



Microsoft Excel

Overview — Key Concepts _____	1	Other Common Operations in Excel _____	9
The Screen _____	1	Sorting _____	9
Watch the Mouse! _____	2	Printing _____	9
Getting Around _____	2	Print Preview _____	10
By Keyboard: _____	2	Page Setup _____	10
By Mouse: _____	2	Dates & Times: _____	12
Ranges _____	2	Database Operations _____	13
Noncontiguous Ranges _____	3	OPERATORS, WILDCARDS & FUNCTIONS: _____	14
Entering Information _____	3	Subtotals and Consolidate _____	14
The Numeric Keypad _____	3	Views & Scenarios _____	14
Editing Within a Cell _____	3	Views _____	14
Formatting _____	4	Scenarios _____	15
Widening Columns _____	4	Links _____	15
Centering Across Columns _____	4	Copying to Word _____	15
Formulas _____	5	Pivot Tables _____	16
Creating Formulas _____	5	The PivotTable Wizard _____	16
Nesting Operations _____	5	Modifying Reports _____	16
Absolute Cell Addresses _____	5	Auto Formatting _____	17
Functions _____	6	Pivot Charts _____	17
Charting in Excel _____	7	Advanced Options _____	17
Manipulating an existing chart _____	7	Templates _____	17
Design _____	8	Excel Keyboard Shortcuts _____	18
Layout _____	8	Other Windows Keyboard Shortcuts _____	18
Format _____	9	Other Important Terms and Symbols _____	18

Overview — Key Concepts

A spreadsheet consists of columns (which take priority and are referred to by letters) and rows (which come second, referred to by numbers). Where they cross is a “cell.” Each cell has an address (letter plus number, such as “A1”).

	A	B	C	D	E	F	G
1	A1	B1			Text	Number	Format
2		B2	C2		Chicago	39	\$1,234.55
3				D3	Milwaukee	2987.65	6/8/09

A cell can contain five kinds of content:

- Text (aligns left to right)
- Numbers (aligns right to left)
- Formats (such as \$1,000.00 or 2/15/05 or 27.5%)
- Formulas (that do math and that you manually type in)
- Functions (more complex math that Excel performs for you).

Never use spaces in numbers, formulas, or functions.

An equation or formula adds, subtracts, multiplies, or divides; it uses either numbers or cells. It *always* begins with an equal sign (=), and then shows the operation to be performed. For example,

$$=27+36+99+18$$

yields the result 180. An equation can also be based on cell addresses (*such as* =a1+a2+a3+d27). Equations recognize the following symbols: + (addition), – (subtraction), * (multiplication), / (division), and ^ (exponent, or power). In a formula, always remember the mathematical order of operation or PEMDAS:

() Parentheses— ^ Exponent— * Multiplication— / Division— + Addition— - Subtraction

$$=(2+3)^2*4 \text{ would yield the result } 100$$

A function is an operation Excel performs for you; it always begins with an equal sign (=), followed by a named command (such as “sum” or “average”), a set of parentheses () defining the area affected, and a cell range (such as a1:a200). For example, the function =average(a1:d1) would return the average of all numbers in cells a1, b1, c1, and d1. The most commonly used function, “sum” or Σ , is for totals.

The Screen

The Excel workscreen is divided into parts. In the upper left corner is the standard Office Button (with common commands such as save and print) and the “Quick Access” toolbar (for putting commands you use frequently). Then you have the tabbed “ribbon”: Home (common commands), Insert (graphics), Page Layout (margins, paper size), Formulas (really, functions), Data (sort and select), Review (track changes), and View (screen layout). These tabs are “grouped” into categories (such as Font or Alignment), which frequently offer expandable dialog boxes with more options.

Below the ribbon is the “formula bar” where you edit your information. As you type, you see your data in the cell you have selected, but it also appears on the blank white line of the formula bar. At the beginning of the line is an “X” (cancel, same as ESC) and a “✓” (done, or enter) on which you can click, as well as an f_x for accessing the functions. At the beginning of the line is the cell indicator, where you can type to move to a specific cell location.

Below the formula bar is the spreadsheet area (where your mouse appears as a white plus-shape — the cell pointer). The spreadsheet is divided into 16,384 columns (identified by letters, which always come first) and 1,048,576 rows (identified by numbers). Each square cell is referred to by the letter and number of its column and row. This makes a “sheet.”

At the bottom left is the sheet tabs, where you can move to sheet 2, sheet 3, or add more sheets as needed. At the bottom right is a quick view toolbar for adjusting your screen.

Watch the Mouse!

One of the keys to Excel is paying attention to the mouse. There are many mouse shapes that appear, but four are significant:

	Cell pointer—selects a cell; types; highlights
	Insertion point—inserts cursor for editing
	Move—drag cell contents to different location
	Copy—repeat cell contents; Iterate—repeat cell content following a pattern

Getting Around

Excel provides different ways to navigate around your spreadsheet:

By Keyboard:

Cursor keys	Move your cursor arrows up, down, right, and left.
ENTER key	Pressing ENTER automatically moves your active cell down one row. Shift+enter is one row up.
TAB key	Pressing TAB automatically moves your active cell to the right one column. Shift+tab is one cell to the left.
F5 (Go To...) key	This brings a dialog box to type in any cell on the worksheet you want to go to.

By Mouse:

Pointer	Click on whatever cell where your pointer is located, and that's your active cell.
Scroll Bar	This doesn't move your active cell, but it allows you to see other areas on your worksheet.
Name Box	In the upper left corner is a box showing the cell location. Click in that box, type any cell you would like to go to, then hit enter.

Ranges

A range of cells in Excel is simply a group of cells that can be manipulated in a variety of ways. Ranges are essential for formatting and many common functions. Ranges are also important when you are working with functions (see below), where they are often part of the "argument."

- To create a range with your mouse, place your cell pointer over a cell, click, hold, and drag the cell down and over until the range you desire is highlighted.
- To create a range with your keyboard, move your active cell to the first cell of the intended range, then hold down the SHIFT key and cursor down and over to select the desired range.

- To select an entire column-range or row-range, place the pointer over the column or row Headers (The gray) and click. That entire column - (16,384 rows deep), or that row (256 columns wide) is selected. To select a bunch of rows or column, click and drag.
- To select the entire worksheet, click the blank gray corner button just above Row #1 and left of Column A headers.

Noncontiguous Ranges

The ranges just discussed are contiguous — all the cells are adjacent or together as one group. You can create noncontiguous ranges where the cells that make up that range aren't next to each other.

Define your first range, then move the cell pointer to the beginning of your second, noncontiguous range. Hold down the CTRL key, and click and drag to select the range. You can do this again and again to select as many noncontiguous ranges as you want, but be careful not to click on a cell without the CTRL key pressed — that deselects all the other ranges.

Entering Information

To enter text, simply select the cell and start typing. Press enter or tab when done. When entering text, if what you type is longer than the cell is wide, one of two things will happen:

- The text spills over onto the adjacent cells, because the adjacent cell or cells are empty.
- The text is cut off at the end of your cell because the adjacent cell contains text or data, so Excel cannot allow text from one cell to spill onto a cell with something in it.

Solve either of these problems by widening your cell width or adjusting its height and using word wrap (format).

To enter nontext data, move to the desired cell, type the number or formula, then:

- Press ENTER, which tells Excel you've completed inputting in that cell, and moves the active cell down one row, or click on the Green Checkmark on the Formula Bar to confirm your decision yet stay in the same cell.
- If you change your mind or made a mistake and hadn't yet pressed ENTER, either hit the ESC key or click on the "X" on the Formula bar to cancel.
- After you input your data and confirm it, if you realize you made a mistake, you can either choose UNDO from the quick access toolbar or simply hit the BACKSPACE key to clear that cell's contents.

Sometimes a number in a cell is longer than a cell is wide. When this occurs, you'll see ##### across the cell. This means you must widen your cell for the number to appear properly (see Formatting, below, for various way to do this.)

The Numeric Keypad

Many people overlook the keypad on the right-hand side of a standard keyboard (though not laptops). The numeric keypad is specifically designed for numerical data entry; most people find it more efficient to type in their numbers from there. It is particularly useful for quickly accessing +, -, *, and /.

Editing Within a Cell

If you move to a cell that already contains data or text and type something in, what you just typed will completely replace what was there. If you want to edit a cell's contents there are two ways of doing this. First, you can simply move your mouse to the Formula Bar so that the cell pointer becomes an insertion point, then click the mouse button to place the cursor in the appropriate area. Then, like a word processor, make any necessary changes.

To edit in a cell without going up to the Formula Bar, double click in the cell (or hit F2) where you want to make the changes, and the cursor automatically appears in the cell.

Nagging Rule: Be in the cell where you want the answer to appear!
As obvious as this may seem, people often write long, complicated formulas in the wrong cells.

Formatting

Once all the data are in the worksheet, you'll want to make the sheet look as presentable and as professional as possible. Formatting, simply put, changes the display attributes of cells, ranges of cells, or the entire worksheet. For instance, you may want a cell or range of cells to reflect currency —so the numbers should have a \$ before them; text may look better centered within a cell, subtotals will stick out if the font is larger, bold and bright blue. You may want some numbers to appear as whole numbers, without decimals. A shaded box around the grand total might be an attention grabber. Formatting allows you to control appearances for when you print.

There are many shortcuts on the Ribbon for formatting (be sure to select the cell or range of cells you want to change). If you would like to see the full range of format options, go to the dropdown for **FORMAT** on the ribbon, and go to **Format Cells**. A dialog box will appear with tabbed categories of the types of formatting options available:

Number	Allows you to select how that number will appear - with a fixed number of decimals, as a percentage, currency, as a fraction, etc.
Alignment	Determine just how text or numbers sit within cells - centered, flush right or flush left, at the top, across columns, etc.
Font	Change text styles, size, color or attributes
Border	Lets you box, underline, add a variety of borders using different line styles and colors.
Patterns	Allows you to shade a cell with different patterns and colors
Protection	Allows you to protect cells from the possibility that someone might change the contents. Protection will allow you to also "hide" the cell - the answer will appear in the cell, but notice that the formula bar is empty. If you want to keep the formula secret, this is how you do it.

Widening Columns

If your text is wider than the column, select that cell or range of cells that contain the widest cell to which you want to widen the column. Then select **FORMAT >> COLUMN >> AUTOFIT SELECTION**.

If a number is too wide for the column, you'll see this: #####. Widen the column the same way as above.

If you want to adjust column width with your mouse, move the pointer to the gray column headers, directly on top of the line separating columns. The pointer should transform into double arrows when you point *between* the columns. Then Click & Drag to the right or left to widen or narrow the column, or double-click to autofit.

Centering Across Columns

Define how wide an area needs to be combined. To do this, select a range the desired width, starting in the cell that contains the text you want centered. Then click on the "Merge and Center" button on the Ribbon.

!!Note!! Do not select any of the three alignment buttons on the Formatting Toolbar - they align text *within* a cell, not *across* cells. And beware, if multiple cells that you highlight have content, only the first cell's content will remain and the rest will be deleted.

Hint:

One of the most useful shortcuts in Excel for formatting is the *right mouse button*. The right button is the menu key for whatever you are pointing at when you click. It can be extremely useful for operations like cut and paste, rename sheets, insert rows and columns, and even hide or unhide rows or columns for printing.

Formulas

Data The information you put in your spreadsheet

Formula The means by which you analyze data.

For instance, =5+4 is a formula calculating constants, =B17*H17 is a formula calculating cell references. In other words, formulas do basic arithmetic.

Operator A symbol that represents a mathematical operation in a formula

= The operator symbol that tells Excel that the cell contains a formula or function.

Operator	Purpose	Formula	Answer
+	Addition	=20+7	27
-	Subtraction	=80-6	74
*	Multiplication	=10*34	340
/	Division	=50/5	10
%	Percent	=15%	0.15
^	Exponentiation	=3^4	81

Creating Formulas

Formulas always begin with an equal sign. They never contain spaces. A formula consists of numbers *or* cell references *or* functions *and* operators. If a formula needs to contain levels, then the levels must be separated by parentheses — a step called “nesting.”

Nesting Operations

When using operators such as + and *, Excel always assumes that multiplication and division take priority over addition and subtraction. Therefore, if you need to add two numbers, then multiply, you must identify which step to do first by placing it in parentheses.

Formula	Result	Action
=2+4*3	14	This formula multiplies 4*3 (which equals 12), then adds 2.
=(2+4)*3	18	This formula nests 2+4 (6), then multiplies by 3.
=(9-2)/3)+6	8.33	This formula subtracts 9-2 (7), then divides 7 by 3 (2.33), then adds 6.

Absolute Cell Addresses

When using commands such as “Copy” or “Fill” to move or repeat functions, you have to remember that cell addresses change when they are moved; for example, if you shift a formula in C1 that reads =a1+b1 to the cell D1, it will change automatically to read =b2+c2 — every reference shifts over a cell. To prevent that from happening, you can “lock” a cell address by making it absolute. Absolute cells are identified by the \$ symbol: \$B1 locks the column; B\$1 locks the row; \$B\$1 locks both column and row. This is especially useful in calculating complex formulas, such as percentages:

	A	B	C	Formula	Result
1	Jan	43	48.31	=(B1/\$B\$4)*100	Divide 43 by 89, then multiply by 100
2	Feb	34	38.20	=(B2/\$B\$4)*100	Divide 34 by 89, then multiply by 100
3	Mar	12	13.48	=(B3/\$B\$4)*100	Divide 12 by 89, then multiply by 100
4	Total	89	100.00	=SUM(C1:C3)	Sum 48.31+38.20+13.48

Functions

A function is a mathematical or logical operation that Excel provides for you. It contains a name and an "argument." For instance, rather than typing =B5+C5+D5+E5+F5, you might create the function =SUM(B5:F5), where B5:F5 is the argument. Some arguments are very simple, such as SUM, and others are more complex, as shown in the table below.

Some commonly used functions in Excel:			
Function	Explanation	Example	Result
AVEDEV	Average Deviation of data points from the mean; a measure of the variability in a data set; can contain numbers of cells.	AVEDEV(13,19,27,33)	7
AVERAGE	Average of the data set; contains numbers or cells.	AVERAGE(13,19,27,33)	23
COUNT	Count how many numbers are in a range of cells.	COUNT(A1:D4)	2
COUNTA	Count how many nonblank values (cells with contents, either text or numbers) are in a range of cells.	COUNTA(A1:D4)	13
COUNTIF	Count how many numbers are in a range, based on a criteria	COUNTIF(A1:D4>10)	5
DATE	Returns the "serial number" of a particular date (the numeric value to Excel of that date); contains year, month, date.	DATE(96,12,25)	35424
DATEVALUE	The "serial number" of the date used to convert a date typed as text into the numeric value (useful within other functions).	DATEVALUE("8/16/96")	35293
DAYS360	Results in the number of days between two dates based on a 360-day year, useful for accounting systems based on twelve 30-day months; contains the start date and end date.	DAYS360("1/1/96","1/1/97")	360
DB	Depreciation of an asset for a specified time, with a fixed-declining balance; <i>cost</i> is the initial cost, <i>salvage</i> is the value at the end, <i>life</i> is the number of periods being depreciated, <i>period</i> is the want to calculate for.	DB(cost,salvage,life,period) DB(1000,50,5,1) (\$1,000 item, resale of \$50, 5 years, in the first year)	\$451.00
FREQUENCY	Frequency distribution of a range of values, at specified intervals (a second range of values called "bins").	FREQUENCY(range,bins)	
FV	Future value of an investment based on periodic, constant payments and constant interest rate; <i>rate</i> is the interest rate per period, <i>nper</i> is the total number of payment periods, <i>pmt</i> is the payment per period.	FV(rate,nper,pmt) FV(0.08125/12,24,100)	(\$2,596.49)
HOUR	Shows the value of an hour of day.	HOUR("3:30 pm")	15
IF	Returns one value if logical test is true and another if false; <i>logical test</i> is an instruction, such as > or < or +, <i>value_if_true</i> or <i>value_if_false</i> is a value to report if true (or false).	IF(logical test,value_if_true, value_if_false) IF(d13>10,"wow","oops")	wow
IPMT	Interest payment for a specified period of time based on periodic, constant payments and constant interest; <i>rate</i> is interest per period, <i>per</i> is the period you want the interest for, <i>nper</i> is total number of payments, <i>pv</i> is the present value.	IPMT(rate,per,nper,pv) IPMT(0.08125/12,1,360,93600)	(\$633.75)
MAX	Maximum value in a range.	MAX(d1:d15)	35424
MEDIAN	Number in the middle of a set of cells.	MEDIAN(d1:d15)	14
MIN	Shows minimum value in a range of cells.	MIN(d1:d15)	-2596.49
MODE	Most frequently occurring value in a range of data.	MODE(5,9,4,5,3,2,6,1,5,9)	5
NOW	Serial number of the current date and time; updates when document is used.	NOW()	1/8/2008 12:00
PI	Inserts the value of PI, to 15 digits.	PI()	3.141592654
PMT	Periodic payment for an annuity, based on constant interest rate, number of payments, and present value.	PMT(rate,nper,pv) PMT(0.08125/12,360,93600)	(\$694.98)
PPMT	Payment on principal for a given period, based on rate, period to be calculated, number of payments, and present value.	PPMT(rate,per,nper,pv) PPMT(0.08125/12,1,360,93600)	(\$61.23)
PV	Present value of an investment, based on rate, number of payments, and payment each period.	PV(rate,nper,pmt) PV(0.08125/12,360,700)	(\$94,276.45)
ROUND	Rounds a number to a specified number of digits.	ROUND(2.149,1)	2.1
STDEV	Estimate for the standard deviation based on a range of cells.	STDEV(d1:d25)	25930.43
TIME	Serial number of a particular time, in hours, minutes, seconds.	TIME(16,45,15)	4:45 PM
TODAY	Returns the serial number of the current date.	TODAY()	1/8/2008

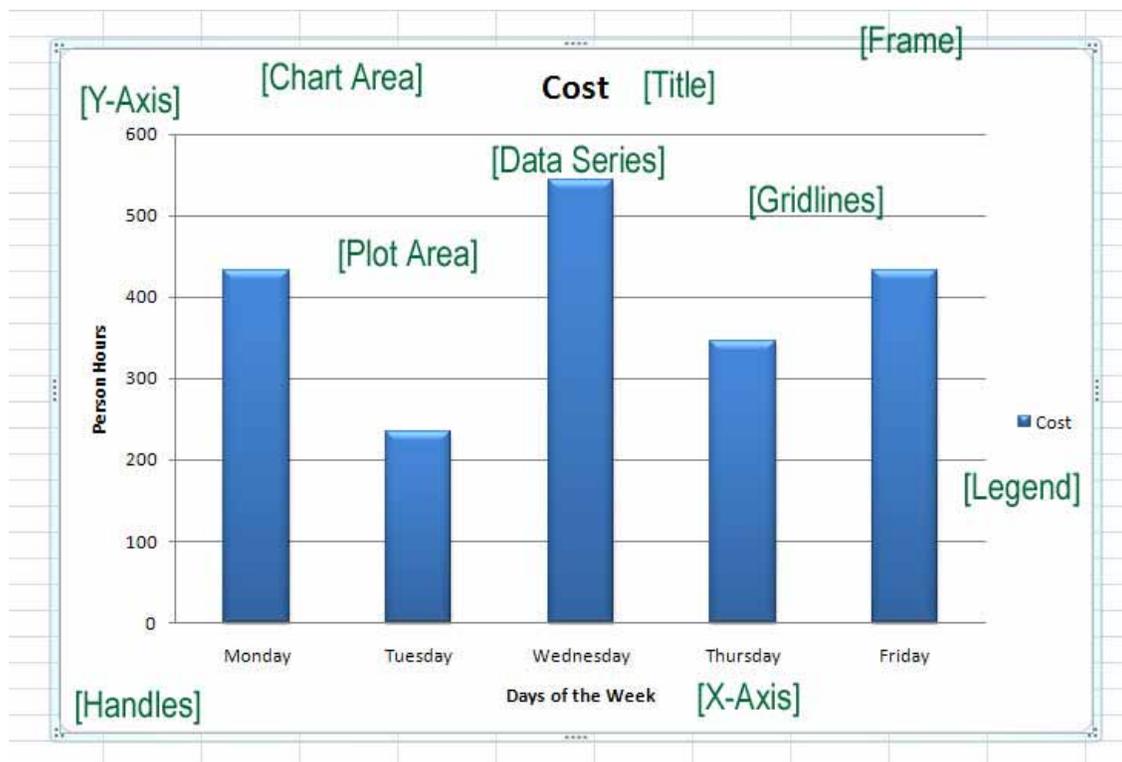
Charting in Excel

An Excel chart is based on numerical data you wish to graph. The key to charting is properly selecting the correct data to be included in the graph. Once selected (remember to use CTRL to skip portions, and you usually don't include totals), click the Insert ribbon and pick your chart type (column, line, pie, bar, area, scatter, other). This automatically inserts the chart into your sheet, as well as adds three new tabs to the ribbon: *Chart Tools*: Design, Layout, and Format.

Manipulating an existing chart

- Selecting:** To manipulate a chart, you first select or highlight it. To do this, simply place your pointer anywhere in the chart and click once. Graphical "handles" should appear on the chart edges.
- Moving:** With the chart active, point the mouse at the frame or border outlining the chart, then click and drag, moving the mouse, and the chart moves with you.
- Resizing:** To enlarge, shrink or change the shape of the chart, simply place the pointer on any of the "handles" on the frame until the pointer's shape changes into double-arrows, then click and drag. The outline you draw will change the chart accordingly. Corner handles enlarge and shrink.
- Formatting:** Clicking once on a chart will allow you to move the chart or change the dimensions. But you may want to change other aspects of the chart as well. One option is to click once on any specific part of the chart, then right-click with your mouse to find "change" and "format" options. Alternatively, you can use the ribbon tabs, as explained below. Remember to click the Home tab for simple formats (font, size, center, color).
- Deselecting:** After completing your chart changes, simply "Click Away" - or click anywhere on the worksheet outside the chart.

Parts of a chart



Design

Type

Change Chart Type — Opens the dialog window that allows you to select the kind of chart you wish to have (column, line, pie, bar, area, XY, stock, surface, doughnut, bubble, radar). There are multiple designs for each chart type; for example, for column charts, there are side-by-side, stacked, percentile, and front-to-back.

Save as Templates — Saves an edited chart as a template, so it can be re-used.

Data

Switch Row/Column — Flip the display of your data: switch x axis to y, and vice-versa. Changes the display and the formats.

Select Data — Re-select data to be included in the chart. Use this if you did not correctly select your data at the beginning.

Chart Layouts

This option is an “expander” (see the drop-down arrow in the bottom right corner). When expanded, there are multiple layouts for each chart type, impacting the title, legend, axes, gridlines, and more.

Chart Styles

Another group that expands (use the drop-down), with a variety of color formats.

Location

This feature allows you to move the chart from an embedded-in-the-spreadsheet object (which often means it is difficult to get it to print in an attractive way) to a separate, new sheet (its own worksheet). Having a chart on a linked sheet often makes editing and formatting (and printing!) much easier.

Layout

Current Selection

First single left-click on the portion of the chart you would like to change. The part you click on appears in the top drop-down of this group. There is both a “format” command and a reset command.

Insert

Allows you to insert a picture, shape, or text box into the chart area.

Labels

This is where you control the text content. There are drop-downs for Chart Title (position, and more); Axis Titles; Legend; Data Labels (showing values on the chart); and Data Table (which appends the data in a table beneath the graph).

Axes

Horizontal and vertical axes and gridlines.

Background

Plot Area is the actual chart background (on a 2-dimension graph). Chart Wall and Floor is the chart background and floor on a 3-dimensional graph. 3-D Rotation swivels and tilts the graph.

Analysis

Adds Trendlines and Error Bars to a graph.

Properties

The name of the chart sheet.

Format

Current Selection

First single left-click on the portion of the chart you would like to change. The part you click on appears in the top drop-down of this group. There is both a “format” command and a reset command.

Shape Styles

Predesigned or custom fills, outlines, and effects for the components of the chart (such as fill colors or borders or shadows).

Word Art Styles

Predesigned or custom text formats (including text color, text border, and text effects such as glow).

Arrange

Bring to front or send to back (used when there are multiple objects embedded within a chart).

Size

The horizontal and vertical dimensions of your chart. This is an alternative way of sizing, as opposed to dragging handles.

Other Common Operations in Excel

Sorting

The “Sort” function rearranged your data by a specified column. Highlight *all* the data to be sorted. To alphabetize by the first column of the highlighted area, you can use the AtoZ button on the toolbar. However, if you wish to sort by some other column in the highlighted area, use the “Tools” menu to select Sort. The Sort window will allow you to specify which data within the highlighted area to sort by.

Warning! If you have three columns of information to be sorted, but you highlight only the first column, then only that data will be rearranged — not the other columns. If this happens, remember to use Edit/Undo to reverse your last step.

Printing

The Print menu allows you to print the entire spreadsheet, the highlighted (selected) area, or page ranges (such as 2 to 4). It also allows you to go into “Preview” mode, to see what your document will look like when it prints. Print Preview has some of the most useful functions for printing, including printing the gridlines, page numbers, and headers and footers. Print Preview also allows you to center your table on the page, and, if it is too large to fit, to shrink it to scale so it fits on one sheet.

There are three ways to print a worksheet in Excel: the print button on the toolbar, the File/Print menu, and the option under print preview.

PRINT BUTTON

Click on the Print button on Quick Access toolbar. This is the easiest and fastest method, but will print according to a set of default print instructions (which we'll get to shortly). In the Office Button (formerly, File), you will find a print option that gives you more control:

Selection	Will print only a selected range of cells in a worksheet
Selected Sheet(s)	Will print all the data in an entire worksheet
Entire Workbook	Will print all the worksheets in a workbook that contain any data
Copies	How many copies you want printed
Print Range	Allows you to define what pages of a worksheet to print.

Other Print Buttons

Page Setup	Brings up a dialog box that allows you to customize how the worksheet will be printed (We'll explore this in the Print Preview section)
Print Preview	Sends you to the Print Preview mode
Printer Setup...	Allows you to select printer settings.

Print Preview

Print Preview allows you to see how your document will appear, so you can make changes before you send it to paper. When you select Print Preview, either from FILE on the menu bar or by clicking on the Print Preview button on the toolbar, you'll see a full page appear on the screen. Near the top of the screen a new button bar will appear. Here's what the buttons will do:

Other Preview Buttons

NEXT	Displays the following page if there is one. If Next is grayed-out, this tells you the worksheet is only one page.
PREVIOUS	Displays the previous page, if you're aren't looking at the first.
ZOOM	A button you need never actual press. But if you did, this will enlarge the image. Here's why you don't need to use it: If you move your mouse pointer around the page, notice that it takes the shape of a magnifying glass. Clicking will automatically zoom into that area where the magnifying glass is currently located. Click again and the screen zooms out to display the full page.
PRINT...	Closes out of the Print Preview mode, and displays the same dialog box you'd see from FILE >> PRINT...
SETUP	Here's where you can have fun and completely decide how your worksheet will look. The Print Setup box that comes up has tabbed categories. Let's look at each one and see what happens:

Page Setup

Page

Orientation	Do you want to print your worksheet like a letter (a.k.a. - "portrait" or "tall") or on it's side ("landscape" or "wide")?
Scaling	Very cool stuff! Allows you to shrink or enlarge the contents of your worksheet on the paper.

Example: Let's say you have a worksheet should fit on two pages. But you want to see it on one. Simply select the Fit to: button, and make sure it's to 1 page wide by 1 page tall. Voila, all on one page!

Warning! Don't try to scale a 20 page worksheet onto one page. It's unreaable, and you might freeze (crash) the computer or worse.

Paper Size	Allows you to decide to what size paper you'll be printing.
Print Quality	Determines the resolution of the printout in dpi (dots per inch).
1st Page	What number to start numbering with.
Options...	Allows you reconfigure how your printer will print.

Margins

Allows you to set page margins, and the areas in which headers and footers will fit. Also allows you to center your worksheet both horizontally and vertically on the page. (Try this when working on small worksheets)

Headers/Footers

Headers are text that repeat at the top of every page. Footers are the same, except they're at the bottom of every page.

The boxes display the current defaults. If it says "Sheet 1", this means that the tabbed worksheet name is the header. The footer box should display "Page 1".

To change this, click on the down-arrow below Header or Footer, respectively. This will display a number of pre-set options.

But if you want to *really* customize your headers/footers, select Header button (the same applies to Footer): And here's what you'll see: A set of buttons, and below that, three boxes, labeled Left, Center and Right Sections. This displays what appears in the Headers and Footers. You can type text in these Section boxes or insert various codes (That's where the above mentioned buttons come in).

The Header/Footer Buttons:

- The "A" Button allows you to select the fonts, styles and sizes to be used.
- The "#" Button will insert a code that will display the current page.
- The "+ + +" Button inserts a code displaying the total number of pages in the worksheet.
- The Calendar (yes, that's a calendar) Button displays the print date.
- The Clock Button display's the print time.
- The Excel Logo Button displays the Filename.
- The Last Button displays the Tabbed Worksheet name.

Sheet

Print Area	displays the range selected to print
Print Titles	If you have column headings you want repeated every page (similar to a Header, but different), select specific rows or columns to repeat

Print:

Gridlines	Selects or deselects the gridlines (does not affect the monitor display)
Notes	To print Notes
Draft Quality	Tells the printer to use less resolution (don't worry about it)
Black & White	Prints w/o color or some formatting attributes (as if you had a color printer!)

Row & Column Headings

If you want A,B,C Column headings, or 1,2,3 Row headings to appear

Page Order

Determines how the multiple pages will print (down and across, or across and down — that is, from left to right, then down, or top to bottom, then across).

Dates & Times:

Dates are converted into serial numbers, where each subsequent day is accorded an increasing numerical value (starting on 1/1/1900). So, if the date equals,

<u>Date</u>		<u>Serial #</u>
Jan 1, 1900	=	1
Jan 2, 1900	=	2
Jan 1, 1901	=	366
July 4, 1995	=	34,884
January 1, 2009	=	39,814

This can be very useful in doing math calculations with dates. For example, if you are a doctor in a hospital who is tracking patients, you might find it helpful to chart “days of survival.” If the patient started treatment on Sept. 14, 2007, and is still alive today, that patient has “survived” 634 days:

=today()-“9/14/2007”

Formatting the date cell is the process by which you can change the numeric appearance. On the Format button of the Ribbon, under Format Cells, are the numerical formats, including an option for “Custom.” Below are some of the codes you can put into “Custom” to create your own date formats:

Day Code	Appearance	Month Code	Appearance	Year Code	Appearance
d	7	m	11	yy	09
dd	07	mm	11	yyy	2009
ddd	Tue	mmm	Nov		
dddd	Tuesday	mmmm	November		

Here’s how you might manipulate the formatting codes to change the date’s appearance:

Tuesday, November 7, 1995	dddd, mmmm d, yyy
7/11/95	d/m/y
Nov. 7, 1995	m. d, yyy

Time, to further this concept, is accorded a decimal value, where if one day equals the value of one (1), then:

6:00 am	.25
12:00 Noon	.5
6:00 PM	.75

Here’s how to format time codes. So if it’s 3:33 PM, you’ll see:

h	3
hh	03
m	33
mm	33
ss	However many seconds
AM/PM	AM/PM

Database Operations

Databases are all about information and what you can do with that information. To better understand databases, here's a simple model:

First	Last	Age	Income	Sex
Fred	Smith	42	\$35,000	M
Sally	Sampson	67	\$45,000	F
Joe	Smith	54	\$22,000	M
Jane	Jones	33	\$60,000	F

To understand databases, it's important to know about Records and fields.

A *record* is all the information pertaining to a person, place, thing - or whatever it is the database is tracking. So the record for Sally Sampson contains all the information pertaining to her and her alone.

A *field* is a component of a record. For this database, the Field Headings are FIRST, LAST, AGE, INCOME & SEX. Sally Sampson's age is 67.

Here's what you can do with a database:

Query or Find Seeking and locating records that meet specific requirements:

Find all records for men (M) Fred and Joe

Find all records for those older than 40 (>40) Fred, Sally, and Joe

Sort Arranging all the records in either ascending or descending order:

List the records in alphabetical order, by last name Jane at the top, Fred at the bottom

List the records in descending order, by income Jane at the top, Joe at the bottom

It's important when creating a database that you have first have field headings, then don't skip a row before starting to input the data. The database must be contiguous.

To Sort: Click in any record, it doesn't matter which one, but it must be in the under the field you by which you want sort the database by. Then from the Standard Tool Bar, click the **A-Z** button to sort all the records in ascending order. Click the **Z-A** button to sort in descending order.

Note that each complete record moves, not just the contents of that column. They have to; otherwise they'd be wrong. And that's not good.

Also note that the Field Headings don't move. Don't worry about it. It's magic.

To Filter: Click and select any cell in the database. Select "Data" from the menu bar, then choose "Filter", then select "AutoFilter..." Notice how the field headings all get down-arrows in the right of each cell? Click on an arrow, and what pops up are field contents of various records. Referring back to the database above, if you select the down arrow for LAST, then select Smith, the database would appear to have only two records - Fred's and Joe's.

IMPORTANT! To redisplay all the missing records, you must click on all the blue arrows, then find and select "All." This will remove any query commands in Excel.

To query for and display those records for those earning over 40, click on the "INCOME" arrow. Select "Custom." A dialog box appears that displays the Field Heading. Below that is an equal sign. Select one of the logical operators <, >, =, etc. to specify the criteria for the search. Hit the TAB button or click in the neighboring box. Type "40000". Then select OK and see what happens! Only those records where the incomes are greater than \$40,000.

OPERATORS, WILDCARDS & FUNCTIONS:

Wildcard Characters

?	Any single character	Sm?th	matches Smith, Smyth, Smoth, etc.
*	Any characters	S*	matches Smith, Sampson, Sorenson, etc
#	Any numeric digit	5##	matches 500 to 599
[]	Any characters in bracket	Sm[iy]th	matches Smith or Smyth, but not Smoth
-	Any characters within the range (must be in brackets)	J[N-Z]nes	matches Jones but not Janes
!	Any characters except (must be in brackets)	[!N-Z]	Excludes Jones but not Janes

Operators

=	Equals	=50	must be 50
>	Greater than	>3000	Must be greater than 3000
<	Less than	<50	Must be less than 50
>=	Greater than or equal to	>=30	Any number 30 or larger
<=	Less than or equal to	<=500	Any number 500 or smaller
<>	Not equal to	<>CA	Does not equal CA
Between	Between two values	Between 30 and 50	Any number from 30 to 50

Subtotals and Consolidate

If you have a large table with a lot of repetitive information, there are several features under the Data menu that will help you better organize, analyze, and present the information.

“**Subtotals**” looks for repetitive values and adds totals (or averages, counts, etc.) at each change in data. It also adds an outline toolbar for viewing on the left side of the spreadsheet. Subtotals can also be removed when no longer needed (i.e., this feature can be turned on and off; it is temporary and does not permanently alter data).

“**Consolidate**” looks for repetitive values and collapses them into one, with a resulting total (or average, count, etc.). The resulting consolidation is a new table, and is not linked to the source (see Pivot Tables below for similar options).

Views & Scenarios

Views

If you have a large worksheet where you frequently need to show different parts of it to different people, you can accommodate those different viewing requirements with the view manager.

If, for instance, you want to display only summary information:

First, define just how that worksheet is to look (hide certain columns or ranges, etc.)

Select VIEW >> View Manager...

Choose Add...

Give this Display style a name.

Select Okay

If you have to show this worksheet in this view every week, simply go to the View Manager and select a named view, and then the worksheet will be displayed however you want it to look.

(Note: It's a good idea to create a named view of the worksheet showing the entire thing)

Scenarios

Scenarios are rather arcane, so let take an example. You have a worksheet that displays this years sales figures. You need to predict next years sales, based on national economic indicators. But what if those figures change? You can create Scenarios based on how these indicators vary and will give different answers.

You can create named scenarios that are based on cells whose values may change. So if company sales are tied into national growth figures, you may want to have best-case/worst-case scenarios.

Links

To copy data from one workbook to another is pretty straightforward; simply highlight the source data, select Copy, then toggle to another workbook file, then Paste.

Copying formulas or creating Links is a little trickier. When copying cells containing formulas, that *formula* copies, not the *value*.

That's when you select Edit >> Paste Special...

All	Copies exactly what is in the source cell
Formulas	Copies only the formula
Values	Copies the <i>value</i> of the source cell
Formats	Copies only the display attributes of the source cell
Notes	Copies any notes in the source cell

Paste Link.—Will maintain a relationship between the two files. That is, if the source cell in the source worksheet file changes, the linked cell in the linked file will change accordingly.

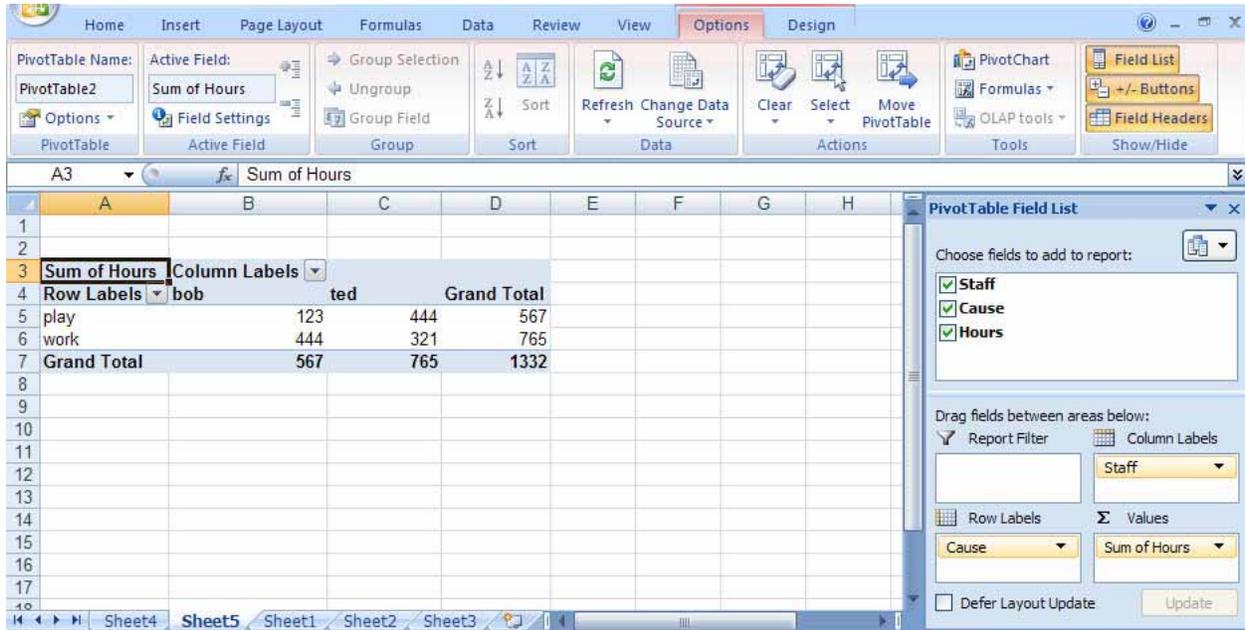
Copying to Word

You can copy worksheet contents to your Word document quite easily. Highlight a cell or range of cells in Excel, choose Copy, then toggle to Word. Place your cursor where you want to insert the worksheet data, then simply choose Paste. The values of your data will appear in Word's Table format.

Alternatively, use Paste Special, where you will find the "Link" option (be sure to select that it is a link to Microsoft Excel Worksheet Object). Tables that are linked from Word back to Excel can only be updated or edited in Excel.

Pivot Tables

PivotTables are especially well-suited for taking enormous amounts of data and summarizing that data into useful reports. To rearrange the worksheet, simply drag and drop column headings to a new location on the worksheet, and Microsoft Excel crunches the data accordingly. The diagram below depicts a typical PivotTable and highlights its moveable elements.



To begin, you need raw data. The general rule is you need more than two sets of data (three columns) to work with—otherwise you have nothing to pivot. And it needs to be consistently entered (like data in like columns or rows), although it does not need to be sorted. It also helps if you have column headings.

The PivotTable Wizard

To create a Pivot Table, place the cursor anywhere in the data area, and start the Pivot Table wizard from the Insert tab on the Ribbon. The PivotTable wizard walks you through the process of creating a PivotTable. While there are many advanced options available to use, the simple results are that Excel creates a blank PivotTable structure. You then move the particular fields to the designated areas: column labels (headings at top), row labels (headings at the left), and values (the data to be summed or analyzed). You can have multiple fields in each category.

As you drag and drop these items into their respective areas, the resulting report is displayed. The next step is to further manipulate your data by rearranging different fields onto the table, or removing fields. This action is pivoting the data—what Pivot Tables are all about. You'll find that all duplicate entries have been consolidated, and the data automatically sorted.

Modifying Reports

A Pivot Table can be modified to display different results such as averages, counts, minimums, maximums, etc. The Pivot Table field dialog box shows how to change this report to display percentages instead of total amounts.

Numeric data fields can be summarized using SUM, AVERAGE, MAX, MIN, and the other aggregate functions including COUNT. (As with the Subtotals feature, text fields can only be summarized with the COUNT function.)

Auto Formatting

The next step is to understand how the automatic formatting controls can make data clean-up a snap. On the Ribbon are tabs for Options and Designs. Under Designs, Excel provides an assortment of formats to choose from. Simply choose a format, and your data is now more readable. Additionally, these automatic formats are persistent formats, which means the table's formatting will hold even as you continue to pivot your data around by dragging and dropping additional fields on the screen.

Pivot Charts

The next step is to turn your Pivot Table into a chart. On the Ribbon, under Options, click the Pivot Chart button to launch the chart screen, which then adds a chart to the table. Just as with Pivot Tables, Pivot Charts are interactive as well. Simply drag and drop the data onto the chart to see instant results.

Advanced Options

On the Options tab of the Ribbon is a dropdown with advanced options.

Layout allows you to generate default field settings for the PivotTable during the wizard process. This screen is a little more graphical and might be preferred by some users. However, this utility does not add any additional functionality or save any particular steps.

Templates

On the Office Button (in the upper left corner) is a command called "New." This is where you will find, not only new blank spreadsheets, but dozens and dozens of spreadsheet templates already set up. These are free, but they must be downloaded onto your computer for use; once downloaded, they are stored under "Installed Templates" for re-use.

Excel Keyboard Shortcuts

Move to cell "A1"	CTRL-Home
Move to "A" Column of worksheet	Home
Go To	F5
Move to end or start of table or worksheet	End + arrow
Move one window Left/Right	Alt-Page Up/Alt-Page Down
Move one window Up/Down	Page Up/Page Down
Insert AutoSum	ALT+=
Select entire Column	CTRL+Spacebar
Select entire Row	SHFT+Spacebar
Clear Cell Contents	Delete
Clear Cell Contents, and Edit	Backspace
Recalculate Worksheet	F9
Switch from displaying Values/Formulas	CTRL+` (single left quotation mark)
Edit a Cell's Data	F2
Edit a Cell's Contents (data, notes, etc.)	CTRL+F2
Format Cells	Ctrl-1
Insert Cells	Ctrl-SHIFT-=

Other Windows Keyboard Shortcuts

Save	CTRL-S
New	CTRL-N
Open	CTRL-O
Print	CTRL-P
Select All	CTRL-A
Undo last action	CTRL-Z
Absolute Cell Reference (\$)	F4
Cut	CTRL-X
Copy	CTRL-C
Paste	CTRL-V
Find	CTRL-F
Find & Replace	CTRL-H
Fill Down	CTRL-D
Fill Right	CTRL-R
Help	F1
Bold	CTRL-B
Italics	CTRL-I
Underline	CTRL-U

Other Important Terms and Symbols

<	Less than
>	Greater than
<=	Less than or equal to
>=	Greater than or equal to
<>	Not equal to
Circular	A cell is referencing itself
Filter	A database is being filtered (selected by specific criteria)