



Excel Logical Functions

Student Notes | Master IF, AND, OR, IFS & IFERROR

Each function includes: Syntax | Arguments | Examples | Common Mistakes | Pro Tips

TOPICS COVERED

IF

Returns one value if TRUE, another if FALSE

AND

TRUE only when ALL conditions are TRUE

OR

TRUE when AT LEAST ONE condition is TRUE

IFS

Checks multiple conditions (replaces nested IF)

IFERROR

Catches formula errors and shows a friendly value

⚡ Quick Reference — Logical Functions Cheat Sheet

Function	Syntax	Best Used For	Returns
IF	<code>=IF(test, true_val, false_val)</code>	Simple yes/no decisions	Any value you specify
AND	<code>=AND(cond1, cond2, ...)</code>	ALL conditions must be true	TRUE or FALSE
OR	<code>=OR(cond1, cond2, ...)</code>	AT LEAST ONE condition must be true	TRUE or FALSE
IFS	<code>=IFS(test1,val1, test2,val2, TRUE,default)</code>	Multiple conditions, no nesting needed	First matching value
IFERROR	<code>=IFERROR(formula, value_if_error)</code>	Handle formula errors gracefully	Result or fallback

🔍 AND vs OR — Truth Table

Condition 1	Condition 2	AND Result	OR Result
☑ TRUE	☑ TRUE	☑ TRUE	☑ TRUE
☑ TRUE	✗ FALSE	✗ FALSE	☑ TRUE
✗ FALSE	☑ TRUE	✗ FALSE	☑ TRUE
✗ FALSE	✗ FALSE	✗ FALSE	✗ FALSE

💡 Remember: AND needs ALL true • OR needs ONE true • IFS stops at first TRUE • IFERROR catches any error

IF Function

The most fundamental decision-making function in Excel

WHAT DOES IT DO?

The IF function tests a condition and returns one value when the condition is TRUE and a different value when the condition is FALSE. Think of it as Excel asking a yes/no question and acting accordingly.

SYNTAX

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

ARGUMENTS

Argument	Meaning	Required?
logical_test	The condition you want to evaluate (e.g., A1>50, B2="Yes", C3<>0)	Yes
value_if_true	The value or formula to return when the condition is TRUE	Yes
value_if_false	Value to return when FALSE (if omitted, returns FALSE)	Optional

EXAMPLES

#	Formula	Scenario	Result
1	<code>=IF(A2>=50,"Pass","Fail")</code>	Mark in A2 >= 50? Pass, else Fail	"Pass" or "Fail"
2	<code>=IF(B2>100, B2*0.1, 0)</code>	Sales > 100: 10% bonus, else 0	Numeric value
3	<code>=IF(C2="", "Missing", C2)</code>	If cell is blank show Missing else value	Text or value
4	<code>=IF(D2>90,"A",IF(D2>75,"B",IF(D2>60,"C","D")))</code>	Nested IF to assign A/B/C/D grade	"A","B","C" or "D"

⚠ COMMON MISTAKES TO AVOID

- ✗ Forgetting quotes around text: `=IF(A1=Pass,"Yes","No")` should be `=IF(A1="Pass","Yes","No")`
- ✗ Mismatched parentheses in nested IFs — count your opening and closing brackets carefully
- ✗ Nesting more than 3 IFs without switching to IFS — becomes hard to read and debug

★ PRO TIPS

- ✓ Use IFS instead of deeply nested IFs for cleaner, more readable formulas
- ✓ Use `""` as `value_if_false` to show nothing instead of FALSE or 0
- ✓ Wrap IF with IFERROR: `=IFERROR(IF(...),"Error")` to handle unexpected errors

AND Function

Returns TRUE only when every single condition is TRUE

WHAT DOES IT DO?

AND checks multiple conditions simultaneously and returns TRUE only if ALL conditions are TRUE. If even one condition is FALSE, the entire AND returns FALSE. Most commonly used inside an IF function.

SYNTAX

```
=AND( condition1, condition2, [condition3], ... )
```

ARGUMENTS

Argument	Meaning	Required?
condition1	The first logical condition to evaluate	Yes
condition2	The second logical condition to evaluate	Yes
[condition3...]	Additional conditions — up to 255 conditions allowed	Optional

EXAMPLES

#	Formula	Scenario	Result
1	<code>=AND (A2>=18 , A2<=60)</code>	Check if age is between 18 and 60	TRUE or FALSE
2	<code>=IF (AND (B2="Active" ,C2>1000) ,"VIP" ,"Standard")</code>	Active customer with sales > 1000 = VIP	"VIP" or "Standard"
3	<code>=AND (D2="Yes" ,E2="Yes" ,F2="Yes")</code>	All three approvals must be Yes	TRUE or FALSE

#	Formula	Scenario	Result
4	=IF (AND (G2>=60 ,H2>=60 ,I2>=60) , "Promoted" , "Held Back")	Student passed all 3 subjects	"Promoted"/"Held Back"

⚠ COMMON MISTAKES TO AVOID

- ✗ Using AND alone — combine with IF for useful results: =IF(AND(...),"Yes","No")
- ✗ Confusing AND with OR: AND requires ALL conditions true; OR needs just ONE
- ✗ Using text without quotes: AND(A1=Yes) causes an error; correct: AND(A1="Yes")

★ PRO TIPS

- ✓ AND is perfect for range checks: AND(A1>=10, A1<=100) checks between 10 and 100
- ✓ Combine AND and OR: =IF(AND(A1="Admin",OR(B1="Read",B1="Write")),"OK","Deny")
- ✓ AND accepts up to 255 arguments — great for multi-criteria dashboards

OR Function

Returns TRUE when at least one condition is TRUE

WHAT DOES IT DO?

OR checks multiple conditions and returns TRUE if ANY of them is TRUE. It only returns FALSE when ALL conditions are FALSE. Use it whenever one qualifying condition is enough to trigger a result.

SYNTAX

```
=OR( condition1, condition2, [condition3], ... )
```

ARGUMENTS

Argument	Meaning	Required?
condition1	The first logical condition to evaluate	Yes
condition2	The second logical condition to evaluate	Yes
[condition3...]	Additional conditions — up to 255 conditions allowed	Optional

EXAMPLES

#	Formula	Scenario	Result
1	<code>=OR (A2="Manager" , A2="Director")</code>	Is role Manager OR Director?	TRUE or FALSE
2	<code>=IF (OR (B2<0 , B2>1000) , "Check!" , "OK")</code>	Flag values below 0 or above 1000	"Check!" or "OK"
3	<code>=OR (C2="Cash" , C2="Card" , C2="UPI")</code>	Is payment method valid?	TRUE or FALSE
4	<code>=IF (OR (D2>=90 , E2="Distinction") , "Honours" , "Pass")</code>	Score >= 90 OR has Distinction = Honours	"Honours" or "Pass"

COMMON MISTAKES TO AVOID

- ✗ Mixing up AND and OR logic — draw a truth table when unsure which to use
- ✗ Using OR when you need AND: "score > 60 AND attendance > 75" requires AND, not OR
- ✗ Forgetting quotes around text: OR(A1=Cash) should be OR(A1="Cash")

★ PRO TIPS

- ✓ OR is ideal for validating allowed values: =IF(OR(A1="Yes",A1="No"),"Valid","Invalid")
- ✓ Combine OR with NOT: =IF(NOT(OR(A1="X",A1="Y")), "Allowed", "Blocked")
- ✓ Use OR in conditional formatting to highlight rows meeting any of several conditions

IFS Function

Multiple conditions without messy nested IFs (Excel 2019+)

WHAT DOES IT DO?

IFS tests conditions one by one from left to right and returns the value for the FIRST condition that is TRUE. It completely eliminates nested IF statements, making formulas much easier to read, write, and maintain.

SYNTAX

```
=IFS( test1, value1, test2, value2, [test3, value3], ... )
```

ARGUMENTS

Argument	Meaning	Required?
test1	First condition to evaluate	Yes
value1	Value to return if test1 is TRUE	Yes
test2, value2	Second condition and its return value	Yes
[test3, val3...]	Additional condition-value pairs, up to 127 pairs	Optional

EXAMPLES

#	Formula	Scenario	Result
1	<code>=IFS (A2>=90 , "A" , A2>=75 , "B" , A2>=60 , "C" , A2>=40 , "D" , TRUE , "F")</code>	Grade based on score — 5 bands	"A","B","C","D" or "F"
2	<code>=IFS (B2="North" , 1000 , B2="South" , 800 , B2="East" , 900 , TRUE , 700)</code>	Regional target by zone	Numeric target
3	<code>=IFS (C2<18 , "Junior" , C2<35 , "Young Adult" , C2<60 , "Adult" , TRUE , "Senior")</code>	Age group classification	Age category
4	<code>=IFS (D2="A" , 5 , D2="B" , 4 , D2="C" , 3 , D2="D" , 2 , TRUE , 1)</code>	Letter grade to grade points	Grade points 1-5

 COMMON MISTAKES TO AVOID

- ✗ Not adding a TRUE catch-all at the end — if no condition matches, IFS returns #N/A error
- ✗ Wrong order: `IFS(A1>=60,"Pass",A1>=80,"Merit")` — Merit is never reached! Put `>=80` first
- ✗ IFS is not available in Excel 2016 or earlier — use nested IF as fallback

 PRO TIPS

- ✓ Always add TRUE as the last test with a default: `IFS(..., TRUE, "Other")` to avoid #N/A
- ✓ Order matters — put the most specific (highest/lowest) condition FIRST
- ✓ Combine IFS with AND/OR: `IFS(AND(A1>50,B1>50),"Both Pass",...)` for compound logic

IFERROR Function

Catch and handle formula errors gracefully

WHAT DOES IT DO?

IFERROR checks if a formula produces an error. If an error occurs (#VALUE!, #DIV/0!, #N/A, #REF!, #NAME?, #NUM!), it returns your chosen alternative value. If there is no error, it returns the original formula result normally.

SYNTAX

```
=IFERROR( value, value_if_error )
```

ARGUMENTS

Argument	Meaning	Required?
value	The formula or expression to evaluate for errors	Yes
value_if_error	Value to return if an error is detected (text, number, or formula)	Yes

EXAMPLES

#	Formula	Scenario	Result
1	<code>=IFERROR(A2/B2, 0)</code>	Divide A2 by B2; return 0 if B2 is zero	Number or 0
2	<code>=IFERROR(VLOOKUP(C2,D:E,2,0),"Not Found")</code>	VLOOKUP; show Not Found if no match (#N/A)	"Not Found" or value
3	<code>=IFERROR(A2/SUM(B2:B10),"N/A")</code>	Percentage share; N/A if sum is zero	Percent or "N/A"
4	<code>=IFERROR(INDEX(MATCH(F2,G:G,0)),"-")</code>	INDEX-MATCH with dash fallback on any error	Value or "-"

COMMON MISTAKES TO AVOID

- ✗ Using IFERROR to hide genuine formula mistakes — fix the formula first, then add IFERROR
- ✗ Leaving value_if_error blank — this returns 0 which may be confused with a real zero

✗ Using ISERROR instead: =IF(ISERROR(formula),alt,formula) is longer and less clean

★ PRO TIPS

- ✓ Use IFNA instead of IFERROR when you only want to catch #N/A errors (e.g., from VLOOKUP)
- ✓ Return "" (empty string) to show nothing on error instead of 0 or FALSE
- ✓ Always place IFERROR as the outermost function so it catches all errors in the formula