

Excel IF Function

- The logical functions in Excel are a small group consisting of six functions
- These functions are noted for their black-or-white results
- A logical function can return only one of two values: **TRUE** or **FALSE**

Excel IF Function

- The operators in the logical_test of the IF function is may be:

=	Equals to
<>	Not Equals to
>	Greater than
>=	Greater than or equal to
<	Less than
<=	Less than or equal to

The logical test: 100<>100 returns **FALSE**
 3*6>=2^3 returns **TRUE**

Excel IF Function

- The most common and powerful of the logical functions in Excel is the **IF** function
- This function is particularly powerful because it can test for a particular condition in the worksheet and:
 - do a calculation if the condition is **TRUE**; or
 - another calculation if the condition is **FALSE**

Excel IF Function

- Consider the following IF function:

=IF(B2>=1000,100,50)

- If the logical_test is **TRUE**, or in other words if the value of B2 is greater than or equal to 1000, than the function returns a value of 100
- If the logical_test is **FALSE**, or in other words if the value of B2 is not greater than or equal to 1000, than the function returns a value of 50

Excel IF Function

- The format of the IF function is:

IF(logical_test, value_if_true, value_if_false)

- logical_test is any value or expression that can be evaluated to **TRUE** or **FALSE**
- value_if_true is the value that is returned if logical_test is **TRUE**
- value_if_false is the value that is returned if logical_test is **FALSE**
- value_if_true and/or value_if_false can be another formula

Excel IF Function

- Consider the following IF function:

=IF(B2>=1000,B2*0.1,B2*0.05)

- If the Logical_test is **TRUE**, or in other words if the value of B2 is greater than or equal to 1000, than the function returns 10% of B2
- If the Logical_test is **FALSE**, or in other words if the value of B2 is not greater than or equal to 1000, than the function returns 5% of B2

Excel IF Function

➤ Consider the following IF function:

=IF(B2>=1000,"A \$1000 or better", "Less than a grand")

- If the value of B2 is greater than or equal to 1000, than the function returns the string "A \$1000 or better"
- If the value of B2 is not greater than or equal to 1000, than the function returns the string "Less than a grand"
- When you use text as the value_if_true or the value_if_false arguments, you must enclose the text in a pair of double quotation marks (" ")

Excel IF Function

IF(Score>89,"A",IF(Score>79,"B",IF(Score>69,"C",IF(Score>59,"D","F"))))

- If the first logical_test (Score>89) is TRUE, "A" is returned
- If the first logical_test is FALSE, the second IF statement is evaluated
- If the second logical_test (Score>79) is TRUE, "B" is returned
- If the second logical_test is FALSE, the third IF statement is evaluated, and so on
- Up to seven IF functions can be nested together in one function

Excel IF Function

➤ Consider the following IF function:

=IF(A10=100,SUM(B5:B15),"")

- If the value of A10 is equal to 100, than the function returns the sum of the values in cells B5 to B15
- If the value of A10 is not equal to 100, than the function returns a blank string ""

Excel AND Function

➤ The format of the AND function is:

AND(logical1, logical2, . . .)

- Returns TRUE if all the logical arguments are TRUE
- Returns FALSE if one or more arguments is FALSE
- Up to 30 conditions you want to test that can be either TRUE or FALSE

Excel IF Function

➤ Suppose you want to assign letter grades to numbers referenced by the name Score. See the following table.

If Score is	Then return
Greater than 89	A
From 80 to 89	B
From 70 to 79	C
From 60 to 69	D
Less than 60	F

IF(Score>89,"A",IF(Score>79,"B",IF(Score>69,"C",IF(Score>59,"D","F"))))

Excel AND Function

➤ Suppose you want to display B4 if it contains a number strictly between 1 and 100, and you want to display a message if it is not.

IF(AND(1<B4, B4<100), B4, "The value is out of range.")

- If B4 contains 104, then the value of the IF function is "The value is out of range."
- If B4 contains 50, then the value of the IF function is 50

Excel OR Function

- The format of the OR function is:

OR(logical1, logical2, . . .)

- Returns **TRUE** if any logical arguments is **TRUE**
- Returns **FALSE** if all arguments are **FALSE**
- Up to 30 conditions you want to test that can be either **TRUE** or **FALSE**

Excel IF Function Problem

- Use the IF function to compute the value of the deflection if:

W is in cell A4 a is in cell B6
E is in cell A5 x is in cell B8
I is in cell A6

$$y = \frac{Wx^2}{6EI}(3a - x) \quad \text{for } x \leq a$$

$$y = \frac{Wx^2}{6EI}(3x - a) \quad \text{for } x > a$$

Excel Logical Functions

IF	Specifies a logical test to perform
AND	Returns TRUE if all its arguments are TRUE
OR	Returns TRUE if any argument is TRUE
NOT	Reverses the logic of its argument
FALSE	Returns the logical value FALSE
TRUE	Returns the logical value TRUE

Excel IF Function Problem

- Use the IF function to compute the value of the deflection if:

W is in cell A4 a is in cell B6
E is in cell A5 x is in cell B8
I is in cell A6

$$=IF(B8 \leq B6, A4 * B8^2 * (3 * B6 - B8) / (6 * A5 * A6), A4 * B8^2 * (3 * B8 - B6) / (6 * A5 * A6))$$

Excel IF Function Problem

- The deflection of a cantilever beam is given by the following

$$y = \frac{Wx^2}{6EI}(3a - x) \quad \text{for } x \leq a$$

$$y = \frac{Wx^2}{6EI}(3x - a) \quad \text{for } x > a$$

where y is the deflection of the beam,
 W is the applied load,
 a is the location of the load,
 E is the modulus of elasticity, and
 I is the moment of inertia

Excel Logical Functions

Questions?

