

### 1. **NORM.INV** function

Returns the inverse of the normal cumulative distribution for the specified mean and standard deviation.

### 2. **VLOOKUP**

The VLOOKUP function syntax has the following arguments:

VLOOKUP(lookup\_value, table\_array, col\_index\_num, [range\_lookup])

- **lookup\_value** Required. The value to search in the first column of the table or range. The **lookup\_value** argument can be a value or a reference. If the value you supply for the **lookup\_value** argument is smaller than the smallest value in the first column of the **table\_array** argument, **VLOOKUP** returns the #N/A error value.
- **table\_array** Required. The range of cells that contains the data. You can use a reference to a range (for example, **A2:D8**), or a range name. The values in the first column of **table\_array** are the values searched by **lookup\_value**. These values can be text, numbers, or logical values. Uppercase and lowercase text are equivalent.
- **col\_index\_num** Required. The column number in the **table\_array** argument from which the matching value must be returned. A **col\_index\_num** argument of 1 returns the value in the first column in **table\_array**; a **col\_index\_num** of 2 returns the value in the second column in **table\_array**, and so on.

If the **col\_index\_num** argument is:

Less than 1, **VLOOKUP** returns the #VALUE! error value.

Greater than the number of columns in **table\_array**, **VLOOKUP** returns the #REF! error value.

- **range\_lookup** Optional. A logical value that specifies whether you want **VLOOKUP** to find an exact match or an approximate match:
  - If **range\_lookup** is either TRUE or is omitted, an exact or approximate match is returned.
  - If an exact match is not found, the next largest value that is less than **lookup\_value** is returned.

**Important** If **range\_lookup** is either TRUE or is omitted, the values in the first column of **table\_array** must be placed in ascending sort order; otherwise, **VLOOKUP** might not return the correct value.

For more information, see Sort data in a range or table.

If **range\_lookup** is FALSE, the values in the first column of **table\_array** do not need to be sorted.

If the *range\_lookup* argument is FALSE, **VLOOKUP** will find only an exact match. If there are two or more values in the first column of *table\_array* that match the *lookup\_value*, the first value found is used. If an exact match is not found, the error value #N/A is returned.

### 3. Array formula syntax

In general, array formulas use standard formula syntax. They all begin with an equal (=) sign, and you can use any of the built-in Excel functions in your array formulas. The key difference is that when using an array formula, you must press CTRL+SHIFT+ENTER to enter your formula. When you do this, Excel surrounds your array formula with braces — if you type the braces manually, your formula will be converted to a text string, and it will not work.

The next thing you need to understand is that array functions are a form of shorthand. For example, the multi-cell function that you used earlier is the equivalent of:

**=C2\*D2**

**=C3\*D3**

and so on. The single-cell formula in cell B13 condenses all of those multiplication operations, plus the arithmetic required to add those subtotals: **=E2+E3+E4**, and so on.

### 4. Rules for entering and changing array formulas

The primary rule for creating an array formula is worth repeating: Press CTRL+SHIFT+ENTER whenever you need to enter or edit an array formula. That rule applies to both single-cell and multi-cell formulas.

Whenever you work with multi-cell formulas, you also need to follow these rules:

- You must select the range of cells to hold your results *before* you enter the formula. You did this in step 3 of the multi-cell array formula exercise when you selected cells E2 through E11.
- You cannot change the contents of an individual cell in an array formula. To try this, select cell E3 in the sample workbook and press DELETE.
- You can move or delete an entire array formula, but you cannot move or delete part of it. In other words, to shrink an array formula, you first delete the existing formula and then start over.

**Tip** To delete an array formula, select the entire formula (for example, **=C2:C11\*D2:D11**), press DELETE, and then press CTRL+SHIFT+ENTER.

- You cannot insert blank cells into or delete cells from a multi-cell array formula.

### 5. FREQUENCY function

This article describes the formula syntax and usage of the **FREQUENCY** [function](#) in Microsoft Excel.

## Description

Calculates how often values occur within a range of values, and then returns a vertical array of numbers. For example, use FREQUENCY to count the number of test scores that fall within ranges of scores. Because FREQUENCY returns an array, it must be entered as an array formula.

## Syntax

FREQUENCY(data\_array, bins\_array)

The FREQUENCY function syntax has the following [arguments](#):

- **Data\_array** Required. An array of or reference to a set of values for which you want to count frequencies. If data\_array contains no values, FREQUENCY returns an array of zeros.
- **Bins\_array** Required. An array of or reference to intervals into which you want to group the values in data\_array. If bins\_array contains no values, FREQUENCY returns the number of elements in data\_array.

## Remarks

- FREQUENCY is entered as an array formula after you select a range of adjacent cells into which you want the returned distribution to appear.
- The number of elements in the returned array is one more than the number of elements in bins\_array. The extra element in the returned array returns the count of any values above the highest interval. For example, when counting three ranges of values (intervals) that are entered into three cells, be sure to enter FREQUENCY into four cells for the results. The extra cell returns the number of values in data\_array that are greater than the third interval value.
- FREQUENCY ignores blank cells and text.
- Formulas that return arrays must be entered as array formulas.

There is a live example on how to use the frequency function here

<http://chandoo.org/wp/2009/06/01/statistical-distributions/>

## 6. Anchoring cells (i.e. attaching \$ signs to reference cells)

In the image below:

Relative cell references change from row to row.

Absolute cell reference always refers to cell D9.

Cell D9 contains the value for the 7 percent discount.

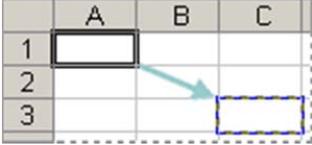
	A	B	C	D
1		Jan	Feb	
2	<b>Entertainment</b>			
3	Cable TV	52.98	52.98	1 2
4	Video rentals	7.98	15.96	=C4*\$D\$9
5	Movies	16.00	32.00	=C5*\$D\$9
6	CDs	18.98	29.98	=C6*\$D\$9
7	Totals	95.94	130.92	
8				3
9				0.07

By default, a cell reference is **relative**. For example, when you refer to cell A2 from cell C2, you are actually referring to a cell that is two columns to the left (C minus A), and in the same row (2). A formula that contains a relative cell reference changes as you copy it from one cell to another. As an example, if you copy the formula=**A2+B2** from cell C2 to D2, the formula in D2 adjusts downward by one row and becomes **=A3+B3**. If you want to maintain the original cell reference in this example when you copy it, you make the cell reference **absolute** by preceding the columns (A and B) and row (2) with a dollar sign (\$). Then, when you copy the formula (**=\$A\$2+\$B\$2**) from C2 to D2, the formula stays exactly the same.

In less frequent cases, you may want to make a cell reference "mixed" by preceding either the column or the row value with a dollar sign to "lock" either the column or the row (for example, \$A2 or B\$3). To change the type of cell reference:

1. Select the cell that contains the formula.
2. In the **formula bar**  , select the reference that you want to change.
3. Press F4 to switch between the reference types.

The following table summarizes how a reference type updates if a formula containing the reference is copied two cells down and two cells to the right.

FOR A FORMULA BEING COPIED:	IF THE REFERENCE IS:	IT CHANGES TO:
	\$A\$1 (absolute column and absolute row)	\$A\$1 (the reference is absolute)
	A\$1 (relative column and absolute row)	C\$1 (the reference is mixed)
	\$A1 (absolute column and relative row)	\$A3 (the reference is mixed)
	A1 (relative column and relative row)	C3 (the reference is relative)