

## Dr. Rich's Excel Basics

Note: Excel is a vital tool in finance and your ability to get some internships and jobs will depend on your Excel skills. This primer covers the basics you will need when modeling in Excel.

Notation: I will use x# to refer to a cell. For example, B5 is cell B5. I will also use x#:y# to refer to a range of cells. For example, B5:D9 refers to the cells from B5 to D9 (15 cells altogether).

### 1. Comments and suggestions:

1) Excellent introduction to learning Excel:

[Beginner's Guide to Excel: Excel Basics Tutorial](#)  
[Intermediate Excel Skills, Tips, and Tricks](#)

- 2) When building any Excel model, it is very helpful to have an area for entering data that you will change, and an area that displays results. You should clearly label things so that you can easily find variables that need changing and so that you can easily find the new answer once you have changed the variables. You may also need an out-of-sight area in which you do some calculations. Keeping this area out-of-sight helps keep the visible part of your spreadsheet less cluttered...so you can more easily find numbers to change or results.
- 3) When building spreadsheets to solve problems in this class, you should build it so that ANY of the numbers given in the problem can be changed.
- 4) When speed-checking spreadsheets in this class, it helps to have an area where you have saved a copy of the original numbers given in the problem. This way you can change them back easily.
- 5) I tend to build my own time-value-of-money equations rather than using Excel's built-in functions
- 6) Microsoft has free training videos for Excel (and other Office programs): [link](#)

Note: Throughout this primer, I've included links to individual lessons on Microsoft's training site related to specific functions.

## 2. Really useful shortcuts:

Note: Shortcuts are more efficient than using a mouse and menus. Some employers will take away your mouse to force you to learn shortcuts.

Ctrl+C: copy the contents of the cells

Ctrl+X: cut the contents of the cells

Ctrl+V: paste what you have copied or cut

Ctrl+F: find

Ctrl+H: find & replace

F2: edit current cell

F12: save as

Ctrl+P: print

Ctrl+Z: undo

Ctrl+S: save

F9: recalculates spreadsheet (and generates new random numbers if any)

Ctrl+PageUp: move one tab to left if multiple sheets in a workbook

Ctrl+PageDown: move one tab to right if multiple sheets in a workbook

Ctrl+` : switch between showing values and formulas

Ctrl+A: select entire worksheet

Alt+T+G: goal seek

List of Excel Shortcuts on Microsoft website: [link](#)

### 3. Cell references:

#### a) relative: =x#

Comment: If you copy and paste this cell, the cell you reference is relative to the cell you copy from. For example, assume that in cell B2 you have “=A2”. You are referencing the cell just to the left of B2 (the cell is in the column just to the left of B2 but on the same row as B2). If you copy B2 and paste it into C5, the result in C5 will be “=B5”...the cell just to the left of C5 (the cell is in the column just to the left of C5 but on the same row as C5).

#### b) absolute:

=x\$#

Comment: If you copy and paste this cell, the cell you reference is a particular cell. For example, assume that in cell B2 you have “=\$A\$2”. If you copy B2 and paste it into C5, the result in C5 will be “=\$A\$2”.

#### c) mixed references:

=x\$# or =x\$#

Comment: If you copy a cell with “=x\$#”, the column (x) is absolute but the row (#) is relative. For example, assume that in B2 you have “=\$A2”...the cell just to the left of B2 (the cell in the column just to the left of B2 but on the same row as B2). If you copy B2 and paste it into C5, the result in C5 will be “=\$A5”. The column stayed “A” but the row is the same as C5.

If you copy a cell with “=x\$#”, the column (x) is relative but the row (#) is absolute. For example, assume that in B2 you have “=A\$2”...the cell just to the left of B2 (the cell in the column just to the left of B2 but on the same row as B2). If you copy B2 and paste it into C5, the result in C5 will be “=B\$2”. The column remained the one just to the left of your cell, but the row stayed as 2.

Microsoft tutorial on cell references: [Both Modules](#)

Discussion of absolute and relative references on Microsoft’s website: [link](#)

## 4. Useful functions:

A. Arithmetic operators: =, +, -, \* [multiply:  $x*y = x$  times  $y$ ], / [divide:  $x/y = x$  divided by  $y$ ], ^ [ $x^y = x$  to  $y$  power]

Microsoft training: [Module 1](#)

## B. Math functions:

=abs(x#) [absolute value of number in cell x#]

For example, assume the value in x# is -5.9, then =abs(x#) gives 5.9.

Discussion of abs() function on Microsoft's website: [link](#)

=sum(x#,y#) [add up the values in x# and y#]

Note: can also be used on a range: =sum(x#:y#) [adds all of the values in the range x# to y#].

Microsoft training: [Module 2](#)

=round(x#,y) [rounds value in cell x# to y decimal places].

For example, assume value in B3 is 3.9327. If in C5 you enter =round(B3,2), the result will equal 3.93. If the value in B3 had been 3.9377, the result would have equaled 3.94.

Discussion of round() on Microsoft's website: [link](#)

=rounddown(x#,y) [rounds value in cell x# towards zero to y decimal places].

For example, assume the value in B3 is 3.9327. If in C5 you enter =rounddown(B3,2), the result will equal 3.93. If the value in B3 had been 3.9377, the result would have still equaled 3.93.

Discussion of rounddown() on Microsoft's website: [link](#)

=roundup(x#,y) [rounds value in cell x# away from zero to y decimal places].

For example, assume the value in B3 is 3.9327. If in C5 you enter =roundup(B3,2), the result will equal 3.94. If the value had been 3.9377, the result would still have equaled 3.94.

Discussion of roundup() on Microsoft's website: [link](#)

=sumproduct(x#1:x#2,y#1:y#2) [adds up the values from multiplying the first number in row x by the first number in row y and the second number in row x by the second number in row y and the third number in row x by the third number in row y etc. through the final numbers in each column)

Microsoft training: [Module 3](#)

Discussion of sumproduct() on Microsoft's website: [link](#)

=rand() [generates a random value between 0 and 1]

Discussion of rand() on Microsoft's website: [link](#)

### C. Statistical functions:

=min(x#,y#) [smallest of the values in x# or y#]

Note: can also be used on a range: =min(x#:y#) [smallest of all the values included in the range x# to y#].

Discussion of min() on Microsoft's website: [link](#)

=max(x#,y#) [largest of the values in x# or y#]

Note: can also be used on a range: =max(x#:y#) [largest of all the values included in the range x# to y#].

Discussion of max() on Microsoft's website: [link](#)

=average(x#:y#) [average of numbers in range x#:y#]

Discussion of average() on Microsoft's website: [link](#)

=stdev.s(x#:y#) [standard deviation of a sample of numbers in range x#:y#]

Discussion of stdev.s() on Microsoft's website: [link](#)

=var.s(x#:y#) [variance of a sample for the numbers in the range x#:y#]

Discussion of var.s() on Microsoft's website: [link](#)

=count(x#:y#) [counts how many numbers are in the range x#:y#]

Discussion of count() on Microsoft's website: [link](#)

Note: =counta(x#:y#) [counts the number of nonempty cells (numbers or alphabetical) in the range x#:y#]

Discussion of counta() on Microsoft's website: [link](#)

#### D. Logical functions:

=if(exp,x#,y#) [if exp is true, then cell take on value of x#. If not, cell takes on value of y#]

Note: You can nest "if" functions.

Example: =if(A4>5,1,if(A4<5,-1,0)) will product the following results:

If cell A4 = 5, the result will be 0  
 If cell A4 < 5, the result will be -1  
 If cell A4 > 5, the result will be +1

Reason: Excel starts with the inner most "if" statement and returns a -1 if A4 is less than 5 and a 0 otherwise. So our cell will equal -1 if A4 is less than 5 and will equal 0 if A4 is equal to or greater than 5. Next, Excel checks the outer "if" statement. If A4 is greater than 5, Excel changes the result to 1. So if A4 is less than 5, the result stays at -1, if A4 equals 5 the result stays at 0, and if A4 is greater than 5, the result changes to 1.

Microsoft training: [All Modules](#)

Discussion of if() on Microsoft's website: [link](#)

=and(logical1,logical2) [returns TRUE if all of the logical statements are true]

Note: can have more than two logical statements

Discussion of and() on Microsoft's website: [link](#)

#### E. Lookup & Reference

=vlookup(w,x#:y#,z) [used for looking up values on a table of data]

Microsoft training: [all modules](#)

Discussion of vlookup() on Microsoft's website: [link](#)

## F. Financial Functions

`=xirr(x#1:x#2;y#1:y#2)` [returns internal rate of return where x#1:x#2 contains the cash flows and y#1:y#2 contains the dates of the cashflows]

Discussion of `xirr()` on Microsoft's website: [link](#)

## 5. Useful Tools

### A. Goal Seek

=> allows you to find the value of one input variable that yields desired output variable

For example, assume the value in A1 is 0.1, the value in A2 is 2, and that cell A3 includes `"=(1+A1)^A2"`. The value of A3 shows as 1.21. Goal seek allows you to determine what value in A2 would give you a value of 2 in A3. Note: A2 must equal 7.272541

Getting to Goal Seek:

Short-cut: Alt + T + G

Menus: Data, What-If Analysis, Goal Seek

Discussion of Goal Seek on Microsoft's website: [link](#)

### B. Solver

=> a more general tool that does everything Goal Seek does plus it allows you to find values of one cell that maximize or minimize the value of another cell

For example, assume the value in A1 is 2, the value in A2 is 0, and cell A3 includes `"=A1 - (A2 - 4)^2"`. The value in A3 is -14. Solver allows you to determine the value in A2 that gives you the maximum value for A3. Note: The maximum value of 2 occurs when the value in A2 equals 4.

Getting to Solver:

Menus: Data, Solver

Note: Solver is an Add-In that you may have to add to your copy of Excel.