

**Course
&
Test Series**

AND, OR and NOT Function in MS Excel

Microsoft Excel

CBSE

Module 32 - AND, OR and NOT Function in Excel

AND Function

ICSE

The Excel AND function is a logical function that returns TRUE only if all the conditions provided are true, and FALSE if any condition is false. It's often used with other functions like IF, NOT, and OR to create complex logical tests.

Purpose:

The AND function evaluates multiple conditions and returns a single TRUE or FALSE value based on whether all conditions are met.

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Syntax:

=AND(logical1, [logical2], [logical3], ...)

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logical1: The first logical expression to test.

[logical2], [logical3], ...: Optional, additional logical expressions to test.

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The conditions can check things like:

1. If a number is greater than another number >
2. If a number is smaller than another number <
3. If a number or text is equal to something =

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Example: AND Function

Check if the Pokemon type is "Fire" and has speed greater than 70:

The function returns "TRUE" or "FALSE".

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| | A | B | C | D |
|----|------------|--------|-------|----------------------------------|
| 1 | Name | Type 1 | Speed | Fire Type AND more than 70 Speed |
| 2 | Bulbasaur | Grass | 45 | |
| 3 | Ivysaur | Grass | 60 | |
| 4 | Venusaur | Grass | 80 | |
| 5 | Charmander | Fire | 65 | |
| 6 | Charmeleon | Fire | 80 | |
| 7 | Charizard | Fire | 100 | |
| 8 | Squirtle | Water | 43 | |
| 9 | Wartortle | Water | 58 | |
| 10 | Blastoise | Water | 78 | |
| 11 | | | | |

MBA Entrance

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Example AND function, step by step:

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1. Select the cell D2.
2. Type =AND.
3. Double click the AND command.

| | A | B | C | D | E | F | G | H | I |
|----|------------|--------|-------|----------------------------------|---|---|---|---|---|
| 1 | Name | Type 1 | Speed | Fire Type AND more than 70 Speed | | | | | |
| 2 | Bulbasaur | Grass | 45 | =AND | | | | | |
| 3 | Ivysaur | Grass | 60 | | | | | | |
| 4 | Venusaur | Grass | 80 | | | | | | |
| 5 | Charmander | Fire | 65 | | | | | | |
| 6 | Charmeleon | Fire | 80 | | | | | | |
| 7 | Charizard | Fire | 100 | | | | | | |
| 8 | Squirtle | Water | 43 | | | | | | |
| 9 | Wartortle | Water | 58 | | | | | | |
| 10 | Blastoise | Water | 78 | | | | | | |
| 11 | | | | | | | | | |

4. Specify the first condition B2="Fire"
5. Type semicolon;
6. Specify the second condition C2>70. Close the parenthesis.
7. Hit enter.

| | A | B | C | D |
|----|------------|--------|-------|----------------------------------|
| 1 | Name | Type 1 | Speed | Fire Type AND more than 70 Speed |
| 2 | Bulbasaur | Grass | 45 | =AND(B2="Fire"; C2>70) |
| 3 | Ivysaur | Grass | 60 | |
| 4 | Venusaur | Grass | 80 | |
| 5 | Charmander | Fire | 65 | |
| 6 | Charmeleon | Fire | 80 | |
| 7 | Charizard | Fire | 100 | |
| 8 | Squirtle | Water | 43 | |
| 9 | Wartortle | Water | 58 | |
| 10 | Blastoise | Water | 78 | |
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Since the value in cell B2 is not "Fire" the first condition is FALSE.

Since the value in cell C2 is less than 70 the second condition is also FALSE.

All conditions need to be TRUE for the AND function to return TRUE.

Now, each row has a check for Fire Type and Speed

| | A | B | C | D |
|----|------------|--------|-------|----------------------------------|
| 1 | Name | Type 1 | Speed | Fire Type AND more than 70 Speed |
| 2 | Bulbasaur | Grass | 45 | FALSE |
| 3 | Ivysaur | Grass | 60 | FALSE |
| 4 | Venusaur | Grass | 80 | FALSE |
| 5 | Charmander | Fire | 65 | FALSE |
| 6 | Charmeleon | Fire | 80 | TRUE |
| 7 | Charizard | Fire | 100 | TRUE |
| 8 | Squirtle | Water | 43 | FALSE |
| 9 | Wartortle | Water | 58 | FALSE |
| 10 | Blastoise | Water | 78 | FALSE |
| 11 | | | | |

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greater than 70:

Only Charmeleon and Charizard both have Fire type and speed greater than 70, so the function returns "TRUE".

Example: AND Function (with IF)

Combining the AND function with an IF function lets you check multiple conditions for the IF function:

The IF function is typed =IF and has 3 parts:

=IF(logical_test, [value_if_true], [value_if_false])

The AND function takes the place of the logical_test condition.

Here, the IF function returns "Yes" or "No".

Example AND function as the condition for IF function, step by step:

1. Select cell C2.
2. Type =IF.
3. Double Click the IF command.

| | A | B | C | D | E | F | G | H | I |
|----|------------|--------|-------|----------------------------------|--|---|---|---|---|
| 1 | Name | Type 1 | Speed | Fire Type AND more than 70 Speed | | | | | |
| 2 | Bulbasaur | Grass | 45 | =IF | | | | | |
| 3 | Ivysaur | Grass | 60 | IF | Checks whether a condition is met, and returns one value if TRUE, and another value if FALSE | | | | |
| 4 | Venusaur | Grass | 80 | IFERROR | | | | | |
| 5 | Charmander | Fire | 65 | IFNA | | | | | |
| 6 | Charmeleon | Fire | 80 | IFS | | | | | |
| 7 | Charizard | Fire | 100 | | | | | | |
| 8 | Squirtle | Water | 43 | | | | | | |
| 9 | Wartortle | Water | 58 | | | | | | |
| 10 | Blastoise | Water | 78 | | | | | | |
| 11 | | | | | | | | | |

4. Type AND.
5. Double Click the AND command.

| | A | B | C | D | E | F | G | H | I |
|----|------------|--------|-------|----------------------------------|---|---|---|---|---|
| 1 | Name | Type 1 | Speed | Fire Type AND more than 70 Speed | | | | | |
| 2 | Bulbasaur | Grass | 45 | =IF(AND | | | | | |
| 3 | Ivysaur | Grass | 60 | AND | Checks whether all arguments are TRUE, and returns TRUE if all arguments are TRUE | | | | |
| 4 | Venusaur | Grass | 80 | BITAND | | | | | |
| 5 | Charmander | Fire | 65 | RAND | | | | | |
| 6 | Charmeleon | Fire | 80 | RANDARRAY | | | | | |
| 7 | Charizard | Fire | 100 | RANDBETWEEN | | | | | |
| 8 | Squirtle | Water | 43 | STANDARDIZE | | | | | |
| 9 | Wartortle | Water | 58 | | | | | | |
| 10 | Blastoise | Water | 78 | | | | | | |
| 11 | | | | | | | | | |

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- Specify the first condition B2="Fire"
- Type semicolon;
- Specify the second condition C2>70
- Close the parenthesis).
- Specify the value "Yes" for when both conditions are TRUE
- Type semicolon;
- Specify the value "No" for when either, or both, conditions are FALSE
- Close the parenthesis) and hit enter

| | A | B | C | D | E |
|----|------------|--------|-------|---|---|
| 1 | Name | Type 1 | Speed | Fire Type AND more than 70 Speed | |
| 2 | Bulbasaur | Grass | 45 | =IF(AND(B2="Fire"; C2>70); "Yes"; "No") | |
| 3 | Ivysaur | Grass | 60 | | |
| 4 | Venusaur | Grass | 80 | | |
| 5 | Charmander | Fire | 65 | | |
| 6 | Charmeleon | Fire | 80 | | |
| 7 | Charizard | Fire | 100 | | |
| 8 | Squirtle | Water | 43 | | |
| 9 | Wartortle | Water | 58 | | |
| 10 | Blastoise | Water | 78 | | |
| 11 | | | | | |

Now each row has a check for both being Fire type and Speed greater than 70:

| | A | B | C | D |
|----|------------|--------|-------|----------------------------------|
| 1 | Name | Type 1 | Speed | Fire Type AND more than 70 Speed |
| 2 | Bulbasaur | Grass | 45 | No |
| 3 | Ivysaur | Grass | 60 | No |
| 4 | Venusaur | Grass | 80 | No |
| 5 | Charmander | Fire | 65 | No |
| 6 | Charmeleon | Fire | 80 | Yes |
| 7 | Charizard | Fire | 100 | Yes |
| 8 | Squirtle | Water | 43 | No |
| 9 | Wartortle | Water | 58 | No |
| 10 | Blastoise | Water | 78 | No |
| 11 | | | | |

Only Charmeleon and Charizard both have Fire type and speed greater than 70, so the function returns "Yes".

OR Function

In Excel, the OR function checks if any of the provided conditions are TRUE and returns TRUE if at least one is, otherwise it returns FALSE.

Purpose:

The OR function is a logical function used to evaluate multiple conditions and determine if any of them are met.

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Syntax:

=OR(logical1, [logical2], ...)

logical1: The first condition to evaluate.

logical2: Optional, additional conditions to evaluate.

Example OR Function


Check if the Pokemon type is water OR has defense greater than 60:

The function returns "TRUE" or "FALSE".

| | A | B | C | D |
|----|------------|--------|---------|------------------------------------|
| 1 | Name | Type 1 | Defense | Water Type OR more than 60 Defense |
| 2 | Bulbasaur | Grass | 49 | |
| 3 | Ivysaur | Grass | 63 | |
| 4 | Venusaur | Grass | 83 | |
| 5 | Charmander | Fire | 43 | |
| 6 | Charmeleon | Fire | 58 | |
| 7 | Charizard | Fire | 78 | |
| 8 | Squirtle | Water | 65 | |
| 9 | Wartortle | Water | 80 | |
| 10 | Blastoise | Water | 100 | |
| 11 | | | | |

Example OR function, step by step:

1. Select the cell D2.
2. Type =OR.
3. Double Click the OR command.

| | A | B | C | D | E | F | G | H | I |
|----|------------|--------|---------|--|---|---|---|---|---|
| 1 | Name | Type 1 | Defense | Water Type OR more than 60 Defense | | | | | |
| 2 | Bulbasaur | Grass | 49 | =OR | | | | | |
| 3 | Ivysaur | Grass | 63 |  | | | | | |
| 4 | Venusaur | Grass | 83 | | | | | | |
| 5 | Charmander | Fire | 43 | | | | | | |
| 6 | Charmeleon | Fire | 58 | | | | | | |
| 7 | Charizard | Fire | 78 | | | | | | |
| 8 | Squirtle | Water | 65 | | | | | | |
| 9 | Wartortle | Water | 80 | | | | | | |
| 10 | Blastoise | Water | 100 | | | | | | |
| 11 | | | | | | | | | |

4. Specify the first condition B2="Water"
5. Type semicolon;
6. Specify the second condition C2>60.

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| | A | B | C | D |
|----|------------|--------|---------|------------------------------------|
| 1 | Name | Type 1 | Defense | Water Type OR more than 60 Defense |
| 2 | Bulbasaur | Grass | 49 | =OR(B2="Water"; C2>60) |
| 3 | Ivysaur | Grass | 63 | |
| 4 | Venusaur | Grass | 83 | |
| 5 | Charmander | Fire | 43 | |
| 6 | Charmeleon | Fire | 58 | |
| 7 | Charizard | Fire | 78 | |
| 8 | Squirtle | Water | 65 | |
| 9 | Wartortle | Water | 80 | |
| 10 | Blastoise | Water | 100 | |
| 11 | | | | |

- Close the Parenthesis.
- Hit enter.

- Since the value in cell B2 is not "Water" the first condition is FALSE.
- Since the value in cell C2 is less than 60 the second condition is also FALSE.
- **At least one condition need to be TRUE for the OR function to return TRUE.**

| | A | B | C | D |
|----|------------|--------|---------|------------------------------------|
| 1 | Name | Type 1 | Defense | Water Type OR more than 60 Defense |
| 2 | Bulbasaur | Grass | 49 | FALSE |
| 3 | Ivysaur | Grass | 63 | TRUE |
| 4 | Venusaur | Grass | 83 | TRUE |
| 5 | Charmander | Fire | 43 | FALSE |
| 6 | Charmeleon | Fire | 58 | FALSE |
| 7 | Charizard | Fire | 78 | TRUE |
| 8 | Squirtle | Water | 65 | TRUE |
| 9 | Wartortle | Water | 80 | TRUE |
| 10 | Blastoise | Water | 100 | TRUE |
| 11 | | | | |

For Example:

- Ivysaur is not Water type, but it has more than 60 defense, so the function returns "TRUE".
- Charmeleon is not Water type, and has less than 60 defense, so the function returns "FALSE"
- Wartortle is both Water type and has more than 60 defense, so the function returns "TRUE"

NOT Function

The NOT function in Excel reverses the logical value of its argument, changing TRUE to FALSE and FALSE to TRUE. It's useful for creating complex logical tests and is often used in conjunction with other functions like IF, AND, and OR. Here's a breakdown:

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Purpose:

The primary function of NOT is to invert a logical value.

Syntax:

=NOT(logical_test)

logical_test: This is a value or expression that can be evaluated as TRUE or FALSE.

Examples:

=NOT(TRUE) returns FALSE.

=NOT(FALSE) returns TRUE.

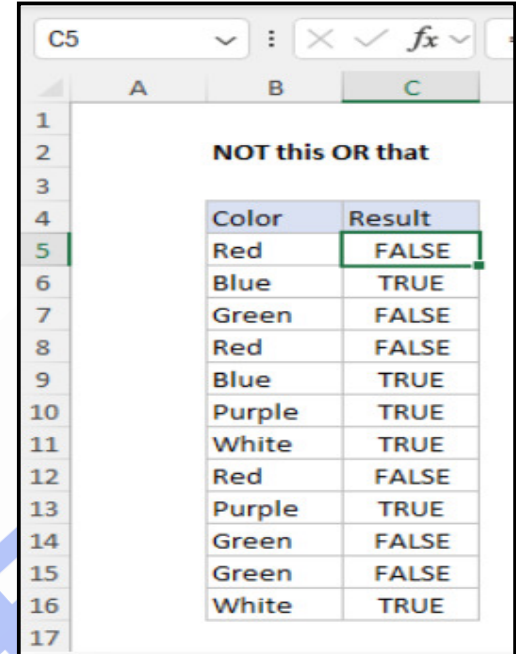
=NOT(1+1=2) returns FALSE (because 1+1=2 is TRUE, and NOT(TRUE) is FALSE).

=NOT(A1="red") returns TRUE if cell A1 does not contain the text "red".

Example - NOT this OR that

In the worksheet below, the goal is to test each color in column B and return TRUE if the color is not "green" or "red". The formula in C5, copied down, is:

=NOT(OR(B5="green",B5="red"))



| Color | Result |
|--------|--------|
| Red | FALSE |
| Blue | TRUE |
| Green | FALSE |
| Red | FALSE |
| Blue | TRUE |
| Purple | TRUE |
| White | TRUE |
| Red | FALSE |
| Purple | TRUE |
| Green | FALSE |
| Green | FALSE |
| White | TRUE |