Microsoft Office

Excel 2016 for Windows

INTRODUCTION TO MS-EXCEL

Learning Objectives

- The Ribbon, Customizing the Ribbon

- The Quick Access Toolbar, Tell Me and Smart Lookup

- The Smart Lookup Tool, The File Tab

- Columns and Rows, Entering Text

- Long Words and Numbers, Completing a Series

- Selecting Multiple Cells, Moving Text and Numbers

- Copying Data

- Insert a Row or Column, Delete a Row or Column

- Changing Column Width and Row Height, Formatting Numbers

- Formatting Text and Numbers, Changing the Font, Borders

- GraphicsClip Art, Images from a FilePrinting, Saving

Intro to Excel spreadsheets

What is a spreadsheet?

A spreadsheet is the computerized equivalent of a general ledger. It has taken the place of the pencil, paper, and calculator. Spreadsheet programs were first developed for accountants but have now been adopted by anyone wanting to prepare a budget, forecast sales data, create profit and loss statements, compare financial alternatives and any other mathematical applications requiring calculations**.**

The electronic spreadsheet is laid out similar to the paper ledger sheet in that it is divided into columns and rows. Any task that can be done on paper can be performed on an electronic spreadsheet faster and more accurately.

The problem with manual sheets is that if any error is found within the data, all answers must be erased and recalculated manually. With the computerized spreadsheet, formulas can be written that are automatically updated whenever the data are changed.

What can a spreadsheet do?

In contrast to a word processor, which manipulates text, a spreadsheet manipulates numerical data and text. Using a spreadsheet, one can create budgets, analyze data, produce financial plans, and perform various other simple and complex numerical applications.

By having formulas that automatically recalculate, either built by you, the user, or the built-in math functions, you can play with the numbers to see how the result is affected. Using this "what-if?" analysis, you can see what affect changing a data value or calculation can have on your monitoring program.

Spreadsheets can also be used for graphing data points, reporting data analyses, and organizing and storing data.

Starting Excel

You are encouraged to start using MS Excel as you read through the following materials to familiarize yourself with the topics and procedures.

1.   Click the Start button on the Windows taskbar.

a.   The Start menu opens

2.   Point to Programs

a.   The Programs menu opens

3.   Click Microsoft Excel

a.   Excel opens a new workbook

Note: an icon for MS Excel may be located either on the desktop or on the Office toolbar.

The Excel Screen

The screen in Excel looks different than those used in other types of applications.
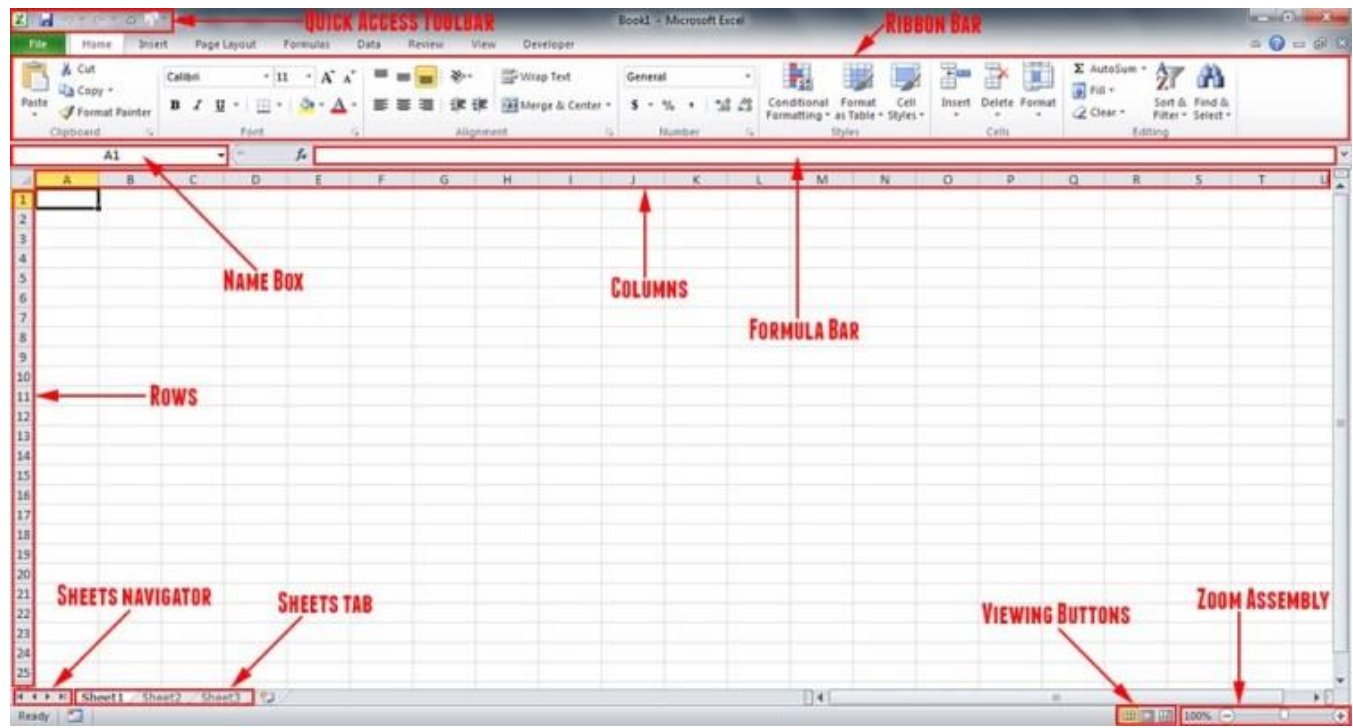
Columns

The large window, labeled "Microsoft Excel" may take up the entire screen. This is referred to as the Application Window. The top line is called the Title Bar and has three buttons (Minimize, Restore, and Close) to the right. These buttons are used to size the window and close it. This title bar is standard in all Windows programs.

The second line is called the Menu Bar. Notice that one character of each selection is highlighted or underlined. This menu bar is also standard in all Windows programs.

The next two lines contain buttons with text or images and are referred to as the Standard and Formatting Toolbars. If you have a mouse, these toolbars allow you to enhance your worksheet without accessing the menu. Keep in mind that these may not be in the exact same place as on the illustration above. All toolbars can be customized to display any buttons you desire.

The next line is the Formula Bar and displays the current cell address (see below) and contents. As you move from cell to cell, Excel will keep track of the current cell address for you. The Formula Bar can also be used to edit the text (contents) or formulas contained in the cell.

Columns and Cells and Row

The horizontal bar across the top of the worksheet area is filled with letters, beginning with A. Each letter represents a column while the vertical bar on the left side of the worksheet filled with numbers refers to rows.

The intersection between a column and a row is referred to as a cell. A cell is similar to a box that can be used to store pieces of information. Each piece of information could be a word or group of words, a number or a mathematical formula.

Each cell has its own address. This address is used in formulas for referencing different parts of the worksheet. The address of a cell is defined by the letter of the column in which it is located and the number of the row. For example, the address of a cell in column B, row 5 would be referred to as B5. The column is always listed first followed by the row without any spaces between the two.

The outlined cell (the one with the dark borders) within the worksheet is referred to as the active cell. Each cell may contain text, numbers, or dates. You can enter up to 32,000 characters in each cell (Equivalent to a 44 page report!).

These cell addresses are useful when entering formulas. Instead of typing actual values in your equations, you simply type the cell address where the value is stored. Then, if you need to go back and change one of the values the spreadsheet automatically updates the result of the formula based on the new data.

For example, instead of typing 67*5.4 you could enter C5*D5. The number 67 is stored in cell C5 and the number 5.4 is stored in cell D5. If these numbers change next month or next year, the formula remains correct because it references the cells - not the actual values. With the second formula, you can change the numbers stored in cells C5 and D5 as often as required and see the result recalculated immediately.

The next section of the screen lists the columns and rows within the current worksheet. As mentioned, columns are lettered and rows are numbered. The first 26 columns are lettered A through Z. Excel then

begins lettering the 27th column with AA and so on. In a single Excel worksheet there are 256 columns (lettered A-IV) and 65,536 rows (numbered 1-65,536), totaling 16,777,216 individual cells.

Sheets and Workbooks

Towards the bottom of the worksheet is a set of small Tabs that identify each sheet in the workbook (file). If there are multiple sheets, you can use the tabs to easily identify what data is stored on each sheet. For example, the top sheet could be "Expenses" and the second sheet could be called "Income". When you begin a new workbook, the tabs default to being labeled Sheet1, Sheet2, etc.

At the bottom of the screen is another bar called the Status Bar. This bar is used to display various information about the system and current workbook.

The left- hand corner of this line lists the Mode Indicator, which tells you what mode you are currently working in.

The Zoom button (located on the toolbar at the top of the screen) allows you to change the size of the viewing area. This does not affect the actual printing of the file. Click on the down arrow located to the right side of the current zoom factor. Scroll through the available zoom choices. When you select a zoom factor, Excel will zoom in or out of the worksheet area - as specified in the Zoom. You can also access the View Æ Zoom menu. In addition, you can hide everything except the worksheet and the menu (which will increase your working area) by accessing the View Æ Full Screen menu.

The Ribbon

The Ribbon is designed to help you quickly find the commands that you need to complete a task. Commands are organized in logical groups, which are collected together under Tabs. Each Tab relates to a type of activity, such as formatting or laying out a page. To reduce clutter, some Tabs are shown only when needed. For example, the Picture Tools tab is shown only when a picture is selected.

File Menu

Here you will find the basic commands such as open, save, print, etc.

Quick Access Toolbar

The place to keep the items that you not only need to access quickly, but want to be immediately available regardless of which of the Ribbon's tabs you're working on. If you put so many items on the Quick Access Toolbar that it becomes too big to fit on the title bar, you can move it onto its own line.

Tell Me

This is a text field where you can enter words and phrases about what you want to do next and quickly get to features you want to use or actions you want to perform. You can also use Tell Me to find help about what you're looking for, or to use Smart Lookup to research or define the term you entered.

Formula Bar

A place where you can enter or view formulas or text.

Expand Formula Bar Button

This button allows you to expand the formula bar. This is helpful when you have either a long formula or large piece of text in a cell.

Worksheet Navigation Tabs

By default, every workbook starts with 1 sheet.

Insert Worksheet Button

Click the Insert New Worksheet button to insert a new worksheet in your workbook.

Horizontal/Vertical Scroll

Allows you to scroll vertically/horizontally in the worksheet.

Normal View

This is the "normal view" for working on a spreadsheet in Excel.

Page Layout View

View the document as it will appear on the printed page.

Page Break Preview

View a preview of where pages will break when the document is printed.

Zoom Level

Allows you to quickly zoom in or zoom out of the worksheet.

Navigating in the Excel Environment

Below is a table that will assist you with navigating/moving around in the Excel environment.

Key	Description
ARROW KEYS	**Move one cell up, down, left, or right in a worksheet.**
	SHIFT+ARROW KEY extends the selection of cells by one cell.
BACKSPACE	**Deletes one character to the left in the Formula Bar.**
	Also clears the content of the active cell.
	In cell editing mode, it deletes the character to the left of the insertion point.
DELETE	**Removes the cell contents (data and formulas) from selected cells without affecting cell formats or comments.**
	In cell editing mode, it deletes the character to the right of the insertion point.
END	**Moves to the cell in the lower-right corner of the window when SCROLL LOCK is turned on.**

Also selects the last command on the menu when a menu or submenu is visible.

CTRL+END moves to the last cell on a worksheet, in the lowest used row of the rightmost used column. If the cursor is in the formula bar, CTRL+END moves the cursor to the end of the text.

CTRL+SHIFT+END extends the selection of cells to the last used cell on the worksheet (lower-right corner). If the cursor is in the formula bar, CTRL+SHIFT+END selects all text in the formula bar

ENTER Completes a cell entry from the cell or the Formula Bar, and selects the cell below (by default).

ESC Cancels an entry in the cell or Formula Bar. Closes an open menu or submenu, dialog box, or message window.

HOME Moves to the beginning of a row in a worksheet.

CTRL+HOME moves to the beginning of a worksheet.

PAGE DOWN Moves one screen down in a worksheet.

PAGE UP Moves one screen up in a worksheet.

SPACEBAR In a dialog box, performs the action for the selected button, or selects or clears a check box.

CTRL+SPACEBAR selects an entire column in a worksheet.

SHIFT+SPACEBAR selects an entire row in a worksheet.

CTRL+SHIFT+SPACEBAR selects the entire worksheet.

TAB   **Moves one cell to the right in a worksheet.**

Highlighting/Selecting Areas Using the Mouse

Select cells:

Moves a cell's contents:

Activate the Autofill feature:

To Select a Column: Click on the column letter

To Select a Row: Click on the row number

To Select the Entire Worksheet: Click above row 1 and to the left of column A or hit CTRL A on the keyboard

Entering Text

Any items that are not to be used in calculations are considered, in Excel's terminology, labels. This includes numerical information, such as phone numbers and zip codes. Labels usually include the title, column and row headings.

To Enter Text/Labels:

1)   Click in a cell

2)   Type text

3)   Press Enter

NOTE: By default, pressing the Enter key will move you to the cell below the active cell.

The label actually "lives" in the cell you typed it into. If you type long text it might appear to be in multiple columns. It is important to understand this concept when trying to apply formatting to a cell. Using the formula bar will confirm where the label actually "lives."

Autofills

Frequently, it is necessary to enter lists of information. For example, column headings are often the months of the year or the days of the week. To simplify entering repetitive or sequential lists of information, Excel has a tool called Autofill. This tool allows preprogrammed lists, as well as custom lists, to be easily added to a spreadsheet.

Entering Values

Numerical pieces of information that will be used for calculations are called values. They are entered the same way as labels. It is important NOT to type values with characters such as "," or "$".

To Enter Values:

1)   **Navigate to a cell**

2)   **Type a value**

3)   **Press Enter**

Creating Formulas

Formulas perform calculations or other actions on the data in your worksheet. A formula starts with an equal sign (=). It is possible to create formulas in Excel using the actual values, such as "4000*.4" but it is more beneficial to refer to the cell address in the formula, for example "D1*.4". One of the benefits of using a spreadsheet program is the ability to create a formula in one cell and copy it to other cells. Most spreadsheet formulas use a concept called relative referencing.

This is the explanation of relative referencing from Excel's help file:

"A relative cell reference in a formula, such as A1, is based on the relative position of the cell that contains the formula and the cell the reference refers to. If the position of the cell that contains the formula changes, the reference is changed. If you copy the formula across rows or down columns, the

reference automatically adjusts. By default, new formulas use relative references. For example, if you copy a relative reference in cell B2 to cell B3, it automatically adjusts."

It is also important to know the operators Excel uses for formulas:

Operator (Key)   Function

=   Begins all Excel functions and formulas

+   Addition

-          Subtraction

*   Multiplication

/   Division

Operator (Key)	Function
=	Begins all Excel functions and formulas
+	Addition
-	Subtraction
*	Multiplication
/	Division

To Create a Formula:

1)   Click in a cell

2)   Press the = key

3)   Type the formula

4)   Press Enter

Copying Formulas

Like many things in Excel, there is more than one way to copy formulas. Feel free to choose what works best for you.

To Copy Formulas Using Autofill:

1)   Click in the cell that contains the formula

2)   Position the mouse on the Autofill handle (a thin black cross will appear)

3)   Click and drag to copy the formula

To Copy Formulas Using Copy and Paste:

1)   Click in the cell that contains a formula

2)   Select Copy on the Home Ribbon in the Editing group

3)   Highlight the cell where you would like to paste the formula

4)   Select Paste on the Home Ribbon in the Editing group

ALTERNATE METHODS

Keyboard: Ribbon: Mouse:

Press CTRL + C copy   Right-click and choose

Keyboard:	Ribbon:	Mouse:
Press CTRL + C		Right-click and choose Copy

Autosum Function

The most common formula in Excel is SUM, or the addition of multiple values. In this example, we could create a formula that reads =C6+D6+E6+F6+G6+H6. That's a lot of typing! Instead, we can use the SUM function and specify a range of cells.

Functions are more complex formulas that are invoked by typing their name. In this example, we will use the SUM function. Excel has over 200 functions that can be used. Because SUM is the most common function, it is the only one with its own toolbar button.

When working with functions, the cells used in the formula are referred to as the range. A range is a group of cells that are specified by naming the first cell in the group and the last cell. For example, A1:D1 is a range that includes cells A1, B1, C1 and D1.

To Create the Total Column's Values Using Autosum:
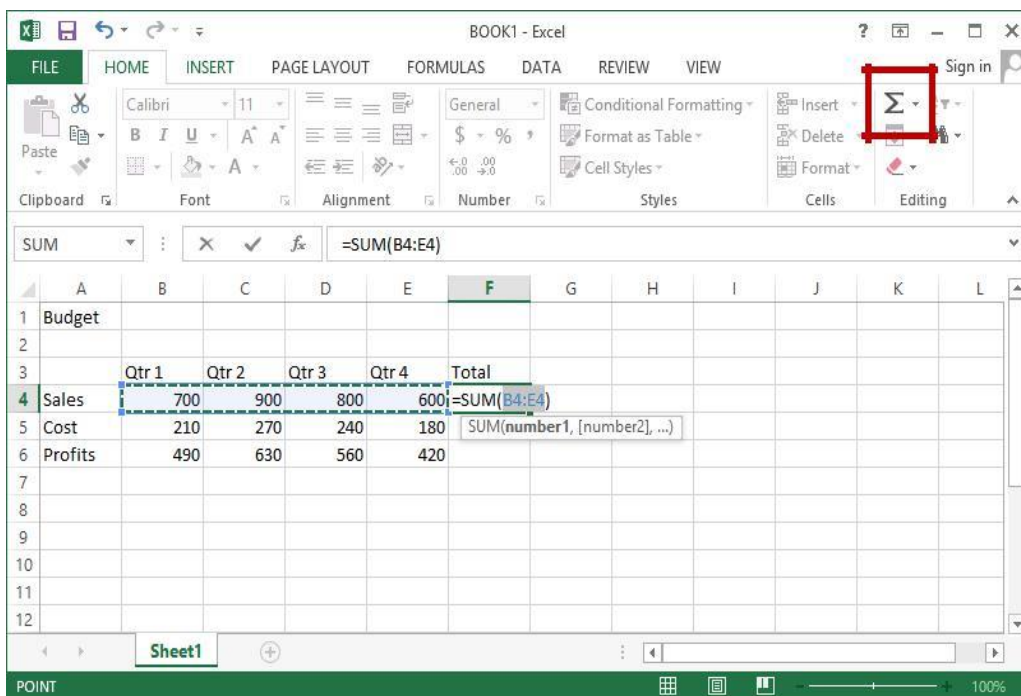
1)   Click in the cell where you would like the Total to be located

2)   Press the Autosum button on the Home Ribbon

The Autosum function automatically looks for cells that have values in them. It will read values until it finds the first blank cell. Autosum will always look for values in the cells above it first, then to the left. This means that you need to be aware of what cells will be in the formula. Autosum will select the range of cells to use in the formula by highlighting the range.

3)   Press Enter

Saving a Worksheet

When working in Excel it is necessary to save your files. It is also very important that while working, your file is saved frequently. When naming a file, you are restricted to 255 characters. Avoid most punctuation; spaces are acceptable.

To Save the File:ss

1)   Click on the File tab

2)   Click Save

3)   Choose the destination

4)   Type a file name

5)   Click Save

Editing Cells

Excel provides a major enhancement over earlier spreadsheet products in its ability to edit cells easily. There are various methods for cell editing, including double-clicking in the cell, using the F2 key, and typing in the formula bar.

To Edit a Cell in the Worksheet:

1)   Position yourself in the cell you would like to edit

2)   Press the F2 key on the keyboard or double-click in the cell

3)   Use the backspace or delete keys to edit the cell

4)   Press Enter when you have finished editing the cell

5)   Click in the cell you would like to edit

6)   Click in the formula bar and make any necessary changes

7)   Press Enter when you have finished editing the cell

Undo

Excel and other Windows applications have a convenient method of correcting mistakes known as Undo. In many applications, including Excel, you can undo an almost limitless number of commands. The Undo button has a small down-pointing arrow next to it. When pressed, it will display a list of actions that can be undone. Redo works in the same way, allowing you to repeat actions.

Excel will undo actions in reverse chronological order, meaning that the most recent command is reversed first, then the one prior to that, and so on. You cannot reverse an earlier action using Undo without first undoing the actions that were performed after it.

NOTE: The list of commands to undo is reset after the file is saved. You cannot use Undo to fix an error after the file is saved.

To Undo a Command:

Click Undo

Clearing Cells

As we begin to look at formatting, it is important to understand what makes up the contents of a cell. There are three distinct items that can be in a cell:

•   Contents

•   Formats

•   Comments

These allow items to be formatted properly, even if the values change. However, when trying to delete or clear a cell, it can be a bit tricky. Excel stores formats and contents separately, simply deleting the contents does not delete the format.

To Clear a Cell Format:

1)   Click in the cell that contains formatting
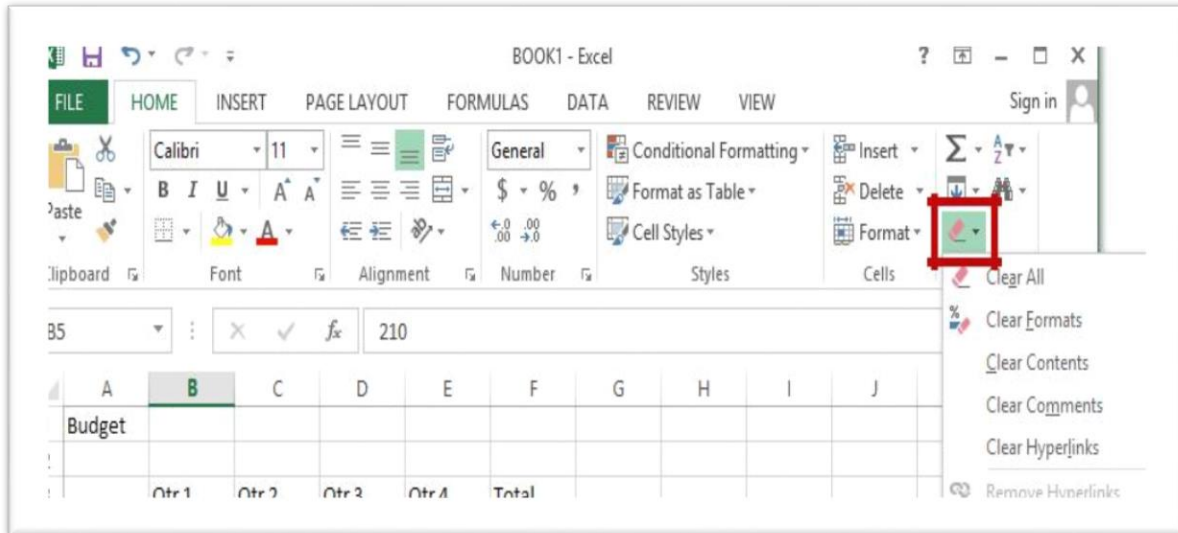
Click the drop-down arrow next to the Clear button on the Home tab in the Editing group

Click Clear Formats

Formatting Values

Applying formats to any cell(s) can be done either using the Font, Alignment and Number groups or using the dialog box which will include all the formatting options.

To Apply the Currency Format:

1)   Highlight the cell(s)

2)   Click on the Currency Style button   on the Home tab in the Number group

3)   If necessary, click on the Increase or Decrease Decimal button   on the Number group

To Apply the Comma Format:

1)   Highlight cells

2)   Click on the Comma Style button   on the Number group

3)   If necessary, click on the Increase or Decrease Decimal button   on the Number group

Formatting Labels

A Label, or text formatting is applied virtually the same way it is done in word processing programs.

To Format the Title Labels:

1)   Highlight the cell(s)

2)   Select a font from the Font group

3)   Select a point size from the Font group
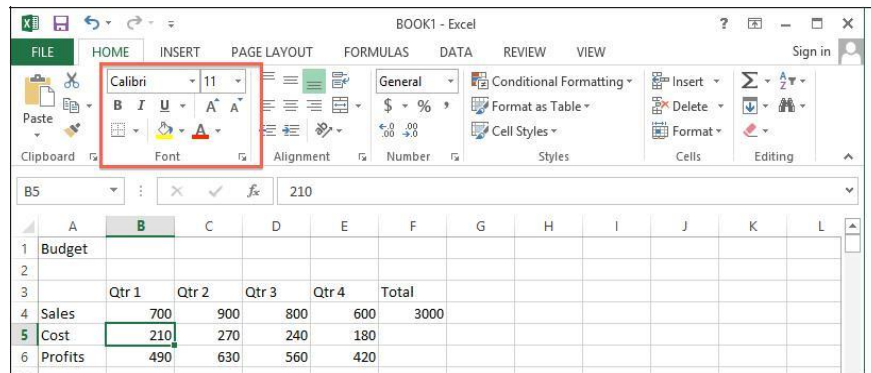
Using the Dialog Box:

1)   Highlight the cells

2)   Click on the arrow in the corner of one of the formatting groups (Font, Alignment, Number) to open the Format Cells dialog box and click on one of the tabs
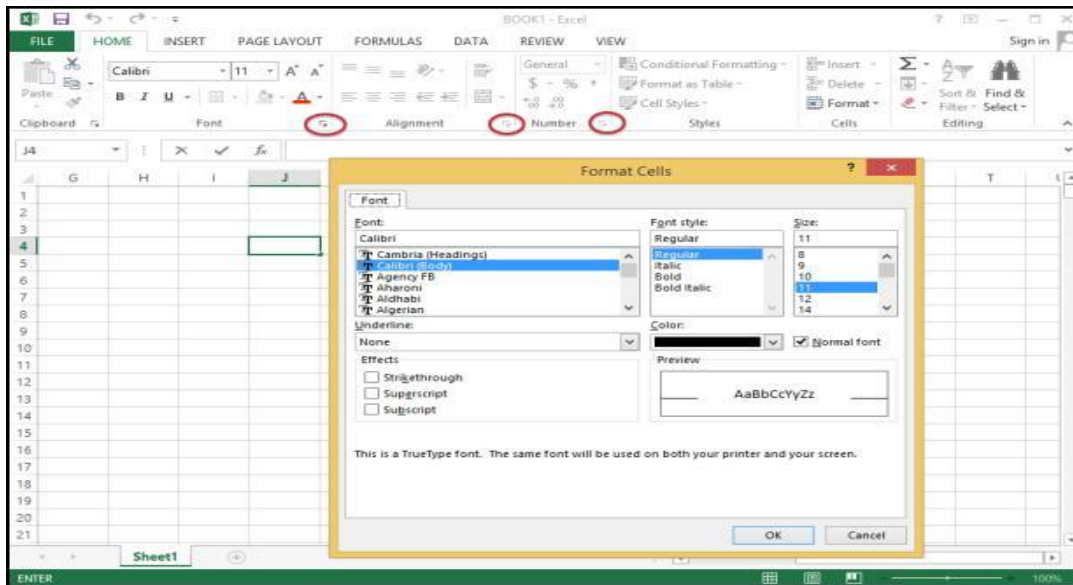
Format Painter

Frequently, you will need to take a format that is applied to one cell and apply it to other cells. A quick way to do this is by using the Format Painter.

To Apply a Format to Cells:

1)   Highlight cell(s)

2)   Format the cell(s) to the desired format

3)   Select the formatted cell(s)

4)   Click the Format Painter   from the Clipboard group of the Home tab

5)   Highlight the cells you wish to format

Tips and Tricks: If you would like the Format Painter to remain active, double-click the Format Painter. It will remain active until you press the Esc key.

Cantering Text Across Columns

When it comes to titles, it may be preferable to have the information cantered across the document, rather than in only one cell. Excel uses the feature Merge Cells to accomplish this.

To Centre the Title Across Columns:

1)   Highlight cell(s)

2)   Click the Merge and Centre button   on the Alignment group

NOTE: Each cell must be done individually. Excel will delete the contents of all but the top most cell if multiple cells are selected.

This option basically takes all the cells in the highlighted range and merges them into one large cell. For example, the range A1:F1 became cell A1 after the Merge Cells button was selected. There is no cell B1, C1, etc. any longer.

Creating a Basic Chart

1)   Highlight the data to be charted

2)   Click on the Insert tab

3)   Click on a Chart Type in the Charts group

4)   Click on a Chart Style
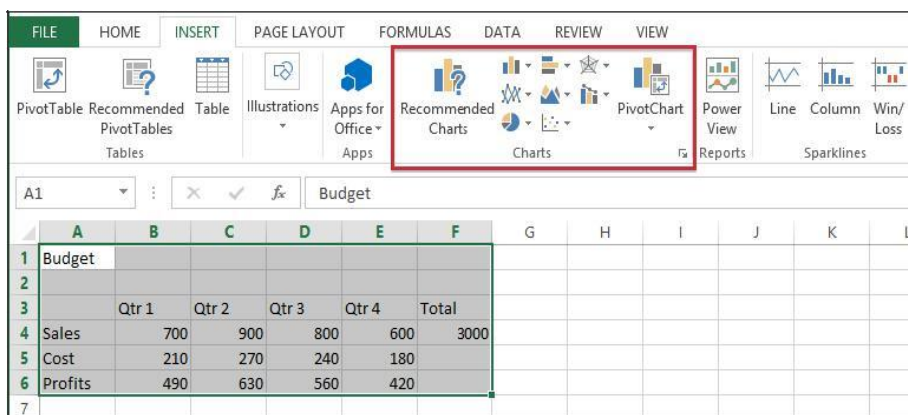
To Move your Chart:

Click and drag the chart to a new location on the worksheet.

When the chart is selected you will notice a new tab "Chart Tools" on the Ribbon. If you do not see the Chart Tools, click on the chart to select it. Under Chart Tools you will find 2 tabs:

• Design

• Format`
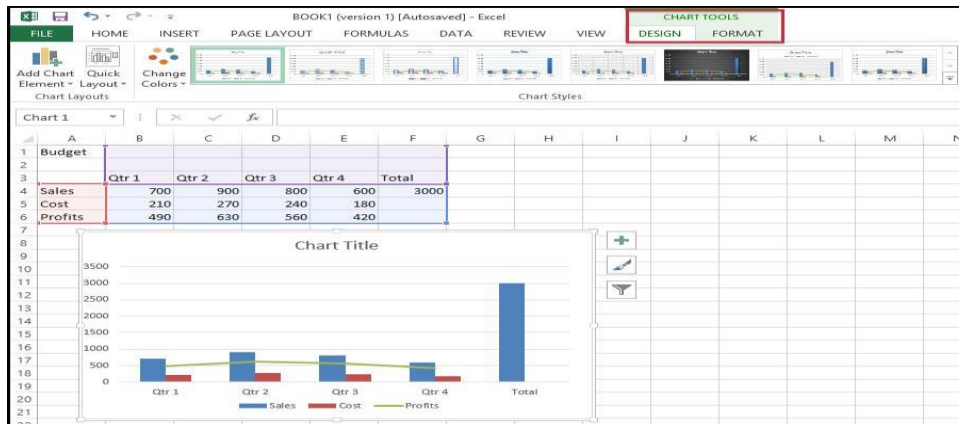
Excel Functions

As we have previously seen, the power of Excel lies in its ability to perform calculations. The real strength of this is shown in Functions. Functions are more complex formulas that are executed by using the name of a function and stating whatever parameters the function requires.

To Enter the SUM Function:

1) Click in a cell

2) Click on the AutoSum button in the Editing group

3) Highlight the range of cells that are to be added (The colon means "through")

4) Press ENTER

To Insert the Average Function into the Worksheet:

1) Click in a cell

2) Click on the drop-down arrow next to the AutoSum button

3) Click on Average

4)   Highlight the range of cells be calculated

5)   Press ENTER

To Insert the MAX Function into the Worksheet:

1)   Click in a cell

2)   Click on the drop-down arrow next to the AutoSum button

3)   Click on Max

4)   Highlight the range of cells be calculated

5)   Press ENTER

To Insert the MIN Function into the Worksheet:

1)   Click in a cell

2)   Click on the drop-down arrow next to the AutoSum button

3)   Click on Min

4)   Highlight the range of cells be calculated

5)   Press ENTER

To Insert the COUNT NUMBERS Function into the Worksheet:

1)   Click in a cell

2)   Click on the drop-down arrow next to the AutoSum button

3)   Click on Count Numbers

4)   Highlight the range of cells be calculated

5)   Press ENTER

Printing a Worksheet

To Print, Preview and Modify Page Setup

1)   Click on the File tab

2)   Click on Print

The spreadsheet shows as it will be printed. You can proceed to print the document from here, or you can change things to make the printed output look different.

Page Setup

You can change options under Settings or you can click on Page Setup.
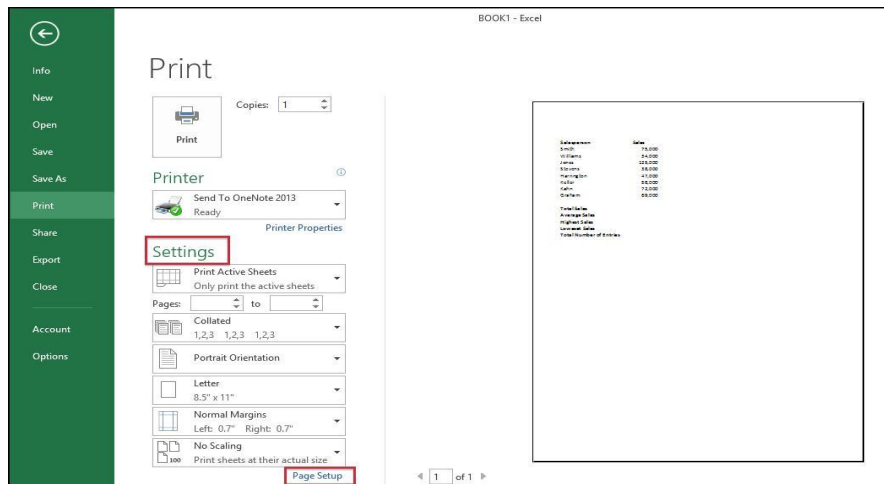
Clicking on Page Setup will open a dialog box with four tabs:

•   Page

•   Margins

•   Header/Footer

•   Sheet

Page:

1)   Change the Orientation

2)   Adjust the Scaling

3)   Change the Paper Size
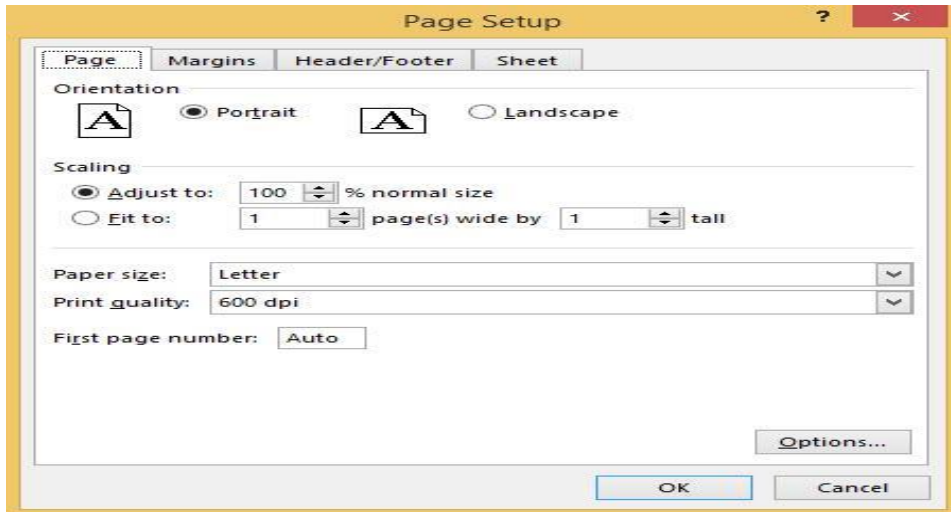
Margins:

1)   Change the margins

2)   Center on the page either horizontally, vertically or select both

Header/Footer:

1)   To select from one of the already created headers/footers, click on the drop-down arrow for Header and also for Footer and choose from the list

2)   To create a custom header and/or footer, click on Custom Header and Custom Footer

This area is made of three sections – left, centre and right. Any information added in these sections will appear in that area (left, centre or right) in the header or footer. You will also see a row of buttons in this dialog box. Following are their functions:

Click in a section to position your cursor

3)   Enter text/fields

4)   Click OK when finished

Sheet Tab:

1.   Repeat Rows and Columns under Print Titles

2.   Check off what to print under Print
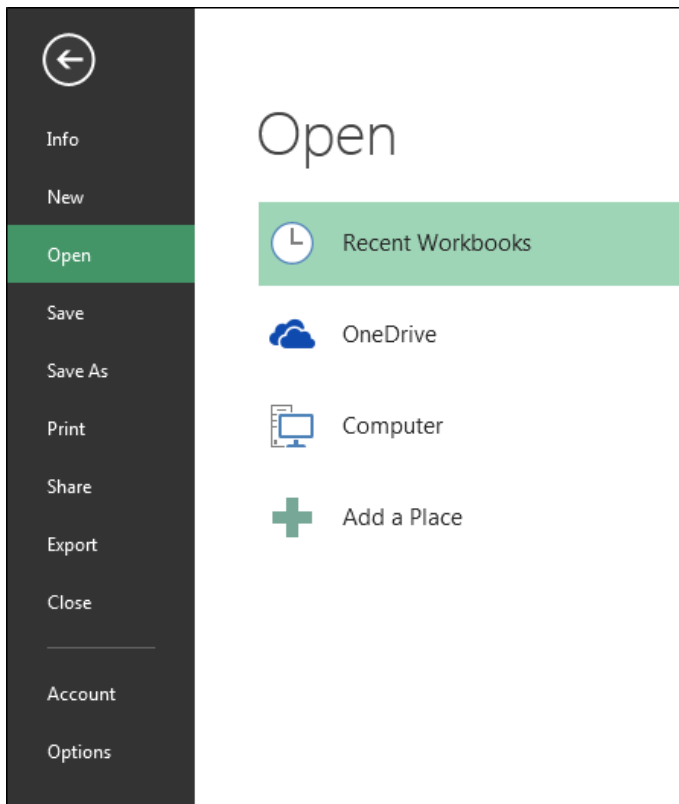
3.   Change the Page Order
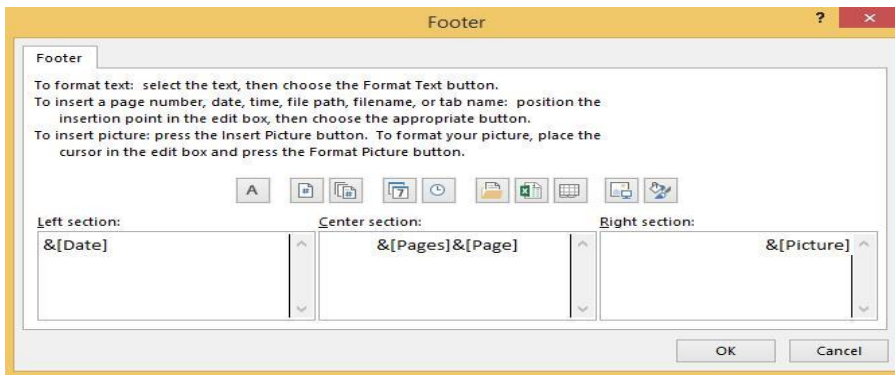
# File Tab in Microsoft Excel

What is File tab and its uses?

File tab contains the basic required options such as New, Open, Save, Save as, Print, Share, Export, and Close options. Other than the aforementioned options, we can find account and Excel options tab, too.
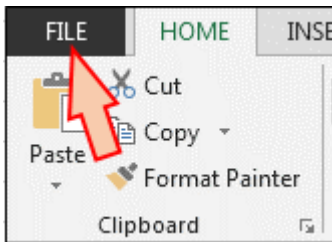
a) Info: - With this option, we can get the information about the particular Excel file. Created date, last modified date, Author name, Properties, versions etc.

b) New: – We use this option to open the new Excel file. We can open new file using shortcut key, Ctrl+N or by Clicking on File tab > New > Blank workbook. If Excel file is not opened, then Press Window+R and type Excel, New Excel file will open.
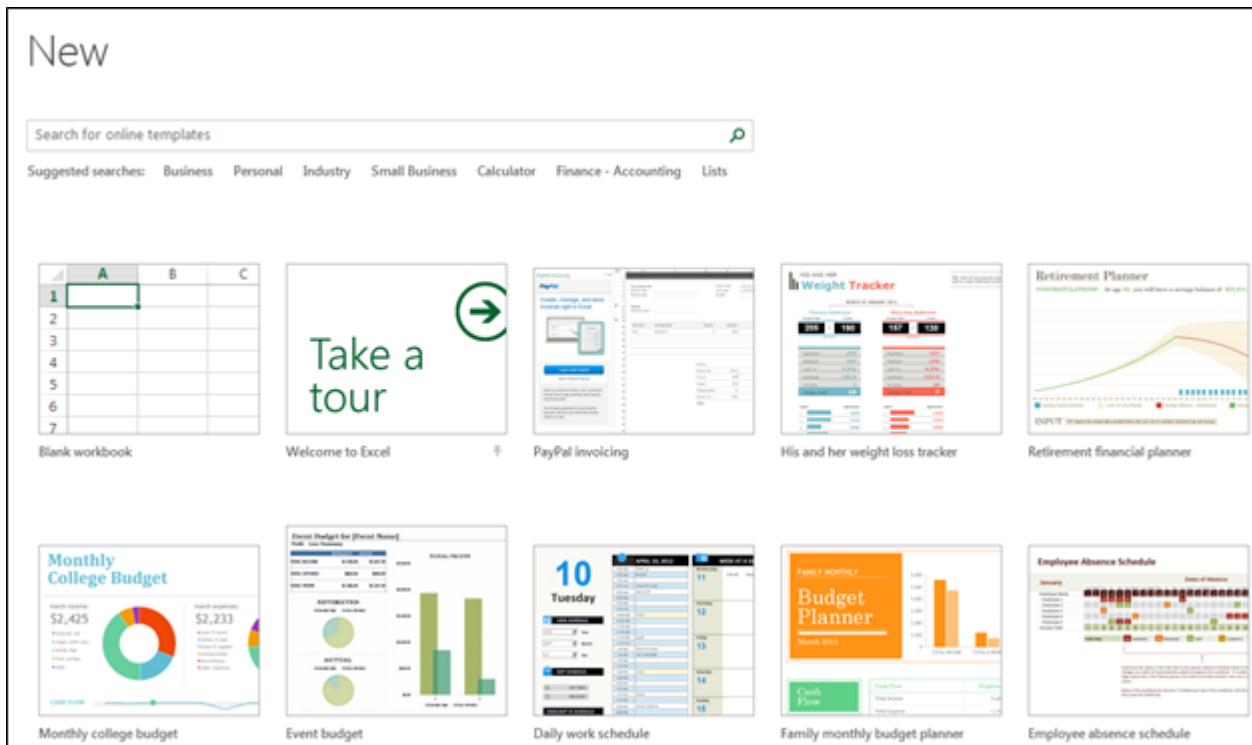
c) Open: – We use this option to open the existing file (shortcut Ctrl+O). "Open" option appears and you can choose to open the file.

Alternatively, File tab > Open > choose the file

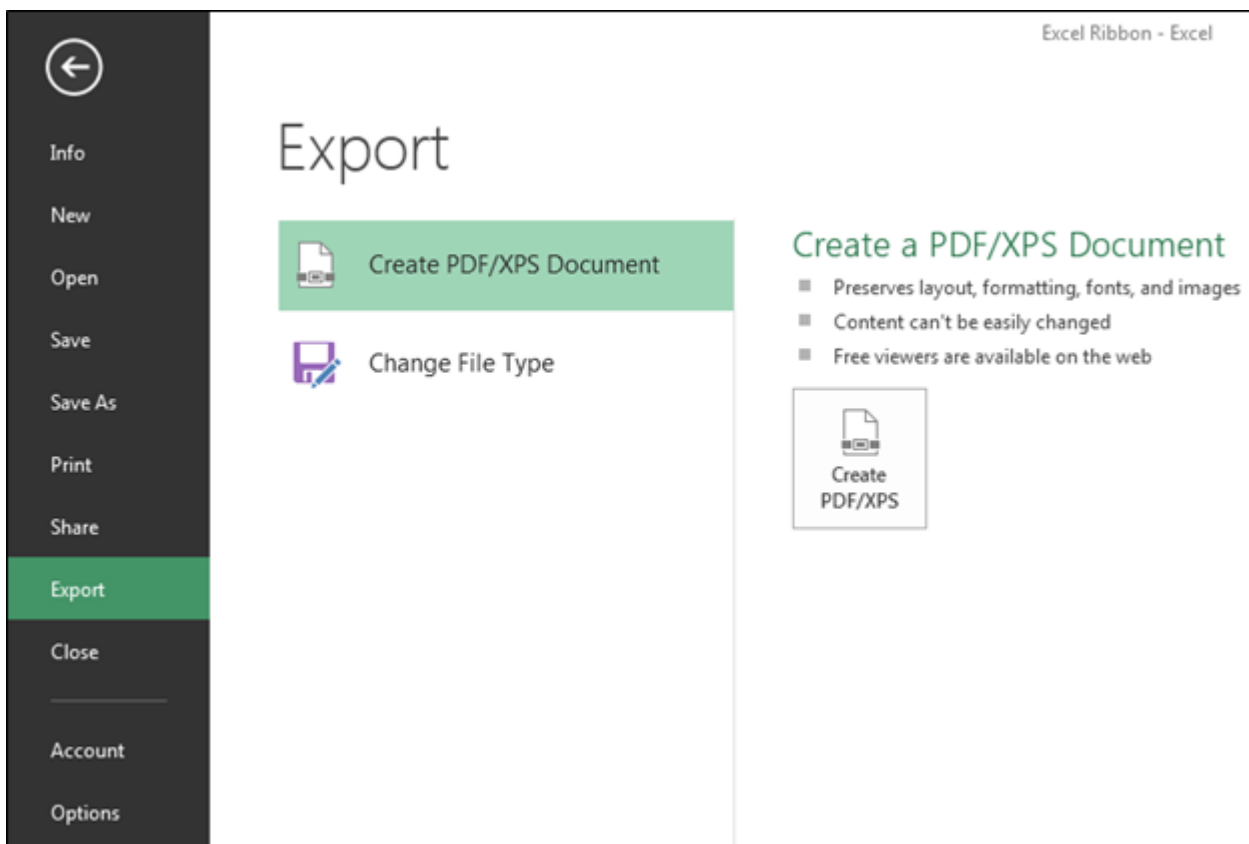d) Save: – We use this option to save the current file.

Shortcut: – Ctrl+S

Path: – Click on File tab >Save

e) Save as: – We use this option to make another copy or save the file at another place. F12 is the shortcut key to save as the file or we can save the file following these steps: – Click on File tab > Save as and then choose the location.
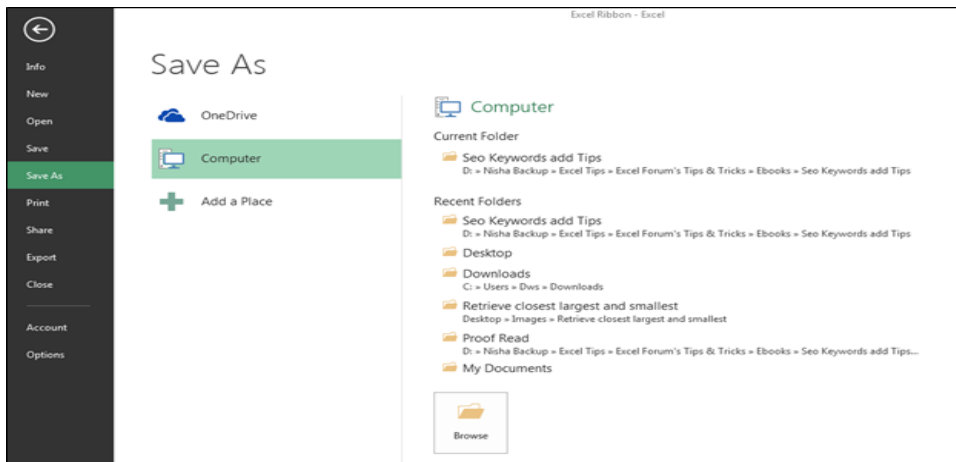
g) Share: – We use this option to share the file with multiple users and send it over email. To share the file we can follow the steps: – Click on File tab >Share.

h) Export: – We use this option to export the file in PDF or XPS document and we can change the file type as well. To Export the file, we can follow the steps: – Click on File tab >Export. And then we can export it as per our requirement.

i) Close: – We use this option to close the file. Ctrl+W is the shortcut key to close the workbook or we can follow the steps: – Click on File tab >Close, active file will be closed. When we close the file, we get the confirmation message to save the file or not or cancel the command.
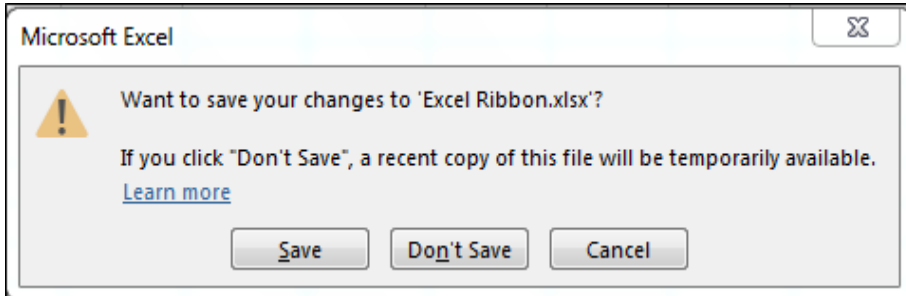

j) Account: – We use this option to sign in to our office account and we can change office theme, too. We can follow the steps: – Click on File tab >Active, Active window will appear.
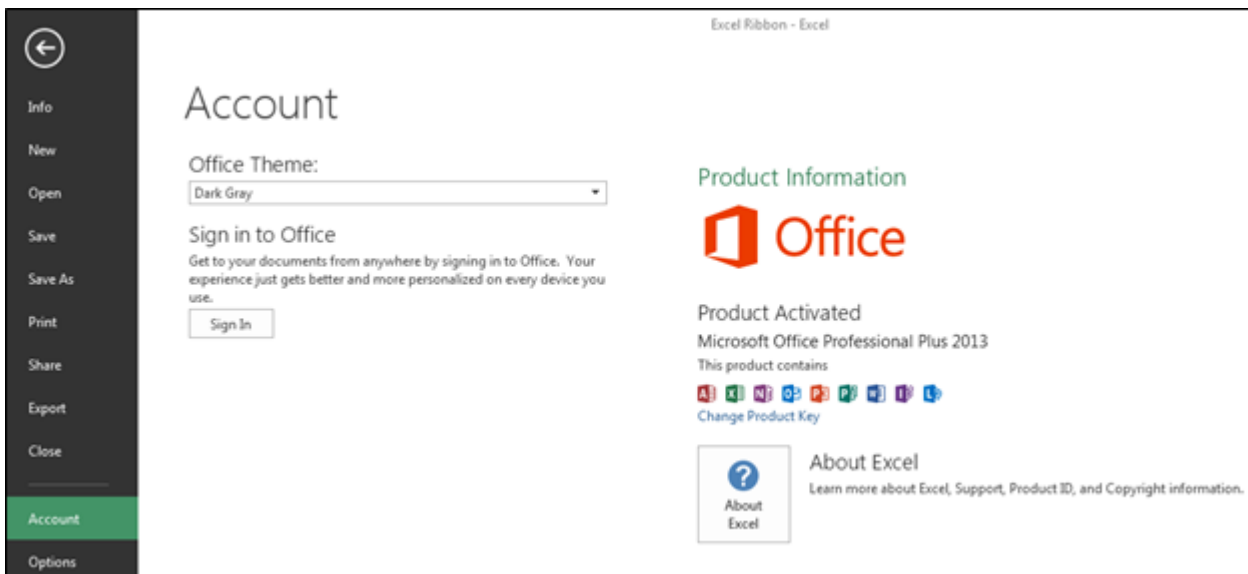
k) Options: – It was in the tool menu of the previous versions of 2007 MS. We use this option to add extra and advanced features, like Developer tab, Power pivot, Analysis toolpak and many more. Also, we can change default settings, like font size, font style, number of sheets etc. In Excel options, we have 10 categories:-
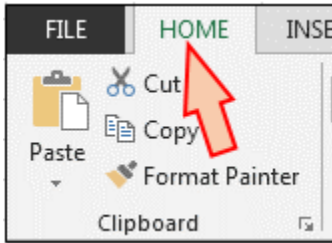
1) General

2) Formulas

3) Proofing

4) Save

5) Language

6) Advanced

7) Customize Ribbon

8) Quick Access toolbar

9) Add Ins

10) Trust Center
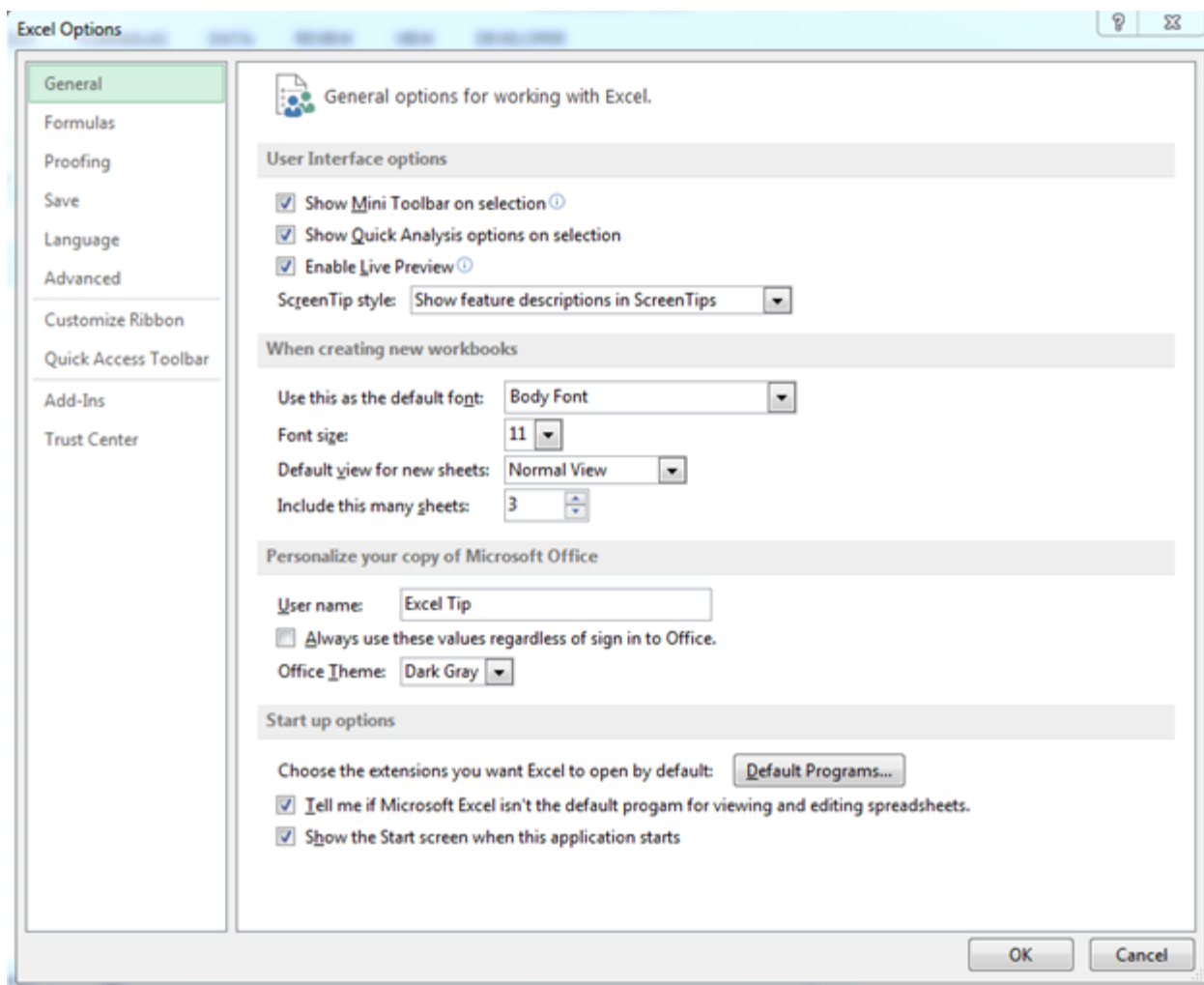
Home Tab in Microsoft Excel

What is Home tab and its uses?

Home tab contains the most frequently used options such as cut-copy-paste, font formatting, alignment, Number, Conditional formatting, etc. All the options are used to format the data.


Under the Home tab, we have 7 groups: -

7 groups of Home Tab

1) Clipboard
2) Font
3) Alignment
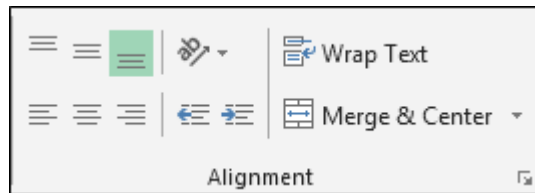4) Number
5) Styles
6) Cells
7) Editing

a) Clipboard: – This group contains frequently used commands: Cut, Copy, Paste and Format painter. Clipboard option allows us to collect text and graphic items and paste it.
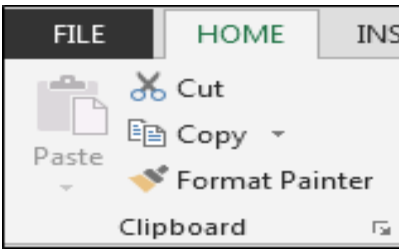
b) Font: – We use this option to change the font style and font-size. We can make it bold, italic and underline. Also, this group contains border styles, fill color, font color.
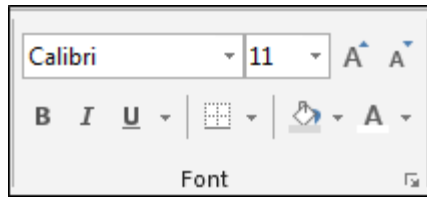
c) Alignment: – We use this option to change the alignment of cell's text to the right, left and middle. Also, we can subject the text to top, bottom, and middle alignment. In this group, we have Wrap text option to adjust and make the text visible within a cell, and we can also merge 2 or more cells, using merge option.

d) Number: – We use this option to change the number formatting into General, Percentage, Currency, Date, Time, Fraction etc. We can increase and decrease the decimal and convert the number into accounting number.
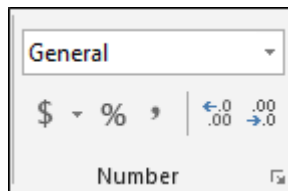

e) Styles: – In this option, we have Conditional Formatting, Format as Table and Cell Styles. Conditional formatting is used to highlight the cell or range on the basis of conditions. Format as table is having

readymade table format and Cell styles feature different types of built-in styles that are a combination of Font style, Font colour and Fill colour.
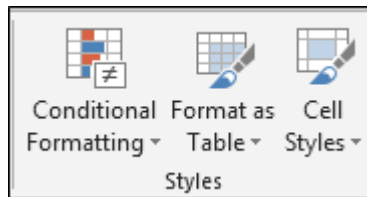
 f)   Cells: – We use this option to insert or delete cells, rows, columns and sheets. Also, we have format option to adjust the height, width of cells or range. Using this option, we can hide or unhide the range, protect the workbook, rename the sheet name, fill the tab colour, move or copy to sheets, lock the cells.
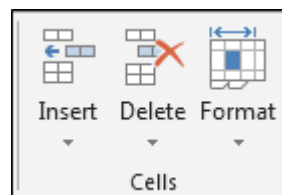
 g)   Editing: – This option has Auto Sum feature to return the total of numbers and move the text to right, left, up and down, Clear the format, content, comments and hyperlink; sort the data and find and select option.
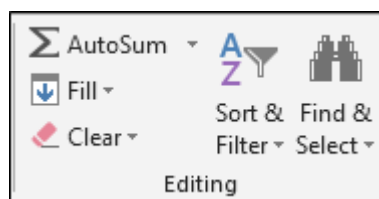
Insert Tab in Microsoft Excel

What is Insert tab and its uses?

We use Insert tab to insert the picture, charts, filter, hyperlink etc. We use this option to insert the objects in Excel. To open the insert tab, press shortcut keys Alt+N.

FILE	HOME	INSERT

PivotTable Recommended able
            PivotTables
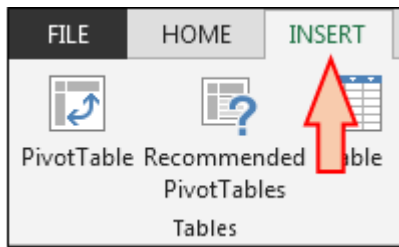
Tables

10 groups of Insert Tab

1) Tables
2) Illustration
3) Apps
4) Charts
5) Reports
6) Sparklines
7) Filters
8) Links
9) Text
10) Symbols

Under the Insert tab, we have 10 groups:-

a) Tables: - We use this option to insert the dynamic table, Pivot table and recommended table. Pivot table is used to create the summary of report with the built-in calculation, and we have option to make our own calculation. Tables make it easy to sort, filter and format the data within a sheet. This option is also having recommended table that means on the basis of data, we can just insert the table as per the Excel's recommendation.
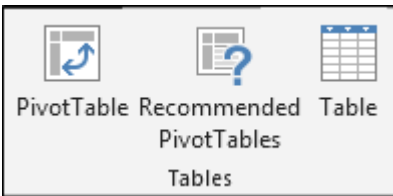
b)   Illustration: - We use this option to insert the Pictures, Online Pictures, Shapes, SmartArt and Screenshot. It means if we want to insert any image, we can use Illustration feature.
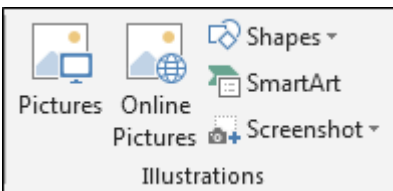
c)   Apps: - We use this option to insert an app into the document and, in order to enhance the functionality, we can use web option.

d)   Charts: -Charts is very important and useful function in Excel. In excel, we have different and good numbers of readymade chart options. We have 8 types of different charts in Excel:- Column, Bar, Radar, Line, Area, Combo, Pie and Bubbles chart. We can insert Pivot chart as well as Recommended chart, and if we don't know which chart we should insert for the data, we can use this option to fulfil the requirement.
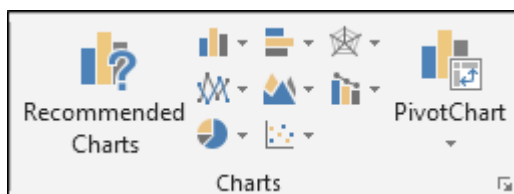
e)   Reports: -We use this option to create a better report on the basis of the decisions we take for business. It makes the report more   interactive and decipherable.
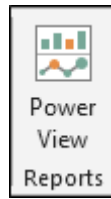
f) Sparkline's: -Sparkline is a very tricky and useful option added by Microsoft Excel. On the basis of a range, it can visualize the trends in a single cell as charts. We have 3 different types of cell charts: - Line, Column and Win/Loss chart.
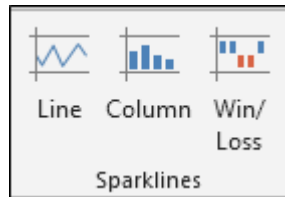
g) Filters: -We use this option to filter data visually and filter dates interactively. We have 2 options: Slicers and Timeline. We use Slicer to make the fast and easier to filter tables, Pivot tables, Pivot Charts and cube functions. Timeline makes it faster and easier to select time periods in order to filter Pivot Tables, Pivot Charts and Cube function.
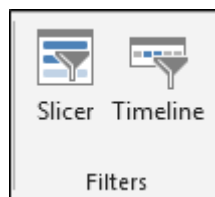
h) Links: -

• We use this option to create the link in the document for the quick access to webpage and files.

• We can also use it to access different locations in the document.

i) Text: -We use this option to insert the Text box, Header and Footer, Word art, Signature and objects. We insert Text box to write something in the image format. We use Header and Footer options to place the content on the top and bottom of the page. Word art makes the text stylish. Insert the Add Signature Lines that specify the individual who is supposed to sign it. And object option works for embedded objects, like documents or other files we have inserted into the document.
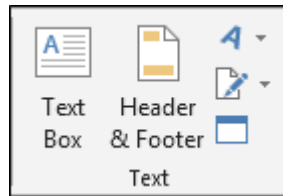
j)   Symbols: - We use this option to insert the symbols and equation. Equation is used to insert the common mathematical equations to your document and also we can add equation by using the mathematical symbols. We use Symbols to insert the symbols which are not on the keyboard and, to create the equation, we use the symbols from here.
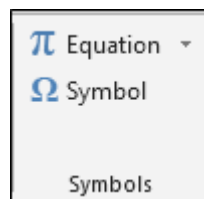
DATE AND TIME FUNCTIONS

LEARNING OBJECTIVES

- Dates in Exce
- Times in Excelss
- Useful Date/Time Shortcuts
- Custom Formatting
- Simple Date/Time Math
- Date Worksheet Functions
- Time Functions
- Datedif Function

Dates in Excel

If you've ever lost the date formatting on a cell, you have seen it turn into a strange number. For example, according to Excel these cells are the same number:

	A	B
1	10/17/2013	41564

The serial number 41, 564 tells us how many days it has been since January 1st, 1900*. The date serial numbers are sequential, one day at a time:

	A	B
1	10/17/2013	41564
2	10/18/2013	41565
3	10/19/2013	41566

*Note: The default date system for the Macintosh begins with January 1, 1904. This may cause some confusion if you try to use the same file in both a Mac and a PC. The setting can be changed in the Excel Options on the File menu.

Times in Excel

One day has 24 hours, so in Microsoft Excel, 1 is equivalent to 24 hours, 0.5 is equivalent to 12 hours. If we take our October 17th date, and add in a time of 12:00pm, it translates into 41564.5, the 0.5 representing the half- way point of the day.

1=24 hours, 0.5=12 hours, 0.25=6 hours…

	A	B
1	10/17/13 12:00 PM	41564.5

If you leave the date off a time, Excel will default to 1/0/1900 as the 'understood' date. You can ignore it, but realize that is what happens if you change a time format into a date/time format. All three of these cells contain 12:00 PM, they are just displayed with different formats:

	A	B	C
1	12:00 PM	1/0/1900	1/0/00 12:00 PM

Day		Month		Year	
D	3	m	2		
dd	03	mm	02	yy	04
ddd	Tue	mmm	Feb		
dddd	Tuesday	mmmm	February	yyyy	2004

Custom Formatting

Days, Months, and Years

You can format a cell with a preset list of options in the

Format Cells Window.

1. Click the More button in the Number group

2. Right-click on a cell and choose Format cells

3. Select the cell and press Ctrl-1 to open this window

Excel has a pretty extensive list of date and time formats, but it is possible to custom build a date format, using simple abbreviations.

Hours, minutes, and seconds

If you use "m" immediately after the "h" or "hh" code or immediately before the "ss" code, Excel displays minutes instead of the month.

Times for 1:02:05

Shortcut	Result	Note
Ctrl-;	Current Date	Control Semicolon
Ctrl-:	Current Time	Control Colon

appropriate designator at the end. Access will accept any of the following: AM/PM; am/pm; A/P; a/p; AMPM.

Times for 17:02:05

Hours			24 hour clock		12 hour clock	
H		17	h:m	17:2	h:m am/pm	5:2 PM
hh		17	h:mm	17:02	h:mm am/pm	5:02 PM
h AM/PM		5 PM	hh:mm	17:02	hh:mm am/pm	05:02 PM

If you need to go smaller, adding .00 after the second format (ss.00) will give the fraction of a second.

Totaling Time

The time formats in Excel stay within the defaults of 24 hours, 60 minutes, 60 seconds. If we do math we may want it to display the times beyond these boundaries. For this, we use the brackets [ ] around the abbreviation.

Beyond   **the**

36 Hours			75 minutes		75 seconds
h	12	m	(assumes month)	s	15
hh	12	mm	(assumes month)	ss	15
[h]	36	[m]	75	[s]	75

Boundaries

Simple Date/Time Math

Because dates and times are stored as numbers you can do simple math with them

Times are a fraction of a day. As mentioned earlier, 0.5=12 hours. If we multiply a time by 24 we should get the numeric value.

Time	Time * 24
8:45 AM	6:00 PM

Why doesn't it look right? You have to format the result as a true number field.

Time	Time * 24 (formatted as a number)

8:45 AM	8.75

Remember if you are going beyond the 24 hour clock, you will need to set up a custom format.

Date Worksheet Functions

Adapted from Excel Help

DATE - Returns the sequential serial number that represents a particular date

Syntax: DATE(year, month, day)

Year   The value of the year argument can include one to four digits.

Month A positive or negative integer representing the month of the year from 1 to 12. If month is greater than 12, month adds that number of months to the first month in the year specified

Day   A positive or negative integer representing the day of the month from 1 to 31.

DATEVAULE - Returns the serial number of a date

Converts a date that is stored as text to a serial number that Excel recognizes as a date. To view a date serial number as a date, you must apply a date format to the cell.

Syntax: DATEVALUE(date_text)

date_text represents a date between 01/01/1900 and 12/31/9999 saved as text

Equation	Result	Notes
=DATEVALUE(3/15/2009)	#VALUE!	Date not in Text format
=DATEVALUE("10/15/1905")	2115	

=DATEVALUE("3/20/2011")	40622	
=DATEVALUE(A1)	#VALUE!	A 1 = 12/5/1976
=DATEVALUE(A1)	28099	A 1 = "12/5/1976"

DAY - Returns the numeric value of the day in a valid date

Syntax: =DAY(serial number)

Serial Number is the date of the day you are trying to find.

Equation	Result	Notes
=DAY(3/15/2009)	0	*Serial Number* not a Date (Excel sees 3÷15÷2009)
=DAY("10/15/1905")	15	
=DAY(40622)	20	Equivalent to 3/20/2011
=DAY(A1)	5	A1 = 12/5/1976

DAYS360 - returns the number of days between two dates based on a 360-day year

360 day year assumes twelve 30-day months, this is often used with accounting calculations. If start date occurs after end date, the DAYS360 function returns a negative number.

Syntax: DAYS360(start date, end date, [method])

Start Date and End Date are valid dates which represent the starting and ending dates. Method Optional logical value that specifies whether to use the U.S. (NASD) or European method in the calculation. False or omitted will give us the U.S. method, True will use the European method.

Remarks: If *start_date* is the last day of the month, both methods set the start_date to the 30th of the month, but if the end_date is the last day of the month the US method will change the date to the 1st of the next month, the European will change the date to the 30th.

EDATE - Returns serial number of the date that is a number of months away from a date

Syntax: EDATE (start date, months)

    Start Date is a valid date that represents the starting date

    Months is the number of months before or after start date. A positive value for months yields a future date; a negative value yields a past date

Equation	Result		Notes
=EDATE(A1, 1)	39899	03/27/2009	A1 = 02/27/2009
=EDATE(A1, 10)	40174	12/27/2009	A1 = 02/27/2009
=EDATE(A 1, 100)	42913	06/27/2017	A1 = 02/27/2009
=EDATE(A 1, -1)	39840	01/27/2009	A1 = 02/27/2009

EOMONTH - Returns serial number for the last day *of the*

***month* EOMonth => End of month**

Syntax: EOMONTH(start date, months)

Months number of months before or after start_date. A positive value for months yields a future date; a negative value yields a past date.

MONTH- Returns the numeric value of the month in a valid date

Syntax: =MONTH (serial number)

Serial Number is the date of the month you are trying to find.

Syntax: NETWORKDAYS(start_date, end_date, holidays)

Start Date and *End Date* are valid dates.

Holidays is an optional range of one or more dates to exclude from the working calendar. The list can be either a range of cells that contains the dates or an array constant of the serial numbers that represent the dates

Equation	Result	Notes
=NETWORKDAYS(A1, A2)	5	A1 = 02/27/2009, A2 = 03/05/2009
=NETWORKDAYS(B1, B2)	1	B1 = 01/30/2009, B2 = 02/01/2009
=NETWORKDAYS(C1, C2)	12	C1 = 07/01/2009, C2 = 07/15/2009

Equation	Result	Notes
=NETWORKDAYS(C1, C2, C3)	11	C1 = 07/01/2009, C2 = 07/15/2009, C3 = 07/04/1999
=NETWORKDAYS(D1, D2, D3:D4)	259	D1 = 11/15/2009, D2 = 11/15/2010, D3 = 01/01/2010, D4 = 07/04/2010

WEEKDAY - Returns the day of the week corresponding to a date

Syntax: =WEEKDAY (serial number, return_type)

Serial Number is the date of the day you are trying to find.

Return Type is a number that determines the type of return value. 1 or omitted sees the week as 1- Sunday, 7-Saturday. 2 sees the week as 1-Monday, 7-Sunday. 3 sees the week as 0-Monday, 6- Sunday.

Equation	Result	Notes
=WEEKDAY("12/15/1976")	4	Wednesday, December 15, 1976
=WEEKDAY(40622)	1	Sunday, March 20, 2011
=WEEKDAY(A1)	7	A1 = Saturday, October 28, 1905

WEEKNUM - Returns the day of the week corresponding to a date

Syntax: =WEEKNUM (serial number, return_type)

Serial Number is the date of the day you are trying to find.

Return Type is a number that determines the type of return value. **1 -** Week begins on Sunday. Weekdays are numbered 1 through 7; **2 -** Week begins on Monday. Weekdays are numbered 1 through 7.

Remarks: The WEEKNUM function considers the week containing January 1 to be the first week of the year.

Equation	Result	Notes
=WEEKNUM ("12/15/1976")	51	Wednesday, December 15, 1976
=sWEEKNUM (40622)	13	Sunday, March 20, 2011
=WEEKNUM(A1)	43	A1 = Saturday, October 28, 1905

WORKDAY - Returns a date that is a number of working days before or after a date

Syntax: WORKDAY (start_date, days, holidays)

Start Date is a valid date that represents the starting date.

Days is the number of non-weekend and non-holiday days before or after start_date. A positive value yields a future date; a negative value, a past date.

Holidays is an optional range of one or more dates to exclude from the working calendar. The list can be either a range of cells that contains the dates or an array constant of the serial numbers that represent the dates

YEAR- Returns the numeric value of the year in a valid date

Syntax: =YEAR (serial number)

Serial Number is the date of the year you are trying to find.

Equation	Result	Notes
=YEAR("10/15/1905")	5	
=YEAR(40622)	2011	Equivalent to 3/20/2011
=YEAR(A1)	1976	A1 = 12/5/1976

YEARFRAC - Returns fraction of the year of the number of whole days *between two*

dates Syntax: YEARFRAC (start_date, end date, basis)

Start Date and *End Date* are valid dates which represent the starting and ending dates

Basis is the type of day count basis to use

0-US/NASD 30/360; **1**-Actual/Actual; **2**-Actual/360; **3**-Actual/365; **4**-European 30/360

Equation	Result	Notes
=YEARFRAC (A1, A2)	1	A1 = 1/1/2009, A2 = 1/1/2010
=YEARFRAC (A1, A3)	1.013888889	A1 = 1/1/2009, A3 = 1/1/2010
=YEARFRAC (A1, A4)	0.455555556	A1 = 1/1/2009, A4 = 6/15/2009
=YEARFRAC (A1, A5)	0.538888889	A1 = 1/1/2009, A5 = 7/15/2009
=YEARFRAC (A1, A6)	13.53888889	A1 = 1/1/2009, A6 = 7/15/2022

HOUR - Returns the hour of a time value

Syntax: HOUR (serial number)

Serial Number the time that contains the hour you want to find.

Remarks: Times may be entered as text strings within quotation marks (for example, "6:45 PM"), as decimal numbers (for example, 0.78125, which represents 6:45 PM), or as results of other formulas or functions (for example, TIMEVALUE ("6:45 PM")).

Equation	Result	Notes
=HOUR(A1)	20	A1 = 8:28 PM
=HOUR(B1)	8	B1 = 8:28 AM
=HOUR(C1)	15	C1 = 15:43:12
=HOUR(D1)	17	D1 = 1/2/2003 17:52

MINUTE- Returns the hour of a time value

Syntax: MINUTE (serial number)

Serial Number the time that contains the hour you want to find.

Remarks: Times may be entered as text strings within quotation marks (for example, "6:45 PM"), as decimal numbers (for example, 0.78125, which represents 6:45 PM), or as results of other formulas or functions (for example, TIMEVALUE ("6:45 PM")).

Equation	Result	Notes
=MINUTE(A1)	28	A1 = 8:28 PM
=MINUTE(C1)	43	C1 = 15:43:12
=MINUTE(D1)	52	D1 = 1/2/2003 17:52

NOW - the serial number of the current date *and time*

Syntax: NOW()

SECOND - Returns the Seconds of a time value

Syntax: SECOND (serial number)

Serial Number the time that contains the hour you want to find.

Remarks: Times may be entered as text strings within quotation marks (for example, "6:45 PM"), as decimal numbers (for example, 0.78125, which represents 6:45 PM), or as results of other formulas or functions (for example, TIMEVALUE("6:45 PM")).

Hour   is a number from 0 (zero) to 32767 representing the hour. Any value greater than 23 will be divided by 24 and the remainder will be treated as the hour value

Minute is a number from 0 to 32767 representing the minute. Any value greater than 59 will be converted to hours and minutes.

Second is a number from 0 to 32767 representing the second. Any value greater than 59 will be converted to hours, minutes, and seconds.

Equation	Result	Notes
=TIME(15, 3, 15)	3:03:20 PM	
=TIME(0, 0, 2000)	12:33:20 AM	2000 seconds = 33 min, 20 sec
=TIME(C1, C2, C3)	6:12:09 AM	

TIMEVAULE - Returns the serial number of a time

Converts a time that is stored as text to a serial number that Excel recognizes as a time. To view a time serial number as a time, you must apply a time format to the cell.

Syntax: TIMEVALUE (time text)

time text represents a time between 01/01/1900 and 12/31/9999 saved as text

Datedif Function

Interval	Description
D	Number of Days
M	Number of Months
Y	Number of Years
YM	Number of months, not counting years
YD	Number of days, not counting years
MD	Number of days, not counting years and months

There is a "hidden" function that can find the difference between two dates and return different increments. When you subtract two dates you get the number of days between them. The Datedif function is not in the help files or list of formats, but is probably one of the most powerful date related worksheet functions.

Syntax: DATEDIF (Begin Date, End Date, "Interval")

Math and Functions

Learning Objectives

- Fill Handle
- Mathematical Operations
- Building an Equation
- Order of Operations
- Formatting Dates
- Formula View
- Absolute/Relative
- Functions.
- Naming Cells

Fill Handle Options

When you use the Fill Handle, you will notice a symbol appear in the right hand bottom corner of your newly filled cells. This icon ( ) represents your AutoFill Options. If you put your mouse over the icon you will see a drop down arrow that will give you a list of your fill options.

The four basic Fill Options are:

➢ Copy Cells – Repeat the cells along the selection

➢ Fill Series – Follow pattern along the selection

➢ Fill Format Only – Repeat the format of the cells along the selection

➢ Fill without Formatting – Follow the pattern along the selection, but not the format

➢ Flash Fill – Fills based on a pattern you establish in the same column

If you use the **Fill Handle** on cells with dates you will notice even more options:

➢ Fill Days

➢ Fill Weekdays

➢ Fill Months

➢ Fill Years

Building an Equation

You can directly type in values, but that data stays constant. If you want to have the answers to your equations update as you change your data, you should use the cell addresses. You will see the cell addresses change colors so you can tell which ones are used in your equation.

Type in the exact cell address

Cells are labeled by their row and column headings. Rows are numbered and go horizontally across (rows of chairs) and columns are lettered and go vertically top to bottom (columns of a building). When we refer to the address of a cell, we use the column letter then the row number such as A1.

-        Click in the cell where the answer will appear

-        Press the Equal sign (=)

-        Type in the cell address you want to use in your equation

-        Accept the answer or press the next math operator (+, -, *, /, ^)

	A	B	C
1	1	2	=a1+b1

Use the keyboard to point to the cell address

When you first enter a character into a cell, you will be in "ENTER" mode. This includes when you type an equal sign. But if you press an arrow key on the keyboard after the equal sign, Excel does not move

out of the cell. Instead you will be put into a "POINT" mode, and Excel will color coordinate the cell you are selecting.

- Click in the cell where the answer will appear

- Press the Equal sign (=)

- Press the arrow keys until you are on the cell you want to use in your equation

- Accept the answer or press the next math operator (+, -, *, /, ^)

Use the mouse to point to the cell address

The mouse and arrow keys are both "pointers". If you press the equal sign and then use the mouse to click on another cell, Excel will put you into a "POINT" mode, and place the address of the cell you clicked on in your equation.

Click in the cell where the answer will appear

Press the Equal sign (=)

- Use the mouse to click on the cell you want to use in your equation

- Accept the answer or press the next math operator (+, -, *, /, ^)

Order of Operations

Microsoft Excel respects the Order of Operations.

1)   Parenthesis
2)   Exponents (raised to a power)
3)   Multiplication and Division
4)   Addition and Subtraction

Parentheses		Exponents	Multiply	Divide	Add	Subtract
Please		Excuse	My	Dear	Aunt	Sally

This means with an equation such as

= 5 + 3 * 2

Excel will do the multiplication before it does the addition. would be 11.

If you wanted the addition to happen first, you have to use parentheses:

=   (5 + 3) * 2

giving us a result of 16.

In math, we use the brackets, such as {[(5+3) *(4-2)] / 2}

In Excel we ONLY use parentheses

=((5+3)*(4-2))/2) result 8.

Remember to let Excel know you want it to calculate something; you have to start with an equal sign

If you get stuck inside an equation, or confused by a mistake, press **Esc** to cancel and try again.
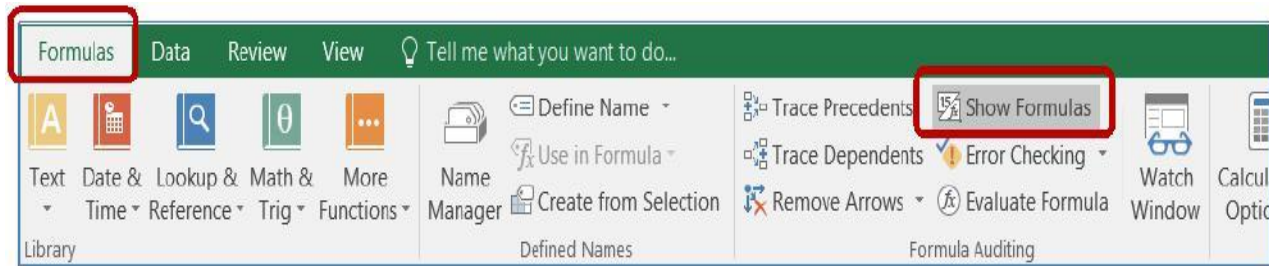
Formatting Dates

Dates and Times are technically numbers because they can be used in equations. Excel is able to do this because it has a "serial" number equivalent. Both columns of this table at the right of this page show the same value, but the dates in the second column have lost the date format. For a date, 0 = 1/1/1900. The numeric values in the second column represent how many days there are between 1/1/1900 and the date listed.

If your date loses its format you can modify it through the Number group or through the Format Cells Window. If you don't like the choices offered, you can custom build your date from the Custom section of the Number page in the Format Cells Window. Use M for months, D for days and Y for years. Excel is not case sensitive, upper or lowercase letters will work for these formats.

/1978	0.00
982	8.00
1986	0.00

1993	3.00
/1995	6.00
002	9.00
2008	3.00
/2010	7.00
013	3.00
/2018	4.00

Our cells display the formula results. If we want to see the equation, we have to look at the formula bar or edit the cell. Sometimes it helps to see all the equations on a worksheet. The button for this option is on the Formula tab, in the Format Auditing group. The keyboard shortcut is Control-Tilde, ctrl ~ (the wavy line above Tab, below Esc on your

You can also turn this on through the Excel Options. From the File Menu, choose **Options**. On the **Advanced** tab, under the **Display Options for this Worksheet** group, check the box next to **Show formulas in cell instead of their calculated results**.

Calculated Results (normal view)

	A	B	C	D	E	F	G	H	I
1	Big City Store		Date:	10/8/2016					
2	Sales Report								
3									
4	Items	Price	Qty	SubTotal					
5	AAA	$ 123.00	987	$ 121,401.00					
6	BB	$ 456.00	654	$ 298,224.00					
7	C	$ 789.00	321	$ 253,269.00					
8				$ 672,894.00					

Formula View

|	A	B	C	D	
1	Big City Store		Date: 42651		
2	Sales Report				
3					
4	Items	Price	Qty	SubTotal	
5	AAA	123	987	=B5*C5	
6	BB	456	654	=B6*C6	
7	C	789	321	=B7*C7	
8				=SUM(D5:D7)	

The formula view will stretch out the columns and all the numbers appear to have lost their format, including the dates and some alignments. Be careful adjusting the column widths, if you shrink them in the formula view, it will proportionally shrink in the calculated results view.

You can continue working in this view and print out the sheet with all the formulas showing. If you're going to print this view, I recommend turning on the print headings from the Page Layout tab.
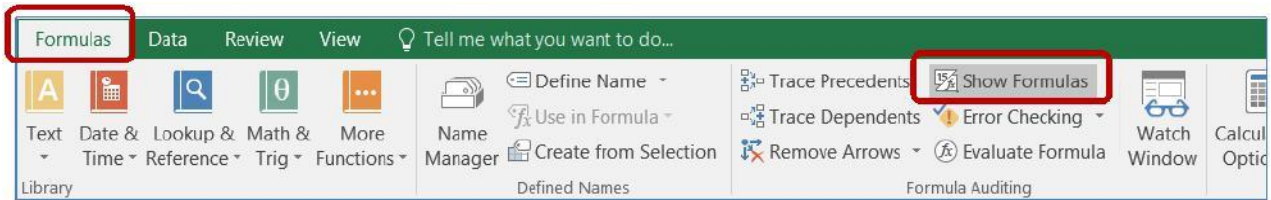
Friday, February 1, 2002

dddd, mmmm d, yyyy

Day	Month		

Function
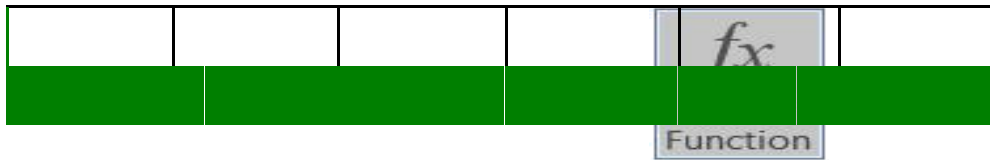
You can also custom build times using H for hours, M for minutes and S for seconds.

Formula View

Our cells display the formula results. If we want to see the equation, we have to look at the formula bar or edit the cell. Sometimes it helps to see all the equations on a worksheet. The button for this option is on the Formula tab, in the Format Auditing group. The keyboard shortcut is Control-Tilde, ctrl ~ (the wavy line above Tab, below Esc on your keyboard).

You can also turn this on through the Excel Options. From the File Menu, choose **Options**. On the **Advanced** tab, under the **Display Options for this Worksheet** group, check the box next to **Show formulas in cell instead of their calculated results**.

Calculated Results (normal view)

	A	B	C	D	E	F	G	H	I
1	Big City Store		Date:	10/8/2016					
2	Sales Report								
3									
4	Items	Price	Qty	SubTotal					
5	AAA	$ 123.00	987	$ 121,401.00					
6	BB	$ 456.00	654	$ 298,224.00					
7	C	$ 789.00	321	$ 253,269.00					
8				$ 672,894.00					

The formula view will stretch out the columns and all the numbers appear to have lost their format, including the dates and some alignments. Be careful adjusting the column widths, if you shrink them in the formula view, it will proportionally shrink in the calculated results view.

You can continue working in this view and print out the sheet with all the formulas showing. If you're going to print this view, I recommend turning on the print headings from the Page Layout tab.

Absolute/Relative

When you create an equation in Excel using cell addresses, Excel sets up the equation to have a **relative** reference. When you are using the Fill Handle or the Copy and Paste features the equation result is relative If this equation is copied into cell C2, or the Fill Handle is used to drag the equation down to C2, Excel will give you this result:

1	5	6	=A1+B1
2	12	4	=A2+B2
3			

Since the equation was moved down, between rows, only the row number changes. If instead we moved the equation across, the row numbers will remain the same, but the column numbers will change:

The addresses in the equation are **relative** to where the answer is positioned. The equation in cell C1 of the table above states 'take the value of the cell that is two to the left from this cell and add it to the value of the cell that is one to the left from this cell'. When we fill or copy the cell over or down, the basic equation stays the same.

If you do not want a number to move relatively you can make it **absolute** by using dollar signs ($) in the equation. The **F4** button on the keyboard will place the dollar sign characters in for you while you are in Enter, Edit, or Point mode. (Think F4 -> FORCE)

=$A$1 - Locks the reference into Cell A1

=$A1 - Locks the reference into Column A, but will allow the row number to change =A$1 - Locks the reference into Row 1, but will allow the row number to change

	A	B	C	D	E	F	G	H	I
1	5	6	=$A$1+B1		SubTotals:	123	456	789	
2	12	4	=$A$1+B2		TaxRate:	6.5%			
3					Taxes:	=F1*$F$2	=G1*$F$2	=H1*$F$2	

Functions

Microsoft Excel has several built in functions. To insert a function, click the **Insert Function** button 𝑓𝑥 on the Formula Bar, or the **Insert Function** option from the **Formulas Tab**.
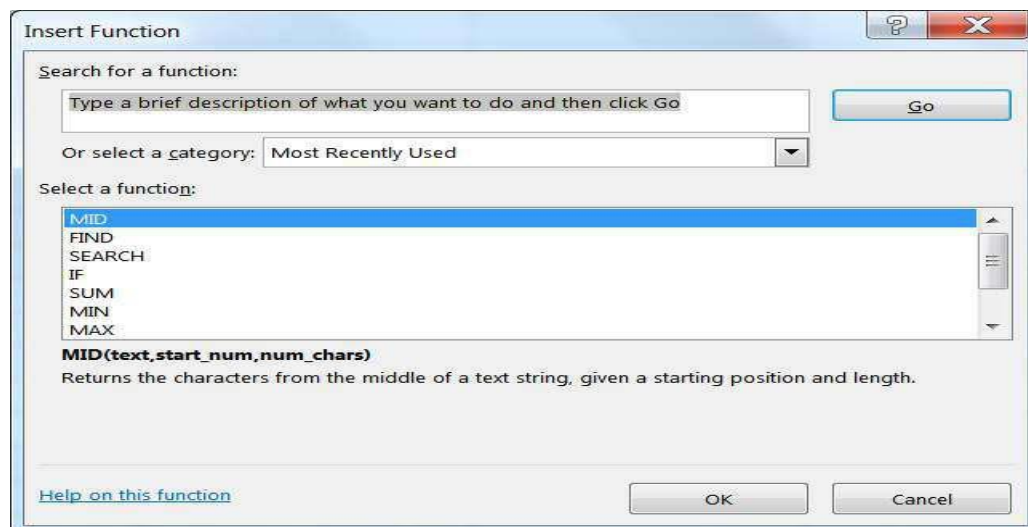
From here you can request a function to perform a particular task and Excel will make suggestions for you. If you **Search for a function:** Excel will return a **Recommended** category, offering all the functions it thinks might help in your search.

By default, the first category is a list of **Most Recently Used** functions. To see all the functions built into Excel, you can choose **All** from the **Select a category**: list.
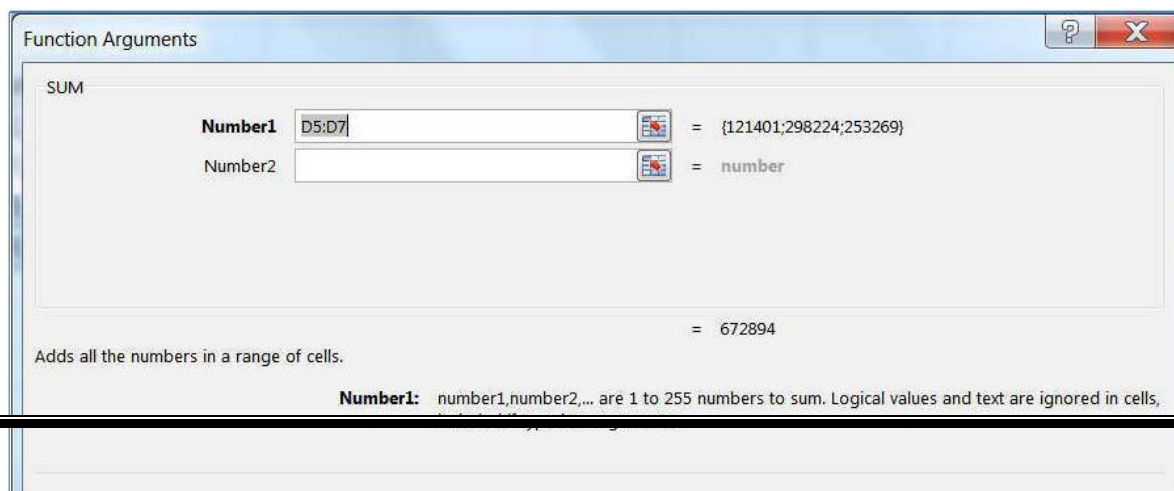
The bottom of this window displays a description of the selected function. Each choice will show an example arrangement of the function, the arguments, and a description of what that function should do. If you need more information, click on the Help on this function option in the bottom left corner. If you have found the function you would like to use, select it and click **OK**.

An easier way to access the list of **Most Recently Used** functions is to press the equal sign on the keyboard, as if you were going to type an equation. The name box, that displays which cell you are in, changes to the last function that was used. When you click on the arrow next to the listed function (in this case SUM), you will see a list of list of **Most Recently Used** functions.

SUM
AVERAGE
IF
HYPERLINK
COUNT
MAX
SIN
SUMIF
PMT
STDEV
More Functions...

A1   becomes   SUM ▾
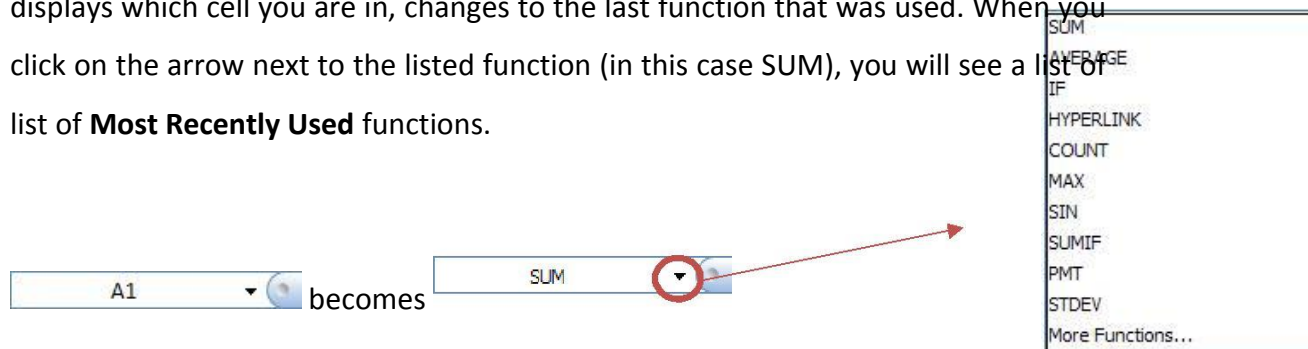
If the function you desire is not on the Most Recently Used list, chose the More Functions... option at the bottom of the list and you will get the above Insert Function dialog box.

Either selection method will open the Function Arguments window.

Function Arguments		? X
SUM		
Number1	D5:D7	= {121401;298224;253269}
Number2		= number
		= 672894

Adds all the numbers in a range of cells.

Number1: number1,number2,... are 1 to 255 numbers to sum. Logical values and text are ignored in cells,

The function name is listed in the top left corner and the description is across the bottom. There are blanks in the middle of the screen for the arguments of the statement. You can type in the cell addresses, move the window out of the way to try to select the addresses or let Excel help you move the window by using the **Collapse** or "go out and get it button" ( ). This button will *collapse* your Function Arguments window so you can select the data you wish to use as an argument in this function. Once you have chosen your desired data either press **Enter** or click on the **Expand** button ( ) to return to the full window.

In the sample above, you can see we can **Sum** more than one number/set of numbers. As soon as you click into **Number 2** a **Number 3** will appear. The description tells us this will allow up to 255 arguments (number ranges) to sum.

Across the bottom of this window we can see a **Formula Result =**. This will show us the running total as we add in each part of the equation. Notice there is also an **=number** at the end of each argument line. This will give you a piece-by-piece result for each argument. This is especially helpful when using the logic functions, such as **If**.
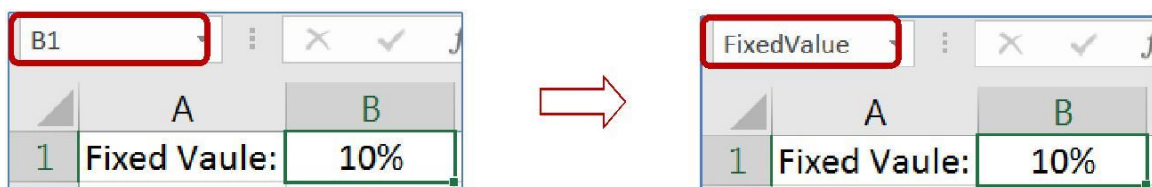
Once a name is defined, you can use it in your equations. =B12*$B$1 means the same as

=B12*FixedValue

When you use the fill handle or the Copy/Paste feature, the B12 will change to be relative to the new location, but FixedValue will remain throughout, always pointing to cell B1.

This same method can be used for a range of cells. Select the desired range, click within the name box, erase the current cell address, type the name of the range, press Enter.

NOTE There are some limitations in naming. You cannot use many special characters such as the hyphen (**-**), and the name must be all one word, no spaces. In the example above we used capitalization to show multiple words, you can also use the underscore character (_).

Defined Names group on the **Formula** Tab:
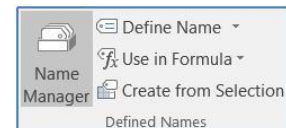
- ⬚ **Define a Name** – create a new name

- ⬚ **Use in Formula –** choose from a list of existing names, this can be used to begin a new formula or to add a name to a formula you are building.

- ⬚ **Create from Selection –** make a new name based on a group of selected cells

Use the **Name Manager** to modify a Defined Name.

- *New:* Create a new Name

- *Edit…:* Rename, add a comment, change cell reference

- *Delete:* Select the name in the list and click **Delete** to remove it

- *Filter:* Filter the list of names to help you find the one you need.
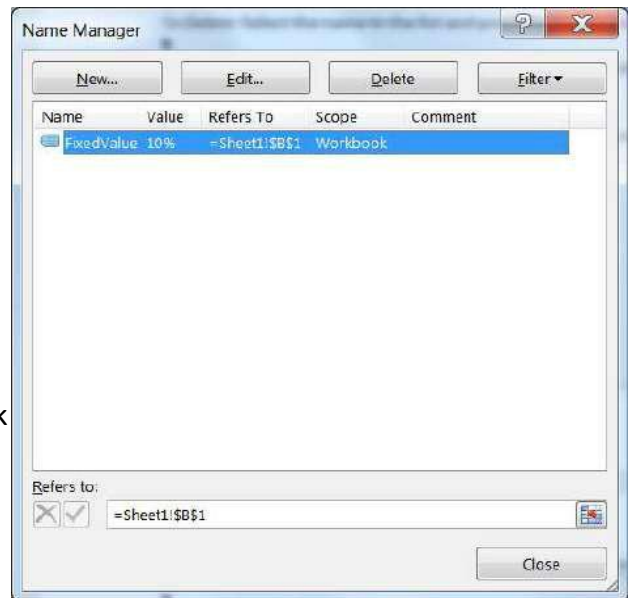
To Redefine: Select the name in the list, erase the Refers to blank and choose your new range of cells. Click the Check to accept.

F3 is the keyboard shortcut to let you pick a name to use in your equation.

Creating Equations with Cell addresses (pg 3)

- Clear cell C1, type =a1+b1 O

     Not case sensitive

➢ Notice the color coding

➢ Accept data, should get a 3

➢ Change A1 to 5, accept to see answer in C1 change

-**USING KEYBOARD**	-**USING MOUSE**
➢ Go to C2	➢ Go to C3
➢ press = sign	➢ press = sign
➢ press ⬇ arrow two times	➢ click on cell A3
➢ press + sign	➢ press the + sign

➢ press ⬇ arrow once

➢ enter to accept

➢ click on cell B3

➢ click on check to accept

Basic math symbols (pg 3)

- Add **+**, Subtract **-**, Multiply *****, Divide **/** O

   All found on the Num Pad

- Build these equations

➢ In Cell C4 add A4 and B4: =A4+B4

➢ In Cell C5 subtract A5 and B5: =A5-B5

➢ In Cell C6 multiply A6 and B6: =A6*B6

➢ In Cell C7 divide A7 and B7: =A7/B7

Remember the Order of Operations (pg 4)

- Parenthesis

- Exponents/Powers

- Multiplication/Division

- Addition/Subtractions

- Build these equations

	A	B	C
1	1	2	3
2	2	4	6
3	3	6	9
4	4	8	12
5	5	10	-5
6	6	12	72
7	7	14	0.5
8	8	16	17
9	9	18	25
10	10	20	

O In Cell C8 type =2+3*5

O In Cell C9 type =(2+3)*5

<u>Date not Math?</u>

- Put today's date in cell C10

O i.e. 10/5

O Note Excel sees it as a date not as an equation (10 divided by 5), Why? Because there is no Equal sign! 10/5 is October 5th, =10/5 is an equation with a result of 2

Totals Preview

- Select Column A

- Look in the status bar in the bottom right side of the window. When you select more than one cell, Excel will automatically calculate the Average, Count, and Sum of your selection.
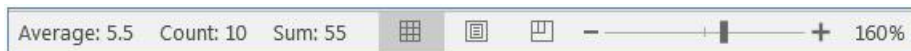
Formatting

- Format column A with dollar signs

O Select Column A, from the right-click or Home tab, choose the $ format

- Format column B to be centered

    o Select Column B, from the right-click or Home tab, choose Align Center

- Edit Cell C1 (double-click in cell)

    o When you accept, Excel recalculates answer and the format changes

- Format Column C with dollar signs

Note format in cell C10, no longer a date

Reformat Date

- Click on Cell C10 (we don't want the whole column)

- Choose **Short date** from the list of number formats, in the Number group on the Home Tab

- Choose "More Numbers" to view different date formats

- Choose the 14-Mar format to return to the original date formatting

    To custom build a data format see pg 4

Formula View (pg 5)

- Toggle cell data with ctrl-` (Ctrl-~… Wavy line above tab, below Esc)

- We can see all the formulas but NO formatting

- Toggle back to answer view

Create Data Table

	A	B	C
1	Big City Store		
2	Sales Report		
3			
4	Items	Price	Qty
5	A	123	987
6	BB	456	654
7	CCC	789	321

- Click on the Plus sign next to Sheet 2 to create Sheet 3

- Zoom to 150%

- Type in the table shown here

Format Data Table

	A	B	C	D
1	Big City Store			
2	Sales Report			
3				
4	**Items**	**Price**	**Qty**	**SubTotal**
5	A	$ 123.00	987	
6	BB	$ 456.00	654	
7	CCC	$ 789.00	321	

- Bold Row 4

- Center Column C

- AutoFit Column C

- Dollar Format the Prices, B5 through B7

- In Cell D4 type: SubTotal

O   Should be bold already

Calculate SubTotals

➤ Enter First SubTotal

o In Cell D5 Type: = B5*C5

$121,401.00

- Each total is going to be the price of the item, times the Qty sold of the item. If we had 3,000 records, we would not want to type the equation 3,000 times

   O   Our equation is a pattern, "the cell two away, times the cell next to me"

   O   Anywhere you copy or fill the equation, the pattern will follow

- Use Fill handle to pull down this "pattern"

- Switch to Formula view (Ctrl ~) to see results and switch back to normal view

	A	B	C	D
1	Big City Store			
2	Sales Report			
3				
4	Items	Price	Qty	SubTotal
5	A	123	987	=B5*C5
6	BB	456	654	=B6*C6
7	CCC	789	321	=B7*C7

calculate Taxes

- In Cell D2 type: Tax Rate

- In Cell E2 type: 10%

- In Cell E4 type: Taxes

- In Cell E5 type: =D5*E2

o Our pattern is Subtotal times Tax Rate

Use fill handle to pull down equation

o **Don't Panic,** these answers are supposed to look weird

Absolute vs Relative (pg 6)

What Happened?

Pattern "Cell next to me * Cell three above me"

As we move DOWN the pattern continues but it's wrong for this equation

Erase the answers

In Cell E5 type the same equation: =D5*E2

Before you accept, press the **F4** button on the keyboard to lock cell address E2

=D5*$E$2

you can type in the $ signs, but **F4** is often faster

Think **FORCE** for the F4 button

D5 is relative (always cell next to me)

$E$2 is absolute (always cell E2)

Use fill handle to pull down the equation

Calculate Totals

- In Cell F4 type: Total

- In Cell F5 type: = D5+E5

- Use fill handle to pull down the equation

Calculate Grand Total

In Cell E8 Type: Big City Store Grand Total O From the

Home tab, Align Right

If it won't let you, make sure you have accepted your entry (enter or ▣)

Click in Cell F8

Use AutoSum button Sigma - ∑ in the **Editing** group on far right

of the **Home** tab
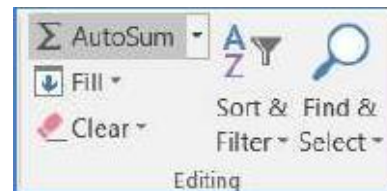
 O =SUM(F5:F7)

 O In English, this reads "Calculate the Sum of F5 through F7"

	A	B	C	D	E	F
1	Big City Store					
2	Grand Total			Tax Rate:	10%	
3						
4	**Items**	**Price**	**Qty**	**SubTotal**	**Taxes**	**Total**
5	AAA	$123.00	987	$121,401.00	$12,140.10	$133,541.10
6	BB	$456.00	654	$298,224.00	$29,822.40	$328,046.40
7	C	$789.00	321	$253,269.00	$25,326.90	$278,595.90
8				Big City Store Grand Total		=SUM(F5:F7)

Note: When you click the AutoSum button Excel looks for numbers above the current cell. If it can't find a number, it will look to the left. The AutoSum button has a drop down menu to do quick calculations for Sum, Average, Max, Min, and Count.

Confirm your answer

Select cells F5:F8

Look at the status bar in the bottom right of the window to see the Average, Count, and Sum O Sum should be $740,183.40

Change the fill color for cells F5:F8 to yellow
These are now our "Yellow Numbers"

Set up for Functions

- In Cell C9 type: Grand Total

- In Cell C10 type: Total Avg

- In Cell C11 type: # of Items

- In Cell C12 type: Largest Sale

- In Cell C13 type: Smallest Sale

- Right align all titles in cells C9:C13

- click in cell D10

O   We can tell we are in cell D10 because of the Name Box

- Press the Equal Sign =

    O   The Name Box has changed to a list of Most Recently Used Functions

    O   Since the last function used on this computer is SUM, it's listed first
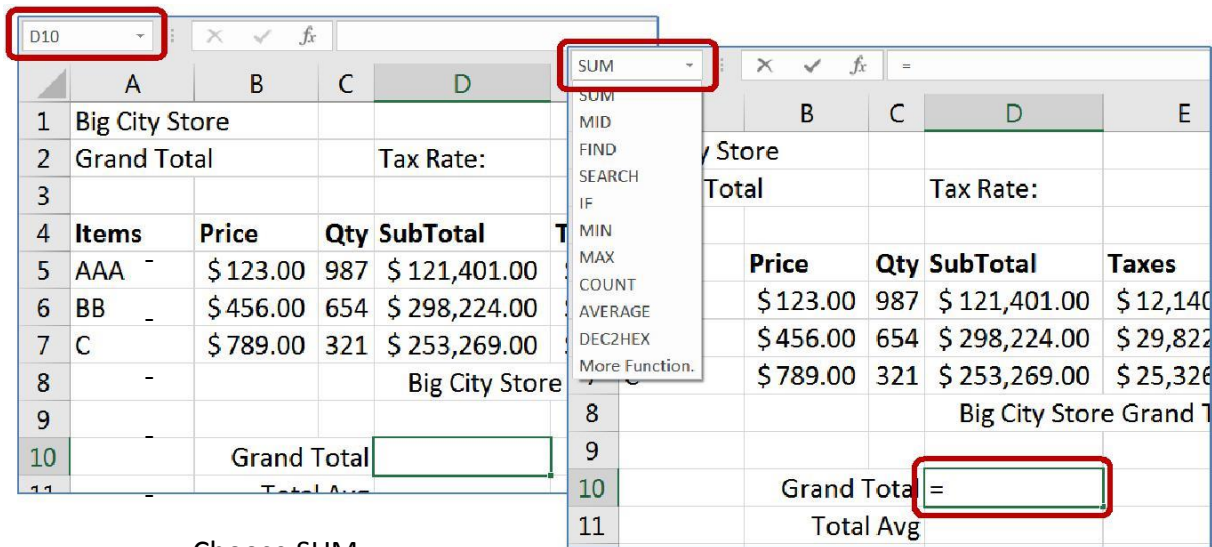

- Choose SUM

    O   This will open the **Function Arguments** window
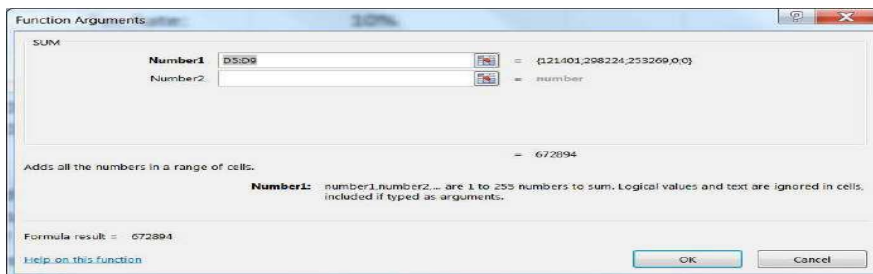
➢ Clear the contents in the Number1 box

➤ Move window so you can see the yellow numbers

➤ To move: click in the title bar or any grey blank space and drag

➤ Once you can see the yellow numbers, click in the first one, cell F5

➤ Drag to the last yellow number, F7

➤ Selection should be F5:F7

- Sum should be $740,183.40

- Clear Cell D10

- In Cell D10 Type: =

- Open the List of Recent Functions from the Name Box

- Click on the last option, More Functions…

O If you click on a function name, Excel gives a brief description.

O Click on the Help on this function link for a Help article about this function, usually with examples.
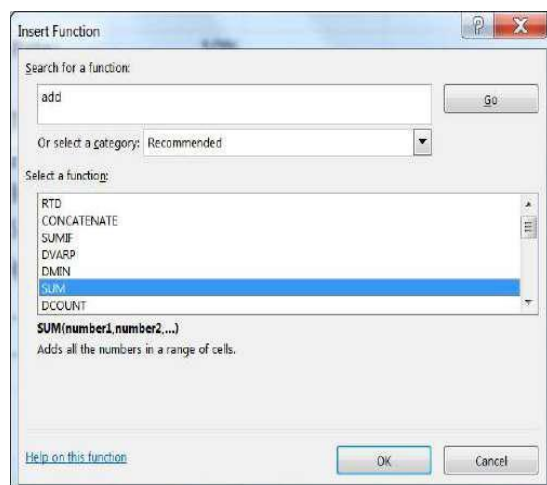
Erase the "Type a brief description of what you want to do and then click Go" from the Search box. Type in ADD and click the GO button.

- ➢ Select Sum from the list and click OK

- ➢ This opens the same Function Arguments window

- ➢ Choose your Yellow Numbers and Click OK

- ➢ Sum should be $740,183.40

- ➢ Clear Cell D10

Editing a function (pg 8)

Press the Equal Sign

Choose SUM from function list

Click OK

Answer should be WRONG

Why? Because we don't have the yellow numbers

Click on the Edit Function box in front of the formula bar f_x

This opens the **Function Arguments** window

Choose the Yellow Numbers and Click OK

Other Basic Functions

- Click in Cell D11

- Press Equal Sign =

- Click on List of Functions

- Choose Average (aka Arithmetic Mean)

- Choose Yellow Numbers and Click OK

- Using Yellow numbers for each

O   In cell D12 calculate the Count

O   In cell D13 calculate the Max

O   In cell D14 calculate the Min

Final Result

	A	B	C	D	E	F
1	Big City Store					
2	Grand Total		Tax Rate:		10%	
3						
4	Items	Price	Qty	SubTotal	Taxes	Total
5	AAA	$123.00	987	$121,401.00	$12,140.10	$133,541.10
6	BB	$456.00	654	$298,224.00	$29,822.40	$328,046.40
7	C	$789.00	321	$253,269.00	$25,326.90	$278,595.90
8				Big City Store Grand Total		$740,183.40
9						
10			Grand Total	$740,183.40		
11			Total Avg	$246,727.80		
12			# of Items	3		
13			Largest Sale	$328,046.40		
14			Smallest Sale	$133,541.10		

	A	B	C	D	E	F
1	Big Cit					
2	Grand		Tax Rate:		0.1	
3						
4	Items	Price	Qty	SubTotal	Taxes	Total
5	AAA	123	987	=B5*C5	=D5*$E$2	=D5+E5
6	BB	456	654	=B6*C6	=D6*$E$2	=D6+E6
7	C	789	321	=B7*C7	=D7*$E$2	=D7+E7
8					e Grand Total	=SUM(F5:F7)
9						
10			Grand Total	=SUM(F5:F7)		
11			Total Avg	=AVERAGE(F5:F7)		
12			# of Items	=COUNT(F5:F7)		
13			Largest Sale	=MAX(F5:F7)		
14			Smallest Sale	=MIN(F5:F7)		

Reset for next lesson

Clear the calculated taxes, Cells E5:E7

Notice how it carries through to all the answers

Clear the Grand Total in Cell F8

Clear the five functions you created in Cells D10:D14

Press Ctrl-Home to return to the top of the worksheet

Naming a Cell (pg 9)

➢ Click in cell E2 (10%)

➢ Click in Name box

➢ Erase E2 in Name box

➢ Type **TaxRate**

➢ No Spaces, No Hyphens, capitalization doesn't matter

- ➢ Press Enter and TaxRate should still be in the box

- ➢ Click anywhere else, see cell address in name box

- ➢ Click on E2 (10%), see "TaxRate" in Name Box

- ➢ Click anywhere else

- ➢ Click arrow next to Name box and choose TaxRate

- ➢ Should jump to cell E2

- ➢ Go to Sheet 1, Click on Name box menu, Choose TaxRate

- ➢ Should jump to Worksheet 3, Cell E2

- ➢ We have made a "bookmark" in our workbook

Using named cell in equations

D	E
Tax Rate:	10%
SubTotal	**Taxes**
$ 121,401.00	=D5*TaxRate

- ➢ In Cell E5 type =D5*

- ➢ Click on cell E2

- ➢ Instead of E2 we see **TaxRate**

- ➢ TaxRate is always TaxRate, no ($) locks needed

➢ Accept and fill down for E6 and E7

Naming Ranges

- Select Yellow numbers

- Type **Total** in the Name box and press Enter

Using named cell in functions

- Click in cell F8

- Use AutoSum button Sigma - ∑ O

=Sum(Total)

- In Cell D10 type: =

- Choose Sum from the List of Recently Used Functions

- Select your Yellow numbers, you should get Total

- Click OK

Typing in Functions

Clear cell D10

In Cell D10 Type: =SU

See list of functions that start with an SU

Once you see the word **SUM** Select it

Double-click or press Tab (to GRAB!)

Continue to type: TO

See list of all functions and Names that start with TO

Double-click **Total** *or tab*

Press Enter to accept

Try the same for the other four functions. Type an equal sign, start typing the name of the function. Once you see it, double-click, or tab to grab the selection. Then type the first few letters of total. Double-click or tab to grab. Enter to accept.

Cell D11 the Average

Cell D12 the Count

Cell D13 the Max

Cell D14 the Min

Answers will be the same as the ones on

the top of Page 19 of this handout.

	A	B	C	D	E	F
1	Big City					
2	Grand			Tax Rate:	0.1	
3						
4	**Items**	**Price**	**Qty**	**SubTotal**	**Taxes**	**Total**
5	AAA	123	987	=B5*C5	=D5*TaxRate	=D5+E5
6	BB	456	654	=B6*C6	=D6*TaxRate	=D6+E6
7	C	789	321	=B7*C7	=D7*TaxRate	=D7+E7
8					re Grand Total	=SUM(Total)
9						
10			and Total	=SUM(Total)		
11			Total Avg	=AVERAGE(Total)		
12			of Items	=COUNT(Total)		
13			gest Sale	=MAX(Total)		
14			llest Sale	=MIN(Total)		

Working with Ranges of Data

If we insert new data it must go inside the range

Insert two rows, one above item "C", one Below item "C" O

Right-click on Row Number 7, INSERT

Right-click on Row Number 9, INSERT

Enter in data

➢ In Cell A7 Type: D

➢ In Cell B7 Type: 159

- In Cell C7 Type: 951

- In Cell A9 Type: E

- In Cell B9 Type: 357

o In Cell C9 Type: 753

- Select Cells D5:F5

O The first SubTotal through the First Total

O The numbers should not change, just be selected

- Use fill handle to pull down through all the yellow numbers

4	Items	Price	Qty	SubTotal	Taxes	Total
5	AAA	$123.00	987	$121,401.00	$12,140.10	$133,541.10
6	BB	$456.00	654	$298,224.00	$29,822.40	$328,046.40
7	D	$159.00	951	$151,209.00	$15,120.90	$166,329.90
8	C	$789.00	321	$253,269.00	$25,326.90	$278,595.90
9	D	$357.00	753	$268,821.00	$26,882.10	$295,703.10
10				Big City Store Grand Total		$906,513.30
11						
12			Grand Total	$906,513.30		
13			Total Avg	$226,628.33		
14			# of Items	4		

Freeze Panes
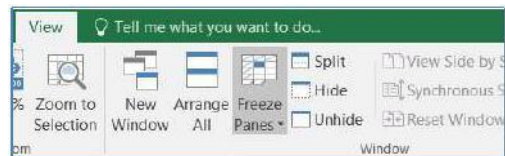
- Click inside Cell B5

- From the View tab in the Window group, choose

Freeze Panes

This will lock the first four rows and the first column into place, so as you scroll through the worksheet you can always cee the content in those cells.

	A	B	C	D	E	F
1	Big City Store					
2	Grand Total		Tax Rate:		10%	
3						
4	Items	Price	Qty	SubTotal	Taxes	Total
5	AAA	$123.00	987	$ 121,401.00	$ 12,140.10	$ 133,541.10
		$456.00	654	$ 298,224.00	$ 29,822.40	$ 328,046.40
		$159.00	951	$ 151,209.00	$ 15,120.90	$ 166,329.90
		$789.00	321	$ 253,269.00	$ 25,326.90	$ 278,595.90
9	D	$357.00	753	$ 268,821.00	$ 26,882.10	$ 295,703.10
10				Big City Store Grand Total		$ 1,202,216.40
11						
12		Grand Total	$ 1,202,216.40			
13		Total Avg	$ 240,443.28			
14		# of Items	5			
15		Largest Sale	$ 328,046.40			
16		Smallest Sale	$ 133,541.10			

Freeze panes above

and to the left of

THIS cell. (B5)

If Function (if there is time)

❖ In Cell G4 type: Continue

❖ Draw Logic Tree

❖ If our Total for this item is greater than $250,000, then yes we want to continue

❖ If our Total for this item is less than $250,000, then no we don't want to continue

IF Item Total > 250000
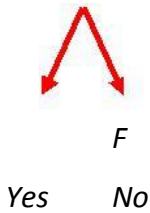
Logical_test	F5>250000		=	FALSE
Value_if_true	"Yes"		=	"Yes"
Value_if_false	"No"		=	"No"

T   F

Yes   No

-         In Cell G5 type: =

     O   From the list of functions choose IF and fill in the parts from our logic tree

   -   Use fill handle to pull down the equation

   -   Edit the function in cell G4 to 280000

   -   DON'T FORGET TO: Use fill handle to fill down again

harts

A chart helps you display your data into a graphical representation. There are many types of charts, but in this class we'll focus on simple column, line, and pie charts. There are examples of other charts near the end of this handouts.

The first thing to know is the data has to be organized so Excel can understand what you are trying to chart. Excel will chart your data selection or your connected data range. As long as there are no blank columns and no blank rows within your dataset, you can skip selecting the cells.

Clustered Column

Value Axis

Chart Title
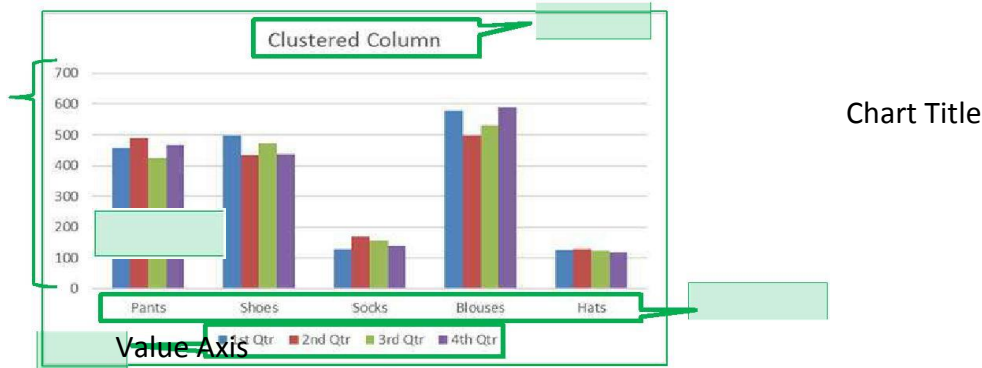
Here is a dataset we will use in class:

Item	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr
Pants	456	489	423	468
Shoes	498	435	472	436
Socks	128	168	157	138
Blouses	579	498	531	589
Hats	126	129	123	119

This is a structured collection of related data set in a table format. When plotted onto a clustered column chart, like the one shown above, the titles in the first column of the dataset appear along our category axis. The titles in the first row appear within the legend. The values are represented by the height of each column.

Line

Line charts are usually set up to go across a period of time, think *Time Line*. For this chart I've used the **Switch Row Column** tool so we can see the trend of the sales through the year. In this case our first column titles appear in the

Pie
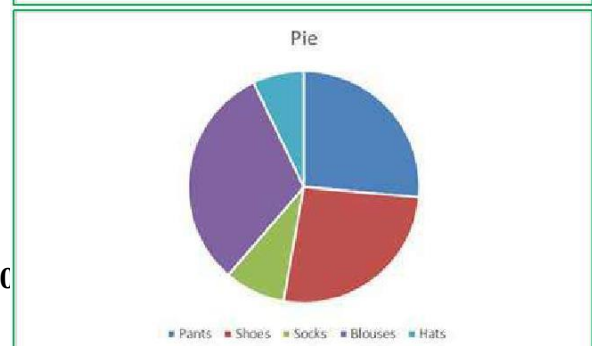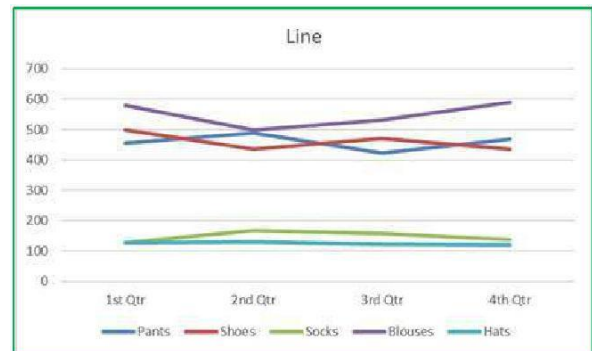
legend, and the first row of titles appears in our category axis.

Pie charts are usually created to display the breakdown of the total values within the whole. Pie charts can only be based on one set of data. When you try to create one with the above dataset, you will only see the first value set
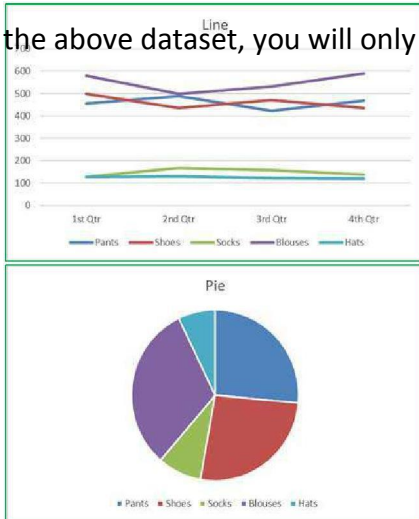
appear within the chart. If you want to go to an extreme and have all four quarters show, try using a *Doughnut* chart.

Creating a Chart

To create a chart make sure your cursor is in the dataset you would like to plot. If you want a subset of the dataset, select that portion. You can use your Ctrl key to add to a current selection.

You will find the **Charts** group on the **Insert** tab. Click on any small chart button to see a list of possible charts.
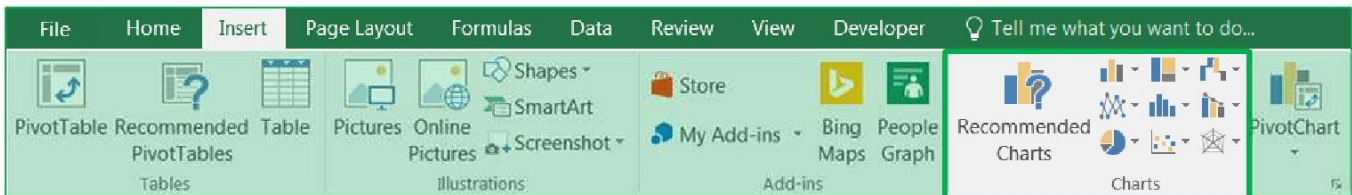
If you are unsure of the best chart option for your data use the **Recommend Charts** button. It will open the Insert Chart window shown here.
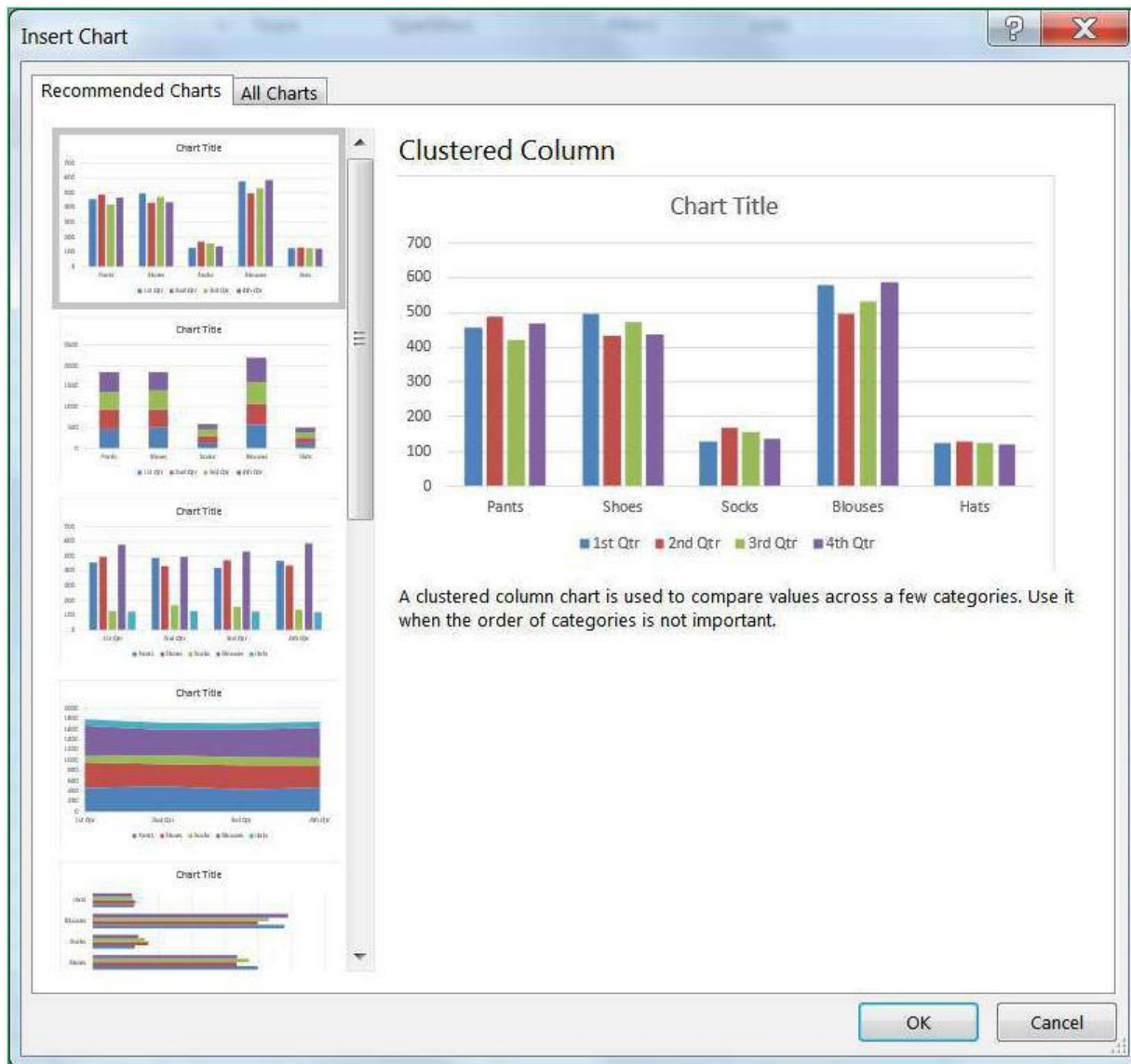

Chart Tools

When you select a chart, three buttons appear along the right side of the selection.
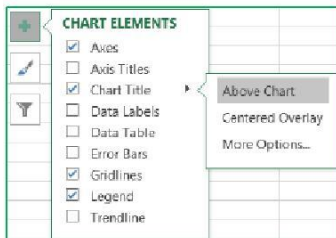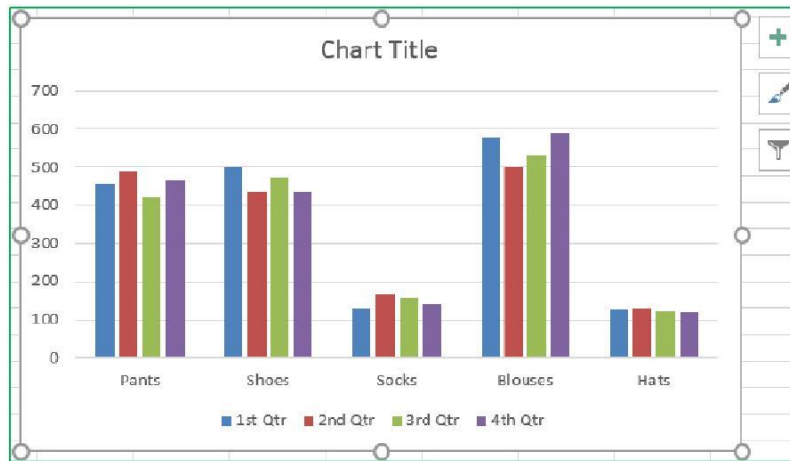
The plus sign is the Add Chart Element button. This option is used to add and remove different pieces of your chart. The list of options will vary depending on the type of chart. For example, a pie chart will not have a set of category axis titles. As you hover your mouse over each option, you will see a small arrow head pointing to the right. This will open another menu with more detailed choices. Each menu also has a "More Options…" button which will open a Format Pane on to customize each chart element.

There is a *Chart Style Gallery* and a *Colors* menu on the *Design* tab, but the **Chart Styles** button, the paint brush next to the chart, offers the same options.
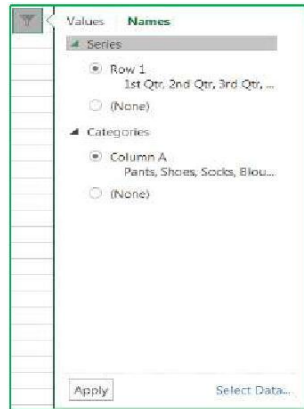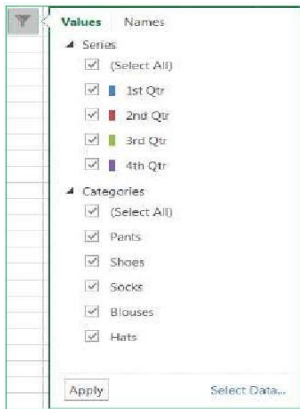
If you are patient while you hover over each option, Excel will provide you with a Live Preview of the result.

The **Color** options are available at the top of the menu.

The third button is a funnel. This is a Chart Filters button.

The Values group allows you to add and remove data points from the chart.

The Names page allows you to change the labels that appear in the legend (series) and axis titles (category).

The **Select Data…** option at the bottom of the window opens the same window as the *Select Data* button on the *Design* tab. From there you can change or adjust the range of cells used to create this chart.

Chart Tool Tabs

When a chart is selected two chart tool tabs appear at the end of the ribbon, **Design** and **Format**.

Design Tab

1. **Add Chart Element** – A menu of chart elements that can be added or removed to the chart. Each option will have a expand arrow at the end of the element name that will provide specifics and a **More**

Options button to open the Format Pane. This is the same as the Add Chart Element button that appears next to the selected chart.

2. **Quick Layout** – A variety of layouts that offer suggested views and choices that adjust the chart elements such as adding a title, varying the space between columns, and moving the legend.

3. **Change Colors** – Different color that can be applied to your chart. Changing the Theme on the *Page Layout* tab will give you a different sets of colors.

4. **Chart Style Gallery** – Different chart styles that can be applied to your chart. Because Excel automatically adjusts the Ribbon to fit on your screen, your copy of Excel may show less options than the picture above. Use the scroll arrows and open menu buttons at the right side of the gallery for more.

5.	**Switch Row/Column** – Changes the direction the chart looks at the data. In our column chart, each column is plotted on the chart, when we **Switch** each row is plotted. We are swapping the category labels with the legend labels.
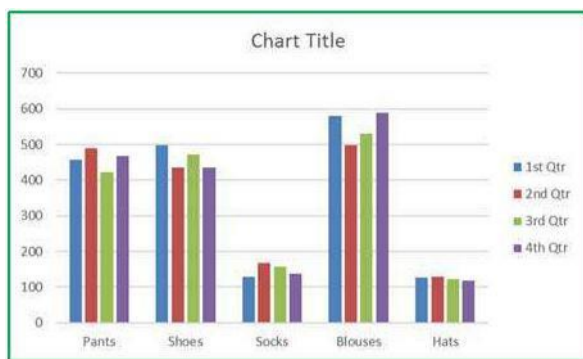
ITEM	1ST QTR	2ND QTR	3RD QTR	4TH QTR
PANTS	456	489	423	468
SHOES	498	435	472	436
SOCKS	128	168	157	138
BLOUSES	579	498	531	589
HATS	126	129	123	119

6.	**Select Data** – Opens a Select Data Source window where you can customize the source of the chart data, even edit the labels. Use this window to reorder your legend and change how Line charts deal with blank cell values.


7.	**Change Chart Type** – Opens Insert Chart window where you can change to other chart types. If you have multiple series you can change each to be different chart type by choosing the *Combo* chart type from the bottom of the left pane.
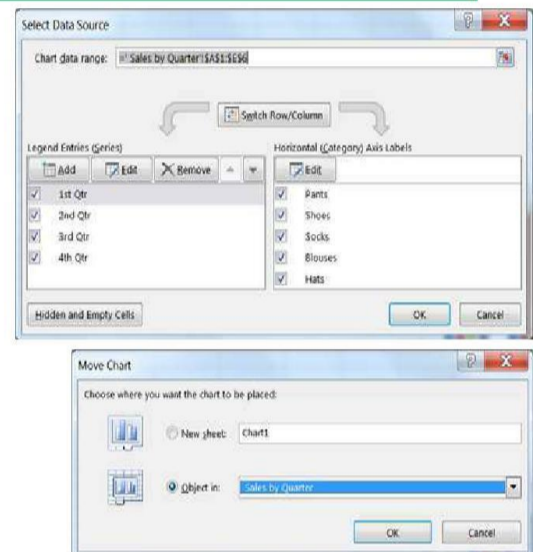
8.	**Move Chart** – By default when you create a chart it is placed on the same worksheet as your data set. You can move the chart to its own worksheet or to any existing worksheet with the workbook.

Format Tab
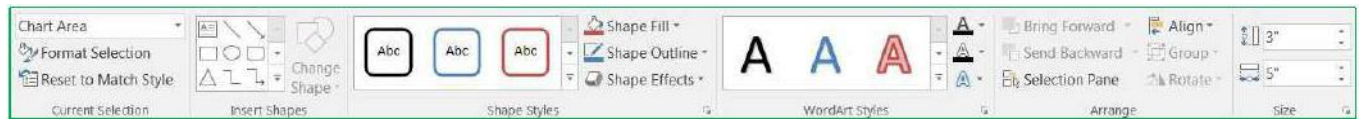
Current Selection

a. **Chart Elements** – This box shows the currently selected Chart Element, and the menu provides a list of the major chart elements. Choose an item from this list to select that element.

b. **Format Selection –** Opens the Format Pane based on the current selection shown in the Chart Elements box.

c. **Reset to Match Style** – Changes the current selection to match the original style of the chart.

   2. **Insert Shape**

a. **Shape Gallery – Use** this gallery to find a shape such as a block arrow to add to your chart.

b. **Change Shape** – Use this tool to change the current shape to a different one, perhaps a rectangle into a rounded rectangle.
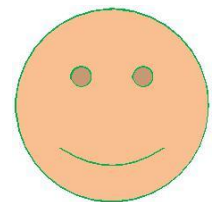
   3. **Shape Styles**

   Style Gallery – Different shape styles, options will vary based on the current selection.

   Shape Fill – Menu of the most common fill colors and options, such as pictures and textures. For more options, open the Format Pane.

Shape Outline – Menu of the most common outline colors and options, such as dashes and arrows. For more options open the Format Pane.

Shape Effects – Menu of the most common shape effects, such

as shadows. For more options open the Format Pane.

4.   WordArt Styles

WordArt Gallery – Different WordArt styles

Text Fill – Menu of the most common fill colors and options, such as pictures and textures.

Text Outline – Menu of the most common outline

colors and options, such as dashes and line weight.

Text Effects – Menu of the most common Text effects, such as

shadows. For more options open the Format Pane.

5.   Arrange – Change the alignment and arrangement of multiple charts. Use the **Shift** key

to select more than one chart at a time.

6.   **Size** – Change the height and width of the chart.

Format Pane

There are multiple ways to open the Format Pane.

Click on the **Format Selection** button in the *Format* tab

Click on **More** option from any menu

Right-click on a chart element and choose **Format…**

Double-click on a chart element

The format pane can remain open for as long as you need it. The properties shown change depending on the current selection. The current selection is shown on the Format tab and in the title of the Format Pane.

The pane can be pulled free from the side by dragging the title toward the middle of the window. To return the pane to the side of the window drag it back into place or double-click the title of the Format Pane.

To close the pane, click on the X in the upper right hand corner. If you accidentally close the pane, use any method above to reopen it.

Within the Format Pane, click on each icon to see the subset of properties. Click on the expand arrow in front of the options to see the relevant properties.
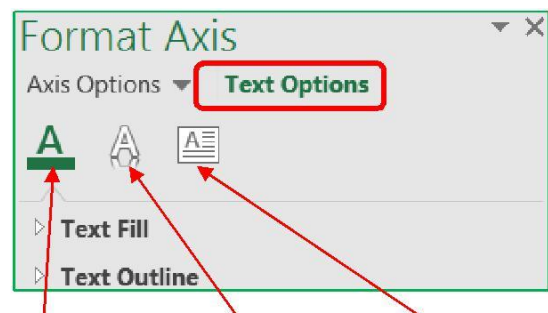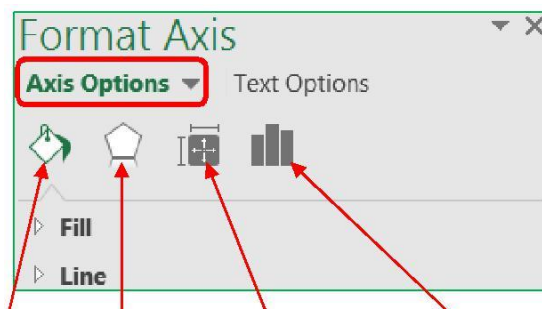
Fill & Line   Effects Size & Properties   Options   Text Fill & Outline   Text Effects   Text Box Options

The Fill & Line and Effects options are the same for all the of the chart elements. If an option cannot be applied to that chart element, Excel will disable (grey out) that option.

Below are the fill options for a Chart Element. Each **Fill** choice provides a new set of options.
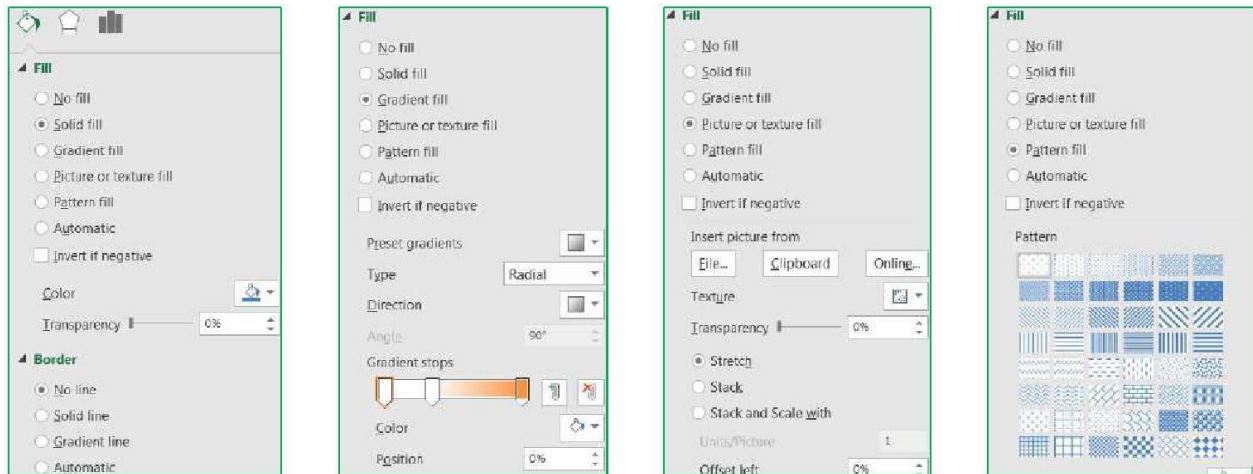
How do I …?

Change Axis Numbers

Select the Axis by clicking on a number in the area. Open the Format pane, be sure the title says **Format Axis**. Click on the Options button.

From here you can:

➢   Change the **Minimum** and **Maximum** numbers shown. These can be greater than the minimum and less than the maximum if you want.

➢   Change the **Major** unit, this is how the displayed number is chosen. If the major unit is 100 the chart axis will read 100, 200, 300. If it's 25 the chart will show 25, 50, 75.

➢   Change the **Display Units** to Thousands, Millions, Billions. This will change the unit

➢   shown in the labels and data tables as well.

➢   Change the **Format** of the numbers; number of decimals, include a dollar sign, etc.

Change Distance Between Columns

Select any column. Open the Format pane, be sure the title says **Format Data Series**.

Click on the Options button.

From here you can:

➢   Change the selected series to be on a **secondary axis**

➢   Change the distance the series **overlap**

➢   Change the **width between** the each category grouping

Explode a Pie Chart

In the chart: Hover over a pie wedge. Click and drag the piece away from the center. To move one piece at a time, select the single pie wedge first, and then move it from the middle.

In the properties: Select a pie wedge. Open the Format pane, be sure the title says **Format Data Series**. Click on the Options button.

From here you can:

➢   Change the rotation without changing the order of the data

➢   Change the explosion, how close the wedges are to each other

Add Trendlines and Error Bars

Select the chart. Click on the Add Chart Element button in the Design tab, or on the ⊞ button next to the chart.

You can add your own custom error bars, if needed, from the error bar options. You do have to format one series of error bars at a time.

Make Charts the Same Size

Use the Height and Width properties found on the Format tab in the ribbon, or on the Format Pane for the Chart Area's Size & Options. You can use the alignment options on the format tab to make the charts line up.

Changing the Data Source

From the Worksheet

When you select a chart you will see the Chart Tool tabs in the ribbon, and the three options buttons along the right side of the chart. If you can see the cells in the worksheet used for the chart you will also be able to see the data is selected and each section is shaded.

Item	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr
Pants	456	489	423	468
Shoes	498	435	472	436
Socks	128	168	157	138

Chart Title

If you hover your mouse over the bottom right-hand corner of the data grouping you will get the two-way sizing arrow. If you click and drag the
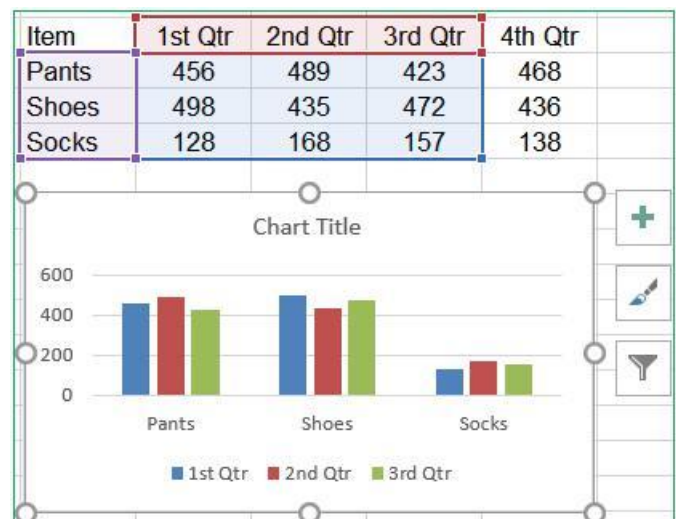
selection you can manually change the chart data source.

If you know you will have more categories and series you can grow the data area beyond what's showing and Excel will assign new colors and make room in the chart for the new values.

From the Select Data Source Window

From the Chart Tools *Design* tab choose **Select Data**.

The **Chart data range** option can be a bit finicky so I recommend deleting the current range and selecting the new set from the worksheet.
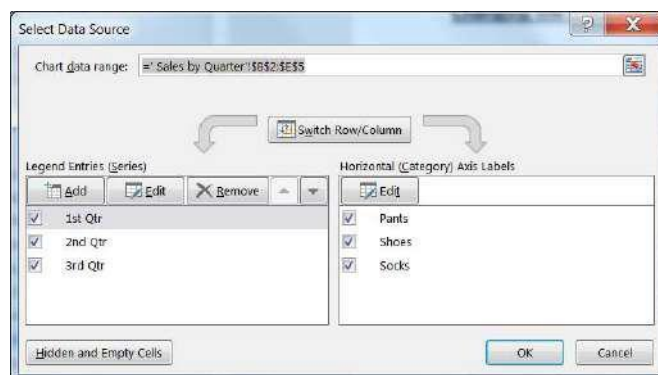

The chart is initially arranged to follow the order of the data, but if you would like the legend in a different order, you can rearrange the Legend Entries using the up and down arrows.

Removing data

Both of the above options will help you add and remove data. You can manually adjust the range in the worksheet or you can select a different range from the Select Data Source window. Both are great as long as you are using a consecutive range of data.

The Select Data Source window also had a **Remove** button to delete a series from the chart. Notice there is not one for the Category/Axis labels. To be able to remove one you will need to first **Switch Row/Column**. Once you've removed the categories, **Switch Row/Column** again.
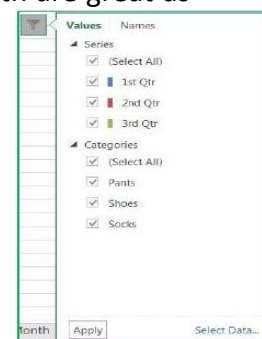
From the chart itself you can click on the series you want to remove and press **Delete** on the keyboard. You can only delete the series, so the same actions apply in order to remove a category you will need to switch the row/columns first.

However, we now have a Filters button along the side of the selected chart. From here we can uncheck any of the values we do not want on the chart; Series and Categories. You must click the Apply button at the bottom of the menu for the filter to take effect.

Sorting and Filtering

Sorting Data

On the far right side of the **Home** tab you will find a large Sort & Filter button. The menu you see when you click on the button is reflected in the Sort & Filter group of the **Data** tab.

If you make a selection of cells, Excel will think you only want to sort or
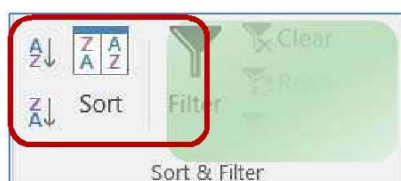
filter by that selection. But if your

dataset has no blank rows and no

blank columns Excel will see the

whole range as one data set.

You can have blank cells, but not completely blank columns/rows; if you are not sure that your dataset is consistent, click inside one cell, and press Ctrl-A. This will select all the cells within the dataset. A second "Ctrl-A", or pressing the shortcut in an empty cell, will select the entire sheet.

When you have completed a sort, you can click the Undo button (or Ctrl-Z). Excel will undo the sort and it will select the dataset it used in the sort. This is another way to see your dataset.

Ascending Sorts

1) **Text**: Sort alphabetically from A to Z

2) **Numbers**: Sorts from smallest number to largest number

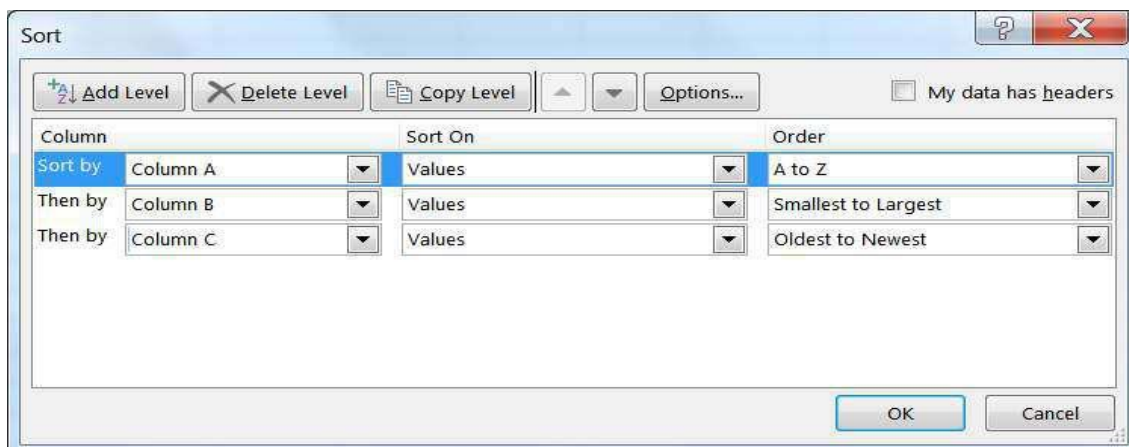3) **Dates**: Sorts from the newest date to the oldest date

Descending Sorts

3) **Text**: Sort alphabetically from Z to A

4) **Numbers**: Sorts from largest number to smallest number

5) **Dates**: Sorts from the oldest date to the newest date

Custom Sorts

When you first open this window, Excel will show the most recent sort options. If you haven't created a sort yet, this window may be blank.

In Excel 2016, we can sort by 64 levels. From this sort window we can add levels, delete levels, copy levels, and even change the order of our sort using the up and down arrows in the toolbar.

Column: The column drop-down menu will show the names of your columns, your 'fields'. If your data doesn't have titles Excel lists the column heading letters instead. If you were expecting titles, but is only showing the column letters, you can click on the check box in the upper right hand corner of the Sort window to let Excel know your data has headers.

Sort On: You can Sort on the values of the cells, the cell colors, the font colors, or the cell icons.
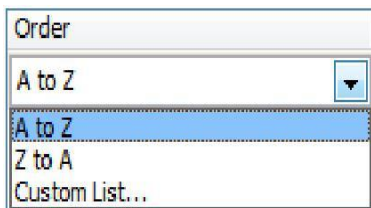
Order: The order options change depending on the values in the cells.
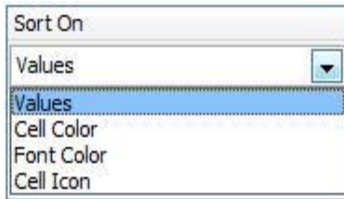
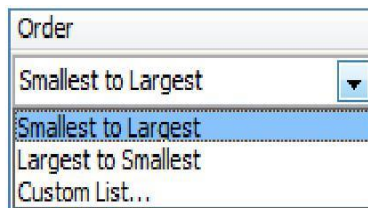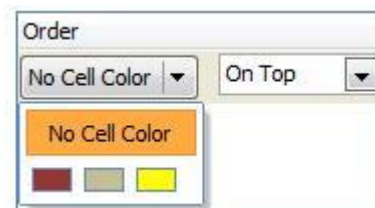| Text	Number	Date
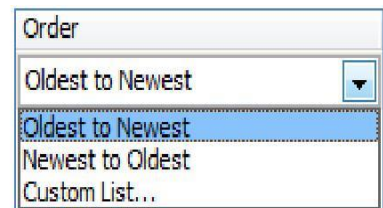
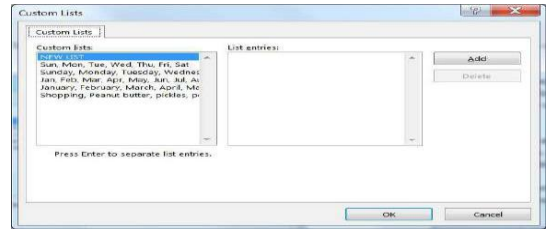**Font Color**   **Cell Color**

Custom Lists

Custom lists can be built through the Excel Options under the File menu in the Advanced section under General. Or by choosing Custom List… option at the bottom of each order box above.

If you choose this option, you will be able to select from one of these lists. Alphabetically, April comes before January. With the Custom List order, we can ensure January comes first.

These custom lists will work as patterns with the fill handle. Notice the "Shopping" list? Once I set this up, I can type any of the words in a cell and use the fill handle to follow this pattern.

Sort Options

☐ **Case sensitive:** Sort lowercase letters before uppercase letters

☐ **Orientation:** Sort vertically (top to bottom, sort rows) or horizontally (left to right, sort columns)

Filtering Data

Filters hide rows (records) based on criteria you set. You can turn the filter on and off by choosing Filter from the Sort & Filter button on the Home tab, or choosing the Filter button on the Data tab.

Excel will place a drop-down arrow at the end of each cell in the title row (the first row of the dataset). When you click on this arrow we see several options including our sort orders:

1) Sort Ascending, Descending, and by color

2) Clear the Filter

3)   Filter by Color

4)   Set a custom filter (text, number, date)

5)   Search for a matching value in the column

6)   List of values in the column (field). **Select All** will toggle between everything and nothing.
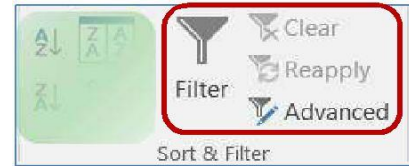
Once a filter has been set Excel will hide all the rows that don't match the criteria. The status bar will show how many records (rows) were found that matched. The row numbers of the original data will remain the same, but will appear blue. The dropdown arrows of the columns that are being filtered will show the filter icon (funnel). The double line between the row numbers indicate hidden rows.

Custom Filters

Depending on the data in the column you will have the option to set a custom filter based on text, numbers, and dates.
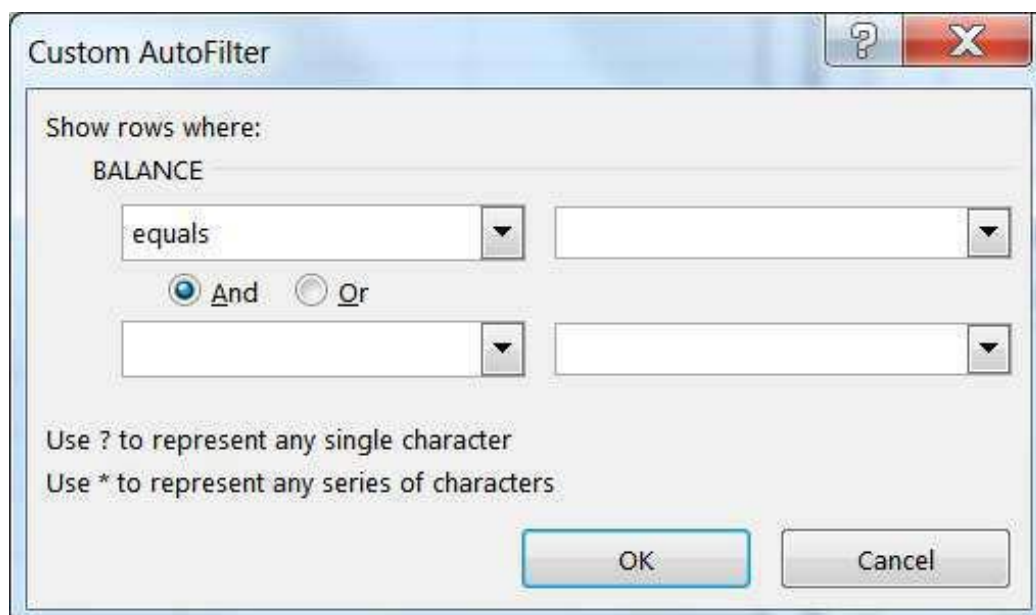
Text Filters	Number Filters	Date Filters

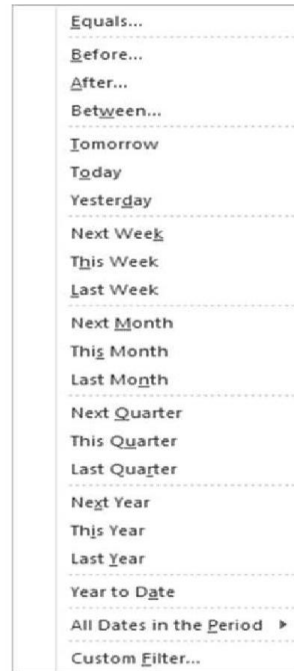|		
Equals...	Equals...	Equals...
Does Not Equal...	Does Not Equal...	Before...
Begins With...	Greater Than...	After...
Ends With...	Greater Than Or Equal To...	Between...
Contains...	Less Than...	Tomorrow
Does Not Contain...	Less Than Or Equal To...	Today
Custom Filter...	Between...	Yesterday
	Top 10...	Next Week
	Above Average	This Week
	Below Average	Last Week
	Custom Filter...	Next Month
		This Month
		Last Month
		Next Quarter
		This Quarter
		Last Quarter
		Next Year
		This Year
		Last Year
		Year to Date
		All Dates in the Period ▶
		Custom Filter...

If you choose one of the options on the Filter List with the ellipsis (…), you will see a Custom Auto Filter window such as this. From here we can set up to two filters.
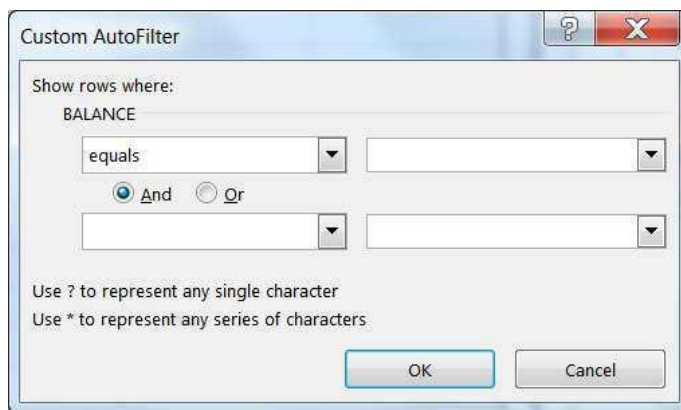
Be careful with the AND/OR relationships. If you ask Excel to show the rows where the City equals Jacksonville **AND** the City equals Gainesville, you will get no results, because one cell cannot equal both values. But if you ask for the same using the OR, Excel will show all the records for both cities.

Or's tend to work for exact matches (Equals This **OR** Equals That), whereas AND's tend to work for ranges (Greater than This **AND** Less than That).

You can use the "Wildcards" ? and * to help you with your filter. ? is used for one character, * for multiple.

Equals Jacks* -> Jacksonville, Jacksonville Beach, Jackson Heights

Some of the filter choices may work just as well. I could say Contains 'Jacks' or Begins with 'Jacks'.

SUBTOTAL Worksheet Function

We can do common mathematical functions with our filtered lists using the SUBTOTAL worksheet function. The syntax is for this function is "SUBTOTAL(function_num,ref1,ref2,...)".

Function_Num	Function	Function_Num	Function
1	AVERAGE	7	STDEV
2	COUNT	8	STDEVP
3	COUNTA	9	SUM
4	MAX	10	VAR
5	MIN	11	VARP
6	PRODUCT		

Function_num is the number 1 to 11 that specifies which 'function' to use in calculating subtotals within a list (see below). The ref1, ref2… are the ranges of data that should be used in the equation, there can be up to 29 different ranges used in this function.

Function numbers 1 through 11 will include manually-hidden rows, ones you have hidden yourself. Function numbers 101-111 will exclude your hidden rows from the function. Filtered-out rows are always excluded.

	A	B	C	D	E	F
1	Sum	1411		SubSum	1411	
2	Average	8.70987654		SubAvg	8.70987654	
3	Count	162		SubCount	162	
4						
5	Quarter	Item	Size	Color	# Sold	
6	1st Quarter	blouses	Large	Blue	14	
7	1st Quarter	blouses	Large	Red	6	
8	1st Quarter	blouses	Large	White	10	
9	1st Quarter	blouses	Medium	Blue	2	
10	1st Quarter	blouses	Medium	Red	4	

	A	B	C	D	E	F
1	Sum	1411		SubSum	24	
2	Average	8.70987654		SubAvg	8	
3	Count	162		SubCount	3	
4						
5	Quarter	Item	Size	Color	# Sold	
43	2nd Quarter	pants	Large	Red	8	
46	2nd Quarter	pants	Medium	Red	6	
49	2nd Quarter	pants	Small	Red	10	
168						
169						

	A	B	C	D	E
1	Sum	=SUM(E5:E168)		SubSum	=SUBTOTAL(9,E5:E168)
2	Average	=AVERAGE(E5:E168)		SubAvg	=SUBTOTAL(1,E5:E168)
3	Count	=COUNT(E5:E168)		SubCount	=SUBTOTAL(2,E5:E168)
4					
5	Quarter	Item	Size	Color	# Sold
43	2nd Quarter	pants	Large	Red	8
46	2nd Quarter	pants	Medium	Red	6
49	2nd Quarter	pants	Small	Red	10
168					
169					
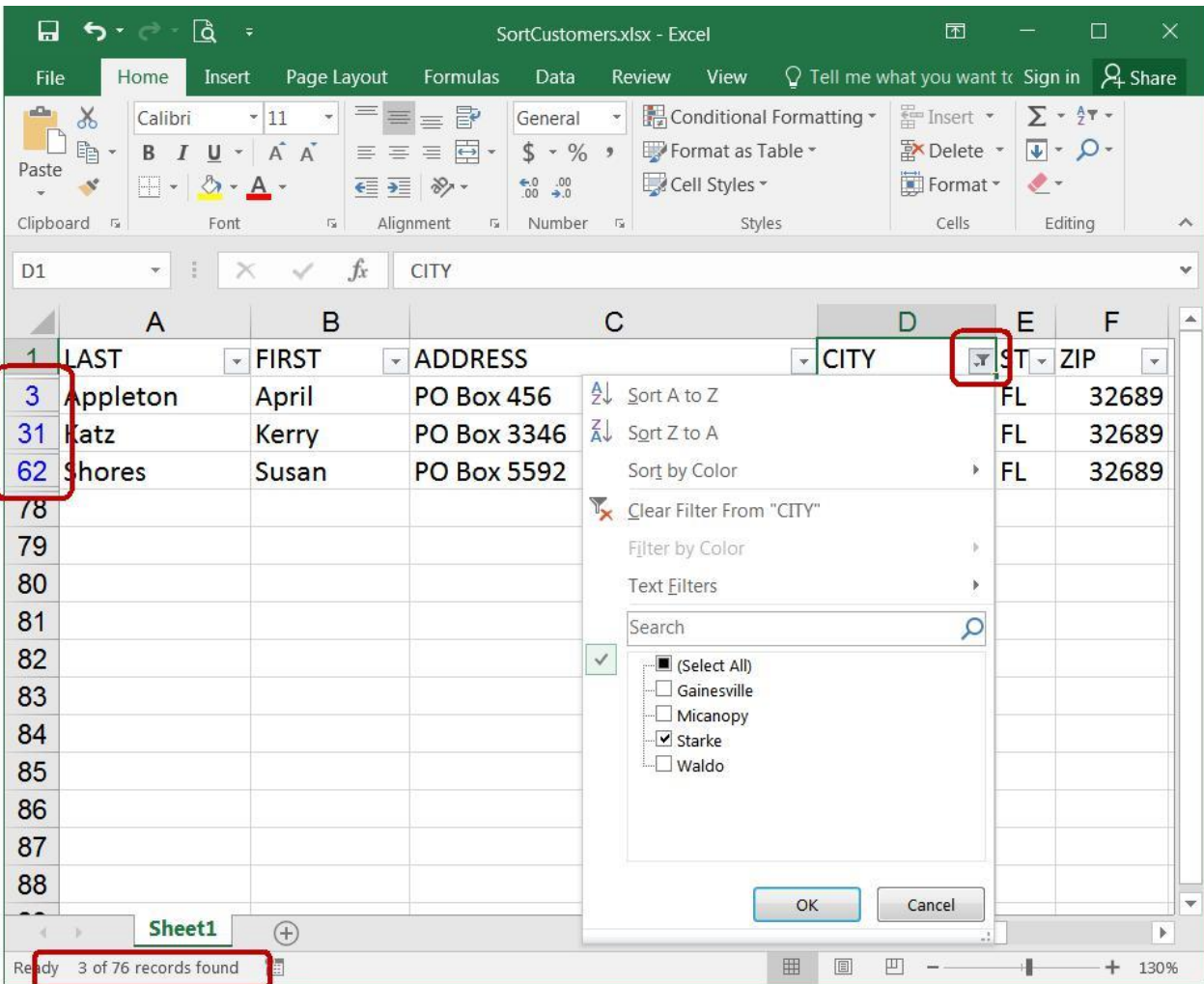
Using the IF Function

The If function allows users to make logical comparisons between values, returning a value of either True, or False. Based on the result of the logical comparison, the if function can carry out a specific operation, based on a true or false value.

The syntax for an if function is: **=IF(logical_test, value_if_ture, value_if_false)**

Logical test: any value or expression that can return a TRUE or FALSE

Value_if_true: The value to be returned, or operation to be performed, if the condition is TRUE. This can be text (must be in double quotes "text"), a number, or a function.

Value_if_false: The value to be returned, or operation to be performed, if the condition is FALSE.

Excel Comparison Operators

## Comparison Operator

- = (equal sign)

- > (greater than sign)

- < (less than sign)

- >= (greater than or equal to sign)

- <= (less than or equal to sign)

- <> (not equal to sign)
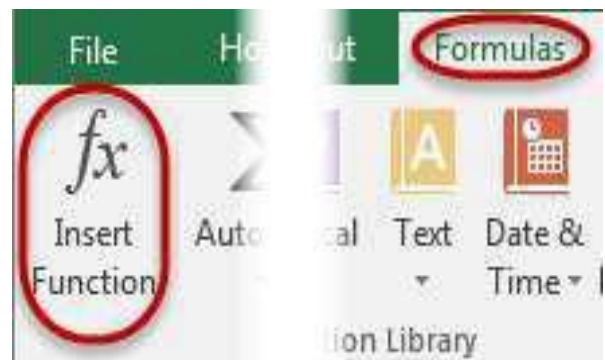
Steps for an If Statement:

1. Place cursor in the cell that will contain the If Statement.

2. Navigate to the Formulas tab, and click on the Insert Function icon.

3. Within the Insert Function window, search for If in the search textbox and hit the Go Button.

4. Select the if function from the select a function box. Select it by either double clicking on it or by selecting it and clicking the OK button
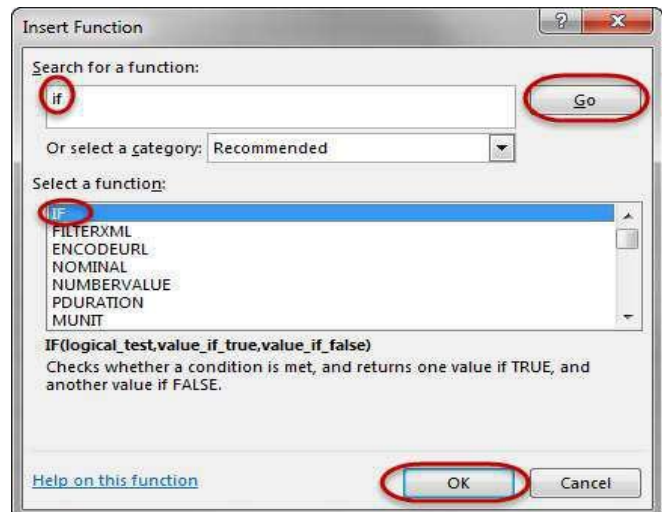
5. In the Functions Argument window, we are able to see each argument of the if function. For the logical test, we want to select the Cell that we are comparing.
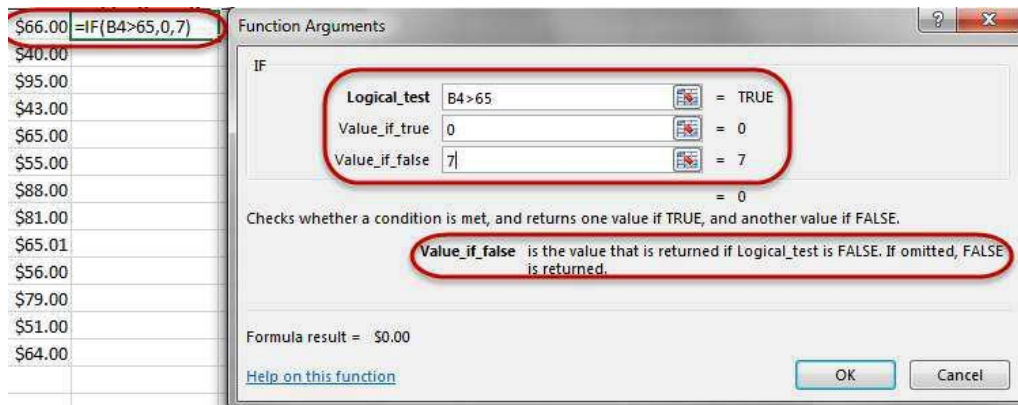
6. Value_if_true. What do we want to happen if our argument is True?
   a. This can be as simple as a number, text(must be in quotes "", an arithmetic function, or even another function entirely.
7. Value_if_false. What do we want to happen if our argument is False?
   a. This can be as simple as a number, text (must be in quotes "", an arithmetic function, or even another function entirely.
8. When we have all of our arguments filled out, click on the OK button and our function is now complete.

9. To copy this function to the remaining cells, click back on the cell that contains the original function. Move your mouse into the lower right corner until your mouse turns into a dark plus sign.

10. Click and hold with your mouse as you drag to the bottom of the rest of the data. The function has now been copied to all of the other cells.

Best practices with if statements

Generally, it is not good practice to put static values (values that may need to change from time to time) directly into functions in Excel. The main reason for this is because if a change ever has to be made, the values can be hard to find and change. It is best to put these values into their own individual cell, and then reference the cell containing the value in the function. This way, any time the values has to change, the referenced cell's value is changed and all functions related to that function are now updated immediately. There isn't a need to search for each function to update them.

Display a formula with color coded cell references

When troubleshooting a function while in Excel, hit the F2 key. This will display all arguments in a function as color coded cell references and cells.

| $10,000 | | | | | | |
| 1.50% | | | | | | |

	Sa		Total sales	Commission	Training completed		Year-end
Qtr1	Q	4					
$2,500	$	400	$8,500	$0	=IF(AND(H9="yes",F9>$B$4),F9*$B$5,"")		

Cell References

When creating functions in Excel, users must know that there are two different cell reference types, Relative and Absolute.

Relative cell reference

It is important to understand how Excel identifies cells in formulas. By default, all cell references are relative references, which means the function is related to the cells around it. As a function is copied across multiple cells, it is updated based on the relative position of rows and columns.

The way Excel reads a function is by looking at the relationship of the cell references in relation to the cell containing the function. For example, in the

	A	B	C
1	Dept A	Dept B	Totals
2	100	300	400 =A2+B2
3	200	400	600 =A3+B3

function contained in cell C3 to the right, Excel reads this as "take the number located two cells to the left and add that to the number in the cell located one column to the left". Therefore, when this function (which appears as =A2+B2) is copied to the cell below, it performs the calculation using the same pattern, "take the number located two cells to the left and add that to the number in the cell located one column to the left", but updates the formula to reflect the appropriate cell addresses. This is called a Relative Reference and is the feature that enables users to copy the same function to a different location within a worksheet.

Absolute cell reference

An absolute reference is a reference to a particular cell, or range of cells, that never updates as the function is copied to a new location. Absolute references can be made to an individual cell, or to keep a row or a column constant as the function is copied to a new location.

To make a cell reference absolute so that it will not adjust when a formula is copied, insert a dollar sign ($) in the appropriate position. By navigating into the formula in the Formula bar, users can cycle through the absolute reference options by hitting the F4 key on the keyboard. The first time the F4 key is pressed, a user will create an absolute reference to the cell reference in the function, the second time the reference will be to the row only, and the third time the reference will be to a particular column.

✕ ✓ ƒx   =B5/B12

Position the cursor
Press the F4 key one time in the cell reference
that you want to
change

=B5/$B$12

=B5/B$12

Two times

Three times

`=B5/$B12`

Example 1: $B$12 Both the Row and the Column are held Constant

Example 2: B$12   The Row is held constant; the Column will update as the function is copied.

Example3: $B12   The Column is constant; the Row will update as the function is copied.

Using OR & AND Functions

The And & Or functions are great functions to use within an if function because they will return a value of either True or False, which is what the first portion of an if statement needs in order to complete the function.

The And and Or functions will allow for multiple logical expressions to be created within the argument of the function. Each logical expression must be separated by a comma.

And Function

The And function is used to check multiple logical expressions and will return a True value if every one of the logical expressions is true.

The syntax is; **=AND(logical1,[logical2],…)**

OR Function

The OR function is used to check multiple logical expressions and will return a True value as long as one of the logical expressions is true.

The syntax is; **=OR(logical1,[logical2],…)**

Nesting an AND or OR function into an If function

The easiest to incorporate an AND or OR function into an if function is to first start with the And or Or Function and then incorporate the function into the logical_test argument of an IF function.

Steps to create a nested AND or OR function within an IF function;

1. Navigating to the cell to contain the IF function and type in an equal sign, followed by AND. Select the AND function by double clicking on it, or using the arrow keys to select the function and then hit the tab key.
2. When the AND function is complete, finish the function by entering in a closed bracket).

4. Now, use the mouse and place the cursor between the equal sign and the A in the front of the AND function.

Users may also use the formula bar to do this, as it may be easier to access the first portion of the function in the formula bar.

With the cursor between the equal sign and the A, start typing if. Excel will populate a list of functions under the cell. Either double click on the If function, or use the arrow keys to highlight IF and then hit the tab key.

Excel will now display the arguments for the IF function underneath the cell, or the formula bar, depending on where the user is working. The argument that will be bolded will be the logical_test, which has already been completed

with the AND function. To enter in to the second portion, value_if_true, of the expression, move the cursor to the far right of the AND function, after the closed bracket and type in a comma.

6   Enter in what is to be done if the AND function is true, then type a comma to get to the last portion   of the IF function, the value_if_false.

When all arguments have been fulfilled, hit the type in a closed bracket to complete the

Note: Users may hit the Enter key to complete the function, which may result in the following error;

This error is just notifying the user that the last closed bracket

is missing. By accepting this error, Excel will insert the closed bracket to complete the function.

Nested IF Statement

Sometimes there is more than one condition that needs to be tested in order to return a value. To test multiple conditions, users can use a nested IF function. A nested IF statement is and easy way to test for multiple conditions. Typically, the first condition will be tested and an answer will be provided if the condition is True. If the condition is false, a new IF statement will be used to test in the value_if_false portion of the first if statement.

The syntax would look similar to this;

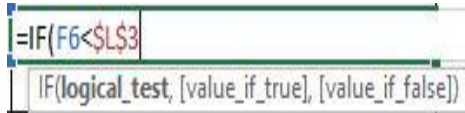**=IF(logical_test,value_if_true,IF(logical_test,value_if_true,value_if_false))**

Note: Excel can nest up to 64 if statements.

Tip: When comparing values within a scale, make sure the values are sorted in either increasing or decreasing order to help make the nested if statement easier to assemble. If the scale is in Increasing order, the less than < sign will be used in the arguments and if the scale is in decreasing order, the greater than > sign will be used in the arguments.

Steps for a Nested IT statement.

1.   Position the cursor in the cell that will contain the formula. Type in an equal sign, followed by if. When if populates under the cell, either double click on if to select it,

or use the arrow keys to highlight it and then hit the tab key to select the IF

function.

2.	Enter in the first logical test within the If function, then hit the comma key to get to the value_if_true.

=IF(F6<$L$3
IF(logical_test, [value_if_true], [value_if_false])

=if
_fx_ IF   Check
_fx_ IFERRO

3.	In the value_if_true portion of the argument, enter in what is to be done if the first logical test is true, and then hit the comma key to get to the value_if_false.

=IF(F6<$L$3,F6*$M$3
IF(logical_test, **[value_if_true]**, [value_if_false])
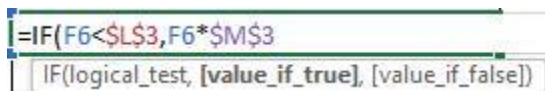
4.	In the value_if_false, a new if statement will have to be started since we are comparing multiple logical tests. To start a new if statement, start typing IF within the value_if_false portion, the exact same way we would start a brand new IF function, but without the equal sign.
Excel will populate the if function underneath the cell that is being typed in. Select the if function, just as if this was a brand new if statement that was being started, by double clicking on the If, or by highlighting it and then hitting the tab key.

When this is done, users will notice that the argument below the cell changed from being in the value_if_false portion of the first IF function to now being the logical_test of the second if statement.

Tip: Treat this new IF function as its own, free standing if function by entering in all arguments within the IF function.

In the second IF functions logical_test, enter in the second comparison and then hit the comma key to get into the value_if_true.
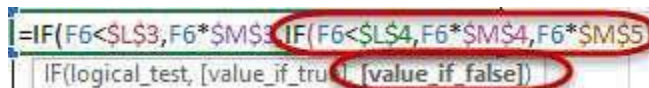
In the value_if_true portion of the argument, enter in what is to be done if the first logical test is true, and then hit the comma key to get to the value_if_false.

In this example, we are only comparing two values, so in the value_if_false portion, enter in what is to be performed if neither of the logical_tests are met.

Note: If more logical tests were being compared, another IF function would be entered into the value_if_false portion, following the same steps that were taken in step 4.ss

After the value_if_false portion is completed, complete the second IF function by typing in a closed bracket).
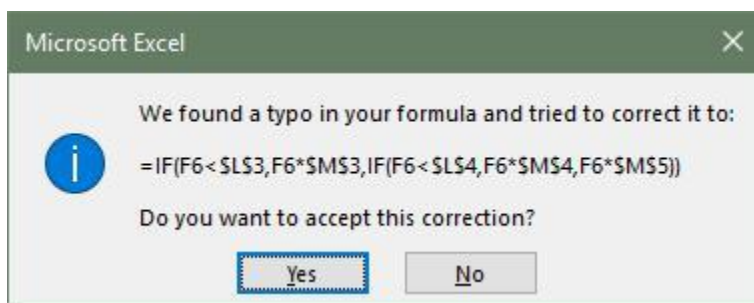
notice that the IF function argument below the cell will now display the value_if_false argument of the first IF function. Since the second IF statement has completed the value_if_false portion of the first IF function the nested if is now complete.

=IF(F6<$L$3,F6*$M$3,IF(F6<$L$4,F6*$M$4,F6*$M$5)
    IF(logical_test, [value_if_tru [value_if_false])

To complete the nested IF function, either type in another closed bracket), or hit the Enter key.

Note: Users may also hit the Enter key after completing the second IF function. If this is done, Excel will populate a window indicating that there is a typo in the formula, meaning there aren't any closed brackets to complete the function. To have Excel enter in the closed brackets, hit the Yes button.

Microsoft Excel ☒

We found a typo in your formula and tried to correct it to:

=IF(F6<$L$3,F6*$M$3,IF(F6<$L$4,F6*$M$4,F6*$M$5))

Do you want to accept this correction?

Yes   No

To verify the nested IF was entered in correctly, click on the cell containing the IF function and then hit the F2 key. This will display the function with colored cell references related to the cells on the worksheet.
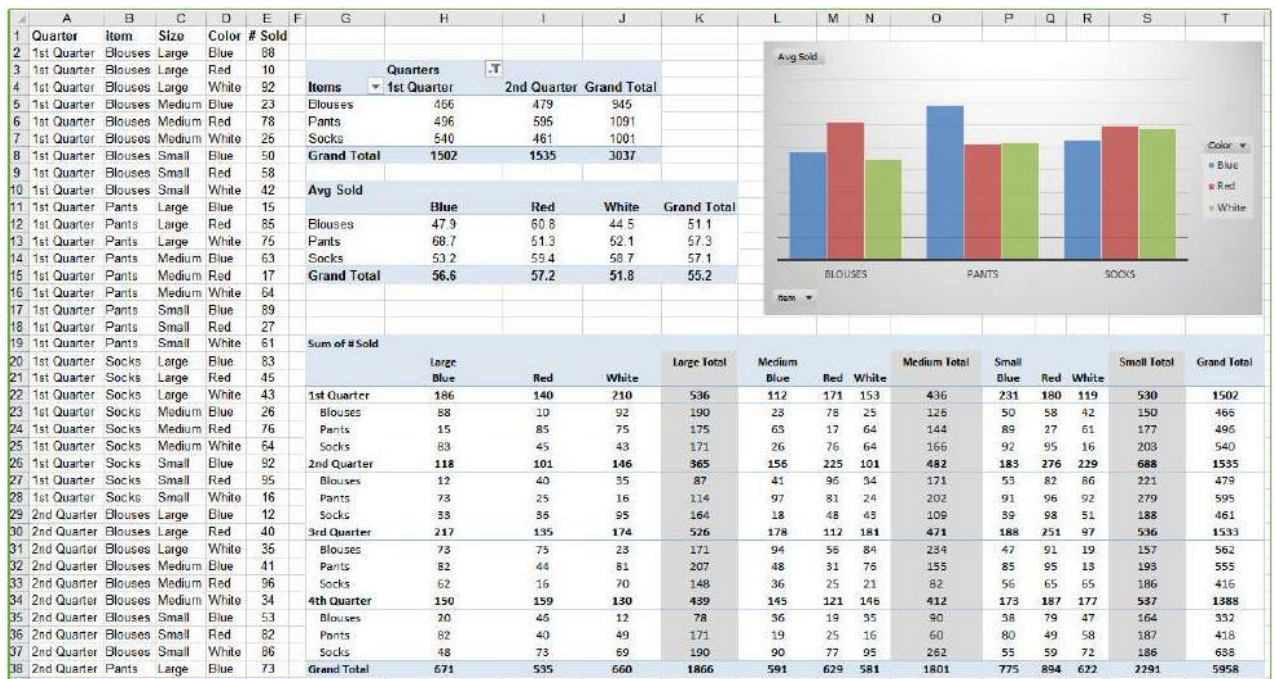

PIVOT TABLES

Learning Objectives

- PivotTables
- Formatting
- Pivot Tables - Excel 2016 Help File
- Exercises
- Things to Remember

PivotTables

PivotTables are summary reports. They give you the ability to take a large boring set of repetitive data and summarize it into a neat table that you can very easily rearrange, filter, format, and even chart.

Here's an example of a repetitive raw data set, three PivotTables, and a PivotChart.

Planning

The most important part of building a PivotTable is planning. You have to remove yourself from the raw data and think about the final result. There's a learning curve, have patience with yourself and with Excel and you'll get there.

The Data

The data has to be repetitive. It looks wrong at first, but the more boring and repetitive your data, the more you can do with it. In the Large Data 1 class we learn about sorting and filtering in Excel. We don't need to keep each quarter, each department, each person on a different sheet. If we keep all of the data in the same place, we can look at each category, one at a time, using the filter, and beautifully because it is all in the same place, we can look across categories and quickly summarize with a PivotTable.

The data has to be consistent. We don't want to see entries like: 4th Qtr, 4th Quarter, Qtr 4. In the Large Data 3 (vLookups) class we'll learn about validation rules, and in Large Data 4 (report) we'll see how to use vLookups to help us cleanup inconsistent data entry.

The definition of a database is a structured collection of related data. Rows of a data table are **records**.

When we filter in Excel, the Status Bar tells us how many Records were found.

Columns of a data table are **fields**. The column titles of your original dataset will appear in the PivotTable Field List. You'll use these titles to control the structure of the PivotTable. If possible, **use clear, concise, and unique column titles**. If you use the same column title more than once, Excel will add a number after the subsequent titles. Example: *Home Address, City, State, Zip, Work Address, City, State, Zip* becomes *Home Address, City, State, Zip, Work Address, City(2), State(2), Zip(2).*

The Result

By all means, jump in and play with the tools, get comfortable with how to make a PivotTable. But when it comes down to needing a specific report, you have to "show your work". Think about what it is you actually want to see.

"I want to know how many items we ordered." Okay. Do you care what the items were? Do you care about the data across the year, or do you only want the total? What about the other details? Each versus boxes? Would you like to compare your orders to another departments?

"I want to know how many patients were admitted last month." Okay. Do you want to see the break down by time, perhaps by morning and afternoon? By shift? By Department? Or would you like to have the flexibility to change (filter) the shifts and departments?

The more you think about what you want out of the glorious summary report known as a PivotTable, the better it will come together for you.

Building

The PivotTable field list shows the column titles of our original dataset, these are our **Fields**. If you rename, add, or delete columns in the dataset you will not see the change here until you refresh the data. The **Refresh** button is on the Analyze tab of the PivotTable Tools, and can be found on the shortcut menu if you right-click inside the table.

 Fields in the **Filters** will appear above the table.

 Fields in the **Columns** will appear at the
  top of each column of the PivotTable.

 Fields in the **Rows** will appear at the left of
  each row of the PivotTable.

 Fields in the **Values** will be summarized.
  By default, text and date fields will be
  counted, number fields will be summed.

Arranging Fields

Adding

- Click the check box in front of the field name

  a. Text fields will go into the **Rows** showing each unique value from the dataset

  b. Date fields will go into the **Rows** grouping the values across time

  c. Number fields will go into the **Value** as a sum

2. Drag fieldname from the field list to an area

  a. You will *have* to drag to add a field to the value area multiple times

3. Right-click on the fieldname in the field list and choose an area

4. **Moving**

- Drag fieldname from an area to a new area

- Right-click on the fieldname in the field list and choose a new area

- Left-click on a field in an area and choose a new area

Deleting

- Drag fieldname out of the area section

- Left-click on a field in the area and choose **Remove Field**

Value Field Settings

Fields added to the value section are summarized within the grouping of the row and column headings set in the PivotTable. Numbers will sum, other values will be counted. To change how the data is summarized, left-click on the fieldname in the Values area and choose **Value Field Settings**.

You can reformat your numbers with the Excel formatting tools, but if you reformat from the Value Field Settings window you'll format the Table, this means if you change the structure of your table by adding fields you won't have to reformat any new cells occupied by the table.

Page 7 of this handout discusses the **Show Values As** options.

It is possible to create other summary options, but it's beyond the scope of this class. If you would like to explore, look at the **Fields, Items, & Sets** option on the Analyze tab

Formatting

The PivotTable Design tab has lots of style options to make the PivotTable look good. Change the Options settings to see how they vary in the style you chose.
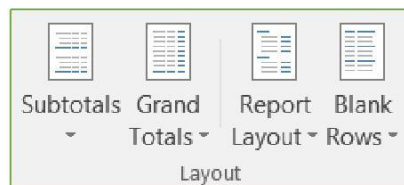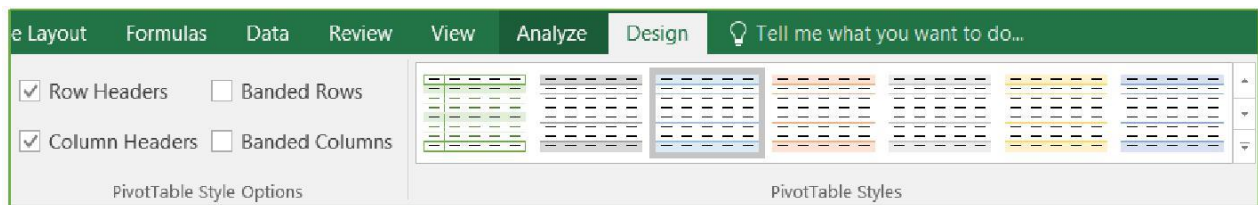
The style options help with the look of the data, but in my opinion the first set of buttons on the Design tab are way better, as they determine how the data is pulled together within the PivotTable.

Original

Sum of # Sold	Column Labels ▼			
Row Labels 🔽	Large	Medium	Small	Grand Total
⊟ 1st Quarter	536	436	530	1502
Blouses	190	126	150	466
Pants	175	144	177	496
Socks	171	166	203	540
⊟ 2nd Quarter	365	482	688	1535
Blouses	87	171	221	479
Pants	114	202	279	595
Socks	164	109	188	461
Grand Total	901	918	1218	3037

Subtotals at **Bottom**, **Blank Rows** inserted

Sum of # Sold	Column Labels ▼			
Row Labels	🔽 Large	Medium	Small	Grand Total
⊟ 1st Quarter				
Blouses	190	126	150	466
Pants	175	144	177	496
Socks	171	166	203	540
1st Quarter Total	536	436	530	1502
⊟ 2nd Quarter				
Blouses	87	171	221	479
Pants	114	202	279	595
Socks	164	109	188	461
2nd Quarter Total	365	482	688	1535
Grand Total	901	918	1218	3037

No **Subtotals**, no **Grand Totals**

Sum of # Sold	Column Labels ▼		
Row Labels 🔽	Large	Medium	Small
⊟ 1st Quarter			
Blouses	190	126	150
Pants	175	144	177
Socks	171	166	203
⊟ 2nd Quarter			
Blouses	87	171	221
Pants	114	202	279
Socks	164	109	188

Report Layout: **Outline**

Sum of # Sold		Size ▼			
Quarter	🔽 item ▼	Large	Medium	Small	Grand Total
⊟ 1st Quarter		536	436	530	1502
	Blouses	190	126	150	466
	Pants	175	144	177	496
	Socks	171	166	203	540
⊟ 2nd Quarter		365	482	688	1535
	Blouses	87	171	221	479
	Pants	114	202	279	595
	Socks	164	109	188	461
Grand Total		901	918	1218	3037

Sum of # Sold		Size ▼			
Quarter	🔽 item ▼	Large	Medium	Small	Grand Total
⊟ 1st Quarter	Blouses	190	126	150	466
	Pants	175	144	177	496
	Socks	171	166	203	540
⊟ 2nd Quarter	Blouses	87	171	221	479
	Pants	114	202	279	595
	Socks	164	109	188	461
Grand Total		901	918	1218	3037

Report Layout: **Tabular**, no **Subtotals**, **Blank Rows** inserted

Notice with the **Outline** and **Tabular** Report Layouts the **Row Labels** are no longer grouped, instead you see a heading for each column and row label.

Create a PivotTable

If you have limited experience with PivotTables, or are not sure how to get started, a **Recommended PivotTable** is a good choice. When you use this feature, Excel determines a meaningful layout by matching the data with the most suitable areas in the PivotTable. This helps give you a starting point for additional experimentation. After a recommended PivotTable is created, you can explore different orientations and rearrange fields to achieve your specific results.

1) Select the PivotTable that looks best to you and press **OK**. Excel will create a PivotTable on a new sheet, and display the **PivotTable Fields** List.

1) Click a cell in the source data or table range.
2) Go to **Insert** > **Tables** > **PivotTable**.
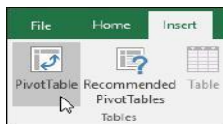
If you're using Excel for Mac 2011 and earlier, the PivotTable button is on the **Data** tab in the **Analysis** group.

3) Excel will display the **Create PivotTable** dialog with your range or table name selected. In this case, we're using a table called "tbl_HouseholdExpenses".
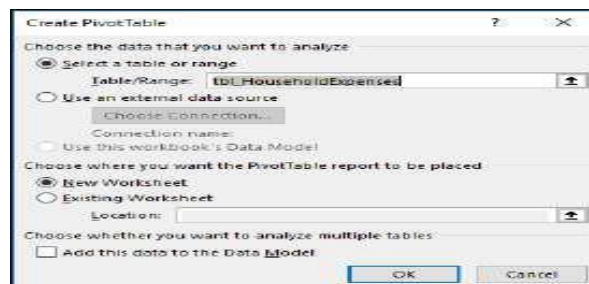
In the **Choose where you want the PivotTable report to be placed** section, select **New Worksheet**, or **Existing Worksheet**. For **Existing Worksheet**, you'll need to select both the worksheet and the cell where you want the PivotTable placed.

1) If you want to include multiple tables or data sources in your PivotTable, click the **Add this data to the Data Model** check box.

2) Click **OK**, and Excel will create a blank PivotTable, and display the **PivotTable Fields** list. Working with the PivotTable Fields list

In the Field Name area at the top, select the check box for any field you want to add to your PivotTable. By default, non-numeric fields are added to the Row area, date and time fields are added to the Column area, and numeric fields are added to the Values area. You can also manually drag-and-drop any available item into any of the PivotTable fields, or if you no longer want an item in your PivotTable, simply drag it out of the Fields list or uncheck it. Being able to rearrange Field items is one of the PivotTable features that makes it so easy to quickly change its appearance.

PivotTable Values

Summarize Values By

By default, PivotTable fields that are placed in the Values area will be displayed as a SUM. If Excel interprets your data as text, it will be displayed as a COUNT. This is why it's so important to make sure you don't mix data types for value fields. You can change the default calculation by first clicking on the arrow to the right of the field name, then select the Value Field Settings option.
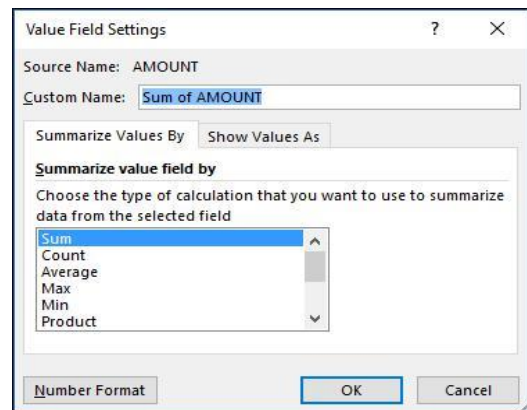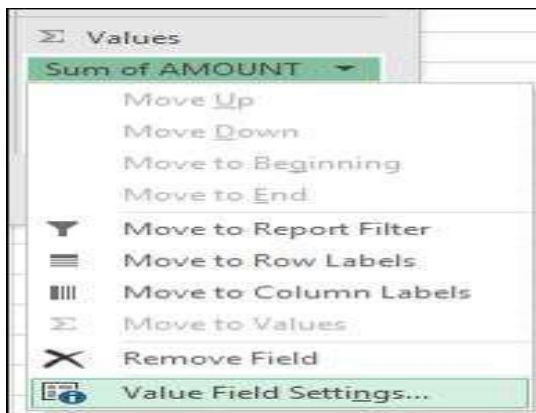
Next, change the calculation in the Summarize Values By section. Note that when you change the calculation method, Excel will automatically append it in the Custom Name section, like "Sum of FieldName", but you can change it. If you click the Number Format button, you can change the number format for the entire field.

Tip: Since the changing the calculation in the Summarize Values By section will change the PivotTable field name, it's best not to rename your PivotTable fields until you're done setting up your PivotTable. One trick is to use Find & Replace (Ctrl+H) >Find what > "Sum of", then Replace with > leave blank to replace everything at once instead of manually retyping.
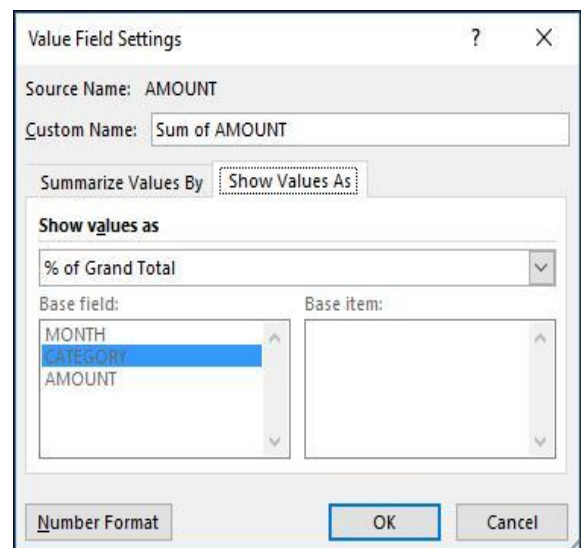
1) **Show Values As**

Instead of using a calculation to summarize the data, you can also display it as a percentage of a field. In the following example, we changed our household expense amounts to display as a **% of Grand Total** instead of the sum of the values.

Sum of AMOUNT	Column La▼			
Row Labels ▼	January	February	March	Grand Total
Entertainment	5.10%	6.38%	6.13%	17.61%
Grocery	12.00%	12.25%	13.27%	37.52%
Household	8.93%	11.49%	10.21%	30.63%
Transportation	3.78%	5.87%	4.59%	14.24%
Grand Total	29.81%	35.99%	34.20%	100.00%

Once you've opened the **Value Field Setting** dialog, you can make your selections from the **Show Values As** tab.

3) **Display a value as both a calculation and percentage.**

Simply drag the item into the **Values**

section twice, then set the **Summarize**

Values By and **Show Values As** options for

each one.

Refreshing PivotTables

If you add new data to your PivotTable data source, any PivotTables that were built on that data source need to be refreshed.

To refresh just one PivotTable, you can right-click anywhere in the PivotTable range, then select Refresh.

If you have multiple PivotTables, first select any cell in any PivotTable, then on the Ribbon go to PivotTable Tools >

Analyze > **Data** > **Click** the arrow under the **Refresh** button and

select **Refresh All**.

Create a PivotChart

1) Click anywhere in the PivotTable to show the PivotTable Tools on the ribbon.

2) Click **Analyze** > **PivotChart**.

3) In the **Insert Chart** dialog box, click the

   chart type and chart subtype you want.
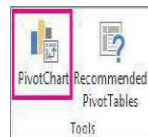
You can use any chart type except an XY

(scatter), bubble, or stock chart.

4) **Click OK**.

5) In the **PivotChart** that appears, click any

   interactive control, and then pick the

   sort or filtering options.
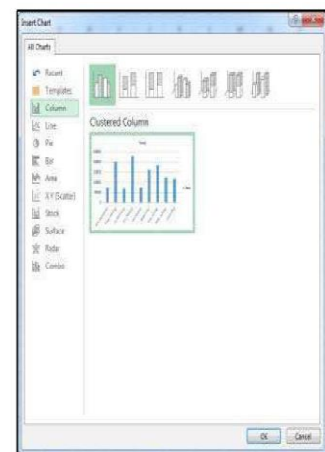
After you create a PivotChart, you can customize it, much like you'd do with any standard charts.

When you select the PivotChart two buttons appear next to the chart so you can quickly add or change chart elements such as titles or data labels, or change the chart style and colors of your PivotChart the same way you would in a standard chart.

The **PivotChart Tools** are shown on the ribbon.

On the **Analyze**, **Design**, and **Format** tabs, you can pick options to work with or customize your PivotChart.

Change the source data

After you create a PivotTable, you can change the range of its source data. For example, you can expand the source data to include more rows of data. However, if the source data has been changed substantially—such as having more or fewer columns, consider creating a new PivotTable.

To change the data source of a PivotTable if it's a range of cells or an Excel table, do the following:

- Click anywhere in the PivotTable to show the **PivotTable Tools** on the ribbon.

- In the **Table/Range** box, enter the range you want to use.
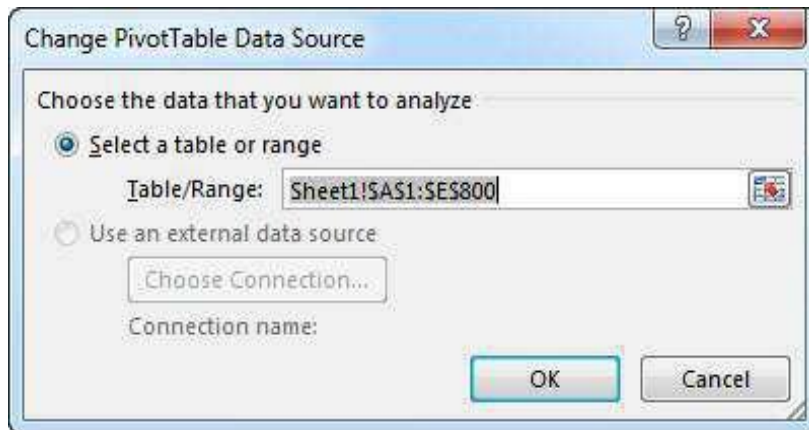
Tip: Leave the dialog box open, and then select the table or range on your worksheet. If the data you want to include is on a different worksheet, click that worksheet, and then select the table or range.

Delete a PivotTable

When you no longer need a PivotTable, select the entire PivotTable, and press the Delete key to remove it. If you get a "Cannot change this part of a PivotTable report" message, smake sure the entire PivotTable is selected. Press Ctrl+A, and press Delete again.

If you're using a device that doesn't have a keyboard, try removing the PivotTable like this:

5) Pick a cell anywhere in the PivotTable to show the **PivotTable Tools** on the ribbon.

6) Click **Analyze** > **Select**, and then pick **Entire PivotTable**.

7) Press Delete.

Tip: If your PivotTable is on a separate sheet that has no other data you want to keep, deleting that sheet is a fast way to remove the PivotTable.

PAGE SETUP

Customizing the Quick Access Toolbar

Quick Access Toolbar

File   Home   Insert

Customize

Quick

Access

Toolbar

File Menu

(Backstage

view)
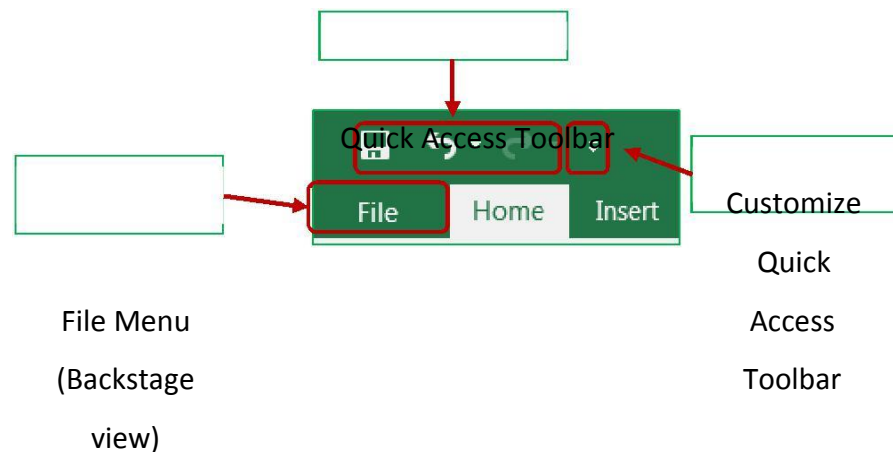
The upper left hand corner of the Excel Window has a Quick Access Toolbar. This is a very convenient location to place commonly used buttons. By default, this toolbar has Save, Undo, and Redo. For this Printing and Setup workshop we would like to add the Print Preview button to the toolbar.

There is a drop down button ( ) at the end of the Quick Access Toolbar that will help you decide which buttons to display. This drop down list displays several common choices, including our Print Preview and Print. When you choose a list item, Excel will place the button on the toolbar.

If you don't see the option you would like, you can choose **More Commands**. This will open the Excel Options window. From the Customize Section, choose the command you would like to see and choose the **Add > >** button.

Page Setup

There are several of ways to customize your printouts in Microsoft Excel. Many of these options can be found on
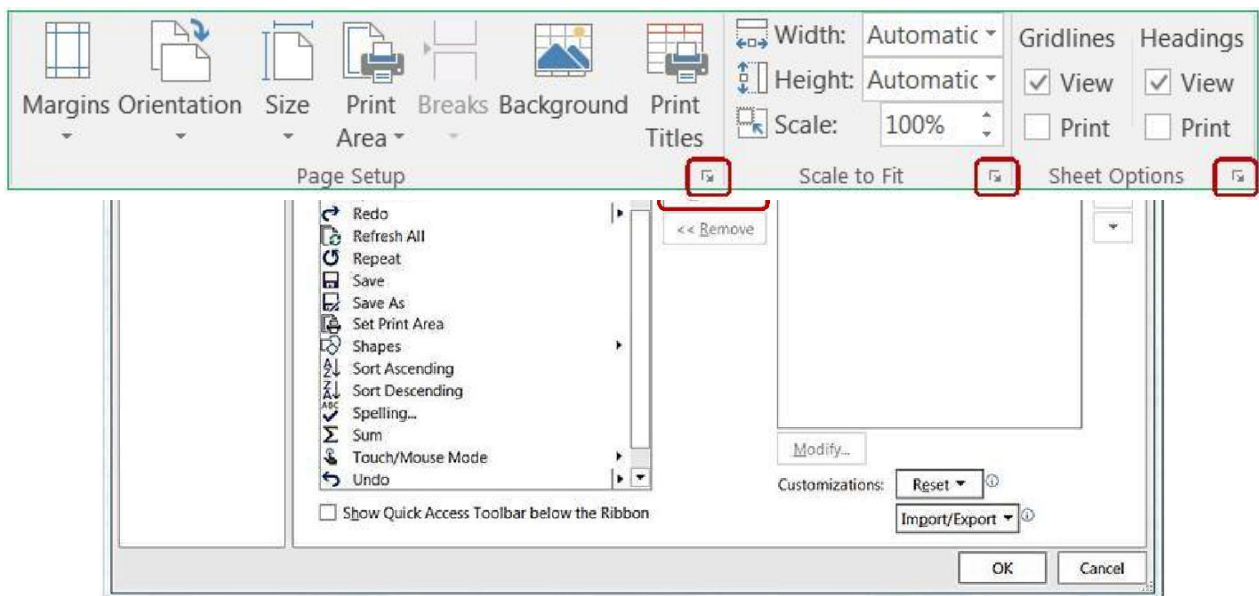
The Page Layout tab in the ribbon.

All of the page setup options can be found through the **Page Setup** window. You can view this window by clicking any of the launch dialog box ("More") 🗗 buttons in the bottom right of any of the sections shown here. You can also open the window by clicking on the **Page Setup** button in the Print Preview.

Page Tab

The first tab in the Page Setup window allows you to change some general page options.

Orientation

This option lets you set your print out to Portrait or Landscape. The image portrays the actual direction of the paper.

This is also a button on the **Page Layout** Tab and in the **Print Settings** in the print preview.

Scaling

This option can be used to change the "zoom" of the printout with the ***Adjust to:*** option or force the number of pages the printout must fit within using the ***Fit to:*** option. Like the zoom in the worksheet, you can adjust this option from 10% to 400%.
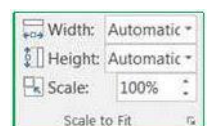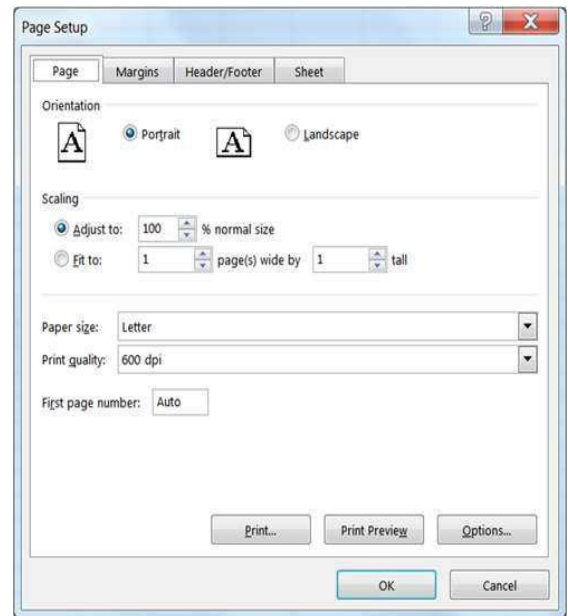
Scaling is also available on the **Page Layout** tab in the **Scale to Fit** section. The *Width* and *Height* options are the same as the *Fit to:* option allows you to specify how many pages wide or tall you want your printout to be.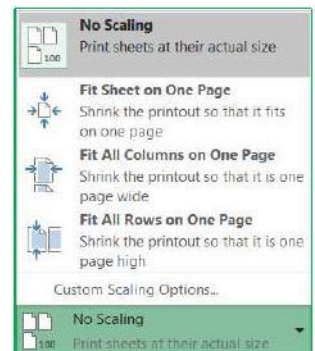 The **Scale** option is the same as to the *Adjust to:* option, it allows you to change the zoom percentage of the printout.

The **Scaling** option in the print preview offers four options.

⯀   <u>No Scaling</u> – Scale to 100%

⯀   <u>Fit Sheet on One Page</u> – Scale Width of only One Page

⯀   <u>Fit All Columns on One Page</u> – Scale Height of only One Page

⯀   <u>Fit all rows on One Page</u> – Scale whole printout to fit everything on one page.

Paper size

This option allows you to choose paper sizes such as Letter, and Legal. This option can also be changed by using the **Size** button on the **Page Setup** section of the **Print Layout** tab, and in the **Print Settings** in the print preview.

Print quality

This option allows you to specify the print quality of your worksheet. The higher the resolution (dots per inch – dpi), the better the quality of your printout. This option can only be changed in the **Page Setup** window.

First page number

By default, a printout starts on page one, but this option allows you to start on a different number. You might do this if you have a cover page, or if you're adding it to another report. This option can only be changed in the **Page Setup** window.
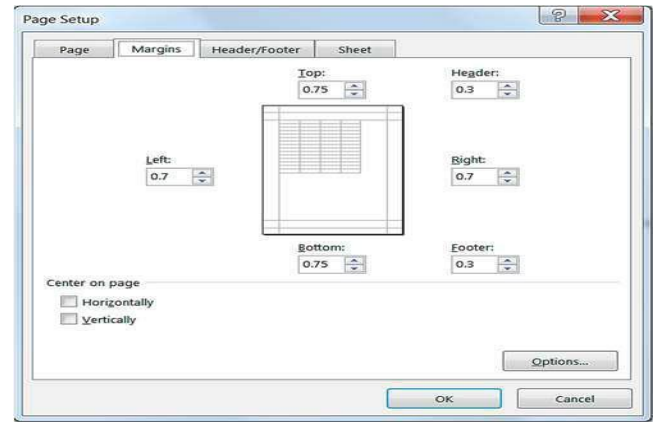
Margins Tab

Margins are the distance between your data and the edge of the page. Here on the second tab of the Page Setup window you can adjust the Top, Bottom, Left, and Right margins to an accuracy of a hundredth of an inch.

A preset list of Margins can also be found on the Page Setup section of the Page Layout tab and in the print preview menu. If you choose Custom Margins…, Excel will open the Margins page of the Page Setup window.

Header is the text that appears at the top of each printed page, and Footer is the text that appears at the bottom of every page. These do not show in the Normal view of the worksheet, but can be seen in the Print Preview and the Page Layout View.

Print Titles

This option allows you to set which **Rows to repeat at the top** of each page, and which **Columns to repeat on the left** of each page.

These do not have to be the first row or column; any column can be chosen as your titles and will be repeated on each page of the printout. If you click on this button in the Page Layout tab, it will open the in the **Page Setup** window to the **Sheet** page.

As with the **Print Area**, to set the rows and columns to repeat, click inside the blank in the **Page Setup** window and use your mouse

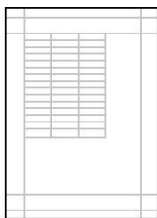to select the rows/columns you would like repeated on every page.

worksheet, but can be seen in the Print Preview and the Page Layout View. Keep the distance of the Header: and Footer: margins smaller than the Top: and Bottom:margins to prevent overlapping the data.

Center on page

This option allows you to adjust how the data will be placed within the set margins.

| *No Centering* | *Centered Horizontally* | *Centered Vertically* | *Horizontally &* |
| *Vertically* | | | |
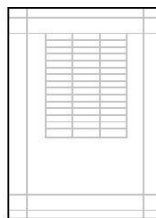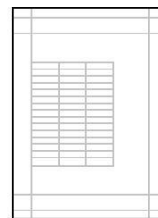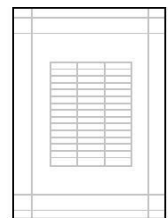
Header/Footer Tab

The third tab of the Page Setup window is Header/Footer. Remember, Headers appear at the top, and Footers appear at the bottom of every page.

The Header and Footer drop down lists offer predefined options. The items listed pull the information such as Author from the Document Properties. These can be modified through the File tab, Info, Properties. Other information is derived from the Worksheet names, Workbook names, computer date and time settings, and calculated page numbers. Remember you can set the beginning page number on the Page tab.

There are several Header and Footer options at the bottom of the window.

☐ **Different Odd and Even Pages** – Custom Headers and Footers can be created for odd vs. even pages.

☐ **Different First Page** – Custom Headers and Footers can be created for the first page to be different from the rest of the pages.

☐ **Scale with Document** – Keeps the same *scaling* as the worksheet. If we set the scale on the Page tab to print at 200%, this check box will ensure the header and footer also scale to 200%.

☐ **Align with Page Margins** – Aligns the Header and Footer with the left and right margins of the worksheet instead of the page itself.
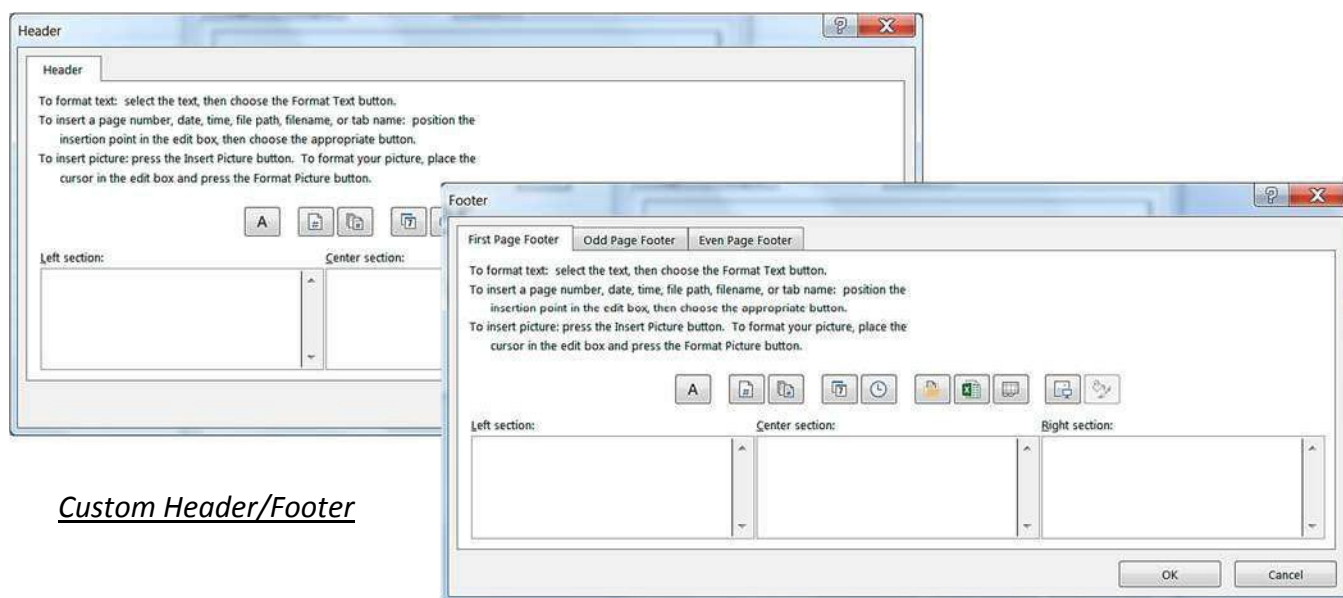
Custom Header/Footer

If you choose the options for *Odd*, *Even* and *First Page*, Excel will show new tabs here so you can set each section to have its own custom header and footer.

Header/Footer Elements (Custom Toolbar)

There are three sections you can enter text. The **Left Section** aligns its contents on the left side of the margin, the **Center Section** aligns its contents in the middle of the margin, and the **Right Section** aligns its contents to the right side of the margin. If you would like the Header/ Footer to align with the page instead of the margin,
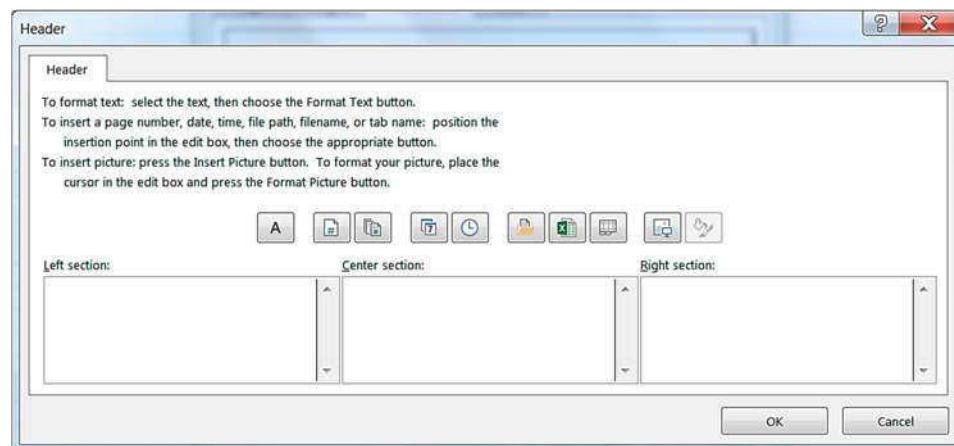
1   2   3   4   5   6   7   8   9   10

turn off the **Align with Page Margins** option on the **Page Setup**.

1. **Font** – You can have several different fonts in the same section. You can set the format before or after you type your text. If you format after, you will need to select the text before you go into the Font window.

2. **Page number** – Inserts the text "&[Page]" which represents the current page number.

3. **Total number of pages** – Inserts the text "&[Pages]" which represents the total number of printed pages. If we wanted to see the phrase Page 1 of 6, we would need to type in the "Page" and " of " (don't forget the

spaces!) So our code would look like -   **Page &[Page] of &[Pages]**

4. **Current date** – Inserts the text "&[Date]". This is the code to display the day the worksheet is printed. This button is automatically updated. If you want it to display the day the worksheet was created, you will need to type the actual date.

5. **Current time** – Inserts the text "&[Time]". Like the Date button, this will automatically update each time the file is printed.

6. **File path** – Inserts the text "&[Path]&[File]". This is the code to show the full file path. Like the Date and Time buttons, this will automatically update. If you move the file, or Save As into another location or with another name, this option will automatically change.

7. **Filename** – Inserts the text "&[File]". This is the code to display the current name of the file.

8. **Worksheet name** – Inserts the text "&[Tab]". This is the code to display the printed worksheet name.

9. **Insert Picture** – Inserts a graphic in the header/footer. This is most often used for logos and watermarks. The image will show in actual size behind the data. Very light images, such as a large graphic of the word DRAFT or CONFIDENTIAL can be inserted into a header and will appear on every page in the printout.

10. **Format Picture** – This button allows you to format the picture you have inserted. If there is no picture, this button will be disabled (grayed out).

The Page Layout View (found on the View tab), allows you to view and edit your Header/Footer and still see the data in your worksheet. From this view you will see the edges of the page and the page numbers in the status bar.

When you click in the Header/Footer area you will get a Header & Footer Tools – Design tab. From here you will see many of the options we have available when setting up our Header/Footer in the Page Setup window.

You may find it useful to create or edit your Header/Footer in this view, where you can see the changes as you make them. To switch views or work within the sheet, double-click back in the cells to leave the Header/Footer design tab.
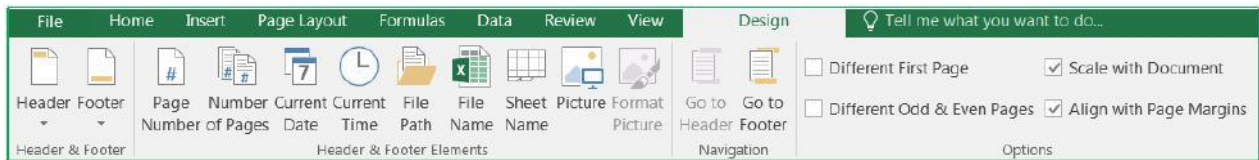
Sheet Tab

The final tab in the Page Setup window allows us to take things from the worksheet to add to our printout.

Print area

This option allows you to choose the range of cells to print. This option is not available if you enter **Page Setup** from the print preview, because you cannot "choose" cells.
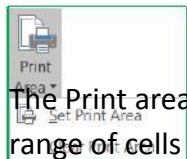
The Print area can also be set from the Page Setup group of the Page Layout tab. Select the desired range of cells and choose, Set Print Area.
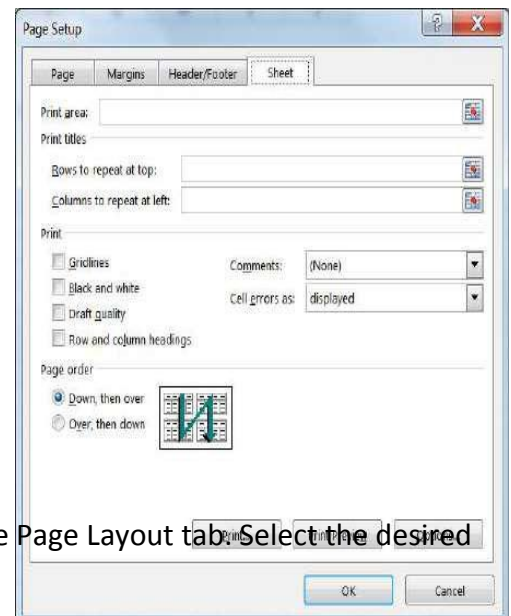
To set the print area from the Page Setup window, click inside Print area box and use the mouse to point to the cells you want. You can move the dialog box by clicking and dragging the blue title bar.

Print Titles

This option allows you to set which **Rows to repeat at the top** of each page, and which **Columns to repeat on the left** of each page. These do not have to be the first row or column; any column can be chosen as your titles and will be repeated on each page of the printout. If you click on this button in the Page Layout tab, it will open the in the **Page Setup** window to the **Sheet** page.

As with the **Print Area**, to set the rows and columns to repeat, click inside the blank in the **Page Setup** window and use your mouse to select the rows/columns you would like repeated on every page.

Gridlines

This option will print the gridlines around all the cells within the print area. The alternative is to place "border" around your cells. Gridlines can be turned on and off from the Page Layout tab, in the Sheet options section.

No Options Set   *Gridlines*

Jack	123
Jill	456
John	789

Jack	123
Jill	456
John	789

Black and white

This option will print your data in simple black and white. This does not include shades of gray. Excel will remove all color formatting from the printout.

No Options Set   *Black and white*

Jack	123
Jill	456
John	789

Jack	123
Jill	456
John	789

Draft quality

This option is the ideal quick printout. Depending on your printer it may reduce printing time. This option will not print gridlines or graphics.

Row and column headings

This option will print out the row headings (the row numbers) and the column headings (the column letters). Row and Column Headings can also be turned on and off from the Page Layout tab, in the Sheet options section.

No Options Set   *Row and column headings*

Jack	123
Jill	456
John	789

	A	B
1	Jack	123
2	Jill	456
3	John	789

Comments

These can be inserted through the **Review** tab in the **Comments** section. By default, comments are not printed, but here on the **Sheet** tab of the **Page Setup** window we have three options that will print the comments: *At end of sheet*, *As displayed on sheet*, and the default **-** *(none).*

Cell errors as

This option allows you to choose how you want the errors to print. The default is to print the errors as you see

them on the screen. But you can change this option to leave those cells blank or fill them all in with N/A or dashes (----).

Page Order

This option allows you to decide how multiple pages will print out. By default, Excel will print data from the upper left corner straight down to the end, and then over to the next page full of data and down. If you want to change the print order, such that Excel reads across and then down, change this option.

Page Breaks

You can tell Excel where to start a new page by choosing **Insert Page Break** from the Page Setup section of the **Print Layout** tab. The page break will be set above and to the left of the selected cell. In **Normal** view the page break will appear slightly thicker gridline. In **Page Break Preview** the page break will appear as a solid blue line.

Normal View   *Page Break Preview*
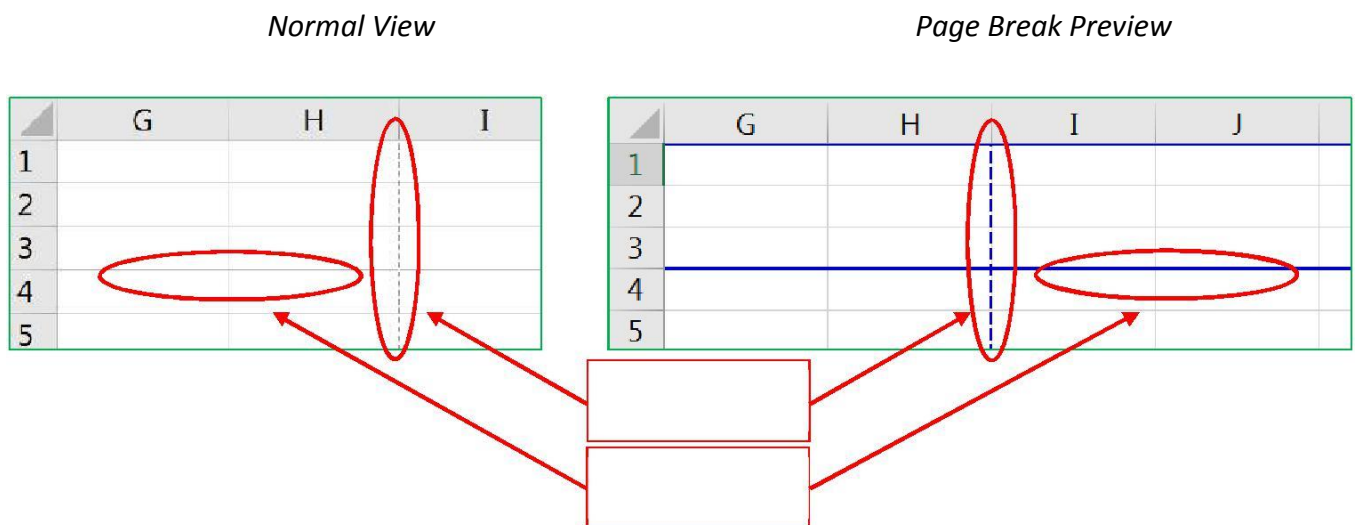
Soft Page Breaks

(natural breaks)

Hard Page Breaks

(inserted breaks)
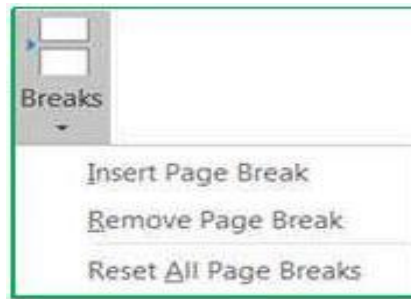
You can remove page breaks that have been inserted. Put yourself in the first cell of that page (below and to the right of the break) and choose **Remove Page Break** from the Page Setup section of the Print Layout tab.

The **Reset All Page Breaks** option will remove all of the inserted page breaks and return the worksheet to the default soft page breaks (natural breaks).

Page Break Preview
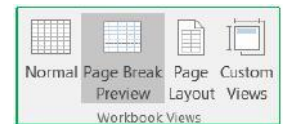
The **Page Break Preview** can be accessed through the View tab, in the Workbook Views group. As with the normal view, you cannot see the headers and footers.

The Page Break Preview shows the order of the pages and allows you to manually move the page breaks. The dashed lines are soft (natural) page breaks. As you change the margins, scale, and orientation of the page, these page lines will automatically update. In this view only, you can drag a page break (a blue line) to another location. When you change where a page break is located, it changes for the entire worksheet. For the whole row and the whole column.

LEARNING OBJECTIVES S

Printing sounds like a simple concept, until that Excel data set just WON'T fit on that printed page! In this workshop we will work with the print preview; set paper size, page orientation, margins, headers and footers; learn how to print titles, gridlines, and column headings; work with the views Page Layout and Page Break Preview; change the document scaling to force the printout into a certain number of

pages; and use print areas and page breaks to adjust what goes on each page. This **basic workshop** assumes some experience with **Microsoft Excel**.

How to use VLOOKUP in Excel 2016

VLOOKUP is a powerful function in Excel. In this tutorial, I'm going to show you how to use VLOOKUP in Excel 2016.

Specifically, I'm going to review an example with the steps needed to apply a VLOOKUP. But before we begin, let's first review the elements of the VLOOKUP function.

Elements of the VLOOKUP in Excel 2016

The VLOOKUP function in Excel has the following structure:

=VLOOKUP(lookup_value, table_array, col_index_num, [range_lookup])

Let's now explain each element within this function:

1. **lookup_value** is the value that is present in your first table, which you wish to find in your second table
2. **table_array** is the range of cells for your second table
3. **col_index_num** is the column position in your second table. For example, the value of '2' represents the second column in your table
4. **[range_lookup]** can assume either a 'TRUE' value for an approximate match, or a 'FALSE' value for an exact match

In the next section, we'll review an example to demonstrate how to use VLOOKUP in Excel 2016.

Example of using the VLOOKUP function

To start, let's review an example, where you have two tables in Excel:

- The first table contains **Client Data** with 3 columns: Client First Name, Client Last Name and Country Code. Let's call this table the 'Client' table
- The second table contains **Country Data** with 2 columns: Country Code and Country Name. Let's call this table the 'Country' tables

For each client name, under the first Client table, the goal is to display the Country Name (to be taken from the second Country table). You can then use the VLOOKUP function to automate this task.

Here is the Client data that can be copied into Excel (under the range of cells A1 to C26). You'll need to rename the first sheet to **Client Data**:

Client First-Name	Client Last-Name	Country Code
Elden	Stanhope	107
Emile	Nation	103
Velda	Labriola	105
Vanesa	Rakowski	109
Sharron	Gorby	120
Cecilia	Swearingen	101
Doretha	Saffell	106
Mariah	Heilman	103
Rana	Bigby	107
In	Vallecillo	116
Librada	Taylor	119
Elane	Mayes	103
Alix	Haskett	109
Anastacia	Goldblatt	115
Melania	Whitlock	108
Dario P	arker	111
Rochel	Witherspoon	106
Lucrecia	Tarrance	114
Jermaine	Lamprecht	102
Regine	Bascom	109
Bryanna	Stansberry	107
Naomi	Arai	114
Darin	Blumstein	108
Greg	Ricketts	102
Wilburn	Guse	118

This is how the client data would look like in Excel:

Next, copy the Country data into a second sheet under the range of cells A1 to B21. You'll need to rename the second sheet to **Country Data**:

Country Code	Country Name
101	Australia
102	Austria
103	Belgium
104	Belize
105	Canada
106	China
107	Finland
108	France
109	Germany
110	Greece
111	Italy
112	Japan
113	Mexico
114	Morocco
115	Nigeria
116	Peru
117	Russia
118	Sweden
119	United Kingdom
120	Uruguay

And this is how the country data would look like in Excel:

Notice that both of the tables have the column *Country Code*, which contains common values under both tables. We will use the values under the Country Code column to connect between the two tables.

Once you connect the two tables via the Country Code, you'll be able to achieve the *goal* of displaying the Country Name for each client under the Client table.

Steps to apply the VLOOKUP in Excel 2016

Let's now look at the steps to apply the VLOOKUP function:

(1) First, go to the 'Client Data' sheet

(2) Next, double-click on cell D2

(3) Then, type/copy:

```
=VLOOKUP(C2,'Country Data'!A:B,2,TRUE)
```

- **C2** is your *lookup_value*. It represents the value that is present in your first Client table, which you wish to find in your second Country table
- **'Country Data'!A:B** is your *table_array*. It represents the range of cells for your second Country table, where you want to find your lookup_value
- The value **2** is your *col_index_num*. It reflects the column position in your Country table. Here, '2' means the second column under your Country table. The values under this second column (i.e., the Country Name column) will then be displayed when you apply the VLOOKUP
- **TRUE** is your *[range_lookup]* which reflects an approximate match

This is how your VLOOKUP function would look like in Excel:

	A	B	C	D	E	F
	SUM		fx	=VLOOKUP(C2,'Country Data'!A:B,2,TRUE)		
1	Client First-Name	Client Last-Name	Country Code			
2	Elden	Stanhope	107	=VLOOKUP(C2,'Country Data'!A:B,2,TRUE)		
3	Emile	Nation	103	VLOOKUP(lookup_value, **table_array**, col_index_num, [range_lookup])		
4	Velda	Labriola	105			
5	Vanesa	Rakowski	109			
6	Sharron	Gorby	120			
7	Cecilia	Swearingen	101			
8	Doretha	Saffell	106			
9	Mariah	Heilman	103			
10	Rana	Bigby	107			
11	In	Vallecillo	116			
12	Librada	Taylor	119			
13	Elane	Mayes	103			
14	Alix	Haskett	109			
15	Anastacia	Goldblatt	115			
16	Melania	Whitlock	108			
17	Dario P	arker	111			
18	Rochel	Witherspoon	106			
19	Lucrecia	Tarrance	114			
20	Jermaine	Lamprecht	102			
21	Regine	Bascom	109			
22	Bryanna	Stansberry	107			
23	Naomi	Arai	114			
24	Darin	Blumstein	108			
25	Greg	Ricketts	102			
26	Wilburn	Guse	118			
27						
28						
29						

Client Data | Country Data

(4) Press Enter, and you'll now see the result of your VLOOKUP function in cell D2. In our case, the country name associated with the country code of 107 is "Finland":

D2		fx	=VLOOKUP(C2,'Country Data'!A:B,2,TRUE)	
	A	B	C	D
1	Client First-Name	Client Last-Name	Country Code	
2	Elden	Stanhope	107	Finland

(5) Finally, drag-down the VLOOKUP function from cell D2 to cell D26, so that you can display the Country Name for each client under your first Client table:

D2 f_x =VLOOKUP(C2,'Country Data'!A:B,2,TRUE)

	A	B	C	D
1	Client First-Name	Client Last-Name	Country Code	
2	Elden	Stanhope	107	Finland
3	Emile	Nation	103	Belgium
4	Velda	Labriola	105	Canada
5	Vanesa	Rakowski	109	Germany
6	Sharron	Gorby	120	Uruguay
7	Cecilia	Swearingen	101	Australia
8	Doretha	Saffell	106	China
9	Mariah	Heilman	103	Belgium
10	Rana	Bigby	107	Finland
11	In	Vallecillo	116	Peru
12	Librada	Taylor	119	United Kingdom
13	Elane	Mayes	103	Belgium
14	Alix	Haskett	109	Germany
15	Anastacia	Goldblatt	115	Nigeria
16	Melania	Whitlock	108	France
17	Dario P	arker	111	Italy
18	Rochel	Witherspoon	106	China
19	Lucrecia	Tarrance	114	Morocco
20	Jermaine	Lamprecht	102	Austria
21	Regine	Bascom	109	Germany
22	Bryanna	Stansberry	107	Finland
23	Naomi	Arai	114	Morocco
24	Darin	Blumstein	108	France
25	Greg	Ricketts	102	Austria
26	Wilburn	Guse	118	Sweden
27				
28				
29				

Client Data | Country Data   ⊕