

Excel 2000 Part 2: Table of Contents

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Excel 2000 Part II

1. Glossary of Terms

1. **Range:** a range of cells in Excel is denoted by a colon (:).

	A
1	1
2	9
3	3
4	7
5	4
6	2
7	4
8	5

Example: (A1:A8) means all the cells in column A beginning with cell A1 and including and ending with cell A8 which is cell A1,A2,A3,A4,A5,A6,A7 and A8.

Note: You can also use Lotus 1-2-3 range syntax (..) for example: (A2..A4) will be converted in Excel to (A2:A4).

2. **Function:** built in calculations that are pre-made formulas for you to enter values into.
(Paste function is the Excel name for a function.) *fx*
Example: =AVERAGE(A1:A8) will compute the average of the numbers contained in cells A1 through and including A8. Average is an Excel paste function.
3. Syntax to **refer to another sheet** in the same Excel workbook:
Sheet2!A1 refers to cell A1 in Sheet2 where Sheet 2 is another sheet in the same workbook (an exclamation point separates the sheet reference from the cell reference.)
4. **3-D reference:** a range that spans two or more sheets in a workbook.
 - a. Example: Sheet2:Sheet6!A2:A5 refers to a range of cells from A2 through and including A5 on each worksheet from Sheet2, Sheet3, Sheet4, Sheet5 and including Sheet6.
5. **Relative References:** A relative reference is an address that references cells based on the current cell's location. (cell A1) Using a relative reference is like giving someone directions that explain where to go from where that person started – “go up two blocks and over one.” The address is relative because if you copy a formula using a relative reference its address will change to reflect the formula's copied location.
6. **Absolute References:** A reference such as \$A\$1 tells Excel how to find a cell based on the exact location of that cell in the worksheet. An absolute reference is designated by adding a dollar sign (\$) before the column letter and the row number. Using an absolute reference is like giving someone a street address “2224B Regency Road”. When you copy a formula using an absolute reference the cell address **does not change**.
7. **Mixed References:** A reference such as A\$1 or \$A1 tells Excel how to find another cell by combining a reference of an exact column or row with a relative row or column. A mixed reference is designated by adding a dollar sign before either the column letter or the row number but not both. So \$A1 has the absolute reference to column A but the relative reference to the row 1. If you copied a formula with \$A1 inside, the \$A keeps the column A absolute but the row 1

would update to the target cell's row location since it has a relative reference. Thus the column address would not change but the row address would change.


Tip: In Windows you can use F4 to add the reference sign or you can type it in. Each time you press F4 it will change the reference type to relative, absolute, or mixed.

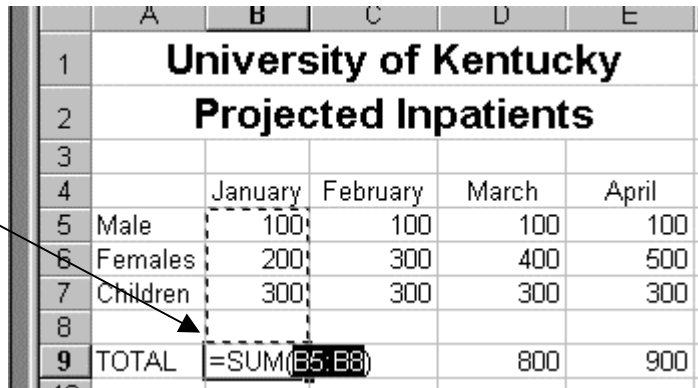
2. Formulas

Entering a formula in a cell is the same as entering text. The Undo and Repeat features are also available when entering a formula. Also you can cancel, before the formula is actually entered.

A. AutoSum

How AutoSum Works.

Excel has a common formula for Summing a row or column located on the Tool Bar. When you place your mouse in a cell below or beside a column or row of numbers and click the **AutoSum** button (Greek Letter Sigma),  and hit the **Enter** key, it will automatically place the formula in that cell. It is a good idea to edit the formula or zero fill cells where no numbers are stored because it sums consecutive cells only.




	A	B	C	D	E
1	University of Kentucky				
2	Projected Inpatients				
3					
4		January	February	March	April
5	Male	100	100	100	100
6	Females	200	300	400	500
7	Children	300	300	300	300
8					
9	TOTAL	=SUM(B5:B8)		800	900

B. Creating a Formula.

- Enter the cell **Labels** in your worksheet.
- Enter the Numbers in your worksheet.
- Place your cursor where you want the Total to be. This is where your formula will be.
- Click on the AutoSum button
- Press Enter to finish the formula. (The marquee will show which cells are included in the formula.)

C. Copy a Formula

- Put your cursor on the first total, -- that is cell that holds the formula.
- Grab the handle box at the bottom right corner of that cell. It starts out a fat cross. 
- Grab the fat cross & move it to the bottom right corner small square. When it forms a thin cross +, grab and drag it across the cells where you want the total formula copied.

D. Grand Totals with the AutoSum Button

You can sum subtotal rows and columns into grand total rows and columns using the AutoSum button. Excel assumes that you want to add the subtotals and ignore the values, as shown in the illustration. You select the cells and it will complete the empty Grand Totals and Totals in cells B11, C11, D2, D3, D4, D7, D8 to look like this:

	A	B	C	D
1	Division A	Product1	Product2	Total
2	East	30	10	
3	West	40	20	
4	Total	70	30	
5				
6	Division B			
7	East	50	70	
8	West	60	80	
9	Total	110	150	
10				
11	Grand Total			

	A	B	C	D
1	Division A	Product1	Product2	Total
2	East	30	10	40
3	West	40	20	60
4	Total	70	30	100
5				
6	Division B			
7	East	50	70	120
8	West	60	80	140
9	Total	110	150	260
10				
11	Grand Total	180	180	360

2. Formula Mathematical Operators

- Formulas always begin with an equal sign “=”.
- Most formulas contain mathematical operators such as “+” for add, “-” for subtract, “/” for divide, “*” for multiply and “^” for exponential functions (raises a number to a higher power).

A. Order of Operations


- The formula computes whatever is in a parentheses first
- The exponential function is calculated next, then division or multiplication (from left to right)
- Finally subtraction or addition (from left to right) are calculated.
- Example: $= (10-2) ^ 2 / 4 * 2$ is done as $10-2$ is 8 then 8 to the second power is 64, then 64 divided by 4 is 16, and last 16 times 2 is 32
- however, without the parentheses the formula becomes:
 $=10 - 2 ^ 2 / 4 * 2$ which is 8 because 2^2 is 4, 4 divided by 4 is 1, 1 times 2 is 2 and last do the subtraction of 10 minus 2 and get 8.

B. Simple Formulas

- As stated above the formula begins with an equal sign “=”
- Go to the cell where you want your formula and begin with typing an “=” then you can type the cell addresses of where you want your numbers to come from and have a mathematical operator in between each cell address.

Example: $= A2 + B3 - C4$ would add the numbers in A2 & B3 then subtract from them the number in C4

OR - You may use your mouse to Point and Click the cell address instead of typing it in. Be sure to follow each cell address with a mathematical operator before pointing and clicking the next cell.

End the formula by hitting the <ENTER> key or click on the green check mark  in the formula bar.

Note: You can point to a cell on another worksheet to be part of your formula.

3. Displaying Formulas

A. Formula Bar

When you select a cell that contains a formula, you can view the formula in the reference area of the formula bar.

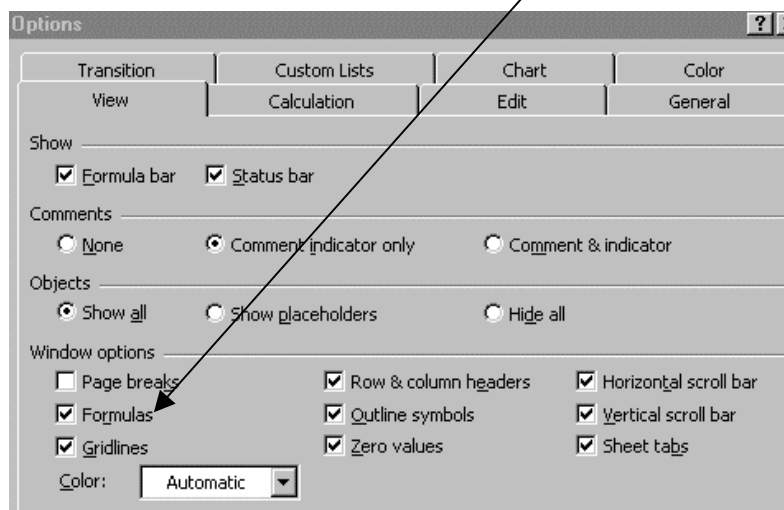


Note: If you click in the formula bar and then press F9, the value of the formula or the selected part of the formula is displayed. To restore the formula to the cell, press <ESC>. If you already pressed <ENTER> then click Undo.



B. Display Formulas in the Cell

Click on Tools/Options then click in the box in front of “Formulas” in the Window options.



Here is an example of a simple spreadsheet without formulas showing:

	A	B	C	D	E
1	University of Kentucky				
2	Projected Inpatients				
3					
4		January	February	March	April
5	Male	100	100	100	100
6	Females	200	300	400	500
7	Children	300	300	300	300
8					
9	TOTAL	600	700	800	900

NOTE: It is a good idea to print with formulas showing in the cells to save a paper copy in case you need that same type of formula in another workbook or to help you proof the formula. When printing with formulas showing, you may need to change to landscape printing. Be sure to print preview.

Here is an example of a simple spreadsheet with formulas showing:

	A	B	C	D	E
1	University of Kentucky				
2	Projected Inpatients				
3					
4		January	February	March	April
5	Male	100	100	100	100
6	Females	200	300	400	500
7	Children	300	300	300	300
8					
9	TOTAL	=SUM(B5:B8)	=SUM(C5:C8)	=SUM(D5:D8)	=SUM(E5:E8)
10					

When you no longer want the formulas to show in the cells, repeat the same steps above to uncheck show formulas.


4. Functions

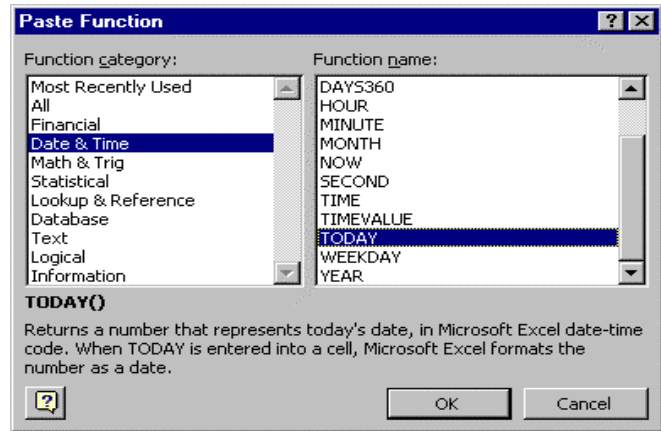
Functions are built-in calculations and data manipulations that perform work on formulas and values. Function names always end with parentheses, such as Average (). An *argument* is a value that a function operates with; arguments appear inside a function's parentheses. For example, the Average () function computes an average of whatever list of values you put in the Average ()'s argument list. =Average(18, 65, 44, 59) means the same as =Sum(18 + 65 + 44 + 59)/4 but by using the Average function you can add another value as part of the argument list easily. In the =Sum()/4 formula you must remember to change to divide by 5 when increasing the numbers you add together. =Average(18, 65, 44, 59, 32) easier than changing the formula =Sum(18 + 65 + 44 + 59 + 32)/5

Note: Your argument list can be a range such as Average(B3:B12)

A. Common Excel Functions

Abs()	Computes the absolute value of its cell argument (good for distance- and age-difference calculations).
Average()	Computes the average of its arguments.
Count()	Counts the number of numerical arguments in the argument list.
Counta()	Counts the number of all arguments the argument list.
CountBlank()	Counts the number of blank cells, if any exist, in the argument range.
Max()	Returns the highest (maximum) value in the argument list.
Min()	Returns the lowest (minimum) value in the argument list.
Pi()	Computes the value of mathematical pi (requires no arguments)
Product()	Computes the product (multiplicative result) of the argument range.
Roman()	Converts its cell value to a Roman numeral.
Sqrt()	Computes the square root of the cell argument.
Stddev()	Computes the argument list's standard deviation.
Sum()	Computes the sum of its arguments.
Today()	Returns today's date (requires no arguments).
Var()	Computes the argument list's sample variance.

Excel 2000 supports many more functions than shown above. There are complex mathematical date, time, financial, and engineering functions. As you need them read through the online help. Click the Paste Function toolbar  button to display its dialog box. As you choose a function under “Function category” and choose a “Function name” you will see a description of what the function does.



5. Linking Formulas/Functions

Excel will allow you to link cells so that when one cell of a worksheet is updated or changed then the linked cell in the same workbook or another workbook will be updated or changed.

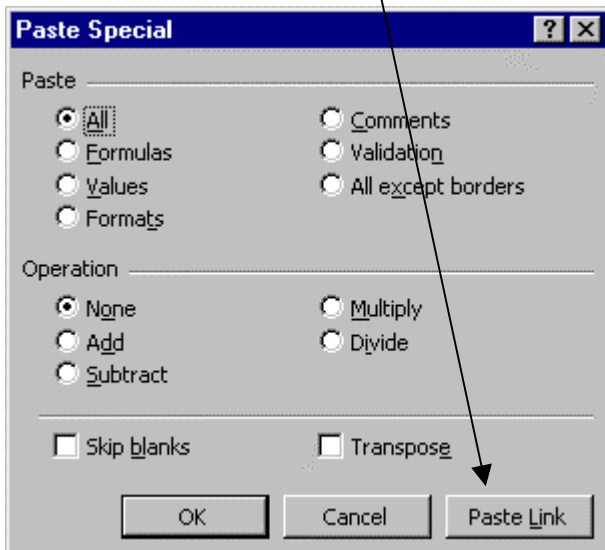
A. Steps to Link

1. Begin on the cell that has the formula or function you wish to link. Copy it.

Example: I copied the formula in cell D9

2. Go to the workbook sheet where and the cell you wish to have the link and select it.
3. Edit/Paste Special
4. Choose Paste link

	A	B	C	D	E
1	University of Kentucky				
2	Projected Inpatients				
3					
4		January	February	March	April
5	Male	100	100	100	100
6	Females	200	300	400	500
7	Children	300	300	300	300
8					
9	TOTAL	600	700	800	900



Your new cell will now be updated or changed each time the cell it is linked to changes.

In my example the new cell is B2 on a different worksheet in the same workbook. Note how it shows the link in the cell reference area. The worksheet it came from was "Practice" and the cell it is linked to is D9.

	A	B	C	D
1				
2		800		
3				

Note: In Excel you can also refer to cells in other workbooks and data in other applications. References to cells in other workbooks are called external references. References to data in other applications are called remote references. These references must be linked.

B. Moving Cells Affect Formulas/References

When you move cells, the values or references they contain never change. However, moving does affect formulas that refer to the moved cells with the following effects:

- Excel automatically adjusts all references to cells that are moved so that the references designate the same cells in their new location.

	A	B	C	D
1				
2		30		
3		40		
4			70	
5				

Example: If cell B4 contains the formula =SUM(B2:B3) was moved to cell C4 the formula doesn't change.

- Formulas that previously referenced the area to which you move the cells produce the #REF! Error value because you effectively delete the existing cells and replace them with the moved cells.

Example: If you were using the result from B4 in another formula but now you have moved the value out of B4, you would get an error value #REF! There isn't any value in B4 since it has been moved to C4 replacing what was in C4.

	A	B	C	D
1				
2		30	10	
3		40	20	
4	Total		70	
5				
6				
7		50	70	
8		60	80	
9	Total	110	150	
10				
11	Grand Total	180	#REF!	
12				

Before the move the formula in B11 was =SUM(B4,B9) but after the move the formula in B11 became =SUM(C4,B9). The formula in C11 before the move was =SUM(C4,C9), but after the move the contents of C4 were erased causing the #REF! Error value to appear indicating an invalid reference.

	A	B	C	D
1				
2		30	10	
3		40	20	
4	Total		70	
5				
6				
7		50	70	
8		60	80	
9	Total	110	150	
10				
11	Grand Total	180	#REF!	

C4 was replaced by the move giving an invalid reference.

C. Copying Cells Affects Formulas/References

Copying cells has a different effect on relative references and absolute references thus effecting formulas.

1) Relative References

When you copy cells, Excel automatically adjusts relative references and the relative parts of mixed references in the area where you paste the copied cells.

Example: B9 contains the formula =SUM(B7,B8) and B11 contains =SUM(B4,B9) after copying B9 to C9 its formula becomes =SUM(C7,C8).

Since relative references were in the formula, it adjusted when copied to the new row and column.

	A	B	C	D
1				
2		30	10	
3		40	20	
4	Total	70	30	
5				
6				
7		50	70	
8		60	80	
9	Total	110	150	
10				
11	Grand Total	180	180	

2) Absolute and Mixed References

When you copy a formula and use the same cell references from the original formula in the duplicate, use absolute or mixed references in your formula.

In the above example, if I wanted the formula in C9 to still add the values in B7 and B8, I would have to begin with =SUM(\$B\$7,\$B\$8) in cell B9. Then when it is copied to C9, it would still add the value from B7 and B8.

D. Inserting and Deleting Cells Affects Formulas/References

You can insert cells, cell ranges, rows or columns in your worksheet. All references that are affected by the insertion adjust accordingly, whether they are relative or absolute. The same applies to deleting cells, cell ranges, rows and columns except when a deleted cell is directly referenced by a formula. So be careful if using absolute references and then deleting that cell.

E. Inserting and Deleting Sheets Affect 3-D References

The following are the guidelines for moving, inserting, and deleting sheets that are included in a 3-d reference. The formula =SUM(Sheet2:Sheet6!A2:A5) is used as an example.

- If you insert sheets between Sheet2 and Sheet6 (the endpoint sheets in this example), the values in the referenced cell range (A2:A5) in the inserted sheets are included in the calculation
- If you delete sheets between Sheet2 and Sheet6 in the workbook, their values are removed from the calculation.
- If you move sheets from between Sheet2 and Sheet6 in a location outside the referenced sheet range, their values are removed from the calculation.
- If you move either Sheet2 or Sheet6 to another location in the workbook, the calculation adjusts to accommodate the new range of sheets between them.

Note: If you move one endpoint sheet past the other endpoint sheet, the results might not be what you expected. For example, if you move Sheet6 before Sheet2 in a workbook, a formula containing Sheet2:Sheet6!A1 would change to Sheet2:Sheet5!A1.

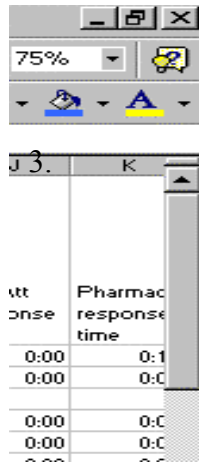
7. Splitting the Screen/Window

To help with large worksheets, Excel has a ways to split the screen or viewing window.

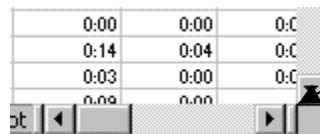
A. Adding a Split Screen

1. From the drop down menu bar, choose Window, then Split Screen
This will split the screen into 4 parts.

- To the right of the screen just above the scroll bar arrows, there is a thick horizontal bar. Grab the bar with the left mouse button pull it down. This will split the screen horizontally into only 2 parts.



- Similarly, there is a thick bar to the right of the scroll bar on the bottom of the worksheet. You grab it and hold down the left mouse button while placing it. It will split the screen vertically into only 2 parts.



The advantage of splitting the screen is to be able to see column or row headings no matter where you are in a large worksheet.

B. Removing a Split Screen

- Choose Window in the drop down menu then select “Remove Split”

OR

- Double click on the split bar.

OR

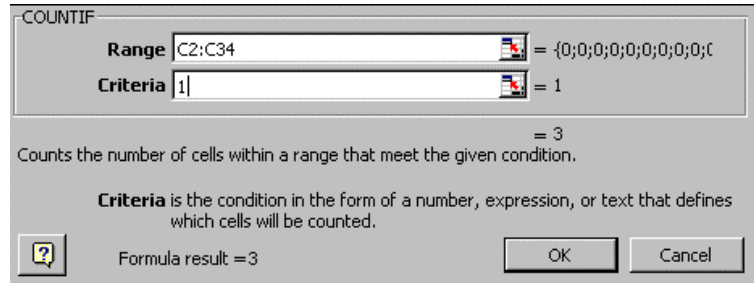
- Grab the split bar and slide it to the top of the screen (if a horizontal split) or to the right of the screen (if a vertical split).

Note: If you get the symbol: ##### in a cell it only means the cell is not wide enough to display the number. Simply increase the cell width.

8. Statistical Analysis

A. Helpful Functions (F_x)

- 1) **Mean** – the mean is the average found by adding the items and the dividing by how many items there are.
- 2) **Median** – the median is the middle number when the numbers are arranged in ascending or descending order. If there are 2 middle numbers then the average of them is the median.
- 3) **Mode** – the number that appears the most times.
- 4) **Count if** – needs an argument, then counts the number if it satisfies the argument.



For example: This countif will check the range C2:C34 and see how many 1's there are.

=Countif(C2:C34,1)

Note: If your criteria is text, be sure to put it in quotes.
Example: =Countif (C2:C34,"knee pain")

B. Analysis Tools Packet

Look under Tools in the drop down menus and see if you have data analysis as a choice. If not then click on Add-Ins. You need to check that you want “Analysis Tool packet” and continue to install it.

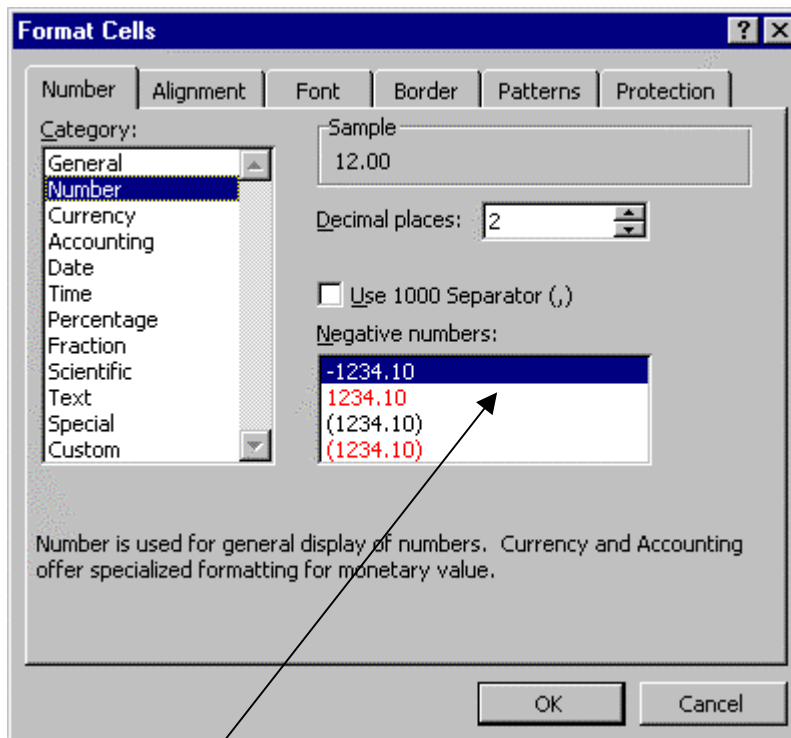
To use this packet of statistical click on “Data Analysis” in the Tools drop down menu. Choose descriptive stats. Then select the range of cells you want the data from. Select where you want the output to go: the same worksheet (designate the top left cell of the range), new worksheet or a new workbook. Choose the summary statistics options. (It will not do the stats for time correctly.) This will automatically give you these functions:

Mean
Standard Error
Median
Mode
Standard Deviation
Sample Variance
Kurtosis
Skewness
Range
Minimum
Maximum
Sum
Count

WARNING: You could accidentally create a circular reference. When a formula refers to its own cell, either directly or indirectly, it is called a circular reference. When you make a circular reference, a message will warn you that a circular reference has occurred. If the circular reference is accidental, click OK. The circular reference toolbar displays, and tracer arrows point to each cell that is referenced by the circular reference. Thus you have a chance to correct it. For more information see circular reference in the Excel online Help.

9. Formatting Negative Numbers

You could have your negative numbers show in red or in parenthesis or a combination. Select the row or column or just the numbers you wish to format. From the menu choose Format, then choose cells and the number heading.



As you change categories note how it displays the negative numbers in the small window on the bottom right. Select your choice of how you want your negative numbers to be displayed on your worksheet.