EXCEL TRAINING – DAY 2

CONDITIONAL FUNCTIONS

IF FUNCTION

- The IF function is one of the most popular functions in Excel, and it allows you to make logical comparisons between a value and what you expect.

Syntax

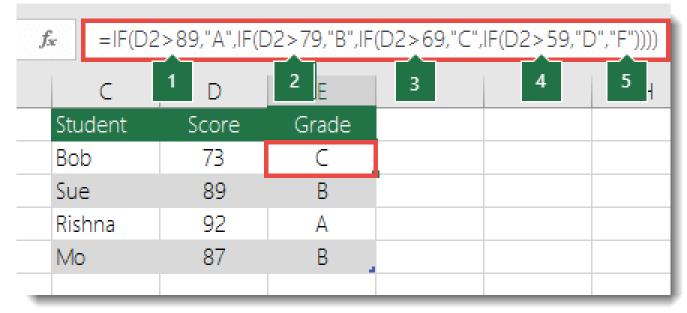- IF(logical_test, value_if_true, [value_if_false])

- For example:

  =IF(A2>B2,"Over Budget","OK")

  =IF(A2=B2,B4-A4,"")

Argument name	Description
logical_test (required)	The condition you want to test.
value_if_true (required)	The value that you want returned if the result of **logical_test** is TRUE.
value_if_false (optional)	The value that you want returned if the result of **logical_test** is FALSE.

NESTED IF FUNCTION

fx =IF(D2>89,"A",IF(D2>79,"B",IF(D2>69,"C",IF(D2>59,"D","F"))))

			1		2		3		4		5	
	C		D		E							H

Student	Score	Grade
Bob	73	C
Sue	89	B
Rishna	92	A
Mo	87	B

=IF(D2>89,"A",IF(D2>79,"B",IF(D2>69,"C",IF(D2>59,"D","F"))))

This complex nested IF statement follows a straightforward logic:

1. If the Test Score (in cell D2) is greater than 89, then the student gets an A

2. If the Test Score is greater than 79, then the student gets a B

3. If the Test Score is greater than 69, then the student gets a C

4. If the Test Score is greater than 59, then the student gets a D

5. Otherwise the student gets an F

IF FUNCTION WITH AND, OR, NOT FUNCTIONS

- The IF function allows you to make a logical comparison between a value and what you expect by testing for a condition and returning a result if that condition is True or False.

  =IF(Something is True, then do something, otherwise do something else)

- But what if you need to test multiple conditions, where let's say all conditions need to be True or False (AND), or only one condition needs to be True or False (OR), or if you want to check if a condition does NOT meet your criteria? All 3 functions can be used on their own, but it's much more common to see them paired with IF functions.

- When you combine each one of them with an IF statement, they read like this:

- AND – =IF(AND(Something is True, Something else is True), Value if True, Value if False)

- OR – =IF(OR(Something is True, Something else is True), Value if True, Value if False)

- NOT – =IF(NOT(Something is True), Value if True, Value if False)

IF FUNCTION WITH AND, OR, NOT FUNCTIONS

	A	B	C	D
1	Value 1	Value 2	IF/AND/OR/NOT	Formula
2	25	75	TRUE	=IF(AND(A2>0,B2<100),TRUE, FALSE)
3	Blue	Green	FALSE	=IF(AND(A3="Red",B3="Green"),TRUE,FALSE)
4	25	75	TRUE	=IF(OR(A4>0,B4<50),TRUE, FALSE)
5	Blue	Green	TRUE	=IF(OR(A5="Red",B5="Green"),TRUE,FALSE)
6	25		TRUE	=IF(NOT(A6>50),TRUE,FALSE)
7	Blue		TRUE	=IF(NOT(A7="Red"),TRUE,FALSE)

Formula	Description
=IF(AND(A2>0,B2<100),TRUE, FALSE)	IF A2 (25) is greater than 0, AND B2 (75) is less than 100, then return TRUE, otherwise return FALSE. In this case both conditions are true, so TRUE is returned.
=IF(AND(A3="Red",B3="Green"),TRUE,FALSE)	If A3 ("Blue") = "Red", AND B3 ("Green") equals "Green" then return TRUE, otherwise return FALSE. In this case only the first condition is true, so FALSE is returned.
=IF(OR(A4>0,B4<50),TRUE, FALSE)	IF A4 (25) is greater than 0, OR B4 (75) is less than 50, then return TRUE, otherwise return FALSE. In this case, only the first condition is TRUE, but since OR only requires one argument to be true the formula returns TRUE.
=IF(OR(A5="Red",B5="Green"),TRUE,FALSE)	IF A5 ("Blue") equals "Red", OR B5 ("Green") equals "Green" then return TRUE, otherwise return FALSE. In this case, the second argument is True, so the formula returns TRUE.
=IF(NOT(A6>50),TRUE,FALSE)	IF A6 (25) is NOT greater than 50, then return TRUE, otherwise return FALSE. In this case 25 is not greater than 50, so the formula returns TRUE.
=IF(NOT(A7="Red"),TRUE,FALSE)	IF A7 ("Blue") is NOT equal to "Red", then return TRUE, otherwise return FALSE.

IFS FUNCTION

- The IFS function checks whether one or more conditions are met, and returns a value that corresponds to the first TRUE condition. IFS can take the place of multiple nested IF statements, and is much easier to read with multiple conditions.

Syntax

- Generally, the syntax for the IFS function is:

- =IFS([Something is True1, Value if True1, Something is True2, Value if True2, Something is True3, Value if True3)

- Please note that the IFS function allows you to test up to 127 different conditions.

IFS FUNCTION EXAMPLE

The formula for cells A2:A6 is:
=IFS(A2>89,"A",A2>79,"B",A2>69,"C",A2>59,"D",TRUE,"F")

Which says *IF(A2 is Greater Than 89, then return a "A", IF A2 is Greater Than 79, then return a "B", and so on and for all other values less than 59, return an "F").*

VLOOKUP FUNCTION

VLOOKUP FUNCTION

Use VLOOKUP when you need to find things in a table or a range by row. For example, look up a price of an automotive part by the part number, or find an employee name based on their employee ID.

Syntax

- VLOOKUP (lookup_value, table_array, col_index_num, [range_lookup])
- For example:
  =VLOOKUP(A2,A10:C20,2,TRUE)
  =VLOOKUP("Fontana",B2:E7,2,FALSE)
  =VLOOKUP(A2,'Client Details'!A:F,3,FALSE)

VLOOKUP FUNCTION

Argument name	Description
lookup_value (required)	The value you want to look up. The value you want to look up must be in the first column of the range of cells you specify in the **table_array** argument. For example, if **table-array** spans cells B2:D7, then your lookup_value must be in column B. **Lookup_value** can be a value or a reference to a cell.
table_array (required)	The range of cells in which the VLOOKUP will search for the **lookup_value** and the return value. You can use a named range or a table, and you can use names in the argument instead of cell references. The first column in the cell range must contain the **lookup_value**. The cell range also needs to include the return value you want to find. Learn how to select ranges in a worksheet.
col_index_num (required)	The column number (starting with 1 for the left-most column of **table_array**) that contains the return value.
range_lookup (optional)	A logical value that specifies whether you want **VLOOKUP** to find an approximate or an exact match: •**Approximate match - 1/TRUE** assumes the first column in the table is sorted either numerically or alphabetically, and will then search for the closest value. This is the default method if you don't specify one. For example, =VLOOKUP(90,A1:B100,2,TRUE). •**Exact match - 0/FALSE** searches for the exact value in the first column. For example, =VLOOKUP("Smith",A1:B100,2,FALSE).

VLOOKUP FUNCTION - EXAMPLES

	A	B	C	D	E
1	ID	Last name	First name	Title	Birth date
2	101	Davis	Sara	Sales Rep	12/08/68
3	102	Fontana	Olivier	VP (Sales)	02/19/52
4	103	Leal	Karina	Sales Rep	08/30/63
5	104	Patten	Michael	Sales Rep	09/19/58
6	105	Burke	Brian	Sales Manager	03/04/55
7	106	Sousa	Luis	Sales Rep	07/02/63
8					
9					
10	Formula	=VLOOKUP(B3,B2:E7,2,FALSE)			
11	Result	Olivier			
12					

VLOOKUP looks for *Fontana* in the first column (column B) in table_array B2:E7, and returns *Olivier* from the second column (column C) of the table_array. FALSE returns an exact match.

VLOOKUP FUNCTION - EXAMPLES

	A	B	C	D	E
1	ID	Last name	First name	Title	Birth date
2	101	Davis	Sara	Sales Rep	12/08/68
3	102	Fontana	Olivier	VP (Sales)	02/19/52
4	103	Leal	Karina	Sales Rep	08/30/63
5	104	Patten	Michael	Sales Rep	09/19/58
6	105	Burke	Brian	Sales Manager	03/04/55
7	106	Sousa	Luis	Sales Rep	07/02/63
8					
9					
10	Formula	=VLOOKUP(102,A2:C7,2,FALSE)			
11	Result	Fontana			

VLOOKUP looks for an exact match (FALSE) of the last name for 102 (lookup_value) in the second column (column B) in the A2:C7 range, and returns *Fontana*.

VLOOKUP FUNCTION - EXAMPLES

▲	A	B	C	D	E
1	ID ▼	Last name ▼	First name ▼	Title ▼	Birth date ▼
2	101	Davis	Sara	Sales Rep	12/08/68
3	102	Fontana	Olivier	VP (Sales)	02/19/52
4	103	Leal	Karina	Sales Rep	08/30/63
5	104	Patten	Michael	Sales Rep	09/19/58
6	105	Burke	Brian	Sales Manager	03/04/55
7	106	Sousa	Luis	Sales Rep	07/02/63
8		IF checks to see if VLOOKUP returns *Sousa* as the last name of employee corresponding to 103 (lookup_value) in A1:E7 (table_array). Because the last name corresponding to 103 is *Leal*, the IF condition is false, and *Not found* is displayed.				
9					
10	Formula	=IF(VLOOKUP(103,A1:E7,2,FALSE)="Sousa","Located","Not found")			
11	Result	Not found			

14

VLOOKUP FUNCTION - EXAMPLES

	A	B	C	D	E
1	ID	Last name	First name	Title	Birth date
2	101	Davis	Sara	Sales Rep	12/08/68
3	102	Fontana	Olivier	VP (Sales)	02/19/52
4	103	Leal	Karina	Sales Rep	08/30/63
5	104	Patten	Michael	Sales Rep	09/19/58
6	105	Burke	Brian	Sales Manager	03/04/55
7	106	Sousa	Luis	Sales Rep	07/02/63
8					
9					
10	Formula	=INT(YEARFRAC(DATE(2014,6,30), VLOOKUP(105,A2:E7,5, FALSE), 1))			
11	Result	59			

VLOOKUP looks for the birth date of the employee corresponding to 105 (lookup_value) in the A2:E7 range (table_array), and returns 03/04/1955. Then, YEARFRAC subtracts this birth date from 2014/6/30 and returns a value, which is then converted by INT to the integer 59.

VLOOKUP FUNCTION - EXAMPLES

	A	B	C	D	E
1	ID	Last name	First name	Title	Birth date
2	101	Davis	Sara	Sales Rep	12/08/68
3	102	Fontana	Olivier	VP (Sales)	02/19/52
4	103	Leal	Karina	Sales Rep	08/30/63
5	104	Patten	Michael	Sales Rep	09/19/58
6	105	Burke	Brian	Sales Manager	03/04/55
7	106	Sousa	Luis	Sales Rep	07/02/63
8					
9					
10	Formula	=INT(YEARFRAC(DATE(2014,6,30), VLOOKUP(105,A2:E7,5, FALSE), 1))			
11	Result	59			

VLOOKUP looks for the birth date of the employee corresponding to 105 (lookup_value) in the A2:E7 range (table_array), and returns 03/04/1955. Then, YEARFRAC subtracts this birth date from 2014/6/30 and returns a value, which is then converted by INT to the integer 59.

VLOOKUP FUNCTION - EXAMPLES

	A	B	C	D	E
1	ID	Last name	First name	Title	Birth date
2	101	Davis	Sara	Sales Rep	12/08/68
3	102	Fontana	Olivier	VP (Sales)	02/19/52
4	103	Leal	Karina	Sales Rep	08/30/63
5	104	Patten	Michael	Sales Rep	09/19/58
6	105	Burke	Brian	Sales Manager	03/04/55
7	106	Sousa	Luis	Sales Rep	07/02/63
8					
9					
10	Formula	=IF(ISNA(VLOOKUP(105,A2:E7,2,FALSE)) = TRUE, "Employee not found", VLOOKUP(105,A2:E7,2,FALSE))			
11	Result	Burke			
12					
13					
14					

IF checks to see if VLOOKUP returns a value for last name from column B for 105 (lookup_value). If VLOOKUP finds a last name, then IF will display the last name, otherwise IF returns *Employee not found*. ISNA makes sure that if VLOOKUP returns #N/A, then the error is replaced by *Employee not found*, instead of #N/A.

In this example, the return value is *Burke*, which is the last name corresponding to 105.

USING INDEX AND MATCH INSTEAD OF VLOOKUP

USING INDEX AND MATCH INSTEAD OF VLOOKUP

- There are certain limitations with using VLOOKUP—the VLOOKUP function can only look up a value from left to right. This means that the column containing the value you look up should always be located to the left of the column containing the return value.

	A	B	C	D
1	Rank	City	State	Population
2	1	New York	NY	8,175,133
3	2	Los Angeles	CA	3,792,621
4	3	Chicago	IL	2,695,598
5	4	Houston	TX	2,099,451
6	5	Philadelphia	PA	1,526,006
7	6	Phoenix	AZ	1,445,632
8	7	San Antonio	TX	1,327,407
9	8	San Diego	CA	1,307,402
10	9	Dallas	TX	1,197,816
11	10	San Jose	CA	945,942
12				
13				2,695,598
14	=INDEX(A1:D11,MATCH("Chicago",B1:B11,0),4)			
15				

INDEX FUNCTION

Returns the value of an element in a table or an array, selected by the row and column number indexes.

Syntax

- INDEX(array, row_num, [column_num])

The array form of the INDEX function has the following arguments:

- Array – Required. A range of cells or an array constant.
  - If array contains only one row or column, the corresponding row_num or column_num argument is optional.
  - If array has more than one row and more than one column, and only row_num or column_num is used, INDEX returns an array of the entire row or column in array.

- row_num – Required, unless column_num is present. Selects the row in array from which to return a value. If row_num is omitted, column_num is required.

- column_num – Optional. Selects the column in array from which to return a value. If column_num is omitted, row_num is required.

Remarks

- If both the row_num and column_num arguments are used, INDEX returns the value in the cell at the intersection of row_num and column_num.

- row_num and column_num must point to a cell within array; otherwise, INDEX returns a #REF! error.

INDEX FUNCTION EXAMPLE

G7 =INDEX(B5:E13,5,3) ←

INDEX function

	1	2	3	4
	Planet	Position	Diameter	Satelites
1	Mercury	1	4,879	0
2	Venus	2	12,104	0
3	Earth	3	12,756	1
4	Mars	4	6,792	2
5	Jupiter	5	142,984	67
6	Saturn	6	120,536	200
7	Uranus	7	51,118	27
8	Neptune	8	49,528	13
9	Pluto	9	2,306	5

142,984

Jupiter's diameter = row 5, column 3

MATCH FUNCTION

The MATCH function searches for a specified item in a range of cells, and then returns the relative position of that item in the range.

Syntax

- MATCH(lookup_value, lookup_array, [match_type])

The MATCH function syntax has the following arguments:

- lookup_value – Required. The value that you want to match in lookup_array. For example, when you look up someone's number in a telephone book, you are using the person's name as the lookup value, but the telephone number is the value you want.
    - The lookup_value argument can be a value (number, text, or logical value) or a cell reference to a number, text, or logical value.

- lookup_array – Required. The range of cells being searched.

- match_type – Optional. The number -1, 0, or 1. The match_type argument specifies how Excel matches lookup_value with values in lookup_array. The default value for this argument is 1.

MATCH FUNCTION EXAMPLE

INDEX MATCH FUNCTION TOGETHER

- The INDEX MATCH[1] Formula is the combination of two functions in Excel: INDEX and MATCH.

=INDEX() returns the value of a cell in a table based on the column and row number.

=MATCH() returns the position of a cell in a row or column.

- Combined, the two formulas can look up and return the value of a cell in a table based on vertical and horizontal criteria. For short, this is referred to as just the Index Match function.

THANK YOU