

Excel® 2010 Functions & Formulas

Glossary

- 
- Formula:** An equation in a cell that results in a new value.
 - Function:** Pre-built formula that performs an operation on values, resulting in one or more values.
 - Argument:** The values used by a function. Can be another function (creating a nested function).
 - Constant:** An unchanging value.
 - Operator:** Symbol specifying a calculation to perform. The order of precedence for symbols is:
 Arithmetic: -, Negative, %, Percent,
 ^, Exponentiation,
 *, /, Multiplication and division,
 +, -, Addition and subtraction.
 Comparison: =, Equals, <, Less than,
 >, Greater than, <=, Less than or equal to,
 >=, Greater than or equal to,
 <>, Does not equal.
 - Reference:** A cell, range of cells, or a name that represents a value or values. The order of precedence for references is:
 - Isolated Range
 - Isolated Intersection
 - Spontaneous Union

Conditionally Summing/Counting Data

The traditional **Sum()** and **Count()** functions can be extended with **SUMIF()** and **COUNTIF()** to only sum or count data that match certain criteria.

=SUMIF(range, criteria, sum_range)

=COUNTIF(range, criteria)

Sums or counts only numbers in range that match criteria. Optional *sum_range* allows cells summed to be in a different range than cells matching criteria. e.g. **=SUMIF(B1:B5, "<3")** results in: 0+1+2+3+4=10.

Examples of Summing/Counting Selected Data

A toy manufacturer, Happy Toys, uses **SUMIF** to track worldwide shipment costs by country.

	A	B	C	D
2	Category	Shipment Cost		COUNTIF
3	US	\$1,098.00		US shipping
4	Canada	\$1,474.00		
5	UK	\$1,473.00		
6	India	\$1,574.00		
7	Japan	\$1,552.00		
8	India	\$1,980.00		

Cell D4 = 51,574.00 because **=SUMIF(B3:B8, "US", C3:C8)** finds all "US" cells in B3:B8 then sums their C3:C8 counterparts.

Being Precise (Rounding)

Use Excel's 12 rounding functions when cells display slightly different values than what is actually stored. For example, Excel may display 5.12 due to formatting for two decimal places, but the number actually stored in the cell and used in calculations could be 5.1249999.

Round Up or Down to a Multiple

=ROUND(number, number of digits)
 Rounds to nearest integer, decimal place or multiple. Rounds a number to a specified number of digits where number can refer to a cell and number of digits can be 0 - rounded to nearest integer.
 Positive - round to decimal places.
 Negative - round to multiples.
 e.g. **=ROUND(3.4375, 2)** rounds 3.4375 to 2 decimal places or 3.44.
=ROUND(67562.34, -2) rounds 67,562.34 to the nearest 100, or 67,600.

=MROUND(number, multiple)
 Rounds to a specified multiple.
 Rounds a positive number up and away from 0 if the remainder of dividing number by multiple is >= half of multiple. Also rounds up and away from 0 if negative, producing a larger negative.
 A positive number must have a positive multiple and a negative number a negative multiple.
 e.g. **=MROUND(3.4375, 2)** rounds 3.4375 up to the nearest multiple of 2, rounding 4.
=MROUND(67562.34, -2) rounds 67,562.34 up to the nearest multiple of -6.2, rounding -67,562.4.

Only Round One Way

=ROUNDDOWN(number, number of digits)
 Same as **ROUND()** but always rounds up and away from 0. **ROUNDUP()** always rounds down and toward zero.

=CEILING(number, significance)
 Same as **ROUND()** except always rounds up unless number is equal to and significance is positive. e.g. **=CEILING(18.1, 2)** = 19.
=CEILING(9.5, 1) = 10.
=CEILING(18.1, -2) = -12.
FLOOR is a similar function that rounds down.

=CEILING.PRECISE(number, significance)
 Same as **CEILING** but always rounds up. **FLOOR.PRECISE** is the latter as **FLOOR** but always rounds down.

EVEN(number)

Same as **ROUND** but always rounds away from zero to the nearest even integer. ODD always rounds away from zero to the nearest odd integer.

ODD(number)

Rounds number down to the nearest integer.

Improving Clarity with Range Names

Use range names to help understand and manage cell references. Functions are more understandable if references are descriptive. For example, the intention of **=AVERAGE(PurchasePrice)** is clearer than **=AVERAGE(B2:E7)**.

Name Rules

- Start with a letter, underscore or backslash.
- Remaining characters must be alphanumeric, a period or an underscore.
- Do not use spaces, cell references (e.g. A100, B0-C5), just "C1", "A", "B", or "C".
- Maximum 255 characters.
- Names are not case sensitive.

Creating a Name

- Select the cells to name.
- Choose **FORMULAS**, then **Define Name**, or **Click** in the Name Box.



The Name Box shows the active cell address or, if defined, the range name.

- Type a name for the range and press <Enter>.

Limiting the Scope of a Name

Use scope to limit the worksheet within which the name is valid, allowing the same name to be used on different worksheets. To limit the scope to a single worksheet:

- Choose **FORMULAS**, then **Define Name**.
- Fill in details. Specify **SCOPE**, then **Click OK**.

The cells referred to can be in a different worksheet than the scope.

Defining a Constant or Formula for a Name

- Choose **FORMULAS**, then **Define Name**.
- Type the NAME, **CONST**, and optionally **COMMENT**.
- In **REFERS TO**, type the constant or formula (prefixed by =). **Click OK**.

Creating Several Names at Once

Row or column labels can be used to create named ranges. Labels can be above, below, left or right of the data.

- Select existing data and the labels.
- Choose **FORMULAS**, then **Get Data from Existing**.
- Specify which part of the selection to use as names, e.g. **TOP ROW** under **GET COLUMNS** (Sheet) **OK**.

For example:

	A	B	C	D
1	Materials	Spent	Spent	Spent
2	Steel	123	144	888
3	Copper	213	244	200
4	Wood	888	400	557

Create 7 named ranges. One for each column and row of data, plus a range called **YTD Sales** for B4:D4.

Examples of Being Precise

Happy Toys wants to set Canadian prices. Multiplying US prices by the exchange rate may not be market smart. Rounding up is always better for the bottom line so **ROUND** and **MROUND** are abandoned in favor of **CEILING**. Additional rounding is required to satisfy Marketing's desire for Canadian prices to always end in 99.

Cell B6: **=B1*C1** results in 19.551.

Cell B7: **=ROUND(B6, 2)** results in 19.55. Cell B6 is rounded to the nearest single decimal.

Cell B8: **=MROUND(B6, 0.5)** results in 19.50. Cell B6 is rounded to the nearest 50 cents.

Cell B9: **=CEILING(B8, 0.5)** results in 20.00. Cell B6 is rounded up to the nearest 50 cents.

Cell B10: **=CEILING(B8, 0.5)-0.01** results in 19.99. One penny is subtracted from the result. This is the price selected by Marketing.

	A	B	C
2	US Prices	Ex. Rate	
3	19.55	1.0488	
4			
5	Canadian Prices	Function Used	
6	19.551		
7	19.55	ROUND	
8	19.50	MROUND	
9	20.00	CEILING	
10	19.99	CEILING	

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