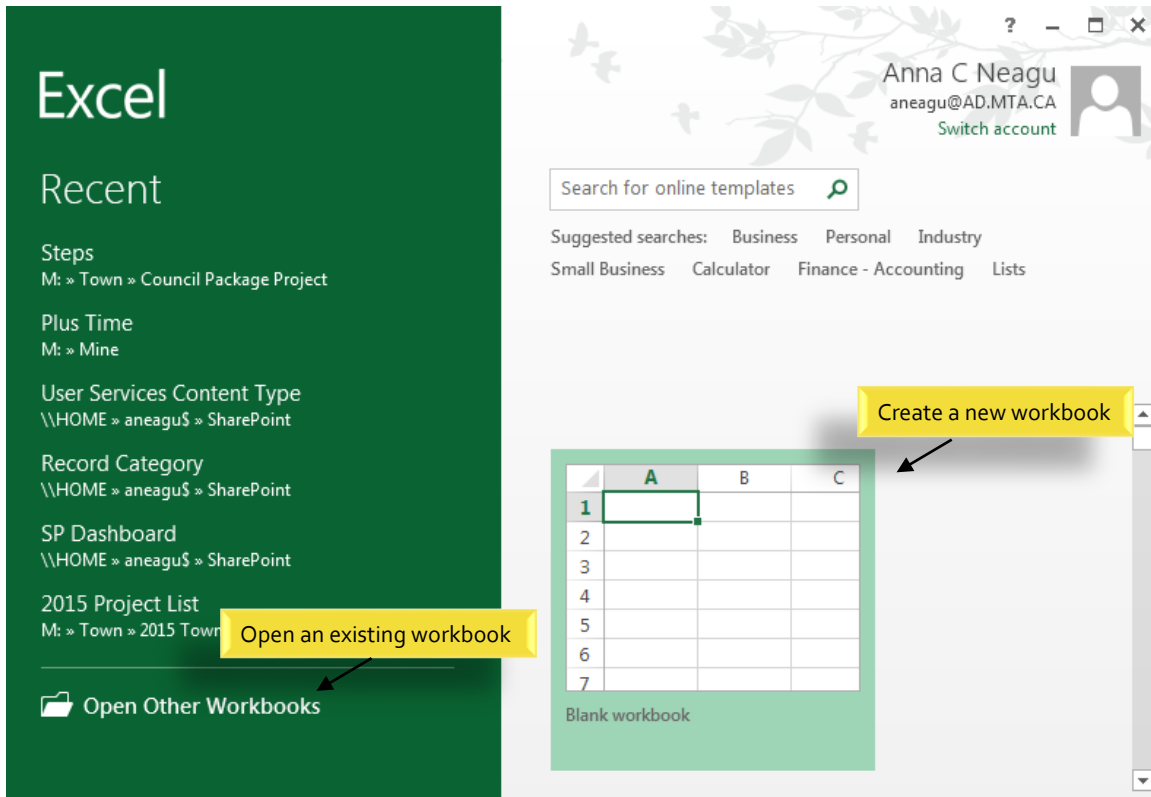
### *Using iOS 7*

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.



*To set up Excel so it automatically opens a new workbook*

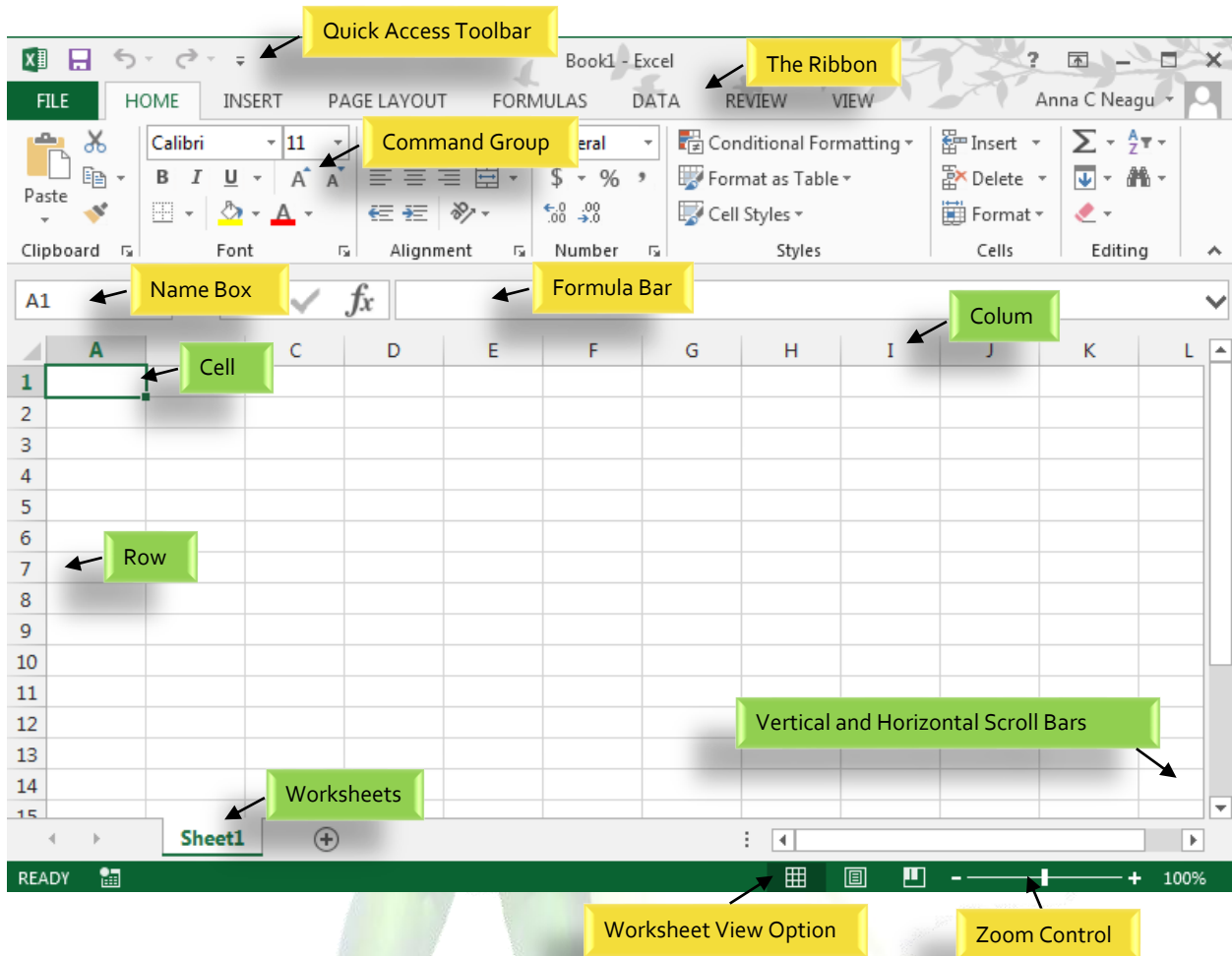
1. Click **File** then **Options**.
2. On the **General** tab, under **Start up options**, uncheck the **Show the Start screen** when this application starts box.
3. The next time you start Excel, it opens a blank workbook automatically similar to older versions of Excel.

**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.



### 2.1.1. The Application Window

The Application Window provides the space for your worksheets and workbook elements such as charts. The components of the Application Window are described below.

#### ❑ The Quick Access Toolbar

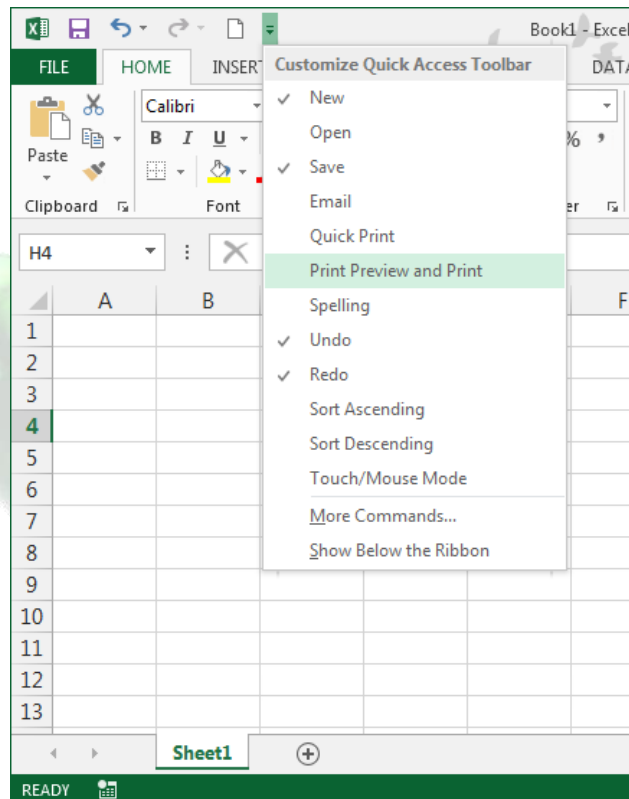
The **Quick Access Toolbar** lets you access common **commands** no matter which tab is selected.

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

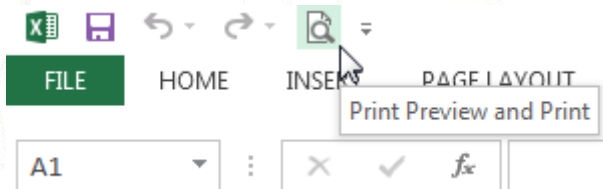
#### *To add commands to the Quick Access toolbar*

1. Click the **drop-down arrow** to the right of the **Quick Access toolbar**.

2. Select the **command** you wish to add from the drop-down menu. To choose from more commands, select **More Commands**.



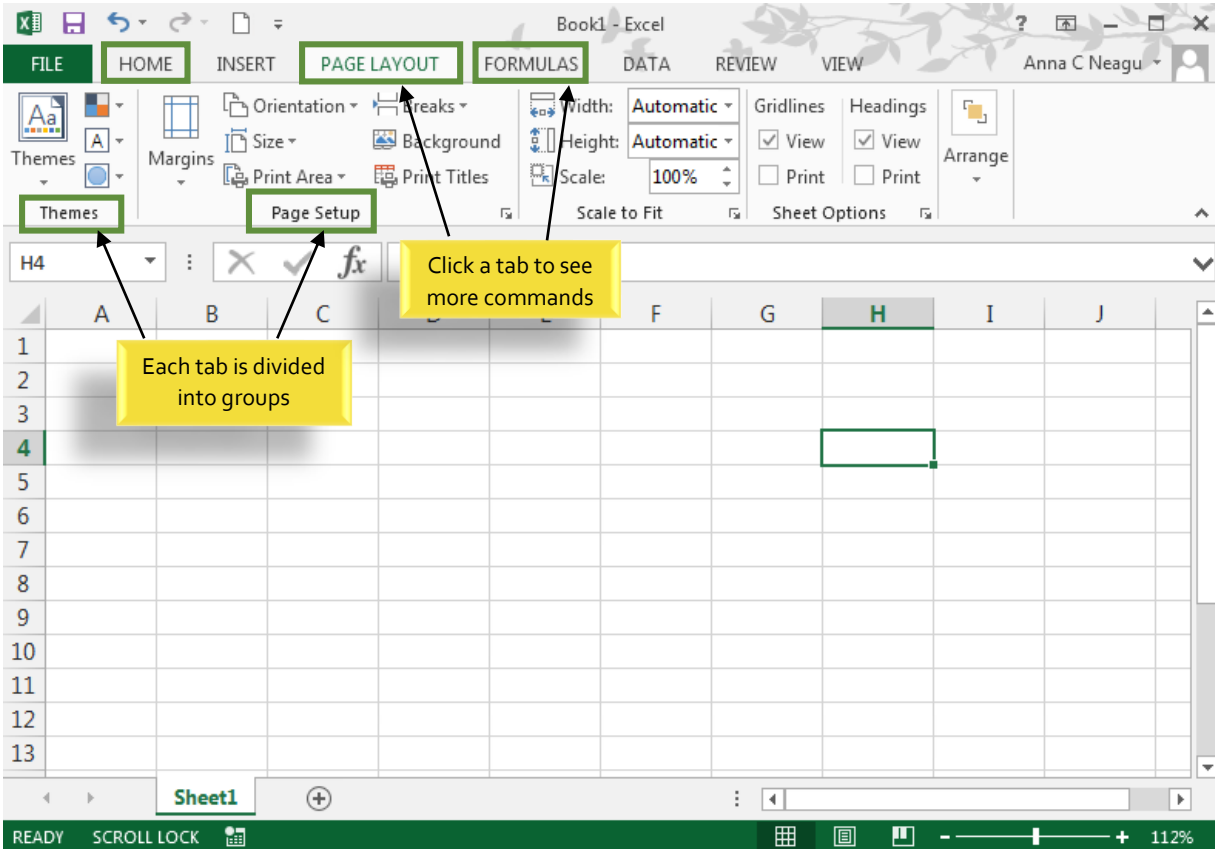
3. The command will be **added** to the Quick Access toolbar.



## ❑ 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.

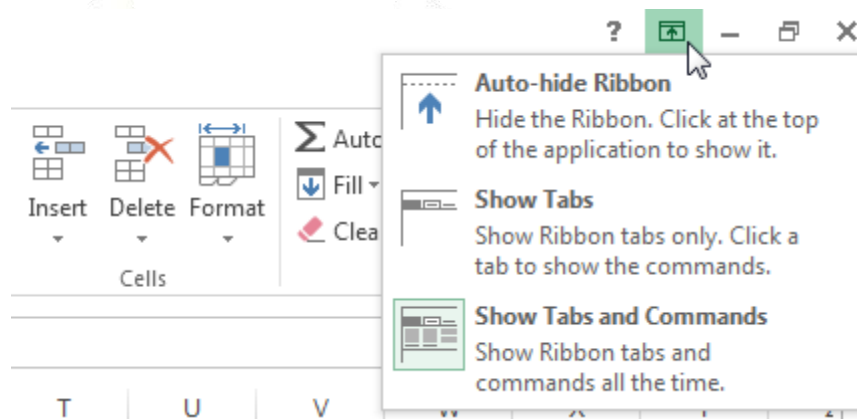




### To minimize and maximize the Ribbon

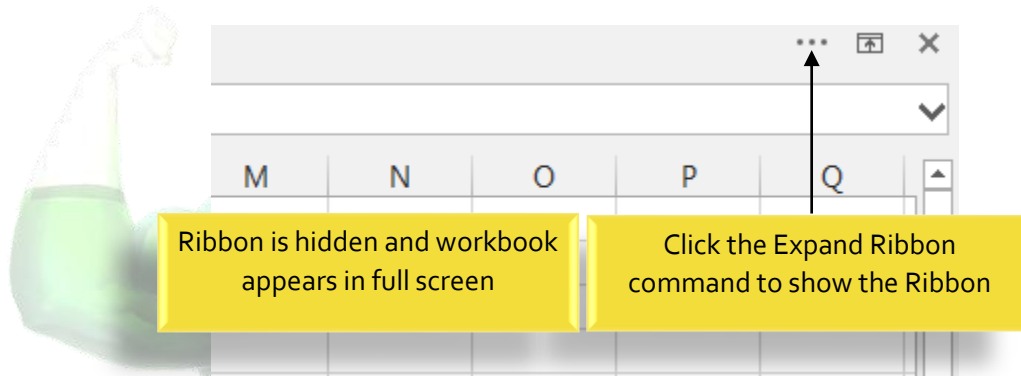
The Ribbon is designed to respond to your current task, but you can choose to **minimize** it if you find that it takes up too much screen space.

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:

- Auto-hide Ribbon:** Auto-hide displays your workbook in full-screen mode and completely hides the Ribbon. To **show the Ribbon**, click the **Expand Ribbon** command at the top of screen.

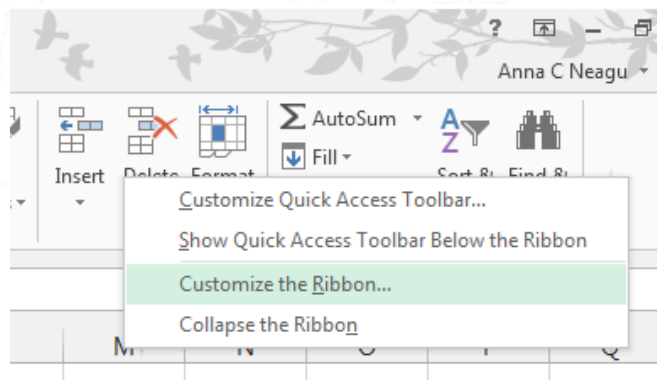


- Show Tabs:** This option hides all command groups when not in use, but **tabs** will remain visible. To **show the Ribbon**, simply click a tab.
- Show Tabs and Commands:** This option maximizes the Ribbon. All of the tabs and commands will be visible. This option is selected by default when you open Excel for the first time.

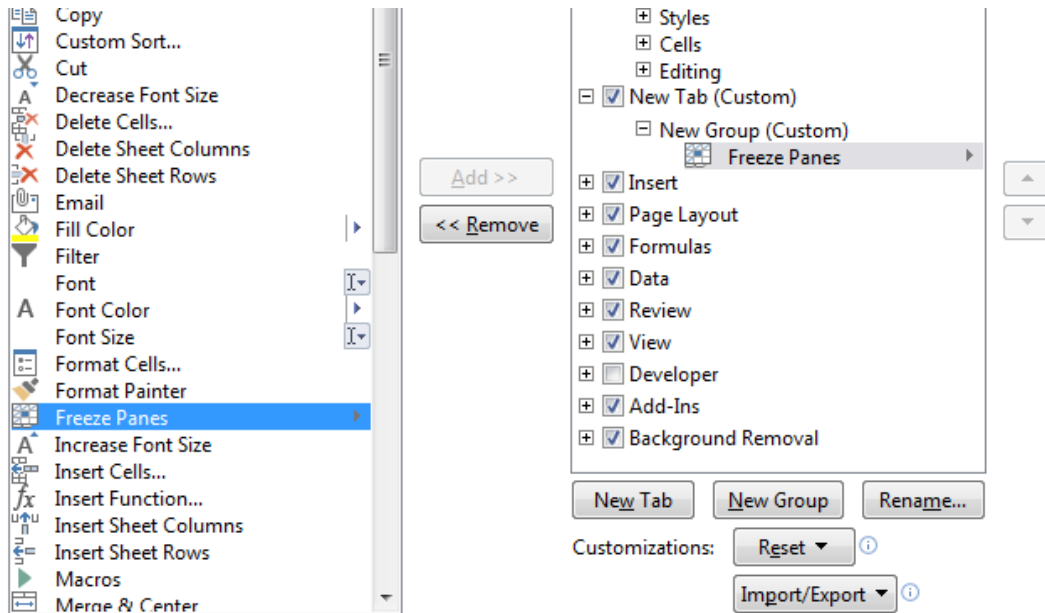
### To Customize the Ribbon in Excel 2013

You can customize the Ribbon by creating your own **tabs** with whichever commands you want. Commands are always housed within a **group**, and you can create as many groups as you want in order to keep your tab organized. If you want, you can even add commands to any of the default tabs, as long as you create a custom group in the tab.

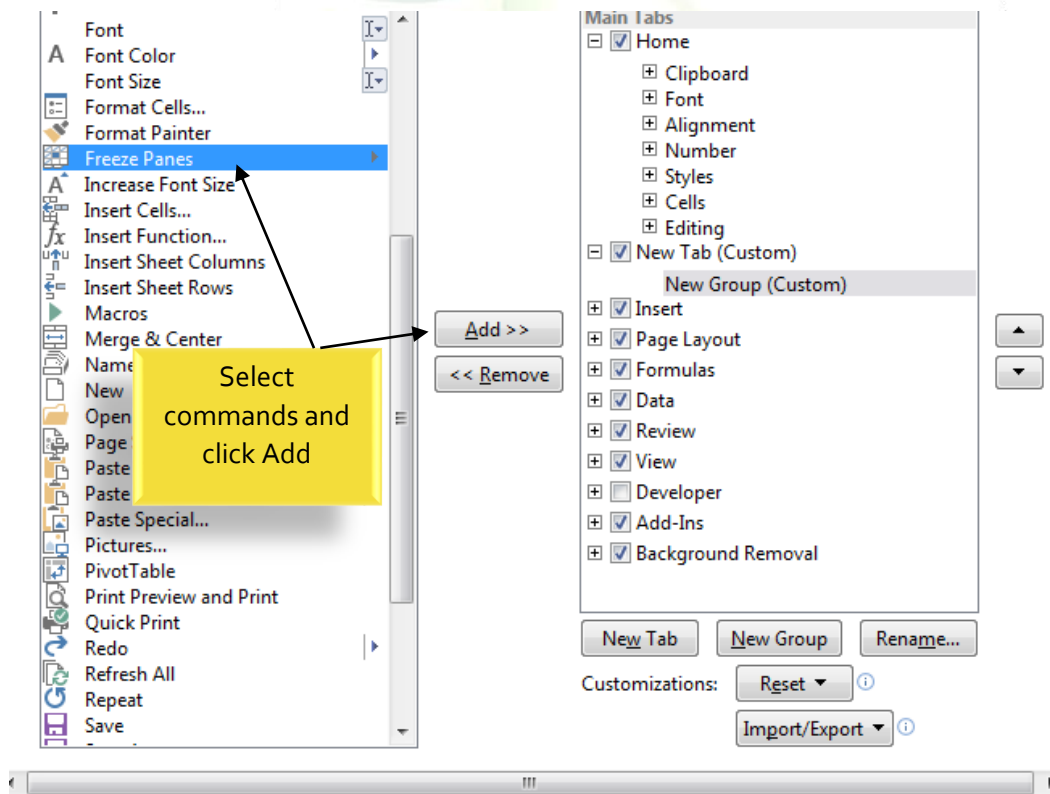
1. Right-click the **Ribbon** and then select **Customize the Ribbon...** from the drop-down menu.



2. The **Excel Options** dialog box will appear. Locate and select **New Tab**.



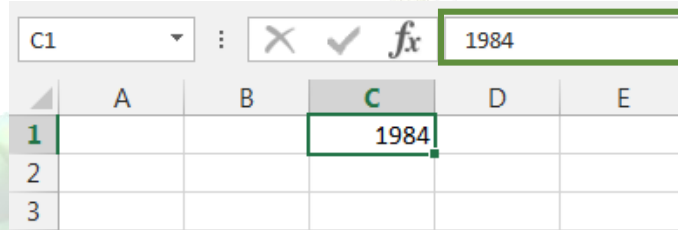
3. Make sure the **New Group** is selected, select a **command**, and then click **Add**. You can also drag commands directly into a group.
4. When you are done adding commands, click **OK**. The commands will be added to the Ribbon.



### ❑ 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.

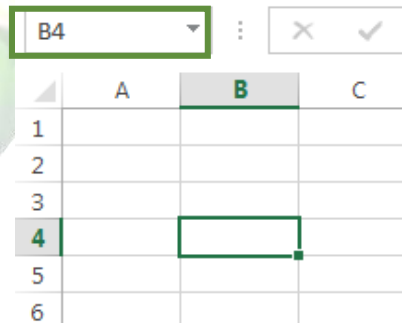
In the image below, cell C1 is selected and 1984 is entered into the formula bar. Note how the data appears in both the formula bar and in cell C1.



### ❑ The Name Box

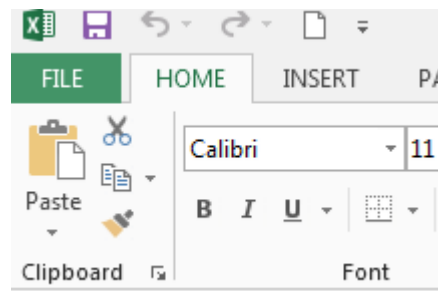
The **Name box** displays the **location**, or "name" of a **selected cell**.

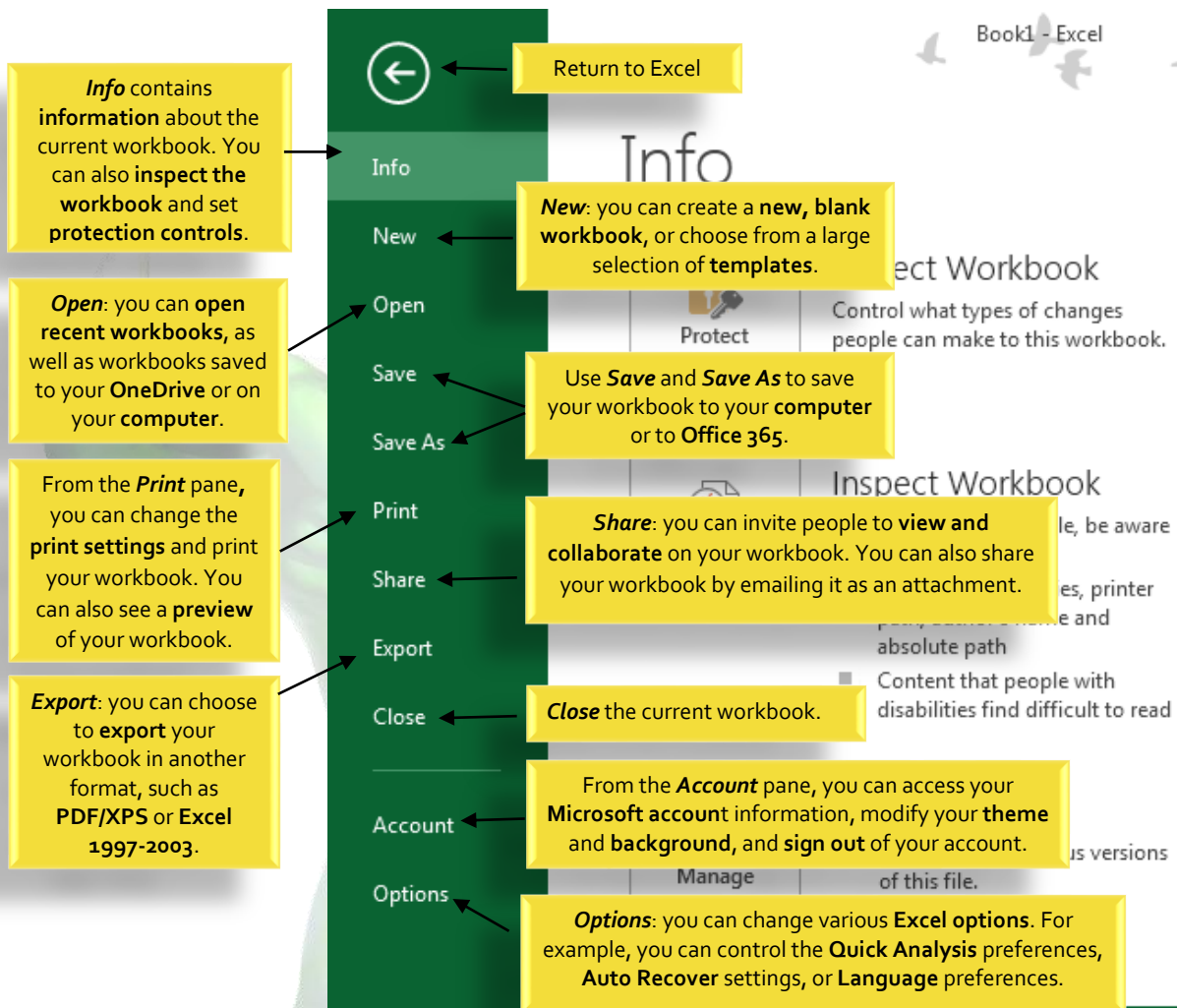
In the image below, cell B4 is selected. Note that cell B4 is where column B and row 4 intersect.



### ❑ The Backstage View (The File Menu)

Click the **File** tab on the **Ribbon**. **Backstage view** will appear.

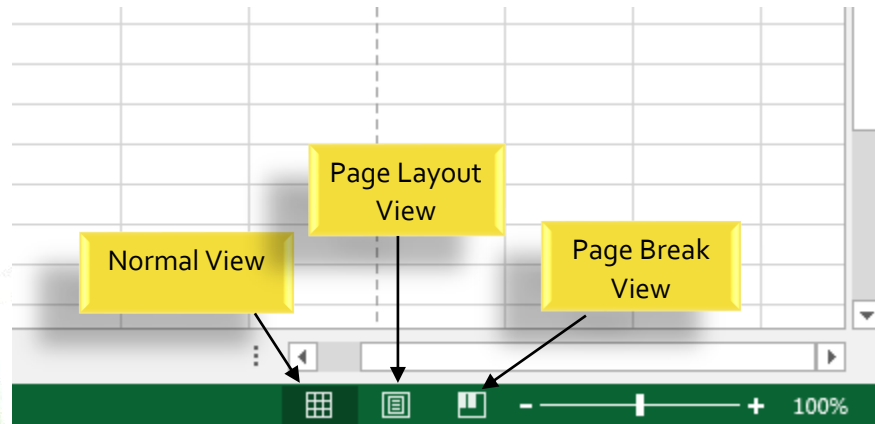




## ❑ The Worksheet Views

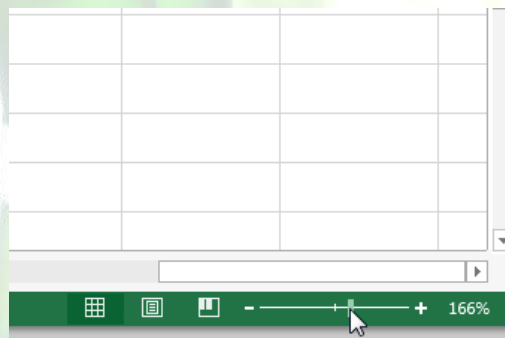
Excel 2013 has a variety of viewing options that change how your workbook is displayed. You can choose to view any workbook in **Normal view**, **Page Layout view**, or **Page Break view**. These views can be useful for various tasks, especially if you're planning to **print** the spreadsheet.

To **change worksheet views**, locate and select the desired **worksheet view command** in the bottom-right corner of the Excel window.



Zoom Control

To use the **Zoom control**, click and drag the **slider**. The number to the right of the slider reflects the **zoom percentage**.



**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. Add a **command** to the **Quick Access toolbar**.
5. Navigate to **Backstage view**, and open your **Account settings**.
6. Try switching **worksheet views**.
7. **Close** Excel (you do not have to save the workbook).

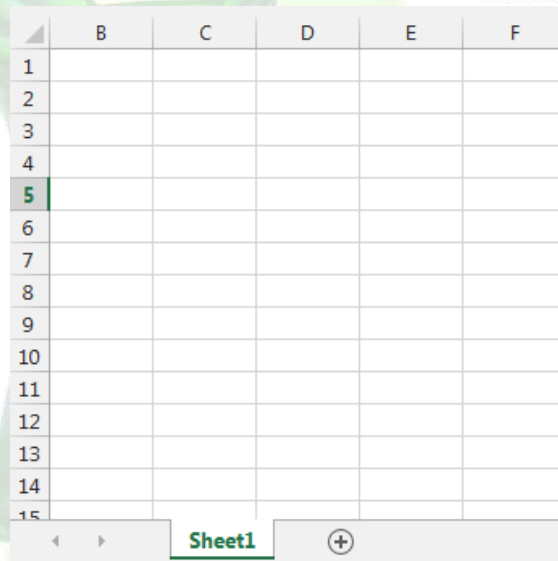
### 2.1.2. The Workbook Window

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

#### ❑ 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.

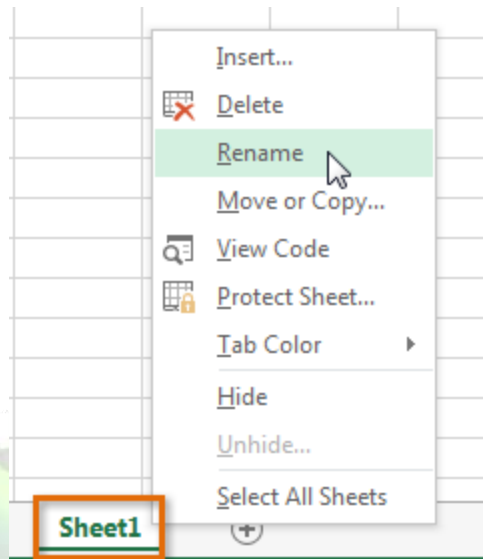


When working with a large amount of data, you can create **multiple worksheets** to help organize your workbook and make it easier to find content. You can also **group** worksheets to quickly add information to multiple worksheets at the same time.

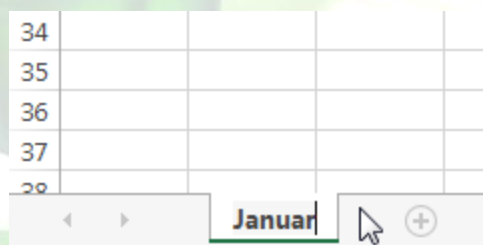
#### *To rename a worksheet*

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**.

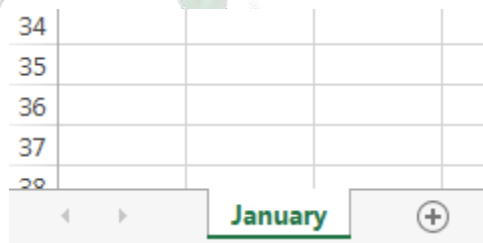
1. Right-click the **worksheet** you wish to rename, then select **Rename** from the **worksheet** menu.



2. Type the **desired name** for the worksheet.

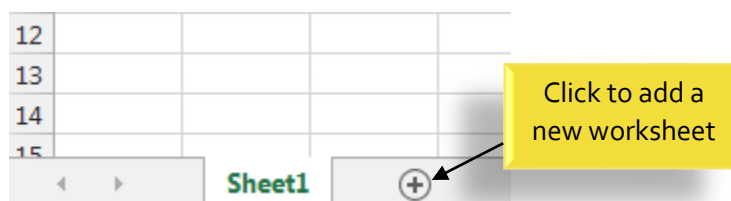


3. Click anywhere outside of the worksheet, or press **Enter** on your keyboard. The worksheet will be renamed.




*To insert a new worksheet*

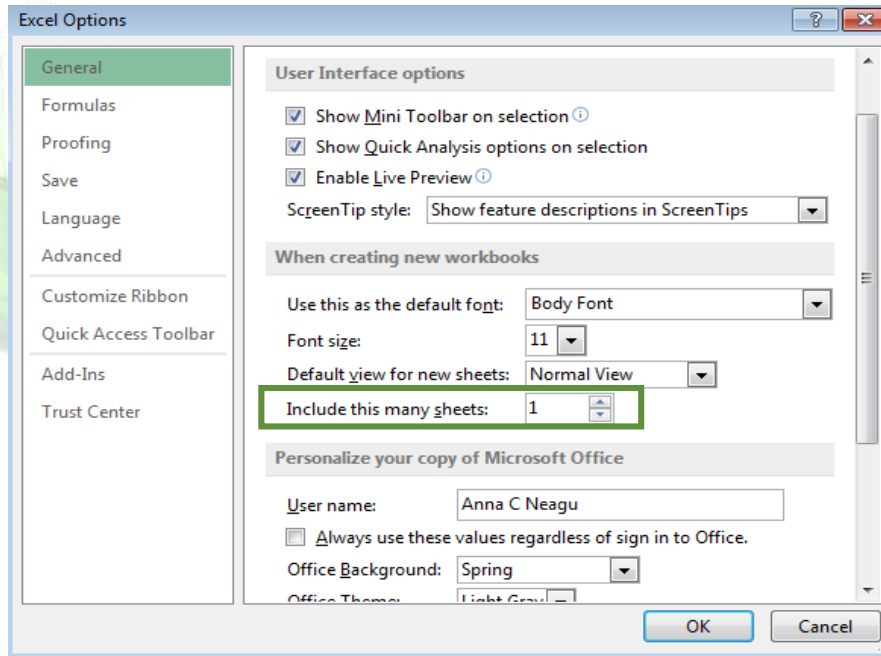
1. Locate and select the **New sheet** button.





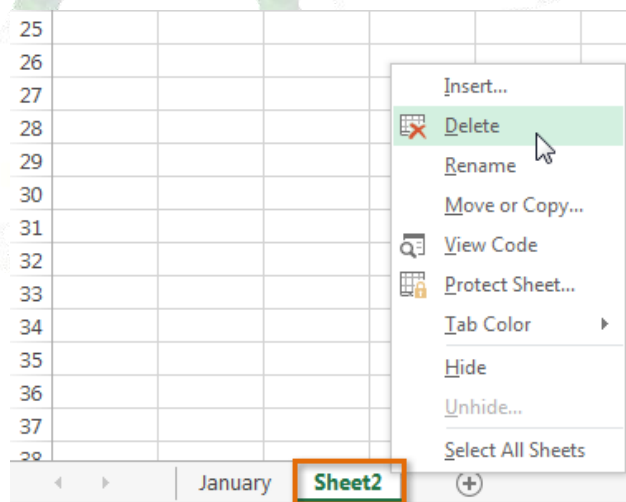
2. A new, blank worksheet will appear.

 **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.

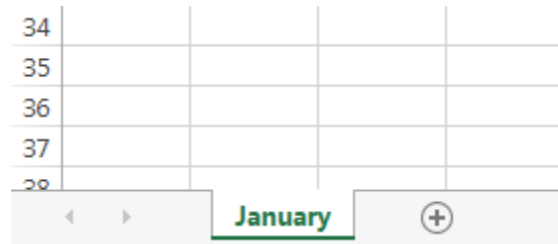


*To delete a worksheet*

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.



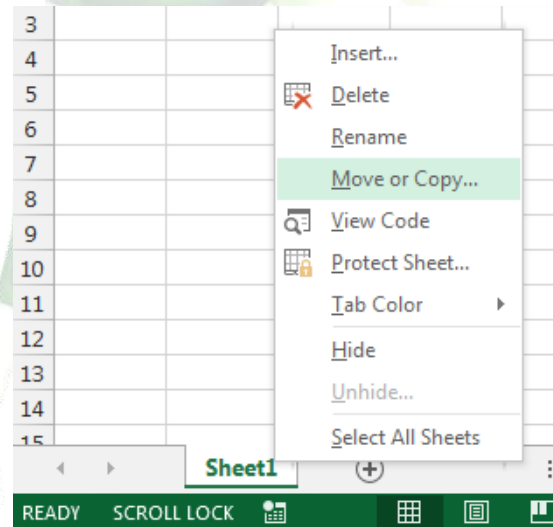
Alternatively, from the **Home Tab** in the **Cells Group** click on **Delete** and select **Delete Sheet**.

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

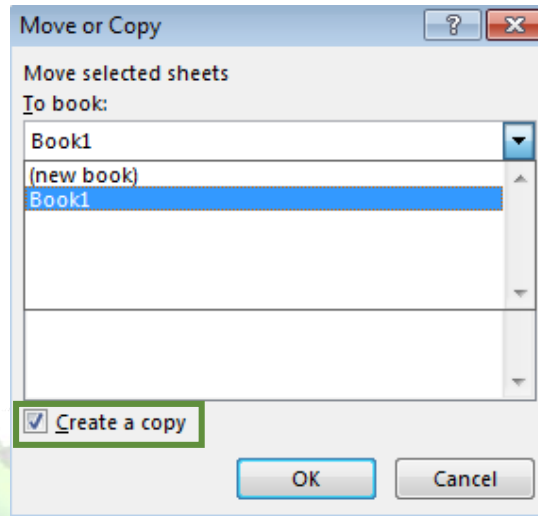
### *To copy a worksheet*

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.

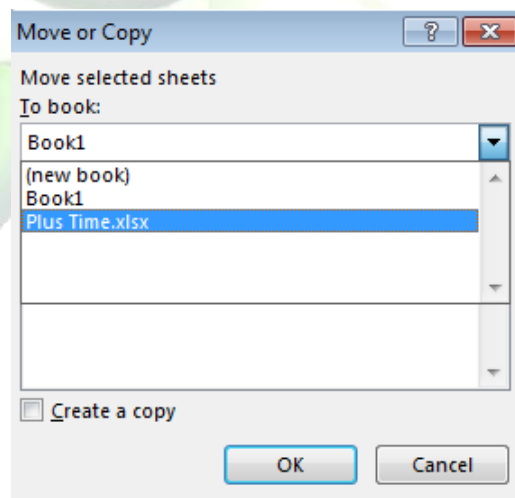


2. The **Move or Copy** dialog box will appear. Choose where the sheet will appear in the **Before sheet:** field. In our example, we'll choose **(move to end)** to place the worksheet to the right of the existing worksheet.
3. **Check the box** next to **Create a copy**, then click **OK**.




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

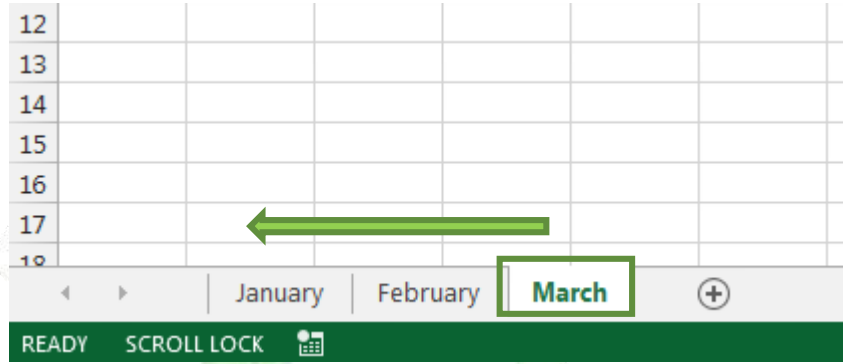
TIP: You can also copy a worksheet to an entirely different **workbook**. You can select any workbook that is currently open from the **To book:** drop-down menu.



### *To move a worksheet*

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

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

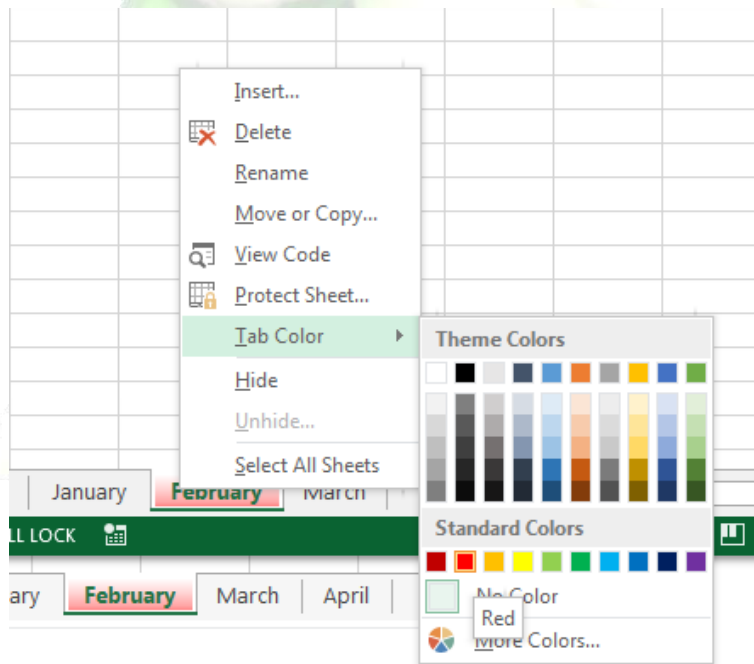


3. Release the mouse. The worksheet will be **moved**.

*To change the worksheet color*

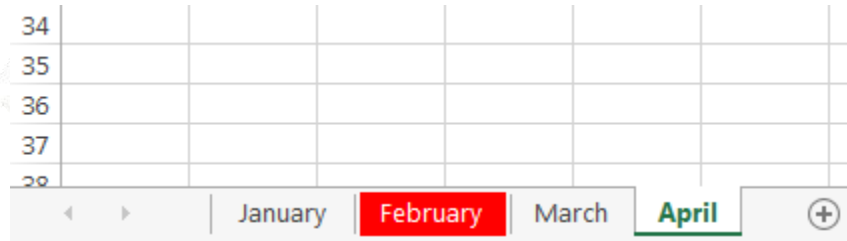
You can change a worksheet's **color** to help organize your worksheets and make your workbook easier to navigate.

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.

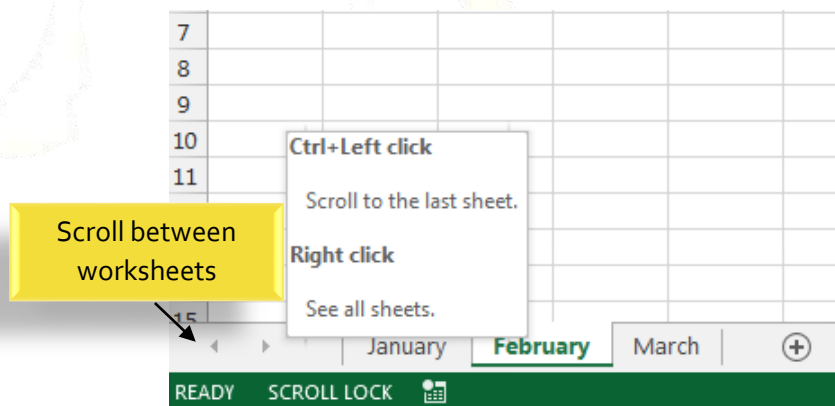


### Challenge!

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.

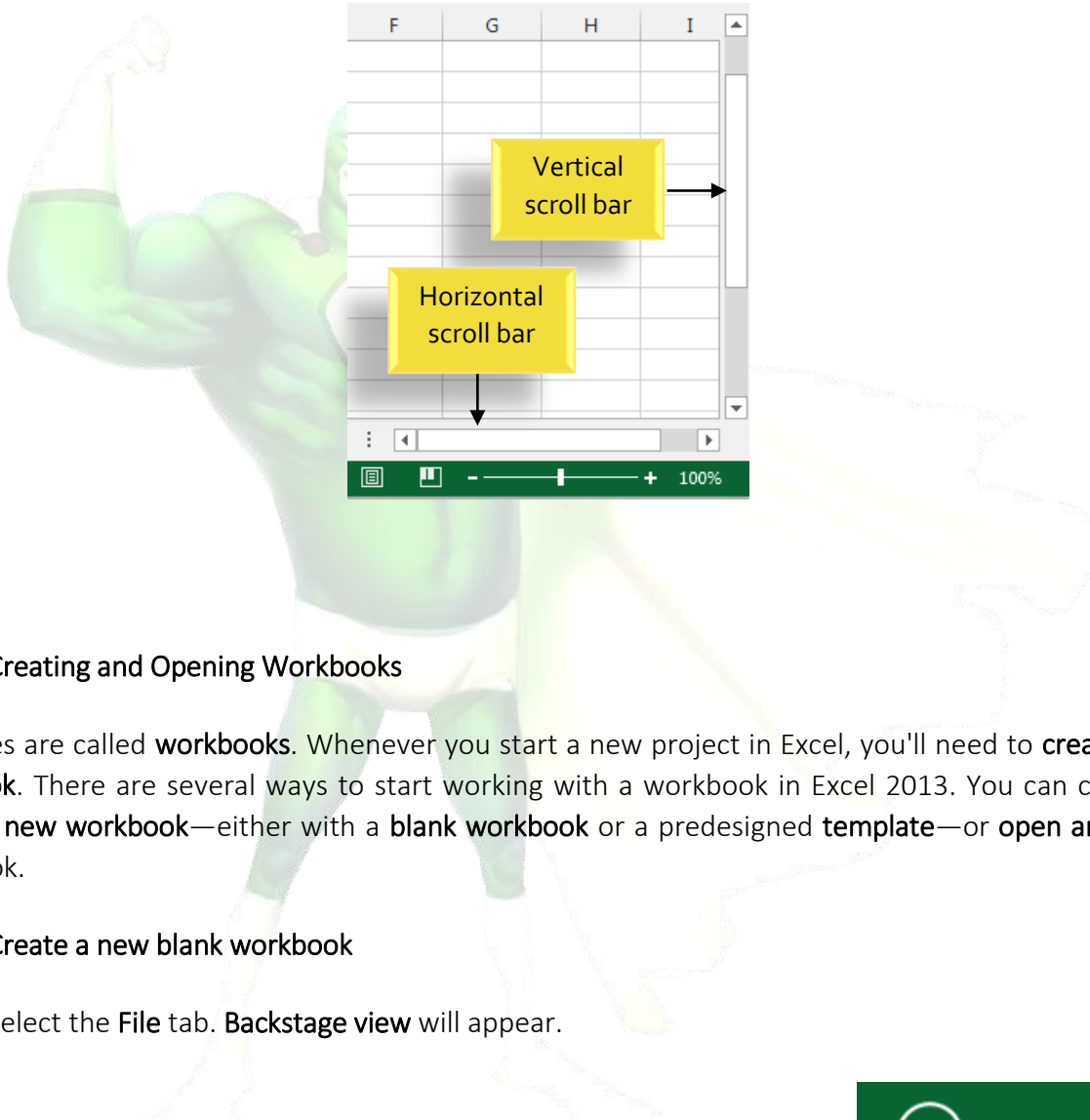
### ❑ The Scrolling Buttons

These buttons scroll the display of sheet tabs one at a time or to display the first and last grouping of sheet tabs and are located to the left of the sheet tabs.



❑ The Scroll Bars

Your spreadsheet may frequently have more data than you can see on the screen at once. Click, hold and drag the vertical or horizontal scroll bar depending on what part of the page you want to see.

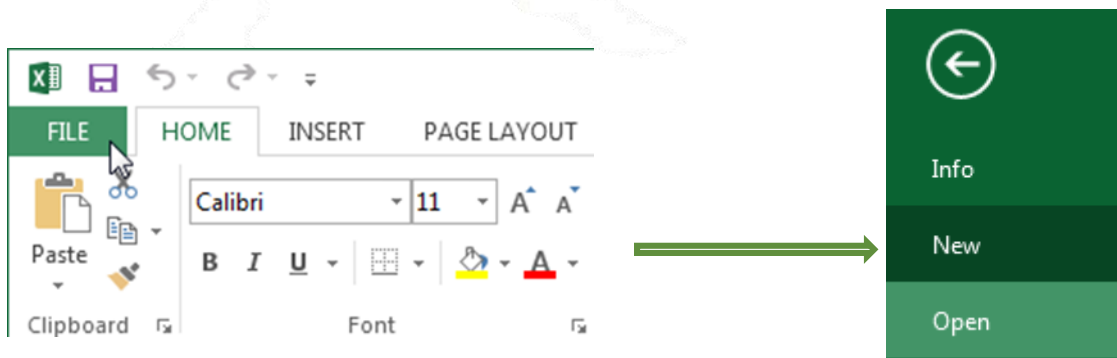


2.2. Creating and Opening Workbooks

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.

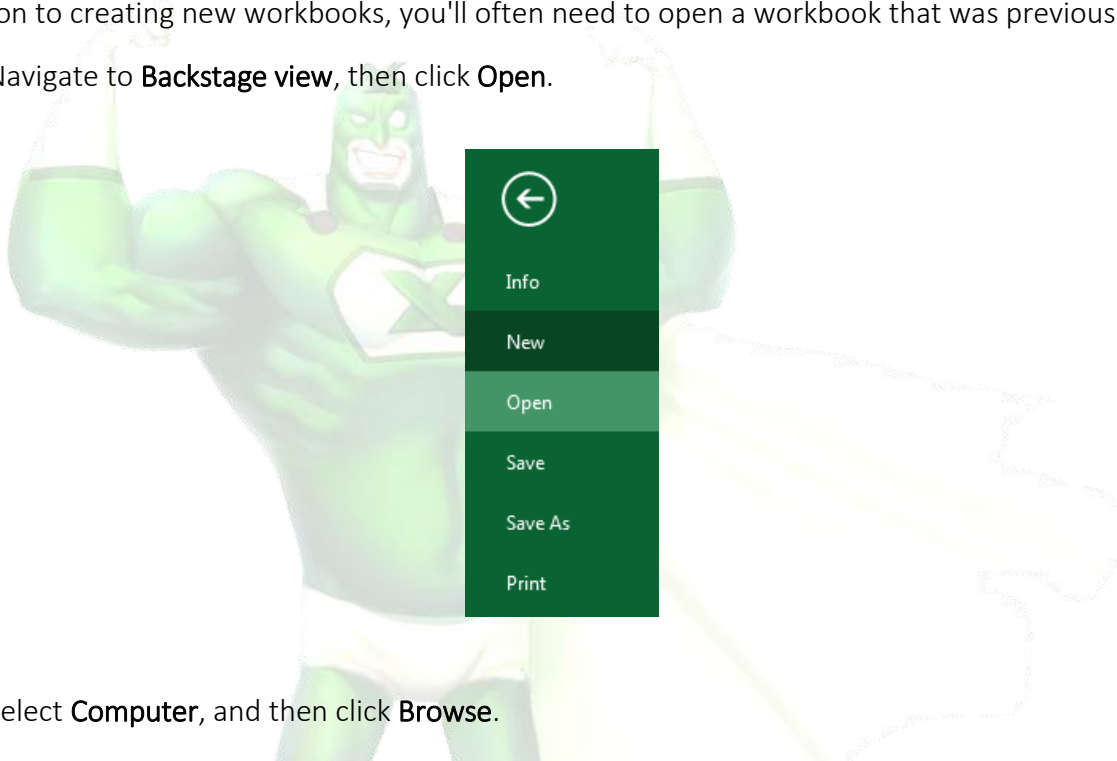


2. Select **New**, then click **Blank workbook**.
3. A new blank workbook will appear.

### 2.2.2. Open an existing workbook

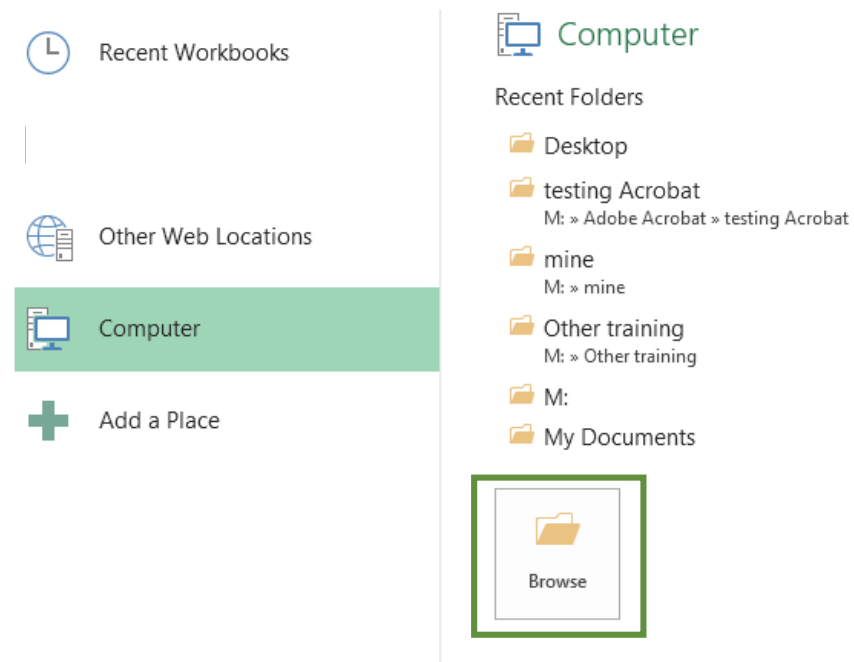
In addition to creating new workbooks, you'll often need to open a workbook that was previously saved.

1. Navigate to **Backstage view**, then click **Open**.

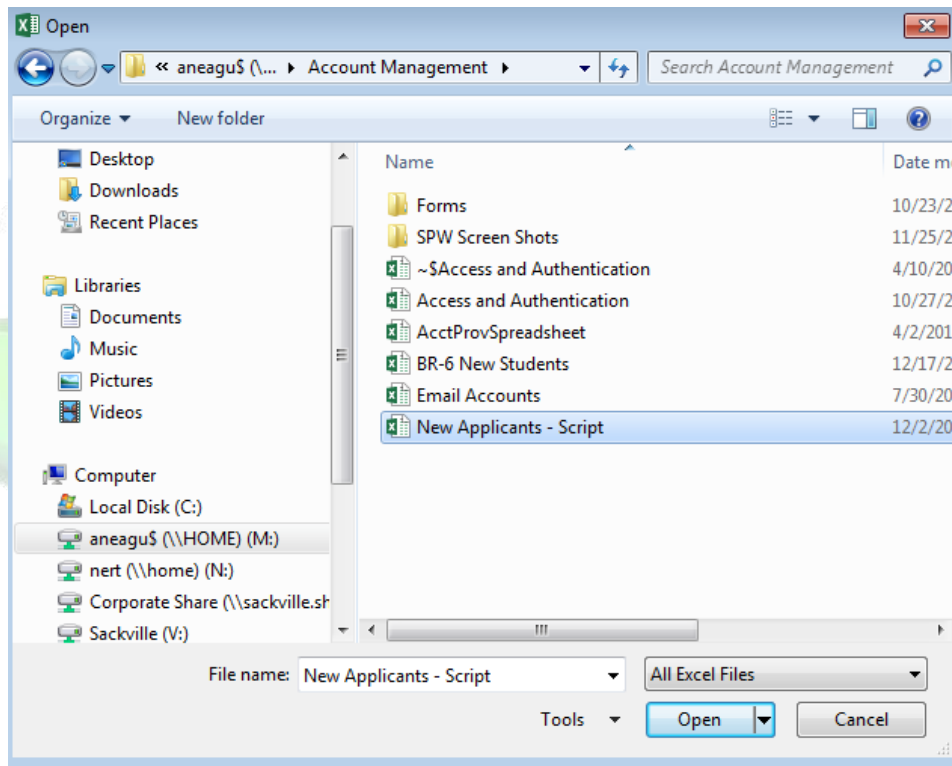



2. Select **Computer**, and then click **Browse**.

## Open







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

-  Recent Workbooks
-  Other Web Locations
-  Computer
-  Add a Place


### Recent Workbooks

-  2015 Project List  
M: » Town » 2015 Town
-  Usage Report  
\\HOME » aneagu\$ » Town » REPORTS
-  Usage Report  
M: » Town » REPORTS
-  Plus Time  
M: » Mine
-  Usage  
M: » Town » REPORTS
-  Steps  
M: » Town » Council Package Project

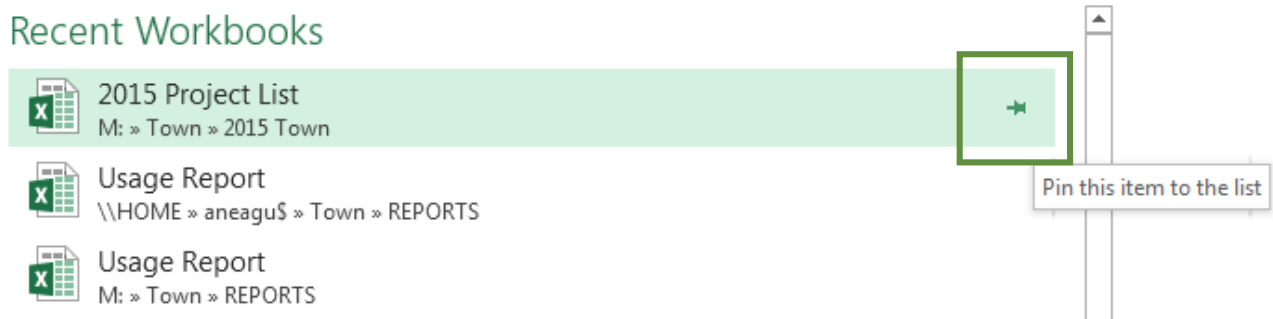


### To pin a workbook


If you frequently work with the **same workbook**, you can **pin it** to Backstage view for quick access.

1. Navigate to **Backstage view** and then click **Open**. Your **recently edited workbooks** will appear.
2. Hover the mouse over the **workbook** you wish to pin. A **pushpin icon**  will appear next to the workbook. Click the **pushpin icon**.

### Recent Workbooks

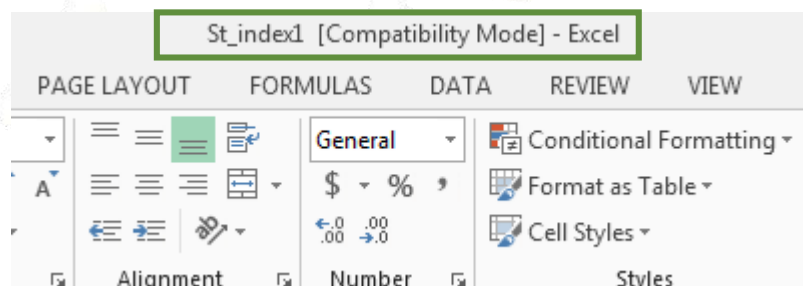


3. The workbook will stay in Recent Workbooks. To **unpin** a workbook, simply click the pushpin icon again.

 **TIP:** You can also **pin folders** to Backstage view for quick access. From Backstage view, click **Open**, then locate the **folder** you wish to pin and click the **pushpin icon**.

### 2.2.3. Compatibility mode

Sometimes you may need to work with workbooks that were created in earlier versions of Microsoft Excel, such as Excel 2003 or Excel 2000. When you open these kinds of workbooks, they will appear in **Compatibility mode**.



Compatibility mode **disables** certain features, so you'll only be able to access commands found in the program that was used to create the workbook. For example, if you open a workbook created in Excel 2003, you can only use tabs and commands found in Excel 2003.

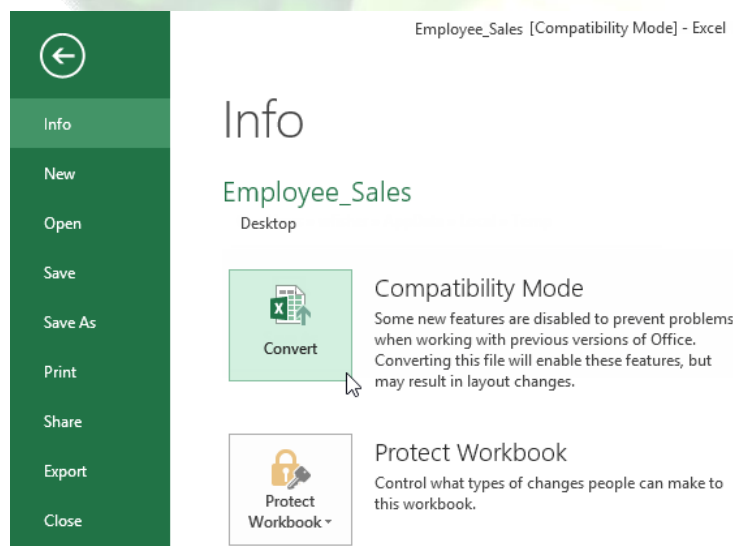
In order to exit Compatibility mode, you'll need to **convert** the workbook to the current version type. However, if you're collaborating with others who only have access to an earlier version of Excel, it's best to leave the workbook in Compatibility mode so the format will not change.

### To convert a workbook

If you want access to all of the Excel 2013 features, you can **convert** the workbook to the 2013 file format.

Note that converting a file may cause some changes to the **original layout** of the workbook.

1. Click the **File** tab to access Backstage view.
2. Locate and select **Convert** command.



3. The **Save As** dialog box will appear. Select the **location** where you wish to save the workbook, enter a **file name** for the presentation, and click **Save**.
4. The workbook will be converted to the newest file type.

### Challenge!

1. Create a **new blank workbook**.
2. Open an **existing workbook** from your computer.
3. **Pin** a folder to Backstage view.

## 2.3. Saving and Sharing Workbooks

Whenever you create a new workbook in Excel, you'll need to know how to save it in order to access and edit it later. As with previous versions of Excel, you can save files **locally** to your computer. But unlike older versions, Excel 2013 also lets you save a workbook to **the cloud** using **OneDrive**. You can also **export** and **share** workbooks with others directly from Excel.

### 2.3.1. Save and Save As

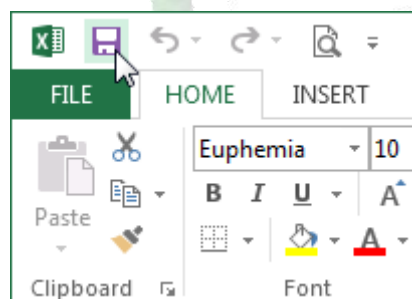
Excel offers two ways to save a file: **Save** and **Save As**. These options work in similar ways, with a few important differences:

- ☑ **Save:** When you create or edit a workbook, you'll use the **Save** command to save your changes. You'll use this command most of the time. When you save a file, you'll only need to choose a file name and location the first time. After that, you can just click the Save command to save it with the same name and location.
- ☑ **Save As:** You'll use this command to create a **copy** of a workbook while keeping the original. When you use Save As, you'll need to choose a different name and/or location for the copied version.

#### *To save a workbook*

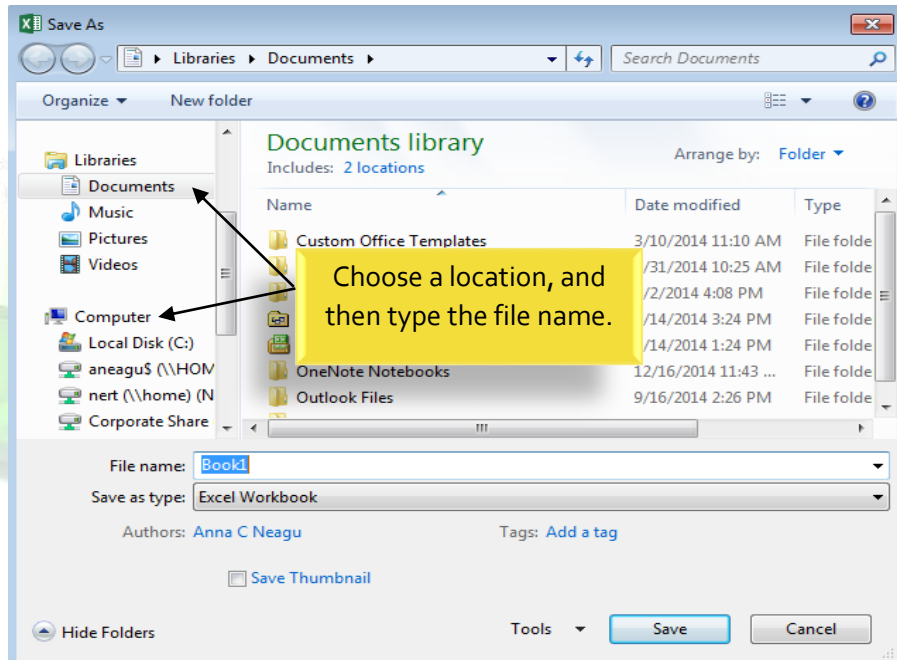
It's important to **save your workbook** whenever you start a new project or make changes to an existing one. Saving early and often can prevent your work from being lost. You'll also need to pay close attention to **where you save** the workbook so it will be easy to find later.

1. Locate and select the **Save** command on the **Quick Access Toolbar**.



2. If you're saving the file for the first time, the **Save As** pane will appear in **Backstage view**.
3. You'll then need to choose **where to save** the file and give it a **file name**. To save the workbook to your computer, select **Computer**, then click **Browse**. Alternatively, you can click **OneDrive** to save the file to your OneDrive.
4. The **Save As** dialog box will appear. Select the **location** where you wish to save the workbook.

5. Enter a **file name** for the workbook, then click **Save**.



6. The workbook will be **saved**. You can click the **Save** command again to save your changes as you modify the workbook.

### Using Save As to make a copy

If you want to save a **different version** of a workbook while keeping the original, you can create a **copy**. For example, if you have a file named "Sales Data" you could save it as "Sales Data 2" so you'll be able to edit the new file and still refer back to the original version.

To do this, you'll click the **Save As** command in Backstage view. Just like when saving a file for the first time, you'll need to choose **where to save** the file and give it a new **file name**.

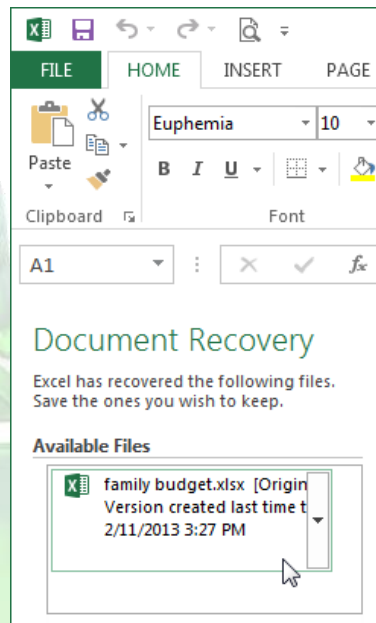
### 2.3.2. AutoRecover

Excel automatically saves your workbooks to a temporary folder while you are working on them. If you forget to save your changes, or if Excel crashes, you can restore the file using **AutoRecover**.

#### To use AutoRecover

1. Open Excel 2013. If **auto-saved versions** of a file are found, the **Document Recovery** pane will appear.

2. Click to **open** an available file. The workbook will be **recovered**.



-  **TIP:** By default, Excel autosaves **every 10 minutes**. If you are editing a workbook for less than 10 minutes, Excel may not create an autosaved version.

If you don't see the file you need, you can browse all autosaved files from **Backstage view**. Just select the **File** tab, click **Manage Versions**, and then choose **Recover Unsaved Workbooks**.

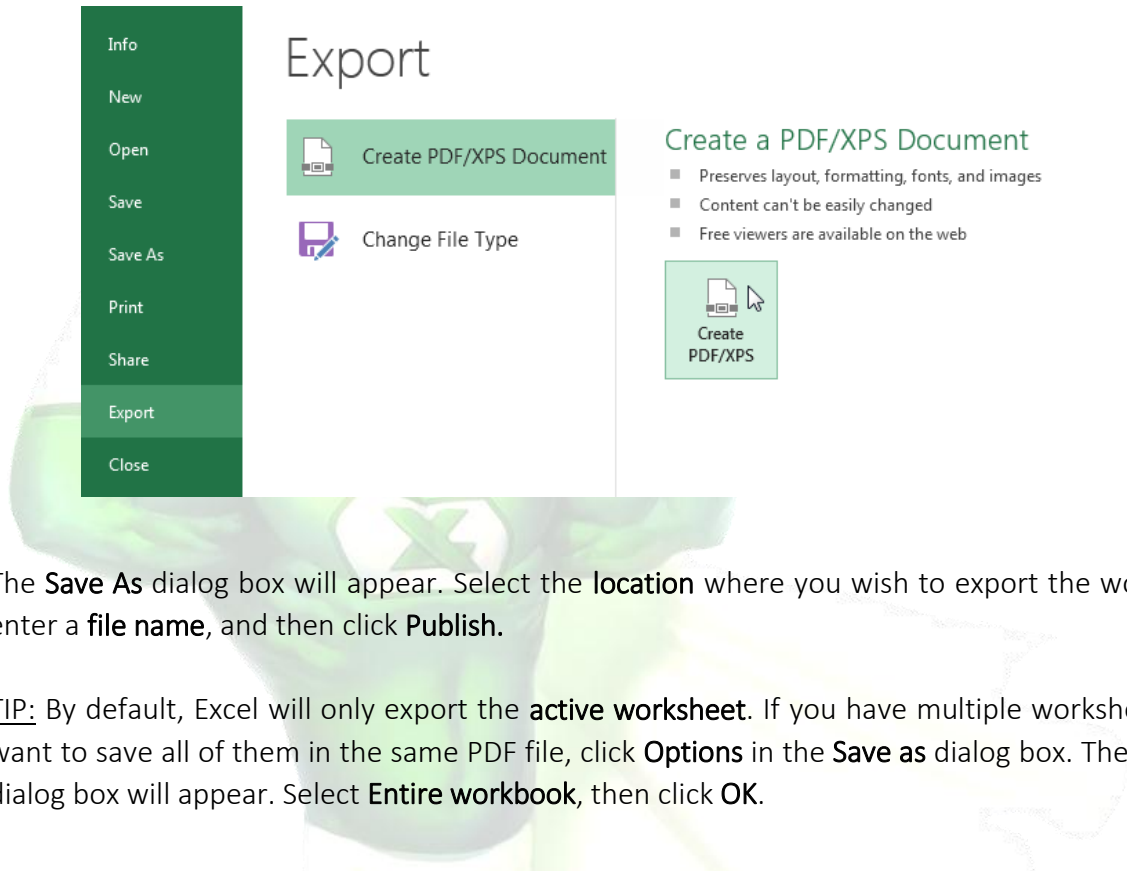
### 2.3.3. Exporting workbooks

By default, Excel workbooks are saved in the **.xlsx** file type. However, there may be times when you need to use **another file type**, such as a **PDF** or **Excel 97-2003 workbook**. It's easy to **export** your workbook from Excel in a variety of file types.


#### *To export a workbook as a PDF file*

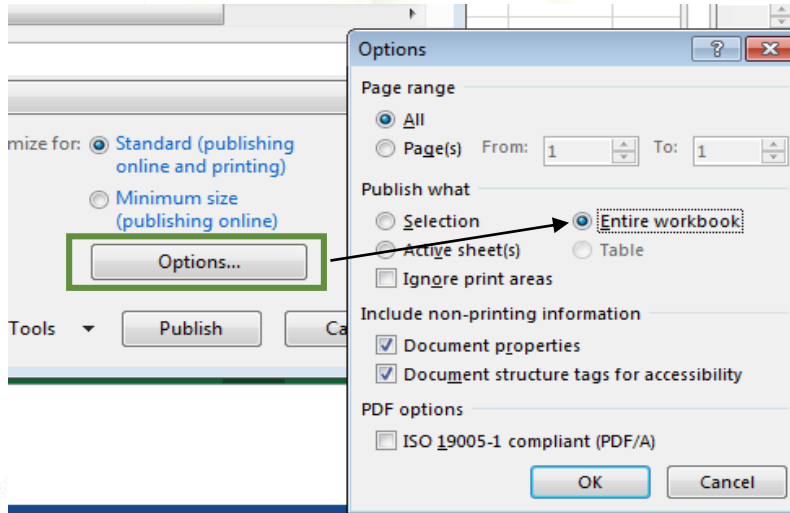
Exporting your workbook as an **Adobe Acrobat document**, commonly known as a **PDF file**, can be especially useful if sharing a workbook with someone who does not have Excel. A PDF will make it possible for recipients to view, but not edit, the content of your workbook.

1. Click the **File** tab to access **Backstage view**.
2. Click **Export**, then select **Create PDF/XPS**.



3. The **Save As** dialog box will appear. Select the **location** where you wish to export the workbook, enter a **file name**, and then click **Publish**.

 **TIP:** By default, Excel will only export the **active worksheet**. If you have multiple worksheets and want to save all of them in the same PDF file, click **Options** in the **Save as** dialog box. The **Options** dialog box will appear. Select **Entire workbook**, then click **OK**.



*To export a workbook in other file types*

You may also find it helpful to export your workbook in other file types, such as an **Excel 97-2003 Workbook** if you need to share with people using an older version of Excel, or a **.CSV file** if you need a **plain-text version** of your workbook.

1. Click the File tab to access Backstage view.
2. Click Export, then select Change File Type.
3. Select a common file type, then click Save As.
4. The Save As dialog box will appear. Select the location where you wish to export the workbook, enter a **file name**, and then click **Save**.

### Challenge!

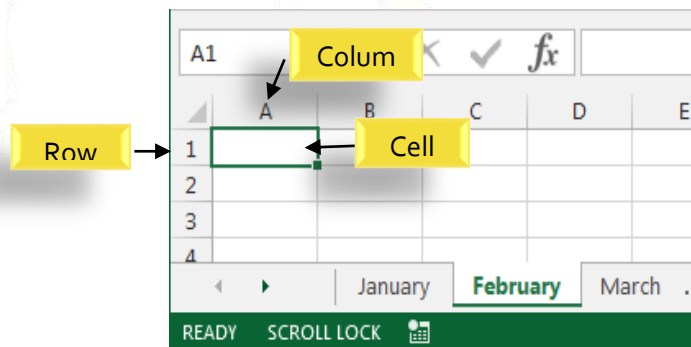
5. Create a **new blank workbook**.
6. Use the **Save** command to save the workbook to your desktop.
7. Save the workbook to **OneDrive** and **invite someone else** to view it.
8. **Export** the workbook as a PDF file.

## 3. Cell Basics

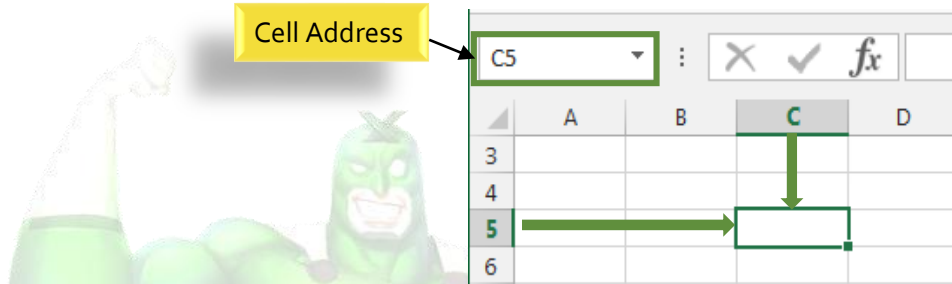
Whenever you work with Excel, you'll enter information, or **content**, into **cells**. Cells are the basic building blocks of a worksheet. You'll need to learn the basics of **cells** and **cell content** to calculate, analyze, and organize data in Excel.

### 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)**.



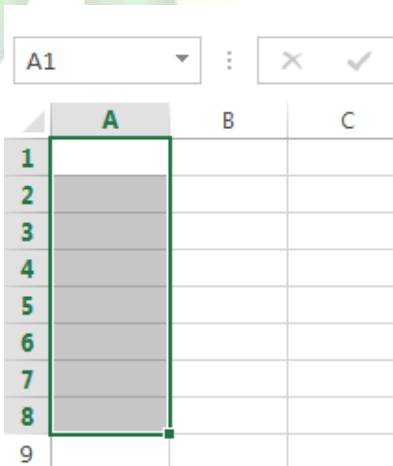
Each cell has its own **name**, or **cell address**, based on its column and row. In this example, the selected cell intersects **column C** and **row 5**, so the cell address is **C5**. The cell address will also appear in the **Name box**. Note that a cell's **column** and **row headings** are **highlighted**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

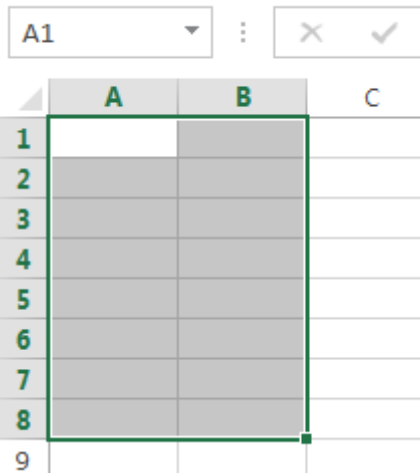
In the images below, two different cell ranges are selected:

- 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	<b>Date</b>	<b>Sales</b>	<b>Percentage of Total</b>
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**.

❑ **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.

	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.

	A	B	C	D	E
1	First				
2					
3					
4					
5					

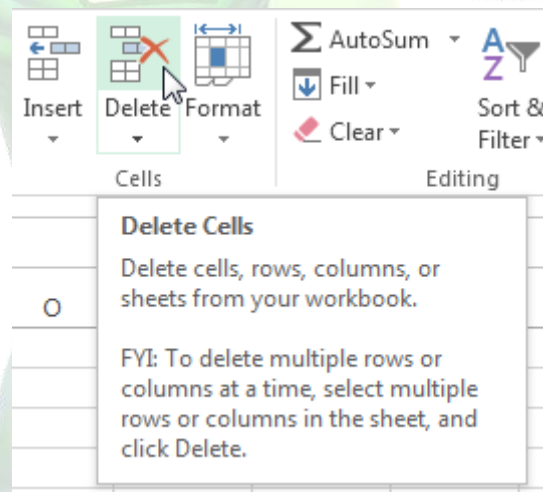
### To delete cell content

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.

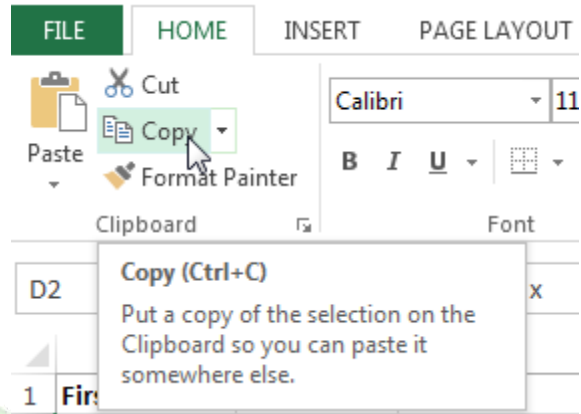
1. Select the **cell(s)** you wish to delete.
2. Select the **Delete** command from the **Home** tab on the **Ribbon**.
3. The cells below will **shift up**.



### 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.

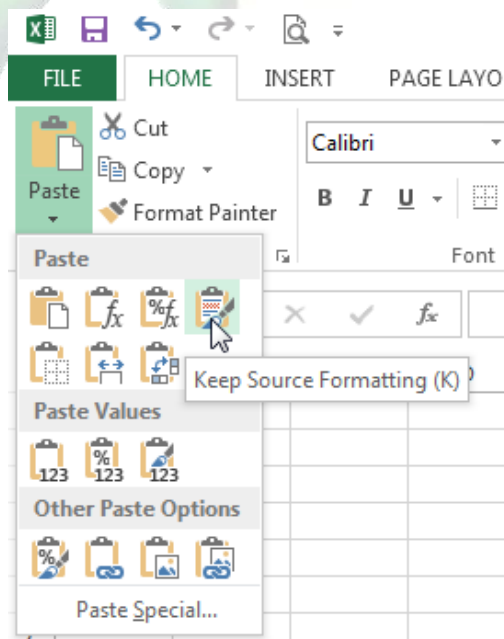



3. Select the **cell(s)** where you wish to **paste** the content. The copied cells will now have a **dashed box** around them.
4. Click the **Paste** command on the **Home** tab, or press **Ctrl+V** on your keyboard.
5. The content will be **pasted** into the selected cells.

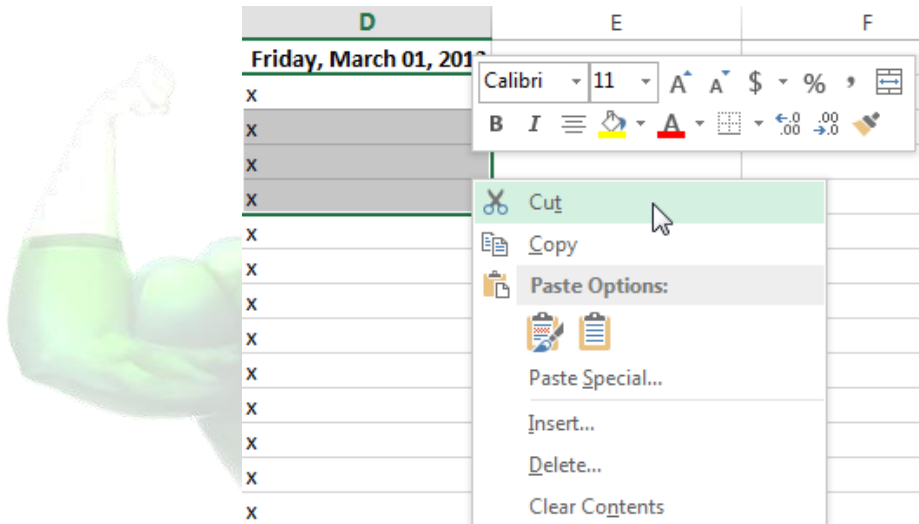
*To access more paste options*

You can also access **additional paste options**, which are especially convenient when working with cells that contain **formulas** or **formatting**.

- To access more paste options, click the **drop-down arrow** on the **Paste** command.



-  **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

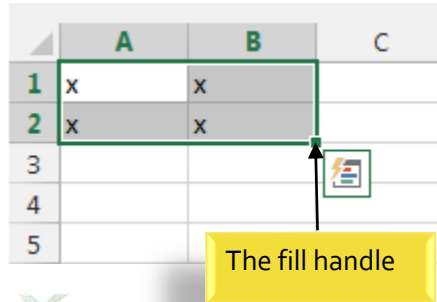
Rather than cutting, copying, and pasting, you can **drag and drop** cells to move their contents.

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.

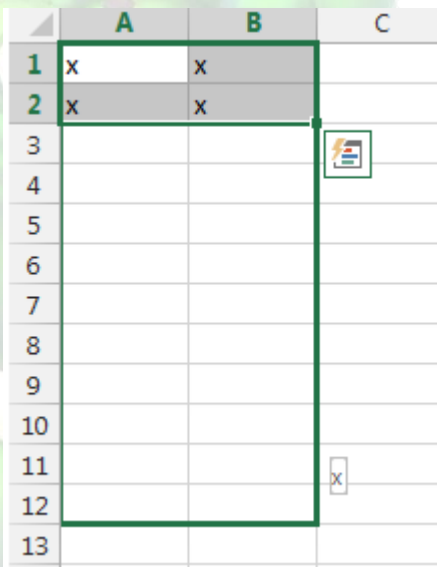
### To use the fill handle

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).



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



- 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.

	A	B	C
1	Monday		
2	Tuesday		
3			
4			
5			
6			
7		Sunday	
8			

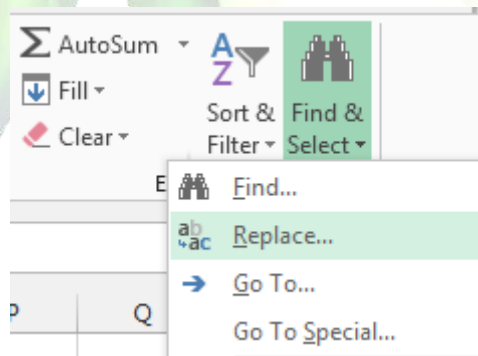
	A	B
1	Monday	
2	Tuesday	
3	Wednesday	
4	Thursday	
5	Friday	
6	Saturday	
7	Sunday	
8		

### 3.3. Find and Replace

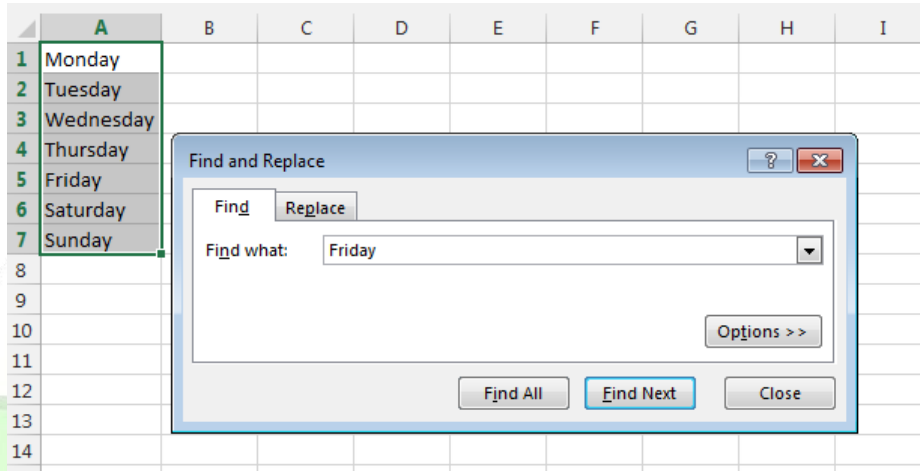
When working with a lot of data in Excel, it can be difficult and time consuming to locate specific information. You can easily search your workbook using the **Find** feature, which also allows you to modify content using the **Replace** feature.

#### To find content


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




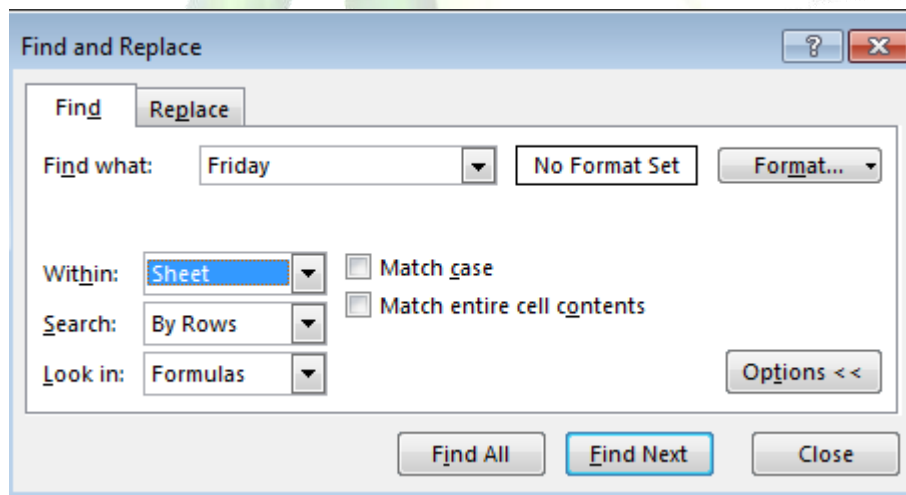
2. The **Find and Replace** dialog box will appear. Enter the **content** you wish to find.
3. Click **Find Next**. If the content is found, the cell containing that content will be **selected**.



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

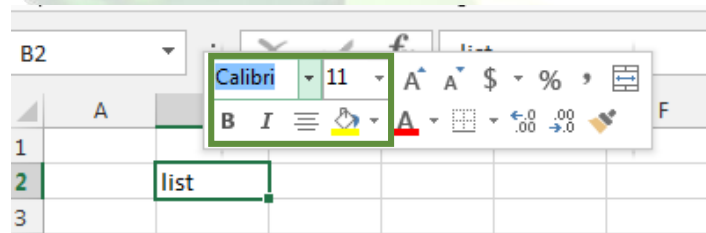
All cell content uses the same **formatting** by default, which can make it difficult to read a workbook with a lot of information. Basic formatting can customize the **look and feel** of your workbook, allowing you to draw attention to specific sections and making your content easier to view and understand. 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. Font Formatting


### To change the font

By default, the font of each new workbook is set to Calibri. However, Excel provides a variety of other fonts you can use to customize your cell text. In the example below, we'll format our **title cell** to help distinguish it from the rest of the worksheet.

1. Select the **cell(s)** you wish to modify.
2. Click the **drop-down arrow** next to the **Font** command on the **Home** tab. The **Font** drop-down menu will appear.
3. Select the desired **font**. A **live preview** of the new font will appear as you hover the mouse over different options.




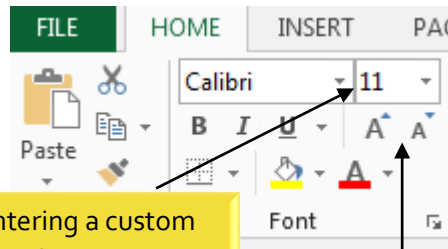
4. The text will change to the **selected font**.

 **TIP:** When creating a workbook in the workplace, you'll want to select a font that is easy to read. Along with Calibri, standard reading fonts include Cambria, Times New Roman, and Arial.

### To change the font size

1. Select the **cell(s)** you wish to modify.
2. Click the **drop-down arrow** next to the **Font Size** command on the **Home** tab. The **Font Size** drop-down menu will appear.
3. Select the desired **font size**. A **live preview** of the new font size will appear as you hover the mouse over different options.
4. The text will change to the **selected font size**.

 **TIP:** You can also use the **Increase Font Size** and **Decrease Font Size** commands or enter a **custom font size** using your keyboard.

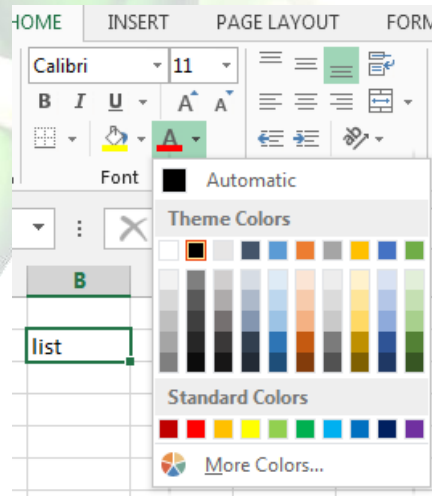


Entering a custom font size

Increase and Decrease Font Size commands

*To change the font color*

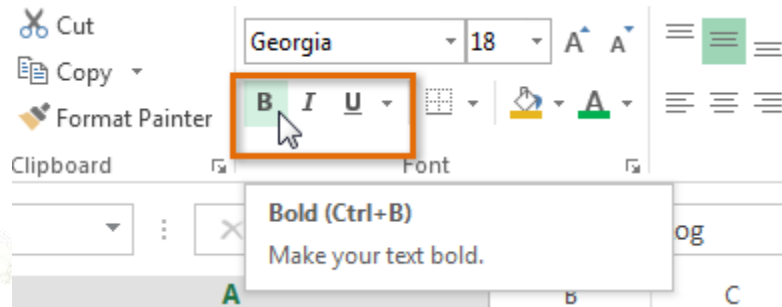
1. Select the **cell(s)** you wish to modify.
2. Click the **drop-down arrow** next to the **Font Color** command on the **Home** tab. The **Color** menu will appear.
3. Select the desired **font color**. A **live preview** of the new font color will appear as you hover the mouse over different options.




4. The text will change to the **selected font color**.

*To use the Bold, Italic, and Underline commands*

1. Select the **cell(s)** you wish to modify.
2. Click the **Bold (B)**, **Italic (I)**, or **Underline (U)** command on the **Home** tab. In our example, we'll make the selected cells **bold**.



3. The **selected style** will be applied to the text.

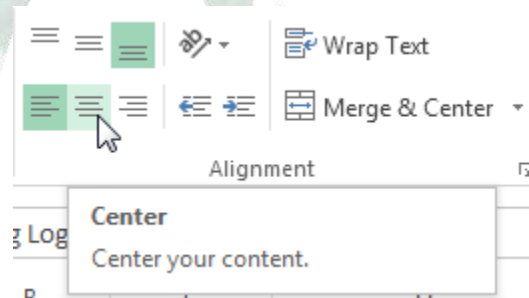
 **TIP:** You can also press **Ctrl+B** on your keyboard to make selected text **bold**, **Ctrl+I** to apply **italics**, and **Ctrl+U** to apply an **underline**.

#### 4.2. Text Alignment

By default, any text entered into your worksheet will be aligned to the bottom-left of a cell. Any numbers will be aligned to the bottom-right of a cell. Changing the **alignment** of your cell content allows you to choose how the content is displayed in any cell, which can make your cell content easier to read.

##### *To change horizontal text alignment*

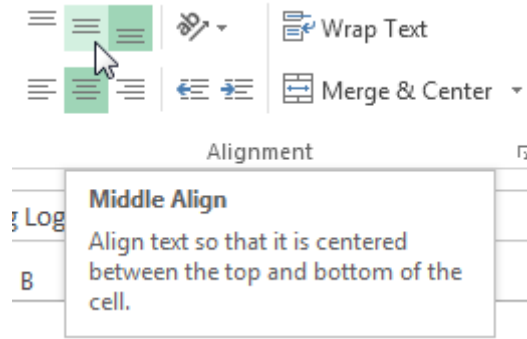
1. Select the **cell(s)** you wish to modify.
2. Select one of the three **horizontal alignment** commands on the **Home** tab. In our example, we'll choose **Center Align**.



3. The text will **realign**.

##### *To change vertical text alignment*

1. Select the **cell(s)** you wish to modify.
2. Select one of the three **vertical alignment** commands on the **Home** tab. In our example, we'll choose **Middle Align**.



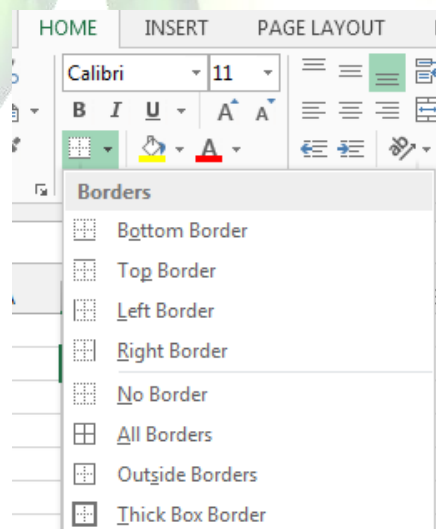
3. The text will **realign**.

#### 4.3. Cell borders and fill colors


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

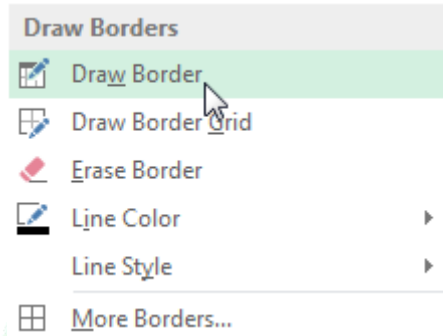
##### *To add a border*

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.



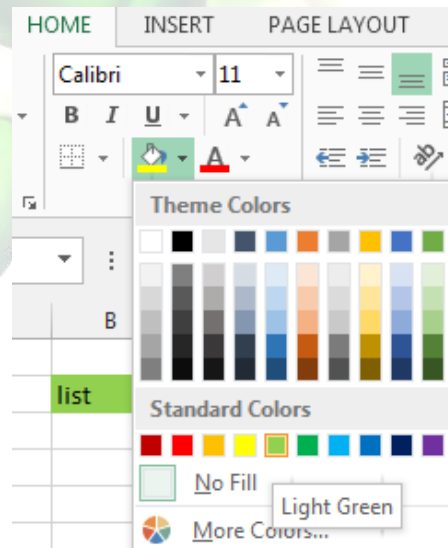
3. Select the **border style** you want to use.
4. The **selected border style** will appear.

 **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**.



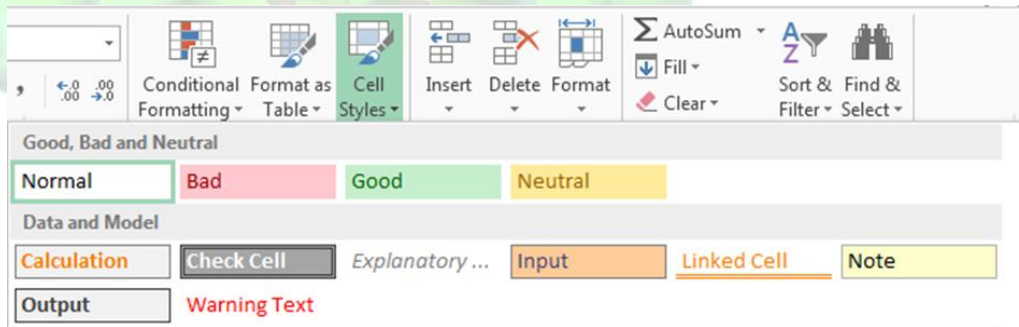
4. The **selected fill color** will appear in the selected cells.


#### 4.4. Cell styles

Rather than formatting cells manually, you can use Excel's **predesigned 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.

#### 4.5. 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**.

The image shows the Excel Number Format dropdown menu with various options and callout boxes explaining them:

- General** (ABC 123): No specific format. Callout: "General is the default format for any cell. When you enter a number into the cell, Excel will guess the number format that is most appropriate."
- Number** (12): list. Callout: "Number formats numbers with decimal places."
- Currency** (currency icon): list. Callout: "Currency formats numbers as currency with a currency symbol."
- Accounting** (accounting icon): list. Callout: "Accounting formats numbers as monetary values like the Currency format, but it also aligns currency symbols and decimal places within columns."
- Short Date** (calendar icon): list. Callout: "Short Date formats numbers as M/D/YYYY."
- Long Date** (calendar icon): list. Callout: "Long Date formats numbers as Weekday, Month DD, YYYY."
- Time** (clock icon): list. Callout: "Time formats numbers as HH/MM/SS and notes AM or PM."
- Percentage** (%): list. Callout: "Percentage formats numbers with decimal places and the percent sign."
- Fraction** (1/2): list. Callout: "Fraction formats numbers as fractions separated by the forward slash."
- Scientific** (10<sup>2</sup>): list. Callout: "Scientific formats numbers in scientific notation."
- Text** (ABC): list. Callout: "Text formats numbers as text, meaning that what you enter into the cell will appear exactly as it was entered."
- More Number Formats...**: Callout: "You can easily customize any format in More Number Formats."

### 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.

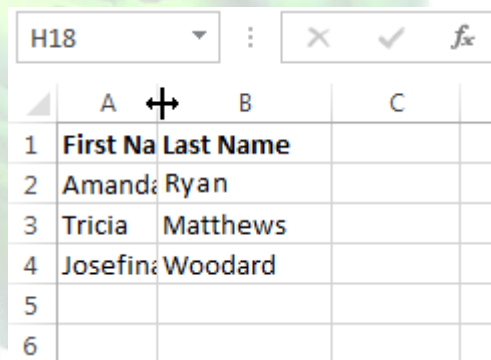


## 5. Modifying Columns, Rows and Cells

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.

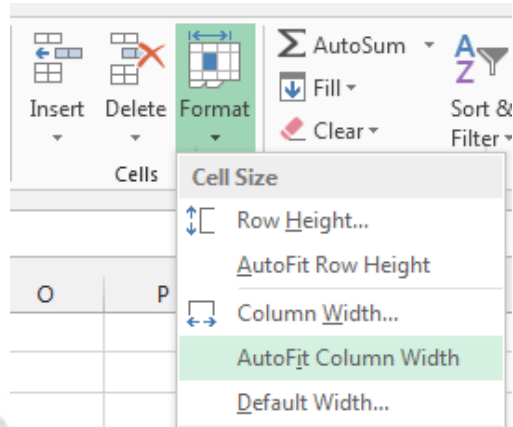
 **TIP:** If you see **pound signs** (#####) in a cell, it means that the column is not wide enough to display the cell content. Simply **increase the column width** to show the cell content.

### 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**.




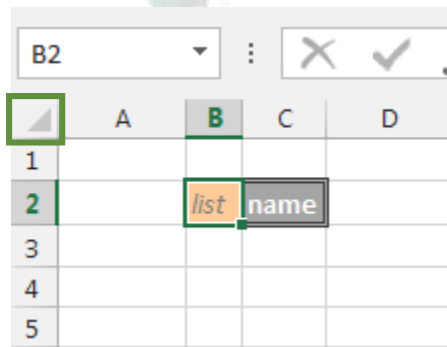
*To modify row height*



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.



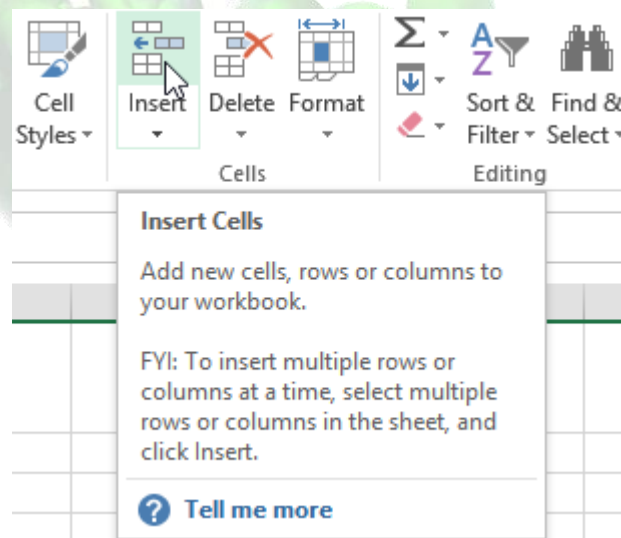
2. Position the mouse over a **row line** so the **white cross**  becomes a **double arrow** .
3. Click, hold, and drag the mouse to **increase** or **decrease** the row height.
4. Release the mouse when you are satisfied with the **new row height** for the worksheet.

## 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.

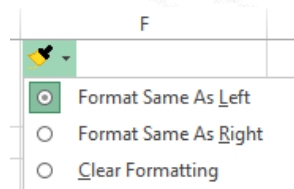
### To insert rows

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



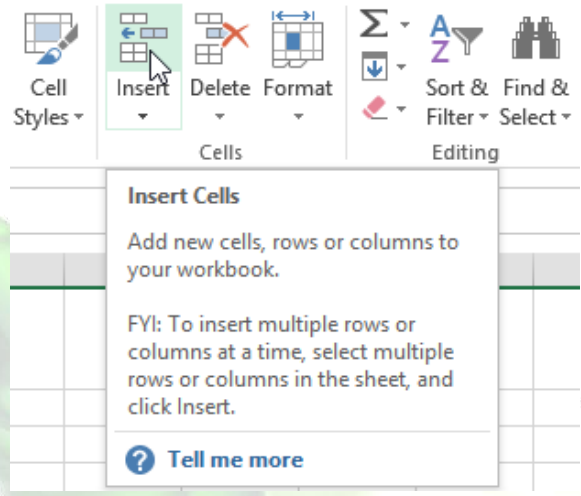
3. The **new row** will appear **above** the selected row.

 **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.



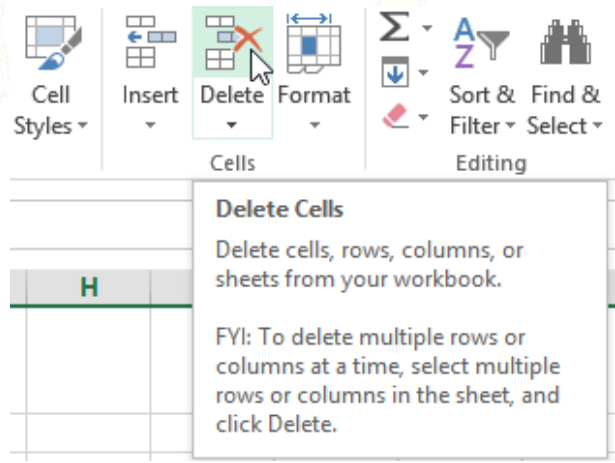
3. The **new column** will appear **to the left** of the selected column.

 **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.

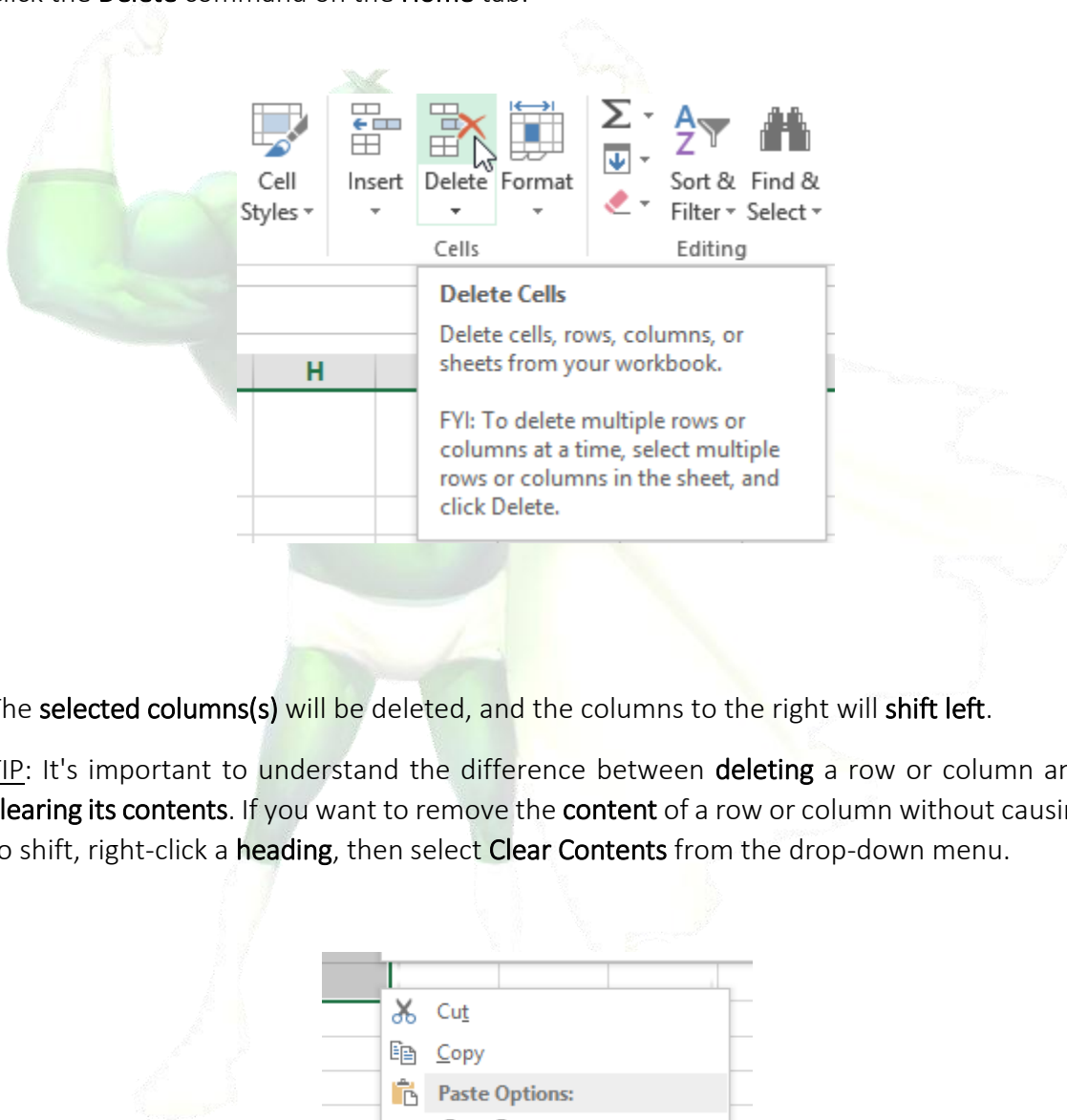
1. Select the **row(s)** you want to delete.
2. Click the **Delete** command on the **Home** tab.




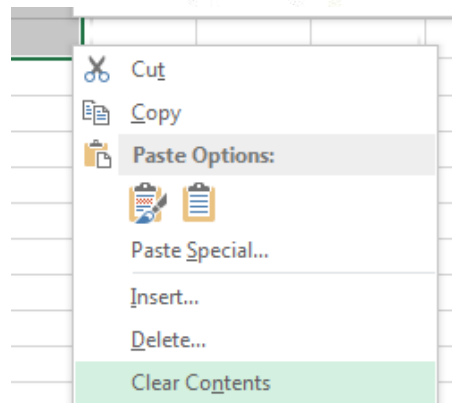
- The **selected row(s)** will be deleted, and the rows below will **shift up**.

*To delete columns*

- Select the **columns(s)** you want to delete.
- Click the **Delete** command on the **Home** tab.



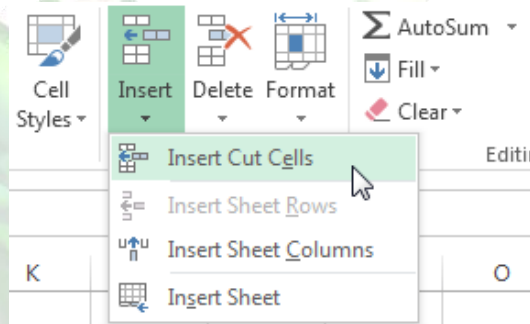
- The **selected columns(s)** will be deleted, and the columns to the right will **shift left**.
-  **TIP:** It's important to understand the difference between **deleting** a row or column and simply **clearing its contents**. If you want to remove the **content** of a row or column without causing 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.



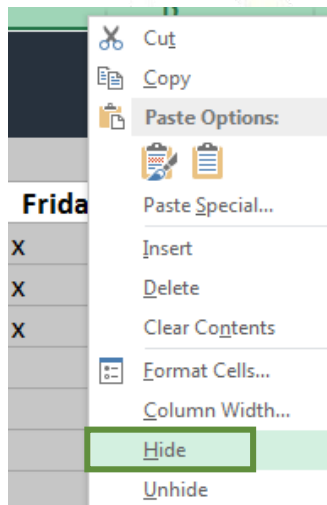
4. The column will be **moved** to the selected location, and the columns to the right will **shift right**.

 **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.

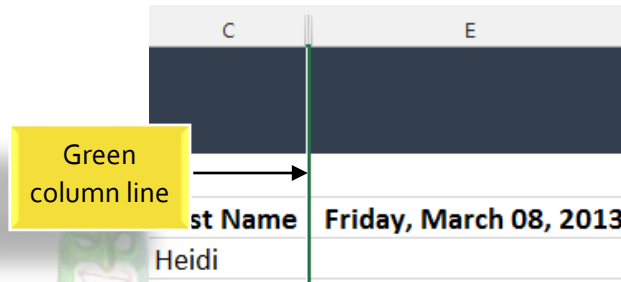
*To hide and unhide a row or column*

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.

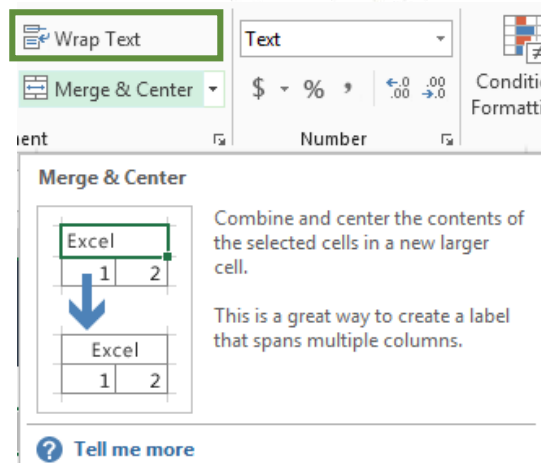


- To **unhide** the columns, select the columns to the **left** and **right** of the hidden columns (in other words, the columns on **both sides** of the hidden columns).
- Right-click the mouse, then select **Unhide** from the **formatting** menu. The hidden columns will reappear.


## 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.

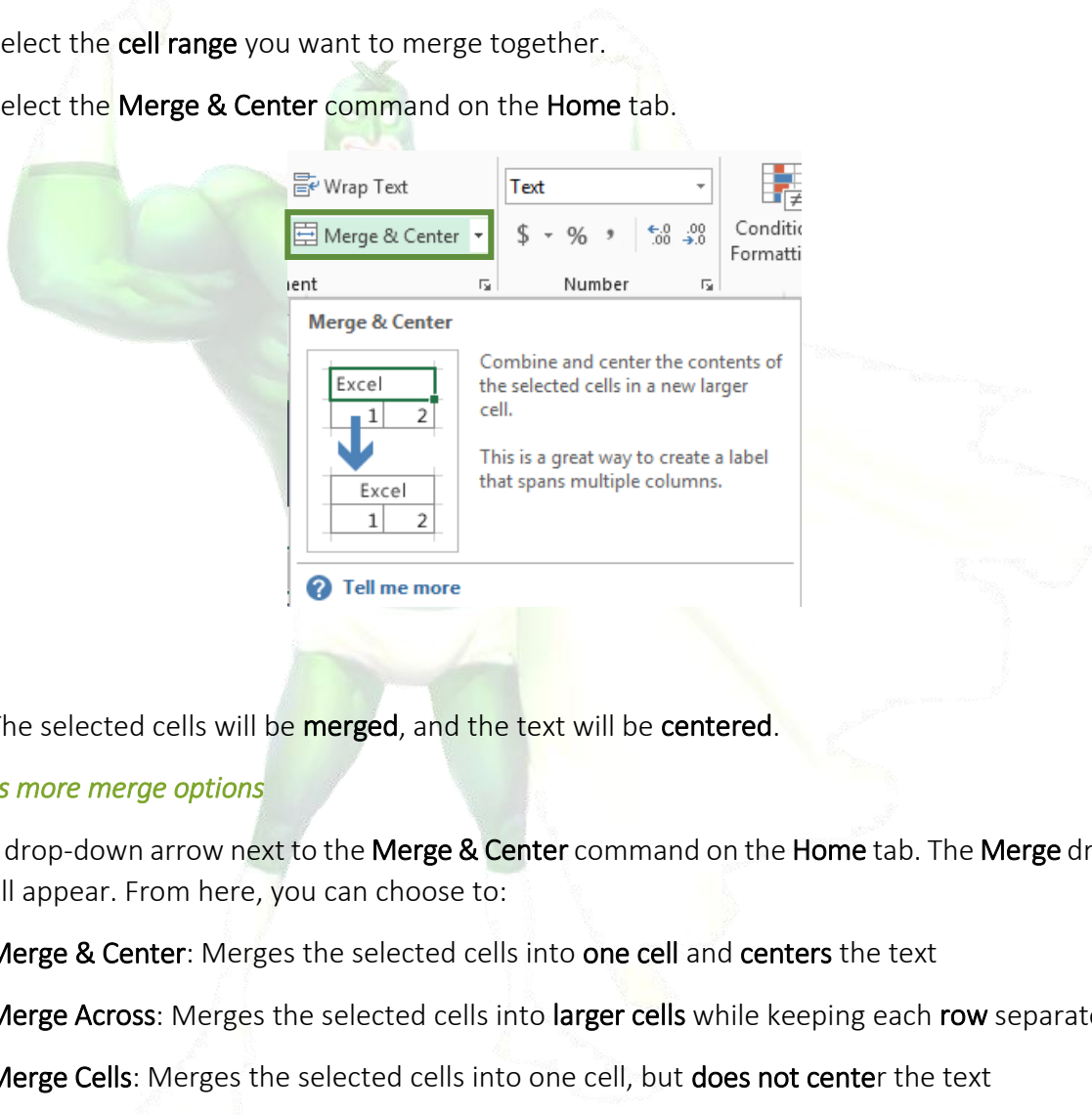


3. The text in the selected cells will be **wrapped**.

 **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.

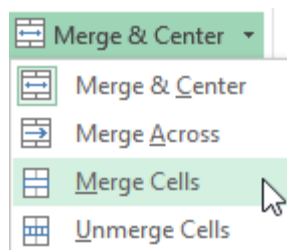


3. The selected cells will be **merged**, and the text will be **centered**.

### 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 **equals 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 formula in cell A3 refers to the value in cell A1 plus the value in cell A2

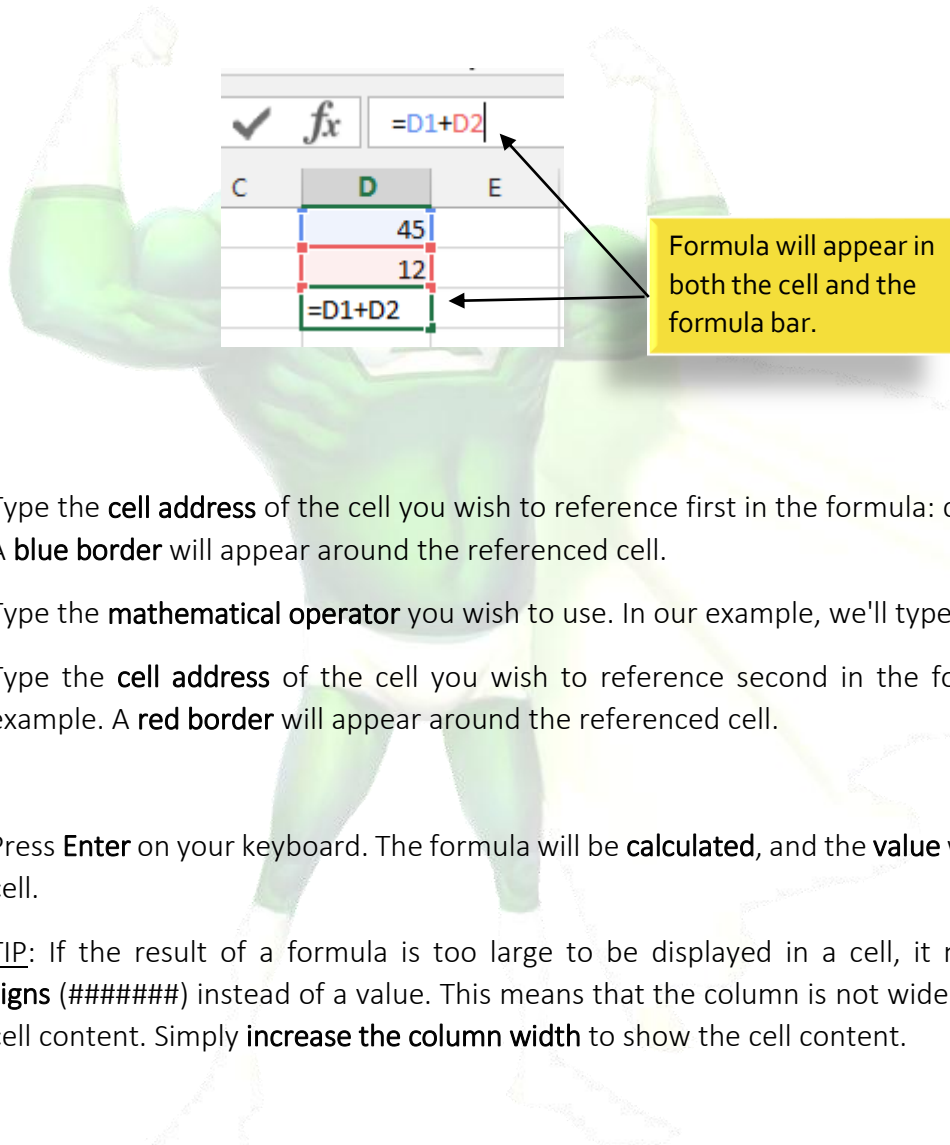
The formula calculates and displays the answer to the equation A1 plus A2


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 create a formula using the point-and-click method*

Rather than typing cell addresses manually, you can **point and click** on the cells you wish to include in your formula. This method can save a lot of time and effort when creating formulas. In our example below, we'll create a formula to calculate the cost of ordering several boxes of plastic silverware.

1. Select the **cell** that will contain the formula. In our example, we'll select cell **D3**.

The screenshot shows an Excel spreadsheet with the following data:

	A	B	C	D	E
1	<b>Paper Supply Inventory Orders</b>				
2	<b>Item</b>	<b>Quantity</b>	<b>Price Per Unit</b>	<b>Total Cost</b>	
3	Plastic Silverware (box of 100)	9	\$8.75	+	
4	Napkins (box of 250)	12	\$2.59		
5	Plates (box of 50)	6	\$14.25		
6	Cups (box of 75)	10	\$11.99		
7	<b>Total</b>				
8					

The formula bar at the top shows 'D3' selected.

2. Type the **equals sign (=)**.
3. Select the **cell** you wish to reference first in the formula: cell **B3** in our example. The **cell address** will appear in the formula, and a **dashed blue line** will appear around the referenced cell.

The screenshot shows the same Excel spreadsheet as above, but now the formula bar contains '=B3'. A dashed blue border is drawn around cell B3 in the spreadsheet.

4. Type the **mathematical operator** you wish to use. In our example, we'll type the **multiplication sign (\*)**.
5. Select the **cell** you wish to reference second in the formula: cell **C3** in our example. The **cell address** will appear in the formula, and a **dashed red line** will appear around the referenced cell.

Paper Supply Inventory Orders			
Item	Quantity	Price Per Unit	Total Cost
Plastic Silverware (box of 100)	9	\$8.75	=B3*C3
Napkins (box of 250)	12	\$2.59	
Plates (box of 50)	6	\$14.25	
Cups (box of 75)	10	\$11.99	
Total			

- Press **Enter** on your keyboard. The formula will be **calculated**, and the **value** will be displayed in the cell.


Paper Supply Inventory Orders			
Item	Quantity	Price Per Unit	Total Cost
Plastic Silverware (box of 100)	9	\$8.75	\$78.75
Napkins (box of 250)	12	\$2.59	
Plates (box of 50)	6	\$14.25	
Cups (box of 75)	10	\$11.99	
Total			


Formulas can also be **copied** to adjacent cells with the **fill handle**, which can save a lot of time and effort if you need to perform the **same calculation** multiple times in a worksheet.

### 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.

- Select the **cell** containing the formula you wish to edit.
- 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.
- A **border** will appear around any referenced cells.
- When finished, press **Enter** on your keyboard or select the **Enter** command ✓ in the formula bar.
- 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.

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

 **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

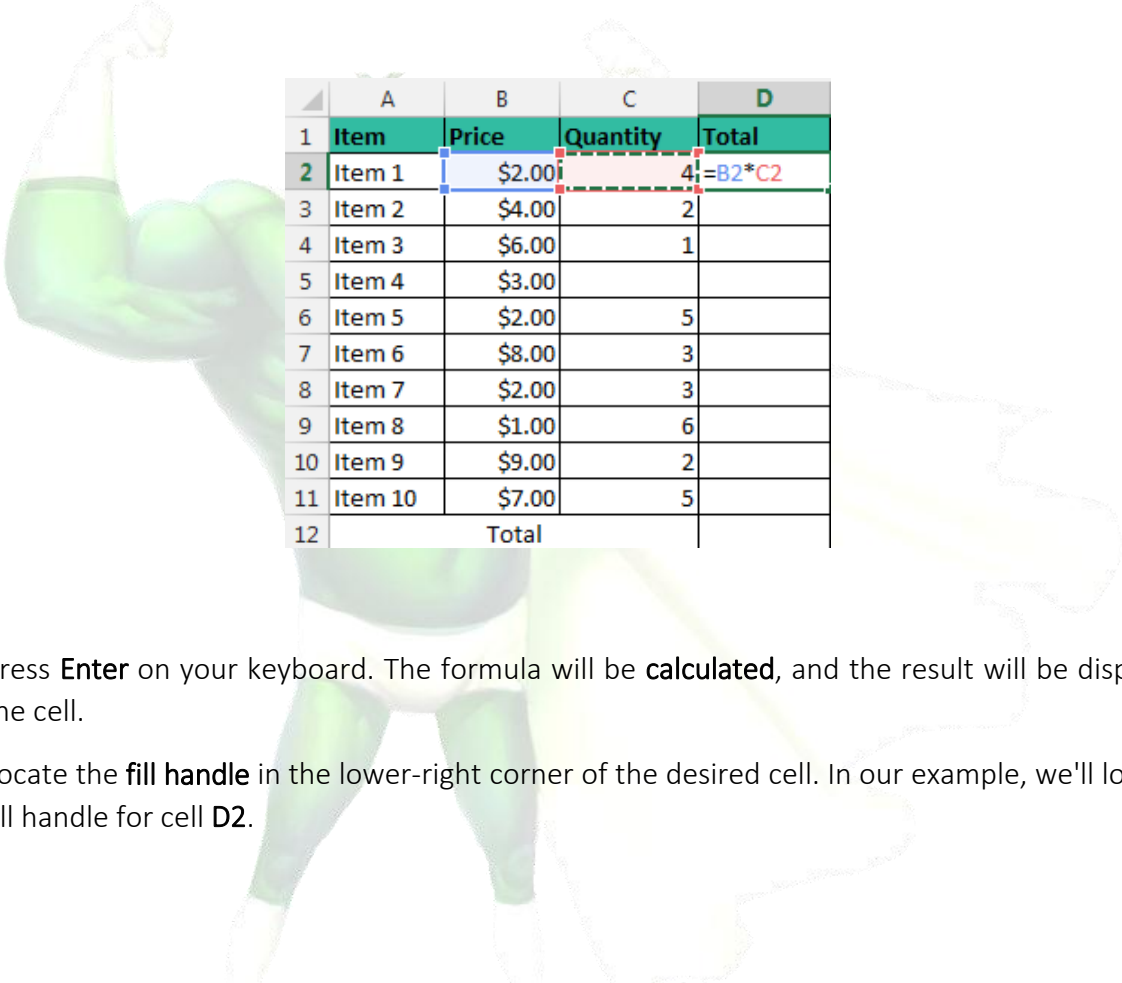
By default, all cell references are **relative references**. *When copied across multiple cells, they change based on the relative position of rows and columns.* For example, if you copy the formula **=A1+B1** from row 1 to row 2, the formula will become **=A2+B2**. Relative references are especially 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




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

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

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			

- 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	<b>Item</b>	<b>Price</b>	<b>Quantity</b>	<b>Total</b>
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.

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

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**.
3. 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				

4. Locate the **fill handle** in the lower-right corner of the desired cell.
5. 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!

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

## 6.3. Functions

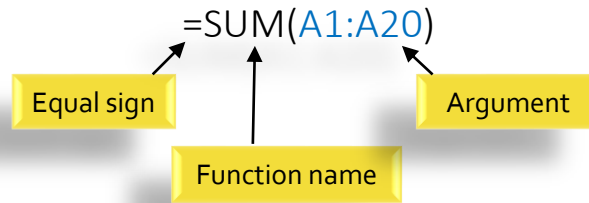
A **function** is a **predefined formula** that performs calculations using specific values in a particular order. Excel includes many common functions that can be useful for quickly finding the **sum**, **average**, **count**, **maximum value**, and **minimum value** for a range of cells. In order to 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.

	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.

	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 basic function*

In our example below, we'll create a basic function to calculate the **average price per unit** for a list of recently ordered items using the AVERAGE function.

1. Select the **cell** that will contain the function.
2. Type the **equals sign (=)** and enter the desired **function name**. You can also select the desired function from the list of **suggested functions** that will appear below the cell as you type. In our example, we'll type **=AVERAGE**.

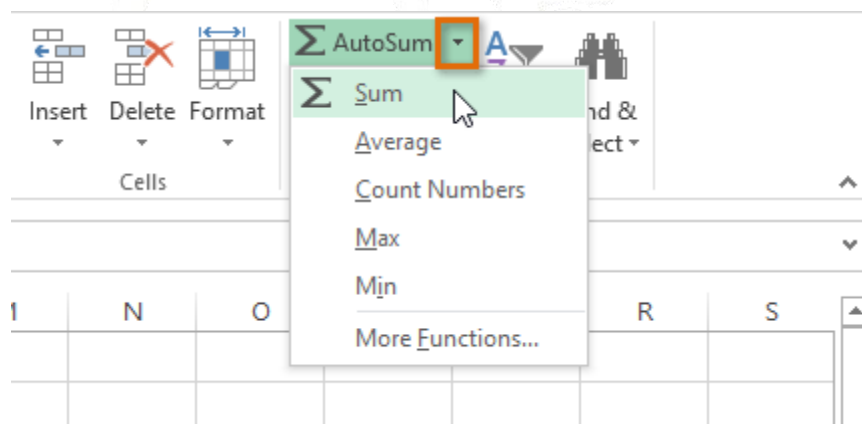
	A	B	C	D
1	Sales Tax			
2	Item	Price	Quantity	Total
3	Item 1	\$2.00	4	\$8.00
4	Item 2	\$4.00	2	\$8.00
5	Item 3	\$6.00	1	\$6.00
6	Item 4	\$3.00		\$0.00
7	Item 5	\$2.00	5	\$10.00
8	Item 6	\$8.00	3	\$24.00
9	Item 7	\$2.00	3	\$6.00
10	Item 8	\$1.00	6	\$6.00
11	Item 9	\$9.00	2	\$18.00
12	Item 10	\$7.00	5	\$35.00
13				=AVER
14				AVERAGE
15				AVERAGEA
16				AVERAGEIF
17				AVERAGEIFS

3. Enter the **cell range** for the **argument** inside **parentheses**. In our example, we'll type **(D3:D12)**.
4. Press **Enter** on your keyboard. The function will be **calculated**, and the **result** will appear in the cell.

### 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.

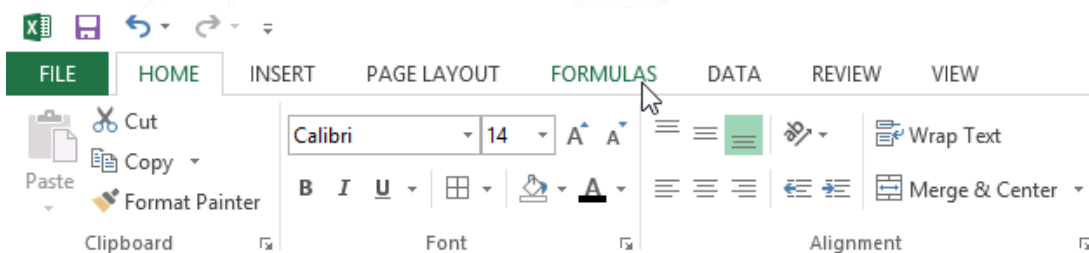
Sales Tax				
Item	Price	Quantity	Total	Tax
Item 1	\$2.00	4	\$8.00	
Item 2	\$4.00	2	\$8.00	
Item 3	\$6.00	1	\$6.00	
Item 4	\$3.00		\$0.00	
Item 5	\$2.00	5	\$10.00	
Item 6	\$8.00	3	\$24.00	
Item 7	\$2.00	3	\$6.00	
Item 8	\$1.00	6	\$6.00	
Item 9	\$9.00	2	\$18.00	
Item 10	\$7.00	5	\$35.00	
			=SUM(D3:D12)	

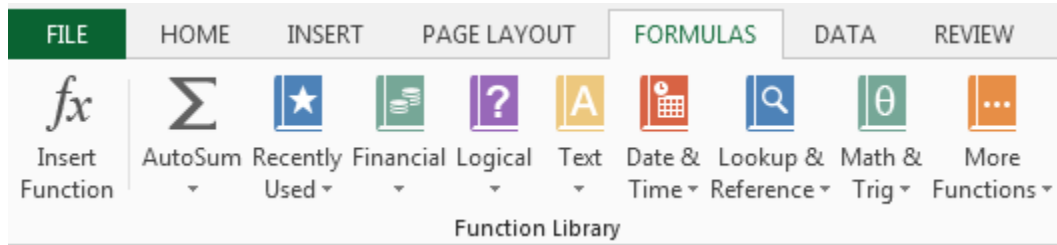
- Press **Enter** on your keyboard.

### 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 contains. 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.



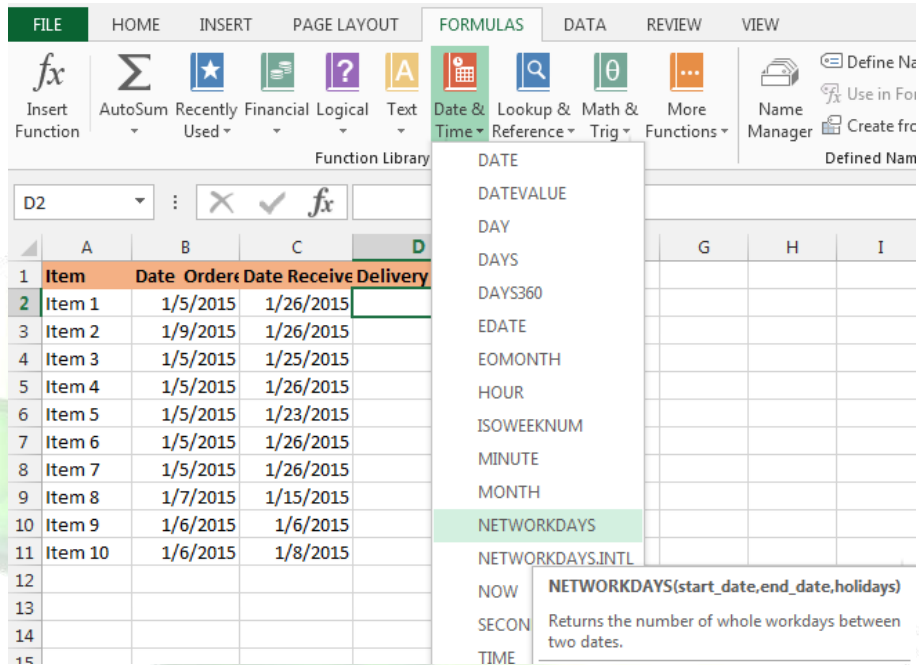


- If you're having trouble finding the right function, the **Insert Function** command allows you to search for functions using keywords.
- The **AutoSum** command allows you to automatically return results for common functions, like **SUM**, **AVERAGE**, and **COUNT**.
- The **Recently Used** command 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**.

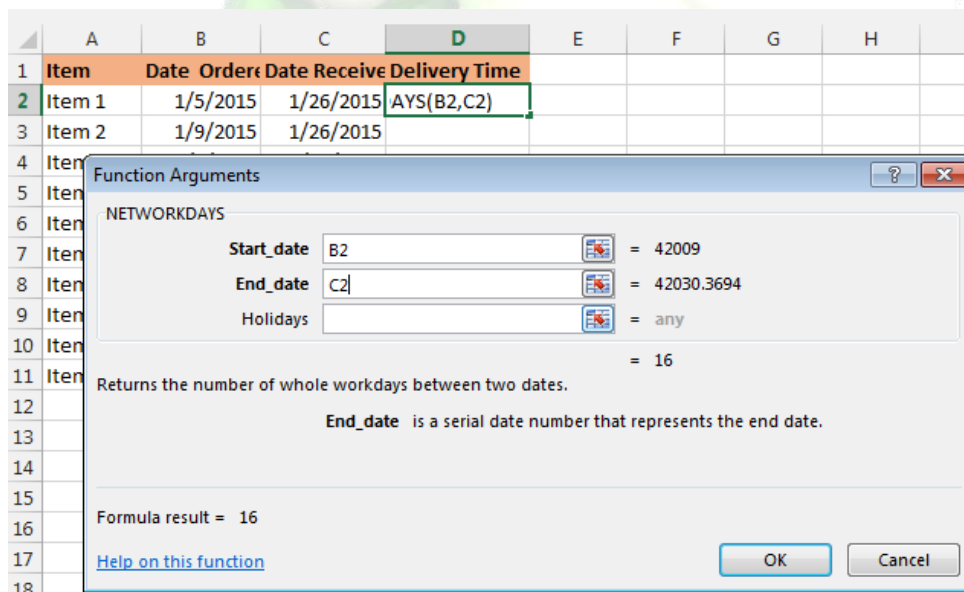
### *To insert a function from the Function Library*

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.



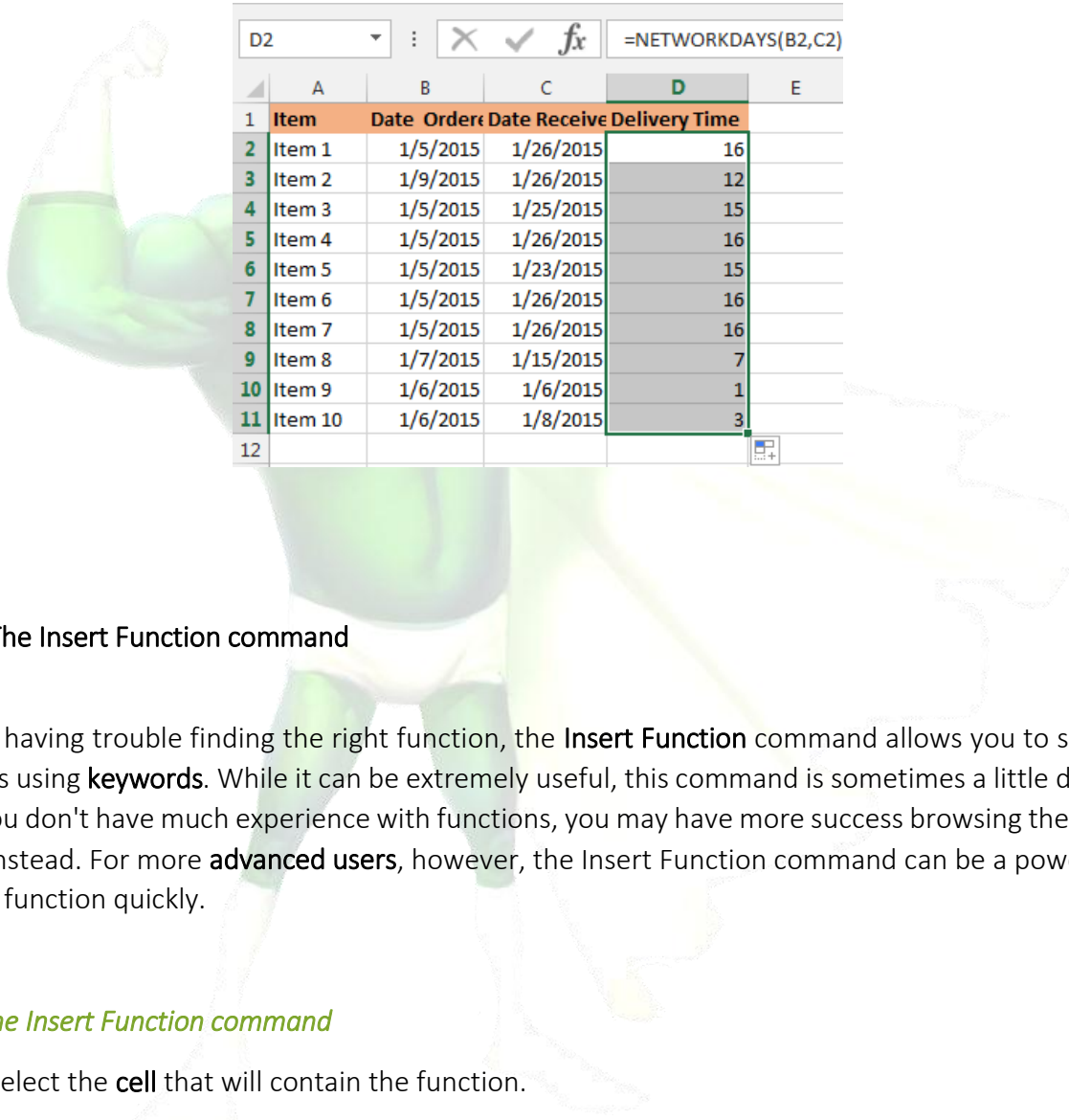


- The **Function Arguments** dialog box will appear. From here, you'll be able to enter or select the cells that will make up the arguments in the function.



- When you're satisfied with the arguments, click **OK**.
- 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.

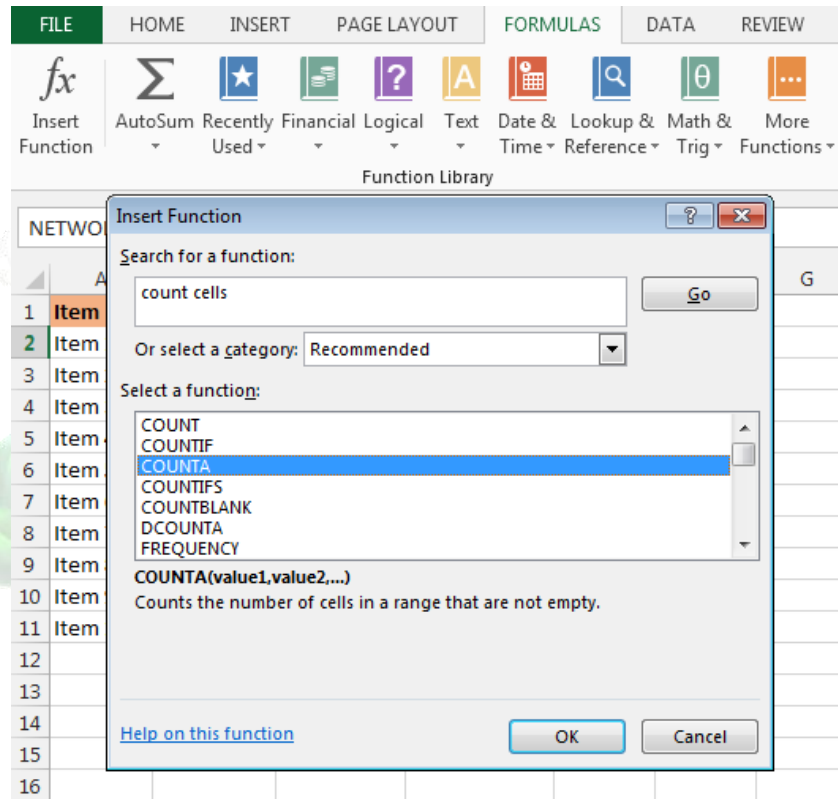


### 6.3.3. The Insert Function command

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

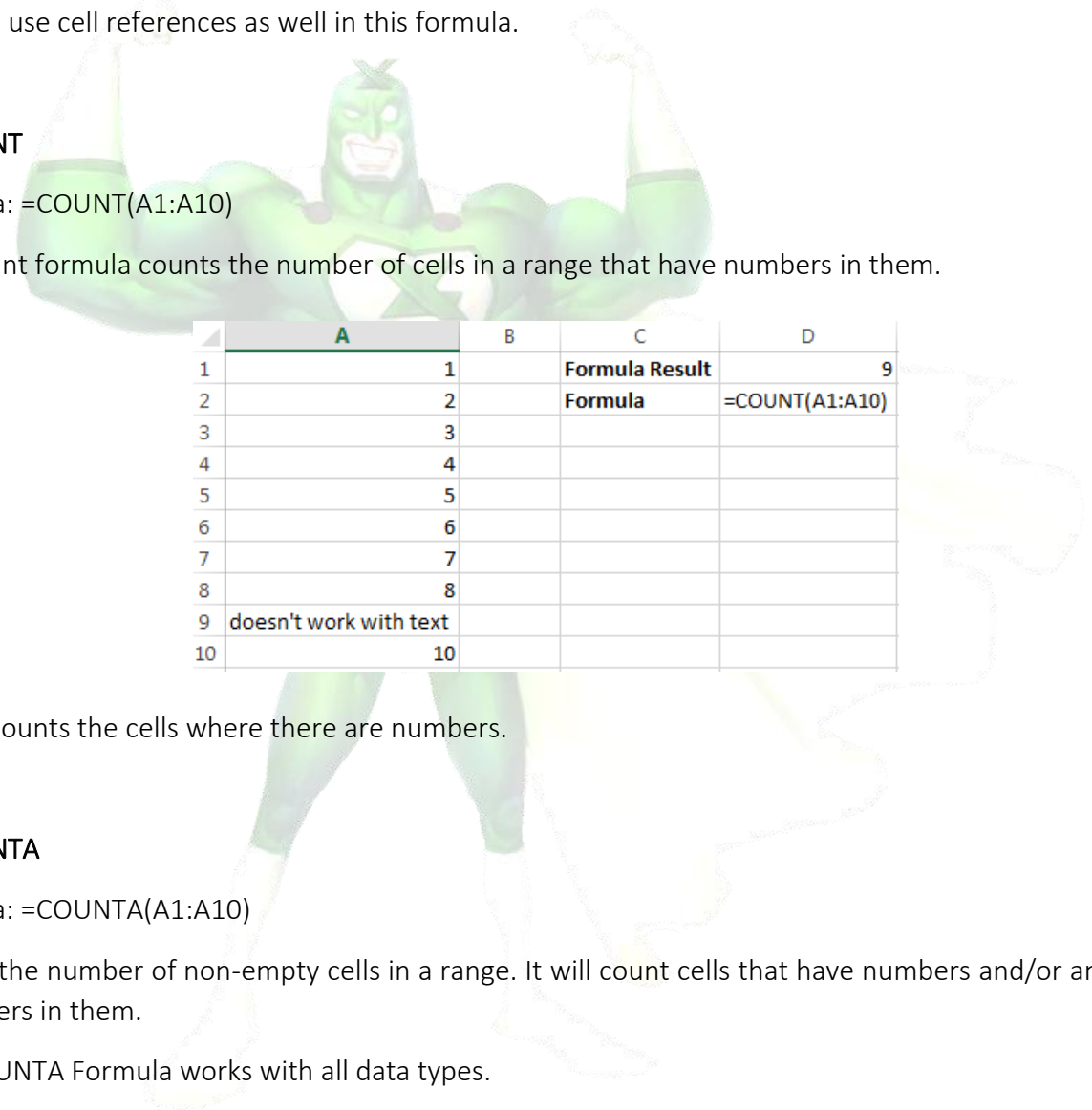
Formula: =SUM(5, 5) or =SUM(A1, B1) or =SUM(A1:B5)

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. VLOOKUP

Formula: =VLOOKUP(lookup\_value, table\_array, col\_index\_num, range\_lookup)

Basically, VLOOKUP lets you **search for specific information** in your spreadsheet. For example, if you have a list of products with prices, you could search for the price of a specific item.

We're going to use VLOOKUP to find the price of the **Photo frame**. You can probably already see that the price is \$9.99, but that's because this is a simple example. Once you learn how to use VLOOKUP, you'll be able to use it with larger, more complex spreadsheets, and that's when it will become truly useful.

	A	B	C	D	E	F
1	Item	Price				
2	Spice rack	\$19.99				
3	Stationery	\$5.49				
4	Gift basket	\$25.99				
5	Cutting board	\$24.99				
6	Landscape painting	\$35.99				
7	Greeting card	\$4.99				
8	T-shirt	\$15.49				
9	Scarf	\$29.99				
10	Coffee mug	\$8.99				
11	Tea set	\$16.99				
12	Serving bowl	\$12.99				
13	Wrapping paper	\$3.99				
14	Photo frame	\$9.99				
15	Handmade soap	\$4.49				
16	Gourmet hot cocoa	\$5.99				

As with any formula, you'll start with an equal sign (=). Then, type the formula name.

`=VLOOKUP("Photo frame"`

The second argument is the **cell range that contains the data**. In this example, our data is in A2:B16. As with any function, you'll need to use a comma to separate each argument:

`=VLOOKUP("Photo frame", A2:B16`

Note: It's important to know that VLOOKUP will **always search the first column** in this range. In this example, it will search column A for "Photo frame". In some cases, you may need to move the columns around so that the first column contains the correct data.

The third argument is the **column index number**. It's simpler than it sounds: The first column in the range is 1, the second column is 2, etc. In this case, we are trying to find the **price of the item**, and the prices are contained in the **second column**. That means our third argument will be 2:

`=VLOOKUP("Photo frame", A2:B16, 2`

The fourth argument tells VLOOKUP whether to look for **approximate matches**, and it can be either TRUE or FALSE. If it is TRUE, it will look for approximate matches. Generally, this is only useful if the first column has numerical values that have been sorted. Since we're only looking for exact matches, the fourth argument should be **FALSE**. This is our last argument, so go ahead and close the parentheses:

`=VLOOKUP("Photo frame", A2:B16, 2, FALSE)`

And that's it! When you press enter, it should give you the answer, which is **9.99**.

fx					=VLOOKUP("Photo frame", A2:B16, 2, FALSE)				
	C	D	E	F	G				
			9.99						

## 6. 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			<b>Formula</b>		
16			=IF(C3>D3, "Met Quota", "Did Not Meet Quota")		

## 7. Working with Data

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

### 7.1 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.

	A	B	C	D
1	Item	Date Ordered	Date Received	
2	Item 1	1/5/2015	1/26/2015	
3	Item 2	1/9/2015	1/26/2015	
4	Item 3	1/5/2015	1/25/2015	
5	Item 4	1/5/2015	1/26/2015	
6	Item 5	1/5/2015	1/23/2015	
7	Item 6	1/5/2015	1/26/2015	
8	Item 7	1/5/2015	1/26/2015	
9	Item 8	1/7/2015	1/15/2015	
10	Item 9	1/6/2015	1/6/2015	
11	Item 10	1/6/2015	1/8/2015	

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**.



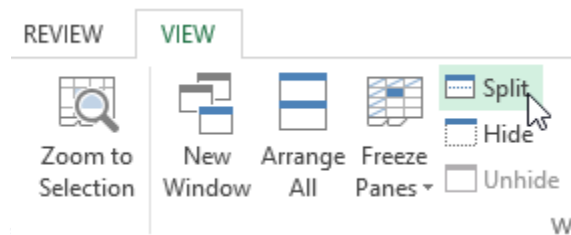
2. Click the **View** tab on the **Ribbon**.
3. Select the **Freeze Panes** command, then choose **Freeze Panes** from the drop-down menu.
4. The column will be **frozen** in place, as indicated by the **gray line**. You can **scroll across** the worksheet while continuing to view the frozen column on 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.

## 7.2 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.

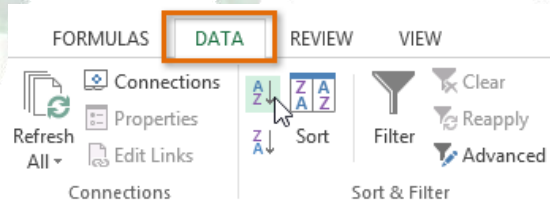
*To sort a sheet*

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**.

	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.



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

	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	


### 7.3 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

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

The screenshot shows the Microsoft Excel interface with the **DATA** tab selected. The **Filter** button (funnel icon) is highlighted in the **Sort & Filter** group. A tooltip for the Filter button is displayed, stating: "Turn on filtering for the selected cells. Then, click the arrow in the column header to narrow down the data." Below the ribbon, a worksheet is visible with columns A, B, and C. Column A is labeled "Item", B is "Date Ordered", and C is "Date Received". The data rows show items 1 through 7 with their respective dates.

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.

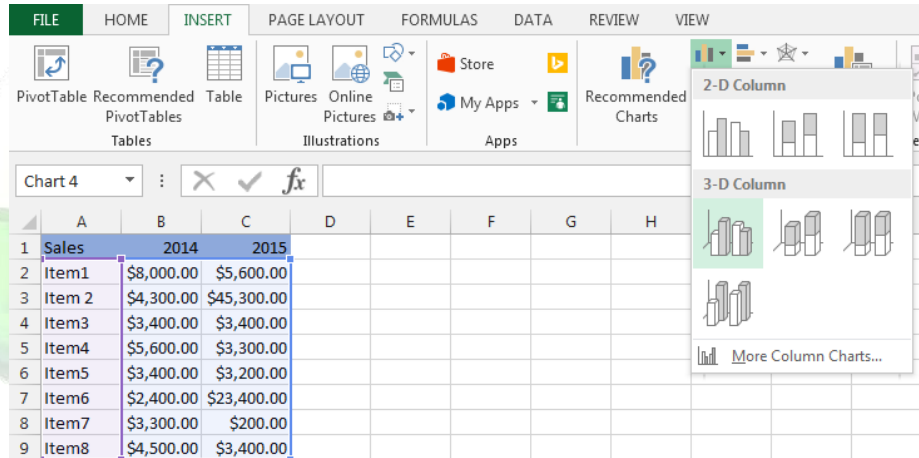
#### Types of Charts:


- 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.

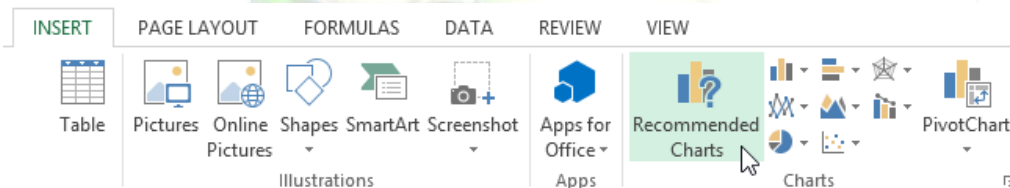
#### *To insert a chart*

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.



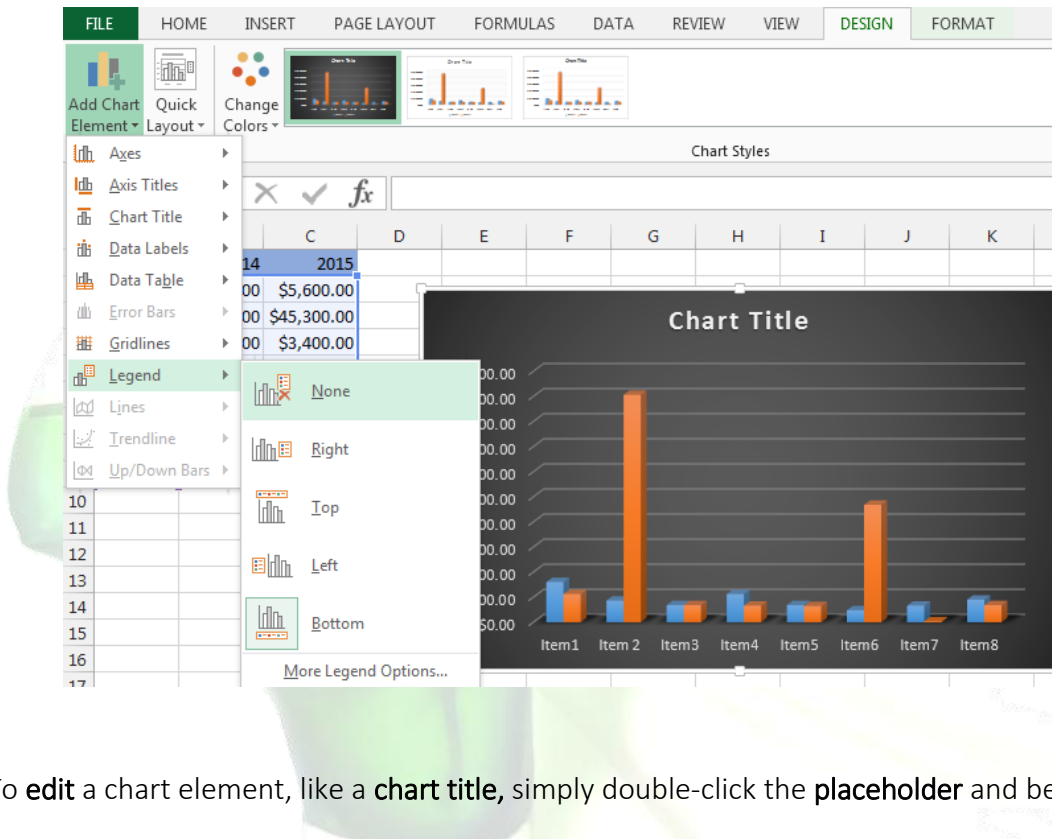
4. The selected chart will be inserted in the worksheet.
-  **TIP:** If you're not sure which type of chart to use, the **Recommended Charts** command will suggest several different charts based on the source data.



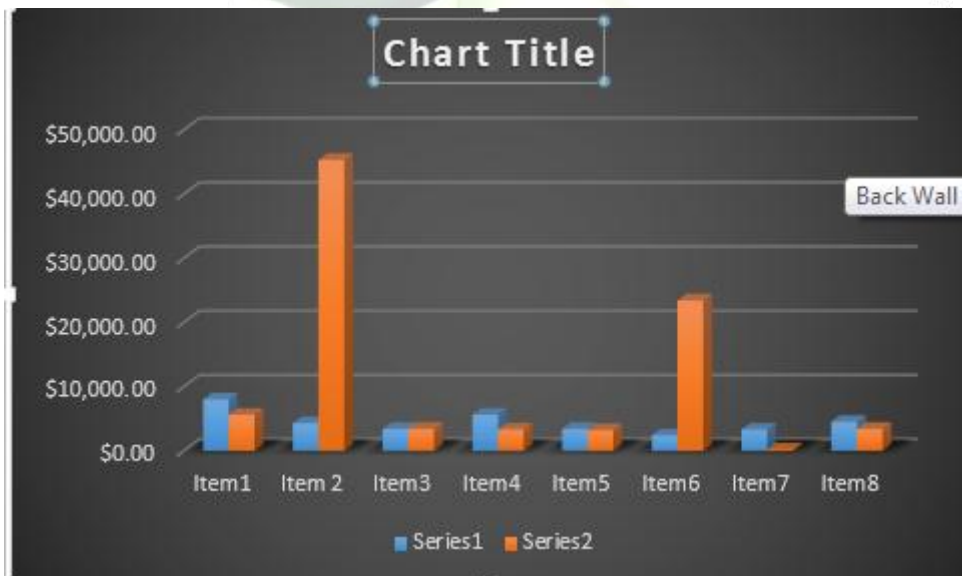
## 8.2. Chart layout and style

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.

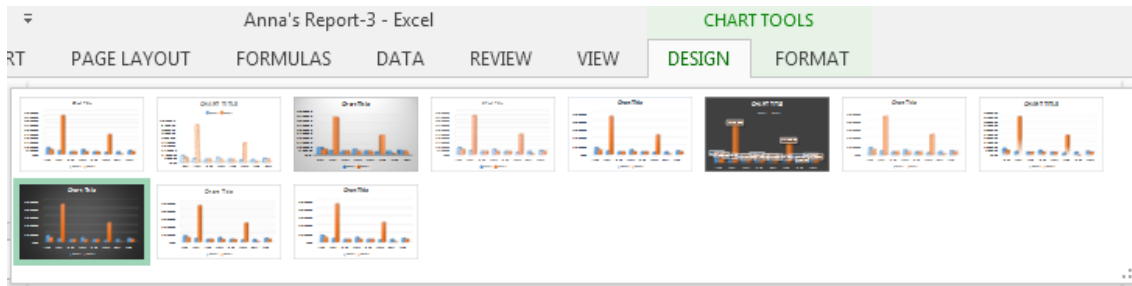
- Excel allows you to add **chart elements**—such as **chart titles**, **legends**, and **data labels**—to make your chart easier to read. To add a chart element, click the **Add Chart Element** command on the **Design** tab, then choose the **desired element** from the drop-down menu.




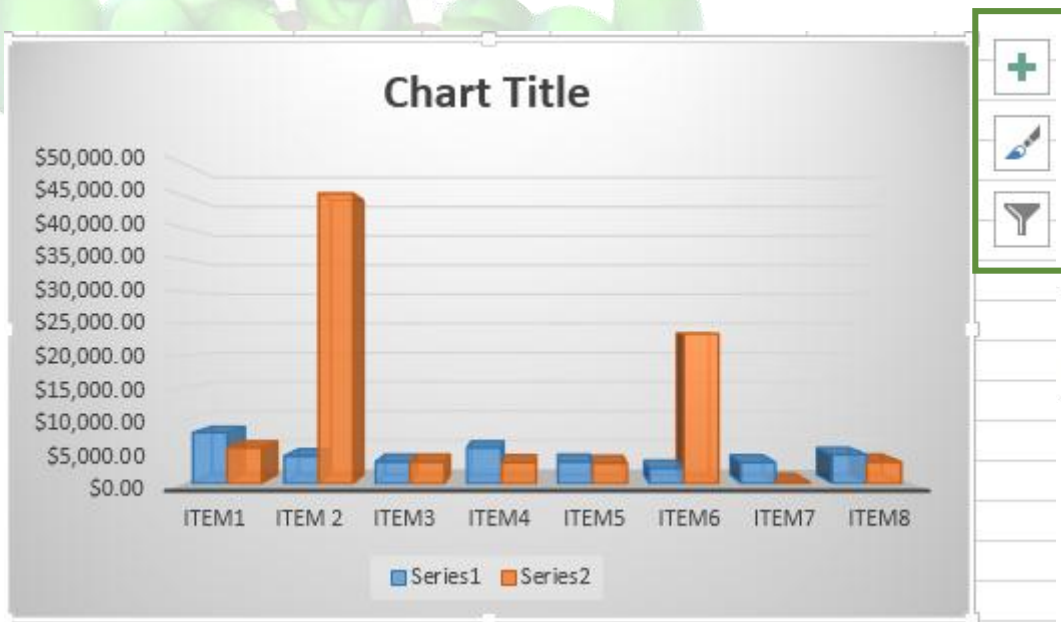
- ☑ To **edit** a chart element, like a **chart title**, simply double-click the **placeholder** and begin typing.



- ☑ 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.

- From the **Design** tab, select the **Switch Row/Column** command.



- 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.

- From the **Design** tab, click the **Change Chart Type** command.

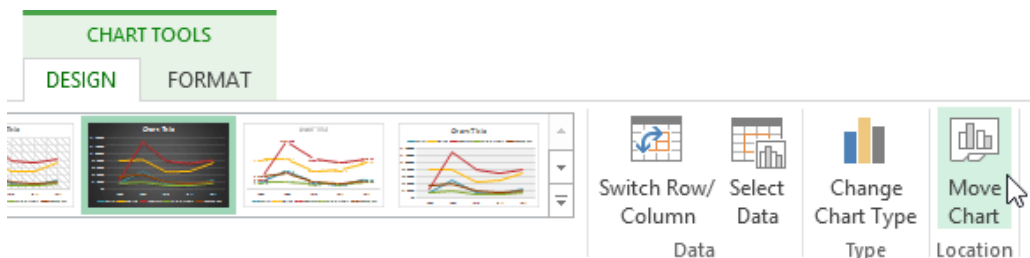


- The **Change Chart Type** dialog box will appear.
- The selected chart type will appear.

### 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.

- Select the **chart** you wish to move.
- 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!

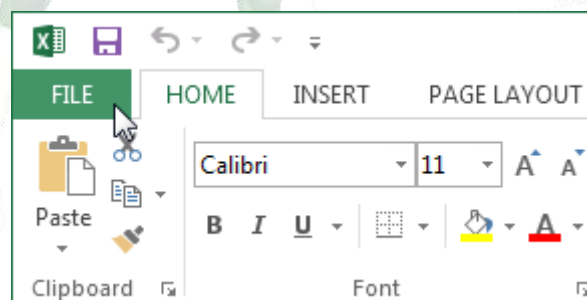
1. Open an **existing Excel workbook**.
2. Use worksheet data to create a **chart**.
3. Change the **chart layout**.
4. Apply a **chart style**.
5. **Move** the chart.

## 9. Printing Workbooks

There may be times when you want to **print a workbook** to view and share your data **offline**. Once you've chosen your **page layout** settings, it's easy to preview and print a workbook from Excel using the **Print** pane.

### To access the Print pane

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



2. Select **Print**. The **Print** pane will appear.

The image shows the Excel Print dialog box with several sections and callout boxes:

- Print**: A button to initiate printing. Callout: "When you are ready to print the workbook, click the **Print** button."
- Copies**: A spinner box set to 1. Callout: "Here you can choose how many **copies** of the workbook you wish to print."
- Printer**: A dropdown menu showing "CSD2851 on PRINTS Ready". Callout: "You may need to **select the printer** you want to use if your computer is connected to **multiple printers**."
- Printer Properties**: A section for printer-specific settings.
- Settings**:
  - Print Active Sheets**: A dropdown menu with options "Only print the active sheets", "Print All Pages", and "Print Selection". Callout: "Here you can choose to print the **active sheets**, the **entire workbook**, or a **selection of**".
  - Pages**: A range selector (e.g., 1 to 1). Callout: "Here you can choose whether to print on **one side** or **both sides** of the paper."
  - Print on Both Sides**: A dropdown menu with "Flip pages on long edge" and "Flip pages on short edge".
  - Collated**: A dropdown menu with "Collated" and "Uncollated". Callout: "If you are printing multiple copies, you can choose whether you want the copies **collated** or **uncollated**."
  - Portrait Orientation**: A dropdown menu with "Portrait Orientation" and "Landscape Orientation". Callout: "Here you can choose **Portrait** or **Landscape** orientation."
  - Letter (8.5" x 11")**: A dropdown menu for paper size. Callout: "If your printer uses different paper sizes, you can choose the **paper size** you wish to use."
  - Normal Margins**: A dropdown menu with "Normal Margins" and "Custom Margins". Callout: "Here you can adjust the **page margins**, which can help your data fit more comfortably on the page."
  - No Scaling**: A dropdown menu with "No Scaling" and "Fit to Page". Callout: "Here you can choose how to **scale** your worksheets for the printed page. You can scale worksheets at their **actual size**, **fit the entire worksheet** on one page, **fit all columns** on one page, or **fit all rows** on one page."
- Page Setup**: A section for page layout settings.

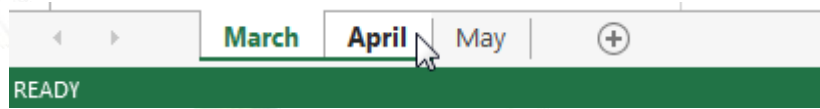
### 9.1. Choosing a print area

Before you print an Excel workbook, it's important to decide exactly what information you want to print. For example, if you have multiple worksheets in your workbook, you will need to decide if you want to print the **entire workbook** or only **active worksheets**. There may also be times when you want to print only a **selection** of content from your workbook.

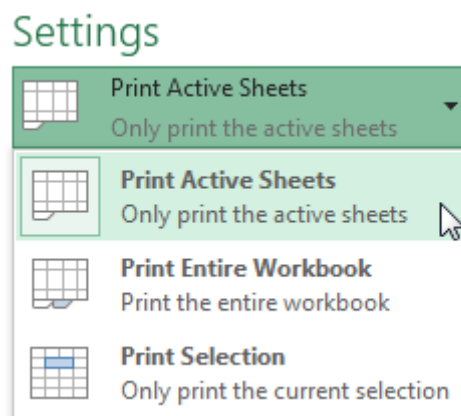
### To print active sheets

Worksheets are considered active when **selected**.

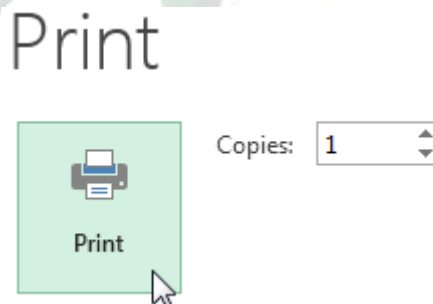
1. Select the **worksheet** you want to print. To print **multiple worksheets**, click the first worksheet, hold the **Ctrl** key on your keyboard, then click any other worksheets you want to select.



2. Navigate to the **Print** pane.
3. Select **Print Active Sheets** from the **Print Range** drop-down menu.



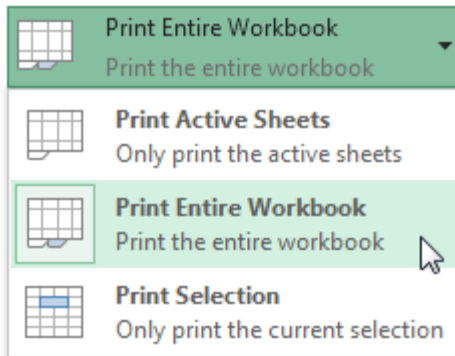
4. Click the **Print** button.



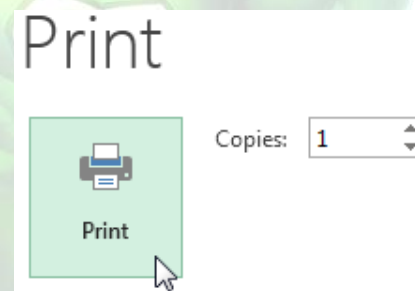
### To print the entire workbook

1. Navigate to the **Print** pane.
2. Select **Print Entire Workbook** from the **Print Range** drop-down menu.

## Settings



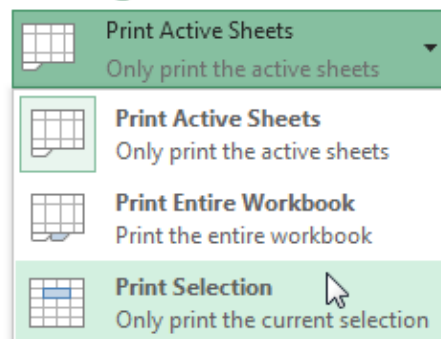
3. Click the **Print** button.



### *To print a selection*

1. Select the **cells** you wish to print.
2. Navigate to the **Print** pane.
3. Select **Print Selection** from the **Print Range** drop-down menu.


## Settings

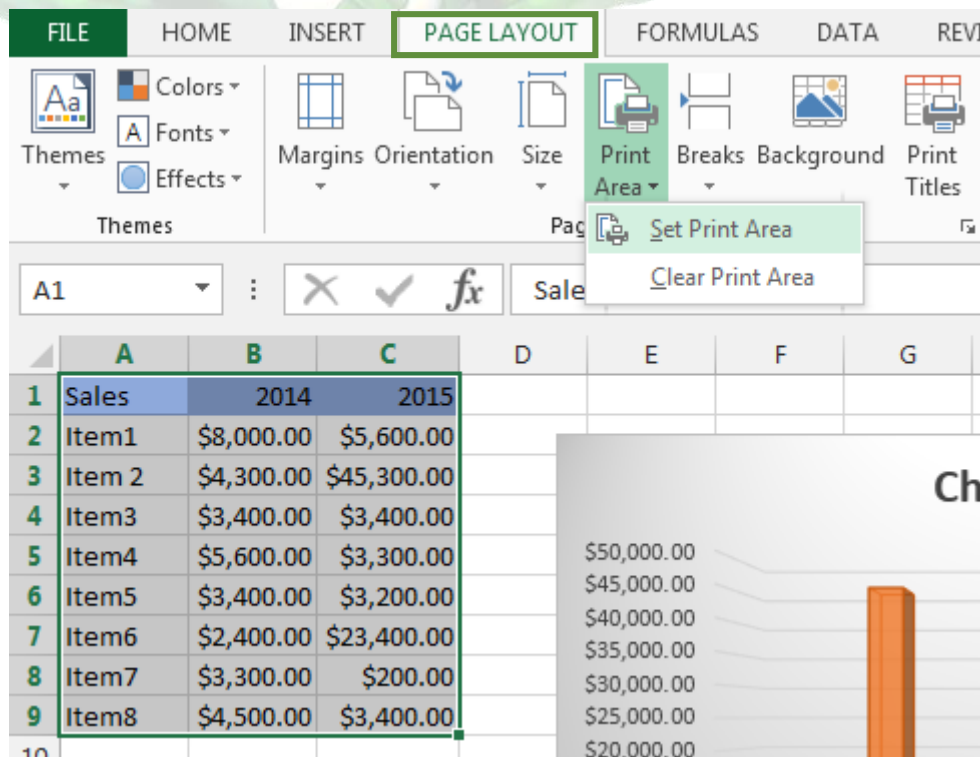


4. A **preview** of your selection will appear in the **Preview** pane.
5. Click the **Print** button to print the selection.

# Print



 **TIP:** If you prefer, you can also set the **print area** in advance so you'll be able to visualize which cells will be printed as you work in Excel. Simply **select** the cells you want to print, click the **Page Layout** tab, select the **Print Area** command, then choose **Set Print Area**.



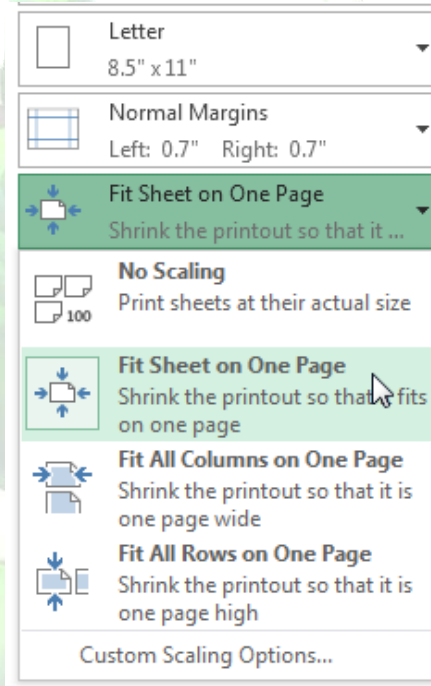
## 9.2. Fitting and scaling content

On occasion, you may need to make **small adjustments** from the Print pane to fit your workbook content neatly onto a printed page. The Print pane includes several tools to help fit and scale your content, such as **scaling** and **page margins**.

### To fit content before printing

If some of your content is being cut off by the printer, you can use **scaling** to fit your workbook to the page automatically.

1. Navigate to the **Print** pane.
2. Select the desired option from the **Scaling** drop-down menu. In our example, we'll select **Fit Sheet on One Page**.

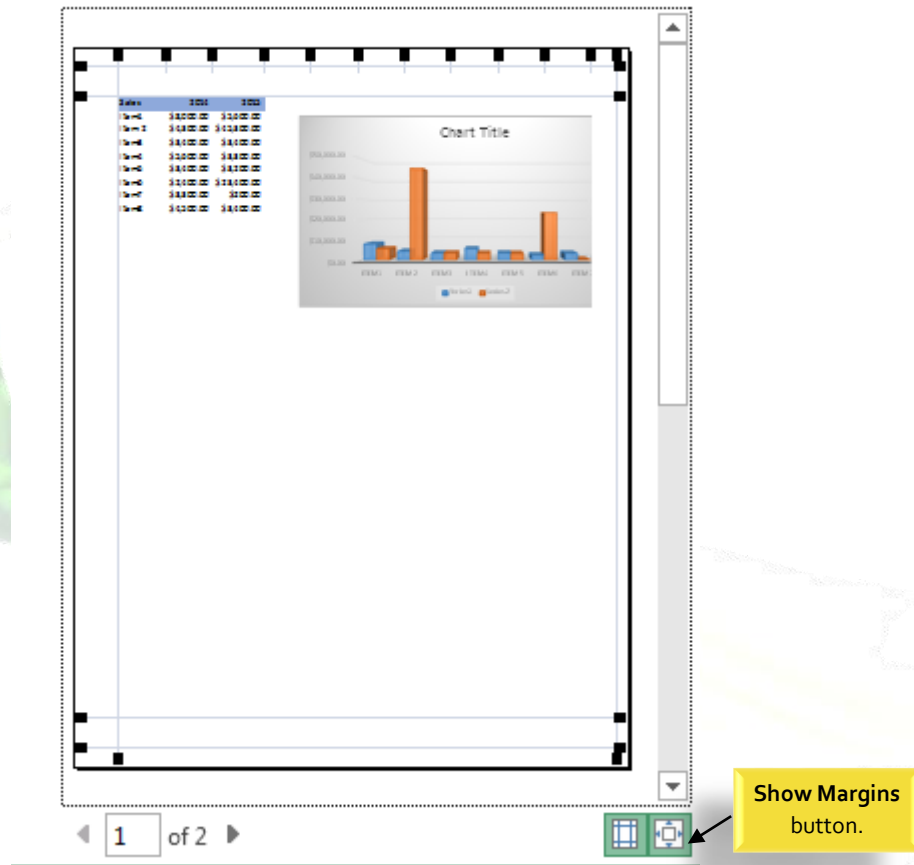


3. The worksheet will be **condensed** to fit onto a single page.
4. When you're satisfied with the scaling, click **Print**.

### To modify margins in the Preview pane

Sometimes you may only need to adjust a **single margin** to make your data fit more comfortably. You can modify individual page margins from the **Preview** pane.

1. Navigate to the **Print** pane, then click the **Show Margins** button in the lower-right corner.



2. The **page margins** will appear in the **Preview** pane. Hover the mouse over one of the **margin markers** until the cursor becomes a **double arrow** ⇄.
3. Click, hold, and drag the mouse to **increase** or **decrease** the **margin width**.
4. Release the mouse. The margin will be modified. In our example, we were able to fit an additional column on the page.

### Challenge!

1. Open an existing Excel workbook.
2. Try printing two **active worksheets**.
3. Try printing only a **selection** of cells.
4. Try the **scaling** feature to condense your workbook content.
5. Adjust the **margins** from the **Preview** pane.