

INDEX function

Syntax

INDEX(array, row_num, [column_num])

The array form of the INDEX function has the following arguments:

- **array** Required. 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** Required, unless column_num is present. Selects the row in array from which to return a value. If row_num is omitted, column_num is required.
- **column_num** Optional. Selects the column in array from which to return a value. If column_num is omitted, row_num is required.

= INDEX(B3:B11,4)

The screenshot shows an Excel spreadsheet. The formula bar at the top displays `=INDEX(B3:B11,4)` with a yellow arrow pointing to the cell G2. The spreadsheet contains a table of planets with columns for Planet, Diameter (km), and Satellites. The 4th row of the table (row 6) is highlighted, showing Mars with a diameter of 6,792 km and 2 satellites. To the right of the table, there is a text box with the text "Get name of the 4th planet:" and the formula `=INDEX(B3:B11,4)`. Below this text box is the EXCELJET logo.

	Planet	Diameter (km)	Satellites
1			
2			
3	1 Mercury	4,879	0
4	2 Venus	12,104	0
5	3 Earth	12,756	1
6	4 Mars	6,792	2
7	5 Jupiter	142,984	67
8	6 Saturn	120,536	200
9	7 Uranus	51,118	27
10	8 Neptune	49,528	13
11	9 Pluto	2,306	5
12			

INDEX returns the value in the 4th row of the range.

= INDEX(B3:D11,4,2)

G3 =INDEX(B3:D11,4,2)

	A	B	C	D	E	F	G	H
1		1	2	3				
2		Planet	Diameter (km)	Satellites				
3	1	Mercury	4,879	0				
4	2	Venus	12,104	0				
5	3	Earth	12,756	1				
6	4	Mars	6,792	2				
7	5	Jupiter	142,984	67				
8	6	Saturn	120,536	200				
9	7	Uranus	51,118	27				
10	8	Neptune	49,528	13				
11	9	Pluto	2,306	5				
12								

Name	Mars
Diameter	6,792

Diameter of the 4th planet:

=INDEX(B3:D11,4,2)

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INDEX retrieves the value at row 4, column 2.

To summarize, INDEX gets a value at a given location in a range of cells based on numeric position. When the range is one-dimensional, you only need to supply a row number. When the range is two-dimensional, you'll need to supply both the row and column numbers.

MATCH function

Syntax

MATCH(lookup_value, lookup_array, [match_type])

The MATCH function syntax has the following arguments:

- **lookup_value** Required. The value that 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.

The *lookup_value* argument can be a value (number, text, or logical value) or a cell reference to a number, text, or logical value.

- **lookup_array** Required. The range of cells being searched.
- **match_type** Optional. The number -1, 0, or 1. The *match_type* argument specifies how Excel matches *lookup_value* with values in *lookup_array*. The default value for this argument is 1.

Match_type	Behavior
1 or omitted	MATCH finds the largest value that is less than or equal to <i>lookup_value</i> . The values in the <i>lookup_array</i> argument must be placed in ascending order, for example: ...-2, -1, 0, 1, 2, ..., A-Z, FALSE, TRUE.
0	MATCH finds the first value that is exactly equal to <i>lookup_value</i> . The values in the <i>lookup_array</i> argument can be in any order.
-1	MATCH finds the smallest value that is greater than or equal to <i>lookup_value</i> . The values in the <i>lookup_array</i> argument must be placed in descending order, for example: TRUE, FALSE, Z-A, ...2, 1, 0, -1, -2, ..., and so on.

- **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, which is 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 a text string, you can use the wildcard characters — the question mark (?) and asterisk (*) — in the *lookup_value* argument. A question mark matches any single character; an asterisk matches any sequence of characters. If you want to find an actual question mark or asterisk, type a tilde (~) before the character.

=MATCH("peach", B3:B9, 0)

Excel screenshot showing the formula bar with `=MATCH("peach",B3:B9,0)` and the result 3 in cell D2. The data is organized in a vertical array.

	A	B	C	D	E	F	G	H	I	J
1										
2		Fruit		3						
3	1	Apple								
4	2	Pear								
5	3	Peach								
6	4	Grape								
7	5	Lemon								
8	6	Lime								
9	7	Kiwi								
10										

Position of peach in vertical array

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MATCH returns 3, since "Peach" is the 3rd item. MATCH is not case-sensitive.

=MATCH("peach", C4:I4, 0)

Excel screenshot showing the formula bar with `=MATCH("peach",C4:I4,0)` and the result 3 in cell B2. The data is organized in a horizontal array.

	A	B	C	D	E	F	G	H	I	J
1										
2		3								
3			1	2	3	4	5	6	7	
4	Fruit	Apple	Pear	Peach	Grape	Lemon	Lime	Kiwi		
5										
6										
7										
8										
9										
10										

Position of peach in horizontal array

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INDEX and MATCH together

= INDEX(C3:E11, MATCH(H2, B3:B11, 0), 2)

Formula bar: **=INDEX(C3:E11,MATCH(H2,B3:B11,0),2)** ←

	A	B	C	D	E	F	G	H	I
1									
2		Name	Jan	Feb	Mar		Name	Frantz	
3		Alper	\$11,882	\$11,519	\$7,565		Feb	\$ 5,194	
4		Burrows	\$11,676	\$6,344	\$5,406				
5		Chandler	\$10,296	\$9,693	\$11,867				
6		Colby	\$4,752	\$6,786	\$12,560				
7		Frantz	\$10,699	\$5,194	\$10,525				
8		Gonzalez	\$10,404	\$8,487	\$8,964				
9		Kyle	\$11,841	\$4,689	\$10,992				
10		Little	\$5,259	\$3,900	\$7,845				
11		Long	\$6,364	\$6,183	\$4,759				
12									

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MATCH finds "Frantz" and returns 5 to INDEX for row.

Formula bar: **=INDEX(C3:E11,MATCH(H2,B3:B11,0),MATCH(H3,C2:E2,0))** ←

	A	B	C	D	E	F	G	H	I
1									
2		Name	Jan	Feb	Mar		Name	Frantz	
3		Alper	\$11,882	\$11,519	\$7,565		Month	Mar	
4		Burrows	\$11,676	\$6,344	\$5,406		Sales	\$ 10,525	
5		Chandler	\$10,296	\$9,693	\$11,867				
6		Colby	\$4,752	\$6,786	\$12,560				
7		Frantz	\$10,699	\$5,194	\$10,525				
8		Gonzalez	\$10,404	\$8,487	\$8,964				
9		Kyle	\$11,841	\$4,689	\$10,992				
10		Little	\$5,259	\$3,900	\$7,845				
11		Long	\$6,364	\$6,183	\$4,759				
12									

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A fully dynamic, two-way lookup with INDEX and MATCH.

= INDEX(C3:E11, MATCH(H2, B3:B11, 0), MATCH(H3, C2:E2, 0))

Left lookup

One of the key advantages of INDEX and MATCH over the VLOOKUP function is the ability to perform a "left lookup". Simply put, this just means a lookup where the ID column is to the *right* of the values you want to retrieve, as seen in the example below:

Left lookup with INDEX and MATCH

Item	Color	Price	ID
T-shirt	Red	\$18.00	1001
T-shirt	Blue	\$17.50	1002
T-shirt	Black	\$19.00	1003
Sandals	Gray	\$24.00	2001
Sandals	Black	\$25.00	2002
Hoodie	Black	\$33.00	3001
Hoodie	Gray	\$35.00	3001
Hoodie	White	\$32.00	3001
Hat	Black	\$28.00	4001
Hat	Orange	\$30.00	4002
Hat	White	\$25.00	4003

ID	Item	Color	Price
1003	T-shirt	Black	\$19.00
3001	Hoodie	Black	\$33.00
4002	Hat	Orange	\$30.00

Item = B5:B15
color = C5:C15
price = D5:D15
id = E5:E15

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Index and Match with multiple criteria

One of the trickiest problems in Excel is a lookup based on multiple criteria. In other words, a lookup that matches on more than one column at the same time. A nice way to handle these problems is to use [Boolean logic](#), a technique for handling TRUE and FALSE values like 1s and 0s. You can see this approach below, where we are using INDEX and MATCH and Boolean logic to find a price based on three values: Item, Color, and Size:

INDEX and MATCH with multiple criteria

Item	Size	Color	Price
T-shirt	Small	Red	\$15.00
T-shirt	Medium	Blue	\$16.00
T-shirt	Large	Red	\$17.00
Hoodie	Small	Gray	\$28.00
Hoodie	Medium	Blue	\$29.00
Hoodie	Large	Black	\$30.00
T-shirt	X-Large	Red	\$18.00

Item	Size	Color	Price
T-shirt	Large	Red	\$17.00

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