Using the IF Function

The If function allows users to make logical comparisons between values, returning a value of either True, or False. Based on the result of the logical comparison, the if function can carry out a specific operation, based on a true or false value.

The syntax for an if function is: **=IF(logical_test, value_if_ture, value_if_false)**

- **Logical test**: any value or expression that can return a TRUE or FALSE
- **Value_if_true**: The value to be returned, or operation to be performed, if the condition is TRUE.
    - o This can be text (must be in double quotes "text"), a number, or a function.
- **Value_if_false**: The value to be returned, or operation to be performed, if the condition is FALSE.
    - o This can be text (must be in double quotes "text"), a number, or a function.

Simply put, the if function is:

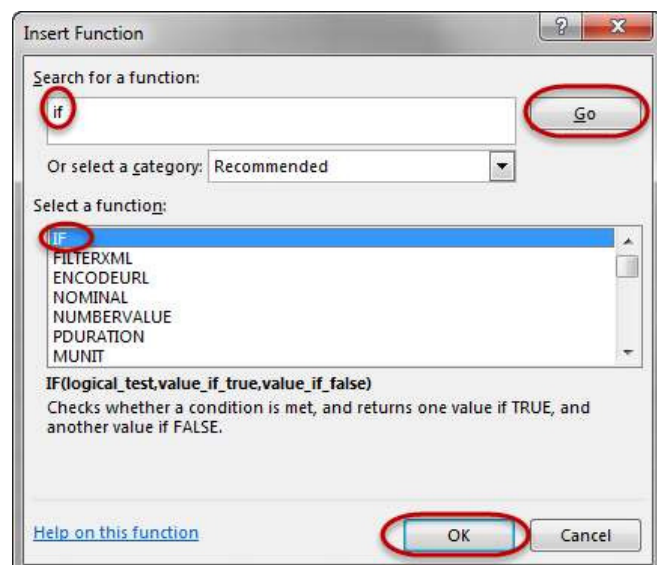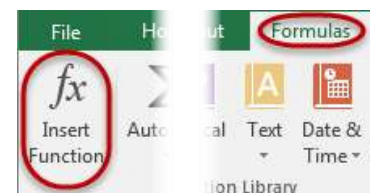IF(Comparison, if true then perform this action, otherwise do something else).

Excel Comparison Operators

Comparison Operator

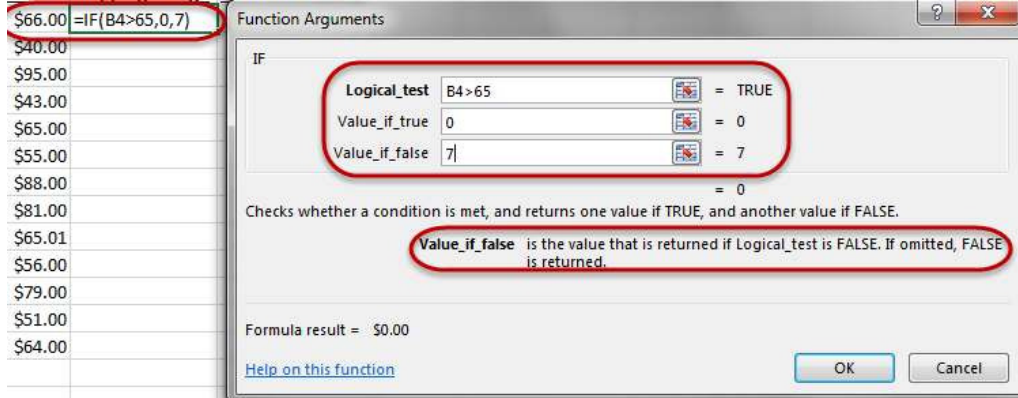- = (equal sign)
- \> (greater than sign)
- < (less than sign)
- \>= (greater than or equal to sign)
- <= (less than or equal to sign)
- <> (not equal to sign)

Steps for an If Statement:

1. Place cursor in the cell that will contain the If Statement.
2. Navigate to the Formulas tab, and click on the Insert Function icon.

3. Within the Insert Function window, search for If in the search textbox and hit the Go Button.

4. Select the if function from the select a function box. Select it by either double clicking on it or by selecting it and clicking the OK button

5. In the Functions Argument window, we are able to see each argument of the if function. For the logical test, we want to select the Cell that we are comparing.

$66.00	=IF(B4>65,0,7)
$40.00	
$95.00	
$43.00	
$65.00	
$55.00	
$88.00	
$81.00	
$65.01	
$56.00	
$79.00	
$51.00	
$64.00	

Function Arguments

IF

Logical_test	B4>65		= TRUE
Value_if_true	0		= 0
Value_if_false	7		= 7
			= 0

Checks whether a condition is met, and returns one value if TRUE, and another value if FALSE.

Value_if_false is the value that is returned if Logical_test is FALSE. If omitted, FALSE is returned.

Formula result = $0.00

Help on this function   OK   Cancel

6. Value_if_true. What do we want to happen if our argument is True?
   a. This can be as simple as a number, text(must be in quotes ""), an arithmetic function, or even another function entirely.
7. Value_if_false. What do we want to happen if our argument is False?
   a. This can be as simple as a number, text (must be in quotes ""), an arithmetic function, or even another function entirely.
8. When we have all of our arguments filled out, click on the OK button and our function is now complete.
9. To copy this function to the remaining cells, click back on the cell that contains the original function. Move your mouse into the lower right corner until your mouse turns into a dark plus sign.

Order Total	Shipping Charge	T
$66.00	$0.00	

10. Click and hold with your mouse as you drag to the bottom of the rest of the data. The function has now been copied to all of the other cells.

Best practices with if statements

Generally, it is not good practice to put static values (values that may need to change from time to time) directly into functions in Excel. The main reason for this is because if a change ever has to be made, the values can be hard to find and change. It is best to put these values into their own individual cell, and then reference the cell containing the value in the function. This way, any time the values has to change, the referenced cell's value is changed and all functions related to that function are now updated immediately. There isn't a need to search for each function to update them.

Display a formula with color coded cell references

When troubleshooting a function while in Excel, hit the F2 key. This will display all arguments in a function as color coded cell references and cells.

$10,000					
1.50%					

	Sa		Total sales	Commission	Training completed		Year-end
Qtr1	Q	4					
$2,500	$	400	$8,500	$0	=IF(AND(H9="yes",F9>B4),F9*B5,"")		

Cell References

When creating functions in Excel, users must know that there are two different cell reference types, Relative and Absolute.

Relative cell reference

It is important to understand how Excel identifies cells in formulas. By default, all cell references are relative references, which means the function is related to the cells around it.   As a function is copied across multiple cells, it is updated based on the relative position of rows and columns.

The way Excel reads a function is by looking at the relationship of the cell references in relation to the cell containing the function. For example, in the function contained in cell C3 to the right, Excel reads this as "take the number located two cells to the left and add that to the number in the cell located one column to the left". Therefore, when this function (which appears as =A2+B2) is copied to the cell below, it performs the calculation using the same pattern, "take the number located two cells to the left and add that to the number in the cell located one column to the left", but updates the formula to reflect the appropriate cell addresses. This is called a Relative Reference and is the feature that enables users to copy the same function to a different location within a worksheet.

	A	B	C	
1	Dept A	Dept B	Totals	
2	100	300	400	=A2+B2
3	200	400	600	=A3+B3

Absolute cell reference

An absolute reference is a reference to a particular cell, or range of cells, that never updates as the function is copied to a new location. Absolute references can be made to an individual cell, or to keep a row or a column constant as the function is copied to a new location.

To make a cell reference absolute so that it will not adjust when a formula is copied, insert a dollar sign ($) in the appropriate position. By navigating into the formula in the Formula bar, users can cycle through the absolute reference options by hitting the F4 key on the keyboard. The first time the F4 key is pressed, a user will create an absolute reference to the cell reference in the function, the second time the reference will be to the row only, and the third time the reference will be to a particular column.

X ✓ *fx*   =B5/B12

Position the cursor in the cell reference that you want to change

Press the F4 key one time   =B5/B12

Two times   =B5/B$12

Three times   =B5/$B12

Example 1: B12   Both the Row and the Column are held Constant

Example 2: B$12   The Row is held constant; the Column will update as the function is copied.

Example3: $B12   The Column is constant; the Row will update as the function is copied.

Using OR & AND Functions

The And & Or functions are great functions to use within an if function because they will return a value of either True or False, which is what the first portion of an if statement needs in order to complete the function.

The And and Or functions will allow for multiple logical expressions to be created within the argument of the function. Each logical expression must be separated by a comma.

And Function

The And function is used to check multiple logical expressions and will return a True value if every one of the logical expressions is true.

The syntax is; **=AND(logical1,[logical2],…)**

OR Function

The OR function is used to check multiple logical expressions and will return a True value as long as one of the logical expressions is true.
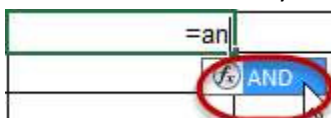
The syntax is; **=OR(logical1,[logical2],…)**

Nesting an AND or OR function into an If function

The easiest to incorporate an AND or OR function into an if function is to first start with the And or Or Function and then incorporate the function into the logical_test argument of an IF function.
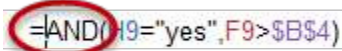
Steps to create a nested AND or OR function within an IF function;

1. Navigating to the cell to contain the IF function and type in an equal sign, followed by AND. Select the AND function by double clicking on it, or using the arrow keys to select the function and then hit the tab key.

2. When the function has been selected, type in the first logical expression. When the first logical has been entered, type in a comma to enter in the second, third, fourth, etc. logical expression, making sure each expression is separated by a comma.
3. When the AND function is complete, finish the function by entering in a closed bracket).
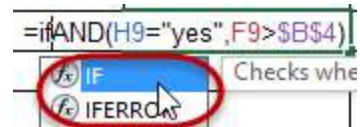
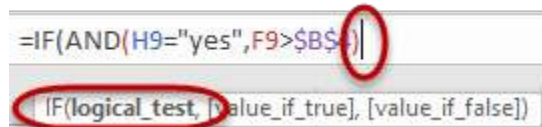4. Now, use the mouse and place the cursor between the equal sign and the A in the front of the AND function.

=AND(H9="yes",F9>B4)

   a. Users may also use the formula bar to do this, as it may be easier to access the first portion of the function in the formula bar.
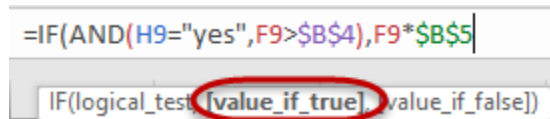
X ✓ f_x AND(H9="yes",F9>B4)

5. With the cursor between the equal sign and the A, start typing if. Excel will populate a list of functions under the cell. Either double click on the If function, or use the arrow keys to highlight IF and then hit the tab key.

=ifAND(H9="yes",F9>B4)
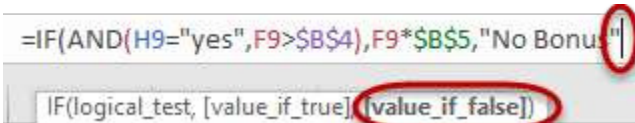IF   Checks whe
IFERROR

6. Excel will now display the arguments for the IF function underneath the cell, or the formula bar, depending on where the user is working. The argument that will be bolded will be the logical_test, which has already been completed with the AND function. To enter in to the second portion, value_if_true, of the expression, move the cursor to the far right of the AND function, after the closed bracket and type in a comma.

=IF(AND(H9="yes",F9>B)
IF(logical_test, [value_if_true], [value_if_false])

7. Enter in what is to be done if the AND function is true, then type a comma to get to the last portion of the IF function, the value_if_false.

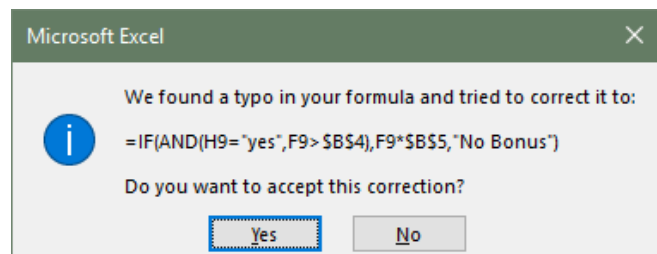=IF(AND(H9="yes",F9>B4),F9*B5
IF(logical_test, [value_if_true], [value_if_false])

8. Enter in what is to be done if the AND function is false.

=IF(AND(H9="yes",F9>B4),F9*B5,"No Bonus"
IF(logical_test, [value_if_true], [value_if_false])

9. When all arguments have been fulfilled, hit the type in a closed bracket to complete the function.

   a. **Note:** Users may hit the Enter key to complete the function, which may result in the following error;

   b. This error is just notifying the user that the last closed bracket is missing. By accepting this error, Excel will insert the closed bracket to complete the function.

Microsoft Excel   X

i We found a typo in your formula and tried to correct it to:

=IF(AND(H9="yes",F9>B4),F9*B5,"No Bonus")

Do you want to accept this correction?

Yes   No