

Using logical functions in formulas

DATA PREPARATION IN EXCEL



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Logical functions

- Test if a condition is true or false
- With logical functions, we can create conditional formulas
 - Choose conditions
 - Obtain different outputs
- Four logical functions
 - `AND()`
 - `OR()`
 - `NOT()`
 - `IF()`



The AND() function

AND()

- *Syntax:* AND(logical1, [logical2], ...)
- Tests one or more conditions and outputs:
 - TRUE if both conditions met
 - Otherwise, FALSE

Example - Identify records where product is Pears and total revenue is over \$2,500.

Month ▼	Product ▼	Total Revenue ▼	Pears Over \$2,500 ▼
Jan-23	Apples	\$ 1,801	FALSE
Jan-23	Oranges	\$ 4,256	FALSE
Jan-23	Pears	\$ 2,977	TRUE
Feb-23	Apples	\$ 1,415	FALSE
Feb-23	Oranges	\$ 2,243	FALSE
Feb-23	Pears	\$ 4,690	TRUE
Mar-23	Apples	\$ 4,110	FALSE
Mar-23	Oranges	\$ 4,541	FALSE
Mar-23	Pears	\$ 3,561	TRUE

=AND([@Product]="Pears",[@[Total Revenue]]>2500)

The OR() function

OR()

- *Syntax:* OR(logical1, [logical2], ...)
- Tests one or more conditions and outputs:
 - TRUE if at least one condition met
 - Otherwise, FALSE

Example - Identify records where product is Pears or total revenue is over \$2,500.

Month ▼	Product ▼	Total Revenue ▼	Pears Or Over \$2,500 ▼
Jan-23	Apples	\$ 1,801	FALSE
Jan-23	Oranges	\$ 4,256	TRUE
Jan-23	Pears	\$ 2,977	TRUE
Feb-23	Apples	\$ 1,415	FALSE
Feb-23	Oranges	\$ 2,243	FALSE
Feb-23	Pears	\$ 4,690	TRUE
Mar-23	Apples	\$ 4,110	TRUE
Mar-23	Oranges	\$ 4,541	TRUE
Mar-23	Pears	\$ 3,561	TRUE

=OR([@Product]="Pears",[@[Total Revenue]]>2500)

The NOT() function

NOT()

- *Syntax:* NOT(logical)
- Takes one logical argument
- Output is TRUE when the opposite of the condition is true
- Otherwise output is FALSE

Example - Identify records where total revenue is \$2,500 or less.

Month ▼	Product ▼	Total Revenue ▼	\$2,500 or Less ▼
Jan-23	Apples	\$ 1,801	TRUE
Jan-23	Oranges	\$ 4,256	FALSE
Jan-23	Pears	\$ 2,977	FALSE
Feb-23	Apples	\$ 1,415	TRUE
Feb-23	Oranges	\$ 2,243	TRUE
Feb-23	Pears	\$ 4,690	FALSE
Mar-23	Apples	\$ 4,110	FALSE
Mar-23	Oranges	\$ 4,541	FALSE
Mar-23	Pears	\$ 3,561	FALSE

=NOT([@[Total Revenue]]>2500)

The IF() function

IF()

- *Syntax:*

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

- Apply different outcomes based on logical test result

- Real-life scenario - going to the shops
 - Is it raining?
 - Yes - take an umbrella
 - No - leave umbrella at home



Combining logical functions

- Test multiple conditions to find true or false outcomes
- Combine logical functions to create nested formulas
 - Multiple conditions to produce two outcomes

IF plus AND functions

```
=IF(AND(logical1, [logical2], ...),  
[value_if_true], [value_if_false])
```

IF plus OR functions

```
=IF(OR(logical1, [logical2], ...),  
[value_if_true], [value_if_false])
```

IF plus NOT functions

```
=IF(NOT(logical), [value_if_true],  
[value_if_false])
```


Combining IF() functions

- Create nested IF formulas:

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

- Real life scenario - weather check
 - Is it snowing?
 - Yes - wear a winter jacket
 - No - is it raining?
 - Yes - use an umbrella
 - No - wear normal outdoor clothes



Let's practice!

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Logical data preparation

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