

Create conditional formulas by using the IF function

► For a result that is a logical value (TRUE or FALSE)

▼ For a result is another calculation, or any other value other than TRUE or FALSE.

Use the IF, AND, and OR functions to do this task.

Worksheet example

The example may be easier to understand if you copy it to a blank worksheet.

► How?

A	
1	Data
2	15
3	9
4	8
Formula	Description (Result)
=IF(A2=15, "OK", "Not OK")	If the value in cell A2 equals 15, then return "OK". (OK)
=IF(AND(A2>A3, A2<A4), "OK", "Not OK")	If 15 is greater than 9 and less than 8, then return "OK". (Not OK)
=IF(OR(A2>A3, A2<A4), "OK", "Not OK")	If 15 is greater than 9 or less than 8, then return "OK". (OK)

The IF function uses the following arguments.

1 **2** **3**
 =IF(logical_test,value_if_true,value_if_false)

Formula with the IF function

- 1** logical_test: the condition you want to check
- 2** value_if_true: the value to return if the condition is true
- 3** value_if_false: the value to return if the condition is false

Function details

AND

OR

IF

VLOOKUP

See Also

Searches for a value in the leftmost column of a table, and then returns a value in the same row from a column you specify in the table. Use VLOOKUP instead of HLOOKUP when your comparison values are located in a column to the left of the data you want to find.

The V in VLOOKUP stands for "Vertical."

Syntax

VLOOKUP(lookup_value,table_array,col_index_num,range_lookup)

Lookup_value is the value to be found in the first column of the array. Lookup_value can be a value, a reference, or a text string.

Table_array is the table of information in which data is looked up. Use a reference to a range or a range name, such as Database or List.

- If range_lookup is TRUE, the values in the first column of table_array must be placed in ascending order: ..., -2, -1, 0, 1, 2, ..., A-Z, FALSE, TRUE; otherwise VLOOKUP may not give the correct value. If range_lookup is FALSE, table_array does not need to be sorted.
- You can put the values in ascending order by choosing the **Sort** command from the **Data** menu and selecting **Ascending**.
- The values in the first column of table_array can be text, numbers, or logical values.
- Uppercase and lowercase text are equivalent.

Col_index_num is the column number in table_array from which the matching value must be returned. A col_index_num 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 col_index_num is less than 1, VLOOKUP returns the #VALUE! error value; if col_index_num is greater than the number of columns in table_array, VLOOKUP returns the #REF! error value.

Range_lookup is a logical value that specifies whether you want VLOOKUP to find an exact match or an approximate match. If TRUE or omitted, an approximate match is returned. In other words, if an exact match is not found, the next largest value that is less than lookup_value is returned. If FALSE, VLOOKUP will find an exact match. If one is not found, the error value #N/A is returned.

Remarks

- If VLOOKUP can't find lookup_value, and range_lookup is TRUE, it uses the largest value that is less than or equal to lookup_value.
- If lookup_value is smaller than the smallest value in the first column of table_array, VLOOKUP returns the #N/A error value.
- If VLOOKUP can't find lookup_value, and range_lookup is FALSE, VLOOKUP returns the #N/A value.

Example

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► How?

The example uses values for air at 1 atm pressure.

	A	B	C
1	Density	Viscosity	Temperature
2	0.457	3.55	500
3	0.525	3.25	400
4	0.616	2.93	300
5	0.675	2.75	250
6	0.746	2.57	200
7	0.835	2.38	150
8	0.946	2.17	100
9	1.09	1.95	50
10	1.29	1.71	0

Formula	Description (Result)
=VLOOKUP(1,A2:C10,2)	Looks up 1 in column A, and returns the value from column B in the same row (2.17)
=VLOOKUP(1,A2:C10,3,TRUE)	Looks up 1 in column A, and returns the value from column C in the same row (100)
=VLOOKUP (.7,A2:C10,3,FALSE)	Looks up 0.746 in column A. Because there is no exact match in column A, an error is returned (#N/A)
=VLOOKUP (0.1,A2:C10,2,TRUE)	Looks up 0.1 in column A. Because 0.1 is less than the smallest value in column A, an error is returned (#N/A)
=VLOOKUP(2,A2:C10,2,TRUE)	Looks up 2 in column A, and returns the value from column B in the same row (1.71)

MATCH

See Also

Returns the relative position of an item in an array that matches a specified value in a specified order. Use MATCH instead of one of the LOOKUP functions when you need the position of an item in a range instead of the item itself.

Syntax

MATCH(lookup_value,lookup_array,match_type)

Lookup_value is the value you use to find the value you want in a table.

- **Lookup_value** is the value you want to match in **lookup_array**. For example, when you look up someone's number in a telephone book, you are using the person's name as the lookup value, but the telephone number is the value you want.
- **Lookup_value** can be a value (number, text, or logical value) or a cell reference to a number, text, or logical value.

Lookup_array is a contiguous range of cells containing possible lookup values. **Lookup_array** must be an array or an array reference.

Match_type is the number -1, 0, or 1. **Match_type** specifies how Microsoft Excel matches **lookup_value** with values in **lookup_array**.

- If **match_type** is 1, MATCH finds the largest value that is less than or equal to **lookup_value**. **Lookup_array** must be placed in ascending order: ...-2, -1, 0, 1, 2, ..., A-Z, FALSE, TRUE.
- If **match_type** is 0, MATCH finds the first value that is exactly equal to **lookup_value**. **Lookup_array** can be in any order.
- If **match_type** is -1, MATCH finds the smallest value that is greater than or equal to **lookup_value**. **Lookup_array** must be placed in descending order: TRUE, FALSE, Z-A, ...2, 1, 0, -1, -2, ..., and so on.
- If **match_type** is omitted, it is assumed to be 1.

Remarks

- MATCH returns the position of the matched value within **lookup_array**, not the value itself. For example, MATCH("b",{"a","b","c"},0) returns 2, the relative position of "b" within the array {"a","b","c"}.
- MATCH does not distinguish between uppercase and lowercase letters when matching text values.
- If MATCH is unsuccessful in finding a match, it returns the #N/A error value.
- If **match_type** is 0 and **lookup_value** is text, **lookup_value** can contain the wildcard characters asterisk (*) and question mark (?). An asterisk matches any sequence of characters; a question mark matches any single character.

Example

The example may be easier to understand if you copy it to a blank worksheet.

► How?

A	B
1	Product
2	Bananas
3	Oranges
4	Apples
5	Pears
	Count
	25
	38
	40
	41
Formula	Description (Result)
=MATCH(39,B2:B5,1)	Because there is not an exact match, the position of the next lowest value (38) in the range B2:B5 is returned. (2)
=MATCH(41,B2:B5,0)	The position of 41 in the range B2:B5. (4)
=MATCH(40,B2:B5,-1)	Returns an error because the range B2:B5 is not in descending order. (#N/A)

INDEX

See Also

Returns the value of an element in a table or an array, selected by the row and column number indexes.

The INDEX function has two syntax forms: array and reference. The array form always returns a value or array of values; the reference form always returns a reference. Use the array form if the first argument to INDEX is an array constant.

Syntax 1

Array form

INDEX(array,row_num,column_num)

Array is a range of cells or an array constant.

- If array contains only one row or column, the corresponding row_num or column_num argument is optional.
- If array has more than one row and more than one column, and only row_num or column_num is used, INDEX returns an array of the entire row or column in array.

Row_num selects the row in array from which to return a value. If row_num is omitted, column_num is required.

Column_num selects the column in array from which to return a value. If column_num is omitted, row_num is required.

Remarks

- If both the row_num and column_num arguments are used, INDEX returns the value in the cell at the intersection of row_num and column_num.
- If you set row_num or column_num to 0 (zero), INDEX returns the array of values for the entire column or row, respectively. To use values returned as an array, enter the INDEX function as an array formula in a horizontal range of cells for a row, and in a vertical range of cells for a column. To enter an array formula, press CTRL+SHIFT+ENTER.
- Row_num and column_num must point to a cell within array; otherwise, INDEX returns the #REF! error value.

Example 1

The example may be easier to understand if you copy it to a blank worksheet.

► How?

	A	B
1	Data	Data
2	Apples	Lemons
3	Bananas	Pears
	Formula	Description (Result)
	=INDEX(A2:B3,2,2)	Value at the intersection of the second row and second column in the range (Pears)
	=INDEX(A2:B3,2,1)	Value at the intersection of the second row and first column in the range (Bananas)

Example 2

The example may be easier to understand if you copy it to a blank worksheet.

► How?

	A	B
1	Formula	Description (Result)
2	=INDEX({1,2;3,4},0,2)	Value in the first row, second column in the array constant (2)
3		Value in the second row, second column in the array constant (4)

Note The formula in the example must be entered as an array formula. After copying the example to a blank worksheet, select the range A2:A3 starting with the formula cell. Press F2, and then press CTRL+SHIFT+ENTER. If the formula is not entered as an array formula, the single result is 2.