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SAMPLE

# Logical Functions

The logical function **IF** tests the contents of a cell and, if the logical test is met (TRUE condition), performs one action; if not (FALSE condition), it performs another.

**=IF(Logical\_test,Value\_if\_true,Value\_if\_false)**

For instance, if the value in cell A1 is greater than 10 then multiply it by 3, if not, multiply it by 2. This is expressed as: **=IF(A1>10,A1\*3,A1\*2)**

The IF function is sometimes described as **IF THEN ELSE**. **IF** the condition is true **THEN** do this **ELSE** do that.

**AND** and **OR** are logical functions that can be either **TRUE** or **FALSE**. **AND** tests 2 or more conditions and if every one is satisfied returns a value of **TRUE**, otherwise it returns a value of **FALSE**. So

**=AND(A1>10,B1>10,C1>10)**

is only **TRUE** if **A1** is greater than **10** and **B1** is greater than **10** and **C1** is greater than **10**.

**OR** tests 2 or more conditions and if any one is satisfied returns a value of **TRUE**, otherwise it returns a value of **FALSE**. So

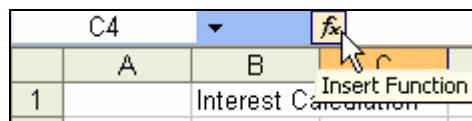
**=OR(A1>10,B1>10,C1>10)**

is **TRUE** if **A1** is greater than **10** or **B1** is greater than **10** or **C1** is greater than **10**.

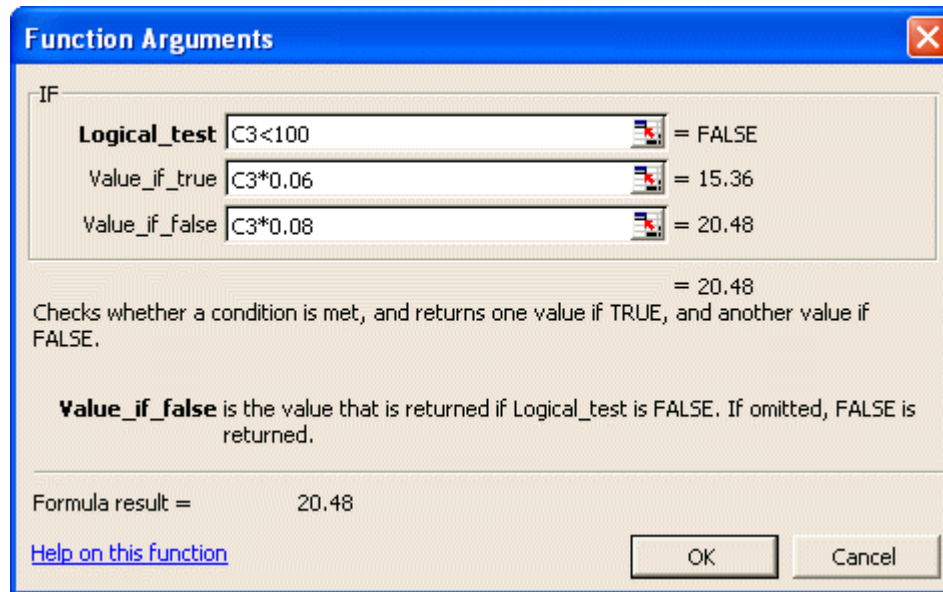
As the functions **AND** and **OR** return **TRUE** or **FALSE** values, they are often used in conjunction with **IF** functions in order to return a value for the logical test based on multiple conditions.

## To create an IF function

- Click in cell the required cell and then click the **Insert Function** button.



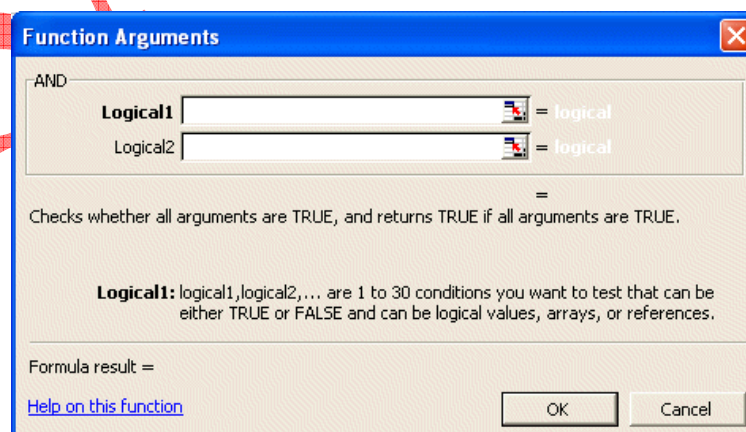
- From the Or select a category select Logical and from the Select a Function select IF.
- Click **OK** and enter the component parts of the test with a mixture of pointing and typing into the **Function Arguments** dialog box.



- Click **OK** to complete the function. The function looks at the contents of the selected cell and if **True**, carries out the action specified in **Value\_if\_true**, otherwise it carries out the action specified in **Value\_if\_false**.
- The example above looks at the contents of cell **C3** and if less than **100**, calculates the interest at **6%** otherwise it calculates it at **8%**.

### To create an AND function

- Click in cell the required cell and then click the **Insert Function** button.
- From the Or select a category select Logical and from the Select a Function select AND.
- Click **OK** and enter the component parts of the test with a mixture of pointing and typing into the **Function Arguments** dialog box.



- Click **OK** to complete the function. The function looks at the contents of the selected cells and if **all** of the **Logical Arguments** specified are **True**, returns a value of **True** in the selected cell, if one or more of the specified conditions are **False**, it returns a value of **False**.

### To create an OR function

- Click in cell the required cell and then click the **Insert Function** button.
- From the Or select a category select Logical and from the Select a Function select OR.
- Click **OK** and enter the component parts of the test with a mixture of pointing and typing into the **Function Arguments** dialog box.
- Click **OK** to complete the function. The function looks at the contents of the selected cells and if at least **one** of the **Logical Arguments** specified is **True**, returns a value of **True** in the selected cell, if **all** of the specified conditions are **False**, it returns a value of **False**.

*Note: In both **AND** and **OR** functions, although the **Logical Arguments** dialog box initially only displays **Logical1** and **Logical2** fields, others (up to a maximum of **Logical30**) are generated as the boxes displayed are completed.*

# Date and Time Functions

Dates and times are stored as numbers of days since 00:00 on 1st Jan 1900. Calculations using dates and times are carried out using the numbers, which represent the dates and times. There are two key presses which automatically insert the current date and time.

- <Ctrl ;>            Inserts the current date.
- <Ctrl Shift ;>      Inserts the current time.

There are also several functions for use with dates and times.

<b>DATE</b>	Returns the number for a particular day, e.g. DATE(92,4,13) returns 33707, the number of days from 1st Jan 1900 to 13th Apr 1992 when formatted as a number.
<b>DAY, MONTH, YEAR</b>	Converts a date to a number representing the day, month, or year, e.g. DAY("23/11/67") would be 23.
<b>NOW</b>	Used as NOW(). Returns the current date and time as a number, and is updated as the worksheet is calculated.
<b>DATEVALUE</b>	Converts the date as text to a number, e.g. DATEVALUE("21-Sept-49") returns 18162.
<b>TODAY</b>	Used as TODAY(). Returns the current date as a number and is updated as the worksheet is calculated.
<b>WEEKDAY</b>	Converts a number to an integer representing the day of the week from 1 (Sunday) to 7 (Saturday), e.g. WEEKDAY("21-Sept-49") returns 4, Wednesday.
<b>TIME</b>	Used as TIME(hour,minute,second). When formatted as a number returns a value in the range 0 to 0.99999999, representing a fraction of a day, e.g. TIME(16,48,10) returns 0.700115741.
<b>TIMEVALUE</b>	Returns a number as a fraction of the day, e.g. TIMEVALUE("22nd-Aug-67 6:35 am") returns .274305556.
<b>HOUR, MINUTE, SECOND</b>	Converts a time into hours, minutes, or seconds, e.g. HOUR("6:35pm") returns 18.

## To use Date and Time Functions

- Open the desired workbook and move to the required cell.

- Enter the required **Date** or **Time Function**, making sure the function is preceded by = sign.
- Format the date or time as desired and close the workbook if required.

SAMPLE

# Lookup and Reference Functions

**Lookup & Reference** functions deal mainly with data in tables or ranges, for example retrieving values or transposing vertical and horizontal ranges.

A **Lookup** table consists of a selection of bands, or intervals, where a given value can be found. There are two functions, **HLOOKUP**, which searches a horizontal table and **VLOOKUP**, which searches a vertical table.

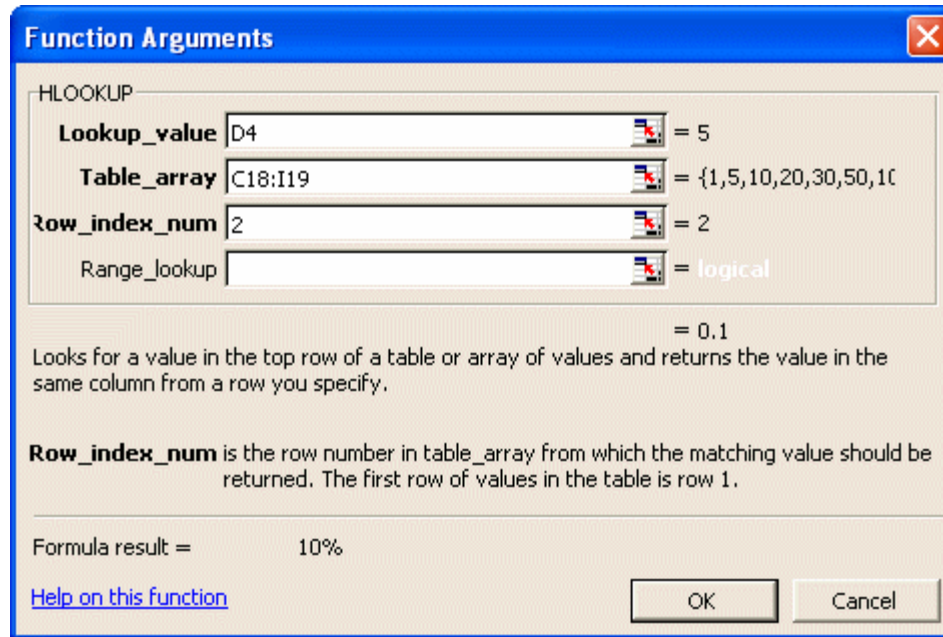
In the example below the **Number Bought** will vary and the discount will automatically be shown in the **Discount %** row. The **Discount Price** will be automatically be worked out when the **Number Bought** is added.

### To use a Lookup function


- Open the required workbook and place the active cell where the **Lookup** value is to be shown, as in the example below.
- Add the appropriate calculations to the spreadsheet, so when the **Lookup Function** has found the appropriate value, the table will be complete.

	A	B	C	D	E	F	G	H	I
1									
2		Price		£69.95					
3									
4		Number Bought		5					
5									
6		Total Price		£349.75					
7									
8		Discount %							
9									
10		Discount		£0.00					
11									
12		Discount Price		£349.75					
13									
14									
15									
16		DISCOUNT TABLE							
17									
18		No. Bought	1	5	10	20	30	50	100
19		Discount	0%	10%	15%	25%	40%	45%	50%
20									

- Click the **Insert Function** button, . Select the **Lookup & Reference** category and the function name **HLOOKUP** or **VLOOKUP** and then click **OK**.



*Note: Setting the **Range\_lookup** to **FALSE** causes the function to return a value only if there is an exact match between the **Lookup\_value** and the table entry.*

- Enter the **Lookup\_value** (if known) or click on the **Collapse** button to hide the dialog box so the worksheet is visible.
- Click on the cell to be used for the **Lookup\_value** and click on the **Expand** button, , to show the dialog box again.
- Enter the **Table\_array** (if known) or collapse the dialog box and highlight the table required (do not include any labels).
- Complete the **Row\_index\_num** -the row or column (if using **VLOOKUP**) in the table from which to return the value.
- Click **OK** to insert the function.
- Change the **Lookup value** and notice the changes made to all associated numbers.


# Statistical Functions

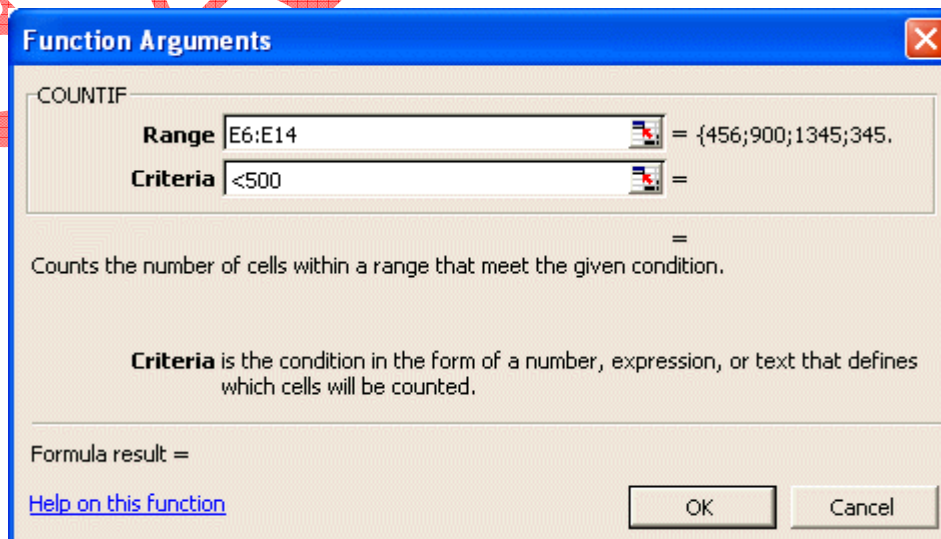
**Statistical** functions deal with analysing numerical data, from simple counting and averaging to calculating complex distribution parameters.

Some useful functions are: **Average**, **Count**, **Max**, **Min**, **Countif**, **STDEV** (standard deviation), **Frequency** and **Trend**.

All functions are used in a similar way. Select the function, if help is required click the **Help on this function** link. As an example this exercise demonstrates **COUNTIF**. This function counts numeric items that match a set condition, e.g. to count the number of clients that owe more than £100.

## To use COUNTIF

- Open a workbook and place the active cell where the solution is required.
- Click the **Insert Function** button .
- Select Statistical as the category and COUNTIF in the Select a function list.
- Click **OK** to display the **COUNTIF** box.
- Complete the **Range** box either by typing the range of the list or collapsing the dialog box and highlighting the range.
- Set the condition or criteria in the **Criteria** box using mathematical symbols, such as < (less than), > (greater than), <= (less than or equal to) or >= (greater than or equal to).



**Function Arguments**

COUNTIF

**Range** E6:E14 = {456;900;1345;345.}

**Criteria** <500 =

=

Counts the number of cells within a range that meet the given condition.

**Criteria** is the condition in the form of a number, expression, or text that defines which cells will be counted.

Formula result =

[Help on this function](#) OK Cancel

- Click **OK**. Check the **Formula Bar** for the formula (the speech marks are added automatically). The cells that match the condition are counted.

SAMPLE


# Maths and Trig Functions

**Math & Trig** functions deal with processing individual numerical data, from simple rounding to complex trigonometric calculations. Some useful functions are: **Int**, **Round**, **Sumif** and **Subtotal**.

**Subtotal** acts on displayed rows when filtering lists. It performs various other functions within it, using **Function\_num** as a value matching the required one. The eleven numbers are:

1	AVERAGE	5	MIN	9	SUM
2	COUNT	6	PRODUCT	10	VAR
3	COUNTA	7	STDEV	11	VARP
4	MAX	8	STDEVP		

## To use SUMIF

- Open a workbook and place the active cell where the solution is required.
- Click on the **Insert Function** button, .
- Select Math & Trig for the category and SUMIF in the Select a function.
- Click **OK** to display the **SUMIF** box.
- Add the required range into the **Range** box using one of the ways as described earlier.
- Set the **Criteria** box. Click **OK** to insert the function. The items in the list which meet the criteria will be summed.