1 GETPIVOTDATA

The `GETPIVOTDATA` function in Excel is used to extract data from a pivot table.

FUNCTION 1
In this function, `GETPIVOTDATA` will retrieve the "**Amount**" data for the "**Product**" specified in cell `B15` from the pivot table located in cell `A3`.

FUNCTION 2
In this function, `GETPIVOTDATA` will retrieve the "**Amount**" data for the "**Country**" specified in cell `B18` from the pivot table located in cell `A3`.

FUNCTION 3
In this function, `GETPIVOTDATA` will retrieve the "**Amount**" data for the "**Product**" specified in cell `B21` and the "**Country**" specified in cell `B22` from the pivot table located in cell `A3`.

2 HLOOKUP

The `HLOOKUP` function in Excel is a way to search for a value in the top row of a table and return a value from a specified row in the table.

FUNCTION 1

In this function, `HLOOKUP` will search the top row of the table **($G$1:$I$3)** for the value in cell **B2**, and return the value from the **2nd row** of the table. If the value in **B2** is not found in the top row of the table, the function will return an error.

FUNCTION 2

In this function, `HLOOKUP` will search the top row of the table **($G$1:$I$3)** for the value in cell **B2**, and return the value from the **3rd row** of the table. If the value in **B2** is not found in the top row of the table, the function will return an error.

FUNCTION 3

In this function, `HLOOKUP` will search the top row of the table **(A17:E25)** for the value in cell **H19**, and return the value from the **4th row** of the table. If the value in **H19** is not found in the top row of the table, the function will return the value from the **largest value** in the top row that is **less than the search value**. If the search value is smaller than the smallest value in the top row, the function will return an error.

	A	B	C	D	E	F	G	H	I
31		**ID**	**Product**						
32		104	Printer	=HLOOKUP(B32,$F$36:$I$38, 3, FALSE)					
33		103	Tablet						
34		104	Printer						
35		101	Laptop						
36		102	Mouse		Find the Product based on ID.				
37		103	Tablet		**ID**	101	102	103	104
38		101	Laptop		**Brand**	Dell	Logitech	Apple	HP
39		102	Mouse		**Product**	Laptop	Mouse	Tablet	Printer

FUNCTION 4

In this function, `HLOOKUP` will search the top row of the table **($F$36:$I$38)** for the value in cell **B32**, and return the value from the **3rd row** of the table. If the value in **B32** is not found in the top row of the table, the function will return an error.

3 INDEX

The `INDEX` function in Excel is used to retrieve a value from a range of cells based on a specified row and column number.

	A	B	C	D	E
1	ID	NAME	SURNAME	EMAIL	Course
2	610	Jane	Farley	j.farley@gmail.com	Computer
3	798	Steven	Batista	a.batista@gmail.com	Psychology
4	841	Evelyn	Monet	e.monet@gmail.com	Biology
5	886	Marilyn	Bradley	m.bradley@gmail.com	Computer
6	622	Jonathan	Adder	j.adder@gmail.com	Biology
7	601	Adrian	Birt	a.birt@gmail.com	Maths

Find the Course based on Row/Column

RESULT   2/5

Psychology

=INDEX(A2:E7,2,5)

FUNCTION 1

In this function, the array is **A2:E7**, the row_num is **2**, and the column_num is **5**. The function would return the value from the **2nd row** and **5th column** of the range **A2:E7**.

	A	B	C	D
11	Planet	Position	Satellites	Diameter
12	Mercury	1	0	4,879
13	Venus	2	0	12,104
14	Earth	3	1	12,756
15	Mars	4	2	6,792
16	Jupiter	5	64	142,984
17	Saturn	6	200	120,536
18	Uranus	7	27	51,118
19	Neptune	8	13	49,528
20	Pluto	9	5	2,306

Find Jupiter's diameter

RESULT

142984

=INDEX(A12:D20,5,4)

FUNCTION 2

In this function, the array is **A12:D20**, the row_num is **5**, and the column_num is **4**. This formula would return the value from the **5th row** and **4th column** of the range **A12:D20**.

	A	B	C	D
24	Dept	2015	2016	2017
25	Sales	252	245	151
26	HR	325	436	475
27	Operation	176	665	629
28	Marketing	136	630	127
29	Finance	242	237	681
30				
31		Dept	2015	2016
32		Security	325	436
33		Payroll	176	665
34		Procuremen	136	630
35				
36	Dept	2015	2016	
37	Developer	252	245	
38	Admin	325	436	
39	Tax	176	665	
40	Audit	136	630	

RESULT   Reference Form With Multiple Two-Dimensional Arrays

665   =INDEX((A25:D29,C32:E34,B37:D40),2,3,2)

FUNCTION 3

In this function, the array is **(A25:D29, C32:E34, B37:D40)**, the row_num is **2**, the column_num is **3**, and the area_num is **2**. This formula would return the value from the **2nd row** and **3rd column** of the **second area in the array**.

The array in this formula is made up of three ranges: **A25:D29**, **C32:E34**, and **B37:D40**. The second area in the array is **C32:E34**.

FUNCTION 3

4 LOOKUP

The `LOOKUP` function in Excel allows you to search for a value in a range of cells and return a corresponding value from a different range of cells.

FUNCTION 1

If cell `E1` contains the value `3125`, and the range `B2:B6` contains the values `1000`, `2000`, `3000`, `4000`, `5000`, then the formula `=LOOKUP(E1,B2:B6)` would return the value `3000` because it is found in the **1st column** of the range `B2:B6`.

FUNCTION 2

If cell `E1` contains the value `3125`, and the range `B2:B6` contains the values `1000`, `2000`, `3000`, `4000`, `5000`, and the range `A2:A6` contains the values `Peter`, `George`, `Helen`, `Taylor`, `Maria` then the formula `=LOOKUP(E1,B2:B6,A2:A6)` would return the value `Helen` because it corresponds to the value `3000` in the range `B2:B6`.

FUNCTION 3

`LOOKUP` is searching for the value `2` in the range `1/(Item=E14)` and returning the corresponding value from the range `Price`.

The `1/(Item=E14)` part of the formula is known as an **array formula**. It creates an array of values that consist of either **1 or 0**, depending on whether the value in the corresponding cell in the range `Item` is equal to the value in cell `E14`. If the value in the cell is equal to `E14`, the formula returns a value of **1**. If the value is not equal, the formula returns a value of **0**.

If the range `Item` consists of the following values: "Hat", "Sandals"etc. and the value in cell `E14` is "Sandals", then the array formula `1/(Item=E14)` would return the following array of values: `{0,1,0,1,0,0,1,0}`.

The `LOOKUP` function will then **search** this array for the value `2`. Since `2` is <u>not</u> present in the array, the function will return the **next smallest value** that is present, which is `1`. It will then

return the **corresponding value** from the range `Price`, which is the value in the **same position** as the `1` in the array.

	A	B	C	D	E	F	G	H	I	J
23	**Score**	**Grade**		**Score**	**Grade**	Look up the Grade based on Score (using data left)				
24	0	F		91	A	=LOOKUP(D24,A24:B28)				
25	60	D		85	B	=LOOKUP(D25,B30:F31)				
26	70	C				Look up the Grade based on Score (using data below)				
27	80	B			4					
28	90	A								
29										
30	**Score**	0	60	70	80	90				
31	**Grade**	F	D	C	B	A				
32										

FUNCTION 4

The `LOOKUP` function will search the range `A24:B28` for the value in cell `D24`.

If the value in cell `D24` was not found in the range, the function would return the next smallest value that is present.

If the value in cell `D24` is "**91**", then the `LOOKUP` function would return the value "**A**" because it is the **next smallest value** in column A after "**90**".

5 MATCH

The **MATCH** function in Excel is used to find the relative position of an item in an array that matches a specific value.

	A	B	C	D	E	F	G
1	**NAME**						
2	Peter	1		*Get the position of an item in array*			
3	George	2		**LOOKUP**	**RESULT**		
4	Helen	3		Helen	3	**=MATCH(D4,A2:A6)**	
5	Taylor	4			Helen	**=LOOKUP(D4,A2:A6)**	
6	Maria	5					

FUNCTION 1

If **D4** contains the value "**Helen**" and the values in **A2:A6** are "**Peter**", "**George**", "**Helen**", "**Taylor**", "**Maria**", the **MATCH** function would return **3**, since "**Helen**" is the **first value** in the lookup array that matches "**Helen**".

If the lookup_value is not found in the lookup_array, the **MATCH** function will return an **#N/A** error.

FUNCTION 2

If **D4** contains the value "**Helen**" and the values in **A2:A6** are "**Peter**", "**George**", "**Helen**", "**Taylor**", "**Maria**", the **LOOKUP** function would return "**Helen**", since "**Helen**" is the value in the lookup_vector that matches the lookup_value.

	A	B	C	D	E	F	G	H
11	**PLANET**							
12	Mercury	1		*Get the position of an exact item in array*				
13	Venues	2		**Planet**	Mars			
14	Earth	3		**Position**	4	**=MATCH(E13, A12:A20,0)**		
15	Mars	4						
16	Jupiter	5				*0 = exact match*		
17	Saturn	6				*not case sensitive*		
18	Uranus	7						
19	Nepture	8						
20	Pluto	9						

FUNCTION 3

If the value "**Mars**" appears in the cell **E13**, and **MATCH** function searches for "**Mars**" in the range **A12:A20**, the function will return **4**, because "**Mars**" is the **4th** value in the range.

	A	B	C	D	E	F	G	H	I	J	
24	VALUES			*Get the position of an approximately item in array*						VALUES	
25	100	1								900	1
26	200	2		Planet	575					800	2
27	300	3		Position	5	=MATCH(E26, A25:A33,1)				700	3
28	400	4				↑				600	4
29	500	5		**4**		*1 = approximately match*				500	5
30	600	6				*values should be in ascending order*				400	6
31	700	7								300	7
32	800	8		Planet	575					200	8
33	900	9		Position	4	=MATCH(E32,J25:J33,-1)				100	9
34						↑					
35				**5**		*-1 = approximately match*					
36						*values should be in descending order*					

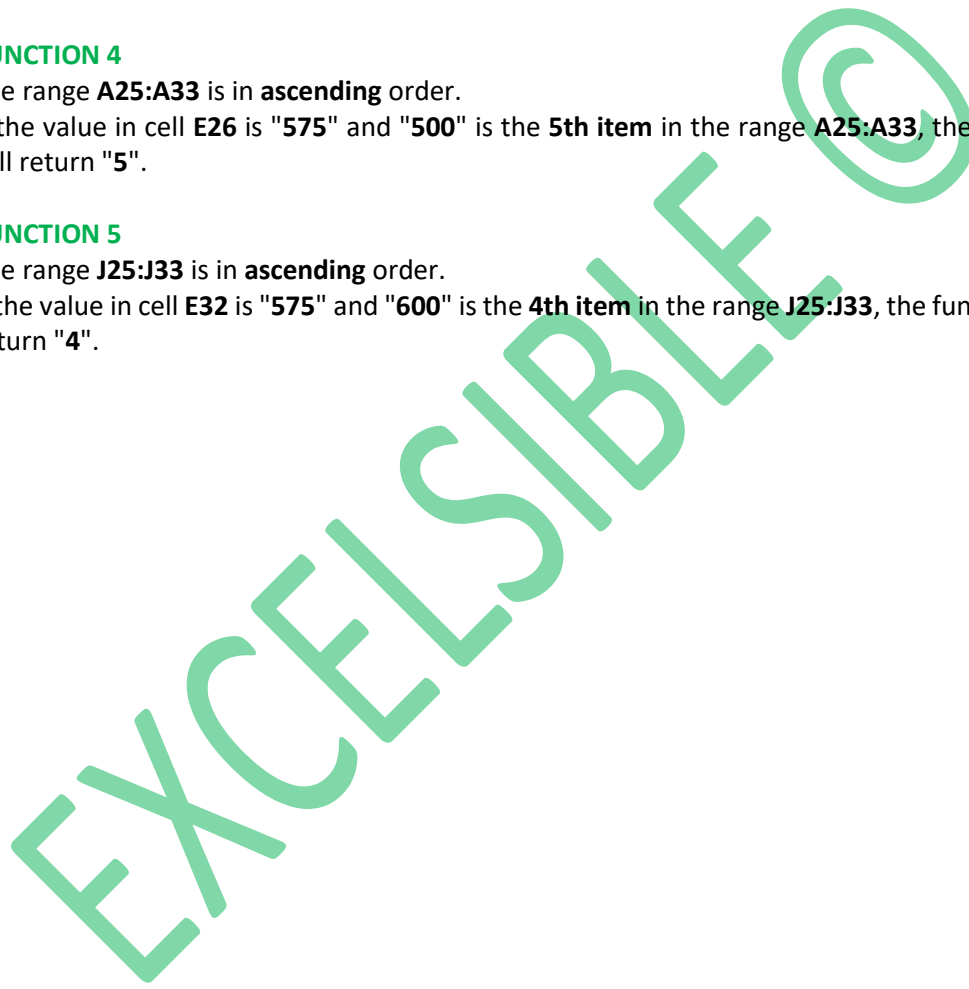## FUNCTION 4

The range **A25:A33** is in **ascending** order.

If the value in cell **E26** is "**575**" and "**500**" is the **5th item** in the range **A25:A33**, the function will return "**5**".

FUNCTION 5

The range **J25:J33** is in **ascending** order.

If the value in cell **E32** is "**575**" and "**600**" is the **4th item** in the range **J25:J33**, the function will return "**4**".

6 VLOOKUP

The **VLOOKUP** function in Excel is used to search for a specific value in a table and return a corresponding value from a different column in the same row.

	A	B	C	D	E	F
1	ID	NAME	SURNAME	EMAIL	Course	
2	610	Jane	Farley	j.farley@gmail.com	Computer	
3	798	Steven	Batista	a.batista@gmail.com	Psychology	
4	841	Evelyn	Monet	e.monet@gmail.com	Biology	
5	886	Marilyn	Bradley	m.bradley@gmail.com	Computer	
6	622	Jonathan	Adder	j.adder@gmail.com	Biology	
7	601	Adrian	Birt	a.birt@gmail.com	Maths	
8	↑			↑		
9	lookup			result		
10	column			column		
11						
12			ID	EMAIL		
13			798	a.batista@gmail.com	=VLOOKUP(C13,A2:E7,4,FALSE)	
14			↑	↑	Find an email based on ID	
15			lookup	result		
16			values			

1

FUNCTION 1

The function will search the table array **A2:E7** for the **value** in cell **C13**. If it finds a match, it will return the **value** from the **4th column** of the same row. If it doesn't find a match, it will return an **error**.

	A	B	C	D	E	F	G	H	I	J
19							Find Logicom's sales for Year 2020			
20	CUSTOMERS	YR 2018	YR 2019	YR 2020	GR TOTAL		CUSTOMER	Logicom		
21	UNIC	€ 66,663	€ 164,248	€ 43,216	€ 274,127		SALES YEAR	2020		
22	Logicom	€ 113,799	€ 13,964	€ 106,826	€ 234,589		RESULT	106826	←	
23	IBM	€ 80,369	€ 77,384	€ 41,632	€ 199,385		=VLOOKUP(H20,A21:E28,4,FALSE)			
24	European	€ 67,320	€ 108,285	€ 14,659	€ 190,264					
25	Cyta	€ 129,462	€ 68,797	€ 94,378	€ 292,637					
26	Cycom	€ 85,030	€ 25,263	€ 113,918	€ 224,211		Find UNIC's Grand Total			
27	AHK	€ 66,826	€ 49,562	€ 75,088	€ 191,476				↓	
28	ABC Education	€ 53,522	€ 31,176	€ 85,607	€ 170,305		Customer	GR TTL	VAT	GR TTL (+ VAT)
29							UNIC	€ 274,127	€ 52,084	€ 326,211
30							IBM	€ 199,385	€ 37,883	€ 237,268
31							AHK	€ 191,476	€ 36,380	€ 227,856
32									TOTAL	€ 791,336
33							=VLOOKUP(G29,$A$21:$E$28,5,FALSE)			

2

3

FUNCTION 2

The function will search the table array **A21:E28** for the value in cell **H20**. If it finds a match, it will return the **value** from the **4th column** of the same row. If it doesn't find a match, it will return an **error**.

FUNCTION 3

The function will search the table array **$A$21:$E$28** for the value in cell **G29**. If it finds a match, it will return the **value** from the **5th column** of the same row. If it doesn't find a match, it will return an **error**.

	A	B	C	D	E	F	G	H	I
40			*Join Full Name and Departments data*						
41			=A44&B44						
42			↓						
43	**Full name**	**Department**	**Helper**	**Salary**			Find the Salary for George Georgiou in Sales Department		
44	Andreas Andreou	Adm	Andreas AndreouAdm	€ 92,985.00			↓		
45	Annie Hunter	Marketing	Annie HunterMarketing	€ 60,691.00					
46	Anna Lyn	IT	Anna LynIT	€ 75,144.00		**Salary**	**Criteria1**	**Criteria2**	
47	George Georgiou	Sales	George GeorgiouSales	€ 81,603.00		€ 81,603.00	George Georgiou	Sales	
48	Bob Simon	Marketing	Bob SimonMarketing	€ 65,237.00		=VLOOKUP(G46&H46,C:D,2,FALSE)			
49	Bradley Stewart	IT	Bradley StewartIT	€ 64,717.00					
50	James Petrou	Adm	James PetrouAdm	€ 63,713.00					
51	Bryan Sloane	IT	Bryan SloaneIT	€ 74,243.00					
52	Caylie Menaniou	Adm	Caylie MenaniouAdm	€ 62,683.00					
53	Chatsworth Miller	Marketing	Chatsworth MillerMarketing	€ 71,358.00					
54	Chris Savva	Sales	Chris SavvaSales	€ 89,758.00					
55									

FUNCTION 4

This function will search the table array `C:D` for the value in cells `G46` and `H46` concatenated together. If it finds a match, it will return the **value** from the **2nd column** of the same row. If it doesn't find a match, it will return an **error**.