MS Excel 2000-2003 Formula Tips

Text Formulas

Note: that MS Excel always uses 15 significant digits in any calculation, no matter how many are set in the cell.

Double Quotes

Double quotes are used to enclose strings (text). The string can be empty "", a space " ", or one or more characters "asdf jlkj". When you use quotes to type a string into a cell it is displayed as just the string. For example, ="MRD" would appear as MRD.

String concatenator: & (ampersand)

Used to join strings, cell values or expressions together. Example to join two cells together when Cell A1 ="Marine" and cell B1 ="Resources"

Expression	Result
=A1&B1	MarineResources
=A1&" "&B1	Marine Resources
=B1&", "& A1	Resources, Marine

Length of string: LEN(*text*)

LEN returns the number of characters in a text string. Punctuation, underscores and spaces are all counted as part of the string, and therefore part of its length.

	A	B	C
1	**Text**	**Expression**	**Result**
2	MRRI	=LEN("MRRI")	4
3	Marine Resources	=LEN(A3)	16
4	density-dependent	=LEN(A4)	17
5	1 stop	=LEN(A5)	9
6	STOP!	=LEN(A6)	5
7	Coll#	=LEN(A7)	5
8	Coll_#	=LEN(A8)	6
9	Coll #	=LEN(A9)	6

Proper Case: PROPER(*text*)

Capitalizes the first letter in a text string and any other letters in text that follow any character other than a letter. Converts all other letters to lowercase letters.

	A	B	C
1	**Text**	**Expression**	**Result**
2	fiRst name	=PROPER(A2)	First Name
3	2008annual review	=PROPER(A3)	2008Annual Review
4	first last name	=PROPER(A4)	First Last Name
5	2008's totals	=PROPER(A5)	2008'S Totals

Upper case: UPPER(*text*)
Converts text to uppercase.

Lower case: LOWER(i)
Converts text to lowercase.

	A	B	C
1	**Text**	**Expression**	**Result**
2	2008's totals	=UPPER(A5)	2008'S TOTALS
3	2008annual review	=UPPER(A3)	2008ANNUAL REVIEW
4	first Last name	=LOWER(A4)	first last name
5	fiRst name	=LOWER(A2)	first name

Trim multiple spaces: TRIM(*text*)
Removes all spaces from text except for single spaces between words.

	A	B	C
1	**Text**	**Expression**	**Result**
2	This is great!	=TRIM(A2)	This is great!
3	Preceding space	=TRIM(A3)	Preceding space

Left: LEFT(*text, number of characters*)
Returns the specified number of characters from the left of a string. Text is the string that contains the characters you want to extract. Number of characters specifies the number of characters from the LEFT side of the string.

Right: RIGHT(*text, number of characters*)
Returns the specified number of characters from the right of a string. Text is the string that contains the characters you want to extract. Number of characters specifies the number of characters from the RIGHT side of the string.

Mid: MID(*text, start number, number of characters*)
MID returns a specific number of characters from a text string, starting at the position you specify, based on the number of characters you specify. Text is the text string containing the characters you want to extract. Start number is the position of the first character you want to extract in text. The first character in text has a start number of 1. Number of characters specifies the number of characters you want MID to return from the text.

	A	B	C
1	Text	Expression	Result
2	South Carolina blackwater	=LEFT(A2, 5)	South
3	South Carolina blackwater	=LEFT(A2, 7)	South C
4	South Carolina blackwater	=RIGHT(A4, 10)	Blackwater
5	South Carolina blackwater	=MID(A5,7,8)	Carolina
6	S1300809430234A346	=LEFT(A6)	S
7	S1300809430234A346	=LEFT(A7,3)	A13

8	S1300809430234A346	=RIGHT(A8, 4)	A346
9	S1300809430234A346	=MID(A9, 4, 11)	0089430234

Numeric Formulas

Absolute value: Abs(*number*)

Returns the absolute value of a numeric cell.

Expression	Result
=Abs(-5)	5
=Abs(5)	5
=Abs(5*-1)	5

Exponent: ^ or POWER(*number, power*)

Raises a number to the power of another number. So that y^x is typed in as = y^x. The value displayed is that number.

Example 5^3

Expression	Result
=5^3	125
=POWER(5,3)	125

Exp: EXP(*number*)

Returns e raised to the power of number. The constant e equals 2.71828182845904, the base of the natural logarithm. This is the inverse of the natural logarithm, LN(number).

Expression	Result
=EXP(1)	2.718282
=EXP(10)	22026.47
=EXP(3.4)	29.9641

Square root: Sqrt(*number*)

Returns a positive square root of a number.

Expression	Result
=SQRT(25)	5
=SQRT(36)	6
=SQRT(14)	3.741657

Integer: INT(*number*)

Returns a value rounded *down* to the nearest integer.

Expression	Result
=INT(2.31)	2
=INT(-2.31)	-3

Remainder: MOD(*number, divisor*)
Returns the remainder after number is divided by divisor. The result has the same sign as divisor. Number is the number for which you want to find the remainder. Divisor is the number by which you divide. The divisor can not be 0.

Expression	Math	Result
=MOD(3, 2)	3 / 2 = 1 1/2	1
=MOD(5, 3)	5 / 3 = 1 2/3	2
=MOD(-3, 2)	-3 / 2 = -1 1/2	1
=MOD(3, -2)	3 / -2 = -1 1/2	-1

Quotient: QUOTIENT(*numerator, denominator*)
Returns the integer portion of a division. Use this function when you want to discard the remainder of a division. Numerator is the dividend, and denominator is the divisor.

Expression	Math	Result
=QUOTIENT(3, 2)	3 / 2 = 1 1/2	1
=QUOTIENT(7, 2)	7 /2 = 3 1/2	3
=QUOTIENT(-9, 2)	-9 / 2 = -4 1/2	-4
=QUOTIENT(9, -2)	9 / -2 = -4 1/2	-4
=QUOTIENT(-9, -2)	-9 / -2 = 4 1/2	4

Log10(*number*)
Returns the base-10 logarithm of a number.

Expression	Result
=LOG10(10)	1
=LOG10(5)	0.69897
=LOG10(1)	0

LOG(*number, base*)
Returns the logarithm of a number to the base specified. If the base is omitted it is assumed to be 10.

Expression	Result
=LOG(10)	1
=LOG(5,2)	2.321928

Natural Logarithm: LN(*number*)
Returns the natural logarithm of a number. Natural logarithms are based on the constant e (2.71828182845904). The number must be positive. This is the inverse of EXP.

Expression	Result
=LN(1)	0
=EXP(2.71828182845904)	1

=EXP(25)	3.218876

Sum:

SUM(number1, number2, …numberX)
SUM(range)

Returns the additive total of a series of numbers; ignores any text values. The numbers can be selected one by one or used in a range.

Expression	Result
=SUM(1,2,5,4)	12
=SUM(1,"A", 3)	4
=SUM(A1:A4) where cells are as follows: A1 = 5, A2 = 9, A3 = 10, A4= 1	25

Average:

AVERAGE(number1, number2, …numberX)
AVERAGE (range)

Returns the arithmetic mean (average) of a series of numbers; ignores any text values. The numbers can be selected one by one or used in a range.

Expression	Result
=AVERAGE(1,2,5,4)	3
=AVERAGE(1,"A", 3)	2
=AVERAGE(A1:A4) where cells are as follows: A1 = 5, A2 = 9, A3 = 10, A4= 1	6.25

Standard deviation

STDEV(number1, number2, …numberX)
STDEV (range)

Returns the standard deviation based on a sample. The standard deviation is a measure of how widely values are dispersed from the average value (the mean). All non-numeric values are ignored.

Expression	Result
=STDEV(1,2,5,4)	1.825742
=STDEV(A1:A4)	

Min

MIN(number1, number2, …numberX)
MIN (range)

Returns the smallest value in a series of numbers; ignores any text values. The numbers can be selected one by one or used in a range.

Expression	Result
=MIN(1,2,5,4)	1
=MIN(1,"A", 3)	1
=MIN(A1:A4) where cells are as follows: A1 = 5, A2 = 9, A3 = 10, A4= 1	1

MINA

MINA(number1, number2, …numberX)
MINA (range)

Returns the smallest value in the list of arguments. *Text and logical values such as TRUE and FALSE are compared as well as numbers.* Text is stored as a 0 value. True values are stored as 1, and false values are stored as 0.

Expression	Result
=MINA(1,2,5,4)	1
=MINA(1,"A", 3)	0
=MINA(A1:A4) where cells are as follows: A1 = True, A2 = 9, A3 = 10, A4= 6	1
MINA(False, True, 10, 34, "A")	0

Max

MAX(number1, number2, …numberX)
MAX (range)

Returns the largest value in a series of numbers; ignores any text values. The numbers can be selected one by one or used in a range.

Expression	Result
=MAX(1,2,5,4)	5
=MAX(1,"A", 3)	3
=MAX(A1:A4) where cells are as follows: A1 = 5, A2 = 9, A3 = 10, A4= 1	10

MAXA

MAXA(number1, number2, …numberX)
MAXA (range)

Returns the largest value in the list of arguments. *Text and logical values such as TRUE and FALSE are compared as well as numbers.* Text is stored as a 0 value. True values are stored as 1, and false values are stored as 0.

Expression	Result
=MAXA(1,2,5,4)	5
=MAXA(1,"A", 3)	3
=MAXA(A1:A4) where cells are as follows: A1 = True, A2 = 9, A3 = 10, A4= 6	10
MAXA(False, True, 10, 34, "A")	34

ROUNDING

Round(*number, number of digits*)

Returns a number rounded to the nearest specified number of digits. If number of digits is greater than 0 (zero), then number is rounded to the specified number of decimal places. If number of digits is 0, then number is rounded to the nearest integer. If number of digits is less than 0, then number is rounded to the left of the decimal point.

Expression	Result
=ROUND(2.23, 1)	2.2
=ROUND(2.23, 10)	2.23
=ROUND(2.23, -1)	0
=ROUND(2.23, 0.05)	2
=ROUND(400.35, 0. 1)	400

Roundup(*number, number of digits*)

Returns a number rounded up, away from 0. ROUNDUP behaves like ROUND, except that it always rounds a number up. If number of digits is 0, then number is rounded up to the nearest integer. If number of digits is greater than 0 (zero), then number is rounded up to the specified number of decimal places. If number of digits is less than 0, then number is rounded up to the left of the decimal point.

Expression	Result
=ROUNDUP(2.31, 0)	3
=ROUND UP(2.31, 1)	2.4
=ROUND UP(2.31, -1)	10
=ROUNDUP(2.312546, 2)	2.32
=ROUNDUP(-2.31, 1)	-2.4

RoundDown: RoundDown(*number, number of digits*)

Returns a number rounded down, towards 0. ROUNDUP behaves like ROUND, except that it always rounds a number down. If number of digits is 0, then number is rounded up to the nearest integer. If number of digits is greater than 0 (zero), then number is rounded down to the specified number of decimal places. If number of digits is less than 0, then number is rounded down to the left of the decimal point.

Expression	Result
=ROUNDDOWN(2.31, 0)	2
=ROUNDDOWN(2.31, 1)	2.3
=ROUNDDOWN(2.31, -1)	0
=ROUNDDOWN(2.312546, 2)	2.31
=ROUNDDOWN(-2.31, 1)	-2.3

Ceiling: Ceiling(*number, significance*)

Returns a value that rounds **away from zero** to the nearest integer. Number is the value that will be rounded and significance is the multiple to which you want to round. The number and significance must have the same sign.

Expression	Result
=Ceiling(2.23, 0)	0
=Ceiling(2.23, 1)	3
=Ceiling(2.23, 10)	10
=Ceiling(2.23, 2)	4
=Ceiling(2.23, 0.05)	2.25
=Ceiling(2.23,0. 1)	2.30
=Ceiling(-2.23,- 1)	-3

Floor: Floor(*number, significance*)

The opposite of ceiling, this function rounds a number down towards zero.

Expression	Result
=Floor(2.23, 1)	2
=Floor(2.23, 10)	0
=Floor(2.23, 2)	2
=Floor(2.23, 0.05)	2.20
=Floor(2.23,0. 1)	2.20
=Floor(-2.23,- 1)	-2

Truncate: Trunc(*number, number of digits*)
Truncates a number to an integer by removing the fractional part of the number. Number is the number you want to truncate, and number of digits is a number specifying the precision of the truncation.

Expression	Result
=TRUNC(2.31)	2
=TRUNC(2.31, 1)	2.3
=TRUNC(2.31, -1)	0
=TRUNC(2.312546, 2)	2.31
=TRUNC(-2.31, 1)	-2.3

Logic Formulas

Counting
COUNT(*range*) or COUNT(*value1, value2, ….valueX*)
Counts the number of cells that contain numbers. Only cells with numeric data or date fields are counted. Text fields are not counted.

	A	B
1	4 1/2	Fraction
2	4.5	decimal
3	A	text
4	2/13/2008	date
5	12	number as text

Expression	Result	Values Counted
=Count (A1:A5)	3	A1, A2, and A4
=Count(A1:A3)	2	A1, A2
=count(A3:A5)	1	A4

COUNTA(*range*)
Counts the number of cells that are not empty. Will count numeric, text, and date fields. Will exclude any cell that has no information. If a cell appears empty, but really has one or more spaces in it, it will be counted.

COUNTBLANK(*range*)
Counts empty cells in a specified range of cells.

	A	B
1	4 1/2	Fraction
2	4.5	decimal
3	A	text
4	2/13/2008	date
5	12	number as text
6		Two spaces
7		Null or empty

Expression	Result	Values Counted
=CountA (A1:A7)	6	A1, A2, A3, A4, A5, A6
=COUNTBLANK(A1:A7)	1	A7

COUNTIF(*range, criteria*)

Counts the number of cells within a range that meet the given criteria. Range is the range of cells from which you want to count cells and criteria is the criteria in the form of a number, expression, or text that defines which cells will be counted. For example, criteria can be expressed as 32, "32", ">32", "apples".

	A	B
1	1	A
2	2	GA
3	5	D
4	42	AE
5	15	GA
6	2	E
7	1	A
8	65	A
9	1	GA
10	54	AE
11	2	A
12	5	GA
13	4	W

Expression	Result	Values Counted
=COUNTIF(A1:A13, 1)	3	A1, A7, A9
=COUNTIF(A1:A13, “>5”)	4	A4, A5, A8, A10
=COUNTIF(B1:B13, “A”)	4	B1, B7, B8, B11
=COUNTIF(B1:B13, “A*”)	6	B1, B4, B7, B8, B10, B11
=COUNTIF(B1:B13, “*A*”)	10	B1, B2, B4, B5, B7, B8, B9, B10, B11, B12

Random Numbers

RAND()

Returns an evenly distributed random number greater than or equal to 0 and less than 1. A new random number is returned every time the worksheet is calculated. If you want to use RAND to generate a random number but don't want the numbers to change every time the cell is calculated, you can enter =RAND() in the formula bar, and then press F9 to change the formula to a random number. Note F9 creates a new random number for any cell with the RAND or RANDBETWEEN function in the worksheet.

RANDBETWEEN(*bottom, top*)

Returns a random number between the numbers you specify. A new random number is returned every time the worksheet is calculated. Bottom is the smallest integer RANDBETWEEN will return and top is the largest integer RANDBETWEEN will return.

IF(logical_test,value_if_true,value_if_false)

Returns a value based on if the conditions specified are true or false. Logical_test is any value or expression that can be evaluated to TRUE or FALSE. Value_if_true is the value that is returned if logical_test is TRUE. Value_if_false is the value that is returned if logical_test is FALSE. Up to seven IF functions can be nested.

Example If statements:

```
=IF(A61>1, "Greater Than One", "Less than One")
=IF(B61>1, "Greater Than One", "Less than One")
=IF(A61>1, SUM(B61:B62), SUM(A61:B61))
=IF(A61<>B62, "Good", "Bad")
```

Nested If statement:

```
IF(AverageScore>89,"A",IF(AverageScore>79,"B",IF(AverageScore>69,"C",IF(AverageScore>59,"D","F"))))
```

Date/Time Formulas

TODAY()
Returns the current date.

NOW()
Returns the current date and time.

MONTH(cell)
Returns the month number for specified date.

DAY(cell)
Returns the day number for specified date.

YEAR(cell)
Returns the year for specified date.

WEEKDAY(cell, return type)
Returns the current date and time. Return type 1 starts on Sunday, while return type 2 starts on Monday.