Microsoft Excel Handbook

How to use this Hand Book

This Handbook on Microsoft Excel is primarily aimed for officials in Government Departments who are required to work on spread sheet applications, who need to analyse, calculate or present numbers in a particular format.

This is a compendium of information on various spread sheet utility features. This book will come handy when one has to work on Excel and would like know the right way of working on particular feature to arrive at the desired output. This book will helpful to the readers from both IT and non -IT background as quick reference guide on various concepts, covered during the training programme.

This Hand book is organised into sections. Each section presents information to the readers with different levels of technical expertise and different needs. At the start of each section is a brief introduction about the topic and subsequently the methods of working on the specific features and their usage with practical examples where ever possible.

Excel is a very popular and widely used tool. It helps in day to day functioning and also helpful for core technical/professional calculation and data analysis. Mastering this tool will help in playing with data to arrive at analytical reports. We hope that this Handbook provides concise, informative and easily used companion for those who work on spread sheet as they can use the information from this book during training and use it as reference guide throughout.

Contents

1. Microsoft Excel – An Introduction

What is Microsoft Excel?

Microsoft Excel is a spread sheet program that is used to record and analyse numerical data**.**

Spreadsheet programme is a software application capable of organizing, storing and analyzing data in tabular form. The application can provide digital simulation of paper accounting worksheets. They can also have multiple interacting sheets with data represented in text, numeric or in graphic form. With these capabilities, spreadsheet software has replaced many paper-based systems, especially in the business world. Originally developed as an aid for accounting and bookkeeping tasks, spreadsheets are now widely used in other contexts where tabular lists can be used, modified and collaborated.

Spreadsheet software provides a distinct advantage when working with numbers. Calculation and functionalities are easier to represent in spreadsheets than in word processors, and thus effective data handling is possible. Spreadsheet software also provides flexible presentation of data. This software is capable of interacting with databases, can populate fields and can also help in automation of data creation and modification. Spreadsheet software can be shared both online and offline and allows for easy collaboration. There are many spread sheet applications available in the market or in open source (free), for the purpose of this training Microsoft Excel is used.

Data in spread sheet is represented by cells**,** organized as rows and columns that form a table and can be text or numeric. Alphabetical letters are assigned to columns and numbers are assigned to rows. The point where a column and a row meet is called a cell**.** The address of a cell is given by the letter representing the column and the number representing a row.

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Why Microsoft Excel

We all deal with numbers in one way or the other. Microsoft Excel comes in handy when we want to record, analyze and store such numeric data and it becomes easy to handle data.

2. Getting Started with Excel 2010

What's New in Excel 2010

With the introduction of Excel 2010, Microsoft is putting the focus on analysing data, visualising trends, and sharing the results. Along with enhancements to existing functionality made across the board, Excel 2010 comes with a few new features too.

New Features of Excel 2010

- **Slicer** – a filter enhancement for PivotTables that helps us to quickly and intuitively drill down and analyse data in our spread sheet.

- **Sparklines** – tiny charts designed to fit in a cell that helps us to visualise trends in the underlying data.

- **Share** - publish to a SharePoint compatible server. You and your colleagues can then work on the same worksheet simultaneously.

- **Conditional formatting** – conditional formatting is much improved. It gives you more control over styles and icons, there are improved data bars, and you have the ability to highlight specific items in a few clicks. You also can display data bars for negative values to more accurately illustrate your data visuals.

- **Protected View for downloaded items** – Excel 2010 prevents you from editing downloaded content without your consent.

- **64-bit support** – in fact, all of the Office 2010 apps offer 64-bit support giving you greater processing power.

- **Greater capacity** – thanks to 64-bit support, the 2GB file size limit on previous versions of Excel is blown out of the water with Excel 2010. You can now work on files that have a staggering 4GB size.

The file you create and edit in MS Excel is called a workbook. You can create an Excel workbook from a blank workbook or from an existing, customizable Excel template. Each workbook file contains many worksheets, which are comparable to individual pages in a Word document. A worksheet is also referred to as a spreadsheet or a sheet, and you can use these terms interchangeably. This book also uses the terms "workbook" and "file" interchangeably.

Starting Excel with the Start Menu
1) Click on Start Button
2) Select All Programs
3) Select Microsoft Office
4) Click on Microsoft Excel 2010

Starting Excel by Using Run Option
1) Click on Start Button
2) Select Run (a dialog box will appear)
3) Type Excel
4) Enter

This will launch the Microsoft Excel 2010 application and you will see the following excel window.
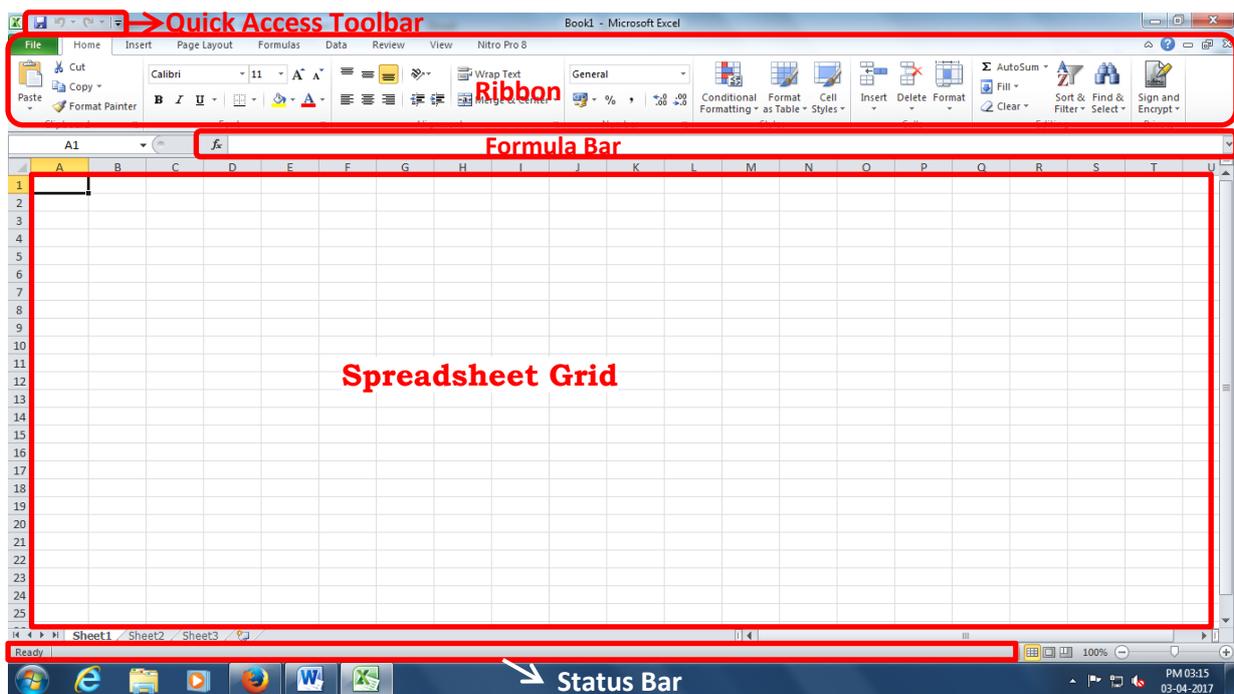
There are 5 important areas in the screen

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1. Quick Access Toolbar:

This is a place where all the important tools can be placed. When you start Excel for the very first time, it has only 3 icons (Save, Undo, and Redo). But you can add any feature of Excel to to Quick Access Toolbar so that you can easily access it from anywhere (hence the name).

2. Ribbon:

Ribbon is like an expanded menu. It depicts all the features of Excel in easy to understand form. Since Excel has 1000s of features, they are grouped in to several ribbons. The most important ribbons are – Home, Insert, Formulas, and Page Layout & Data.

3. Formula Bar:

This is where any calculations or formulas you write will appear. You will understand the relevance of it once you start building formulas.

4. Spreadsheet Grid:

This is where all your numbers, data, charts & drawings will go. Each Excel file can contain several sheets. But the spreadsheet grid shows few rows & columns of active spreadsheet. To see more rows or columns you can use the scroll bars to the left or at bottom. If you want to access other sheets, just click on the sheet name (or use the shortcut CTRL+Page Up or CTRL+Page Down).

5. Status bar:

This tells us what is going on with Excel at any time. You can tell if Excel is busy calculating a formula, creating a pivot report or recording a macro by just looking at the status bar. The status bar also shows quick summaries of selected cells (count, sum, average, minimum or maximum values). You can change this by right clicking on it and choosing which summaries to show.

The Ribbon

Understanding the Ribbon is a great way to help understand the changes between Microsoft 2003 to Microsoft 2007/2010. The ribbon holds all of the information in previous versions of Microsoft Office in a more visual stream line manner through a series of tabs that include an immense variety of program features.

Home Tab

This is the most used tab; it incorporates all text and cell formatting features such as font and paragraph changes. The Home Tab also includes basic spreadsheet formatting elements such as text wrap, merging cells and cell style.
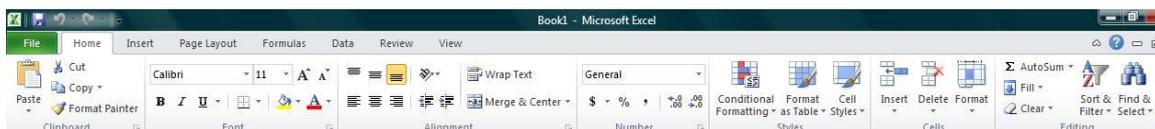
Insert Tab

This tab allows you to insert a variety of items into a document from pictures, clip art, and headers and footers.

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Page Layout Tab

This tab has commands to adjust page such as margins, orientation and themes.
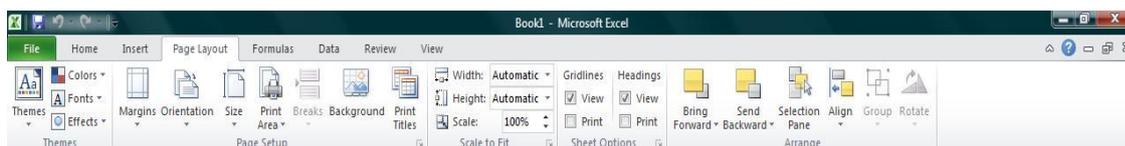
Formulas Tab

This tab has commands to use when creating Formulas. This tab holds an immense function library which can assist when creating any formula or function in your spreadsheet.
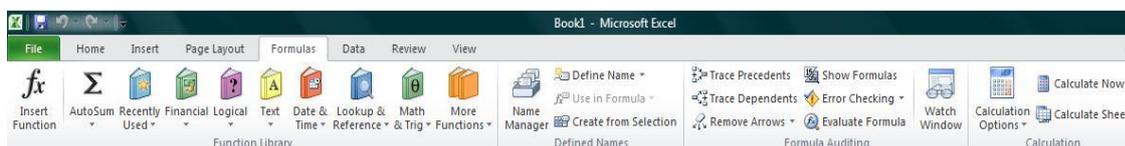
Data Tab

This tab allows you to modifying worksheets with large amounts of data by sorting and filtering as well as analyzing and grouping data.
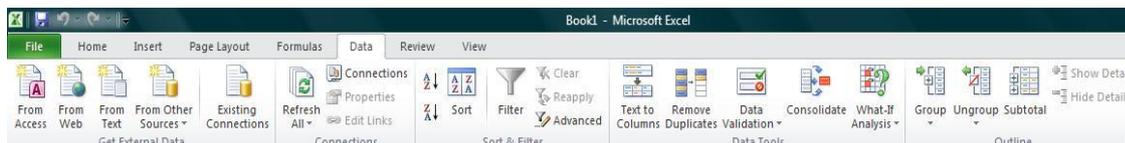
Review Tab

This tab allows you to correct spelling and grammar issues as well as set up security protections. It also provides the track changes and notes feature providing the ability to make notes and changes someone's document.
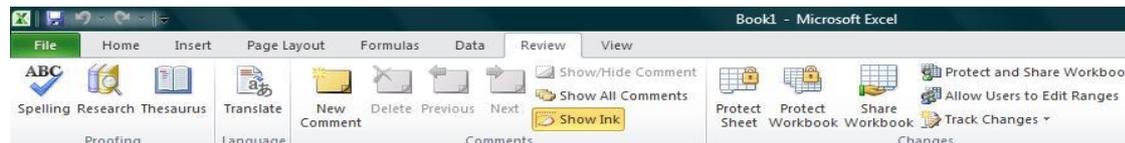
View Tab

This tab allows you to change the view of your document including freezing or splitting panes, viewing gridlines and hide cells.

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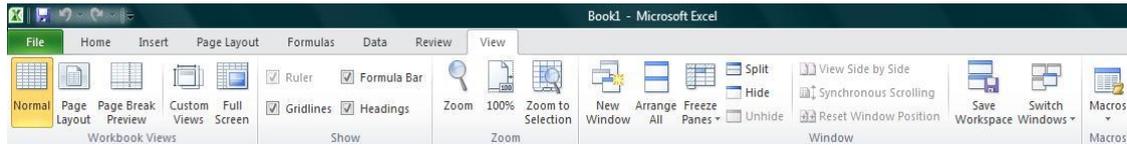
The Excel Worksheet (Spreadsheet) and Workbook

An Excel worksheet, or spreadsheet, is a two-dimensional grid with columns and rows. Look at the spreadsheet below. The column names are letters of the alphabet starting with A, and the rows are numbered chronologically starting with the number one. The cells in the first *row* are A1, B1, C1, and so on. And the cells in the first *column* are A1, A2, A3, and so on. These are called cell names or cell references.

We use **cell references** when creating math formulas or functions. For example, the formula to add the contents of cells B2 and B3 together is: =B2+B3.

The Name Box is located in the area above Column A, and displays the cell reference of the selected cell - the cell where the cursor is resting. In our spreadsheet above, the selected cell is C2. Notice that the column letter (C) and the row number (2) change color.

The beginning of the Formula Bar can be seen in the area above Column D on our worksheet. The Formula Bar displays the contents of the selected cell.

A workbook is a collection of worksheets or spreadsheets. When the Excel program is opened, a workbook opens with three blank worksheets. The names of the worksheets are displayed on tabs at the bottom of the Excel window.

Moving From Cell to Cell

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The arrow keys can be used to move left, right, up, and down from the current cell. Press the Enter key to move to the cell immediately below the current cell, and press the Tab key to move one cell to the right.

Selecting Cells or Range

In order to complete more advanced processes in Excel you need to be able to highlight or select cells, rows and columns. There are a variety of way to do this, see the table below to understand the options.

To select	Do this
A single cell	Click the cell, or press the arrow keys to move to the cell.
A range of cells	Click the first cell in the range, and then drag to the last cell, or hold down SHIFT while you press the arrow keys to extend the selection.
A large range of cells	Click the first cell in the range, and then hold down SHIFT while you click the last cell in the range. You can scroll to make the last cell visible.
All cells on a worksheet	Click the Select All button or press CTRL+A.
Nonadjacent cells or cell ranges	Select the first cell or range of cells, and then hold down CTRL while you select the other cells or ranges. **NOTE:** You cannot cancel the selection of a cell or range of cells in a nonadjacent selection without canceling the entire selection.
An entire row or column	Click the row or column heading. 1 Row heading • Column heading
Adjacent rows or columns	Drag across the row or column headings. Or select the first row or column; then hold down SHIFT while you select the last row or column.
Nonadjacent rows or columns	Click the column or row heading of the first row or column in your selection; then hold down CTRL while you click the column or row headings of other rows or columns that you want to add to the selection.
Cells to the last used cell on the worksheet (lower-right corner)	Select the first cell, and then press CTRL+SHIFT+END to extend the selection of cells to the last used cell on the worksheet (lower-right corner).
Cells to the beginning of the worksheet	Select the first cell, and then press CTRL+SHIFT+HOME to extend the selection of cells to the beginning of the worksheet.
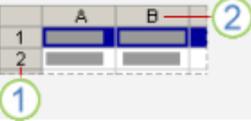
NOTE: To cancel a selection of cells, click any cell on the worksheet. This is not applicable to cells with formulas in it.

Propagating Cell Contents

There are multiple ways to propagate or fill data from one cell to adjacent cells. Let's begin with two popular keyboard shortcuts that allow us to fill down, or fill to the right:

- To fill adjacent cells with the contents of the cell above, select the cell with the data and the cells to be filled and press Ctrl + D (the Ctrl key and the D key) to fill down.
- To fill adjacent cells with the contents of the cell to the left, select the cell with the data and cells to be filled and press Ctrl + R (the Ctrl key and the R key) to fill to the right.

To propagate in any direction, use the Fill Handle. Click in a cell with data to be copied, hover the cursor over the cell's lower right corner until the cursor changes to a thin plus sign (+) or a dark square, and drag up, down, left, or right to fill the cells. Excel's Fill Handle is powerful; see our Fill Handle tutorial.

If the data to be copied is a date, number, time period, or a custom-made series, the data will be incremented by one instead of just copied when the Fill Handle is used. For example, to display the months of the year in column A, type January in cell A1, drag the Fill Handle down to cell A12, and the months will display, in order, in column A!

3. Modifying Spreadsheets

In order to create an understandable and professional document you will need to make adjustments to the cells, rows, columns and text. Use the following processes to assist when creating a spreadsheet.

Cut, Copy, and Paste Data

You can use the Cut, Copy, and Paste commands in Microsoft Office Excel to move or copy entire cells or their contents. **NOTE:** Excel displays an animated moving border around cells that have been cut or copied. To cancel a moving border, press ESC.

Move/Copy Cells

When you move or copy a cell, Excel moves or copies the entire cell, including formulas and their resulting values, cell formats, and comments.

1. Select the cells that you want to move or copy.
2. On the **Home** tab, in the **Clipboard** group, do one of the following:
   a. To move cells, click Cut.
   b. To copy cells, click Copy.
3. Click in the center of the cell you would like to Paste the information too.
4. On the Home tab, in the Clipboard group, click Paste.

NOTES: Excel replaces existing data in the paste area when you cut and paste cells to move them. When you copy cells, cell references are automatically adjusted. If the selected copy or paste area includes hidden cells, Excel also copies the hidden cells. You may need to temporarily unhide cells that you don't want to include when you copy information.

Moving and Copying Cells

To move cell contents, right-click in the selected cell and click Cut; then right-click in the new location and click Paste. Similarly, to copy cell

contents, right-click in the selected cell and select Copy, and paste in the new cell.

You can copy the contents of a cell as described above, but paste and fill multiple adjacent cells. Just highlight the block of cells you want to paste in: click and hold the left mouse button in one corner of the cell range. Still holding the mouse button down, swipe the cursor over to the opposite corner until just the cells you want filled are highlighted. Then right-click and click Paste.

To remove the animated border around the original cell, press the ESC key, or start typing in a new cell.

4. Adding and Deleting Rows and Columns

To insert a new row in a spreadsheet, right-click on a row number, and click Insert. Excel always inserts the row ABOVE the row that was clicked on. If you want to continue inserting rows, press the F4 key to insert each additional row.

To delete a row, right-click on the row number, and click Delete. Contiguous rows can be deleted by highlighting them before clicking Delete. And non-contiguous rows can be selected by pressing and holding the CTRL key before clicking Delete. *Don't press the Delete key on the keyboard unless you just want to delete the cell contents and not the actual row.*

To insert a new column, right-click on a column letter and click Insert. Excel always inserts the column to the LEFT of the column that was clicked on. As with rows, if you want to add additional columns after inserting the first column, press the F4 key.

To delete a column, right-click on the column letter, and click Delete. Contiguous columns can be deleted by highlighting them before clicking Delete. And non-contiguous columns can be selected by pressing and holding the CTRL key. *Don't press the Delete key on the keyboard unless you just want to delete the cell contents and not the actual column.*

Column Width and Row Height

On a worksheet, you can specify a column width of 0 to 255 and a row height of 0 to 409. This value represents the number of characters that can be displayed in a cell that is formatted with the standard font. The default column width is 8.43 characters and the default row height is 12.75 points. If a column/row has a width of 0, it is hidden.

Set Column/Row Width/Height

1. Select the column(s) or row(s) that you want to change.
2. On the **Home** tab, in the **Cells** group, click **Format**.

3. Under **Cell Size**, click **Column Width** or **Row Height**.
4. A **Column Width** or **Row Height** box will appear.
5. In the **Column Width** or **Row Height** box, type the value that you want your column or row to be.

Automatically Fit Column/Row Contents

1. Click the Select All button

2. Double-click any boundary between two column/row headings.

3. All Columns/Rows in the entire worksheet will be changed to the new size

NOTE: At times, a cell might display **#####**. This can occur when the cell contains a number or a date that exceeds the width of the cell so it cannot display all the characters that its format requires. To see the entire contents of the cell with its current format, you must increase the width of the column.

Set Column/Row Width/Height with Mouse
To change the width of one column/row

1. Place you cursor on the line between two rows or columns.

2. A symbol that looks like a lower case t with arrows on the horizontal line will appear

3. Drag the boundary on the right side of the

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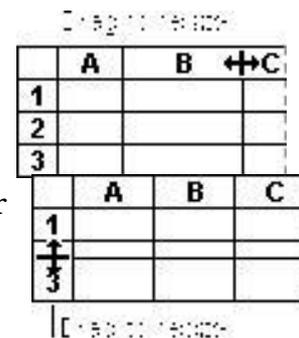
column/row heading until the column/row is the width that you want.

To change the width of multiple columns/rows

1. Select the columns/rows that you want to change
2. Drag a boundary to the right of a selected column/row heading.
3. All selected columns/rows will become a different size.

   To change the width of columns/rows to fit the contents in the cells
1. Select the column(s) or row(s) that you want to change
2. Double-click the boundary to the right of a selected column/row heading.
3. The Column/Row will automatically be size to the length/height of the longest/tallest text.

Merge or Split Cells

When you merge two or more adjacent horizontal or vertical cells the cells become one larger cell that is displayed across multiple columns or rows. When you merge multiple cells, the contents of only one cell appear in the merged cell.

Merge and Center Cells

1. Select two or more adjacent cells that you want to merge.
2. On the **Home** tab, in the **Alignment** group, click **Merge and Center**.
3. The cells will be merged in a row or column, and the cell contents will be centered in the merged cell.
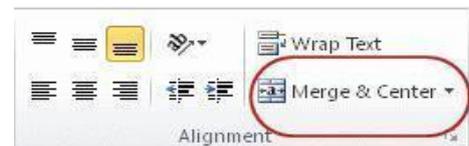
Merge Cells

To merge cells only, click the arrow next to **Merge and Center**, and then click
Merge Across or **Merge Cells**.
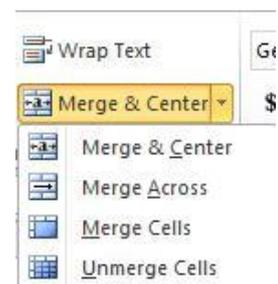
Split Cells

1. Select the merged cell you want to split
2. To split the merged cell, click **Merge and Center** . The cells will split and the contents of the merged cell will appear in the upper-left cell of the range of split cells.

Automatically Fill Data

To quickly fill in several types of data series, you can select cells and drag the fill handle . To use the fill handle, you select the cells that you

want to use as a basis for filling additional cells, and then drag the fill handle across or down the cells that you want to fill.

1. Select the cell that contains the formula that you want to be brought to other cells.
2. Move your curser to the small black square in the lower-right corner of a selected cell also known as the fill handle. Your pointer will change to a small black cross.
3. Click and hold your mouse then drag the fill handle across the cells, horizontally to the right or vertically down, that you want to fill.
4. The cells you want filled will have a gray looking border around them. Once you fill all of the cells let go of your mouse and your cells will be populated.

5. Formatting Spreadsheets

To further enhance your spreadsheet you can format a number of elements such as text, numbers, coloring, and table styles. Spreadsheets can become professional documents used for company meetings or can even be published.

Wrap Text

You can display multiple lines of text inside a cell by wrapping the text. Wrapping text in a cell does not affect other cells.

1. Click the cell in which you want to wrap the text.
2. On the **Home** tab, in the **Alignment** group, click **Wrap Text**.
3. The text in your cell will be wrapped.

NOTE: If the text is a long word, the characters won't wrap (the word won't be split); instead, you can widen the column or decrease the font size to see all the text. If all the text is not visible after you wrap the text, you might have to adjust the height of the row. On the **Home** tab, in the **Cells** group, click **Format**, and then under **Cell Size** click **AutoFit Row**

Format Numbers

In Excel, the format of a cell is separate from the data that is stored in the cell. This display difference can have a significant effect when the data is numeric. For example, numbers in cells will default as rounded numbers, date and time may not appear as anticipated.

After you type numbers in a cell, you can change the format in which they are displayed to ensure the numbers in your spreadsheet are displayed as you intended.

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1. Click the cell(s) that contains the numbers that you want to format.
2. On the **Home** tab, in the **Number** group, click the arrow next to the **Number Format** box, and then click the format that you want.
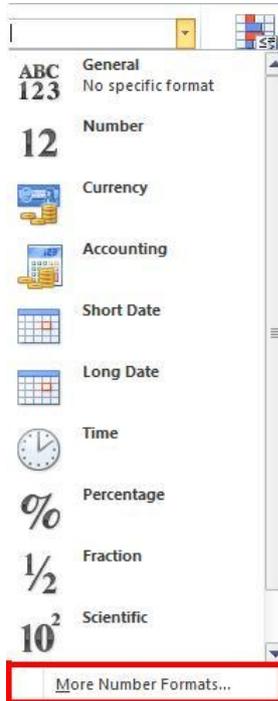
If you are unable to format numbers in the detail you would like that you can click on the **More Number Formats** at the bottom of the **Number Format** drop down list.

1. In the Category list, click the format that you want to use, and then adjust settings to the right of the Format Cells dialog box. For example, if you're using the Currency format, you can select a different currency symbol, show more or fewer decimal places, or change the way negative numbers are displayed.
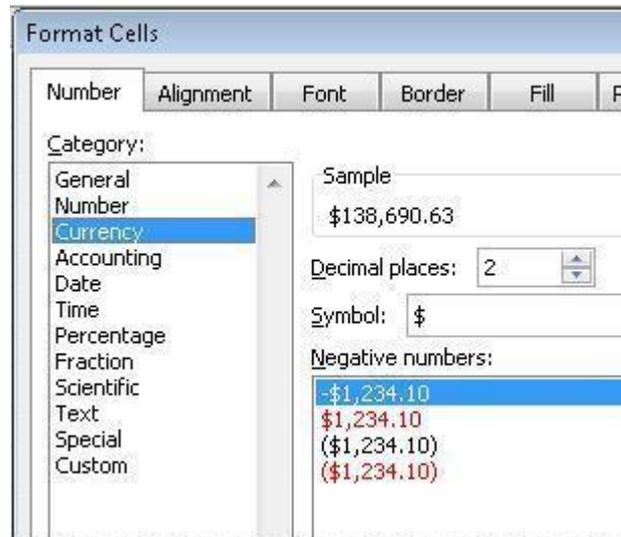
Cell Borders

By using predefined border styles, you can quickly add a border around cells or ranges of cells. If predefined cell borders do not meet your needs, you can create a custom border.

NOTE: Cell borders that you apply appear on printed pages. If you do not use cell borders but want worksheet gridline borders for all cells to be visible on printed pages, you can display the gridlines.

Apply Cell Borders

1. On a worksheet, select the cell or range of cells that you want to add a border to, change the border style on, or remove a border from.

2. Go to the **Home** tab, in the **Font** group
3. Click the arrow next to **Borders** ⊞
4. Click on the border style you would like
5. The border will be applied to the cell or cell range

NOTE: To apply a custom border style, click **More Borders**. In the

Format Cells dialog box, on the **Border** tab, under **Line** and **Color**, click the line style and color that you want.

Remove Cell Borders

1. Go to the **Home** tab, in the **Font** group
2. Click the arrow next to **Borders** ⊞
3. Click **No Border** ⊞.

NOTES: The **Borders** button displays the most recently used border style. You can click the **Borders** button (not the arrow) to apply that style.

6. Locking Cells and Protecting a Worksheet

There are two steps to preventing important cell content from being accidentally overwritten or deleted. First, the cell must be **locked**. Second, the worksheet must be **protected**. If you have any valuable data or complex formulas that you do not want to lose, and data DOES get accidentally erased(!), then you owe it to yourself to learn which cells to lock and which worksheet protection options to take.

Managing Workbooks and Worksheets

When the Excel program is first opened, the user is presented with a workbook containing three empty worksheets (spreadsheets). The first empty worksheet is displayed, and in the bottom left corner of Excel we see three tabs - one for each worksheet - with the names Sheet1, Sheet2, and Sheet3 as shown in the screenshot below. We also see arrows that are used to scroll right and left to locate worksheet tabs when a workbook has a large number   of worksheets.
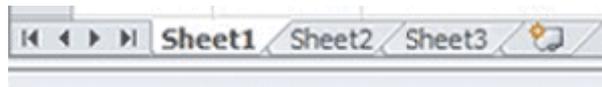
If you're only using one worksheet, you don't have to delete the two unused worksheets - most folks don't bother. Excel workbooks are saved with a file extension of xlsx in newer versions of Excel. Older versions used the xls extension.

How many Excel worksheets can we have in one workbook? Microsoft says the number is limited to your computer's memory! It's handy to group together worksheets that are VERY closely related, and especially if you

are linking data from one worksheet to another. But hopping back and forth using the worksheet tabs can become confusing.

7. Viewing, Renaming, Inserting, and Deleting Worksheets

"Sheet1" isn't very descriptive. Here is how you view, rename, insert, and delete worksheets in a workbook.

How to View a Worksheet

To view a worksheet, click on its tab. If the workbook window is not wide enough to display all of the tabs because of long worksheet names and/or many worksheet tabs, use the arrows to the left of the tabs to navigate left or right, or right-click on any of the arrows and select the desired worksheet from the list that displays.

How to Rename a Worksheet

To rename a spreadsheet, right-click on the spreadsheet tab, select Rename from the context menu, and type a new name. Or, double-click on the worksheet tab and type a new name.

How to Insert a Worksheet

The fastest way to insert a worksheet in a workbook is to simply click on the small tab to the right of the last worksheet tab as shown in the image below. Then you can move the worksheet to a different position if desired.
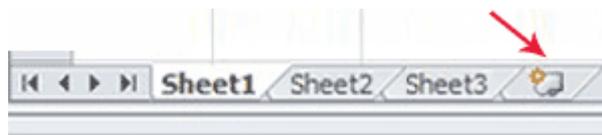
Alternatively, you can insert a new worksheet to the left of an existing worksheet by right-clicking on the tab of the worksheet that is immediately to the right of where you want the new worksheet to be located and select Insert from the Insert window. Excel always inserts a spreadsheet to the left of the selected worksheet.

How to Delete a Worksheet

To delete a worksheet, right-click on the worksheet tab and select Delete from the context menu.

8. Moving Worksheets (Spreadsheets)

Sometimes we need our worksheets need to be in a different order or even in a different workbook.

How to Move a Worksheet in the Same Workbook

There are two ways to move a worksheet in the same workbook. The easy way is to click and hold the left mouse button on a worksheet's tab and slide the tab to its desired position. Watch the little black arrow that appears just above. When it is to the right of left of the adjacent worksheet, release the mouse and the worksheet will be moved.

If you dislike dragging with the mouse, here is another method. Right-click on the tab of the source worksheet and click "Move or Copy..." In the Move or Copy window, click the name of the worksheet that you want the sheet to be *inserted before,* and click OK.

How to Move a Worksheet to a NEW Workbook
To move a spreadsheet to a new workbook, right-click on the tab of the source spreadsheet and click "Move or Copy." In the Move or Copy window, click the drop-down arrow under "To Book:" and click (new book). Excel removes the worksheet from the existing workbook and opens a new workbook containing the moved worksheet. Save the workbook.

How to Move a Worksheet to a Different Workbook
Open both the source workbook and the target workbook. Right-click on the tab of the source worksheet (the one to be moved) and click "Move or Copy..." Then at the top under "To book," click the small down arrow to open up the drop-down menu and click on the name of the target workbook (where the worksheet is to be moved to). Verify that the worksheet was successfully moved to the other workbook and save the workbook.

9. Copying Worksheets (Spreadsheets)

Rather than start from scratch, it is often easier to copy, and then modify, an existing worksheet - especially if you're going to be using a lot of the same formatting, formulas, and so on.

How to Copy a Worksheet in the Same Workbook
To copy a worksheet in the same workbook, right-click on the tab of the source worksheet and click "Move or Copy..." In the Move or Copy window, check the "create a copy" box, click the name of the worksheet that you want the sheet to be *inserted before,* and click OK.

How to Copy a Worksheet to a NEW Workbook
To copy a worksheet into a new workbook, right-click on the tab of the source worksheet and click "Move or Copy..." In the Move or Copy window, click the drop-down arrow under "To Book:" and click (new book). Excel opens a new workbook containing the copied spreadsheet. Save the new workbook.

How to Copy a Worksheet to Different Workbook
The best way to copy a worksheet to an another workbook is as follows: Open both the source workbook and the target workbook. Right-click on the tab of the source worksheet (the one to be copied) and click "Move or Copy..." **On the Move or Copy window, CHECK the box at the bottom titled "Create a copy."** Then at the top under "To book," click the small down arrow to open up the drop-down menu and click on the name of the target workbook (the other workbook). Verify that the worksheet was successfully copied to the other workbook and save the workbook.

As a rather messy alternative, you can copy and paste the contents as follows. In the source worksheet, right-click in the top left corner cell to select all the workbooks cells and select Copy.

Then, open the other Excel workbook, find an empty worksheet, right-click in the top left corner cell to select all cells, and click Paste. Save the workbook.

Return to the first (source) worksheet and press the ESC key to remove the animated border and then click in an empty cell to deselect all of the cells.

10. Important Excel shortcuts

Keystroke	Where the Insertion Point Moves
→	Forward one box
←	Back one box
↑	Up one box
↓	Down one box
PageUp	To the previous screen
PageDown	To the next screen
Home	To the beginning of the current screen
End	To the end of the current screen

Shortcut keys using Ctrl Keys

Key Combination	Where the Insertion Point Moves
Ctrl + →	To the last box containing data of the current row.
Ctrl + ←	To the first box containing data of the current row.
Ctrl + ↑	To the first box containing data of the current column.
Ctrl + ↓	To the last box containing data of the current column.
Ctrl + PageUp	To the sheet in the left of the current sheet.
Ctrl + PageDown	To the sheet in the right of the current sheet.
Ctrl + Home	To the beginning of the sheet.
Ctrl + End	To the end of the sheet.

Avoid common errors with formulas

The following table summarizes some of the most common errors that you can make when entering a formula and how to correct those errors:

MAKE SURE THAT YOU	MORE INFORMATION
Match all open and close parentheses	Make sure that all parentheses are part of a matching pair. When you create a formula, Excel displays parentheses in color as they are entered.
Use a colon to indicate a range	When you refer to a range of cells, use a colon (**:**) to separate the reference to the first cell in the range and the reference to the last cell in the range. For example, **A1:A5**.
Enter all required arguments	Some functions have required arguments. Also, make sure that you have not entered too many arguments.
Nest no more than 64 functions	You can enter, or nest, no more than 64 levels of functions within a function.
Enclose other sheet names in single	If the formula refers to values or cells on other worksheets or

	workbooks, and the name of the other workbook or worksheet contains a non-alphabetical character, you must enclose its name within single quotation marks (').
Enter numbers without formatting	Do not format numbers as you enter them in formulas. For example, even if the value that you want to enter is $1,000, enter **1000** in the formula.

11. Advanced Spreadsheet Modification

Once you have created a basic spreadsheet there are numerous things you can do to make working with you data easier. Some of these elements are hiding, freezing and splitting rows. You can also sort and filter data, these features are quite helpful when working with a large amount of data.

Hide or Display Rows and Columns

You can hide a row or column by using the **Hide** command or when you change its row height or column width to 0 (zero). You can display either again by using the **Unhide** command. You can either unhide specific rows and columns, or you can unhide all hidden rows and columns at the same time. The first row or column of the worksheet is tricky to unhide, but it can be done.
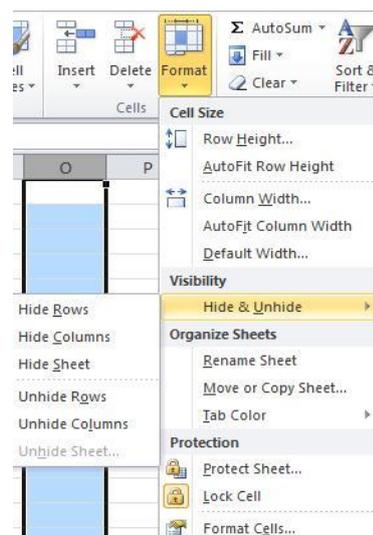
Hide Rows or Columns

1. Select the rows or columns that you want to hide.
2. On the **Home** tab, in the **Cells** group, click **Format**.
3. Under **Visibility**, point to **Hide & Unhide**, and then click **Hide Rows** or **Hide Columns**.

NOTE: You can also right-click a row or column (or a selection of multiple rows or columns), and then click **Hide**.

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Unhide Rows or Columns

1. Select the rows, columns or entire sheet to unhide.
2. On the Home tab, in the Cells group, click Format.
3. Under Visibility, point to Hide & Unhide, and then click Unhide Rows or Unhide Columns

TIP: You can also right-click the selection of visible rows and columns surrounding the hidden rows and columns, and then click Unhide

Freezing/Splitting Rows and Columns

To keep an area of a worksheet visible while you scroll to another area of the worksheet, you can either lock specific rows or columns in one area by freezing panes.

Freezing vs. splitting

When you freeze panes, Microsoft Excel keeps specific rows or columns visible when you scroll in the worksheet. For example, if the first row in your spreadsheet contains labels, you might freeze that row to make sure that the column labels remain visible as you scroll down in your spreadsheet. A solid line indicates that the row is frozen to keep column labels in place when you scroll.
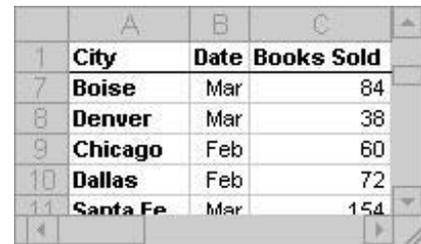
When you **split** panes, Excel creates either two or four separate worksheet areas that you can scroll within, while rows or columns in the non-scrolled area remain visible. This worksheet has been split into four areas. Notice that each area contains a separate view of the same data. Splitting panes is useful when you want to see different parts of a large spreadsheet at the same time.

NOTE: You cannot split panes and freeze panes at the same time.

Freeze Panes

1. On the worksheet, select the row or column that you want to keep visible when you scroll.
2. On the **View** tab, in the **Window** group, click the arrow below **Freeze Panes**.
3. Then do one of the following:
   - To lock one row only, click **Freeze Top Row**.
   - To lock one column only, click **Freeze First Column**.

- To lock more than one row or column, or to lock both rows and columns at the same time, click **Freeze Panes**.

NOTE: You can freeze rows at the top and columns on the left side of the worksheet only. You cannot freeze rows and columns in the middle of the worksheet.

Unfreeze panes
1. On the **View** tab, in the **Window** group, click the arrow below **Freeze Panes**.
2. Click **Unfreeze Panes**.
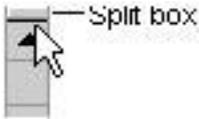
Split Panes
1. To split panes, point to the split box at the top of the vertical scroll bar or at the right end of the horizontal scroll bar.
2. When the pointer changes to a split pointer ⇳or ↔, drag the split box down or to the left to the position that you want.
3. To remove the split, double-click any part of the split bar that divides the panes.

12. Basic Math Calculations in Excel

Whenever the contents of the cells referenced in a math formula change, Excel will automatically recalculate the answer for you. That is what makes this software program so powerful.

The 5 basic rules to remember as we discuss Excel formulas are:

1. All Excel formulas start with an equal (=) sign. This tells Excel that it is a formula.
2. The answer to the formula displays in the cell into which the formula is entered.
3. Cells are referenced in a formula by their column-row identifier, ie. A1, B2.
4. The symbols for addition, subtraction, multiplication, and division are: + - * /
5. You do not have to enter capital letters in your formula; Excel will automatically capitalize them.

Example of simple math formulas:

- =A1+A6   this Excel formula adds the contents of cell A1 and A6
- =A1+A2+A3   this Excel formula adds the contents of the three cells specified. (See the SUM function for adding multiple numbers)
- =A3-A1   this Excel formula subtracts the contents of cell A1 from the contents of cell A3

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- =B2*B3   this Excel formula multiples the numbers in cells B2 and B3
- =G5/A5   this Excel formula divides G5 by A5. (NOTE: If you see the error message #DIV/O! in a cell, you are trying to divide by zero or a null value - which is not allowed.)
- =G5^2   this formula tells Excel to square the value in cell G5. The number *after* the caret is the exponent. Likewise, the formula H2^3 would cube the value in cell H2.

We can combine multiple operations in one formula. Make sure you use parentheses where needed or you may not get the correct results (see Order of Operations below). Here are some examples:

- =(C1+C3)/C4   This Excel formula adds the value in C1 to the value in C3, and then divides the result by the value in C4
- =4*(A2+A5)+3   This Excel formula adds the contents of A2 and A5, multiples this sum by 4, and then adds 3.

Mathematical Order of Operations

Remember the Order of Operations by remembering the phrase
Please **E**xcuse **M**y **D**ear **A**unt **S**ally.

The letters stand for: Parentheses, Exponents, Multiplication, Division, Addition, and Subtraction. And all operations are carried out from left to right. Here is how the order is applied:

1. First, any math inside of parentheses is calculated.
2. On the second pass, all exponents are resolved.
3. Then any multiplication OR division is performed.
4. Lastly, any addition OR subtraction is performed.

Note: Even though the Aunt Sally phrase may imply that multiplication is done before division, and addition is done before subtraction, that is not true. They are performed during the same step, or pass, through the formula.

Let's illustrate with a simple formula: 4+2*3

- Since the multiplication must be done first, our expression resolves itself to 4+6=10.

Let's practice with a more complex formula: (2*4)+3^2-8/4

- Step 1 - Parentheses: 2*4 = 8. Now our expression reads: 8+3^2-8/4
- Step 2 - Exponents: 3^2=9. Now our expression reads: 8+9-8/4

- Step 3 - Multiply and Divide: 8/4=2. Now our expression reads: 8+9-2
- Step 4 - Add and Subtract: The answer is 15

Now test your skill on a complicated formula! 3^(6/3)+(3*3)-2*(6-3)

- Pass 1 - Parentheses: 6/3=2, 3*3=9, and 6-3=2. So now our formula reads: 3^2+9-2*3
- Step 2 - Exponents: 3^2=9. So now our formula reads: 9+9-2*3
- Step 3 - Multiply and Divide: 2*3=6. So now our formula reads: 9+9-6
- Step 4 - Add and Subtract: 12

Copying and Pasting Formulas

To copy the contents of a cell, click in the cell, right-click, and click Copy. (Or use the keyboard shortcut Ctrl+C.) Then place the cursor in the receiving cell, right-click, and click Paste. (Or use the keyboard shortcut Ctrl+V.)

To remove the animated border on the original cell, press Enter, press the Esc key, or click in another cell and begin typing.

When pasting the contents of a cell into multiple cells, the cell contents need only be copied once. Use the arrows on the keyboard to move to the other cells and paste.

Examples of Excel Functions: The SUM Function

The SUM function allows the user to easily add values from a range of cells.

Description of the SUM Function

It's easy to add in Excel. To add the contents of cells G3 and G4, merely type =G3+G4. But the SUM function in vital when adding lengthy columns of cells.

The syntax for the SUM function is:

SUM (number1,number2,number3, ...)
Where:
► number1, number2, number3, ... are from 1 to 255 arguments, for which you want the sum. The arguments can contain cell references, formulas, and functions.

Examples of the SUM Function

=SUM(2,1,3) - This Excel function adds the numbers 2, 1, and 3 and returns a value of 6.

=SUM(B6:M6,R6) - This Excel function adds the contents of B6 through M6, plus R6.

=SUM(A2:A23)/150 - This Excel formula adds the contents in A2 through A23 via the SUM function, and then divides the result by 150.

=10*SUM(A1:D1) - This Excel formula adds the contents of cells A1 through D1 as directed by the SUM function, and then multiplies the result by 10.

=SUM(A2:A14,C4:C29) - This Excel function adds together the sum of the contents of A2 through A14, and the sum of the contents of C4 through C29.

=SUM(6/3,4*2,33) - This Excel function adds the numbers 2 (6÷3), 8 (4x2), and 33 and returns a value of 43.

13. The AVERAGE Function

We often use the word "average" in our daily lives. But in the world of mathematics, the average, also called the **mean**, of a group of numbers has a strict definition and must be calculated.

What is the AVERAGE Function?

When you find the average of a group of numbers, you calculate their sum and then divide the sum by the number of numbers in the group. Microsoft Excel calculates averages with the AVERAGE function.

The syntax of the AVERAGE function is:

AVERAGE(number1, number2, number3, ...)
Where:
► number1, number2, etc. are from 1 to 255 arguments for which Excel should find the average. The arguments can be numbers; or cell references, cell ranges, formulas, or other functions that resolve to a number.

Cells that contain the AVERAGE function should be formatted to a desired number of decimal points as the decimal portion may be infinite when averaging numbers.

Example of the AVERAGE Function

=AVERAGE(4,5,2) . . . This Excel function adds three numbers and divides by 3: (4 + 5 + 2 = 11; 11 ÷ 3 = 3.66666..... If the cell is formatted to display 2 decimal points, Excel returns a value of 3.67

Worksheet Examples of the AVERAGE Function

Example #1:

=AVERAGE(C1,C4) . . . This example shows that individual cell references can be arguments. The average of C1 and C4 is 4: 3 + 5 = 8; 8 ÷ 2 = 4

Example #2:

=AVERAGE(C1:C3) . . . This example shows the function containing a cell range. The average of the first 3 cells in Column C is 3: 3 + 4 + 2 = 9; 9 ÷ 3 = 3

Example #3:

=AVERAGE(C1:C2,5) . . . This example shows that arguments can be numbers: 3 + 4 + 5 = 12; 12 ÷ 3 = 4

Example #4:

 =AVERAGE(C1:C2,C4) . . . This example mixes a cell range with a cell reference. Since C4 contains the number 5, the answer is the same as Example #3 above

14. The MAX Function

The MAX function determines the *largest* value from the range specified in the arguments..

The syntax of the MAX function is:

> **MAX(number1, number2, ...)**
> Where:
> ► number1, number2, etc. are from 1 to 255 arguments, which can contain cell references, formulas, or functions that resolve to numeric values.

Now let's look at several spreadsheet examples of the MAX function.

Examples of the MAX Function

Example 1:

=MAX(A1:A5,500) — This Excel function determines the largest value among the numbers in cells A1 through A5, and the number 500. Excel returns a value of 755 (cell A3).

Example 2:

=MAX(A1:A5,900) — This Excel function determines the largest value among the numbers in cells A1 through A5, and the number 900. Excel returns a value of 900.

Example 3:

=MAX(A1:B5) — This Excel function determines the largest value among the numbers in the cell range A1 through B5. Excel returns a value of 923 (cell B3).

Example 4:

=MAX(A1:B1,A5,B5) — This Excel function determines the largest value among 4 specific cells. Excel returns a value of 502 (cell A1).

15. The MIN Function

The MIN function determines the *smallest* value from the range specified in the arguments.

The syntax of the MIN function is:

> **MIN(number1, number2, ...)**
> Where:
> ► where number1, number2, etc. are from 1 to 255 arguments, which can contain cell references, formulas, or functions that resolve to numeric values.

Examples of the MIN Function

Look at the last two examples in the worksheet below that show the MIN function:

	A	B	C	D
1	502	336	20	Function: =MIN(A1:B5)
2	223	89	65	Function: =MIN(B1:B5,100)
3	755	923	10	Function: =MIN(A1:B5,10)
4	20	65	89	Function: =MIN(A1,B1,A5,B5)
5	333	89		

Example 1:

=MIN(A1:B5) — This Excel function determines the smallest value among the cell range of A1 to B5. Excel returns a value of 20 (cell A4).

Example 2:

=MIN(B1:B5,100) — This Excel function determines the smallest value among the numbers in cells B1 through B5, and the number 100. Excel returns a value of 65 (cell B4).

Example 3:

=MIN(A1:B5,10) — This Excel function determines the smallest value among the numbers in the cell range A1:B5, and the number 10. Excel returns a value of 10.

Example 4:

=MIN(A1,B1,A5,B5) — This Excel function determines the smallest value among the 4 cells listed, and returns a value of 89 (cell B5).

16. What is the COUNT Function?

This excel function calculates the number of cells that contain *numeric values* or the number of arguments in the function, if any, that are numeric. The syntax of the COUNT function is:

> **COUNT(value1, [value2], . . .)**
>
> Where:
>
> ► **value1** is required and is an item, cell reference, or range of cells, and
>
> ► [value2] . . . are optional and are 1 to 255 additional items, cell references, or ranges.

For example, the function **=COUNT(5,10,15)** would ask Excel to count the number of arguments that are numeric (3). And the function **COUNT(C1:C22)** would ask Excel to count the number of cells in the range C1 through C22 that contained a numeric value.

Examples of the COUNT Function

Now let's look at three unique examples of the COUNT function. In the spreadsheet below, columns A and B contain data. Column C contains the actual COUNT function, so what we see is the function's result. Column D shows the function. Follow along as we discuss each of the three examples below the worksheet image.

	A	B	C	D
1	Cost	Sales	3	=COUNT(A1:A5)
2	6.89	35	4	=COUNT(A1:A5,10)
3	8/8/2012	Good	5	=COUNT(A1:A5,B1:B5)
4		7/7/2014		
5	40179	#REF!		

Example 1:

=COUNT(A1:A5) - This Excel function counts the number of cells in the range A1 through A5 that contain a numeric value. Excel returns a value of 3 (cells A2, A3, and A5). Cells A1 and A4 are not counted because they do not contain numbers.

Example 2:

=COUNT(A1:A5,10) - The number of cells with numeric values in cells in A1 to A5 is 3, plus 1 for the number 10; so Excel displays 4 (cells A2, A3, A5, and the number 10)

Example 3:

=COUNT(A1:A5,B1:B5) - This Excel function counts all cells containing numeric values in cells A1 to A5, and cells B1 to B5. Excel returns a value of 5 (cells A2, A3, A5, B2, and B4)

17. The COUNTIF Function

This Excel function allows you to display the number of cells in a single range whose values meets specific criteria. The default action or operator for the COUNTIF function is **equals** and **is not included when writing the function**. The syntax of the COUNTIF function is:

COUNTIF(**range**,**criteria**) ... where range is a group of cells, and criteria is the value a cell must have to be counted.

Example #1:

=COUNTIF(B1:B9,4) counts the number of cells in B1-B9 whose value equals 4.

Example #2:

 =COUNTIF(B1:B9,A1) counts the number of cells in the same range whose value equals that of cell A1.

Example #3:

=COUNTIF(B1:B9,"yes") counts the number of cells in B1-B9 that contain the word **yes** - text must be enclosed in quotation marks.

Other COUNTIF Function Operators

As discussed above, the default operator for the COUNTIF function is equals. However, advanced users can specify the other operands listed below, and this tutorial discusses, and provides examples of, the use of these other operands.

> greater than
< less than
>= greater than or equal to
<= less than or equal to
<> not equal to

These operators **must be enclosed in quotation marks!**

Advanced COUNTIF Spreadsheet Examples

The image below shows our Excel spreadsheet containing seven advanced examples of the COUNTIF function.

Columns A and B contain text and numerical data. **Column C contains the actual function**, and we show what the function looks like in Column D.

Read the explanation of each example, and then study the worksheet. We repeat the worksheet image several times for your convenience.

	A	B	C	D
1	Baker	40	5	Function: =COUNTIF(A1:A7,"<>Smith")
2	Hall	10	3	Function: =COUNTIF(B1:B7,"<"&B1)
3	May	110	1	Function: =COUNTIF(A1:A7,"<>*")
4		30	6	Function: =COUNTIF(A1:A7,"<>"&"")
5	Smith	70	3	Function: =COUNTIF(A1:A7,"<N")
6	Smith	30	3	Function: =COUNTIF(B1:B7,">"&AVERAGE(B1:B7))
7	Vine	60	33%	Function: =COUNTIF(A1:A7,"Smith")/
8				(ROWS(A1:A7)– COUNTIF(A1:A7,"<>*"))

Example 1: Count the cells in a range whose values do not equal a string of text

=COUNTIF(A1:A7,"<>Smith") - The operand and criteria must be wrapped in quotes as shown. This function returns a value of 5 as there are five cells in the range that do not equal Smith. Excel excludes empty cells, cells with numbers, and error messages.

Many tutorials instruct users to concatenate every value that follows an operator. For instance, it is perfectly OK to write the function as =COUNTIF(A1:A7,"<>"&"Smith"). It just isn't necessary.

Example 2: Count the cells in a range that are < the contents of a particular cell

=COUNTIF(B1:B7,"<"&B1) - **When using an operator AND referencing a cell name in the criteria**, two rules must be followed.

- The operator must be enclosed in quotation marks, and

- An ampersand (&) must precede the cell name

The ampersand (&), which is the concatenation operator, must precede the cell name so that Excel knows you are referencing a cell name. If you omit the ampersand, Excel will display the dreaded "The formula you typed contains an error" popup window.

Referencing a cell name with an operator is one of the few instances that concatenation must be specified.

	A	B	C	D
1	Baker	40	5	Function: =COUNTIF(A1:A7,"<>Smith")
2	Hall	10	3	Function: =COUNTIF(B1:B7,"<"&B1)
3	May	110	1	Function: =COUNTIF(A1:A7,"<>*")
4		30	6	Function: = COUNTIF(A1:A7,"<>"&"")
5	Smith	70	3	Function: =COUNTIF(A1:A7,"<N")
6	Smith	30	3	Function: =COUNTIF(B1:B7,">"&AVERAGE(B1:B7))
7	Vine	60	33%	Function: =COUNTIF(A1:A7,"Smith")/
8				(ROWS(A1:A7)– COUNTIF(A1:A7,"<>*"))

Example 3: Count the number of cells in a range that do not contain text

=COUNTIF(A1:A7,"<>*") - In this example, the criterion must be wrapped in quotation marks since we are using an operator. We use the wildcard * to refer to any text. Excel counts the number of cells that do not contain text and returns a value of 1 (cell A4).

Excel will count all cells other than cells containing text: empty cells, cells with numbers, and cells with error messages. Excel will *not* count, however, cells that have been cleared of data by pressing the space bar. Clearing cells this way places a blank space character in the cell. Use the delete key to clear the contents of a cell instead.

Example 4: Count the number of cells in a range that are not empty

=COUNTIF(A1:A7,"<>"&"") - In Excel, a blank or empty cell (one that does not contain a blank space character) is referenced by a pair of double quotation marks, "". This example counts the number of cells in A1:A7 that are not empty. We wrap the operator in quotation marks "<>" - and then place the concatenate operator & before the pair of double quotation marks symbolizing 'empty.' Excel returns a value of 6.

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	A	B	C	D
1	Baker	40	5	Function: =COUNTIF(A1:A7,"<>Smith")
2	Hall	10	3	Function: =COUNTIF(B1:B7,"<"&B1)
3	May	110	1	Function: =COUNTIF(A1:A7,"<>*")
4		30	6	Function: =COUNTIF(A1:A7,"<>"&"")
5	Smith	70	3	Function: =COUNTIF(A1:A7,"<N")
6	Smith	30	3	Function: =COUNTIF(B1:B7,">"&AVERAGE(B1:B7))
7	Vine	60	33%	Function: =COUNTIF(A1:A7,"Smith")/
8				(ROWS(A1:A7)– COUNTIF(A1:A7,"<>*"))

Example 5: Count the number of cells in a range containing text, and whose first initial is greater than or less than a specific letter.

=COUNTIF(A1:A7,"<N") - This application of the COUNTIF function is useful for counting the number of cells whose values are in the first half of the alphabet (A-M) or the last half of the alphabet (N-Z). However, when working with criteria of this nature, strict rules must be followed or Excel will not return the value you expect.

When counting the number of cells in the *lower half of the alphabet*, the criterion should read "<N" (and *not* "<=M"). Always use < on the first letter after the range's upper limit.

And when counting the number of cells in the *upper half of the alphabet*, code ">=N" (*not* ">M"). Always use >= on the lowest letter of the range.

Example 6: Count the cells in a range that are greater than the average of the cells in that range

=COUNTIF(B1:B7,">"&AVERAGE(B1:B7)) - This useful application of the COUNTIF function counts the number of cells whose values are above a calculated average. (This function can be modified, or course, to count cells that are less than average or equal to an average.) The operator must be wrapped in quotation marks and an & placed before the AVERAGE function. The average of the 7 numbers in this example is 50, so Excel returns a value of 3.

	A	B	C	D
1	Baker	40	5	Function: =COUNTIF(A1:A7,"<>Smith")
2	Hall	10	3	Function: =COUNTIF(B1:B7,"<"&B1)
3	May	110	1	Function: =COUNTIF(A1:A7,"<>*")
4		30	6	Function: =COUNTIF(A1:A7,"<>"&"")
5	Smith	70	3	Function: =COUNTIF(A1:A7,"<N")
6	Smith	30	3	Function: =COUNTIF(B1:B7,">"&AVERAGE(B1:B7))
7	Vine	60	33%	Function: =COUNTIF(A1:A7,"Smith")/
8				(ROWS(A1:A7)– COUNTIF(A1:A7,"<>*"))

Example 7: Calculate the percentage of cells in a range that meet certain criteria - excluding cells without text

=COUNTIF(A1:A7,"Smith")/(ROWS(A1:A7)-COUNTIF(A1:A7"<>*")) - This example illustrates how to ask Excel to determine what percent as particular text value is compared to all of the cells in the range with text values. It can be modified with wildcards; or empty cells could also be eliminated from the dividend before calculating the percentage. Do remember that Excel does not consider a cell empty if the space is pressed when the cell is active. Use the delete key to clear a cell of all data.

We begin with a COUNTIF function that counts the cells containing Smith (2). We then divide that number by the number of rows, as determined by the ROWS function (7), less the number of cells without text values (1).

Notice that the last two functions *must be enclosed in parentheses* so Excel will subtract the cells without text values *before* dividing. Without these parentheses, Excel would perform the division first. (Mathematical Order of Operations is important to understand. See our Math Basics tutorial on the Excel Basics menu.). Our equation reads: 2 ÷ (7 - 1). Format the cell as a percentage.

18. Logical Function

If function

The IF function of Excel is a very powerful function. It allows the user to specify certain criteria, and then instruct Excel to perform one action if the criteria is true, and perform a different action if the criteria is not true.

Description of the IF Function

One of the most useful functions in Excel is the IF function. The IF function allows you to test a condition and have one value returned if the condition is TRUE, and another value returned if the condition is FALSE.

The syntax of the IF function is:

IF(logical-test, value-if-true, value-if-false)
where:
► logical-test is a condition which must evaluate to either TRUE or FALSE

> ► value-if-true is the value Excel returns if the logical test evaluates to TRUE
>
> ► value-if-false is the value that Excel returns if the logical test evaluates to FALSE

More Information on Excel IF Function

- You can use IF Function for nested formulas.

- The maximum number of nested condition you can perform is 64.

- You can use comparison operators to evaluate a condition in IF function.

Examples of the IF Function

=IF(D1>26,33,44) - This Excel function checks to see if the value in D1 is greater than 26. If so, Excel returns a value of 33. If not, a value of 44 is returned.

=IF(A5<>"","Done","Open") - This Excel function, a value of Done will be returned if cell A5 is not empty. Otherwise, a value of Open will be returned.

=IF(D1<100,"OK","Over Budget") - This Excel formula checks to see if the value in D1 is less than 100. If so, Excel displays OK. If not, Excel displays Over Budget. Text must be wrapped in quotation marks.

=IF(SUM(A1:A3)=50,"Slow","Fast") - This Excel formula checks to see if the sum of the contents of cells A1 through A3 equals 50. If so, Excel returns a value of Slow. If not, Fast is displayed.

=IF(A2>1000,985,B2+245) - This Excel formula checks to see if the value in A2 is greater than 1000. If so, Excel returns a value of 985. If not, Excel displays the sum of B2 and 245. Nested IF Functions

The IF function allows the user to ask Excel to test certain criteria and to perform different actions depending on if the criteria is met or not. Because data analysis can be complex, often the logical-test, value-if-true, and/or value-if-false portions of our IF function must, in themselves, contain an IF function. When IF functions are used inside of IF functions, we call this **nested IFs**.

Excel allows both the "value-if-true" parameter and the "value-if-false" parameter of the IF statement **to contain IF statements**. These are called Nested IFs.

Here is an example of an IF statement for the **value-if-false** parameter:

=IF(B9>=18,"Adult",IF(B9>12,"Teen","Child"))

This function evaluates the value in cell B9. If the value in B9 is ≥18, the logical test is true, so Excel displays Adult *and stops reading the function.*

If the value is not ≥18, Excel executes the **value-if-false** argument. This argument contains an IF statement testing to see if the value in B9 is >12. If true, Excel returns a value of Teen. If not true, Excel displays Child in the cell.

Nested IFs: Example 1

Review the worksheet below. Each team plays two rounds and their scores are added. Scores are always integers; there are no "half" points for example. If their total score is 12 or greater (> 11), they get a Gold medal. If the total score is 8, 9, 10, or 11 (>7 but < 12), they are awarded a Silver Medal. If 7 or less, they receive no prize.

The formula for Team A which we have entered into cell E2 can be seen in the worksheet's formula bar. We also show the formula below:

=IF((C2+D2)>11,"Gold",IF((C2+D2)>7,"Silver","No Prize"))

Let's look at how Excel processes Team A's formula. First, it encounters an IF statement asking if the sum of cells C2 and D2 is greater than 11. The sum is 10, so Excel processes the **value-if-false** portion of the IF statement which begins with another IF function.

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In this second IF function, Excel now compares the sum of the contents of C2 and D2, to see if the sum is greater than 7. Since the sum is 10, the test is true, so Excel does what the **value-if-true** portion of the IF statement instructs, which is to display **Silver** in the cell and quit processing the formula.

=IF((C2+D2)>=12,"Gold",IF((C2+D2)>=8,"Silver","No Prize"))

Note: Because we are working with Integers in this example, instead of writing >=12, we can just say >11. However, if we had to account for decimals, or if it is easier for you think in terms of >=, then see the equivalent formula above.

Nested IFs: Example 2

A common example of nested IF functions is when grades or awards are based upon a numeric scale.

The spreadsheet below shows the first 6 students of a class. The cells in Column C contain a formula with nested IF functions for Excel to determine the letter grade based upon the numeric grade that the instructor entered in column B.

| C4 | fx | =IF(B4>89,"A",IF(B4>79,"B",IF(B4>69,"C",IF(B4>59,"D","F")))) |

	A	B	C	D	E	F
1	Name	Numeric Grade	Letter Grade			
2	Bell, J.	65	D			
3	Cass, R.	95	A			
4	Cole, A.	55	F			
5	David, P.	95	A			
6	Dean, J.	75	C			
7	Frank, L.	85	B			

The formula with nested IFs for the third student on the list, Mr. Cole, can be seen in the worksheet's formula bar, and is shown below. We've color coded the parentheses to make it easier to see the nested IF statements.

=IF**(**B4>89,"A",IF**(**B4>79,"B",IF**(**B4>69,"C",IF**(**B4>59,"D","F"**))))**

Now we'll take a step-by-step look at how Excel handles the nested IFs in this long formula. If we had examined the formula for the second student in the list who got a score of 95, Excel would process the first IF statement,

display an A, and quit! But fortunately for us, this student's score is quite low. So let's begin.

STEP 1

```
=IF(B4>89,"A", IF(B4>79,"B",IF(B4>69,"C",IF(B4>59,"D","F"))))
     test  if true              if not true
```

Excel begins by testing if B4 is > 89. If the test is true, Excel will display an A and quit processing. But the test is not true as the value in cell B4 is 55, so Excel proceeds to the **value-if-false** argument - which is another IF statement which we have underlined in purple.

STEP 2

```
=IF(B4>89,"A", IF(B4>79,"B",IF(B4>69,"C",IF(B4>59,"D","F"))))
                test  if true      if not true
```

Now Excel looks to see if the score in cell B4 is > 79. If so, it would display a B. But 55 in not %gt; 79, so Excel proceeds to the **value-if-false** argument. This is another IF statement and is underlined in purple.

STEP 3

```
=IF(B4>89,"A", IF(B4>79,"B",IF(B4>69,"C",IF(B4>59,"D","F"))))
                             test  if true    if not true
```

This IF statement asks Excel to see if the value in cell B4 is > 69. It is not, so Excel does not display a C, but proceeds to the **value-if-false** argument which, of course, another IF statement (underlined in purple).

STEP 4

```
=IF(B4>89,"A", IF(B4>79,"B",IF(B4>69,"C",IF(B4>59,"D","F"))))
                                          test   if  if not
                                                 true true
```

We are finally at the end of the formula. The last IF statement asks Excel to test to see if the value in cell B4 is > 59. If it is, Excel will display a D. If not,

Excel will display an F. Since the value in cell B4 is 55, Excel displays an F, and is finished processing the formula.

When working with nested IF statements, it is often useful to write the formula in a simple editor like Notepad (not a word processing program like Word) in the format shown below in order to keep track of the parentheses. We've color-coded ours to help you see which pairs belong together. But remove the spaces before copying and pasting into a spreadsheet cell.

=IF(B4>89,"A",
   IF(B4>79,"B",
     IF(B4>69,"C",
       IF(B4>59,"D","F"))))

Using AND and IF Functions Together

To combine IF and AND functions you have to just replace logical_test argument in IF function with AND function.

By using AND function you can specify more than one condition.

Now, AND function will test your all conditions here.

If all the conditions are true then AND function will return true and IF function will return the value which you have specified for true.

And, if any of the conditions is false then AND function will return false and IF function will return the value which you have specified for false.

Let's show you a real life example.

Now let's look at our worksheet examples. Each month sales reps make a bonus of 500 or 250. To make a 500 bonus, they must sell 11 or more units AND sell more than 800 cost. So our IF function tests to see if BOTH of these conditions are met via an AND function. If so, Excel returns a value of 500; otherwise, a value of 250.

We've entered our functions in Column D, and the function for raju is:

=IF(AND(B2>10,C2>800),500,250)

Then we copied and pasted the function into column D for the other 3 persons. Notice that since we're dealing with whole numbers, we specified **B2>10** instead of **B2>=11** because it's easier to write. The function for Ian can also be seen in the formula bar of our spreadsheet below

	f_x	=IF(AND(B2>10,C2>800),500,250)	
	A	B	C	D
1	Name	Units	Cost	Bonus
2	Raju	11	810	500
3	Kiran	9	880	250
4	Sam	14	860	500
5	Uma	14	770	250

Raju's function: =IF(AND(B2>10,C2>800),500,250)

For Raju, the value in B2 (11) is > 10 and the cost in cell C2 (810) is > 800, so the value of the AND function is true. Therefore, the result of the IF function will be the value-if-true: 500. (We formatted column D to display currency.)

Kiran's function: =IF(AND(B3>10,C3>800),500,250)

The value for Kiran in cell B3 (9) is NOT > 10. Even though the next condition of the AND function is met, the result of the AND function is still false. So the value produced by the IF function is 250 - the value-if-false.

Sam's function: =IF(AND(B4>10,C4>800),500,250)

The value for Sam in B4 (14) is > 10 and the cost in cell C4 (860) is > 800, so the AND function is true, and Excel displays 500 in cell D4.

Uma's function: =IF(AND(B5>10,C5>800),500,250)

The value for Uma in cell B5 (14) is > 10. However, the value in cell C5 (770) is NOT > 800, so the AND function is false. Therefore, the result of the IF function is 250 (value-if-false).

Wrap-up

- If Excel cannot arrive at a TRUE or FALSE conclusion, it will return the #VALUE! error
- If an argument of the function contains text, it must be enclosed in quotation marks
- To indicate "not equal" in an equation, use <>
- When a function is embedded inside of another function, it is enclosed in parentheses, and the equal sign (=) that is normally placed in front of a function is omitted for the embedded function.

Using OR and IF Functions Together

In the syntax of IF function, have a logical test argument in which we use to specify a condition to test.

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

And, then it return a value based on the result of that condition.

Now, if we use OR function for that argument and specify multiple conditions into it.

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

OR(*logical1,logical2*)

If any of the conditions is true OR will return true and IF will return the specific value.

And, if none of the conditions is true OR with return false and IF will return another specific value.

In this way, we can test more than one value with IF function.

Let's get into some real life examples.

In this example, we are testing whether any of the three Sales Teams qualify for the weekly bonus. In order to qualify, the team must have sold at least 4 computer systems OR at least 9,000 in sales. See the worksheet below.

The teams are listed in column A, the number of systems sold in column B, and the total price of the sales in column C. Column D contains the functions and the function for Team 1 is shown in the formula bar and follows: **=IF(OR(B2>=4,C2>=9000),"Yes","No")**.
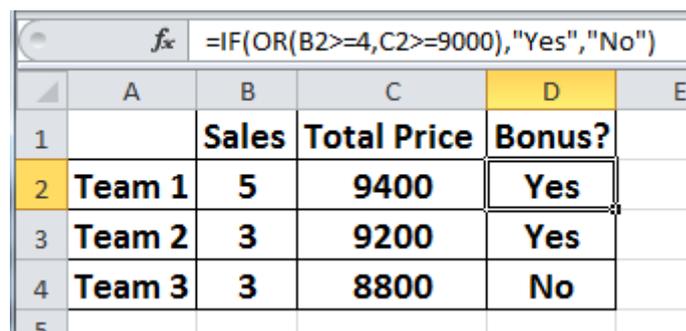
	fx	=IF(OR(B2>=4,C2>=9000),"Yes","No")		
	A	B	C	D	E
1		Sales	Total Price	Bonus?	
2	Team 1	5	9400	Yes	
3	Team 2	3	9200	Yes	
4	Team 3	3	8800	No	
5					

19. Conditional Formatting

Conditional formatting quickly highlights important information in a spreadsheet. But sometimes the built-in formatting rules don't go quite far enough. Adding your own formula to a conditional formatting rule gives it a power boost to help you do things the built-in rules can't do.

With conditional formatting, you can do things like highlight dates in the next 30 days, flag data entry problems, highlight rows that contain top customers, show duplicates, and more.

Excel ships with a large number of "presets" that make it easy to create new rules without formulas. However, you can also create rules with your own custom formulas. By using your own formula, you take over the condition that triggers a rule, and can apply exactly the logic you need. Formulas give you maximum power and flexibility.

For example, using the "Equal to" preset, it's easy to highlight cells equal to "apple".

But what if you want to highlight cells equal to "apple" or "kiwi" or "lime"? Sure, you can create a rule for each value, but that's a lot of

trouble. Instead, you can simply use one rule based on a formula with the OR function:
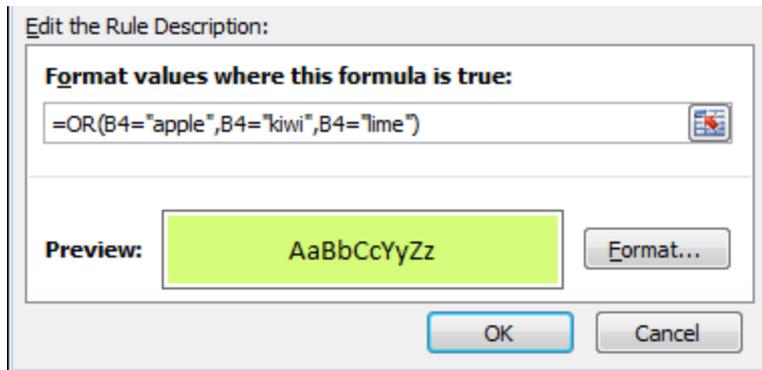
Here's the result of the rule applied to the range B4:F8 in this spreadsheet:

	A	B	C	D	E	F	G
1							
2		Highlight x or y or z					
3							
4		Apple	Cantaloupe	Grapefruit	Mango	Pineapple	
5		Apricot	Cherry	Honeydew	Orange	Kiwi	
6		Banana	Date	Plum	Papaya	Raspberry	
7		Blackberry	Fig	Lime	Peach	Strawberry	
8		Blueberry	Grape	Lemon	Pear	Watermelon	
9							

Here's the exact formula used:

=OR(B4="apple",B4="kiwi",B4="lime")

Highlight orders from Texas

To highlight rows that represent orders from Texas (abbreviated TX), use a formula that locks the reference to column F:

=$F5="TX"

	A	B	C	D	E	F	G	H
1								
2		Highlight orders from Texas (TX)						
3								
4		Order	Date	Amount	Name	State		
5		1001	9-Jan-16	$ 175.00	Dan Kennedy	CA		
6		1001	17-Jan-16	$ 150.00	Bob Smith	TX		
7		1003	1-Feb-16	$ 100.00	Sue Martin	TN		
8		1004	15-Mar-16	$ 125.00	Bob Smith	TX		
9		1005	22-Feb-16	$ 85.00	Amy Chang	TX		
10		1006	13-Mar-16	$ 100.00	Sue Martin	TN		
11		1007	19-Mar-16	$ 100.00	Joe Brown	AK		

Highlight dates in the next 30 days

To highlight dates occurring in the next 30 days, we need a formula that (1) makes sure dates are in the future and (2) makes sure dates are 30 days or less from today. One way to do this is to use the AND function together with the NOW function like this:

`=AND(B4>NOW(),B4<=(NOW()+30))`

With a current date of August 18, 2016, the conditional formatting highlights dates as follows:

	A	B	C	D	E	F	G
1							
2		Highlight dates in the next 30 days			Current date:	8/18/2016	
3							
4		8/14/2016	9/26/2016	7/18/2016	7/10/2016	8/13/2016	
5		9/7/2016	10/3/2016	8/18/2016	7/19/2016	10/5/2016	
6		8/31/2016	8/25/2016	9/25/2016	9/27/2016	7/12/2016	
7		9/11/2016	10/10/2016	10/12/2016	9/18/2016	8/29/2016	
8		9/18/2016	6/21/2016	8/21/2016	7/18/2016	6/24/2016	
9		9/5/2016	7/23/2016	8/1/2016	6/22/2016	9/2/2016	
10		9/14/2016	7/22/2016	9/24/2016	9/1/2016	10/11/2016	
11		7/5/2016	7/9/2016	6/22/2016	6/23/2016	6/30/2016	
12							

Highlight column differences

Given two columns that contain similar information, you can use conditional formatting to spot subtle differences. The formula used to trigger the formatting below is:

`=$B4<>$C4`

	A	B	C	D	E	F
1						
2		Compare columns and highlight differences				
3						
4		Apple	Apple			
5		Berkshire Hathaway	Berkshire Hathaway			
6		Chevron	Chevron Inc.			
7		Citigroup	Citigroup			
8		Exxon Mobil	Exxon Mobil			
9		General Electric	General Electric			
10		JPMorgan Chase	JP Morgan Chase			
11		Verizon Communications	Verizon Communications			
12		Wal-Mart Stores	Wal Mart Stores			
13		Wells Fargo	Wells Fargo			

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20. Data Sorting

After entering data in excel, we may want to arrange it in the alphabetical order (A-Z) or smallest to largest values. For this, we may use the sort functionality in Excel.

In excel, we can re-arrange data on values, cell color, font color, or cell icon. When we sort on values it may be in the order A to Z, Z to A (Text), Smallest to Largest, largest to Smallest (Numbers), oldest to newest, newest to oldest (Date) or custom list.
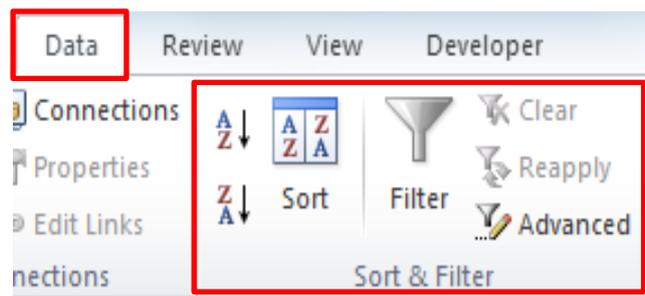
Sort

Data tab →Sort & filter Group →Sort
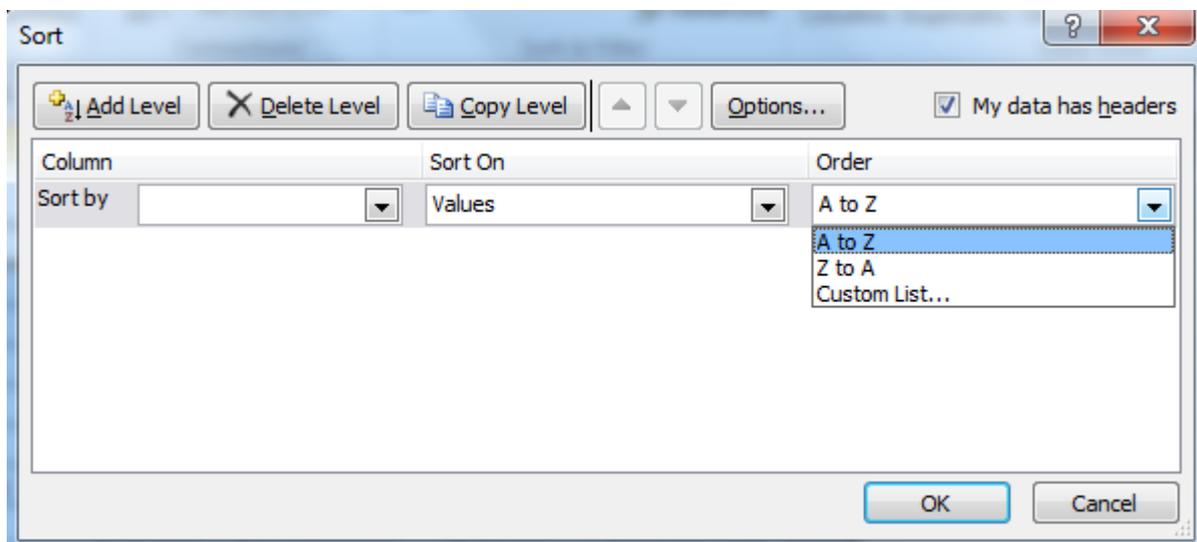
Sorting by Multiple Columns

In Excel, we can also arrange the data by multiple columns, by clicking on Add level so that one more column will get added in the sorting list. Second and subsequent sorting parameters help us sort one field on top of another. Example, if we sort data first Designation wise and then location wise, first the data is arranged designation wise in the sorting order selected and then

for each designation, data would be arranged location wise. We can perform up to 64 levels of sorting in Excel.

Multi-Level Sorting

21. Filter

What are filters?

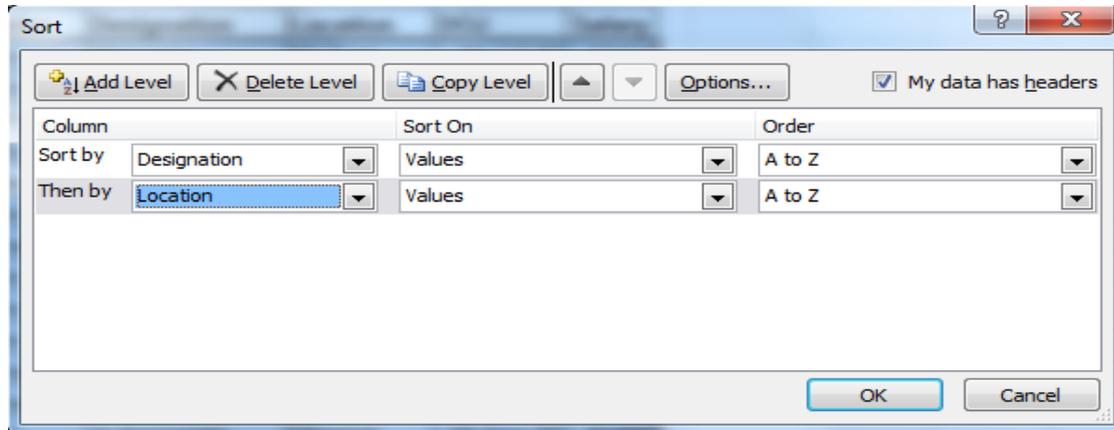Filtering is a quick and easy way to find and work with a subset of data in an Excel range. Filters enable you to quickly find all the entries for a particular item, e.g. an employee name or a product, in a large worksheet.

Filters allow you to select just the data you need, and to hide any data that is not relevant to your search. For example you might want to find the students with the highest grade, or the records for a specific department. You can also create your own filters, such as figures within a specific range or above a particular amount.

Unlike sorting, filtering does not rearrange your data, it simply hides the rows you don't want. This will allow you to then edit, format, chart and print your filtered data as you wish.

Preparing to filter

Ensure the data in your worksheet is neat and tidy and you will find filtering easy. Use the following guidelines to prepare your data:

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Use headings	The top row of each column should have a heading.
Don't mix the data	The data in a column should all be the same type – don't mix text and numbers.
Don't interrupt	Don't have blank rows or columns. Individual blank cells are OK.
Keep separate	The data to be filtered should be in its own worksheet. If not, separate it from other data with a blank row or column.

Filtered data displays only the rows that meet criteria that you specify and hides rows that you do not want displayed. After you filter data, you can copy, find, edit, format, chart, and print the subset of filtered data without rearranging or moving it.

Data tab→ Sort & filter Group → Filter

When we click on auto-filter option a drop-arrow key will get display on each heading on the data so, that we can filter the list as per our condition. We just need to uncheck the value which we do not want to view.

To use Auto filter effectively, our database must have a heading and data must be ideal. An ideal database contains no blank row or blank column and no merged cells.

Auto -Filter can be done in any type of data i.e. text values, numeric values and date values where we have various type of criteria which is already mention in the list or we have to select the custom filter option which last option in the list of Text filter, Number filter or Date Filter.

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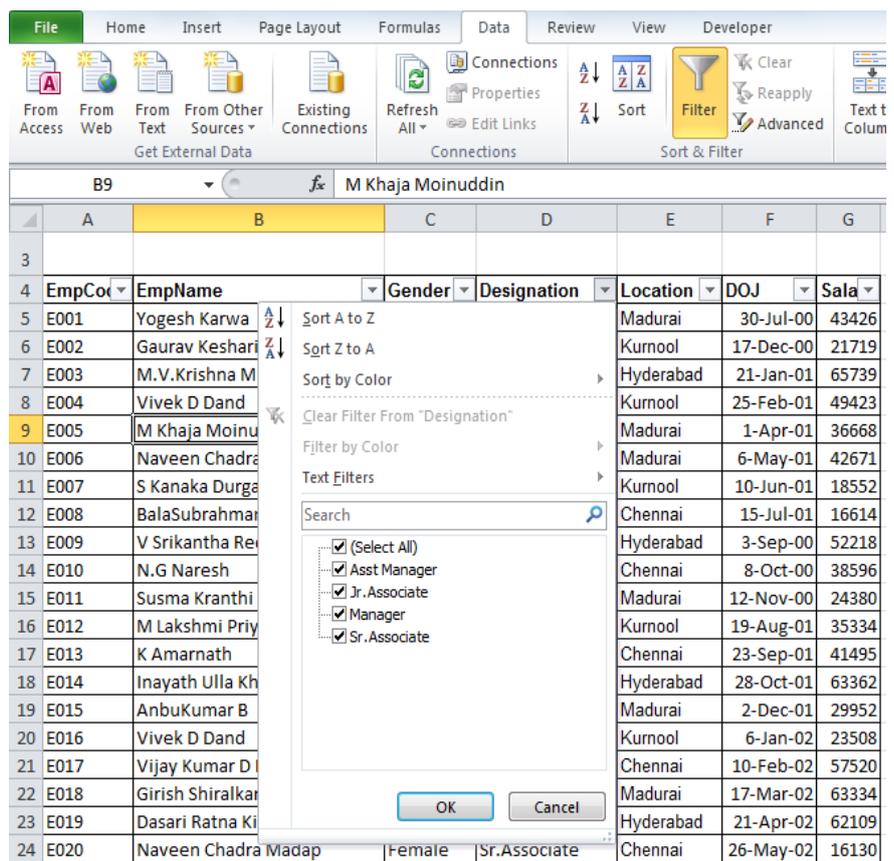
Advanced Filter

The AutoFilter command on the Home Tab is usually the quickest way to filter a list. However, if you want to filter a list using multiple sets of criteria or criteria containing formulas use the Advanced Filter command on the Data Tab.

The Advanced Filter enables you to filter data by using a criteria range to display only the rows that meet all the criteria you specify.

One condition in two or more columns

To find data that meets one condition in two or more columns, enter all the criteria in the same row of the criteria range.

Emp Code	Name	Deptt Name	Location	DOJ	Designation	Basic
		Finance			Executive	

One condition in one column or another

To find data that meets either a condition in one column or a condition in another column, enter the criteria in different rows of the criteria range.

Deptt Name	Location	DOJ	Designation
Finance			
	Mumbai		
			Assistant Manager

One of two sets of conditions for two columns

To find rows that meet one of two sets of conditions, where each set includes conditions for more than one column, type the criteria in separate rows.

Deptt Name	Location	Basic
Finance		>=15000
Procurement		>30000

As an example, we will extract from the list all Employees whose Basic Pay is greater than 15,000 from the Finance Department and also employees from the Procurement Department with a Basic Pay greater than 30,000

♣ Insert several blank rows at the very top of your worksheet. (Your column headings should now be on row 10 of the worksheet)

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♣ Select the column headings in Row 10 and copy. Paste the headings into Row 1 of the worksheet.

♣ Enter the criteria for the advanced filter as follows;

Emp Code	Name	Dept Name	Location	DOJ	Designation	Basic
		Finance				>=15000
		Procurement				>=30000

♣ Click into any cell within the list and then select the Data tab. In the Sort & Filter group choose Advanced Filter…

♣ Ensure that the List Range is $A$7:$G$43

♣ The Criteria Range - specifies the range of cells on your worksheet that contains your criteria. In this example it should be $A$1:$G$3, to ensure this click into the Criteria range box and then with the mouse click into cell A1 of the worksheet and highlight to cell G3.
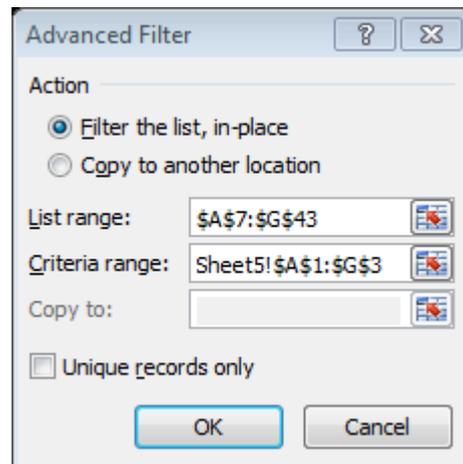
♣ Under the heading Action there are 2 options: Filter the list, in-place - hides the rows that do not meet the criteria and the filtered list is displayed where the existing

List range had been displayed. Copy to Another Location copies the filtered data to another worksheet or another location on the same worksheet. If this option is selected the Copy to: box will no longer be greyed out and you click into this box and select where you wish the filtered list to appear.

♣ Click OK. This will return you to the worksheet, and display the records that match the criteria.(Three records meet the criteria)

Emp Code	Name	Deptt Name	Location	DOJ	Designation	Basic
E101	Rahul Jain	Finance	Delhi	21-Jan-01	Manager	56699
E164	Sahiba Tandon	Finance	Mumbai	30-Nov-08	Executive	43381
E172	Vimi Gupta	Procurement	Mumbai	22-Oct-06	Executive	42028

To turn off the Advanced Filter

From the **Data tab** in the **Sort & Filter Group** click on **Clear**.

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22. Subtotal

Subtotals are an ideal way to *get totals of several columns of data* that need to be broken down in several different categories. It, like the title suggests, will subtotal each category for you making it a quick and easy way to get your Excel data summarized.

- Formatting and sorting your Excel data
- Applying Subtotal to your table

Formatting and sorting your Excel data

As always make sure your data is set up in a format that makes sense - like a database, headers across the top with all your information in the columns below the headers, see my sample below:

Emp Code	Name	Department Name	Location	DOJ	Designation	Basic
E136	Sucheta Ghosh	Client Servicing	Bangalore	15-Feb-04	Executive	53849
E138	Priyank Ahluwalia	Client Servicing	Mumbai	4-Jul-04	Executive	24841
E139	Sayantani Banerjee	Client Servicing	Delhi	12-Sep-04	Manager	41590
E142	Varsha Chawla	Client Servicing	Mumbai	21-Nov-04	Executive	52350
E143	Dikshit Kapoor	Client Servicing	Mumbai	30-Jan-05	Executive	50878
E144	Farooque Ahmed	Client Servicing	Bangalore	6-Mar-05	Executive	37403
E153	Ketan Malhotra	Client Servicing	Mumbai	28-Aug-05	Manager	58212
E156	Nitin Baijal	Client Servicing	Mumbai	2-Oct-05	Assistant Manager	47027
E107	Atul Parashar	Human Resources	Delhi	21-Apr-02	Sr. Manager	38522
E113	Rekha Kujur	Human Resources	Bangalore	24-Aug-03	Sr. Executive	48813
E140	Bikram Bansal	Human Resources	Delhi	17-Oct-04	Vice President	46934
E146	Vidya Srinivasan	Human Resources	Bangalore	19-Jun-05	Executive	18783
E104	Namita Mishra	IT	Mumbai	25-Feb-01	Assistant Manager	17070
E109	Vivek Gupta	IT	Mumbai	8-Sep-02	Executive	34583
E110	Ruchika Sarawat	IT	Mumbai	17-Nov-02	Executive	42665
E105	Sanjana Paul	Legal	Bangalore	8-Oct-00	Sr. Manager	59874
E116	Ulrica Paul	Legal	Mumbai	11-Jan-04	Assistant Manager	28313
E137	Debashree Basu	Legal	Delhi	25-Apr-04	Executive	18341
E108	Sandeep Goel	Marketing	Delhi	4-Aug-02	Executive	15905
E111	Sumit Narwankar	Marketing	Bangalore	26-Jan-03	Executive	38550
E112	Parul Jain	Marketing	Delhi	6-Apr-03	Vice President	20053
E114	Rina Malik	Marketing	Mumbai	28-Sep-03	Vice President	45218
E145	Brian Dsouza	Marketing	Delhi	10-Apr-05	Executive	44772

Make sure that the category that we need to subtotal by is sorted. In this case we will be using the Department Name, and all my Departments are sorted. If you don't sort the data prior to running the Subtotals function, Excel will run your subtotals but it does a subtotal at each change in your chosen column. So if you don't sort the data, you may have multiple subtotals for the same item and have a messy situation to clean up. This will make more sense as we go through the steps and run our subtotals.

Applying Subtotal to your table

First go to the *Data tab* on the ribbon and select the *Subtotal*:

After selecting Subtotal, this window pops up on top of your data file:

Go to the At each change in: area. This is where we tell Excel how we want our data sorted. I want this data set to be sorted by Department Name, that way when we are all done, I can see the Location, Designation by Department. You must think this through because if you choose a category that is moot, then your Subtotal will end up being meaningless. For example if I choose Location as my category, then at each change in location I will have a

subtotal for the columns I choose and this will be meaningless to me for what I am trying to do.

Moving on, I am choosing Department Name, and in this case I want the sum, but there are other options as well that you might need for your data analysis, (Sum, Count, Average, Max, Minimum, Product, Count Numbers, Standard Deviation, Standard Deviation Population, Variance, Variance Population). Again, I am choosing SUM as my function:

Then click on the OK button and here are my results:

	A	B	C	D	E	F	G
7	Emp Code	Name	Department Name	Location	DOJ	Designation	Basic
8	E136	Sucheta Ghosh	Client Servicing	Bangalore	15-Feb-04	Executive	53849
9	E138	Priyank Ahluwalia	Client Servicing	Mumbai	4-Jul-04	Executive	24841
10	E139	Sayantani Banerjee	Client Servicing	Delhi	12-Sep-04	Manager	41590
11	E142	Varsha Chawla	Client Servicing	Mumbai	21-Nov-04	Executive	52350
12	E143	Dikshit Kapoor	Client Servicing	Mumbai	30-Jan-05	Executive	50878
13	E144	Farooque Ahmed	Client Servicing	Bangalore	6-Mar-05	Executive	37403
14	E153	Ketan Malhotra	Client Servicing	Mumbai	28-Aug-05	Manager	58212
15	E156	Nitin Baijal	Client Servicing	Mumbai	2-Oct-05	Assistant Manager	47027
16			Client Servicing Total				366150
17	E107	Atul Parashar	Human Resources	Delhi	21-Apr-02	Sr. Manager	38522
18	E113	Rekha Kujur	Human Resources	Bangalore	24-Aug-03	Sr. Executive	48813
19	E140	Bikram Bansal	Human Resources	Delhi	17-Oct-04	Vice President	46934
20	E146	Vidya Srinivasan	Human Resources	Bangalore	19-Jun-05	Executive	18783
21			Human Resources Total				153052
22	E104	Namita Mishra	IT	Mumbai	25-Feb-01	Assistant Manager	17070
23	E109	Vivek Gupta	IT	Mumbai	8-Sep-02	Executive	34583
24	E110	Ruchika Sarawat	IT	Mumbai	17-Nov-02	Executive	42665
25			IT Total				94318
26	E105	Sanjana Paul	Legal	Bangalore	8-Oct-00	Sr. Manager	59874
27	E116	Ulrica Paul	Legal	Mumbai	11-Jan-04	Assistant Manager	28313
28	E137	Debashree Basu	Legal	Delhi	25-Apr-04	Executive	18341
29			Legal Total				106528
30	E108	Sandeep Goel	Marketing	Delhi	4-Aug-02	Executive	15905
31	E111	Sumit Narwankar	Marketing	Bangalore	26-Jan-03	Executive	38550
32	E112	Parul Jain	Marketing	Delhi	6-Apr-03	Vice President	20053
33	E114	Rina Malik	Marketing	Mumbai	28-Sep-03	Vice President	45218
34	E145	Brian Dsouza	Marketing	Delhi	10-Apr-05	Executive	44772
35			Marketing Total				164498
36			Grand Total				884546

As you can see Excel adds a row at each change in Shipment Number and Sums the appropriate columns. This is why you have to sort your data first. However this format is somewhat cumbersome to use.

	A	B	C	D	E	F	G
7	Emp Code	Name	Department Name	Location	DOJ	Designation	Basic
16			Client Servicing Total				366150
21			Human Resources Total				153052
25			IT Total				94318
29			Legal Total				106528
35			Marketing Total				164498
36			Grand Total				884546

If you notice Excel has added an outline to the data on the left hand side. There are 3 levels, and this view is the expanded, or level 3 view. If we select the 2 in the upper left hand corner by the red arrow... Then our data will look like this:

If I hit the 1 in the upper left hand corner, by the 2 we just hit, our data looks like this:

This view gives us the *Grand Total* of all of our data ready to use for easy copying to a summary elsewhere.

When you open the *Subtotal* window, the Summary below data button is selected for you. This is the default selection and puts a Subtotal line at the bottom of each change in your selected variable. By unselecting this button, it puts the subtotal at the top, and your Grand Total at the top of the page, see picture below:

	Emp Code	Name	Department Name	Location	DOJ	Designation	Basic
7	Emp Code	Name	Department Name	Location	DOJ	Designation	Basic
8			Grand Total				884546
9			Client Servicing Total				366150
10	E136	Sucheta Ghosh	Client Servicing	Bangalore	15-Feb-04	Executive	53849
11	E138	Priyank Ahluwalia	Client Servicing	Mumbai	4-Jul-04	Executive	24841
12	E139	Sayantani Banerjee	Client Servicing	Delhi	12-Sep-04	Manager	41590
13	E142	Varsha Chawla	Client Servicing	Mumbai	21-Nov-04	Executive	52350
14	E143	Dikshit Kapoor	Client Servicing	Mumbai	30-Jan-05	Executive	50878
15	E144	Farooque Ahmed	Client Servicing	Bangalore	6-Mar-05	Executive	37403
16	E153	Ketan Malhotra	Client Servicing	Mumbai	28-Aug-05	Manager	58212
17	E156	Nitin Baijal	Client Servicing	Mumbai	2-Oct-05	Assistant Manager	47027
18			Human Resources Total				153052
19	E107	Atul Parashar	Human Resources	Delhi	21-Apr-02	Sr. Manager	38522
20	E113	Rekha Kujur	Human Resources	Bangalore	24-Aug-03	Sr. Executive	48813
21	E140	Bikram Bansal	Human Resources	Delhi	17-Oct-04	Vice President	46934
22	E146	Vidya Srinivasan	Human Resources	Bangalore	19-Jun-05	Executive	18783
23			IT Total				94318
24	E104	Namita Mishra	IT	Mumbai	25-Feb-01	Assistant Manager	17070
25	E109	Vivek Gupta	IT	Mumbai	8-Sep-02	Executive	34583
26	E110	Ruchika Sarawat	IT	Mumbai	17-Nov-02	Executive	42665
27			Legal Total				106528
28	E105	Sanjana Paul	Legal	Bangalore	8-Oct-00	Sr. Manager	59874
29	E116	Ulrica Paul	Legal	Mumbai	11-Jan-04	Assistant Manager	28313
30	E137	Debashree Basu	Legal	Delhi	25-Apr-04	Executive	18341
31			Marketing Total				164498
32	E108	Sandeep Goel	Marketing	Delhi	4-Aug-02	Executive	15905
33	E111	Sumit Narwankar	Marketing	Bangalore	26-Jan-03	Executive	38550
34	E112	Parul Jain	Marketing	Delhi	6-Apr-03	Vice President	20053
35	E114	Rina Malik	Marketing	Mumbai	28-Sep-03	Vice President	45218
36	E145	Brian Dsouza	Marketing	Delhi	10-Apr-05	Executive	44772

It makes for an interesting view and can be more convenient in some scenarios. It is just an option that you can utilize when and if you need to do so.

Also, if you uncheck the Replace current subtotals checkbox, you can add a few subtotals into your table and get some interesting results.

If you are done with your Subtotals, just open the Subtotals window and click on the Remove All button, and your data will go back to the previous format. The Subtotals will be removed and it is as though you have not touched your data, sometimes a good way to start over if you have made an error or if you realize you need to add or remove columns from your Subtotals.

23. References

There are 3 different sorts of cell references in Excel. These are:

• Relative

• Absolute

• Mixed

A relative reference will change column and row numbers as it is copied to other cells. Think of it as an original instruction being to go in a certain direction e.g. 2 rows up and 2 columns across from your current position. When this instruction is copied elsewhere, it will still refer to 2 rows up and 2 columns across from your new current position.

An absolute reference is one that does not change. If you refer to a cell in a certain row and column and then copy that reference elsewhere, it will still refer to exactly the same cell or range.

A mixed reference is one that is half relative and half absolute.

An absolute address is defined with the use of the "$" symbol. This can be typed in at the time of creating the formula, or by editing the cell afterwards.

Examples of relative and absolute addressing:

Relative	A4	A4:B5
Absolute	$A$4	$A$4:$B$5
Mixed	$A4 or A$4	$A4:B$5

The "$" sign can be hand typed or inserted by pressing the keyboard shortcut F4. As you press F4 the cell address will cycle between the four variations of an address – for example A4 would cycle between:

A4   A$4

$A4 $A$4

24. Naming Cells and Ranges

Cells and ranges can be given a name so that when you need to refer to that cell or range of cells, you can refer to its name rather than an address.

If you have a range of cells that hold a specific type of data e.g. Sales, No. of students etc. then you can give that range a meaningful name. Later if you want to refer to the range you can do that by specifying its name instead of using its cell reference.

In the example below we have two columns, Month (column A) and Sales Value (column B).

If we want to sum the total sales for the 12 months then we will use this formula:

=sum(B2:B13)

Alternatively we can give the range B2:B13 a name like this "SalesValue" and then use the sum formula as follows:

=sum(SalesValue)

The names will make it easier for you to refer to a range and to make your formulas more meaningful.

	A	B
1	Month	Sales Value
2	January	3,420.00
3	February	748.00
4	March	5,488.00
5	April	12,345.00
6	May	38,227.00
7	June	38,490.00
8	July	8,437.00
9	August	3,848.00
10	September	54,347.00
11	October	8,937.00
12	November	935.00
13	December	98,437.00
14	Total Sales	273,659.00

How do you define a named range?

1. Select the range that you want to name.

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2. In the Formulas tab, Defined Names group click Define Name. The New Name window will open.

3. In the Name field enter the name you want to give to your range.

4. In the Scope combo box, if you want this name to be known to other sheets in the workbook, select Workbook. If the name will only be used in the current worksheet, then select the name of the worksheet.

5. In the Refers To field make sure that the required range is specified.

6. Click OK when you are done. Your defined name is now ready to be used in any formula.

NOTES:

• Range names must be one word – if you require 2 words, join them with an underscore as in the example below.

• The names can be a combination of numbers and letters, but must not start with a number.

• The default is to show the address as being ABSOLUTE. By clicking in the REFERS TO text box, this can be edited to what is required.
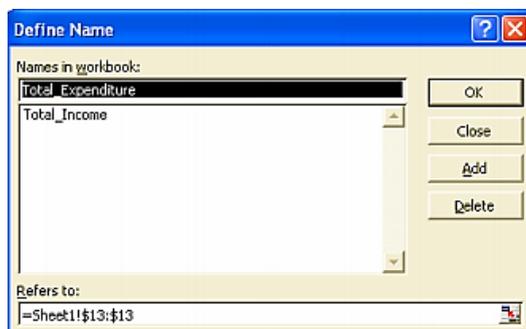
• As a default, names are workbook level i.e. the name you create is available throughout the whole workbook.

• If the worksheet has been named with a name that includes spaces, the worksheet name will have to be enclosed in single quotation marks.

25. Lookup function

Introduction

A lookup formula essentially returns a value from a table by looking up another related value. A common telephone directory provides a good analogy. If you want to find a person's telephone number, you first locate the name (look it up) and then retrieve the corresponding number.

There are multiple lookup functions in Microsoft Excel and these include vlookup, the very similar hlookup, and lookup. You use vlookup to find data in a table by searching for a value in the first column of the table and then returning the corresponding value in another column.

Use hlookup when the data is organized differently to find a matching value in the top row of a table and to return the corresponding value from one of the rows below. The lookup function has two forms - a vector and an array form and it returns a value from a one column or one row range, or from an array. Of the three, the one you're most likely to use day to day is vlookup and this is the one I'll focus on here. Basically if you can understand and create a vlookup you can create an hlookup function too.

Vlookup syntax

To use vlookup to return a value from a table you will provide Excel with the value to look for in the first column of the table, the table range and the column which contains the value to return.

When you provide the table range, Excel looks for the value you specify in the first column of that range - typically the first column will be the row headings for your data. When describing the column you do so as the number of the column in the table range you've provided. Column 1 is the first column and 2 is the one immediately to its right and so on. If you specify a column number that is out of the range of your table - such as less than 1 or greater than the number of columns in your table range you'll get an error.

There is one optional True/False argument for this function which lets you force an exact match or an approximate one - the default is the latter. If you specify an exact match (False) then the table need not be sorted. If you do not include this argument or if you specify an approximate match (True) you

must sort the table so that the values in the first column are in ascending order - if not - the function may not return the correct result. Where you omit this argument or use True, if there is not an exact match, then Excel uses the nearest value, in the first column, to the value that you are searching for that is smaller than that value.

So, for example, in this table where we are showing pounds weight, a handling and a shipping charge, we can use vlookup to search for a weight and determine the handling and shipping charge for a parcel of that weight. Of course most parcels won't weigh exact amounts so we will use the True value (or omit it) so the formula will return a result even if an exact match is not found. This also means we need to sort the table so the data in the first column is in ascending order.

C	D	E	F	G
	Lbs weight	Handling	Shipping	
	0	2.00	4.95	
	1	4.00	6.95	
	2	5.00	10.95	
	5	5.00	15.00	
	10	7.50	20.00	
	20	8.50	25.00	

Vlookup at work

If we try to find a match for a 1.5 pounds weight parcel there is no entry for 1.5 pounds. In this case, the lookup function will return the entry for the largest value that is less than the value that we're looking up. So if we're looking up 1.5 and there is no match for it, Excel will look for the number that is nearest 1.51 but less than it - in other words 1.

To look up a value in cell B11 that is the pounds weight of a parcel (in this case 1.5lbs) and to return the handling value, you would write this formula:

=VLOOKUP(B11,D2:F7,2)

The formula returns the handling cost of $4 - the value in column 2 of the table opposite the next nearest but smaller value to the one we are looking up.

If you want to be able to copy the formula down a column, then you will need to alter it so that the table reference is absolute, so it would look like this:

=VLOOKUP(B11,$D$2:$F$7,2)

Of course, you can also name your table by selecting the cells from D1 to F7 and choose Formulas > Define Name, type a name for the table and click Ok.

Now you can use the table name when you are creating the formula. Here the named range appears in place of the range itself:

=VLOOKUP(B12,shipping_and_handling,2)

We can adapt the formula for the handling to deal with the shipping. In this situation because the shipping is in column 3 of the table, the only change will be to the last value in the formula:

=VLOOKUP(B12,shipping_and_handling,3)

Hlookup works similarly, it takes the same values, in other words the value to look up, the range of the table, but in this case you'll be providing a row number rather than a column number. The rows will be numbered 1, 2, 3 and so on with row 1 being the first row in the table.

In the example above, we want to be able to find weights such as 11, 12 and 25 in a table that simply doesn't have those values in it. The ability to find the closest value that is smaller than the value that we're looking up is extremely attractive. There are, however, some provisos when you're using this process and that is that you'll have to have a starter value as we do of 0. This will catch the situation where you have a shipping weight of less than 1 pound.

	C	D	E	F	G
		Lbs weight	Handling	Shipping	
		0	2.00	4.95	
		1	4.00	6.95	
		2	5.00	10.95	
		5	5.00	15.00	
		10	7.50	20.00	
		20	8.50	25.00	

Working with exact matches

In other circumstances you may want an exact match and there may be no room for the next nearest values. The example below for rug sizes and costs is exactly that. If you don't have an order for a green weave rug then there is no next lowest value. In this situation, we want an exact match or an error message.

	A	B	C	D
1	Rug Style	M	L	
2	Green weave	$200	$300	
3	Red Plaid	$150	$250	
4	Red Polkadot	$275	$325	
5				

For this, we'll look up the value in column A and return a value from column 2 or 3 depending on whether the order is for a medium or a large rug. In this circumstance we'll need to use an If function to determine which column number to use. The lookup function will read as follows:

=VLOOKUP(A7,A2:C4,IF(B7="M",2,3),FALSE)

In this case, we're looking up the value in column A and looking for a match in column B or C depending on whether it's a medium or a large rug. If there is not an exact match, in other words if the rug description being ordered is

not a direct match for one of the rug descriptions in column A then a #N/A error will be returned. If the rug size isn't one of the two options it will default to the large size because of the way the IF function is written.

	A	B	C	D	E
			fx	=VLOOKUP(A7,A2:C4,IF(B7="M",2,3),FALSE)	
1	Rug Style	M	L		
2	Green weave	$200	$300		
3	Red Plaid	$150	$250		
4	Red Polkadot	$275	$325		
5					
6	Rug Style	Size	Cost		
7	Green weave	M	$200		
8	Green weave	L			
9					

Converting formulas to values

If you have a range of formulas that will always produce the same result (that is, dead formulas), you may want to convert them to values. If, say, range A1:A20 contains formulas that have calculated results that will never change — or that you don't want to change. For example, if you use the RANDBETWEEN function to create a set of random numbers and you don't want Excel to recalculate those random numbers each time you press Enter, you can convert the formulas to values.

Just follow these steps:

1. Select A1:A20.
2. Choose Home ⇨ Clipboard ⇨ Copy (or press Ctrl+C).
3. Choose Home ⇨ Clipboard ⇨ Paste Values (V).
4. Press Esc to cancel Copy mode.

Usage notes

VLOOKUP searches for a value in the first column of a table. At the match row, it retrieves a value from the specified column.

Use VLOOKUP when lookup values are located in the first column of a table with information organized vertically. Use HLOOKUP when lookup values are located in the first row of a table, and each "record" appears in a new column.

- **Range_lookup** controls whether **value** needs to match exactly or not. The default is TRUE = allow non-exact match.

- Set **range_lookup** to FALSE to *require* an exact match and TRUE to *allow a non-exact match.*

- If **range_lookup** is TRUE (the default setting), a non-exact match will cause the VLOOKUP function to match the nearest value in the table that is *still less than **value**.*

- When **range_lookup** is omitted, the VLOOKUP function will allow a non-exact match, but it <u>will use</u> an exact match if one exists.

- If **range_lookup** is TRUE (the default setting) make sure that lookup values in the first row of the table are sorted in ascending order. Otherwise, VLOOKUP may return an incorrect or unexpected value.

- If **range_lookup** is FALSE (require exact match), values in the first column of **table** do not need to be sorted.

26. Data Validation

What is Data Validation?

In Excel, the data validation feature helps you control what can be entered in your worksheet. For example, you can:

- Create a drop down list of items in a cell
- Restrict entries, such as a date range or whole numbers only
- Create custom rules for what can be entered
- Create a prompt message explaining the kind of data allowed in a cell.
- Create messages that appear when incorrect data has been entered.
- Set a range of numeric values that can be entered in a cell.
- Determine if an entry is valid based on calculation in another cell.

In practical circumstances you may want to be assured that your user will enter one of the listed rug descriptions and sizes. You could do this using a Data Validation List. To do this, select the cells in which the user can place their answer such as column A or B, and choose Data > Data Validation > Data Validation and from the Settings option choose List. In the Source area, click and then drag over cells A2 to A4 which are the list of rug descriptions. Click Ok.
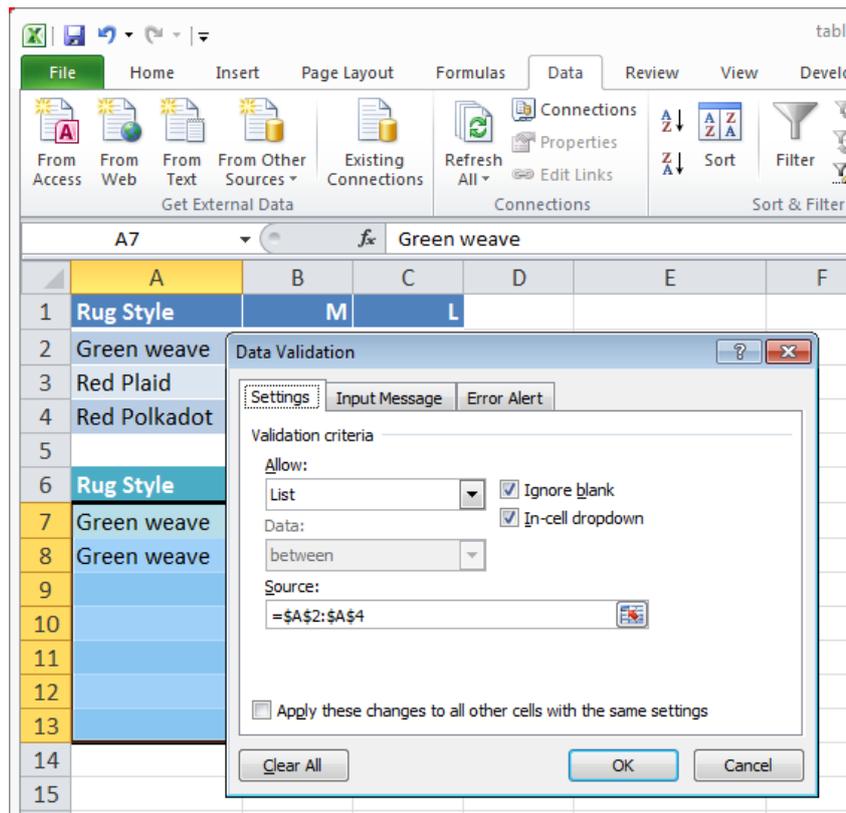
You can also create data validation lists to enter the value M or L as the rug size using the data from cells B1:C1 as the source data for the list.

Now when the user goes to enter a rug style they can select an item from the dropdown list. This ensures that they will always spell the name correctly so that they will always choose an item that is in the list. It also means that if they change their selection and choose a different rug, the vlookup function will recalculate automatically and produce the desired cost.

27. Pivot Table

What is a Pivot Table in Excel?

A Pivot Table gathers all the data in an Excel spreadsheet (or range of a spreadsheet) and presents a summary of this data in a table. This table allows you to see, at a glance, information such as:

1. The number of items of each type;
2. The sum of a data column, broken down into data types;
3. The average of a data column, broken down into data types.

This is best explained by way of an example...

The spreadsheet below lists every sale that was made by a company during the first quarter of 2016. The spreadsheet records the sale date, the invoice reference, the invoice total, the name of the sales representative, and the sales region.

	A	B	C	D	E
1	Date	Invoice Ref	Amount	Sales Rep.	Region
2	01/01/2016	2016-0001	$819	Barnes	North
3	01/01/2016	2016-0002	$456	Brown	South
4	01/01/2016	2016-0003	$538	Jones	South
5	01/01/2016	2016-0004	$1,009	Barnes	North
6	01/02/2016	2016-0005	$486	Jones	South
7	01/02/2016	2016-0006	$948	Smith	North
8	01/02/2016	2016-0007	$740	Barnes	North
9	01/03/2016	2016-0008	$543	Smith	North
10	01/03/2016	2016-0009	$820	Brown	South
	.	.	.	.	.
	.	.	.	.	.
11	.	.	.	.	.

An Excel pivot table can summarise the data in the above spreadsheet for easy analysis.

For example, the pivot table on the right shows the total sum of all sales, for each of the four sales people.

Row Labels ▼	Sum of Amount
Barnes	$74,654
Brown	$70,826
Jones	$65,190
Smith	$79,825
Grand Total	$290,495

A more complex pivot table is shown below. In this pivot table, the sales totals are broken down by month for each sales person. The sales totals for each area are also shown.

Sum of Amount	Column Labels ▼						
	⊟North		North Total	⊟South		South Total	Grand Total
Row Labels ▼	Barnes	Smith		Brown	Jones		
Jan	$33,732	$36,860	$70,592	$28,741	$18,945	$47,686	$118,278
Feb	$20,910	$16,412	$37,322	$18,054	$18,325	$36,379	$73,701
Mar	$20,012	$26,553	$46,565	$24,031	$27,920	$51,951	$98,516
Grand Total	$74,654	$79,825	$154,479	$70,826	$65,190	$136,016	$290,495

A further feature of Excel pivot tables is the ability to quickly extract the data from any part of the pivot table.

For example, if you wanted to see a list of Brown's sales during January 2016, you would simply use the mouse to double click on the cell showing this value (the value $28,741 in the above example Pivot Table).

Excel then creates the new worksheet (shown below), listing Brown's sales during January 2016.

	A	B	C	D	E
1	Date	Invoice Ref	Amount	Sales Rep.	Region
2	1/1/2016	2016-0002	456	Brown	South
3	1/3/2016	2016-0009	820	Brown	South
4	1/3/2016	2016-0010	712	Brown	South
5	1/6/2016	2016-0016	993	Brown	South
6	1/6/2016	2016-0020	1938	Brown	South
7	1/8/2016	2016-0031	654	Brown	South
8	1/8/2016	2016-0030	1784	Brown	South
9	⋮	⋮		⋮	⋮

Create an Excel Pivot Table

For this pivot table example we use the spreadsheet below, which lists a company's sales figures during the first quarter of 2016. The spreadsheet records the sale date, the invoice reference, the invoice total, the name of the sales representative, and the sales region.

	A	B	C	D	E
1	Date	Invoice Ref	Amount	Sales Rep.	Region
2	01/01/2016	2016-0001	$819	Barnes	North
3	01/01/2016	2016-0002	$456	Brown	South
4	01/01/2016	2016-0003	$538	Jones	South
5	01/01/2016	2016-0004	$1,009	Barnes	North
6	01/02/2016	2016-0005	$486	Jones	South
7	01/02/2016	2016-0006	$948	Smith	North
8	01/02/2016	2016-0007	$740	Barnes	North
9	01/03/2016	2016-0008	$543	Smith	North
10	01/03/2016	2016-0009	$820	Brown	South
	.	.	.	.	.
	.	.	.	.	.
11	.	.	.	.	.

We will first create a very simple pivot table, which shows the total sales for each of the four sales reps in the above spreadsheet. To do this:

1. Select any cell within the data range or select the entire data range to be used in your Pivot Table.

Note: If you select a single cell in the data range, Excel will automatically identify, and select the whole data range for your Pivot Table.

2. Click on the Pivot Table button, which is located within the 'Tables' grouping, on the 'Insert' tab of the Excel ribbon.
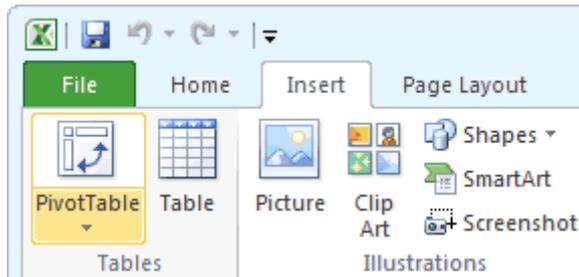
3. You will be presented with the 'Create PivotTable' dialog box (shown on the right).

Make sure that the selected range refers to the range of cells that you want to use for your Pivot Table.
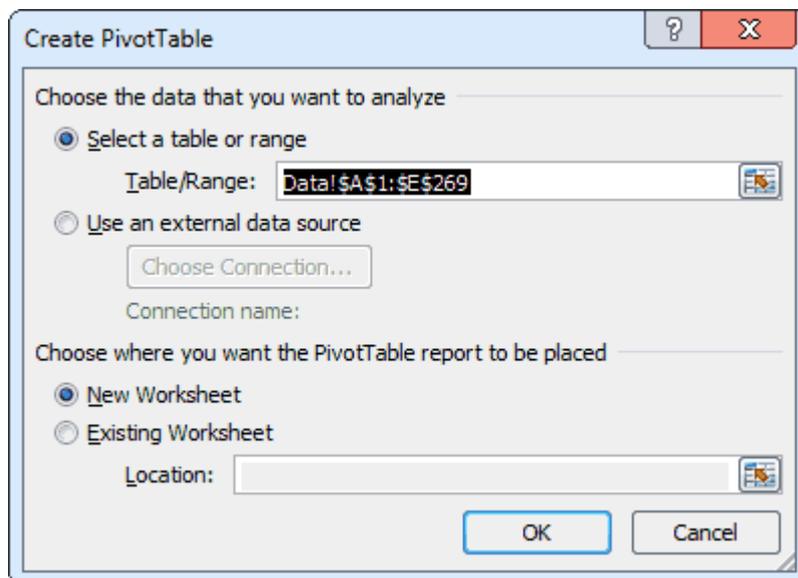
There is also an option asking where you want the Pivot Table to be placed. This allows you to place your pivot table in a specified worksheet.

If you are not sure, select the option 'New worksheet'.

Click OK.

4. You will now be presented with an empty Pivot Table, and the 'Pivot Table Field List' task pane, which contains several data fields. Note that these are the column headers from your data spreadsheet.

Within the 'Pivot Table Field List' task pane:

- Drag the 'Sales Rep.' field into the area marked 'Row Labels' (or 'Rows');
- Drag the 'Amount' field into the area marked 'Σ Values';
- Check: Make sure that the value in the 'Σ Values' section reads "Sum of Amount" and not "Count of Amount".
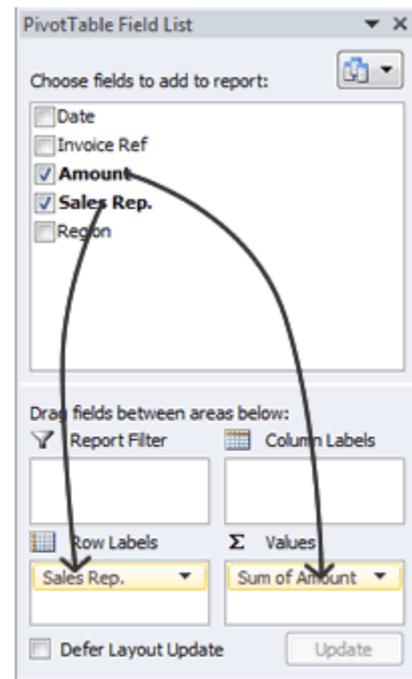
5. Your Pivot Table will be populated with the total sales for each sales rep, as shown on the right.

Pivot Table before Formatting:

Row Labels ▼	Sum of Amount
Barnes	74654
Brown	70826
Jones	65190
Smith	79825
Grand Total	290495

Pivot Table after Currency

Row Labels ▼	Sum of Amount
Barnes	$74,654
Brown	$70,826
Jones	$65,190
Smith	$79,825
Grand Total	$290,495

If you want the sales totals to be displayed as currency values, this is done by formatting the cells containing these values.

The easiest way to do this is to highlight the cells to be formatted and then to click on the currency format button, which is found in the 'Number' group on the 'Home' tab of the Excel ribbon (see below).
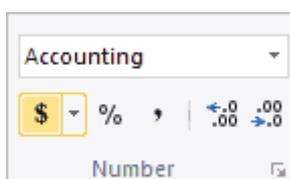
The resulting Pivot Table will be as shown on the right.

Note that the default currency format used will depend on the settings on your computer.

Group A Pivot Table in Excel

When analysing data in an Excel Pivot Table, it is often useful to group the Pivot Table data into categories.

For example, instead of displaying total sales values for each day, you might prefer to group the days into months and display the total sales values for each month.

Excel can automatically group numeric values (including dates & times) in pivot tables. This is shown in the following examples.

Example 1: Group a Pivot Table by Date

Row Labels	Sum of Amount
1/1/2016	2822
1/2/2016	2174
1/3/2016	5629
1/4/2016	1813
1/5/2016	1353
1/6/2016	16125
1/7/2016	1063
1/8/2016	4309
1/9/2016	3294
1/10/2016	2000
1/11/2016	3011
1/12/2016	2830
1/13/2016	1421

Imagine you have created the pivot table on the left, which shows sales figures for each date of the first quarter of 2016.

If you want to group the sales figures by month, you can do this as follows:

Right click on the left column of the pivot table (containing the dates) and select the option Group...;
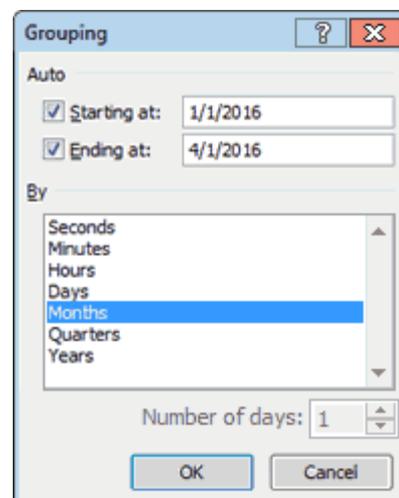
You will be presented with the 'Grouping' dialog box for dates;

Select the value Months and click OK.

This will group the figures by month, as shown in the pivot table below.

Row Labels	Sum of Amount
Jan	$118,278
Feb	$73,701
Mar	$98,516
Grand Total	$290,495

Example 2: Group a Pivot Table by Range

Age	Count of Age
5	16
6	5
7	5
8	10
9	14
10	15
11	17
12	11
13	15
14	13
15	20
16	9
Grand Total	150

Imagine you have created the pivot table on the left, which groups 150 children according to age. The ages range from 5 to 16 years.

If you want to group the ages into the age ranges 5-8 years, 9-12 years and 13-16 years, you can this as follows:

- Right click on left column of the pivot table (containing the ages) and select the option Group...;
- You will be presented with the 'Grouping' dialog box for numbers;
- Excel will automatically enter the minimum and maximum values from the data, (which in this case are of 5 and 16);
- We want to group the ages into 4-year periods, so we change the value in the lower box (labelled By:) to a 4;
- Click OK.

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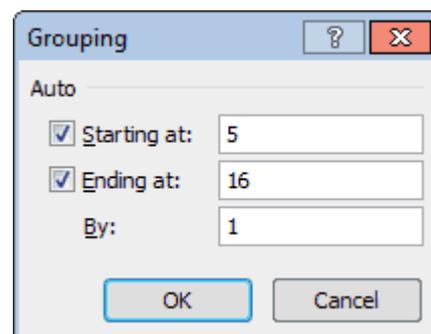
This will group the ages into categories, beginning with age 5-8 and increasing by 4 years each time. The resulting pivot table is shown below:

Age	Count of Age
5-8	36
9-12	57
13-16	57
Grand Total	150

Ungrouping a Pivot Table

To ungroup the values in a pivot table, simply:

- Right click on left column of the pivot table (containing the grouped values);
- Select the option Ungroup...

Common Pivot Table Grouping Error

Pivot Table Grouping Error: Cannot Group That Selection

If you attempt to group a pivot table, but find that the Group... option is greyed out, or that a message box pops up, saying "Cannot Group That Selection", this is usually because the data column in the original data sheet contains one or more non-numeric values (or non-date values), or errors.

In order to fix this, you will need to return to your original data sheet and amend the non-numeric or non-date values.

Once you have done this, right click on the pivot table and select Refresh. This will update the values in the pivot table, and you should now be able to group the selected row or column values.

Microsoft Excel

⚠ Cannot group that selection.

OK
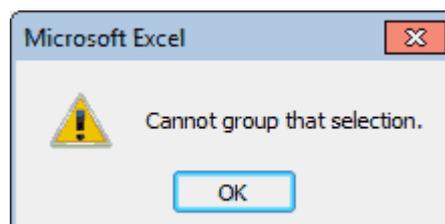
28. Using Excel Auditing Tools

Excel includes a number of tools that can help you track down formula errors. This section describes the auditing tools built in to Excel.

Viewing formulas

You can become familiar with an unfamiliar workbook by displaying the formulas rather than the results of the formulas. To toggle the display of formulas, choose Formulas ⇨ Formula Auditing ⇨ Show Formulas. You may want to create a second window for the workbook before issuing this command. This way, you can see the formulas in one window and the results of the formula in the other window. Choose View ⇨ Window ⇨ New Window to open a new window.

Tip

You can also press Ctrl+` (the accent grave key, typically located above the Tab key) to toggle between Formula view and Normal view. N

Tracing cell relationships

To understand how to trace cell relationships, you need to familiarize yourself with the following two concepts:

l Cell precedents: Applicable only to cells that contain a formula, a formula cell's precedents are all the cells that contribute to the formula's result. A direct precedent is a cell that you use directly in the formula. An indirect precedent is a cell that isn't used directly in the formula but is used by a cell that you refer to in the formula.

l Cell dependents: These formula cells depend upon a particular cell. A cell's dependents consist of all formula cells that use the cell. Again, the formula cell can be a direct dependent or an indirect dependent.

For example, consider this simple formula entered into cell A4:

=SUM(A1:A3)

Cell A4 has three precedent cells (A1, A2, and A3), which are all direct precedents. Cells A1, A2, and A3 each have a dependent cell (cell A4), and they're all direct dependents.

Identifying cell precedents for a formula cell often sheds light on why the

formula isn't working correctly. Conversely, knowing which formula cells depend on a particular cell is also helpful. For example, if you're about to delete a formula, you may want to check whether it has any dependents.

Identifying precedents

You can identify cells used by a formula in the active cell in a number of ways:

- Press F2. The cells that are used directly by the formula are outlined in color, and the color corresponds to the cell reference in the formula. This technique is limited to identifying cells on the same sheet as the formula.
- Display the Go to Special dialog box. (Choose Home ⇨ Editing ⇨ Find & Select ⇨ Go to Special.) Select the Precedents option and then select either Direct Only (for direct precedents only) or All Levels (for direct and indirect precedents). Click OK, and Excel selects the precedent cells for the formula. This technique is limited to identifying cells on the same sheet as the formula.
- Press Ctrl+[. This selects all direct precedent cells on the active sheet.
- Press Ctrl+Shift+{. This selects all precedent cells (direct and indirect) on the active sheet.
- Choose Formulas ⇨ Formula Auditing ⇨ Trace Precedents. Excel will draw arrows to indicate the cell's precedents. Click this button multiple times to see additional levels of precedents. Choose Formulas ⇨ Formula Auditing ⇨ Remove Arrows to hide the arrows.

Tracing error values

If a formula displays an error value, Excel can help you identify the cell that is causing that error value. An error in one cell is often the result of an error in a precedent cell. Activate a cell that contains an error value and then choose Formulas ⇨ Formula Auditing ⇨ Error Checking ⇨ Trace Error. Excel draws arrows to indicate the error source.

Fixing circular reference errors

If you accidentally create a circular reference formula, Excel displays a warning message —Circular Reference — with the cell address, in the status bar, and also draws arrows on the worksheet to help you identify the problem. If you can't figure out the source of the problem, choose Formulas ⇨ Formula Auditing ⇨ Error Checking ⇨ Circular References. This

command displays a list of all cells that are involved in the circular references. Start by selecting the first cell listed and then work your way down the list until you figure out the problem.

Using the Excel Formula Evaluator

Formula Evaluator lets you see the various parts of a nested formula evaluated in the order that the formula is calculated. To use Formula Evaluator, select the cell that contains the formula and then choose Formula ⇨ Formula Auditing ⇨ Evaluate Formula to display the Evaluate Formula dialog box

Excel Error Values

Error Value	Explanation
#DIV/0!	The formula is trying to divide by zero. This also occurs when the formula attempts to divide by what's in a cell that is empty (that is, by nothing).
#NAME?	The formula uses a name that Excel doesn't recognize. This can happen if you delete a name that's used in the formula or if you have unmatched quotes when using text.
#N/A	The formula is referring (directly or indirectly) to a cell that uses the NA function to signal that data is not available. Some functions (for example, VLOOKUP) can also return #N/A.
#NULL!	The formula uses an intersection of two ranges that don't intersect. (This concept is described later in the chapter.)
#NUM!	A problem with a value exists; for example, you specified a negative number where a positive number is expected.
#REF!	The formula refers to a cell that isn't valid. This can happen if the cell has been deleted from the worksheet.
#VALUE!	The formula includes an argument or operand of the wrong type. An *operand* is a value or cell reference that a formula uses to calculate a result.

29. Comments in Excel

Creating comments in cells can be helpful while using Microsoft Excel. Comments help users who are not the original creator to get additional information about the cell, such as what its value represents.

What a comment can do in Excel?

By annotating a worksheet with comments, you can attack additional information to a cell to describe the cell for convenient reading and understanding. For example:

1. Ask questions about the data with comments

2. Leave your feedback in excel document from another person
3. Describe certain value in cells of Excel
4. Explain formulas to other users

How to Add Comments to Cell in Excel

Text and picture are two different kinds of content in comment. The way to add them is also different. So now let's see how to create the two kinds of comments for cell in Excel (2010).

Text comment:
Step 1: Select the cell that you want to add comment.
Step 2: Add comment to cell with three ways.
1. Go to the **Review** tab, and click on **New Comment** icon in **Comments** group.
2. Right click the cell and select **Insert Comment** option from the context menu.
3. Press **Shift + F2** to easily add comment to cell.
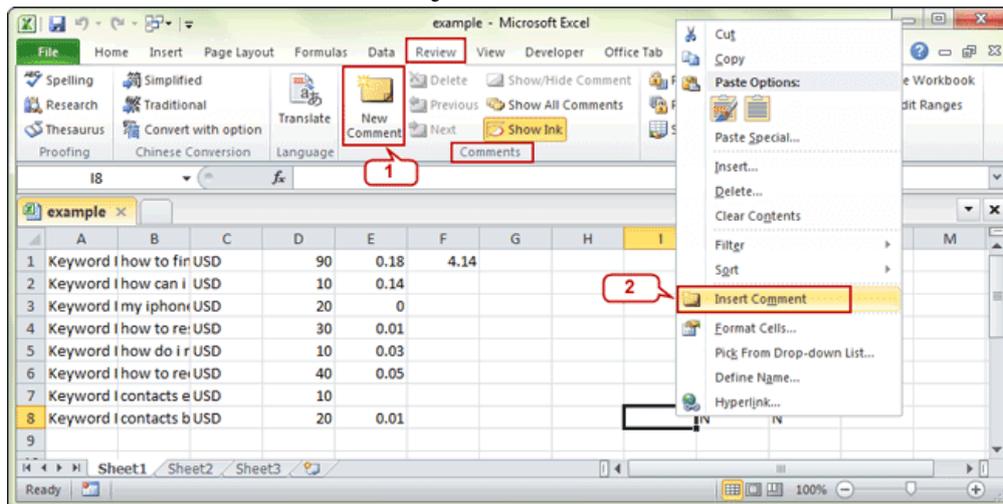
Now you can edit the comment, including **changing default user name** and entering content in the comment textbox. Or later, you can select the comment and click **Edit Comment** button to begin to change the comment.

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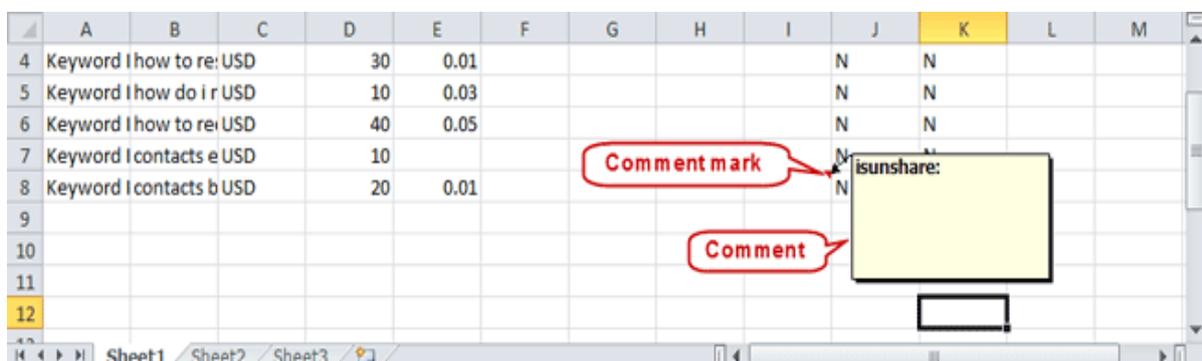
How to Show/Hide Comments to Cell in Excel

If there are lots of comments having been created in Excel, you have several choices to display one or all of the comments in Excel.

Option 1: Show comments one by one in Excel (Previous, Next)

With **Previous** and **Next** button in **Review** tab and **Comments** session, you can view the comments one by one in the Excel.
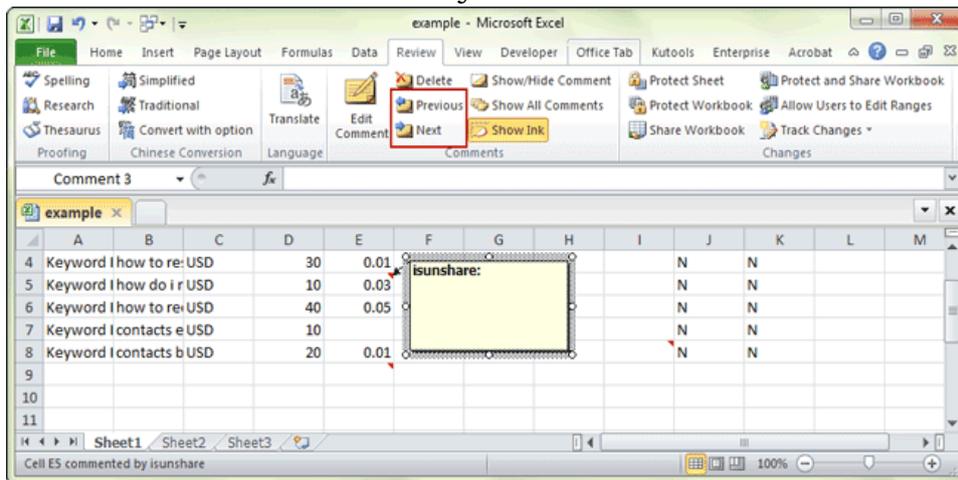
Until all the comments are showed, it would give you a warning message about that you have seen all of the comments.
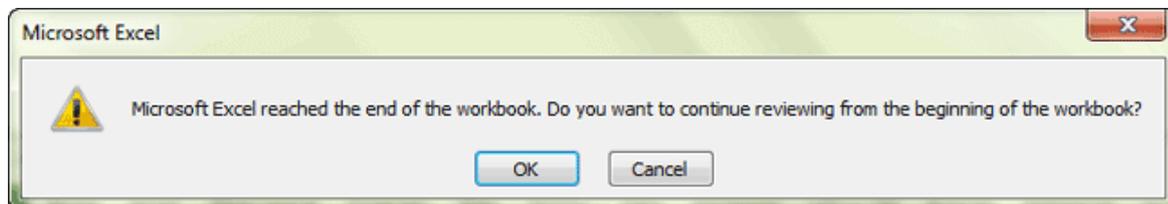
Option 2: Show or Hide All Comments at once in Excel

If you decided to show all the comments instantly in Excel, **Show Comments** option in Excel tab would help you to do that easily. Navigate to **Show All Comment** location in Excel, and click it. All comments would display for cells and you can see all of them.
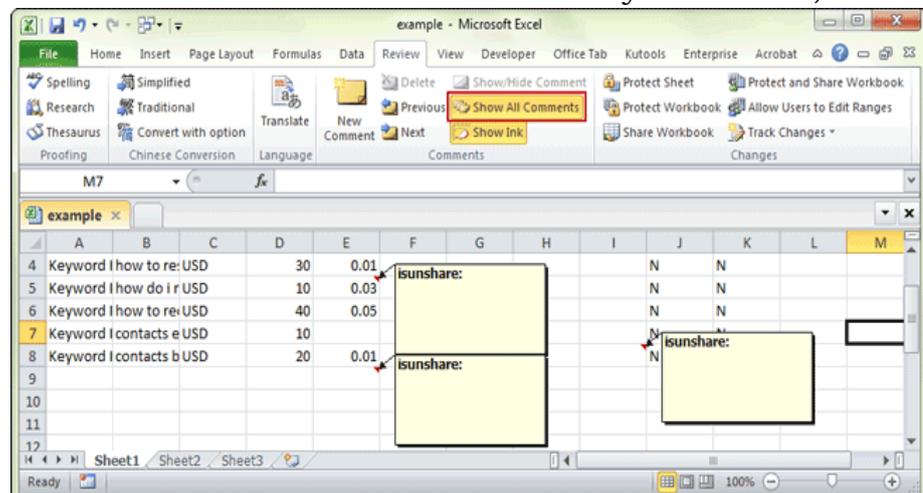
Option 3: Show or Hide Comment with command "Show/Hide Comment"

1. Right-click the cell that has comment and select **Show/Hide Comments** from context menu.
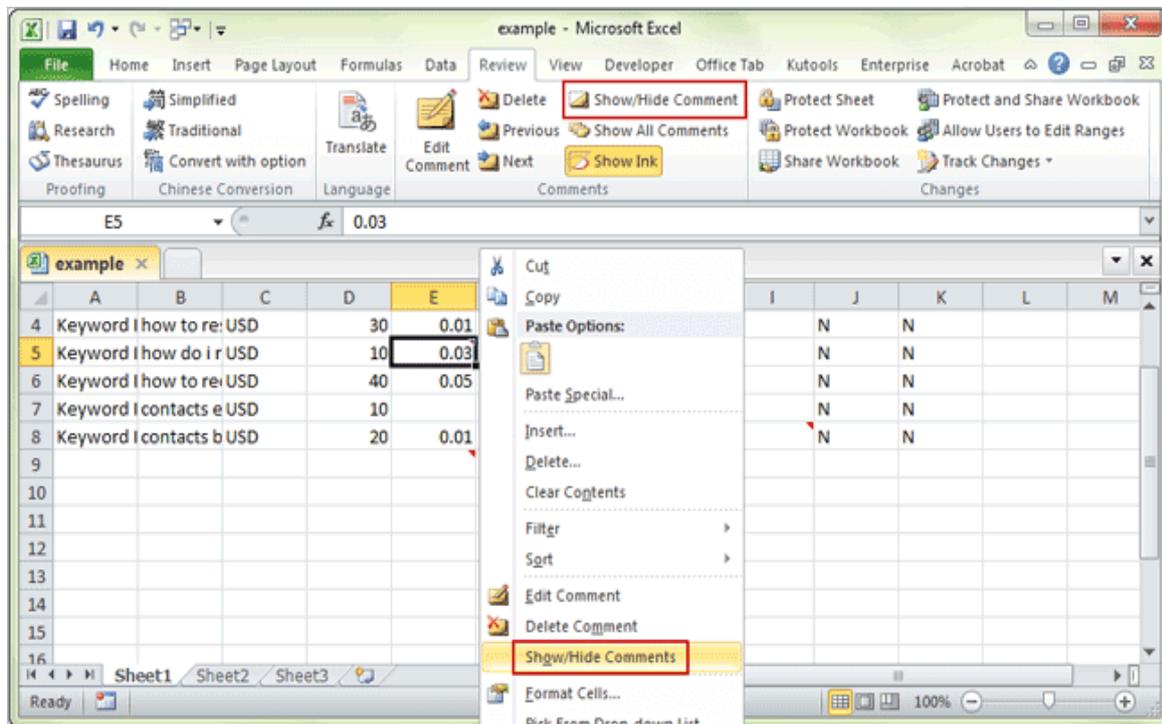
2. Instantly all the comments in Excel are displayed and hidden.

Surely, if you want to edit comment for cell, you can select the cell and click "**Edit Comment**". Or if you want to delete comment, just choose the cell has the comment, and click "**Delete**".

30. Working with Tables in Excel 2010

A table is a range of cells that hold data, with each row corresponding to a single occurrence of an entity. When you create a table, you can manage and analyze the data in that table *independently of data outside the table.* You can format the table, filter the table columns and also publish a table to a server that is running Windows SharePoint Services 3.0 or Windows SharePoint Services "4″. Usually there is an initial row of text headings that

describe the columns of data. For example, you might have rows and rows of employee data with the following column headings:

- First Name
- Last Name
- Age
- Salary

Each row in the table would hold the above details for a particular employee. But as Excel 2010 handles tabular data perfectly well by default, why would you want to put your data into a table? Well, tables allow Excel to respond more appropriately to your data if it is held in a a table. For example, if you create a chart based on the data in a table, the chart will expand as you add more rows to that table.

Creating Tables In Excel 2010

It's quite easy to create a table in Excel 2010; you simply make a cell active that is in the range of cells you want to convert into a table and then click Insert > Tables > Table. If your data has headers, make sure to check the *My table has headers* box in the create table window, and then those headers will be used. The good thing is that you don't need to select the entire range of cells: Excel can identify the limits of the data and also identify the headings.

The following is an example of tabular data before we convert it into a table.

	A	B	C	D
1	First Name	Last Name	Age	Salary
2	Jon	Smith	36	26500
3	Helen	Mirren	22	21000
4	David	Cameron	29	39000
5	Brad	Pitt	52	45000
6	Anna	Starolsky	41	22500
7	Peter	Piper	20	31500
8	David	Duck	19	15700
9	Julie	Walters	33	19000

After we convert it to a table, it looks like this:

If you create a table this way, it is given default formatting that you can change using the Table Styles on the Design tab that appears when the table is selected. Alternatively, you can select a style when you create the table. To do this, activate any cell in the range you want to convert and click Home > Styles > Format as Table. Choose a style from the panel that opens and your table will be created with that style.

Properties of Excel Tables

The main things to notice about tables are:
- When any cell in the table becomes active, the Table Tools contextual tab is displayed.
- Each column heading contains a drop down list that you can use to sort or filter the data in that column.
- If you scroll so far down the table that the column headings disappear, the letters that mark the column headings in the worksheet are replaced with the table's column headings.
- The cells have background colours to enhance readability.
- Background colours are applied to the cells to help readability.

Deleting an Excel Table

If you later decide that you'd prefer your data in its original form (i.e. not in a table), you can convert it back to a range of cells. Click anywhere in the table and then on the Table Tools tab, click Design > Tools > Convert To Range. Once the data is converted back to a range, the table features are no longer available.

Note that the formatting that was applied to the table is still present.

If you want to delete the table and all its data, select the table and press the delete key.

31. Excel 2010 Macros

Excel macros are useful if you find yourself repeating the same actions time after time. When you create a macro, you record all the actions and commands you perform to complete a task. Then instead of repeating those actions you can simply run the macro. Doing this saves you time and reduces the probability of making mistakes.

There are two ways you can create a macro:

- Use the Macro editor
- Use the Excel macro recorder

Using the macro recorder is by far the easiest method, though you can create some quite complex macros with the macro editor. The problem with the macro editor is that it requires some technical expertise (otherwise known as programming!) to use it effectively.

32. Previewing and Printing

Printing the Worksheet

Page setup Margins

In excel, we can also set the margins for printing the page. To customize the margin setting click on small arrow icon, this is right corner of page setup group in Page Layout ribbon

Margins

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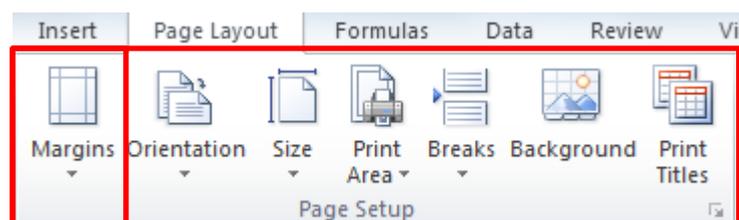
Orientation

Next command in Page setup group is Orientation which allows us to change the page orientation which can be portrait or landscape.
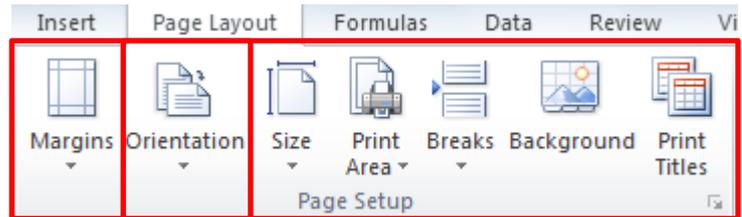
Orientation

Size

Third command in Page Setup group is Size which allows us to change the size of the page. There is various size of page for e.g. we normal use Letter size page for printing or A4 size so, to fix the size of the page this command will use.
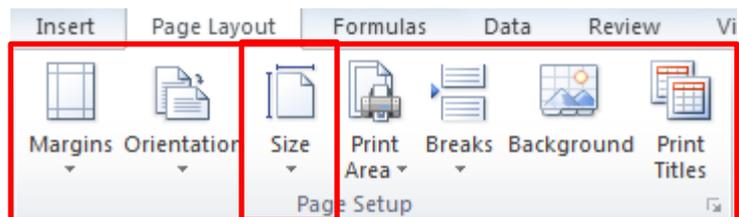
Size

Printing of Worksheet in Multiple Pages

Breaks

This option allows us to break our long worksheet in multiple sheets. This is inserting page break.
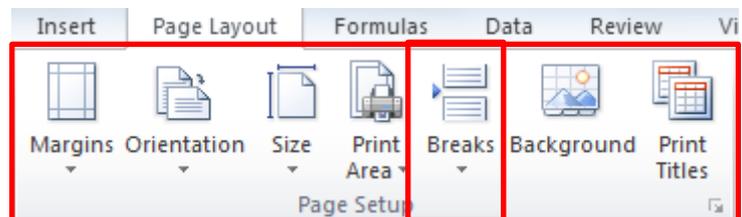
Breaks

Repeating Rows and Columns for Multiple Pages

Print Area

This Print Area allows us to print same row and column to print in multiple page spreadsheets.
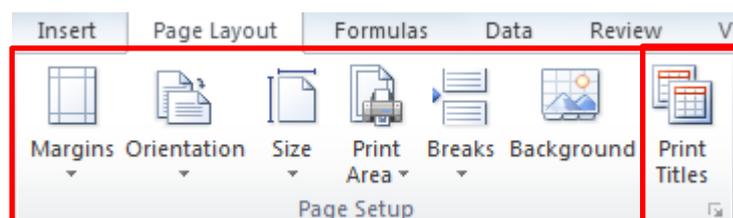
Print Titles

Previewing Worksheet

In excel, we just have worksheet not the pages so cannot make out how the print will come and how much data will get printed on a page. So, before giving print in excel we must see the preview of the sheet so that before giving it to print we can do last min changes. Here, excel has gave us PrintPreview options so that we can see how much data will print on a page.

File→ Print →Print Preview

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