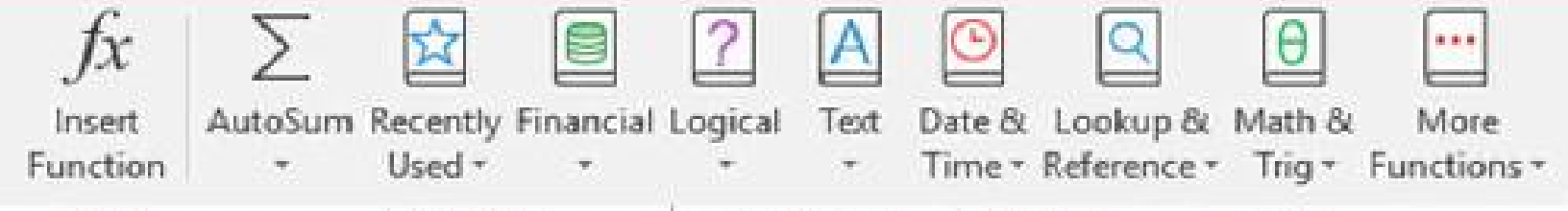
• Downloadable Practice Workbooks • New Formulas in Excel 2019 & Office 365



101 MOST POPULAR EXCEL FORMULAS

John Michaloudis | Bryan Hong | myexcelonline.com

- COUNTIFS
- MOD
- PERCENTAGE
- RAND
- RANDBETWEEN
- ROUND
- SUBTOTAL
- SUMIF
- SUMIFS
- SUMPRODUCT

STATISTICAL FUNCTIONS

- AVERAGE
- LARGE
- MAX
- MEDIAN
- MIN
- SMALL

DATE & TIME FUNCTIONS

- DATE
- DATEDIF
- DATEVALUE
- DAY
- DAY360
- DAYS
- ENDOFMONTH
- HOUR
- MONTH
- NETWORKDAYS
- TODAY
- WEEKDAY
- WEEKNUM
- WORKDAY
- YEAR

TEXT FUNCTIONS

- CLEAN
- CONCATENATE
- EXACT
- FIND
- LEFT
- LEN
- LOWER
- MID

INFORMATION FUNCTIONS

OTHER FUNCTIONS

EXCEL 2019

OFFICE 365 (AS OF SEPTEMBER 2018)

ADVANCED FORMULAS

Match Two Lists With MATCH Function
Named Ranges with VLOOKUP Function
REPT
Sum a Range Using the INDEX Function
SUMPRODUCT: Sum Multiple Criteria
SUMPRODUCT: Sum the Top 3 Sales
TIME – Get Elapsed Time
TRANSPOSE
VLOOKUP Approximate Match
VLOOKUP with a Drop Down List
VLOOKUP Multiple Columns
VLOOKUP with Multiple Criteria

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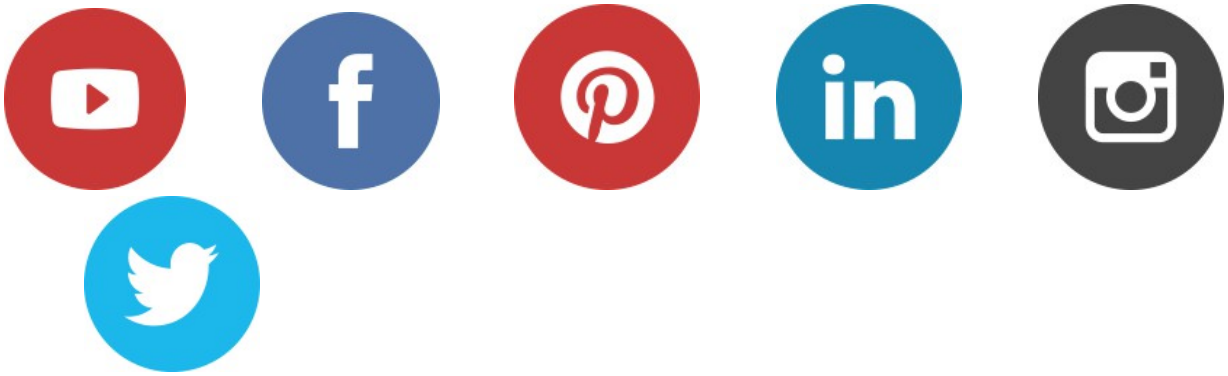


AUTHOR BIOGRAPHY

John Michaloudis is the founder of MyExcelOnline.com. John is currently living in the North of Spain, married and have two beautiful kids. John holds a bachelor's degree in Commerce (Major in Accounting) and speak English/Australian, Greek and Spanish.

Bryan Hong is a contributor of MyExcelOnline.com. He is currently living in the Philippines and is married to his wonderful wife Esther. Bryan is also a Microsoft Certified Systems Engineer with over 10 years of IT and teaching experience!

HOW TO USE THIS E-BOOK

Formulas are one of the most powerful features in Excel and learning how & when to use them will make you into an Excel superstar! There are 483 Functions at the time of publishing this eBook but you only need to know several of these to become efficient at Excel!

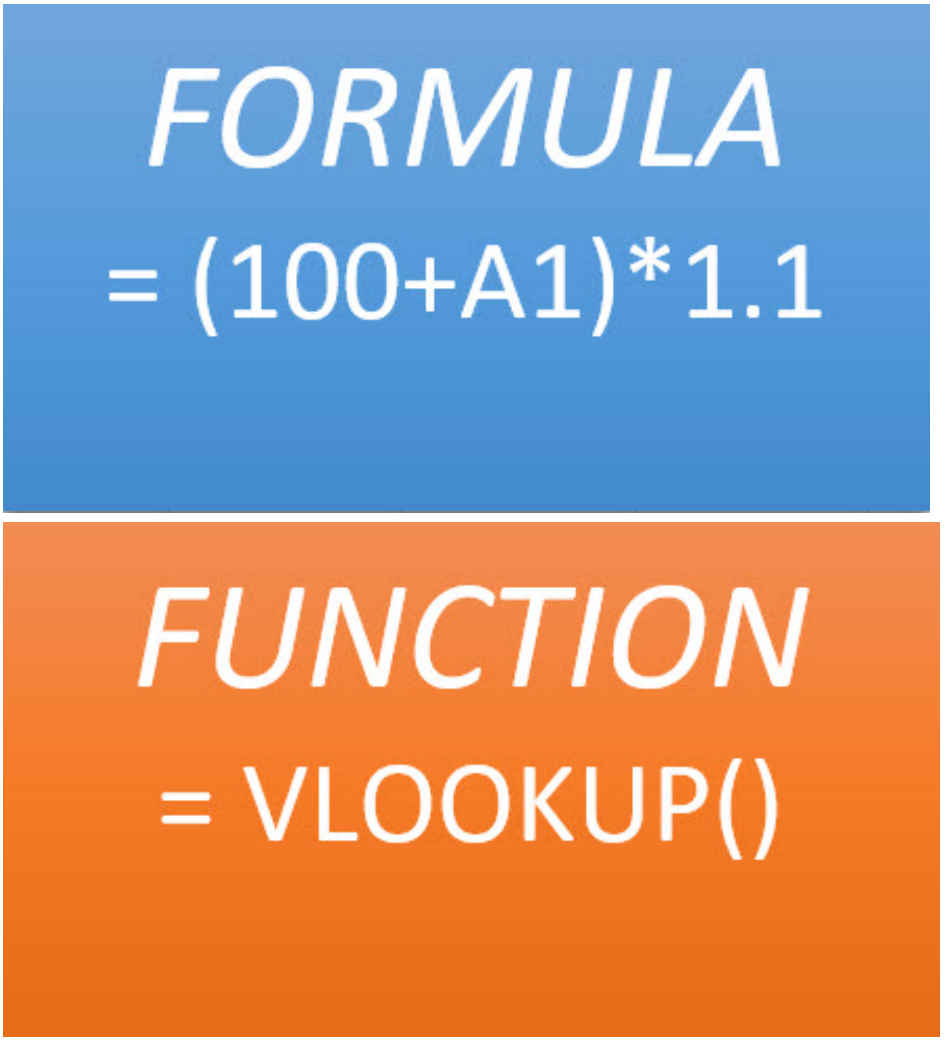
To get the most value out of this eBook, we recommend that you download the workbook that pertains to each Function and practice entering the Function in a cell. Then follow our easy to use step by step guide. Make mistakes! That is fine. You may not get it the first time around (we certainly didn't) but when you finally do, you will be a step closer to Excel stardom!

Here is the download link that has all the workbooks covered in this book. The **Table of Contents** is interactive & will take you to a Function within this eBook!

Formulas VS Functions

You most probably have heard the words Formulas & Functions both being used in Excel. What is the difference between them?

A **Formula** is an expression which calculates the value of a cell. A **Function** is a predefined formula that is made available for you to use in Excel:



In this book, we use both terms (function and formula) interchangeably.

Here are several **operators** that you can use in a Formula:

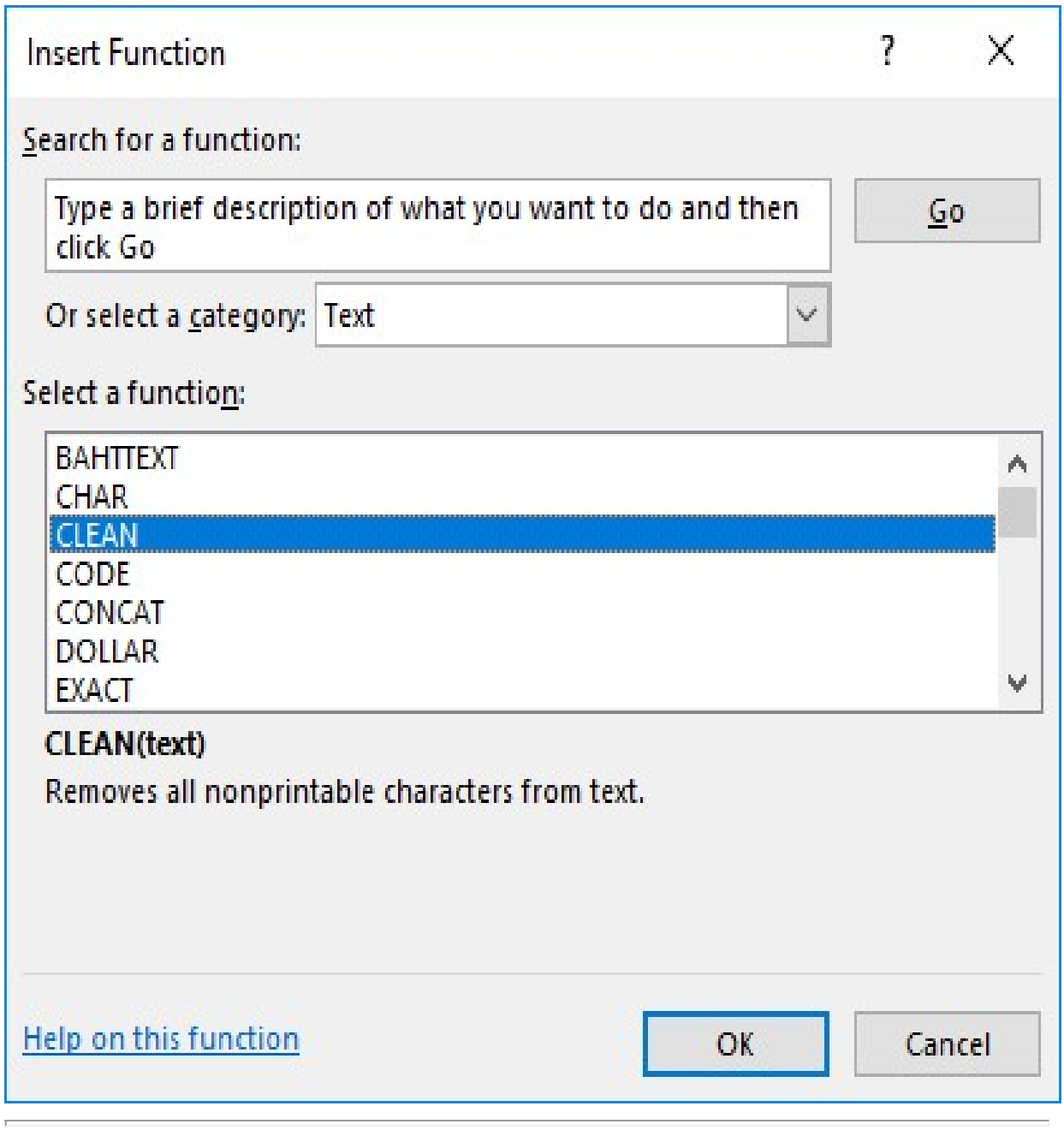
OPERATOR	MEANING	EXAMPLE
+ (plus sign)	Addition	=B15
- (minus sign)	Subtraction	3-3
- (minus sign)	Negation	= 5
* (asterisk)	Multiplication	=3*3
/ (forward slash)	Division	=1/3
% (percent sign)	Percent	30%
^ (caret)	Exponentiation	=3^3
= (equal sign)	Equal to	=A1=B1
> (greater than sign)	Greater than	=A1>B1
< (less than sign)	Less than	=A1<B1
>= (greater than or equal to sign)	Greater than or equal to	=A1>=B1
<= (less than or equal to sign)	Less than or equal to	=A1<=B1
<> (not equal to sign)	Not equal to	=A1<>B1
& (ampersand)	Connects, or concatenates, two values to produce one continuous text value	="North"&"wind" results in "Northwind"
: (colon)	Range operator, which produces one reference to all the cells between two references, including the two references.	B5:B15
, (comma)	Union operator, which combines multiple references into one reference	=SUM(B5:B15,D5:D15)
(space)	Intersection operator, which produces one reference to cells common to the two references	B7:D7 C6:C8

FORMULA TIPS

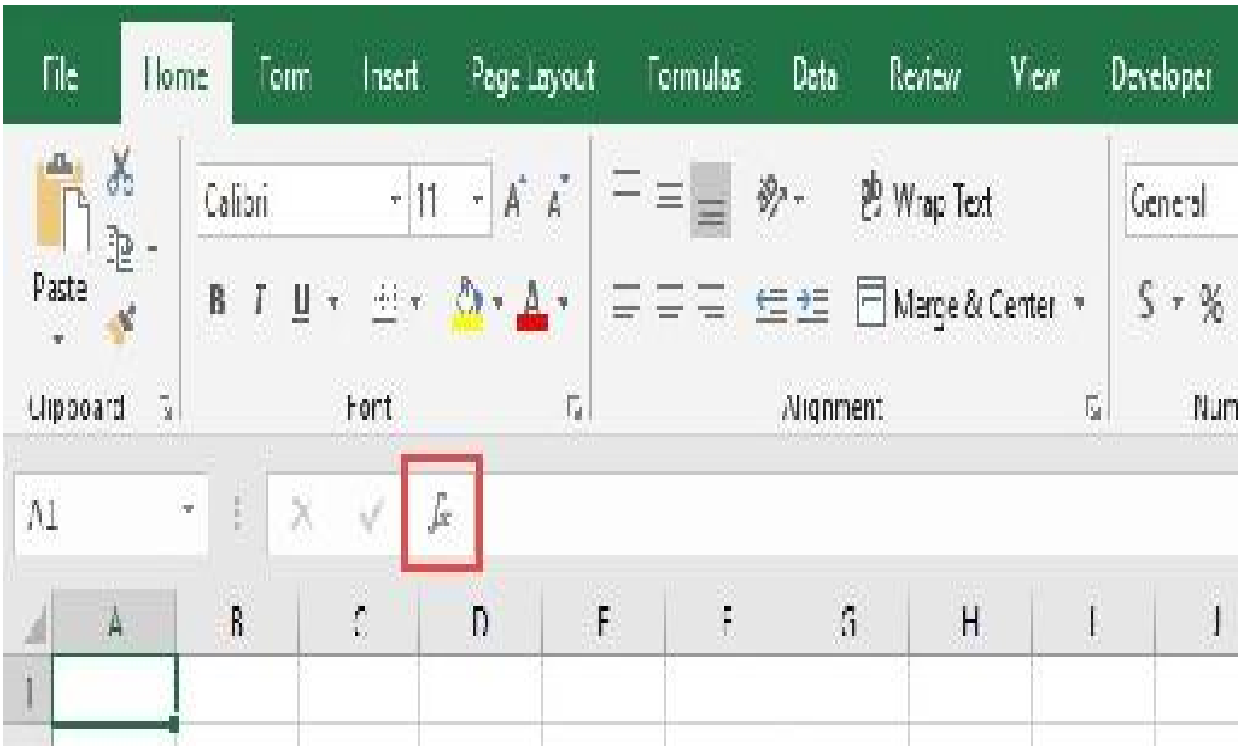
The Function Wizard

What does it do?

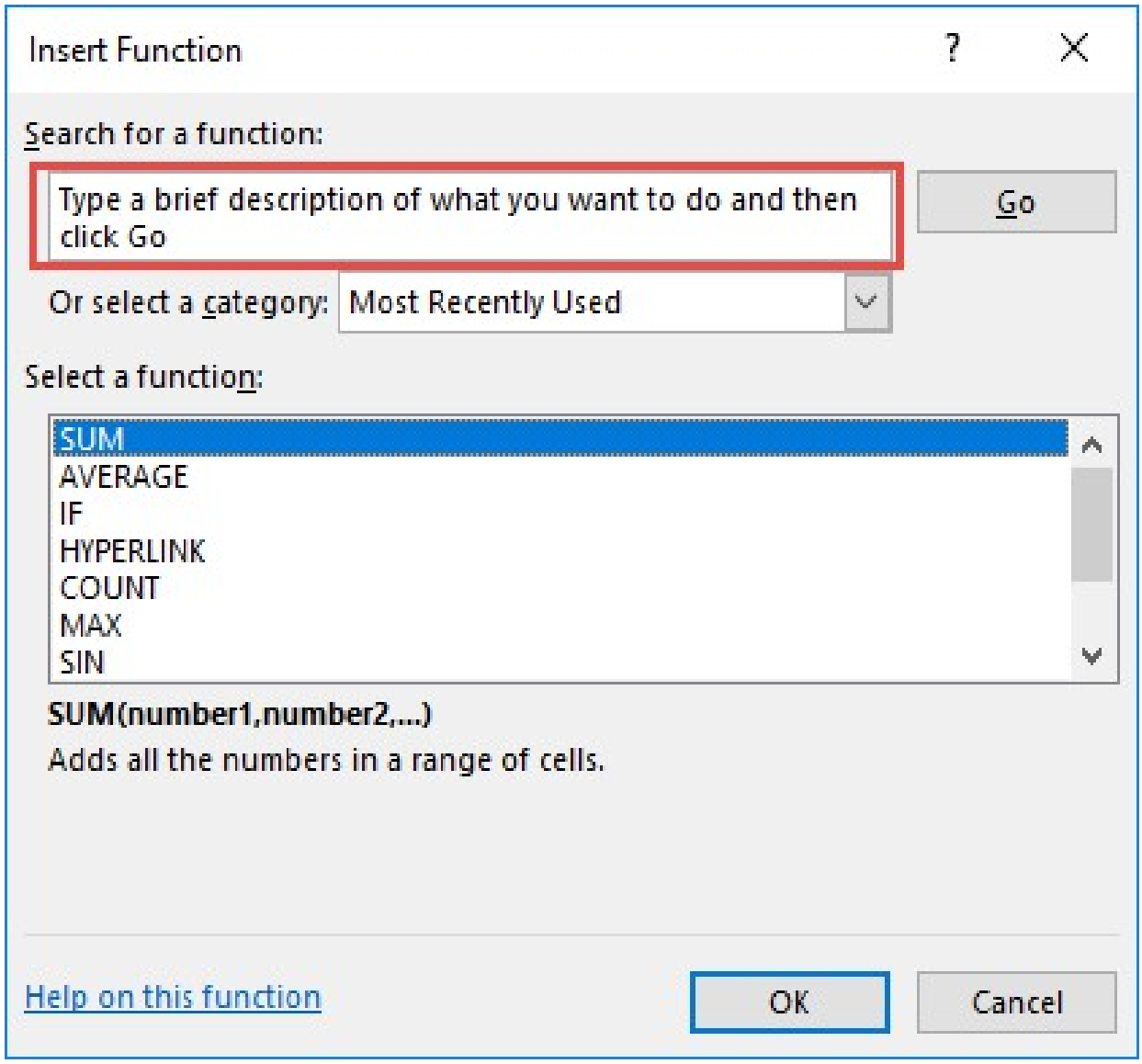
If you are unsure on which formula to use in Excel, Excel has you covered! You can use the **Insert Function Wizard** of Excel to find one for your purpose.


Insert Function
Search for a function:
Type a brief description of what you want to do and then click Go
Go
Or select a category: Text
Select a function:
BAHTTEXT
CHAR
CLEAN
CODE
CONCAT
DOLLAR
EXACT
CLEAN(text)
Removes all nonprintable characters from text.
Help on this function
OK
Cancel

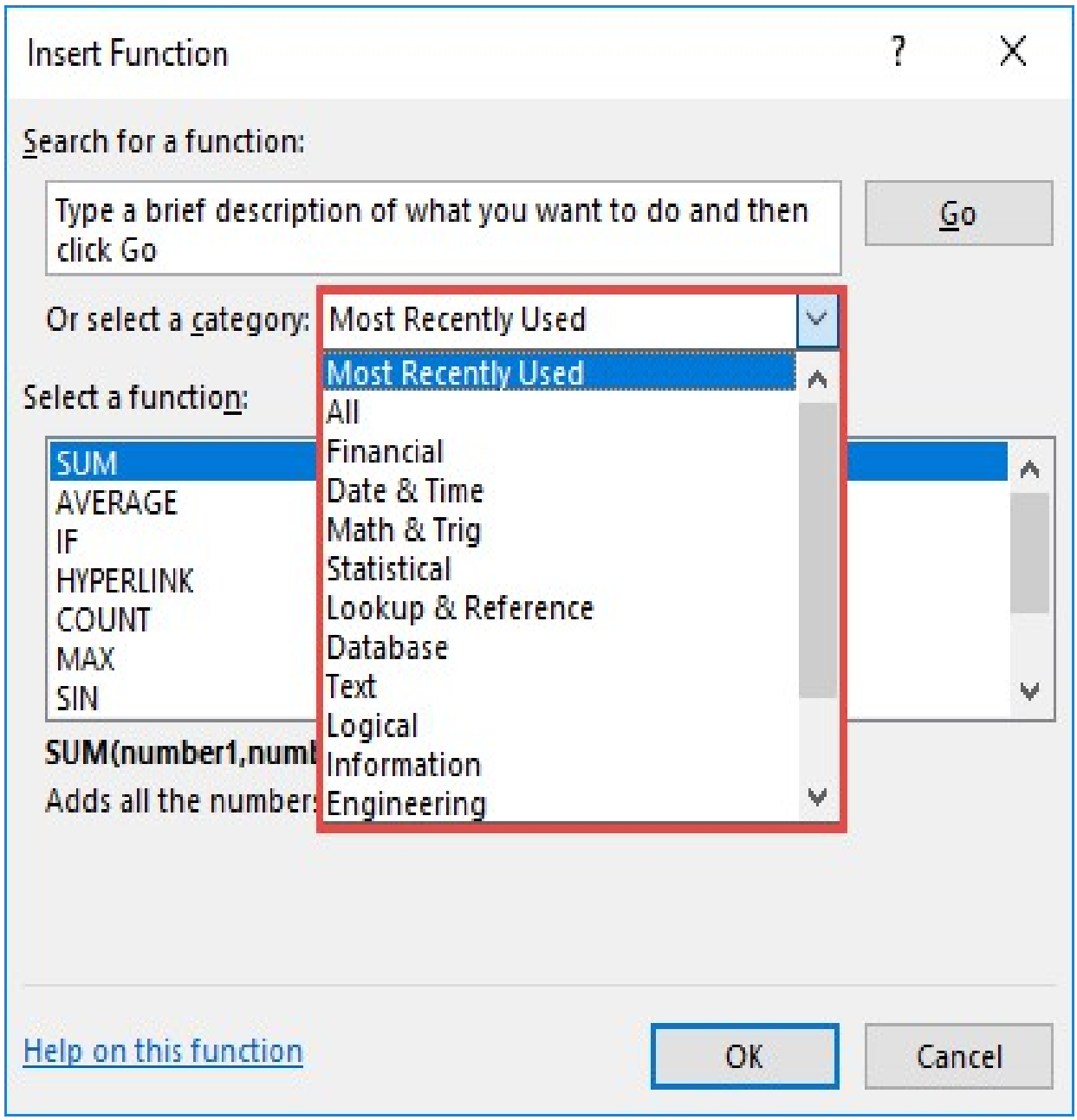
STEP 1: Ensure you have a cell selected and click the Insert Function button depicted as ***fx***:



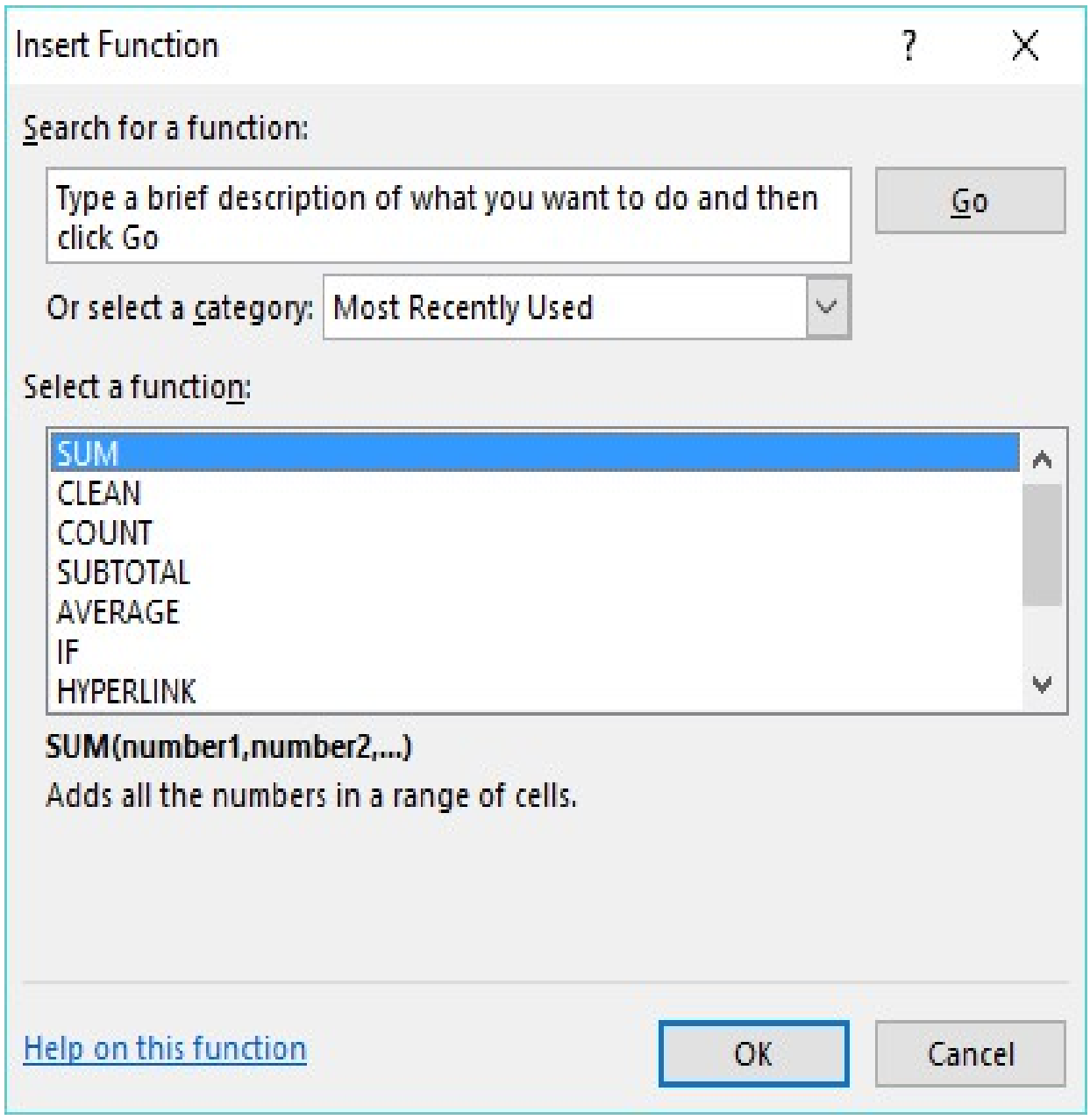
STEP 2: Inside this window, you can try to search for the function:



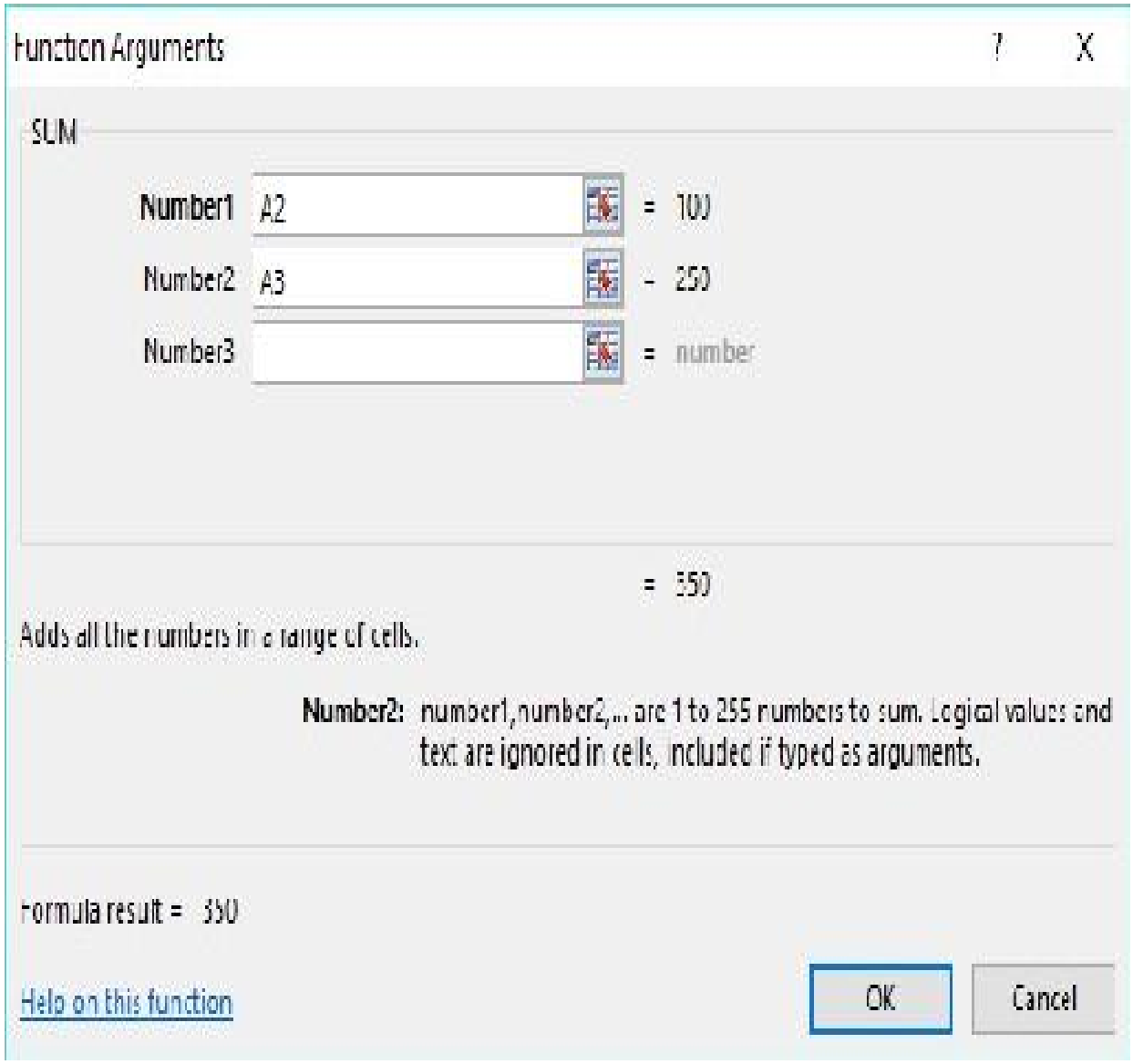
Or filter by category:



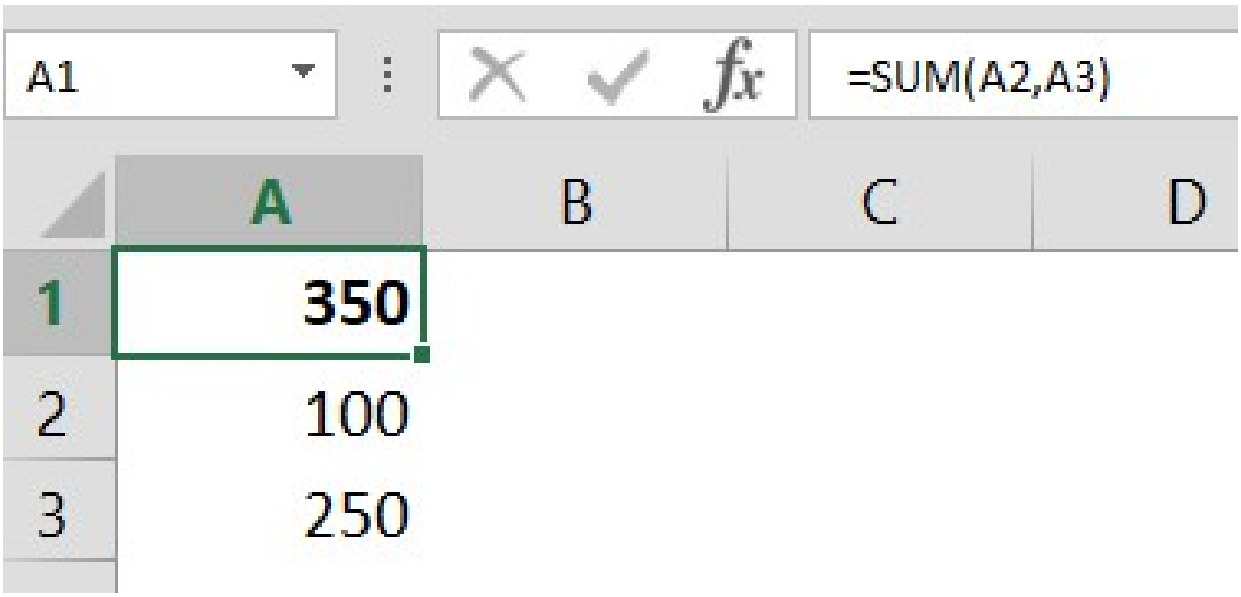
STEP 3: Once you have selected the function you want, click OK.



STEP 4: Fill out the arguments of your selected function. Click OK.



Your Excel Formula is now ready!

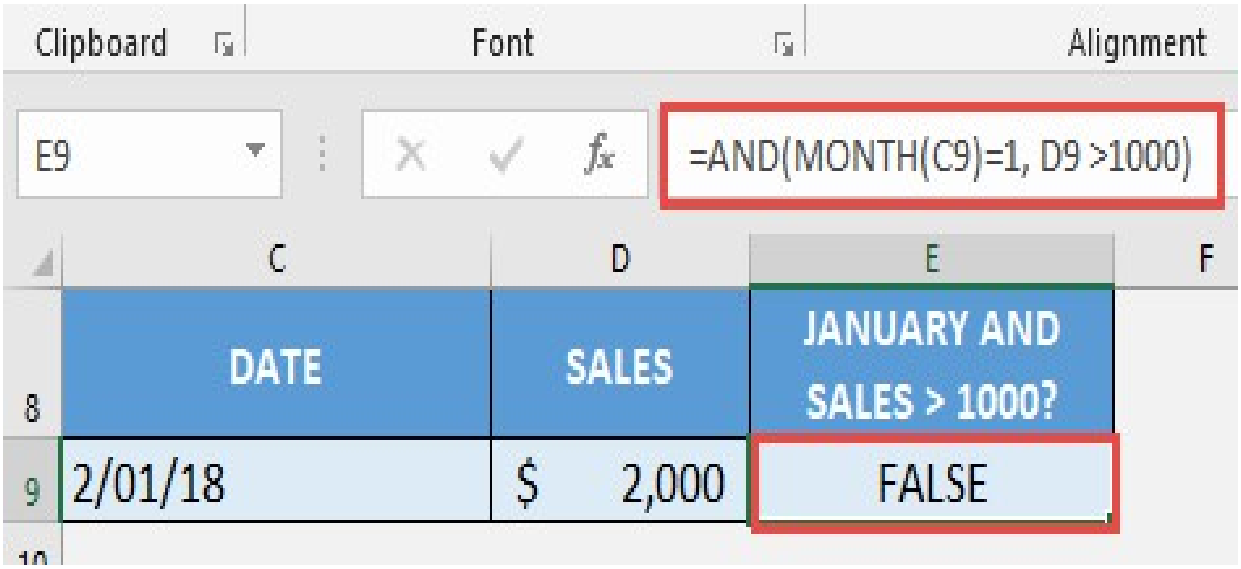

A1
=SUM(A2,A3)
A
B
C
D
1
350
2
100
3
250

F9 to Evaluate a Formula

What does it do?

Sometimes we need to create complicated formulas, and when that happens it is easy to make mistakes. It becomes hard finding what caused the issue! The fun part is it is easy to evaluate parts of your Formula in Excel by using pressing the **F9** Key!

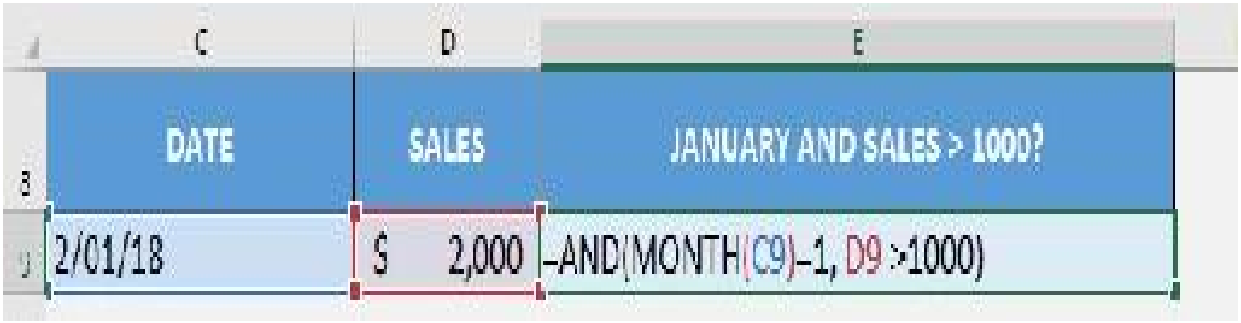
Our example checks if the date is in the Month of January and has sales greater than 1000. It uses the **AND Function** and we want to understand why it evaluated to **FALSE**.



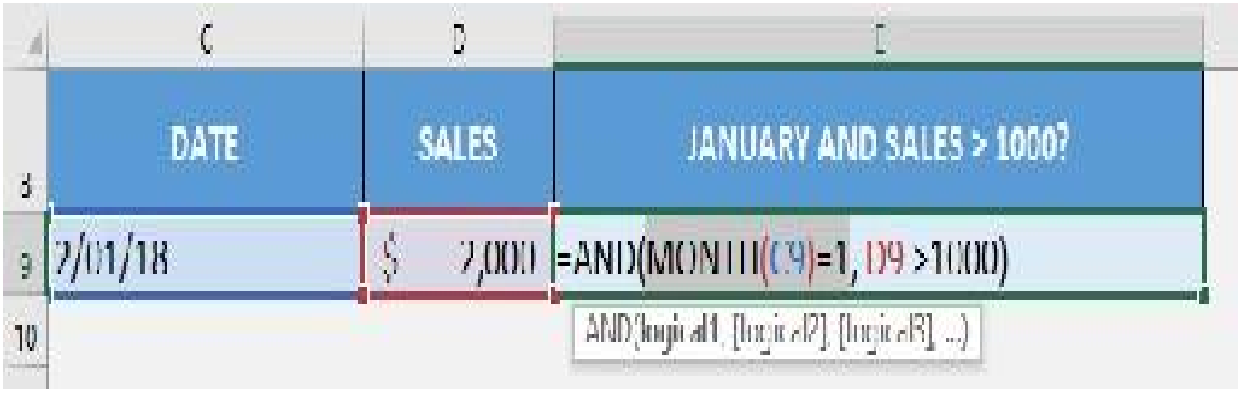
Exercise Workbook:

DOWNLOAD EXCEL WORKBOOK

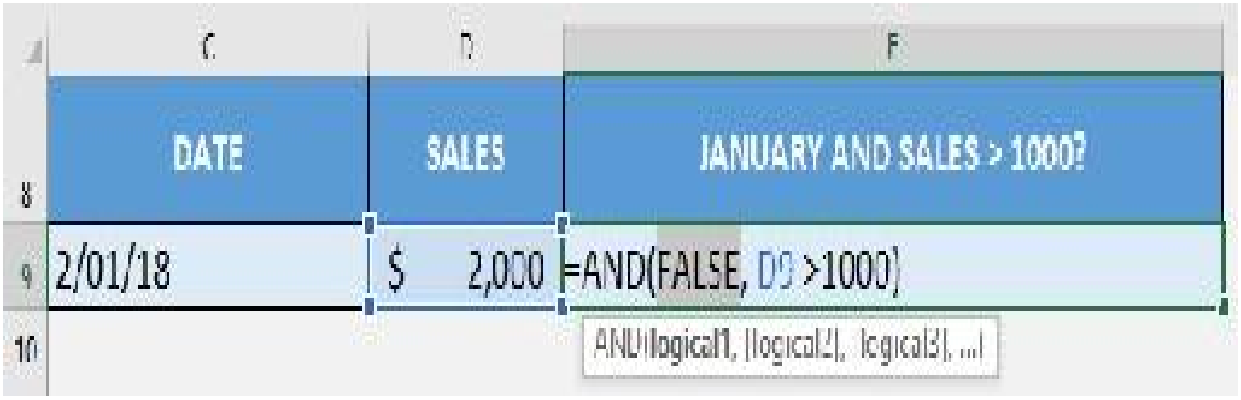
STEP 1: **Double click** or press **F2** on the cell that has the formula



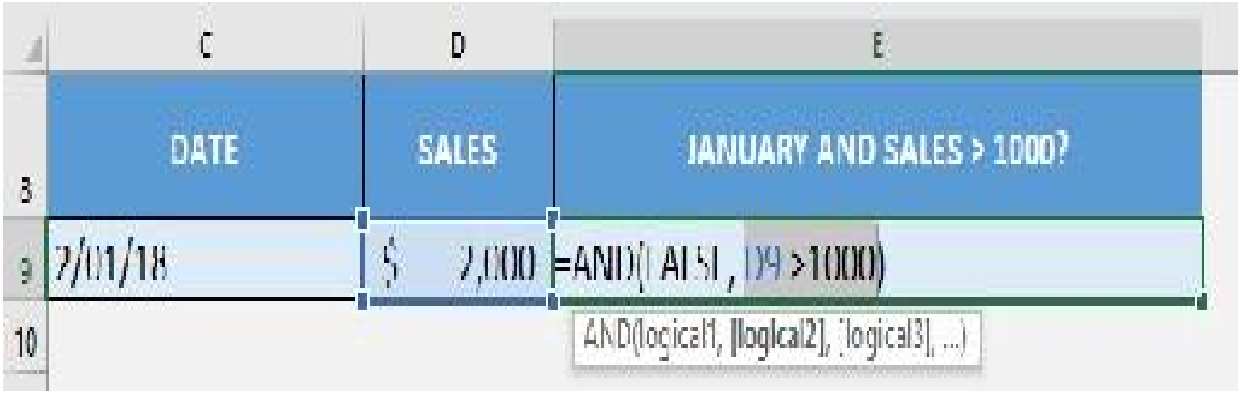
STEP 2: Select the part of the formula that you want to evaluate first. Let us check the first part: **MONTH(C9)=1**



Press **F9** to evaluate this part. It evaluates to FALSE because the month in cell C9 is February and not January or 1



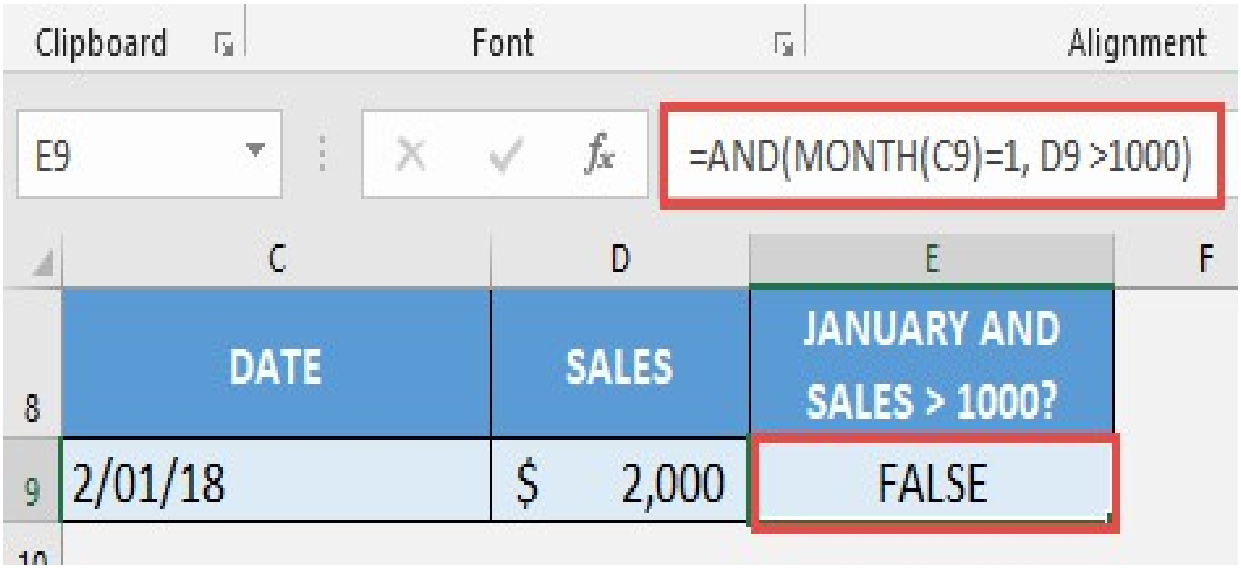
STEP 3: Let us evaluate the second part of the formula. Select the other part: **D9 >1000**



Press **F9** to evaluate this part. It evaluates to TRUE because D9 is greater than 1000.

Press **ESC** to exit the formula editor without making changes.

Now it makes sense why our formula here gave us a value of FALSE!

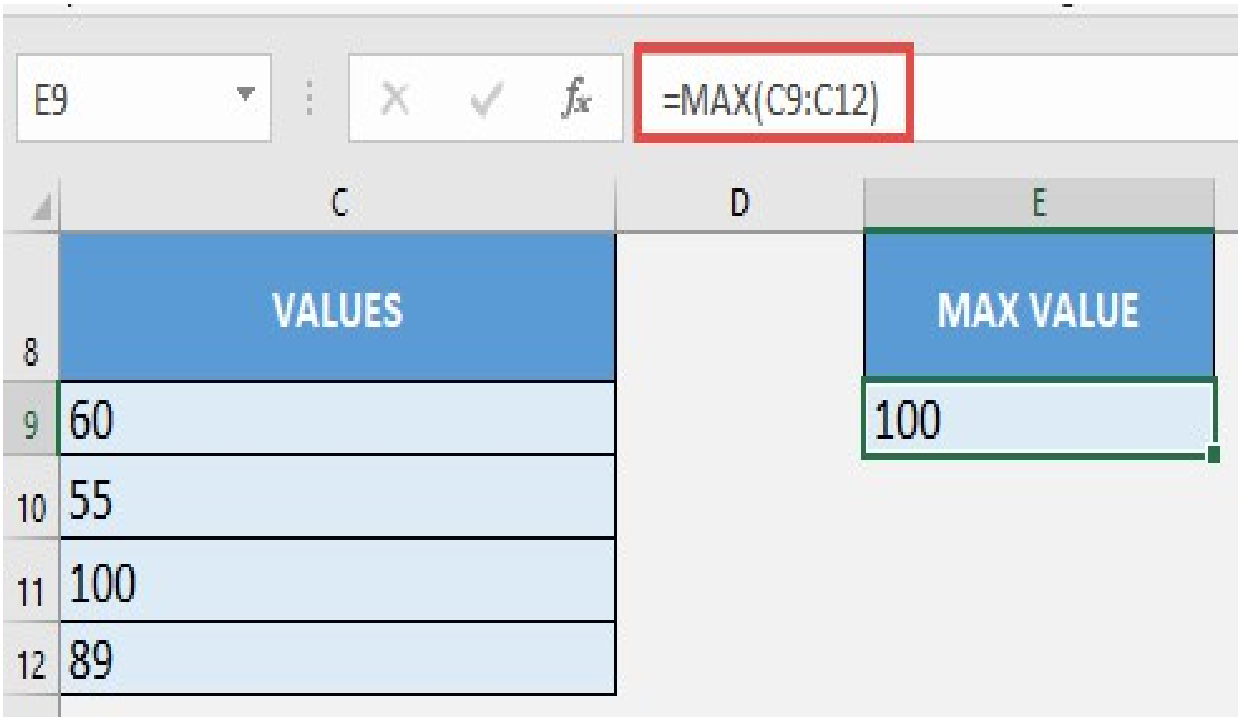

Clipboard
Font
Alignment
E9
=AND(MONTH(C9)=1, D9 >1000)
C
D
E
F
8
DATE
SALES
JANUARY AND SALES > 1000?
9
2/01/18
$ 2,000
FALSE

Named Ranges

What does it do?

A named range in Excel is a cell or range of cells that has a more descriptive name. It goes a long way in using named ranges, because it allows you to create cleaner and easier to understand formulas in Excel!

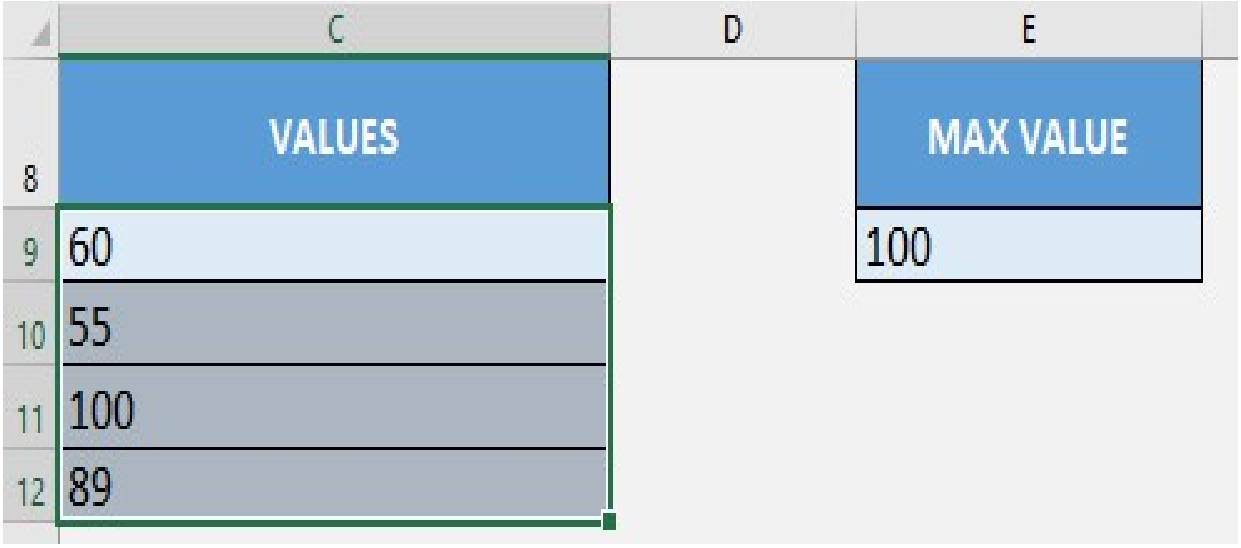
Our example gets the maximum value with the **MAX Function**. Let us improve this function by replacing the range of cells with a named range.



Exercise Workbook:

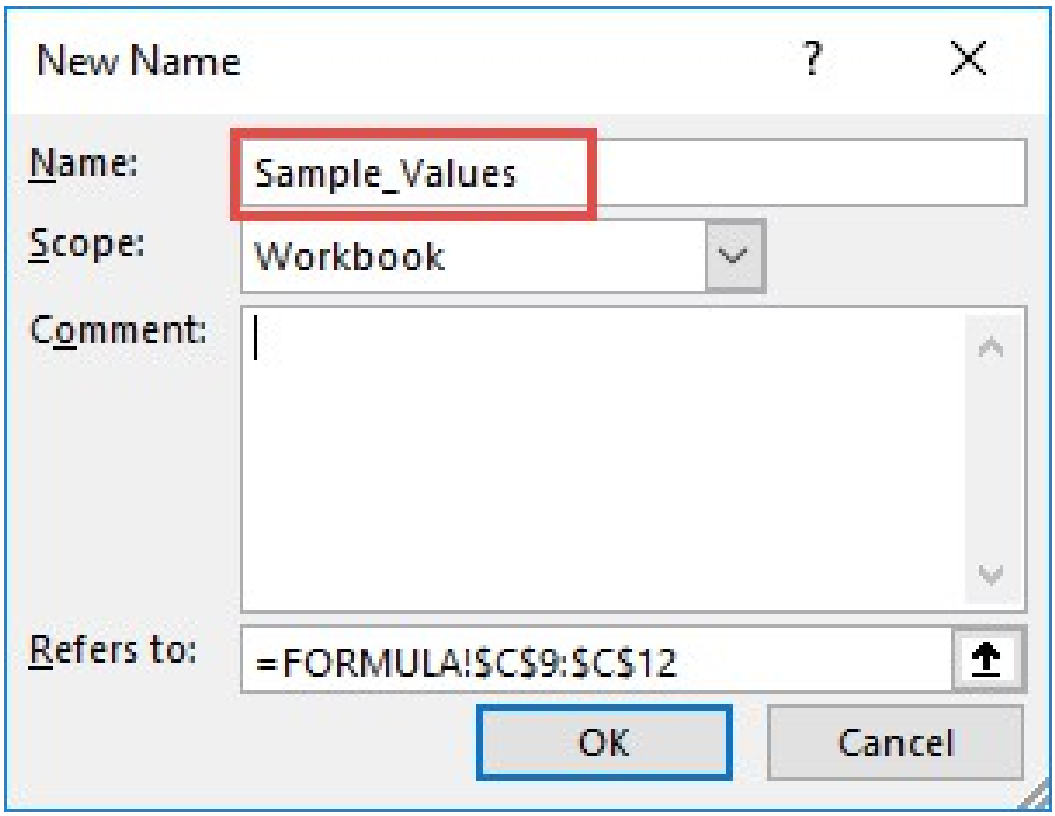
DOWNLOAD EXCEL WORKBOOK

STEP 1: Select the cells that you want to give a named range to.

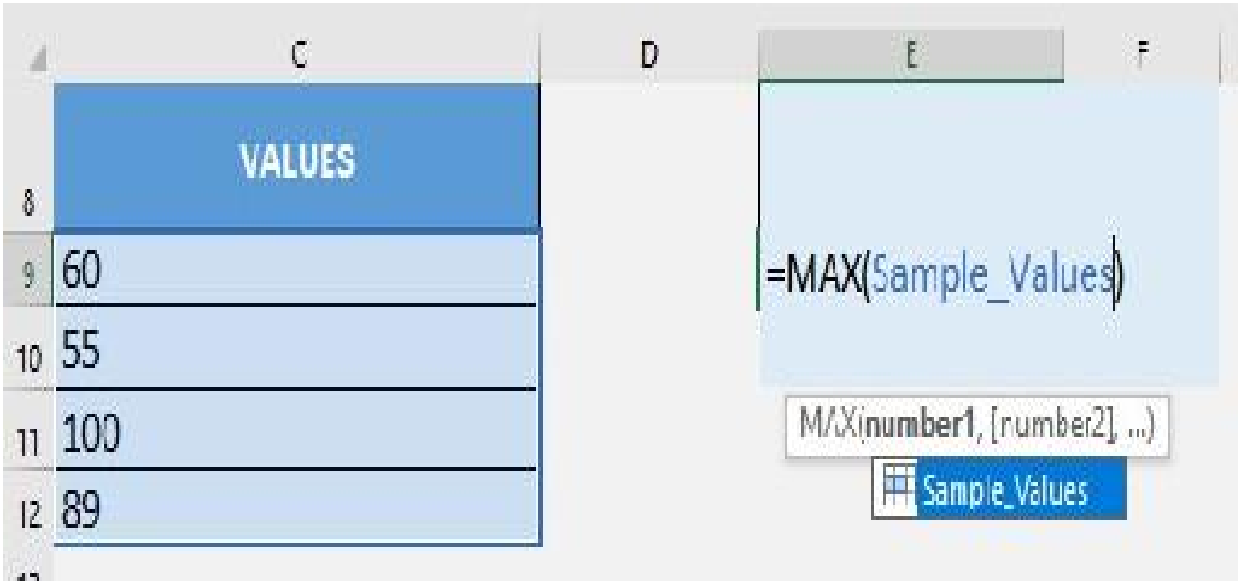


STEP 2: Go to ***Formulas > Defined Names > Define Name***

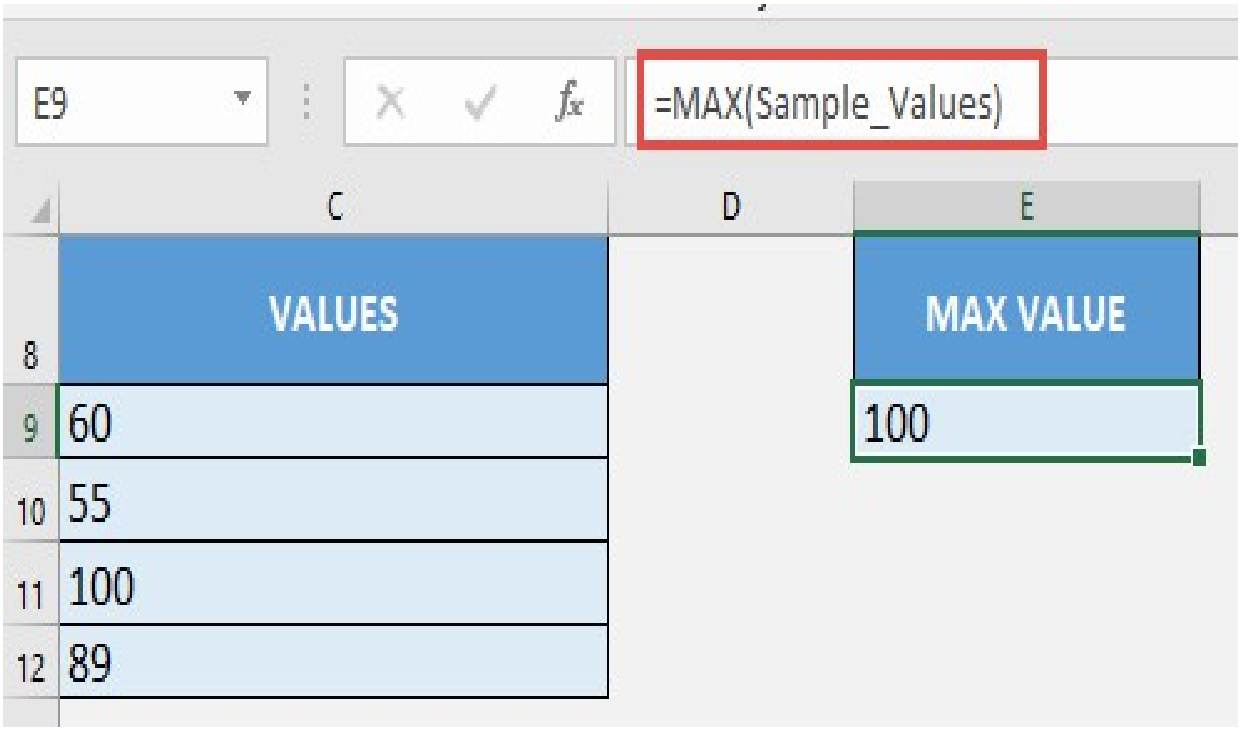
STEP 3: Give it a meaningful name (it cannot have spaces) and click OK.



STEP 4: Let us now update our formula to use our named range!



Our formula looks way better now and is still working as expected!


E9
=MAX(Sample_Values)
C
D
E
VALUES
MAX VALUE
60
55
100
89
100

Absolute & Relative References

What does it do?

When creating formulas, it is very important to understand cell references. Let us go over the differences between absolute and relative references.

It will affect how your cell references will appear when you copy an Excel formula from one cell to another.

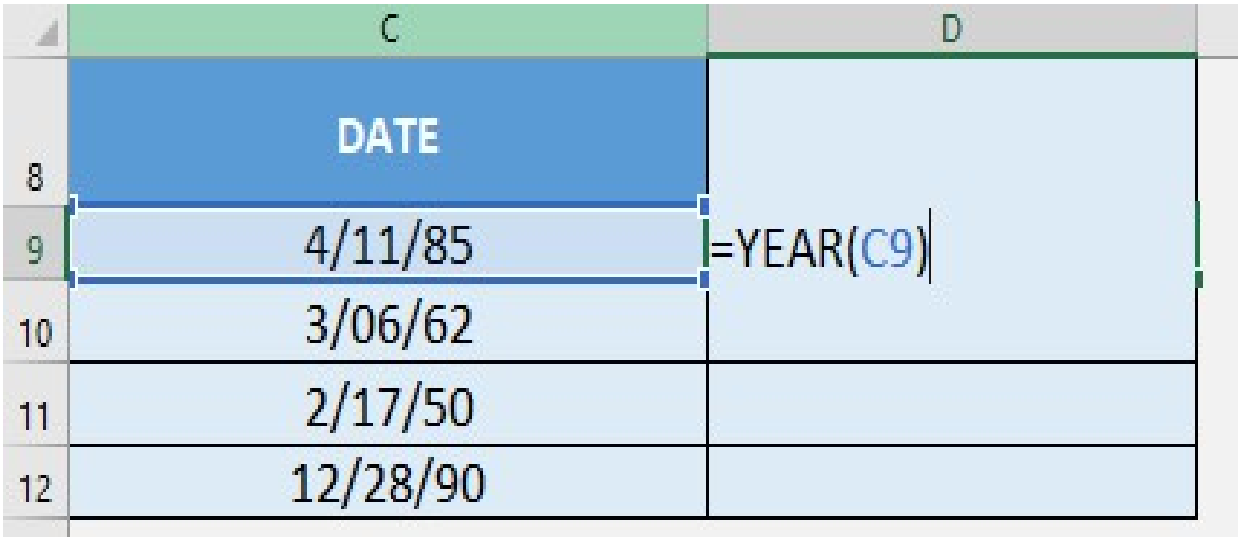
Exercise Workbooks:

DOWNLOAD EXCEL WORKBOOK (Relative Reference exercise)

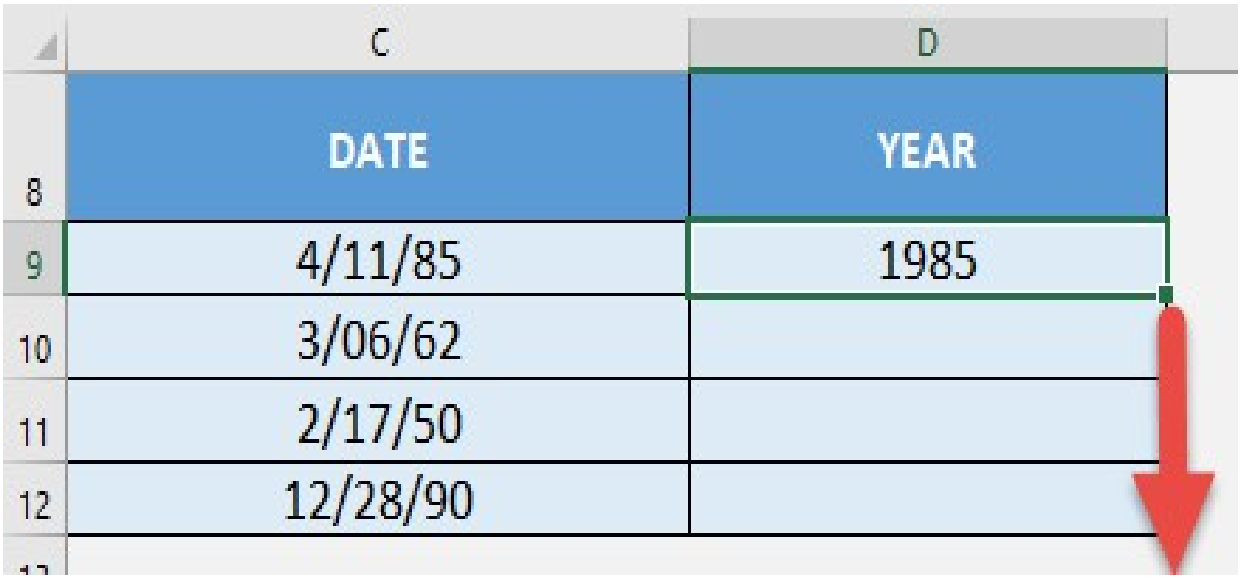
DOWNLOAD EXCEL WORKBOOK (Absolute Reference exercise)

Excel uses **relative references** by default. A relative reference is useful if you want to use the same pattern across different cells.

For example, we have here a formula that gets the YEAR from cell C9.



STEP 1: If we drag this formula all the way down for it to be copied to other cells:



Notice that the cell references have changed as well:

	C	D
8	DATE	YEAR
9	4/11/85	1985
10	3/06/62	=YEAR(C10)
11	2/17/50	1950
12	12/28/90	1990

	C	D
8	DATE	YEAR
9	4/11/85	1985
10	3/06/62	1962
11	2/17/50	=YEAR(C11)
12	12/28/90	1990

	C	D
8	DATE	YEAR
9	4/11/85	1985
10	3/06/62	1962
11	2/17/50	
12	12/28/90	=YEAR(C12)

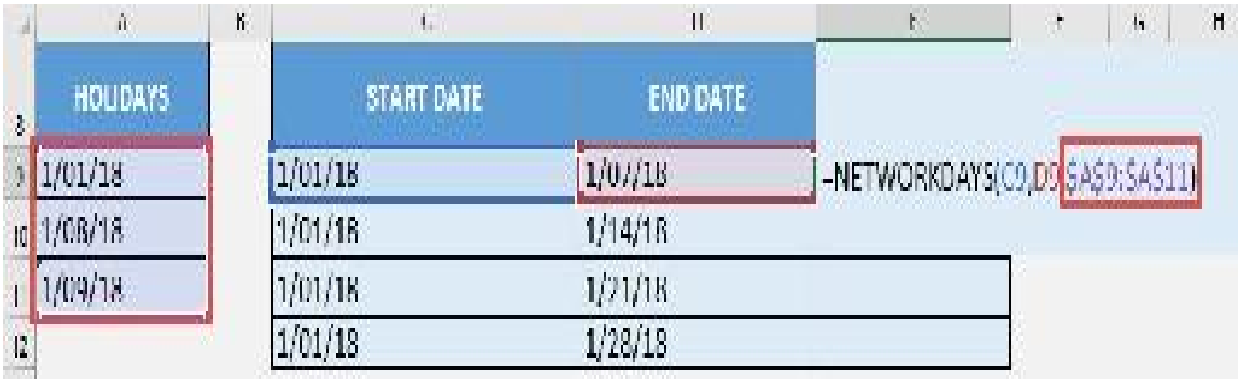
You could tell that Excel was smart enough to get the year of the **left cell which contains the date** without us even making a single change.

For **absolute references**, the reference to a cell is always fixed even if we copy our formula to another cell.

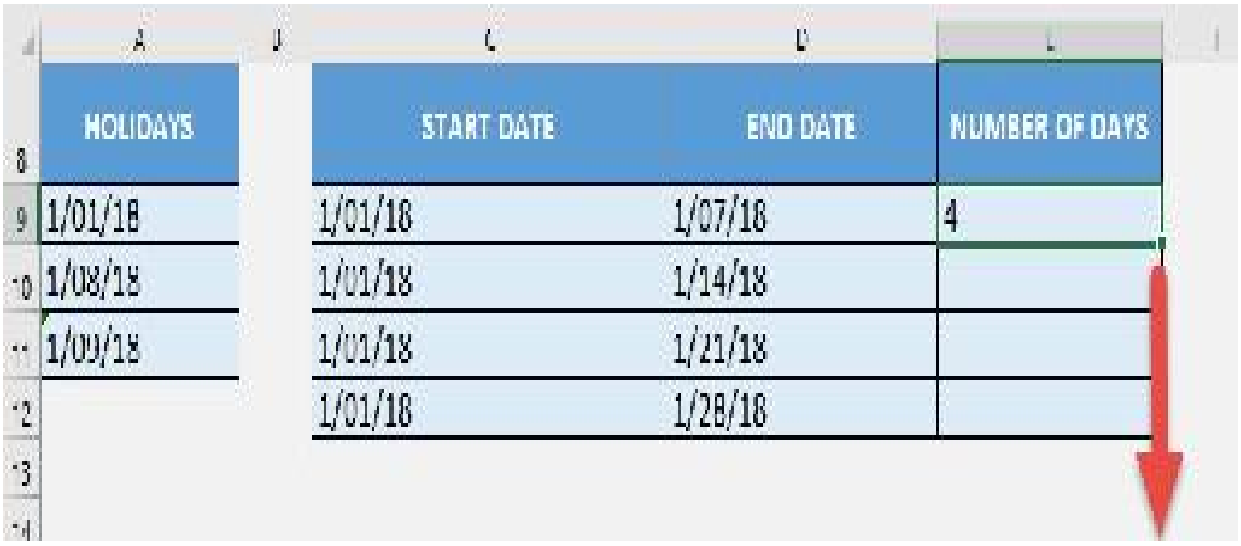
We have this example that uses a NETWORKDAYS function. A NETWORKDAYS Function needs a list of holidays to count the correct number of working days.

Since we want to use the NETWORKDAYS function multiple times, it would make sense to have a single list of holidays for it to use. This is where the absolute reference comes in handy.

An absolute reference contains a $ symbol in front of the column letter and the row number. You can see in our example that it has **$A$9:$A$11** pertaining to our Holiday Table. Notice that there are relative cell references in the formula as well (e.g. **C9 and D9**).



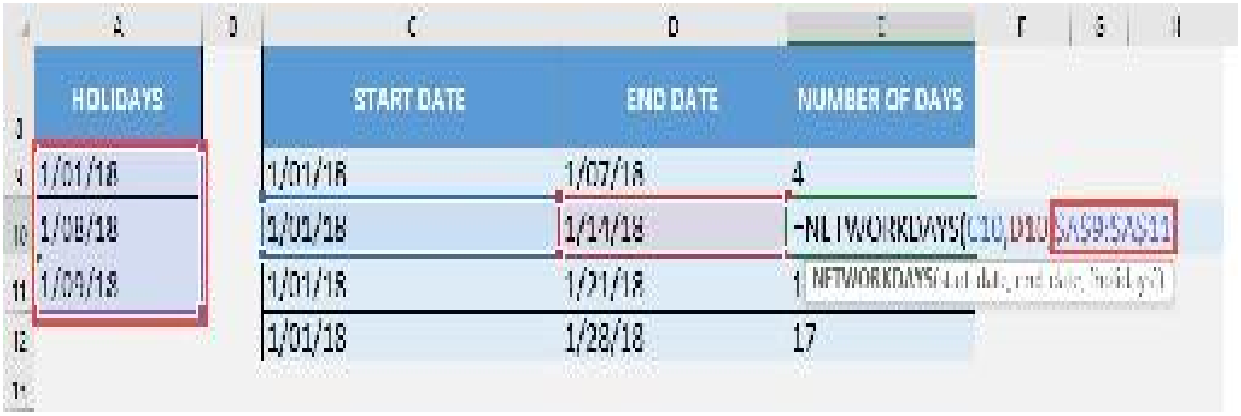
STEP 2: The magic happens when we drag our formula downwards.



HOLIDAYS
1/01/18
1/08/18
1/09/18

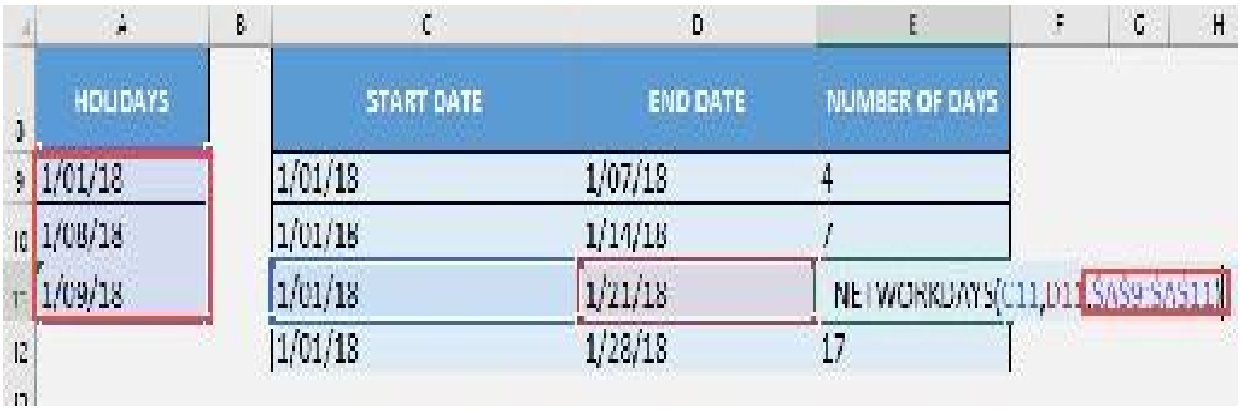
START DATE	END DATE	NUMBER OF DAYS
1/01/18	1/07/18	4
1/01/18	1/14/18	
1/01/18	1/21/18	
1/01/18	1/28/18	

If we look at the other formulas, the Holiday table is exactly the same and has not changed (**$A$9:$A$11)**. While the relative cell references have changed (e.g. **C10 and D10, C11 and D11, C12 and D12**).



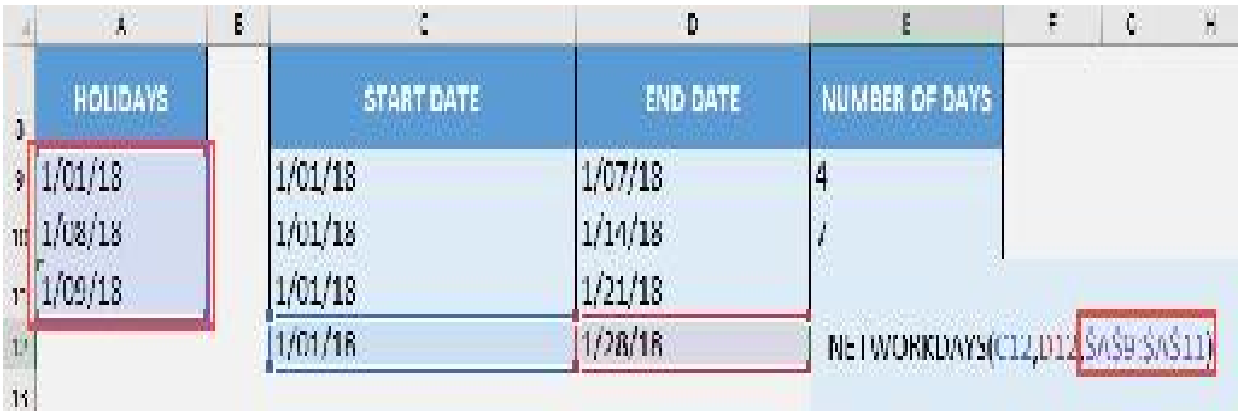
HOLIDAYS
1/01/18
1/08/18
1/09/18

START DATE	END DATE	NUMBER OF DAYS
1/01/18	1/07/18	4
1/01/18	1/14/18	=NETWORKDAYS(C10,D10,$A$9:$A$11)
1/01/18	1/21/18	1 NETWORKDAYS(start_date, end_date, [holidays])
1/01/18	1/28/18	17



HOLIDAYS
1/01/18
1/08/18
1/09/18

START DATE	END DATE	NUMBER OF DAYS
1/01/18	1/07/18	4
1/01/18	1/14/18	7
1/01/18	1/21/18	NETWORKDAYS(C11,D11,$A$9:$A$11)
1/01/18	1/28/18	17



Knowing when to use absolute or relative cell reference will be a crucial skill. It will make your work a lot easier when copying the same formula across multiple cells.

TIP: You can press the F4 key to enter an absolute reference.

Pressing the F4 key multiple times, will change the absolute/relative reference combination to a mixed reference.

Give it a try!

Evaluate Formulas Step By Step

What does it do?

This is one of the coolest tricks I have seen in Excel, as there are countless times where I had a hard time understand formulas. Especially long and complex ones!

Excel provides the way to evaluate your formula, and break it down step by step so that you can understand it!

Let us take the formulas I've created below in the **IS THE VALUE IN BETWEEN** column. We will see how this formula is resolved in a series of steps:

START OF RANGE	END OF RANGE	VALUE TO BE EVALUATED	IS THE VALUE IN BETWEEN?	FORMULA
20	60	50	Yes	IF(C7 MEDIAN(A7:C7), "Yes", "No")
10	40	50	No	=IF(C8=MEDIAN(A8:C8), "Yes", "No")

Exercise Workbook:

DOWNLOAD EXCEL WORKBOOK

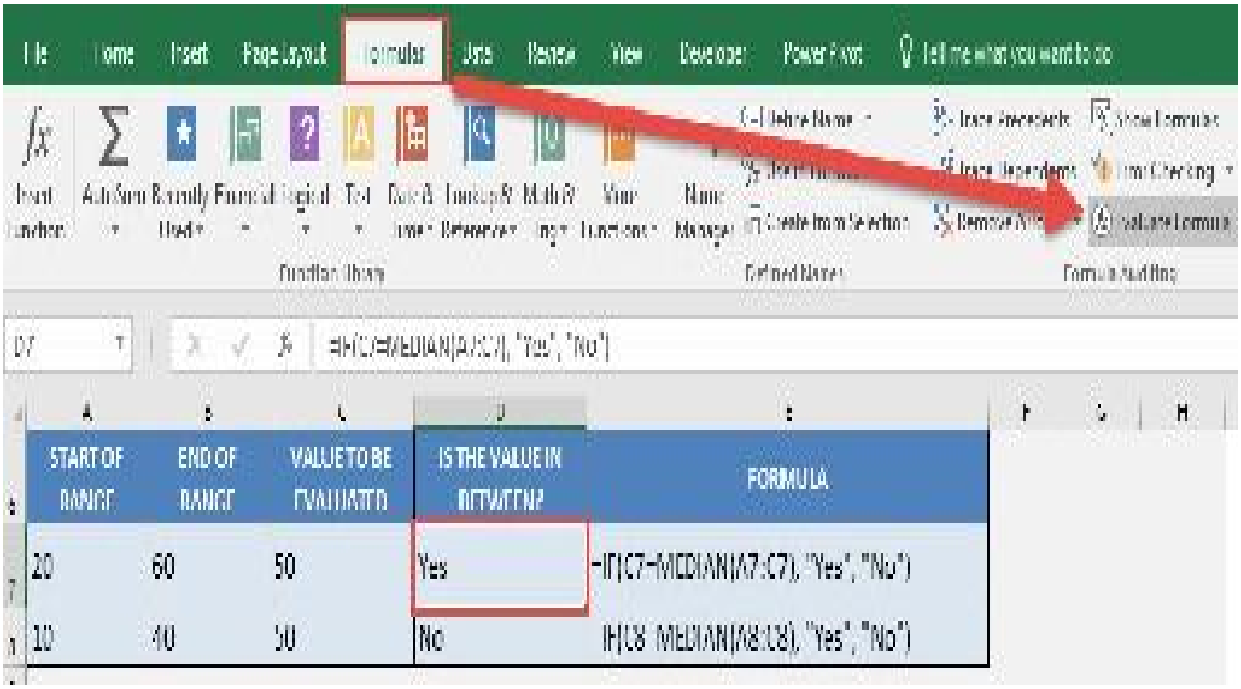
STEP 1: You can see our formula uses both the **If formula** and the **Median formula.**

The goal of this formula is to evaluate if a value (**VALUE TO BE EVALUATED**) is in between the range (**START OF RANGE to VALUE TO BE EVALUATED**)

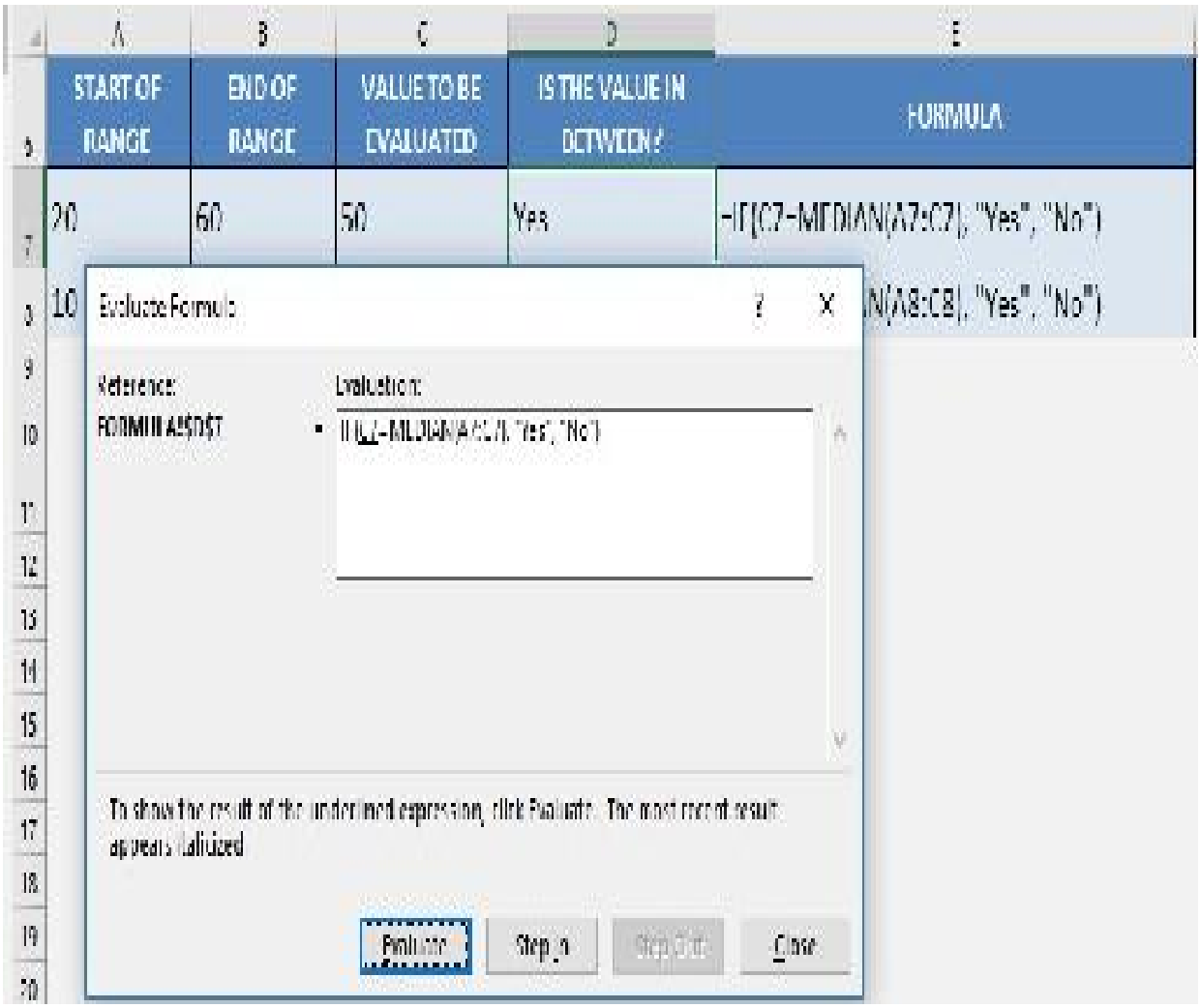
For example: Is 50 the median of the range 20; 60; 50?

=IF(C7=MEDIAN(A7:C7), "Yes", "No")

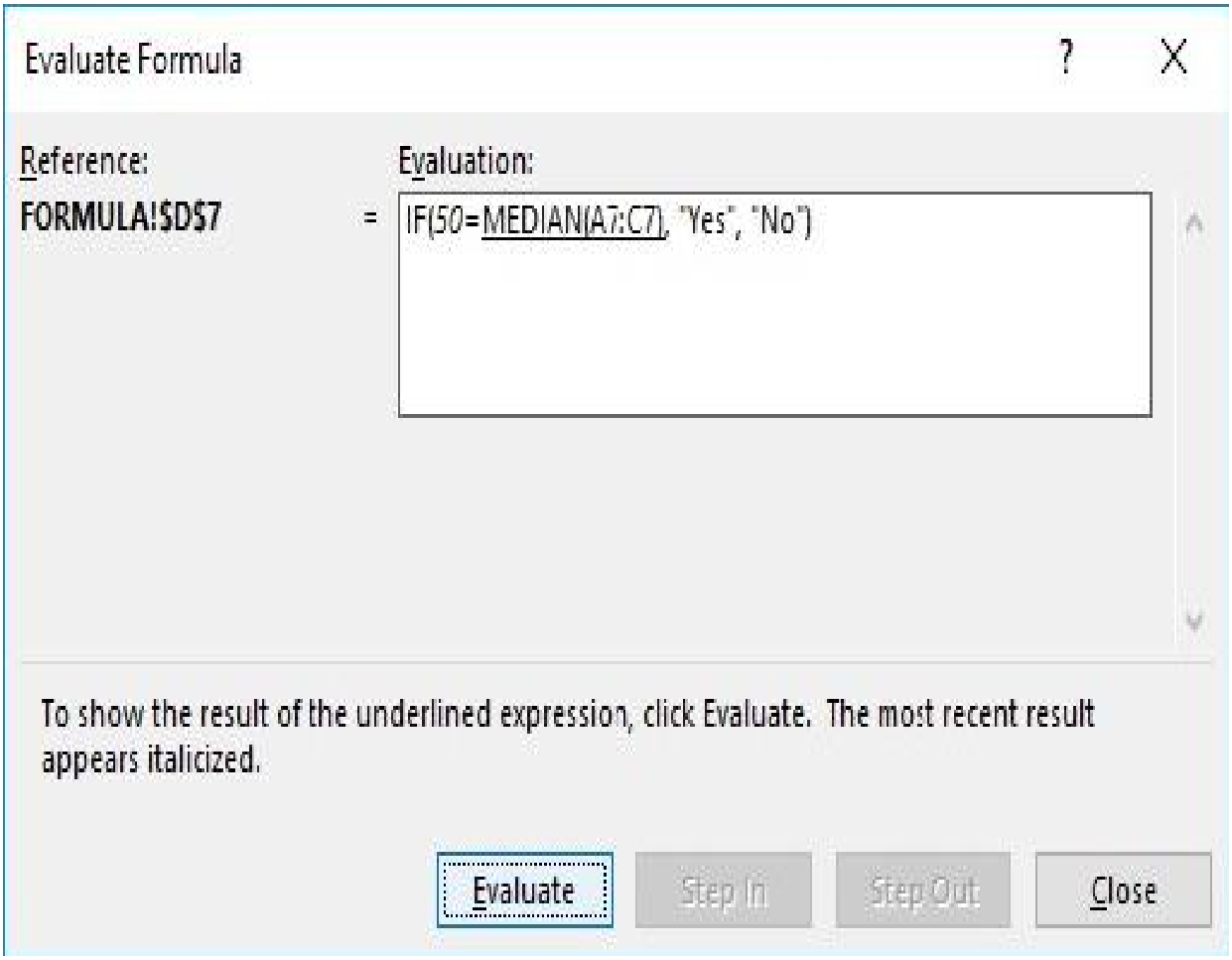
To start understanding our formula, highlight the formula, then go to *Formulas* > *Evaluate Formula***:**



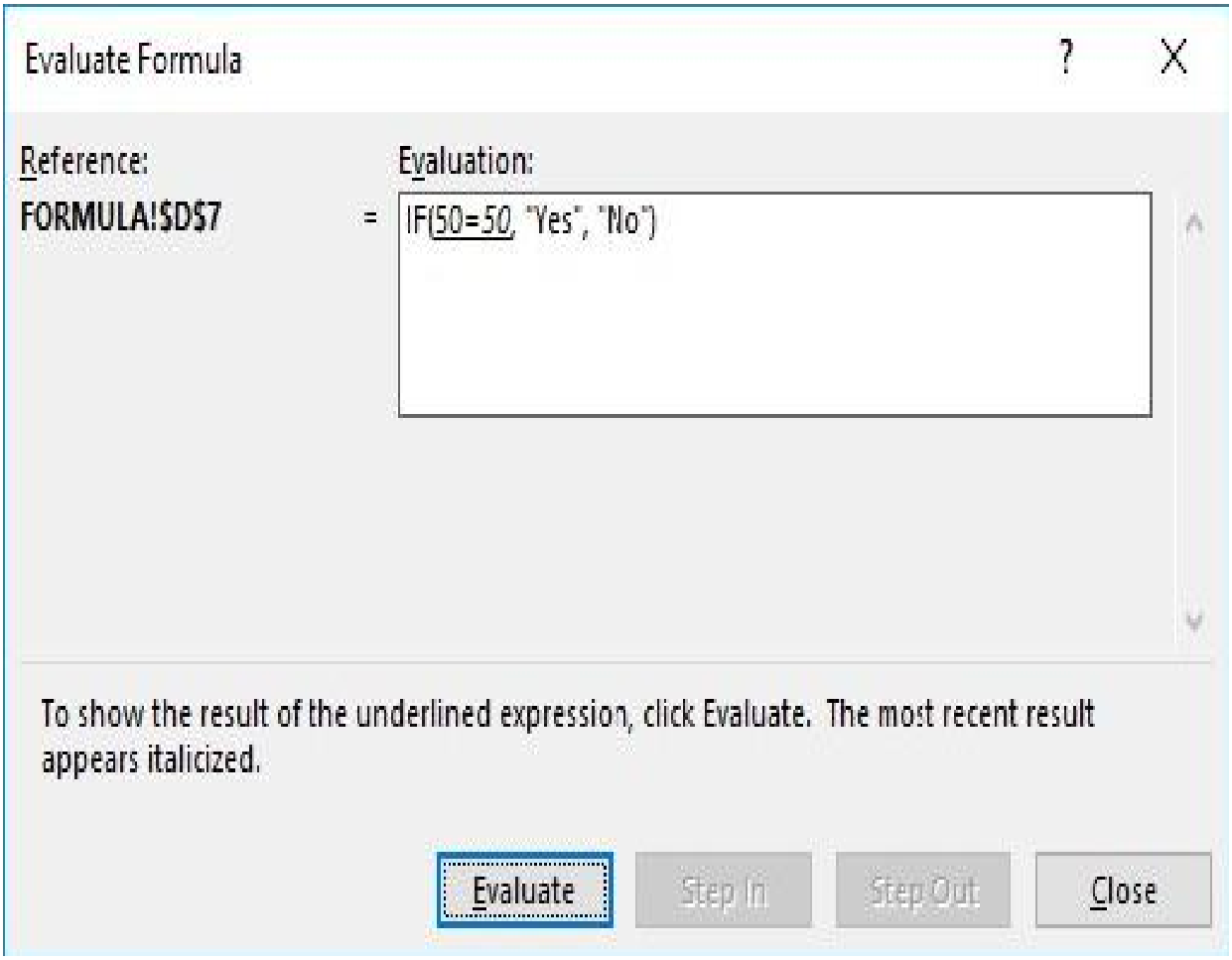
STEP 2: Our formula is now shown on screen, and the part that is underlined is the one to be evaluated first. Click **Evaluate**.



STEP 3: **C7** has been evaluated to **50**. Click **Evaluate**.

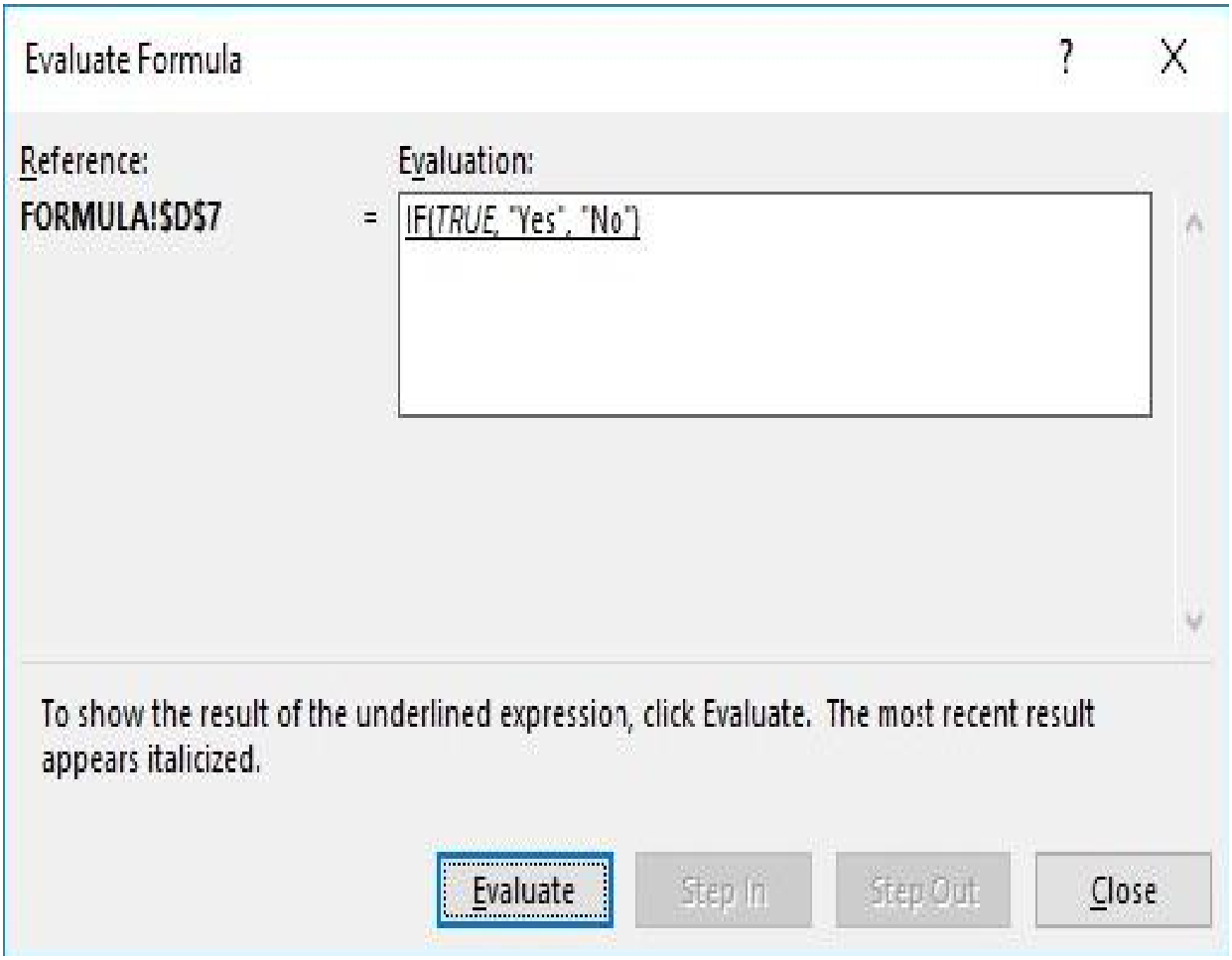


STEP 4: The median of the values from A7 to C7 (20, 60, 50) is evaluated as **50**. Click **Evaluate**.

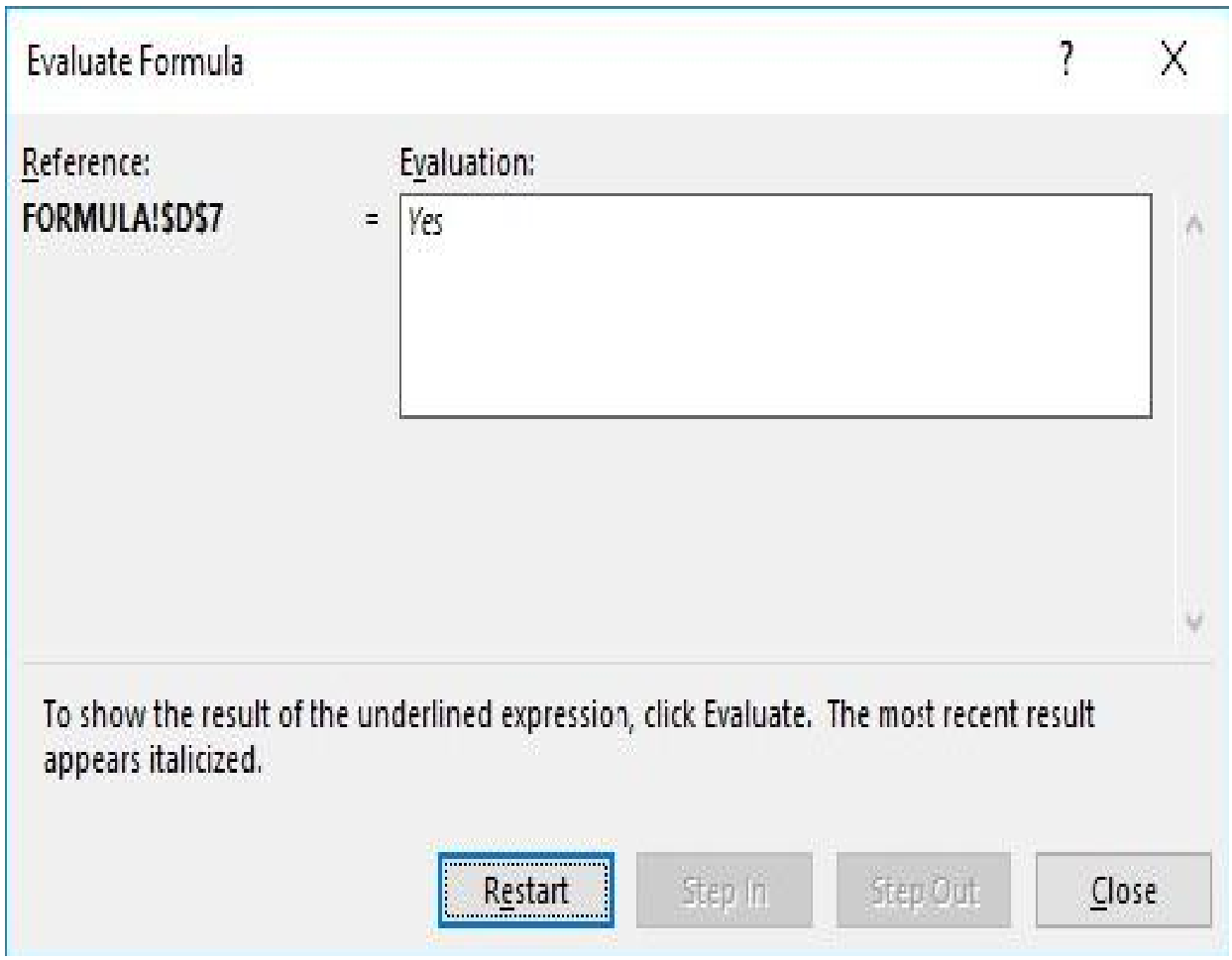


STEP 5: Is 50 equal to 50?

Excel has evaluated it to *TRUE*. Click **Evaluate**.



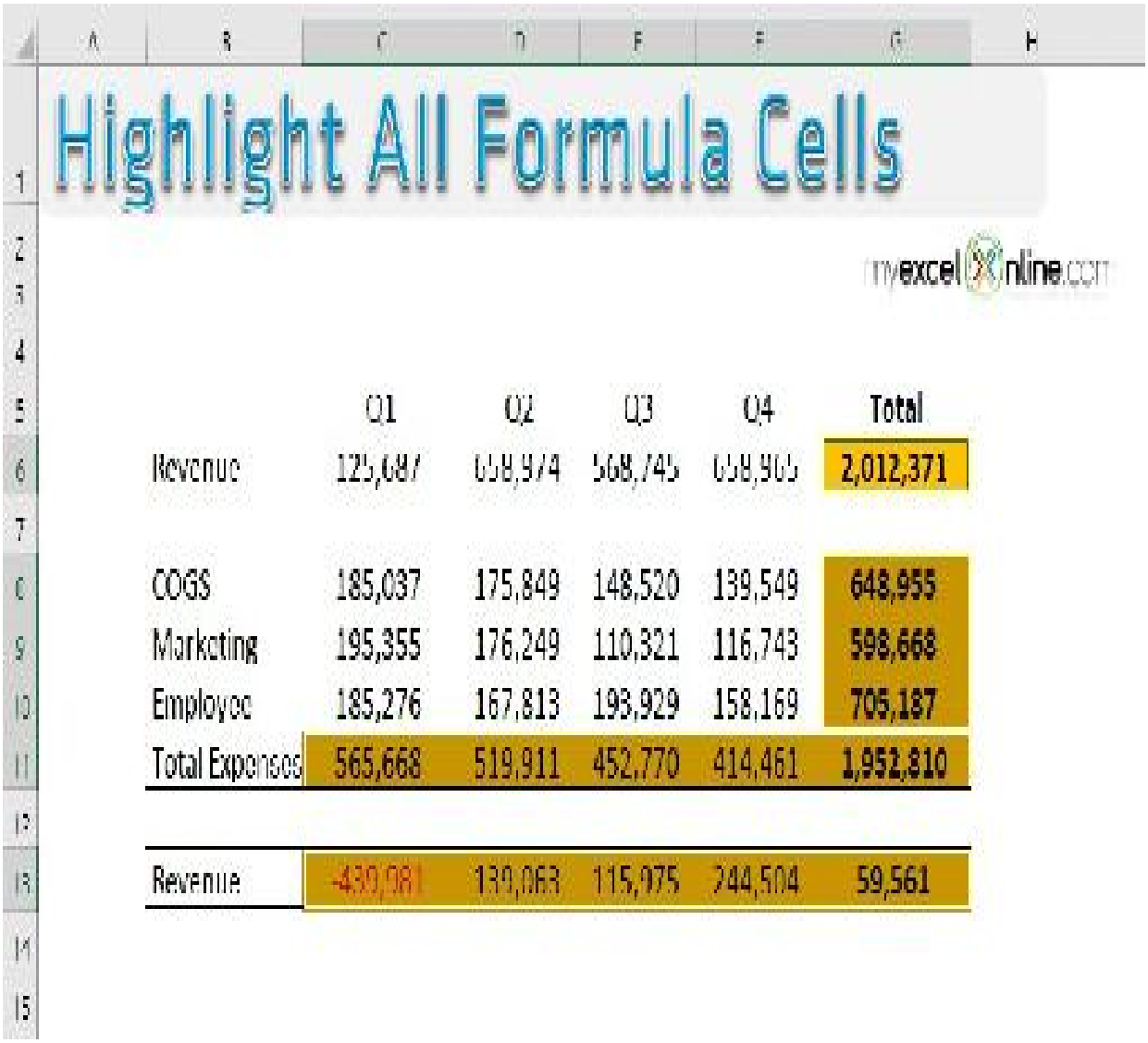
STEP 6: Since the **If formula** received a ***TRUE***, Excel evaluated it as a **Yes** end result. We have seen how the formula gave us the result in a few easy steps!


Evaluate Formula
Reference:
FORMULA!$D$7
=
Evaluation:
Yes
To show the result of the underlined expression, click Evaluate. The most recent result appears italicized.
Restart
Step In
Step Out
Close

Highlight All Excel Formula Cells

What does it do?

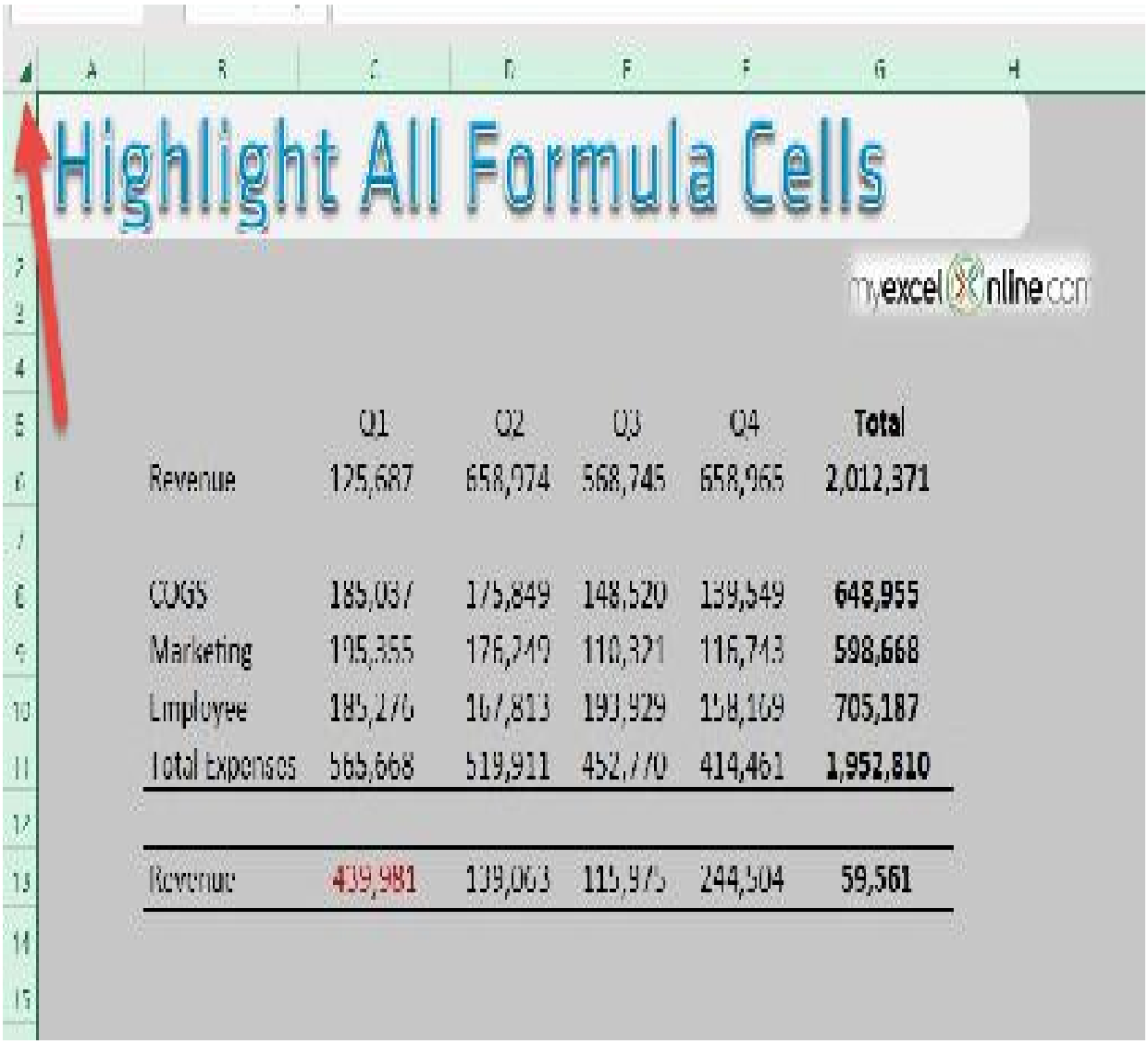
Whenever you are auditing an Excel worksheet and need to know where all the formulas are located, a great way is to highlight the formula cells in a distinctive color.



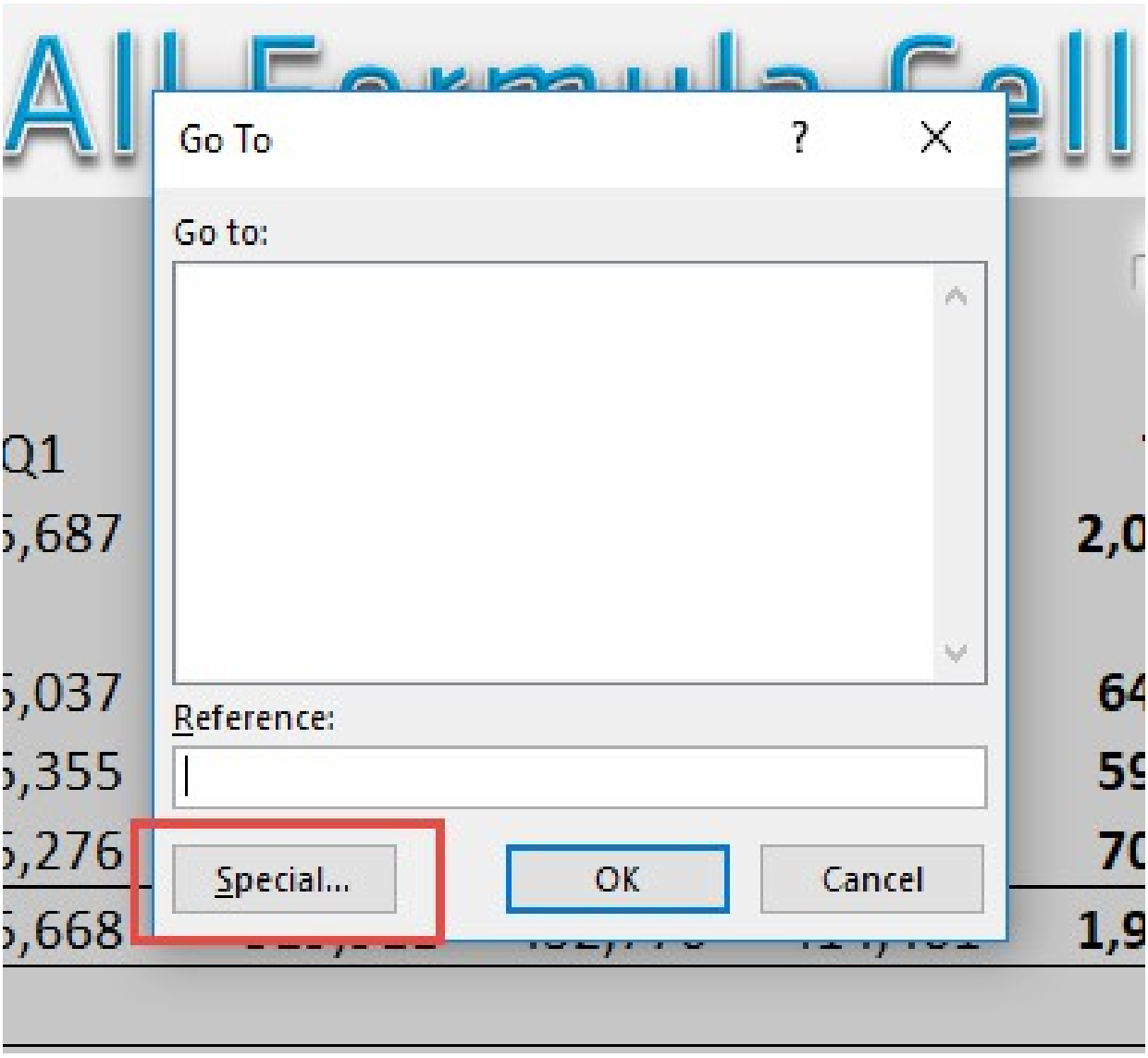
Exercise Workbook:

DOWNLOAD EXCEL WORKBOOK

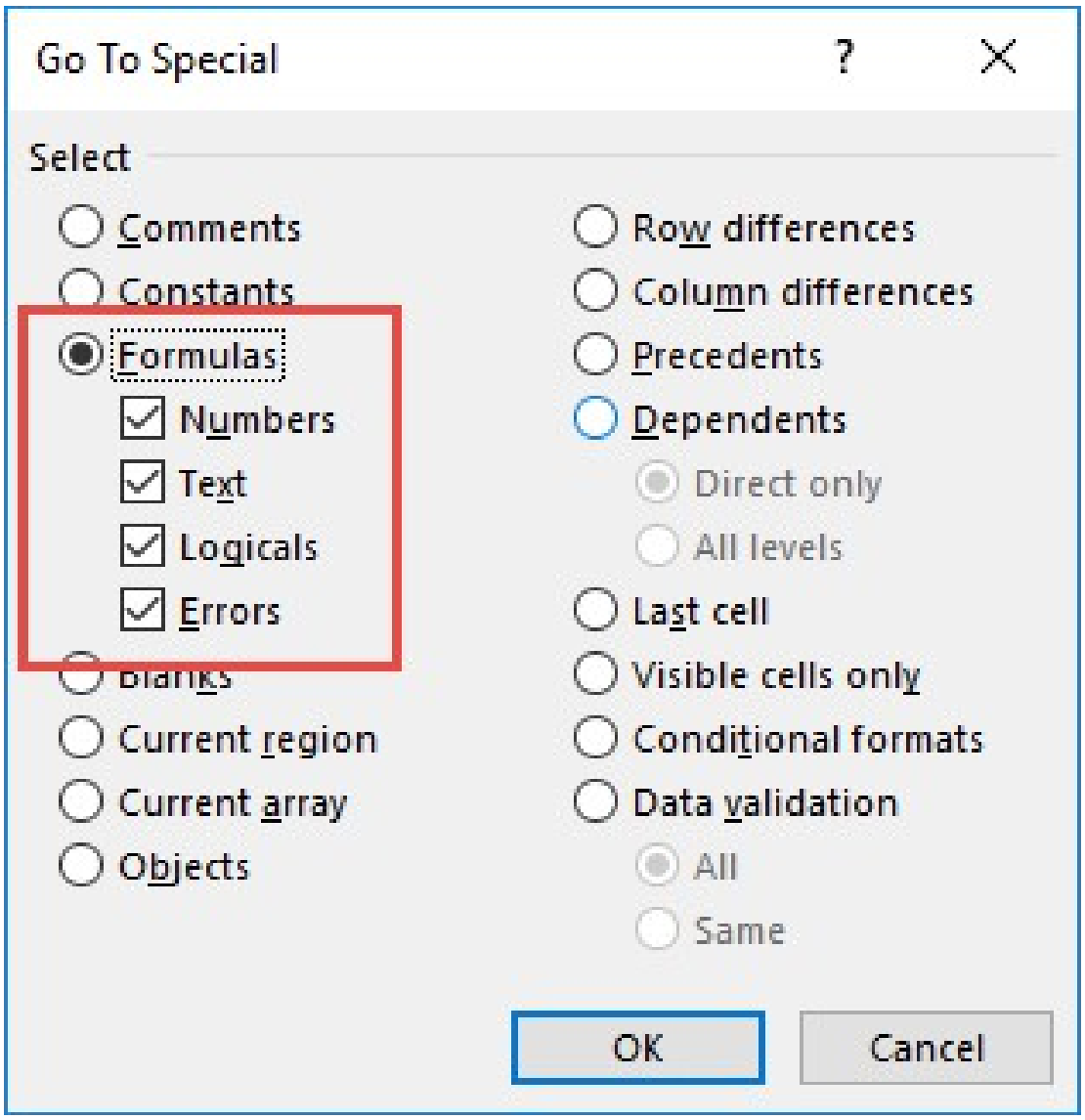
STEP 1: Select all the cells in your Excel worksheet by clicking on the top left hand corner of your worksheet.



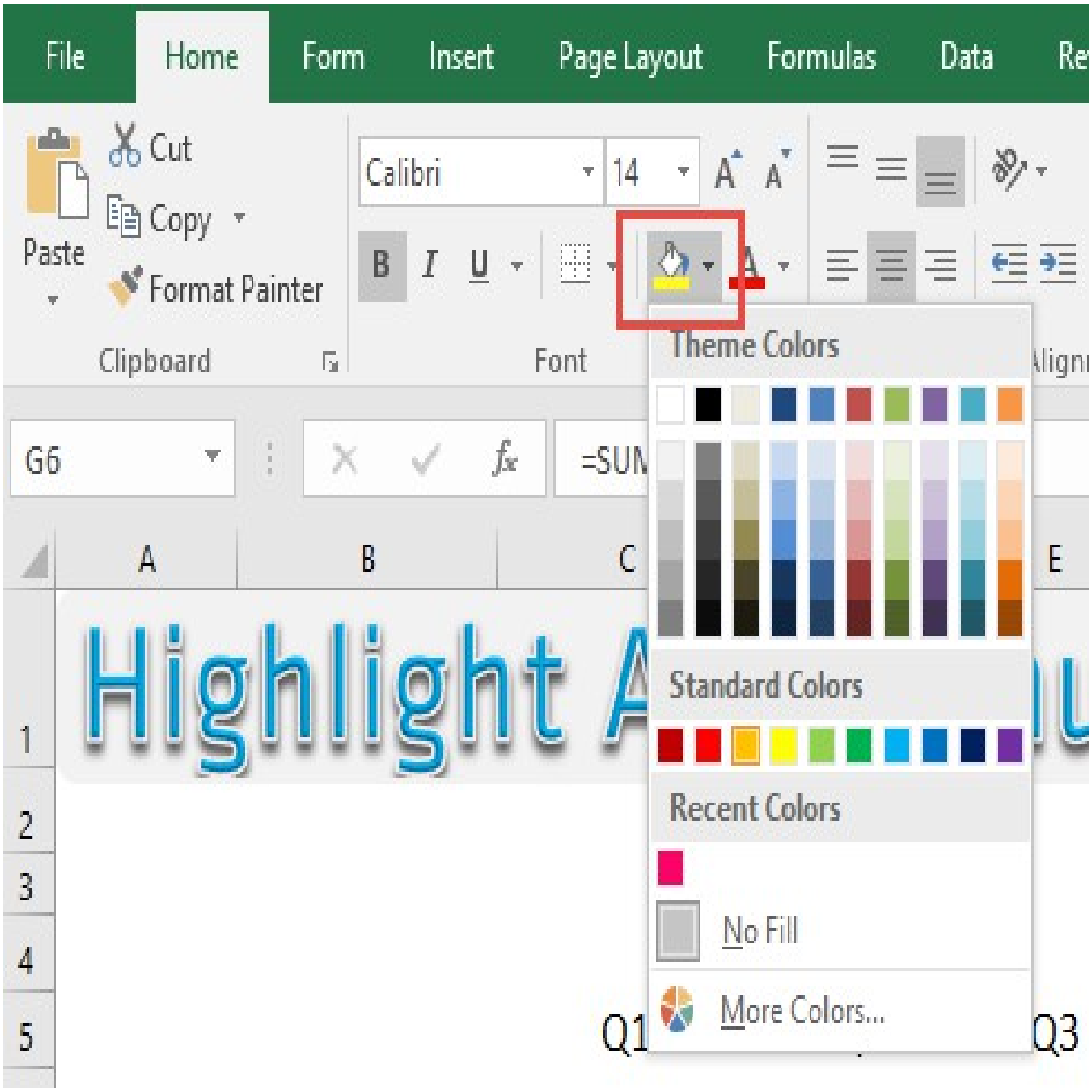
STEP 2: Press the ***CTRL+G*** shortcut which will open up the ***Go To*** dialogue box and select the *Special* button.



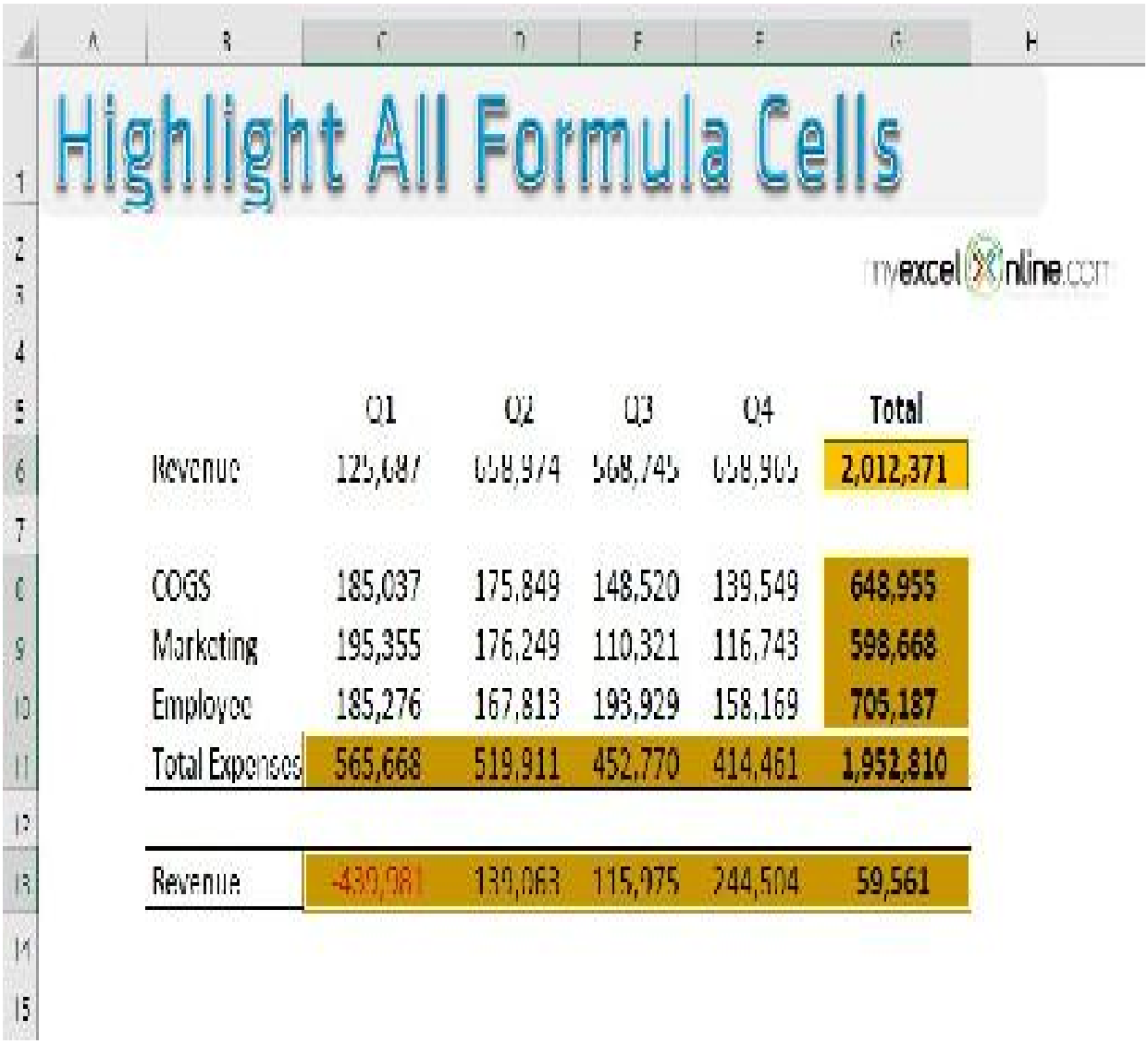
STEP 3: Select the ***Formula*** radio button and press ***OK***.



STEP 4: This will highlight all the formulas in your Excel worksheet and you can use the ***Fill Color*** to color in the formula cells.



And now all your cells containing formulas are now highlighted!

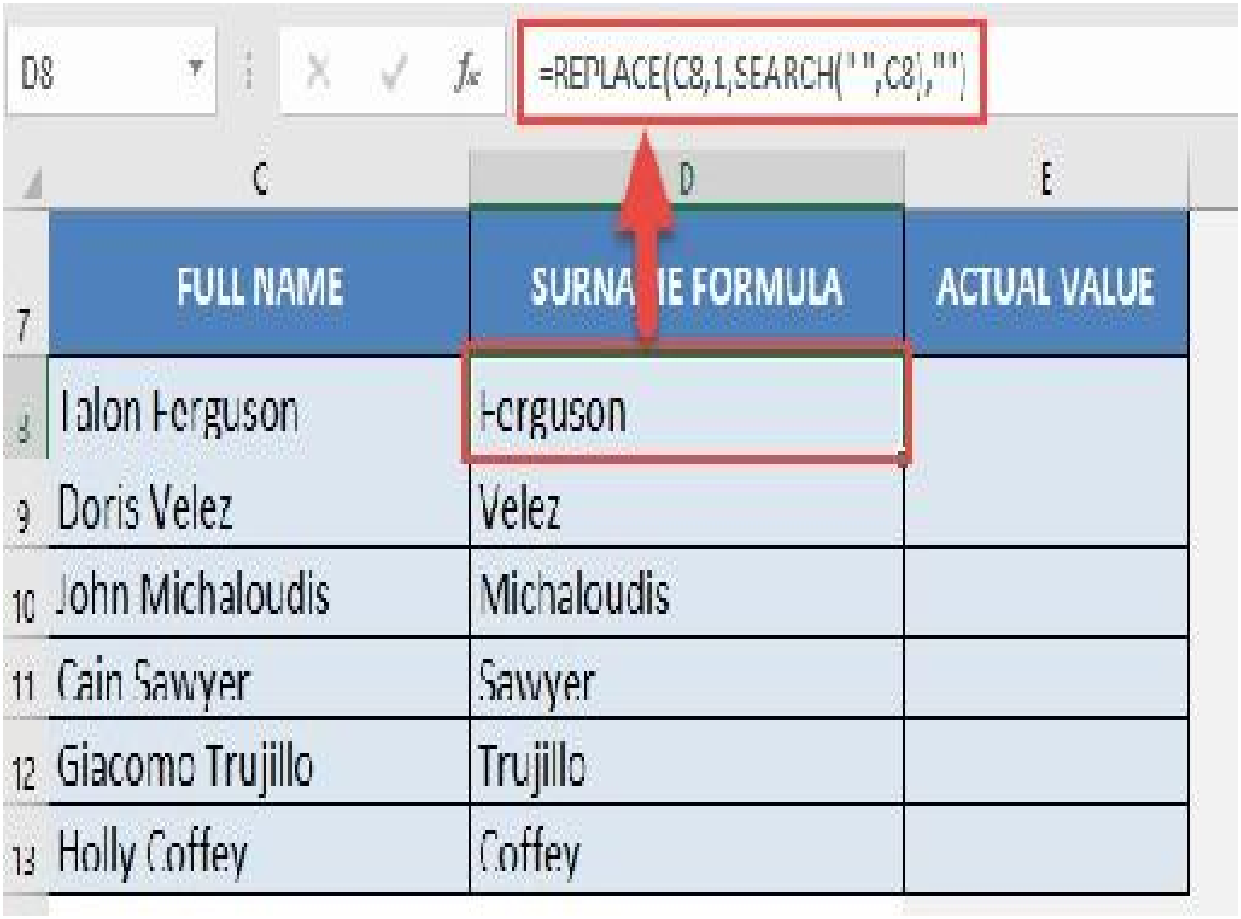

Highlight All Formula Cells
myexcelonline.com
Q1
Q2
Q3
Q4
Total
Revenue
125,687
658,974
568,745
658,965
2,012,371
COGS
185,037
175,849
148,520
139,549
648,955
Marketing
195,355
176,249
110,321
116,743
598,668
Employee
185,276
167,813
193,929
158,169
705,187
Total Expenses
565,668
519,911
452,770
414,461
1,952,810
Revenue
-439,981
139,063
115,975
244,504
59,561

How to Convert Formulas to Values

What does it do?

Have you ever had a scenario where you write a formula and just want to show the value output only and get rid of the formula?

Here is an example of a formula:



Well I do not need the formula, bit I do want the last names only....hard copied!

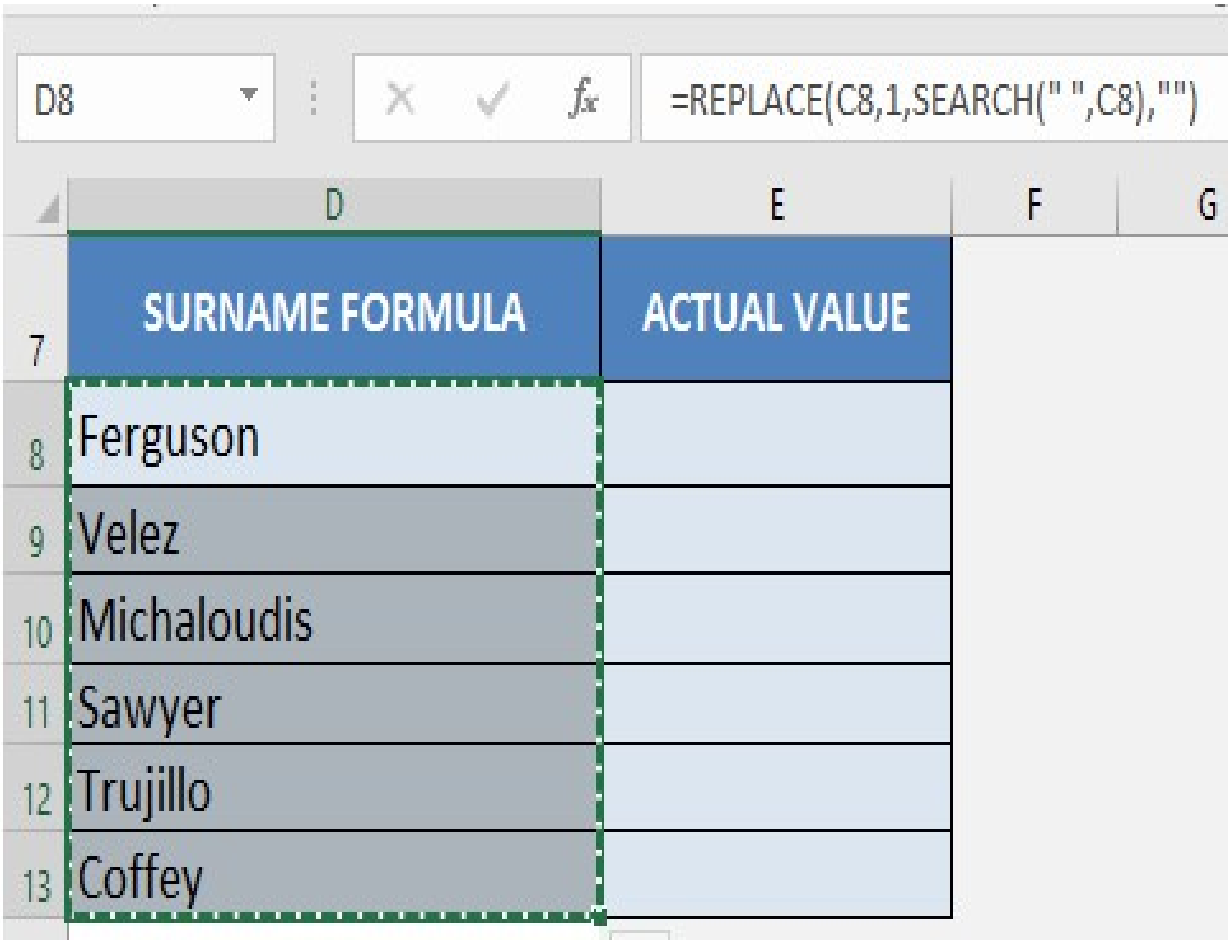
Fortunately, I have discovered two ways that you can achieve this...

Exercise Workbook:

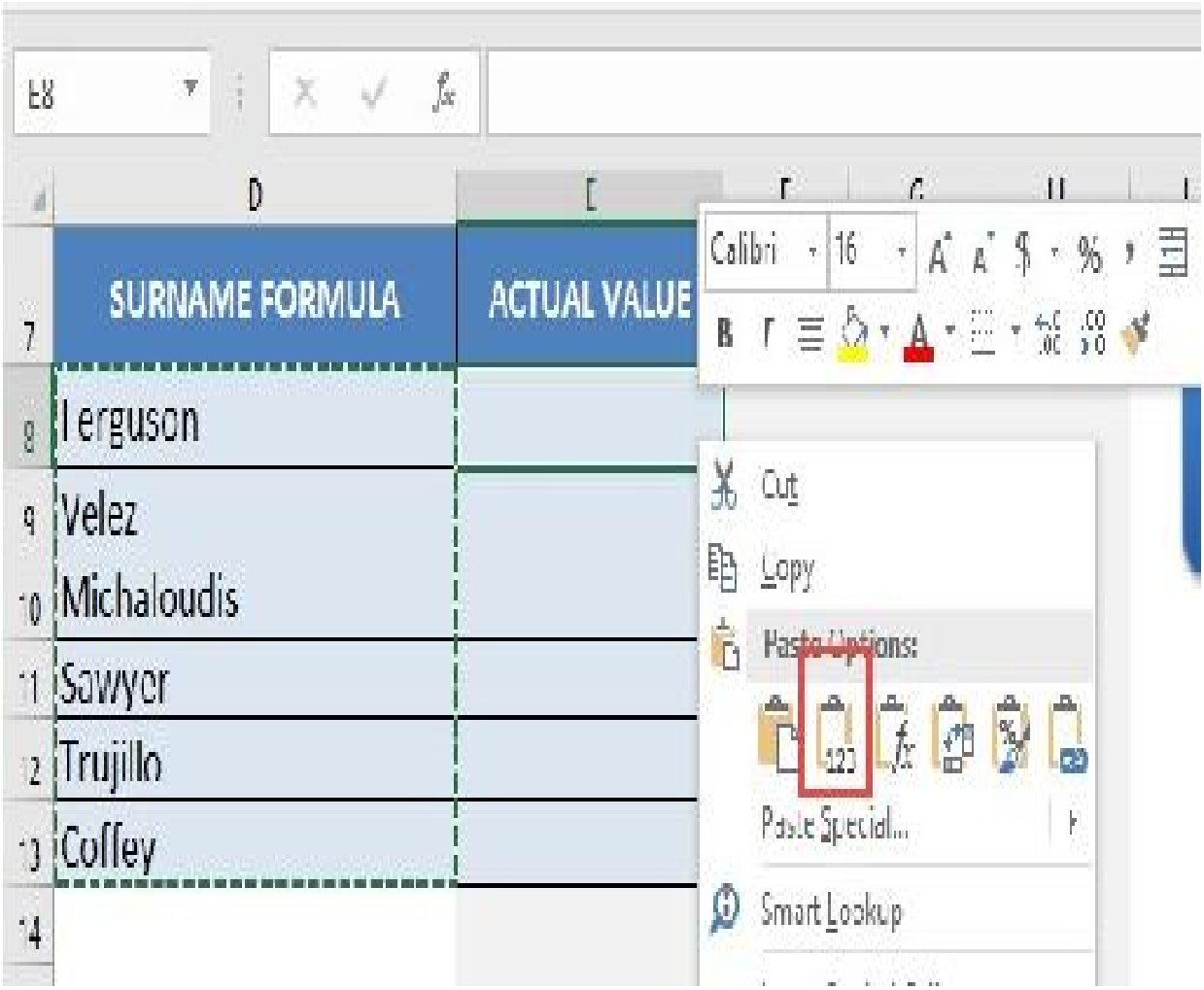
DOWNLOAD EXCEL WORKBOOK

STEP 1: Select the area that contains the formulas.

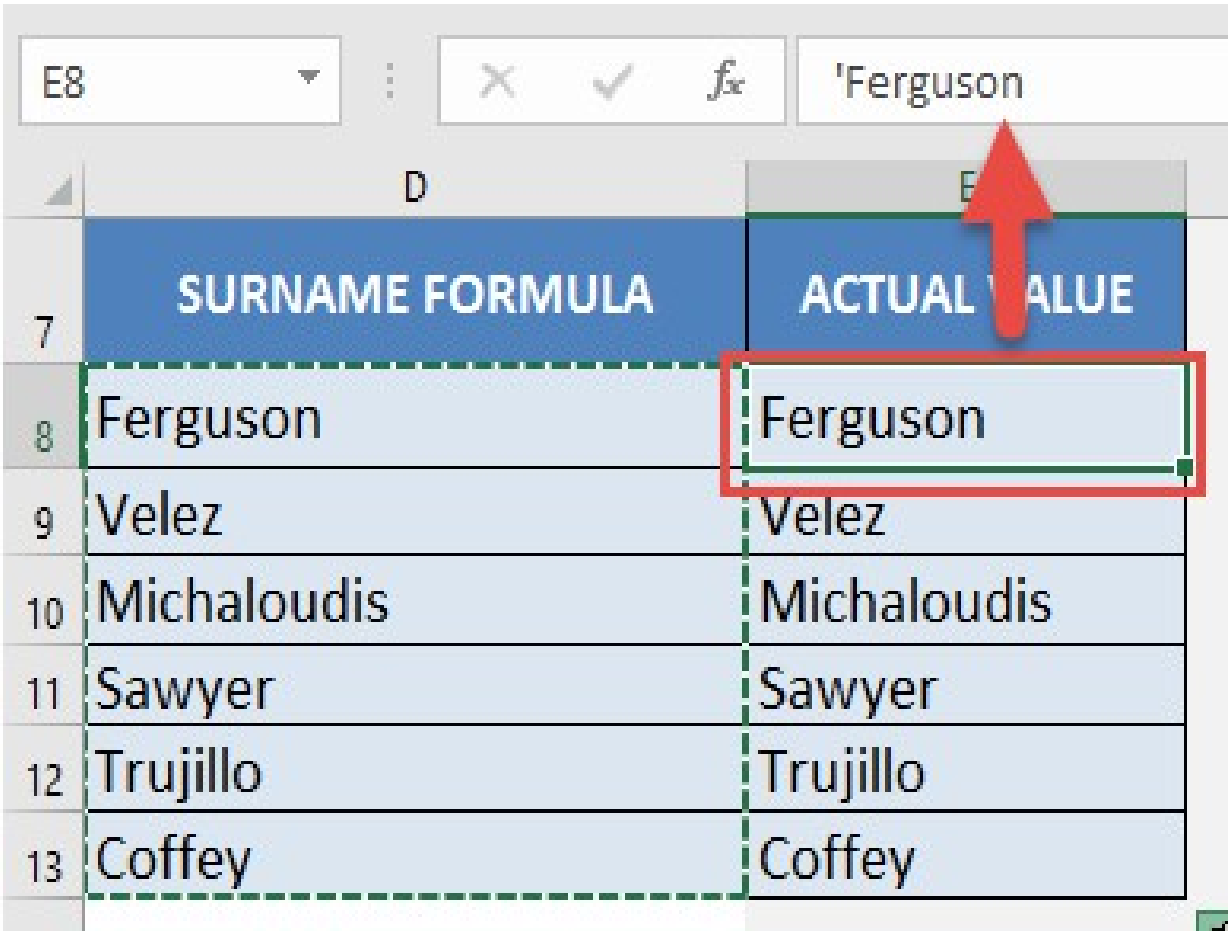
Click ***CTRL+C***



On the column that you want to place the values on, **right-click** and select **Paste Values:**



You can see that the actual values are now stored in that column!

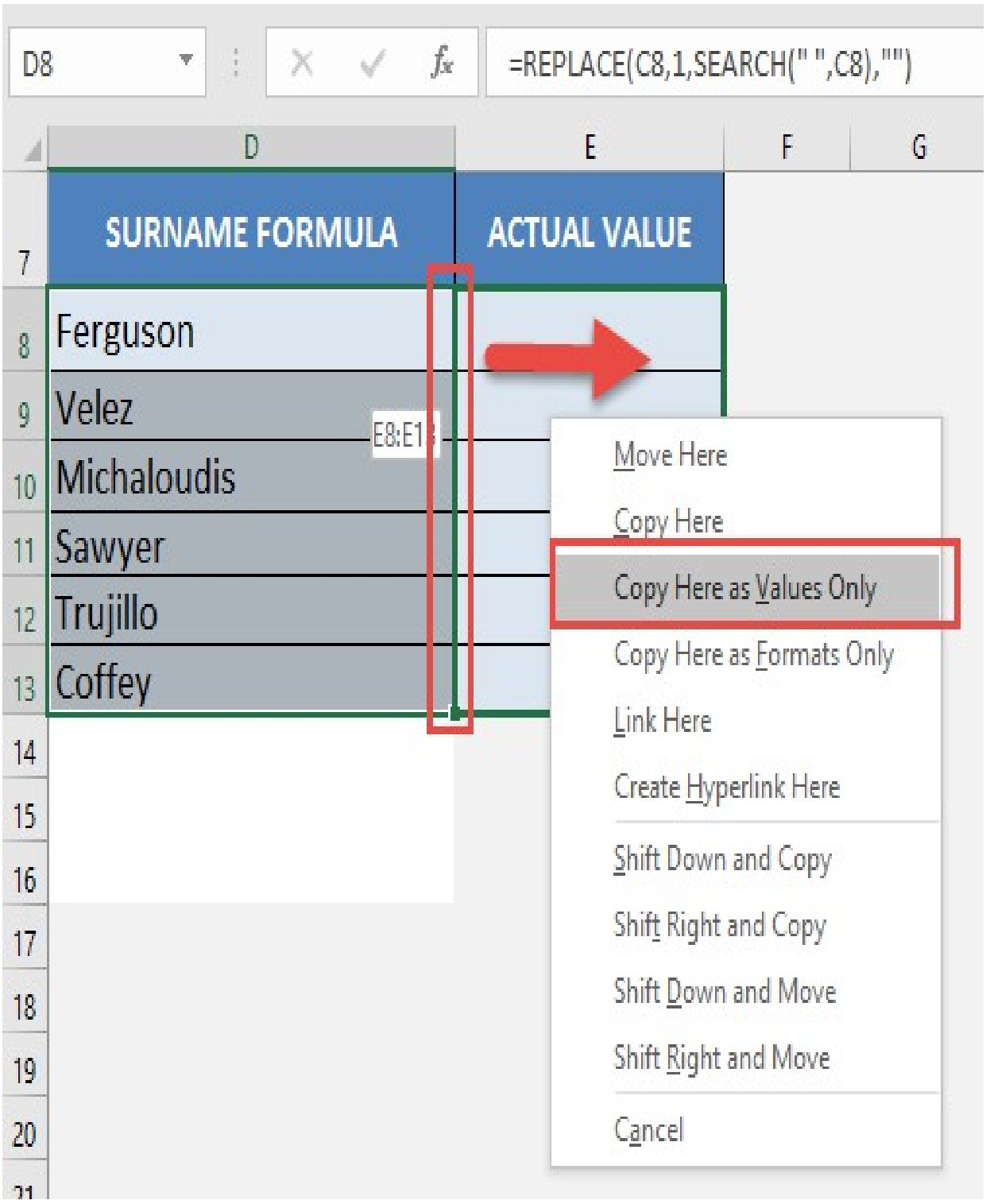


STEP 2: Here's an alternative way. Select the area that contains the formulas.

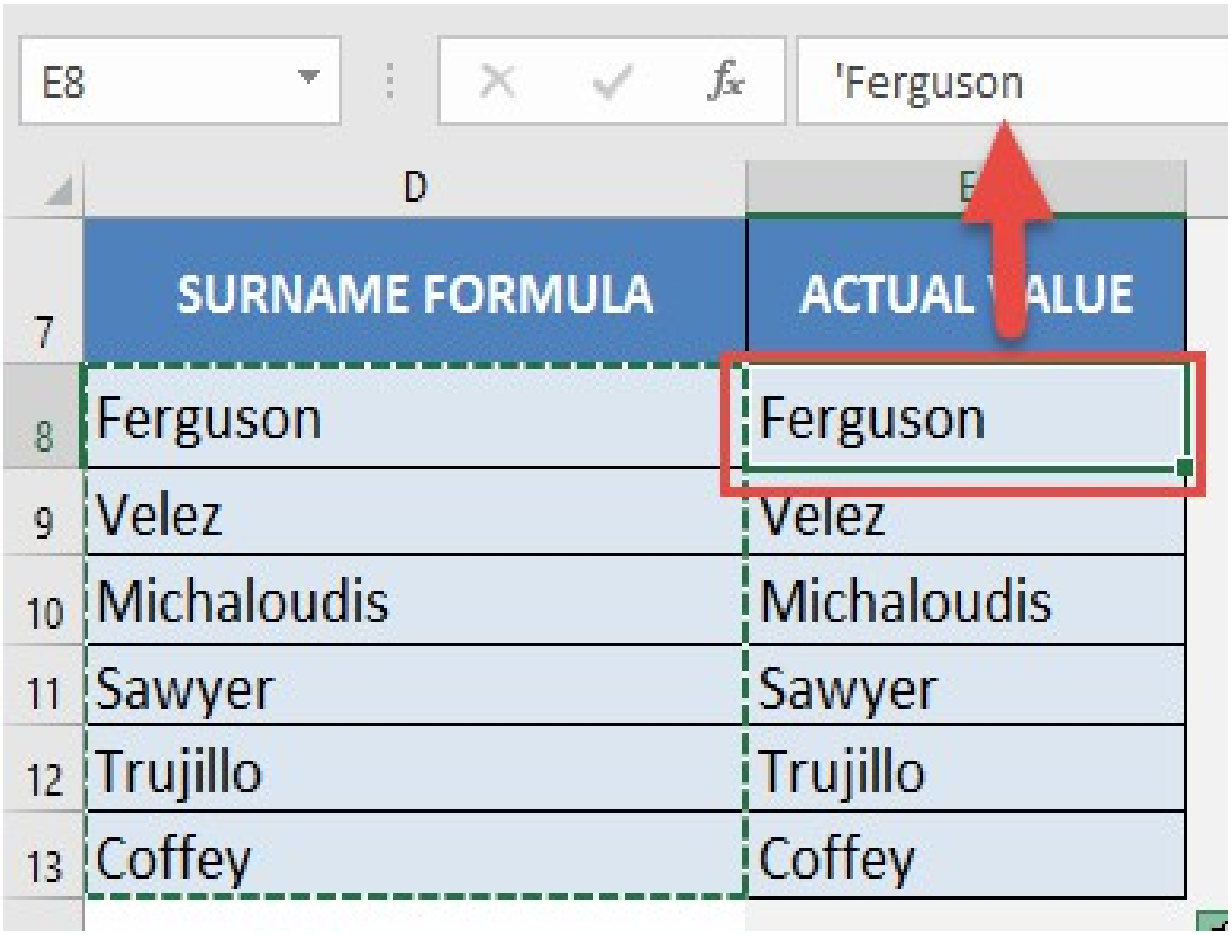
Right-click and hold on the **right border**.

Drag the border, whilst holding down the right-click on your mouse, to the area you want the values to be placed in.

Select **Copy Here as Values Only.**



You now have the actual values hardcoded!


E8
'Ferguson
D
E
SURNAME FORMULA
ACTUAL VALUE
7
8 Ferguson Ferguson
9 Velez Velez
10 Michaloudis Michaloudis
11 Sawyer Sawyer
12 Trujillo Trujillo
13 Coffey Coffey

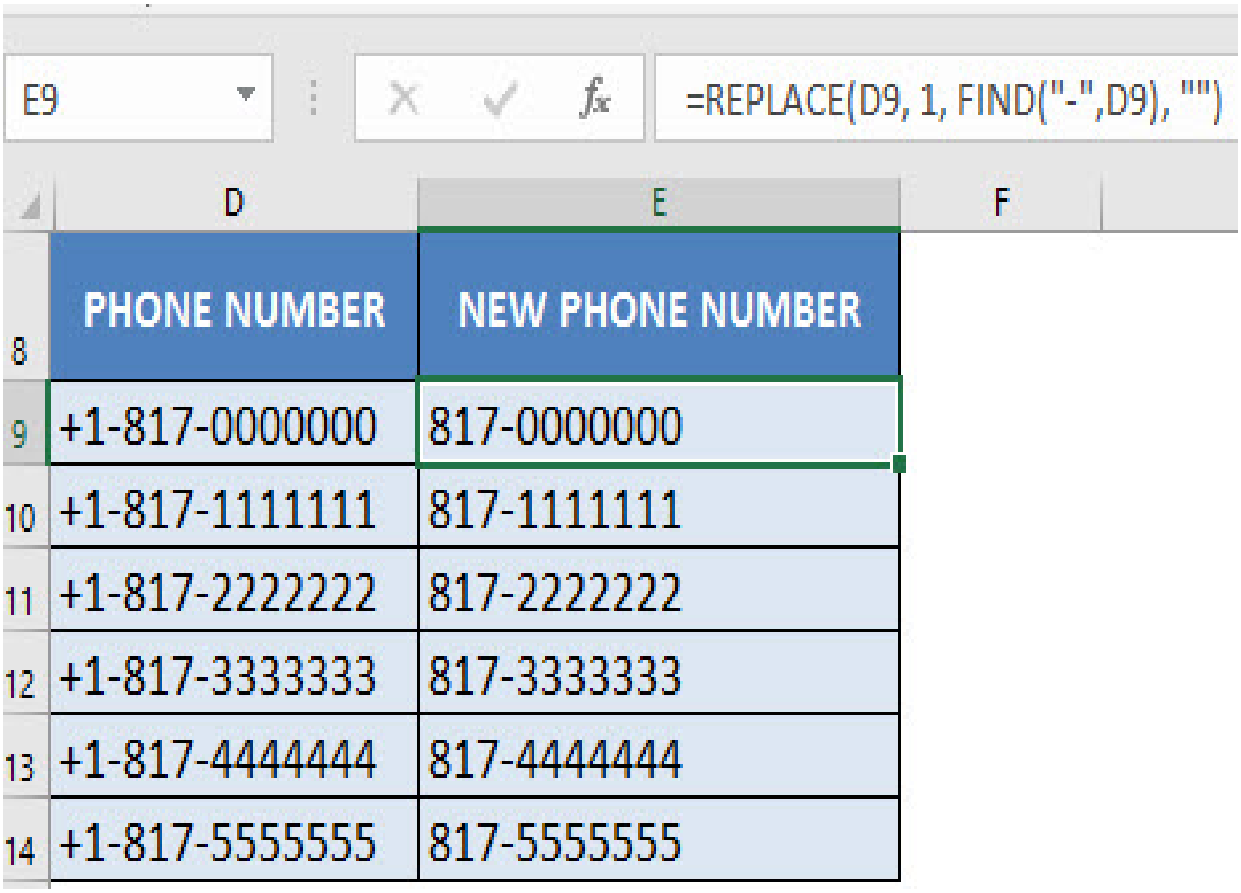
How to Show & Hide Formulas in Excel

What does it do?

When I have a sheet full of Excel formulas, sometimes I want to quickly check how each formula looks like. This is great for spreadsheet auditing.

It is very easy to do so in Excel!

Here is our sample worksheet with formulas:

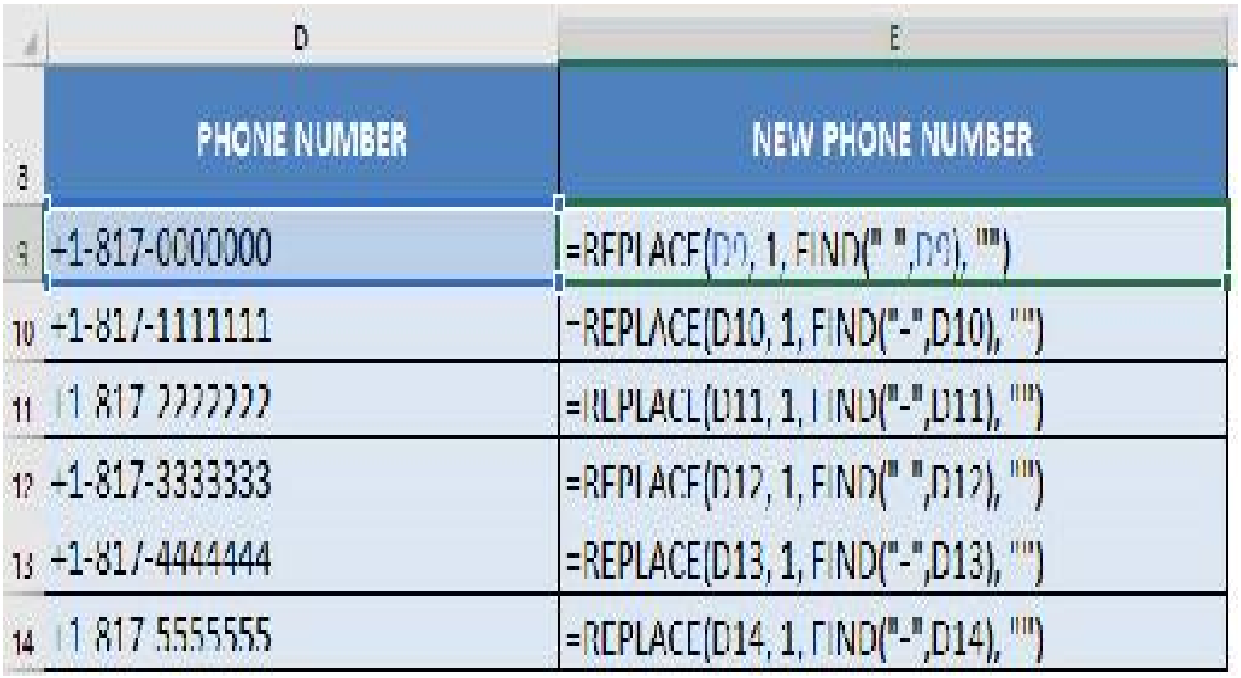


Exercise Workbook:

DOWNLOAD EXCEL WORKBOOK

STEP 1: Press on your keyboard the following keys: **Ctrl** + `

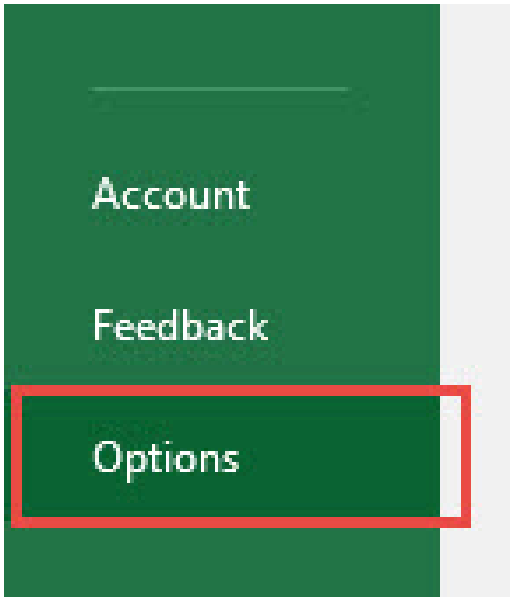
The (`) key is usually located on the upper left part of your keyboard. This will show all your Excel formulas in your worksheet!



	D	E
8	PHONE NUMBER	NEW PHONE NUMBER
9	+1-817-0000000	=REPLACE(D9, 1, FIND(" ",D9), "")
10	+1-817-1111111	=REPLACE(D10, 1, FIND("-",D10), "")
11	+1 817 2222222	=REPLACE(D11, 1, FIND("-",D11), "")
12	+1-817-3333333	=REPLACE(D12, 1, FIND(" ",D12), "")
13	+1-817-4444444	=REPLACE(D13, 1, FIND("-",D13), "")
14	+1 817 5555555	=REPLACE(D14, 1, FIND("-",D14), "")

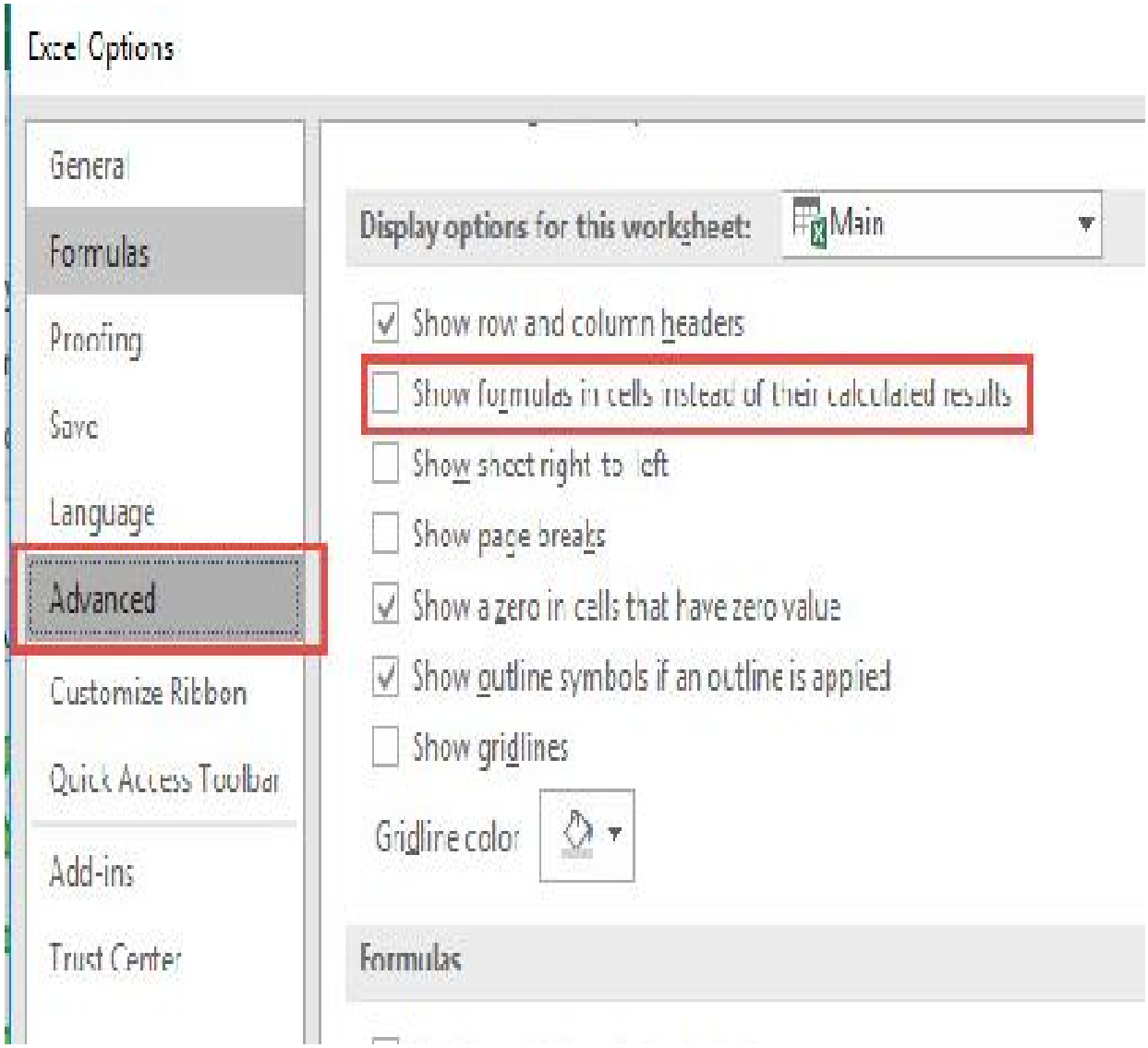
Press the **Ctrl** + ` combination again to hide the formulas.

STEP 2: If you prefer to set this via Excel Options, another way is to go to **File > Options**



STEP 3: Go to **Advanced> Display Options for this Worksheet > Show formulas in cells instead of their calculated fields**

Ensure this is checked.



The formulas are all shown now too! You can uncheck it to hide the formulas again.

PHONE NUMBER	NEW PHONE NUMBER
+1-817-0000000	=REPLACE(D9, 1, FIND(" ",D9), "")
11 817 1111111	=REPLACE(D10, 1, FIND("-",D10), "")
+1-817-2222222	=REPLACE(D11, 1, FIND("-",D11), "")
+1-817-3333333	=REPLACE(D12, 1, FIND("-",D12), "")
+1-817-4444444	=REPLACE(D13, 1, FIND("-",D13), "")
+1-817-5555555	=REPLACE(D14, 1, FIND(" ",D14), "")

Jump to a Cell Reference in a Formula

What does it do?

When writing, editing or auditing Excel formulas you will come across a scenario where you want to view and access the referenced cells within a formula argument.

This is helpful if you want to check how the formula works or to make any changes to the formula.

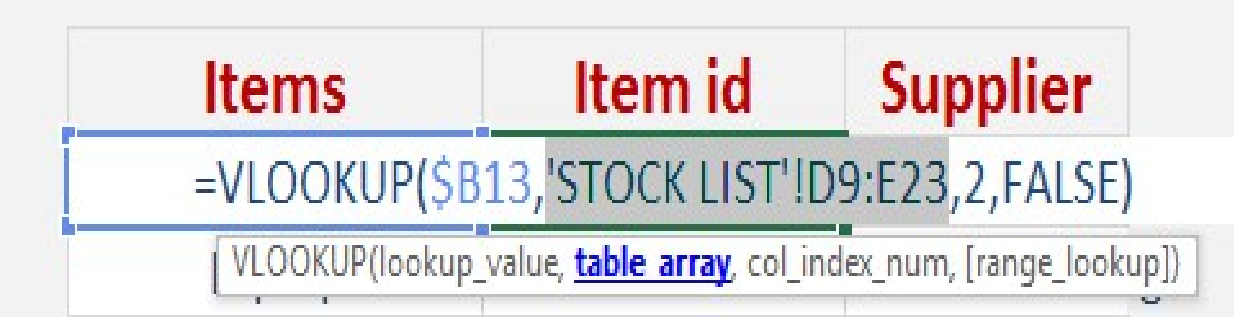
There is a cool tip where you can jump to the referenced cell or range within the formula and make your changes.

Exercise Workbook:

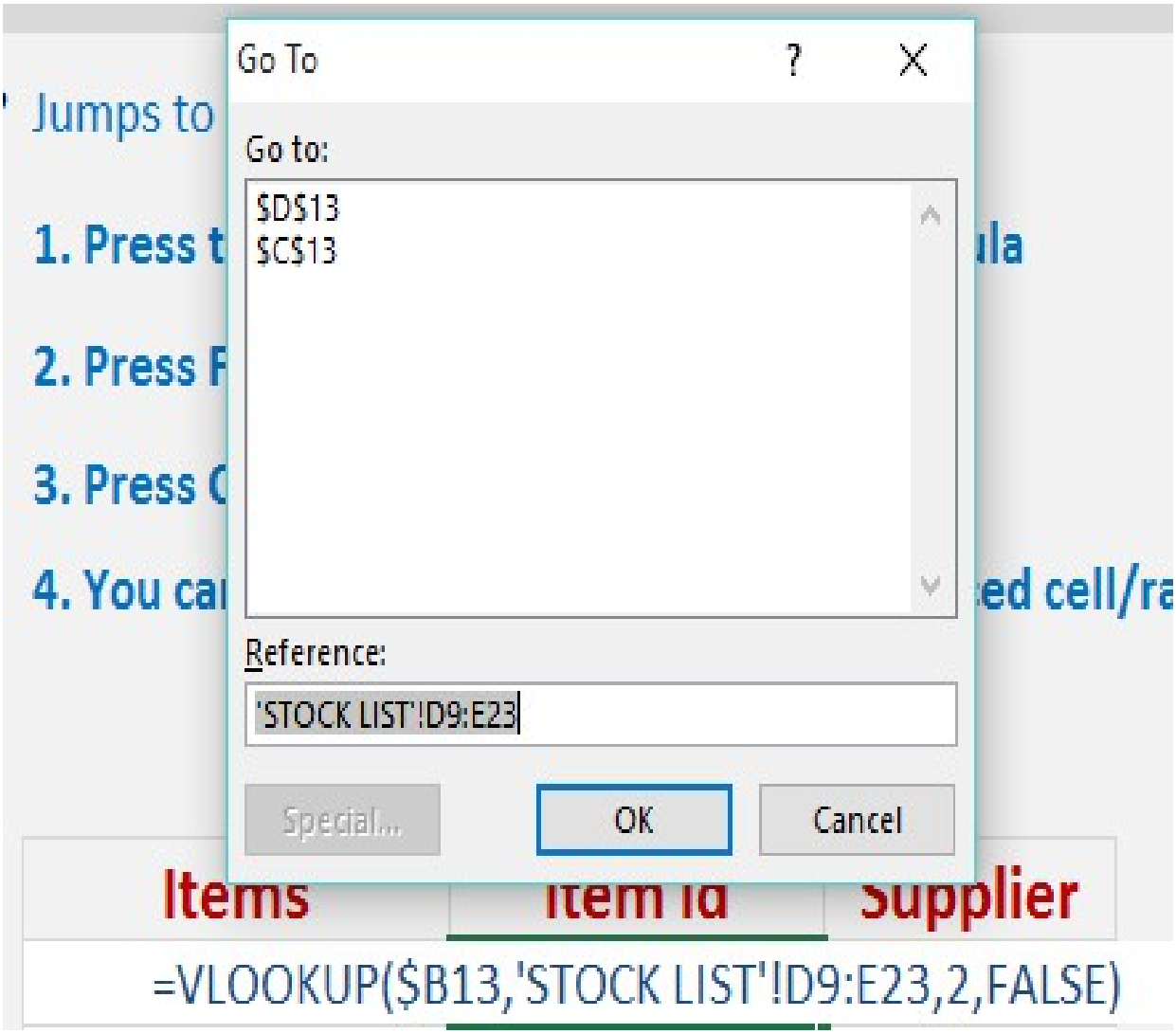
DOWNLOAD EXCEL WORKBOOK

STEP 1: **Double click** inside your Excel formula

STEP 2: **Select the formula argument** that you want to edit with your mouse



STEP 3: Press **F5** which will bring up the Go To dialogue box and press **OK**



STEP 4: This will take you to the referenced cell/range

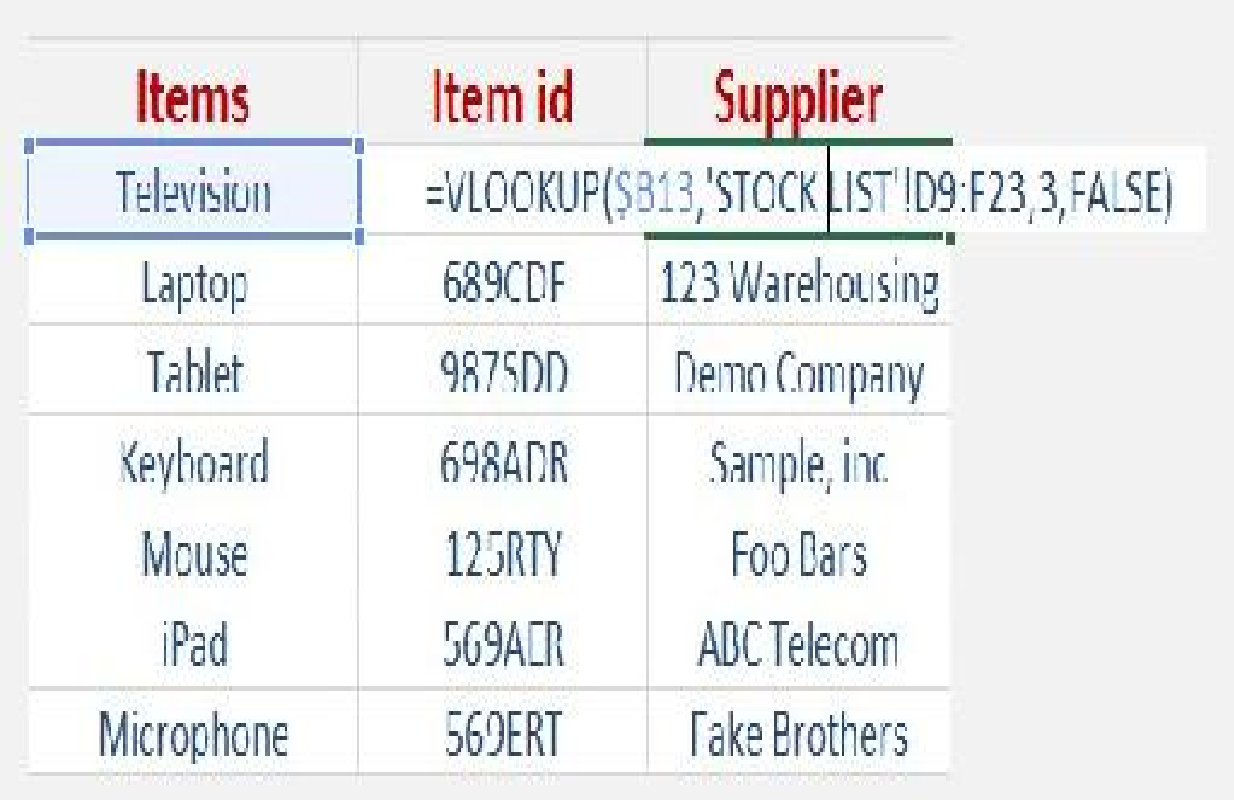
Items	Item ID	Supplier
Floppy Disks	610KLO	Acme, inc.
Mic Stand	125FRT	Widget Corp
Laptop	689CDF	123 Warehousing
Tablet	987SDD	Demo Company
Pop filter	658UYG	Smith and Co.
Mouse	125RTY	Foo Bars
iPad	569AER	ABC Telecom
[illegible]	[illegible]	[illegible]rs
Pen Drive	589YUI	QWERTY Logistics
Mixer	841MKL	Demo, inc.
Laprop Cover	658UYH	Sample Company
Keyboard	698ADR	Sample, inc
Hard Drives	971UOP	Acme Corp
Television	254CFG	Allied Biscuit
Beers	012KIO	Ankh-Sto Associates

VLOOKUP(lookup_value, **table_array**, col_index_num, [range_lookup])

STEP 5: You can **select the new range** with your mouse and also make any changes to the formula bar

Items	Item ID	Supplier
Floppy Disks	610KLO	Acme, inc.
Mic Stand	125FRT	Widget Corp
Laptop	689CDF	123 Warehousing
Tablet	987SDD	Demo Company
Pop filter	658UYG	Smith and Co.
Mouse	125RTY	Foo Bars
iPad	569AER	ABC Telecom
Microphone	569ERT	Fake Brothers
Pen Drive	589YUI	QWERTY Logistics
Mixer	841MKL	Demo, inc.
Laprop Cover	658UYH	Sample Company
Keyboard	698ADR	Sample, inc
Hard Drives	971UOP	Acme Corp
Television	254CFG	Allied Biscuit
Beers	012KIO	Ankh-Sto Associates

STEP 6: Press **Enter** and your formula is updated



Items	Item id	Supplier
Television	=VLOOKUP($B13,'STOCK LIST'!D9:F23,3,FALSE)	
Laptop	689CDF	123 Warehousing
Tablet	9875DD	Demo Company
Keyboard	698ADR	Sample, inc
Mouse	125RTY	Foo Bars
iPad	569AER	ABC Telecom
Microphone	569ERT	Fake Brothers

LOOKUP FUNCTIONS

ADDRESS

What does it do?

Creates a cell reference based on the row and column numbers

Formula breakdown:

=ADDRESS(row_num, column_num, [abs_num], [a1], [sheet_text])

What it means:

=ADDRESS(row number, column number, [absolute or relative], [reference style], [name of the worksheet])

Example:

=ADDRESS(1,1,1) ="$A$1"

Exercise Workbook:

DOWNLOAD EXCEL WORKBOOK

Did you know that you can dynamically create cell references in Excel? Yes you can with the **ADDRESS Formula**!

The **ADDRESS Formula** takes this information to create the cell reference:

- row number
- column number
- abs_num - this is reflected if your cell reference is absolute or relative. It has 4 possibilities:

- 1 - Absolute
- 2 - Absolute row, Relative column
- 3 - Relative row, Absolute column
- 4 - Relative

- a1 - this determines if it's R1C1 or A1 style. For our examples we will not use this, and it will default to A1 Style

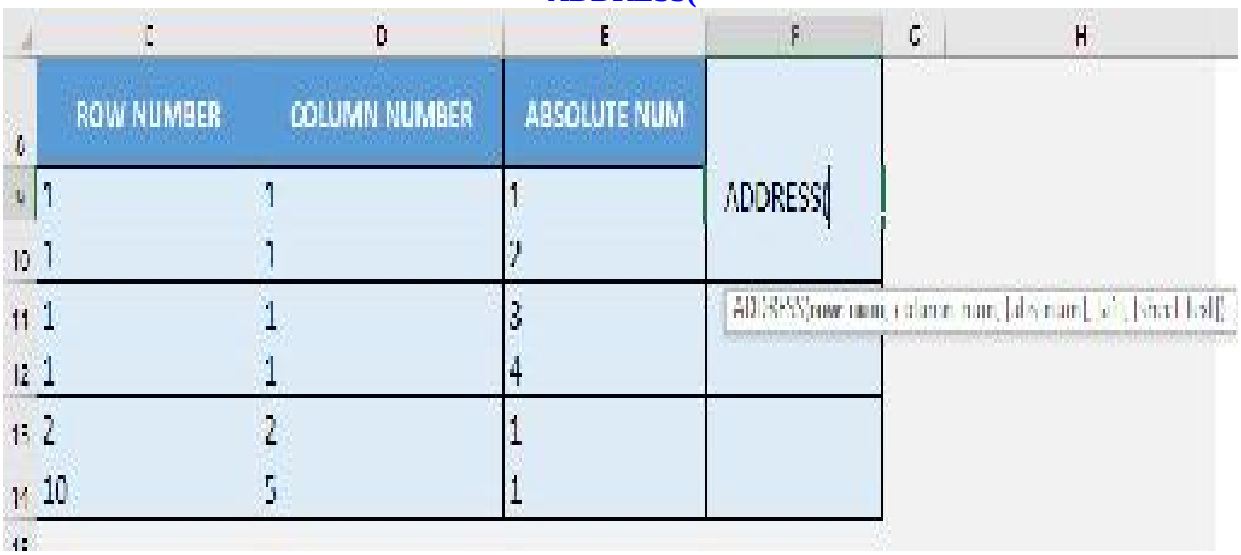
- 0 - R1C1 Style
- 1 - A1 Style

- sheet_text - this will add the sheet name to your cell reference if populated

I explain how you can do this below:

STEP 1: We need to **enter the *ADDRESS* function in a blank cell**:

=ADDRESS(



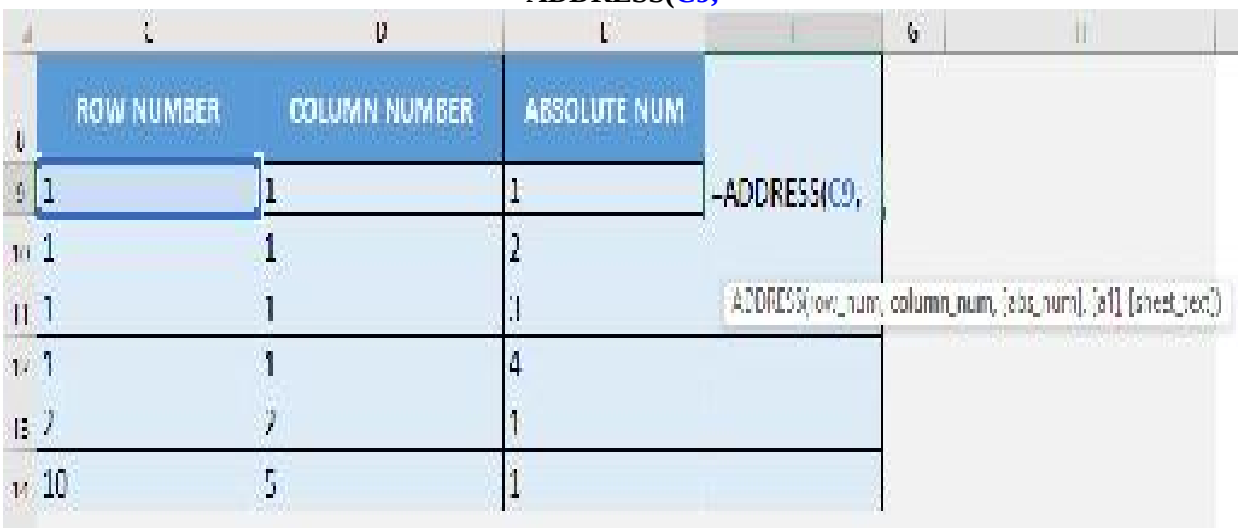
STEP 2: The **ADDRESS** arguments:

row_num

What is the row number?

Select the cell containing the row number:

=ADDRESS(C9,

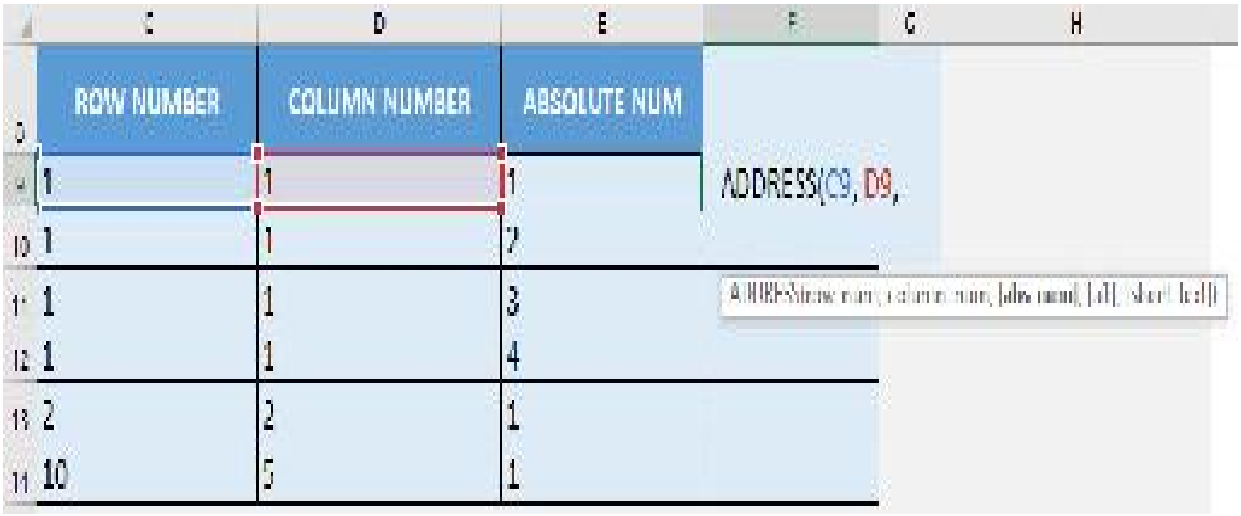


column_num

What is the column number?

Select the cell containing the column number:

=ADDRESS(C9, D9,

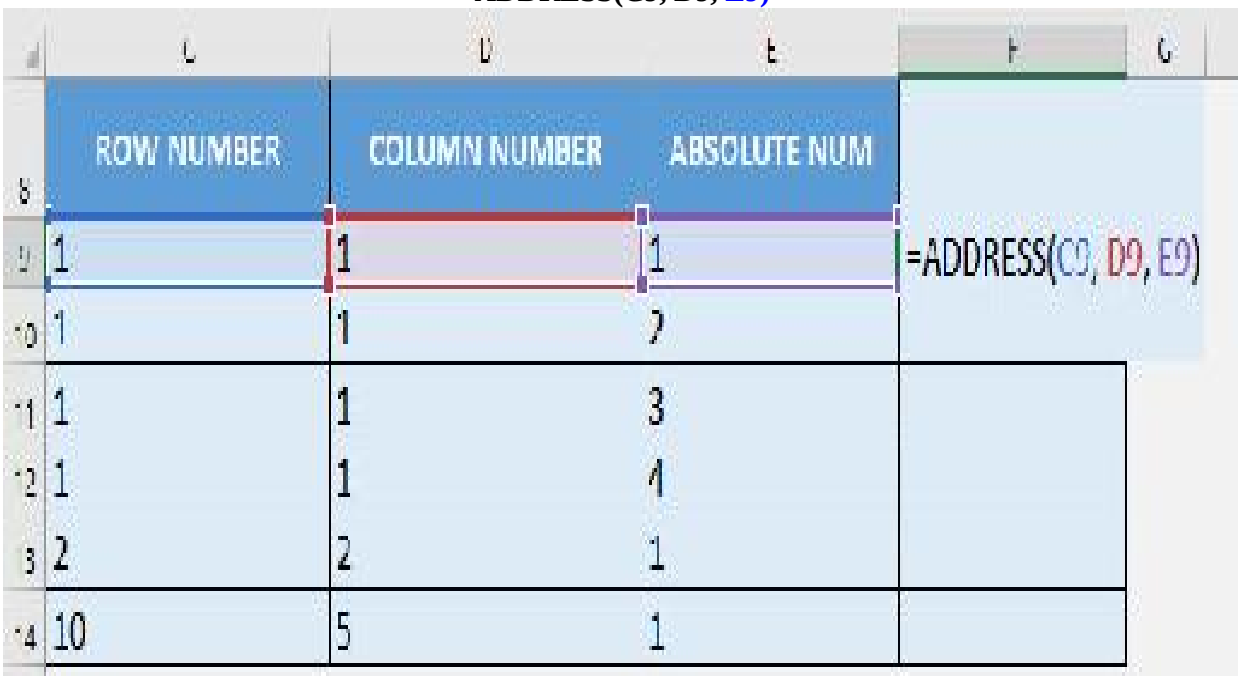


abs_num

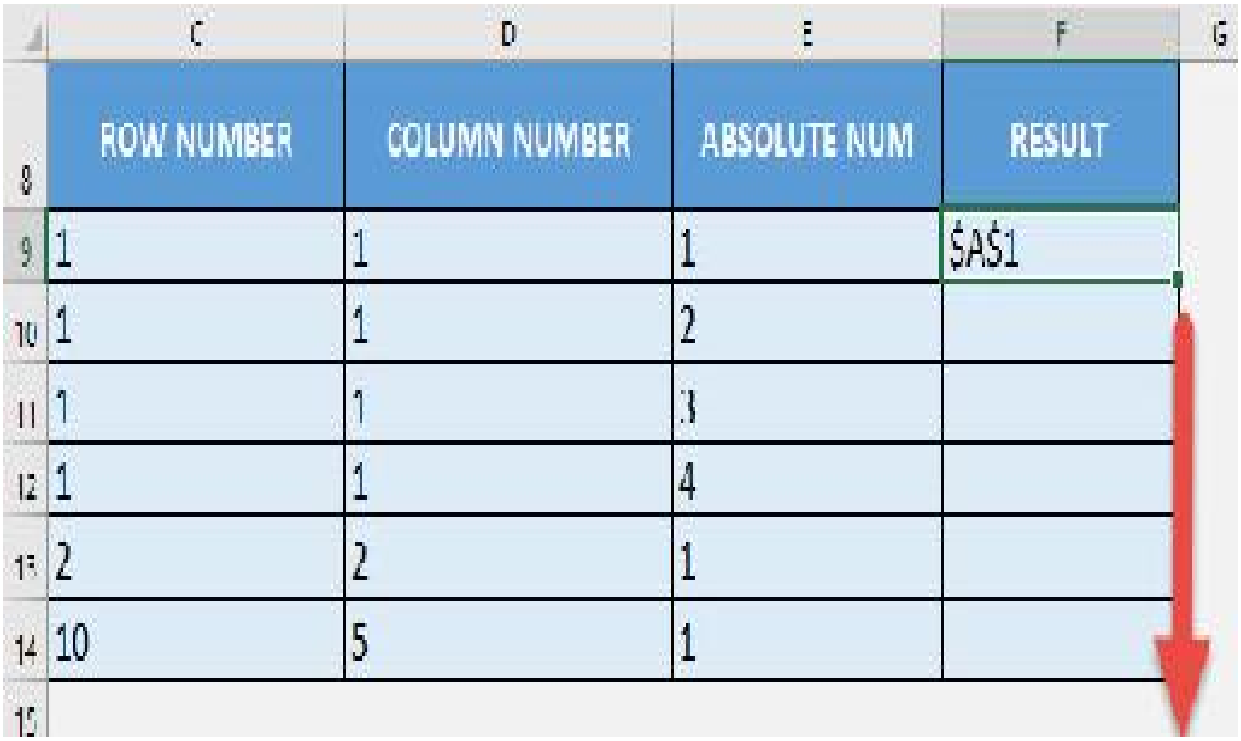
Would it be an absolute or relative cell reference?

Select the cell containing the abs_num input. There are 4 modes, so we have included in all of the examples so that you can see it in action.

=ADDRESS(C9, D9, E9)



Apply the same formula to the rest of the cells by dragging the lower right corner downwards.



	C	D	E	F	G
8	ROW NUMBER	COLUMN NUMBER	ABSOLUTE NUM	RESULT	
9	1	1	1	$A$1	
10	1	1	2		
11	1	1	3		
12	1	1	4		
13	2	2	1		
14	10	5	1		
15					

You have all of your cell references generated now! Notice the differences in the 4 [abs_num] options i.e. AA, A$1, $A1:

	C	D	F	F	G
8	ROW NUMBER	COLUMN NUMBER	ABSOLUTE NUM	RESULT	
9	1	1	1	$A$1	
10	1	1	2	A$1	
11	1	1	3	$A1	
12	1	1	4	A1	
13	2	2	1	$B$2	
14	10	5	1	$E$10	
15					
16					

CHOOSE

What does it do?

Selects a specific value from the list of values provided

Formula breakdown:

=CHOOSE(index_num, value1, [value2], ...)

What it means:

=CHOOSE(position to take from the list, first value, [second value and so on], ...)

Example:

=CHOOSE(2, "apple", "orange", "grapes", "lemon") ="orange"

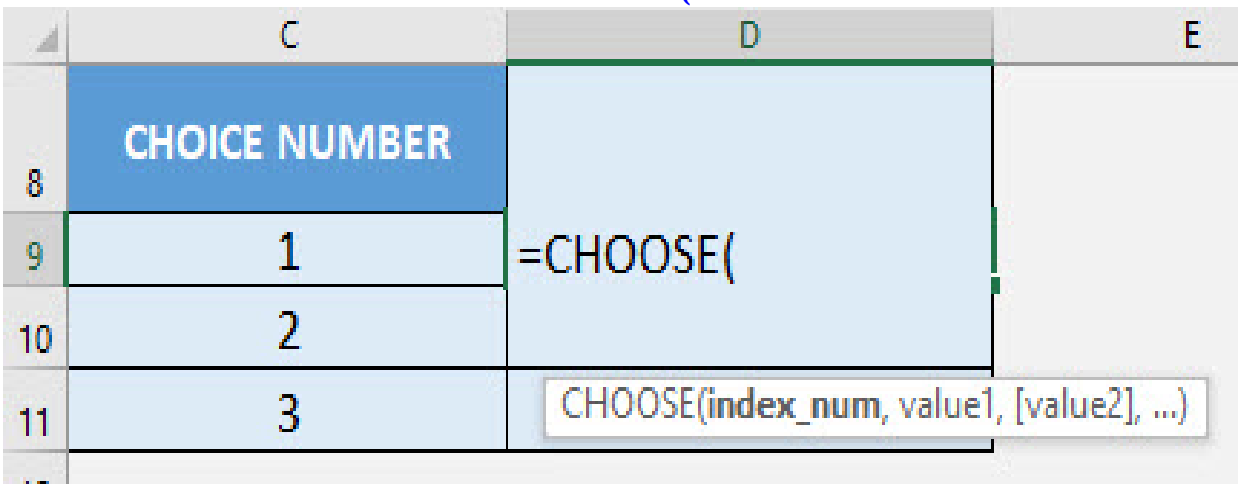
Exercise Workbook:

DOWNLOAD EXCEL WORKBOOK

Suppose you have a list, and you want to dynamically retrieve values from your list based on the position, the **CHOOSE formula** in Excel is perfect for this!

STEP 1: We need to **enter the *CHOOSE* function in a blank cell**:

=CHOOSE(



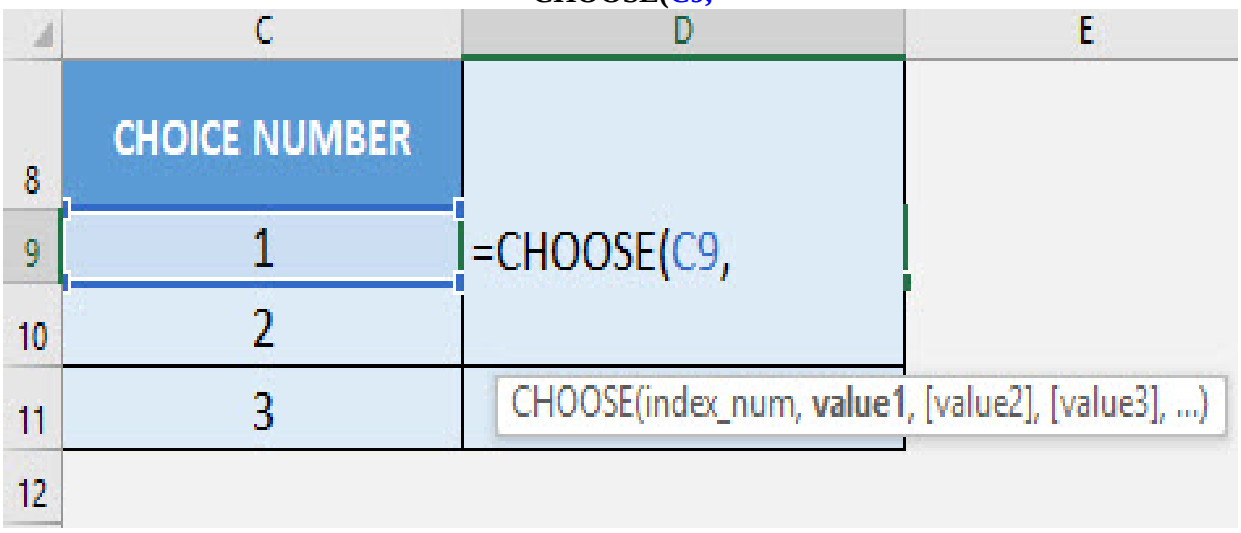
STEP 2: The **CHOOSE** arguments:

index_num

What is the position to take from the list?

Select the cell containing the choice number. The maximum index you can put in is 254:

=CHOOSE(C9,

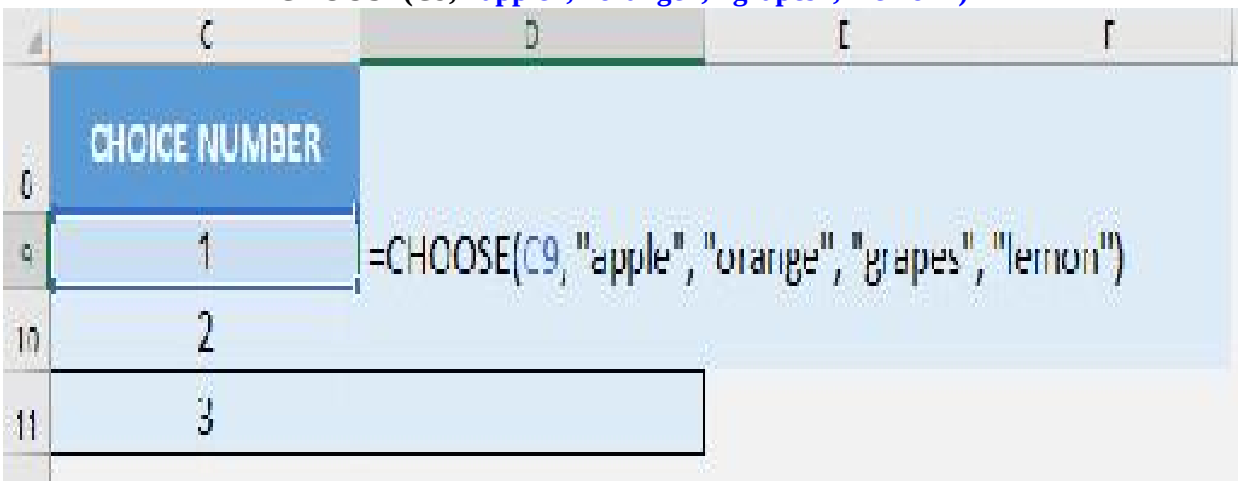


value1, [value2], ...

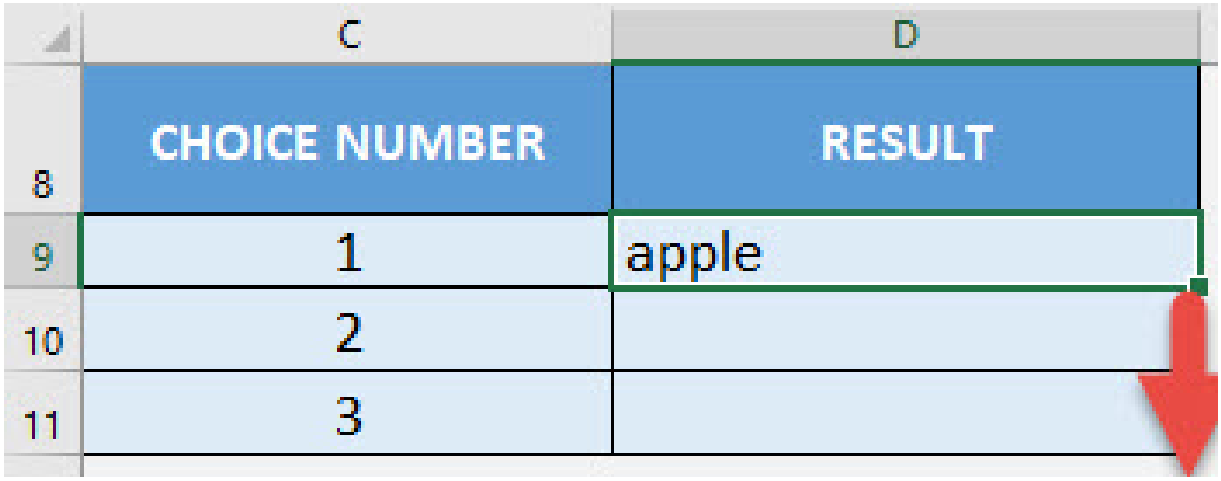
What are the values in our list?

In our example, let us type in our list that contains names of fruits:

=CHOOSE(C9, "apple", "orange", "grapes", "lemon")



Apply the same formula to the rest of the cells by dragging the lower right corner downwards.



We have now chosen the first, second and third items in our list!

	C	D
8	CHOICE NUMBER	RESULT
9	1	apple
10	2	orange
11	3	grapes
12		

HLOOKUP

What does it do?

Searches for a value in the first row of a table array and returns a value in the same column from another row (downwards) in the table array.

Formula breakdown:

=HLOOKUP(lookup_value, table_array, row_index_num, [range_lookup])

What it means:

=HLOOKUP(this value, in this list, and get me value in this row, [Exact Match/FALSE/0])

Example:

=HLOOKUP("Television", A8:D10, 2, FALSE) =$150

Exercise Workbook:

DOWNLOAD EXCEL WORKBOOK

Ever had a horizontal table and you want to search for values in the table easily?

I'm sure you do! There is a simple way to do this with Excel's **HLOOKUP function!**

This is very similar to the **VLOOKUP Function**! The only difference is instead of working with vertical tables, you get to do the same thing for horizontal tables!

Let's try it out on this horizontal table!

Stock List	Television	Laptop	Tablet
Price	$ 150.00	$ 185.00	$ 245.00
Cost	$ 85.00	$ 95.00	$ 90.00

Using the **HLOOKUP function** let us get the following values from this table:

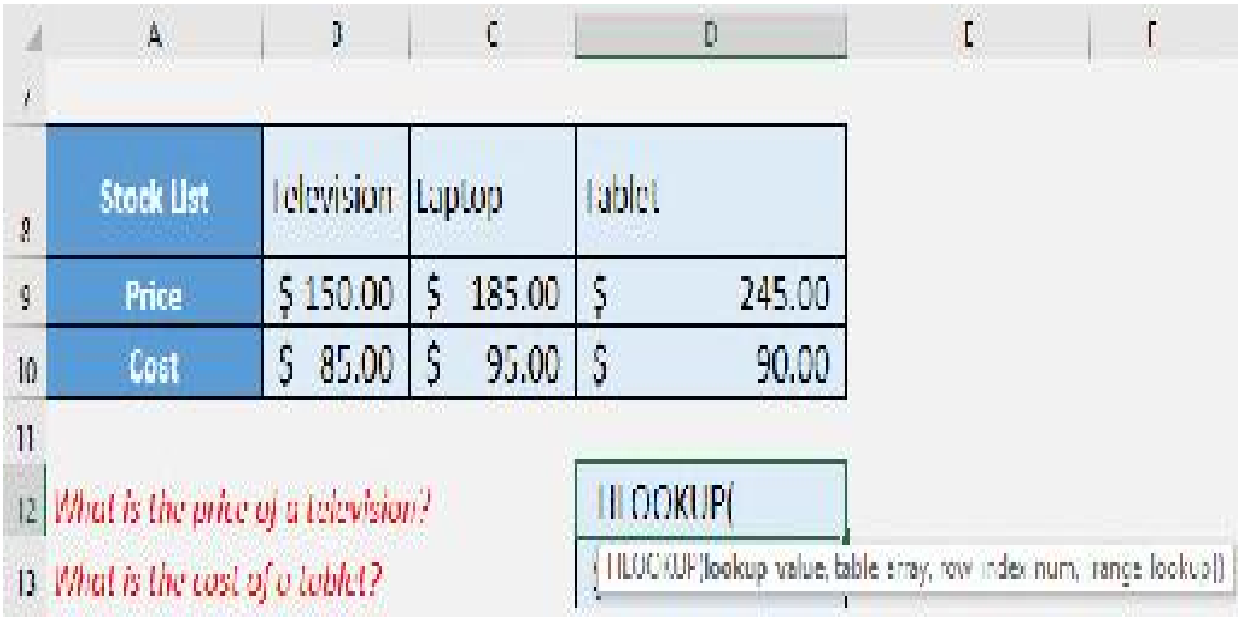
- What is the **price** of a **television?**
- What is the **cost** of a **tablet?**

I explain how you can do this below:

STEP 1: Let us target the first question: ***What is the price of a television?***

We need to **enter the *HLOOKUP* function in a blank cell**:

=HLOOKUP(



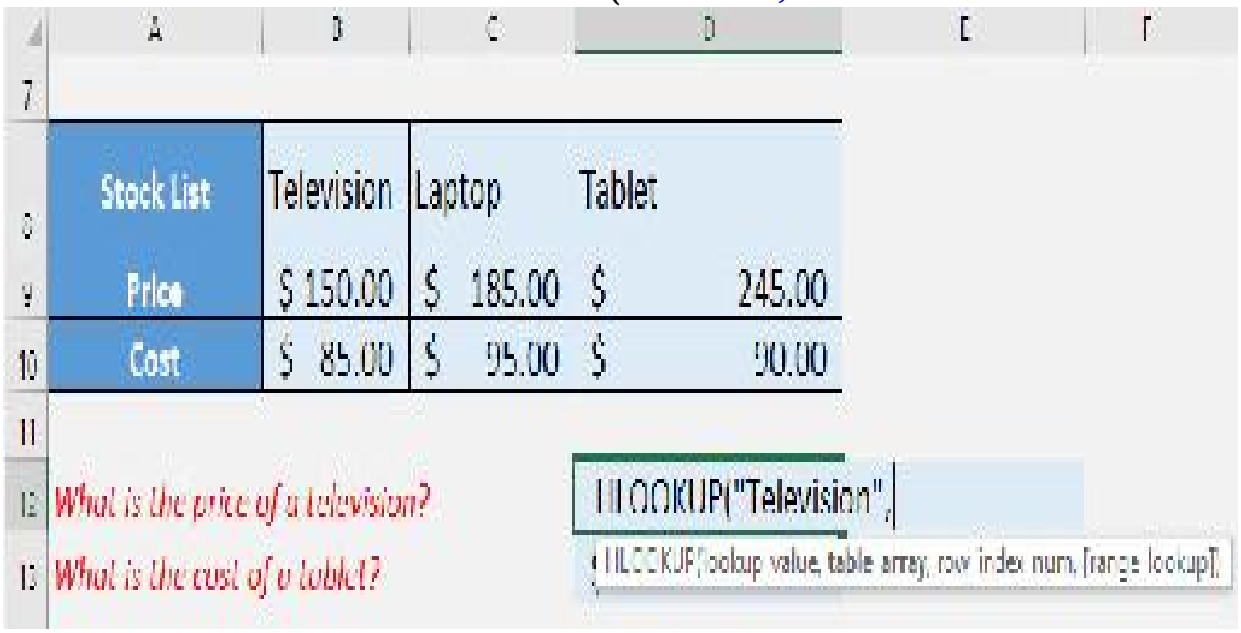
STEP 2: The **HLOOKUP** arguments:

lookup_value

What is the lookup name?

We want to lookup in the "Television" column

=HLOOKUP("Television",

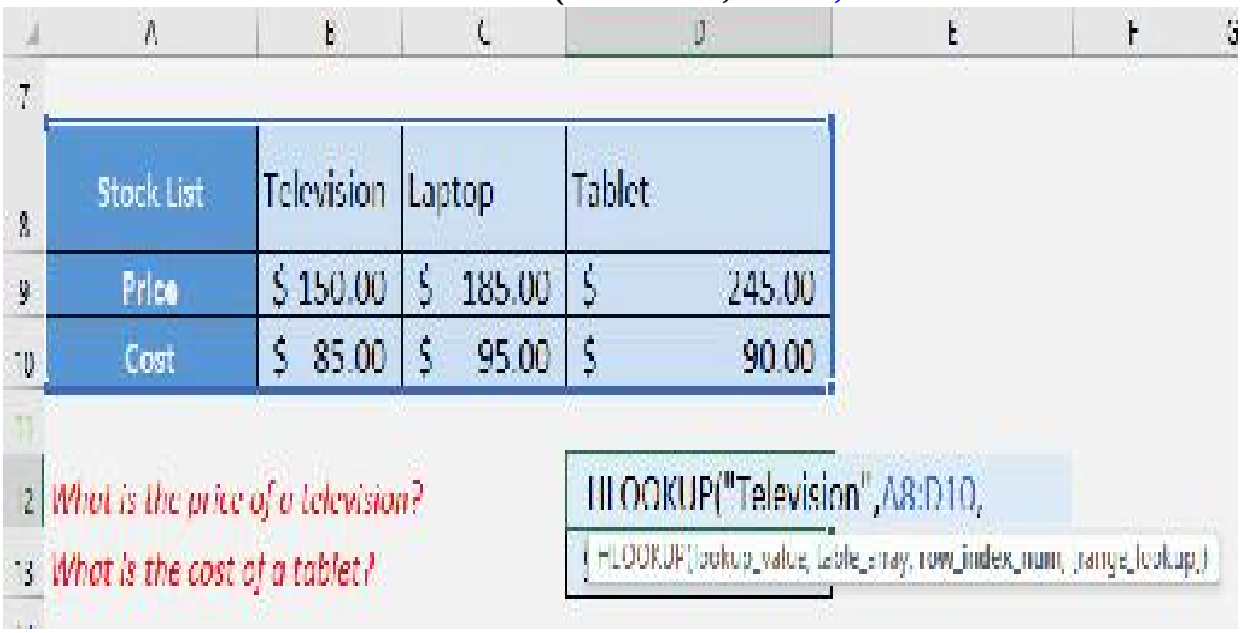


table_array

What is our list?

Select the entire table!

=HLOOKUP("Television", A8:D10,

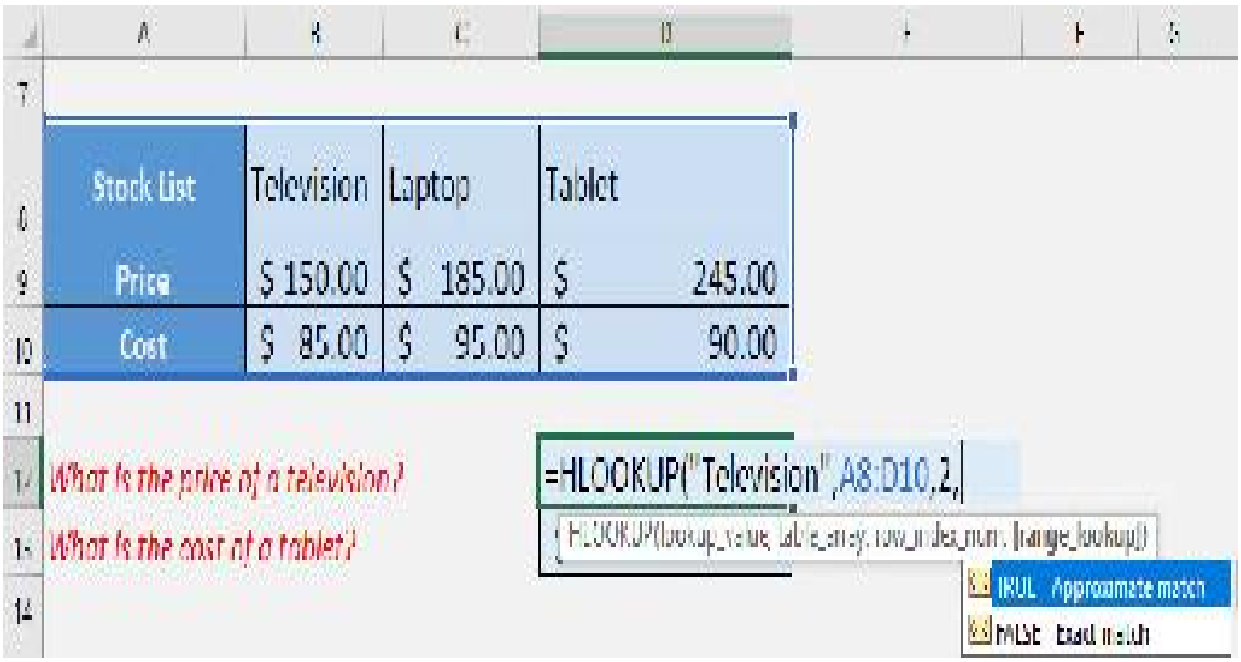


row_index_num

Which row should we get our value from?

We want the price, so it's row #2 in our table!

=HLOOKUP("Television", A8:D10, 2,

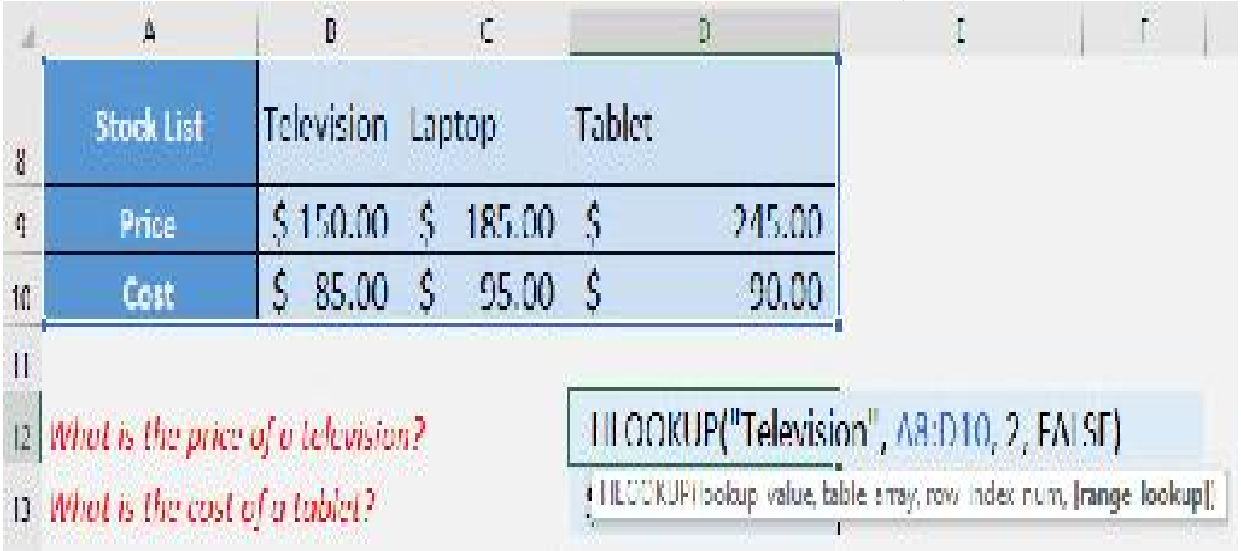


[range_lookup]

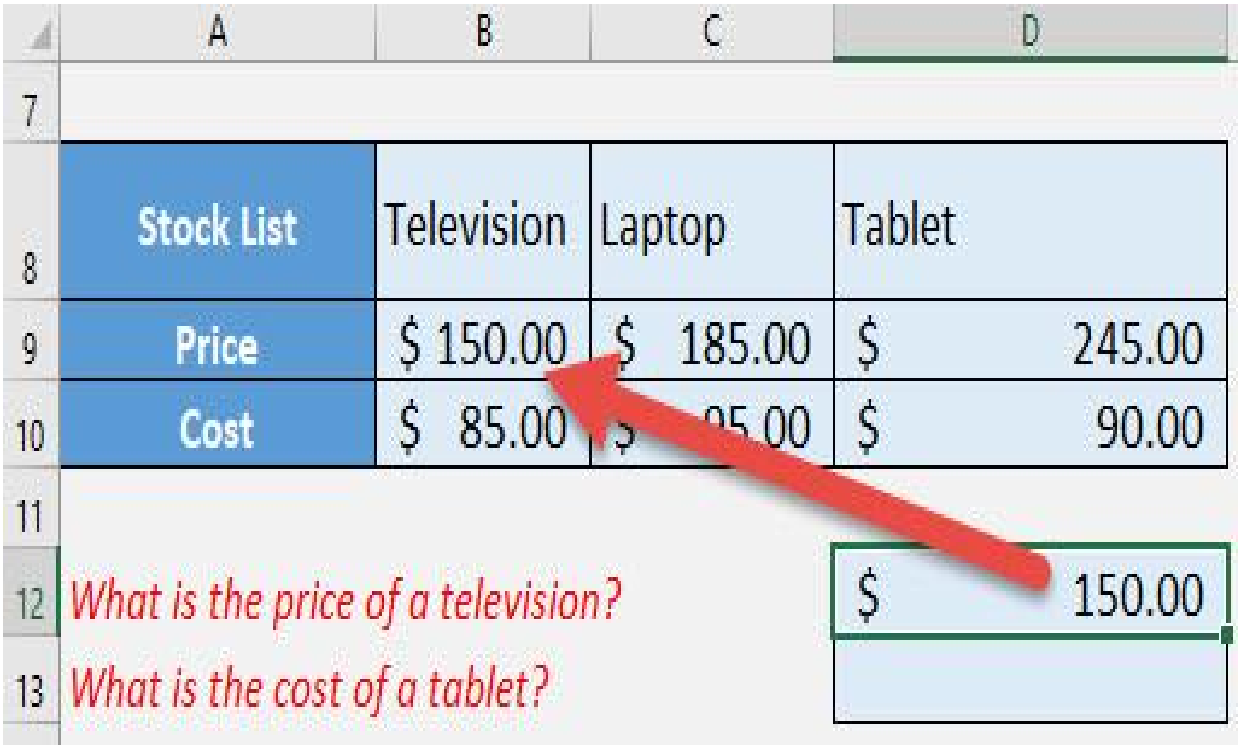
Do we want an appropriate match or exact match?

We want an exact match, so specify FALSE here.

=HLOOKUP("Television", A8:D10, 2, FALSE)



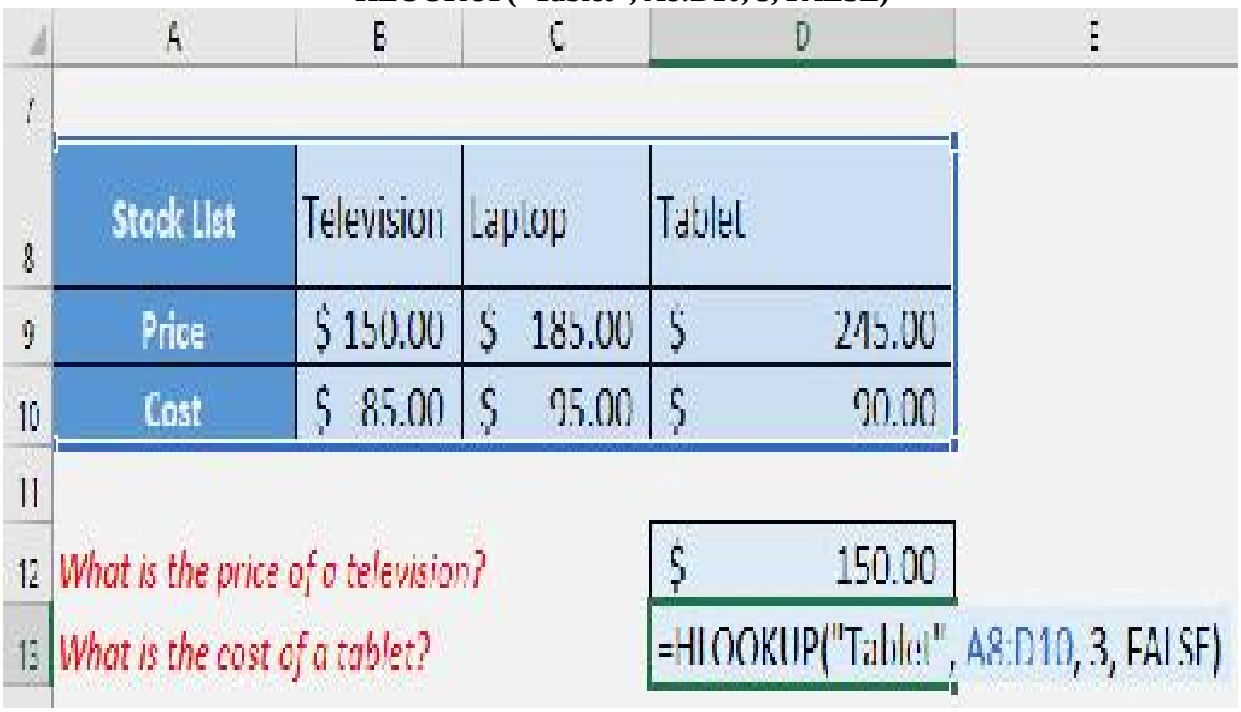
You now have your television price!



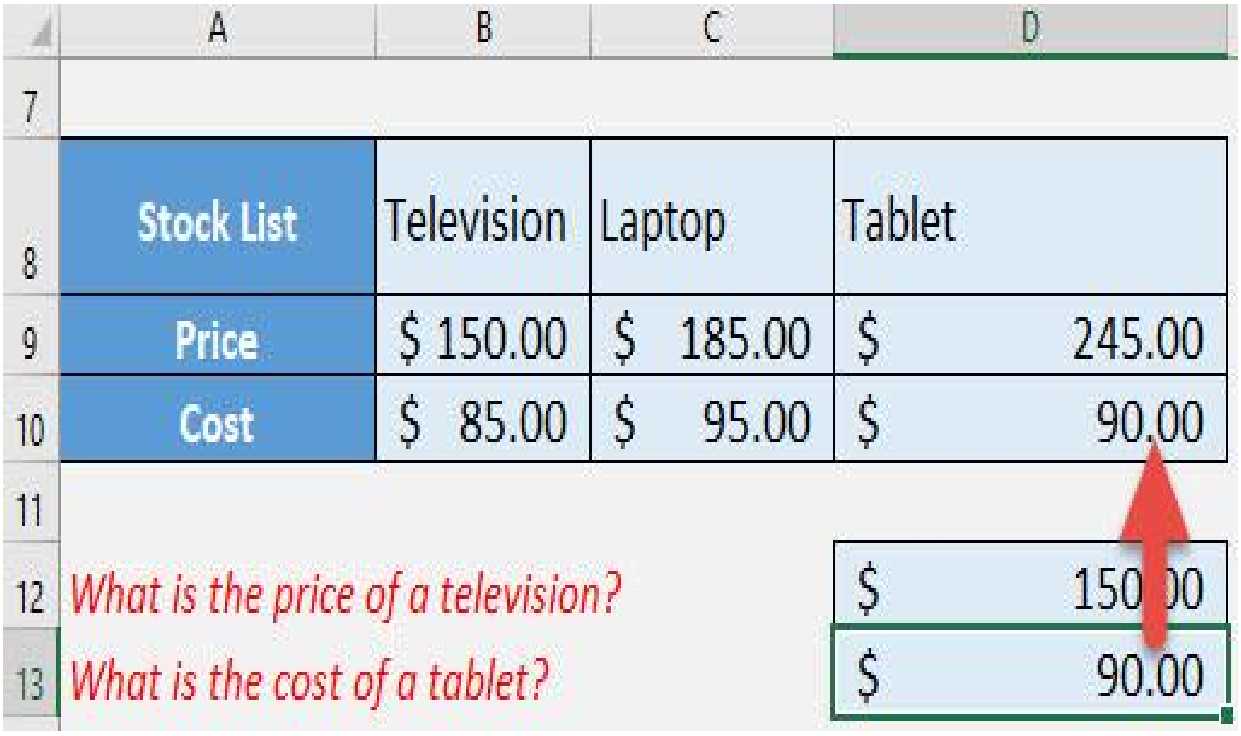
STEP 3: Now let us try doing the same for the cost of the Tablet!

The lookup name is "Tablet", and the cost is on row #3 in our table:

=HLOOKUP("Tablet", A8:D10, 3, FALSE)



You now have your tablet cost!



	A	B	C	D
7				
8	Stock List	Television	Laptop	Tablet
9	Price	$ 150.00	$ 185.00	$ 245.00
10	Cost	$ 85.00	$ 95.00	$ 90.00
11				
12	*What is the price of a television?*			$ 150.00
13	*What is the cost of a tablet?*			$ 90.00

HYPERLINK

What does it do?

Creates a shortcut to a webpage, spreadsheet reference, or a file in the hard drive

Formula breakdown:

=HYPERLINK(link_location, [friendly_name])

What it means:

=HYPERLINK(link to a webpage / spreadsheet reference / hard drive file, [display name])

Example:

=HYPERLINK("https://myexcelonline.com", "MyExcelOnline")
MyExcelOnline

Exercise Workbook:

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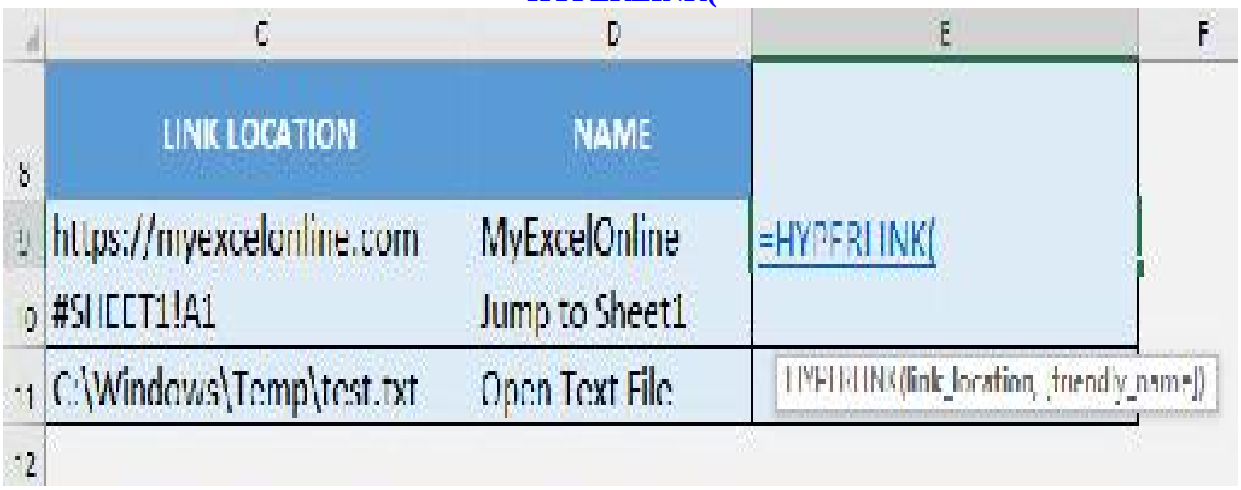
Imagine you can create links in your Excel spreadsheet that either links to: **website urls, other parts in your workbook, or even to a file in your hard drive.**

The **HYPERLINK Formula** in Excel lets you dynamically create these!

STEP 1: We need to **enter the *HYPERLINK* function in a blank cell**:

=HYPERLINK(



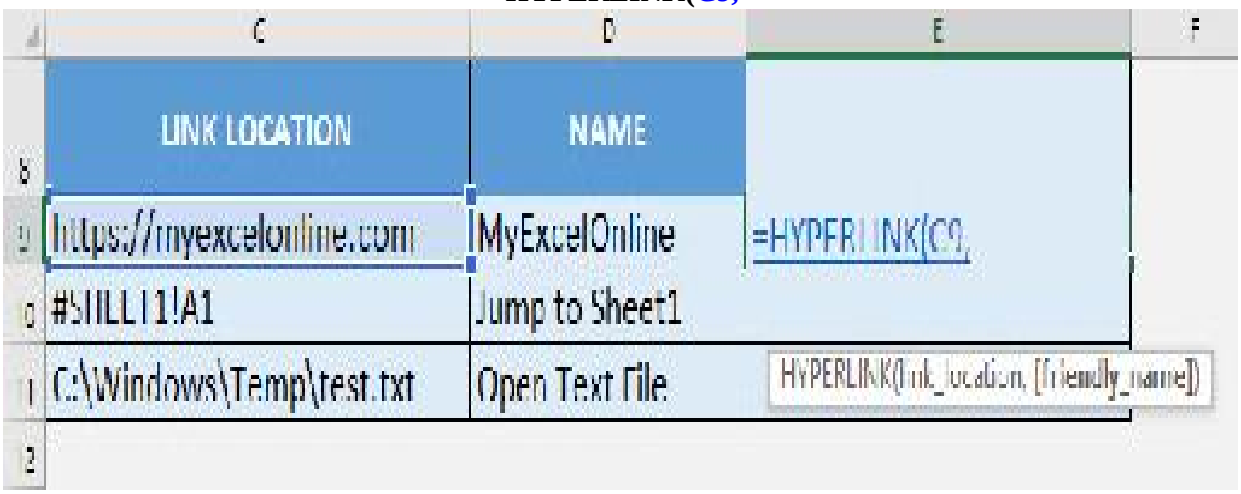
STEP 2: The **HYPERLINK** arguments:

link_location

What is the exact link location?

Select the cell containing the link location:

=HYPERLINK(C9,

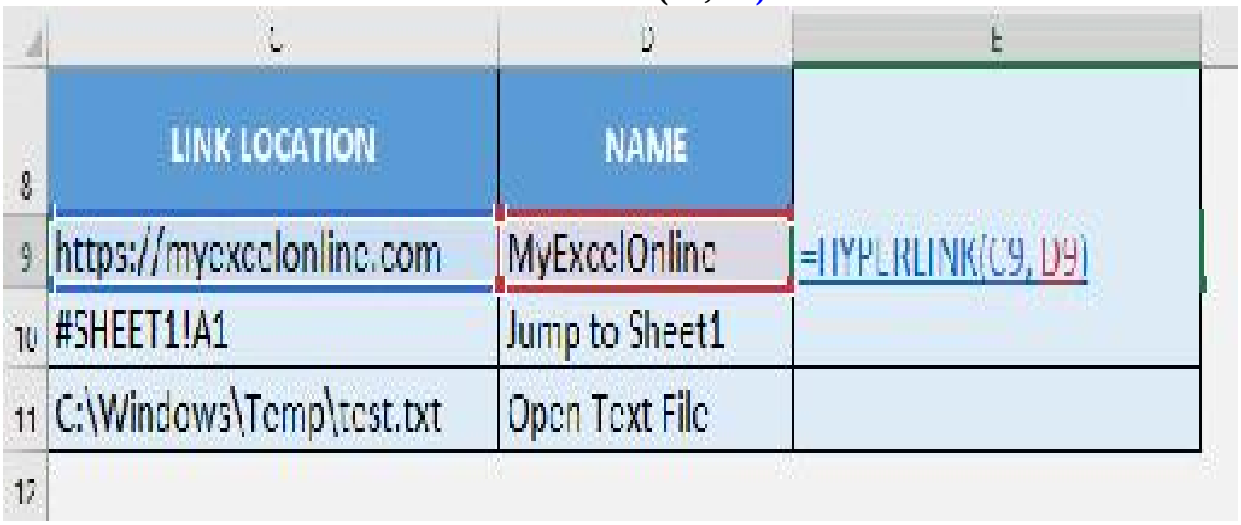


friendly_name

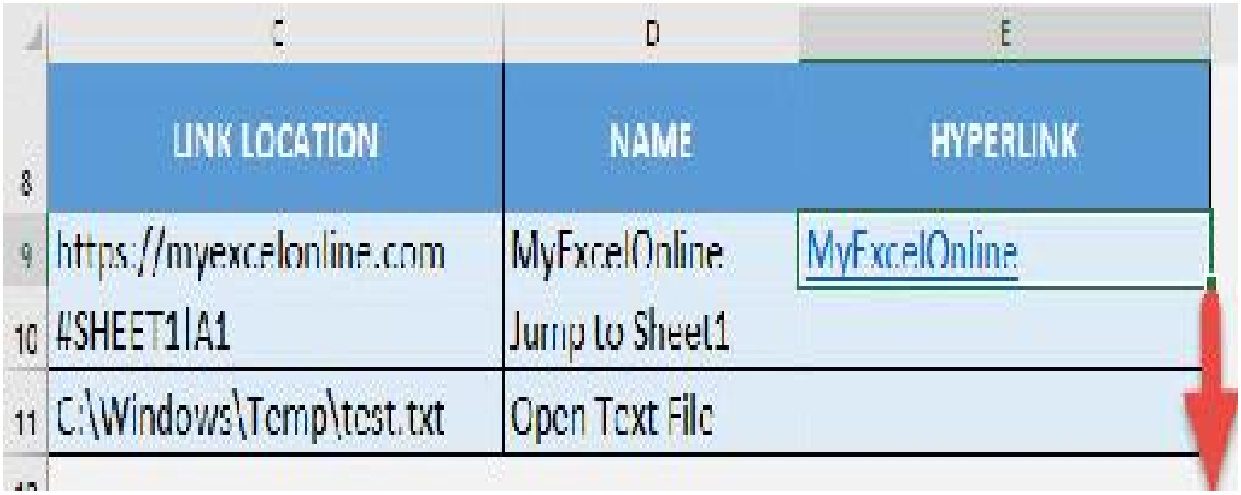
What will be the display name of the link?

Select the cell containing the display name. This gives your link a more presentable name:

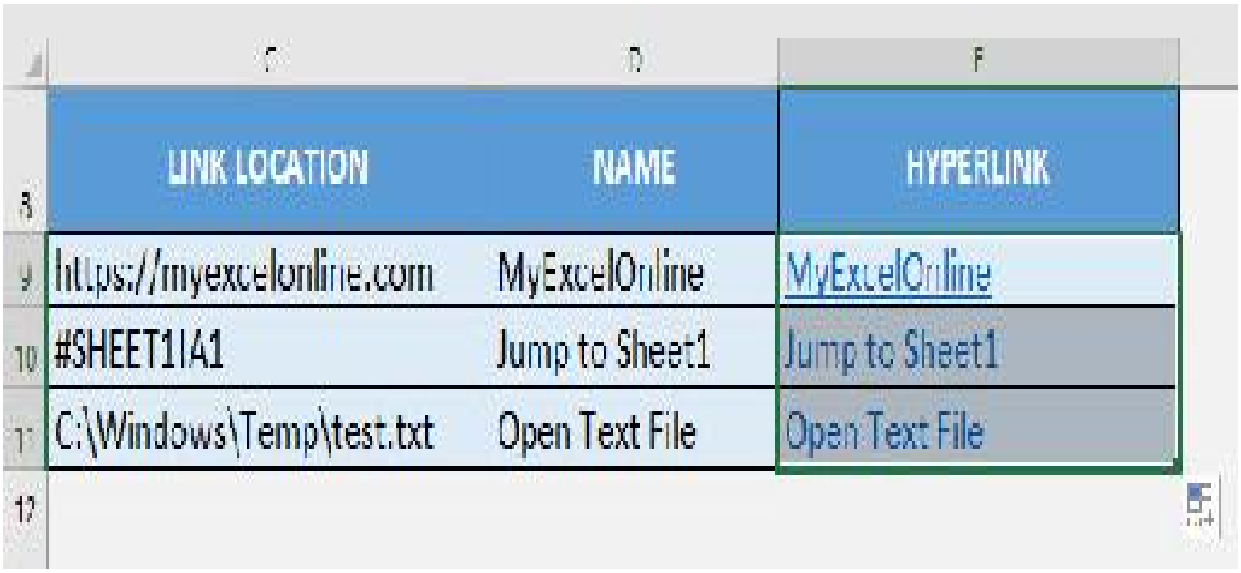
=HYPERLINK(C9, D9)



Apply the same formula to the rest of the cells by dragging the lower right corner downwards.



You now have your **hyperlinks** all ready to go!



	C	D	F
8	LINK LOCATION	NAME	HYPERLINK
9	https://myexcelonline.com	MyExcelOnline	MyExcelOnline
10	#SHEET1!A1	Jump to Sheet1	Jump to Sheet1
11	C:\Windows\Temp\test.txt	Open Text File	Open Text File
12			

INDEX

What does it do?

It returns a cell´s value from within a table/range

Formula breakdown:

=INDEX(array, row_num, [column_num])

What it means:

=INDEX(from this table/range, return me this row number, [and return me this column number])

Example:

=INDEX(C16:E19,2,2) =$652 *i.e. Price of Laptop In Table*

Exercise Workbook:

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The **INDEX** function in Excel returns a cell´s values from within a table/array.

It works like a map, so you have to select a range (table/array) and tell it to return you the coordinates (Row & Column numbers).

So if you want to return values from a Price List or large data set, then your **INDEX** function is your savior.

We want to get the **price of a laptop in 2014 and 2015** based on price table.

STEP 1: We need to enter the **INDEX** function in a blank cell:

=INDEX(

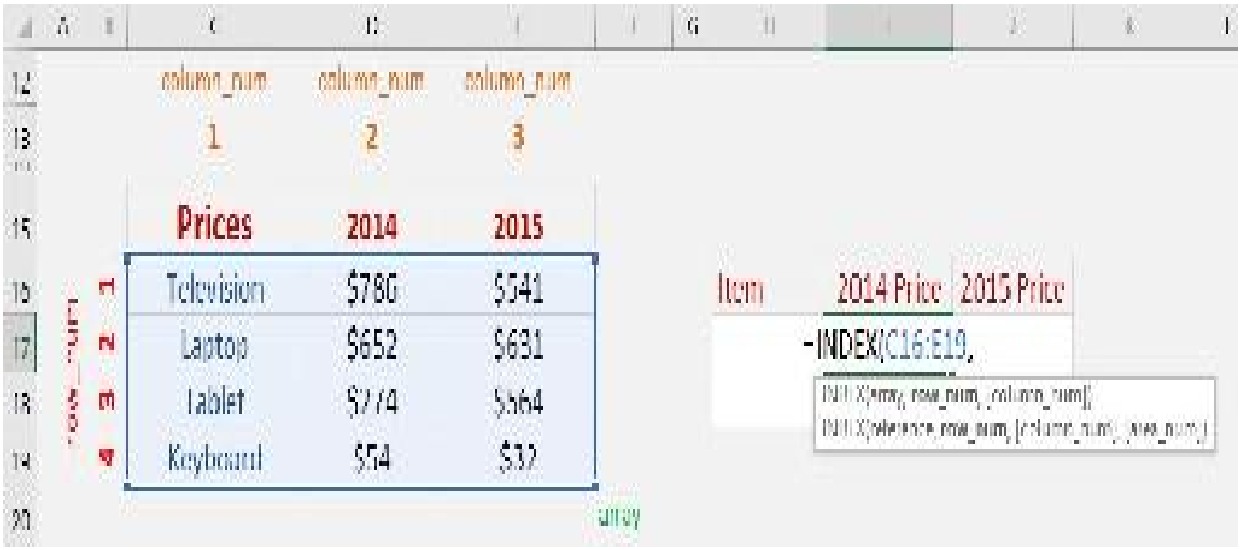
STEP 2: The **INDEX** arguments for the <u>2014 laptop</u> price:

array

What is the table we are searching in?

We need to select the pricing table here.

=INDEX(C16:E19,

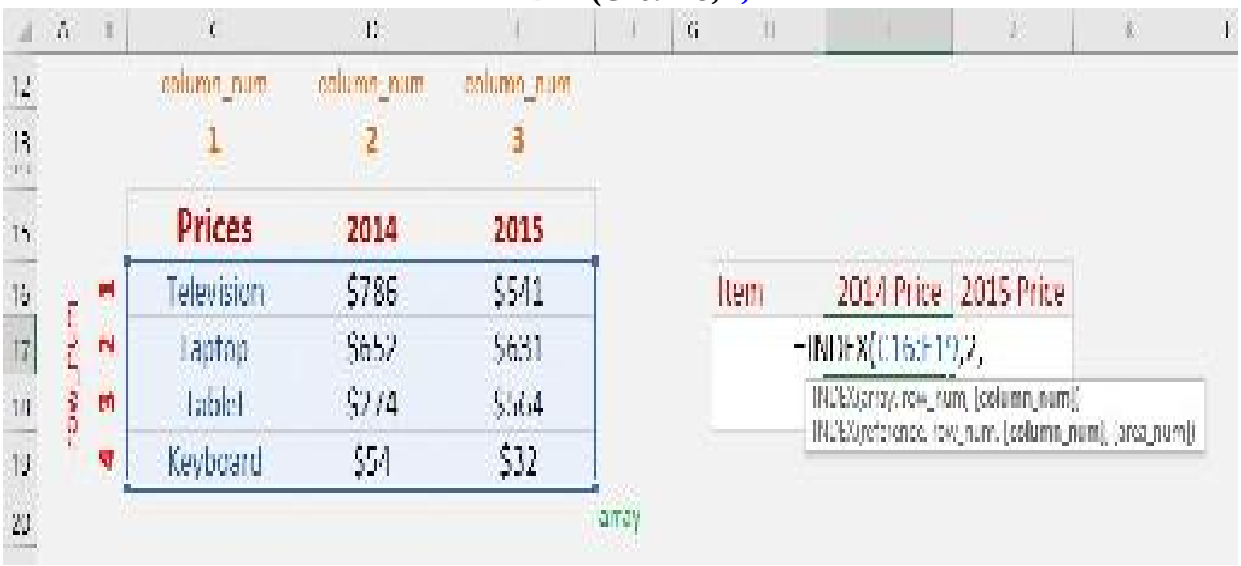


row_num

What row number contains the data?

Since we want the laptop, it's on row #2

=INDEX(C16:E19, 2,

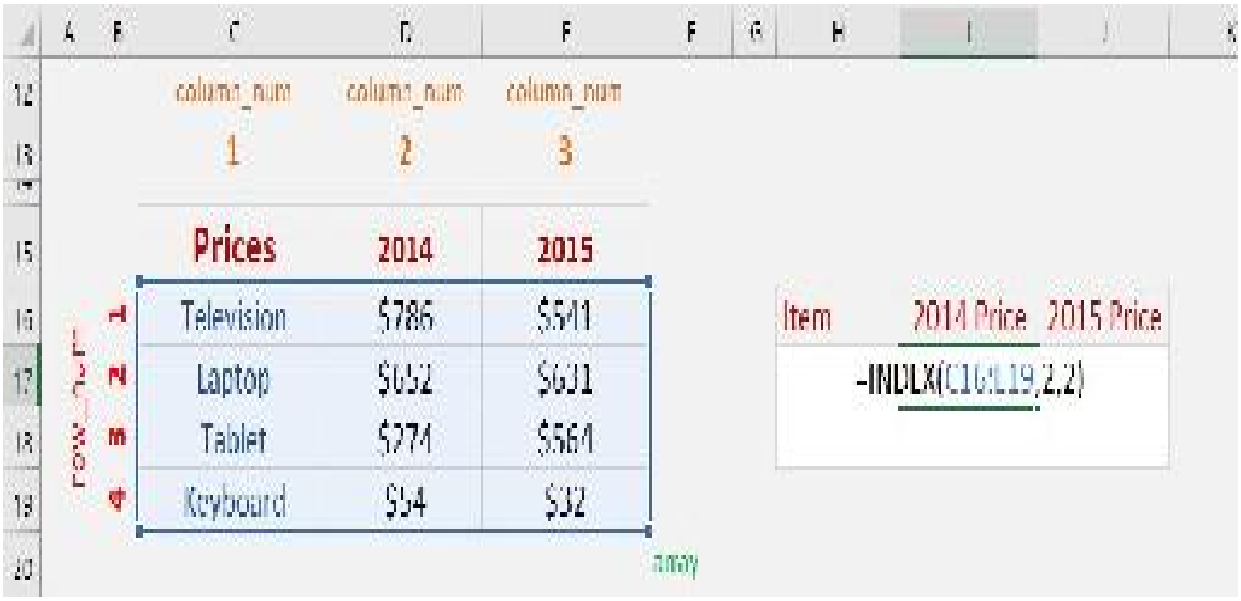


column_num

What column number contains the data?

Since we want the price for the year 2014, it's on column #2

=INDEX(C16:E19, 2, 2)



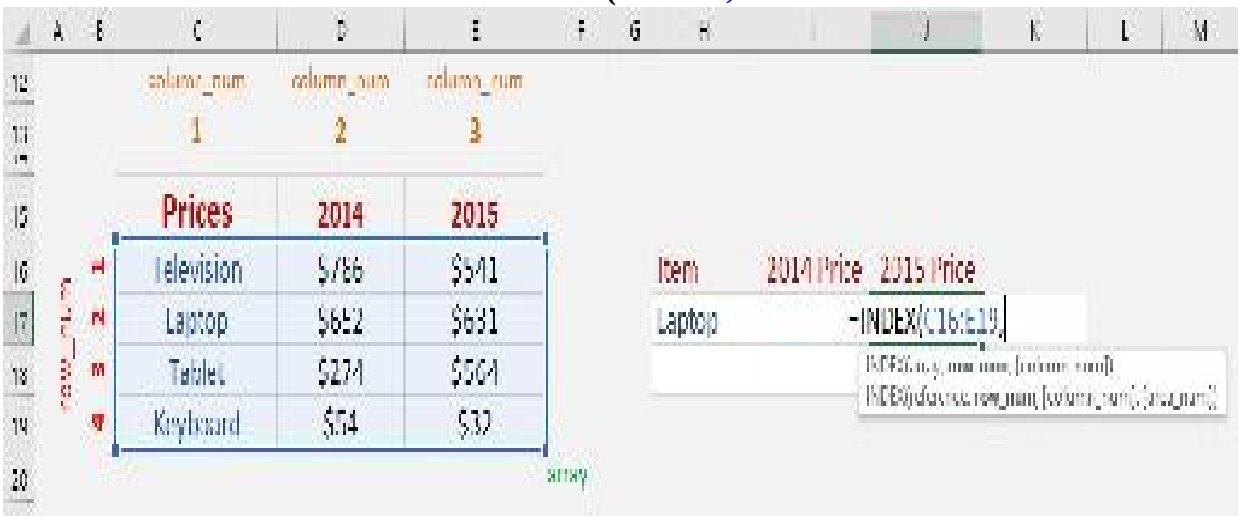
STEP 3: The **INDEX** arguments for the 2015 laptop price:

array

What is the table we are searching in?

We need to select the pricing table here.

=INDEX(C16:E19,

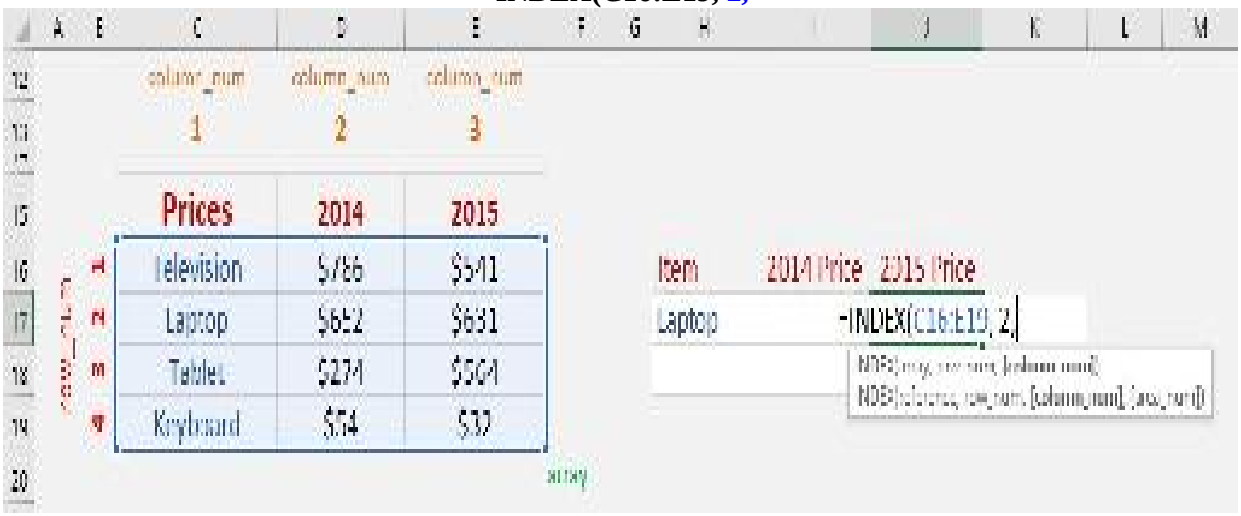


row_num

What row number contains the data?

Since we want the laptop, it's on row #2

=INDEX(C16:E19, 2,

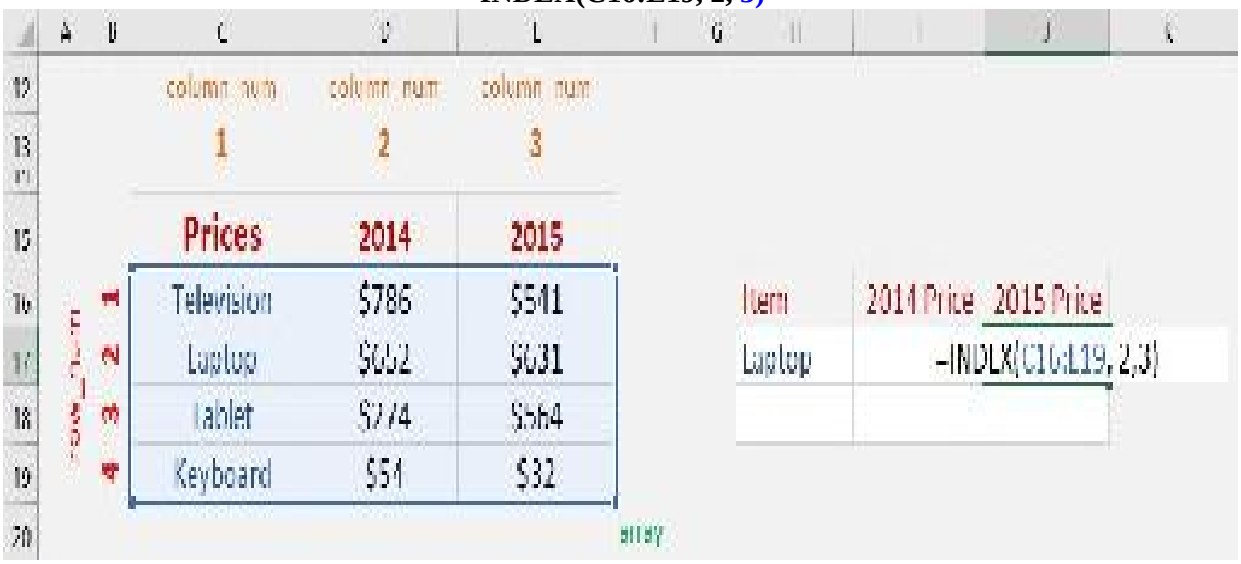


column_num

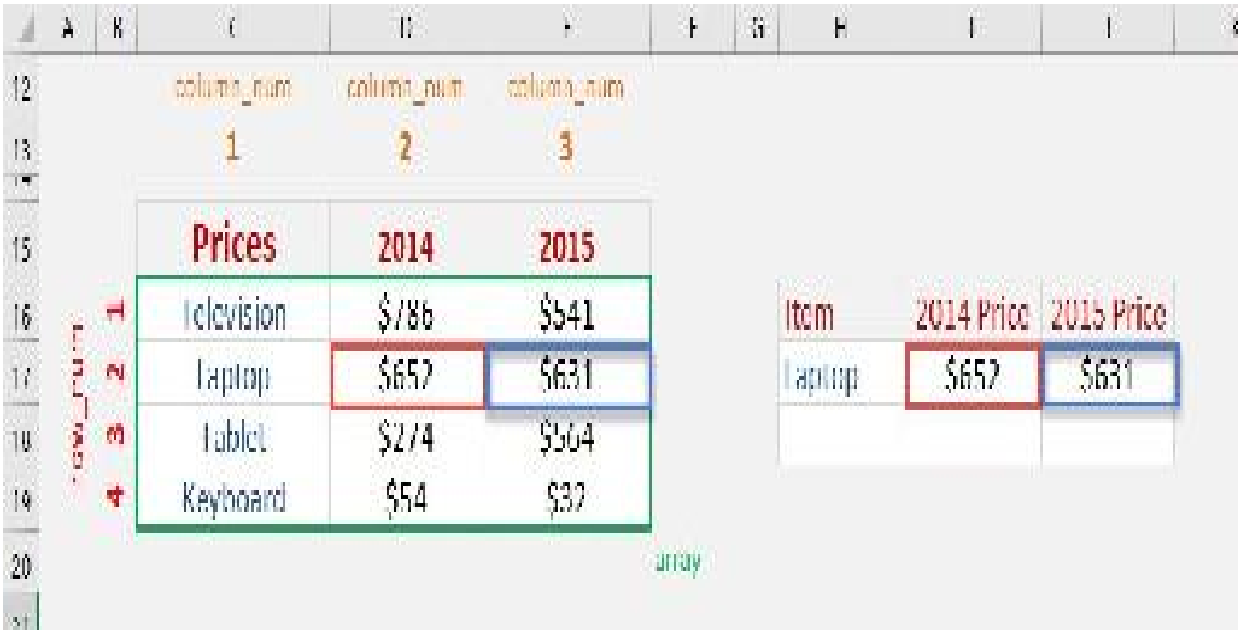
What column number contains the data?

Since we want the price for the year 2015, it's on column #3

=INDEX(C16:E19, 2, 3)



You now have your prices!


column_num
1
column_num
2
column_num
3
Prices
2014
2015
1
Television
$786
$541
2
Laptop
$652
$631
3
Tablet
$274
$564
4
Keyboard
$54
$32
row_num
array
Item
2014 Price
2015 Price
Laptop
$652
$631

INDEX-MATCH

What does it do?

Searches the row position of a value/text in one column (using the **MATCH** function)
and returns the value/text in the same row position from another column to the left or right (using the **INDEX** function)

Formula breakdown:

=INDEX(array, MATCH(lookup_value, lookup_array, [match_type])

What it means:

=INDEX(return the value/text from this range, MATCH(from the row position of this value/text))

Example:

=INDEX(B13:B17,MATCH("Tablet",C13:C17,0)) = TAB698

i.e. Stock Id of a Tablet

Exercise Workbook:

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The VLOOKUP formula searches for a value in the first column of an array and returns a value to the right of that array.

How about if you wanted to return a value to the left hand side of that array?

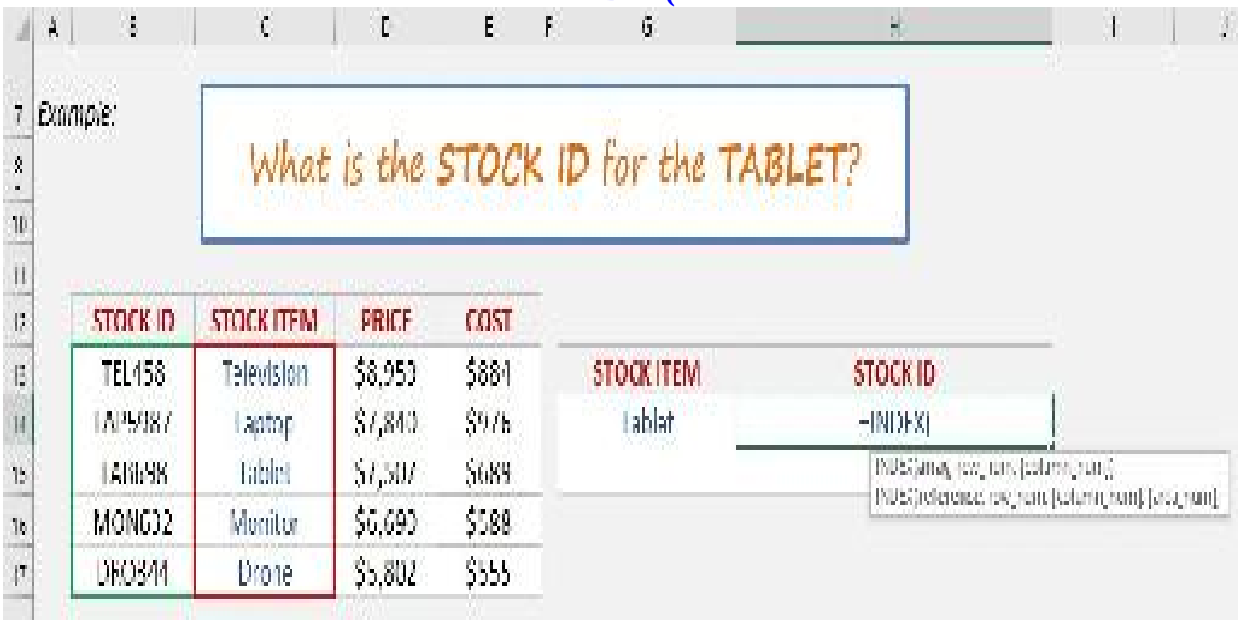
Well, this is where the **INDEX-MATCH** formula comes in and gives you a helping hand!

It searches the row position of a value/text in one column (using the **MATCH** function) and returns the value/text in the same row position from another column to the left or right (using the **INDEX** function).

We want to get the **stock id of the tablet**, and we will use a combination of **INDEX** and **MATCH** to get this!

STEP 1: We need to enter the **INDEX** function in a blank cell:

=INDEX(

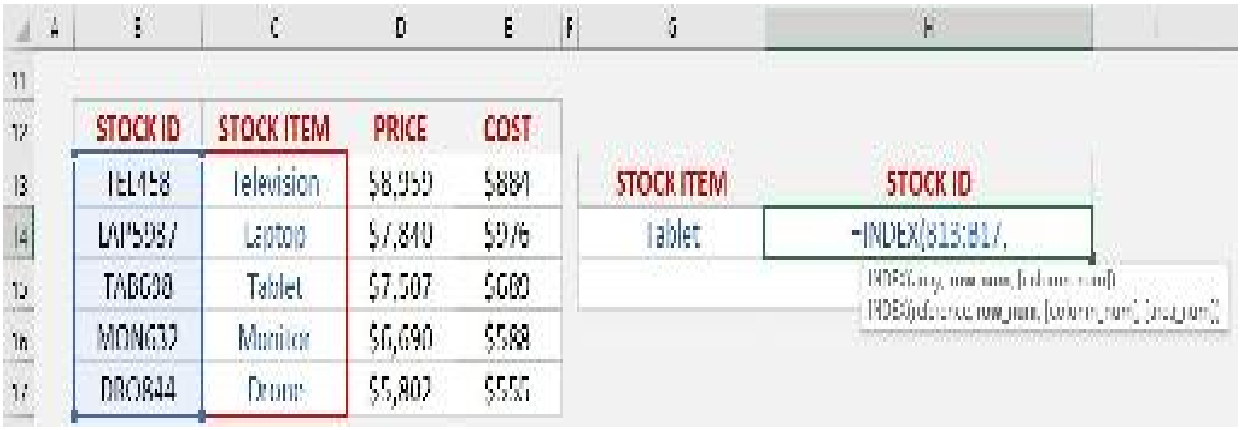


STEP 2: The **INDEX** arguments:

array

Where is the list that contains the stock id that we want to return?

=INDEX(B13:B17,



row_num

What row number contains the data?

Let us use the Match function to get the row number of the stock item.

=INDEX(B13:B17, MATCH(

STEP 3: The **MATCH** arguments:

lookup_value

What is the value that we want to match?

We want to match the Tablet.

=INDEX(B13:B17, MATCH(G14,

lookup_array

Where is the list that contains the stock items?

=INDEX(B13:B17, MATCH(G14, C13:C17,

match_type

What kind of matching do you want?

Let's put in 0 to get the exact match

=INDEX(B13:B17, MATCH(G14, C13:C17, 0))

With this, the **MATCH** function will get the row number containing the Tablet, which is row #3. Then with Row #3, we will get the stock id in that same row using the **INDEX** function.

INDIRECT

What does it do?

Returns a reference to a range. The referenced range can be a cell, a range of cells, or a named range.

Formula breakdown:

=INDIRECT(ref_text, [a1])

What it means:

=INDIRECT(Return the contents in this cell, Omit if the reference is an ***A1*** style **or** enter FALSE if it is a ***R1C1*** style)

Example:

=INDIRECT("D10") =Contents of Cell D10

Exercise Workbook:

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The INDIRECT function mystifies lots of Excel users and one that does not get that much fan fare, but I am about to change that for you!

To be totally honest, I wasn't a big user of the INDIRECT function, but after seeing the various ways that it can be applied in to an Excel workbook, Financial Model or Excel Dashboard, I was hooked!

REFERENCED RANGE IS A CELL

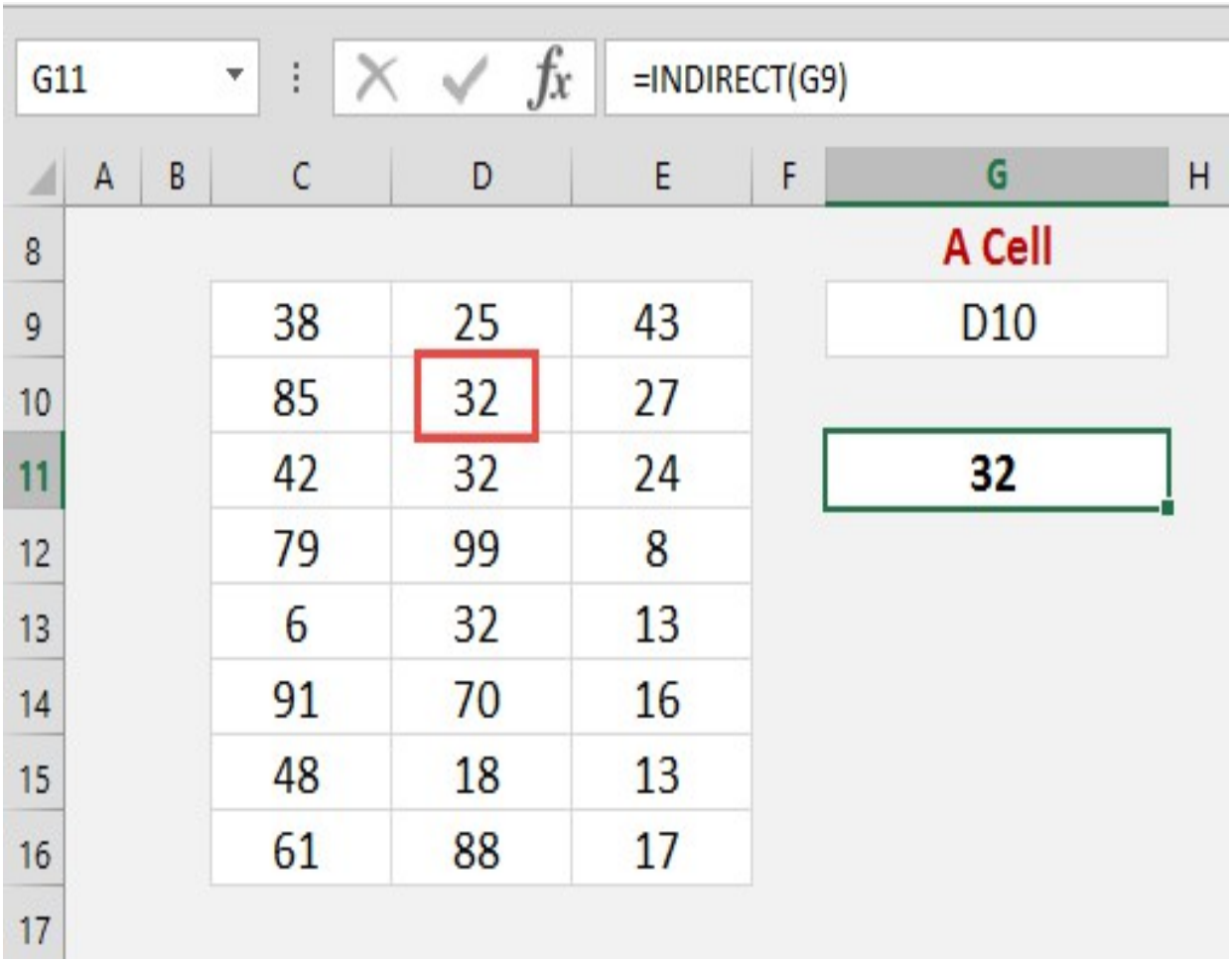
=INDIRECT(G9)

When the referenced range is a cell, the INDIRECT function will go and return the content of the referenced cell.

Say we enter in cell **G9** the following A1 style: ***D10***

In another cell we enter **=INDIRECT(G9)**

This will indirectly return the value that resides in cell D10, which is the number **32** in our example below:



REFERENCE A RANGE OF CELLS

=SUM(INDIRECT(C9:E9))

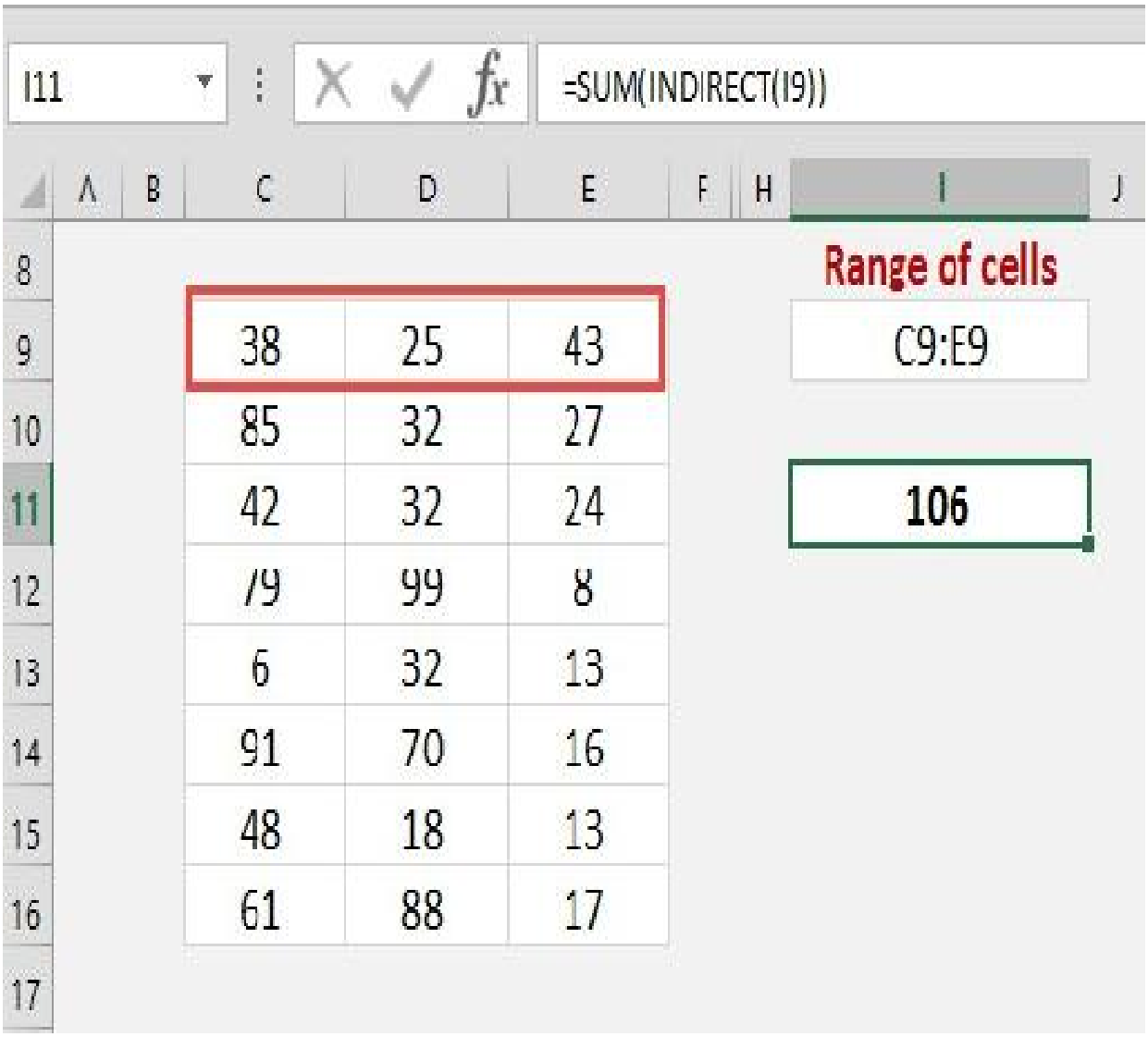
When the referenced range is a range of cells, the INDIRECT function will go and return the content of the referenced cells.

We can then enter a SUM function which will total the referenced cells.

Say we enter in cell **I9** the following A1 style: ***C9:E9***

In another cell we enter **=INDIRECT(I9)**

This will indirectly Sum the values that reside in cells C9:E9, which is **106** in the example below:



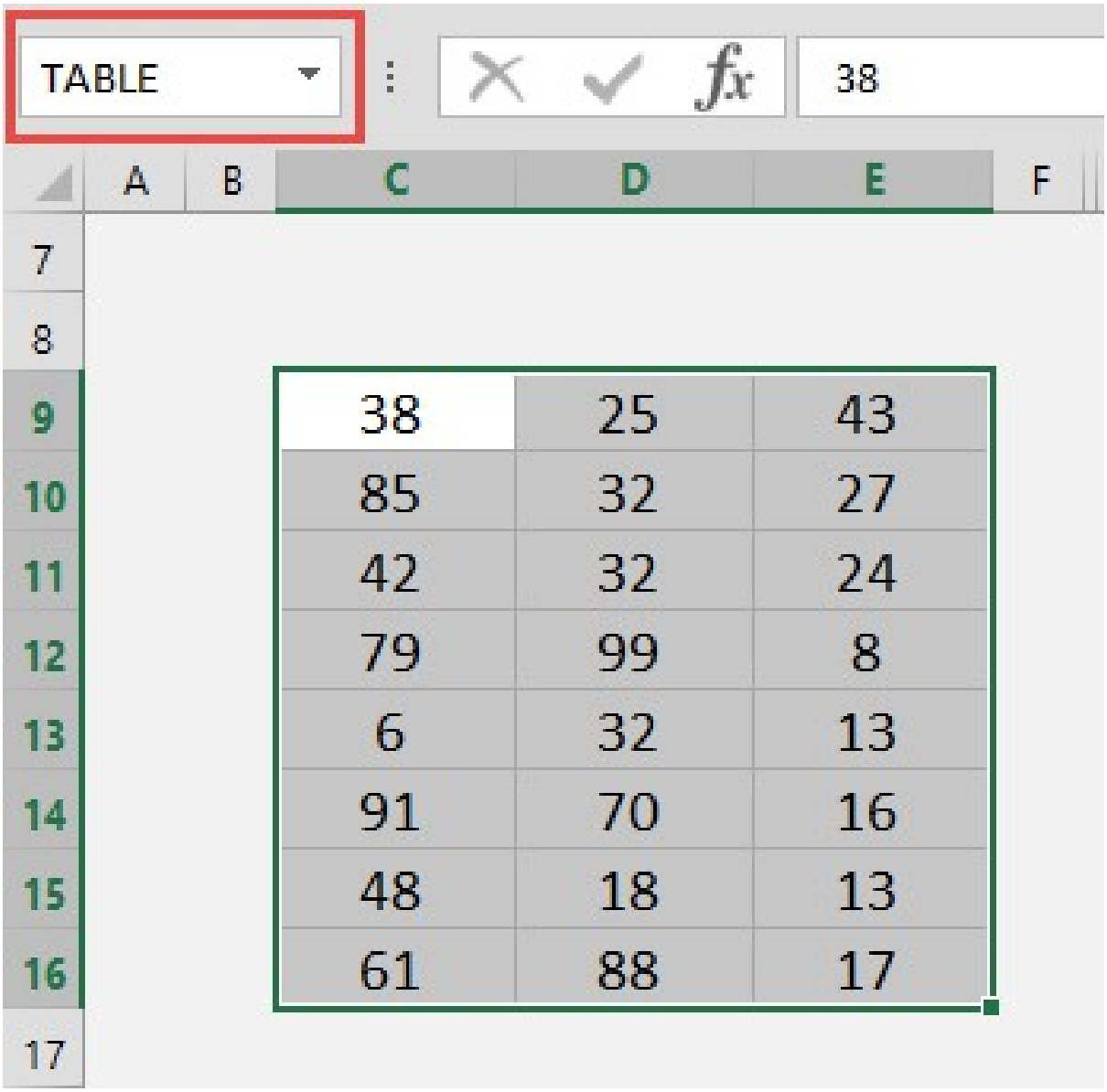
REFERENCE IS A NAMED RANGE

=SUM(INDIRECT(NamedRange))

When the referenced range is Named Range, the INDIRECT function will go and return the content of the Named Range.

We can then enter a SUM function which will total the Named Range.

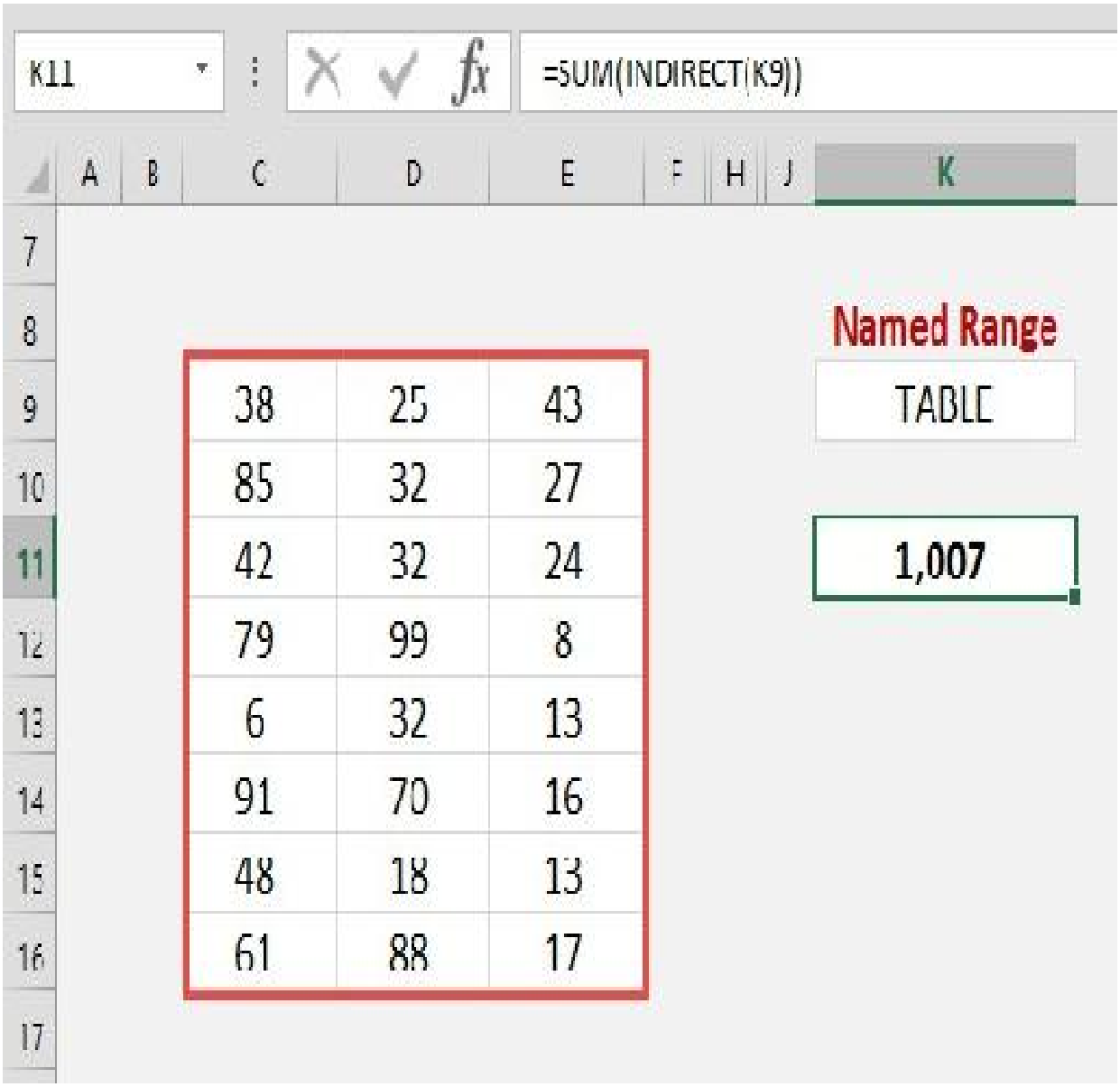
We need to create a **Named Range** by selecting the data range and entering a name (with no spaces) in the Name Box: ***TABLE***



We then enter in cell **K9** the following Named Range: ***TABLE***

In another cell we enter **=SUM(INDIRECT(K9))**

This will indirectly Sum the values that reside in the Named Range TABLE, which is **1,007** in our example below:



Imagine having several Named Ranges that reference different data sets within a Workbook & adding a drop down menu to show the different Named Ranges.

Using this technique you can pick & choose the different data sets and with the INDIRECT function return the summation of each, thus creating an interactive Dashboard!

LOOKUP

What does it do?

Looks up a value from a table array or one-row / one-column range

Formula breakdown:

=LOOKUP(lookup_value, lookup_vector, [result_vector])

What it means:

=LOOKUP(value to be approximately matched, range of values to be matched against, [the matching value to be displayed])

Example:

=LOOKUP(10000, C9:C14, D9:D14) = 18%

i.e. Approximate match in tax rate

Exercise Workbook:

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Have you ever tried getting approximate matches in Excel? **Approximate matches** are used when you have an ascending table like ***Commission Bonus Rates*** or ***Income Tax Rates***.

If you have tried out Vlookup Approximate Match in Excel, there is another cool way to do this! You can use the **LOOKUP Formula** to accomplish this as well.

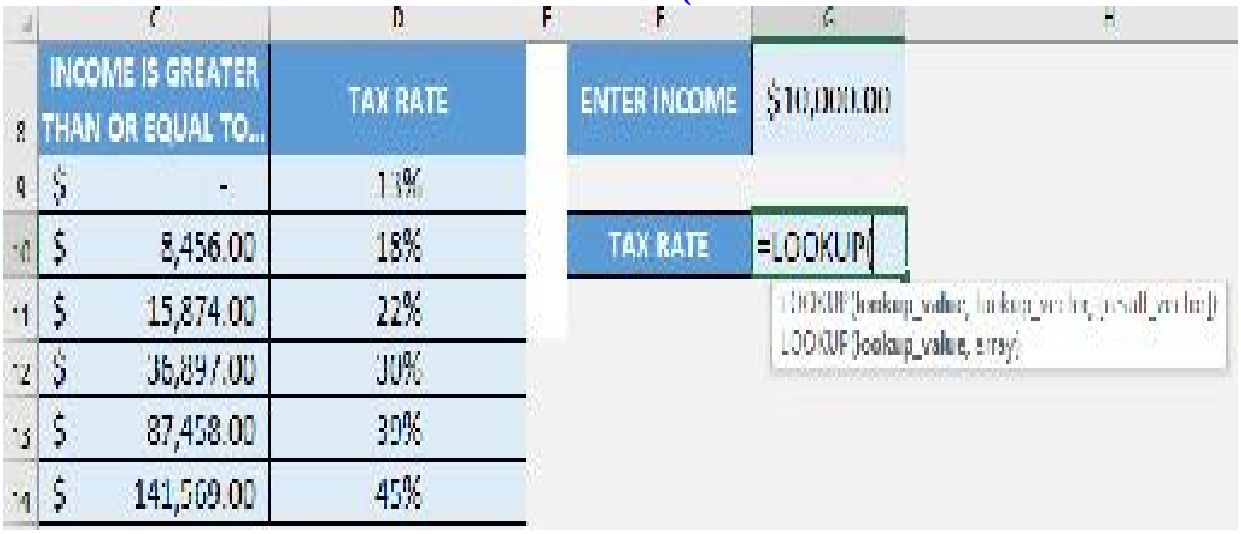
IMPORTANT: ***For the LOOKUP Approximate Match to work in Excel, the lookup_vector has to be sorted in ascending order!***

So the way that this formula works is that it looks at the first value in the ***lookup_vector*** that is greater than the ***lookup_value*** and then goes back one value. If a ***result_vector*** is provided, then the **LOOKUP Formula** will get the result from there, otherwise it simply gets it from the ***lookup_vector***.

I explain how you can do this below:

STEP 1: We need to **enter the *LOOKUP* function in a blank cell**:

=LOOKUP(



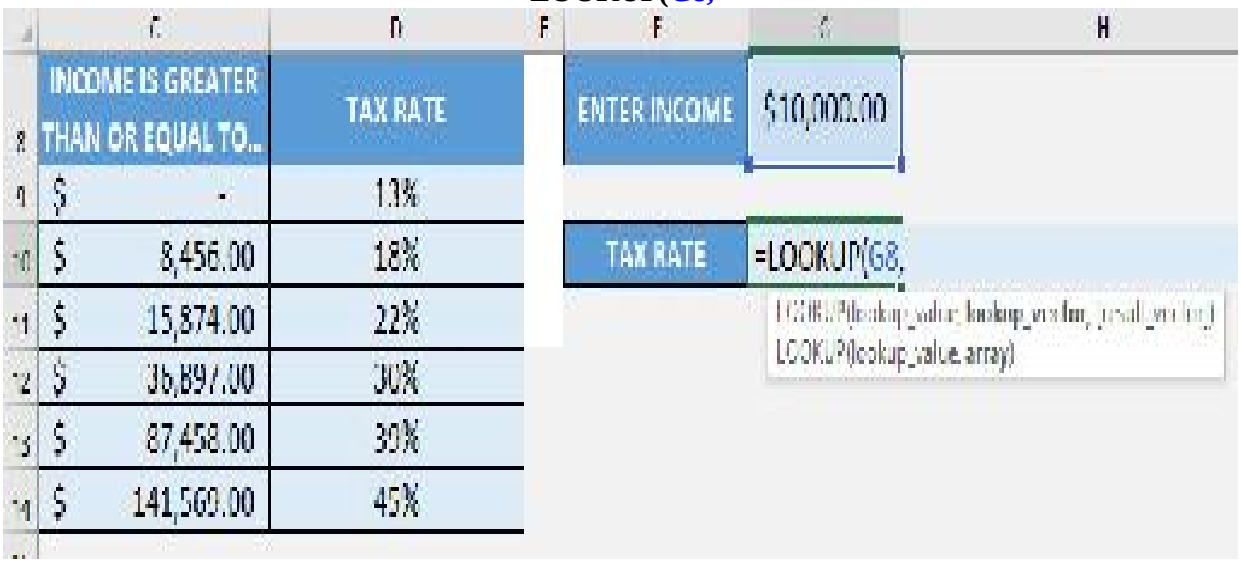
STEP 2: The **LOOKUP** arguments:

lookup_value

What is the value to be approximately matched?

Select the cell containing the value. In our case, it is the $10,000 income:

=LOOKUP(G8,

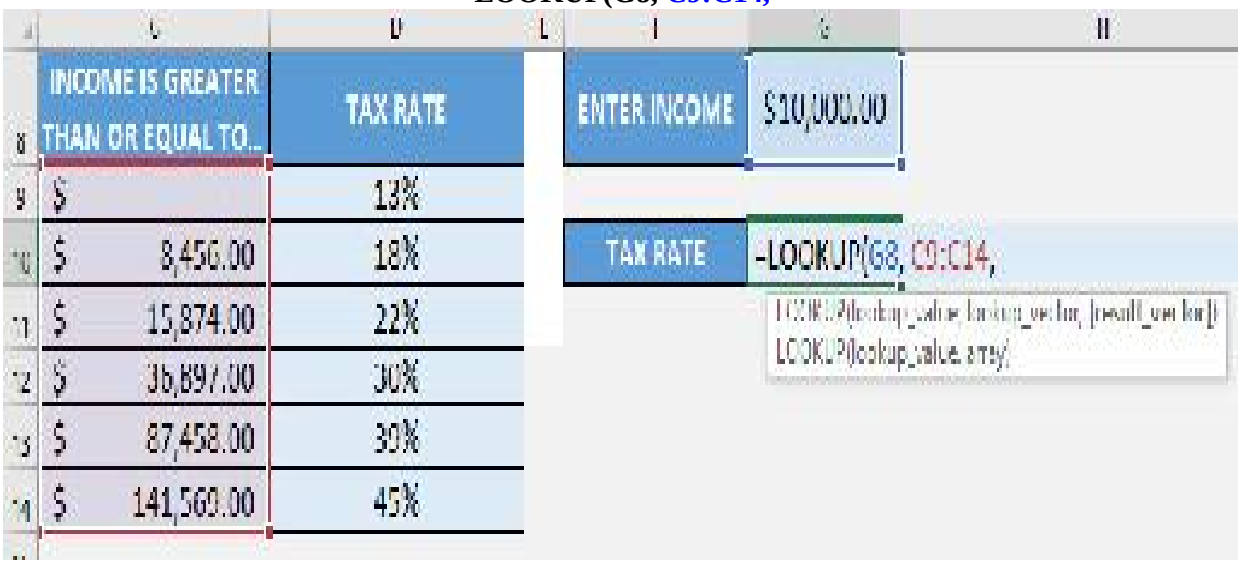


lookup_vector

Where is the range of values to be matched against?

Now we need to select the range that contains the income values. It should be sorted in ascending order for the LOOKUP Formula to work.

=LOOKUP(G8, C9:C14,

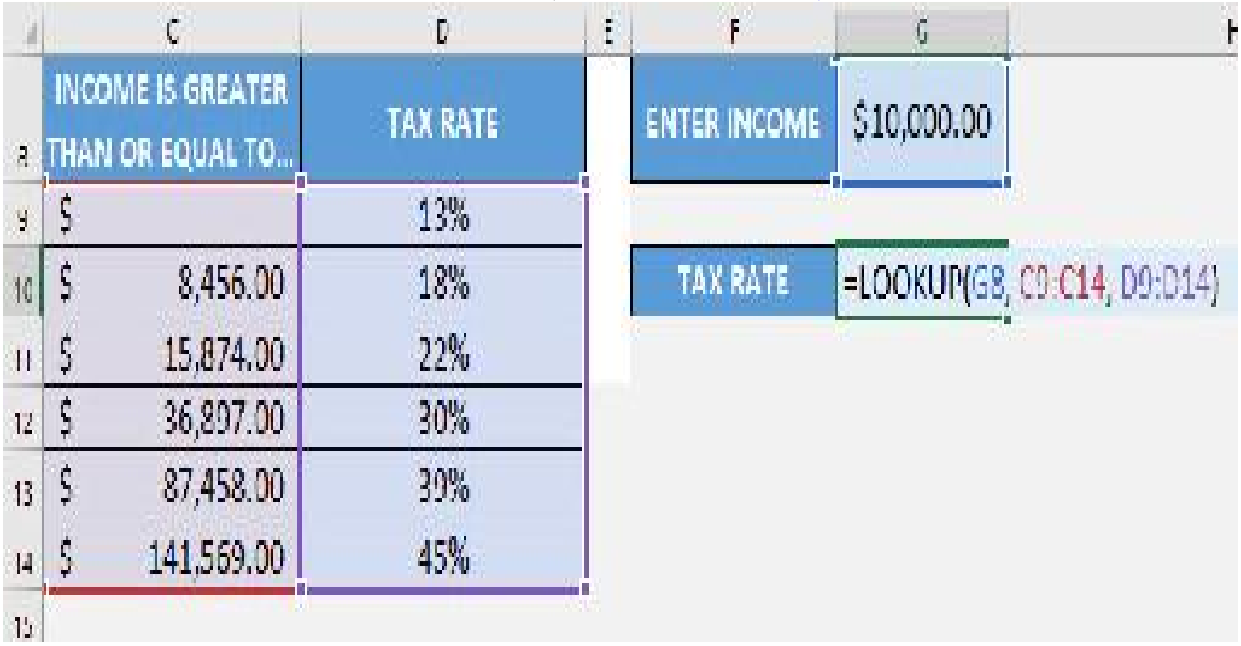


result_vector

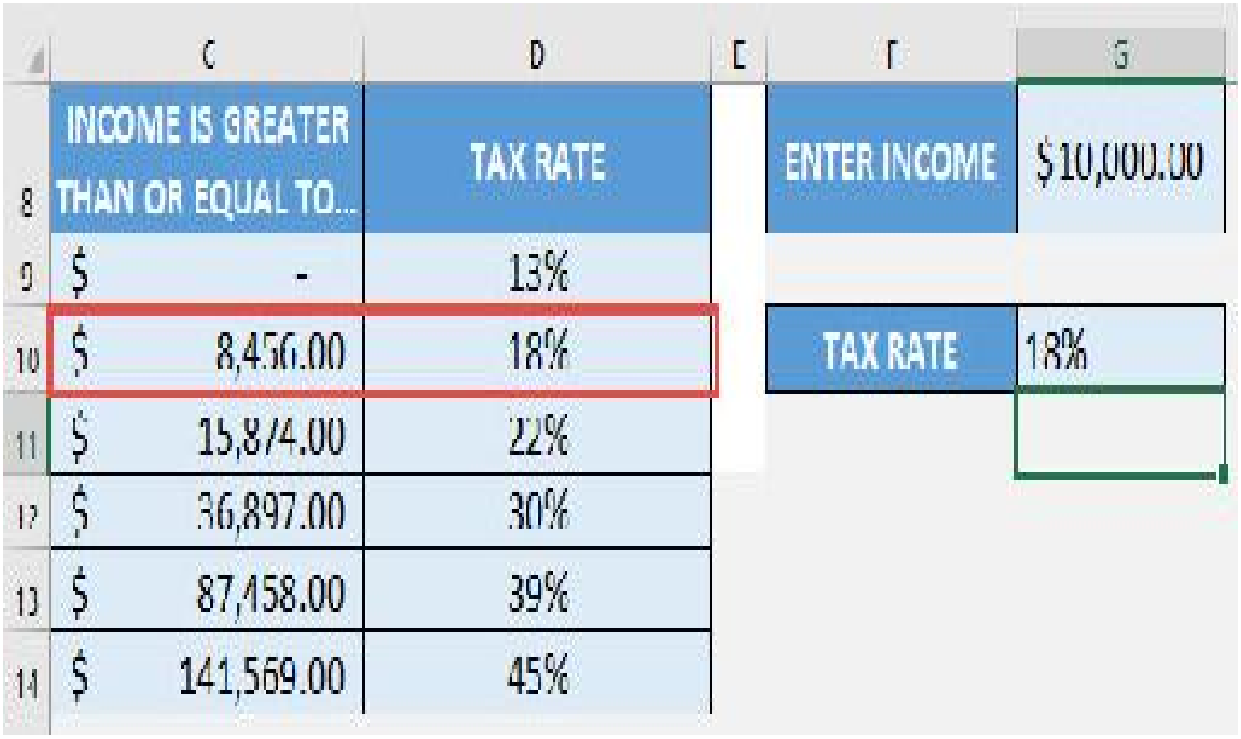
Where is the range of values to contains the value to be displayed as the final result?

Now we need to select the range that contains the tax rates. This is what we want to display as our final result of the lookup.

=LOOKUP(G8, C9:C14, D9:D14)



It was able to find out that the tax rate is 18%!



MATCH

What does it do?

It returns the position of a value/text

Formula breakdown:

=MATCH(lookup_value, lookup_array, [match_type])

What it means:

=MATCH(lookup this value, from this list or range of cells, return me the Exact Match)

Example:

=MATCH("Tablet",C12:C16,0) = 3

i.e. Tablet is in the 3rd position in the range

Exercise Workbook:

DOWNLOAD EXCEL WORKBOOK

The **MATCH** function in Excel returns the position of a value/text within a list or a range of cells.

Say that you have a Price List and want to know in which position a certain item is located within that Price List, then you would use the **MATCH** function.

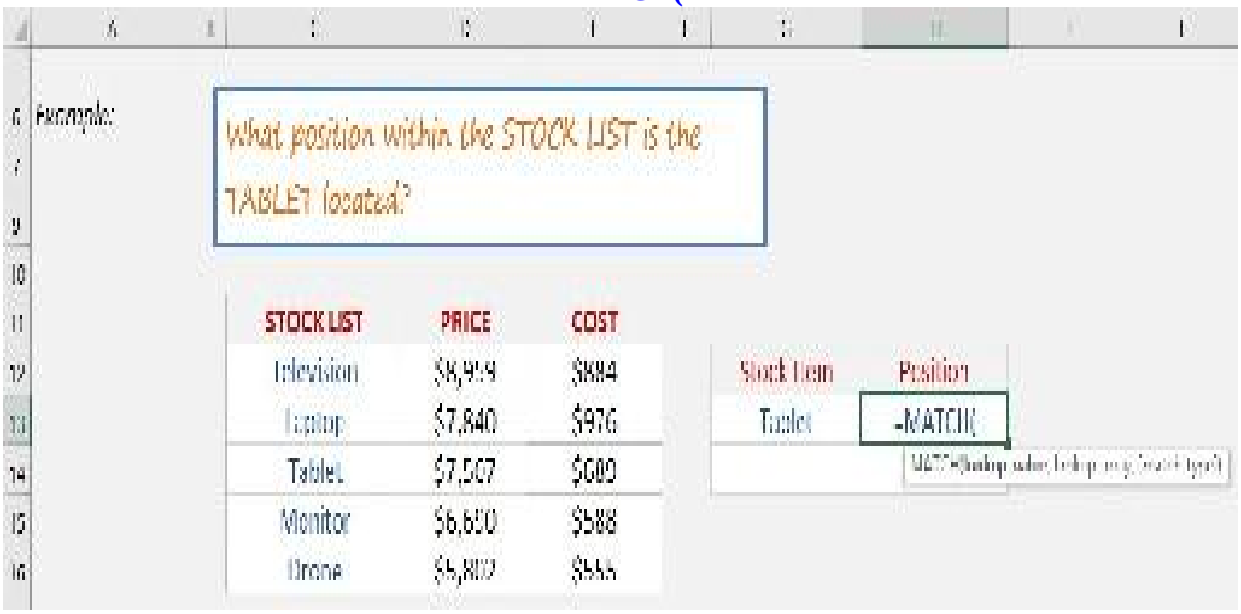
NB: The ***lookup_value*** argument can be a value (number, text, or logical value) or a cell reference to a number, text, or logical value.

We want to get the **position within the Stock list** where the **Tablet** is located.

STEP 1: Enter the following:

We need to enter the **MATCH** function in a blank cell:

=MATCH(



STEP 2: The **MATCH** arguments:

lookup_value

What is the value that we want to match?

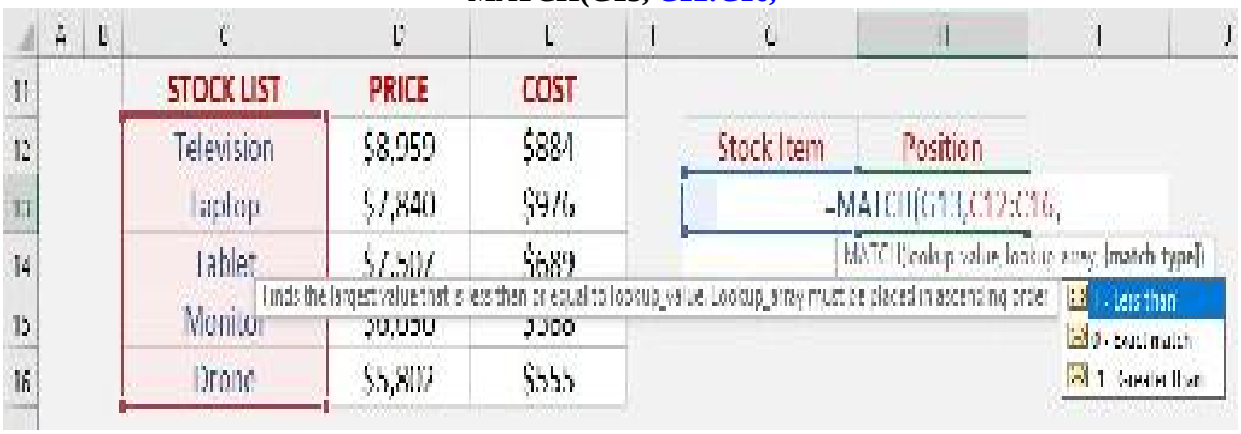
We want to match the "Tablet"

=MATCH(G13,

lookup_array

Where is the list that contains the stock items?

=MATCH(G13, C12:C16,

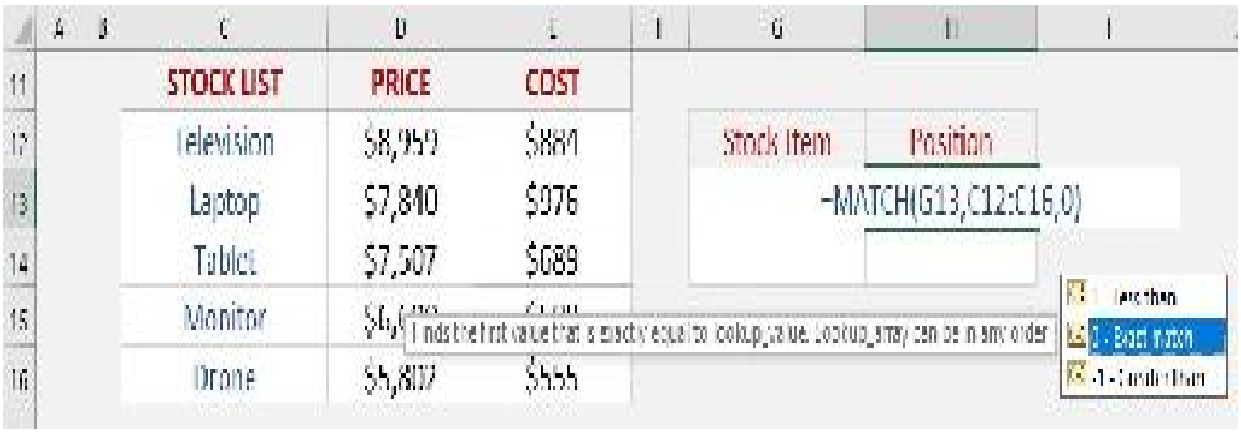


match_type

What kind of matching do you want?

Let's put in 0 to get the exact match

=MATCH(G13, C12:C16, 0)



And with that, you will get that tablet is in Row #3!

VLOOKUP

What does it do?

Searches for a value in the first column of a table array and returns a value in the same row from another column (to the right) in the table array.

Formula breakdown:

=VLOOKUP(lookup_value, table_array, col_index_num, [range_lookup])

What it means:

=VLOOKUP(this value, in this list, and get me value in this column, Exact Match/FALSE/0])

Example:

=VLOOKUP("Laptop",B14:D17,2,FALSE) = $185

i.e. The price of the Laptop in the table

Exercise Workbook:

DOWNLOAD EXCEL WORKBOOK

Excel`s **VLOOKUP** function is arguably the most used function in Excel but can also be the most tricky one to understand. I will show you a **VLOOKUP** example and in a few steps you will be able to extract values from a table and use them to do your custom reports and analysis.

You will be using VLOOKUP with confidence after this!

STEP 1: We need to enter the **VLOOKUP** function in a blank cell:

=VLOOKUP(

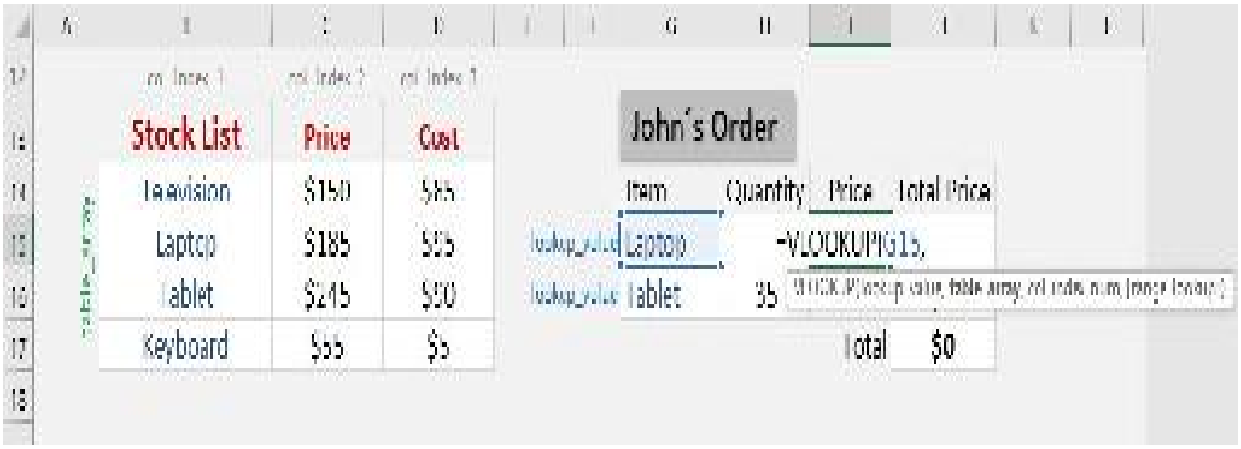
STEP 2: The **VLOOKUP** arguments:

lookup_value

What is the value that you want to look for?

In our first example, it will be "Laptop", so select the Item name

=VLOOKUP(G15,

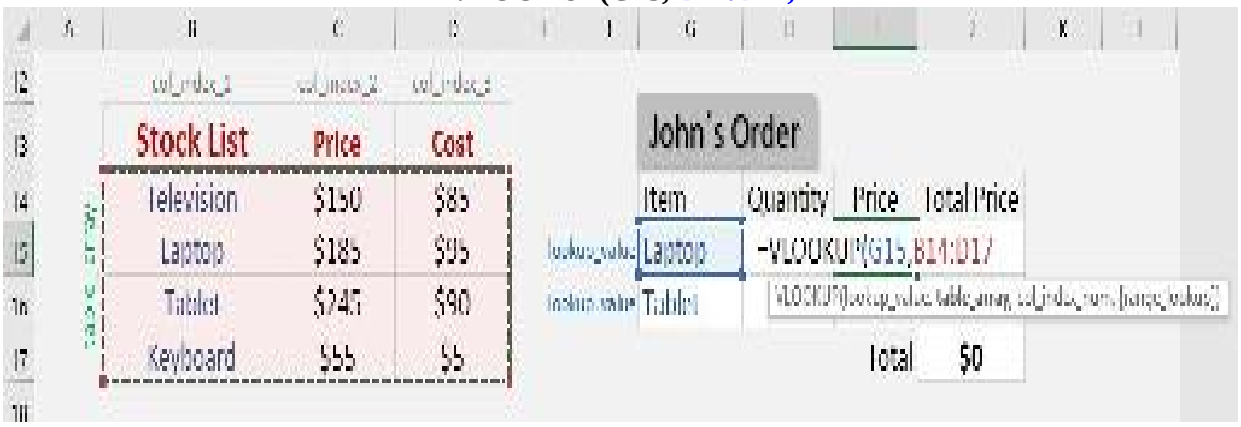


table_array

What is the table or range of cells that contains all your data?

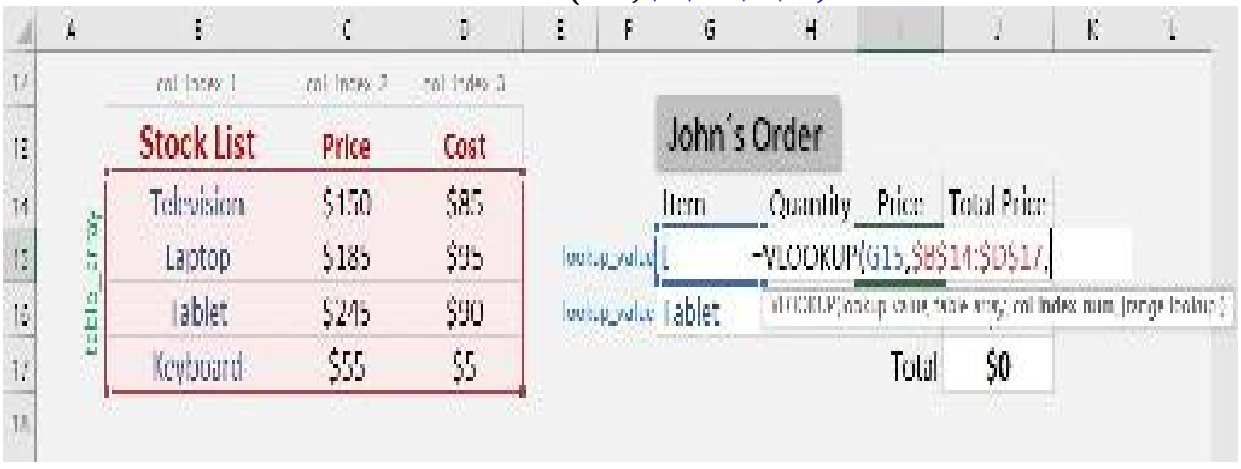
Make sure to select the stock list table so that our VLOOKUP formula will search here

=VLOOKUP(G15, B14:D17,



Ensure that you press **F4** so that you can lock the table range.

=VLOOKUP(G15, $B$14:$D$17,

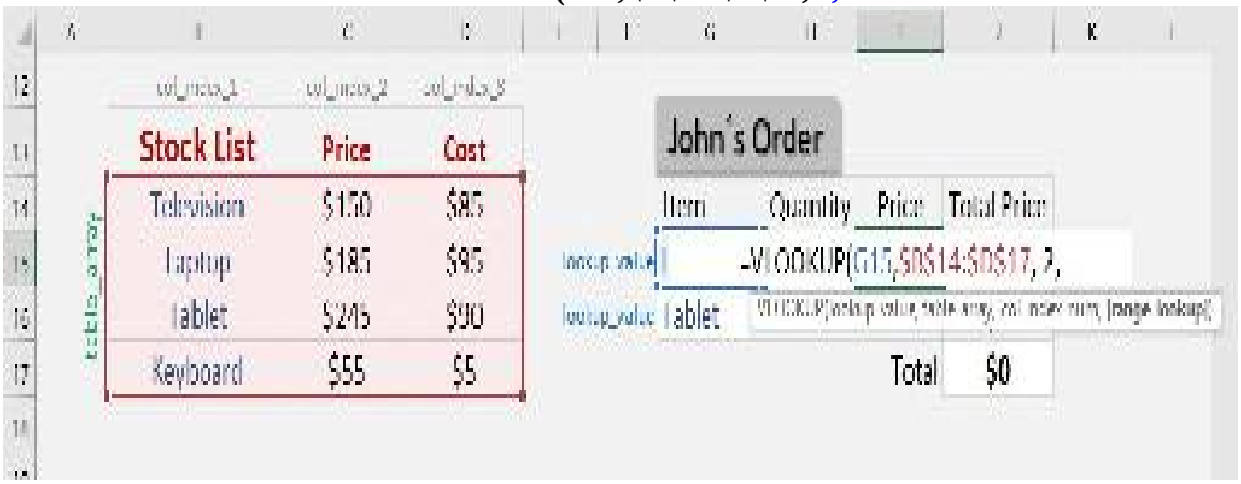


col_index_num

What is the column that you want to retrieve the value from?

*Since we want to get the price, our price is on the **2nd column** of our source data*

=VLOOKUP(G15, $B$14:$D$17, 2,

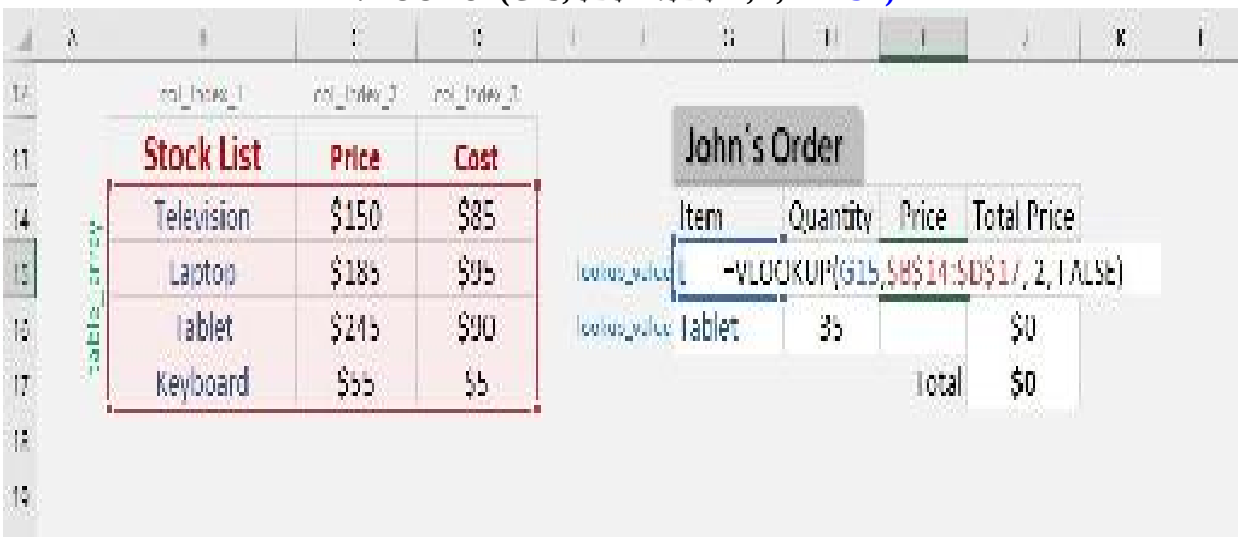


range_lookup

What kind of matching do you need?

*We want an exact match of the Laptop text so make sure **FALSE** is selected (or you can enter 0 instead of FALSE):*

=VLOOKUP(G15, $B$14:$D$17, 2, FALSE)



Apply the same formula to the rest of the cells by dragging the lower right corner downwards.

You now have all of the results!

LOGICAL FUNCTIONS

AND

What does it do?

Checks if all of the conditions are satisfied or not

Formula breakdown:

=AND(logical1, [logical2], ...)

What it means:

=AND(first condition, [additional conditions], ...)

Example:

=AND(MONTH("1/01/18")=1, 1500 >1000) =TRUE

Exercise Workbook:

DOWNLOAD EXCEL WORKBOOK

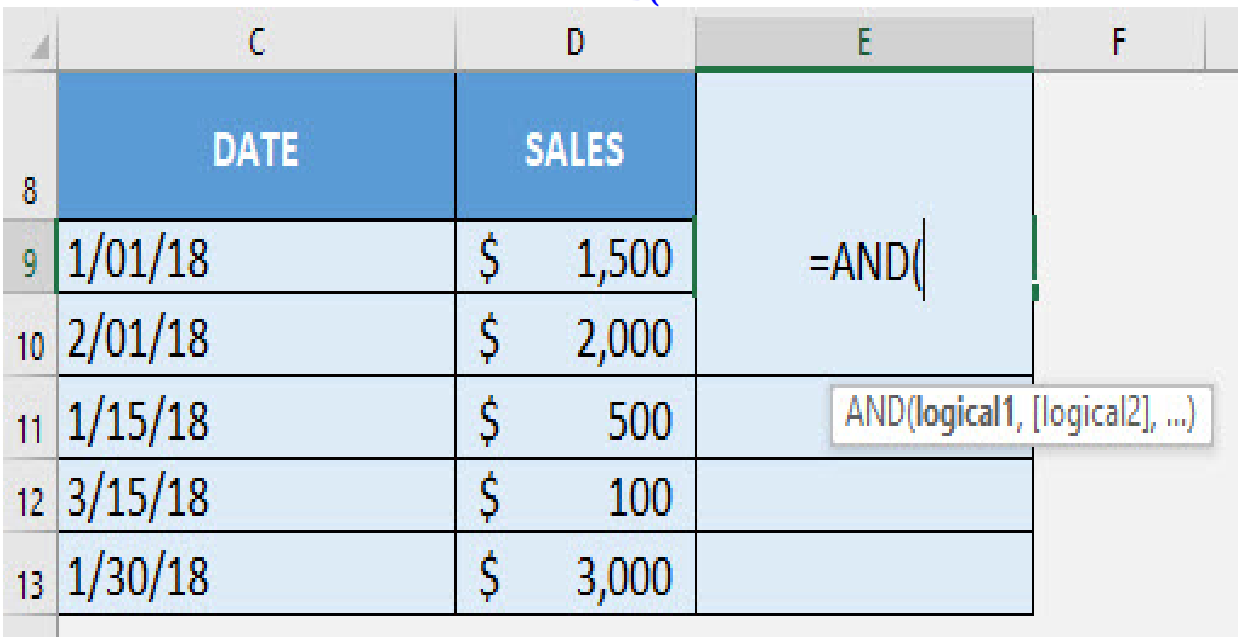
Have a couple of conditions that you need to check for and ensure they are met? The **AND Formula** enforces this and will return **TRUE** if all of your required conditions are met!

Let us give this a try in our examples below. We want to **check if the date is in the month of January and the sales amount is greater than $1000.**

I explain how you can do this below:

STEP 1: We need to **enter the *AND* function in a blank cell**:

=AND(



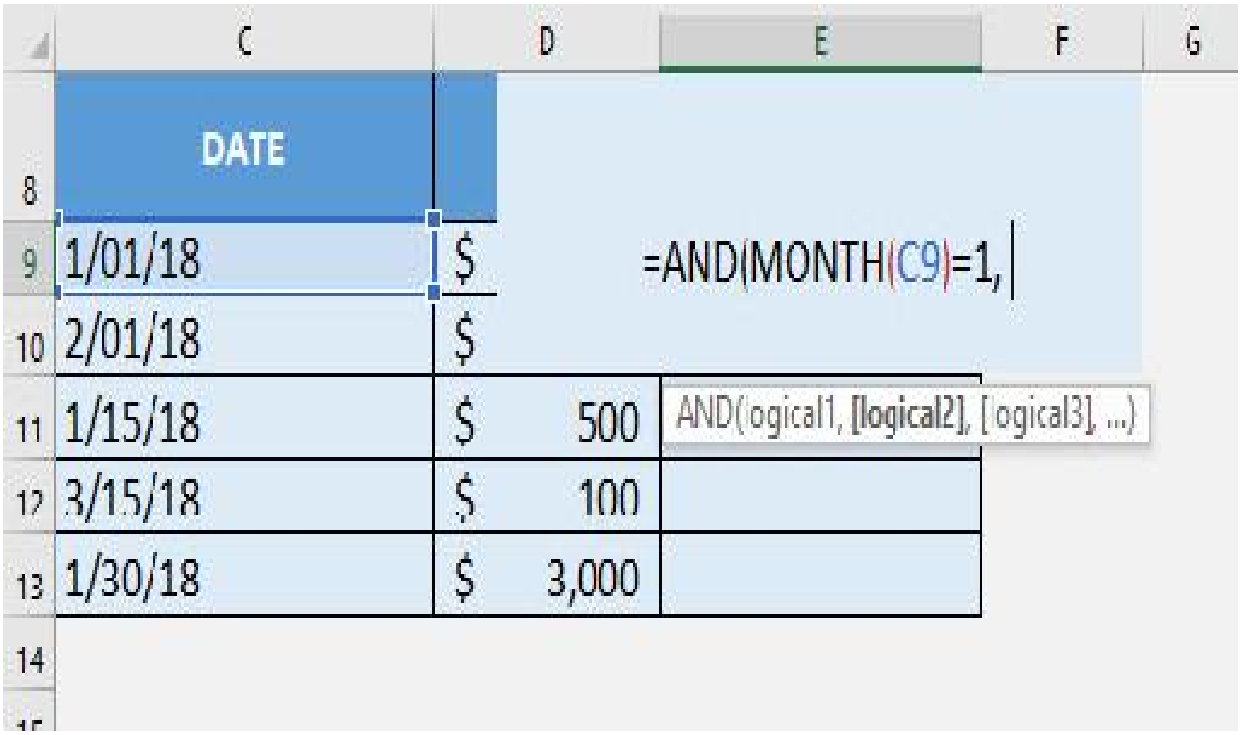
STEP 2: The **AND** arguments:

logical1

What is the first condition?

Let us create the condition to get the month of the date and check if it is January i.e. 1

=AND(MONTH(C9)=1,

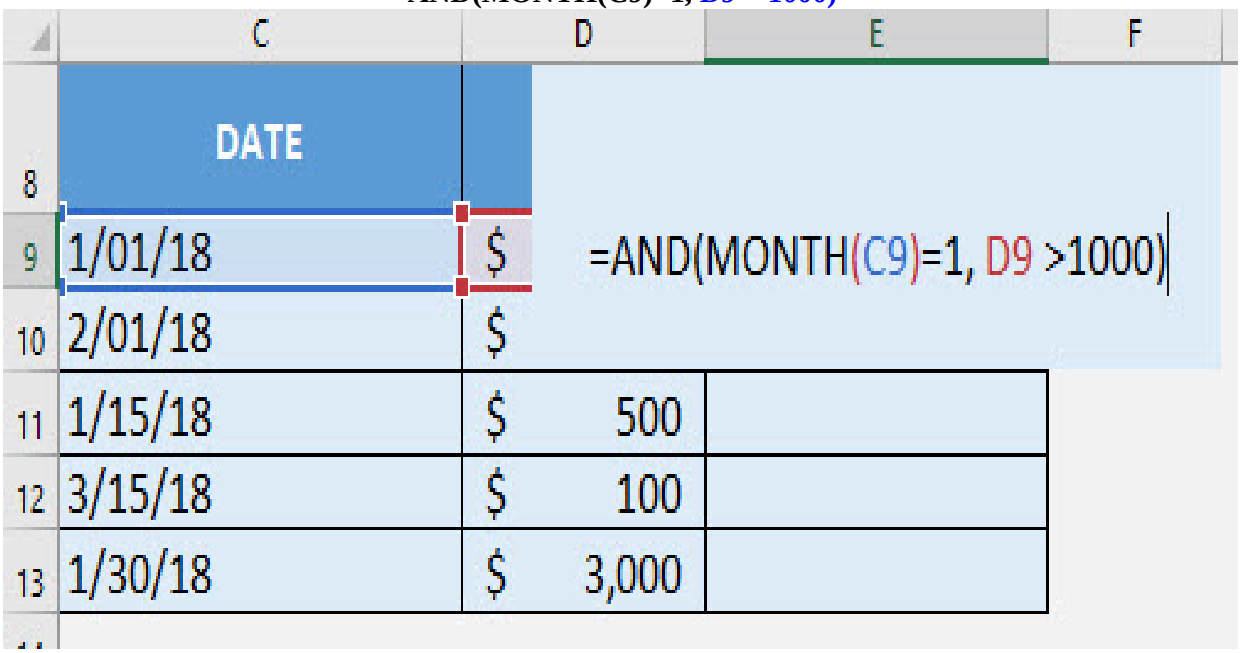


[logical2]

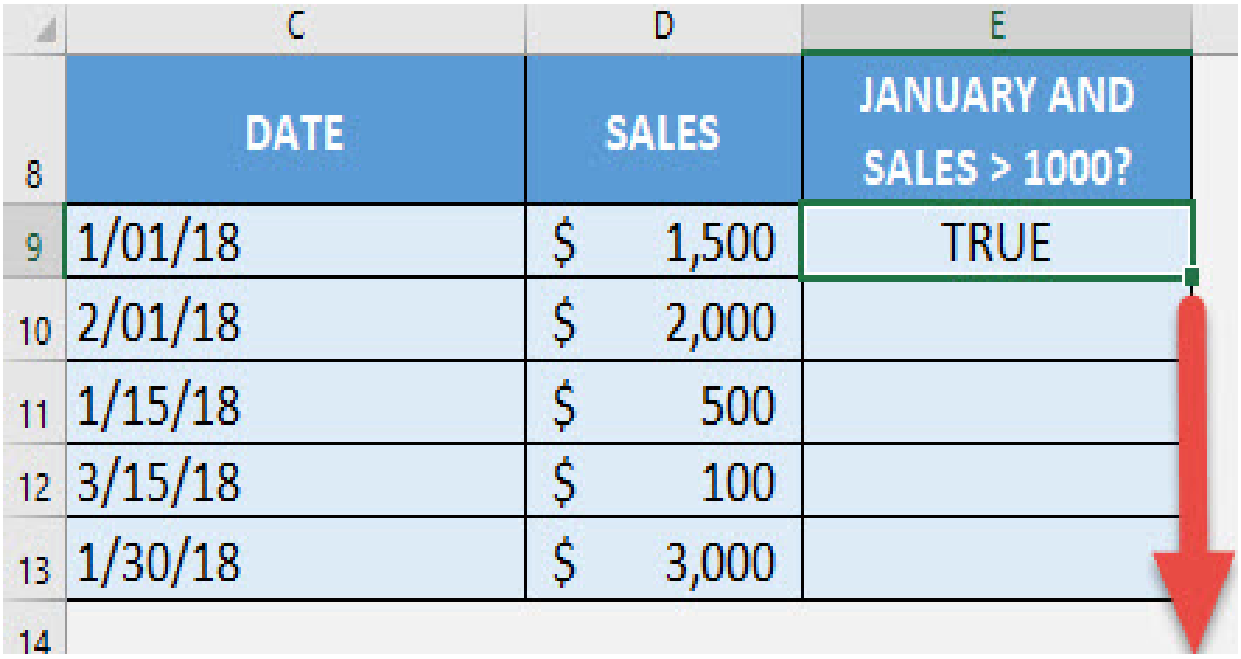
What is the second condition?

Let us create the condition to check if sales is greater than 1000:

=AND(MONTH(C9)=1, D9 > 1000)

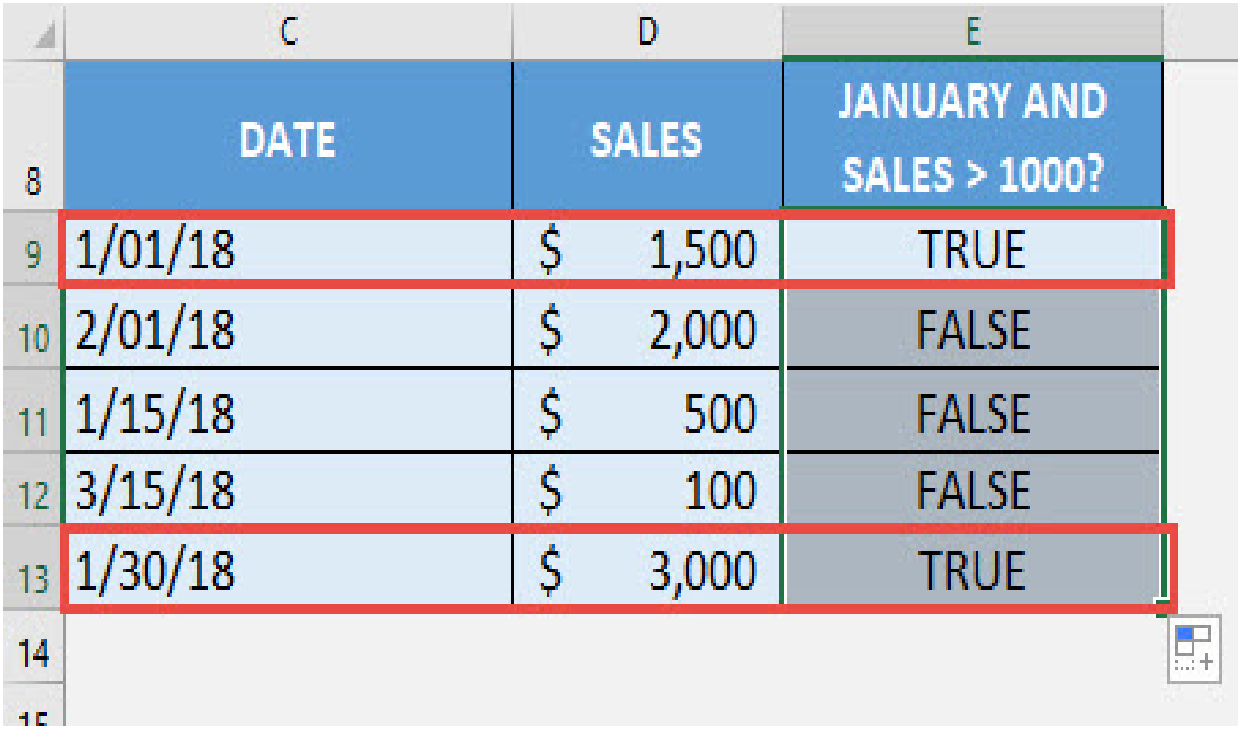


Apply the same formula to the rest of the cells by dragging the lower right corner downwards.



	C	D	E
8	DATE	SALES	JANUARY AND SALES > 1000?
9	1/01/18	$ 1,500	TRUE
10	2/01/18	$ 2,000	
11	1/15/18	$ 500	
12	3/15/18	$ 100	
13	1/30/18	$ 3,000	
14			

You now have your results!



	C	D	E
8	DATE	SALES	JANUARY AND SALES > 1000?
9	1/01/18	$ 1,500	TRUE
10	2/01/18	$ 2,000	FALSE
11	1/15/18	$ 500	FALSE
12	3/15/18	$ 100	FALSE
13	1/30/18	$ 3,000	TRUE
14			

IF

What does it do?

It returns a value that you set if a condition is met, and a value if it is not met

Formula breakdown:

=IF(Logical Test,Value if True,Value if False)

What it means:

=IF(The condition to be checked, Value to be shown if the condition is met, Value to be shown if condition is not met)

Example:

=IF(D15>3000,”Bonus”,”No Bonus”) = No Bonus

Exercise Workbook:

DOWNLOAD EXCEL WORKBOOK

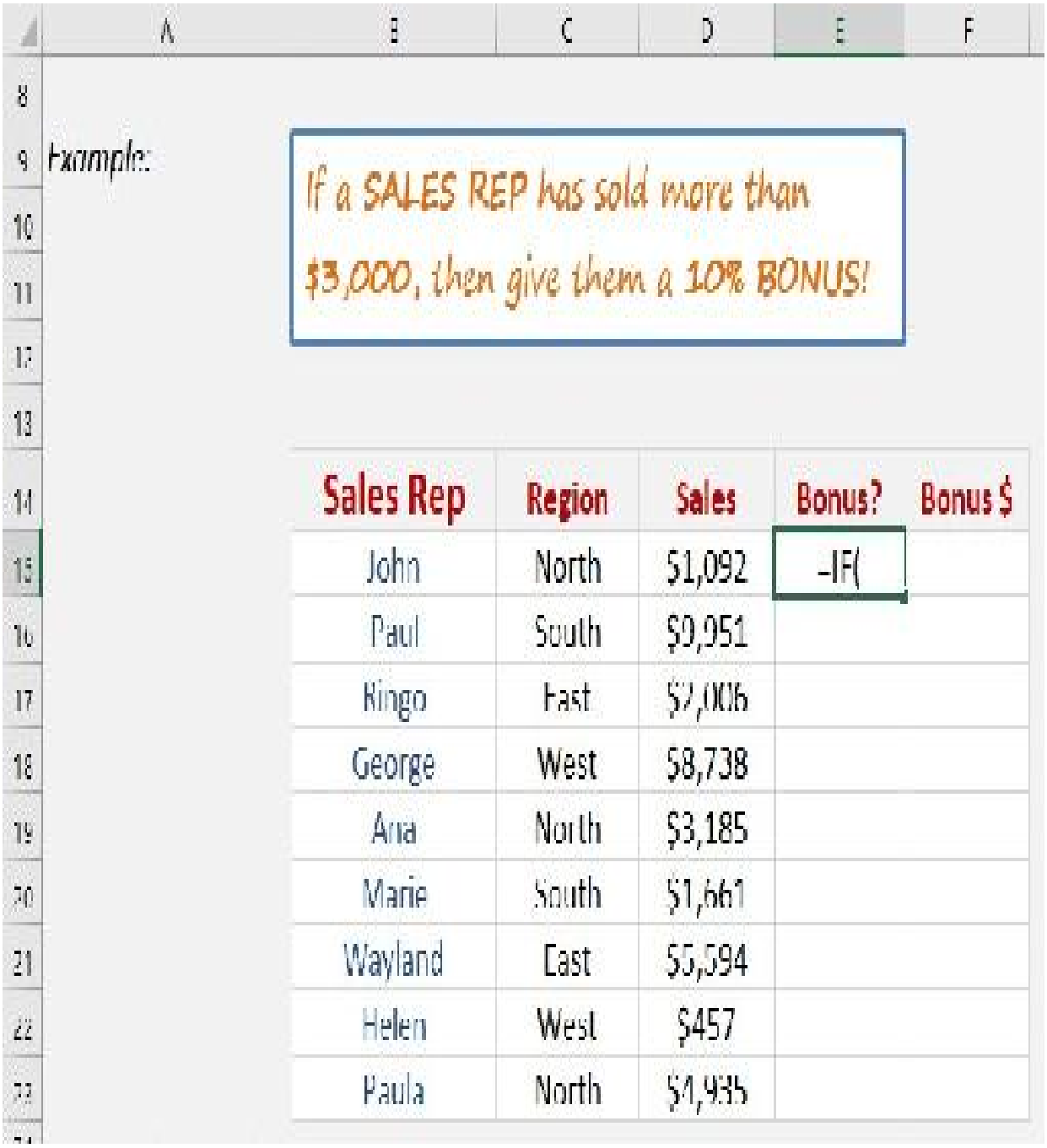
The **IF function** is probably one of the most used Excel functions because it is easy to understand and very flexible when you apply it to real life situations.

Here I will show you a couple of ways that you can use the **IF function** to get you up and going.

We want to show a **Bonus** value if **sales are bigger than $3000**, and **No Bonus** is shown if this condition is not met. Afterwards let's try computing the **10% bonus**!

STEP 1: We need to enter the **IF function** in a blank cell:

=IF(



STEP 2: The **IF** arguments:

logical_test

What is your condition?

Sales Rep has sold more than 3000 dollars.

=IF(D15>3000,

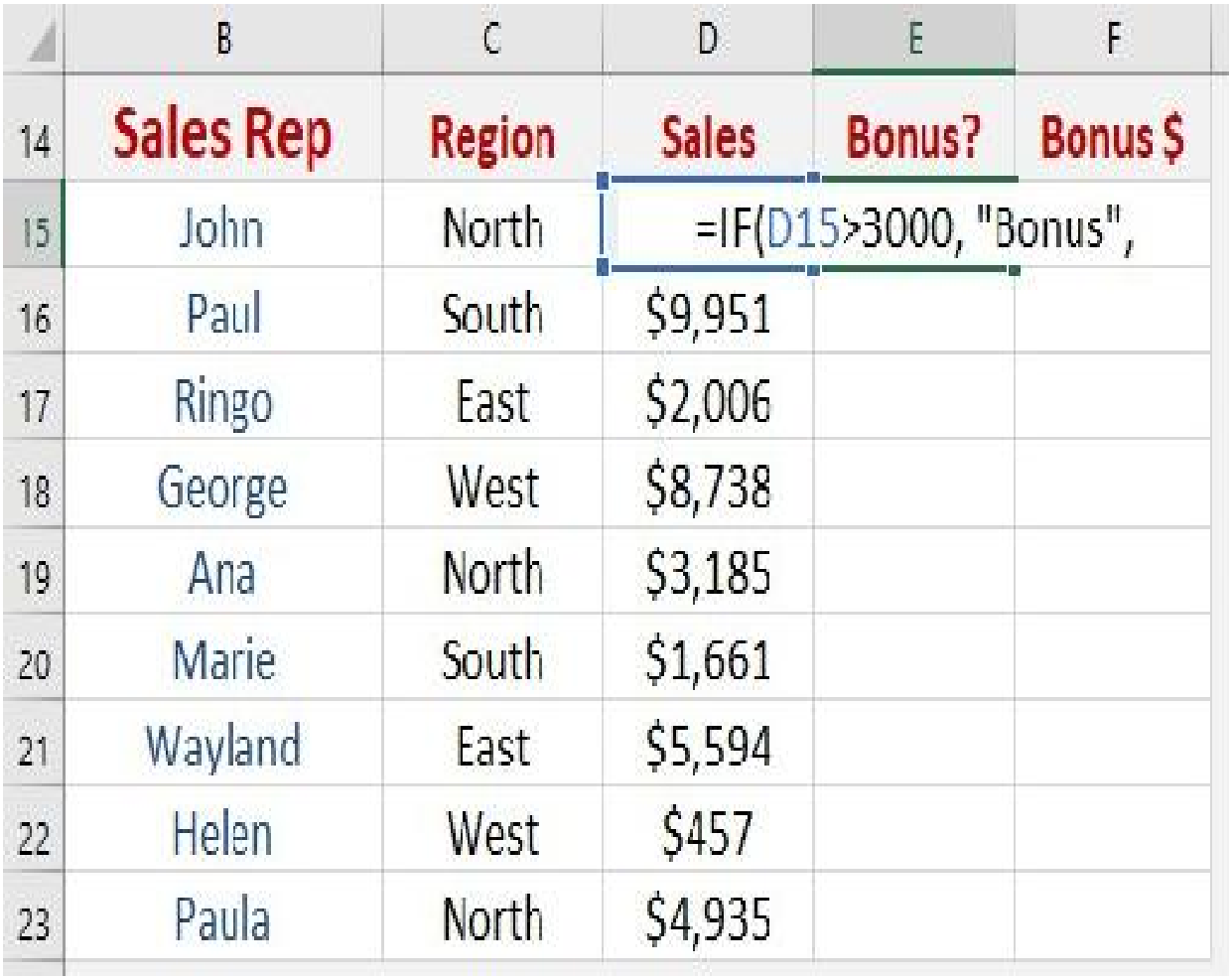
	B	C	D	E	F
14	Sales Rep	Region	Sales	Bonus?	Bonus $
15	John	North	=IF(D15>3000,		
16	Paul	South	$9,951		
17	Ringo	East	$2,006		
18	George	West	$8,738		
19	Ana	North	$3,185		
20	Marie	South	$1,661		
21	Wayland	East	$5,594		
22	Helen	West	$457		
23	Paula	North	$4,935		
24					

value_if_true

What value should be displayed if the condition is true?

*We want "**Bonus**" to be displayed*

=IF(D15>3000, "Bonus",



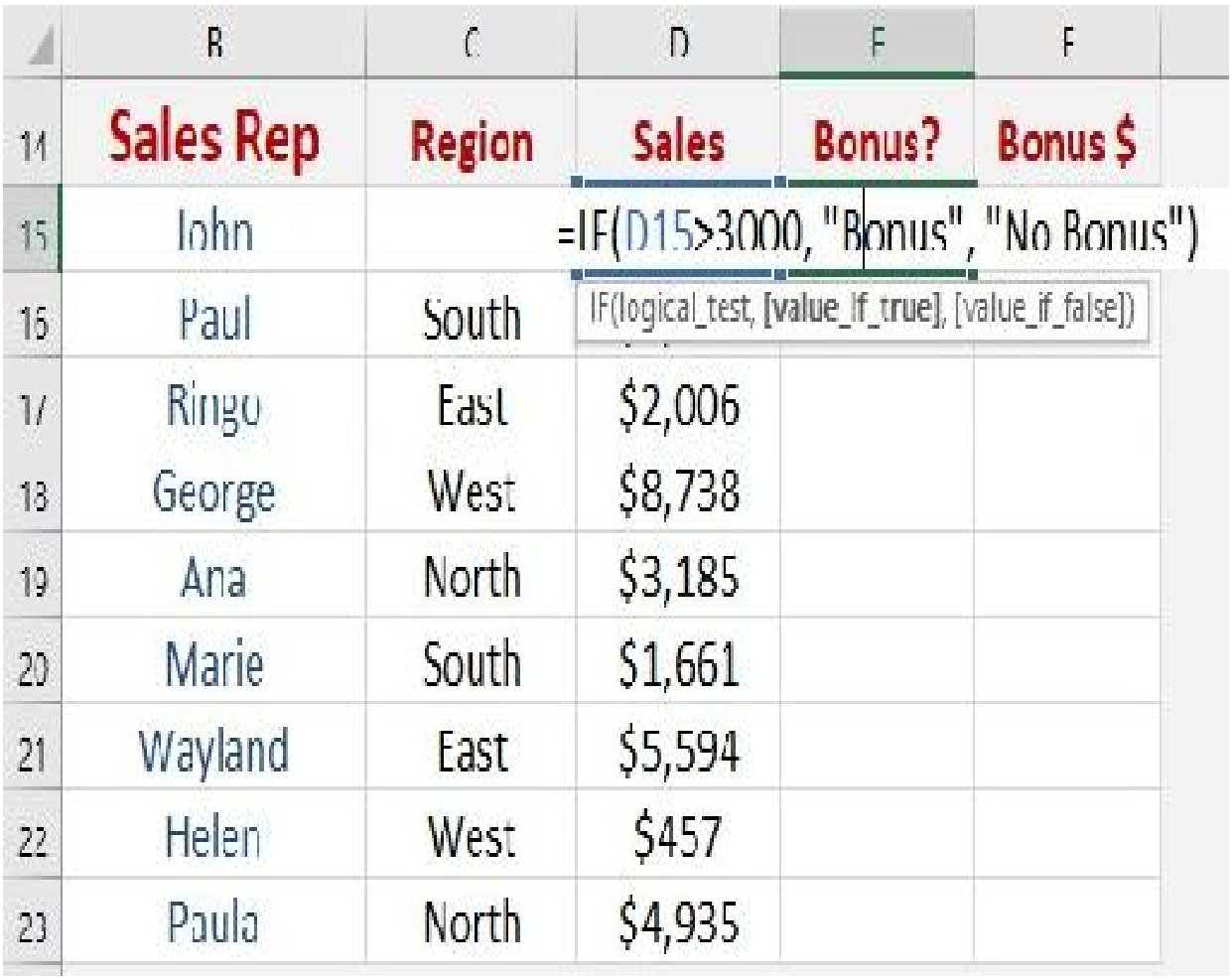
	B	C	D	E	F
14	Sales Rep	Region	Sales	Bonus?	Bonus $
15	John	North	=IF(D15>3000, "Bonus",		
16	Paul	South	$9,951		
17	Ringo	East	$2,006		
18	George	West	$8,738		
19	Ana	North	$3,185		
20	Marie	South	$1,661		
21	Wayland	East	$5,594		
22	Helen	West	$457		
23	Paula	North	$4,935		

value_if_false

What value should be displayed if the condition is false?

*We want "**No Bonus**" to be displayed*

=IF(D15>3000, "Bonus", "No Bonus")



Apply the same formula to the rest of the cells by dragging the lower right corner downwards.

	B	C	D	E	F
14	Sales Rep	Region	Sales	Bonus?	Bonus $
15	John	North	$1,092	No Bonus	
16	Paul	South	$9,951	Bonus	
17	Ringo	East	$2,006	No Bonus	
18	George	West	$8,738	Bonus	
19	Ana	North	$3,185	Bonus	
20	Marie	South	$1,661	No Bonus	
21	Wayland	East	$5,594	Bonus	
22	Helen	West	$457	No Bonus	
23	Paula	North	$4,935	Bonus	
24					

STEP 3: Let us now aim to give the **10% Bonus!**

The **IF** arguments:

logical_test

What is your condition?

Sales Rep has sold more than 3000 dollars.

=IF(D15>3000,

	B	C	D	E	F	G
14	Sales Rep	Region	Sales	Bonus?	Bonus $	
15	John	North	$1,092		=IF(D15>3000,	
16	Paul	South	$9,951	Bonus		
17	Ringo	East	$2,006	No Bonus		
18	George	West	$8,738	Bonus		
19	Ana	North	$3,185	Bonus		
20	Marie	South	$1,661	No Bonus		
21	Wayland	East	$5,594	Bonus		
22	Helen	West	$457	No Bonus		
23	Paula	North	$4,935	Bonus		

value_if_true

What value should be displayed if the condition is true?

*We want give a **10% bonus based on sales***

=IF(D15>3000, D15*10%,

	B	C	D	E	F	G
14	Sales Rep	Region	Sales	Bonus?	Bonus $	
15	John	North	$1,092	=IF(D15>3000, D15*10%,		
16	Paul	South	$9,951	Bonus		
17	Ringo	East	$2,006	No Bonus		
18	George	West	$8,738	Bonus		
19	Ana	North	$3,185	Bonus		
20	Marie	South	$1,661	No Bonus		
21	Wayland	East	$5,594	Bonus		
22	Helen	West	$157	No Bonus		
23	Paula	North	$1,935	Bonus		

value_if_false

What value should be displayed if the condition is false?

Then no bonus amount should be given, type in 0

=IF(D15>3000, D15*10%, 0)

	B	C	D	E	F	G
14	**Sales Rep**	**Region**	**Sales**	**Bonus?**	**Bonus $**	
15	John	North	$1,092	=IF(D15>3000, D15*10%, 0)		
16	Paul	South	$9,951	Bonus		
17	Ringo	East	$2,000	No Bonus		
18	George	West	$8,738	Bonus		
19	Ana	North	$3,185	Bonus		
20	Marie	South	$1,661	No Bonus		
21	Wayland	East	$5,594	Bonus		
22	Helen	West	$157	No Bonus		
23	Paula	North	$4,935	Bonus		

Apply the same formula to the rest of the cells by dragging the lower right corner downwards.

	B	C	D	E	F
14	**Sales Rep**	**Region**	**Sales**	**Bonus?**	**Bonus $**
15	John	North	$1,092	No Bonus	$0
16	Paul	South	$9,951	Bonus	$995
17	Ringo	East	$2,006	No Bonus	$0
18	George	West	$8,738	Bonus	$874
19	Ana	North	$3,185	Bonus	$319
20	Marie	South	$1,661	No Bonus	$0
21	Wayland	East	$5,594	Bonus	$559
22	Helen	West	$457	No Bonus	$0
23	Paula	North	$1,935	Bonus	$194
24					

You now have all of results!

IFERROR

What does it do?

It returns a value that you set if a formula has an error

Formula breakdown:

=IFERROR(Value,Value if Error)

What it means:

=IFERROR(The Formula,What do you want to show if The Formula has an error?)

Example:

=IFERROR(0/0,0) =0

Exercise Workbook:

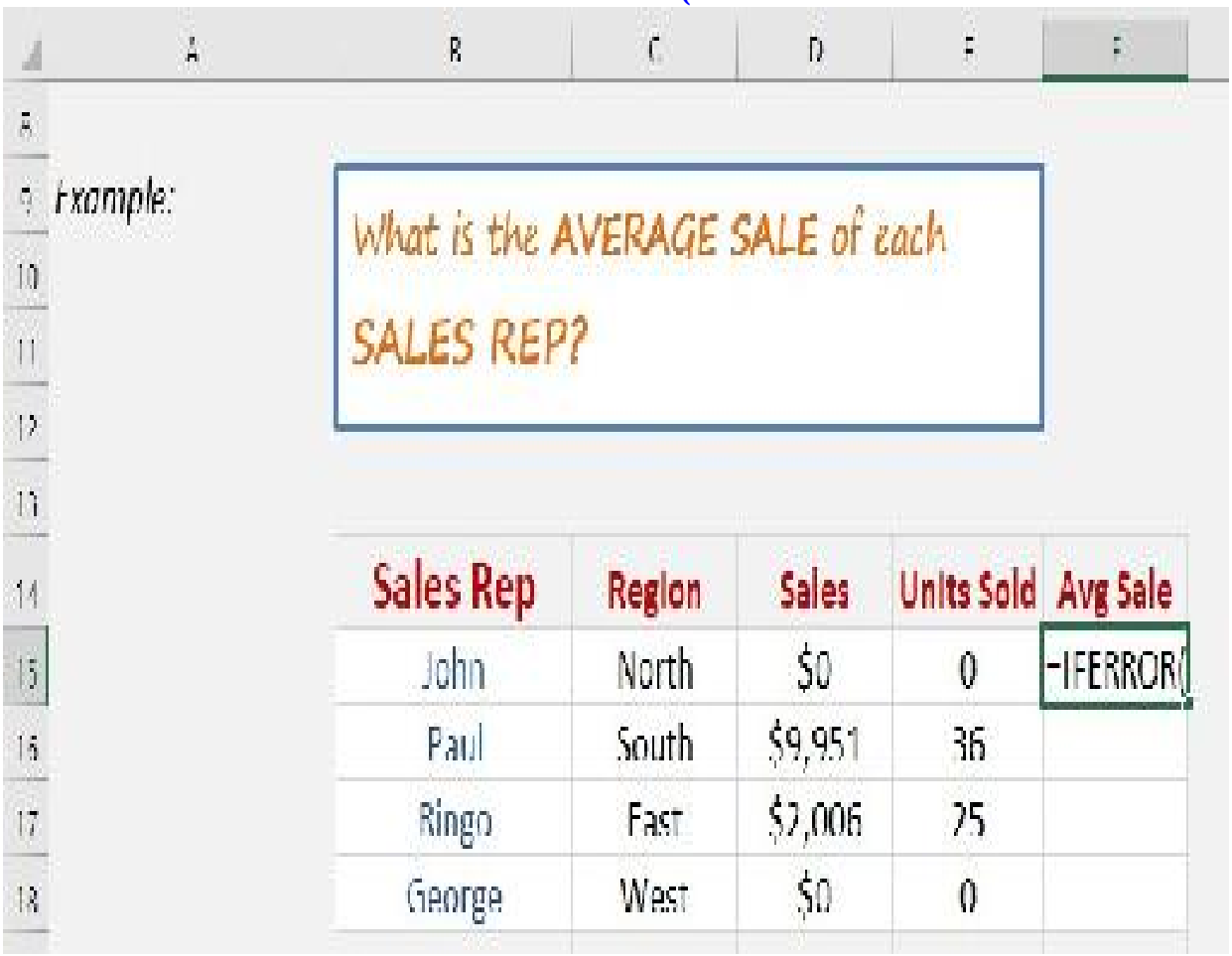
DOWNLOAD EXCEL WORKBOOK

If you have a calculation that results in an error like, #N/A, #VALUE!, #REF!, #DIV/0!, #NUM!, #NAME?, then you can clean it up by using the **IFERROR** function which allows you to replace the error it with a 0, a blank cell "" or whatever value you like.

We want to get the **average sale of each record**. However we need to **handle division by zero errors gracefully**.

STEP 1: We need to enter the **IFERROR** function in a blank cell:

=IFERROR(



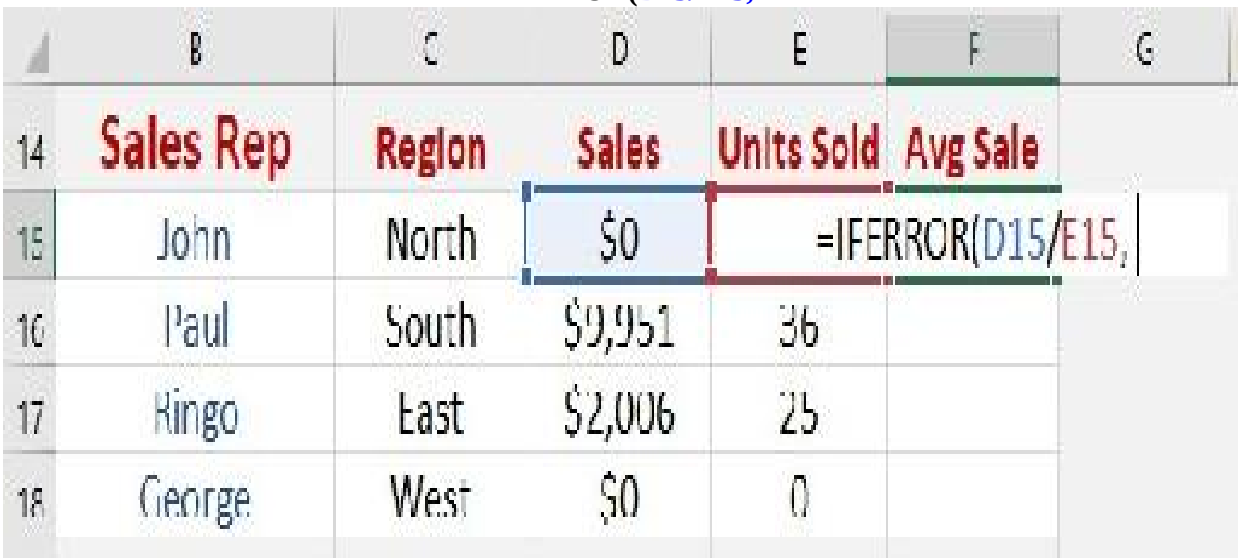
STEP 2: The **IFERROR** arguments:

value

What is the formula?

We need to enter the formula first to calculate the average sale.

=IFERROR(D15/E15,



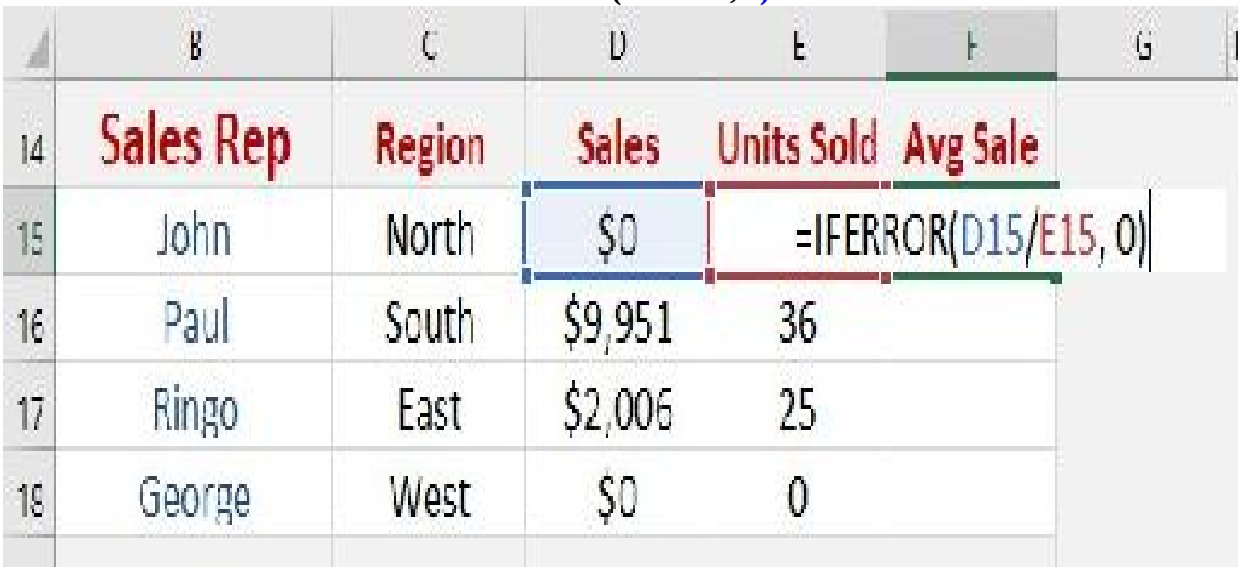
	B	C	D	E	F	G
14	Sales Rep	Region	Sales	Units Sold	Avg Sale	
15	John	North	$0		=IFERROR(D15/E15,	
16	Paul	South	$9,951	36		
17	Ringo	East	$2,006	25		
18	George	West	$0	0		

value_if_error

What value should be displayed if there is an error in the formula?

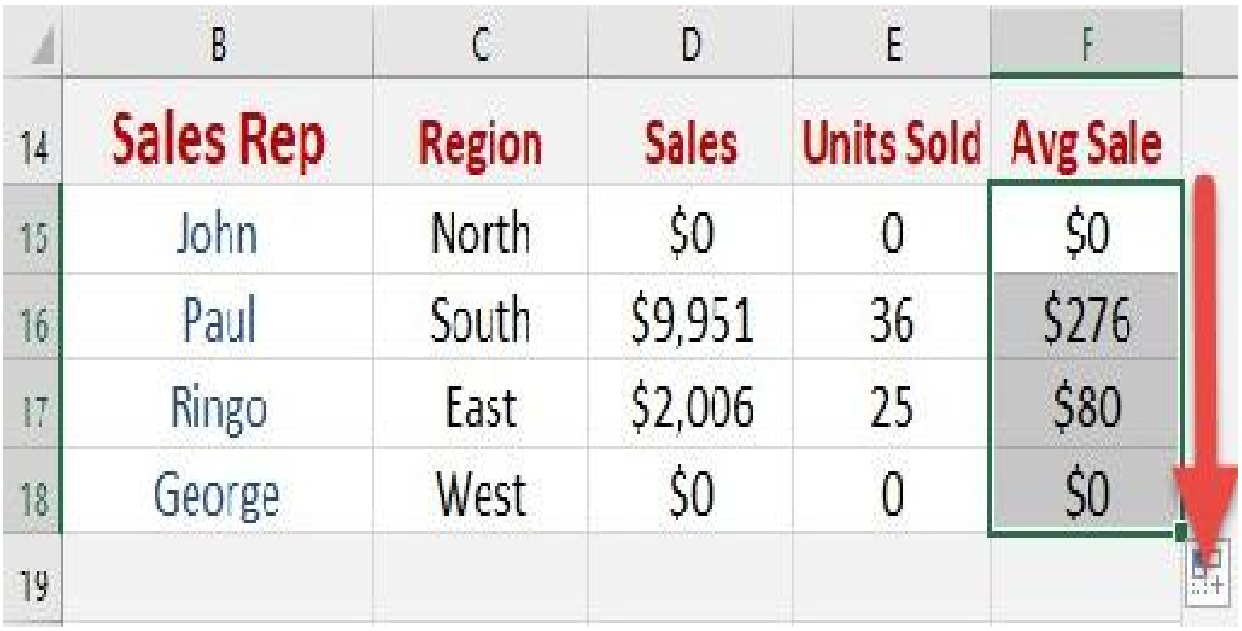
We want "0" to be displayed if there is an error

=IFERROR(D15/E15, 0)



	B	C	D	E	F	G
14	Sales Rep	Region	Sales	Units Sold	Avg Sale	
15	John	North	$0		=IFERROR(D15/E15, 0)	
16	Paul	South	$9,951	36		
17	Ringo	East	$2,006	25		
18	George	West	$0	0		

Apply the same formula to the rest of the cells by dragging the lower right corner downwards.



	B	C	D	E	F
14	Sales Rep	Region	Sales	Units Sold	Avg Sale
15	John	North	$0	0	$0
16	Paul	South	$9,951	36	$276
17	Ringo	East	$2,006	25	$80
18	George	West	$0	0	$0
19					

You now have all of results!

OR

What does it do?

Checks if any one of the conditions is satisfied or not

Formula breakdown:

=OR(logical1, [logical2], ...)

What it means:

=OR(first condition, [additional conditions], ...)

Example:

=OR(MONTH(C9)=1,1500>1000) =TRUE

Exercise Workbook:

DOWNLOAD EXCEL WORKBOOK

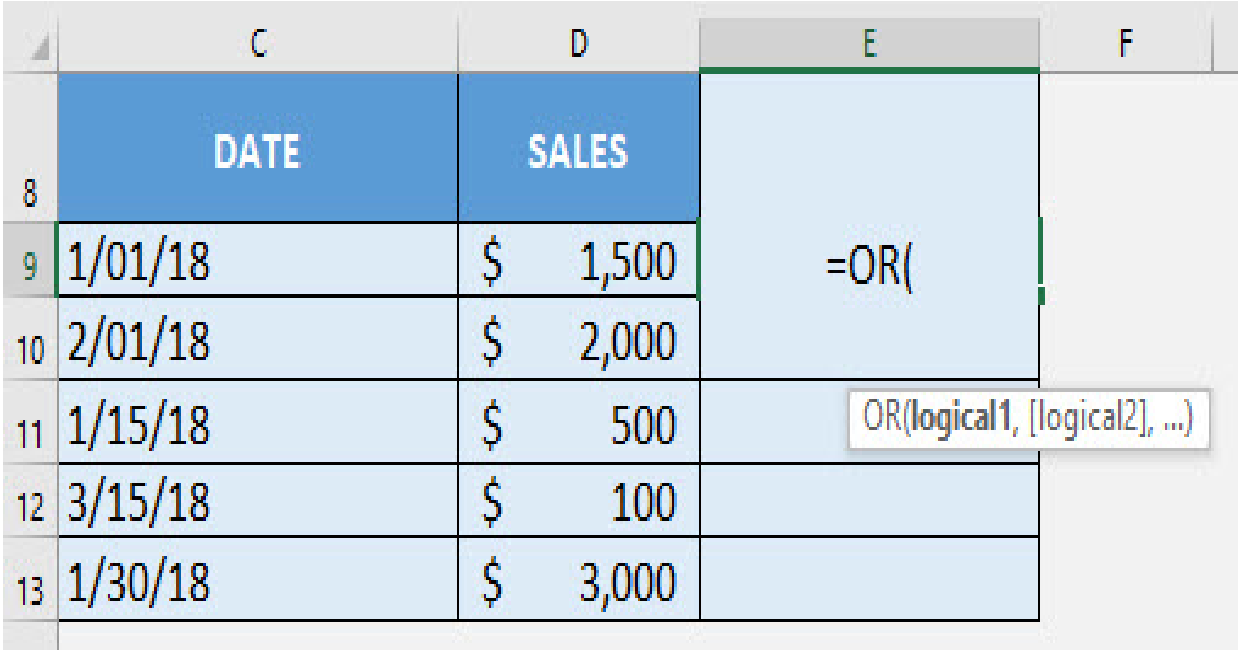
Have a couple of conditions that you need to check for and ensure **at least one is met**? The **OR Formula** enforces this and will return TRUE if any one of your required conditions is met!

Let us give this a try in our examples below. We want to **check if the date is in the month of January OR the sales amount is greater than $1000.**

I explain how you can do this below:

STEP 1: We need to **enter the *OR* function in a blank cell**:

=OR(



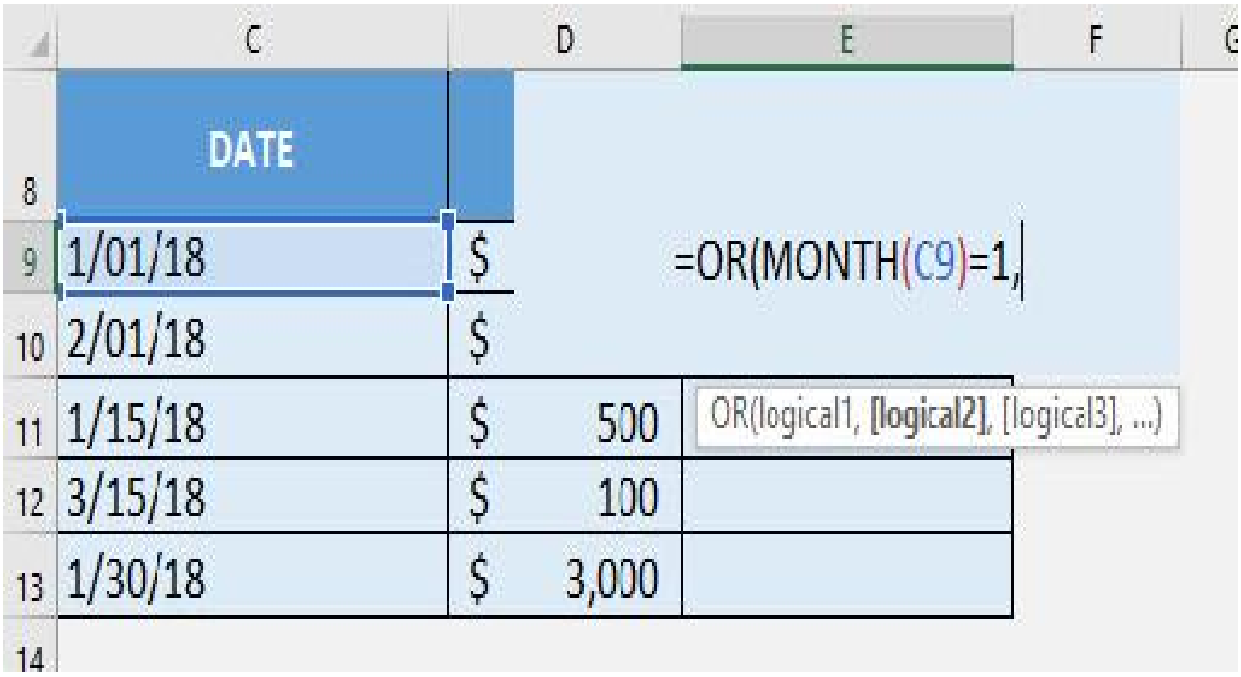
STEP 2: The **OR** arguments:

logical1

What is the first condition?

Let us create the condition to get the month of the date and check if it is January:

=OR(MONTH(C9)=1,

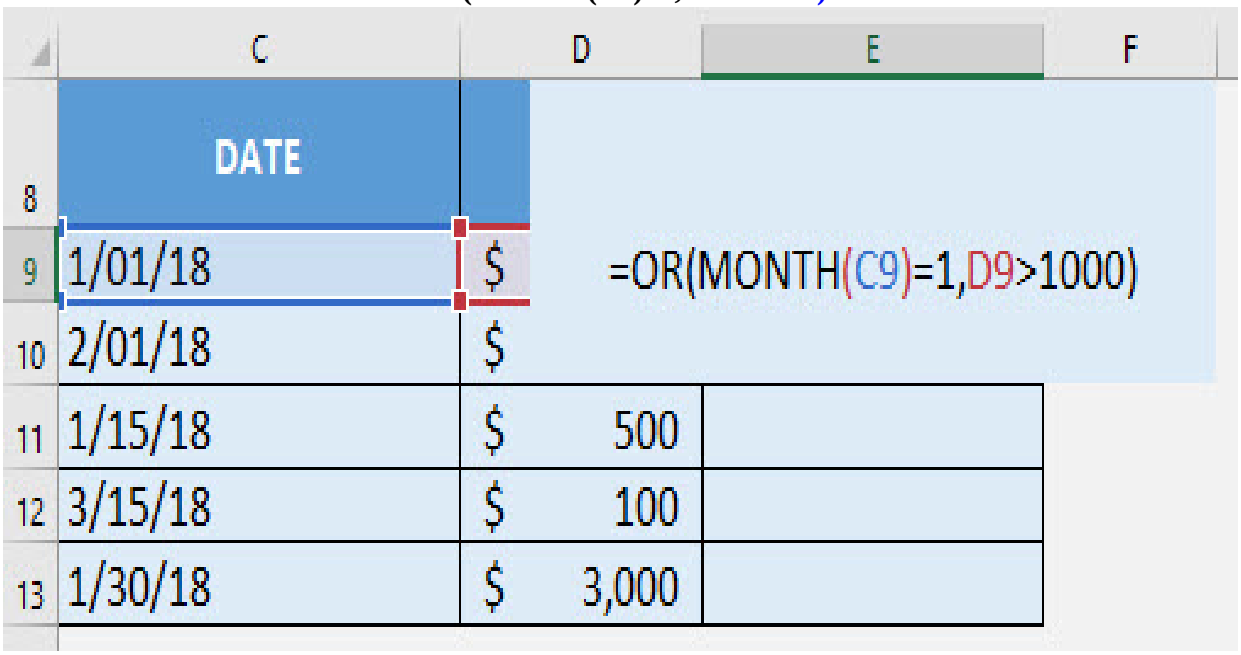


[logical2]

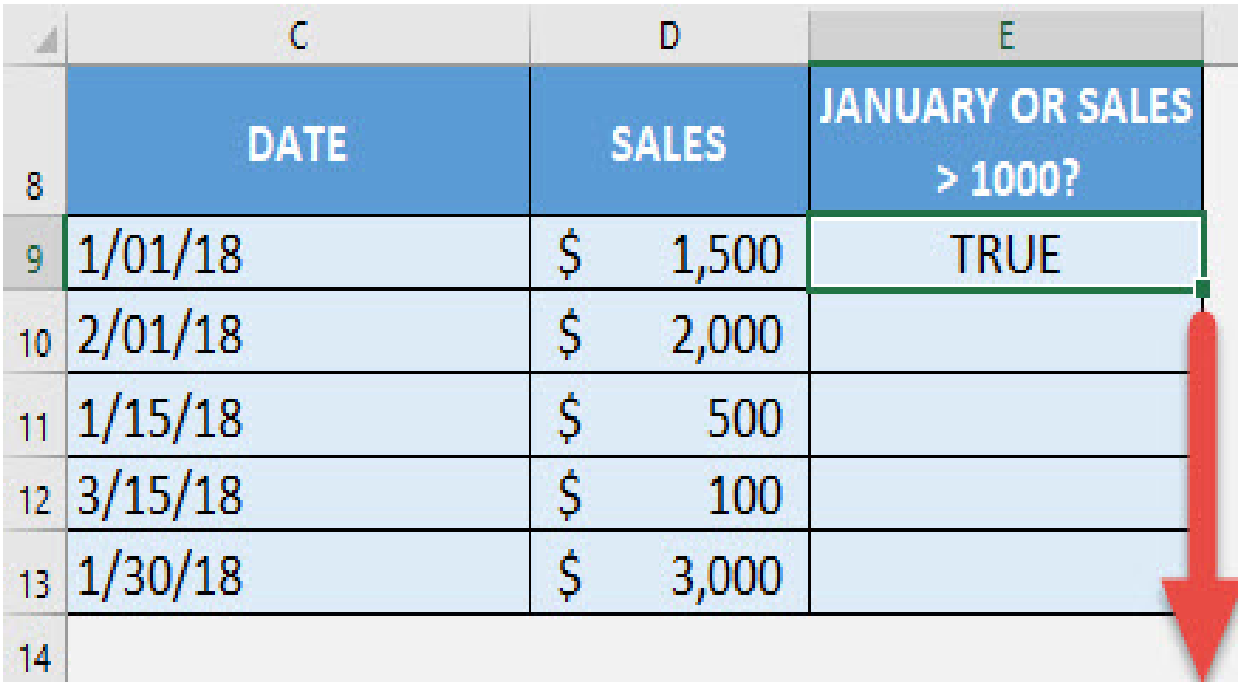
What is the second condition?

Let us create the condition to check if sales is greater than 1000:

=OR(MONTH(C9)=1, D9 > 1000)

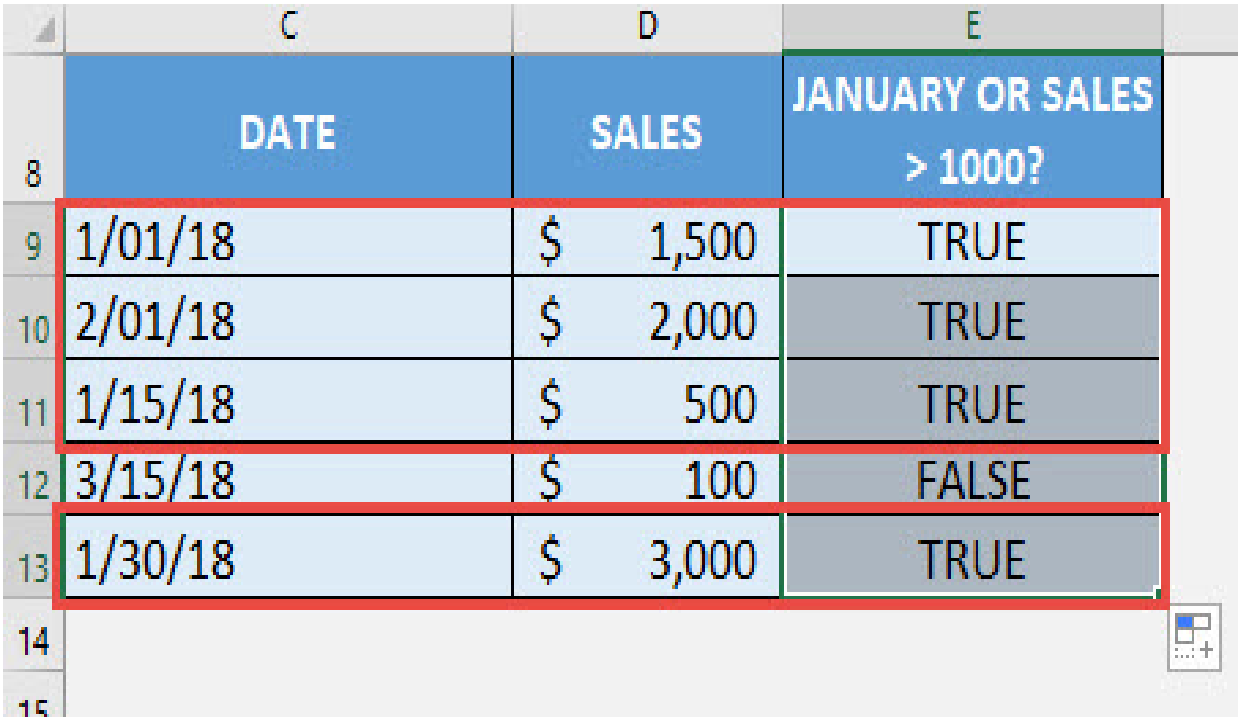


Apply the same formula to the rest of the cells by dragging the lower right corner downwards.



	C	D	E
8	DATE	SALES	JANUARY OR SALES > 1000?
9	1/01/18	$ 1,500	TRUE
10	2/01/18	$ 2,000	
11	1/15/18	$ 500	
12	3/15/18	$ 100	
13	1/30/18	$ 3,000	
14			

You now have your results!



	C	D	E
8	DATE	SALES	JANUARY OR SALES > 1000?
9	1/01/18	$ 1,500	TRUE
10	2/01/18	$ 2,000	TRUE
11	1/15/18	$ 500	TRUE
12	3/15/18	$ 100	FALSE
13	1/30/18	$ 3,000	TRUE
14			

MATH FUNCTIONS

COUNT

What does it do?

Counts the number of cells that contain numbers

Formula breakdown:

=COUNT(value1, [value2]...)

What it means:

=COUNT(range of cells to check, [additional cells to include in the check]...)

Example:

=COUNT(C9:C12) = 2

i.e. There are 2 cells with numbers in them

Exercise Workbook:

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Ever had a column of data and wanted to check if all of the values contain valid numbers?

It would be cumbersome to count and check them one by one, especially if you had hundreds of entries!

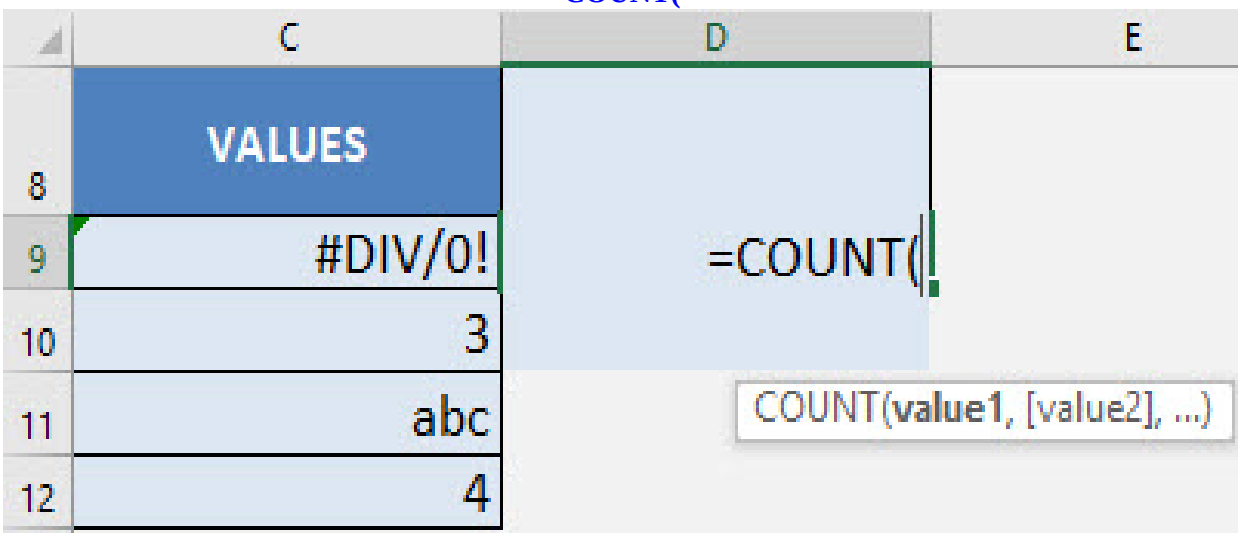
Imagine we have the following data, we see an error, a text and a couple of numbers:

VALUES
#DIV/0!
3
abc
4

Thankfully there is an easy way to count how many of these cells contain valid numbers using the Excel's **COUNT formula.**

STEP 1: We need to **enter the *COUNT* function in a blank cell**:

=COUNT(

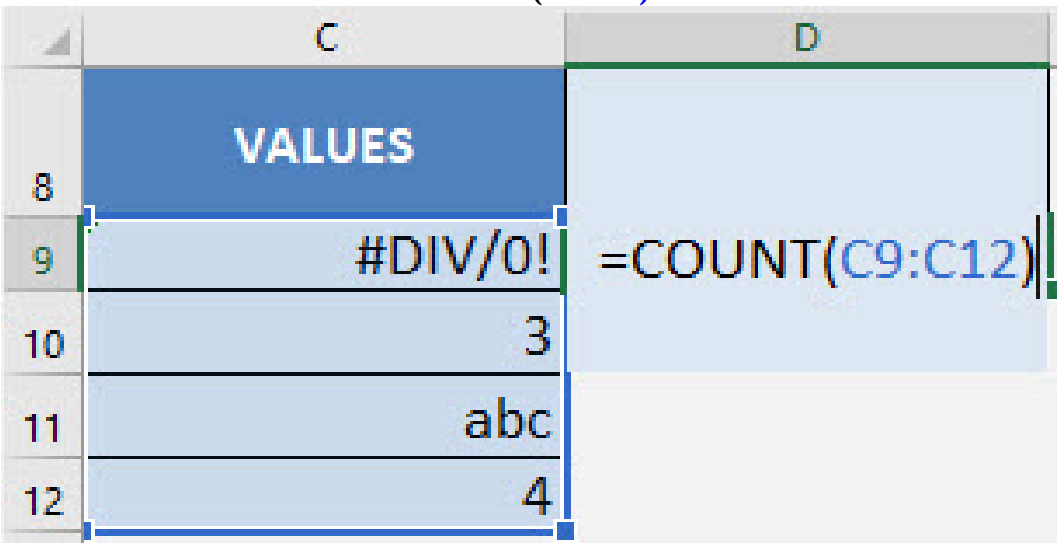


STEP 2: The **COUNT** arguments:

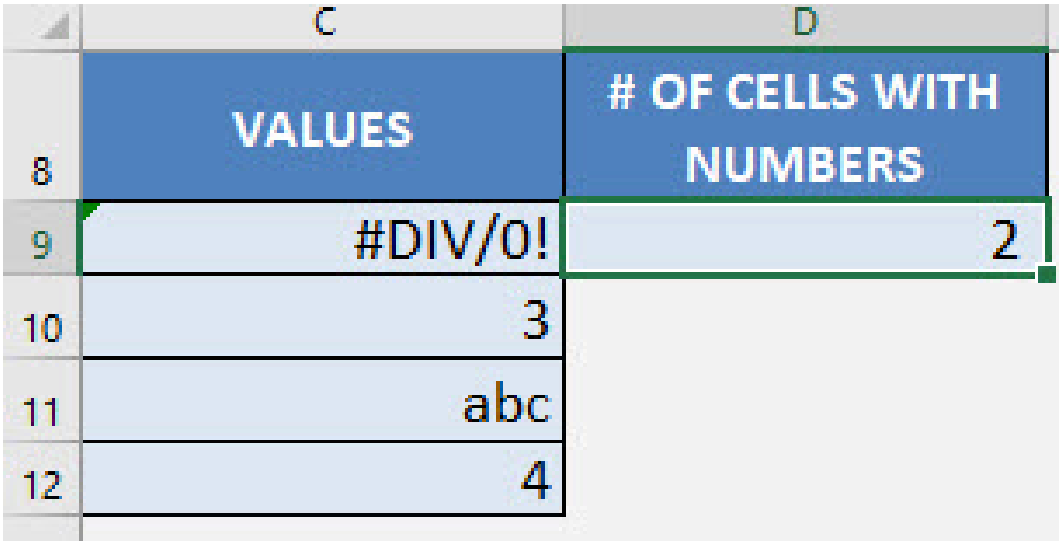
value

What is the value / range of values that you want to check?

=COUNT(C9:C12)



You now have your count of valid numbers!



COUNTA

What does it do?

Counts the number of cells that are non-blank/non-empty (including empty text "")

Formula breakdown:

=COUNTA(value1, [value2], ...)

What it means:

=COUNTA(value or range of cells to check, [value or range of cells to check], ...)

Example:

=COUNTA(B9:C12) = 6

i.e. There are 6 non-blank cells

Exercise Workbook:

DOWNLOAD EXCEL WORKBOOK

Do you have a scenario where you want to count the number of cells that **are non-blank or not empty?**

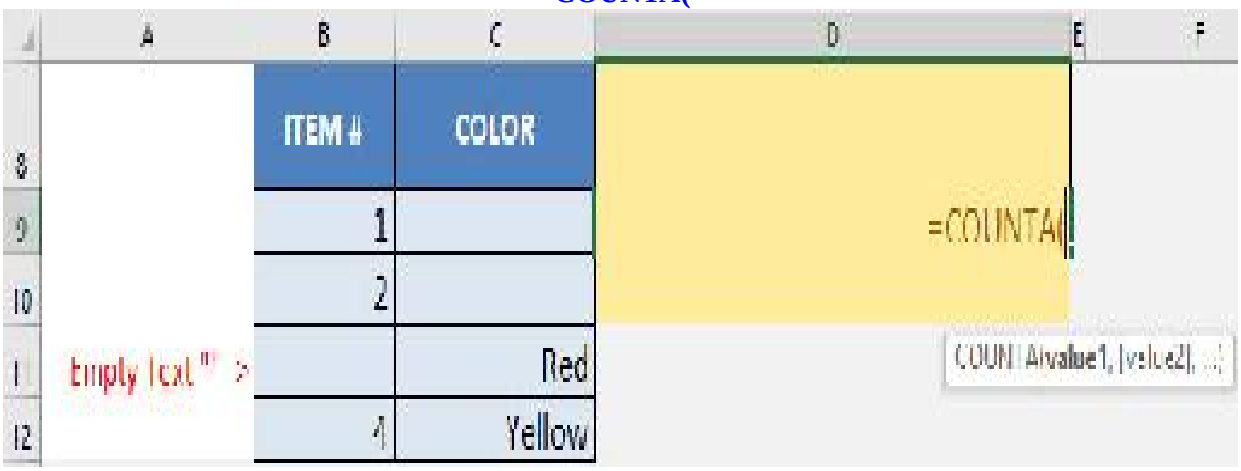
I'm sure you do! There is a simple way to count this with Excel's **COUNTA formula!**

This formula counts everything: numbers, text, non-empty text "", you name it!

I explain how you can do this below:

STEP 1: We need to **enter the *COUNTA* function in a blank cell.** Notice there are 6 non-blank cells in here:

=COUNTA(

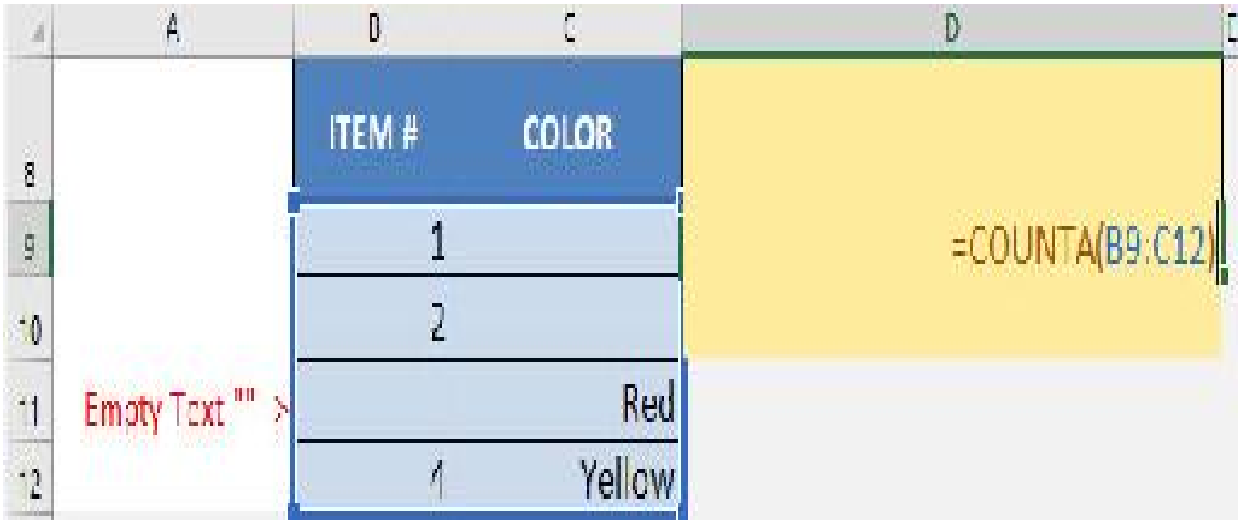


STEP 2: The **COUNTA** arguments:

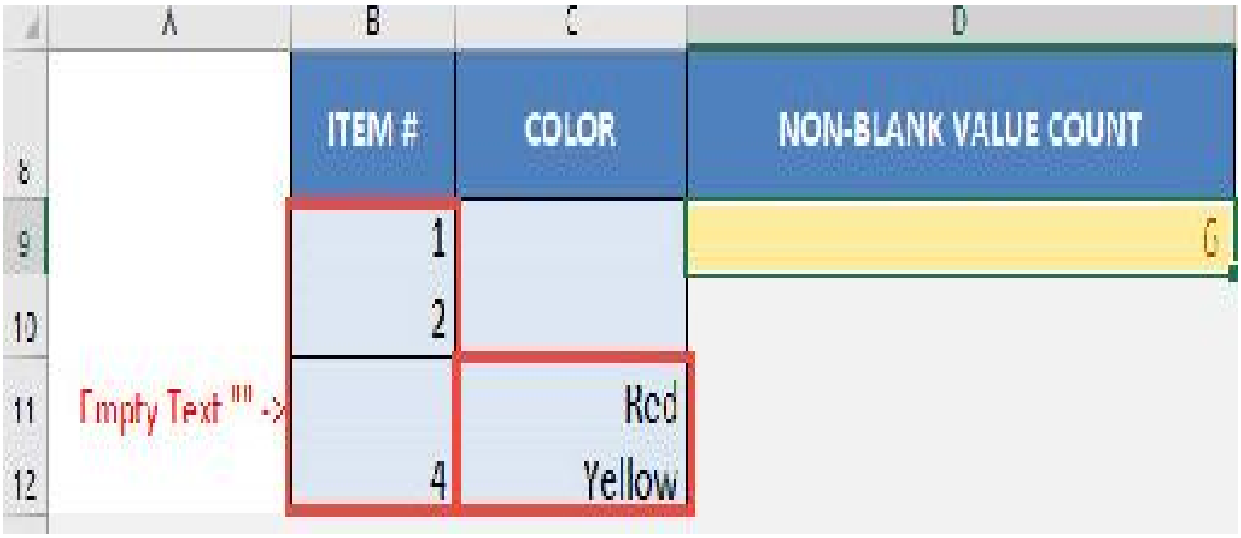
value

What is the value or range of values that you want to check how many are non-blank?

=COUNTA(B9:C12)



You now have your count of values that are non-blank! There are 6 non-blank values!



COUNTBLANK

What does it do?

Counts the number of cells that are blank

Formula breakdown:

=COUNTBLANK(range)

What it means:

=COUNTBLANK(range of cells to check)

Example:

=COUNTBLANK(B9:C12) =3

i.e. There are 3 blank cells

Exercise Workbook:

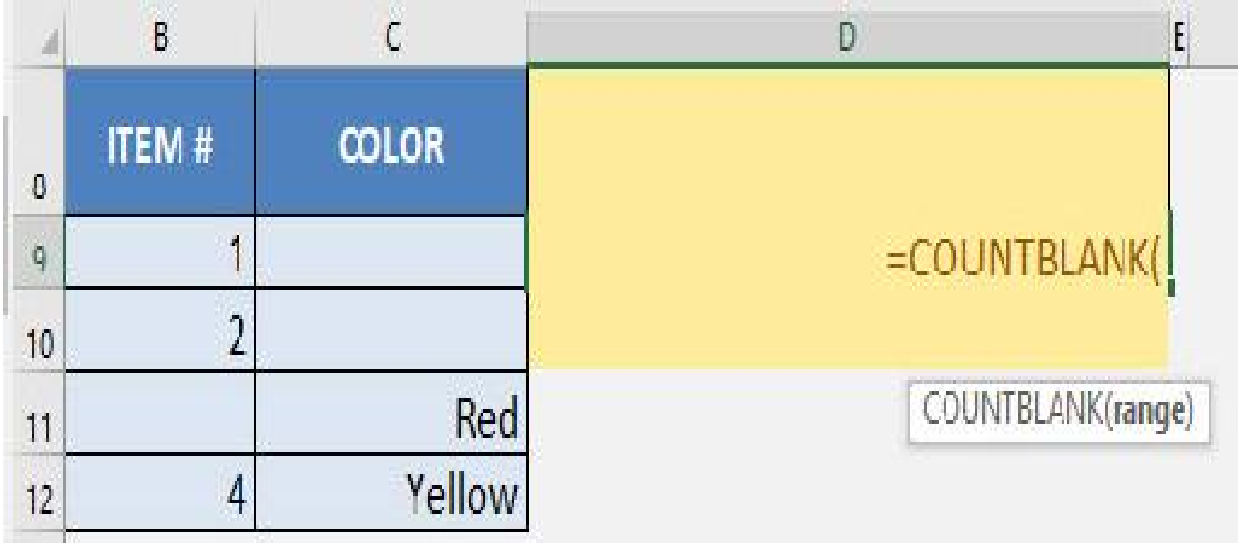
DOWNLOAD EXCEL WORKBOOK

Do you have a scenario where you want to count the number of cells that **are blank in your Excel data?**

If you are auditing your data and want to make sure that a blank cell is actually blank (and doesn't contain an invisible character), then this formula is for you.

STEP 1: We need to **enter the *COUNTBLANK* function in a blank cell**:

=COUNTBLANK(

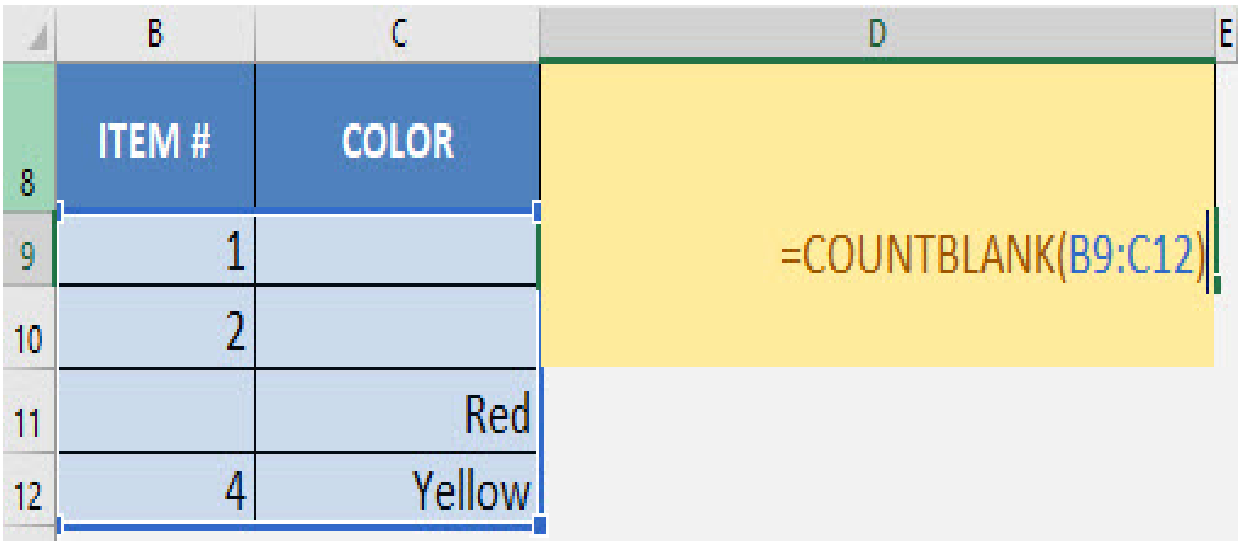


STEP 2: The **COUNTBLANK** arguments:

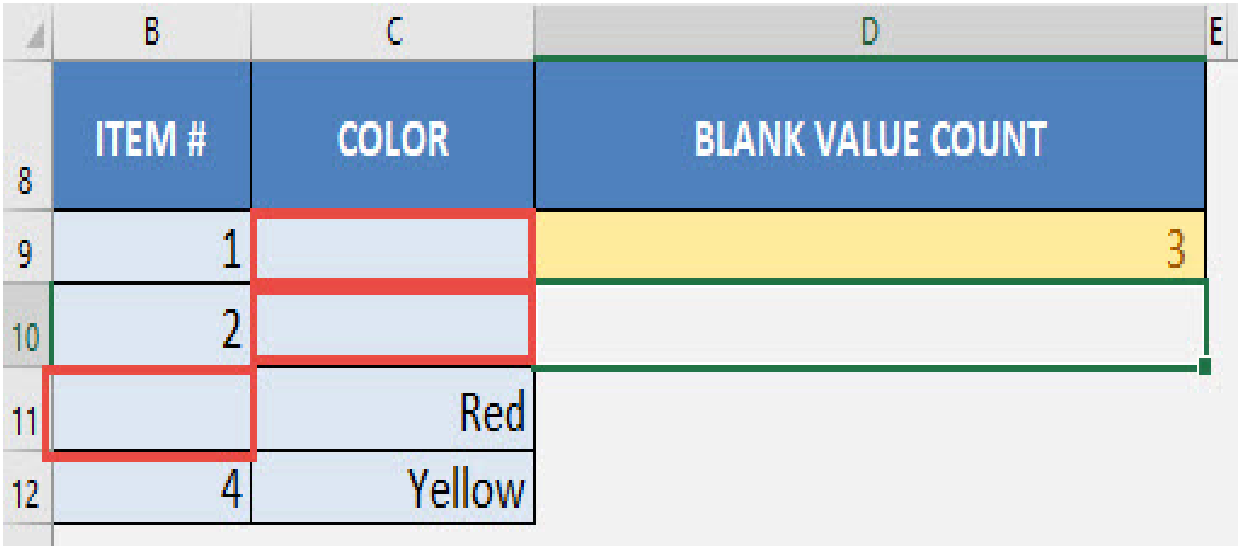
range

What are the range of values that you want to check to see how many are blank?

=COUNTBLANK(B9:C12)



You now have your count of values that are blank! There are 3 blank values!



COUNTIF

What does it do?

Counts the number of cells that matches your specified condition

Formula breakdown:

=COUNTIF(range, criteria)

What it means:

=COUNTIF(range of cells to check, condition to check against)

Example:

=COUNTIF(A9:A12, ">2") = 3

i.e. There are 3 cells that are greater than 2

Exercise Workbook:

DOWNLOAD EXCEL WORKBOOK

Do you have a scenario where you want to count the number of cells that **match a specific condition?**

I'm sure you do! There is a simple way to count this with Excel's **COUNTIF formula!**

The **COUNTIF formula** is very flexible indeed, so let us try to count the following from our Excel worksheet:

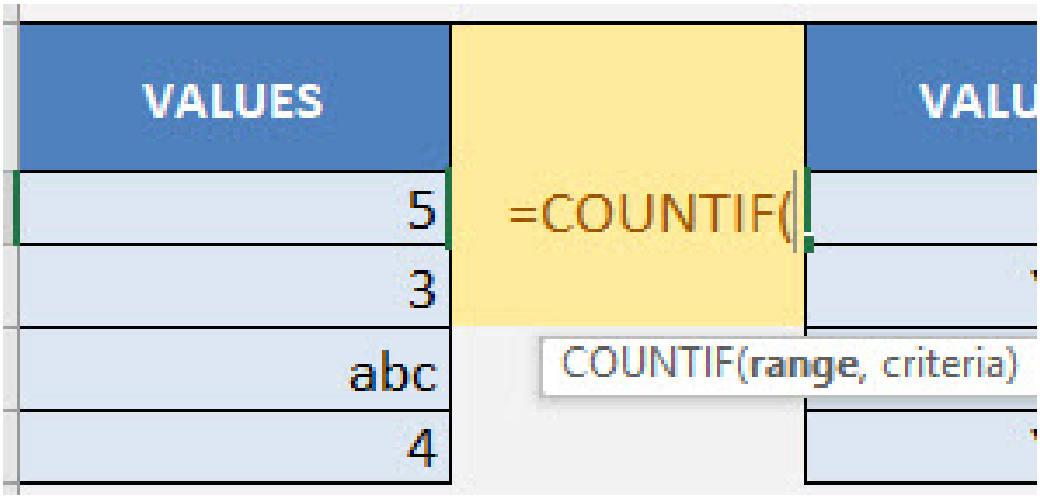
- Number of cells **greater than 2**
- Number of cells that have a **Yellow** value
- Number of cells that **start with the letter "J"**

VALUES	GREATER THAN 2	VALUES	YELLOW VALUES	VALUES	STARTS WITH LETTER J
5		Blue		John	
3		Yellow		Jenny	
abc		Red		Michael	
4		Yellow		Jones	

I explain how you can do this below:

STEP 1: We need to **enter the *COUNTIF* function in a blank cell**:

=COUNTIF(

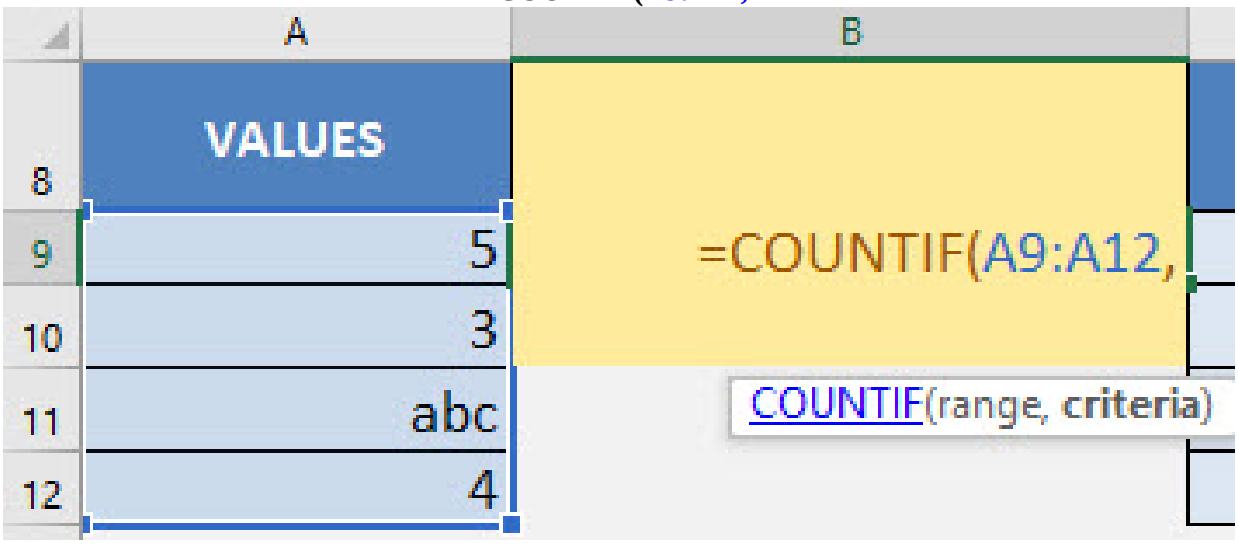


STEP 2: The **COUNTIF** arguments:

range

What are the range of values that you want to check your condition against?

=COUNTIF(A9:A12,

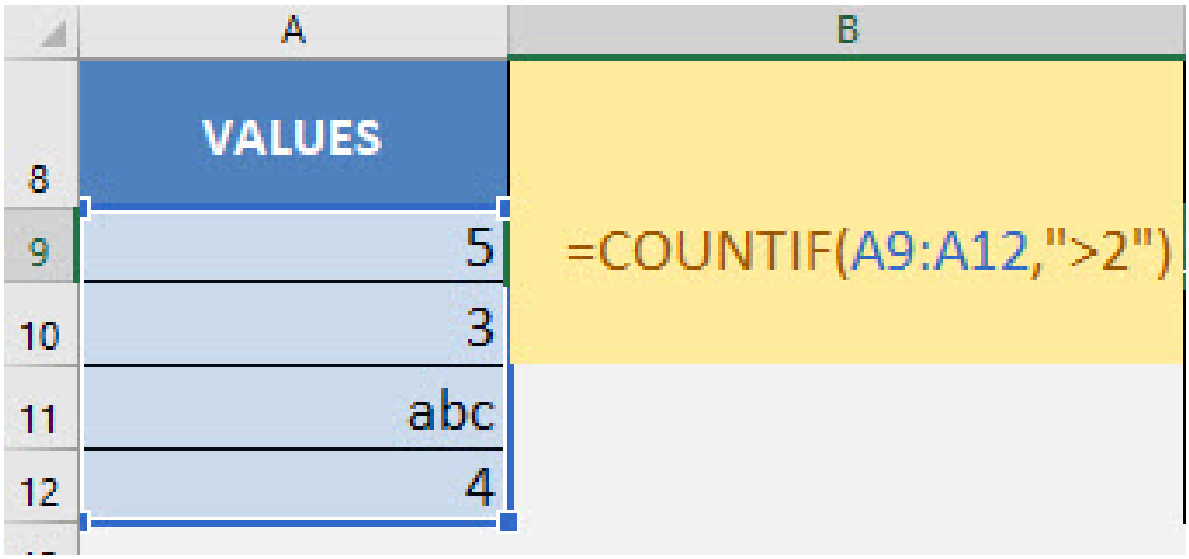


criteria

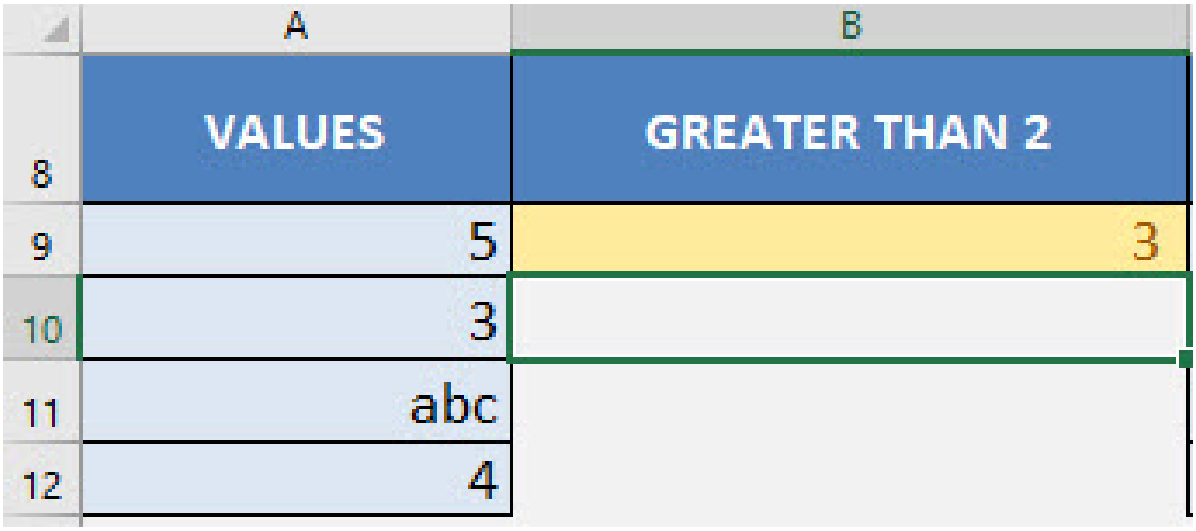
What is the condition that you want to check against?

For our 1st example, we want to count the number of values greater than 2.

=COUNTIF(A9:A12, ">2")

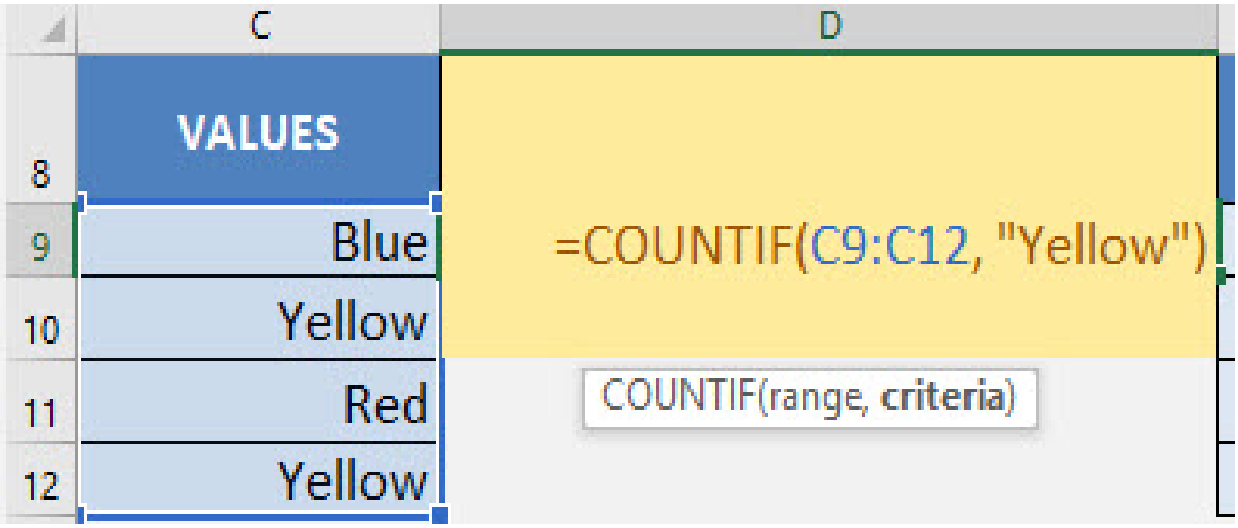


You now have your count of numbers greater than 2!

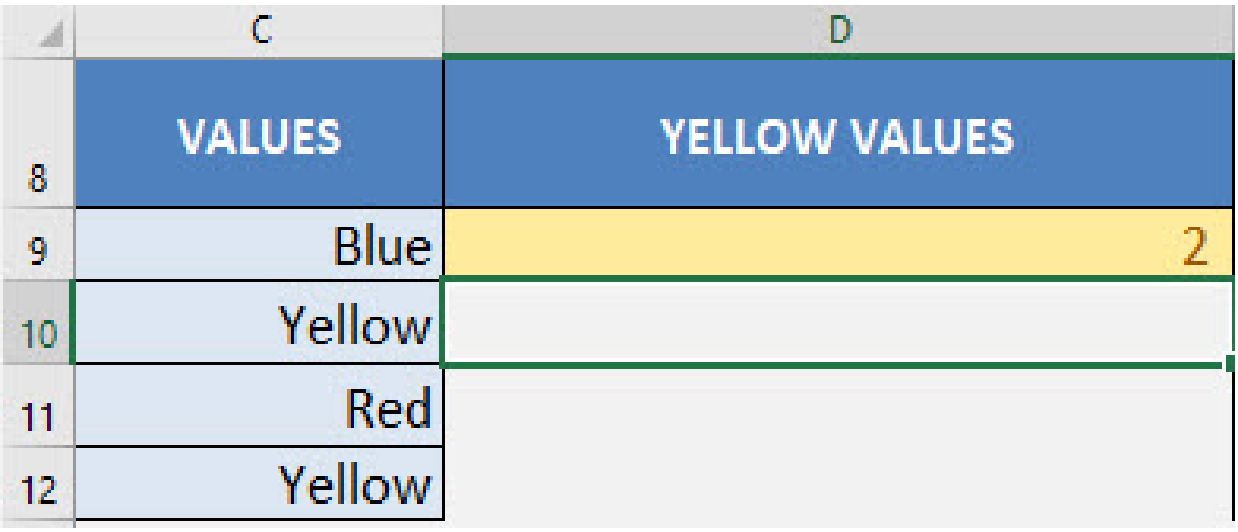


STEP 3: Now let us try for counting the number of **Yellow** values:

=COUNTIF(C9:C12, "Yellow")



You now have your count of values that have the Yellow text!

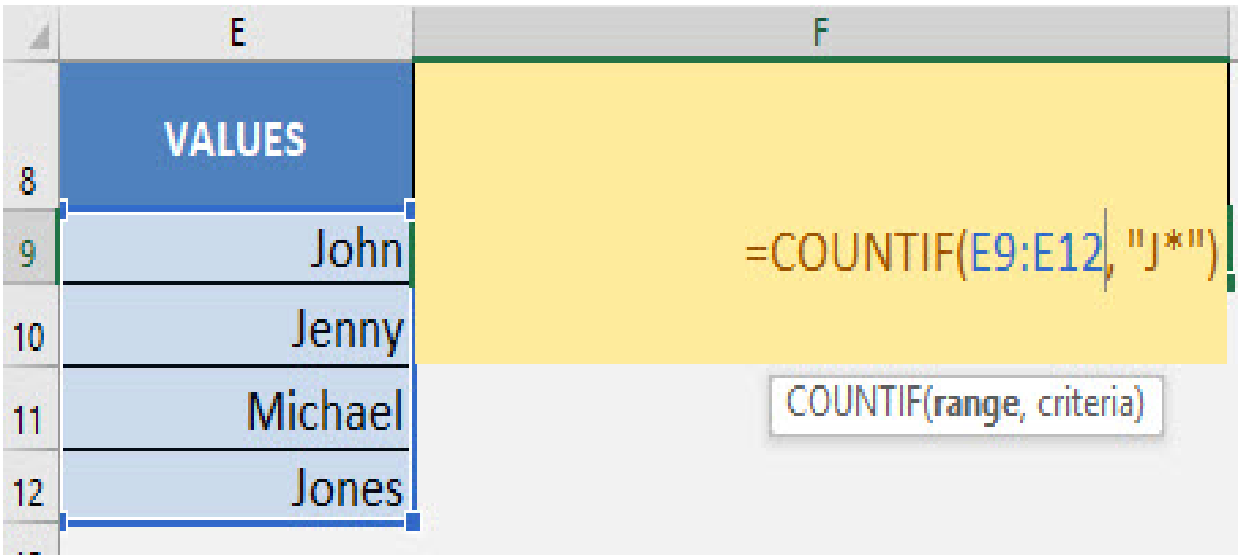


STEP 4: Now let us try for counting the number of names **starting with the Letter J**:

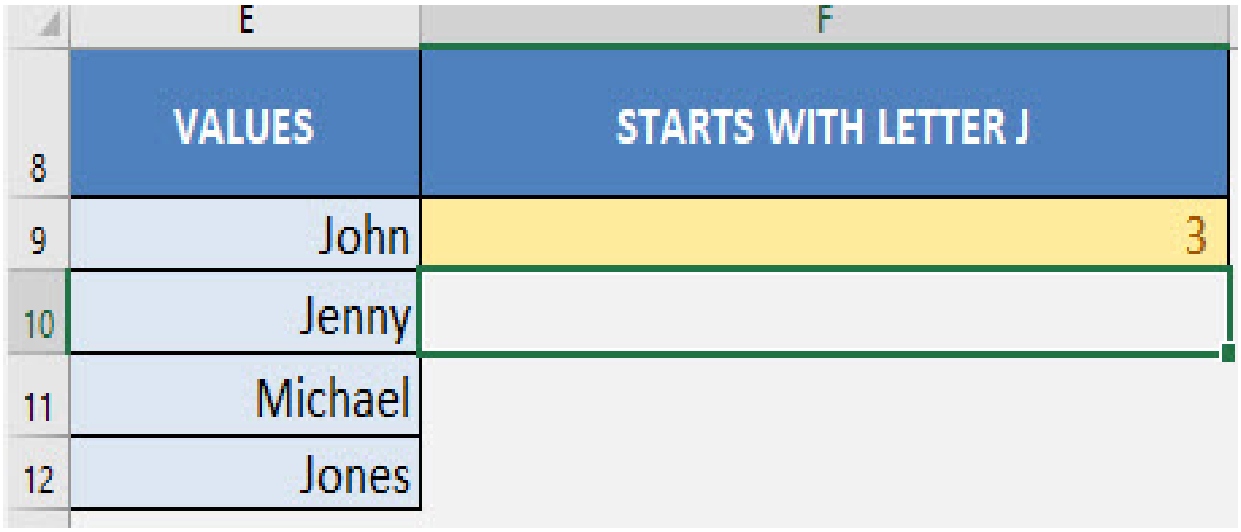
Let us use the wildcard expression **J***

***** signifies a wildcard character i.e. Return any value that **begins with a J**

=COUNTIF(E9:E12, "J*")



You now have your count of values that have a starting letter of J!



COUNTIFS

What does it do?

Counts the number of cells that matches multiple conditions

Formula breakdown:

=COUNTIFS(range1, criteria1, [range2], [criteria2], ...)

What it means:

=COUNTIFS(range of cells to check1, condition to check against1, [range of cells to check2], [condition to check against2], ...)

Example:

=COUNTIFS(A9:A13, "John", C9:C13, ">10000") = 2

i.e. The number of times John got more than $10,000 in sales

Exercise Workbook:

DOWNLOAD EXCEL WORKBOOK

Do you have a scenario where you want to count the number of cells that **match specific conditions?**

I'm sure you do! There is a simple way to count this with Excel's **COUNTIFS formula!**

This is very similar to the **CountIf Formula**! The only difference is it allows you to add even more conditions as needed...That's POWEFUL!

The **COUNTIFS formula** is very flexible indeed, so let us try to count the following from our Excel worksheet:

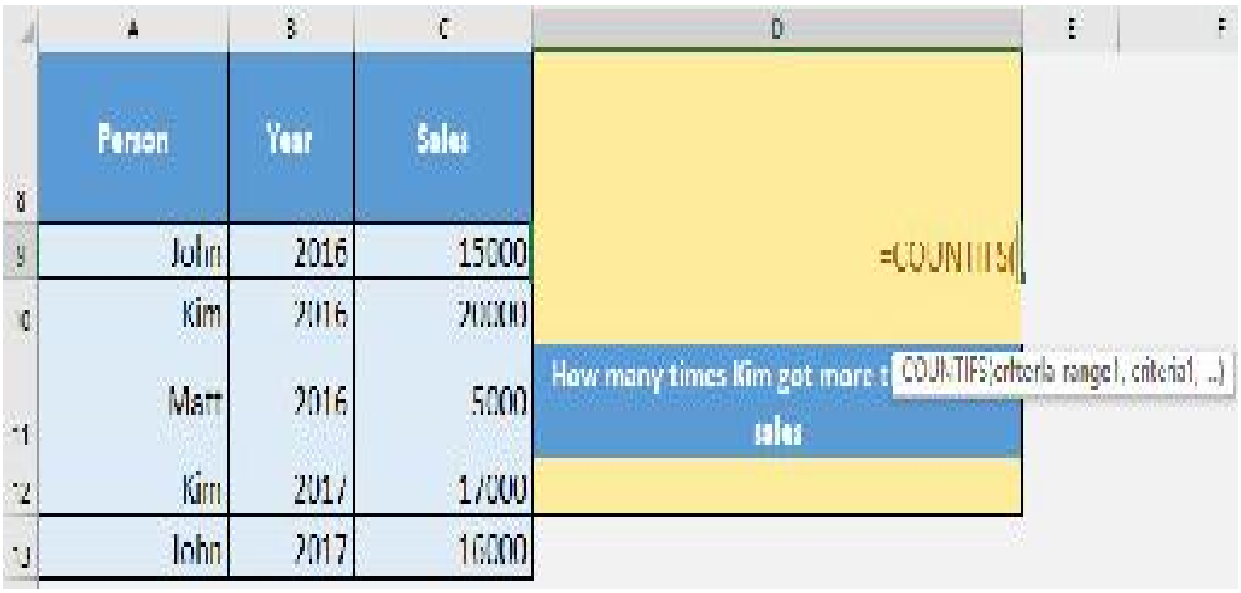
- Number of times **John got more than 10,000 sales**
- Number of times **Kim got more than 18,000 sales**

Person	Year	Sales	How many times John got more than 10,000 sales
John	2016	15000	
Kim	2016	20000	
Mall	2016	5000	How many times Kim got more than 18,000 sales
Kim	2017	17000	
John	2017	16000	

STEP 1: Let us target the first question: ***How many times John got more than 10,000 sales?***

We need to **enter the *COUNTIFS* function in a blank cell**:

=COUNTIFS(



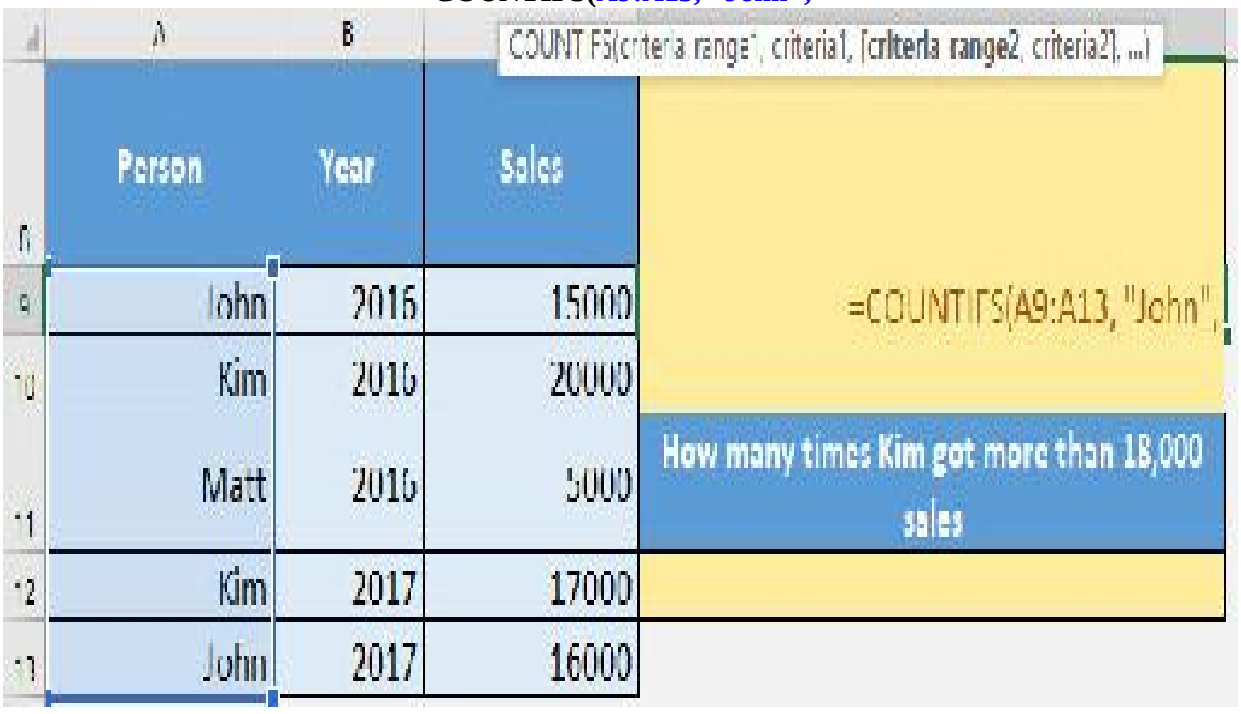
STEP 2: The **COUNTIFS** arguments:

range1, criteria1

What is our first condition?

We want to find the names that match "John"

=COUNTIFS(A9:A13, "John",

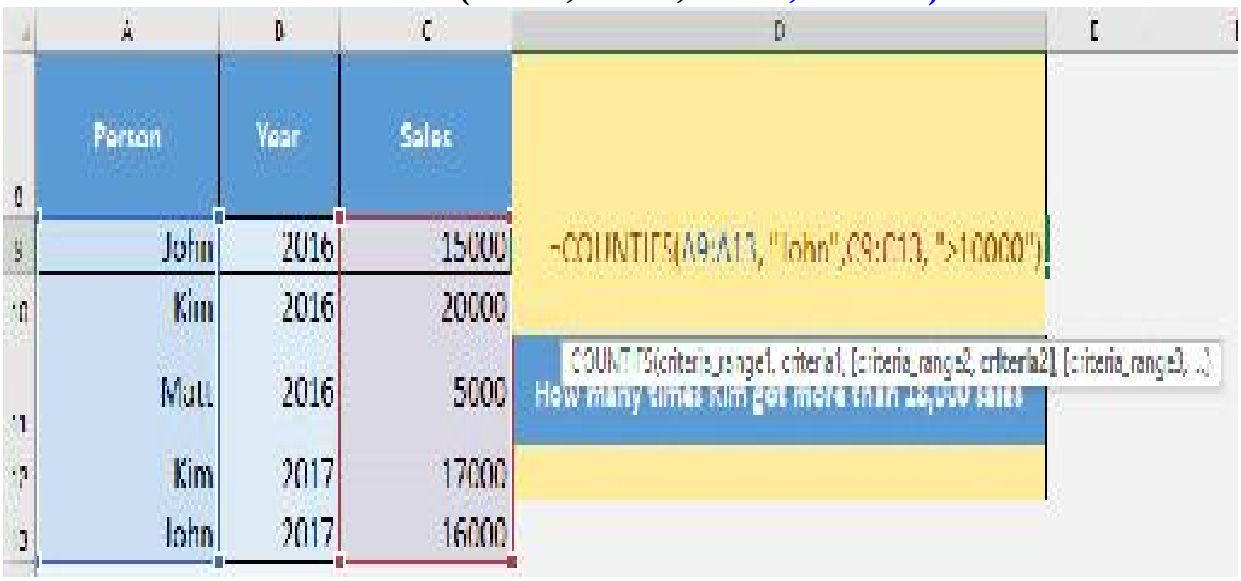


range2, criteria2

What is our second condition?

We want to find sales that are more than 10,000

=COUNTIFS(A9:A13, "John", C9:C13, ">10000")



You now have your count of 2!

STEP 3: Now let us try doing the same for Kim!

range1, criteria1

What is our first condition?

We want to find the names that match "Kim"

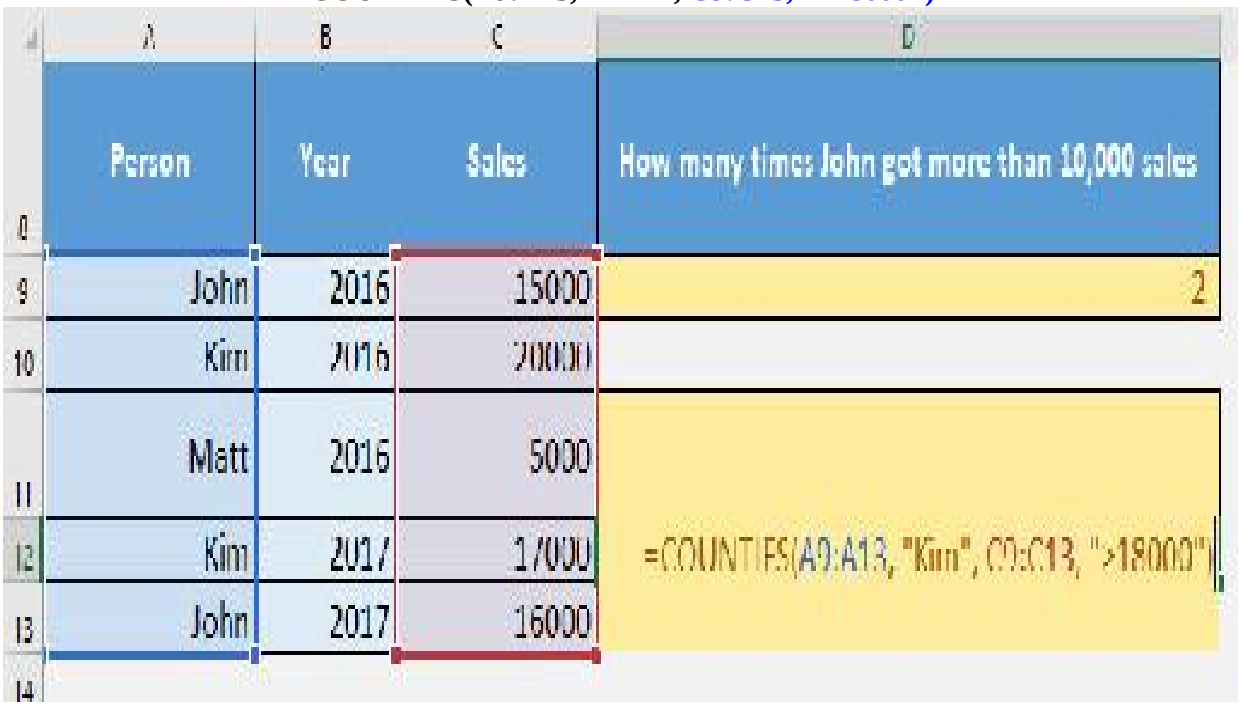
=COUNTIFS(A9:A13, "Kim",

range2*, *criteria2

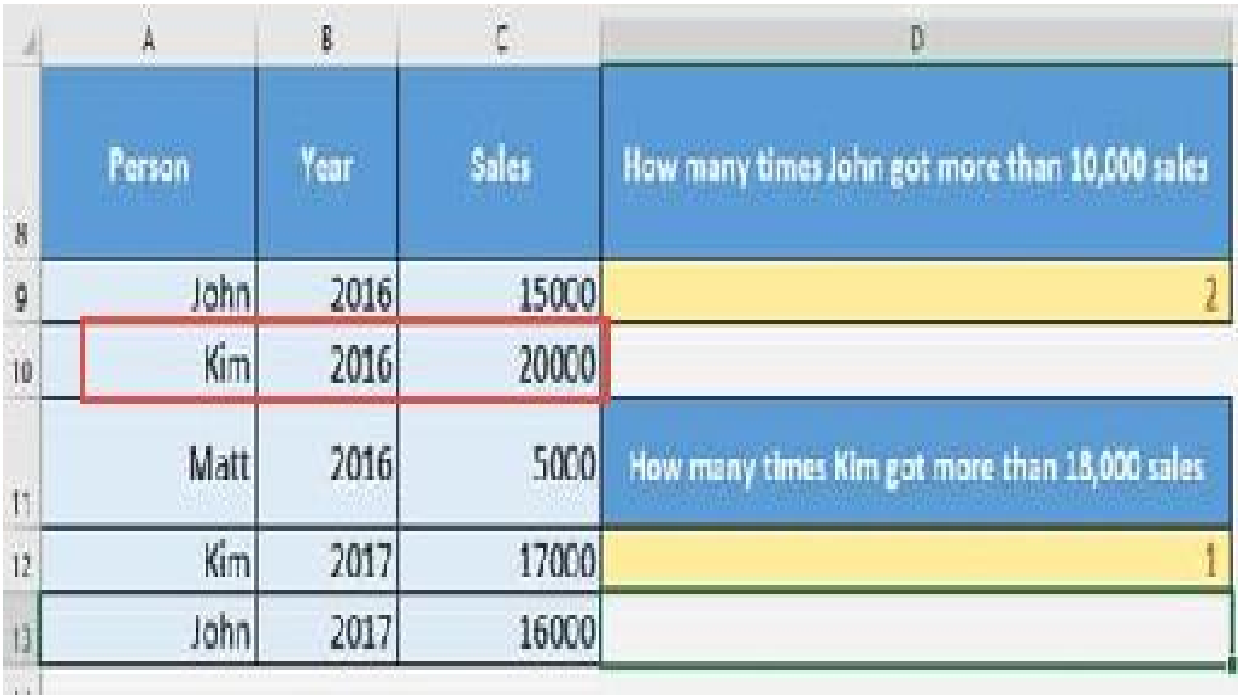
What is our second condition?

We want to find the sales that are more than 18,000

=COUNTIFS(A9:A13, "Kim", C9:C13, ">18000")



You now have your count of 1!



	A	B	C	D
8	Person	Year	Sales	How many times John got more than 10,000 sales
9	John	2016	15000	2
10	Kim	2016	20000	
11	Matt	2016	5000	How many times Kim got more than 18,000 sales
12	Kim	2017	17000	1
13	John	2017	16000	

You can have more than 2 conditions in the COUNTIFS formula, so go crazy with the COUNTIFS!

MOD

What does it do?

Gives you the remainder after dividing one number with another

Formula breakdown:

=MOD(number1, number2)

What it means:

=MOD(a number, divided by this number)

Example:

=MOD(15,4) =3

Exercise Workbook:

DOWNLOAD EXCEL WORKBOOK

In Excel it is very easy to divide two numbers.

But how about if you need to get the remainder from a division operation?

For example, let's do this the manual way, divide 15 by 4:

- Divide the two numbers (i.e. 15 / 4)
- Get the quotient (which is 3)
- Multiply it back to the divisor (3 * 4)
- Subtract it from the original number (15 - 12)
- And I have the remainder! (3)

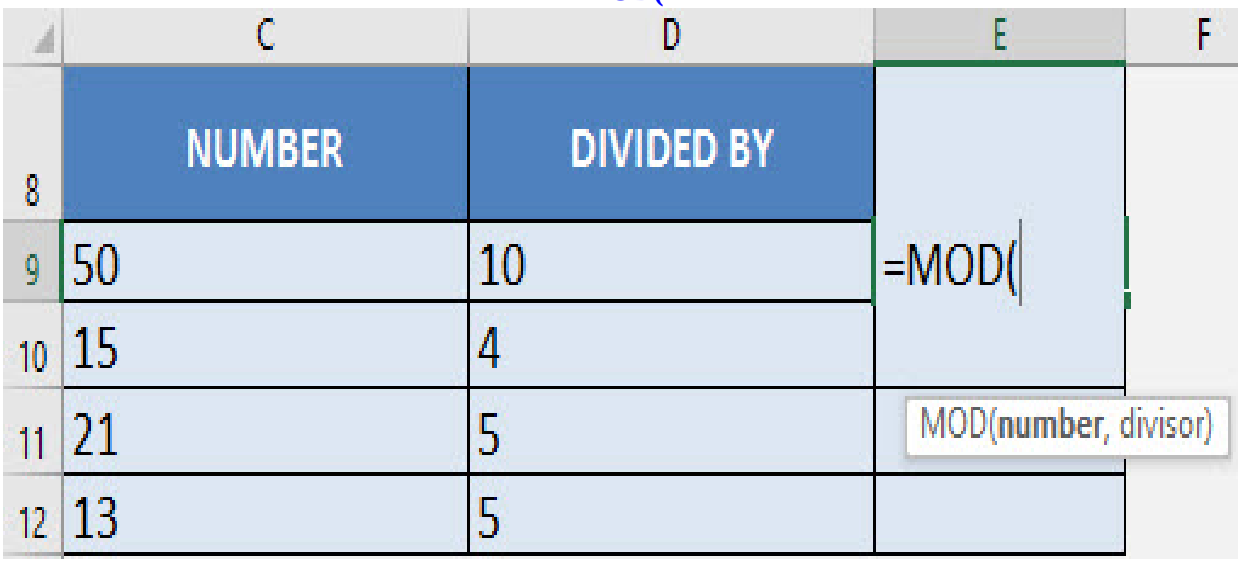
So, 4 goes into 13 three times with a remainder of 1.

Thankfully we can do the above complex and manual calculation with ease using Excel's **MOD formula!**

I explain how you can do this below:

STEP 1: We need to **enter the *MOD* function**:

=MOD(



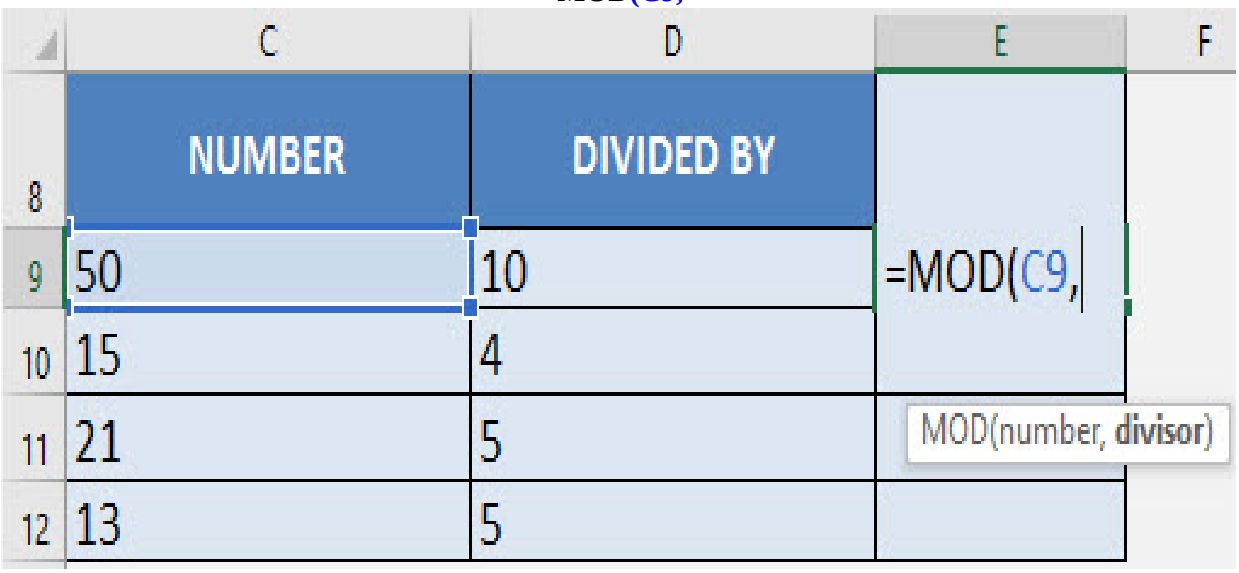
STEP 2: The MOD arguments:

number1

What is the first number that we plan to divide?

Reference the cell that contains the first number:

=MOD(C9,

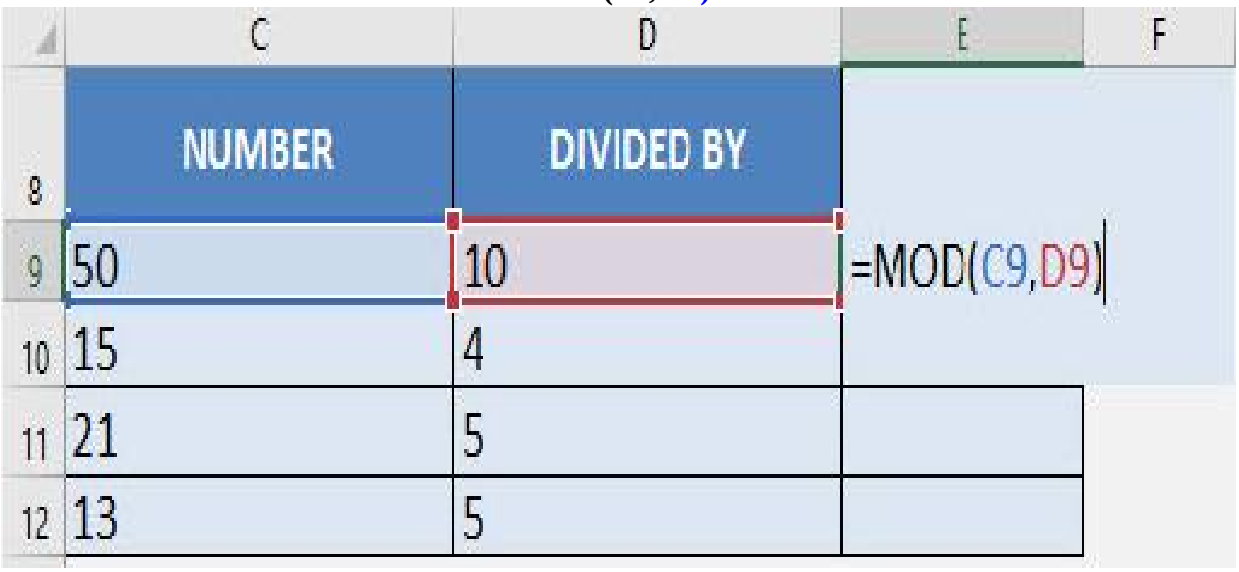


number2

What is the divisor?

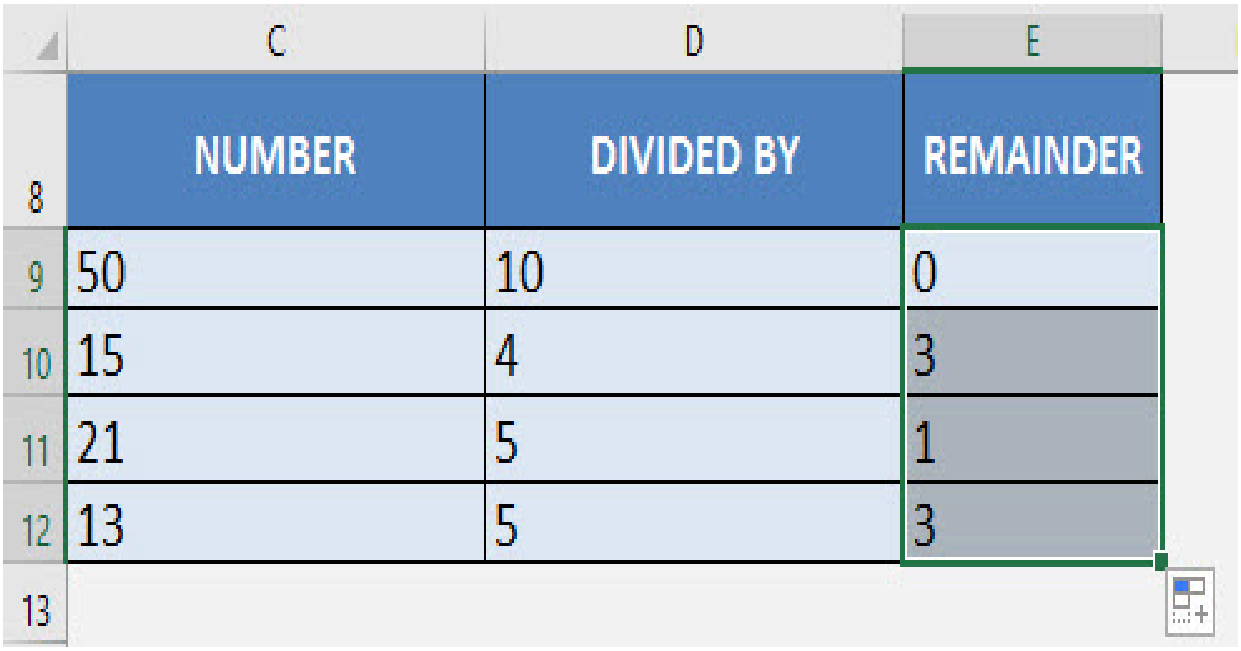
Reference the cell that contains the second number:

=MOD(C9, D9)



STEP 3: Do the same for the rest of the cells by dragging the **MOD** formula all the way down using the left mouse button.

Now you are able to get the remainders of all the division operations!



	C	D	E
8	NUMBER	DIVIDED BY	REMAINDER
9	50	10	0
10	15	4	3
11	21	5	1
12	13	5	3
13			

PERCENTAGE

What does it do?

In calculating percentages in Excel, there are a lot of ways that you could do this:

- What is the percentage of a number?
- What is the percentage change of value i.e. The percentage increase or decrease
- What is the proportion against a total value?

Calculate Percentage	Formula	Sample	Result
Of a Number	= Number * Percentage	What is 75% of 100?	
Change	= (New - Old) / Old	What is the price change if the price increased from 100 to 150?	
Proportionally	= Portion / Total	What is your percentage if you took 20 shots and 12 went in?	

Example:

=75% * 100 =75

Exercise Workbook:

DOWNLOAD EXCEL WORKBOOK

STEP 1: What is the percentage of a number?

To calculate the percentage of the number, simply multiply the number and the percentage together:

Percentage x Number

75% * 100

Calculate Percentage	Formula	Sample	Result
Of a Number	= Number * Percentage	What is 75% of 100?	=75%*100
Change	= (New - Old) / Old	What is the price change if the price increased from 100 to 150?	
Proportionally	= Portion / Total	What is your percentage if you took 20 shots and 12 went in?	

STEP 2: What is the percentage change of value i.e. The percentage increase or decrease

To calculate the change in value as a percentage, get the difference of the new value and the old value, then divide it by the old value:

(New - Old) / Old

(150 - 100) / 100

Calculate Percentage	Formula	Sample	Result
Of a Number	= Number * Percentage	What is 75% of 100?	75
Change	= (New - Old) / Old	What is the price change if the price increased from 100 to 150?	=(150-100)/100
Proportionally	= Portion / Total	What is your percentage if you took 20 shots and 12 went in?	

STEP 3: **What is the proportion against a total value?**

To get the proportion as a percentage, divide the portion by the total amount:

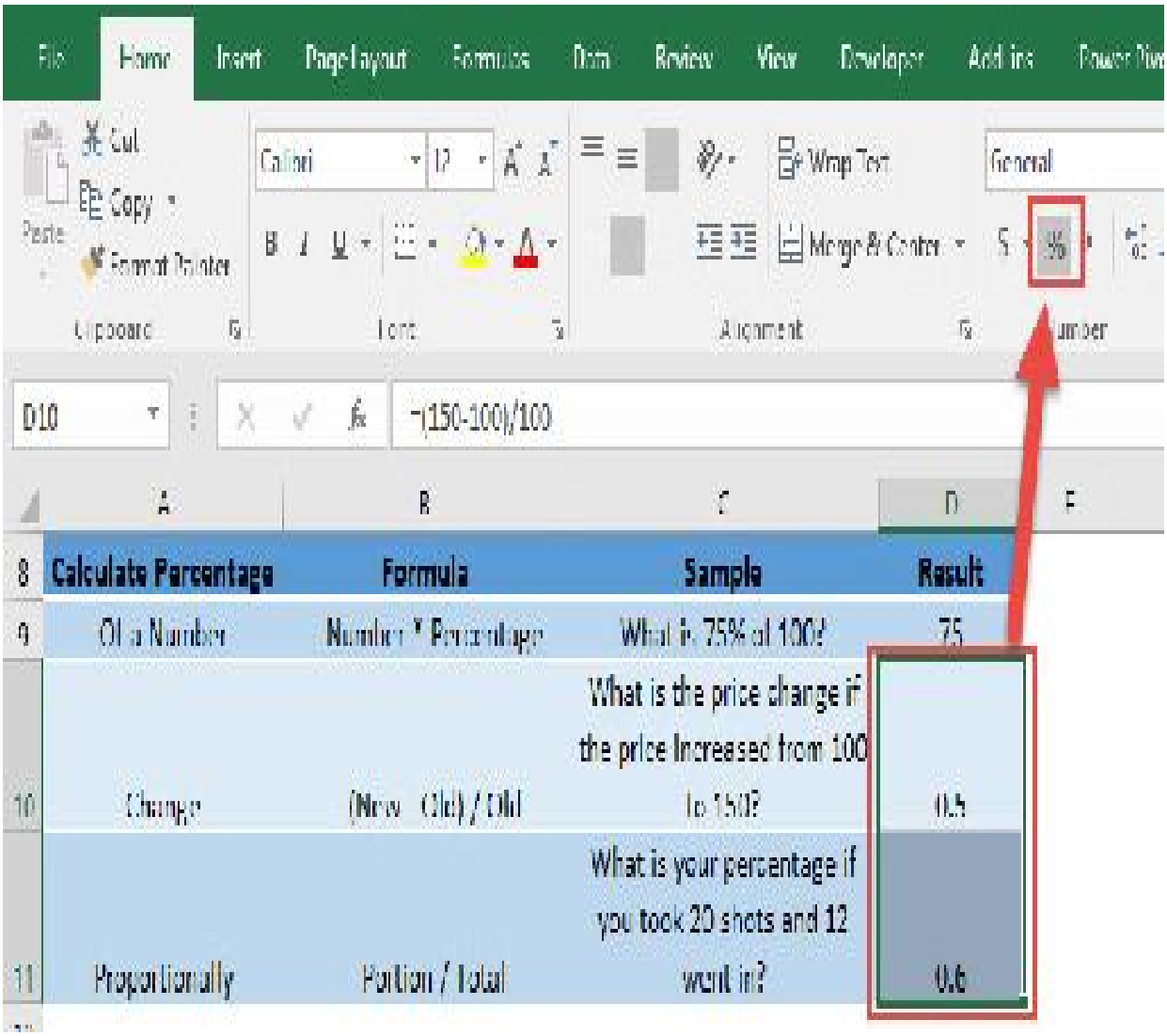
Portion / Total

12/20

Calculate Percentage	Formula	Sample	Result
Of a Number	= Number * Percentage	What is 75% of 100?	75
Change	= (New - Old) / Old	What is the price change if the price increased from 100 to 150?	0.5
Proportionally	= Portion / Total	What is your percentage if you took 20 shots and 12 went in?	=12/20

STEP 4: We are almost done! The last two values are not in the percentage format, so let's fix that.

Select the last two values and go to ***Home*** **>** ***Number*** **>** ***%***



Your percentage values are now all ready!

Calculate Percentage	Formula	Sample	Result
Of a Number	= Number * Percentage	What is 75% of 100?	75
Change	= (New - Old) / Old	What is the price change if the price increased from 100 to 150?	50%
Proportionally	= Portion / Total	What is your percentage if you took 20 shots and 12 went in?	60%

RAND

What does it do?

Gives you a random number between 0 and 1

Formula breakdown:

=RAND()

What it means:

=RAND(Will automatically choose a random number between 0 and 1)

Example:

=RAND() =0.151018728113863

Exercise Workbook:

DOWNLOAD EXCEL WORKBOOK

Excel is able to do a lot of things that most users are unaware of! One thing that amazes me & I use almost daily is its ability to create random numbers for me!

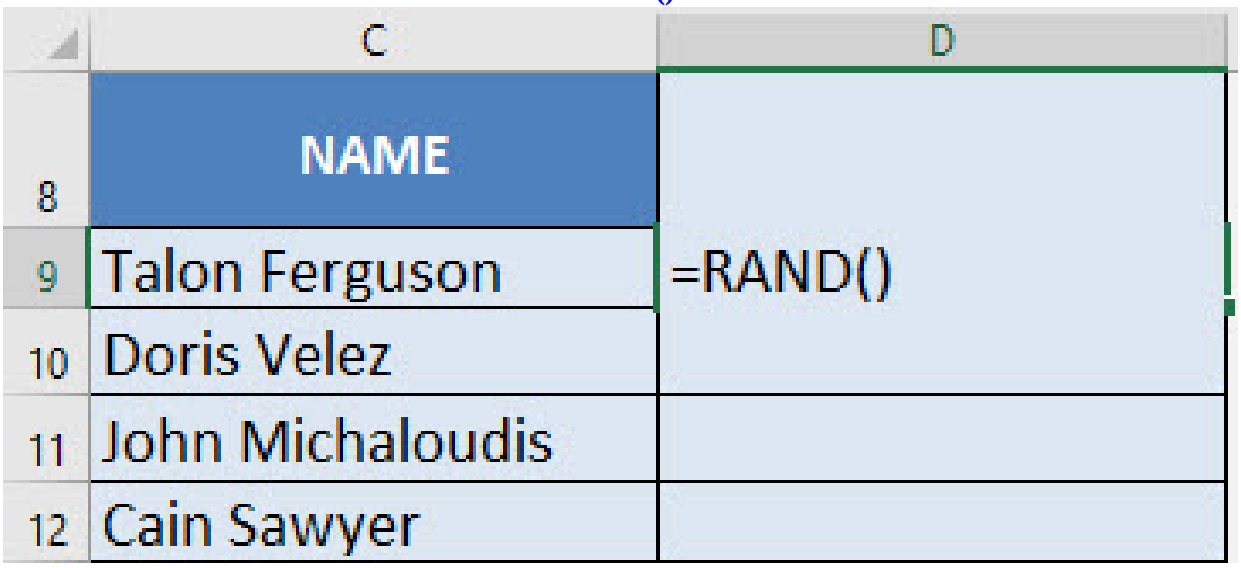
But why would I even need random numbers?

Random numbers in Excel are great if you want to fill in a column with random values so you can create quick charts or just do any kind of random Excel analysis.

One of my best uses of the RAND function in Excel is to create random numbers for a raffle draw!

STEP 1: We need to **enter the** *RAND* **function**:

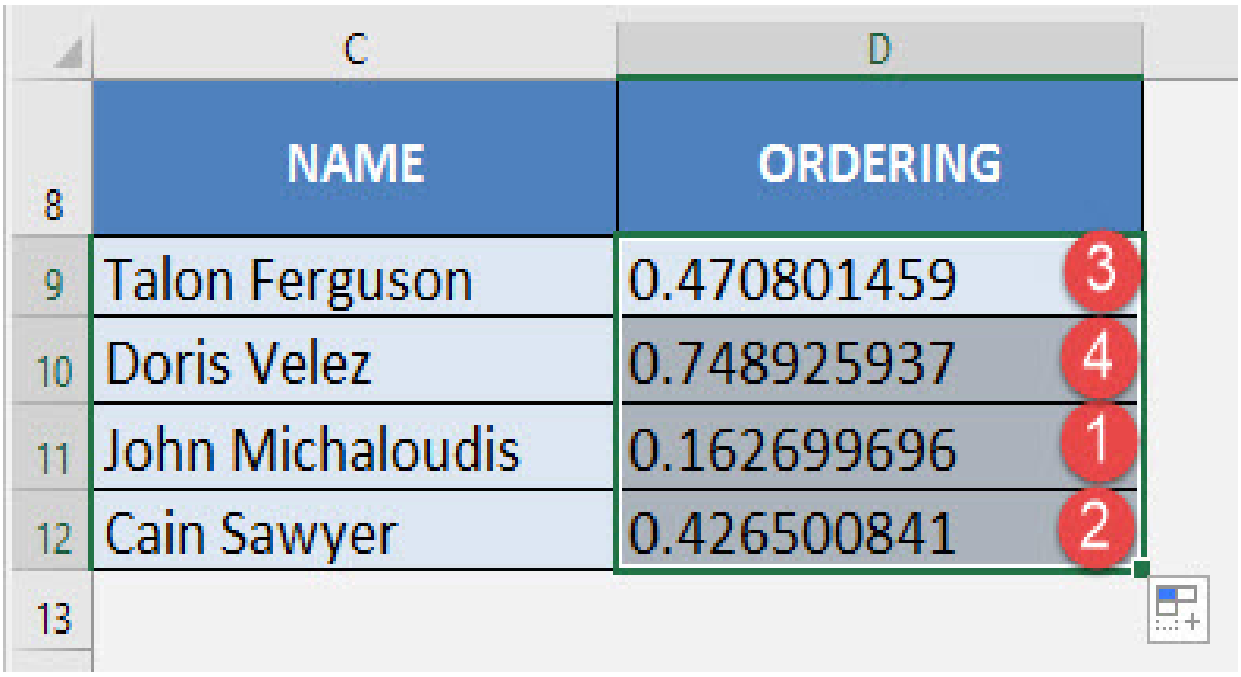
=RAND()



STEP 2: Do the same for the rest of the cells by dragging the **RAND** formula all the way down using the left mouse button.

Now we are able to get random numbers for all the entries without any bias!

I'm actually the winner in this case as I have the lowest value!



	C	D	
8	NAME	ORDERING	
9	Talon Ferguson	0.470801459	3
10	Doris Velez	0.748925937	4
11	John Michaloudis	0.162699696	1
12	Cain Sawyer	0.426500841	2
13			

TIP: Press the **F9** button on your keyboard to refresh/update the RAND values until you get your desired result...with bias :)

RANDBETWEEN

What does it do?

Returns a random integer number between the numbers you specify.

Formula breakdown:

=RANDBETWEEN(bottom number, top number)

What it means:

=RANDBETWEEN(bottom number of the range, top number of the range)

Example:

=RANDBETWEEN(10,10000) =2852

Exercise Workbook:

DOWNLOAD EXCEL WORKBOOK

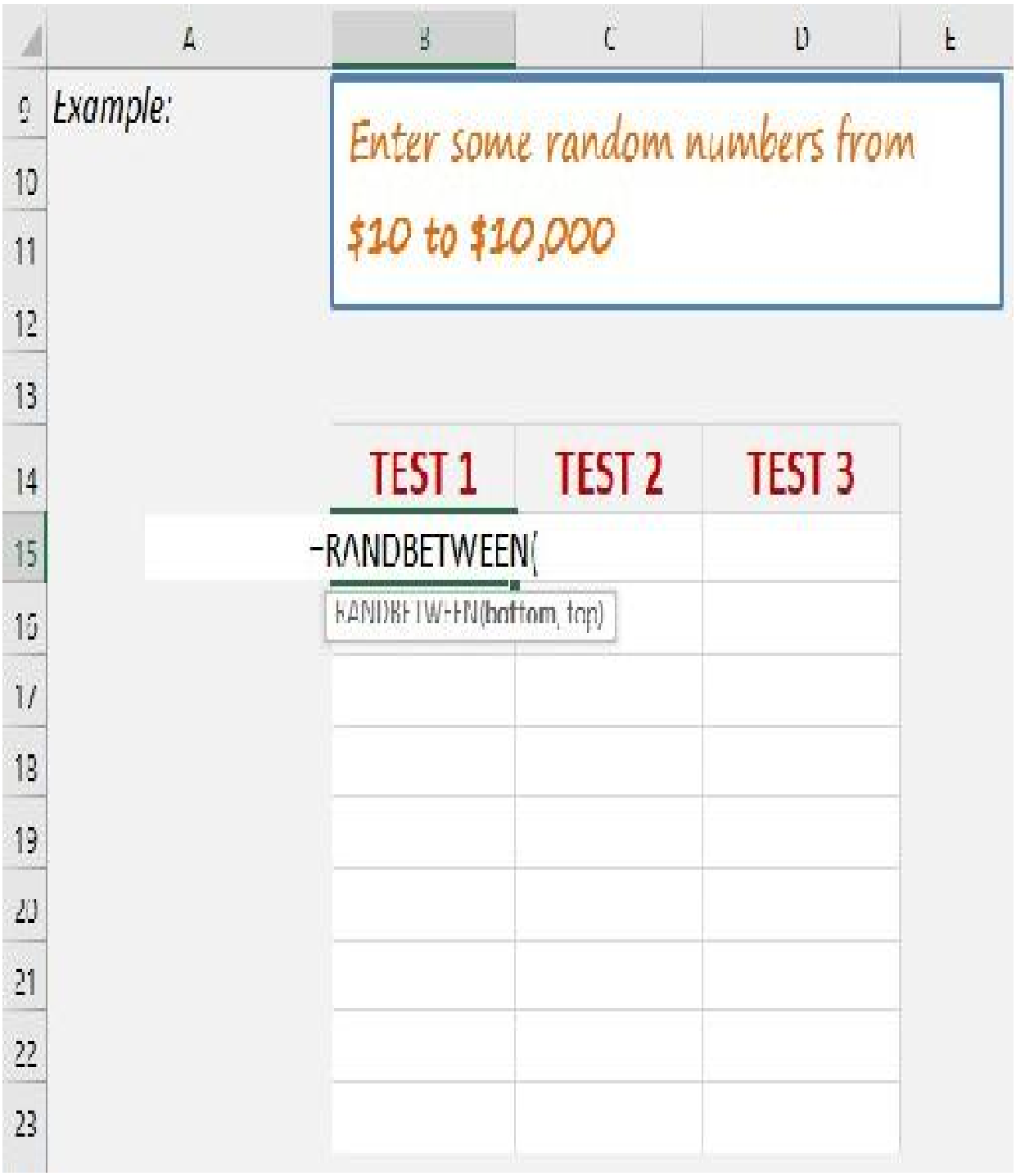
I use the **RANDBETWEEN** function all the time whenever I need to create a sample data set.

The cool thing about the **RANDBETWEEN** function is that if you don't like the numbers that it has given you, you can press F9 in a cell and it will give you new numbers.

We want to enter some random numbers from 10 to 10,000.

STEP 1: We need to enter the **RANDBETWEEN** function in a blank cell:

=RANDBETWEEN(



STEP 2: The **RANDBETWEEN** arguments:

bottom_number

What is your minimum value?

For our example it's 10

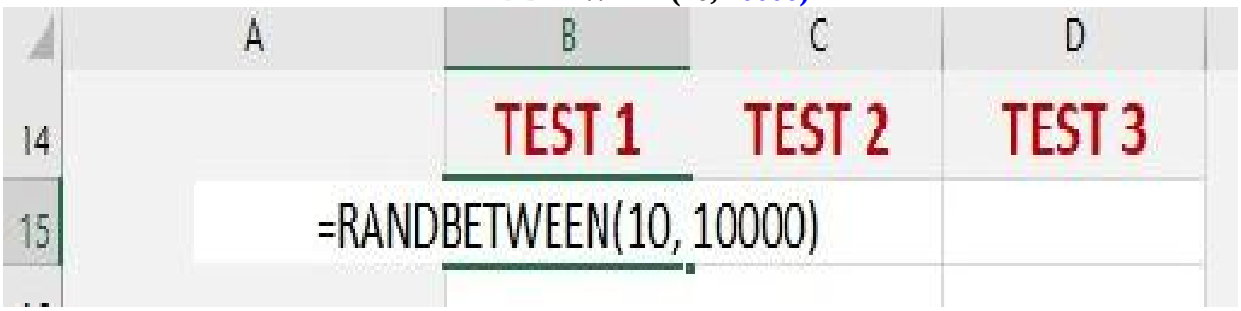
=RANDBETWEEN(10,

top_number

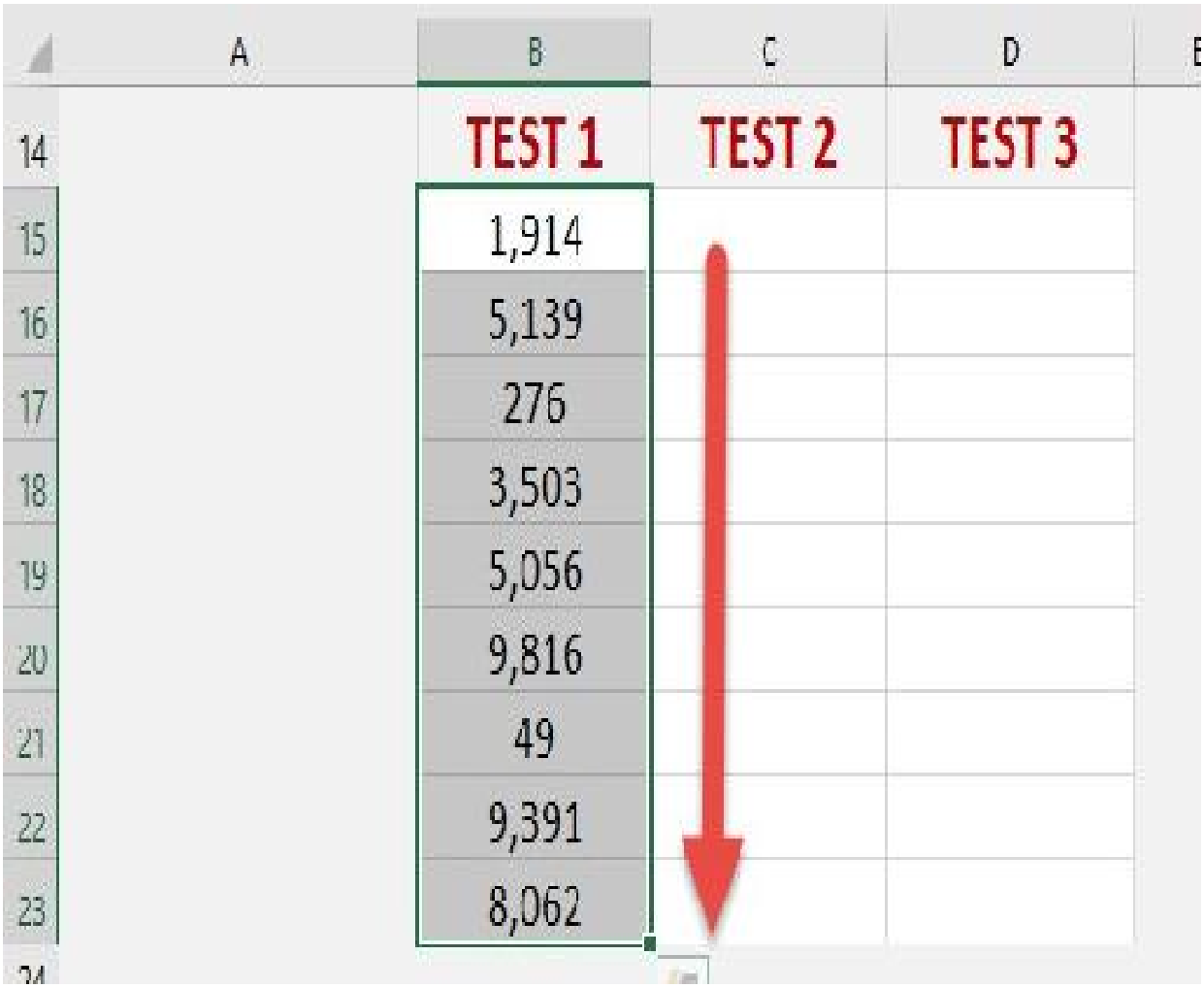
What is your maximum value?

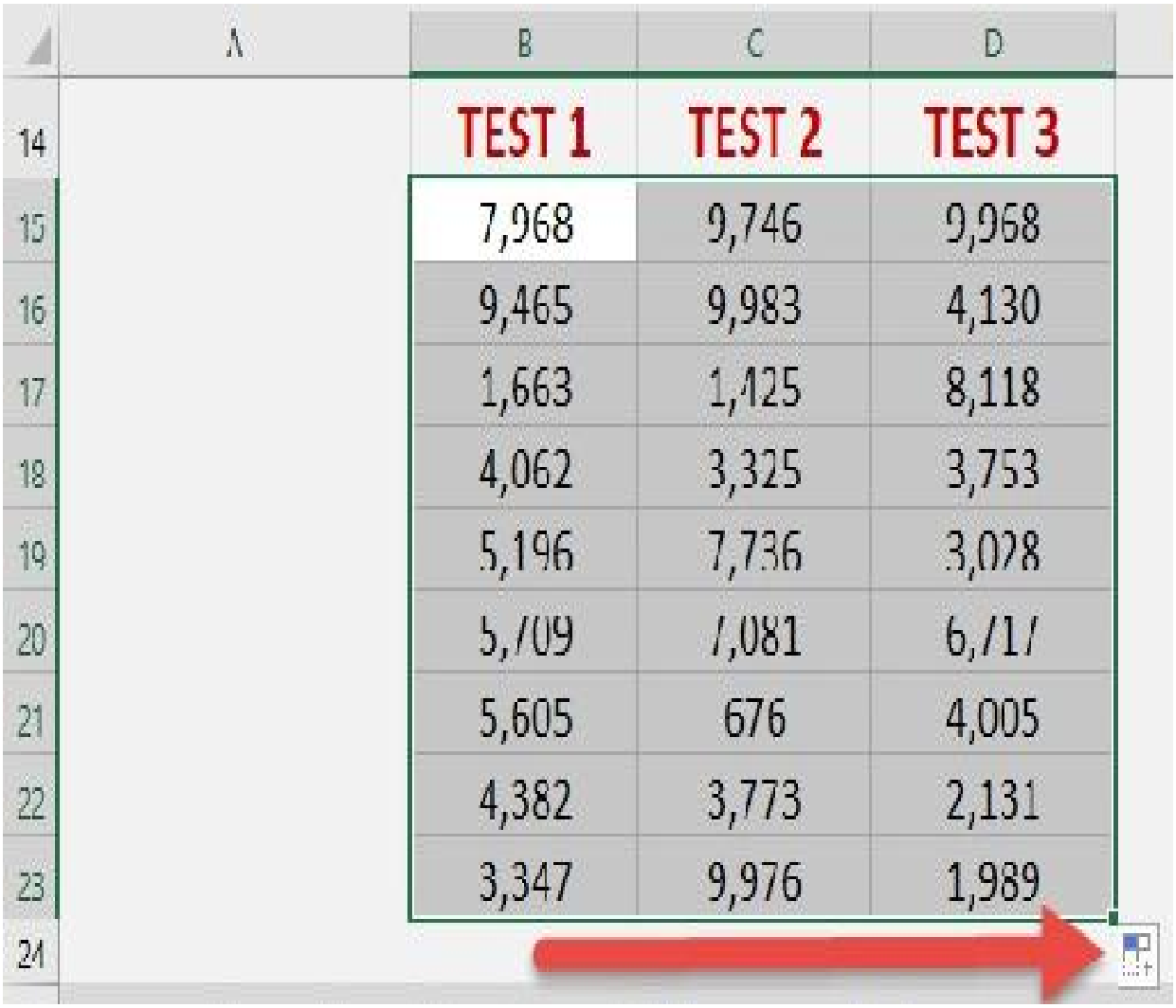
For our example it's 10,000

=RANDBETWEEN(10, 10000)



Apply the same formula to the rest of the cells by dragging the lower right corner downwards. Then drag it to the right to populate all the cells.


A
B
C
D
14
TEST 1
TEST 2
TEST 3
15
1,914
16
5,139
17
276
18
3,503
19
5,056
20
9,816
21
49
22
9,391
23
8,062



	A	B	C	D
14		TEST 1	TEST 2	TEST 3
15		7,968	9,746	9,968
16		9,465	9,983	4,130
17		1,663	1,125	8,118
18		4,062	3,325	3,753
19		5,196	7,736	3,028
20		5,709	7,081	6,717
21		5,605	676	4,005
22		4,382	3,773	2,131
23		3,347	9,976	1,989
24				

You now have all of the random numbers!

ROUND

What does it do?

Rounds a number to the nearest decimal based on your specified number of digits

Formula breakdown:

=ROUND(number, num_digits)

What it means:

=ROUND(the number, number of decimal places to round off)

Example:

=ROUND(1.234567, 2) =1.23

Exercise Workbook:

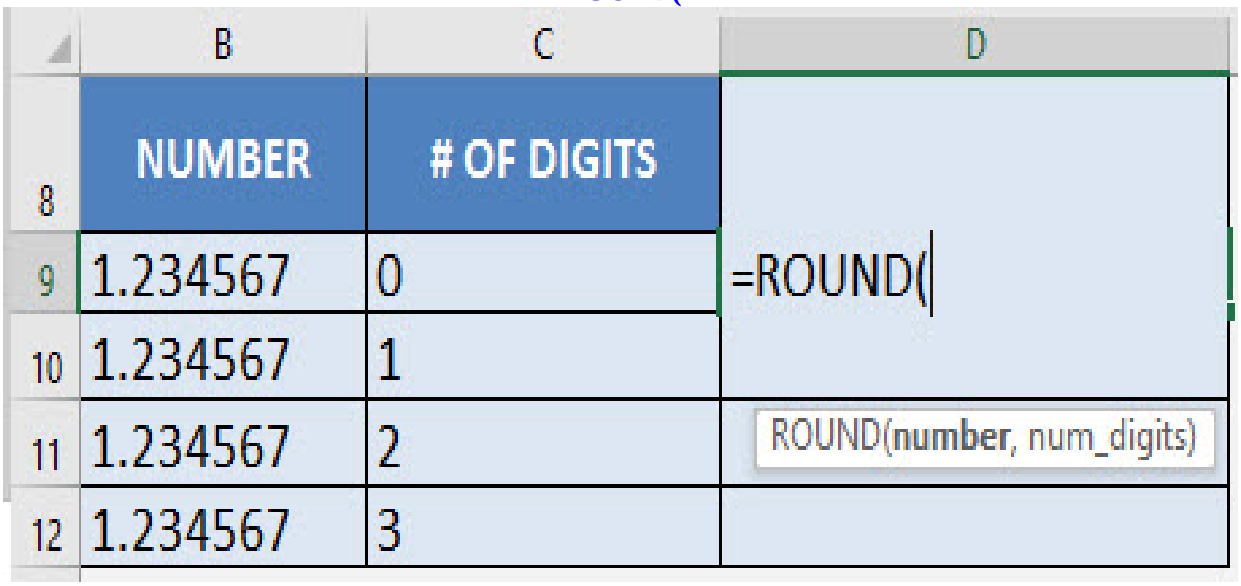
DOWNLOAD EXCEL WORKBOOK

Ever had the need to round off numbers?

I do it all the time in my financial calculations. For example, if I need to calculate ***percentage discounts*** and it gives me a number such as $47.4189349, rounding it off to $47.40 (round off to 1 decimal place) makes it so much more presentable!

STEP 1: We need to **enter the** *ROUND* **function**:

=ROUND(



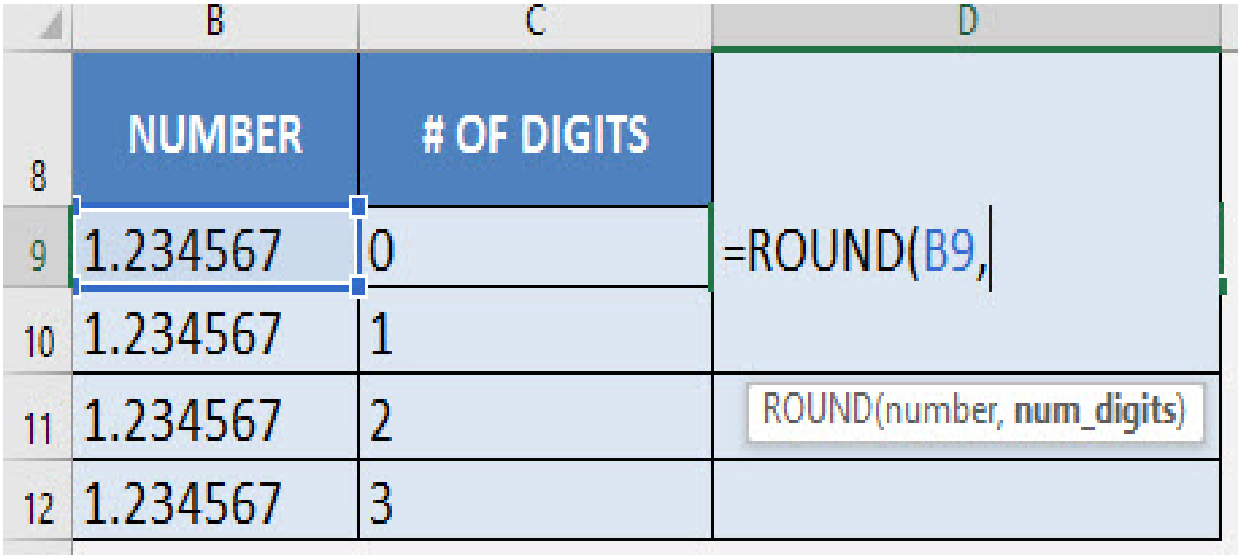
STEP 2: The ROUND arguments:

number

What is the number we want to round off?

Reference the cell that contains the number:

=ROUND(B9,

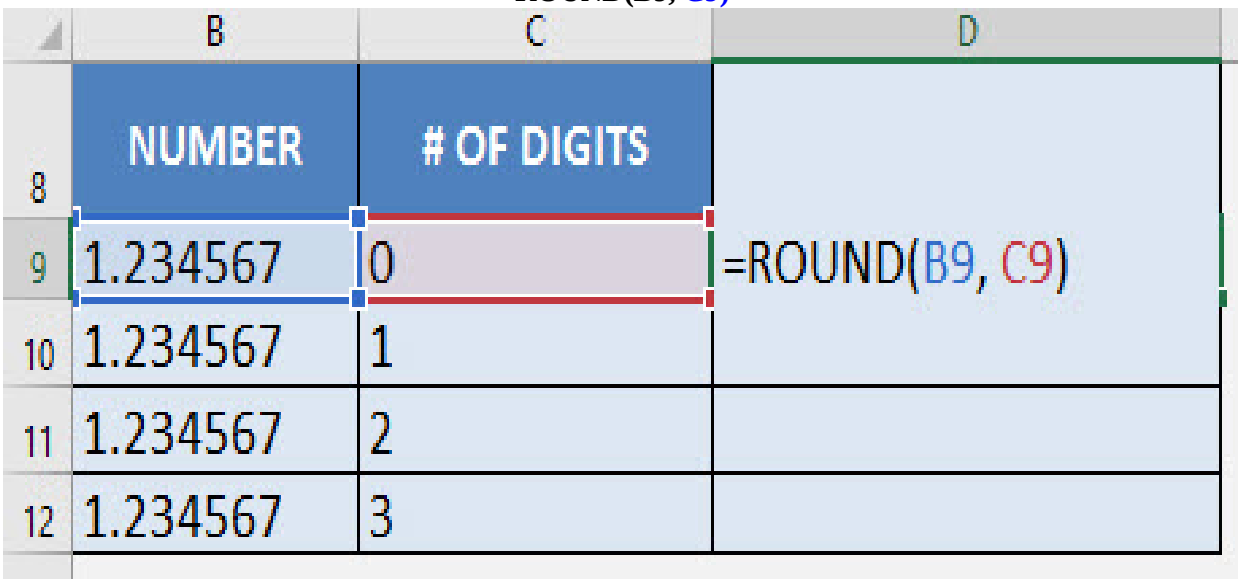


num_digits

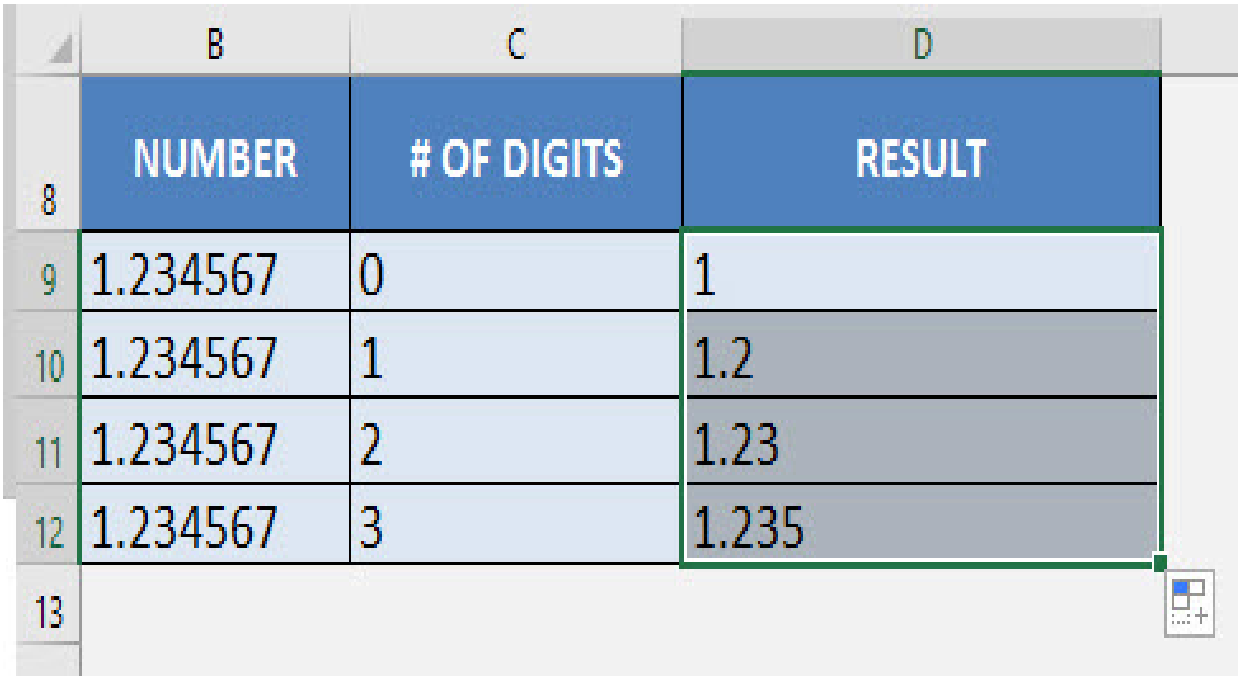
Round off to how many digits?

Reference the cell that contains the number of digits:

=ROUND(B9, C9)



STEP 3: Do the same for the rest of the cells by dragging the **ROUND** formula all the way down using the left mouse button.



	B	C	D
8	NUMBER	# OF DIGITS	RESULT
9	1.234567	0	1
10	1.234567	1	1.2
11	1.234567	2	1.23
12	1.234567	3	1.235
13			

SUBTOTAL

What does it do?

It returns a Subtotal in a list or database

Formula breakdown:

=SUBTOTAL(function_num, ref1)

What it means:

=SUBTOTAL(function number 1-11 includes manually-hidden rows & 101-111 excludes them, your list or range of data)

Example:

=SUBTOTAL(9,B2:B9) = $1,945

Exercise Workbook:

DOWNLOAD WORKBOOK

The SUBTOTAL function in Excel has many great features, like the ability to:

***** Return a **SUM, AVERAGE, COUNT, COUNTA, MAX or MIN** from your data;

*** Include hidden values** within your data by entering the first argument ***function_num***, as values between 1-11;

*** Ignore hidden values** within your data by entering the first argument ***function_num***, as values between 101-111;

***** Find the SUBTOTAL of **filtered values**;

***** Ignore other SUBTOTALS that are included in your range, **avoiding any double counting!**

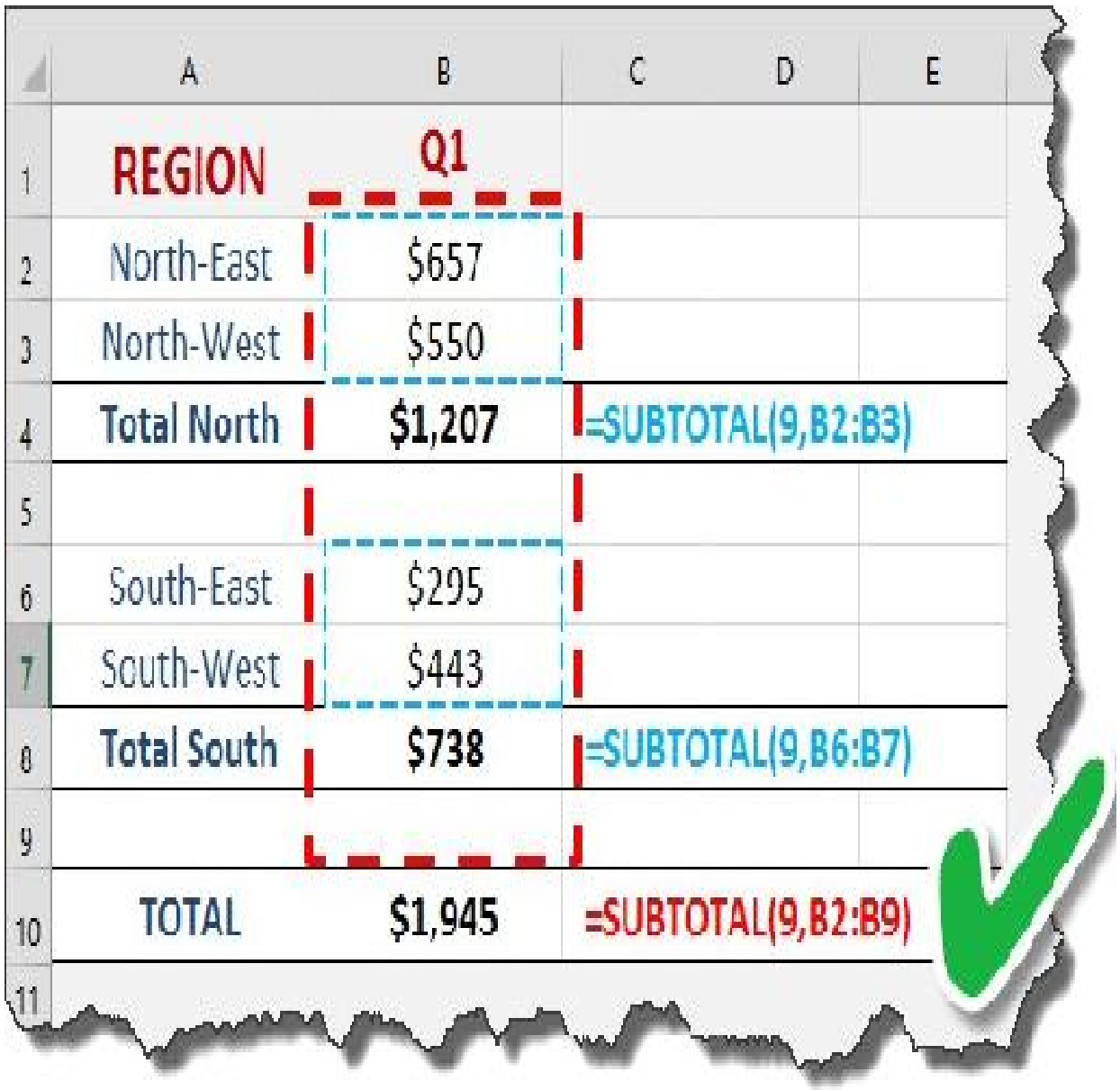
AVOIDING DOUBLE COUNTING WITH THE SUBTOTAL FUNCTION...

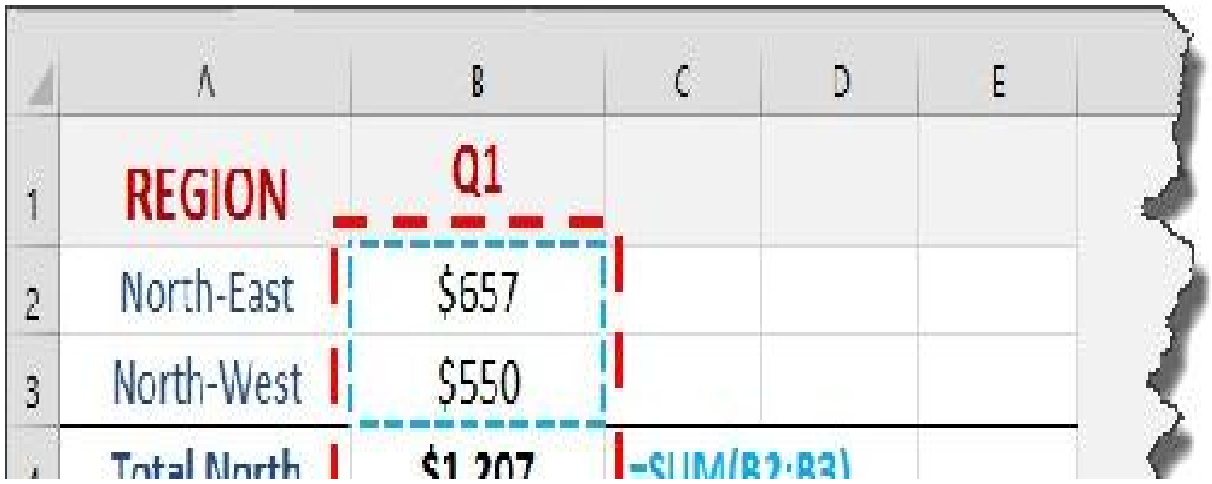
This is probably the most useful feature within the SUBTOTAL function!

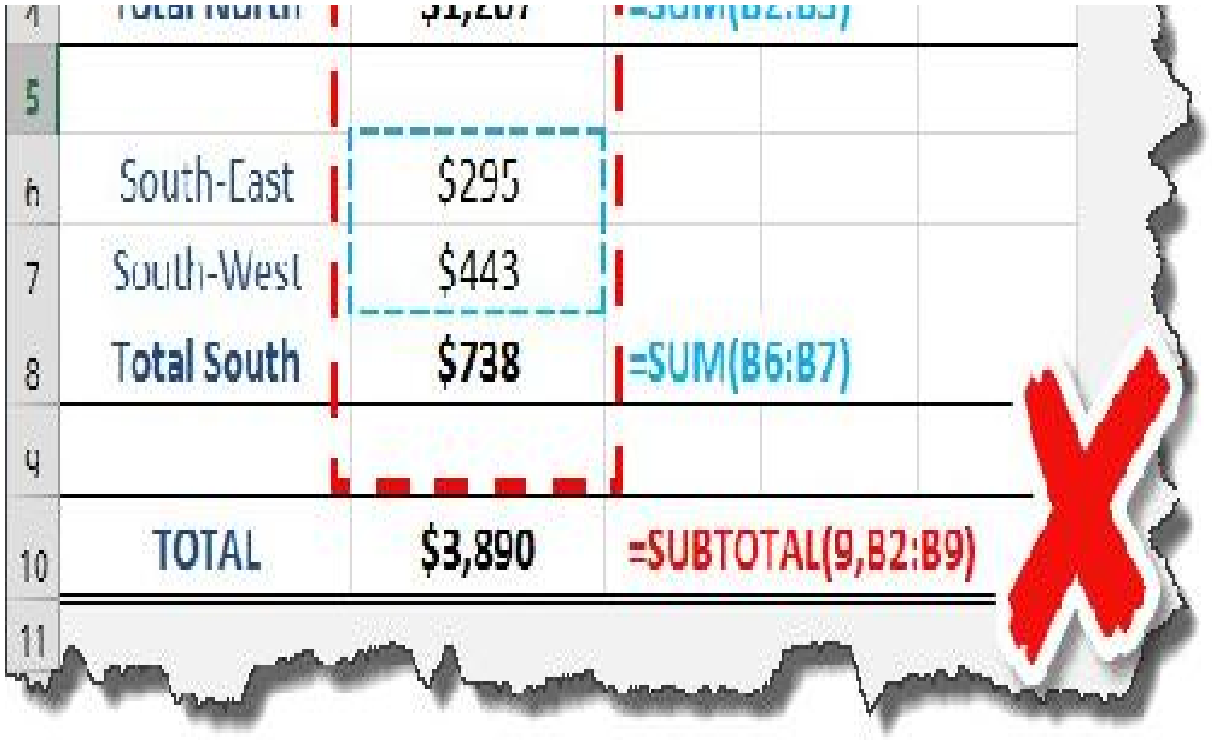
Let's say you have various SUBTOTALS within your data, one SUBTOTAL to ***Sum*** the North Region and another SUBTOTAL to ***Sum*** the South Region.

You can include a third SUBTOTAL for your Grand Total which references all of your data and ignoring the North & South Region SUBTOTALS, meaning that there is **no double counting** in your Grand Total.

See the below images of how this works with the SUBTOTAL function and how it double counts when using the SUM function:


A
B
C
D
E
1
REGION
Q1
2
North-East
$657
3
North-West
$550
4
Total North
$1,207
=SUBTOTAL(9,B2:B3)
5
6
South-East
$295
7
South-West
$443
8
Total South
$738
=SUBTOTAL(9,B6:B7)
9
10
TOTAL
$1,945
=SUBTOTAL(9,B2:B9)
11


A
B
C
D
E
1
REGION
Q1
2
North-East
$657
3
North-West
$550



Values for the SUBTOTAL *function_num***:**

Includes hidden values	Ignores hidden values	Function
1	101	AVERAGE
	102	COUNT
3	103	COUNTA
	104	MAX
5	105	MIN
	106	PRODUCT
7	107	STDEV

	108	STDEVP
9	109	SUM
	110	VAR
11	111	VARP

SUMIF

What does it do?

Sums the values in a range that meet a criteria that you specify

Formula breakdown:

=SUMIF(Range or Cells, Criteria, [Sum_Range])

What it means:

=SUMIF(Evaluate this Range/Cells, With this Criteria, [Optional Sum Range])

Example:

=SUMIF(D15:D23,">3000") = $17,435

i.e. Sum of all the values that are above $3,000

Exercise Workbook:

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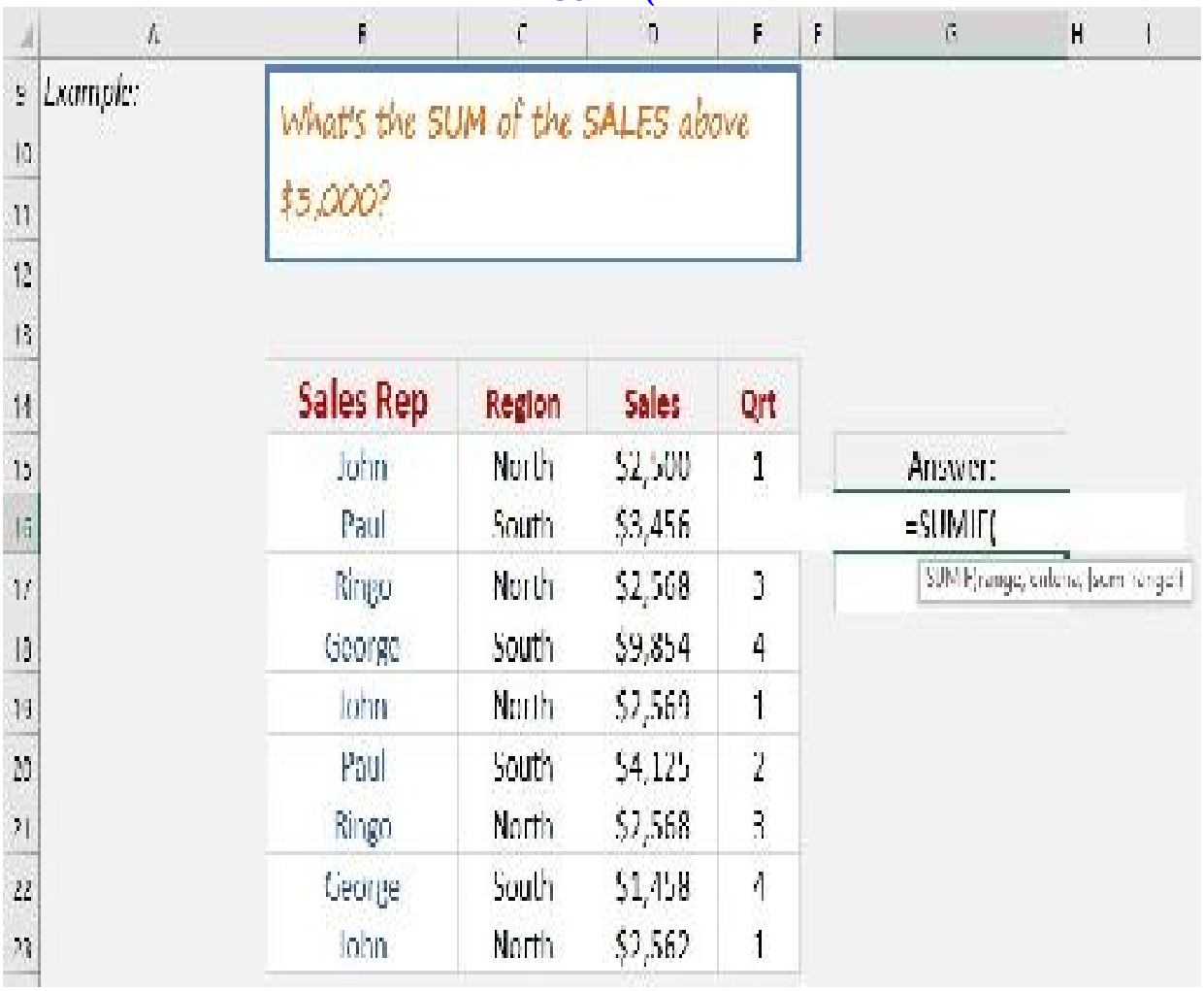
The **SUMIF** function is used widely amongst spreadsheet users as it is a simple Excel function. It allows you to Sum the values in a range that meet a criteria that you specify.

So if you want to Sum a range of sales values that are above $3,000 then this is the best Excel function to use, as I explain below.

We want to get the sum of the sales amounts that are above $3000.

STEP 1: We need to enter the **SUMIF** function in a blank cell:

=SUMIF(



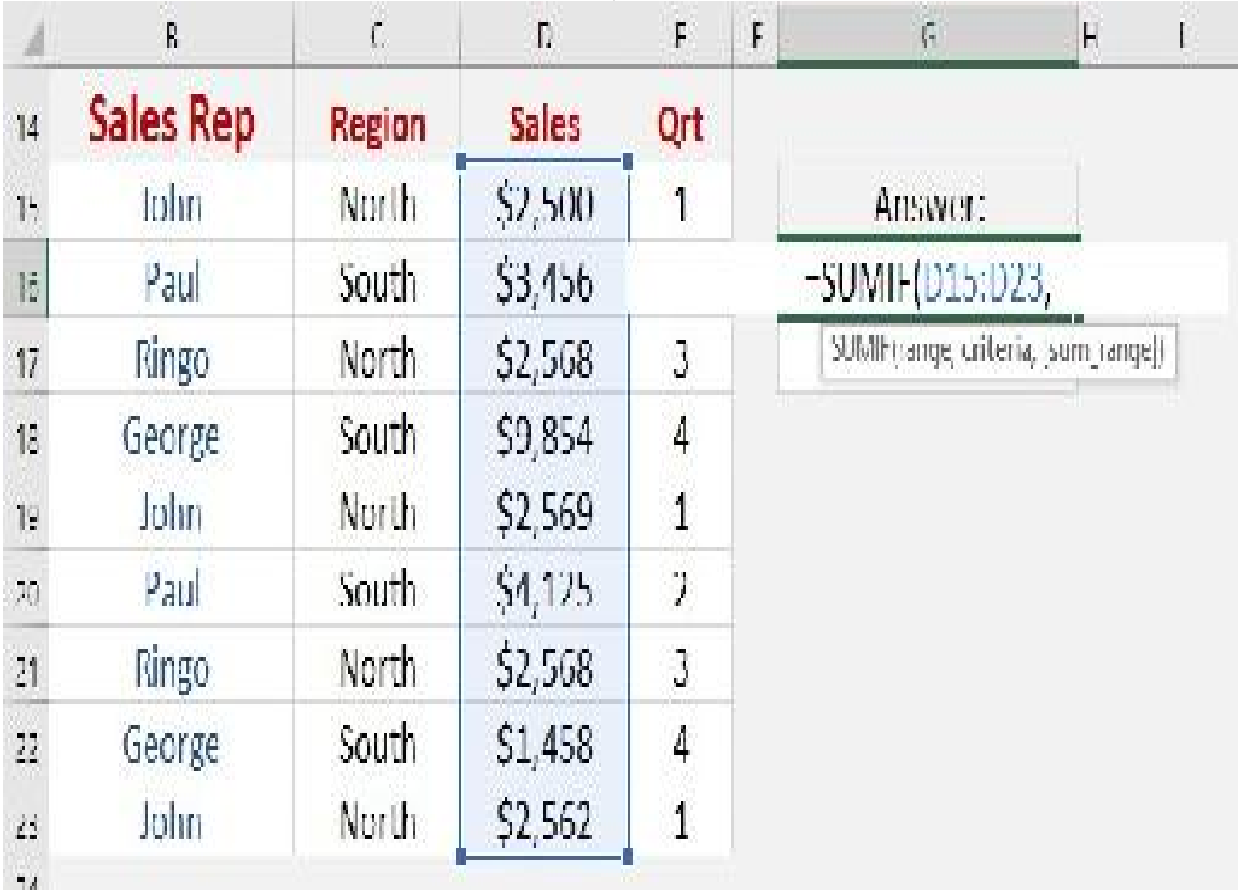
STEP 2: The **SUMIF** arguments:

range

What is your range that contains the source data?

Highlight the column that contains the sales data

=SUMIF(D15:D23,

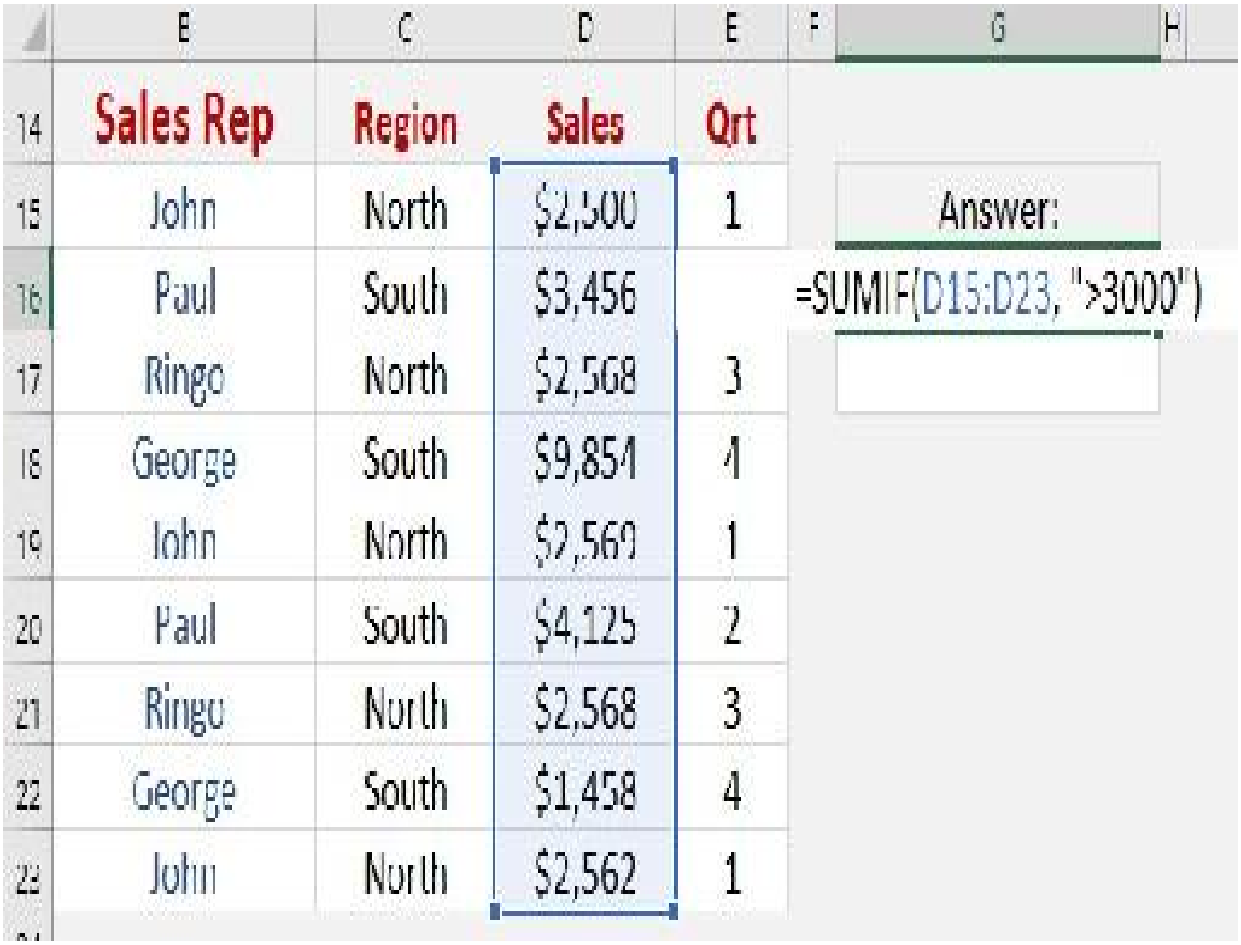


criteria

Which records do you want to sum together?

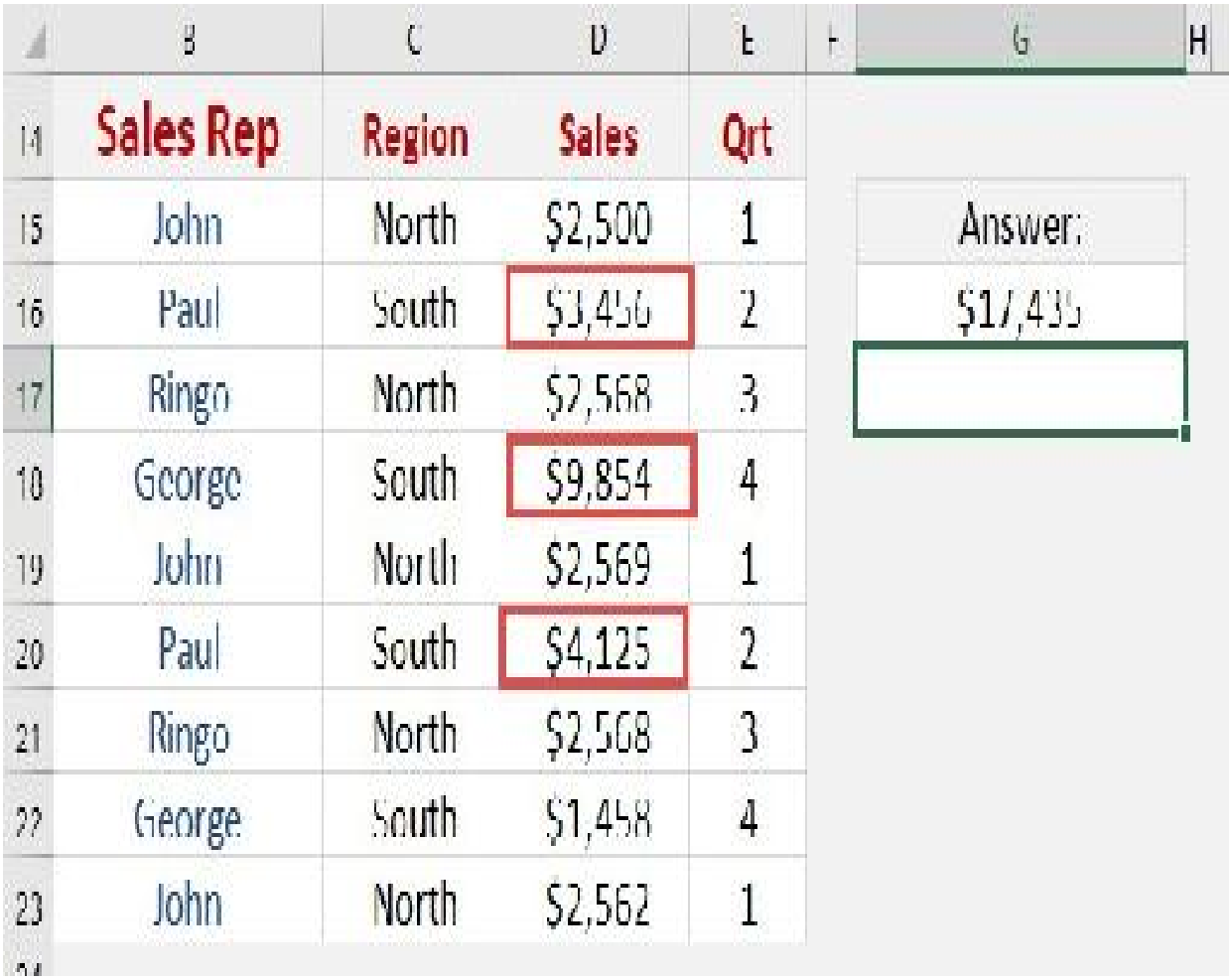
Since we want to sum the amounts greater than 3000, then let's type in >3000

=SUMIF(D15:D23, ">3000")



	B	C	D	E	F	G	H
14	Sales Rep	Region	Sales	Qrt			
15	John	North	$2,500	1		Answer:	
16	Paul	South	$3,456			=SUMIF(D15:D23, ">3000")	
17	Ringo	North	$2,568	3			
18	George	South	$9,851	4			
19	John	North	$2,569	1			
20	Paul	South	$4,125	2			
21	Ringo	North	$2,568	3			
22	George	South	$1,458	4			
23	John	North	$2,562	1			

Just like that, Excel has selectively found the values and summed them together!



	B	C	D	E	F	G	H
14	**Sales Rep**	**Region**	**Sales**	**Qrt**			
15	John	North	$2,500	1		Answer:	
16	Paul	South	$3,456	2		$17,435	
17	Ringo	North	$2,568	3			
18	George	South	$9,854	4			
19	John	North	$2,569	1			
20	Paul	South	$4,125	2			
21	Ringo	North	$2,568	3			
22	George	South	$1,458	4			
23	John	North	$2,562	1			

SUMIFS

What does it do?

Sums multiple criteria

Formula breakdown:

=SUMIFS(Sum_Range,Criteria_Range1,Criteria1,Criteria_Range2,Criteria2...)

What it means:

=SUMIFS(Return the Sum from this Range,Evaluate this Range,With this Criteria,Evaluate that Range,With that Criteria...)

Example:

=SUMIFS(D15:D23,B15:B23,"john",C15:C23,"north") = $7,631

i.e. Total sales for John in the North region

Exercise Workbook:

DOWNLOAD EXCEL WORKBOOK

The **SUMIFS** function allows you to Sum multiple criteria.

For example, you can select one Sales Rep from a list of Sales Reps and select one Region from a list of Regions and return the Sum of those arguments from a Sales list. See how easy it is...

We want to get the **sum of the sales amounts** for **John** in the **North Region**.

STEP 1: We need to enter the **SUMIFS** function in a blank cell:

=SUMIFS(

Example:

What's the SUM of the SALES for John in the NORTH region?

Sales Rep	Region	Sales	Qrt
John	North	$2,500	1
Paul	South	$3,456	2
Ringo	North	$2,568	3
John	South	$9,854	4
John	North	$2,569	1
Paul	South	$4,125	2
Ringo	North	$2,568	3
John	South	$1,458	4
John	North	$2,562	1

Answer:

=SUMIFS(

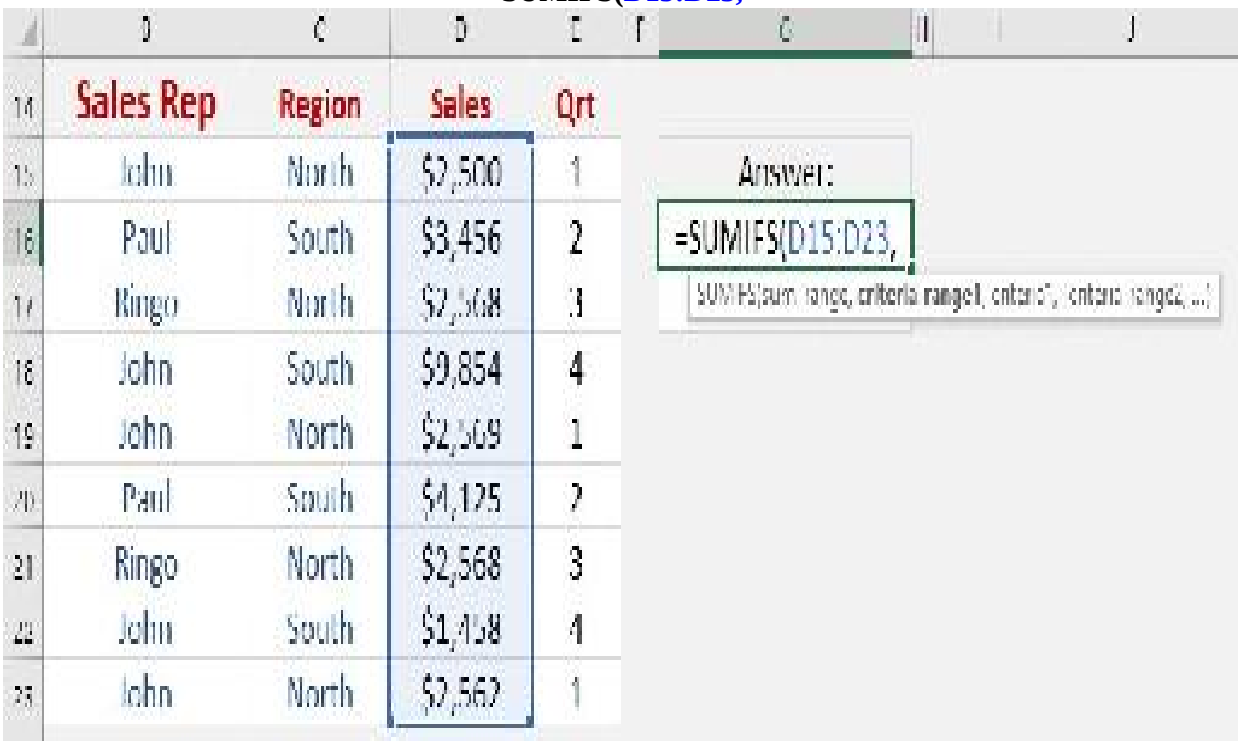
STEP 2: The **SUMIFS** arguments:

range

What is your range that contains the data to add together?

*Highlight the column that contains the **Sales** data*

=SUMIFS(D15:D23,

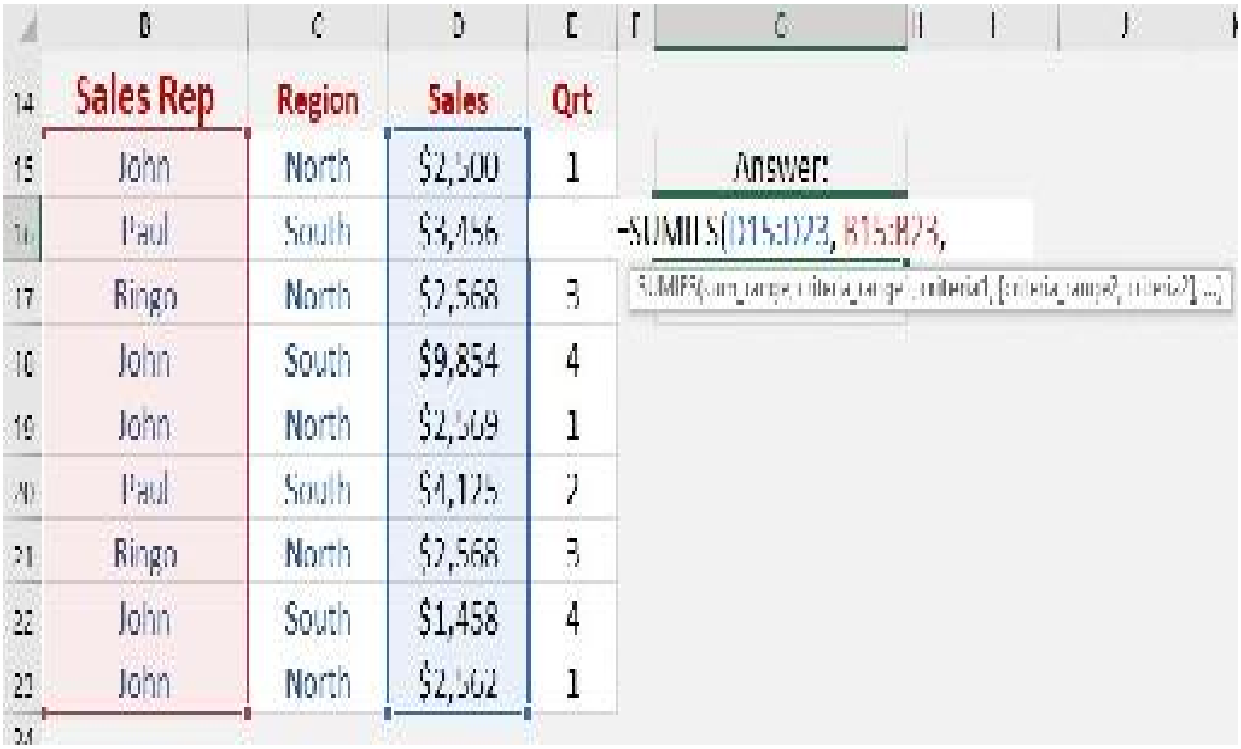


criteria_range1

For the first criteria, which range contains the data?

*Let us target the **Sales Rep** first, so select that column*

=SUMIFS(D15:D23, B15:B23,

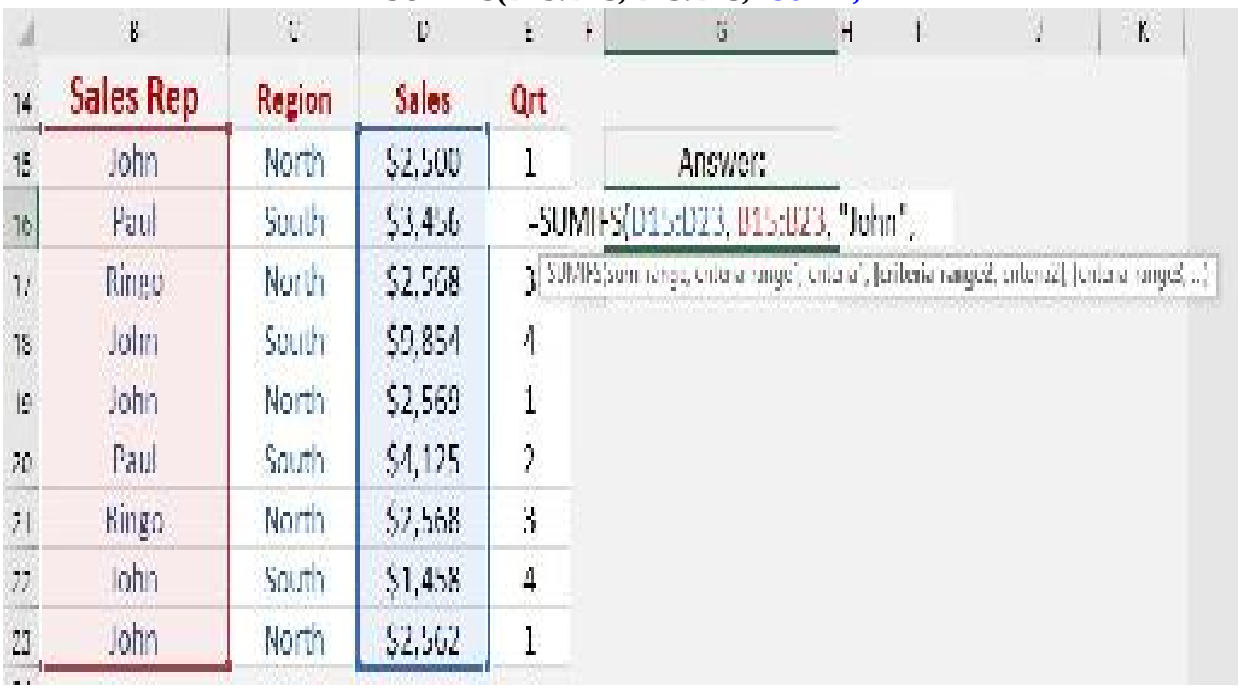


criteria1

What is your filtering criteria?

We want to filter for John, so type in "John"

=SUMIFS(D15:D23, B15:B23, "John",

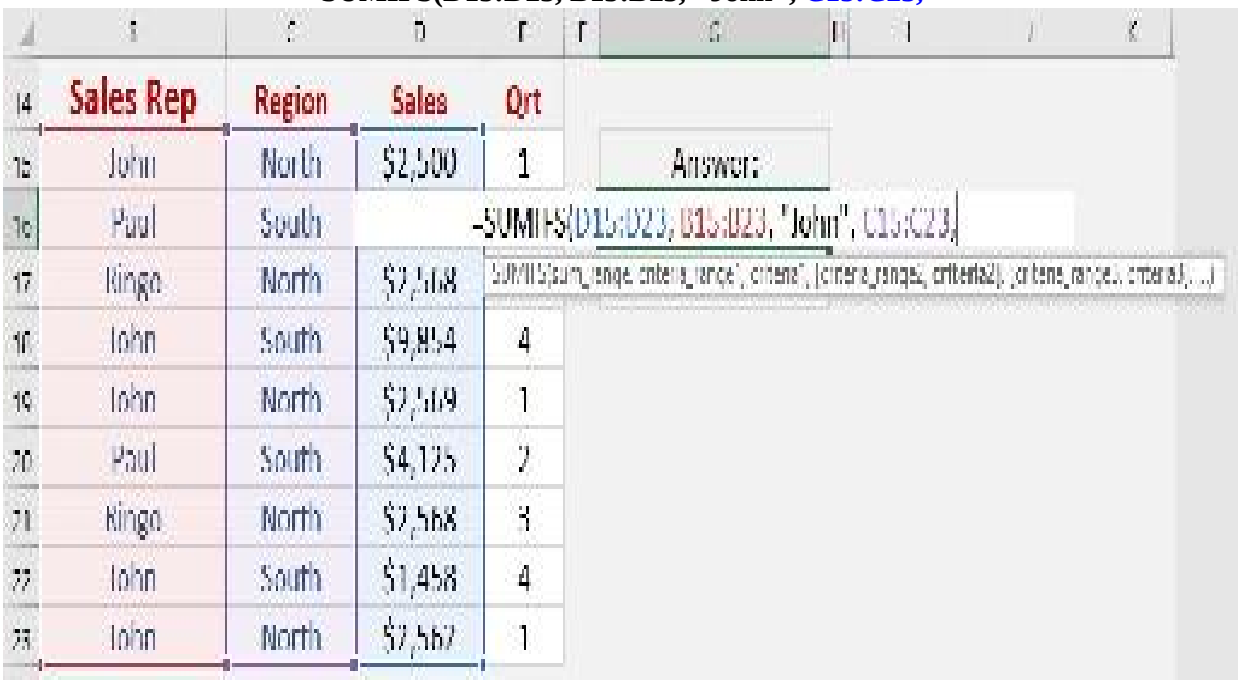


criteria_range2

For the second criteria, which range contains the data?

*Let us now target the **Region**, so select that column*

=SUMIFS(D15:D23, B15:B23, "John", C15:C23,

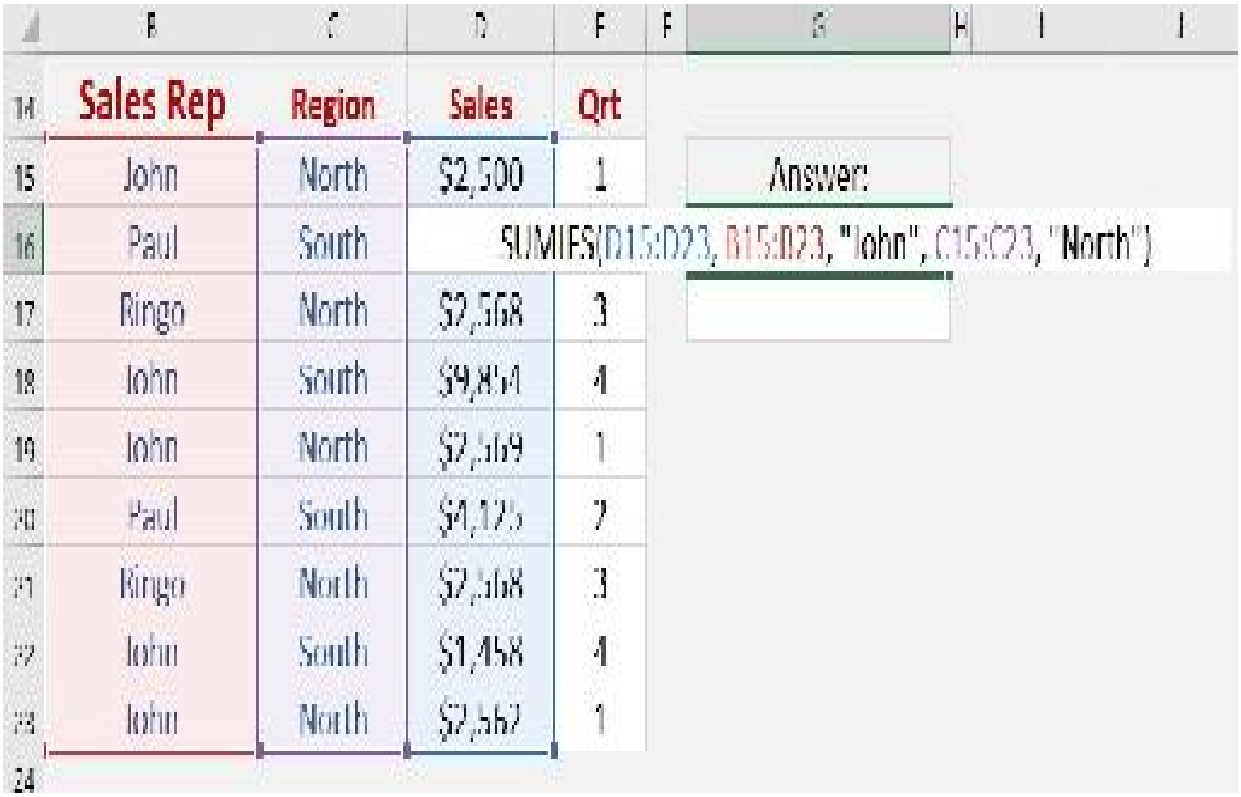


criteria2

What is your filtering criteria?

We want to filter for the North Region, so type in "North"

=SUMIFS(D15:D23, B15:B23, "John", C15:C23, "North")



Just like that, Excel has selectively found the values and summed them together!

	B	C	D	E	G
14	Sales Rep	Region	Sales	Qrt	
15	John	North	$2,500	1	Answer:
16	Paul	South	$3,456	2	$7,631
17	Ringo	North	$2,568	3	
18	John	South	$9,854	4	
19	John	North	$2,569	1	
20	Paul	South	$4,125	2	
21	Ringo	North	$2,568	3	
22	John	South	$1,458	4	
23	John	North	$2,562	1	

SUMPRODUCT

What does it do?

It returns the sum of the products of corresponding ranges or arrays

Formula breakdown:

=SUMPRODUCT(array1, [array2], [array3]...)

What it means:

=SUMPRODUCT(this array, with that array…)

Example:

=SUMPRODUCT(C14:C17,D14:D17)/SUM(C14:C17) = $455

i.e. The average selling price

Exercise Workbook:

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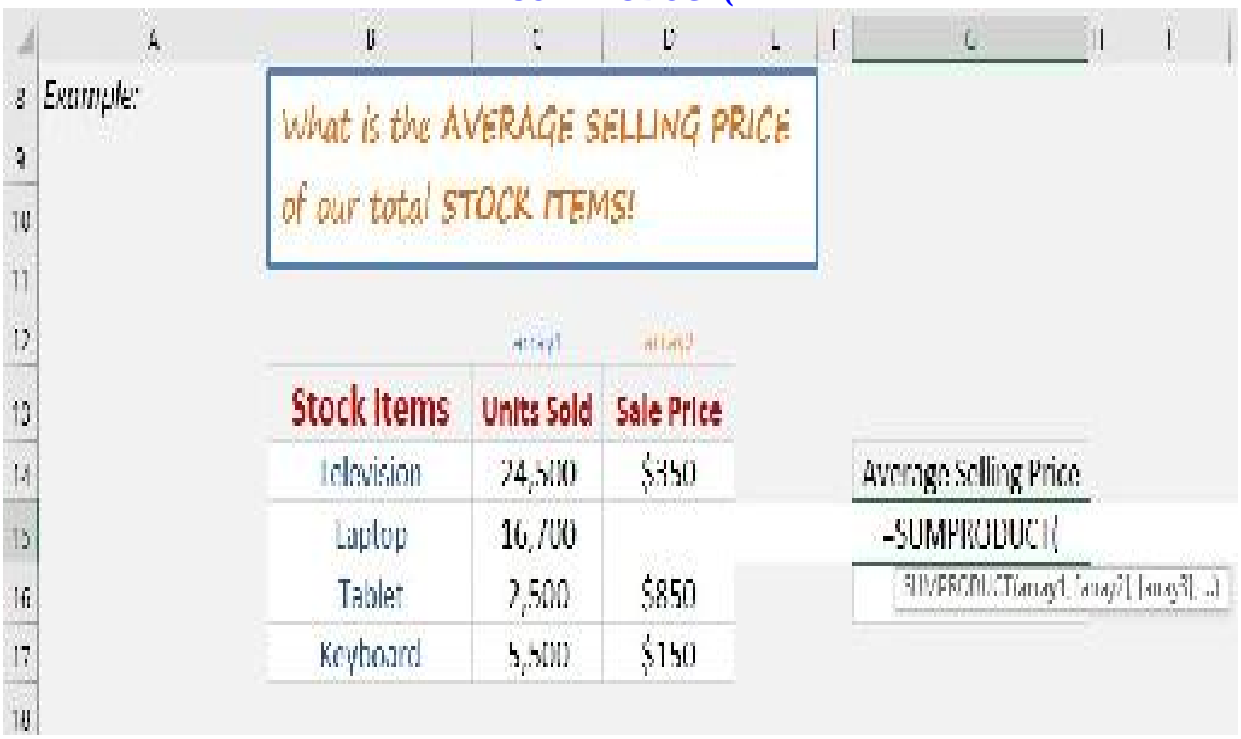
A quick way to calculate the weighted average of two lists of data is to use the **SUMPRODUCT** formula. A **weighted average** can be used to determine the average salary of employees, the average grade of an exam or the average selling price of a company´s stock list, as can been seen below.

We want to get the average selling price of our total stock items. This is easily achievable with the **SUMPRODUCT** formula! We will use this to calculate the total value of the items, then **divide this by the total number of units** to get the **average selling price**.

STEP 1: We need to enter the **SUMPRODUCT** function in a blank cell:

=SUMPRODUCT(



STEP 2: The **SUMPRODUCT** arguments:

array1

What is the first array that contains the data?

*We want to get the **Units Sold** so select those values.*

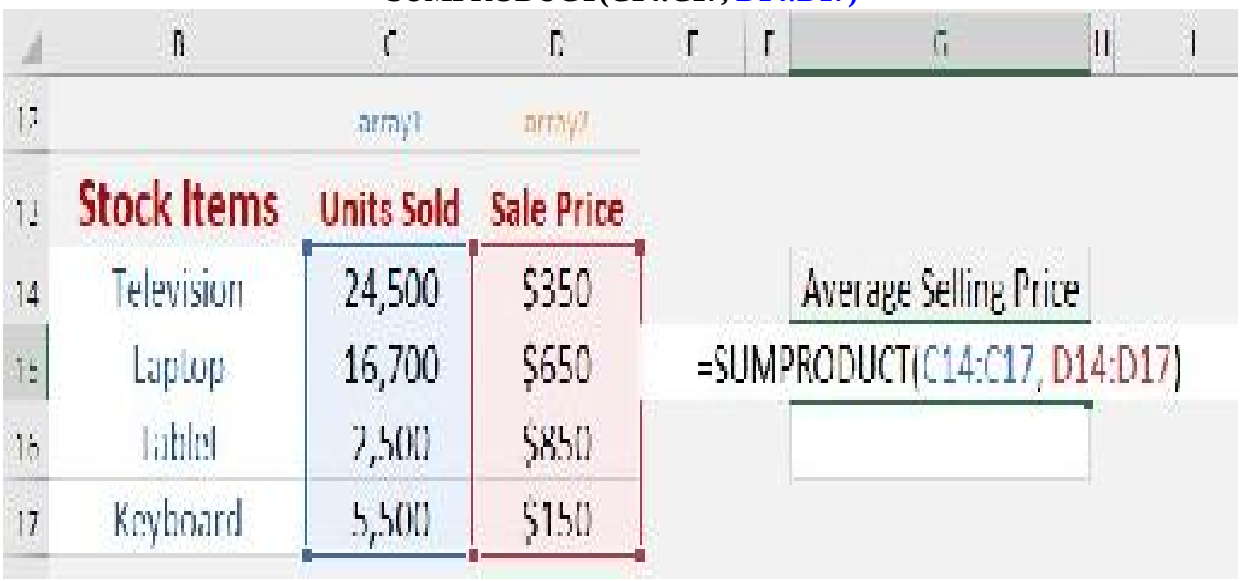
=SUMPRODUCT(C14:C17,

array2

What is the second array that contains the data?

*We want to get the **Sale Price**, so select those values. The values will be multiplied against the first array that we got.*

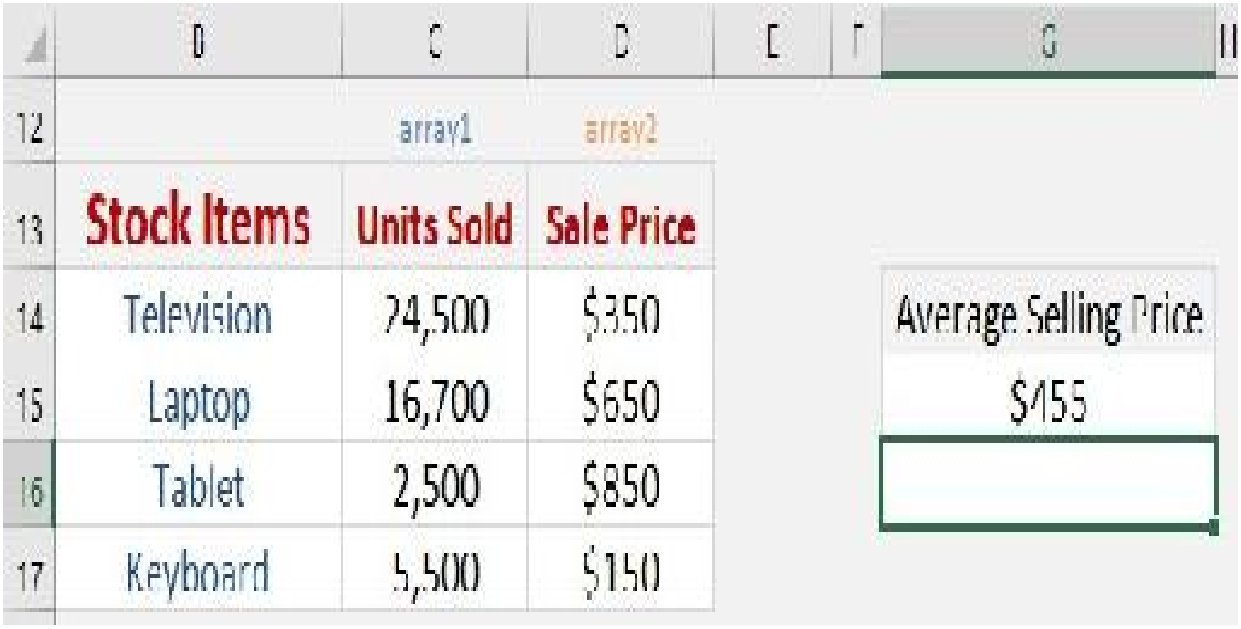
=SUMPRODUCT(C14:C17, D14:D17)



STEP 3: Now we have the total value, we can easily get the average value by dividing it by the total number of items.

=SUMPRODUCT(C14:C17, D14:D17) / SUM(C14:C17)

With just this single formula, we are able to get the average selling price without the need of extra helper columns!



STATISTICAL FUNCTIONS

AVERAGE

What does it do?

Gives you the average of a group of values

Formula breakdown:

=AVERAGE(number1, number2...)

What it means:

=AVERAGE(the numbers you want to average)

Example:

=AVERAGE(1,2,3,4) =2.5

Exercise Workbook:

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There are times when you have to get the average of your values in your Excel worksheet and you would normally have to **SUM** all of the values then divide it by the number of values.

That's the long process!

Thankfully there is a quicker way with Excel's **AVERAGE formula!**

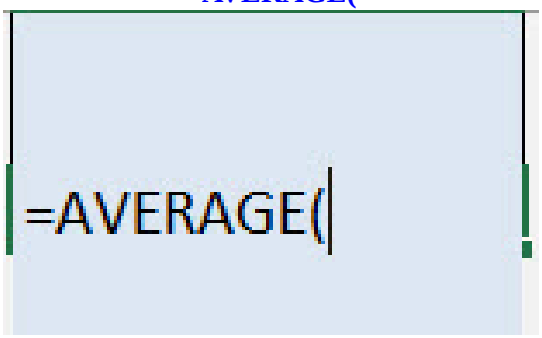
In our example below, we have a table of values that we need to get the average from:

DAY OF THE WEEK	SALES
Monday	$829.41
Tuesday	$894.00
Wednesday	$332.11
Thursday	$1,023.32

I explain how you can do this below:

STEP 1: We need to **enter the *AVERAGE* function in a blank cell**:

=AVERAGE(



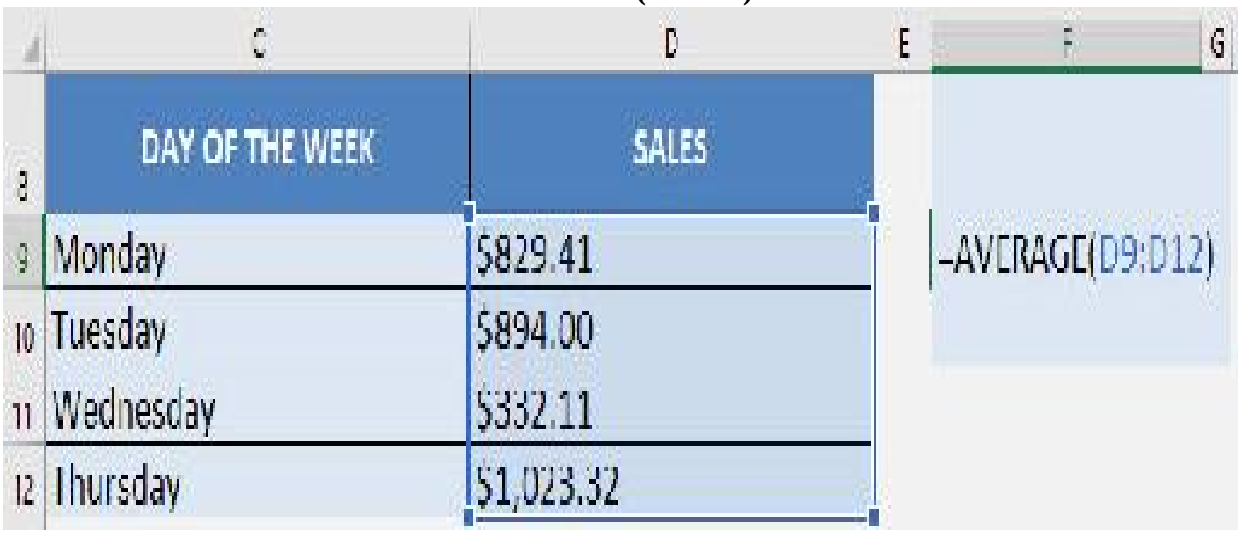
STEP 2: The **AVERAGE** arguments:

text

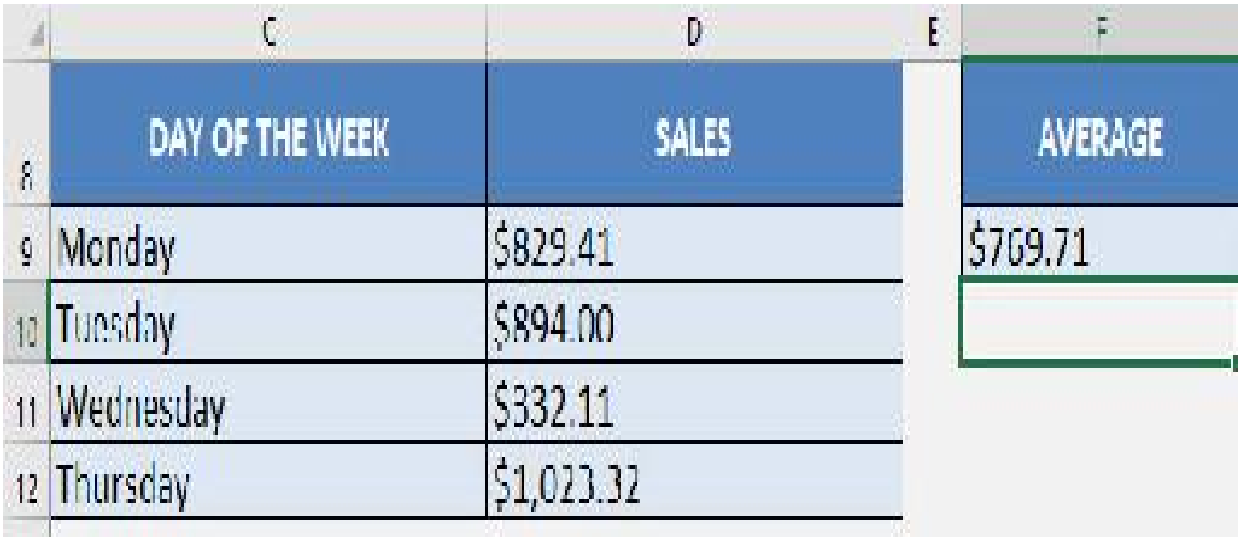
What numbers do we want to get the average of?

Select the range of values:

=AVERAGE(D9:D12)



You have now calculated the average of the Sales numbers!



LARGE

What does it do?

Get the nth largest value from a range of values

Formula breakdown:

=LARGE(array, k)

What it means:

=LARGE(range of values, position of the largest value)

Example:

=LARGE(C9:C12, 3) = 60

i.e. 60 is the 3rd largest value in the range {60;55;100;89}

Exercise Workbook:

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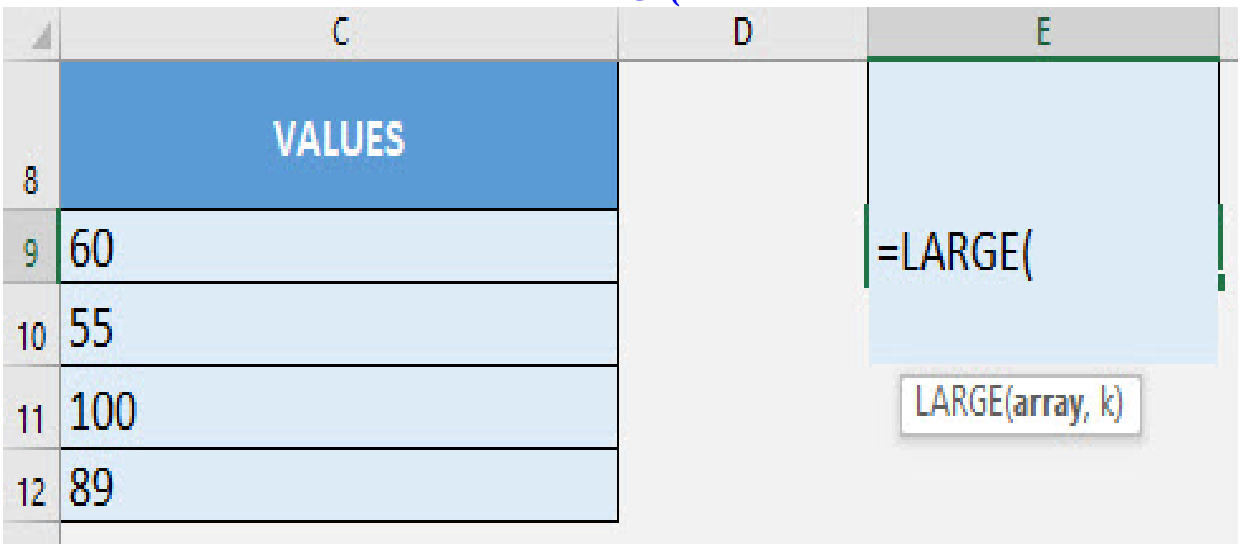
You have a list of values and you want to get the third (or nth) largest value, no problem! Excel's **LARGE Formula** can easily get that for you!

STEP 1: We need to **enter the *LARGE* function in a blank cell**:

=LARGE(



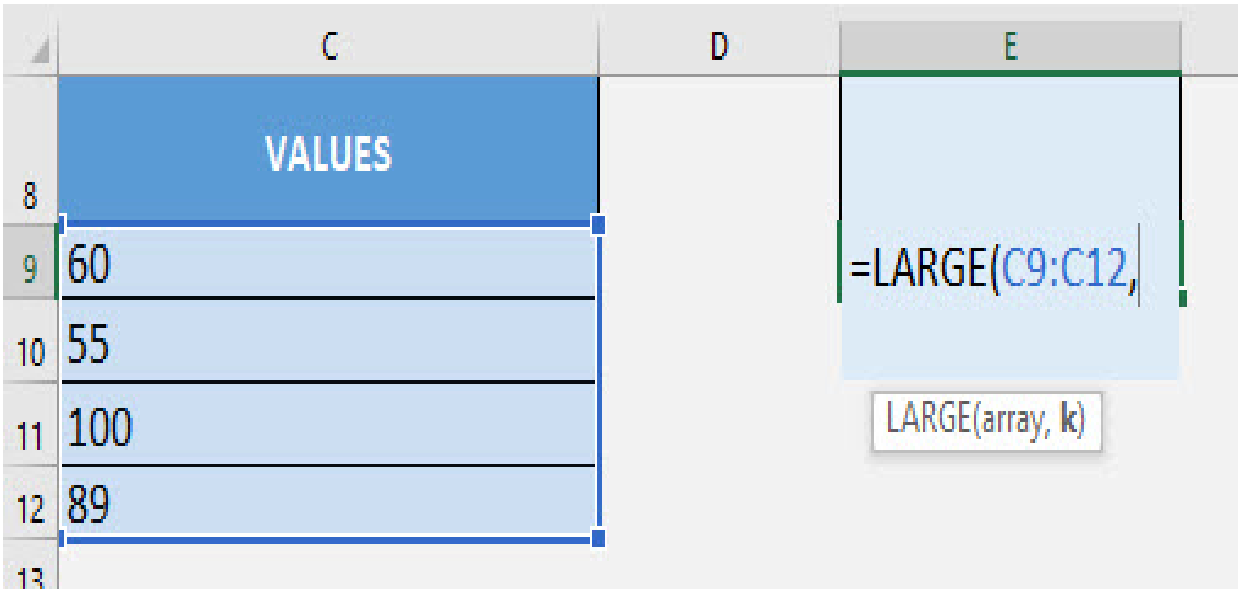
STEP 2: The **LARGE** arguments:

array

What is the range of values?

Select the cells containing your values:

=LARGE(C9:C12,

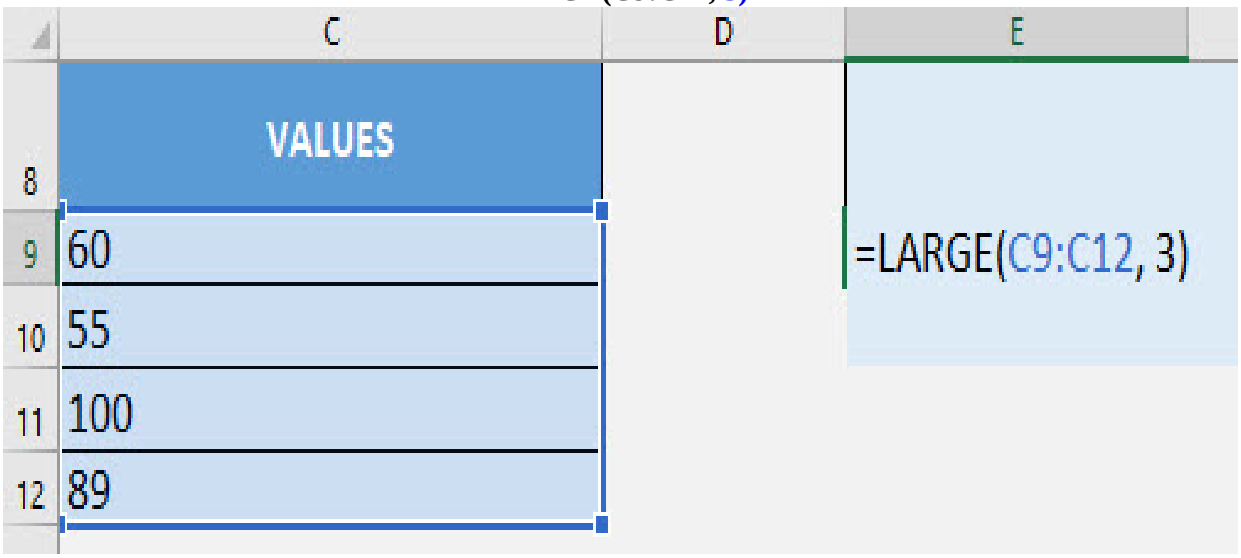


k

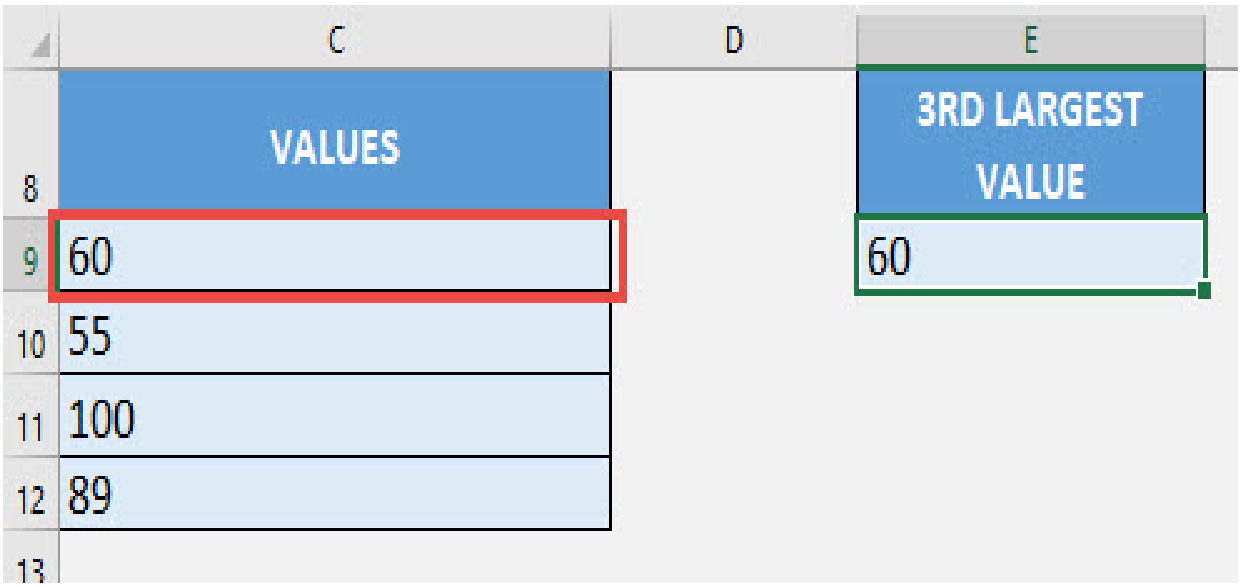
What is the nth largest value that you want to get?

We want to get the third largest value so we will place in 3.

=LARGE(C9:C12, 3)



You now have your third largest value!



	C	D	E
8	VALUES		3RD LARGEST VALUE
9	60		60
10	55		
11	100		
12	89		
13			

MAX

What does it do?

Get the largest value from a range of values

Formula breakdown:

=MAX(number1, [number2], ...)

What it means:

=MAX(a number or range of values, [additional numbers], ...)

Example:

=MAX(60,55,100,89) = 100

i.e. 100 is the largest number in the range {60;55;100;89}

Exercise Workbook:

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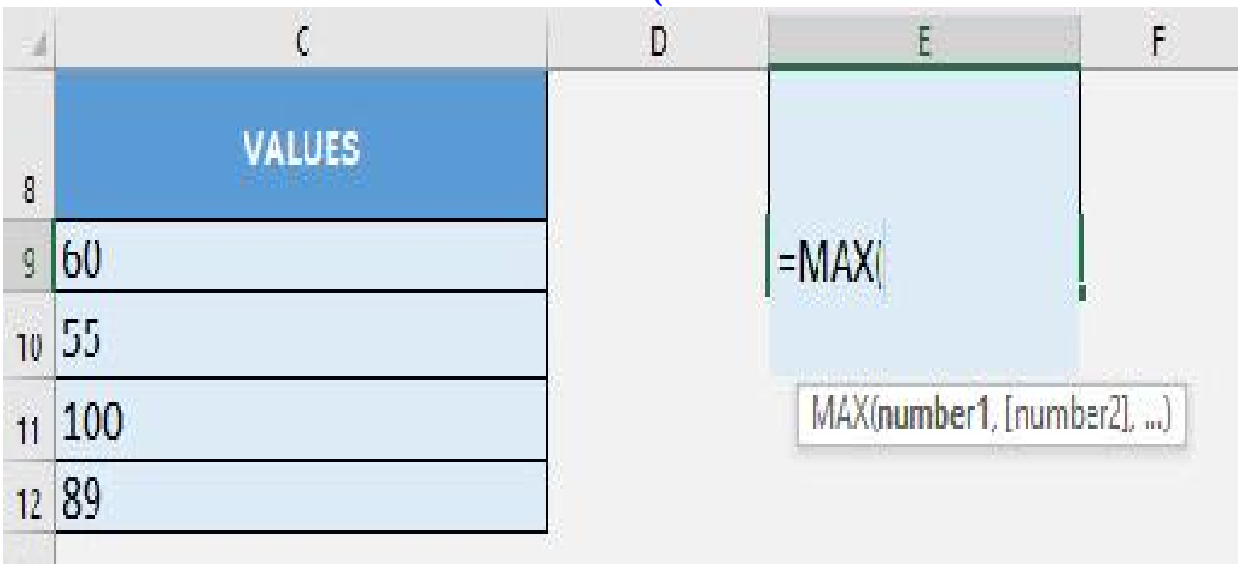
If you want to get the largest value out of a list of values, just one use of Excel's **MAX Formula** gives you the answer instantly!

STEP 1: We need to **enter the *MAX* function in a blank cell**:

=MAX(



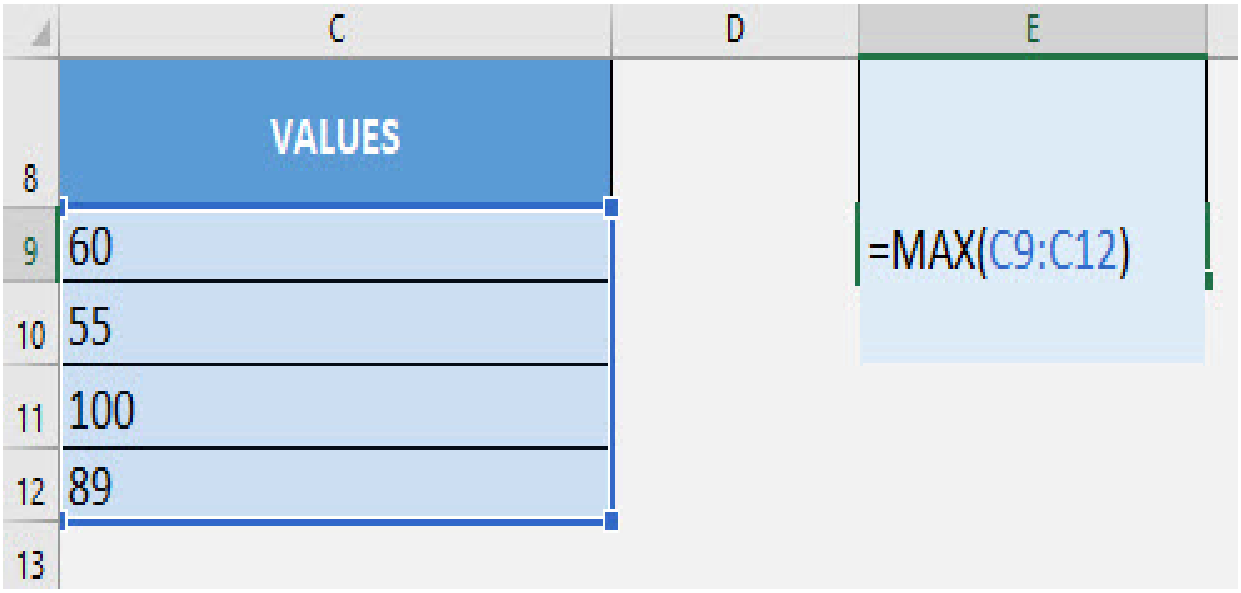
STEP 2: The **MAX** arguments:

number1, [number2], ...

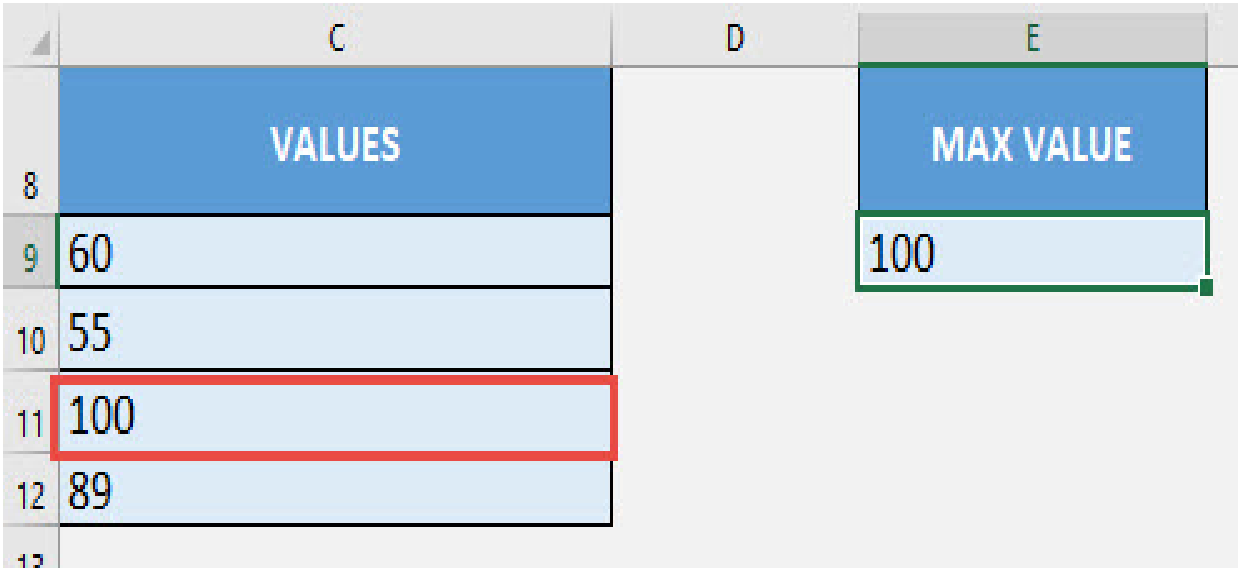
Where is the list of values?

Select the cells containing the values that you want to get the maximum value from.

=MAX(C9:C12)



You now have the maximum value of 100 from the list!



MEDIAN

What does it do?

Gets the middle number in a set of numbers

Formula breakdown:

=MEDIAN(number1, [number2], ...)

What it means:

=MEDIAN(first number, [succeeding numbers in the set], ...)

Example:

=MEDIAN(60,55,100,89) = 74.50

i.e. 74.50 is the middle number (60+89)/2 in the range {60;55;100;89}

Exercise Workbook:

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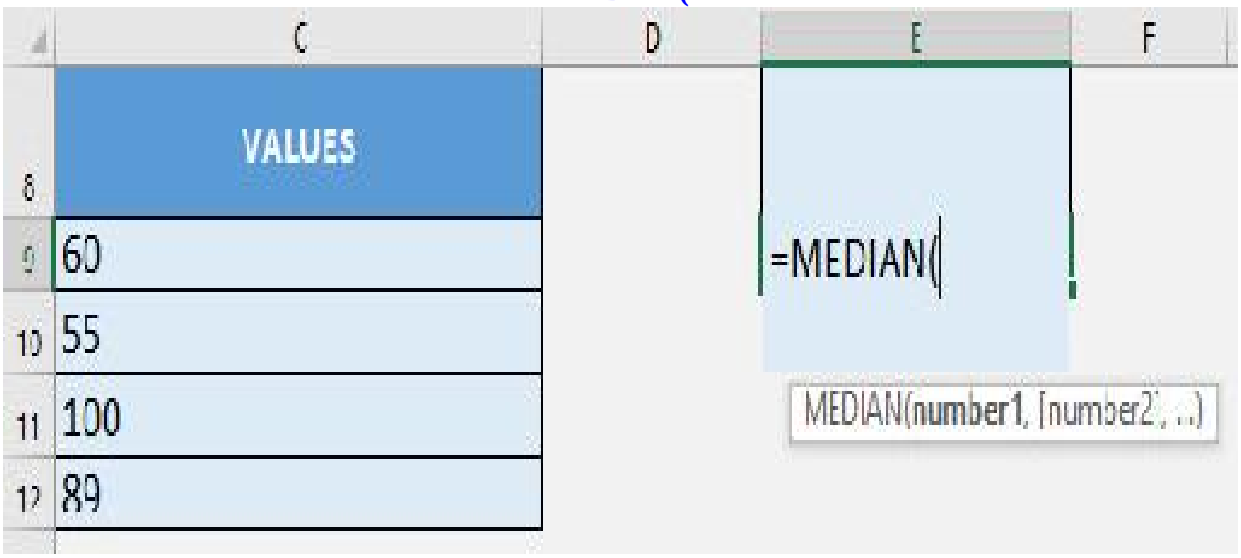
You have a list of values and you want to get the median or middle of those values. Excel's **MEDIAN Formula** can easily get that for you!

An important think to note though, if it's an **odd number of values**, it will simply get the middle value. But if it's an **even number of values**, it will get the 2 middle values, then get their average!

STEP 1: We need to **enter the *MEDIAN* function in a blank cell**:

=MEDIAN(



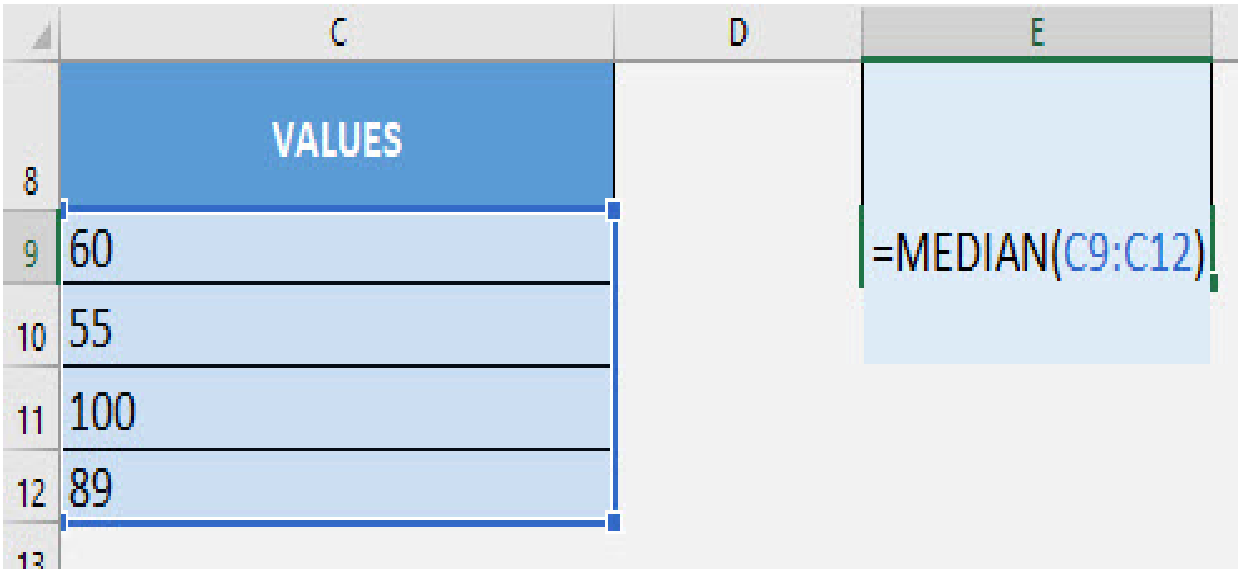
STEP 2: The **MEDIAN** arguments:

number1, [number2], ...

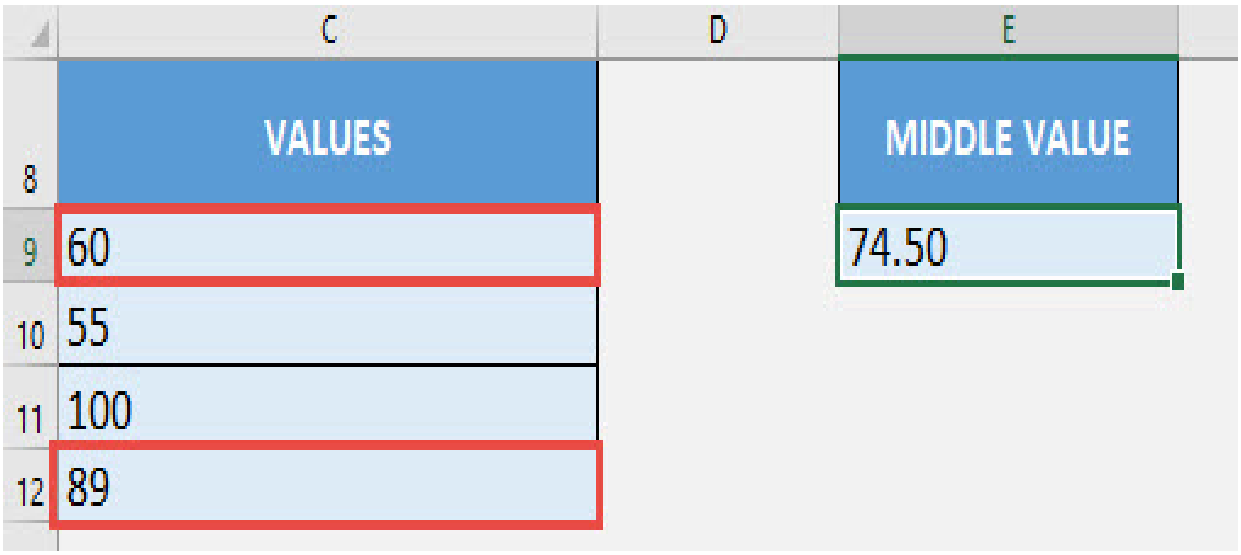
What is the range of values?

Select the cells containing your values:

=MEDIAN(C9:C12)



You now have your **median**! It is calculated as the average of the 2 middle values since we have an even number of values: **(60 + 89) / 2 = 74.50**



MIN

What does it do?

Get the smallest value from a range of values

Formula breakdown:

=MIN(number1, [number2], ...)

What it means:

=MIN(a number or range of values, [additional numbers], ...)

Example:

=MIN(60,55,100,89) = 55

i.e. 55 is the smallest number in the range {60;55;100;89}

Exercise Workbook:

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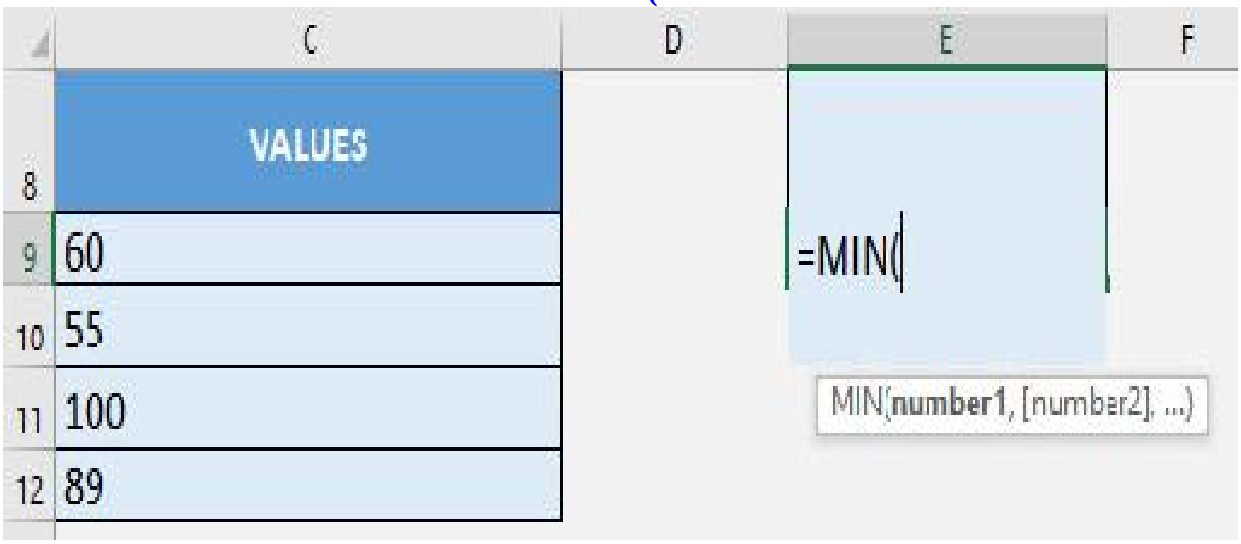
If you want to get the smallest value out of a list of values, just one use of Excel's **MIN Formula** gives you the answer instantly!

STEP 1: We need to **enter the *MIN* function in a blank cell**:

=MIN(



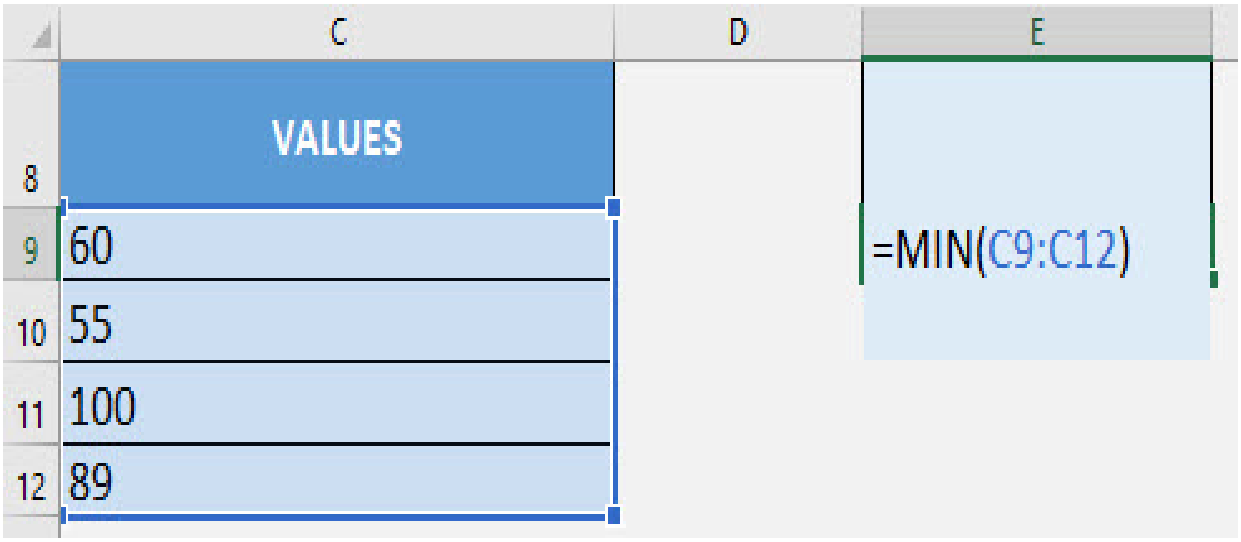
STEP 2: The **MIN** arguments:

number1, [number2], ...

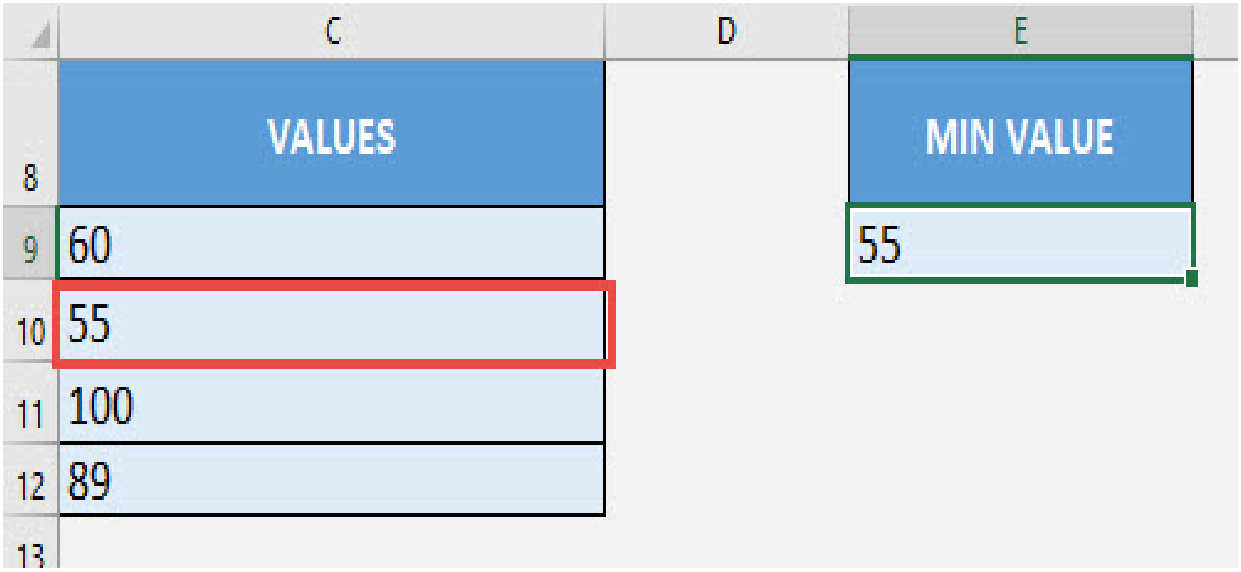
Where is the list of values?

Select the cells containing the values that you want to get the minimum value from.

=MIN(C9:C12)



You now have the minimum value of 55 from the list!



SMALL

What does it do?

Get the nth smallest value from a range of values

Formula breakdown:

=SMALL(array, k)

What it means:

=SMALL(range of values, position of the smallest value)

Example:

=SMALL(C9:C12, 3) = 89

i.e. 89 is the 3rd smallest value in the range {60;55;100;89}

Exercise Workbook:

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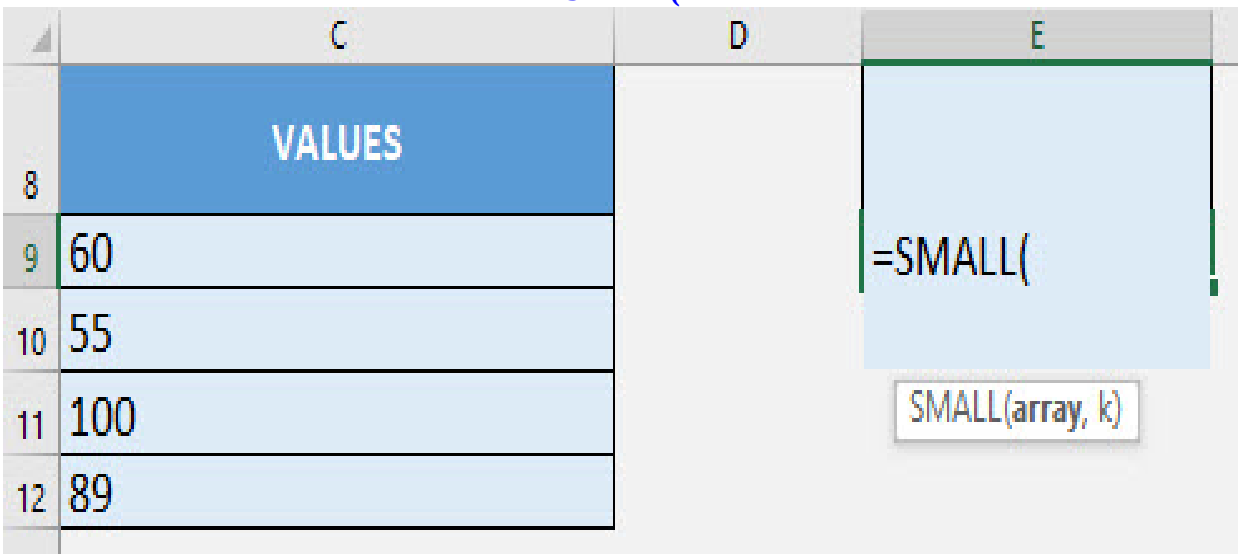
You have a list of values and you want to get the third (or nth) smallest value, no problem! Excel's **SMALL Formula** can easily get that for you!

STEP 1: We need to **enter the *SMALL* function in a blank cell**:

=SMALL(



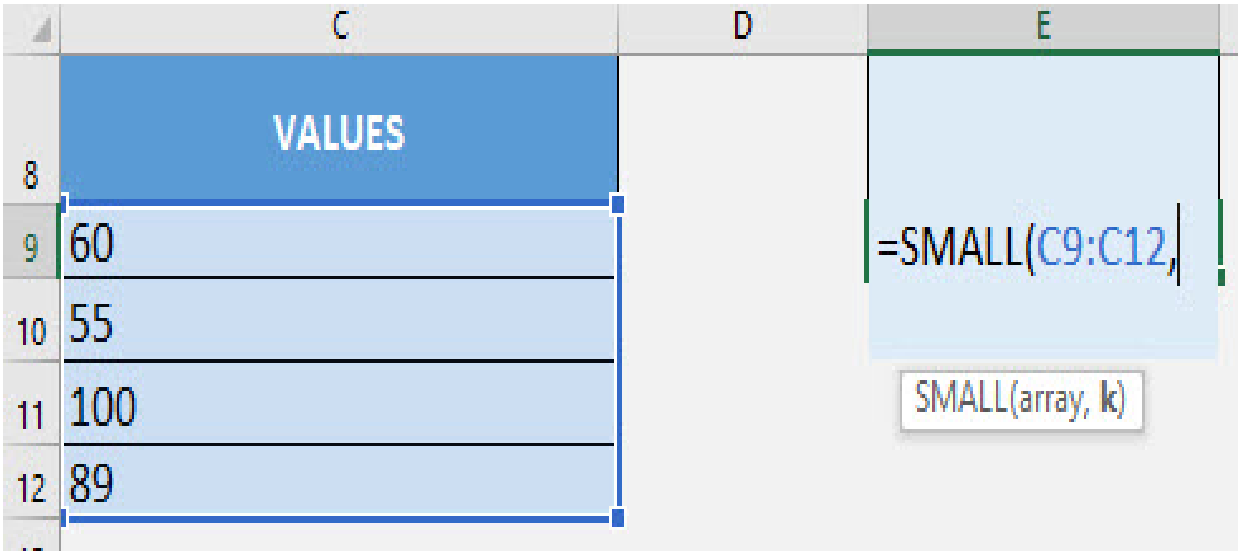
STEP 2: The **SMALL** arguments:

array

What is the range of values?

Select the cells containing your values:

=SMALL(C9:C12,

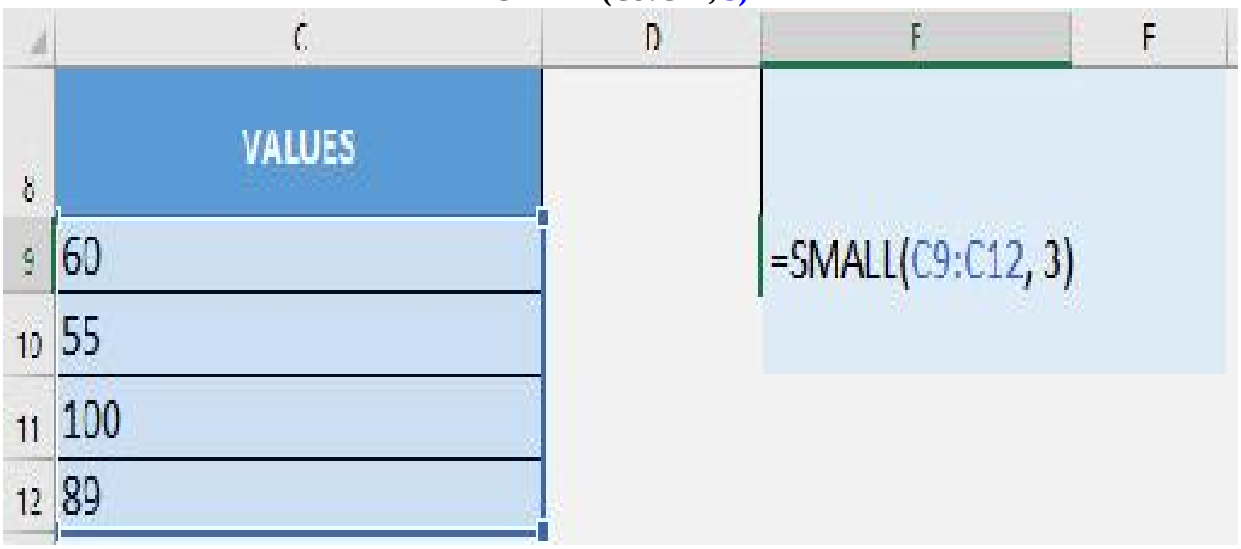


k

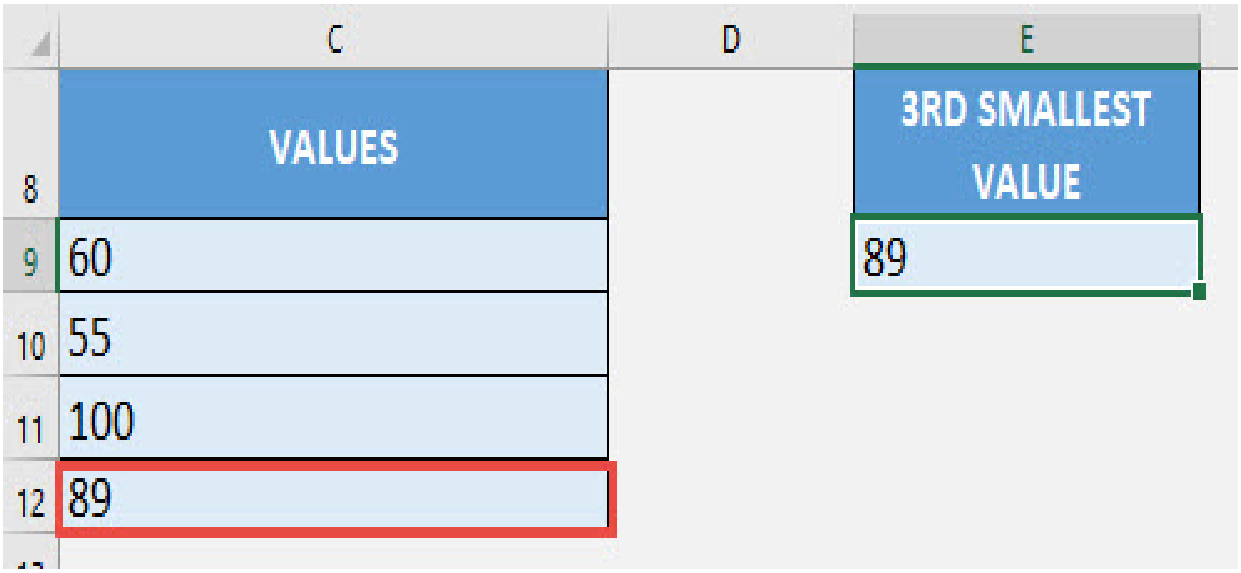
What is the nth smallest value that you want to get?

We want to get the third smallest value so we will place in 3.

=SMALL(C9:C12, 3)



You now have your third smallest value!



	C	D	E
8	VALUES		3RD SMALLEST VALUE
9	60		89
10	55		
11	100		
12	89		

TEXT FUNCTIONS

CLEAN

What does it do?

Removes all nonprintable characters from text

Formula breakdown:

=CLEAN(text)

What it means:

=CLEAN(this dirty text cell)

Example:

=CLEAN(23) =234

Exercise Workbook:

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There are times when imported text from other applications contain characters that are unprintable. The **CLEAN** formula in Excel can clean up the unprintable characters easily.

STEP 1: We need to **enter the** *Clean* **function**

=CLEAN

STEP 2: The Clean argument:

Which text do we want to clean the dirty characters from?

This is our data source:

IMPORTED VALUE	CLEANED VALUE
25468698	
25468 87	
2 4686988	
2546 989	
2546 6990	

Reference the cell which has the dirty data:

=CLEAN(C9)

IMPORTED VALUE	
25468698	=CLEAN(C9)
25468 87	
2 4686988	
2546 989	
2546 6990	

STEP 3: Do the same for the rest of the cells by using the **CLEAN** formula, notice all of the unprintable characters (Wingdings) have been cleaned:

IMPORTED VALUE	CLEANED VALUE
25468698	254686986
25468 87	254686987
2 4686988	254686988
2546 989	254686989
2546 6990	254686990

CONCATENATE

What does it do?

Joins two or more text strings into one string. The item can be a text value, number, or cell reference.

Formula breakdown:

=CONCATENATE(text1, [text2], [text3], ...)

What it means:

=CONCATENATE(the first text, the second text, and so on...)

Example:

=CONCATENATE("Hello", " ", "World") = “Hello World”

Exercise Workbook:

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Excel's **CONCATENATE** functions joins two or more text strings into one string. The item can be a text value, number, or cell reference.

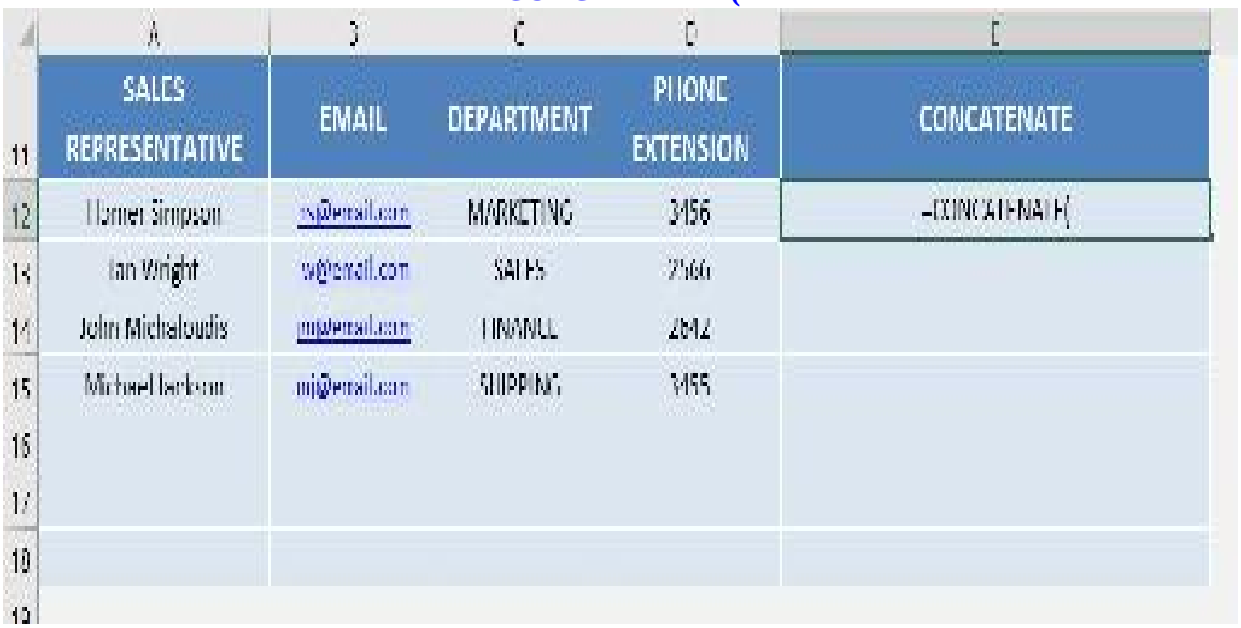
If you add a double quotation with a space in between " " then this will add a space between the texts selected on either side.

You can also add a line break in between each text string. This is done by entering the **CHAR(10)** function in between each text string/argument. You will then need to select WRAP TEXT in order to see each text on a separate line.

See how easy this is to implement this by using employee data on the example below.

STEP 1: We need to enter the **CONCATENATE** function in a blank cell:

=CONCATENATE(



STEP 2: The **CONCATENATE** arguments:

text1, [text2], [text3], ...

Which text do you want to join together?

Let us select all the columns:

=CONCATENATE(A12, B12, C12, D12)

	A	B	C	D	E
11	SALES REPRESENTATIVE	EMAIL	DEPARTMENT	PHONE EXTENSION	CONCATENATE
12	Homer Simpson	hs@email.com	MARKETING	3456	=CONCATENATE(A12,B12,C12,D12)
13	Ian Wright	iw@email.com	SALES	2566	
14	John Michaloudis	jm@email.com	FINANCE	2612	
15	Michael Jackson	mj@email.com	SHIPPING	3455	
16					
17					
18					

Now let's add the function CHAR(10) *to add a line break between each text*

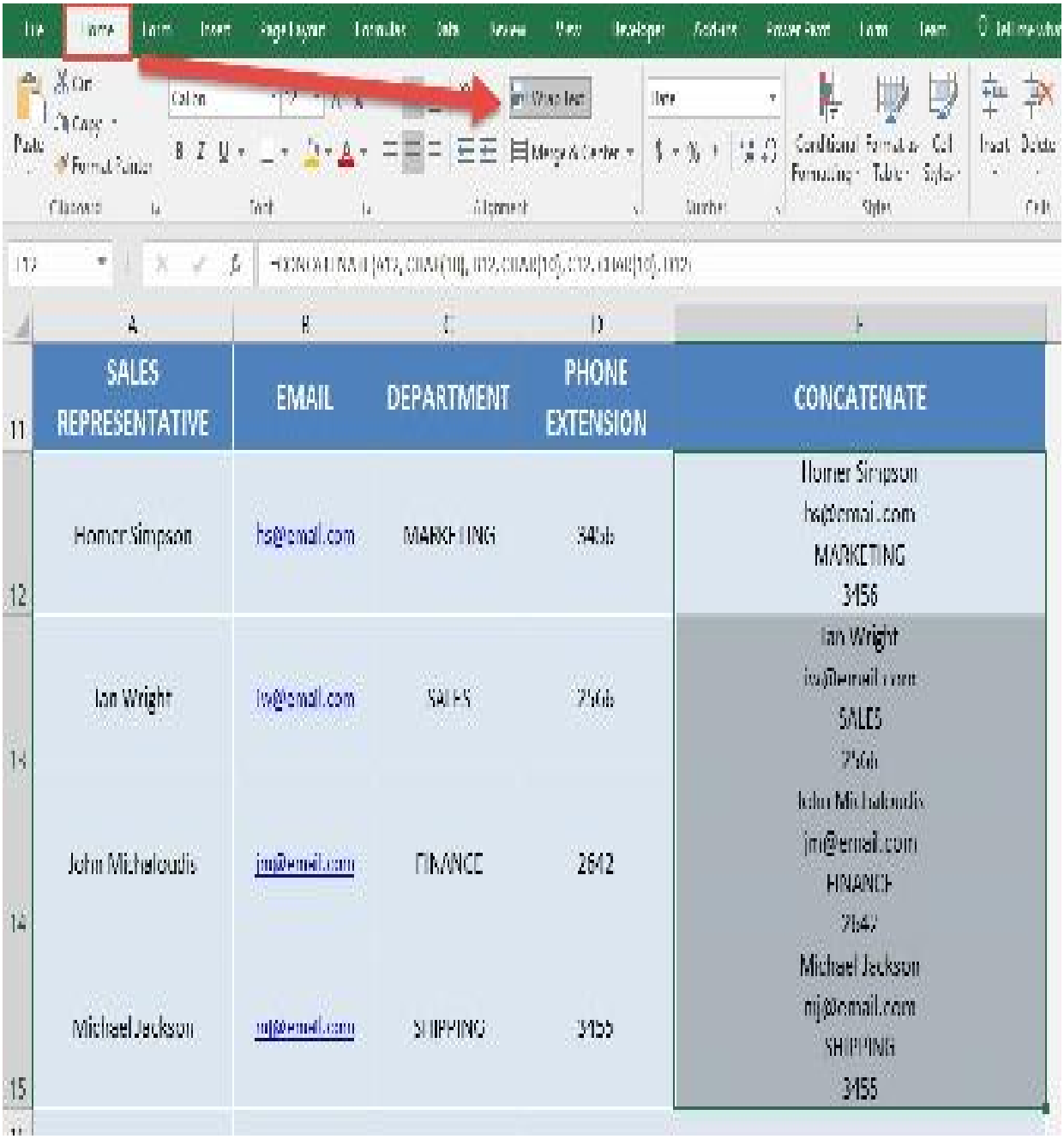
=CONCATENATE(A12, CHAR(10), B12, CHAR(10), C12, CHAR(10), D12)

	A	B	C	D	E
11	SALES REPRESENTATIVE	EMAIL	DEPARTMENT	PHONE EXTENSION	CONCATENATE
12	Homer Simpson	hs@email.com	MARKETING	3456	=CONCATENATE(A12,CHAR(10),B12,CHAR(10),C12,CHAR(10),D12)
13	Ian Wright	iw@email.com	SALES	2566	
14	John Michaloudis	jm@email.com	FINANCE	2612	
15	Michael Jackson	mj@email.com	SHIPPING	3455	
16					
17					
18					

Apply the same formula to the rest of the cells by dragging the lower right corner downwards.

	A	B	C	D	E
11	SALES REPRESENTATIVE	EMAIL	DEPARTMENT	PHONE EXTENSION	CONCATENATE
12	Homer Simpson	hs@email.com	MARKETING	3453	homer Simpsonhs@email.comMARKETING3453
13	Ian Wright	iw@email.com	SALES	2565	Ian Wrightiw@email.comSALES2565
14	John Michaloudis	jm@email.com	FINANCE	2147	John Michaloudisjm@email.comFINANCE2147
15	Michael Jackson	mj@email.com	SHIPPING	3155	Michael Jacksonmj@email.comSHIPPING3155
16					
17					
18					
19					

STEP 3: Go to *Home* > *Alignment* > *Wrap Text* to show the text in multiple lines and you now have all of results!



SALES REPRESENTATIVE	EMAIL	DEPARTMENT	PHONE EXTENSION	CONCATENATE
Homer Simpson	hs@email.com	MARKETING	3456	Homer Simpson hs@email.com MARKETING 3456
Ian Wright	iw@email.com	SALES	2566	Ian Wright iw@email.com SALES 2566
John Michaloudis	jm@email.com	FINANCE	2642	John Michaloudis jm@email.com FINANCE 2642
Michael Jackson	mj@email.com	SHIPPING	3455	Michael Jackson mj@email.com SHIPPING 3455

EXACT

What does it do?

Compares two texts, in a case-sensitive manner, to see if they are the same

Formula breakdown:

=EXACT(text1, text2)

What it means:

=EXACT(first text to be compared, second text to be compared)

Example:

=EXACT("EXCEL","ExCEL") =FALSE

Exercise Workbook:

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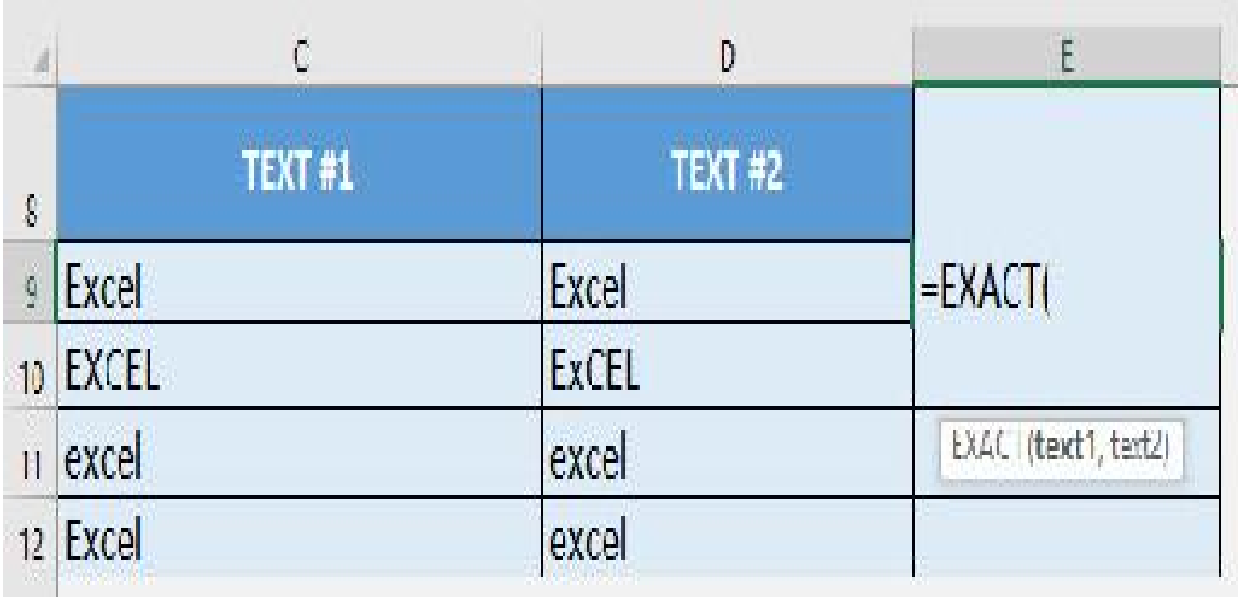
We can easily compare two texts if they are equal or not with the **EXACT formula.**

But I can hear you say now, hold on, I can easily do that with the equal (sign) operator! The difference is, equal compares text and does not consider case sensitivity. However the **EXACT formula** compares text in a **case-sensitive manner**.

I explain how you can do this below:

STEP 1: We need to **enter the *EXACT* function in a blank cell**:

=EXACT(



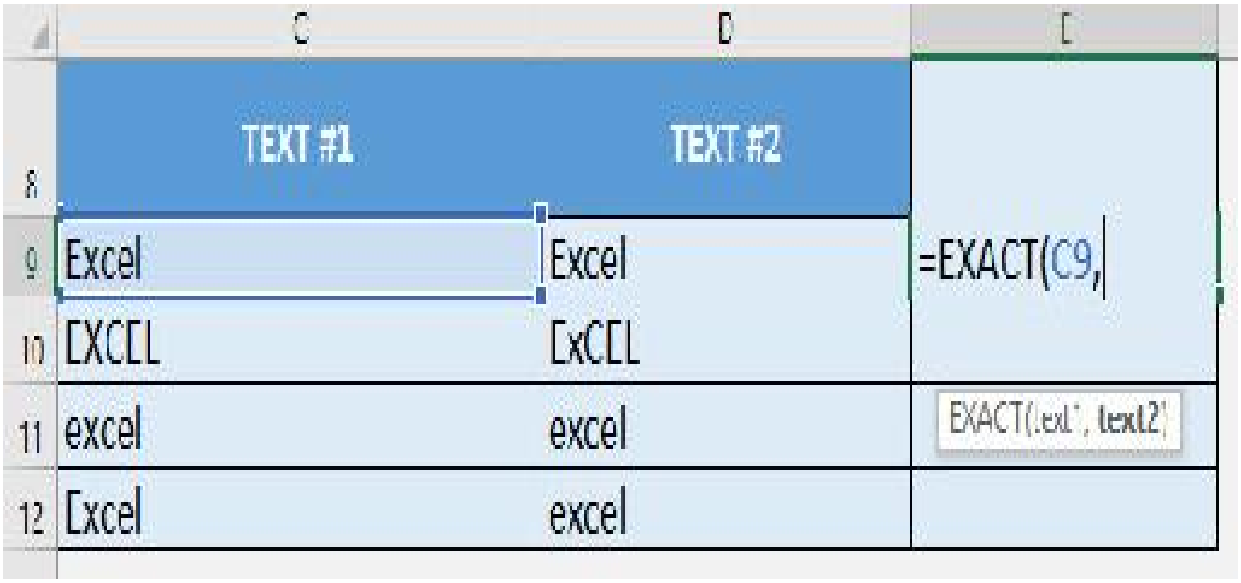
STEP 2: The **EXACT** arguments:

text1

What is the first text to be compared?

Select the cell containing leftmost text that you want to compare:

=EXACT(C9,

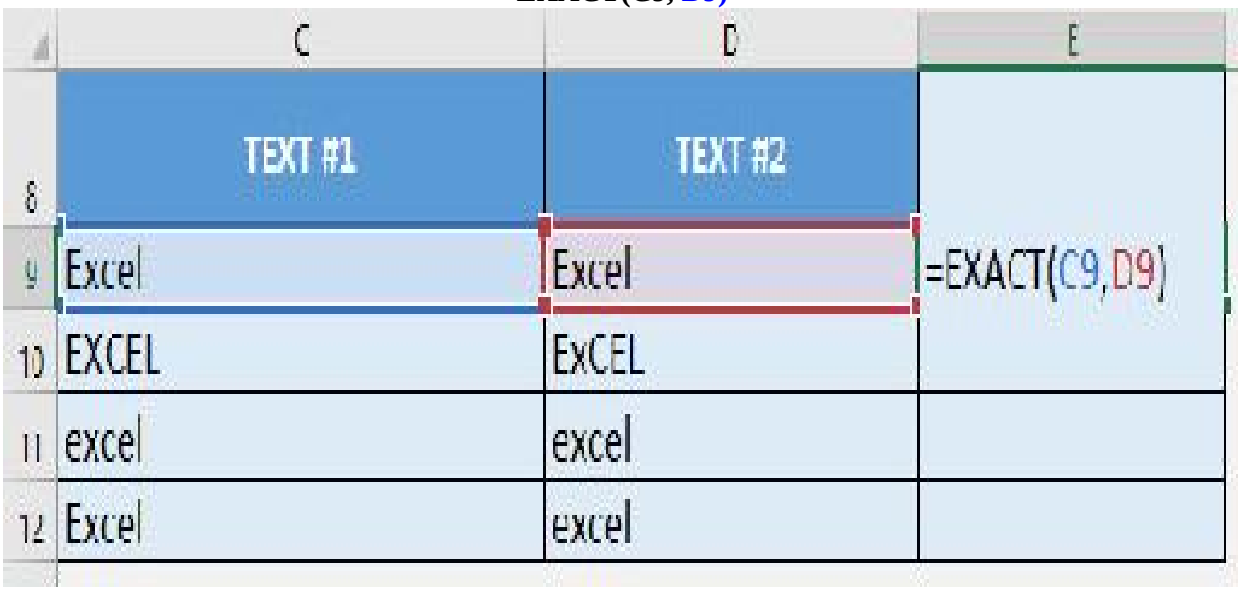


text2

What is the second text to be compared?

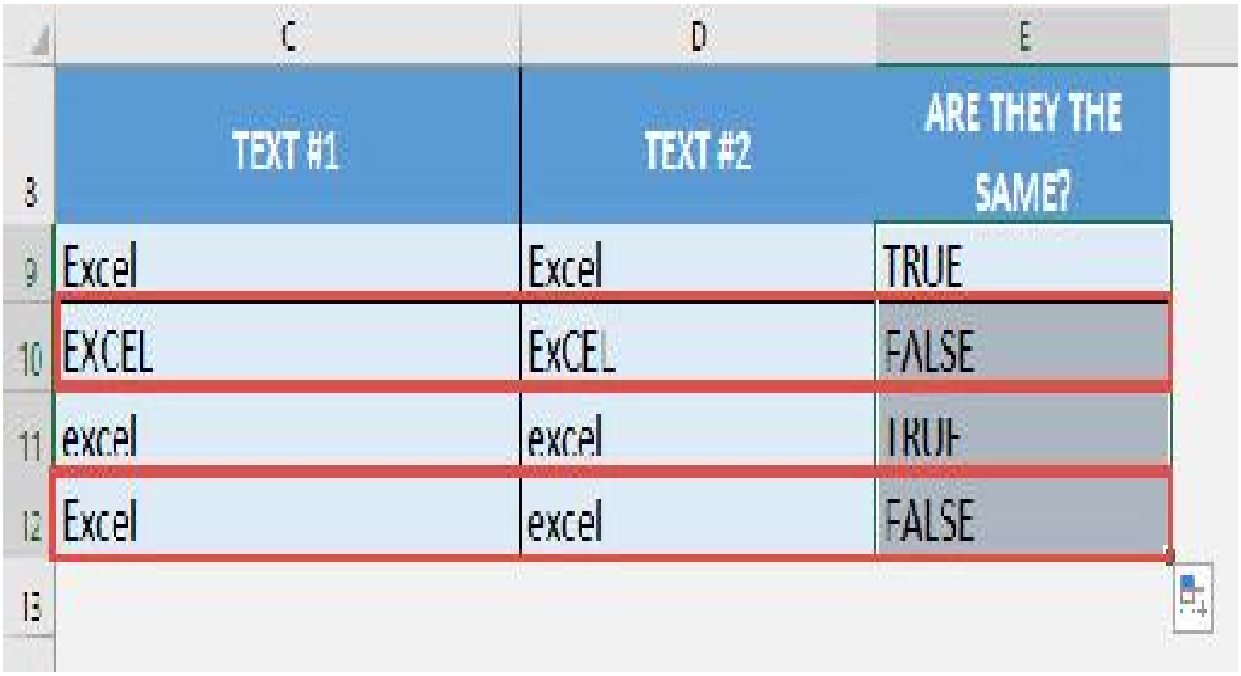
Select the cell containing rightmost text that you want to compare:

=EXACT(C9, D9)



Apply the same formula to the rest of the cells by dragging the lower right corner downwards.

You can see that the Excel values that have different capital letters have a **FALSE** result! (e.g. EXCEL vs. ExCEL)



	C	D	E
8	TEXT #1	TEXT #2	ARE THEY THE SAME?
9	Excel	Excel	TRUE
10	EXCEL	ExCEL	FALSE
11	excel	excel	TRUE
12	Excel	excel	FALSE
13			

FIND

What does it do?

Gets the position of a specific text within another text

Formula breakdown:

=FIND(find_text, within_text, [start_num])

What it means:

=FIND(text to be searched, the source text, [starting position of the source text])

Example:

=FIND("x","Excel",1) =2

Exercise Workbook:

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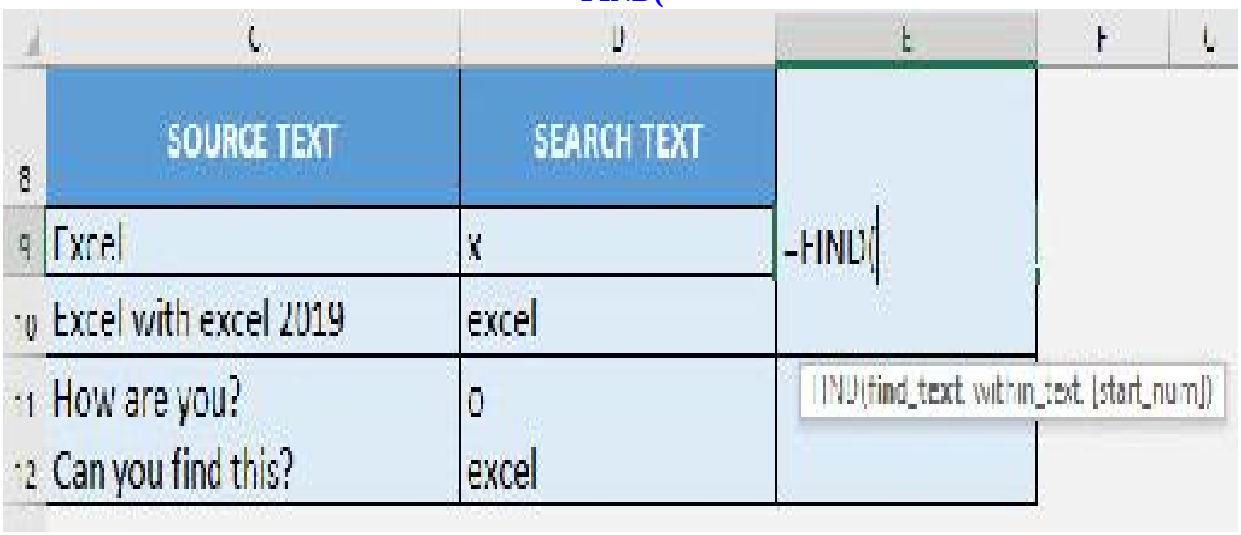
If you want to check where a specific text is located in the source text, it is very easy to search for the position using the **FIND Formula**!

You need to take note that the **FIND Formula** is **case-sensitive** when searching for your text! And it always matches the **first occurrence**. We will see in our examples below!

I explain how you can do this below:

STEP 1: We need to **enter the *FIND* function in a blank cell**:

=FIND(



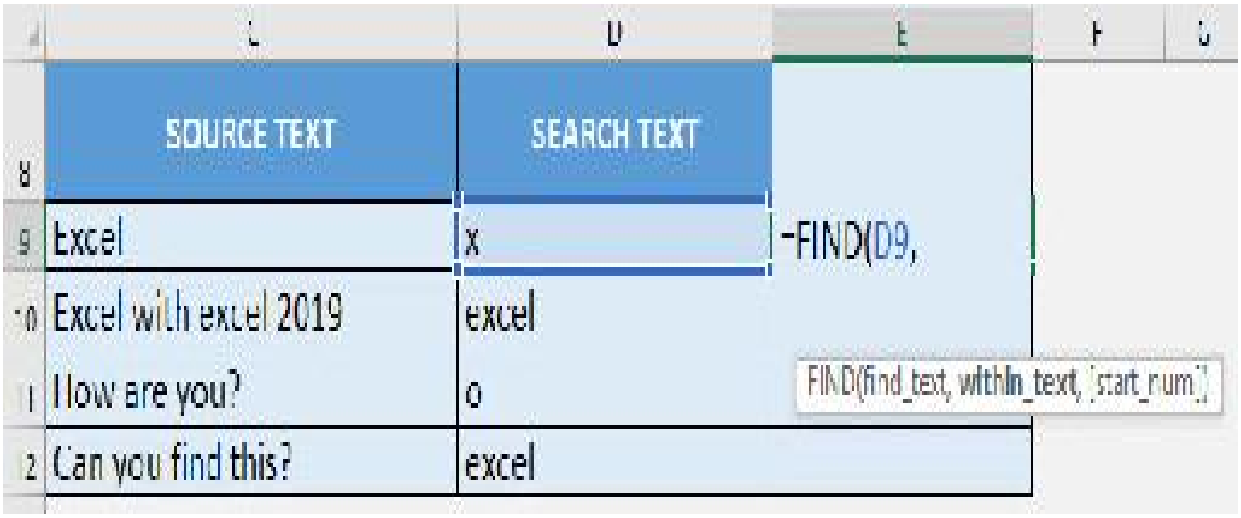
STEP 2: The **FIND** arguments:

find_text

What is the text to be searched for?

Select the cell containing the text to be searched for. In our first example, we want to search for 'x' in the word 'Excel':

=FIND(D9,

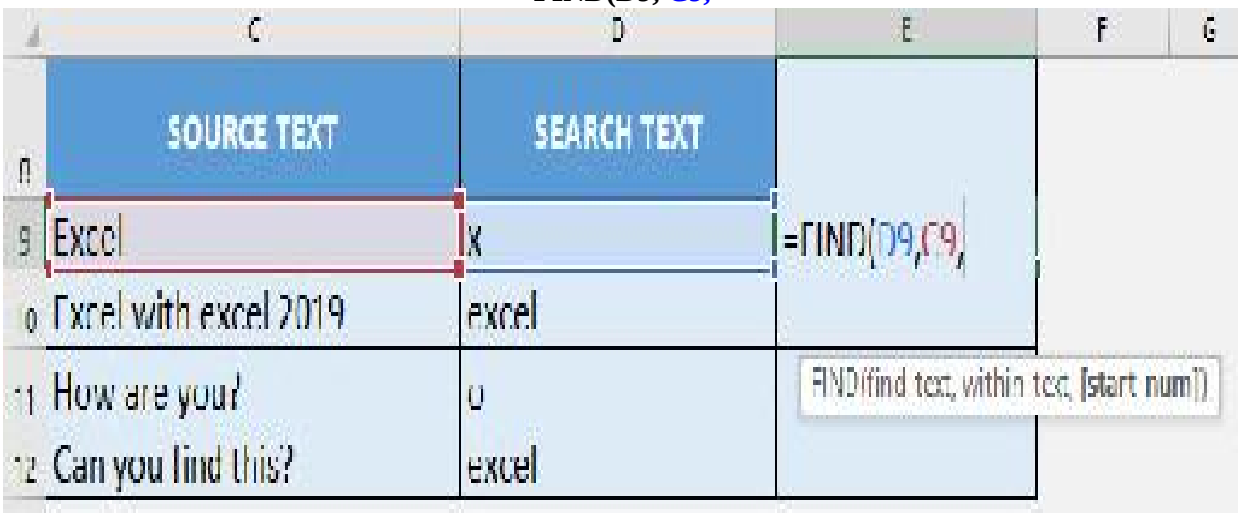


within_text

What is your source text?

Select the cell source text. So let's select 'Excel' as our source text:

=FIND(D9, C9,

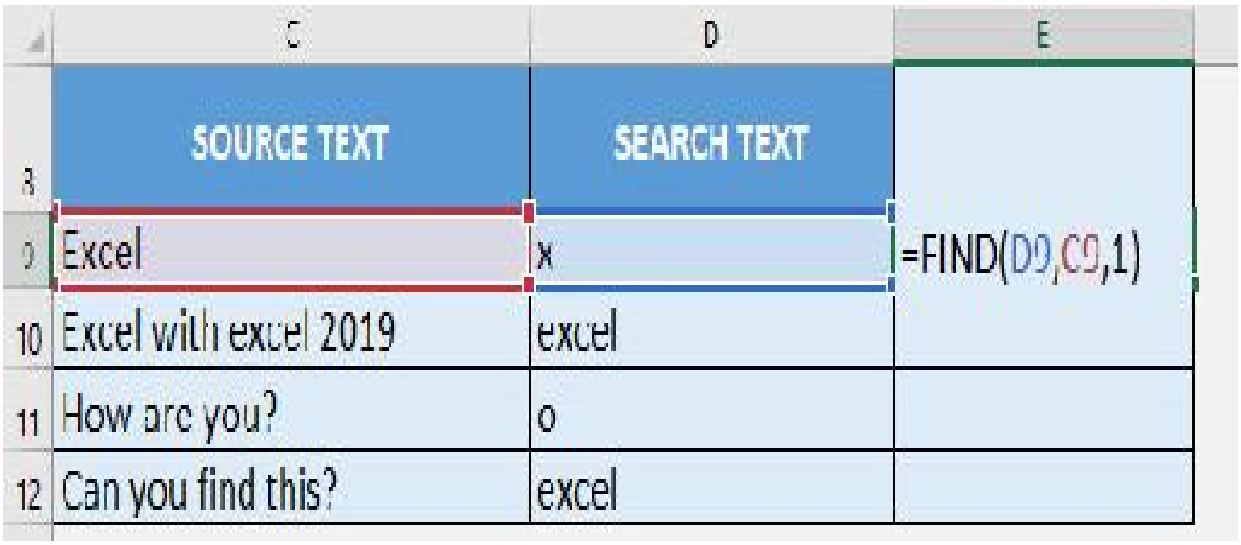


start_num

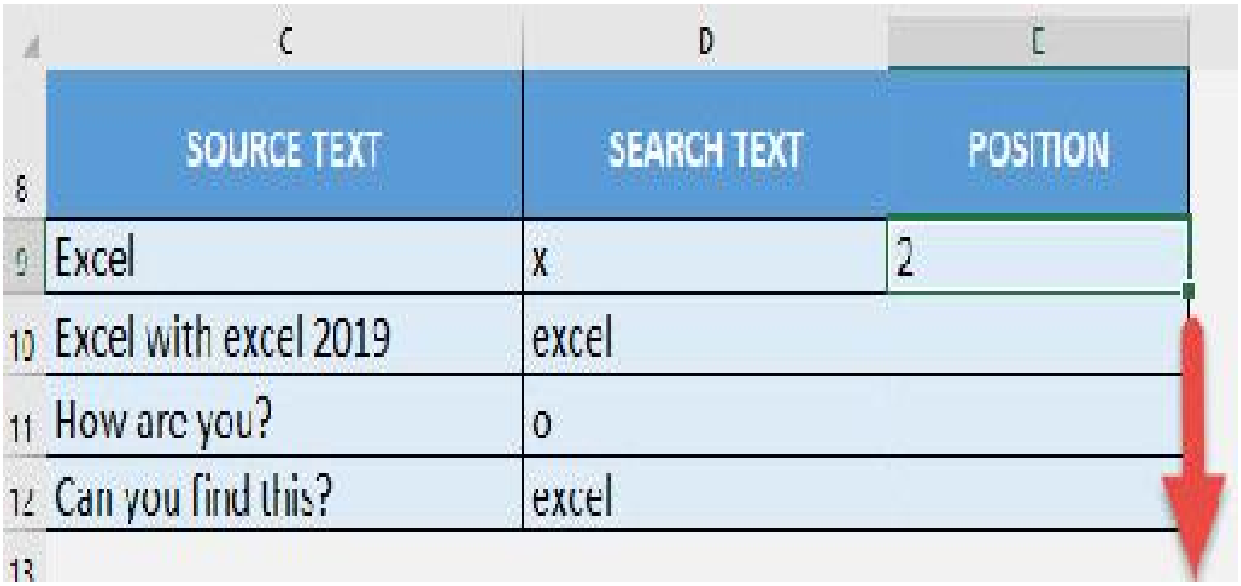
Where do you want to start searching in your source text?

You can leave this blank, it will default to 1 which means it will start looking from the first character of your source text. In our case, let us put in 1 to start searching from there:

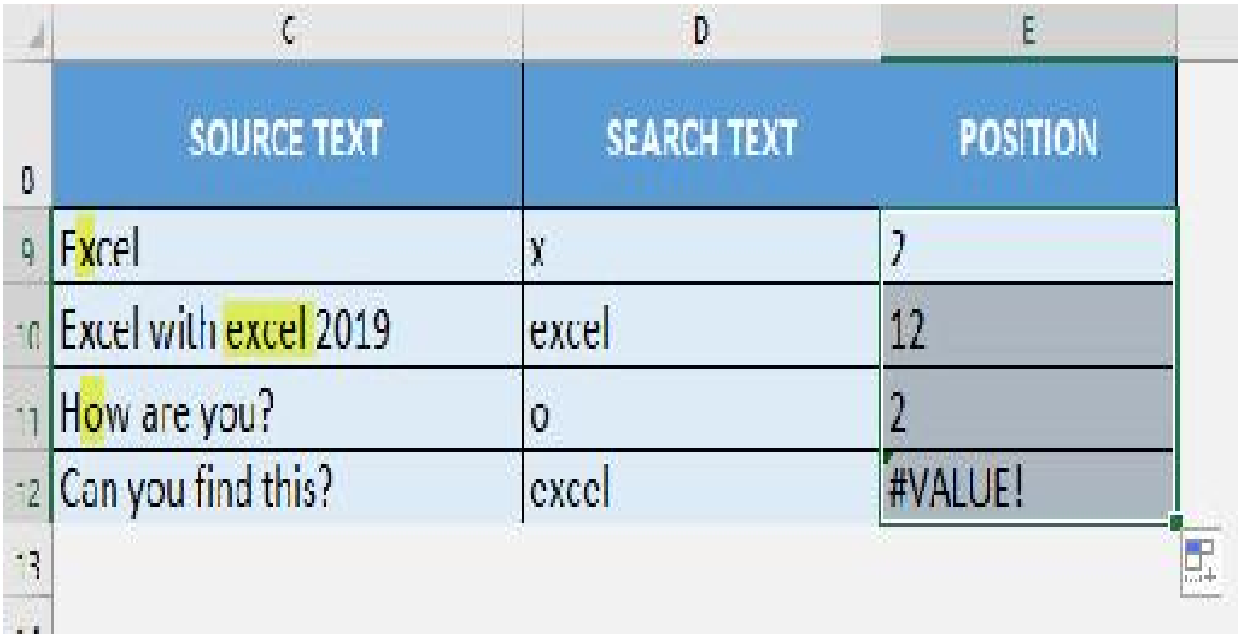
=FIND(D9, C9, 1)



Apply the same formula to the rest of the cells by dragging the lower right corner downwards.



You can see that the matching is **case sensitive**! And if it's unable to find your text, it will return **#VALUE.**



	C	D	E
0	SOURCE TEXT	SEARCH TEXT	POSITION
9	Fxcel	x	2
10	Excel with excel 2019	excel	12
11	How are you?	o	2
12	Can you find this?	cxcel	#VALUE!
13			

LEFT

What does it do?

It returns the first character or characters in a text string, based on the number of characters you specify.

Formula breakdown:

=LEFT(text, [num_chars])

What it means:

=LEFT(look in this cell, extract X characters)

Example:

=LEFT("19281013-2",8) = 19281013

Exercise Workbook:

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There are times when you will need to extract the first few characters of text within a cell, e.g. From a serial number, part number, name, phone number etc.

The **LEFT** formula in Excel can help you parse and extract the needed text easily.

In our example below, we have a Part # which has 10 characters and we want to extract all the characters before the hyphen "-".

STEP 1: We need to **enter the *LEFT* function** next to the cell that we want to extract the data from:

=LEFT(

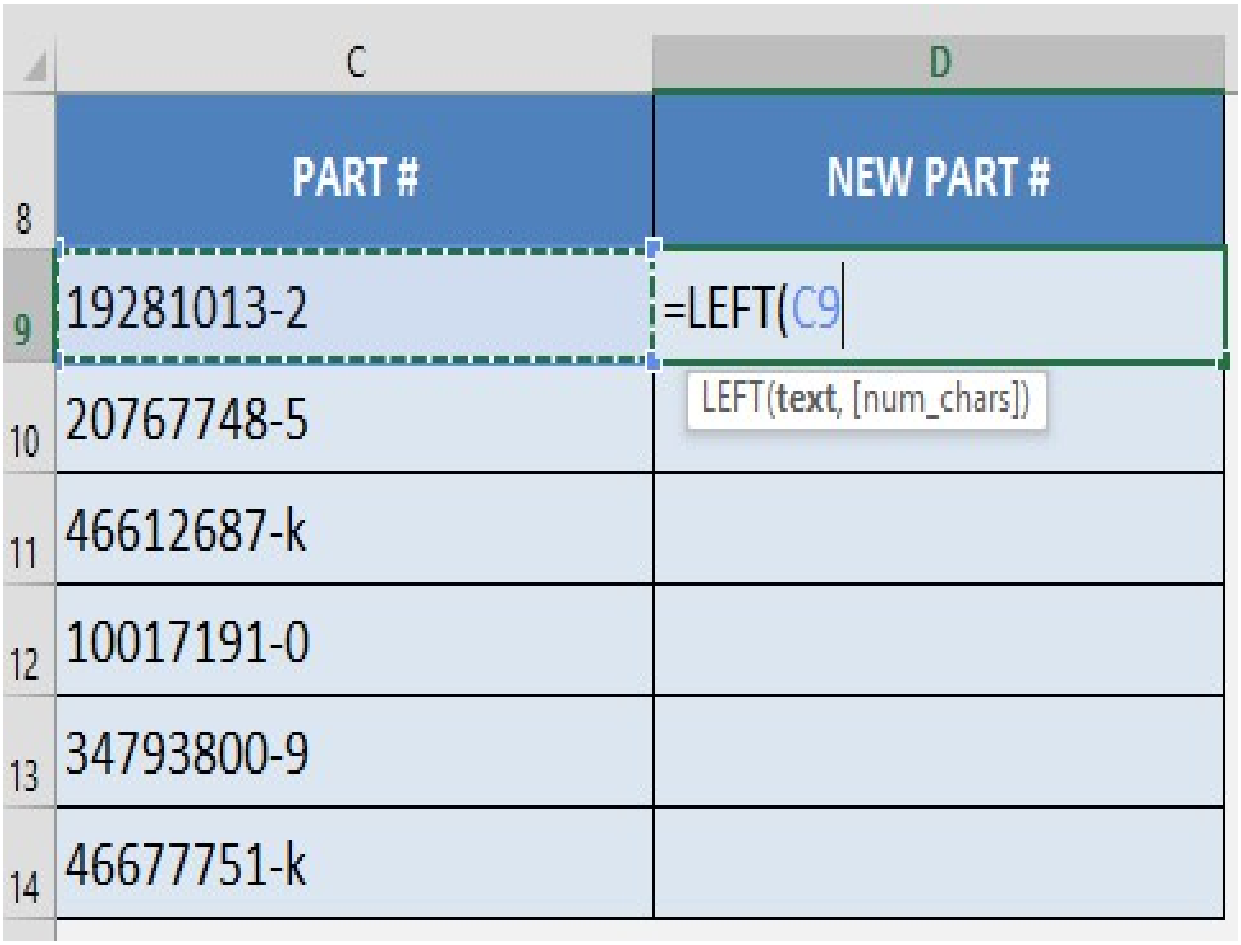
STEP 2: The **LEFT** arguments:

text

Which text do we want to extract the first X characters from?

Reference the cell that contains the text or value:

=LEFT(C9

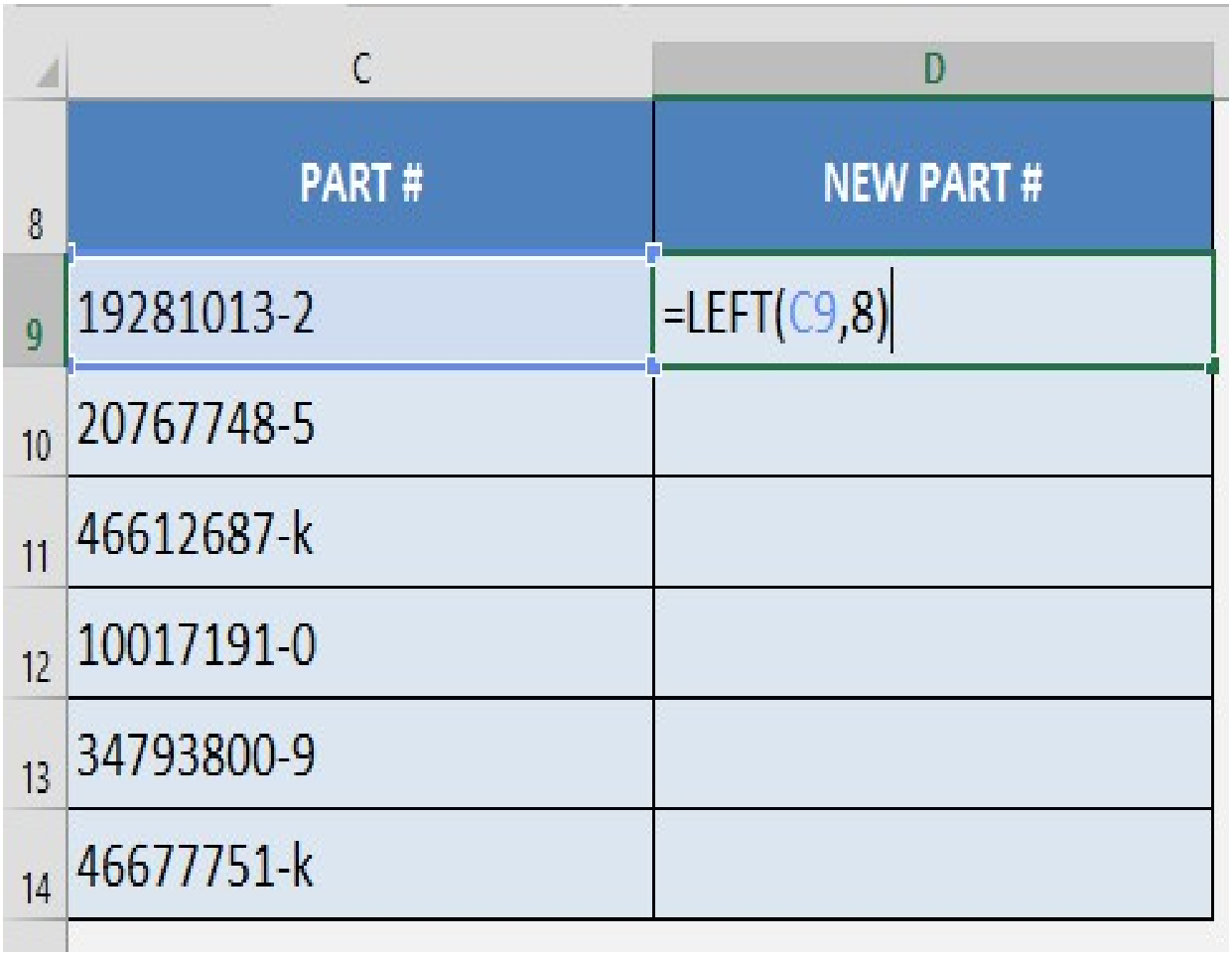


[num_chars]

How many characters do we want to extract from cell C9?

Enter a positive number only:

=LEFT(C9, 8)



	C	D
8	PART #	NEW PART #
9	19281013-2	=LEFT(C9,8)
10	20767748-5	
11	46612687-k	
12	10017191-0	
13	34793800-9	
14	46677751-k	

STEP 3: Do the same for the rest of the cells by dragging the **LEFT** formula all the way down using the left mouse button.

Notice all of the first 8 characters in each text are now extracted:

PART #	NEW PART #
19281013-2	19281013
20767748-5	20767748
46612687-k	46612687
10017191-0	10017191
34793800-9	34793800
46677751-k	46677751

LEN

What does it do?

Gives you the number of characters in a text string

Formula breakdown:

=LEN(text)

What it means:

=LEN(text that you want to get the number of characters from)

Example:

=LEN("John Michaloudis") =16

Exercise Workbook:

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There are times when you need to get the number of characters within a cell in Excel. Thankfully this is very easy to do with Excel's **LEN (Length) formula!**

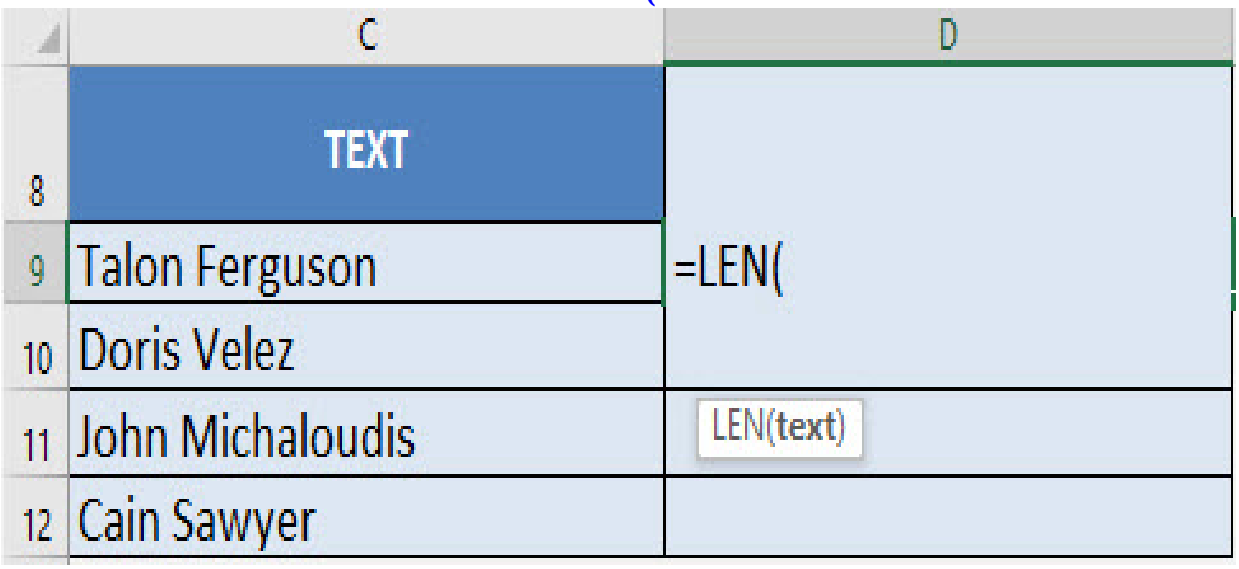
You can use the LEN function in Excel to **count all characters** in a cell, including letters, numbers, special characters, and all spaces.

The LEN function can be used as a data cleansing technique to find leading or trailing spaces or can be nested with other TEXT functions.

I explain how you can do this below:

STEP 1: We need to **enter the LEN function** next to the cell that we want to get the number of characters from:

=LEN(



STEP 2: The **LEN** arguments:

text

Which text do we want to get the number of characters from?

Reference the cell that contains the text string:

=LEN(C9)

	C	D
8	TEXT	
9	Talon Ferguson	=LEN(C9)
10	Doris Velez	
11	John Michaloudis	
12	Cain Sawyer	

STEP 3: Do the same for the rest of the cells by dragging the **LEN** formula all the way down using the left mouse button.

Note that you are able to get the number of characters for each name. My name has 16 characters (including the space)!

	C	D
8	TEXT	NUMBER OF CHARACTERS
9	Talon Ferguson	14
10	Doris Velez	11
11	John Michaloudis	16
12	Cain Sawyer	11
13		

LOWER

What does it do?

Converts all characters in the text string into lowercase

Formula breakdown:

=LOWER(text)

What it means:

=LOWER(text to be converted to lower case)

Example:

=LOWER("EXCEL ROCKS!") = "excel rocks!"

Exercise Workbook:

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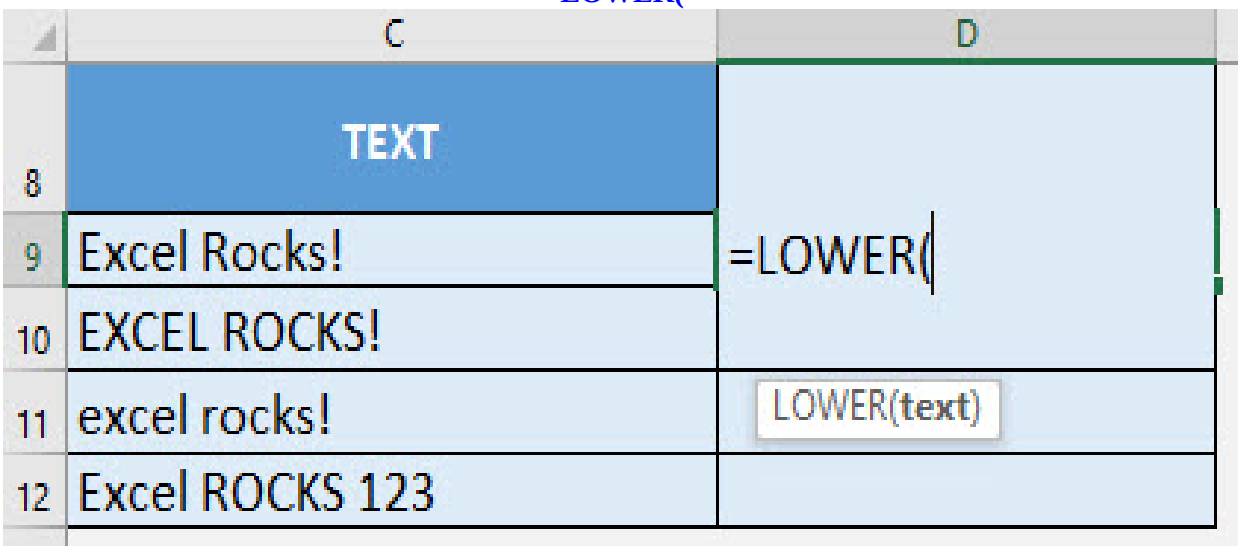
We can easily change text into a lower case using the **LOWER formula** in Excel. It does not convert symbols and numbers though, which we will see in the examples.

If you want to get rid of uneven capitalization throughout the text, then this formula is perfect for you!

STEP 1: We need to **enter the *LOWER* function in a blank cell**:

=LOWER(



STEP 2: The **LOWER** arguments:

text

What is the text to be converted to lower case?

Select the cell containing the text that you want to convert:

=LOWER(C9)

	C	D
8	TEXT	
9	Excel Rocks!	=LOWER(C9)
10	EXCEL ROCKS!	
11	excel rocks!	
12	Excel ROCKS 123	

Apply the same formula to the rest of the cells by dragging the lower right corner downwards.

	C	D
8	TEXT	RESULT
9	Excel Rocks!	excel rocks!
10	EXCEL ROCKS!	
11	excel rocks!	
12	Excel ROCKS 123	

You can see that the values are all now in lower case!

	C	D
8	TEXT	RESULT
9	Excel Rocks!	excel rocks!
10	EXCEL ROCKS!	excel rocks!
11	excel rocks!	excel rocks!
12	Excel ROCKS 123	excel rocks 123
13		
14		

MID

What does it do?

Extracts a specific number of characters from the middle of a text

Formula breakdown:

=MID(text, start_num, num_chars)

What it means:

=MID(source text, starting position to extract text, number of characters to extract)

Example:

=MID("How are you?", 5, 3) ="are"

Exercise Workbook:

DOWNLOAD EXCEL WORKBOOK

Ever wanted to get something in the middle of your text? And you're doing it by hand? It is very easy to do this in Excel with the **MID Formula!**

It allows you to extract any number of characters from the middle of your text!

STEP 1: We need to **enter the *MID* function in a blank cell**:

=MID(

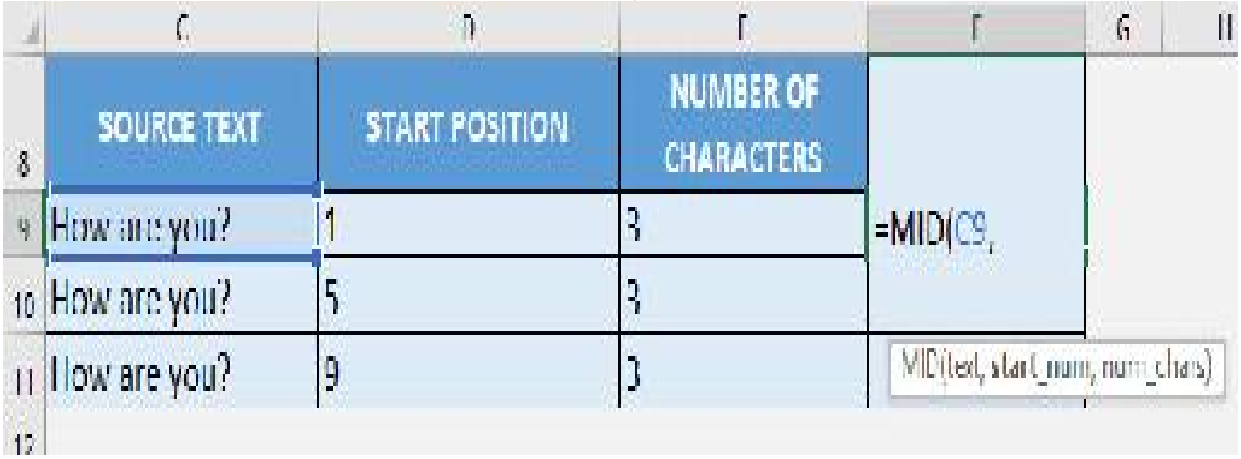
STEP 2: The **MID** arguments:

text

What is the source text?

Select the cell containing the source text that you want to extract from:

=MID(C9,

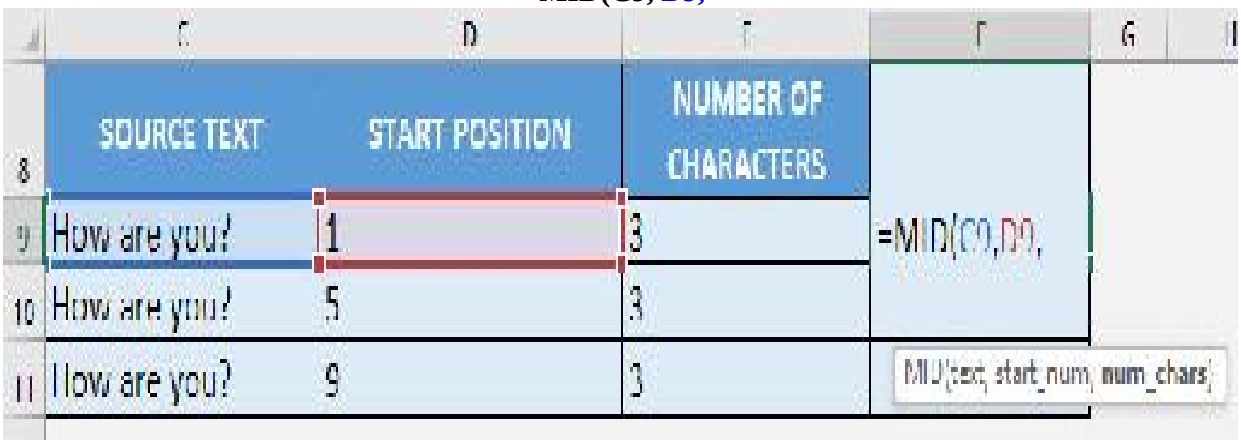


start_num

What position will we start extracting the text from?

Select the cell containing our starting position. This is where the MID formula will start extracting the text from:

=MID(C9, D9,

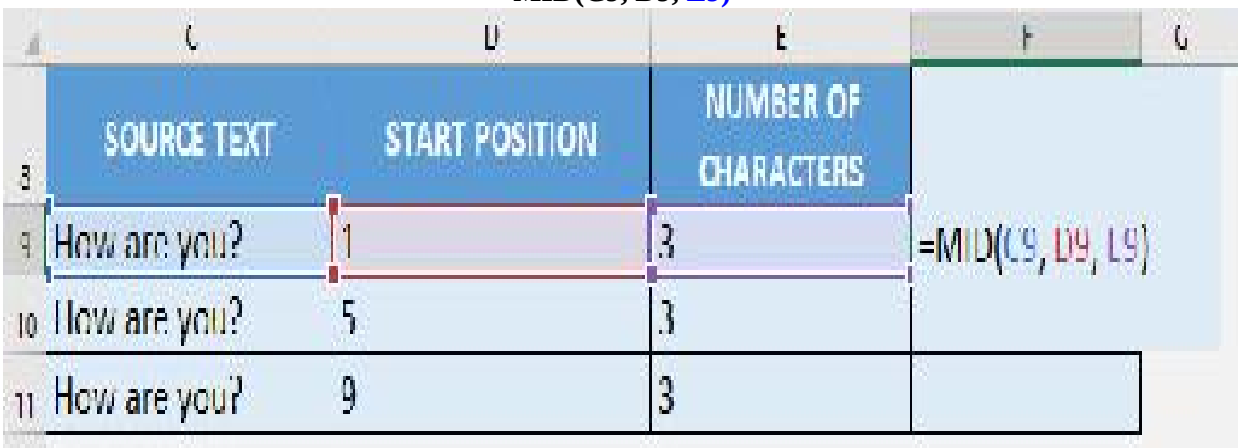


num_chars

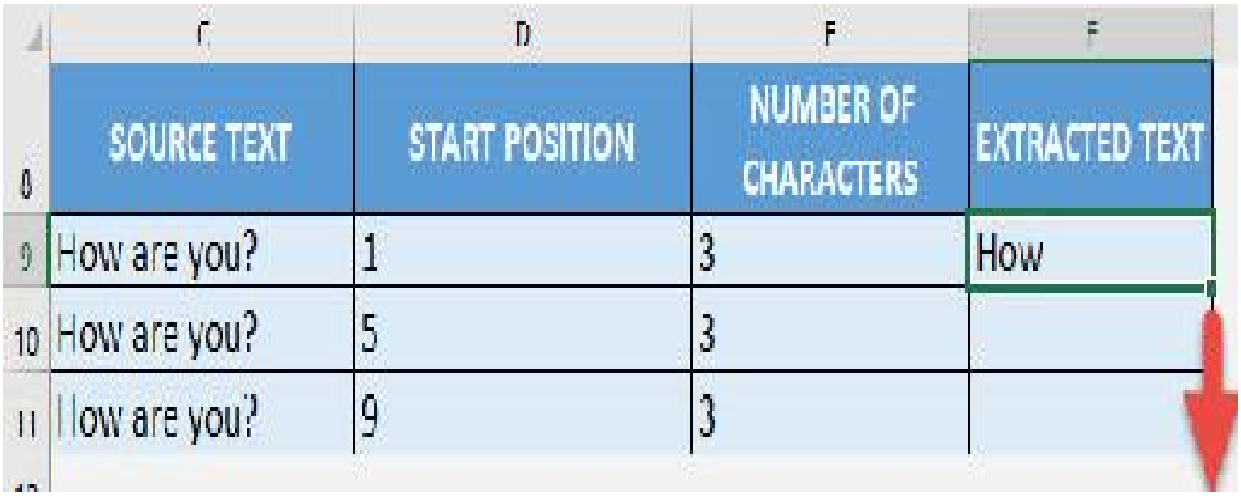
How many characters do we want to extract?

Select the cell containing the number of characters. In our case, we want to extract 3 characters:

=MID(C9, D9, E9)

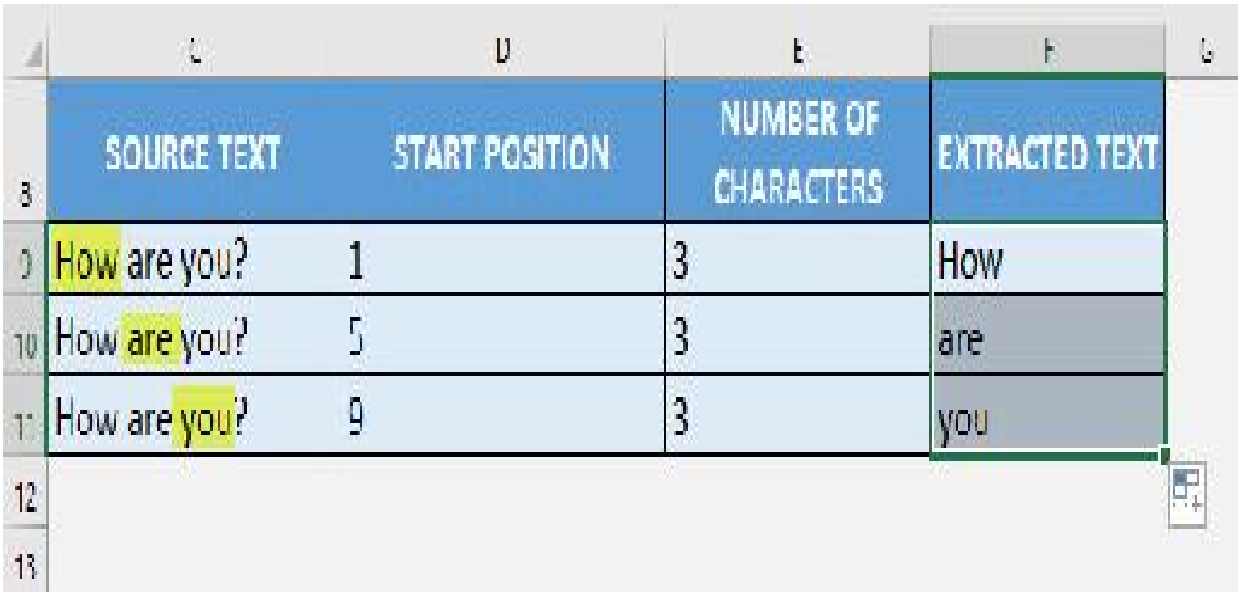


Apply the same formula to the rest of the cells by dragging the lower right corner downwards.



	C	D	F	F
8	SOURCE TEXT	START POSITION	NUMBER OF CHARACTERS	EXTRACTED TEXT
9	How are you?	1	3	How
10	How are you?	5	3	
11	How are you?	9	3	

You now have your extracted text! In our scenario, we tried to extract the different words in the phrase "How are you?"



	C	D	E	F	G
8	SOURCE TEXT	START POSITION	NUMBER OF CHARACTERS	EXTRACTED TEXT	
9	How are you?	1	3	How	
10	How are you?	5	3	are	
11	How are you?	9	3	you	
12					
13					

PROPER

What does it do?

Capitalizes the first letter in a text string and any other letters in the text that follow a space. Converts all other letters to lowercase letters.

Formula breakdown:

=PROPER(text)

What it means:

=PROPER(this text cell)

Example:

=PROPER("STUART POWELL") ="Stuart Powell"

Exercise Workbook:

DOWNLOAD EXCEL WORKBOOK

There are times when you will need to only CAPITALIZE the first letter in each word. The most common scenario would be when you receive data with employee names, countries or cities that are all in lower or uppercase.

The **PROPER** formula in Excel can help you format the text very very easily...goodbye manual adjustments!

In our example below, we have a list of names in capital letters. However we want to show the capital letters only on the first letter of each word.

STEP 1: We need to **enter the *PROPER* function** next to the cell that we want to clean the data from:

=PROPER

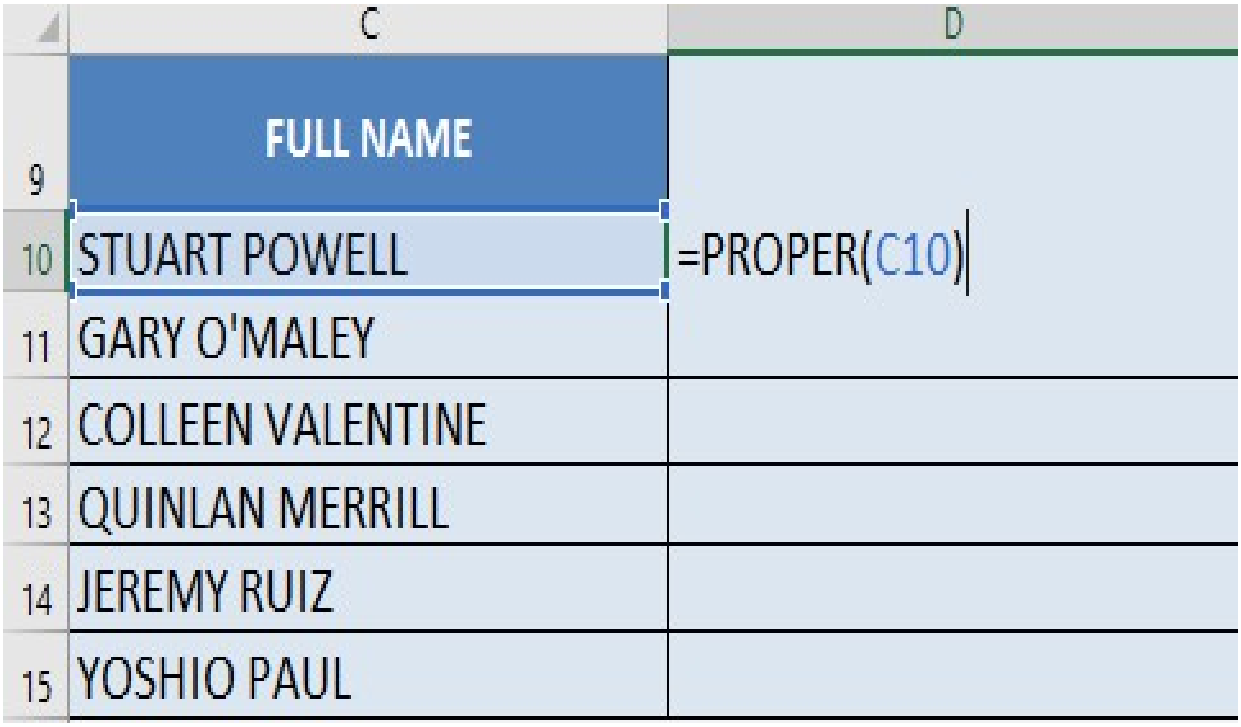
STEP 2: The **PROPER** arguments:

text

Which text do we want to change?

Reference the cell that contains the text string:

=PROPER(C10)



STEP 3: Do the same for the rest of the cells by dragging the **PROPER** formula all the way down using the left mouse button.

Note that all of the names are now properly formatted:

	C	D
9	FULL NAME	PROPER NAME
10	STUART POWELL	Stuart Powell
11	GARY O'MALEY	Gary O'Maley
12	COLLEEN VALENTINE	Colleen Valentine
13	QUINLAN MERRILL	Quinlan Merrill
14	JEREMY RUIZ	Jeremy Ruiz
15	YOSHIO PAUL	Yoshio Paul

REPLACE

What does it do?

Replaces part of a text string (based on the number of characters you specify) with a different text string

Formula breakdown:

=REPLACE(old_text, start_num, num_chars, new_text)

What it means:

=REPLACE(this cell, starting from this number, all the way to this number, with this new text)

Example:

=REPLACE("+1-817-0000000", 1, FIND("-","+1-817-0000000"), "")

="817-0000000"

Exercise Workbook:

DOWNLOAD EXCEL WORKBOOK

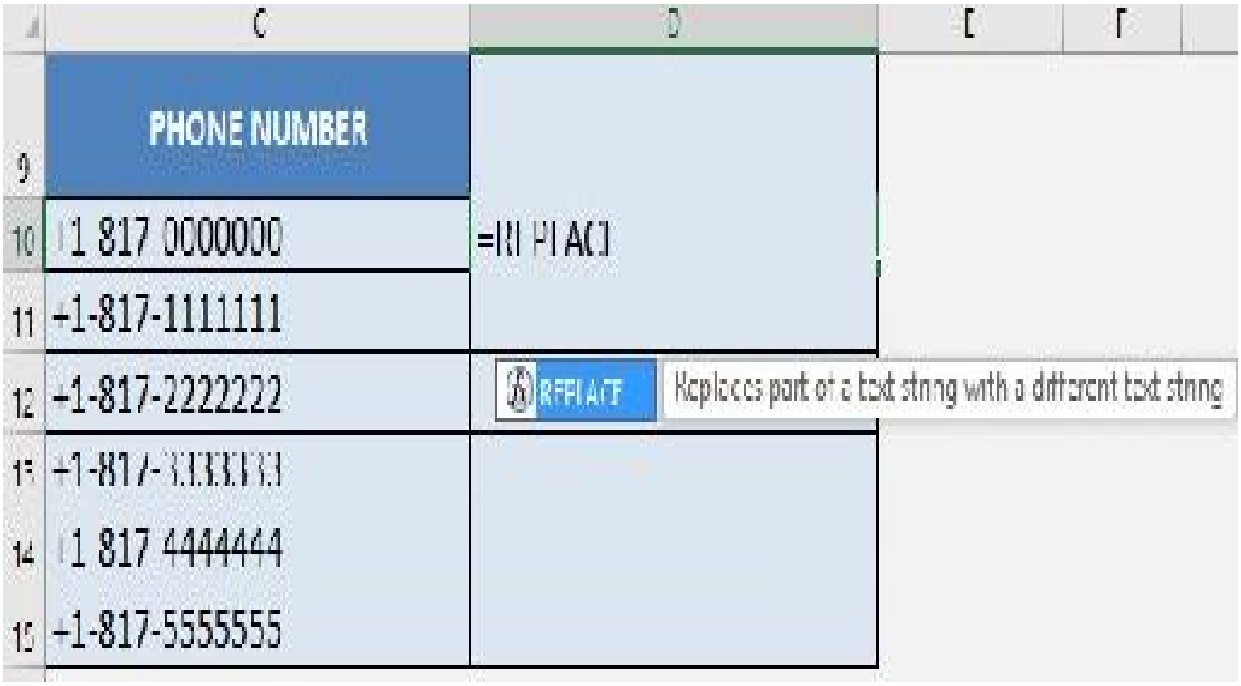
Once I was given a list of phone numbers in their international format. But for my needs, I did not want to include the country code and I just wanted the phone number.

I was looking for a quick way to remove the country code.

I discovered a cool way to do this using the **REPLACE** formula! Goodbye to manual adjustments!

STEP 1: We need to **enter the *Replace* function** next to the cell that we want to clean the data from:

=REPLACE



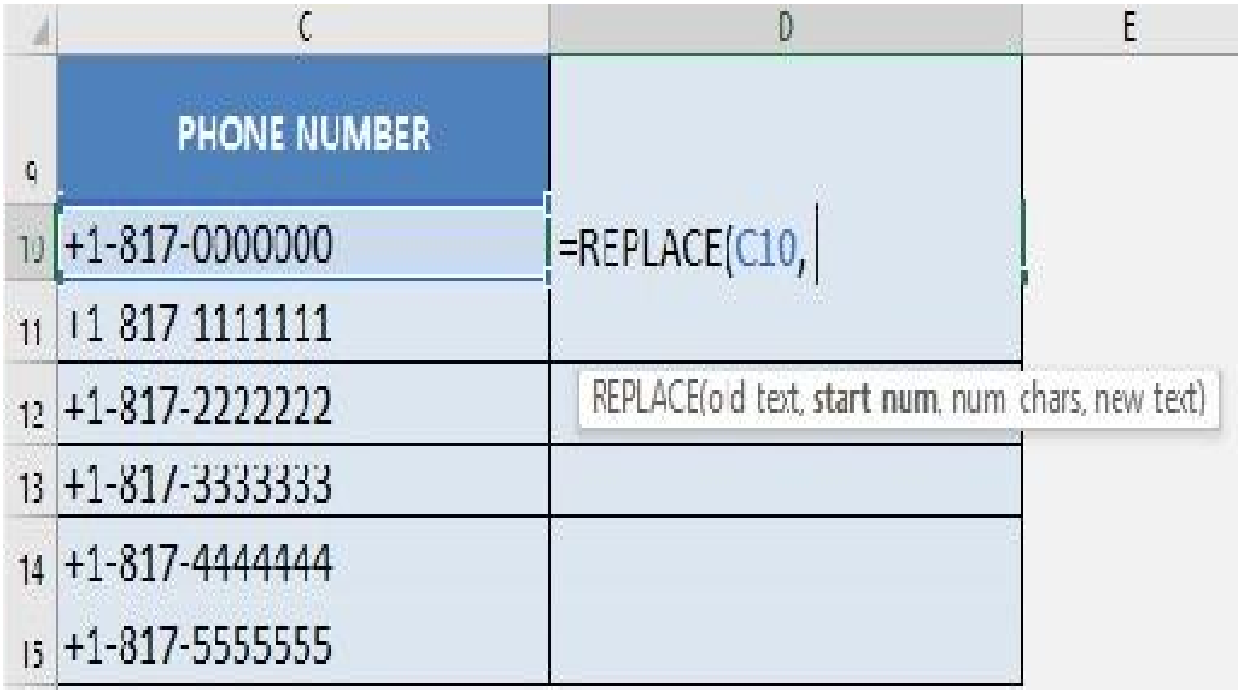
STEP 2: The Replace arguments:

old_text

Which text do we want to change?

Reference the cell that contains the text string:

=REPLACE(C10,

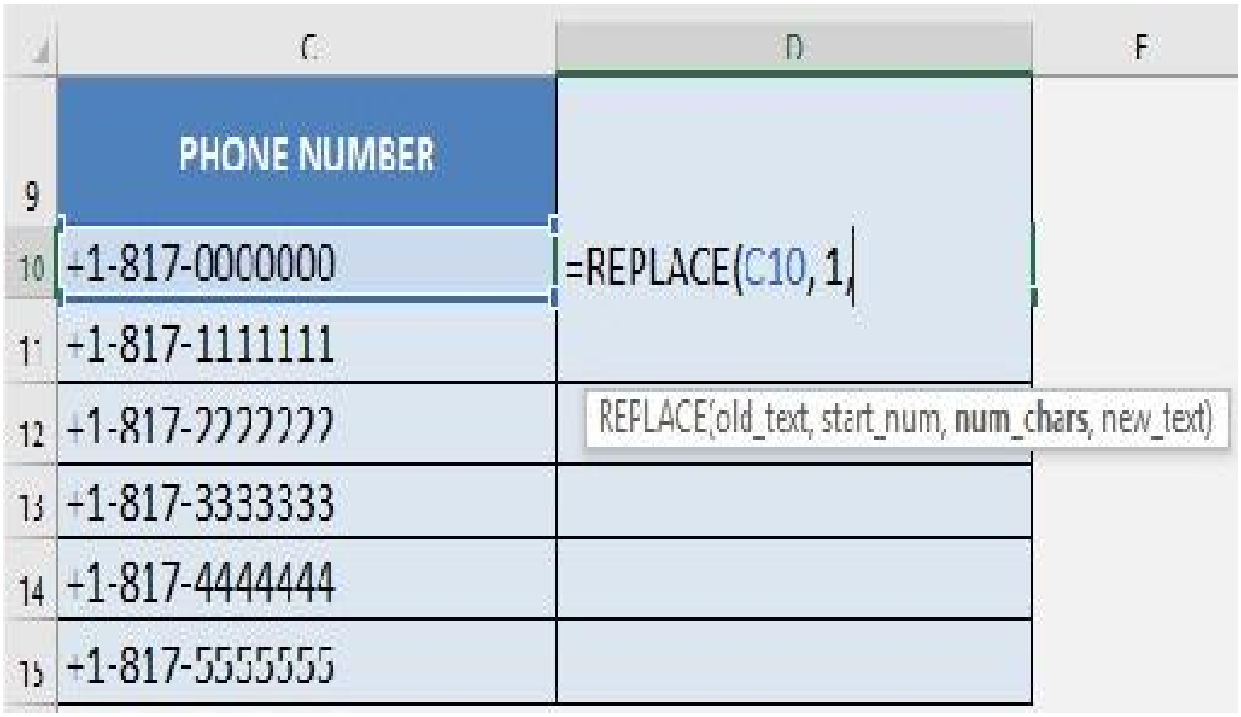


start_num

Which character do we want to start the replacement from?

We want to remove the country code, so it starts from the first character.

=REPLACE(C10, 1,



num_chars

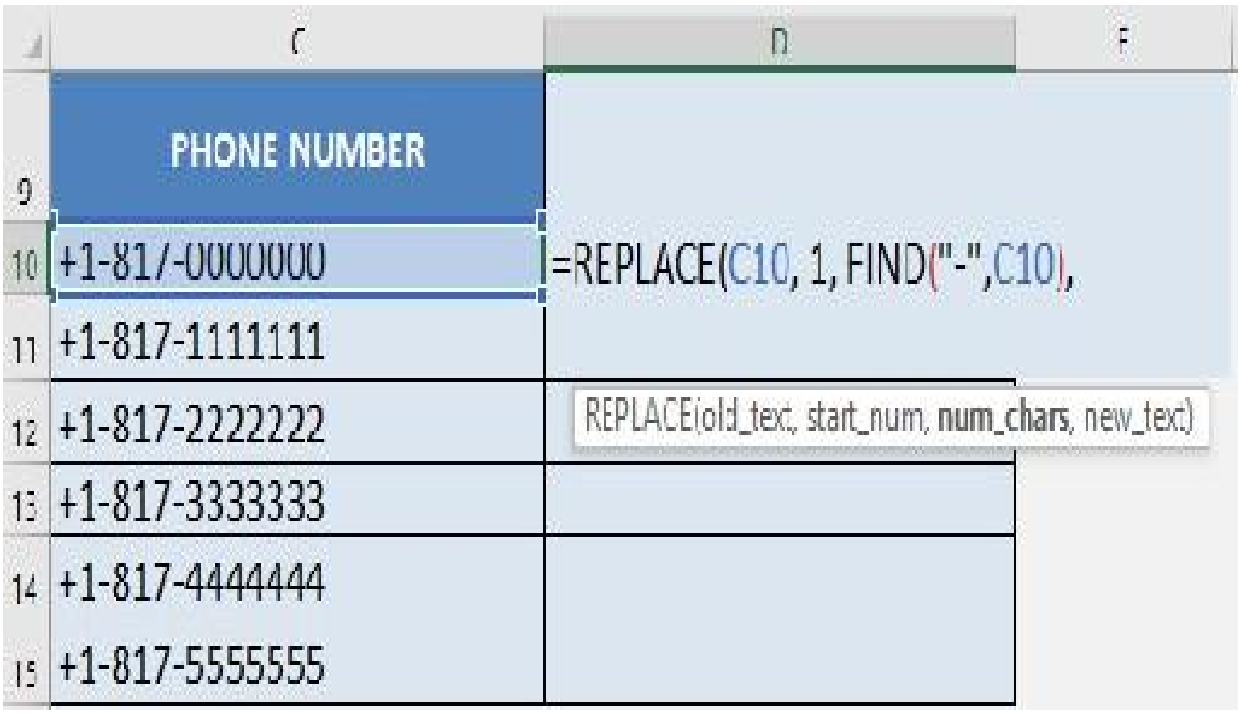
How many characters do we want to replace?

We want to remove all characters up to and including the first hyphen.

We will use the ***FIND*** formula.

FIND("-", C10) will get the location of the first hyphen i.e. The 3rd place

=REPLACE(C10, 1, FIND("-", C10),

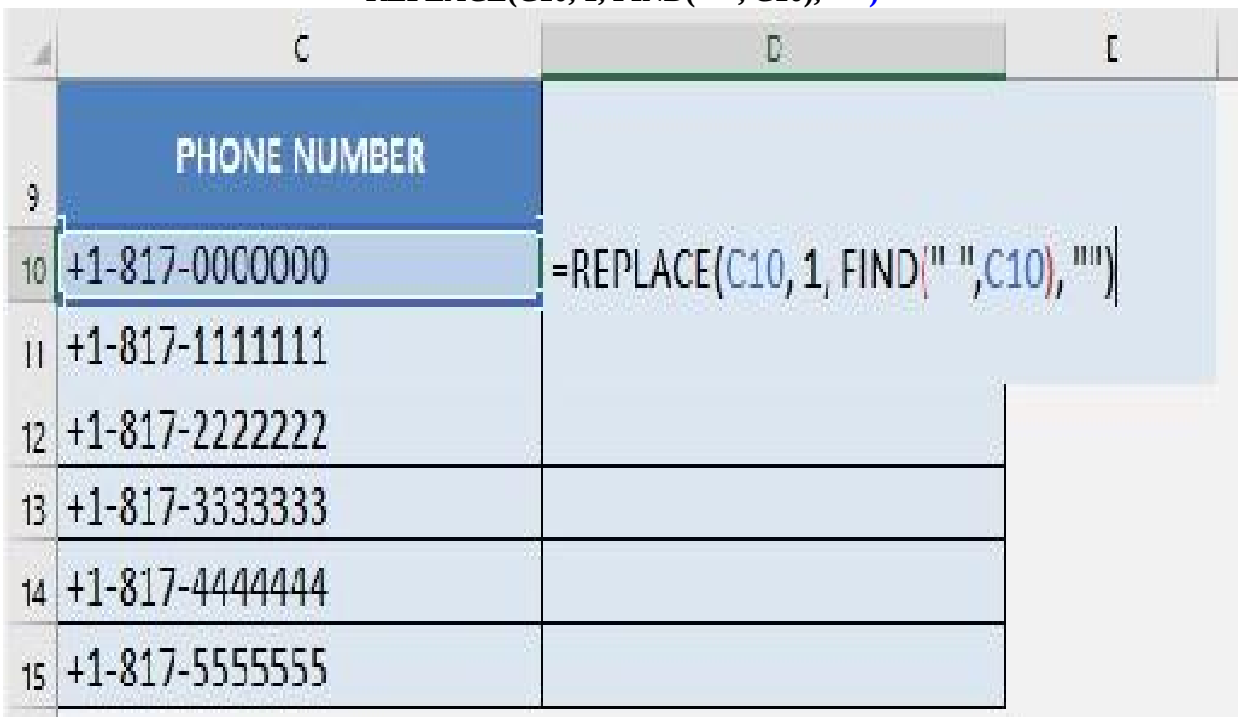


new_text

What text will serve as the replacement?

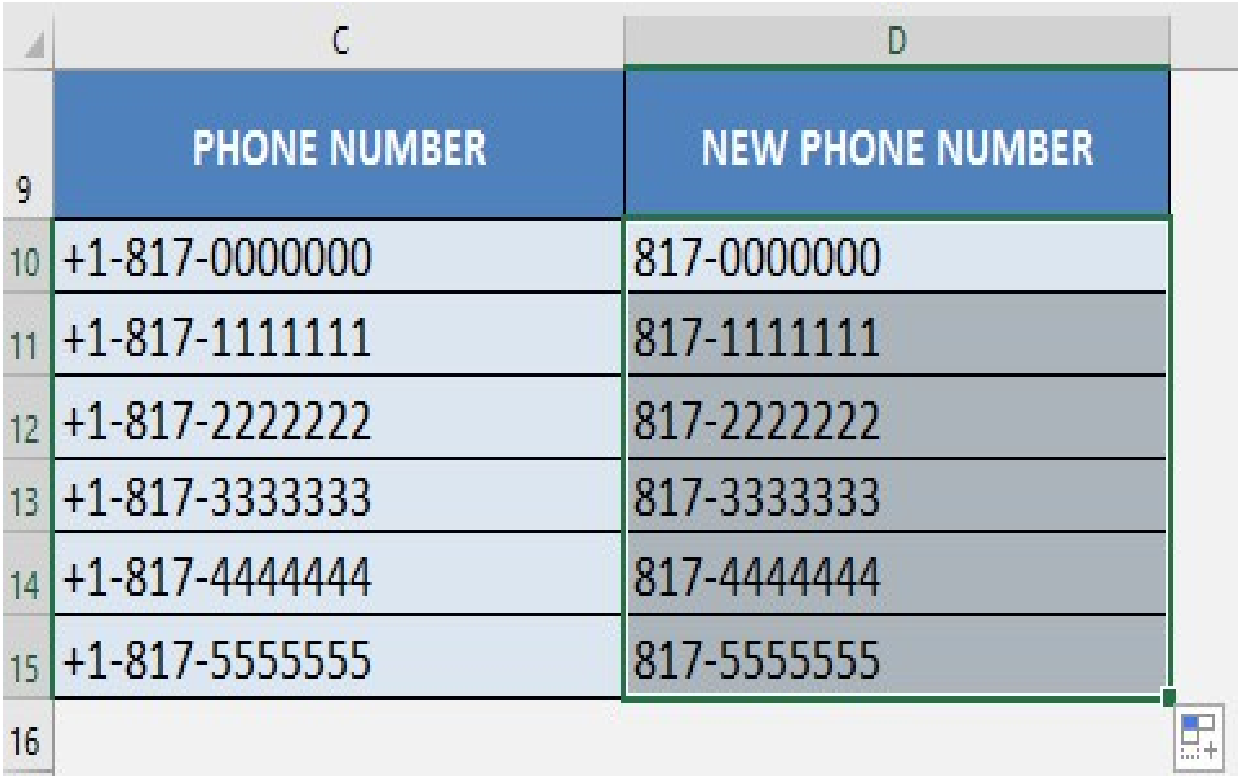
Since we want to remove this, you guessed it! We want the value to be an empty string which is depicted by the double quotations.

=REPLACE(C10, 1, FIND("-", C10), " ")



STEP 3: Do the same for the rest of the cells by dragging the **REPLACE** formula all the way down using the left mouse button.

Note that all of the phone numbers are now clean:



	C	D
9	PHONE NUMBER	NEW PHONE NUMBER
10	+1-817-0000000	817-0000000
11	+1-817-1111111	817-1111111
12	+1-817-2222222	817-2222222
13	+1-817-3333333	817-3333333
14	+1-817-4444444	817-4444444
15	+1-817-5555555	817-5555555
16		

RIGHT

What does it do?

It returns the last character or characters in a text string, based on the number of characters you specify.

Formula breakdown:

=RIGHT(text, [num_chars])

What it means:

=RIGHT(look in this cell, extract X characters)

Example:

=RIGHT("6018 Libero St. 38390", 5) ="38390"

Exercise Workbook:

DOWNLOAD EXCEL WORKBOOK

There are times when you will need to extract the last few characters of text within a cell, e.g. From a serial number, part number, name, address etc.

The **RIGHT** formula in Excel can help you parse and extract the needed text easily.

In our example below, we have an address which has a zip code at the end (the zip code is fixed at 5 characters long) and we want to extract all of the zip codes in our address list.

STEP 1: We need to **enter the RIGHT function** next to the cell that we want to extract the data from:

=RIGHT

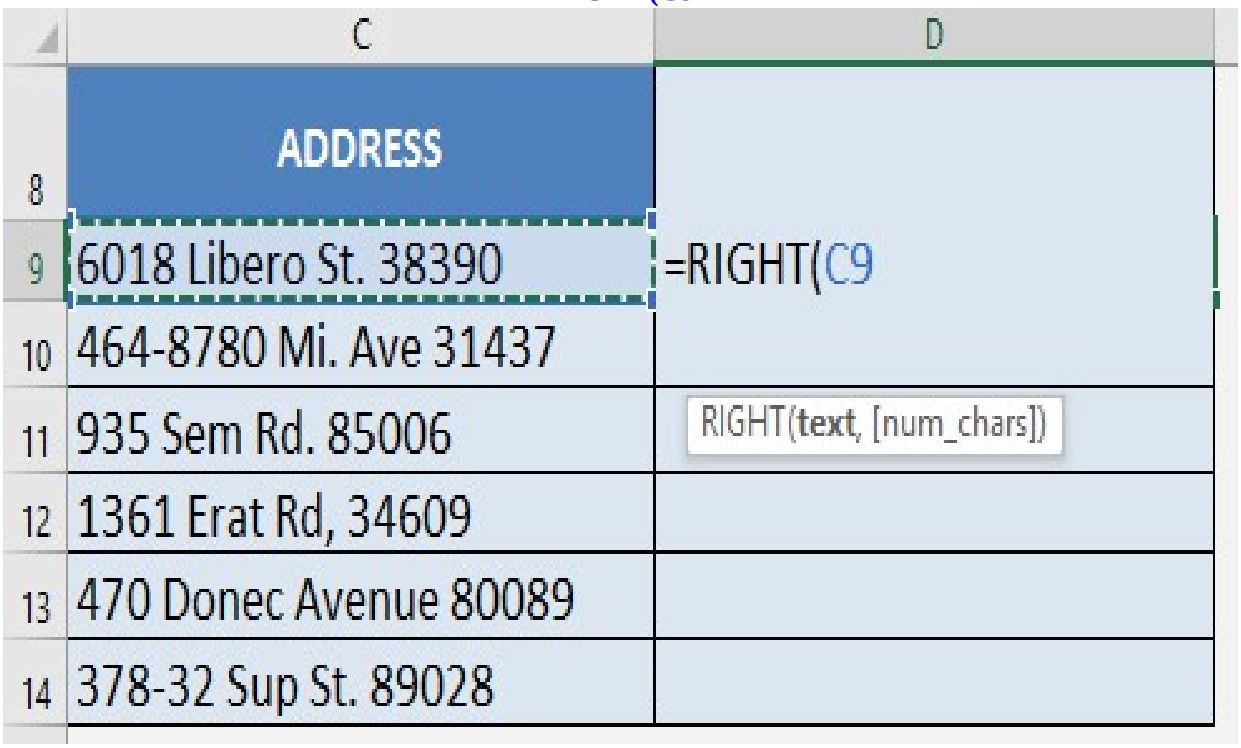
STEP 2: The Right arguments:

text

Which text do we want to extract the last X characters from?

Reference the cell that contains the text or value:

=RIGHT(C9

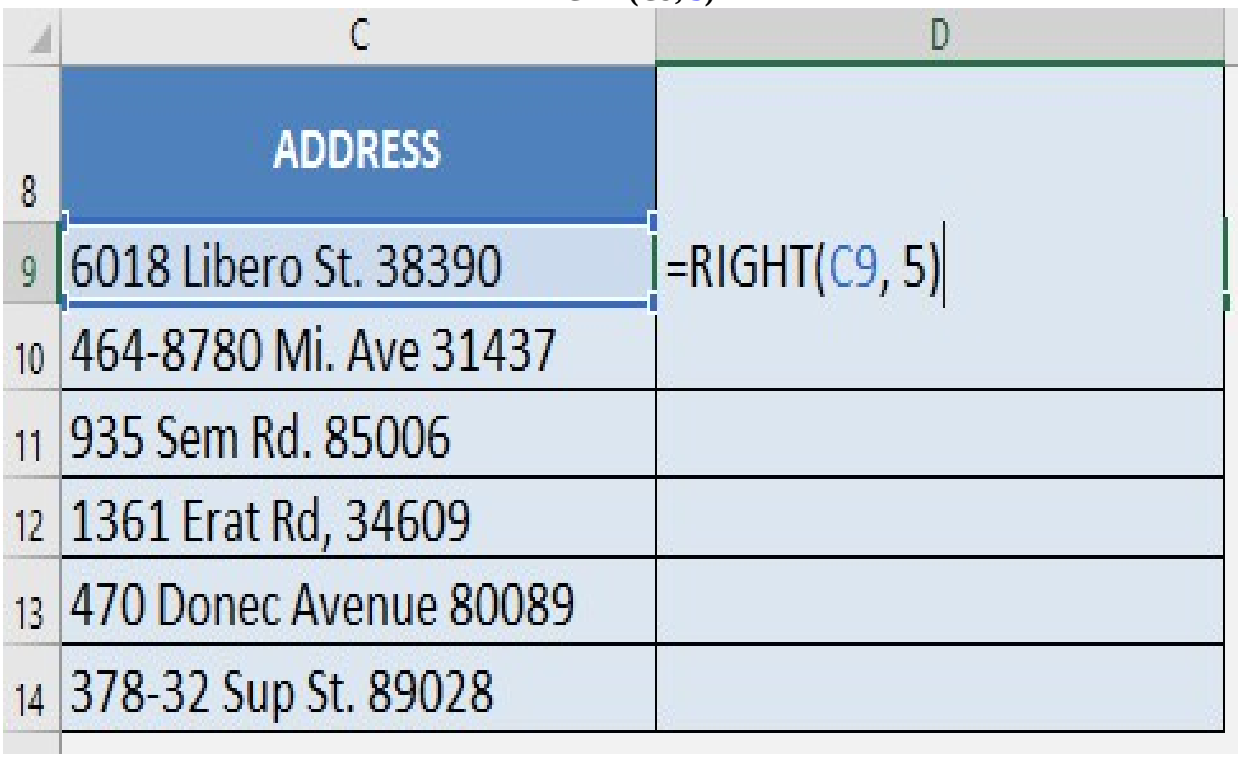


[num_chars]

How many characters from the right do we want to extract from cell C9?

Enter a positive number only:

=RIGHT(C9, 5)



STEP 3: Do the same for the rest of the cells by dragging the **RIGHT** formula all the way down using the left mouse button.

Notice all of the last 5 characters in each text are now extracted:

	C	D
8	ADDRESS	ZIP CODE
9	6018 Libero St. 38390	38390
10	464-8780 Mi. Ave 31437	31437
11	935 Sem Rd. 85006	85006
12	1361 Erat Rd, 34609	34609
13	470 Donec Avenue 80089	80089
14	378-32 Sup St. 89028	89028

SEARCH

What does it do?

Gets the position of a specific text within another text and allows wildcards * ?

Formula breakdown:

=SEARCH(find_text, within_text, [start_num])

What it means:

=SEARCH(text to be searched, the source text, [starting position of the source text])

Example:

=SEARCH("excel", "Excel with excel 2019", 1) =1

Exercise Workbook:

DOWNLOAD EXCEL WORKBOOK

If you want to check where a specific text is located in the source text, it is very easy to search for the position using the **SEARCH Formula**!

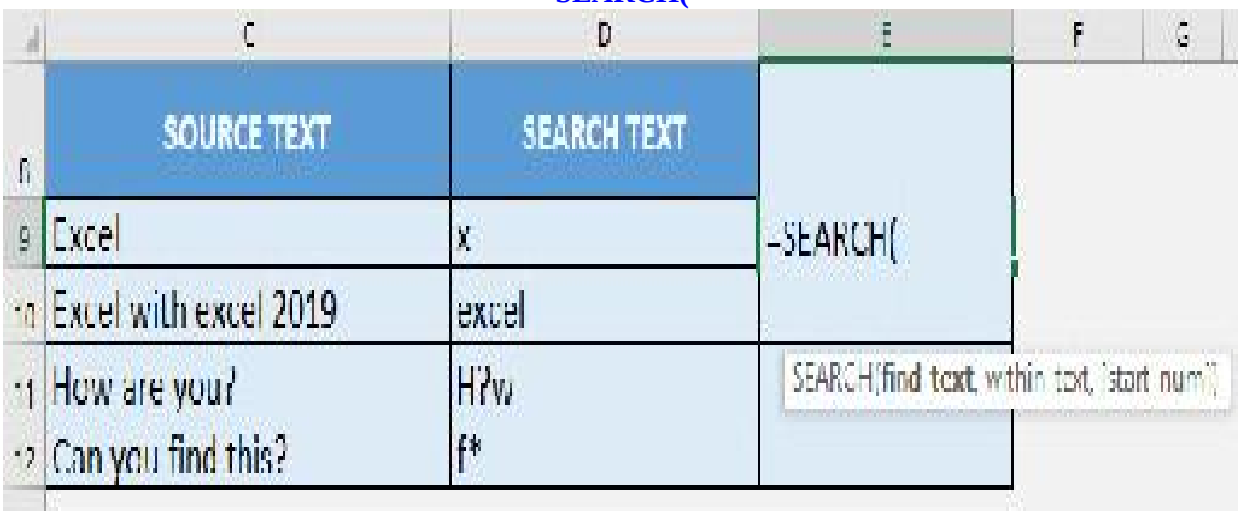
You might be wondering on what makes it different from the FIND Formula. The **SEARCH formula** is **case-insensitive** when searching for text, and it also allows for the use of **wildcard characters like * and ?**

It is very cool when **wildcard characters** are used. The **? character** represents any single character, while ***** represents any number of characters.

I explain how you can do this below:

STEP 1: We need to **enter the *SEARCH* function in a blank cell**:

=SEARCH(



STEP 2: The **SEARCH** arguments:

find_text

What is the text to be searched for?

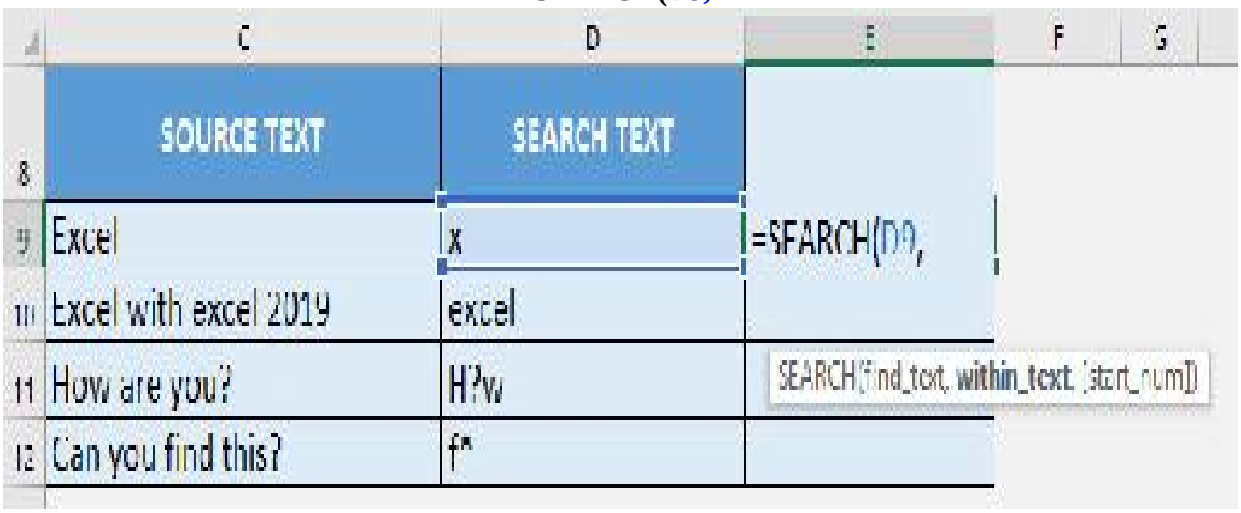
There are a couple of flexible settings you can do in ***find_text***:

- **?** matches **any single character** while ***** matches **any number of characters**.
- For example, if we place in **H?w**, then we want to search for any 3-character text that starts with H and ends with w

- If we change it to **H*w**, then we want to search for any text that starts with H and ends with w
- If ever you want to match the question mark (?) or asterisk character (*) **literally**, you will have to add a **tilde character (~)** before the character. For example, **~?** and **~***

Select the cell containing the text to be searched for. In our first example, we want to search for 'x' in the word 'Excel':

=SEARCH(D9,

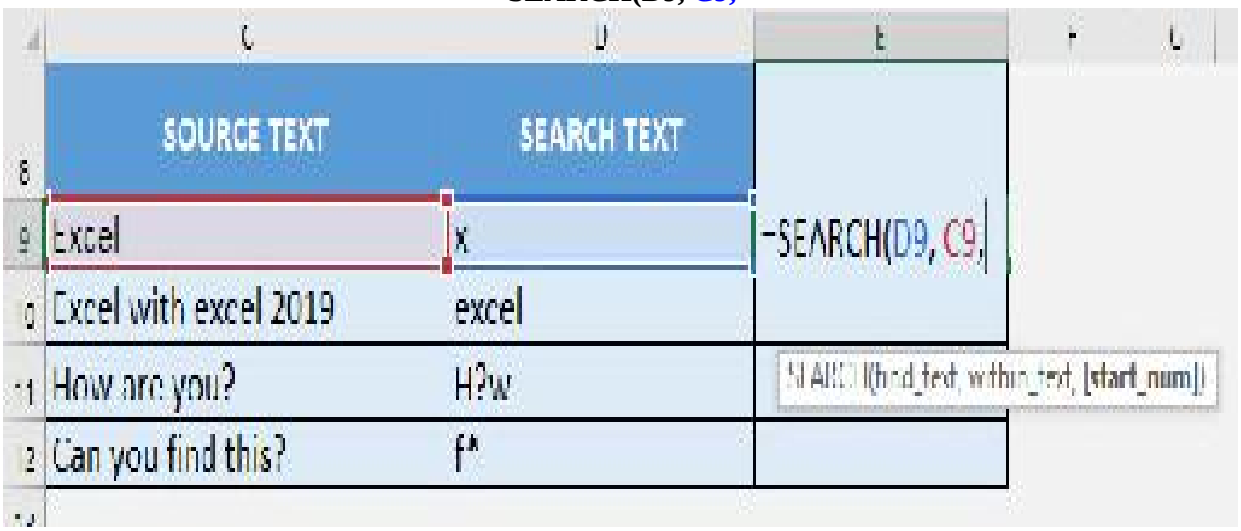


within_text

What is your source text?

Select the cell source text. So let's select 'Excel' as our source text:

=SEARCH(D9, C9,

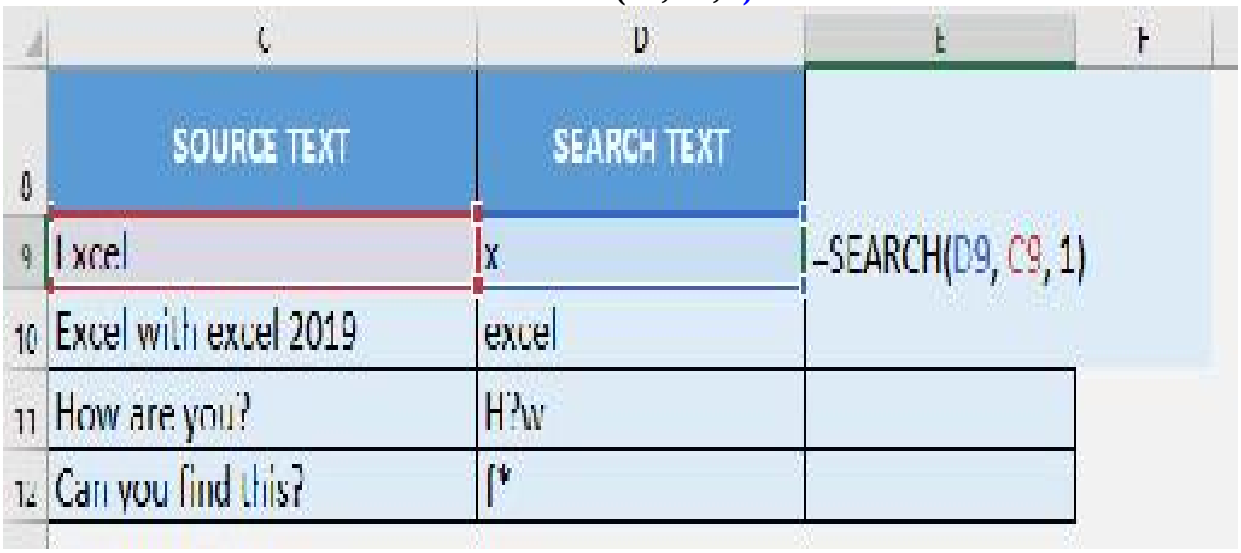


start_num

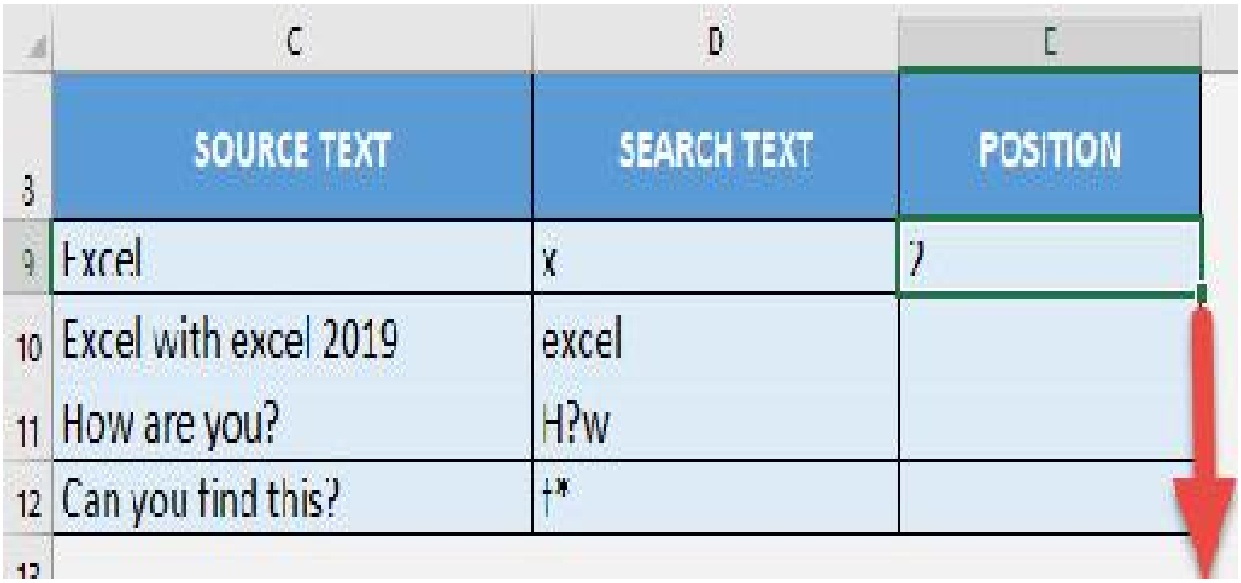
Where do you want to start searching in your source text?

You can leave this blank, it will default to 1 which means it will start looking from the first character of your source text. In our case, let us put in 1 to start searching from there:

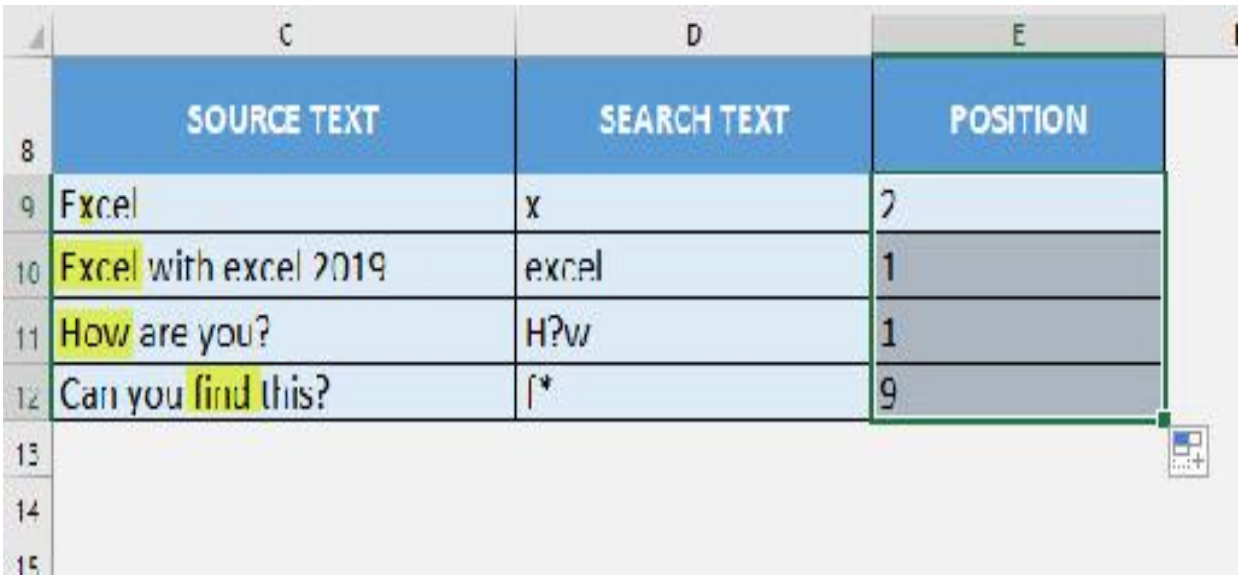
=SEARCH(D9, C9, 1)



Apply the same formula to the rest of the cells by dragging the lower right corner downwards.



You can see that the matching is **case insensitive**! And you can see our **wildcard characters** matching in action!



	C	D	E
8	SOURCE TEXT	SEARCH TEXT	POSITION
9	Fxcel	x	2
10	Fxcel with excel 2019	excel	1
11	How are you?	H?w	1
12	Can you find this?	[*	9
13			
14			
15			

SUBSTITUTE

What does it do?

Substitutes *new text* for *old text* in a text string.

Formula breakdown:

=SUBSTITUTE(text, old_text, new_text, [instance num])

What it means:

=SUBSTITUTE(In this cell, Substitute this text, With this new text, [In the 1st, 2nd…instance it occurs])

Example:

=SUBSTITUTE("C97-27-JT", "-", "#", 2) ="C97-27#JT"

Exercise Workbook:

DOWNLOAD EXCEL WORKBOOK

When you needed to substitute a specific text in each word, and there is a pattern, Excel has just the formula for you.

The **SUBSTITUTE** formula in Excel can help you replace one specific text with another easily.

In our example below, we have a list of part numbers.

We want to replace the second dash - with the number sign # . This formula is able to do this for us.

STEP 1: We need to **enter the *Substitute* function** next to the cell that we want to clean the data from:

=SUBSTITUTE

	C	D
8	PART #	
9	C97-27-JT	=SUBSTITUTE
10	T28-24-FG	
11	F34-68-LJ	
12	S63-86-LL	
13	P73-57-UB	
14	H26-82-HH	

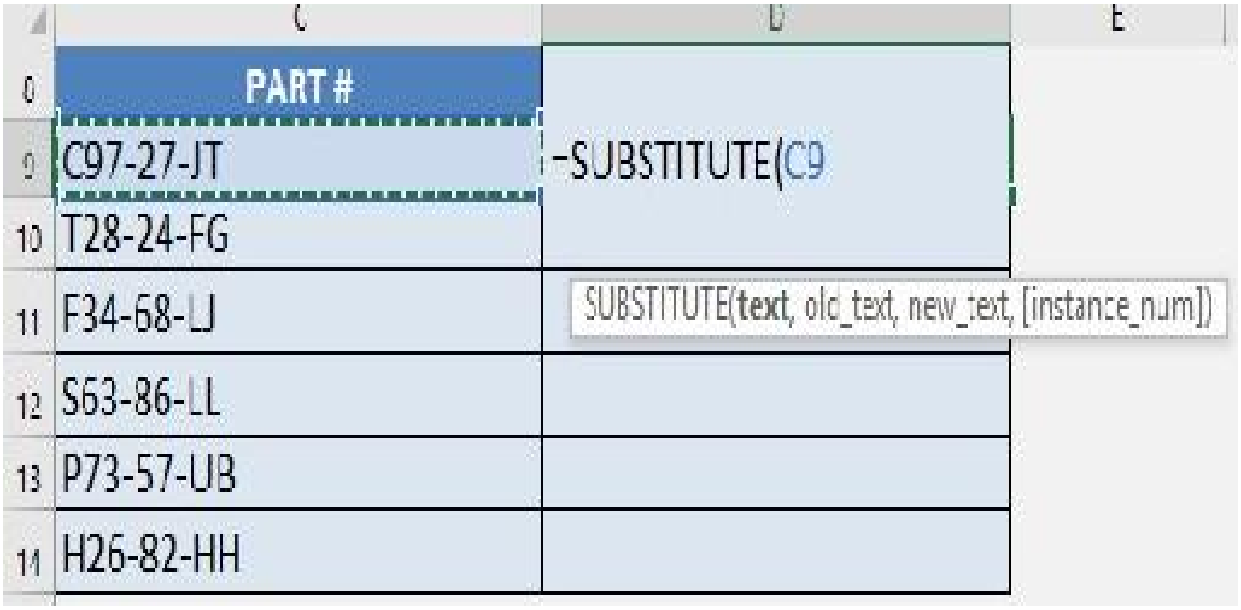
STEP 2: The Substitute arguments:

text

Which text do we want to change?

Reference the cell that contains the text or value:

=SUBSTITUTE(C9,

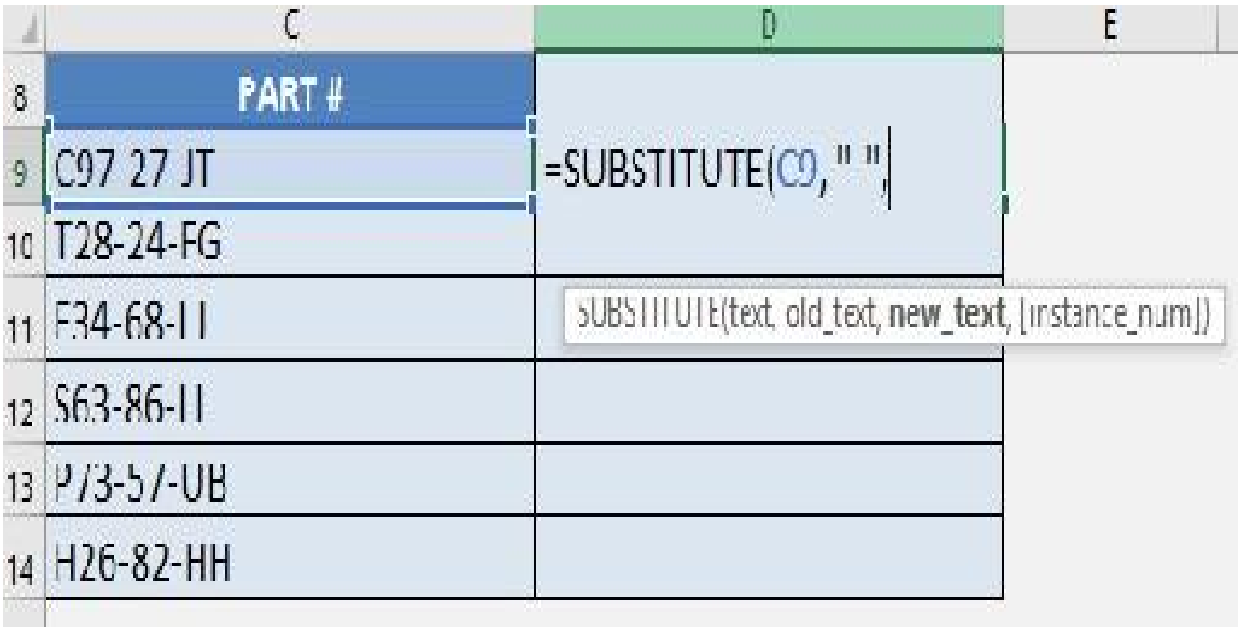


old_text

Which text / characters do we want to replace?

We want to replace the dash - so type it in with double quotations:

=SUBSTITUTE(C9, "-",

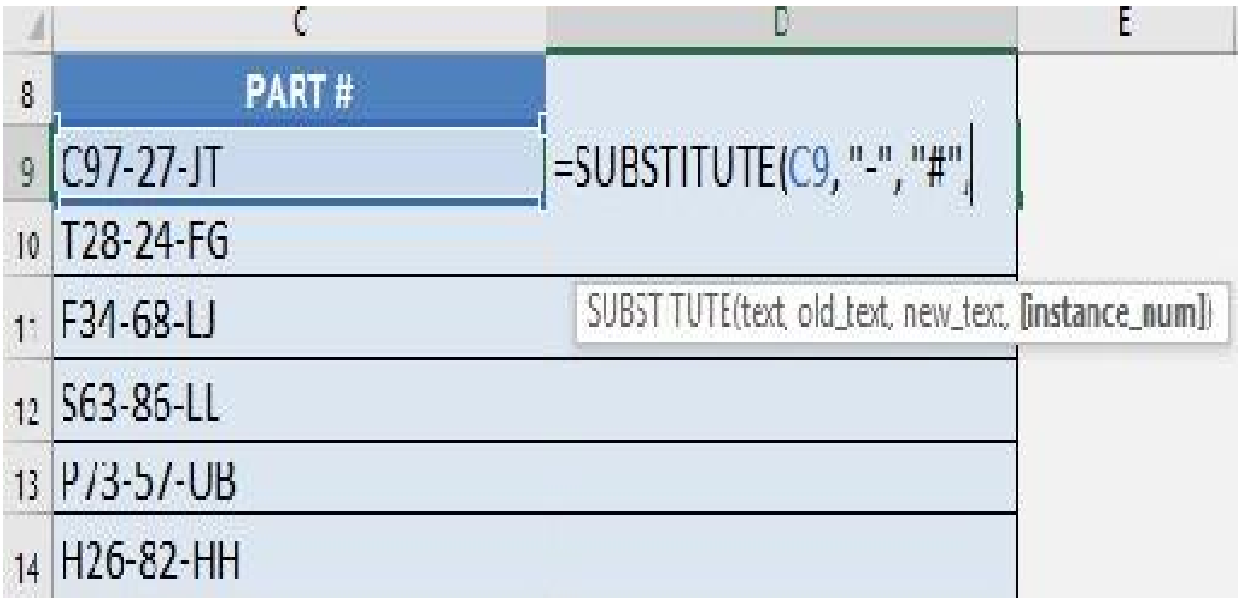


new_text

Which text / characters do we want to replace it with?

We want to replace it with the number sign # so type it in with double quotations:

=SUBSTITUTE(C9, "-", "#",



[instance num]

Which specific instance are we targeting the substitution on?

This parameter is optional. In our scenario, we want the second dash - only to be substituted. So place in the number 2:

=SUBSTITUTE(C9, "-", "#", 2)

	C	D
8	PART #	
9	C97-27-JT	=SUBSTITUTE(C9, "-", "#", 2)
10	T28-24-FG	
11	F34-68-LJ	
12	S63-86-LL	
13	P73-57-UB	
14	H26-82-HH	

STEP 3: Do the same for the rest of the cells by dragging the **SUBSTITUTE** formula all the way down using the left mouse button.

Note that all of the parts are now changed to your new part values:

	C	D
8	PART #	NEW PART #
9	C97-27-JT	C97-27#JT
10	T28-24-FG	T28-24#FG
11	F34-68-LJ	F34-68#LJ
12	S63-86-LL	S63-86#LL
13	P73-57-UB	P73-57#UB
14	H26-82-HH	H26-82#HH
15		

TRIM

What does it do?

Removes unneeded spaces in your text, except single spaces in between words

Formula breakdown:

=TRIM(text)

What it means:

=TRIM(text that you want extra spaces to be removed)

Example:

=TRIM("spaces in the middle") ="spaces in the middle"

Exercise Workbook:

DOWNLOAD EXCEL WORKBOOK

In the quest for cleaner data, one of the common scenarios is removing extra spaces in our text.

Extra spaces are very difficult to spot, especially those at the end i.e. Trailing spaces.

The **TRIM** formula in Excel is one of the Data Cleansing functions and is great if you want to remove extra spaces from text whether it be from the start (leading spaces), middle or at the end (trailing spaces) of the text.

In a nutshell, the **TRIM** function in Excel removes unneeded spaces in your text, except single spaces between words.

STEP 1: We need to **enter the TRIM function**

=TRIM

STEP 2: The Trim argument - **Which text do we want to remove the extra spaces?**

This is our data source:

TEXT	TRIMMED TEXT
extra spaces in front spaces in the middle	
extra spaces in the end spaces everywhere	

Now place in the first cell as the argument for our Trim Formula.

=TRIM(C9)

TEXT	
extra spaces in front	=TRIM(C9)
spaces in the middle	
extra spaces in the end	
spaces everywhere	

STEP 3: Do the same for the rest of the cells by using the **TRIM** formula, notice all of the extra spaces have been removed:

TEXT	TRIMMED TEXT
extra spaces in front	extra spaces in front
spaces in the middle	spaces in the middle
extra spaces in the end	extra spaces in the end
spaces everywhere	spaces everywhere

UPPER

What does it do?

Converts all characters in the text string into uppercase

Formula breakdown:

=UPPER(text)

What it means:

=UPPER(text to be converted to upper case)

Example:

=UPPER("Excel Rocks!") ="EXCEL ROCKS!"

Exercise Workbook:

DOWNLOAD EXCEL WORKBOOK

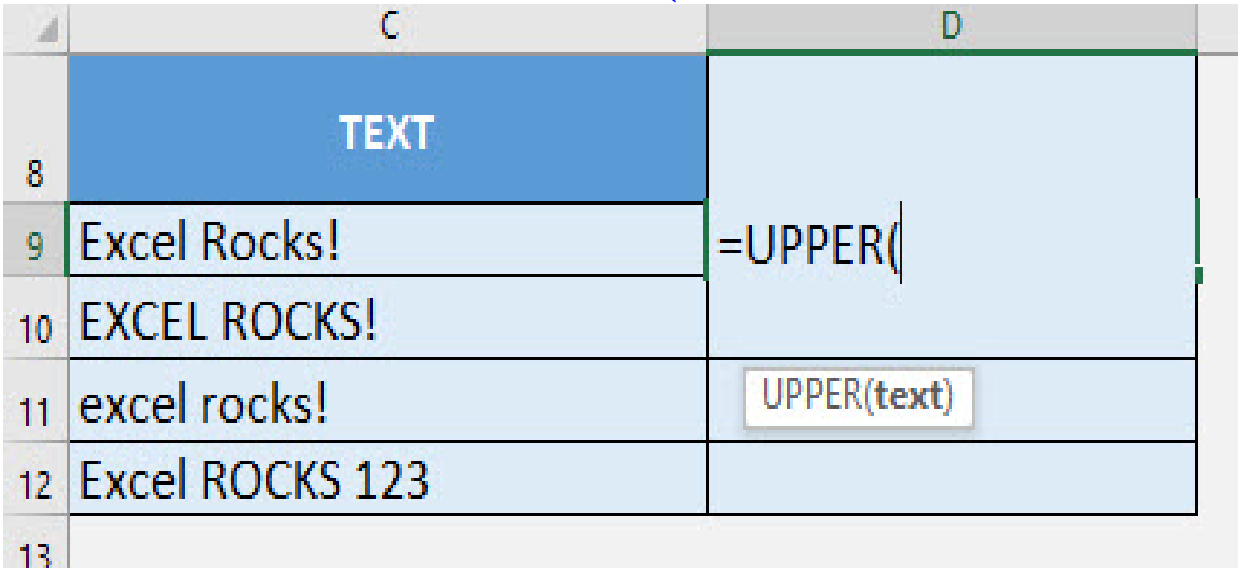
We can easily change text into upper case using the **UPPER formula** in Excel. It does not convert symbols and numbers though which we will see in the examples.

If you want to fix the uneven capitalization throughout the text, then this formula is perfect for you!

I explain how you can do this below:

STEP 1: We need to **enter the *UPPER* function in a blank cell**:

=UPPER(



STEP 2: The **UPPER** arguments:

text

What is the text to be converted to upper case?

Select the cell containing the text that you want to convert:

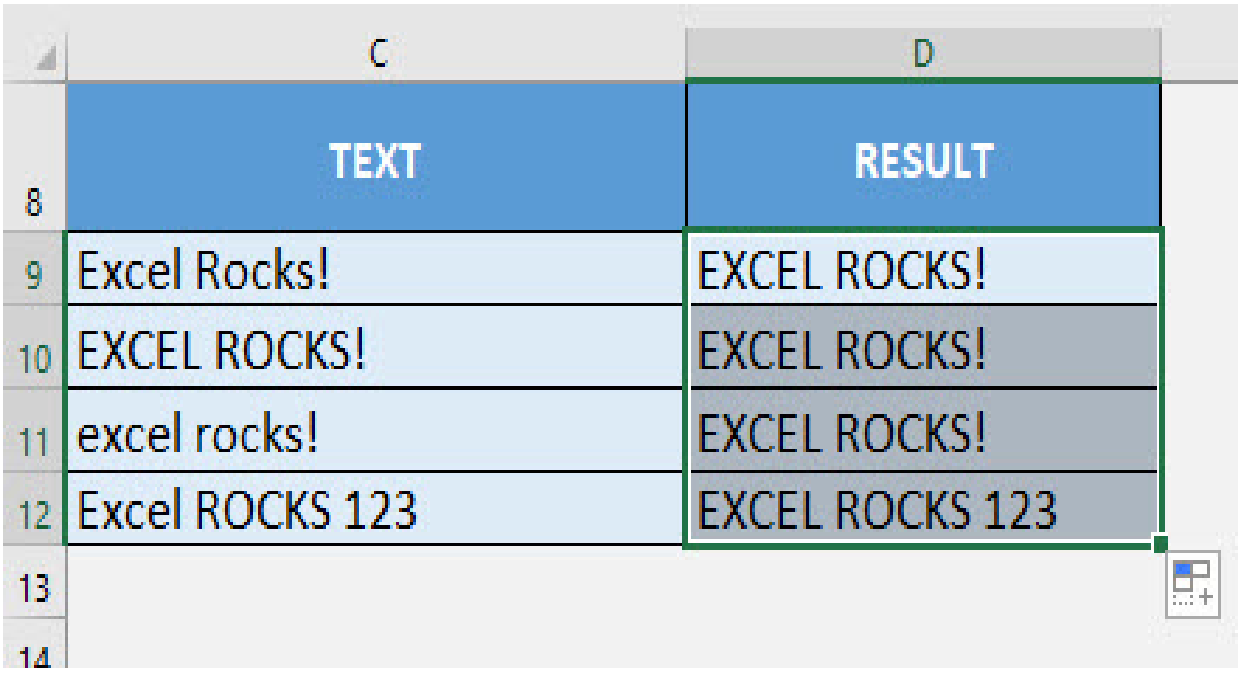
=UPPER(C9)

	C	D
8	TEXT	
9	Excel Rocks!	=UPPER(C9)
10	EXCEL ROCKS!	
11	excel rocks!	
12	Excel ROCKS 123	

Apply the same formula to the rest of the cells by dragging the lower right corner downwards.

	C	D
8	TEXT	RESULT
9	Excel Rocks!	EXCEL ROCKS!
10	EXCEL ROCKS!	
11	excel rocks!	
12	Excel ROCKS 123	

You can see that the values are all now in upper case!



	C	D
8	TEXT	RESULT
9	Excel Rocks!	EXCEL ROCKS!
10	EXCEL ROCKS!	EXCEL ROCKS!
11	excel rocks!	EXCEL ROCKS!
12	Excel ROCKS 123	EXCEL ROCKS 123
13		
14		

VALUE

What does it do?

Converts text into a numeric value

Formula breakdown:

=VALUE(text)

What it means:

=VALUE(text to be converted to a numeric value)

Example:

=VALUE("11/29/18") =43433

Exercise Workbook:

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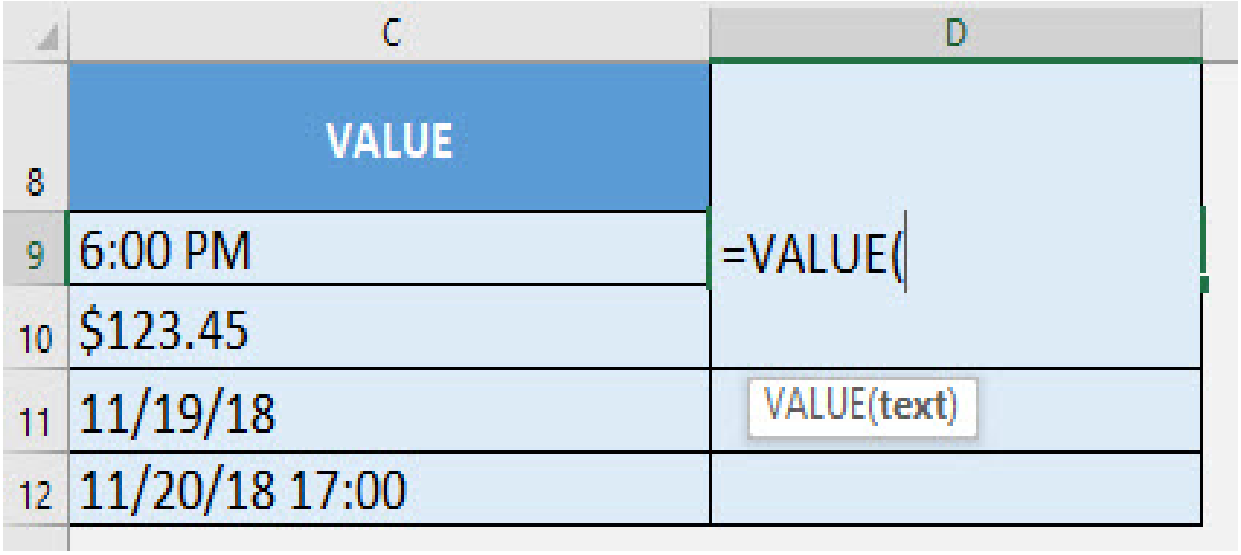
We can easily change text into its corresponding **numeric value** using the **VALUE formula** in Excel. It is also interesting as we can try out different types and see how it looks like in its numeric format.

Let us try out a couple of data types: Dates, currency, and time to name a few!

I explain how you can do this below:

STEP 1: We need to **enter the *VALUE* function in a blank cell**:

=VALUE(



STEP 2: The **VALUE** arguments:

text

What is the text to be converted to a numeric value?

Select the cell containing the text that you want to convert:

=VALUE(C9)

	C	D
8	VALUE	
9	6:00 PM	=VALUE(C9)
10	$123.45	
11	11/19/18	
12	11/20/18 17:00	

Apply the same formula to the rest of the cells by dragging the lower right corner downwards.

	C	D
8	VALUE	RESULT
9	6:00 PM	0.75
10	$123.45	
11	11/19/18	
12	11/20/18 17:00	
13		

You can see that the text are all now in their numeric values!

	C	D
8	VALUE	RESULT
9	6:00 PM	0.75
10	$123.45	123.45
11	11/19/18	43423
12	11/20/18 17:00	43424.70833
13		
14		

DATE & TIME FUNCTIONS

DATE

What does it do?

Creates a date based on the year, month and day provided

Formula breakdown:

=DATE(year, month, day)

What it means:

=DATE(year of the date, month of the date, day of the date)

Example:

=DATE(1985, 1, 3) =”1/03/85”

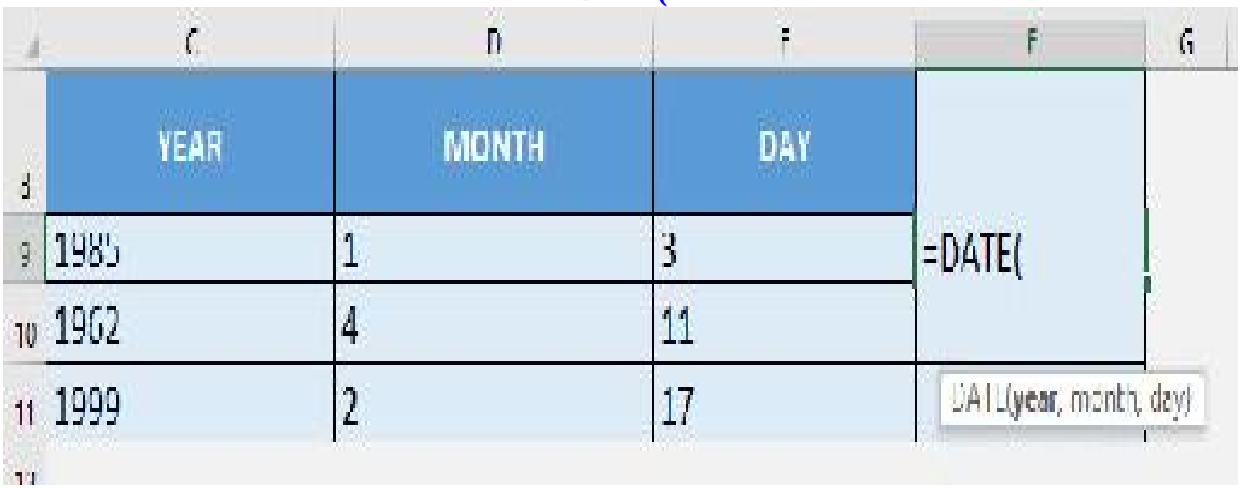
Exercise Workbook:

DOWNLOAD EXCEL WORKBOOK

If you want to create dates dynamically, Excel's **DATE formula** can do this for you! You just need to provide the year, month and day to it.

STEP 1: We need to **enter the *DATE* function in a blank cell**:

=DATE(



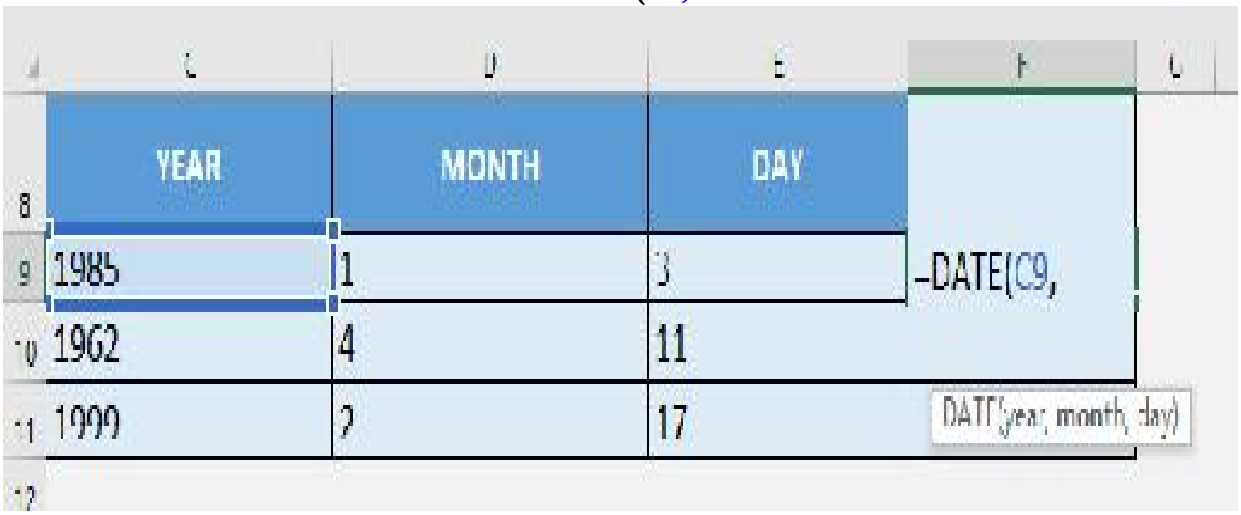
STEP 2: The **DATE** arguments:

year

What is the year of the date?

Select the cell containing the year:

=DATE(C9,

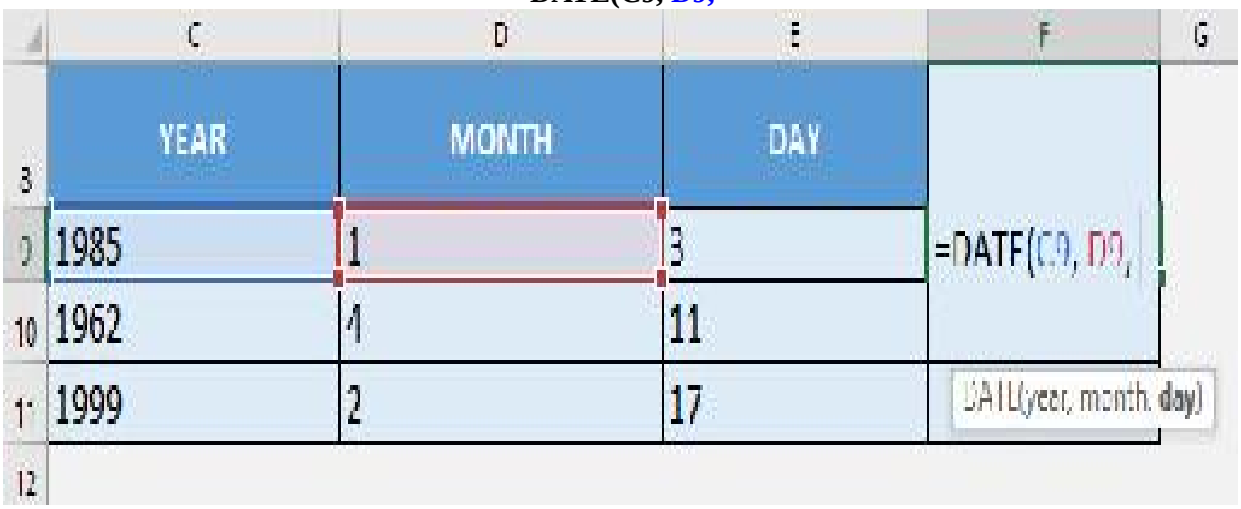


month

What is the month of the date?

Select the cell containing the month:

=DATE(C9, D9,

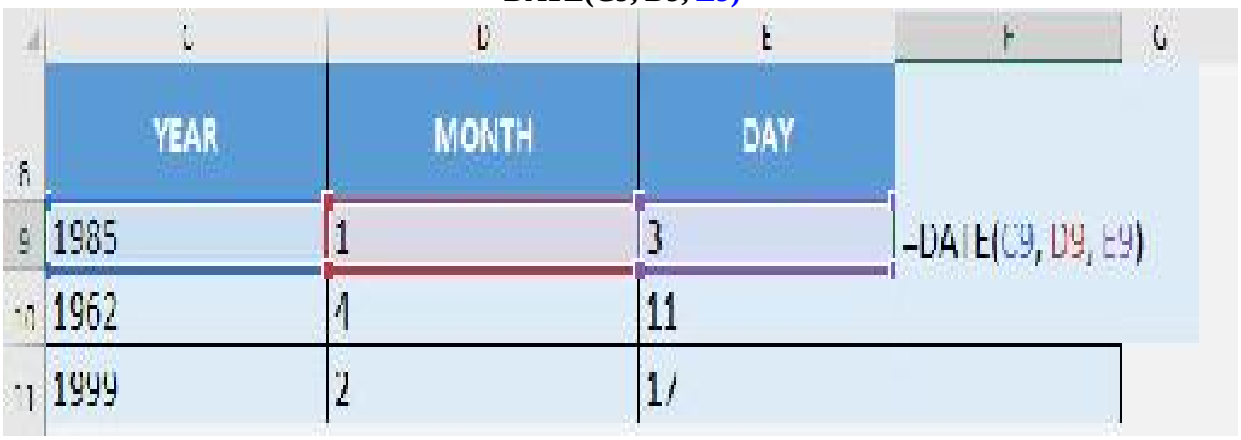


day

What is the day of the date?

Select the cell containing the day:

=DATE(C9, D9, E9)



Apply the same formula to the rest of the cells by dragging the lower right corner downwards.

	C	D	E	F	G
8	YEAR	MONTH	DAY	RESULT	
9	1985	1	3	1/03/85	
10	1962	1	11		
11	1999	2	17		
12					

You now have your dates generated!

	C	D	E	F	G
8	YEAR	MONTH	DAY	RESULT	
9	1985	1	3	1/03/85	
10	1962	4	11	4/11/62	
11	1999	2	17	2/17/99	
12					

DATEDIF

What does it do?

Calculates the number of Days, Months, or Years between two dates

Formula breakdown:

=DATEDIF(Start Date, End Date, Interval)

What it means:

=DATEDIF(starting date, ending date, the unit of measurement)

Where **INTERVAL** is:

"**m**" Months , "**ym**" Months Excluding Years
"**d**" Days , "**yd**" Days Excluding Years
"**y**" Years , "**md**" Days Excluding Years And Months

Example:

=DATEDIF("5/18/80","11/28/18","m") =462

Exercise Workbook:

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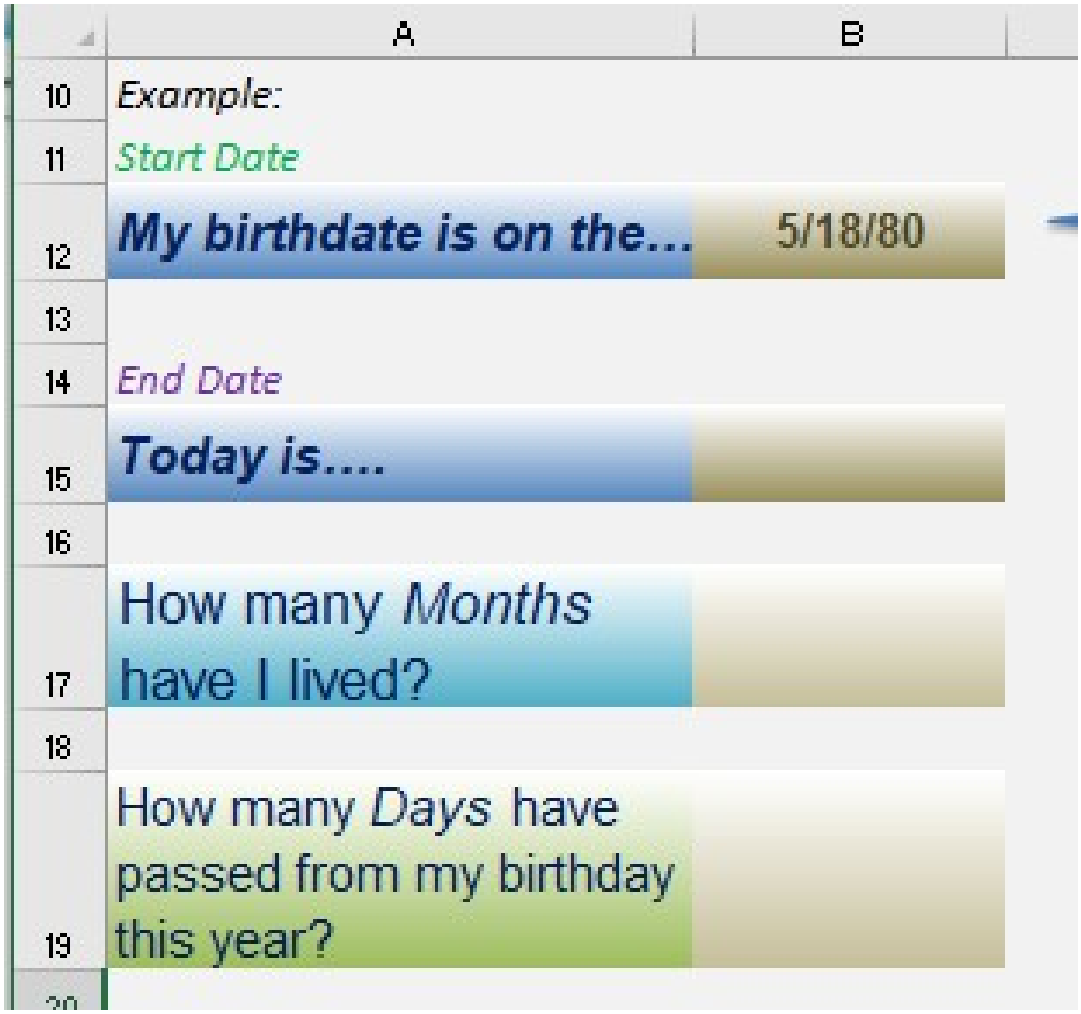
The **DATEDIF** function is a mystery function within Excel. When you write it out in a workbook it doesn't give you any hints like other functions would and if you look it up in the function list you would not find it! Creepy...

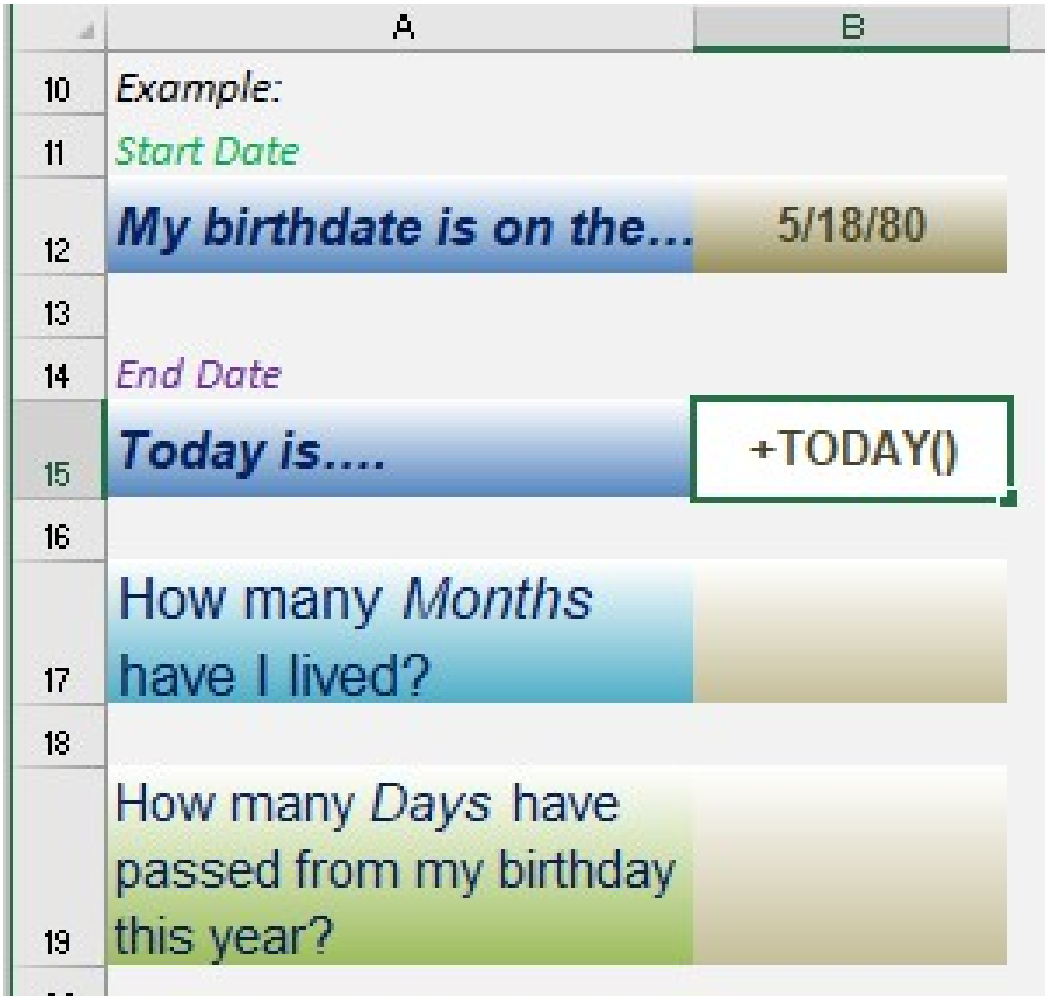
The **DATEDIF** function stands for "**date difference**" and it calculates the number of Days, Months, or Years between two dates.

So if you want to find out how many days, years or months have passed since you were born, well this is the formula for you! Well you can also extend this to project start and end dates, but you get my point.

STEP 1: Enter the **Start Date**



STEP 2: Enter the **End Date**

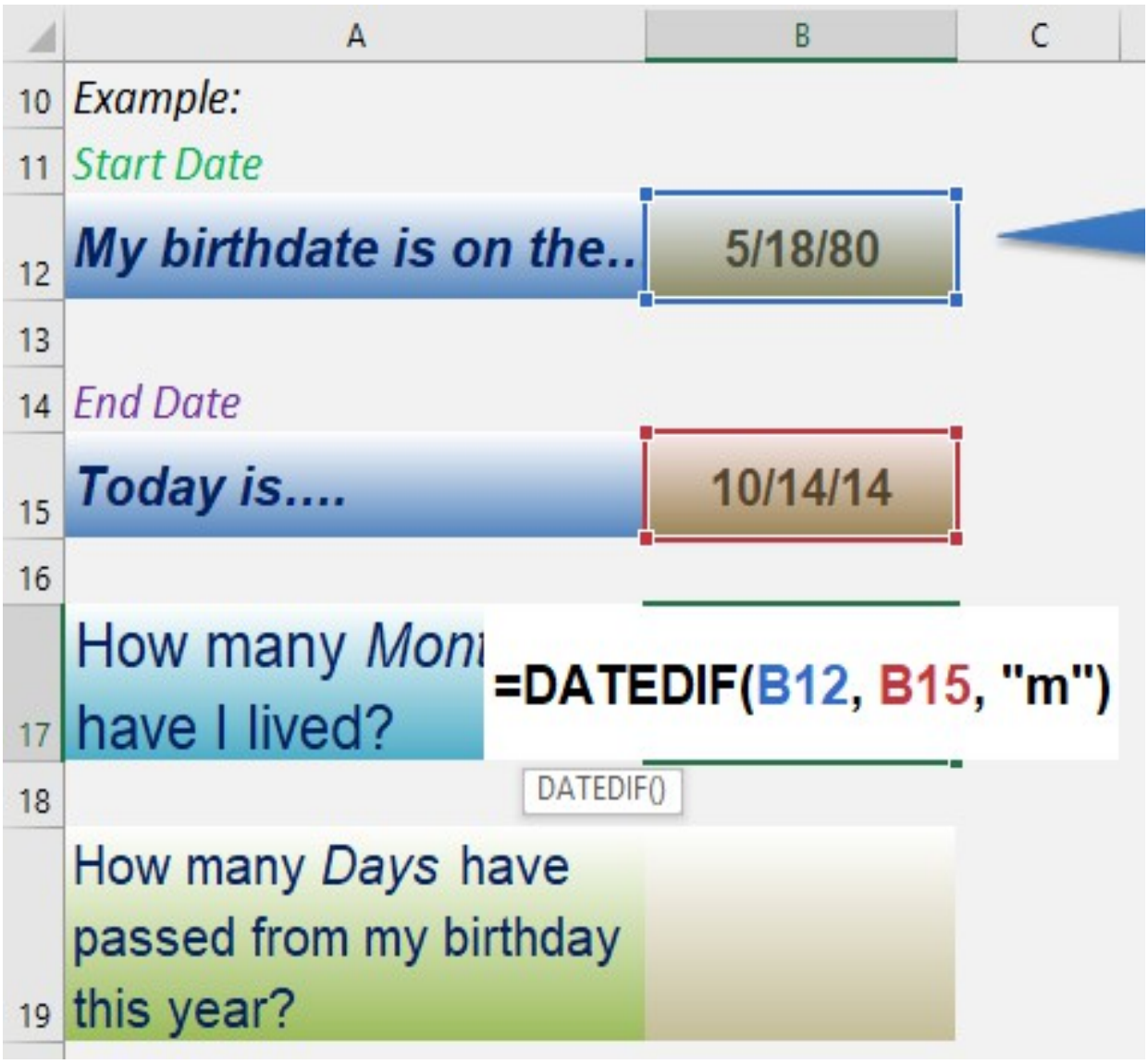


STEP 3: To get the **number of months** as a difference, type in the following formula

=DATEDIF(B12, B15, "m")

The **DATEDIF** arguments:

B12 is the **startdate**
B15 is the **enddate**
m tells it to **count in total months**

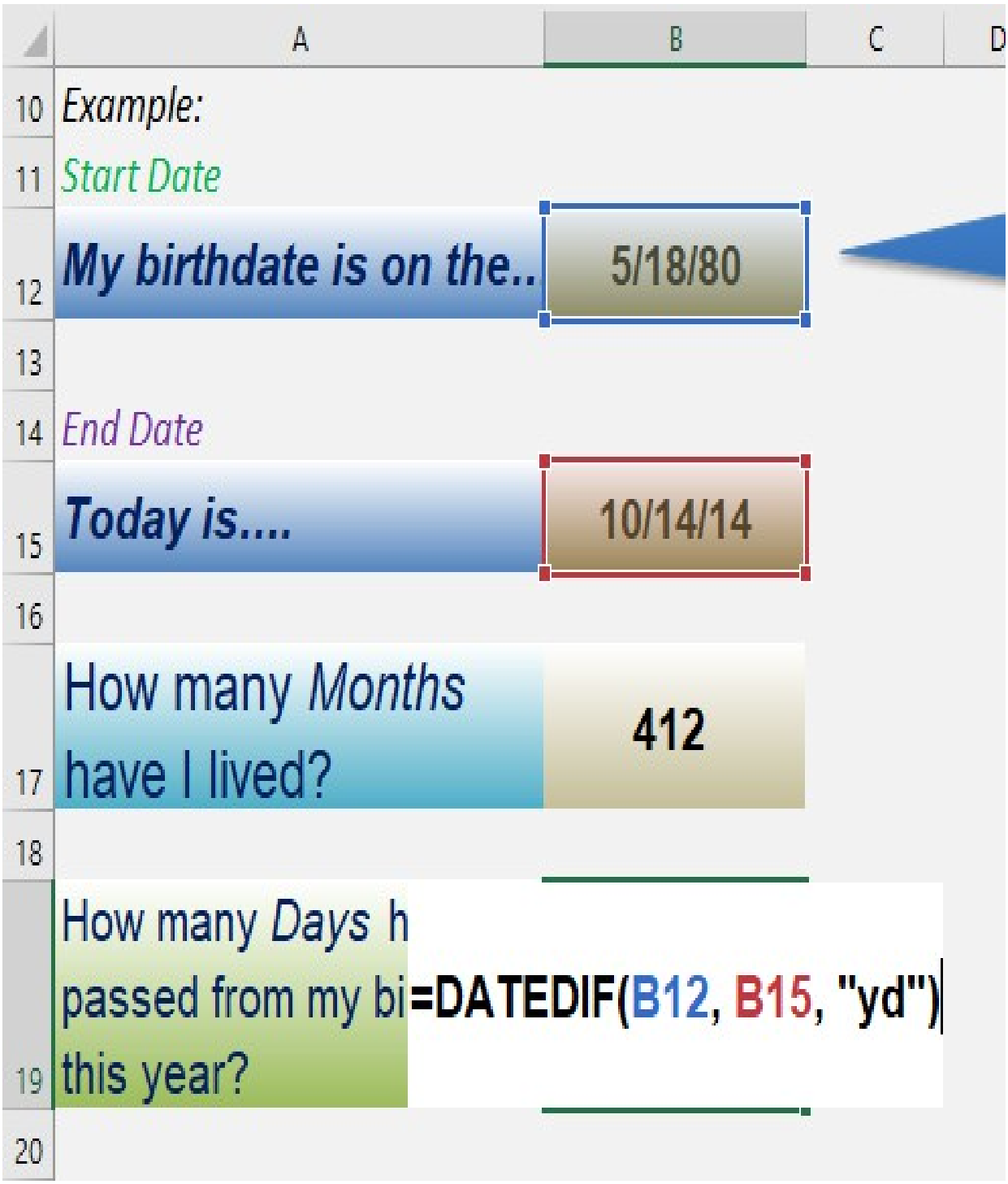


STEP 4: To get the **number of days on this year** from your birthday, type in the following formula

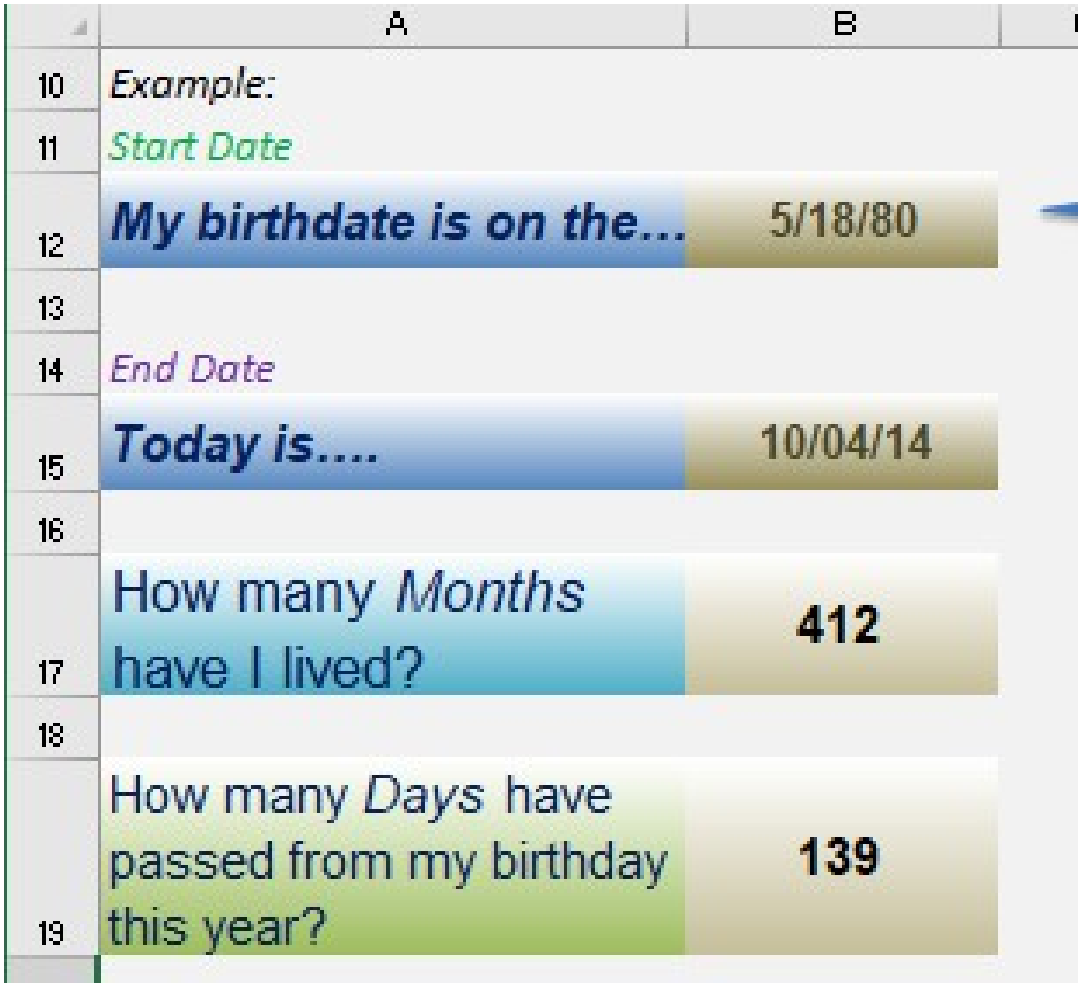
=DATEDIF(B12, B15, "yd")

The **DATEDIF** arguments:

B12 is the **startdate**
B15 is the **enddate**
yd tells it to **count in days but excluding the year portion**



And you have your calculated differences!



	A	B
10	*Example:*	
11	*Start Date*	
12	***My birthdate is on the…***	5/18/80
13		
14	*End Date*	
15	***Today is….***	10/04/14
16		
17	How many *Months* have I lived?	**412**
18		
19	How many *Days* have passed from my birthday this year?	**139**

DATEVALUE

What does it do?

Converts a date that is in text format, into Excel's date serial number format

Formula breakdown:

=DATEVALUE(date_text)

What it means:

=DATEVALUE(the date to be converted)

Example:

=DATEVALUE("December 12, 2018") =43446

Exercise Workbook:

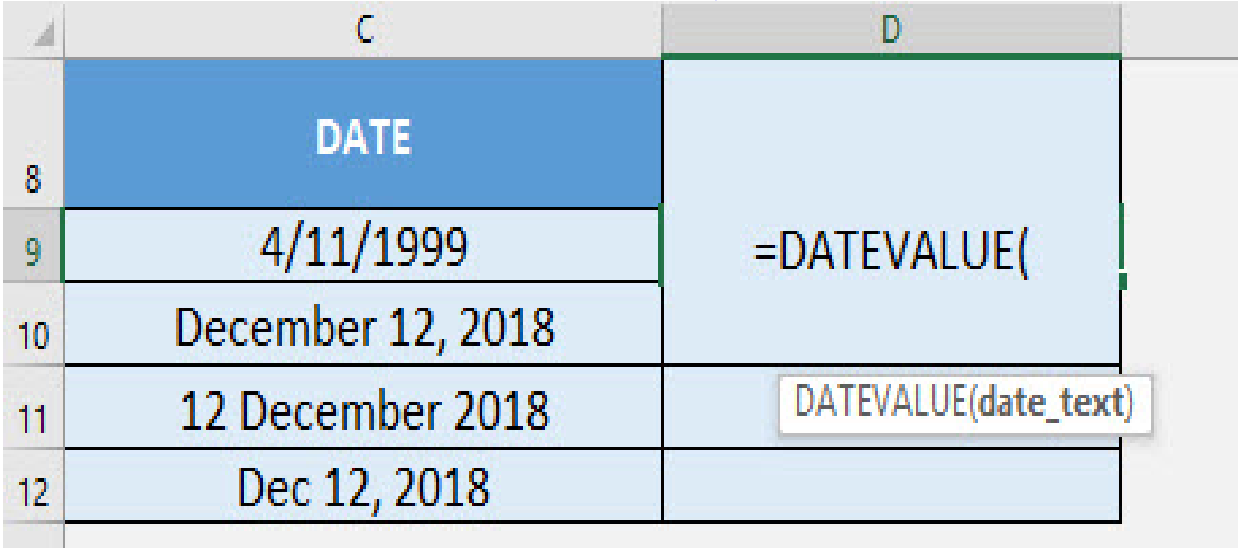
DOWNLOAD EXCEL WORKBOOK

Ever had a lot of dates in different textual formats? These are a pain to deal with! Thankfully there is the **DATEVALUE Formula** in Excel that converts these text dates into the proper Excel date values.

Once converted, you can perform your analysis since they are now in the Excel date format.

STEP 1: We need to **enter the *DATEVALUE* function in a blank cell**:

=DATEVALUE(



STEP 2: The **DATEVALUE** arguments:

date_text

What is the textual date that you want to convert to the proper Excel date?

Select the cell containing the date:

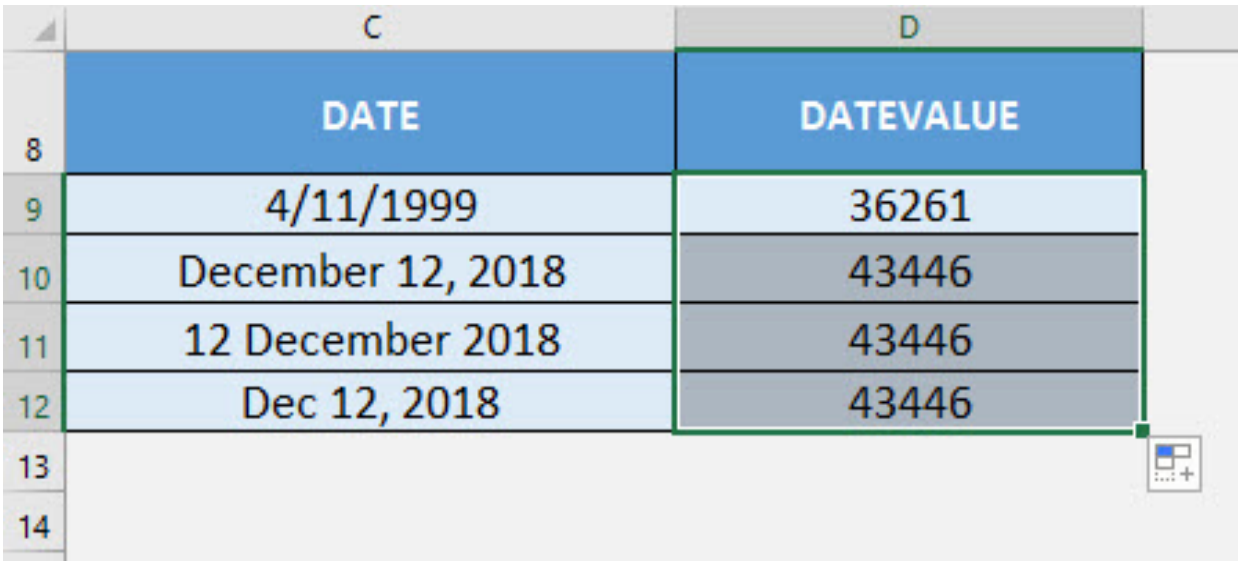
=DATEVALUE(C9)

	C	D
8	DATE	
9	4/11/1999	=DATEVALUE(C9)
10	December 12, 2018	
11	12 December 2018	
12	Dec 12, 2018	
13		

Apply the same formula to the rest of the cells by dragging the lower right corner downwards.

	C	D
8	DATE	DATEVALUE
9	4/11/1999	36261
10	December 12, 2018	
11	12 December 2018	
12	Dec 12, 2018	

You now have your proper dates! Notice the December 12 dates all resulted to the same **DATEVALUE**!



	C	D
8	DATE	DATEVALUE
9	4/11/1999	36261
10	December 12, 2018	43446
11	12 December 2018	43446
12	Dec 12, 2018	43446
13		
14		

DAY

What does it do?

Gets the day from the date

Formula breakdown:

=DAY(serial_number)

What it means:

=DAY(date where the day will be extracted from)

Example:

=DAY("4/11/85") =11

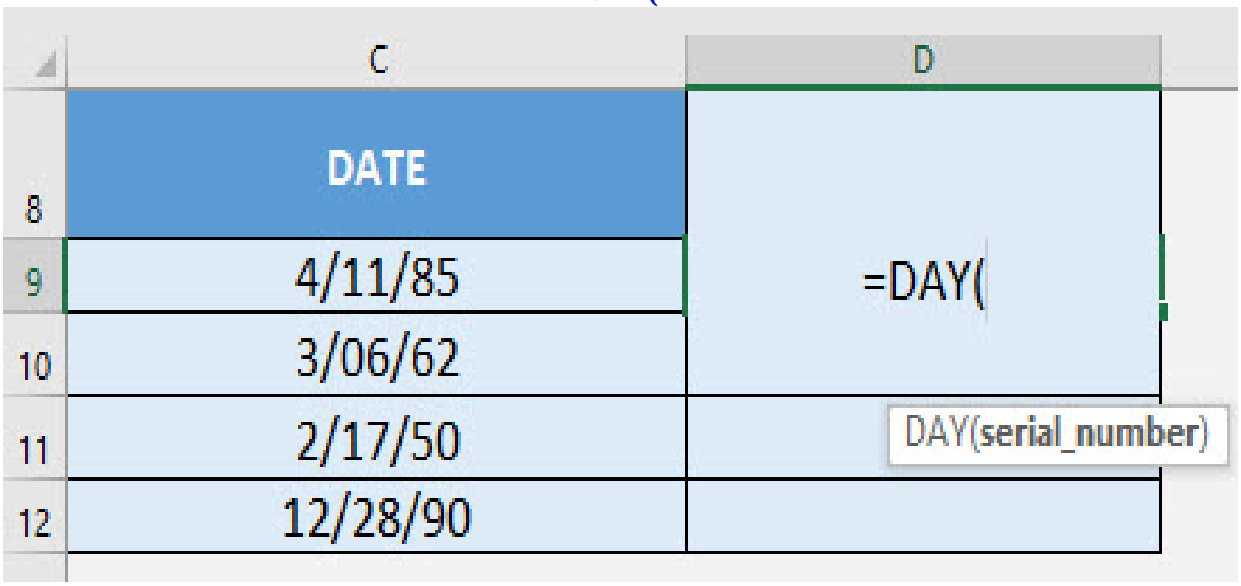
Exercise Workbook:

DOWNLOAD EXCEL WORKBOOK

I recall where I had a lot of dates and I wanted to extract the day of the dates one-by-one... It was too much of a hassle! Thankfully there is Excel's **DAY Formula** to do that for me!

STEP 1: We need to **enter the *DAY* function in a blank cell**:

=DAY(



STEP 2: The **DAY** arguments:

serial_number

What is the date that you want to extract the day from?

Select the cell containing the date:

=DAY(C9)

	C	D
8	DATE	
9	4/11/85	=DAY(C9)
10	3/06/62	
11	2/17/50	
12	12/28/90	
13		

Apply the same formula to the rest of the cells by dragging the lower right corner downwards.

	C	D
8	DATE	DAY
9	4/11/85	11
10	3/06/62	
11	2/17/50	
12	12/28/90	
13		

You now have your days extracted!

	C	D
8	DATE	DAY
9	4/11/85	11
10	3/06/62	6
11	2/17/50	17
12	12/28/90	28
13		
14		

DAY360

What does it do?

Gets the number of days between two dates using 30-day months

Formula breakdown:

=DAYS360(start_date, end_date, [method])

What it means:

=DAYS360(starting date, ending date, [US or European Method])

Example:

=DAYS360("1/01/18", "12/31/18") =360

Exercise Workbook:

DOWNLOAD EXCEL WORKBOOK

If you need to get the difference of two dates, but want to use **30-day months** in calculating the difference, Excel has you covered! We can use the **DAYS360 Formula** to do this. It can be useful in the accounting world and there are two modes that are used to count the number of days:

US Method (Default)

- If your start date is the last day of the month, then it is treated as the 30th day of the same month
- If your end date is the last day of the month and your start date is earlier than the 30th day of the month, then the end date is treated as the 1st day of the NEXT month, otherwise the end date is treated as the 30th day of the same month

European Method

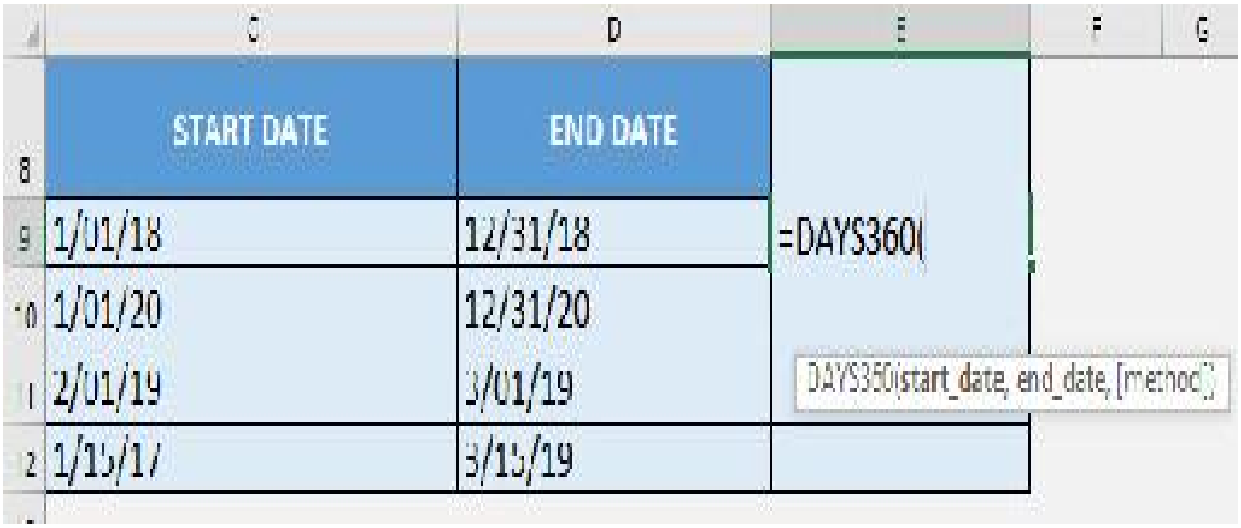
- If your start date or end date is the 31st day of the month, then it is treated as the 30th day of the same month

We will be using the Default US Method in our examples below!

I explain how you can do this below:

STEP 1: We need to **enter the *DAYS360* function in a blank cell**:

=DAYS360(



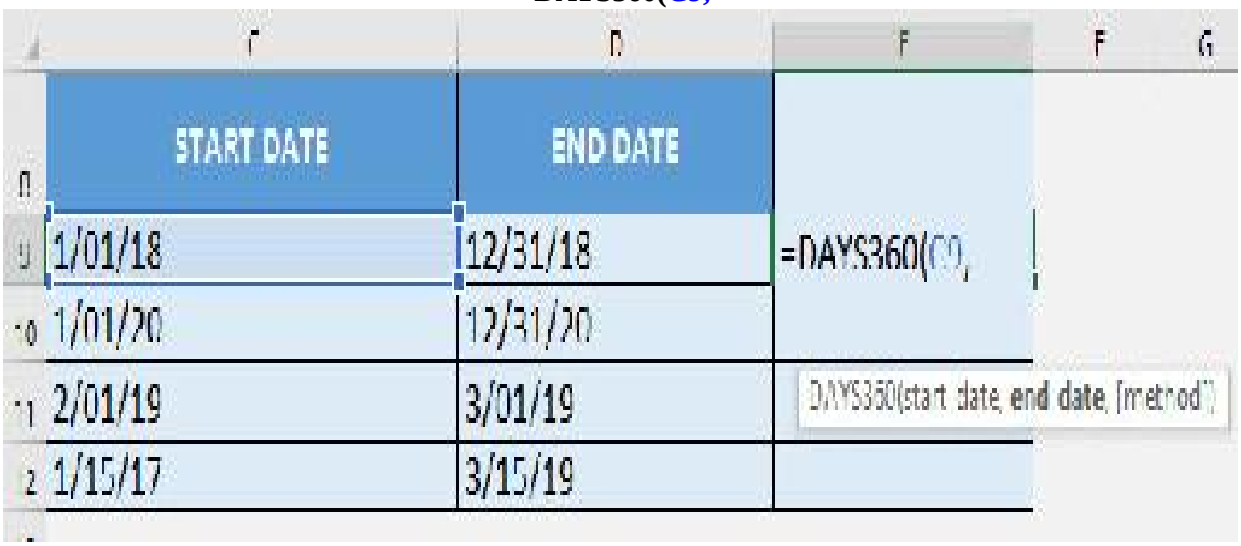
STEP 2: The **DAYS360** arguments:

start_date

What is the start date?

Select the cell containing the starting date:

=DAYS360(C9,



end_date

What is the end date?

Select the cell containing the ending date:

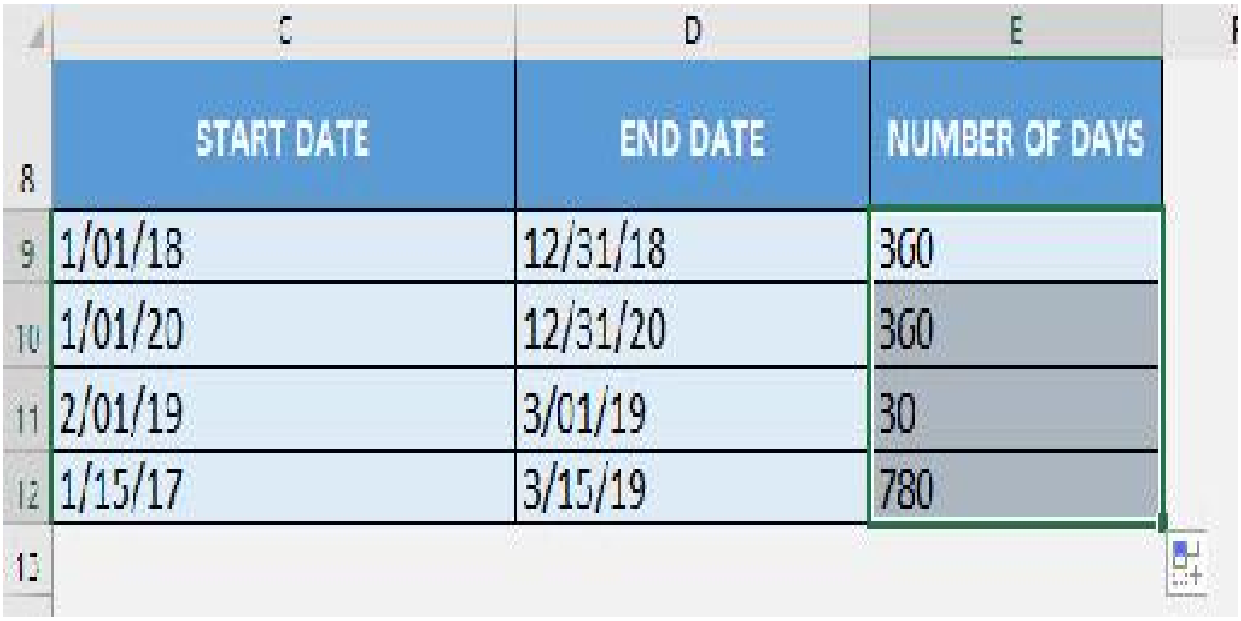
=DAYS360(C9, D9)

	C	D	E
8	START DATE	END DATE	
9	1/01/18	12/31/18	=DAYS360(C9, D9)
10	1/01/20	12/31/20	
11	2/01/19	3/01/19	
12	1/15/17	3/15/19	
13			

We will leave the method as blank, which will use the default US method. Apply the same formula to the rest of the cells by dragging the lower right corner downwards.

	C	D	E
8	START DATE	END DATE	NUMBER OF DAYS
9	1/01/18	12/31/18	360
10	1/01/20	12/31/20	
11	2/01/19	3/01/19	
12	1/15/17	3/15/19	

You now have your differences using 30-day months! Notice that 1 year is treated as 360 days (30 days x 12 months).



	C	D	E
8	START DATE	END DATE	NUMBER OF DAYS
9	1/01/18	12/31/18	360
10	1/01/20	12/31/20	360
11	2/01/19	3/01/19	30
12	1/15/17	3/15/19	780
13			

DAYS

What does it do?

Gets the number of days between two dates

Formula breakdown:

=DAYS(end_date, start_date)

What it means:

=DAYS(ending date, starting date)

Example:

=DAYS("12/31/18", "1/01/18") =364

Exercise Workbook:

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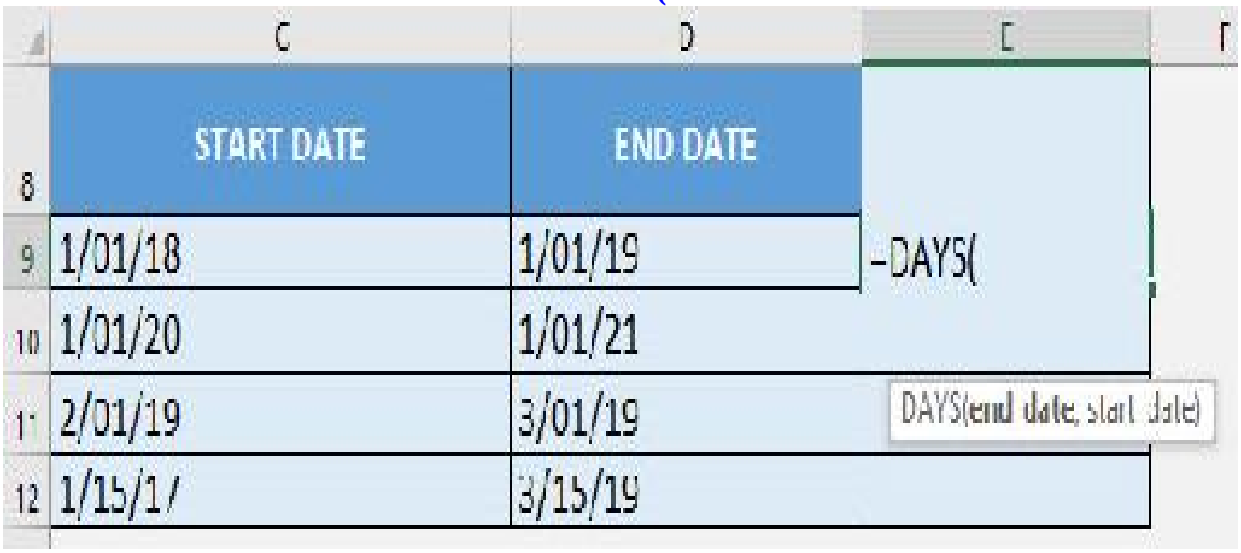
Have two dates that you want to check what is the difference in days? No problem! Excel's **DAYS Formula** will compute this easily for you!

I explain how you can do this below:

STEP 1: We need to **enter the *DAYS* function in a blank cell**:

=DAYS(



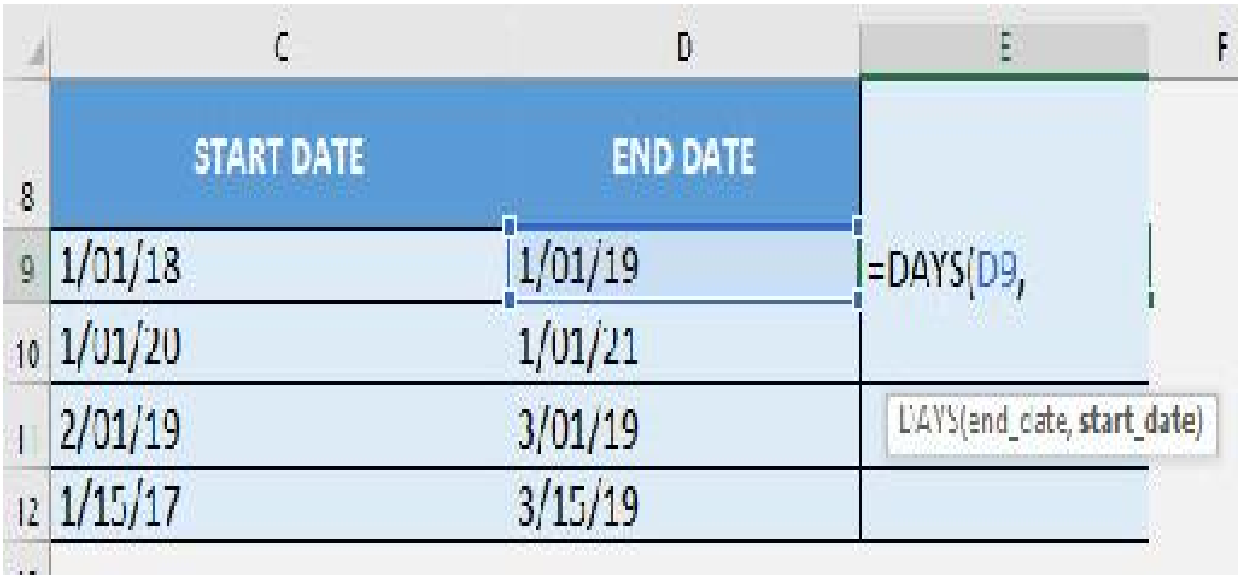
STEP 2: The **DAYS** arguments:

end_date

What is the ending date?

Select the cell containing the ending date:

=DAYS(D9,

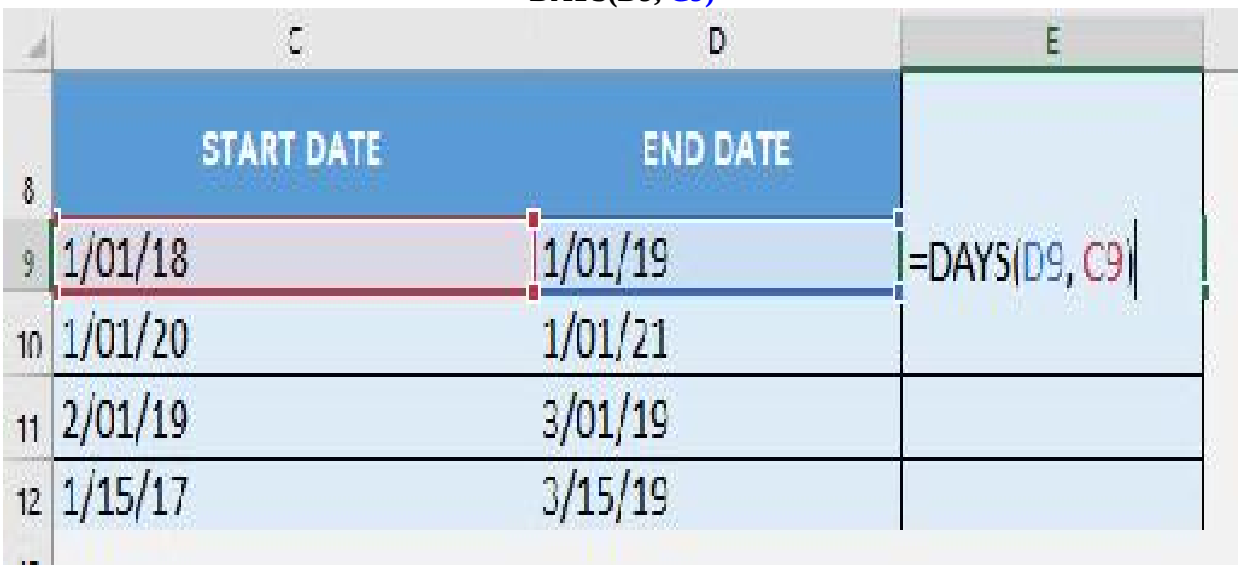


start_date

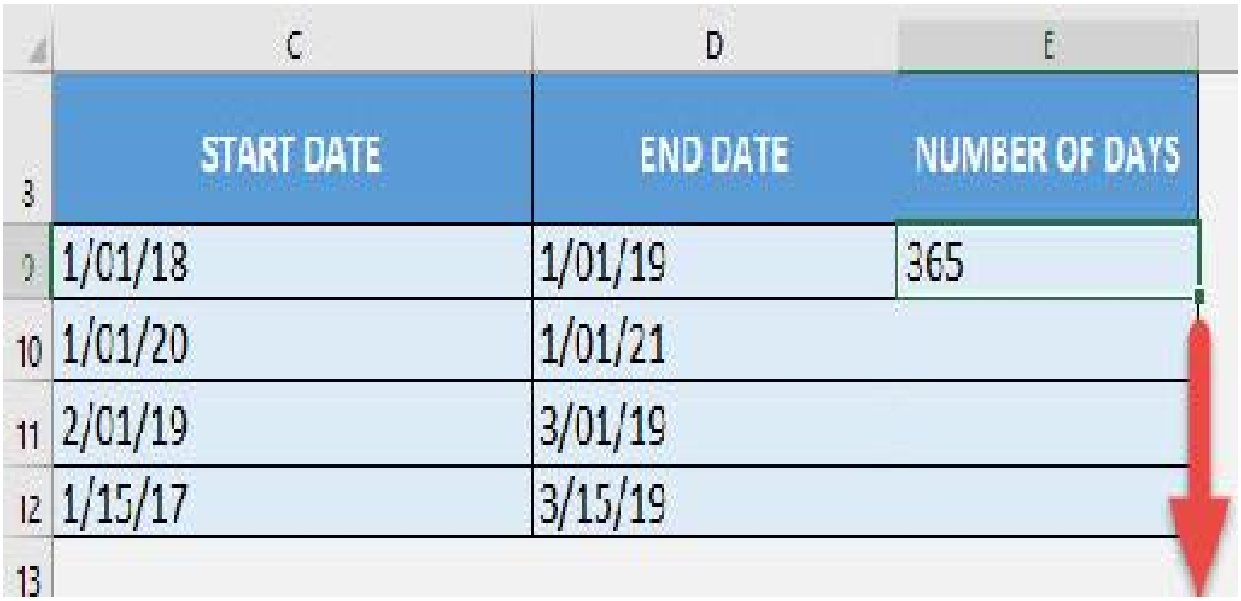
What is the starting date?

Select the cell containing the starting date:

=DAYS(D9, C9)

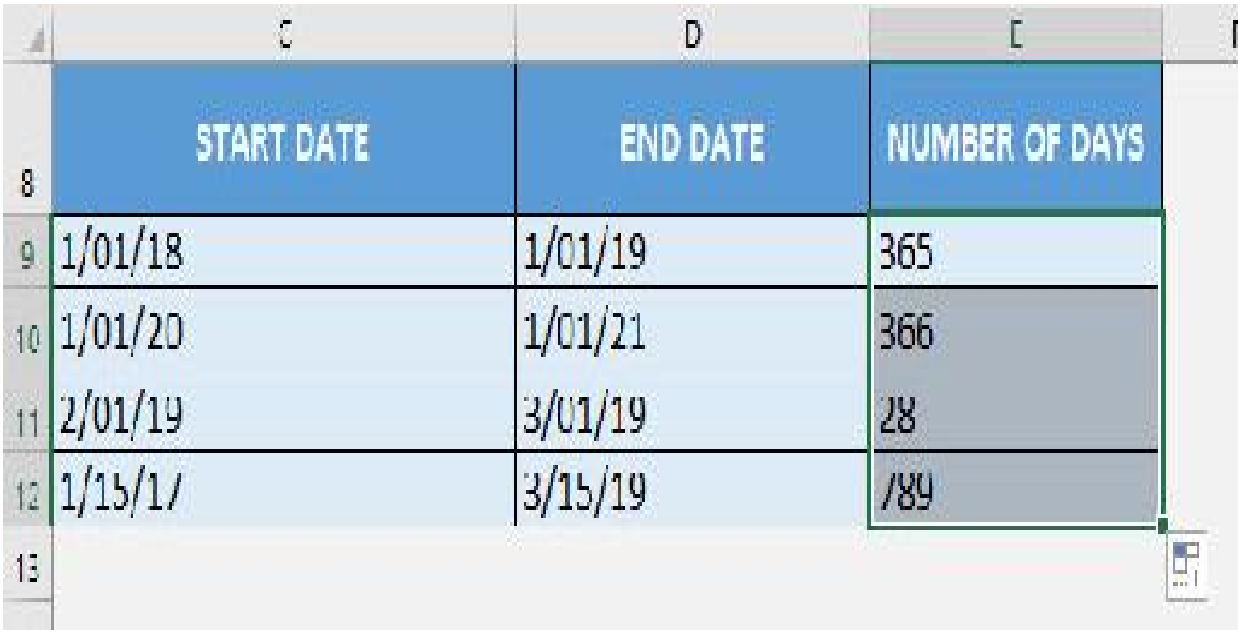


Apply the same formula to the rest of the cells by dragging the lower right corner downwards.



	C	D	E
8	START DATE	END DATE	NUMBER OF DAYS
9	1/01/18	1/01/19	365
10	1/01/20	1/01/21	
11	2/01/19	3/01/19	
12	1/15/17	3/15/19	
13			

You now have your differences in days!



	C	D	E
8	START DATE	END DATE	NUMBER OF DAYS
9	1/01/18	1/01/19	365
10	1/01/20	1/01/21	366
11	2/01/19	3/01/19	28
12	1/15/17	3/15/19	789
13			

ENDOFMONTH

What does it do?

Returns the last day of the month after a start date

Formula breakdown:

=EOMONTH(start_date, months)

What it means:

= EOMONTH (Your Start Date, enter 0 for current end of month, 1 for the next end of month, and so on...)

Example:

=EOMONTH("1/13/15",1) =”2/28/15”

Exercise Workbook:

DOWNLOAD EXCEL WORKBOOK

The **EOMONTH** (**EndOfMonth**) function in Excel is one that most people do not use because they just don't know that it exists.

It is a great Excel function to use if you want to see when the month end date is from a current date's value.

So if you have sales reps who make a sale during the month and their commission is due to be paid at the end of the next month, the **EOMONTH** function will help you determine the total sales due.

STEP 1: We need to enter the **EOMONTH** function in a blank cell:

=EOMONTH(

	A	B	C	D
11	SALES REPRESENTATIVE	SALE DATE	SALES AMOUNT	COMMISSION DUE DATE
12	Homer Simpson	1/13/15	$78,782	=EOMONTH(
13	Ian Wright	1/25/15	$72,602	
14	John Michaloudis	2/06/15	$48,503	
15	Michael Jackson	2/18/15	$44,316	
16	Homer Simpson	3/02/15	$47,810	
17	Ian Wright	3/14/15	$71,361	
18	John Michaloudis	3/26/15	$51,146	
19	Michael Jackson	4/07/15	$28,673	
20	Homer Simpson	4/19/15	$31,810	
21	Ian Wright	5/01/15	$52,916	
22	John Michaloudis	5/13/15	$71,305	
23	Michael Jackson	5/25/15	$27,757	
24	Homer Simpson	6/06/15	$47,404	
25	Ian Wright	6/18/15	$77,547	

STEP 2: The **EOMONTH** arguments:

start_date

What is your start_date?

=EOMONTH(B12,

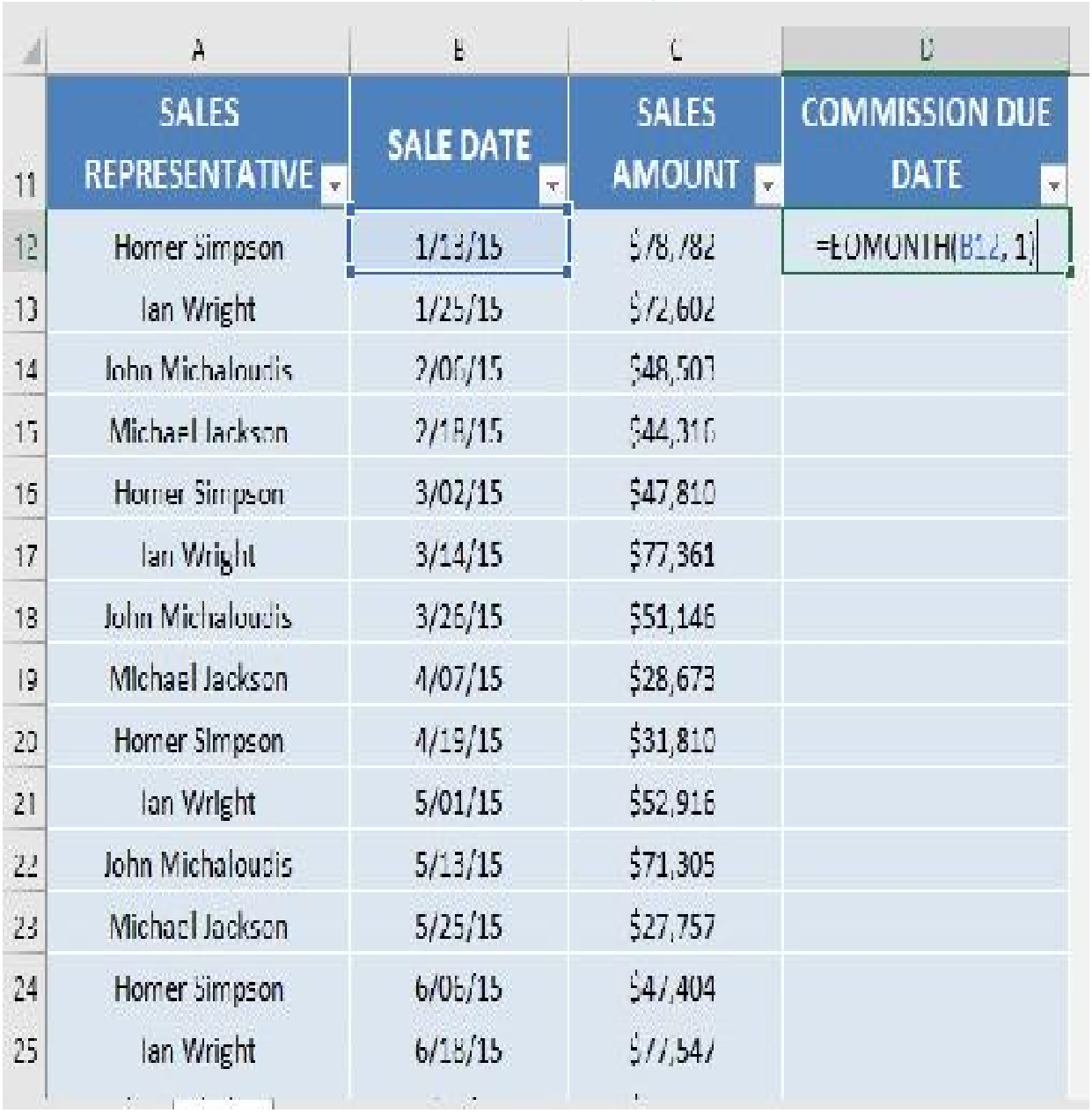
	A	B	C	D
11	SALES REPRESENTATIVE	SALE DATE	SALES AMOUNT	COMMISSION DUE DATE
12	Homer Simpson	1/13/15	$78,782	=EOMONTH(B12,
13	Ian Wright	1/25/15	$72,602	
14	John Michaloudis	2/06/15	$48,503	
15	Michael Jackson	2/18/15	$44,316	
16	Homer Simpson	3/02/15	$47,810	
17	Ian Wright	3/14/15	$77,361	
18	John Michaloudis	3/26/15	$51,146	
19	Michael Jackson	4/07/15	$28,673	
20	Homer Simpson	4/19/15	$31,810	
21	Ian Wright	5/01/15	$52,916	
22	John Michaloudis	5/13/15	$71,305	
23	Michael Jackson	5/25/15	$27,757	
24	Homer Simpson	6/06/15	$47,404	
25	Ian Wright	6/18/15	$77,547	

months

Which end of month do you want?

We can type in 0 for the current End of Month, or 1 for the next End of Month, and so on.

=EOMONTH(B12, 1)



	A	B	C	D
11	SALES REPRESENTATIVE	SALE DATE	SALES AMOUNT	COMMISSION DUE DATE
12	Homer Simpson	1/13/15	$78,782	=EOMONTH(B12, 1)
13	Ian Wright	1/25/15	$72,602	
14	John Michaloudis	2/06/15	$48,507	
15	Michael Jackson	2/18/15	$44,316	
16	Homer Simpson	3/02/15	$47,810	
17	Ian Wright	3/14/15	$77,361	
18	John Michaloudis	3/26/15	$51,146	
19	Michael Jackson	4/07/15	$28,673	
20	Homer Simpson	4/19/15	$31,810	
21	Ian Wright	5/01/15	$52,916	
22	John Michaloudis	5/13/15	$71,305	
23	Michael Jackson	5/25/15	$27,757	
24	Homer Simpson	6/06/15	$47,404	
25	Ian Wright	6/18/15	$77,547	

Apply the same formula to the rest of the cells by dragging the lower right corner downwards.

	A	B	C	D
11	SALES REPRESENTATIVE	SALE DATE	SALES AMOUNT	COMMISSION DUE DATE
12	Homer Simpson	1/13/15	$78,782	2/28/15
13	Ian Wright	1/25/15	$72,602	
14	John Michaloudis	2/06/15	$48,503	
15	Michael Jackson	2/18/15	$44,316	
16	Homer Simpson	3/02/15	$47,810	
17	Ian Wright	3/14/15	$77,361	
18	John Michaloudis	3/26/15	$51,146	
19	Michael Jackson	4/07/15	$28,673	
20	Homer Simpson	4/19/15	$31,810	
21	Ian Wright	5/01/15	$52,916	
22	John Michaloudis	5/13/15	$71,305	
23	Michael Jackson	5/25/15	$27,757	
24	Homer Simpson	6/06/15	$47,404	
25	Ian Wright	6/18/15	$77,547	

You now have all of results!

	A	B	C	D
11	SALES REPRESENTATIVE	SALE DATE	SALES AMOUNT	COMMISSION DUE DATE
12	Homer Simpson	1/13/15	$78,782	2/28/15
13	Ian Wright	1/25/15	$72,602	2/28/15
14	John Michaloudis	2/06/15	$48,503	3/31/15
15	Michael Jackson	2/18/15	$41,316	3/31/15
16	Homer Simpson	3/02/15	$47,810	4/30/15
17	Ian Wright	3/14/15	$77,361	4/30/15
18	John Michaloudis	3/26/15	$51,146	4/30/15
19	Michael Jackson	4/07/15	$28,673	5/31/15
20	Homer Simpson	4/19/15	$31,810	5/31/15
21	Ian Wright	5/01/15	$[illegible]	6/30/15
22	John Michaloudis	5/13/15	$71,305	6/30/15
23	Michael Jackson	5/25/15	$27,757	6/30/15
24	Homer Simpson	6/06/15	$47,404	7/31/15
25	Ian Wright	6/18/15	$77,547	7/31/15

HOUR

What does it do?

Gets the hour from the time

Formula breakdown:

=HOUR(serial_number)

What it means:

=HOUR(time where the hour will be extracted from)

Example:

=HOUR("6:00 PM") =18

Exercise Workbook:

DOWNLOAD EXCEL WORKBOOK

I recall wherein I had a lot of times and I wanted to extract the hour of the times one-by-one... It was too much of a hassle! Thankfully there is Excel's **HOUR Formula** to do that for me!

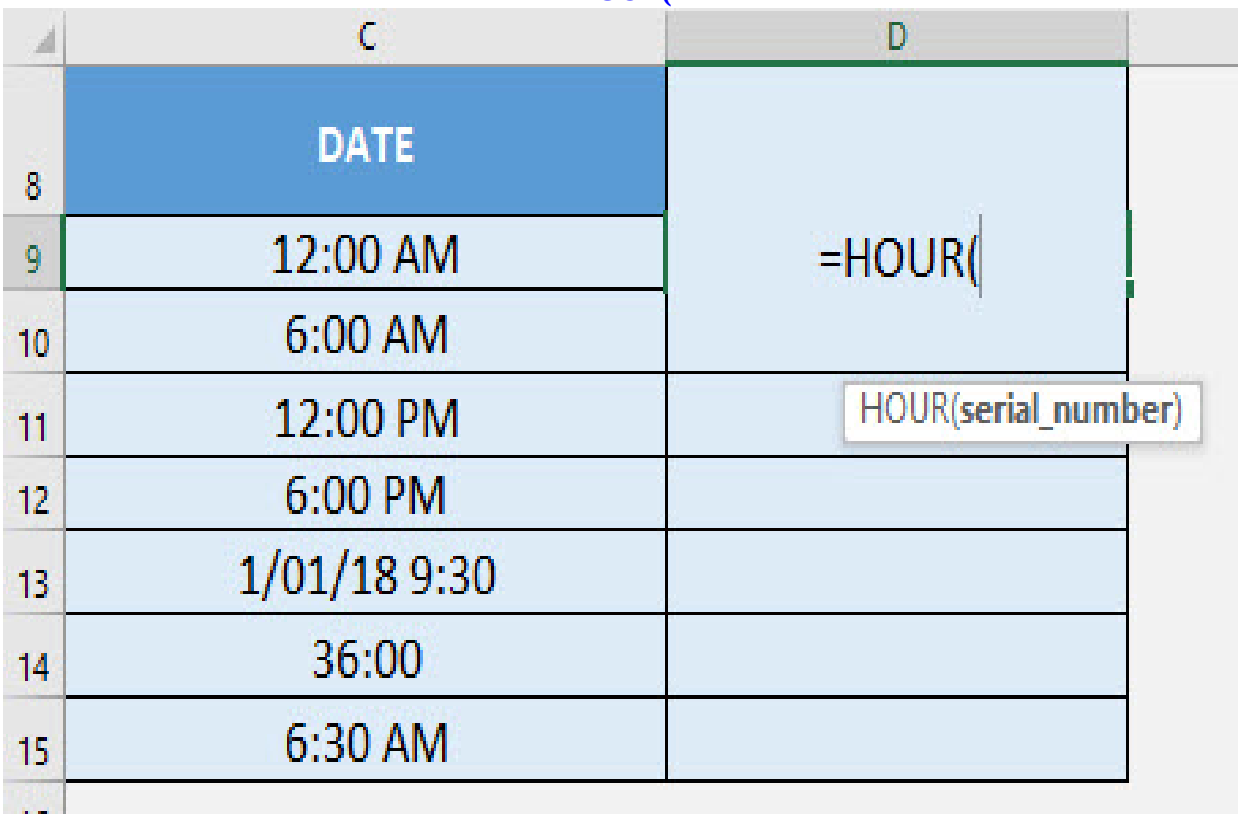
A couple of interesting things on the **HOUR Formula**:

- The hour it returns to you is similar to military time ranging from 0 - 23
- If it's a date time, then the date gets ignored
- If the time is greater than 24 hours, then it simply converts it to days and hours, then returns the hour component only

I explain how you can do this below:

STEP 1: We need to **enter the *HOUR* function in a blank cell**:

=HOUR(



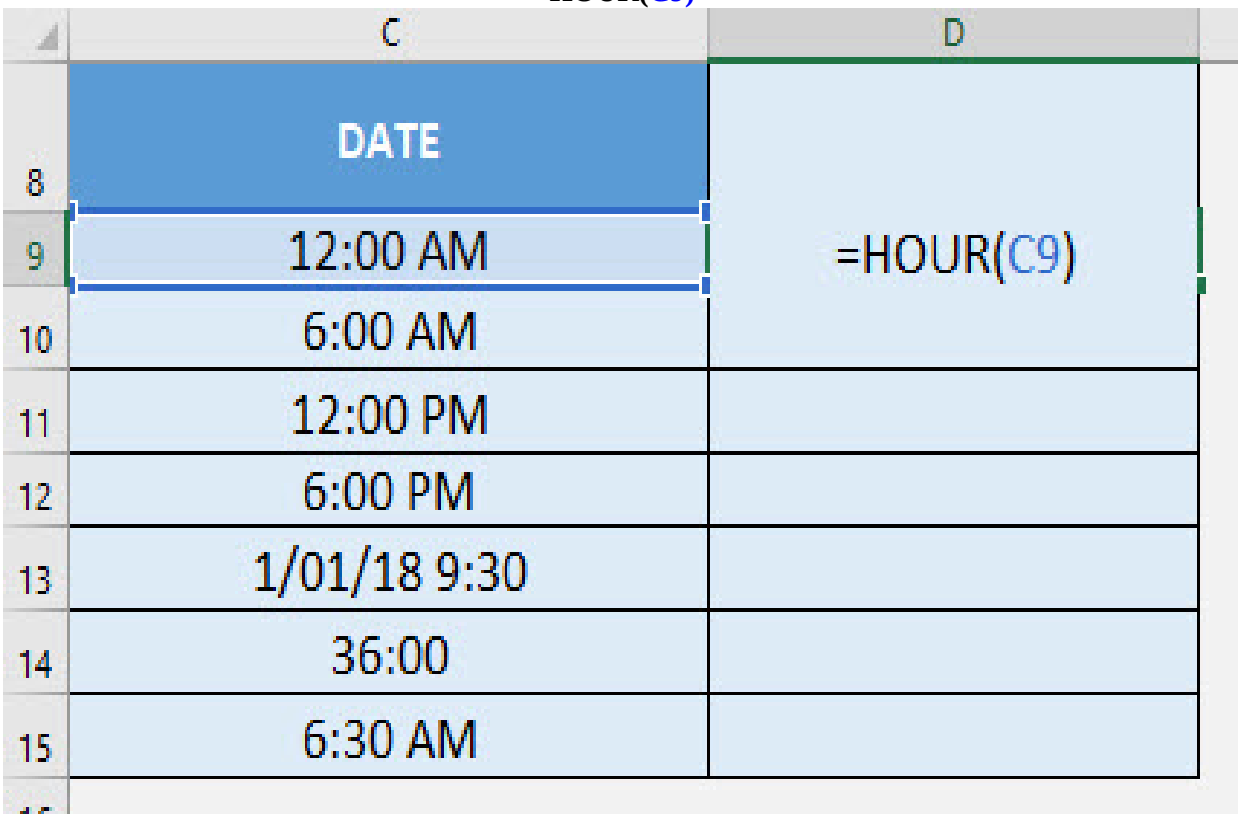
STEP 2: The **HOUR** arguments:

serial_number

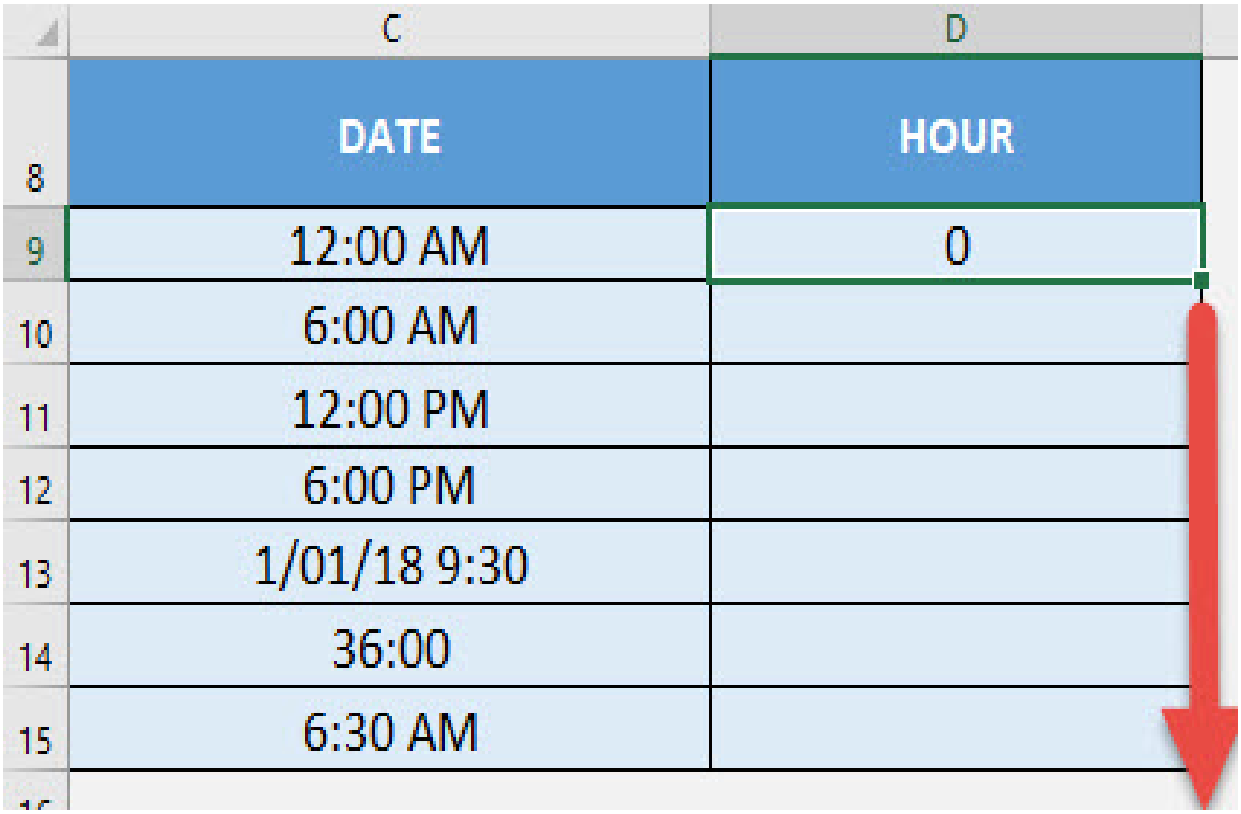
What is the time that you want to extract the hour from?

Select the cell containing the time:

=HOUR(C9)



Apply the same formula to the rest of the cells by dragging the lower right corner downwards.



	C	D
8	DATE	HOUR
9	12:00 AM	0
10	6:00 AM	
11	12:00 PM	
12	6:00 PM	
13	1/01/18 9:30	
14	36:00	
15	6:30 AM	

You now have your years extracted!

	C	D
8	DATE	HOUR
9	12:00 AM	0
10	6:00 AM	6
11	12:00 PM	12
12	6:00 PM	18
13	1/01/18 9:30	9
14	36:00	12
15	6:30 AM	6
16		
17		

MONTH

What does it do?

Gets the month from the date

Formula breakdown:

=MONTH(serial_number)

What it means:

=MONTH(date where the month will be extracted from)

Example:

=MONTH("4/11/85") =4

Exercise Workbook:

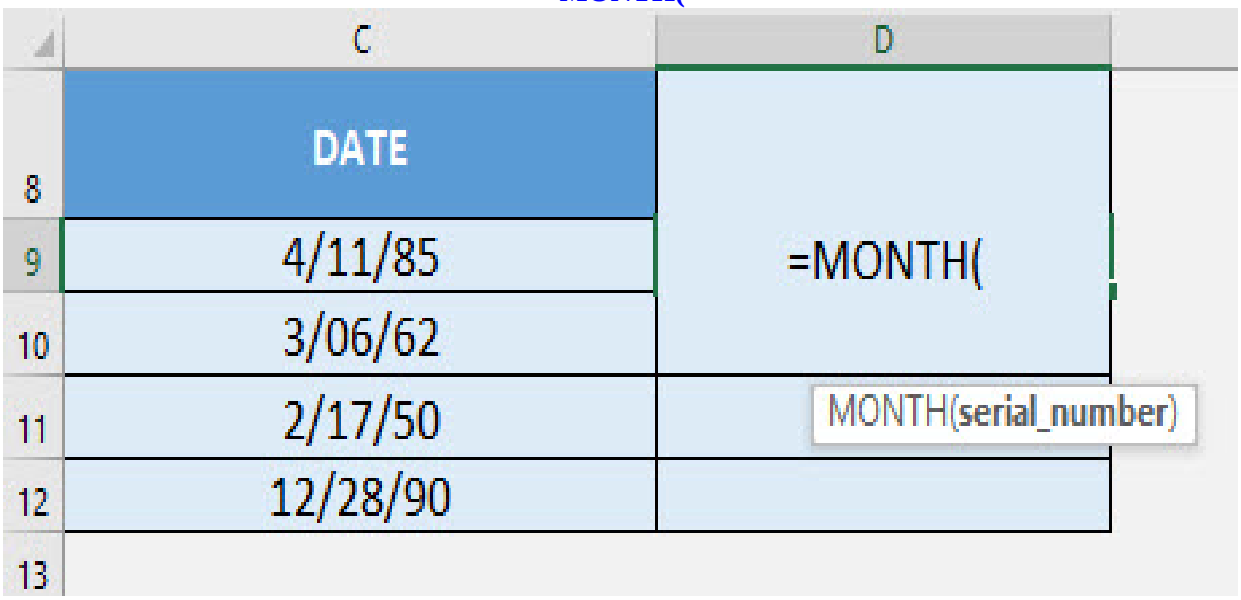
DOWNLOAD EXCEL WORKBOOK

I recall wherein I had a lot of dates and I wanted to extract the month of the dates one-by-one... It was too much of a hassle! Thankfully there is Excel's **MONTH Formula** to do that for me!

I explain how you can do this below:

STEP 1: We need to **enter the *MONTH* function in a blank cell**:

=MONTH(



STEP 2: The **MONTH** arguments:

serial_number

What is the date that you want to extract the month from?

Select the cell containing the date:

=MONTH(C9)

	C	D
8	DATE	
9	4/11/85	=MONTH(C9)
10	3/06/62	
11	2/17/50	
12	12/28/90	
13		

Apply the same formula to the rest of the cells by dragging the lower right corner downwards.

	C	D
8	DATE	MONTH
9	4/11/85	4
10	3/06/62	
11	2/17/50	
12	12/28/90	

You now have your months extracted!

	C	D
8	DATE	MONTH
9	4/11/85	4
10	3/06/62	3
11	2/17/50	2
12	12/28/90	12
13		

NETWORKDAYS

What does it do?

Gets the number of working days between two dates

Formula breakdown:

=NETWORKDAYS(start_date, end_date, [holidays])

What it means:

=NETWORKDAYS(starting date, ending date, [holidays to exclude])

Example:

=NETWORKDAYS(“1/01/18”,”1/07/18”,A9:A11) =number of days minus holidays

Exercise Workbook:

DOWNLOAD EXCEL WORKBOOK

If you want to calculate the number of working days, it is very difficult to do by hand! Imagine going through your calendar and counting the weekdays week per week. Thankfully there is Excel's **NETWORKDAYS Formula!**

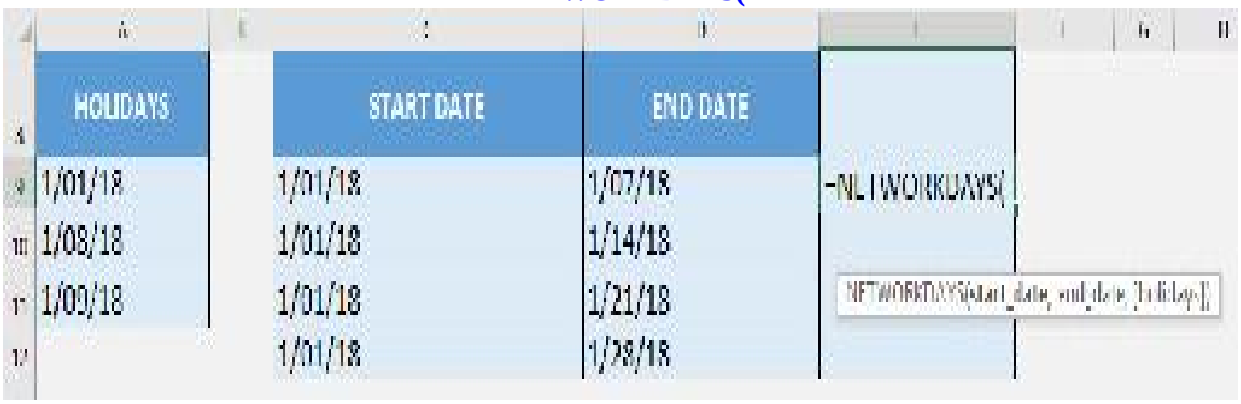
The **NETWORKDAYS Formula** will exclude the weekends in the count, and you can also provide it a list of holidays for it to exclude as well in the count!

Let us try out in our example below from **January 1, 2018 to January 28, 2018**, for these 4 weeks it should be a **total of 20 working days**. Let us add in **3 holidays** during this period, so that total working days will be reduced to **17 working days**.

I explain how you can do this below:

STEP 1: We need to **enter the *NETWORKDAYS* function in a blank cell**:

=NETWORKDAYS(



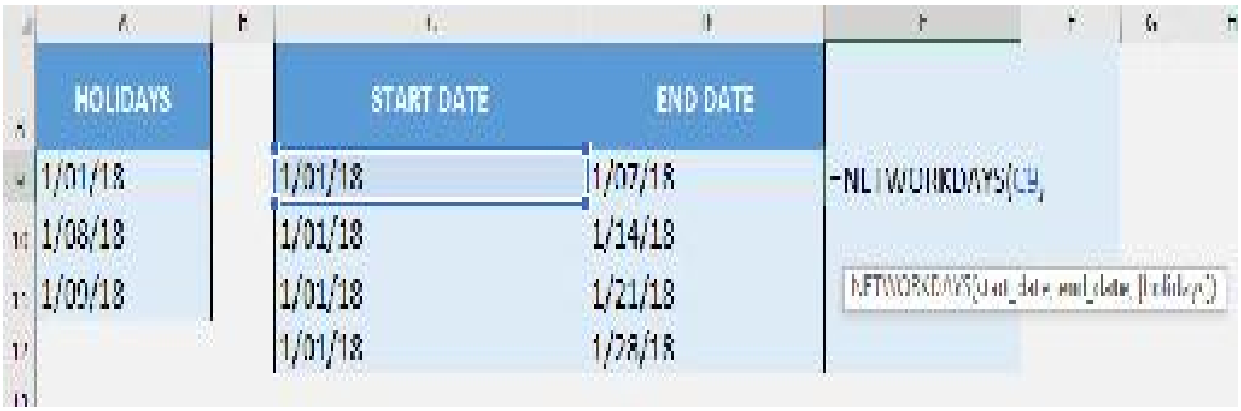
STEP 2: The **NETWORKDAYS** arguments:

start_date

What is the start date?

Select the cell containing the starting date:

=NETWORKDAYS(C9,

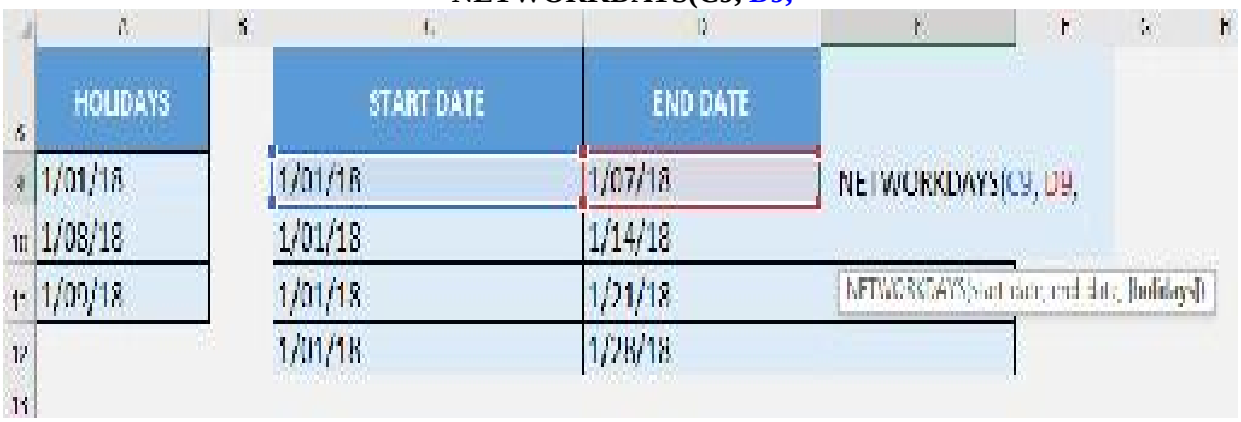


end_date

What is the end date?

Select the cell containing the ending date:

=NETWORKDAYS(C9, D9,

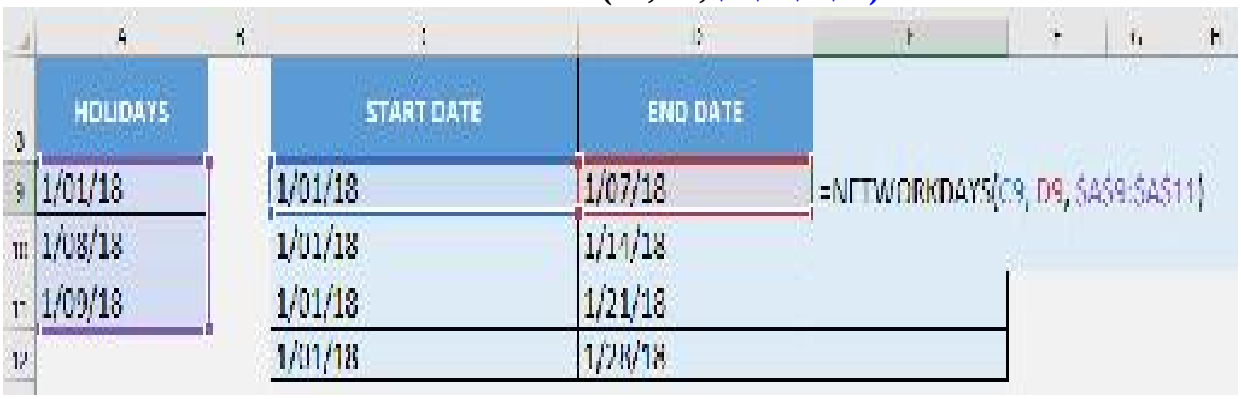


[holidays]

Any holidays that you want to be excluded from the total count?

*Select the range of cells containing your holidays. Ensure to press **F4** to make your cell reference absolute:*

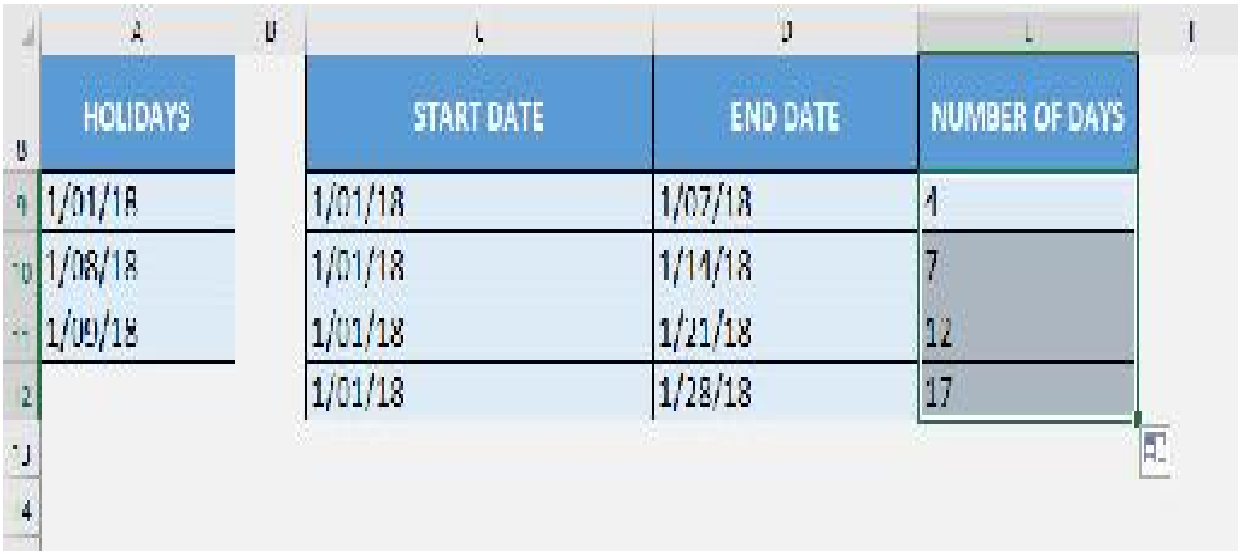
=NETWORKDAYS(C9, D9, $A$9:$A$11)



Apply the same formula to the rest of the cells by dragging the lower right corner downwards.

HOLIDAYS	START DATE	END DATE	NUMBER OF DAYS
1/01/18	1/01/18	1/07/18	4
1/08/18	1/01/18	1/14/18	
1/09/18	1/01/18	1/21/18	
	1/01/18	1/28/18	

You now have the number of working days and the holidays are excluded!



HOLIDAYS	START DATE	END DATE	NUMBER OF DAYS
1/01/18	1/01/18	1/07/18	4
1/08/18	1/01/18	1/14/18	7
1/09/18	1/01/18	1/21/18	12
	1/01/18	1/28/18	17

TODAY

What does it do?

Returns today's date

Formula breakdown:

=TODAY()

What it means:

=TODAY()

Example:

=TODAY() ="11/29/2018"

Exercise Workbook:

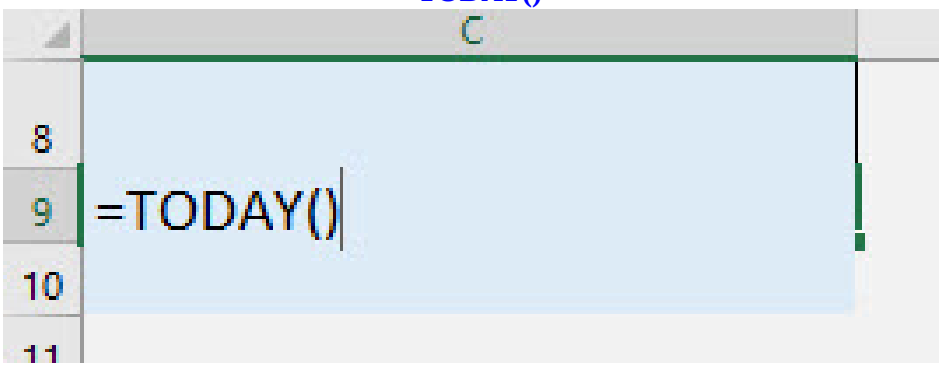
DOWNLOAD EXCEL WORKBOOK

Have a dynamic formula that needs the current date and you are tired of changing the date everyday? Use Excel's **TODAY Formula** to have it update dynamically!

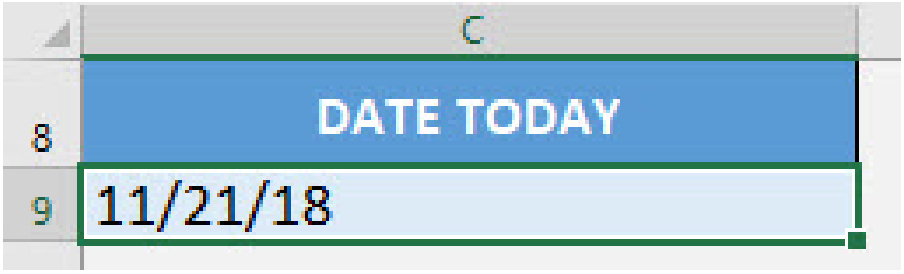
I explain how you can do this below:

STEP 1: We need to **enter the *TODAY* function in a blank cell**:

=TODAY()



And just like that, you already have today's date!



WEEKDAY

What does it do?

Returns the day of the week corresponding to a date. The day is given as an integer, ranging from 1 (Sunday) to 7 (Saturday), by default.

Formula breakdown:

=WEEKDAY(Serial_Number, [Return_Type])

What it means:

=WEEKDAY(Date, [Numbers 1 (Sunday) through 7 (Saturday)])

Example:

=WEEKDAY("5/18/85",1) =7

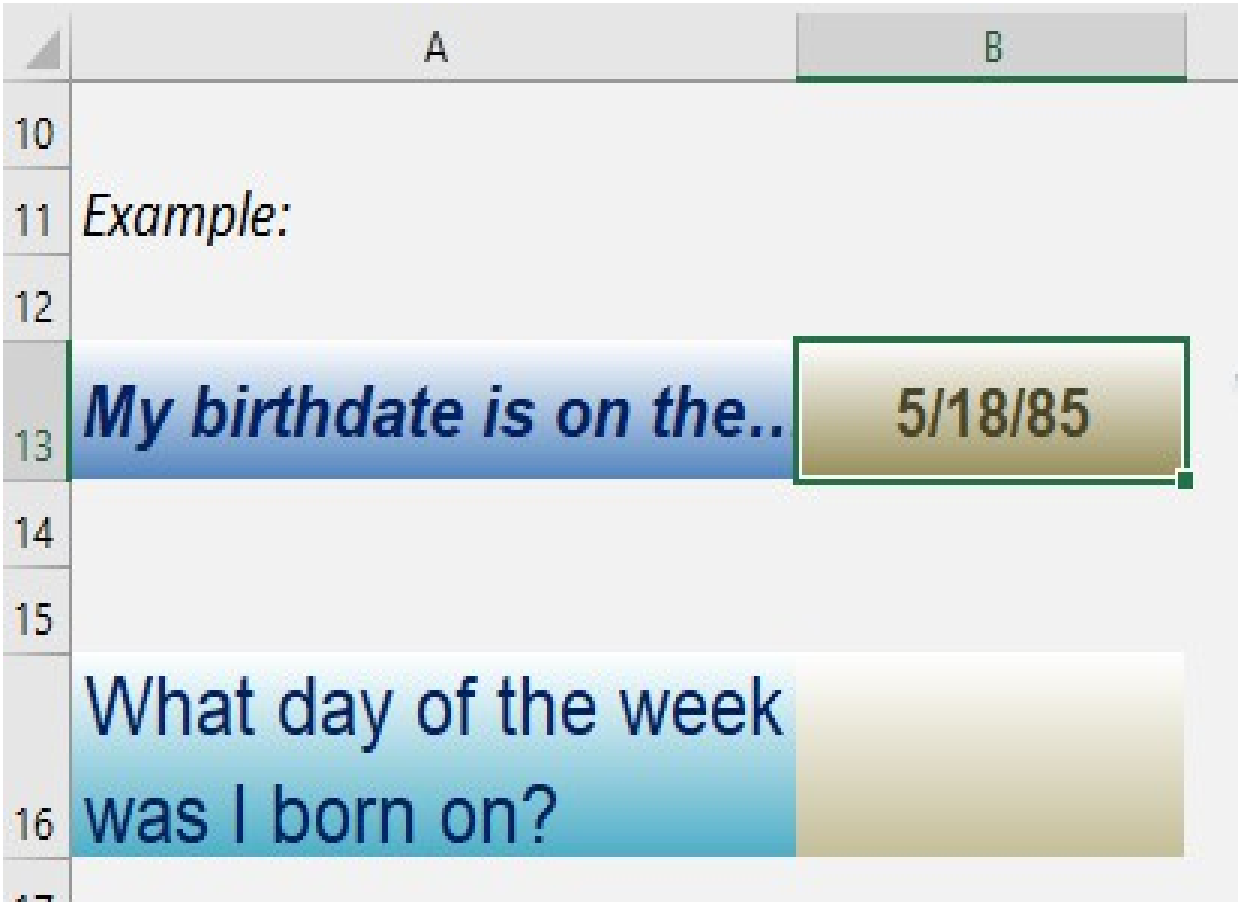
Exercise Workbook:

DOWNLOAD EXCEL WORKBOOK

The **WEEKDAY** function returns the day of the week corresponding to a date. The day is given as an integer, ranging from 1 (Sunday) to 7 (Saturday).

So if you want to find out on what day you were born, then the **WEEKDAY** function will remind you.

STEP 1: Enter any date that you want.



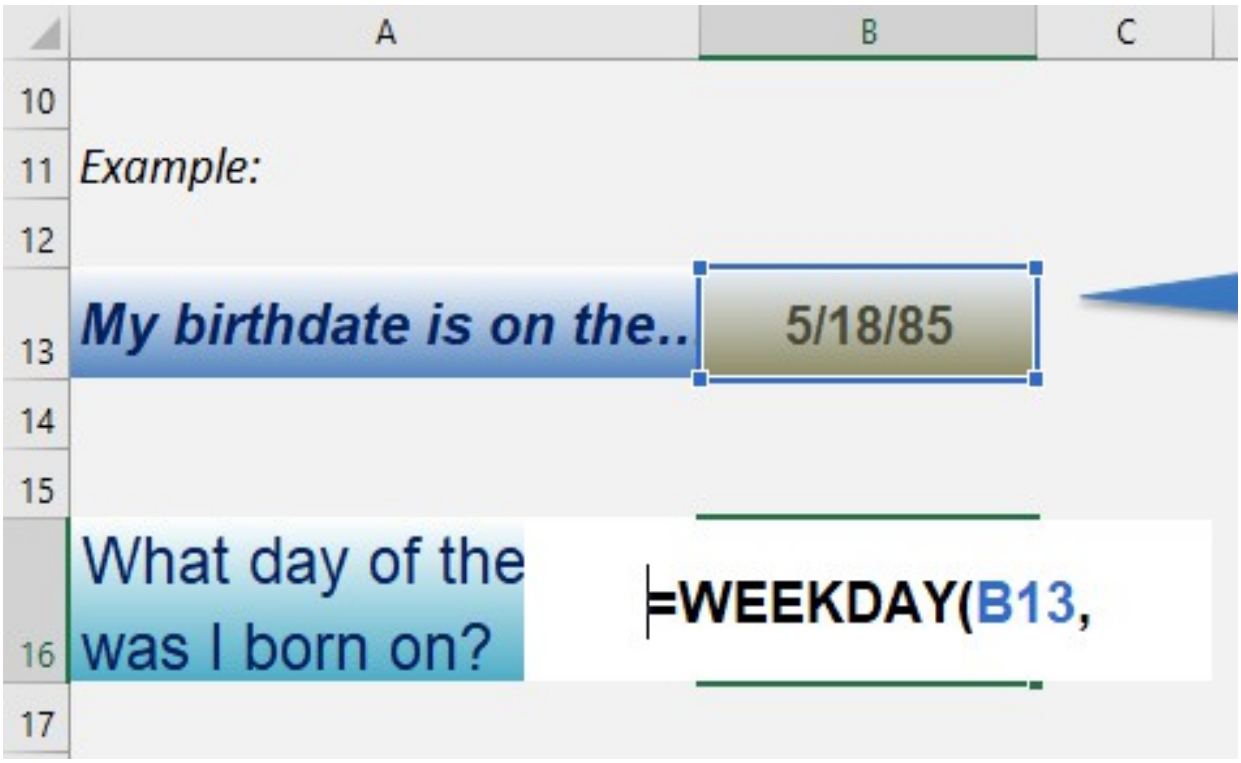
STEP 2: The **WEEKDAY** arguments:

date

What is the date?

Select the date you have entered

=WEEKDAY(B13,



return_Type

What kind of output do you want to show?

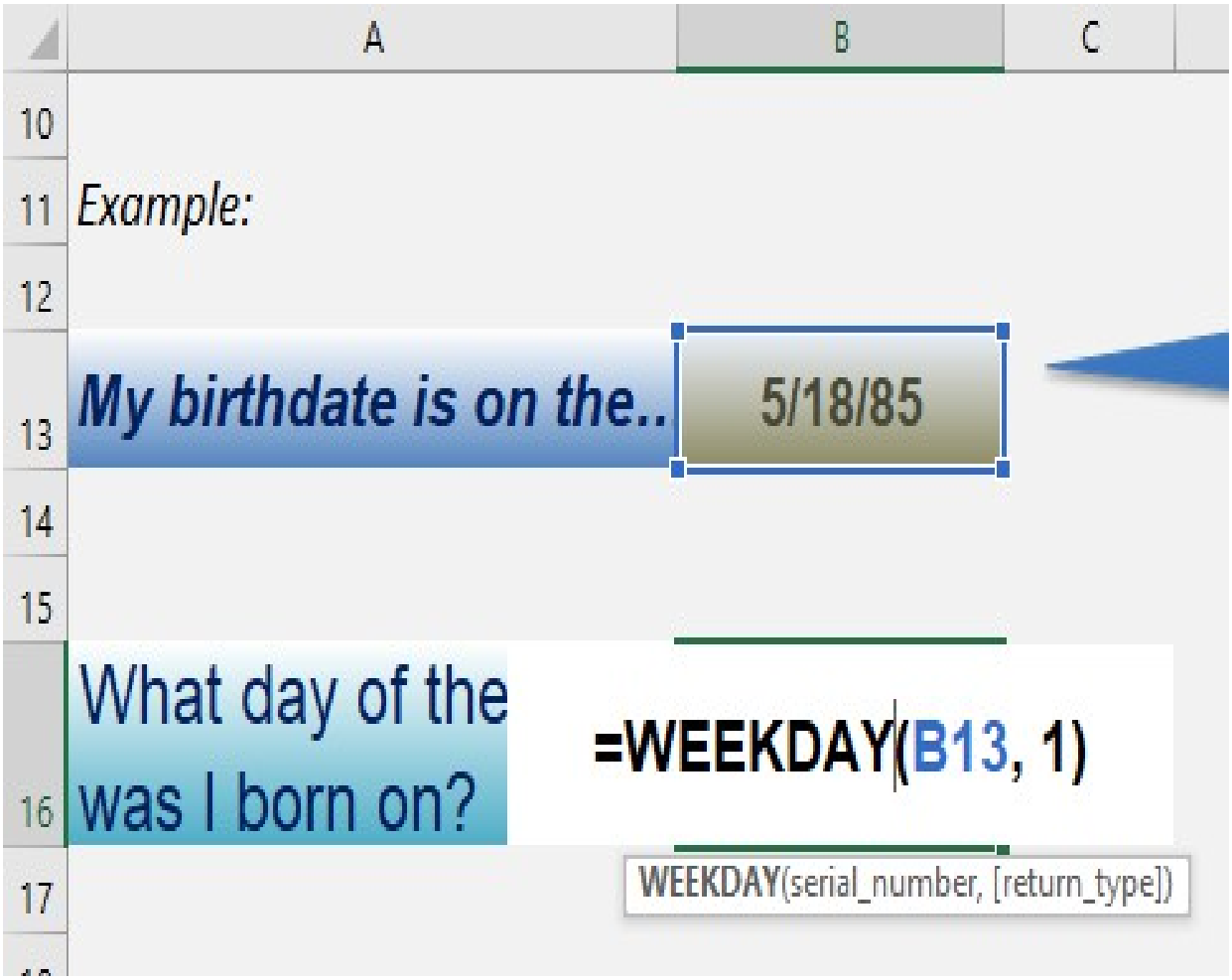
For Sunday=1 through to Saturday=7, use 1

For Monday=1 through to Sunday=7, use 2

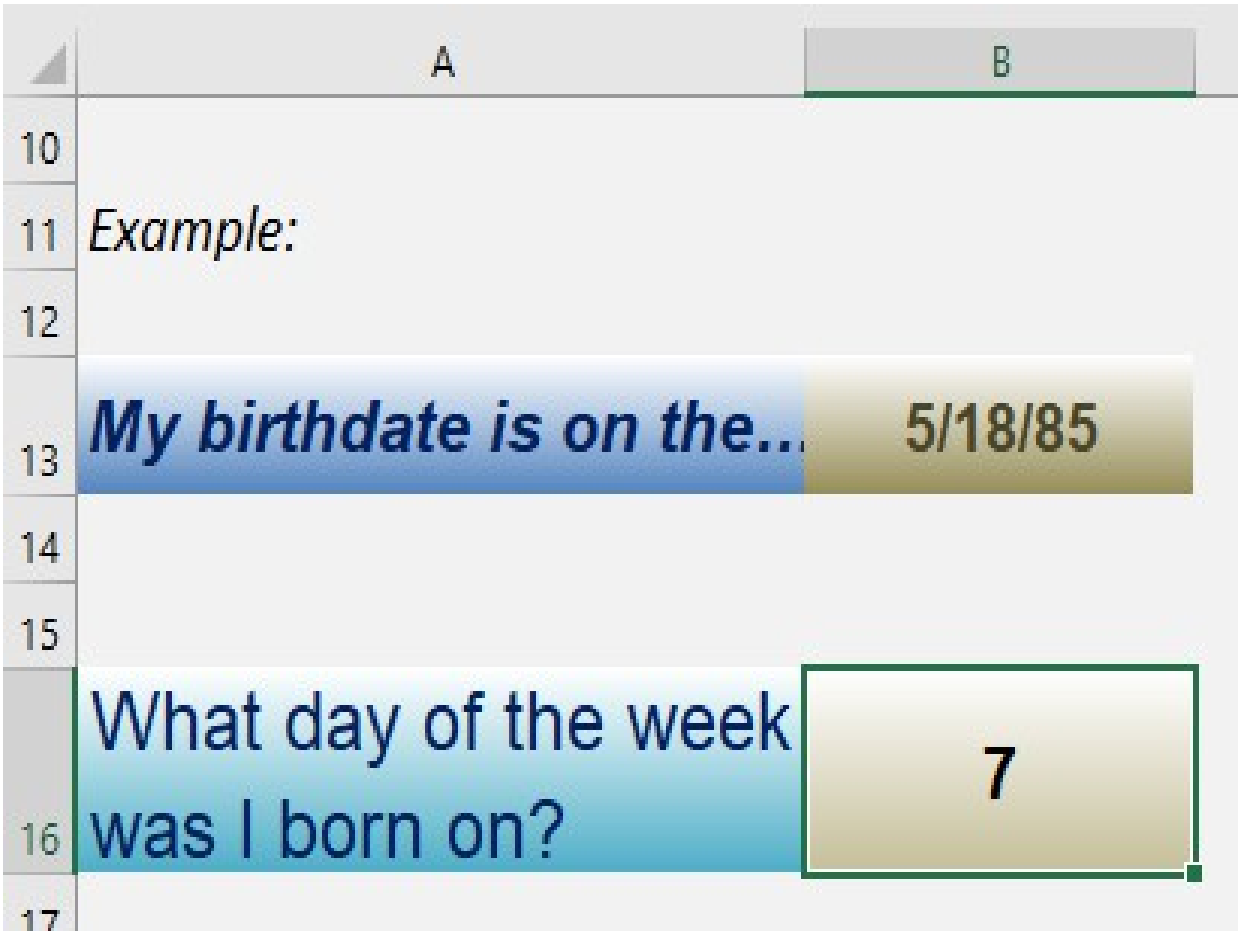
Type in **1** to get the number of the day of the week

We get a result of 7 here, which signifies a **Saturday**. As Type 1 represents days **ranging from 1 (Sunday) to 7 (Saturday).**

=WEEKDAY(B13, 1)



Now we know the day in an instant!


A
B
10
11
Example:
12
13
My birthdate is on the...
5/18/85
14
15
16
What day of the week was I born on?
7
17

WEEKNUM

What does it do?

Gets the week number from the date

Formula breakdown:

=WEEKNUM(serial_number, [return_type])

What it means:

=WEEKNUM(date where the week number will be retrieved, [day when the week will begin])

Example:

=WEEKNUM("4/11/1985") =15

Exercise Workbook:

DOWNLOAD EXCEL WORKBOOK

Do you need to retrieve the week number from a given date? The **WEEKNUM Formula** in Excel is perfect for this!

There are a couple of interesting points to take note of the **WEEKNUM Formula**:

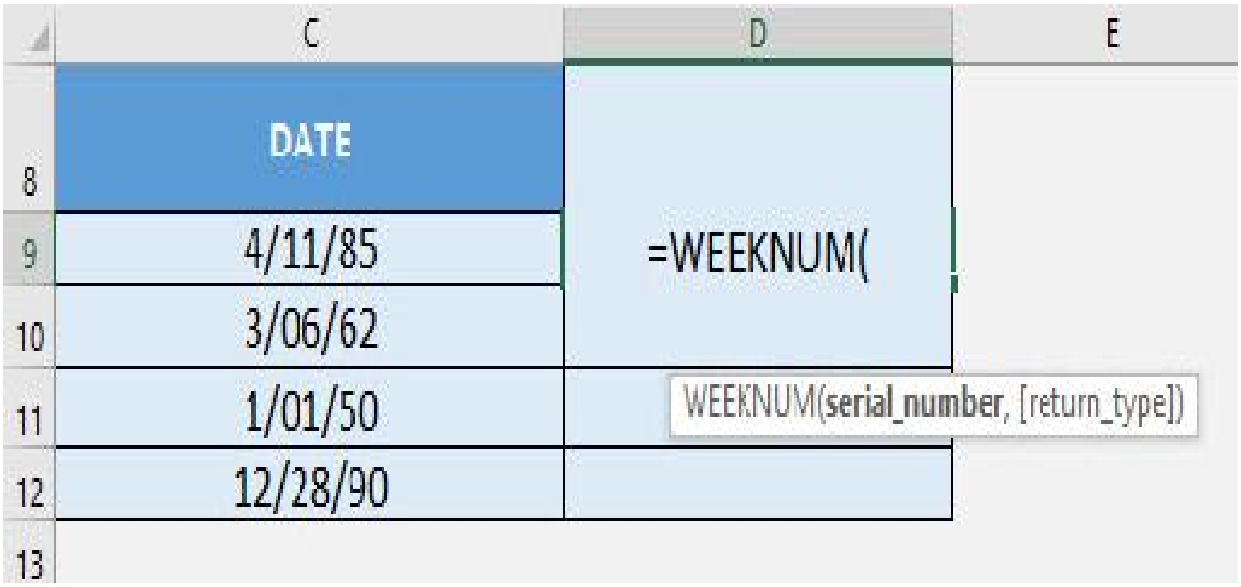
- The return type parameter specifies which day of the week is used to start a new week number. For our examples, we will be using the default. But there are a number of settings that you can use:

- 1 (default) - Sunday
- 2 - Monday
- 11 - Monday
- 12 - Tuesday
- 13 - Wednesday
- 14 - Thursday
- 15 - Friday
- 16 - Saturday
- 17 - Sunday
- 21 - Monday, the difference here is it uses the European week numbering system, week 1 is the week containing the first Thursday of the year as specified in ISO 8601

I explain how you can do this below:

STEP 1: We need to **enter the *WEEKNUM* function in a blank cell**:

=WEEKNUM(



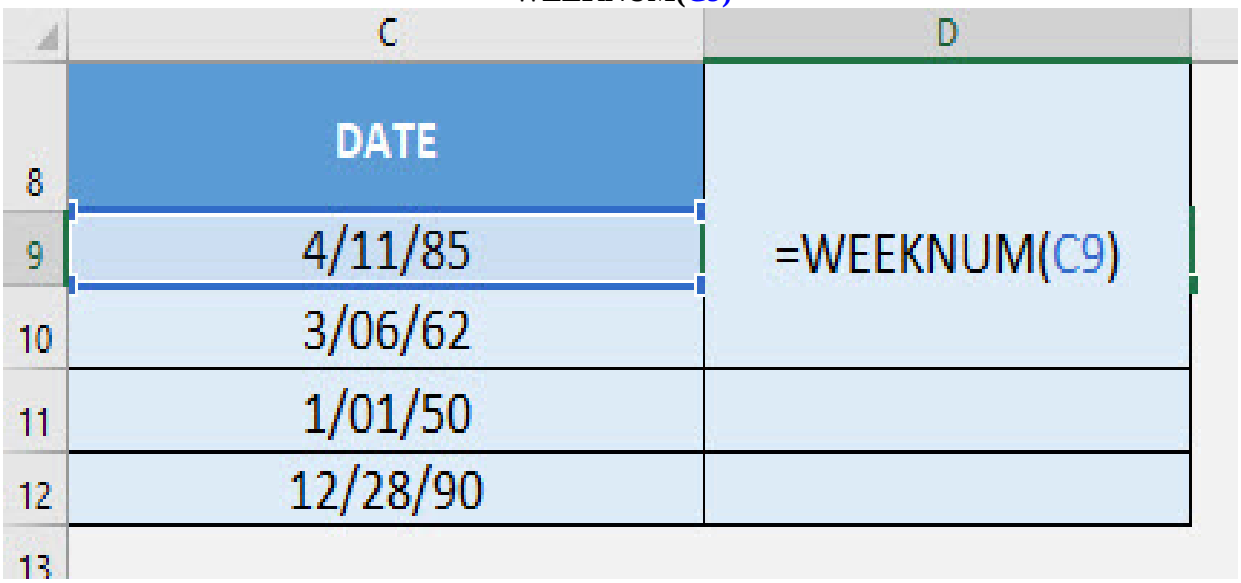
STEP 2: The **WEEKNUM** arguments:

serial_number

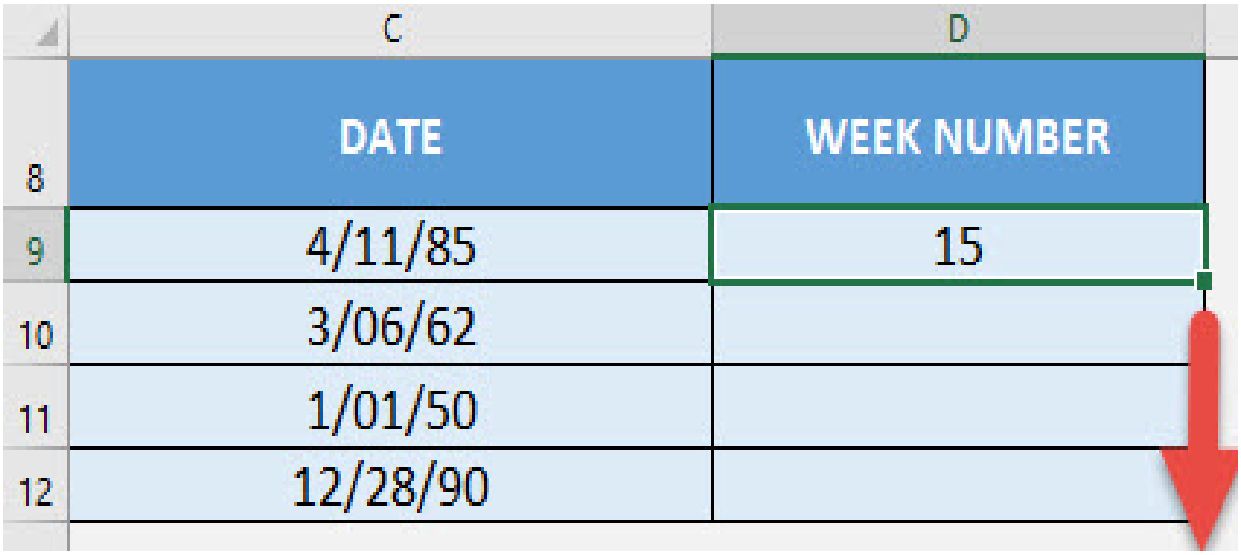
What is the date to extract the week number from?

Select the cell containing the date:

=WEEKNUM(C9)

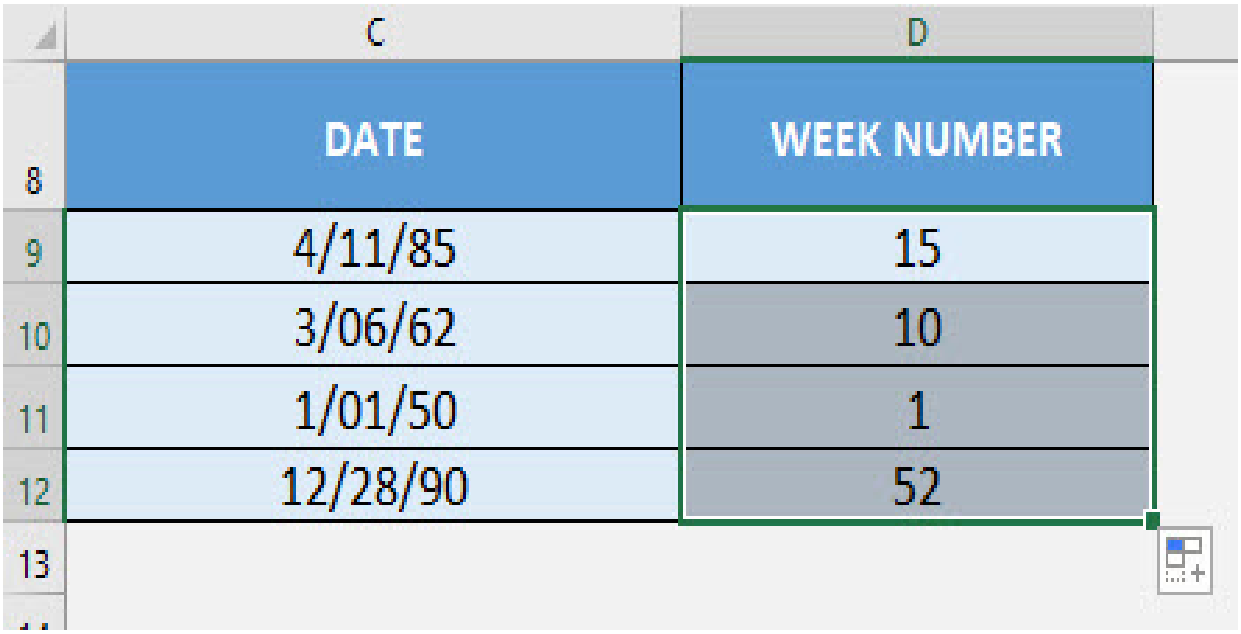


Apply the same formula to the rest of the cells by dragging the lower right corner downwards.



	C	D
8	DATE	WEEK NUMBER
9	4/11/85	15
10	3/06/62	
11	1/01/50	
12	12/28/90	

You now have your week numbers!



	C	D
8	DATE	WEEK NUMBER
9	4/11/85	15
10	3/06/62	10
11	1/01/50	1
12	12/28/90	52
13		

WORKDAY

What does it do?

Adds/Subtracts a specified number of workdays to a Date, which will give you a Future/Past Date

Formula breakdown:

=WORKDAY(start_date, days, [holidays])

What it means:

=WORKDAY(specified date, number of work days to add/subtract, [holidays to be considered])

Example:

=WORKDAY("2/12/2010",10) ="2/26/2010"

Exercise Workbook:

DOWNLOAD EXCEL WORKBOOK

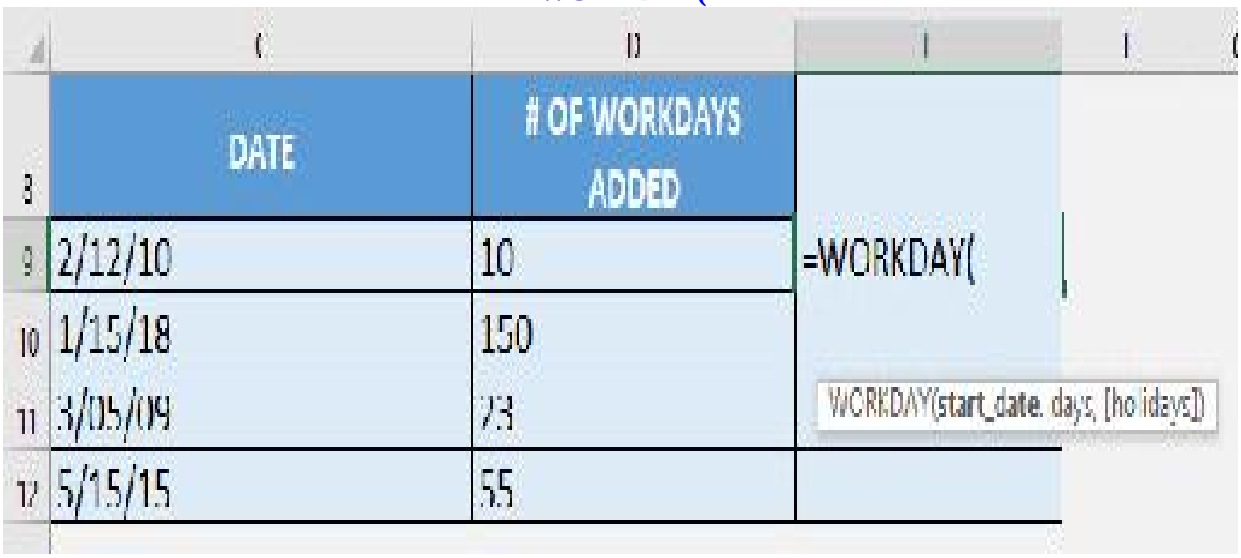
If you want to calculate the future date based on a number of working days added, it will be difficult to manually calculate this!

The hard way: I would normally grab my calendar, and count the days one by one!

The easy way: Excel's **WORKDAY formula!**

STEP 1: We need to **enter the *WORKDAY* function in a blank cell**:

=WORKDAY(



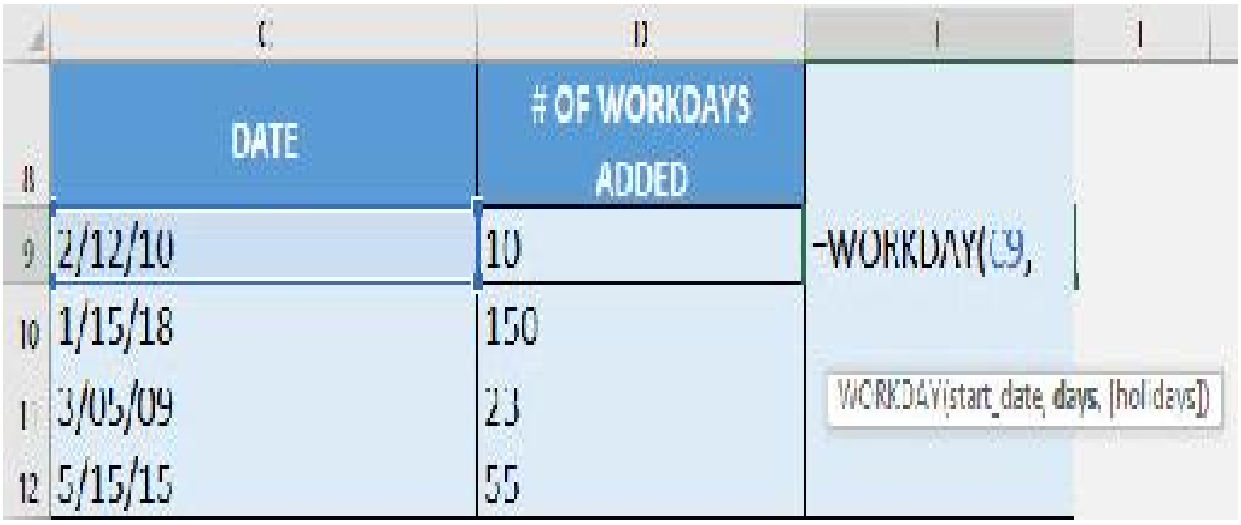
STEP 2: The **WORKDAY** arguments:

start_date

What is the specified date?

Select the cell containing the date you want to add the number of workdays to:

=WORKDAY(C9,

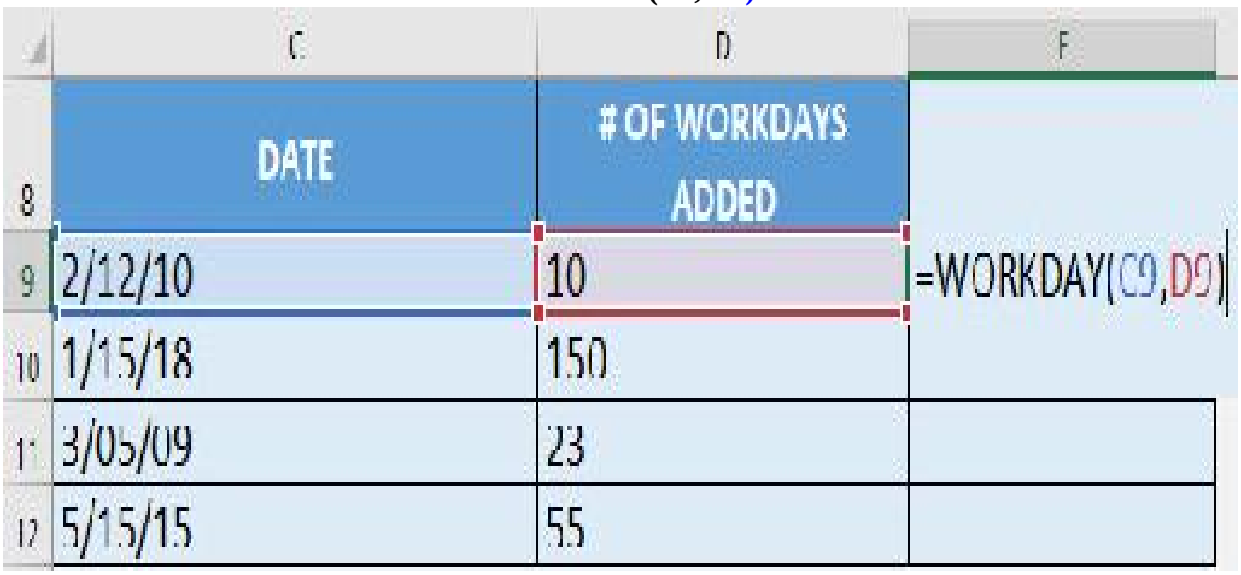


days

How many work days to be added?

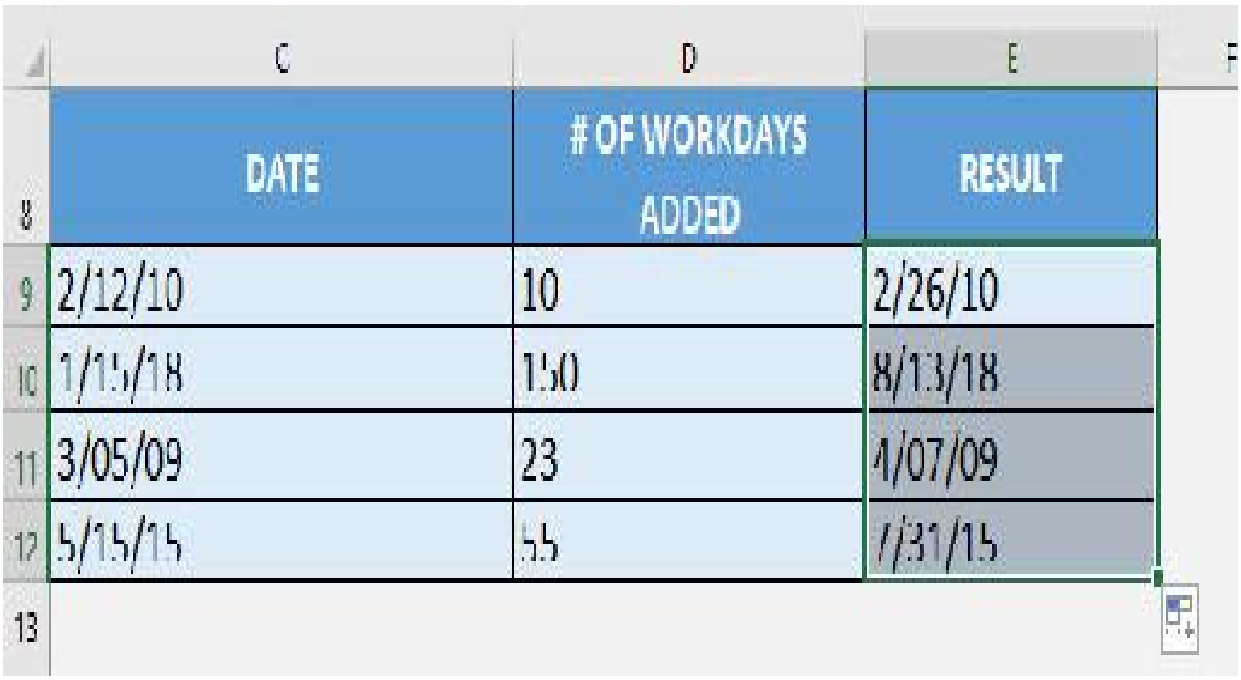
Select the cell containing the number of work days to be added (i.e The number of non-weekend and non-holiday days after the start date):

=WORKDAY(C9, D9)



Apply the same formula to the rest of the cells by dragging the lower right corner downwards.

You now have your future dates with the work days added!



	C	D	E	F
8	DATE	# OF WORKDAYS ADDED	RESULT	
9	2/12/10	10	2/26/10	
10	1/15/18	150	8/13/18	
11	3/05/09	23	4/07/09	
12	5/15/15	55	7/31/15	
13				

YEAR

What does it do?

Extracts the Year from the Date

Formula breakdown:

=YEAR(serial_number)

What it means:

=YEAR(date where the year will be extracted from)

Example:

=YEAR("4/11/85") =1985

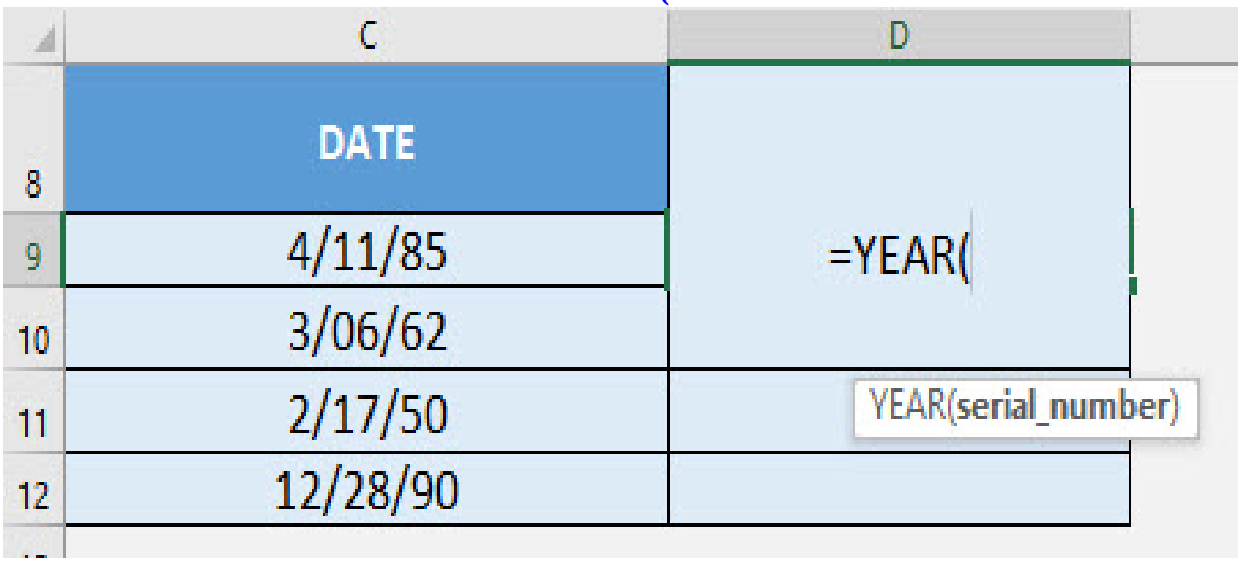
Exercise Workbook:

DOWNLOAD EXCEL WORKBOOK

I recall wherein I had a lot of dates and I wanted to extract the year of the dates one-by-one... It was too much of a hassle! Thankfully there is Excel's **YEAR Formula** to do that for me!

STEP 1: We need to **enter the *YEAR* function in a blank cell**:

=YEAR(



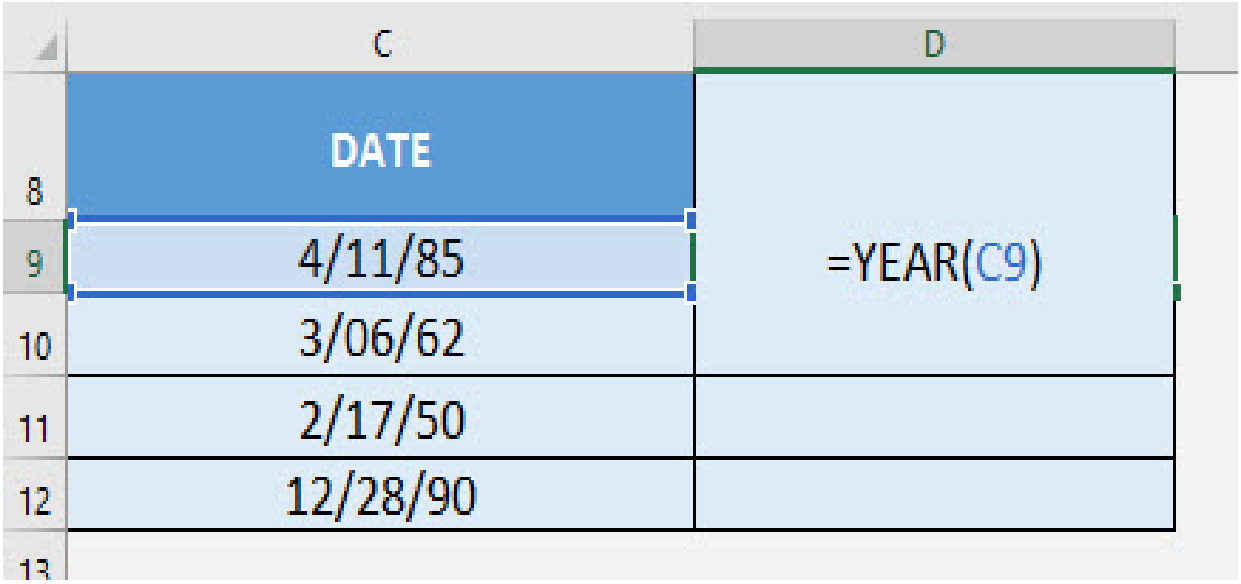
STEP 2: The **YEAR** arguments:

serial_number

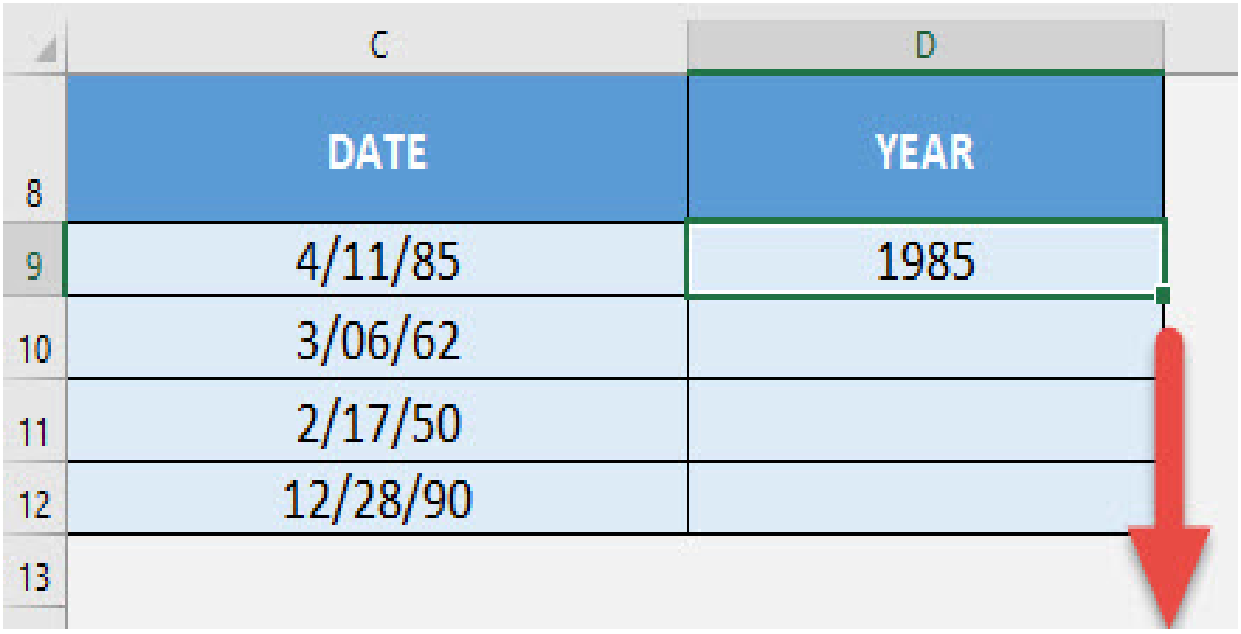
What is the Date that you want to extract the Year from?

Select the cell containing the date:

=YEAR(C9)



Apply the same formula to the rest of the cells by dragging the lower right corner downwards.



You now have your years extracted!

	C	D
8	DATE	YEAR
9	4/11/85	1985
10	3/06/62	1962
11	2/17/50	1950
12	12/28/90	1990
13		

INFORMATION FUNCTIONS

ISBLANK

What does it do?

Checks if the cell value is empty or not

Formula breakdown:

=ISBLANK(value)

What it means:

=ISBLANK(value to be checked to see if it is empty or not)

Example:

=ISBLANK("abc") =FALSE

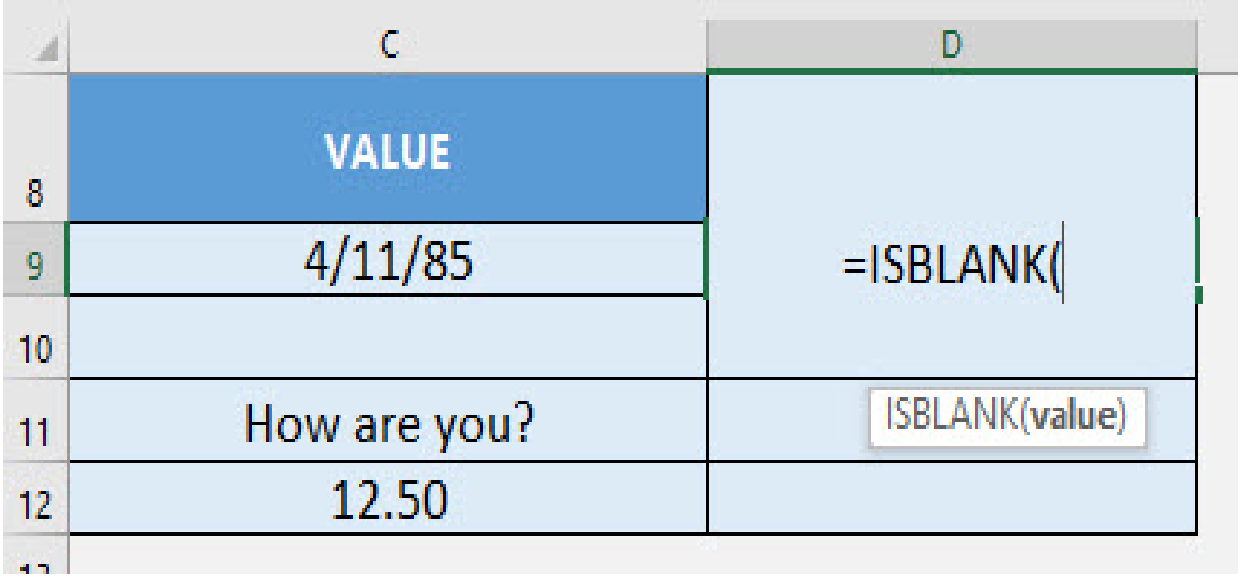
Exercise Workbook:

DOWNLOAD EXCEL WORKBOOK

Have a bunch of empty values and you need to check all of your cells? The **ISBLANK Formula** in Excel is perfect for this!

STEP 1: We need to **enter the *ISBLANK* function in a blank cell**:

=ISBLANK(



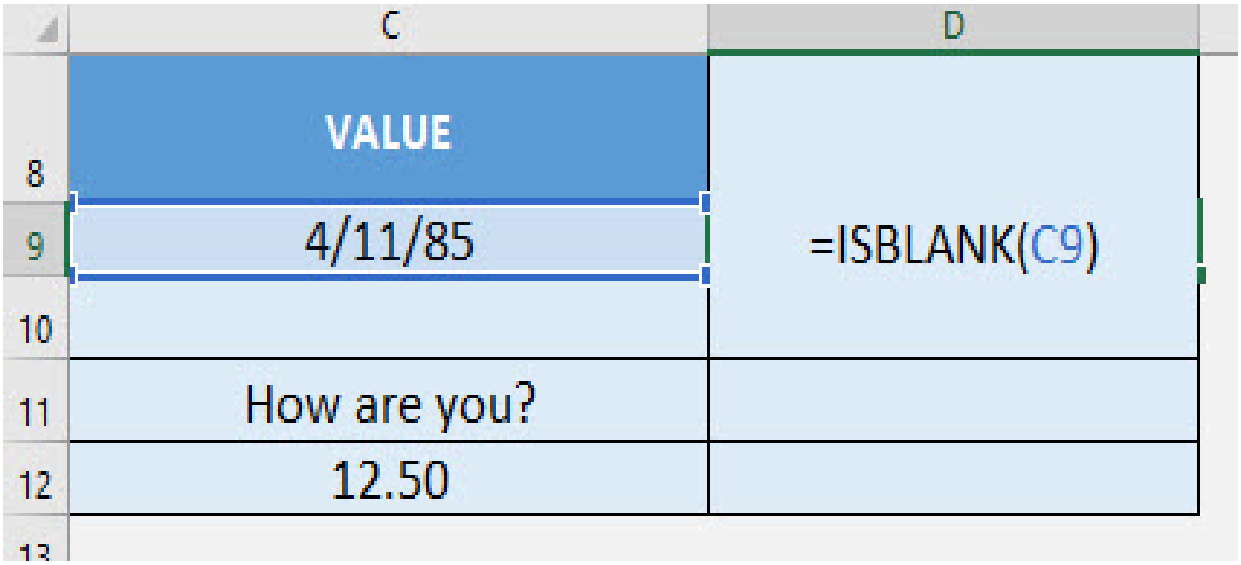
STEP 2: The **ISBLANK** arguments:

value

What is the value to be checked?

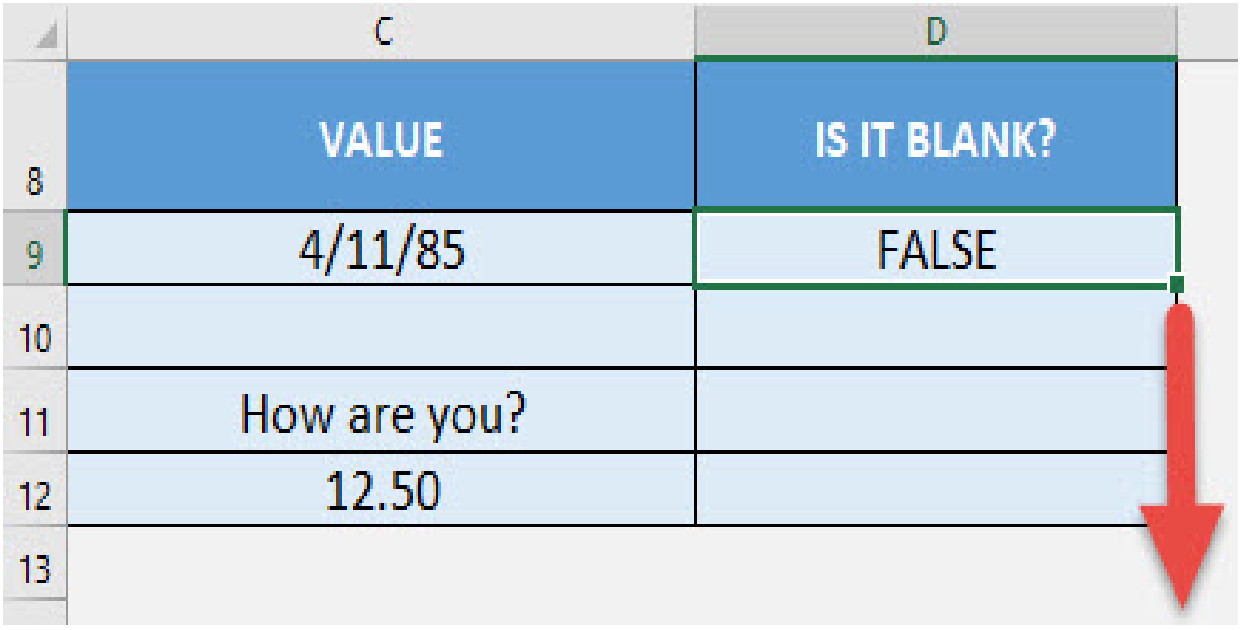
Select the cell containing the value you want to be checked if it's blank:

=ISBLANK(C9)



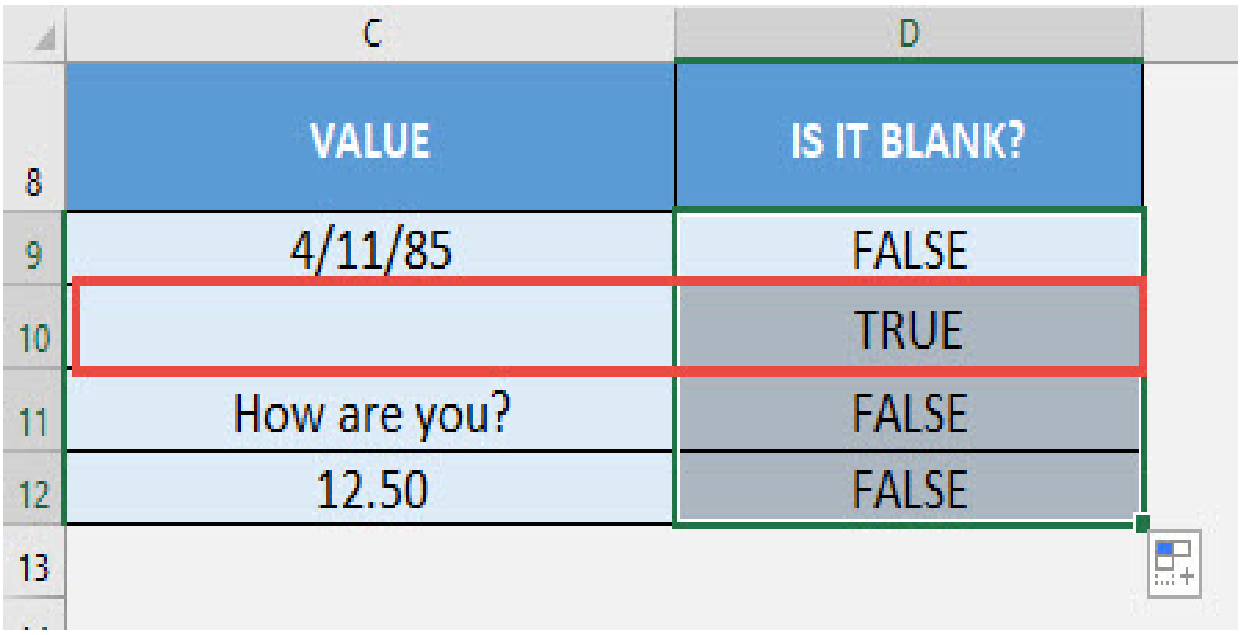
	C	D
8	VALUE	
9	4/11/85	=ISBLANK(C9)
10		
11	How are you?	
12	12.50	
13		

Apply the same formula to the rest of the cells by dragging the lower right corner downwards.



	C	D
8	VALUE	IS IT BLANK?
9	4/11/85	FALSE
10		
11	How are you?	
12	12.50	
13		

You can now see which ones are the blank values!



	C	D
8	VALUE	IS IT BLANK?
9	4/11/85	FALSE
10		TRUE
11	How are you?	FALSE
12	12.50	FALSE
13		

ISERROR

What does it do?

Checks if the cell value is an error or not

Formula breakdown:

=ISERROR(value)

What it means:

=ISERROR(value to be checked to see if it is an error or not)

Example:

=ISERROR(0/0) =TRUE

Exercise Workbook:

DOWNLOAD EXCEL WORKBOOK

Have a bunch of values and you need to check which ones are errors? The **ISERROR Formula** in Excel is perfect for this!

There are a couple of interesting points to take note of the **ISERROR Formula**:

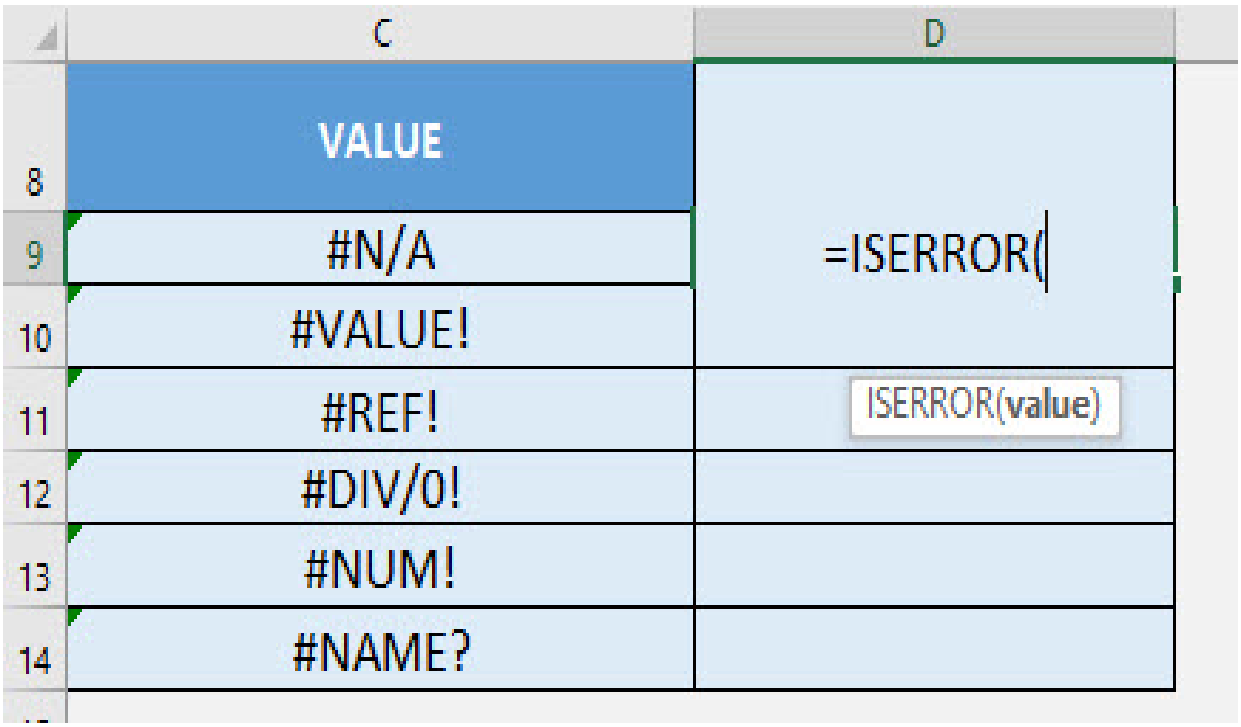
- The following are treated as errors by the **ISERROR Formula**

- #N/A
- #VALUE!
- #REF!
- #DIV/0!
- #NUM!
- #NAME?
- #NULL!

I explain how you can do this below:

STEP 1: We need to **enter the *ISERROR* function in a blank cell**:

=ISERROR(



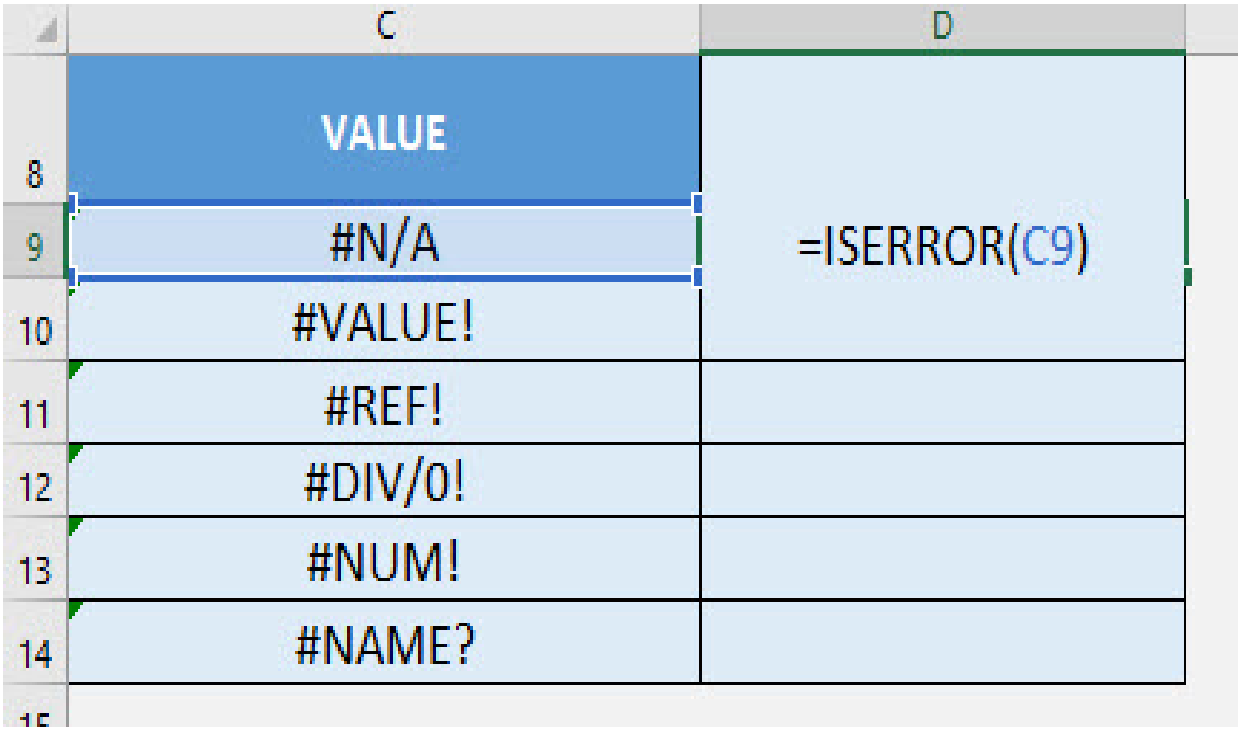
STEP 2: The **ISERROR** arguments:

value

What is the value to be checked?

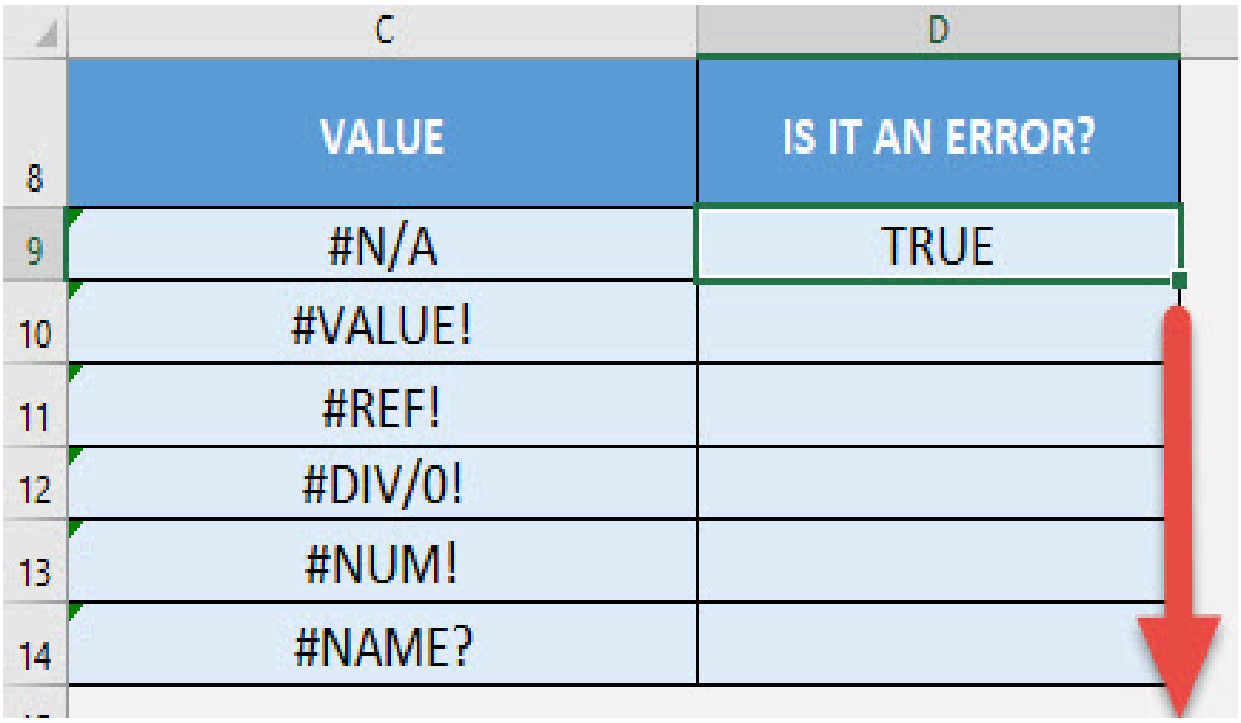
Select the cell containing the value you want to be checked if it is an error:

=ISERROR(C9)



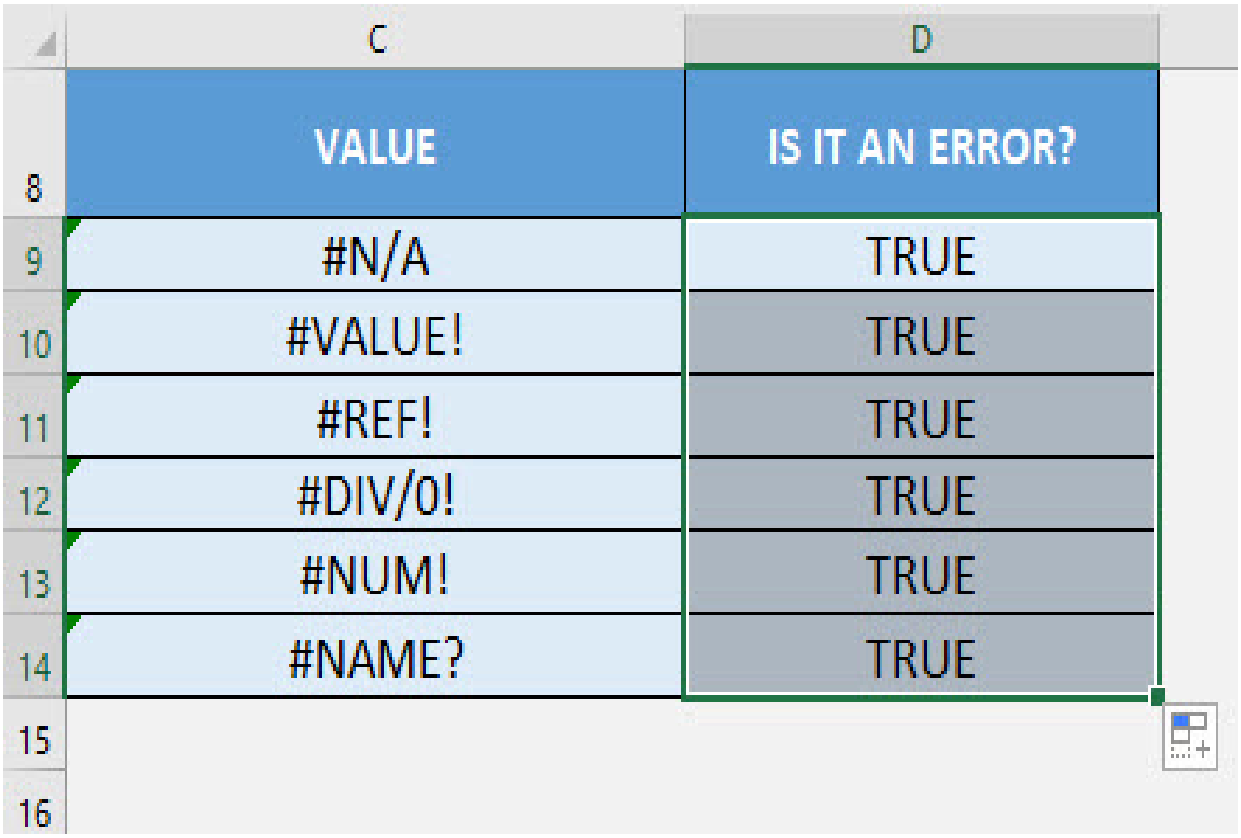
	C	D
8	VALUE	
9	#N/A	=ISERROR(C9)
10	#VALUE!	
11	#REF!	
12	#DIV/0!	
13	#NUM!	
14	#NAME?	

Apply the same formula to the rest of the cells by dragging the lower right corner downwards.



	C	D
8	VALUE	IS IT AN ERROR?
9	#N/A	TRUE
10	#VALUE!	
11	#REF!	
12	#DIV/0!	
13	#NUM!	
14	#NAME?	

You can now see which ones are errors!



	C	D
8	VALUE	IS IT AN ERROR?
9	#N/A	TRUE
10	#VALUE!	TRUE
11	#REF!	TRUE
12	#DIV/0!	TRUE
13	#NUM!	TRUE
14	#NAME?	TRUE
15		
16		

ISNUMBER

What does it do?

Checks if the cell value is numeric or not

Formula breakdown:

=ISNUMBER(value)

What it means:

=ISNUMBER(value to be checked to see if it is a number or not)

Example:

=ISNUMBER(12.5) =TRUE

Exercise Workbook:

DOWNLOAD EXCEL WORKBOOK

Have a bunch of values and you need to check which ones are numbers? The **ISNUMBER Formula** in Excel is perfect for this!

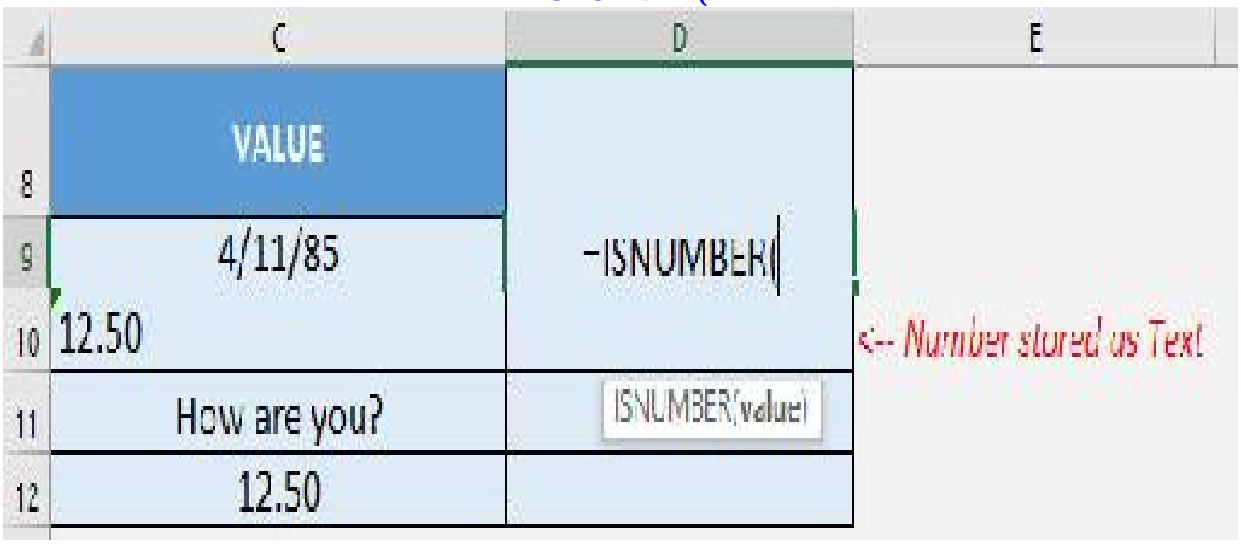
There are a couple of interesting points to take note of the **ISNUMBER Formula**:

- Dates are also treated as numerical values, so the **ISNUMBER Formula** will return **TRUE**
- If the number is stored as text, then the **ISNUMBER Formula** will return **FALSE**

I explain how you can do this below:

STEP 1: We need to **enter the *ISNUMBER* function in a blank cell**:

=ISNUMBER(



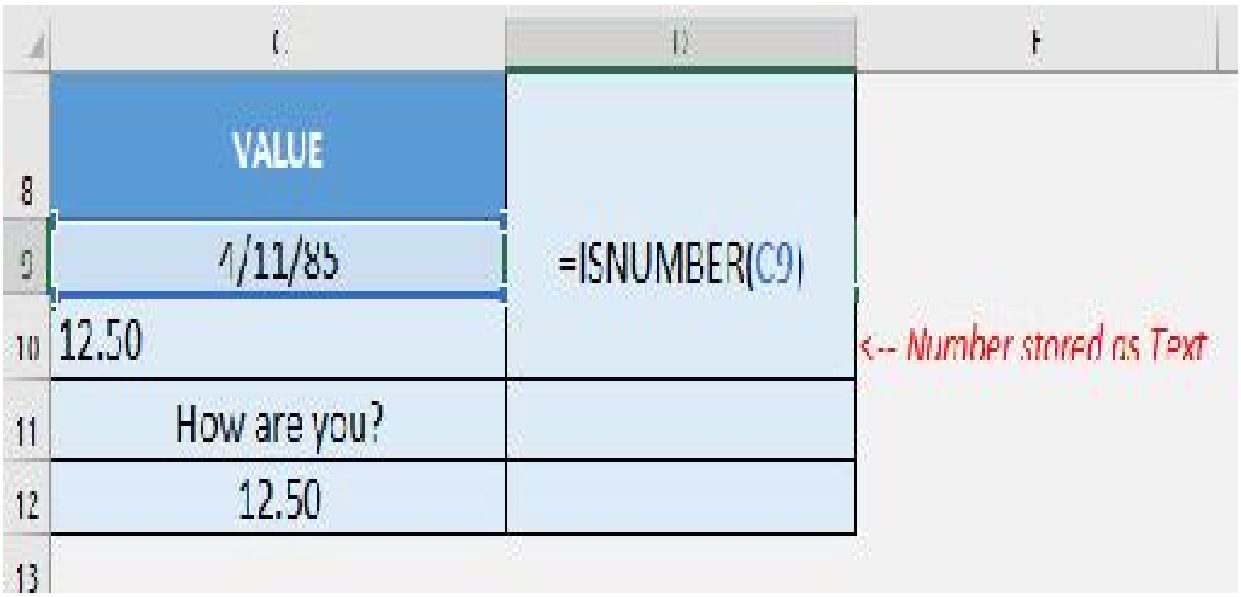
STEP 2: The **ISNUMBER** arguments:

value

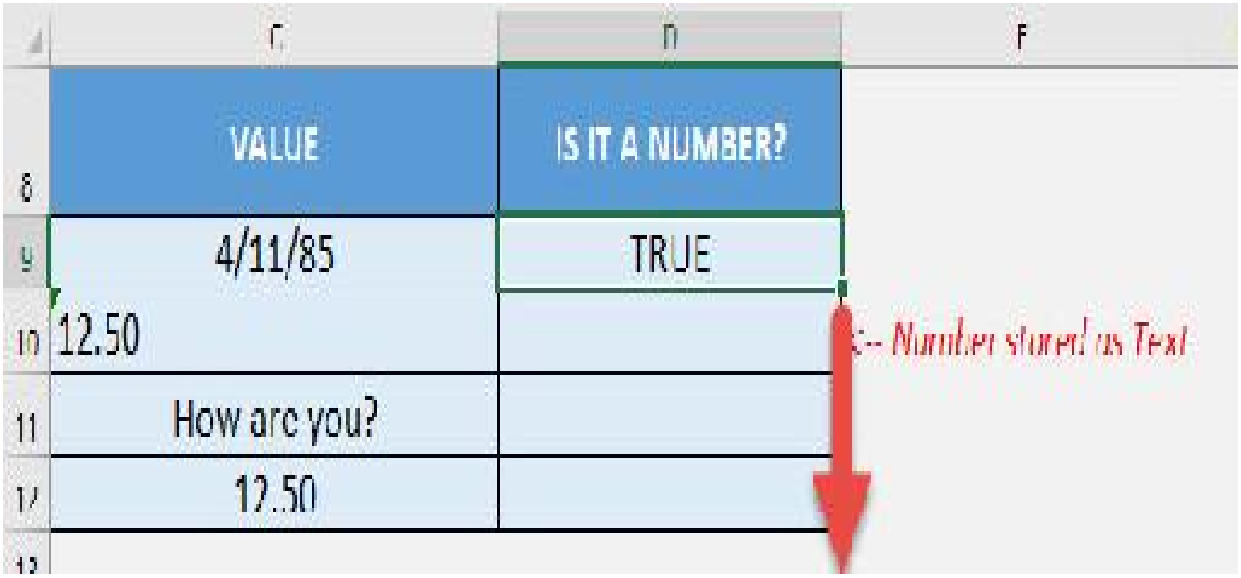
What is the value to be checked?

Select the cell containing the value you want to be checked

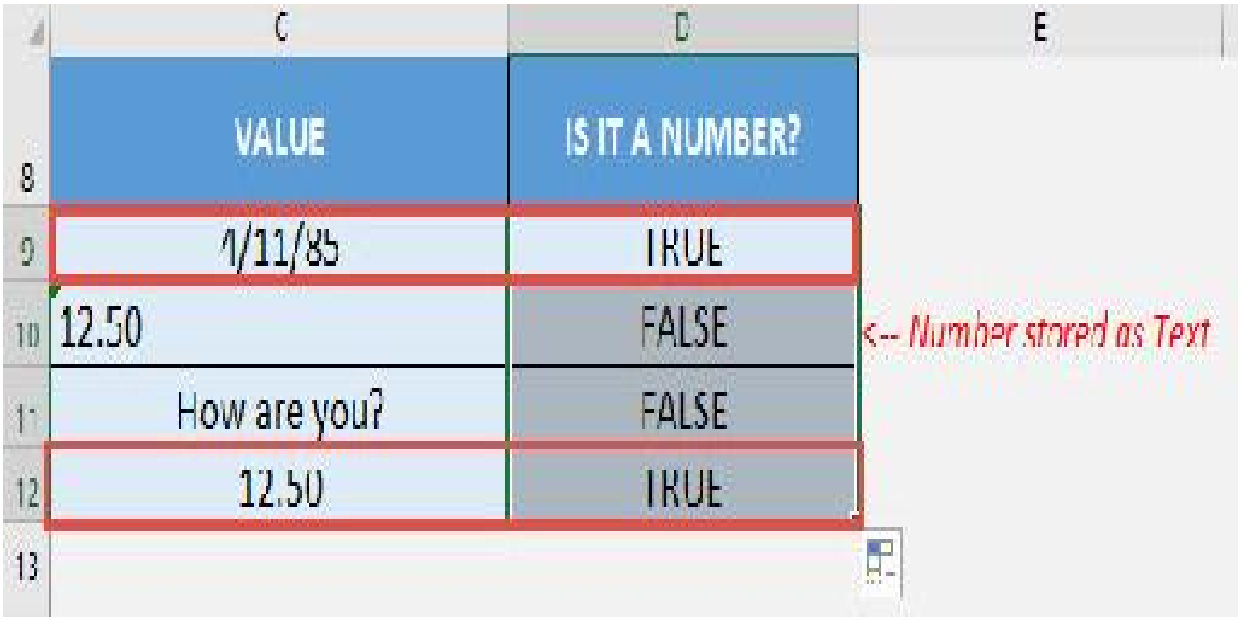
=ISNUMBER(C9)



Apply the same formula to the rest of the cells by dragging the lower right corner downwards.



You can now see which ones are the numbers!


C
D
E
8
VALUE
IS IT A NUMBER?
9
1/11/85
TRUE
10
12.50
FALSE
<-- Number stored as Text
11
How are you?
FALSE
12
12.50
TRUE
13

ISTEXT

What does it do?

Checks if the cell value is text or not

Formula breakdown:

=ISTEXT(value)

What it means:

=ISTEXT(value to be checked to see if it is a text or not)

Example:

=ISTEXT("abc") =TRUE

Exercise Workbook:

DOWNLOAD EXCEL WORKBOOK

Have a bunch of values and you need to check which ones are text? The **ISTEXT Formula** in Excel is perfect for this!

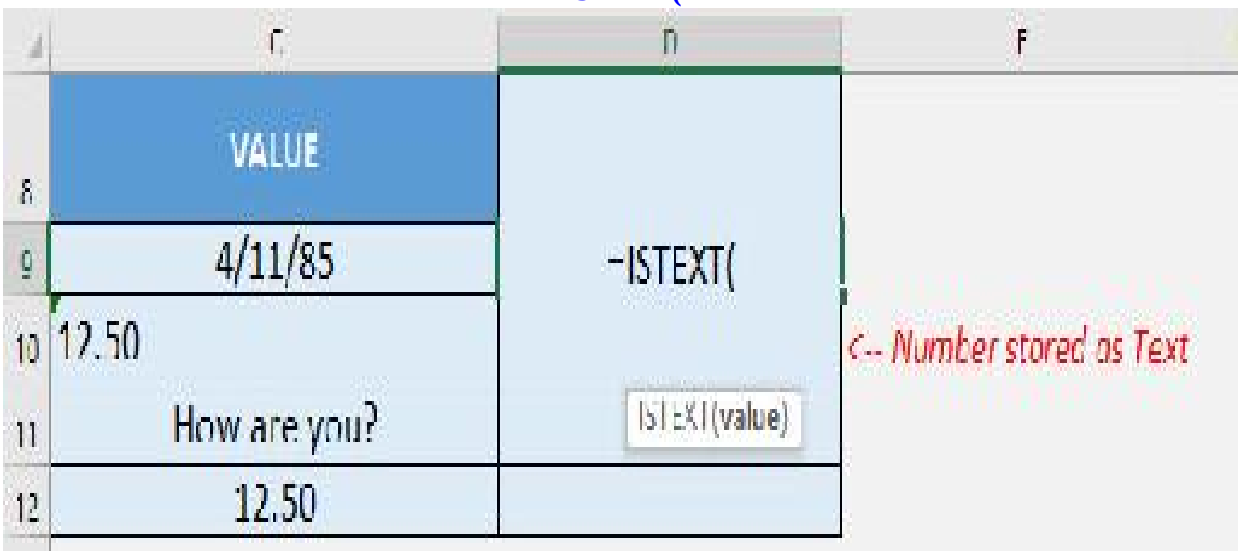
There are a couple of interesting points to take note of the **ISTEXT Formula**:

- Dates are also treated as numerical values, so the **ISTEXT Formula** will return **FALSE**
- If a number is stored as text, then the **ISTEXT Formula** will return **TRUE**

I explain how you can do this below:

STEP 1: We need to **enter the *ISTEXT* function in a blank cell**:

=ISTEXT(



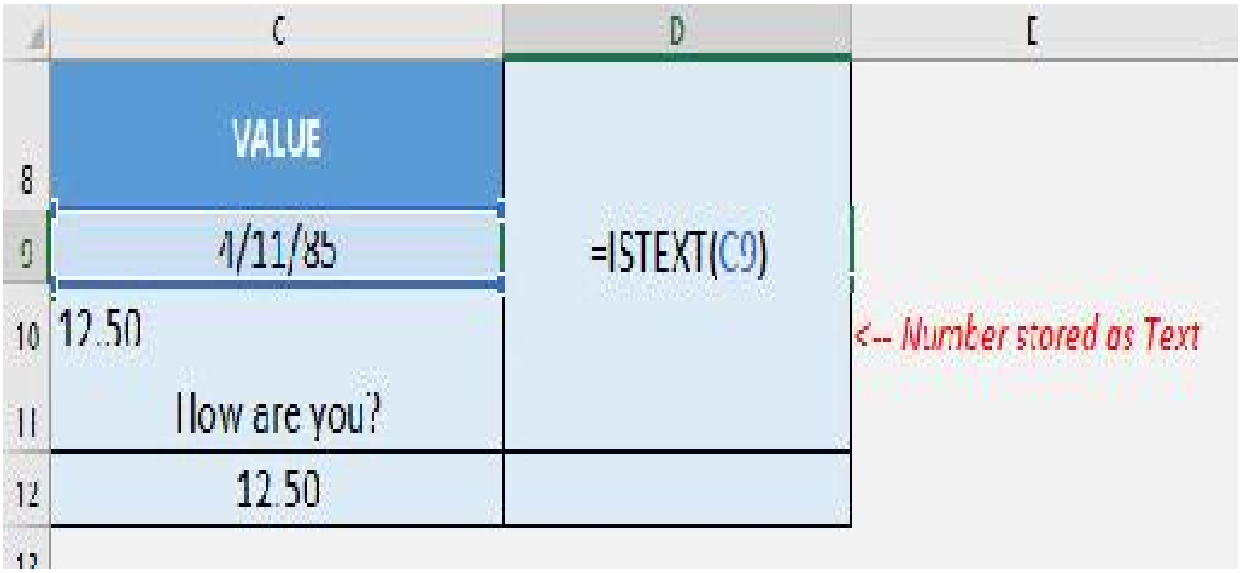
STEP 2: The **ISTEXT** arguments:

value

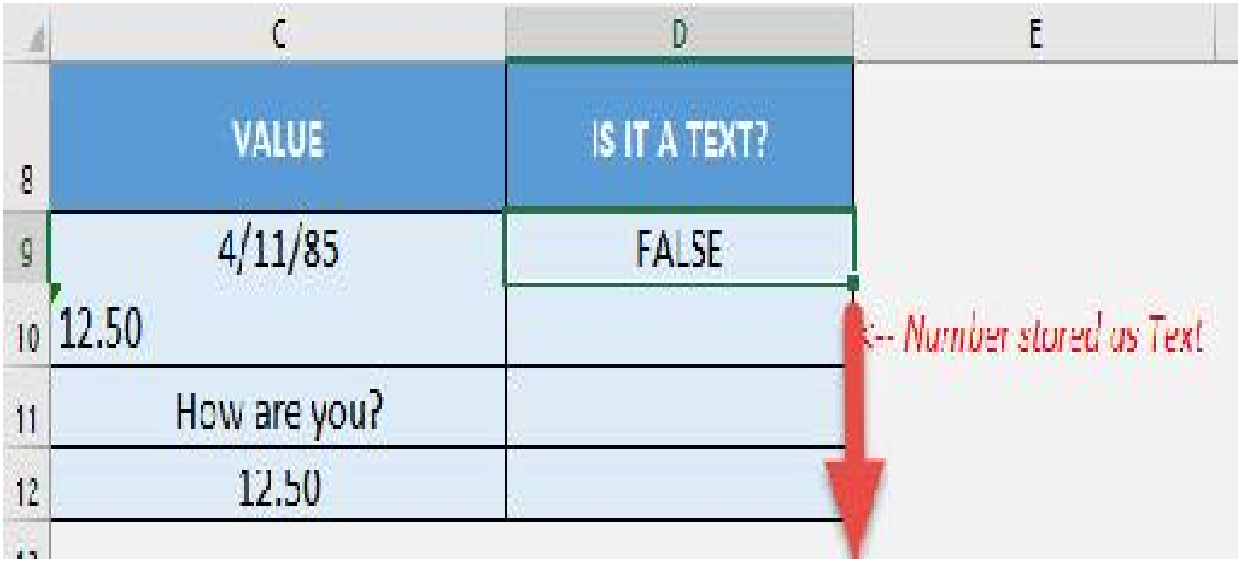
What is the value to be checked?

Select the cell containing the value you want to be checked:

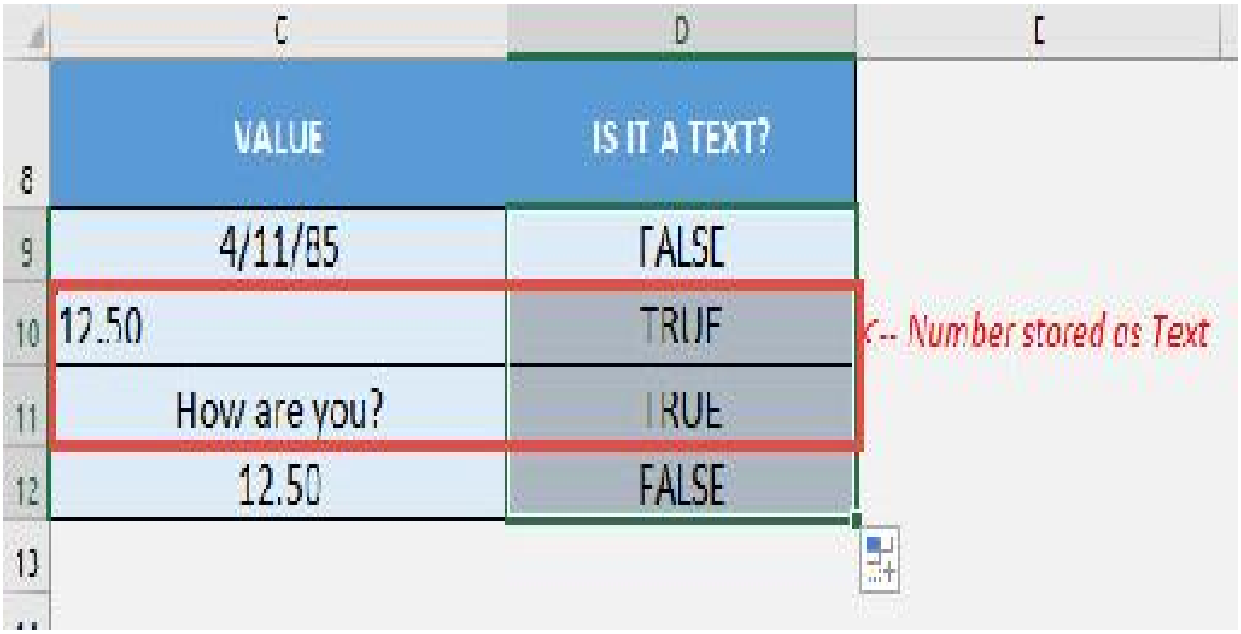
=ISTEXT(C9)



Apply the same formula to the rest of the cells by dragging the lower right corner downwards.



You can now see which ones are text!


C
D
E
VALUE
IS IT A TEXT?
4/11/85
FALSE
12.50
TRUE
<-- Number stored as Text
How are you?
TRUE
12.50
FALSE

TYPE

What does it do?

Returns the data type from a cell's value

Formula breakdown:

=TYPE(value)

What it means:

=TYPE(value to be checked for its data type)

Example:

=TYPE(FALSE) =4

Exercise Workbook:

DOWNLOAD EXCEL WORKBOOK

Do you need to check the data type of your values? The **TYPE Formula** in Excel is perfect for this!

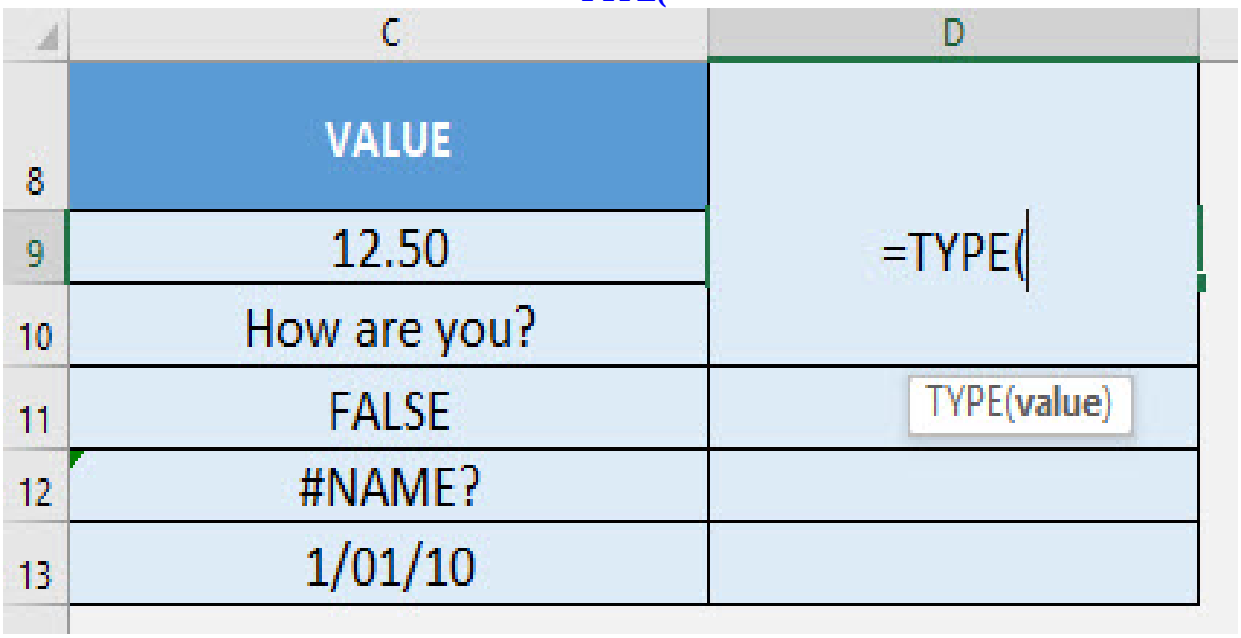
The **TYPE- Formula** checks for the following data types:

- 1 - number
- 2 - text
- 4 - logical value
- 16 - error value
- 64 - array

I explain how you can do this below:

STEP 1: We need to **enter the *TYPE* function in a blank cell**:

=TYPE(



STEP 2: The **TYPE** arguments:

value

What is the value to get the data type from?

Select the cell containing the value:

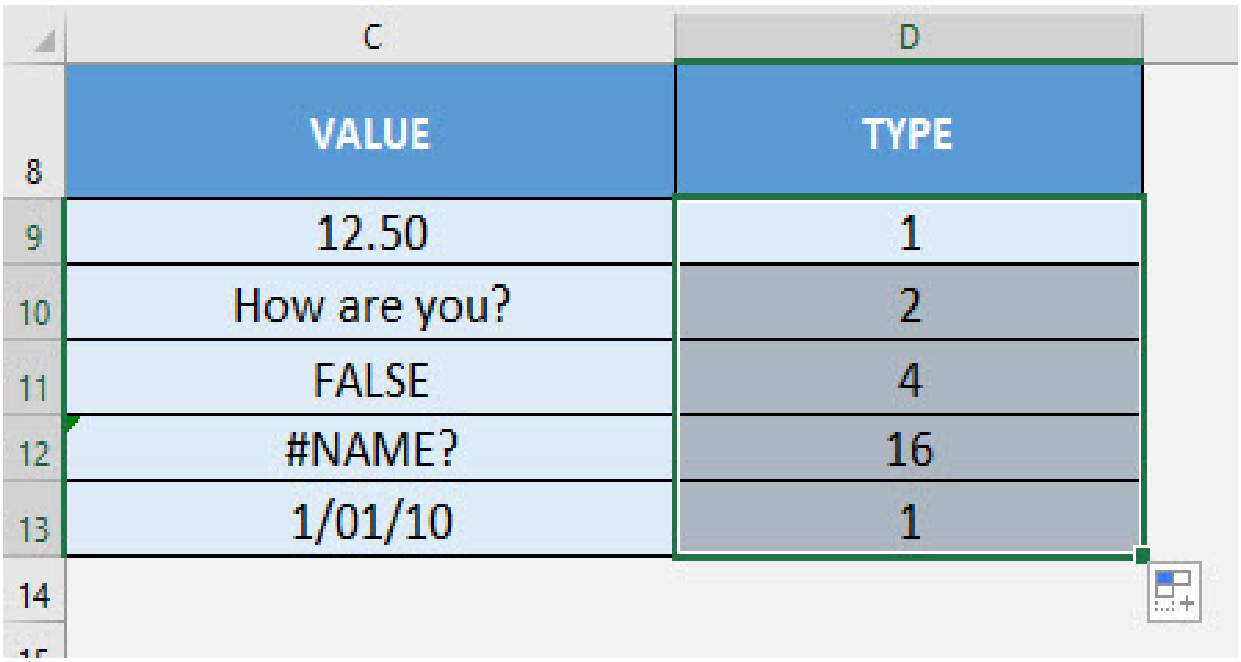
=TYPE(C9)

	C	D
8	VALUE	
9	12.50	=TYPE(C9)
10	How are you?	
11	FALSE	
12	#NAME?	
13	1/01/10	

Apply the same formula to the rest of the cells by dragging the lower right corner downwards.

	C	D
8	VALUE	TYPE
9	12.50	1
10	How are you?	
11	FALSE	
12	#NAME?	
13	1/01/10	
14		

You now have your data types!



	C	D
8	VALUE	TYPE
9	12.50	1
10	How are you?	2
11	FALSE	4
12	#NAME?	16
13	1/01/10	1
14		

OTHER FUNCTIONS

FV – Compound Interest

What does it do?

Calculates the compound interest of an initial investment

Formula breakdown:

=FV(rate, nper, pmt, [pv])

What it means:

=FV(interest rate, number of periods, periodic payment, initial amount)

Example:

=FV(0.1,2,0,1000*-1) =$1210

Exercise Workbook:

DOWNLOAD EXCEL WORKBOOK

Say that you turn 18 years today (CONGRATS!) and you find out that your parents deposited an amount with their bank when you were born.

Now that you are 18 years old you can collect this money and go spend it all in one day!

How much would be available for you to spend?

Thankfully there is an easy way to calculate this with Excel's **FV formula! FV** stands for **Future Value.**

The future value (FV) is the value of a current asset at a specified date in the future based on an assumed rate of growth over time.

In our example below, we have the table of values that we need to get the compound interest or Future Value from:

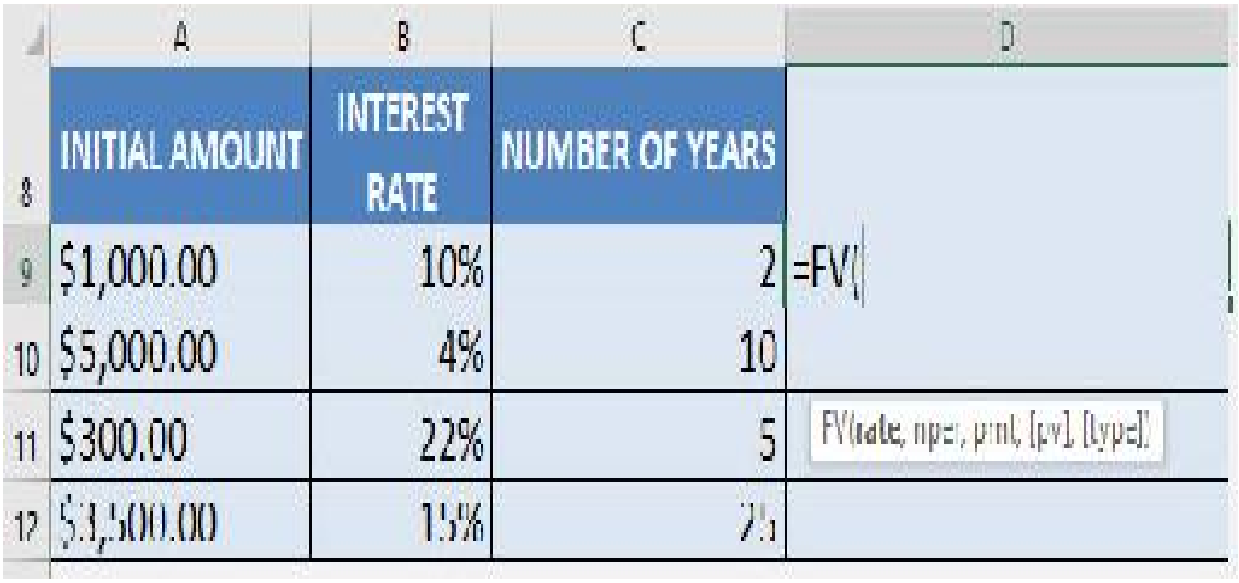
(Change the NUMBER OF YEARS column to 18 to see the results on your 18th birthday)

	A	B	C	D
8	INITIAL AMOUNT	INTEREST RATE	NUMBER OF YEARS	TOTAL AMOUNT WITH INTEREST
9	$1,000.00	10%	2	
10	$5,000.00	4%	10	
11	$300.00	22%	5	
12	$3,500.00	15%	25	

I explain how you can do this below:

STEP 1: We need to **enter the *FV* function in a blank cell**:

=FV(



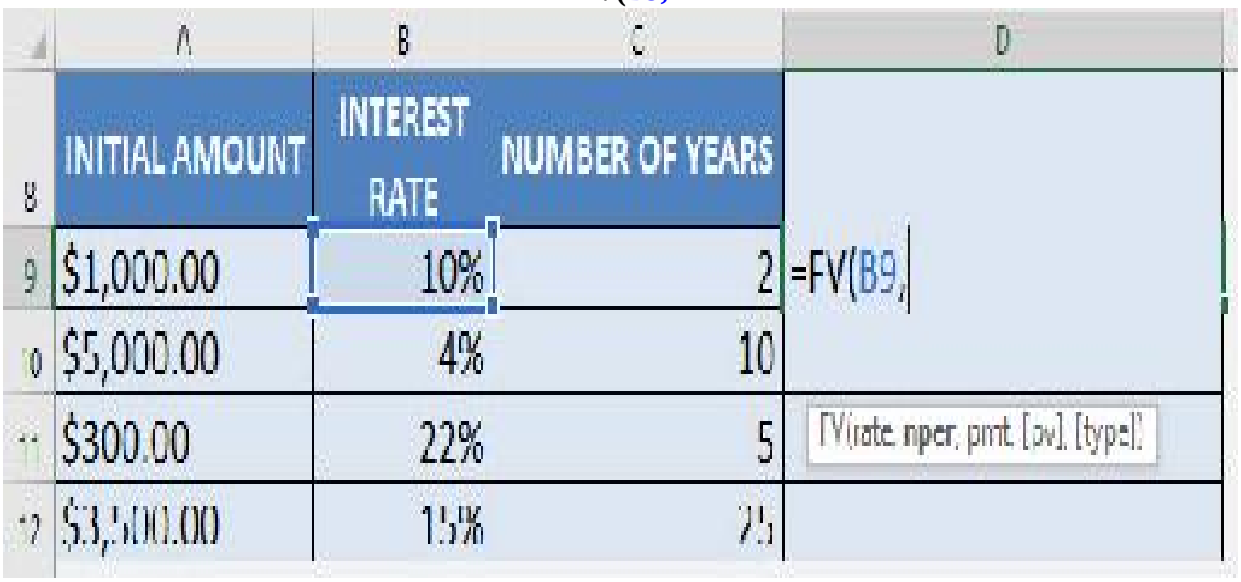
STEP 2: The **FV** arguments:

rate

What is the rate of the interest?

Select the cell containing the interest rate (make sure that this is in a percentage):

=FV(B9,

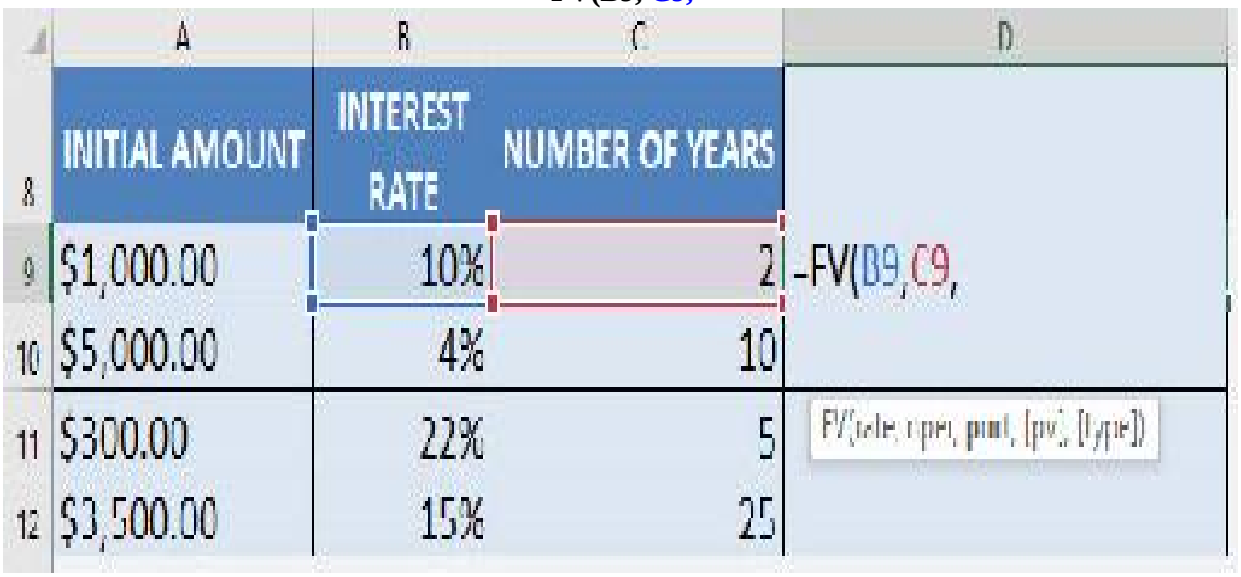


nper

How many periods?

Select the cell containing the number of years:

=FV(B9, C9,

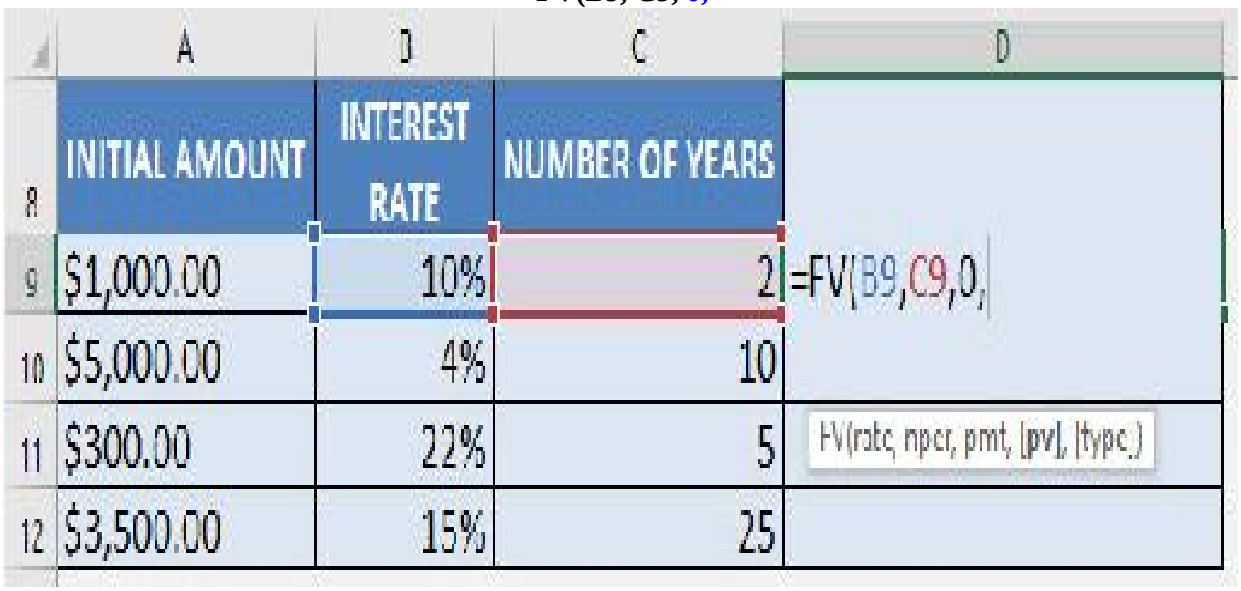


pmt

What is the periodic payment?

We have no periodic payment, only an initial amount, so let us put in 0:

=FV(B9, C9, 0,



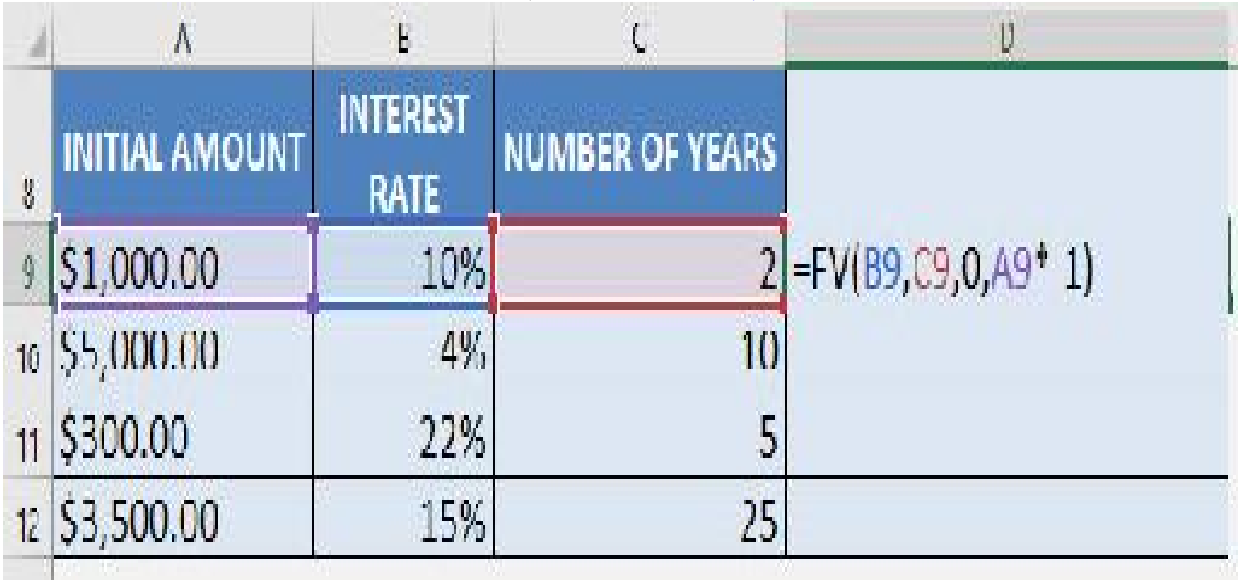
pv

What is the initial amount?

PV stands for present value, the initial amount. We need to change this to a negative value by multiplying -1.

The reason why we need this as a negative value as Excel treats this as "money out" for your investment.

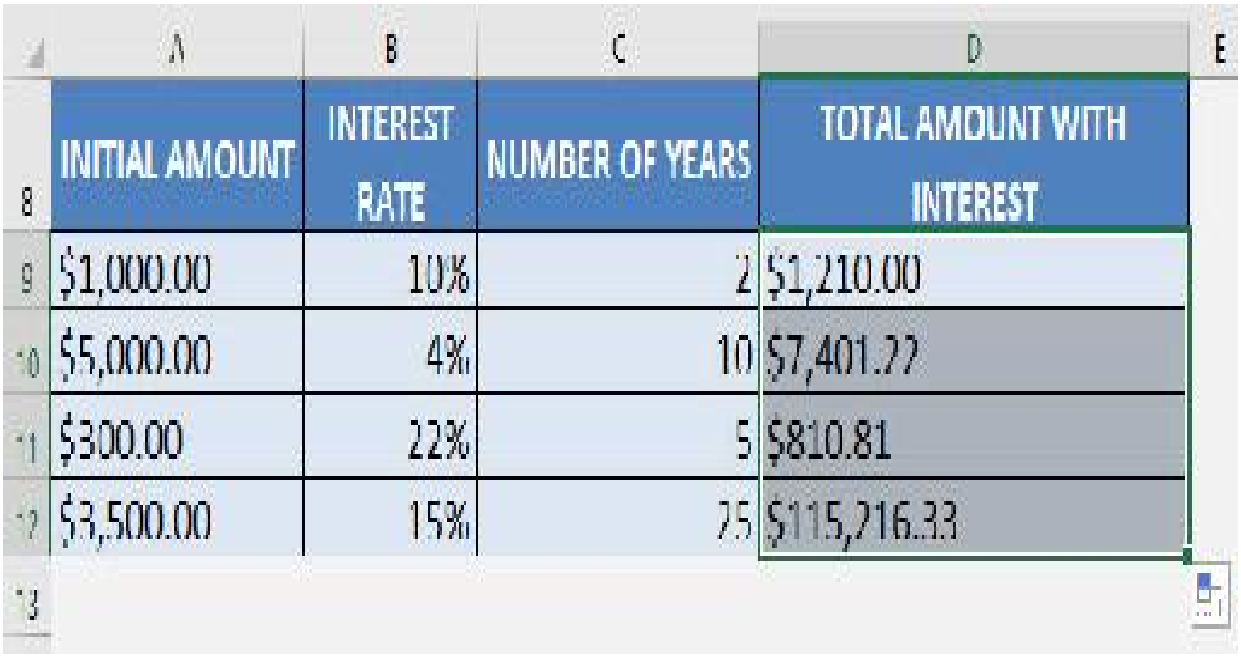
=FV(B9, C9, 0, A9 * -1)



	A	B	C	D
8	INITIAL AMOUNT	INTEREST RATE	NUMBER OF YEARS	
9	$1,000.00	10%	2	=FV(B9,C9,0,A9* 1)
10	$5,000.00	4%	10	
11	$300.00	22%	5	
12	$3,500.00	15%	25	

Apply the same formula to the rest of the cells by dragging the lower right corner downwards.

You now have all of the compound interest results! GO OUT & SPEND!



	A	B	C	D	E
8	INITIAL AMOUNT	INTEREST RATE	NUMBER OF YEARS	TOTAL AMOUNT WITH INTEREST	
9	$1,000.00	10%	2	$1,210.00	
10	$5,000.00	4%	10	$7,401.22	
11	$300.00	22%	5	$810.81	
12	$3,500.00	15%	25	$115,216.33	
13					

FV – Monthly Investment

What does it do?

Calculates the compound interest when you have monthly contributions

Formula breakdown:

=FV(rate, nper, pmt, [pv])

What it means:

=FV(interest rate, number of periods, periodic payment, initial amount)

Example:

=FV(0.1/12,2*12,500,0) * -1 =$13,223.46

Exercise Workbook:

DOWNLOAD EXCEL WORKBOOK

Computing the compound interest of an initial investment is easy for a fixed number of years. But let's add an additional challenge.

What if you are also putting in **monthly contributions** to your investment? Now that's a lot more challenging to compute now!

How much would be available for you at the end of your investment?

Thankfully there is an easy way to calculate this with Excel's **FV formula! FV** stands for **Future Value.**

In our example below, we have the table of values that we need to get the compound interest or Future Value from:

	A	B	C	D	E
8	INITIAL AMOUNT	INTEREST RATE	NUMBER OF YEARS	MONTHLY CONTRIBUTIONS	TOTAL AMOUNT WITH INTEREST
9	$ -	10%	2	$ 500.00	
10	$ 5,000.00	4%	10	$ 1,000.00	
11	$ 1,000.00	22%	5	$ 50.00	
12	$ 3,500.00	15%	25	$ 120.00	

There are two important concepts we need to use since we are using monthly contributions:

- Since our interest rate is the annual rate, we will have to **divide it by 12** to make it monthly
- We will need to convert our number of years into number of months by **multiplying it by 12**

STEP 1: We need to **enter the *FV* function in a blank cell**:

=FV(

	INITIAL AMOUNT	INTEREST RATE	NUMBER OF YEARS	MONTHLY CONTRIBUTIONS	
9	$ -	10%	2	$ 500.00	=FV(
10	$ 5,000.00	4%	10	$ 1,000.00	
11	$ 300.00	22%	5	$ 50.00	FV(rate, nper, pmt, [pv], [type])
12	$ 3,500.00	15%	25	$ 120.00	

STEP 2: The **FV** arguments:

rate

What is the rate of the interest?

Select the cell containing the interest rate and divide it by 12 to get the monthly interest rate (make sure that this is in a percentage):

=FV(B9/12,

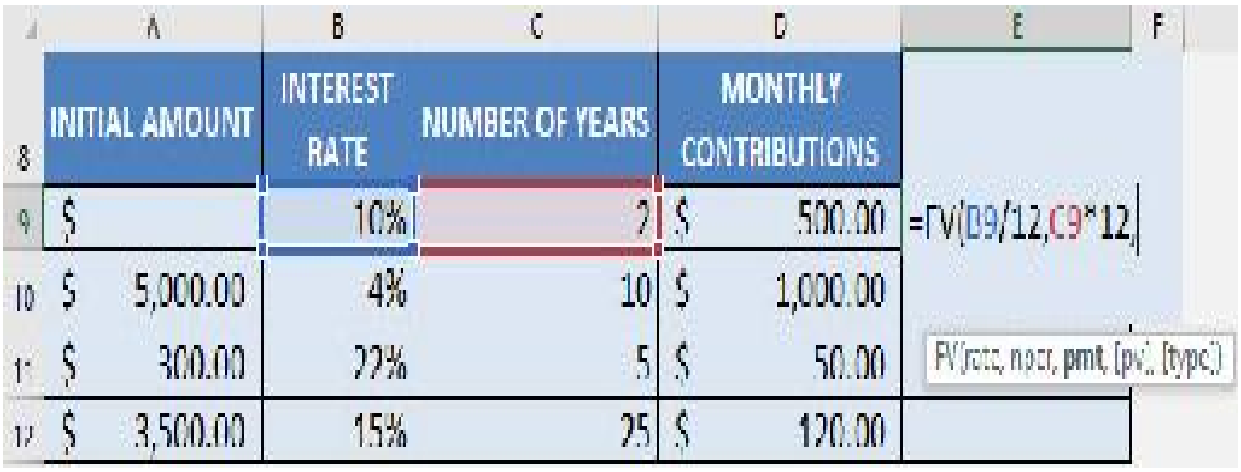
	INITIAL AMOUNT	INTEREST RATE	NUMBER OF YEARS	MONTHLY CONTRIBUTIONS	
9	$ -	10%	2	$ 500.00	FV(B9/12,
10	$ 5,000.00	4%	10	$ 1,000.00	
11	$ 300.00	22%	5	$ 50.00	FV(rate, nper, pmt, [pv], [type])
12	$ 3,500.00	15%	25	$ 120.00	

nper

How many periods?

Select the cell containing the number of years and multiply it by 12 to get the number of months:

=FV(B9/12, C9*12,

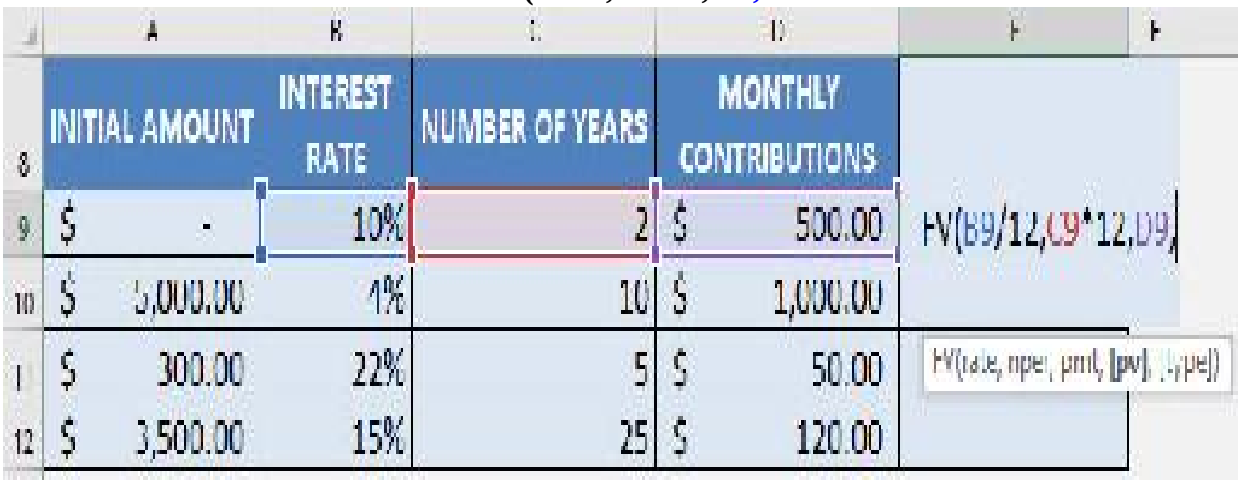


pmt

What is the periodic payment?

Select the cell that contains your monthly contribution (this is your periodic payment):

=FV(B9/12, C9*12, D9,

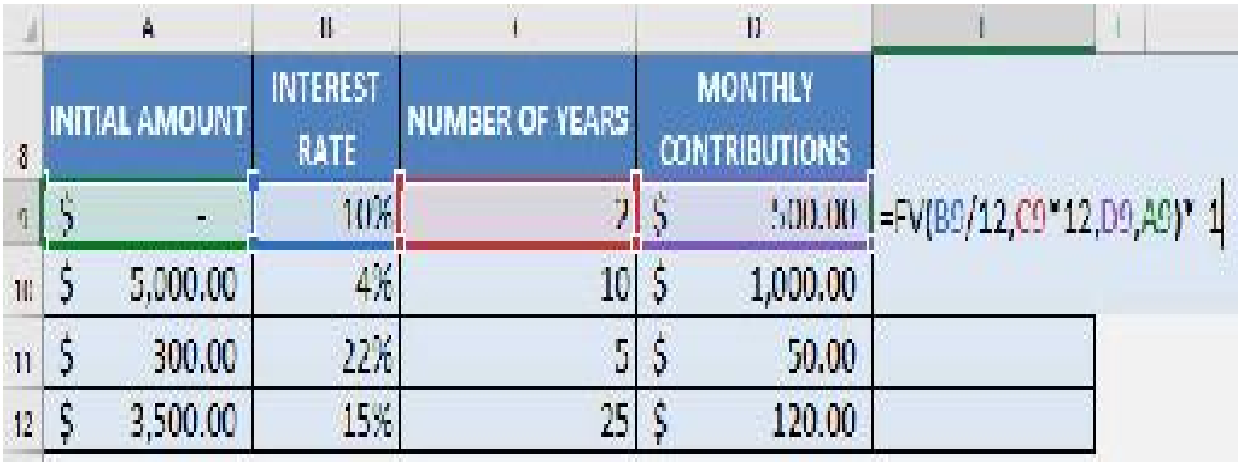


pv

What is the initial amount?

PV stands for present value, the initial amount. Multiply the entire result by -1.

=FV(B9/12, C9*12, D9, A9) * -1



	A	B	C	D	E
8	INITIAL AMOUNT	INTEREST RATE	NUMBER OF YEARS	MONTHLY CONTRIBUTIONS	
9	$ -	10%	2	$ 500.00	=FV(B9/12,C9*12,D9,A9)* 1
10	$ 5,000.00	4%	10	$ 1,000.00	
11	$ 300.00	22%	5	$ 50.00	
12	$ 3,500.00	15%	25	$ 120.00	

Apply the same formula to the rest of the cells by dragging the lower right corner downwards.

You now have all of the compound interest results!

	A	B	C	D	E	F
8	INITIAL AMOUNT	INTEREST RATE	NUMBER OF YEARS	MONTHLY CONTRIBUTIONS	TOTAL AMOUNT WITH INTEREST	
9	$ -	10%	2	$ 500.00	$13,223.46	
10	$ 5,000.00	4%	10	$ 1,000.00	$154,703.97	
11	$ 300.00	22%	5	$ 50.00	$6,277.01	
12	$ 3,500.00	15%	25	$ 120.00	$534,627.97	
13						

EXCEL 2019

CONCAT

What does it do?

Concatenates a list together without a delimiter

Formula breakdown:

=CONCAT(text1, [text2], ...)

What it means:

=CONCAT(first text to combine, [second text to combine], ...)

Example:

=CONCAT("Hello", " ", "World") =”Hello World”

Exercise Workbook:

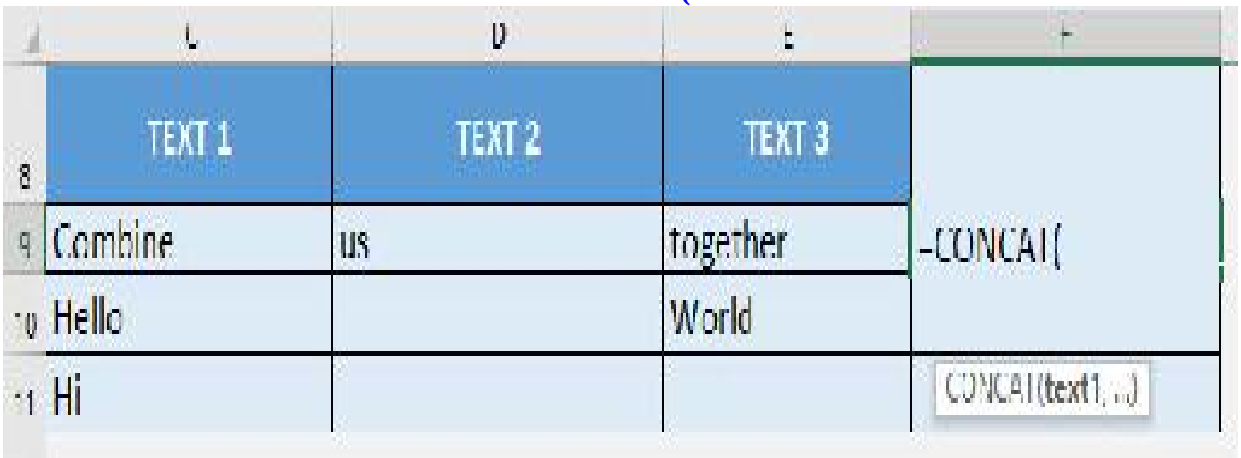
DOWNLOAD EXCEL WORKBOOK

Do you want to combine text or a range of cells together easily? The **CONCAT Formula** in Excel will do this for you in a flash!

It will simply combine the text you specify together into a single text.

STEP 1: We need to **enter the *CONCAT* function in a blank cell**:

=CONCAT(



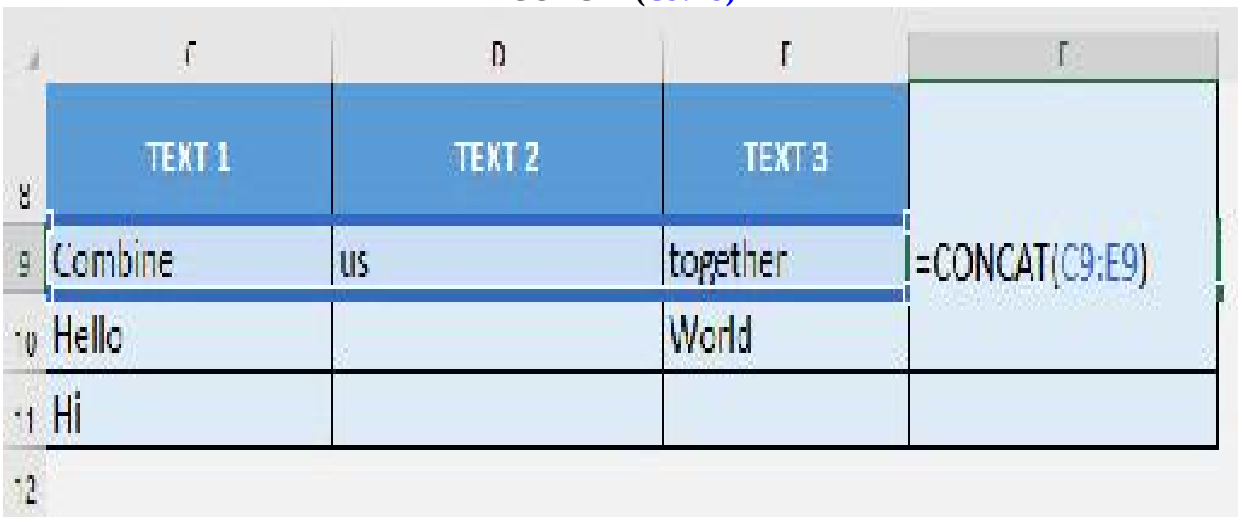
STEP 2: The **CONCAT** arguments:

text1, ...

Which cells do you want to combine together?

Select the range of cells that you want to combine together

=CONCAT(C9:E9)



Apply the same formula to the rest of the cells by dragging the lower right corner downwards.

	TEXT 1	TEXT 2	TEXT 3	COMBINED TEXT
9	Combine	us	together	Combineustogether
10	Hello		World	
11	Hi			

You now have your combined text!

	TEXT 1	TEXT 2	TEXT 3	COMBINED TEXT
9	Combine	us	together	Combineustogether
10	Hello		World	HelloWorld
11	Hi			Hi

If we were to do this the old way it would look something like this using the CONCATENATE FORMULA:

=CONCATENATE(C9,D9,E9)

It is way easier using the **CONCAT Formula**!

IFS

What does it do?

Checks multiple conditions and returns the value of the first TRUE condition

Formula breakdown:

=IFS(logical_test1, value_if_true1, [logical_test2, value_if_true2], ...)

What it means:

=IFS(first condition to check, value to return, [succeeding conditions to check], ...)

Example:

=IFS(10000<8456, 13%, 10000<15874, 18%, 10000>=15874, 22%)

=18%

Exercise Workbook:

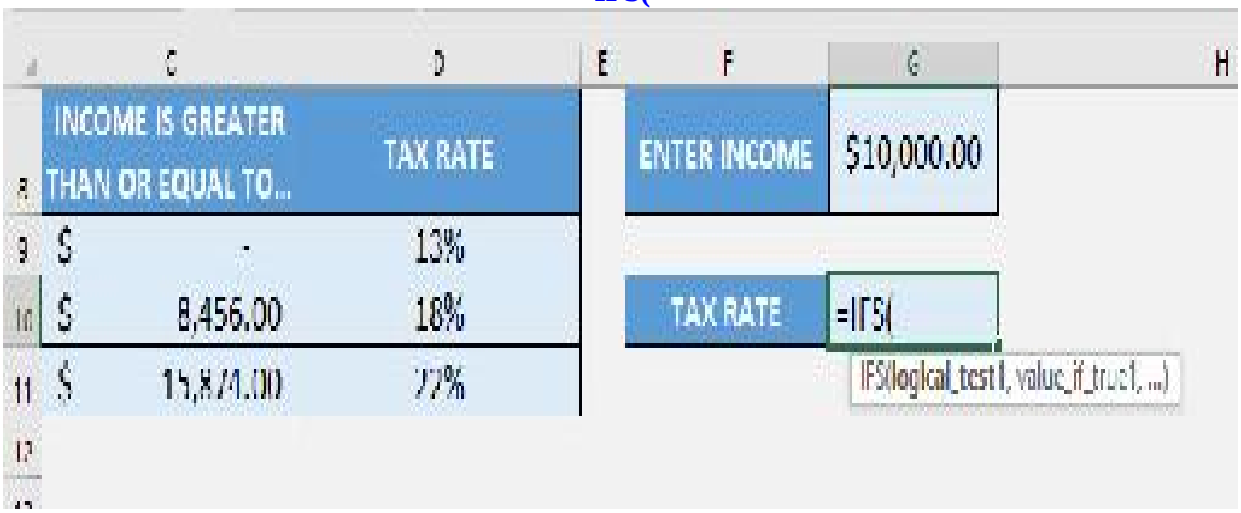
DOWNLOAD EXCEL WORKBOOK

If you have multiple logical conditions to check, instead of creating Nested IF Formulas, we can use **Excel's IFS Formula!** It allows us to specify multiple conditions to check, then the **IFS Formula** will look for the first condition that gets satisfied!

Let us try it out on a simple tax table, then we will create an **IFS Formula** that will simulate the exact same logic of the table!

STEP 1: We need to **enter the *IFS* function in a blank cell**:

=IFS(



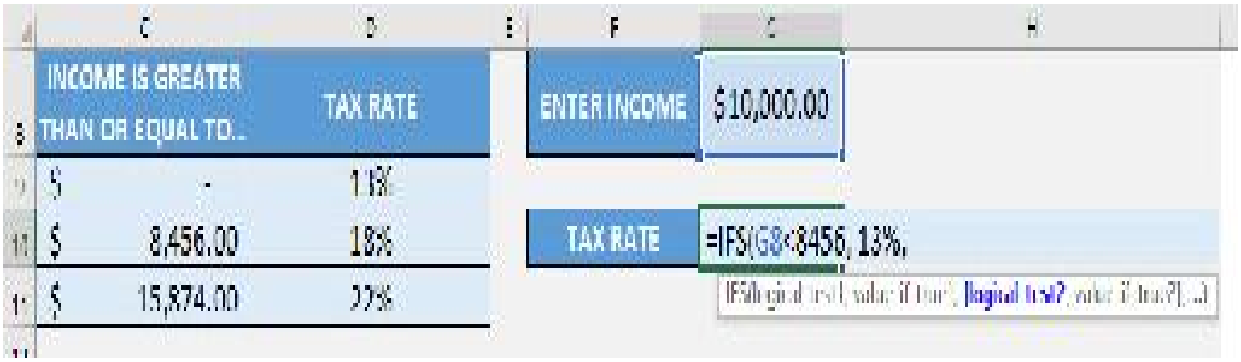
STEP 2: The **IFS** arguments:

logical_test1, value_if_true1

What is the first condition and value to return if the condition is met?

Let us start from the minimum value of the tax table. If the income is less than $8456, then the tax rate is 13%

=IFS(G8<8456, 13%,

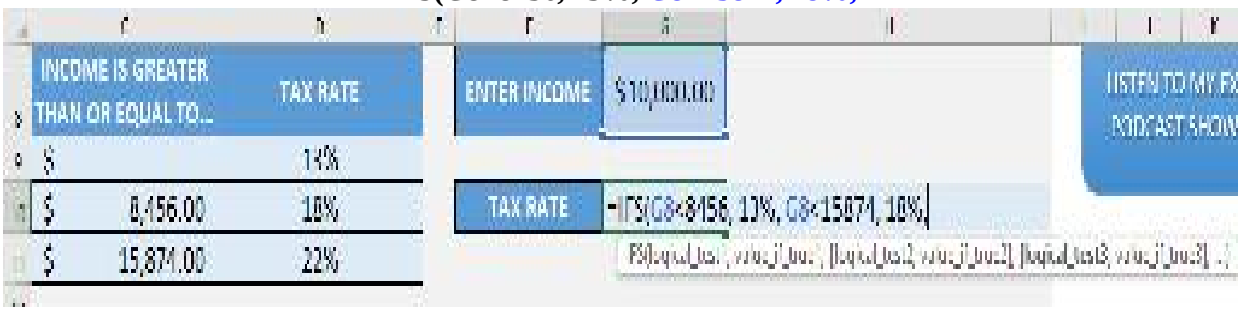


logical_test2, value_if_true2

What is the second condition and value to return if the condition is met?

Going to the second row, if the income is less than $15874, then the tax rate is 18%

=IFS(G8<8456, 13%, G8<15874, 18%,

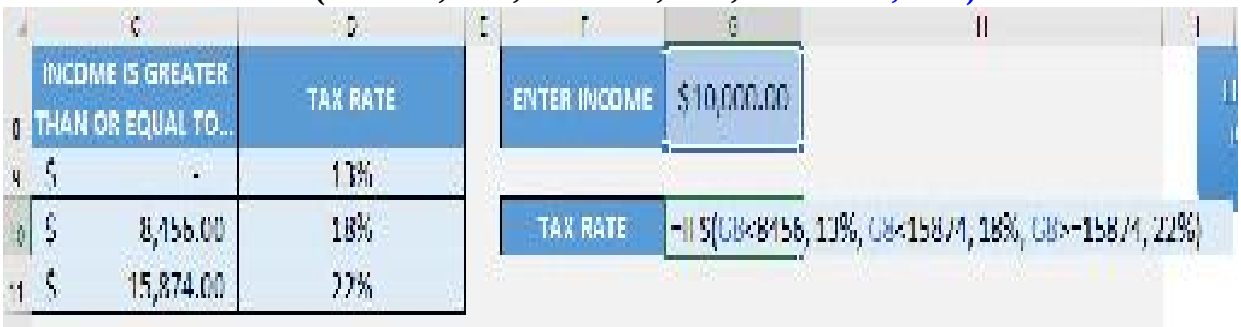


logical_test3, value_if_true3

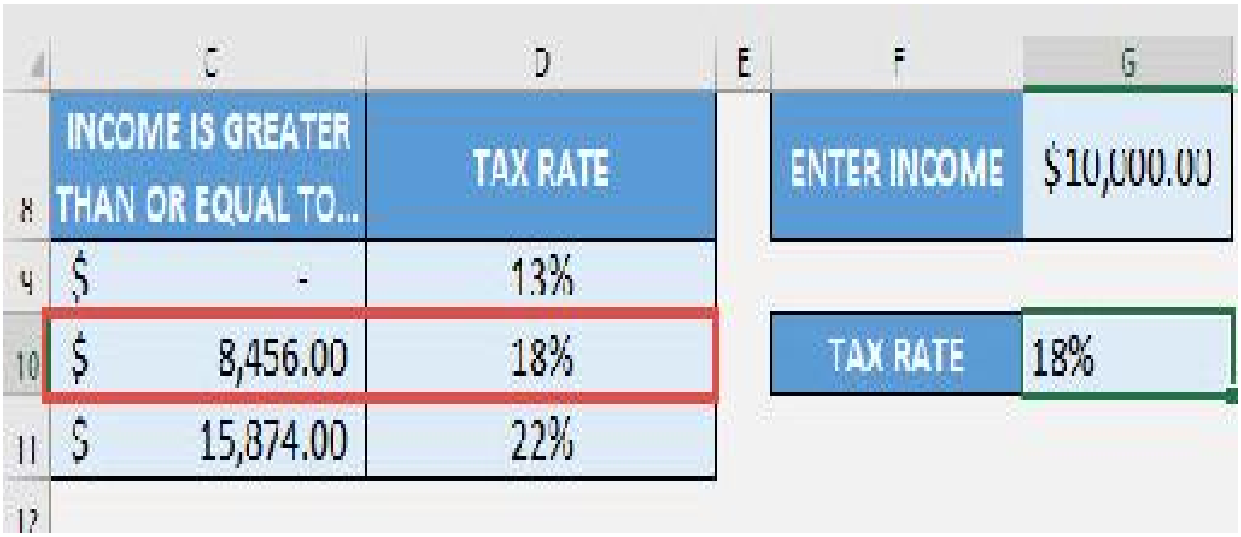
What is the third condition and value to return if the condition is met?

Going to the last row, if the income is greater than or equal to $15874, then the tax rate is 22%

=IFS(G8<8456, 13%, G8<15874, 18%, G8>=15874, 22%)



You now have your correct tax rate!



	C	D	E	F	G
8	INCOME IS GREATER THAN OR EQUAL TO...	TAX RATE		ENTER INCOME	$10,000.00
9	$ -	13%			
10	$ 8,456.00	18%		TAX RATE	18%
11	$ 15,874.00	22%			
12					

If we were to do this the old way it would look something like this using Nested IF Formulas:

=IF(G8<8456, 13%, IF(G8<15874, 18%, 22%))

It is much neater & easier to read using the **IFS Formula**, especially if you have lots of conditions!

MAXIFS

What does it do?

Gets the max value based on the cells that matches certain criteria

Formula breakdown:

=MAXIFS(max_range, criteria_range1, criteria1, ...)

What it means:

=MAXIFS(cells that contains the values, first set of cells to base the filtering on, filtering condition of first set of cells, ...)

Example:

=MAXIFS(D9:D13, C9:C13, "John") = $3,500

i.e. John's largest sale was $3,500

Exercise Workbook:

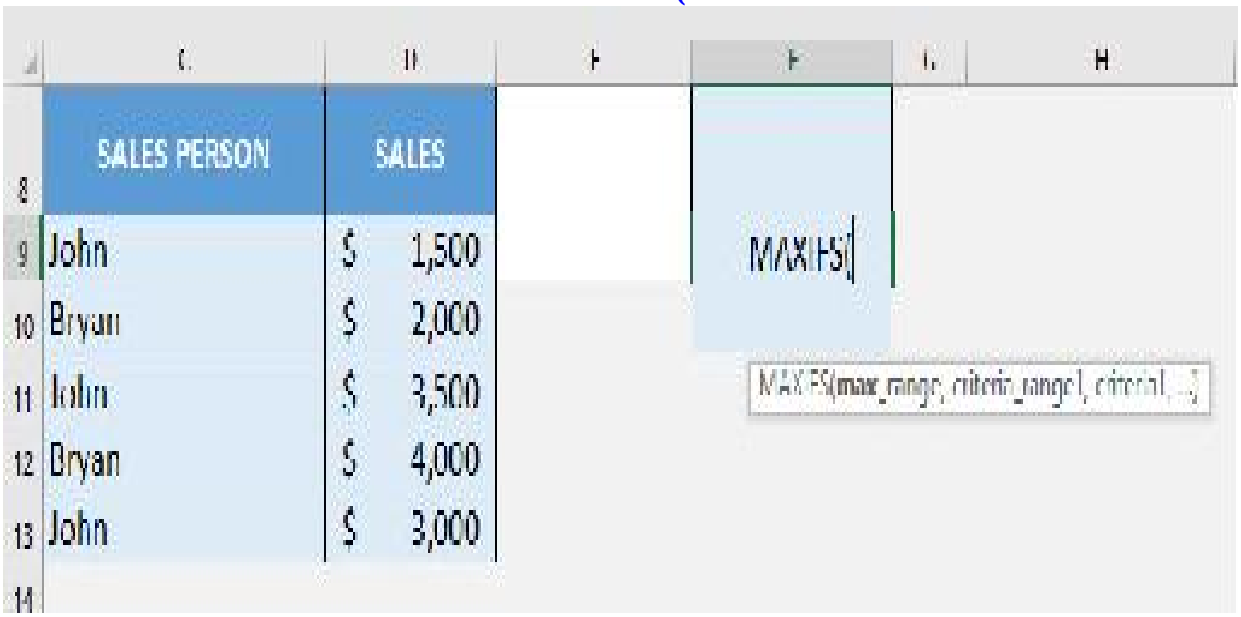
DOWNLOAD EXCEL WORKBOOK

If you need to get the max value based on certain criteria, the **MAXIFS Formula** will do this for you in Excel!

I explain how you can do this below:

STEP 1: We need to **enter the *MAXIFS* function in a blank cell**:

=MAXIFS(



STEP 2: The **MAXIFS** arguments:

max_range

What is the range that contains the values to get the max value from?

Select the cells containing the sales numbers that you want to get the maximum value from:

=MAXIFS(D9:D13,

criteria_range1

What is the range that contains the values for filtering?

Select the cells containing the sales person names:

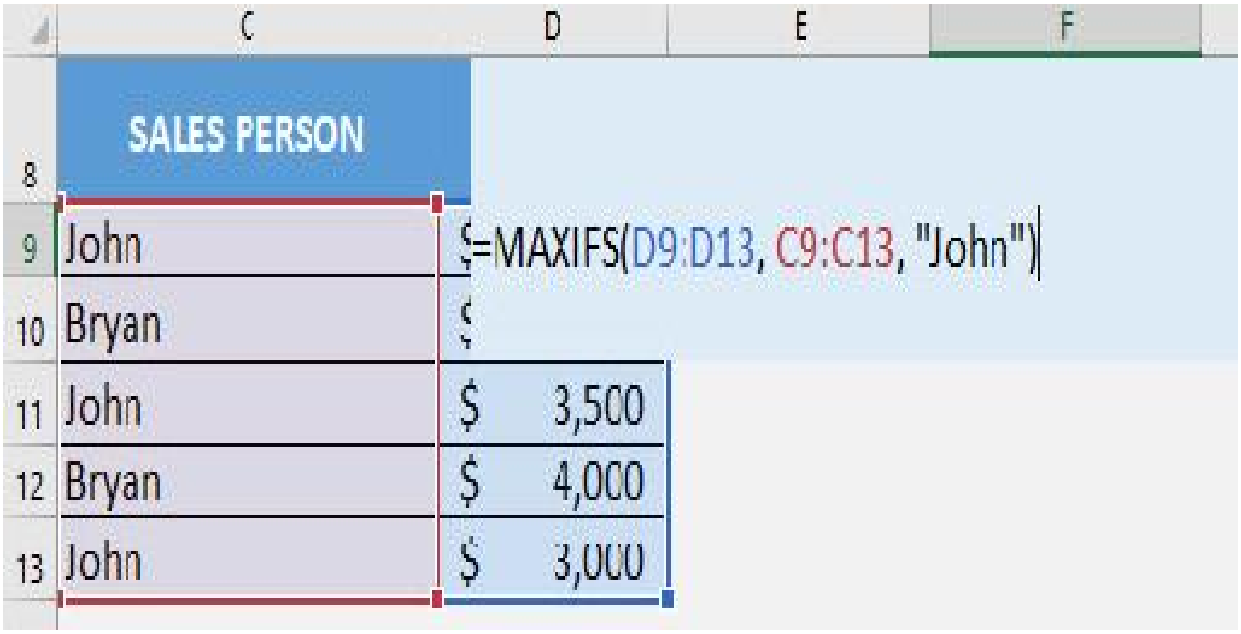
=MAXIFS(D9:D13, C9:C13,

criteria1

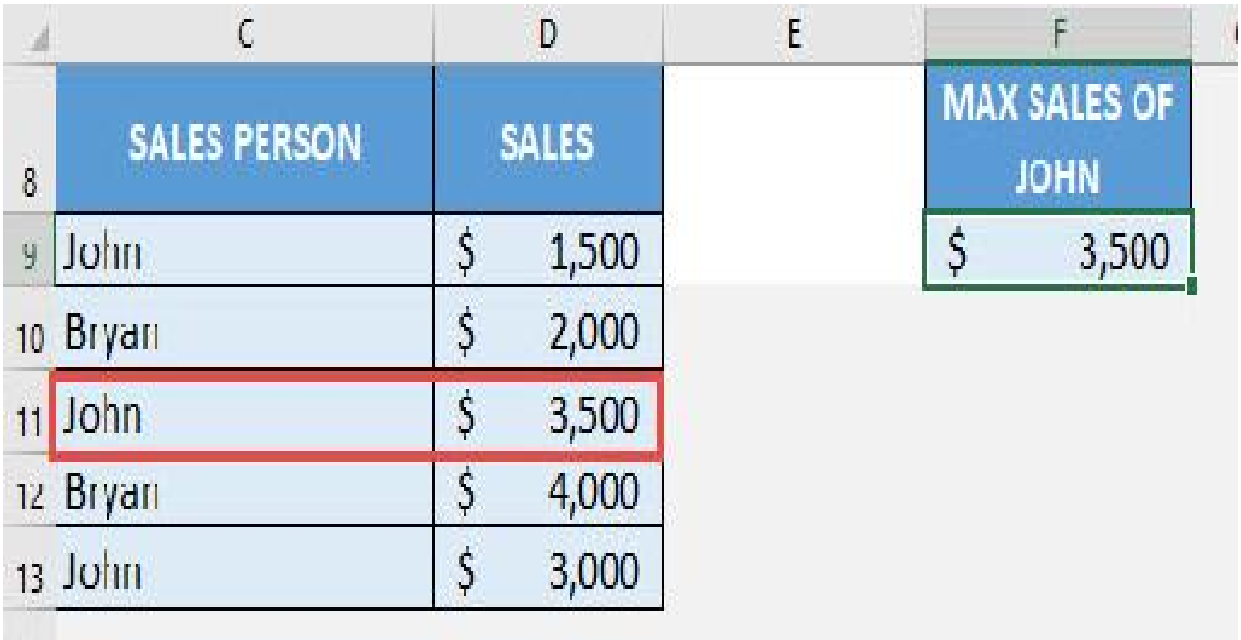
What is your filtering criteria?

Since we want to filter the sales numbers for John, type in "John":

=MAXIFS(D9:D13, C9:C13, "John")



You now have John's largest sales number!



MINIFS

What does it do?

Gets the minimum value based on the cells that matches certain criteria

Formula breakdown:

=MINIFS(min_range, criteria_range1, criteria1, ...)

What it means:

=MINIFS(cells that contains the values, first set of cells to base the filtering on, filtering condition of first set of cells, ...)

Example:

=MINIFS(D9:D13,C9:C13,"John") = $1,500

i.e. John's smallest sale was $1,500

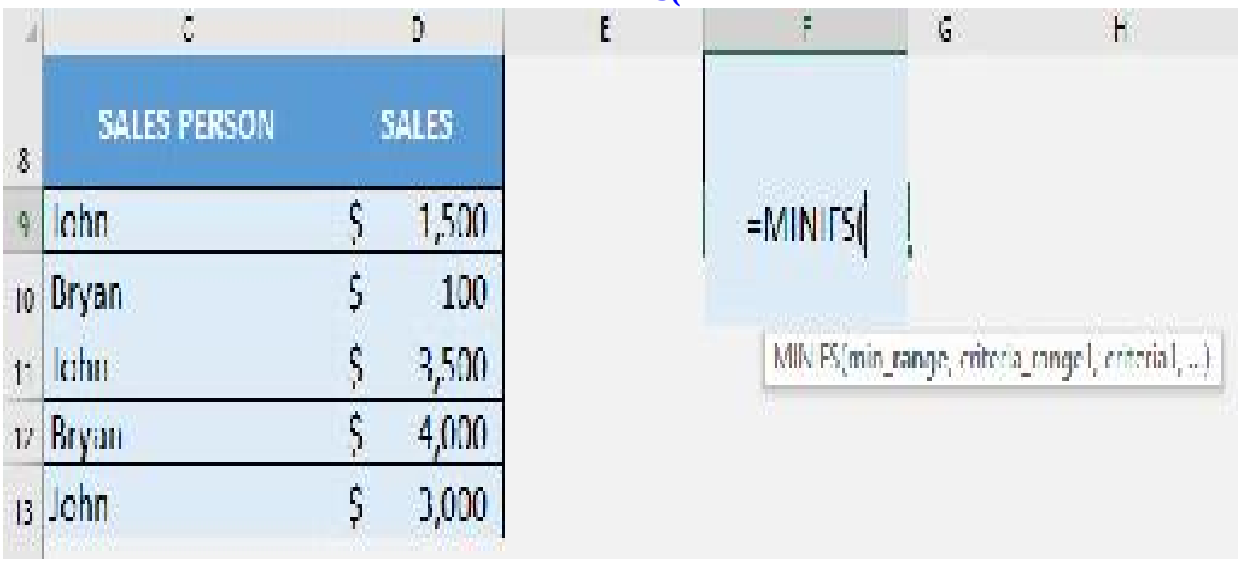
Exercise Workbook:

DOWNLOAD EXCEL WORKBOOK

If you need to get the minimum value based on certain criteria, the **MINIFS Formula** will do this for you in Excel!

STEP 1: We need to **enter the *MINIFS* function in a blank cell**:

=MINIFS(



STEP 2: The **MINIFS** arguments:

min_range

What is the range that contains the values to get the min value from?

Select the cells containing the sales numbers that you want to get the minimum value from:

=MINIFS(D9:D13,

criteria_range1

What is the range that contains the values for filtering?

Select the cells containing the sales person names:

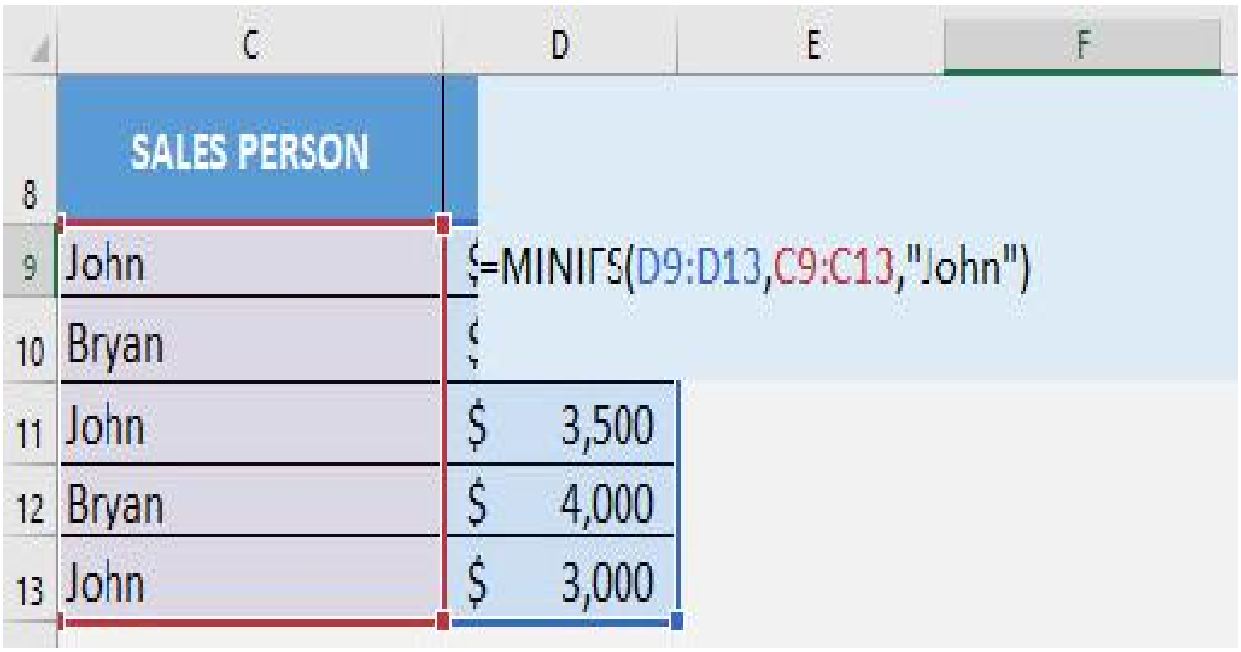
=MINIFS(D9:D13, C9:C13,

criteria1

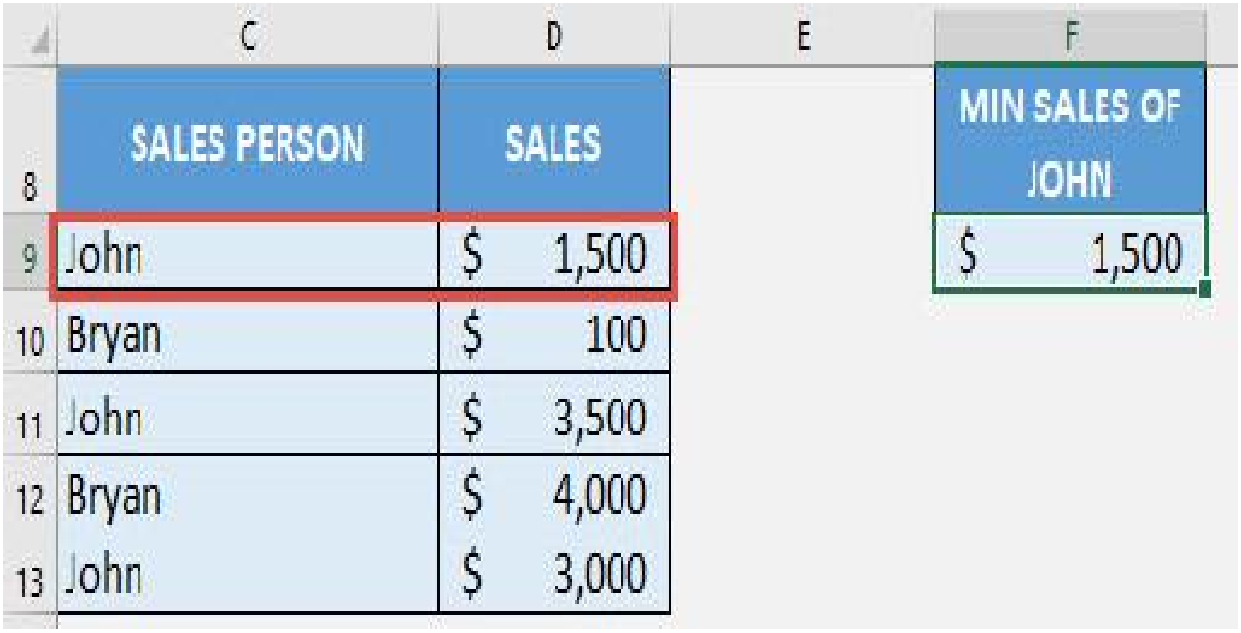
What is your filtering criteria?

Since we want to filter the sales numbers for John, type in "John":

=MINIFS(D9:D13, C9:C13, "John")



You now have John's smallest sales number!



SWITCH

What does it do?

Matches multiple values and returns the first value that has a match

Formula breakdown:

=SWITCH(expression, value1, result1, [value2 / default, result2], ...)

What it means:

=SWITCH(value to check, value to match against, result to return, [succeeding values to match or the default value if nothing gets matched], ...)

Example:

=SWITCH(3, 1, "Bad", 2, "Average", 3, "Great", "Unknown") ="Great"

Exercise Workbook:

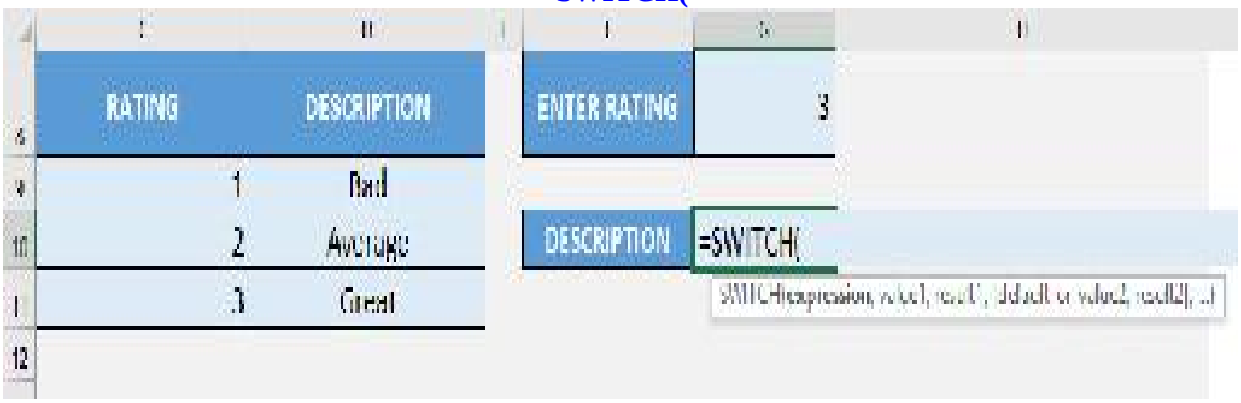
DOWNLOAD EXCEL WORKBOOK

If you have multiple values to check, we can use **Excel's SWITCH Formula!** It allows us to specify multiple values to check, then the **SWITCH Formula** will look for the first value that gets matched!

Let us try it out on a simple ratings table (e.g. 1 = Bad, 2 = Average, 3 = Great), then we will create a **SWITCH Formula** that will simulate the exact same logic of the table!

STEP 1: We need to **enter the *SWITCH* function in a blank cell**:

=SWITCH(



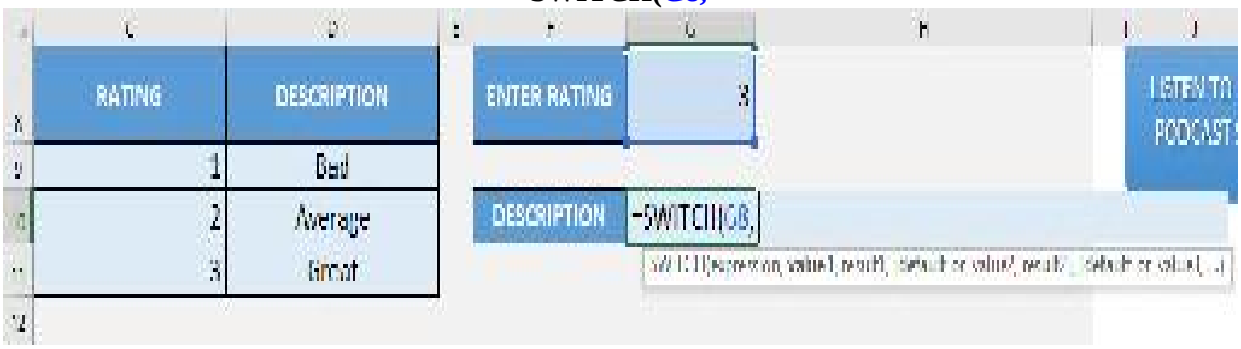
STEP 2: The **SWITCH** arguments:

expression

What is the value to check?

Select the cell containing the rating that you want to translate to the correct description

=SWITCH(G8,

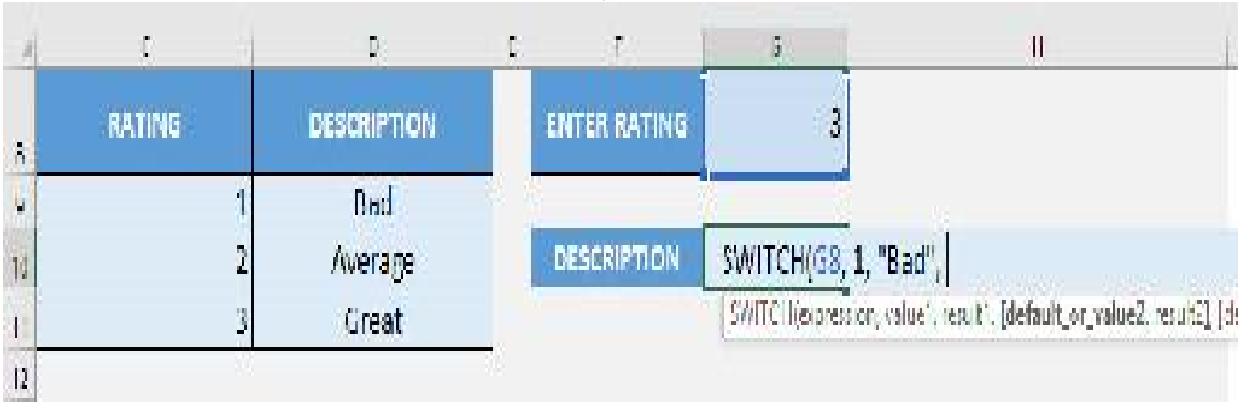


value1, result1

What is the first lookup value and value to return if it is matched?

Let us start from the first value of the rating table. If the value is 1, then the description is "Bad"

=SWITCH(G8, 1, "Bad"

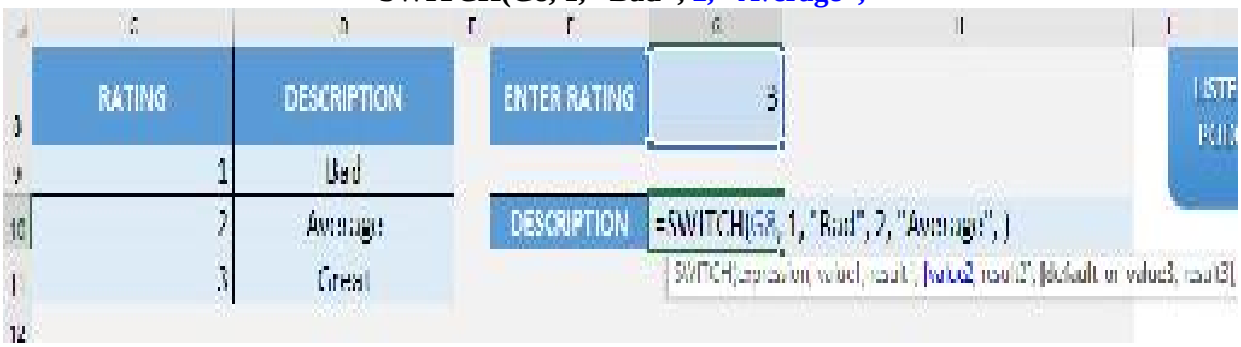


value2, result2

What is the second lookup value and value to return if it is matched?

Let us start from the second value of the rating table. If the value is 2, then the description is "Average"

=SWITCH(G8, 1, "Bad", 2, "Average",



value3, result3

What is the third lookup value and value to return if it is matched?

Let us start from the third value of the rating table. If the value is 3, then the description is "Great"

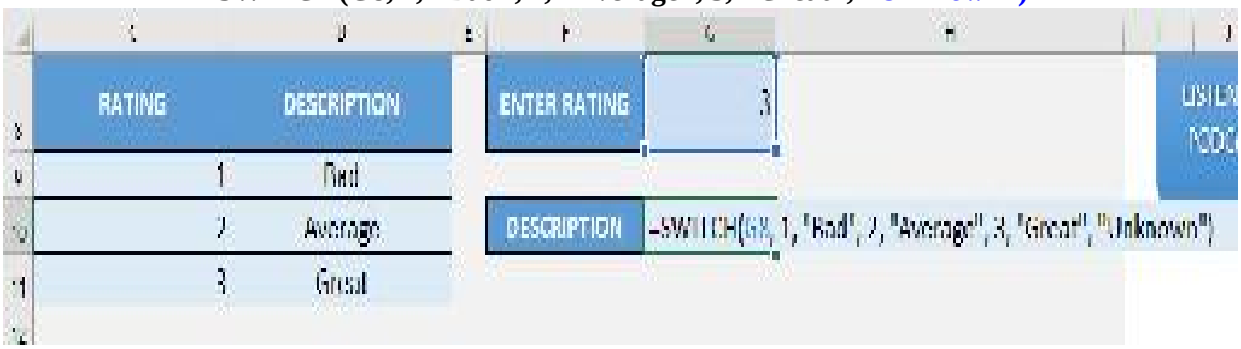
=SWITCH(G8, 1, "Bad", 2, "Average", 3, "Great",

default

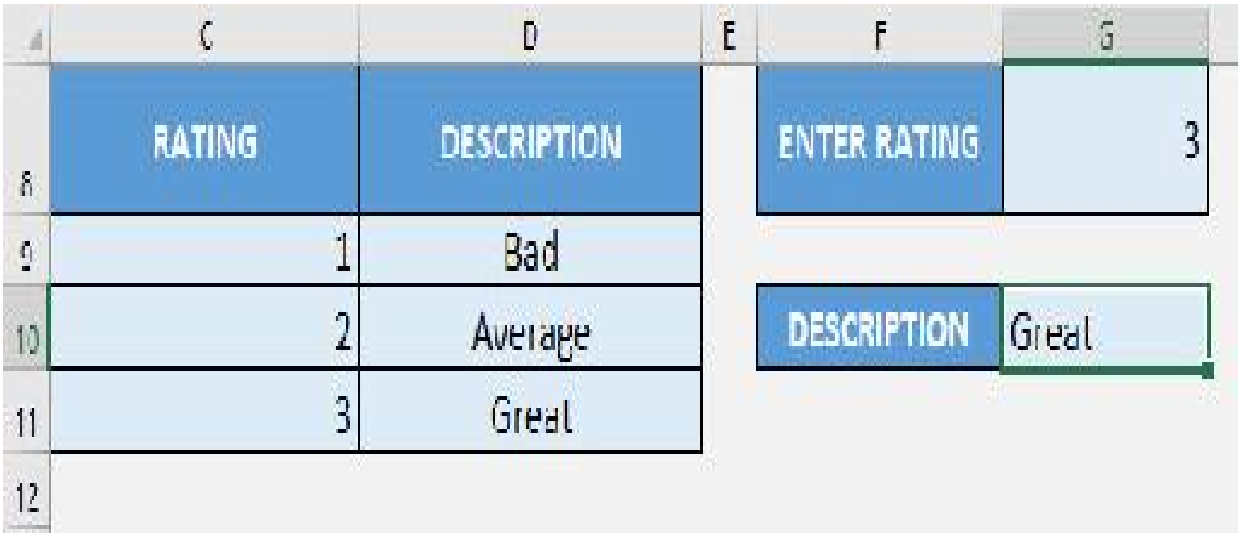
What is the default value to return if nothing gets matched?

We want to show the value "Unknown", if an unknown rating is specified.

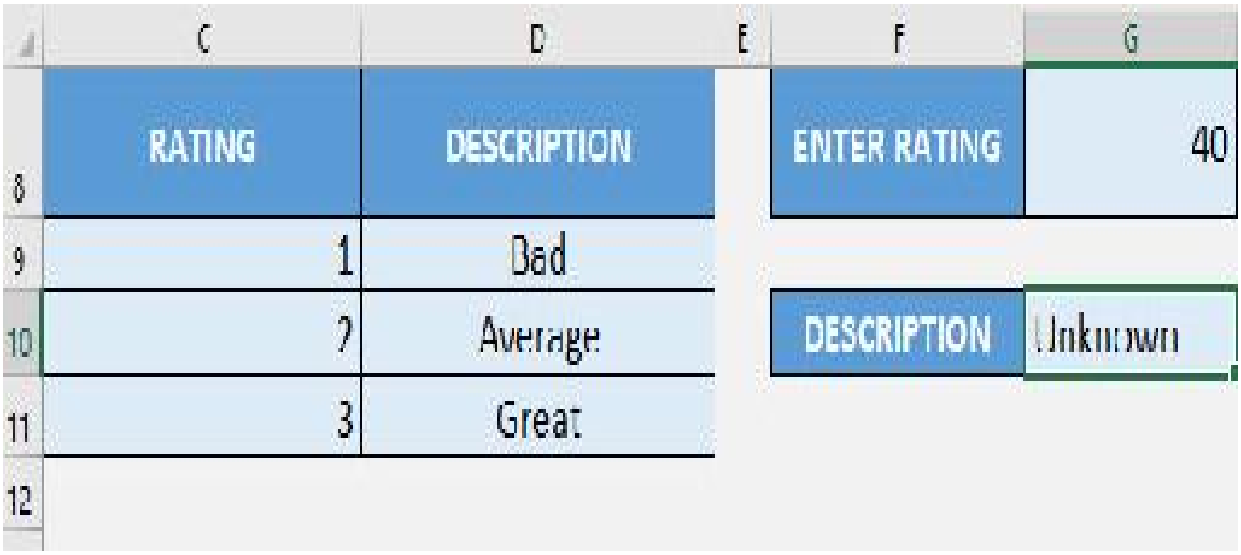
=SWITCH(G8, 1, "Bad", 2, "Average", 3, "Great", "Unknown")



You now have your correct rating description!



Let us try an unknown rating (40) and see the resulting description:



	C	D	E	F	G
8	RATING	DESCRIPTION		ENTER RATING	40
9	1	Bad			
10	2	Average		DESCRIPTION	Unknown
11	3	Great			
12					

If we were to do this the old way it would look something like this using Nested IF Formulas:

=IF(G8= 1, "Bad", IF(G8=2, "Average", IF(G8=3, "Great", "Unknown")))

It is way easier using the **SWITCH Formula**!

TEXTJOIN

What does it do?

Concatenates a list with a specified delimiter

Formula breakdown:

=TEXTJOIN(delimiter, ignore_empty, text1, ...)

What it means:

=TEXTJOIN(the delimiter, ignore empty cells in combining text, first text/range to combine, ...)

Example:

=TEXTJOIN(",",TRUE,"Hello","World") ="Hello,World"

Exercise Workbook:

DOWNLOAD EXCEL WORKBOOK

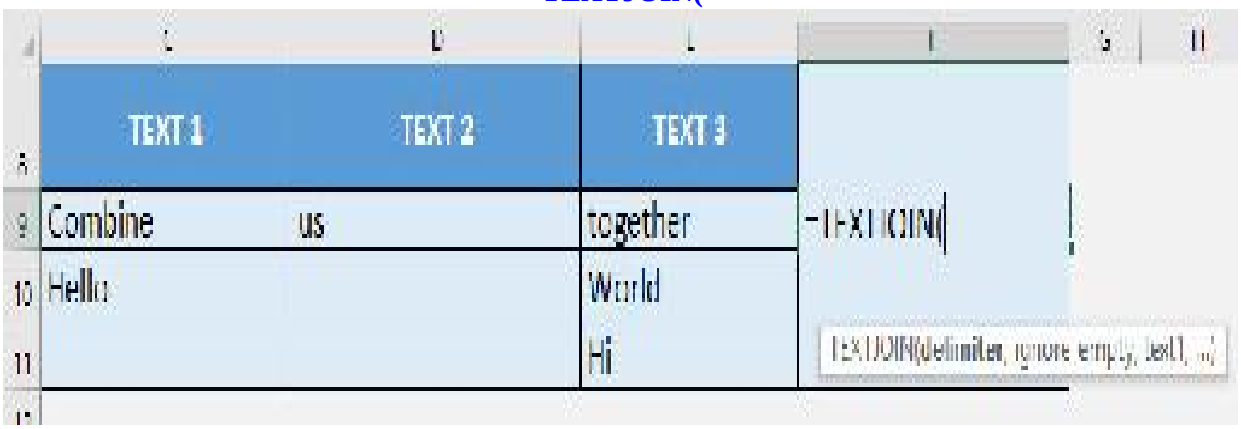
Do you want to combine text or a range of cells together easily? The **TEXTJOIN Formula** in Excel will do this for you in a flash! The **TEXTJOIN Formula** was introduced in Excel 2016.

It can even let you specify a **delimiter** to use to combine the text together and **ignore empty cells** for you!

I explain how you can do this below:

STEP 1: We need to **enter the *TEXTJOIN* function in a blank cell**:

=TEXTJOIN(



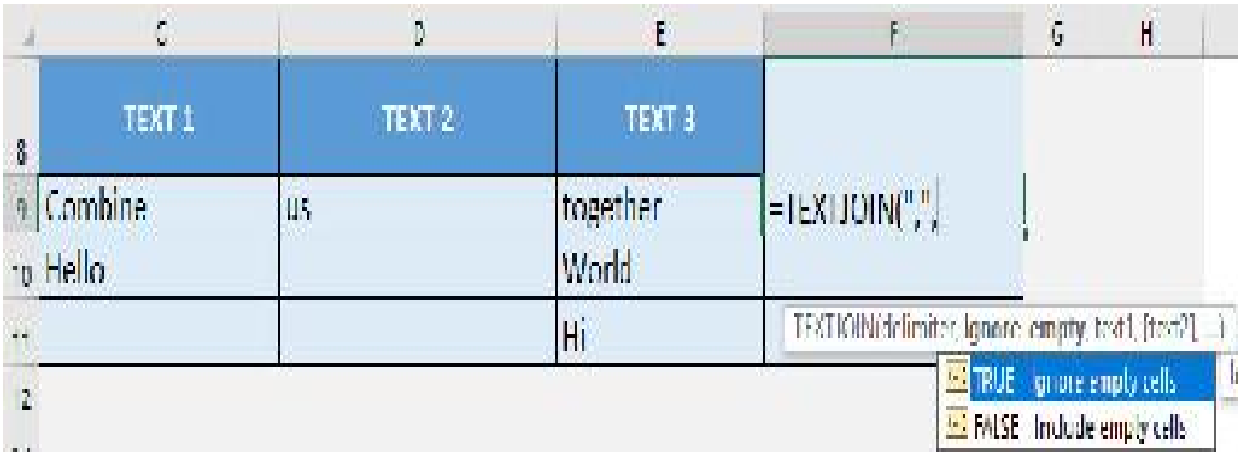
STEP 2: The **TEXTJOIN** arguments:

delimiter

What is the delimiter to use in combining the text?

We want to have the text combined together and separated by a comma:

=TEXTJOIN(",",

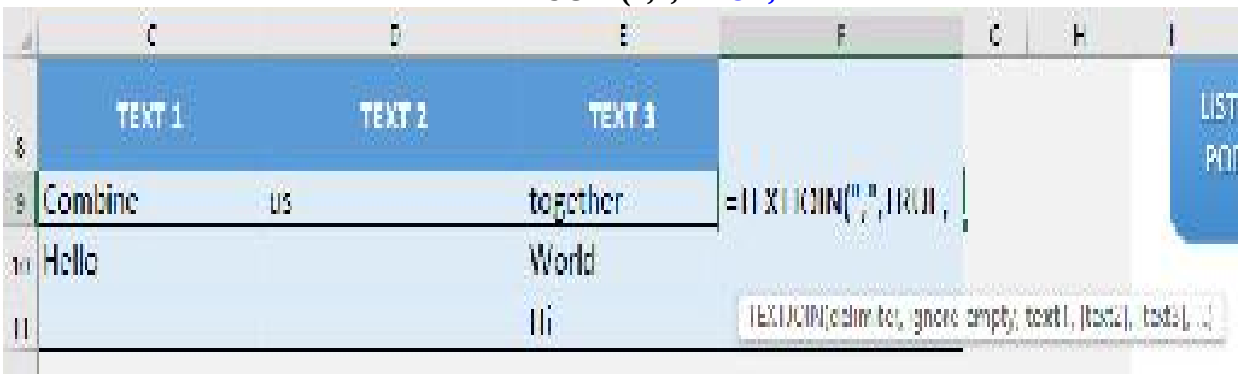


ignore_empty

Do you want to ignore the empty cells?

Let us set this to TRUE to ignore the empty cells when combining them together:

=TEXTJOIN(",", TRUE,

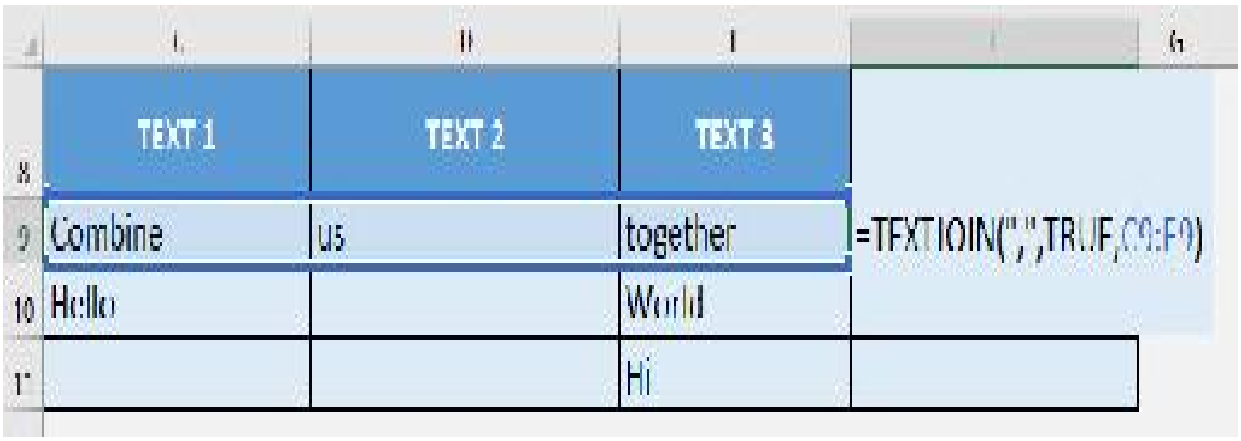


text1, ...

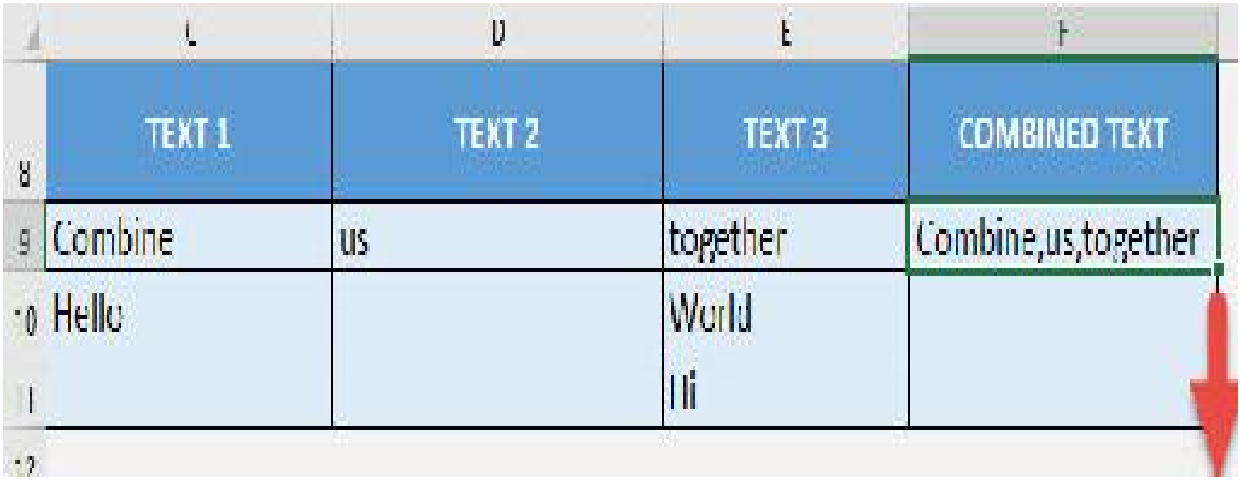
Which cells do you want to combine together?

Select the range of cells that you want to combine together

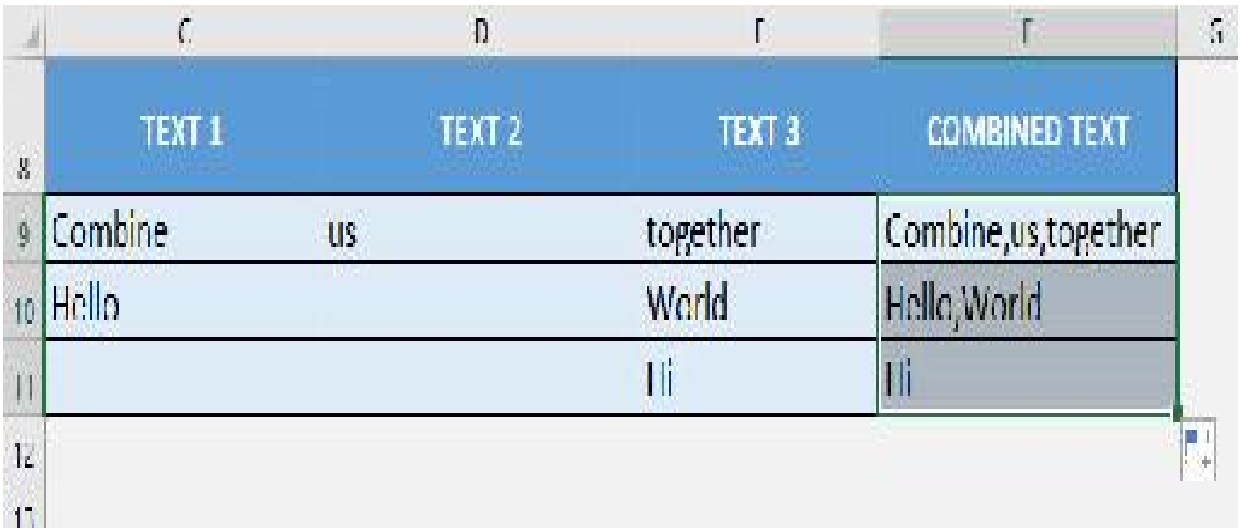
=TEXTJOIN(",", TRUE, C9:E9)



Apply the same formula to the rest of the cells by dragging the lower right corner downwards.



You now have your combined text!



If we were to do this the old way it would look something like this using the CONCATENATE FORMULA:

=CONCATENATE(C9,",",D9,",",E9)

And it does not even have the capability to ignore empty cells. It is way easier using the **TEXTJOIN Formula**!

OFFICE 365 (AS OF SEPTEMBER 2018)

FILTER

What does it do?

Filters a table array based on the filtering condition given

Formula breakdown:

=FILTER(array, include, [if_empty])

What it means:

=FILTER(data to be filtered, the filtering condition, [value to display if nothing gets matched])

Example:

=FILTER(C9:D14,D9:D14>0.33,"") = Shows all the data that has a tax rate > 33%

Exercise Workbook:

DOWNLOAD EXCEL WORKBOOK

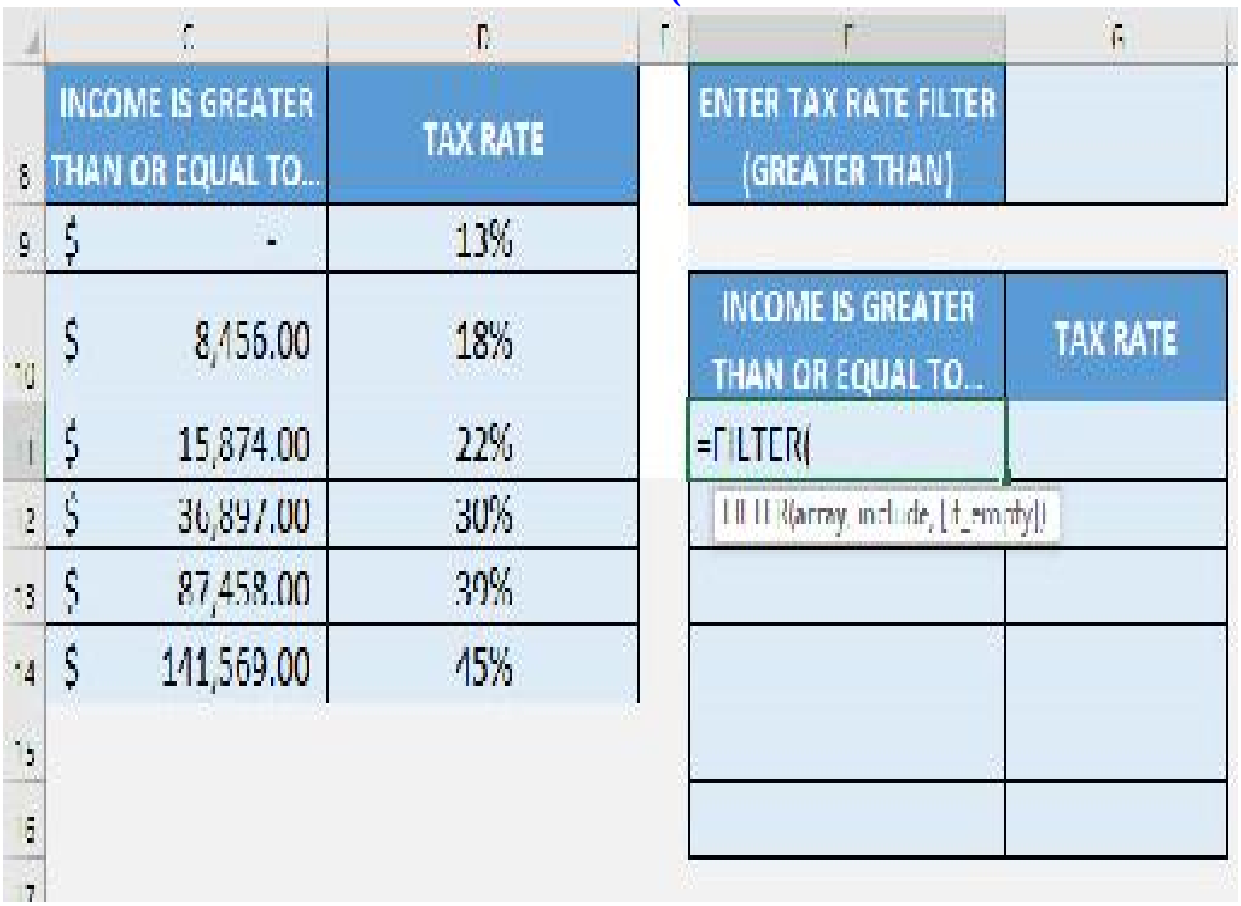
Did you know that you can now filter your table data with an Excel Formula? Yes you can! It is definitely possible now with **Excel's FILTER Formula**.

We have a tax table that we want to dynamically filter with a given rate.

I explain how you can do this below:

STEP 1: We need to **enter the *FILTER* function in a blank cell**:

=FILTER(



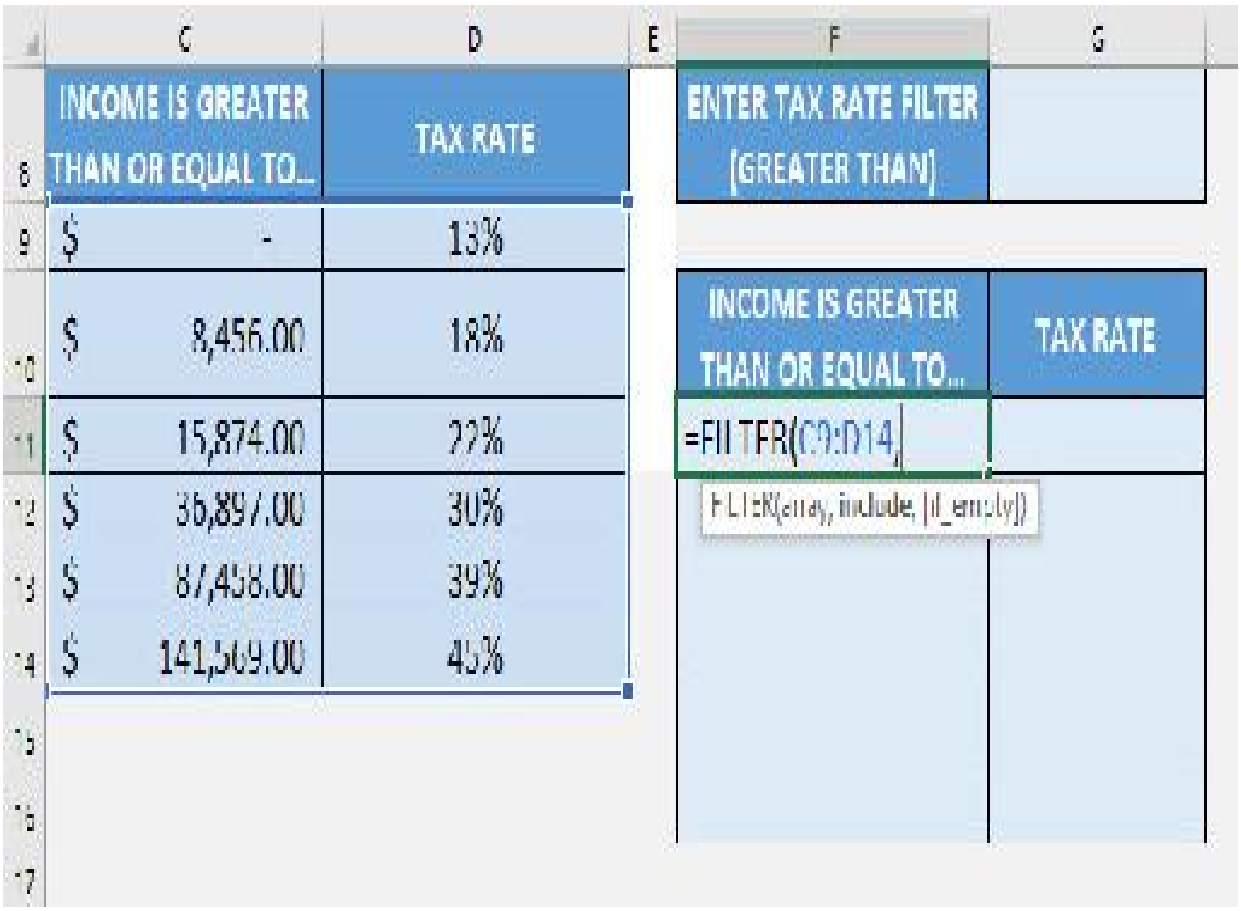
STEP 2: The **FILTER** arguments:

array

What is the data to be filtered?

Select the cells containing the tax data, do not include the headers:

=FILTER(C9:D14,

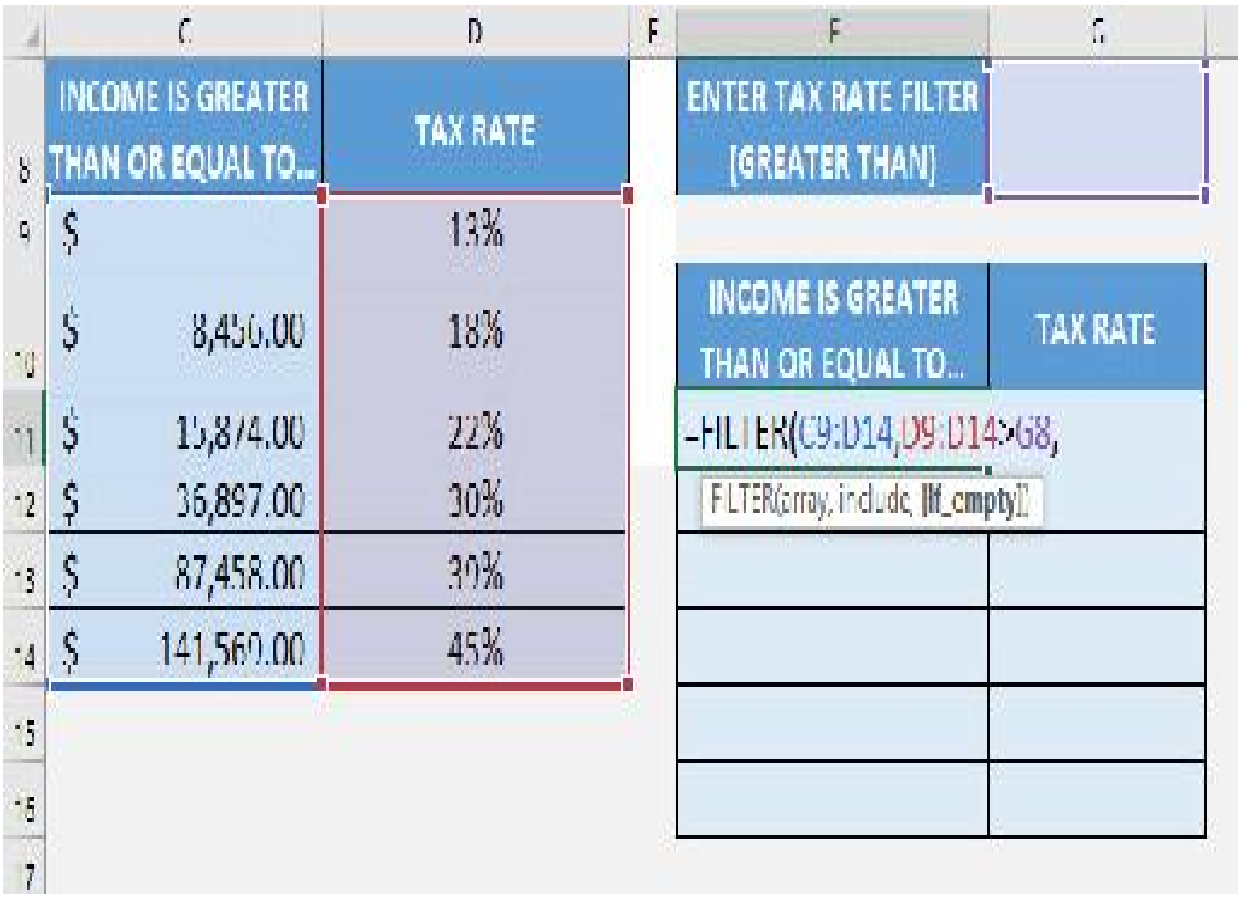


include

What is your filtering condition?

We want to filter the tax rate that is greater than the specified rate. Type in the condition as the tax rate column > the specific tax rate.

=FILTER(C9:D14, D9:D14>G8

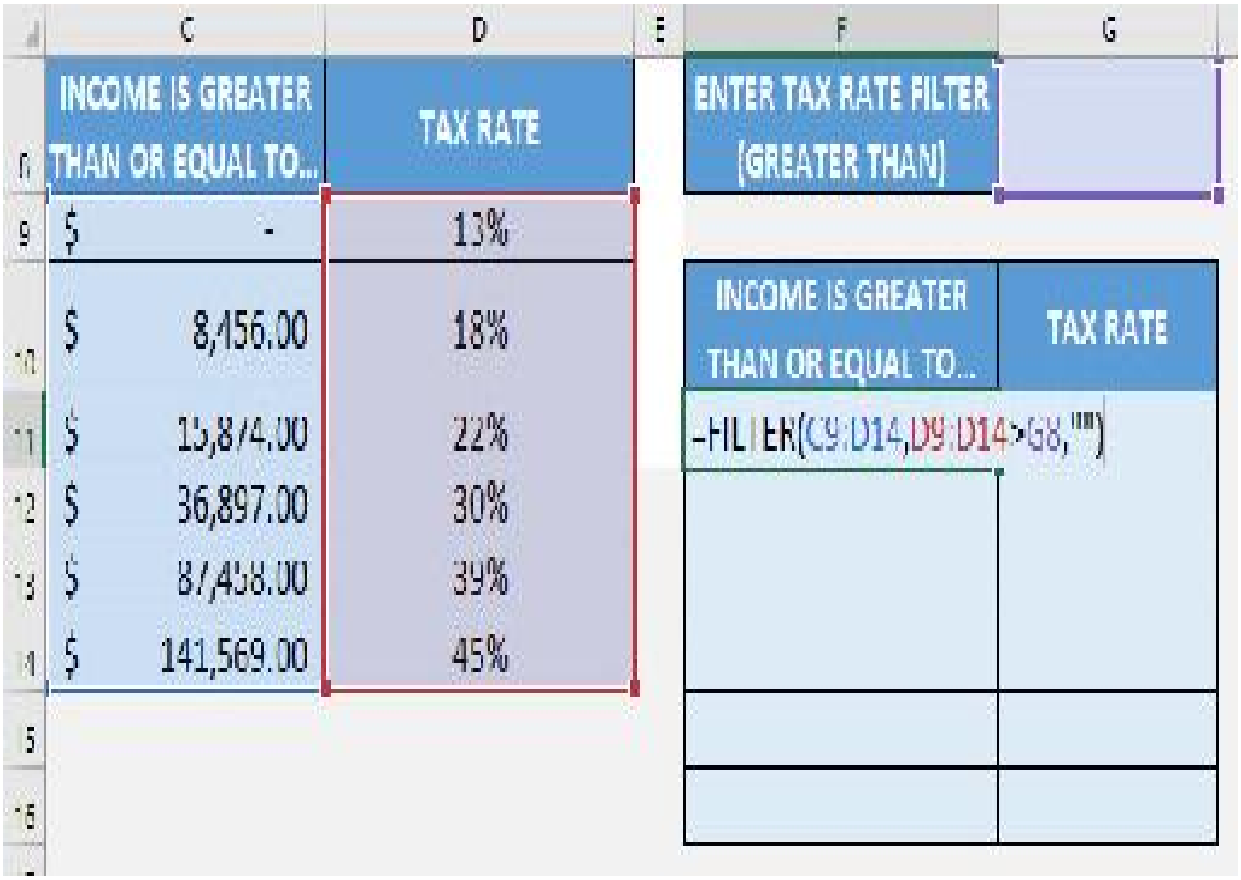


[if_empty]

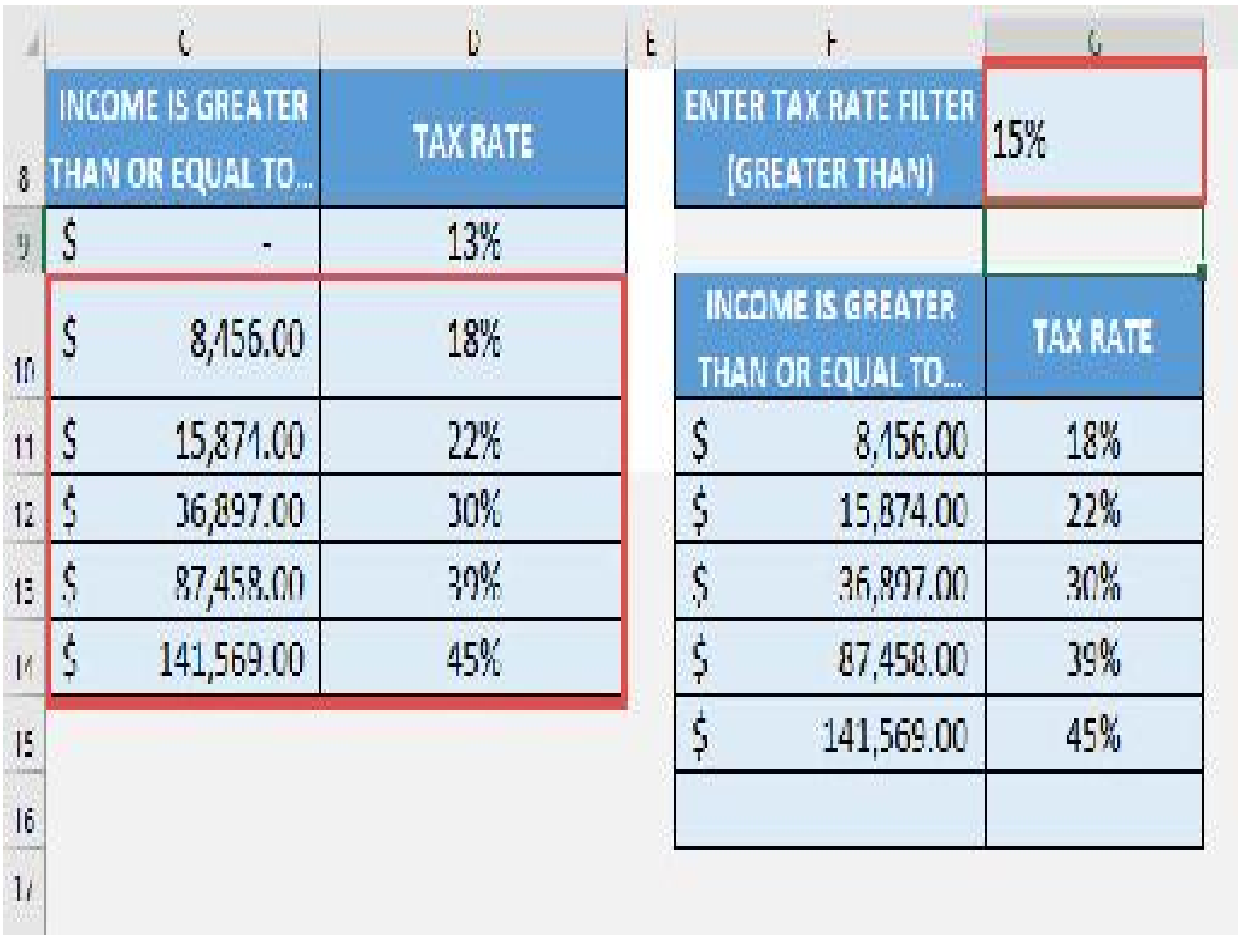
What is the value to display in case nothing gets matched?

Just place an empty string to be displayed if nothing gets matched.

=FILTER(C9:D14, D9:D14>G8, "")



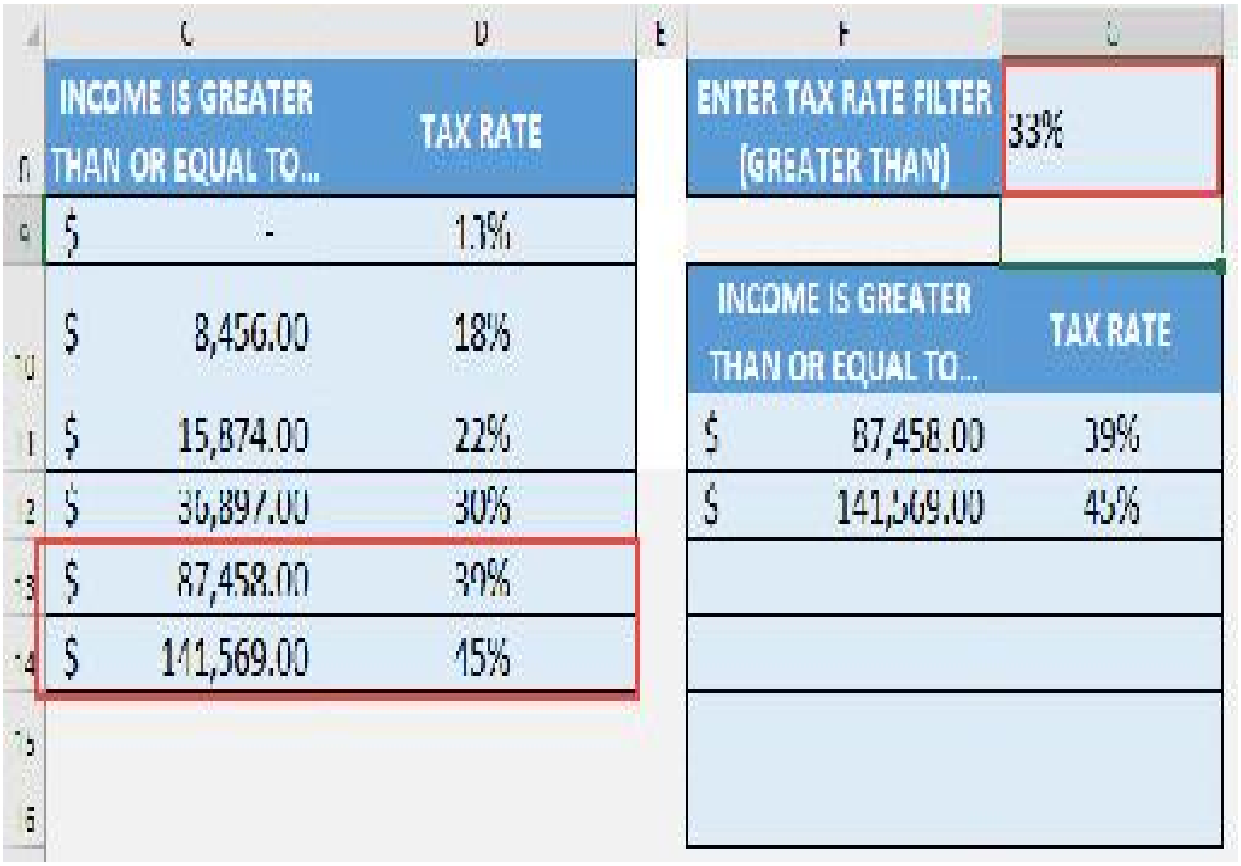
Try it out now with different values and see it get filtered magically!



INCOME IS GREATER THAN OR EQUAL TO...	TAX RATE
$ -	13%
$ 8,156.00	18%
$ 15,871.00	22%
$ 36,897.00	30%
$ 87,458.00	39%
$ 141,569.00	45%

ENTER TAX RATE FILTER (GREATER THAN)	15%

INCOME IS GREATER THAN OR EQUAL TO...	TAX RATE
$ 8,156.00	18%
$ 15,874.00	22%
$ 36,897.00	30%
$ 87,458.00	39%
$ 141,569.00	45%



INCOME IS GREATER THAN OR EQUAL TO...		TAX RATE
$	-	10%
$	8,456.00	18%
$	15,874.00	22%
$	36,897.00	30%
$	87,458.00	39%
$	141,569.00	45%

ENTER TAX RATE FILTER (GREATER THAN)	33%

INCOME IS GREATER THAN OR EQUAL TO...		TAX RATE
$	87,458.00	39%
$	141,569.00	45%

RANDARRAY

What does it do?

Creates an array of random numbers between 0 and 1

Formula breakdown:

=RANDARRAY([rows], [columns])

What it means:

=RANDARRAY(number of rows, number of columns)

Example:

=RANDARRAY(6,2)

=Random numbers in a table of 6 rows and 2 columns

Exercise Workbook:

DOWNLOAD EXCEL WORKBOOK

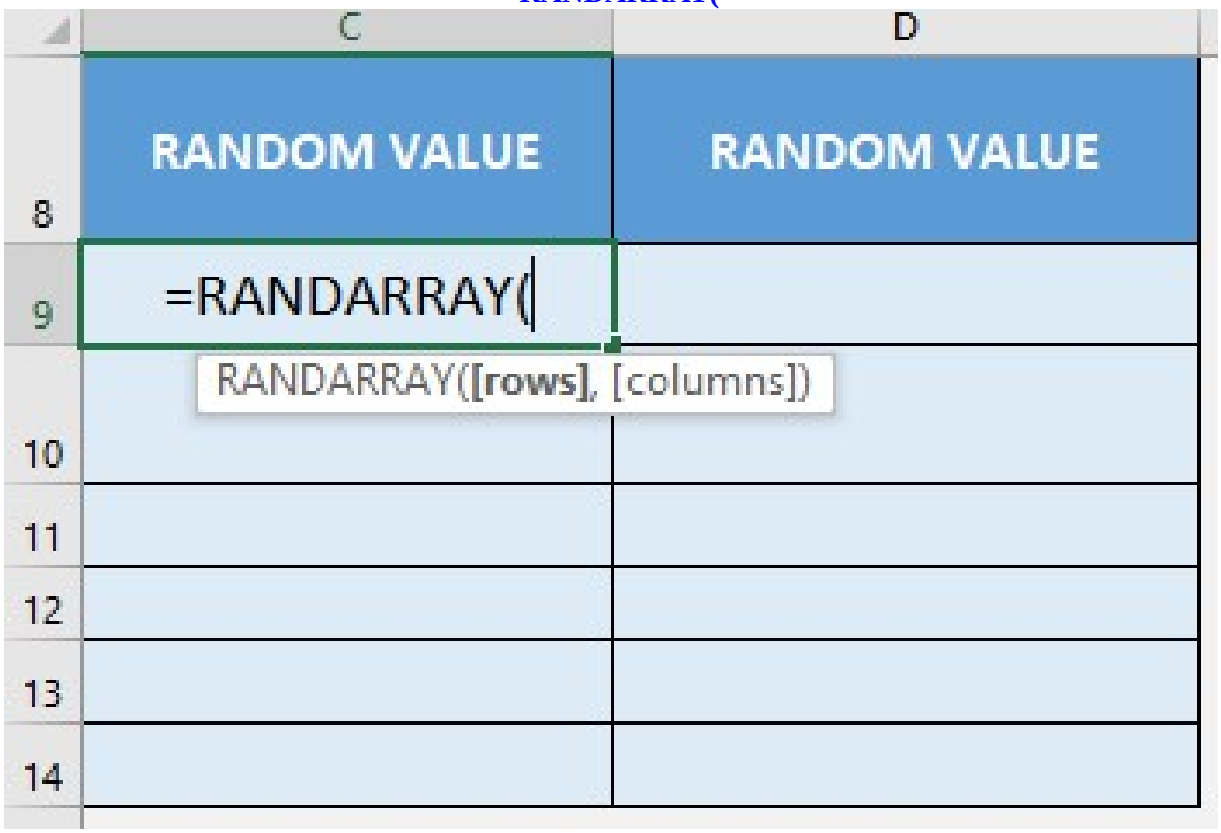
Ever wondered how to create an array of random numbers easily? It is definitely possible now with **Excel's RANDARRAY Formula**.

We want to fill up a table of 6 rows and 2 columns with random numbers between 0 and 1.

I explain how you can do this below:

STEP 1: We need to **enter the *RANDARRAY* function in a blank cell**:

=RANDARRAY(



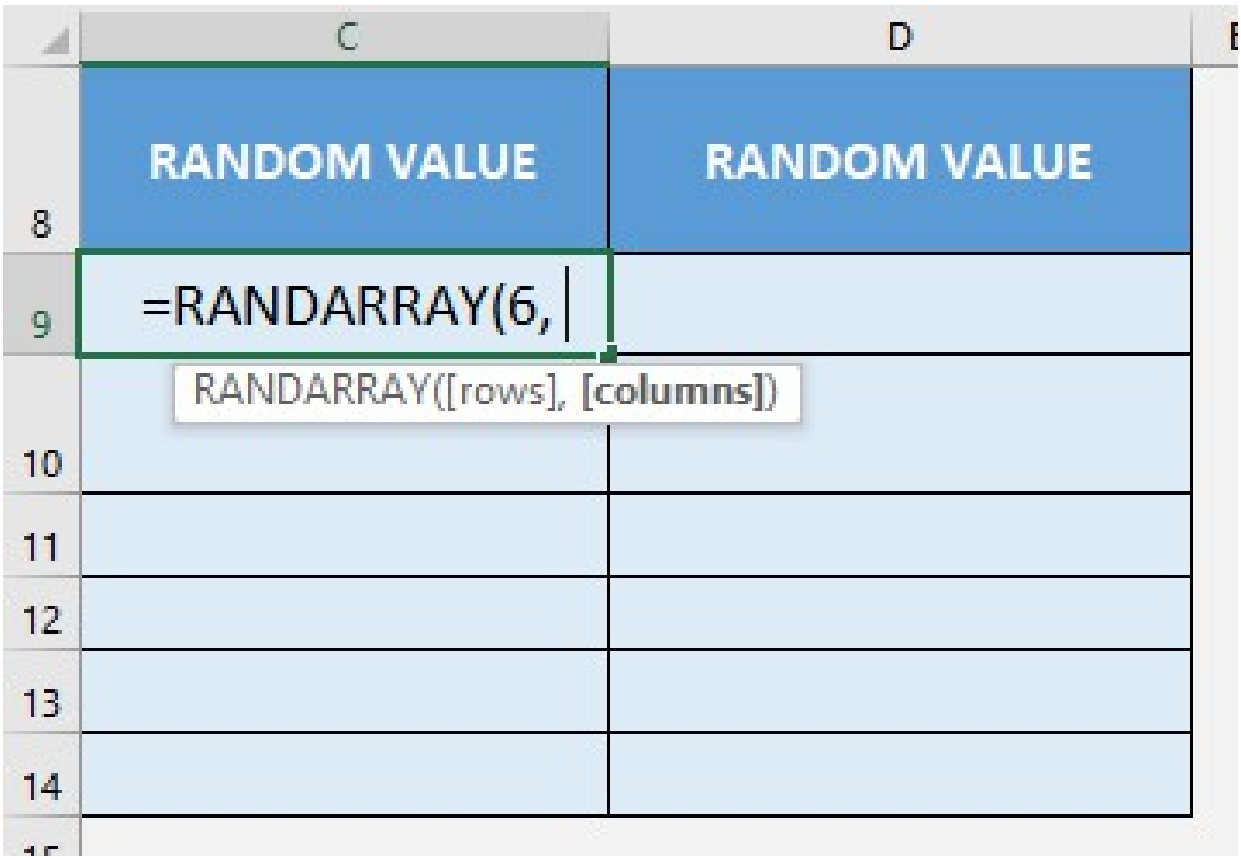
STEP 2: The **RANDARRAY** arguments:

[rows]

How many rows are going to be populated?

We want 6 so input that as the number of rows:

=RANDARRAY(6,

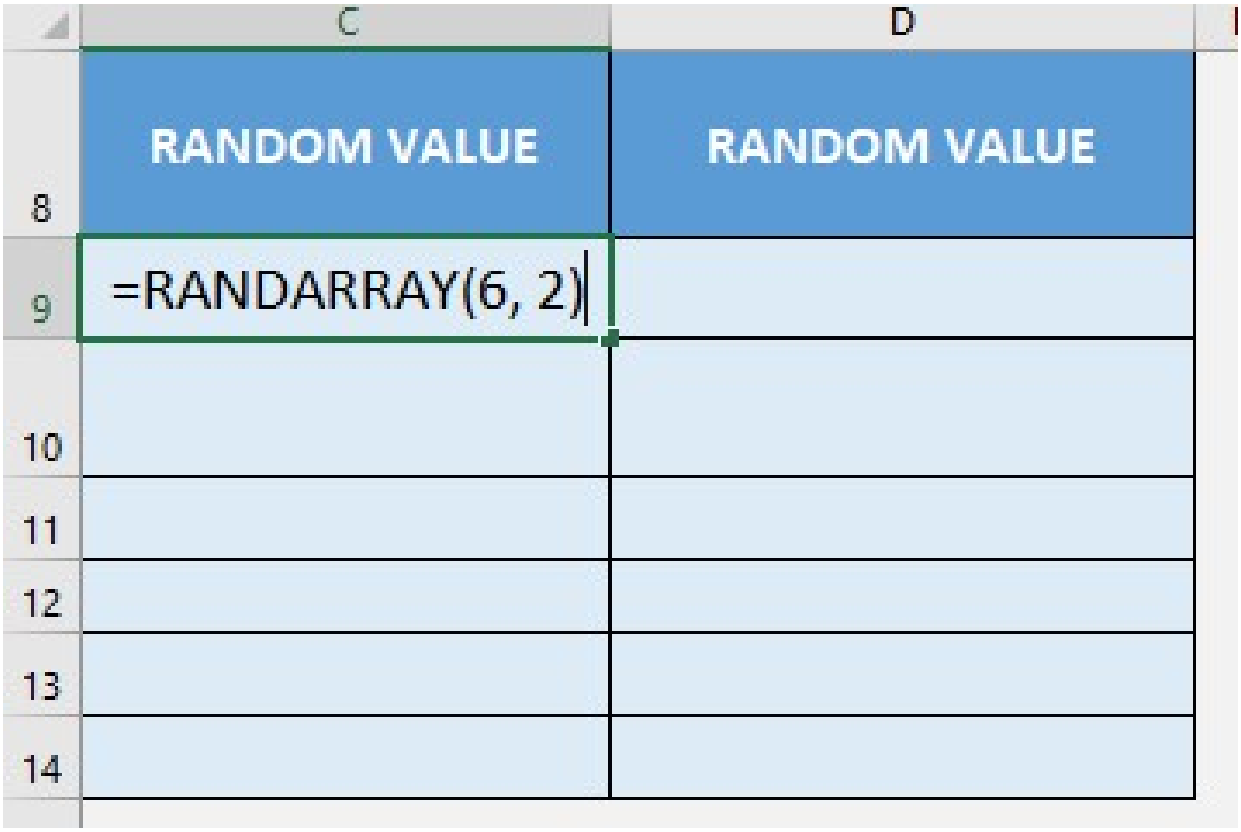


[columns]

How many columns are going to be populated?

We want 2 so input that as the number of columns

=RANDARRAY(6, 2)



Now you have your random array of values!

	C	D	E
8	RANDOM VALUE	RANDOM VALUE	
9	0.35	0.16	
10	0.37	0.38	
11	0.25	0.32	
12	0.82	0.91	
13	0.51	0.91	
14	0.12	0.74	

SEQUENCE

What does it do?

Creates an array of sequential numbers

Formula breakdown:

=SEQUENCE(rows, [columns], [start], [step])

What it means:

=SEQUENCE(number of rows, [number of columns], [starting number], [increment per number])

Example:

=SEQUENCE(6,2,0,2)

=Even numbers starting from 0 in a table of 6 rows and 2 columns

Exercise Workbook:

DOWNLOAD EXCEL WORKBOOK

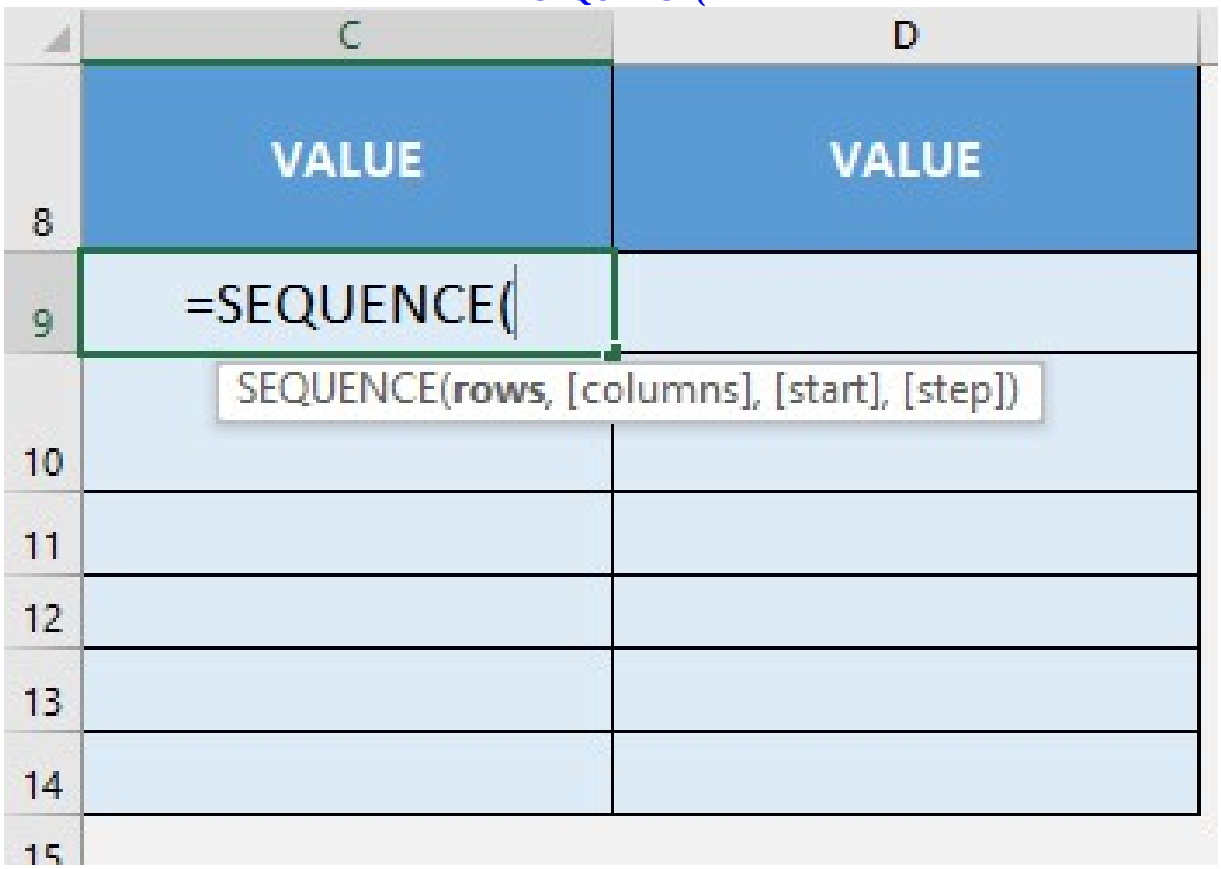
Ever wondered how to create an array of sequential numbers easily? It is definitely possible now with **Excel's SEQUENCE Formula**.

We want to fill up a table of 6 rows and 2 columns with even numbers starting from 0.

I explain how you can do this below:

STEP 1: We need to **enter the *SEQUENCE* function in a blank cell**:

=SEQUENCE(



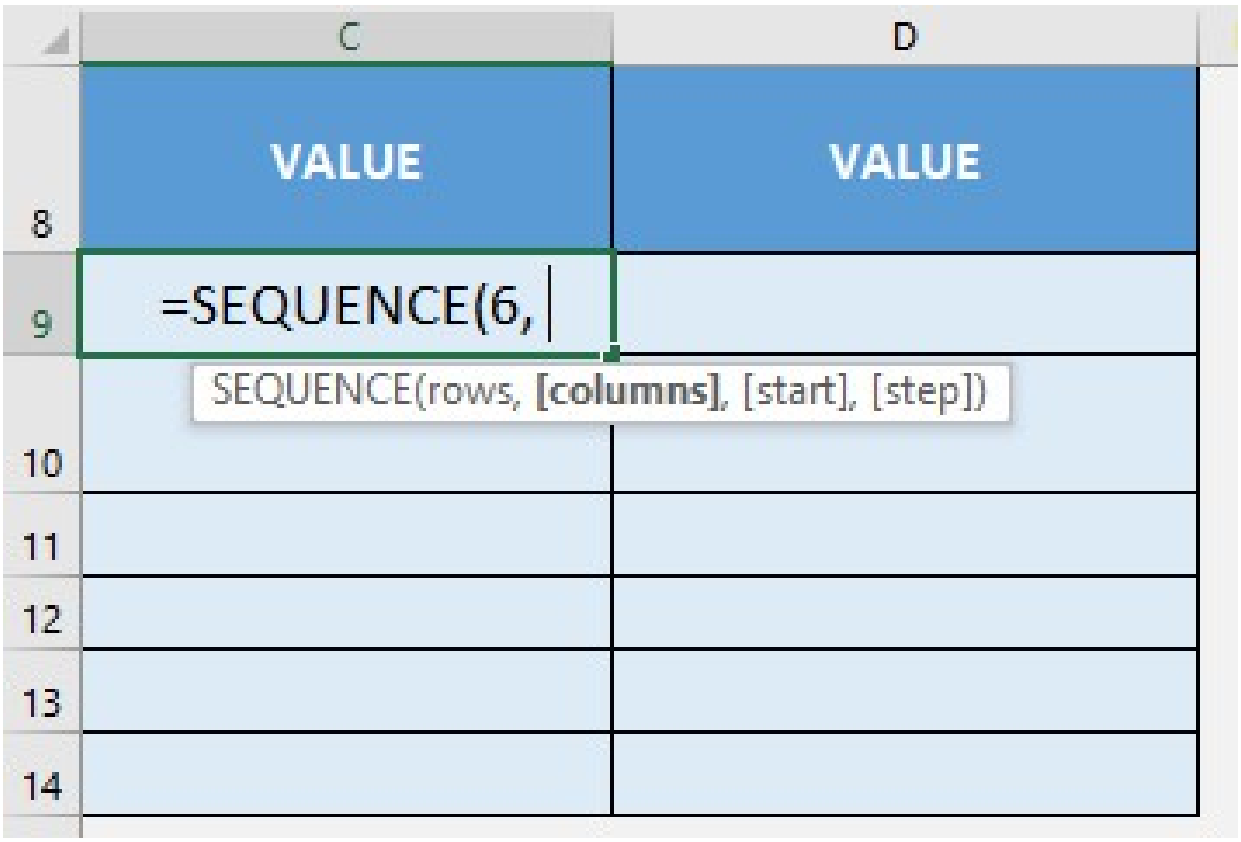
STEP 2: The **SEQUENCE** arguments:

rows

How many rows are going to be populated?

We want 6 so input that as the number of rows.

=SEQUENCE(6,

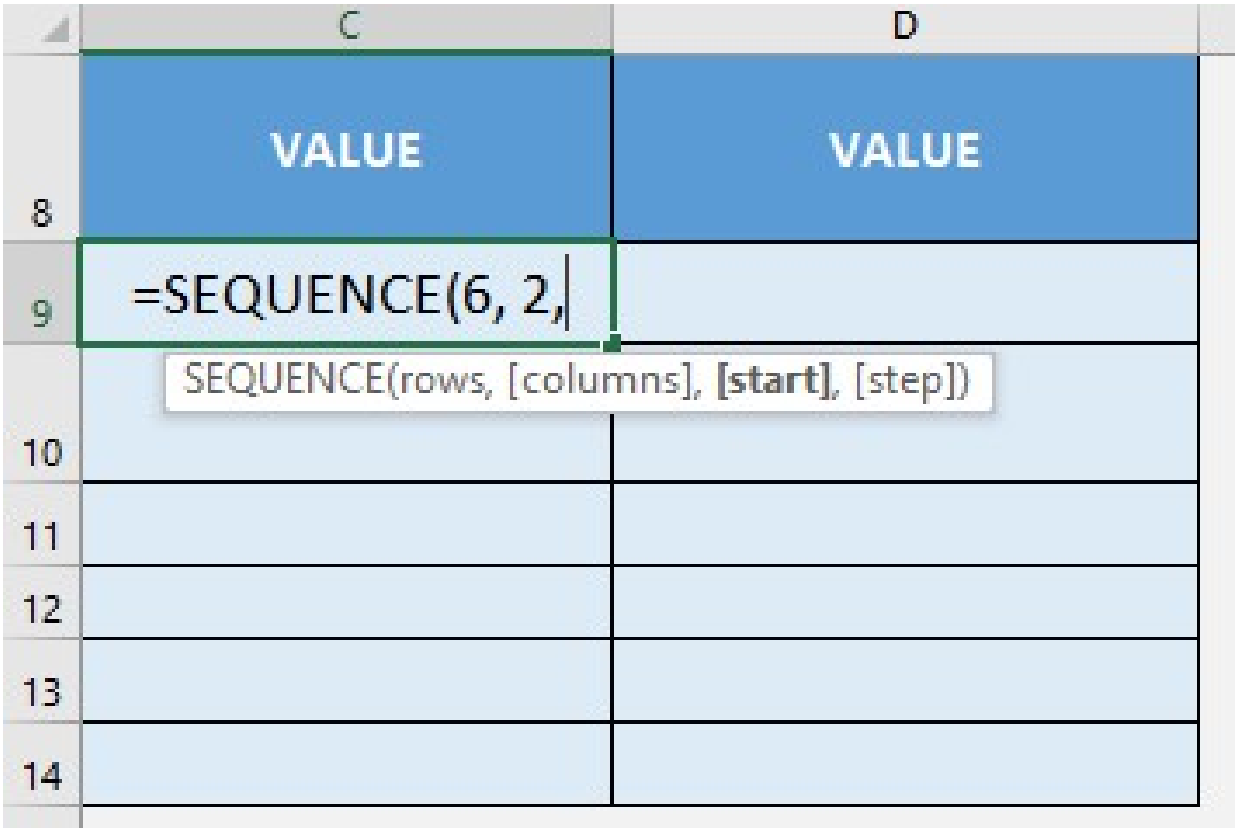


[columns]

How many columns are going to be populated?

We want 2 so input that as the number of columns.

=SEQUENCE(6, 2,

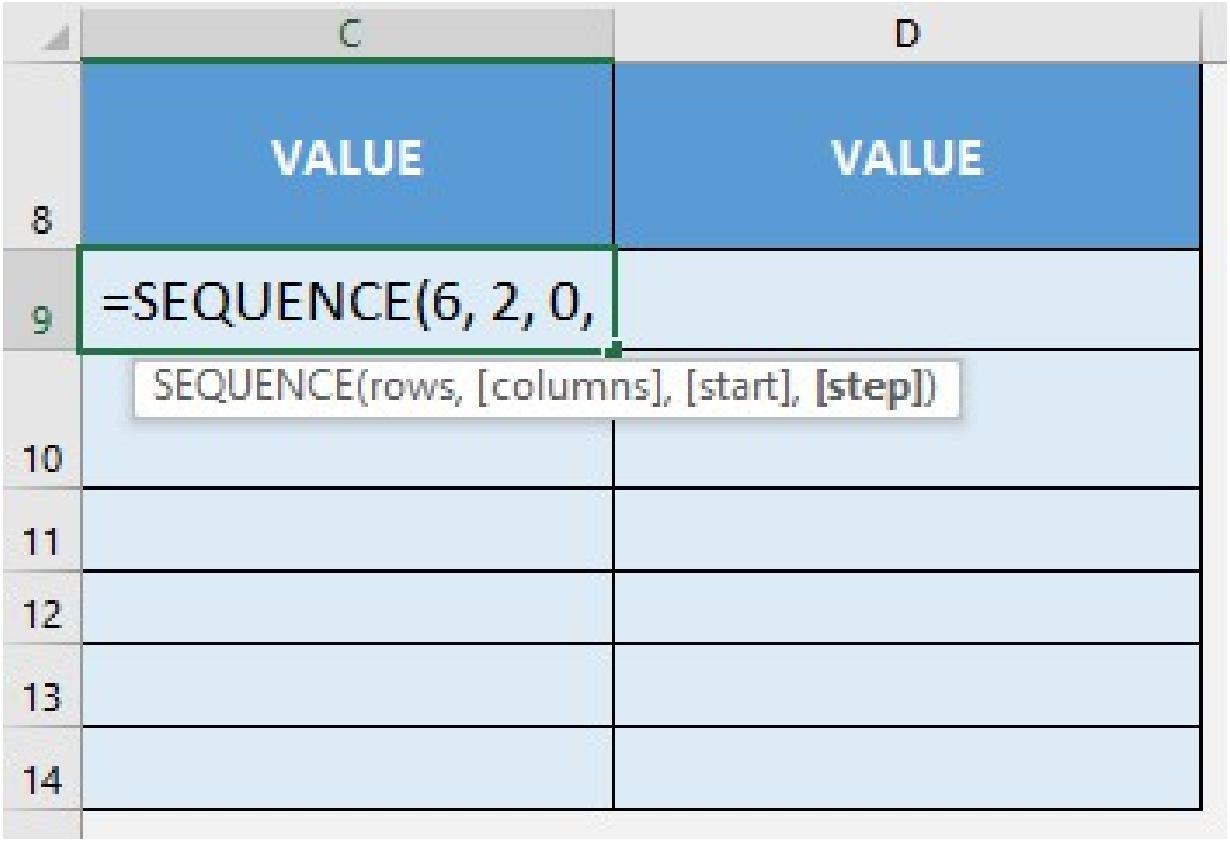


[start]

What is the starting number?

We want the first number to be 0.

=SEQUENCE(6, 2, 0,

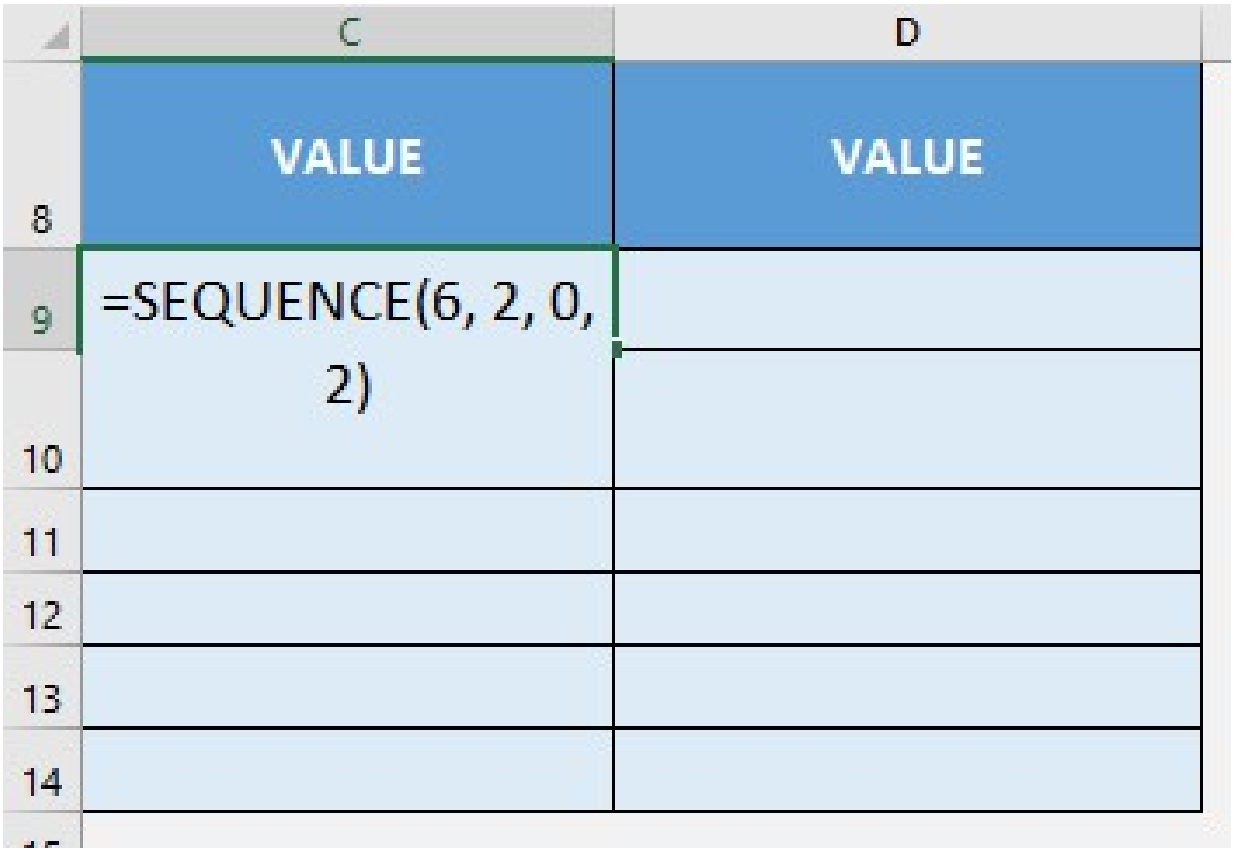


[step]

What is the interval for each succeeding number?

We want even numbers, so the increment should be 2 for each succeeding number.

=SEQUENCE(6, 2, 0, 2)



Now you have your even numbers filled up!

	C	D
8	VALUE	VALUE
9	0	2
10	4	6
11	8	10
12	12	14
13	16	18
14	20	22

SORT

What does it do?

Sorts a table based on a column and order specified

Formula breakdown:

=SORT(array, [sort_index], [sort_order])

What it means:

=SORT(data to be sorted, [which column to be used for sorting], [ascending or descending order])

Example:

=SORT(C9:D14, 2, -1)

Exercise Workbook:

DOWNLOAD EXCEL WORKBOOK

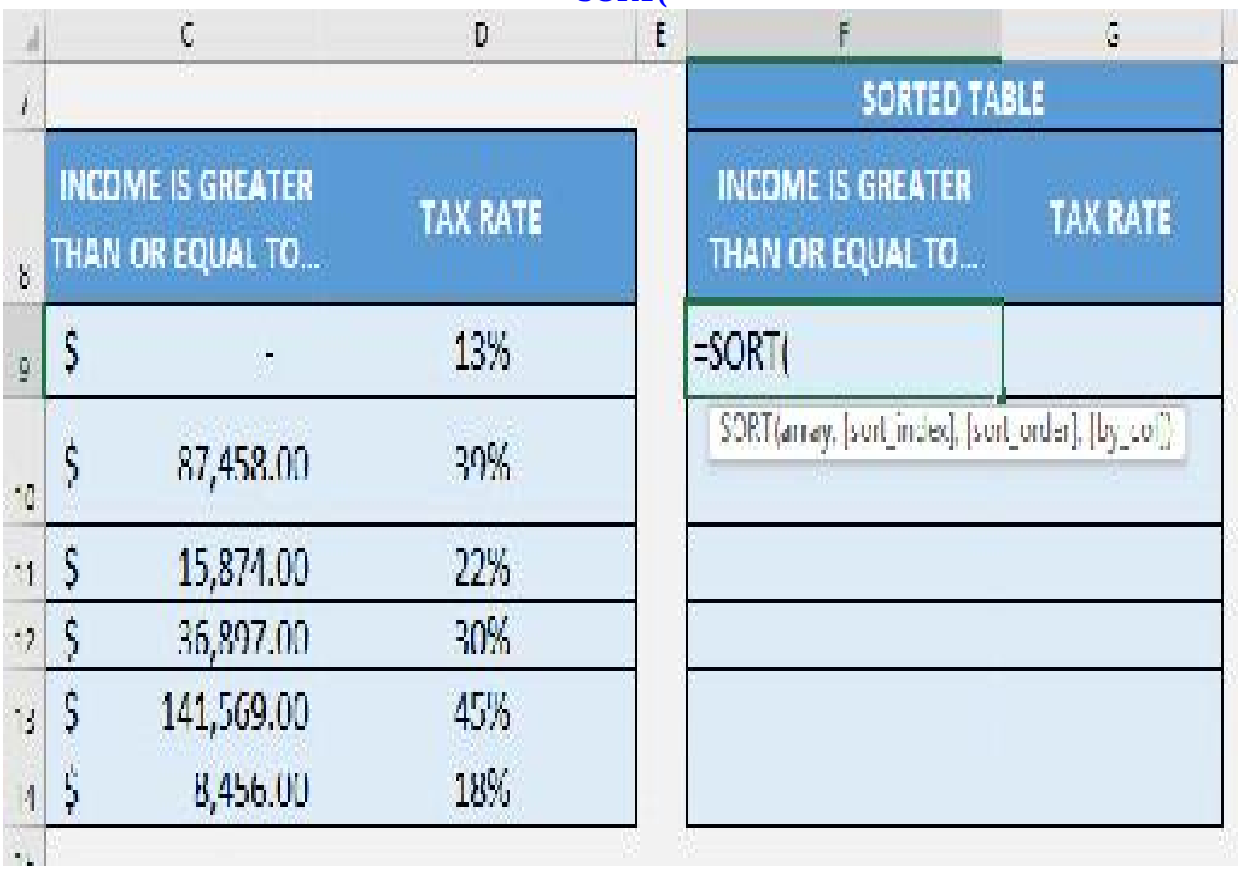
Did you know that you can now sort your table data with an Excel Formula? Yes you can! It is definitely possible now with **Excel's SORT Formula**. It is a new formula introduced in **Excel 2019**!

We have a tax table that we want to sort by the tax rate in a **descending order**.

I explain how you can do this below:

STEP 1: We need to **enter the *SORT* function in a blank cell**:

=SORT(



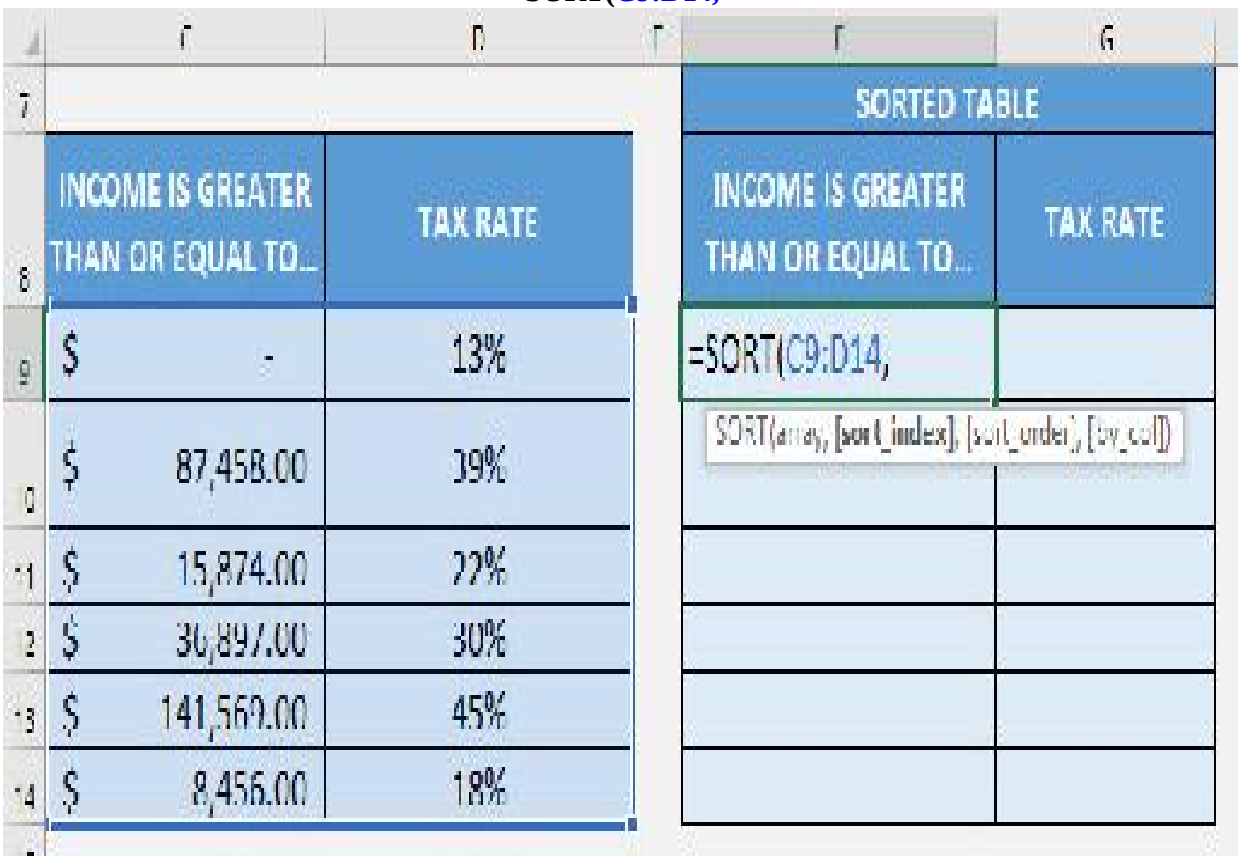
STEP 2: The **SORT** arguments:

array

What is the data to be sorted?

Select the cells containing the tax data, do not include the headers:

=SORT(C9:D14,

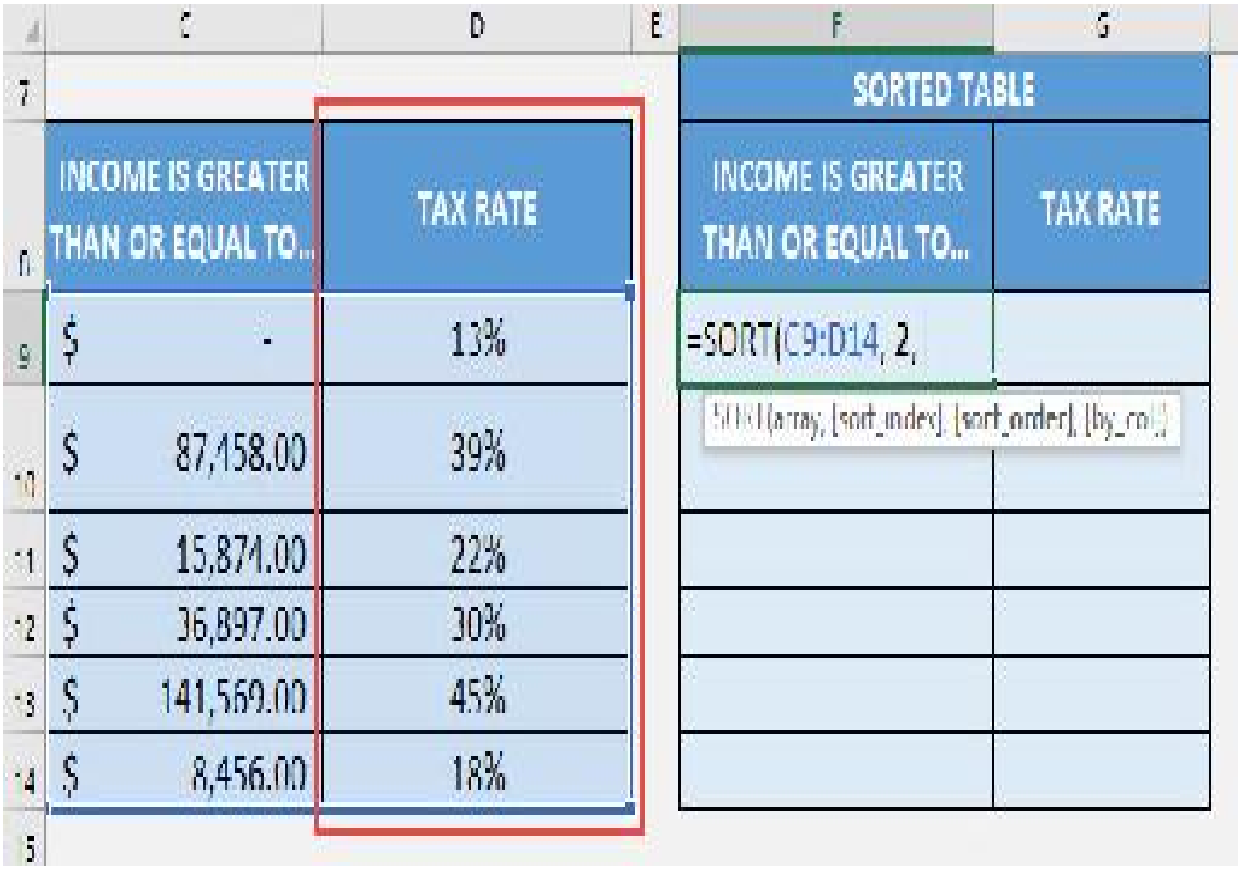


[sort_index]

What is the column to be used for sorting?

We specify the column number here. Since the tax rate column is the second column, place in 2.

=SORT(C9:D14, 2,

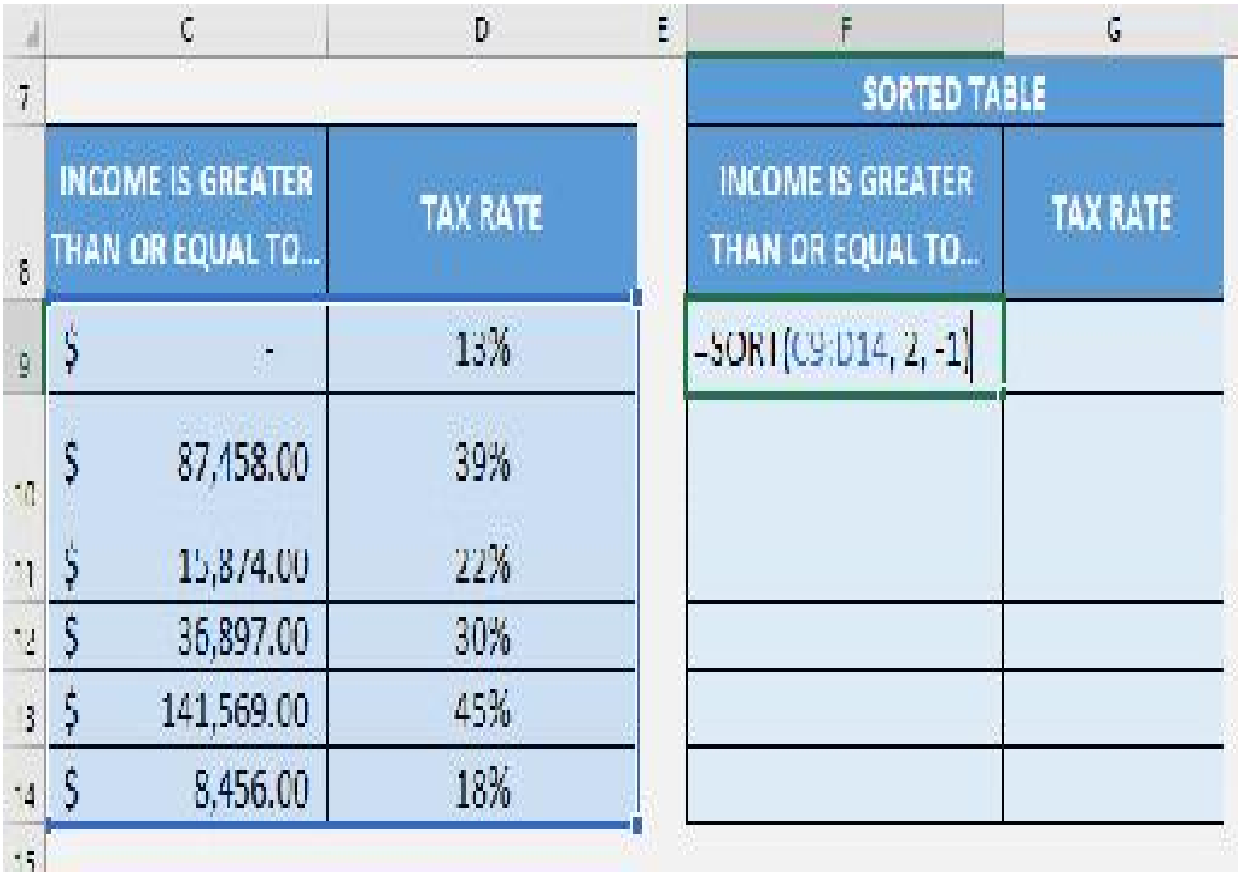


[sort_order]

What is the sort order? 1 for Ascending, -1 for Descending order.

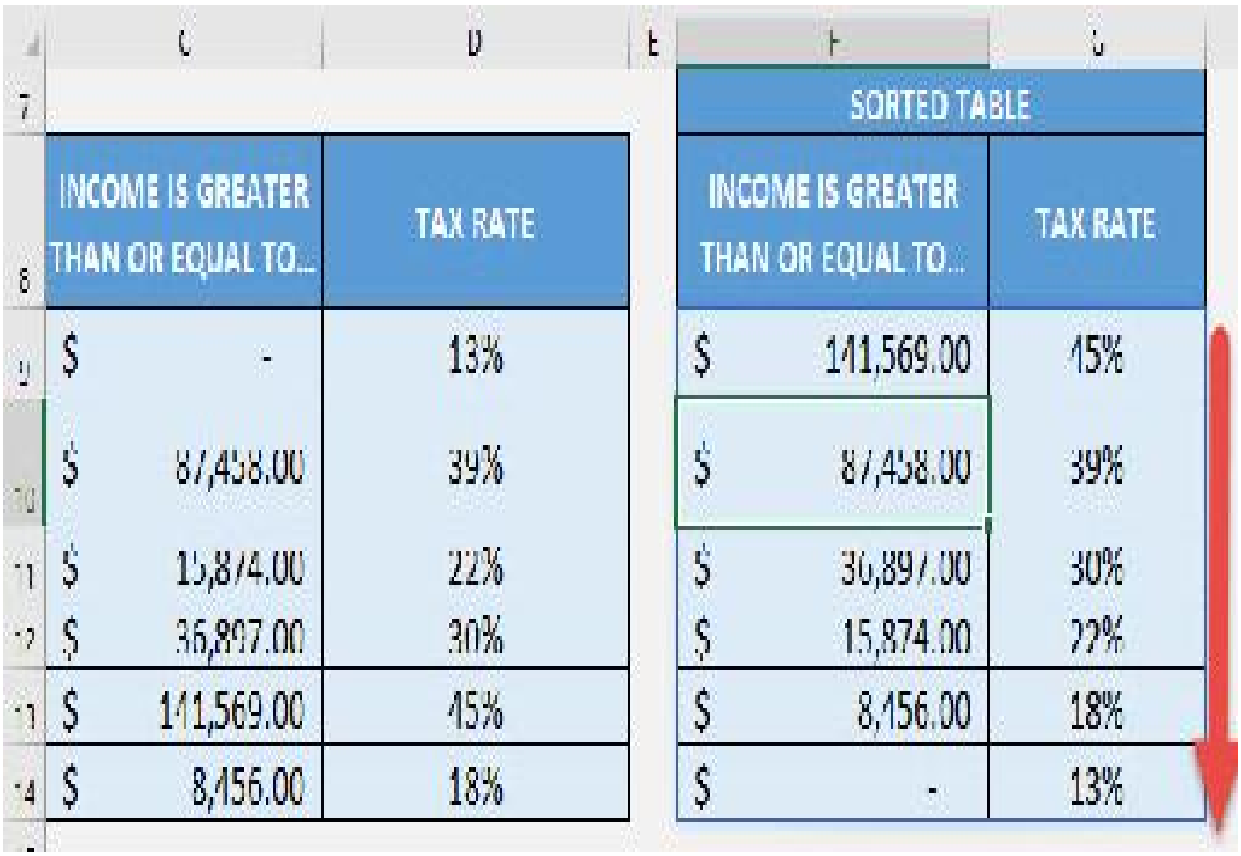
Since we want descending order, place in -1.

=SORT(C9:D14, 2, -1)



	C	D	E	F	G
7				SORTED TABLE	
8	INCOME IS GREATER THAN OR EQUAL TO...	TAX RATE		INCOME IS GREATER THAN OR EQUAL TO...	TAX RATE
9	$ -	13%		=SORT(C9:D14, 2, -1)	
10	$ 87,158.00	39%			
11	$ 15,874.00	22%			
12	$ 36,897.00	30%			
13	$ 141,569.00	45%			
14	$ 8,456.00	18%			
15					

Now it gets sorted magically!



INCOME IS GREATER THAN OR EQUAL TO...	TAX RATE
$ -	13%
$ 87,458.00	39%
$ 15,874.00	22%
$ 36,897.00	30%
$ 111,569.00	15%
$ 8,156.00	18%

SORTED TABLE

INCOME IS GREATER THAN OR EQUAL TO...	TAX RATE
$ 111,569.00	15%
$ 87,458.00	39%
$ 36,897.00	30%
$ 15,874.00	22%
$ 8,156.00	18%
$ -	13%

SORTBY

What does it do?

Sorts a table based on the column(s) specified

Formula breakdown:

=SORTBY(array, by_array1, sort_order1, [by_array2, sort_order2], ...)

What it means:

=SORTBY(data to be sorted, by which column to sort first, [by which column to sort afterwards], ...)

Example:

=SORTBY(B9:D14, B9:B14, 1, D9:D14, 1)

Exercise Workbook:

DOWNLOAD EXCEL WORKBOOK

Did you know that you can now sort your table data with an Excel Formula? Yes you can! It is definitely possible now with **Excel's SORTBY Formula**. It also allows you to sort by multiple columns as well. It is a new formula introduced in **Excel 2019**!

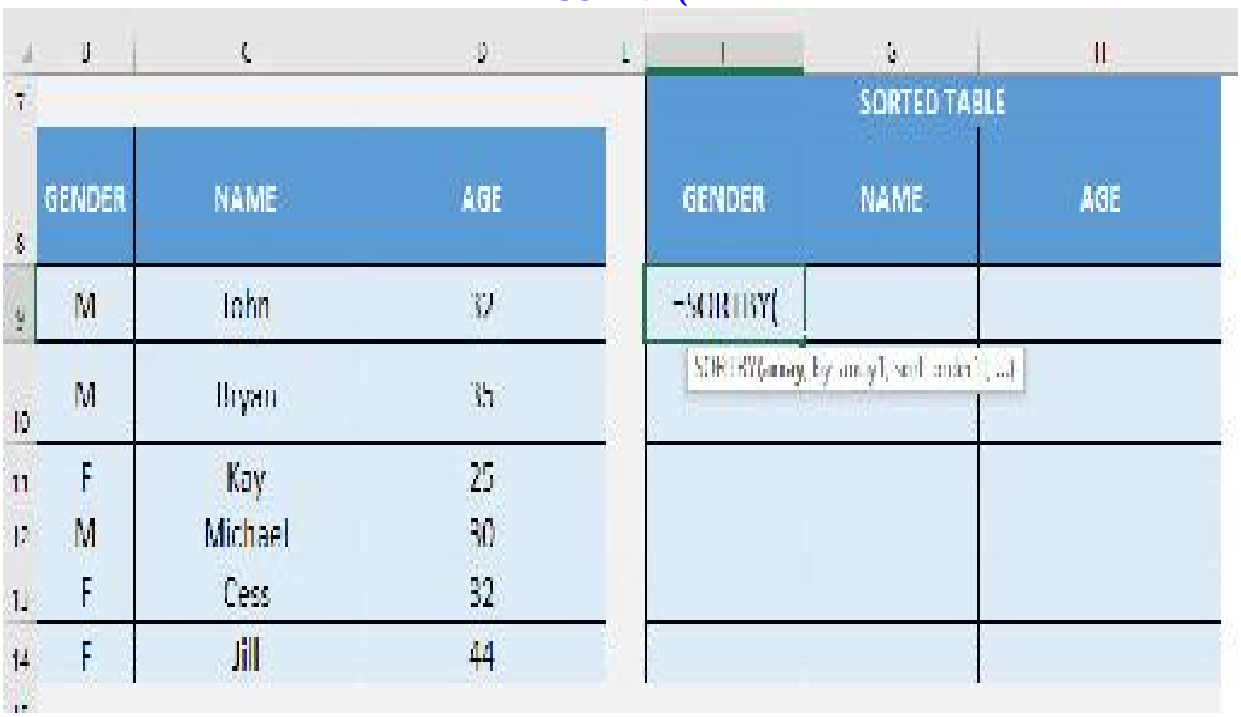
We have a person list that we want to sort by Gender (ascending order) and then by Age (ascending order).

Do take note that in specifying the sorting order, 1 represents ascending order, -1 represents descending order.

I explain how you can do this below:

STEP 1: We need to **enter the *SORTBY* function in a blank cell**:

=SORTBY(



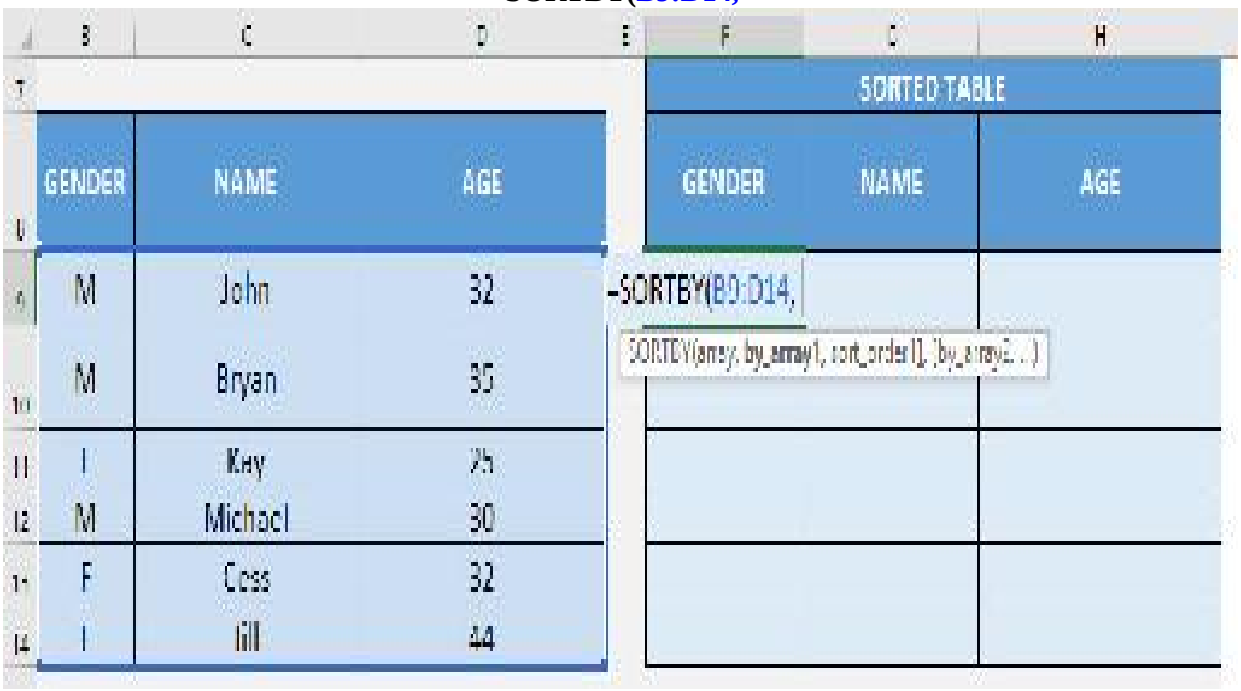
STEP 2: The **SORTBY** arguments:

array

What is the data to be sorted?

Select the cells containing the personal data, do not include the headers:

=SORTBY(B9:D14,

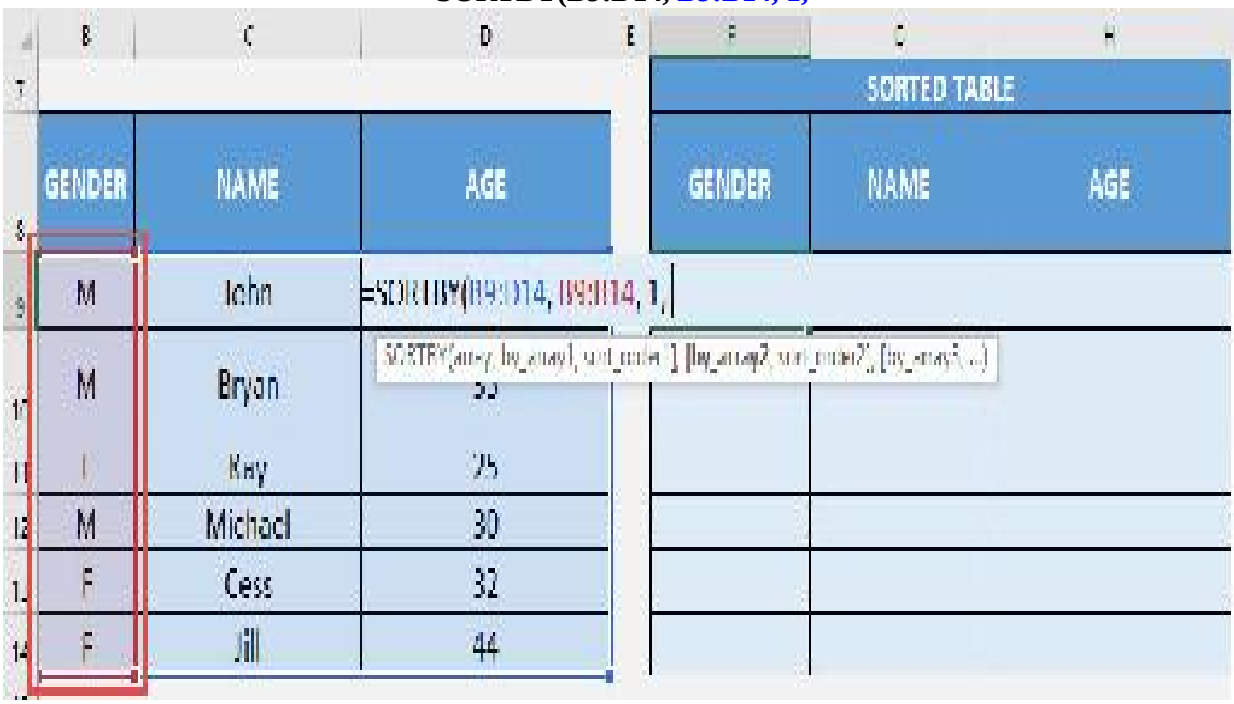


by_array1, sort_order1

Which column will be used to sort first?

Select the cells containing the gender column, then type in 1 for it to be ascending order.

=SORTBY(B9:D14, B9:B14, 1,

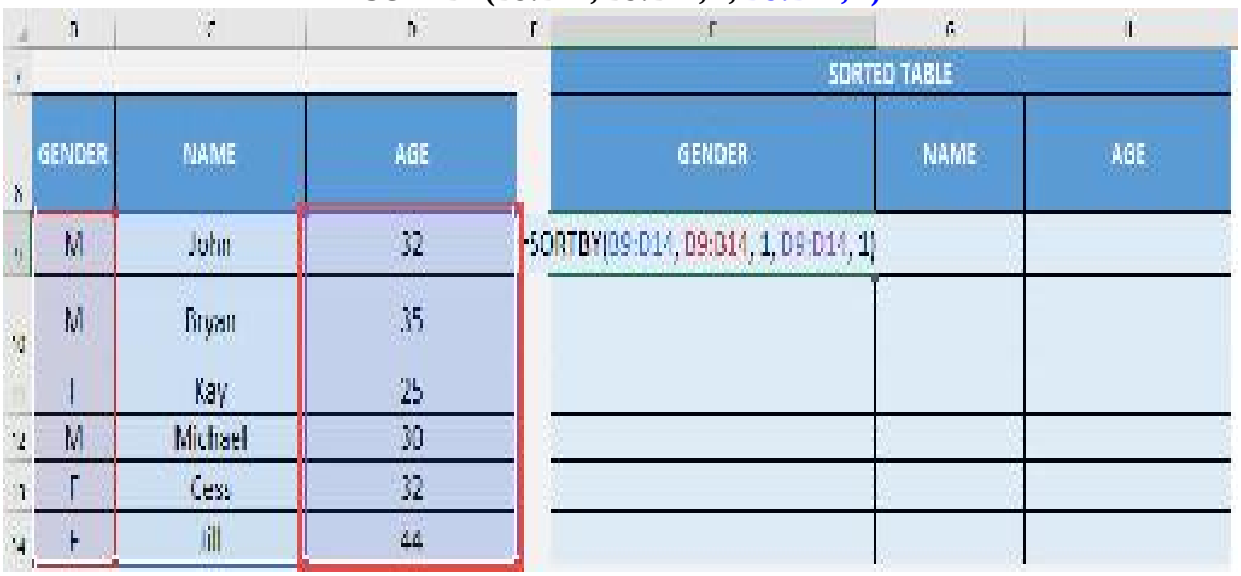


by_array2, sort_order2

Which column will be used to sort next?

Select the cells containing the age column, then type in 1 for it to be ascending order.

=SORTBY(B9:D14, B9:B14, 1, D9:D14, 1)



Now it gets sorted magically!

UNIQUE

What does it do?

Gets the unique values of a list

Formula breakdown:

=UNIQUE(array)

What it means:

=UNIQUE(data to have duplicates removed)

Example:

=UNIQUE(C9:C14)

Exercise Workbook:

DOWNLOAD EXCEL WORKBOOK

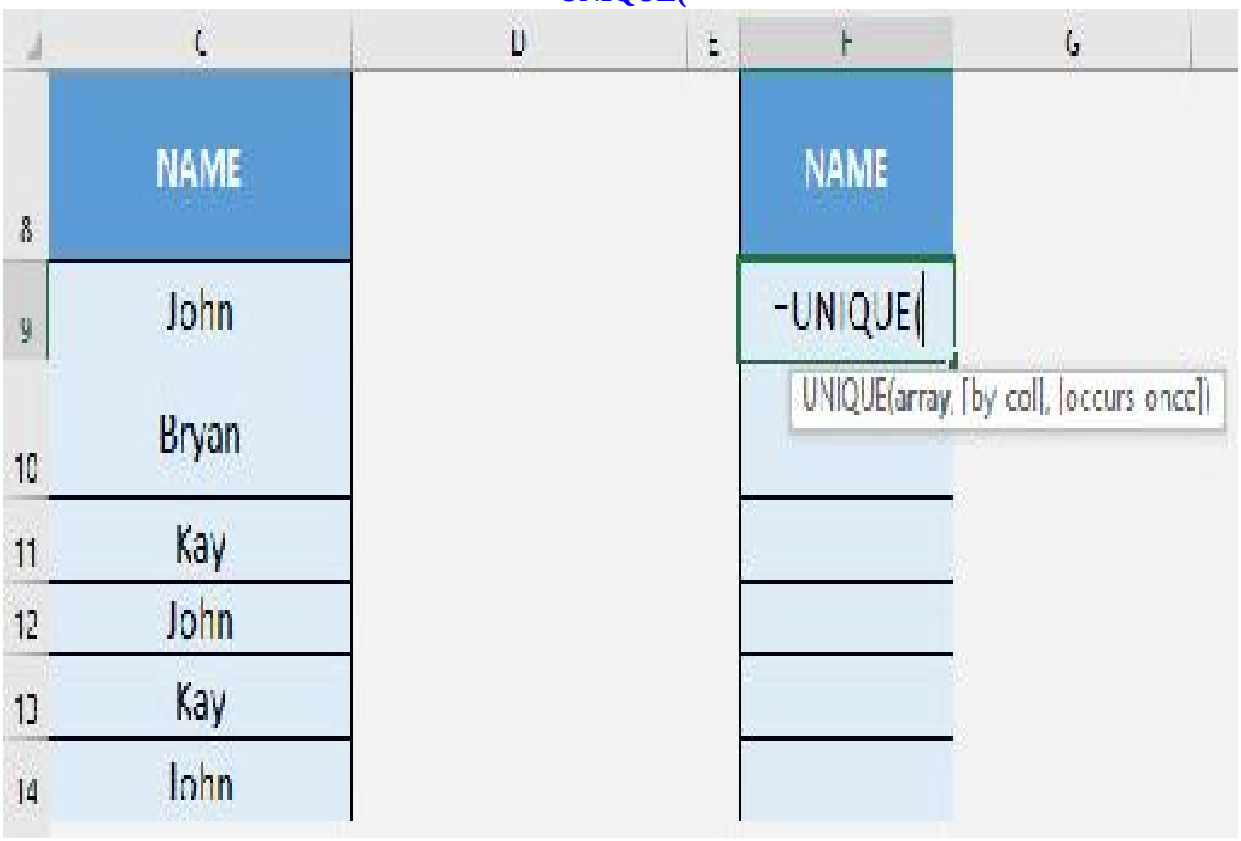
Want to remove duplicate values from your list? It is definitely possible now with **Excel's UNIQUE Formula**. It is a new formula introduced in **Excel 2019**!

We have a list of names and we want to remove the duplicates from it. The **UNIQUE Formula** will make this very quick to do!

I explain how you can do this below:

STEP 1: We need to **enter the *UNIQUE* function in a blank cell**:

=UNIQUE(



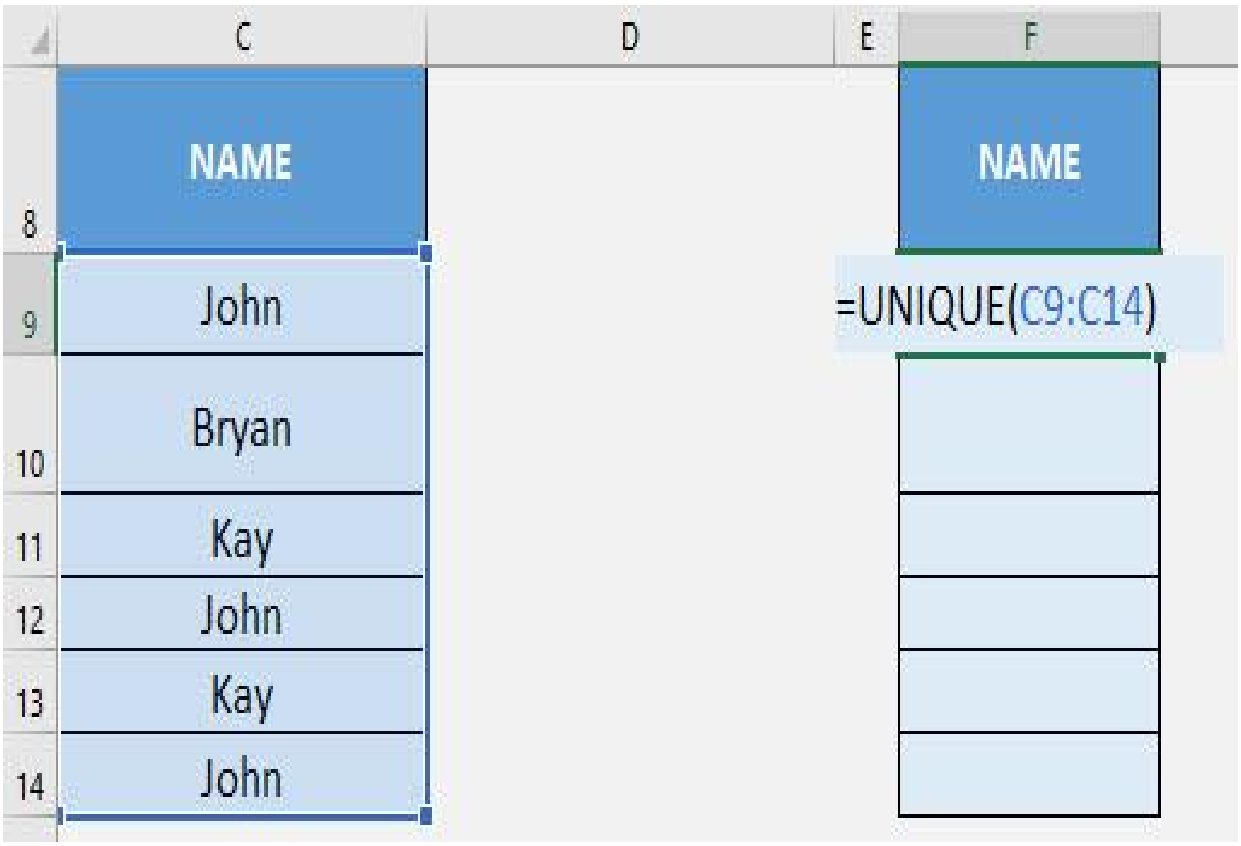
STEP 2: The **UNIQUE** arguments:

array

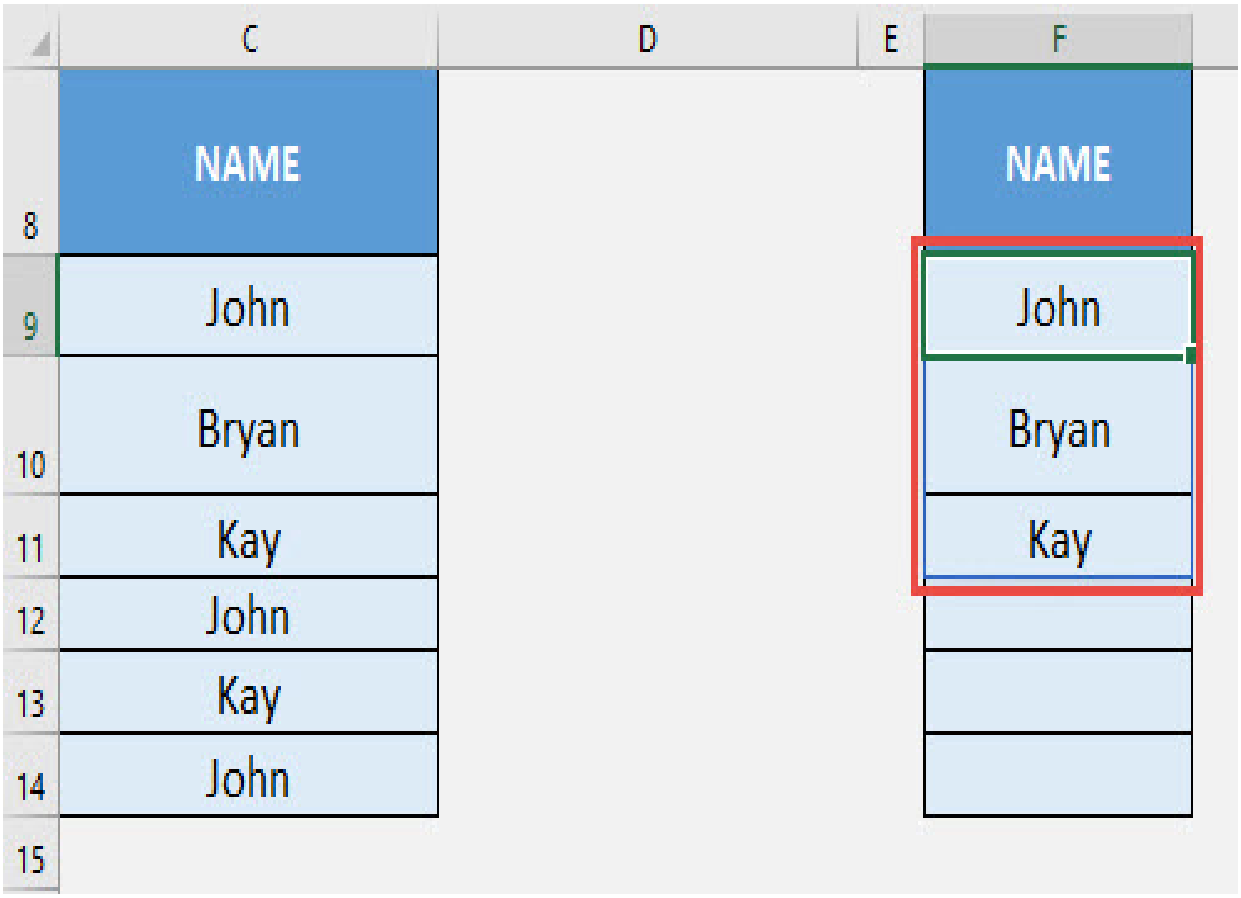
What is the data to be cleared of duplicate values?

Select the cells containing the names, do not include the headers:

=UNIQUE(C9:C14)



Now the duplicate names are all gone!



	C	D	E	F
8	NAME			NAME
9	John			John
10	Bryan			Bryan
11	Kay			Kay
12	John			
13	Kay			
14	John			
15				

ADVANCED FORMULAS

3D Formulas

What does it do?

3D Formulas or References in Excel are a great way to consolidate data from multiple sheets.

3D Formulas reference several worksheets that have the same structure which allows you to consolidate by using the SUM function.

Formula breakdown:

=SUM(Sheet1:Sheet4**!**A1)

What it means:

=SUM(from this Sheet#:up to this Sheet#**!** return the sum of these cells)

Example:

=SUM(MARKETING:ADMIN!C13)

Exercise Workbook:

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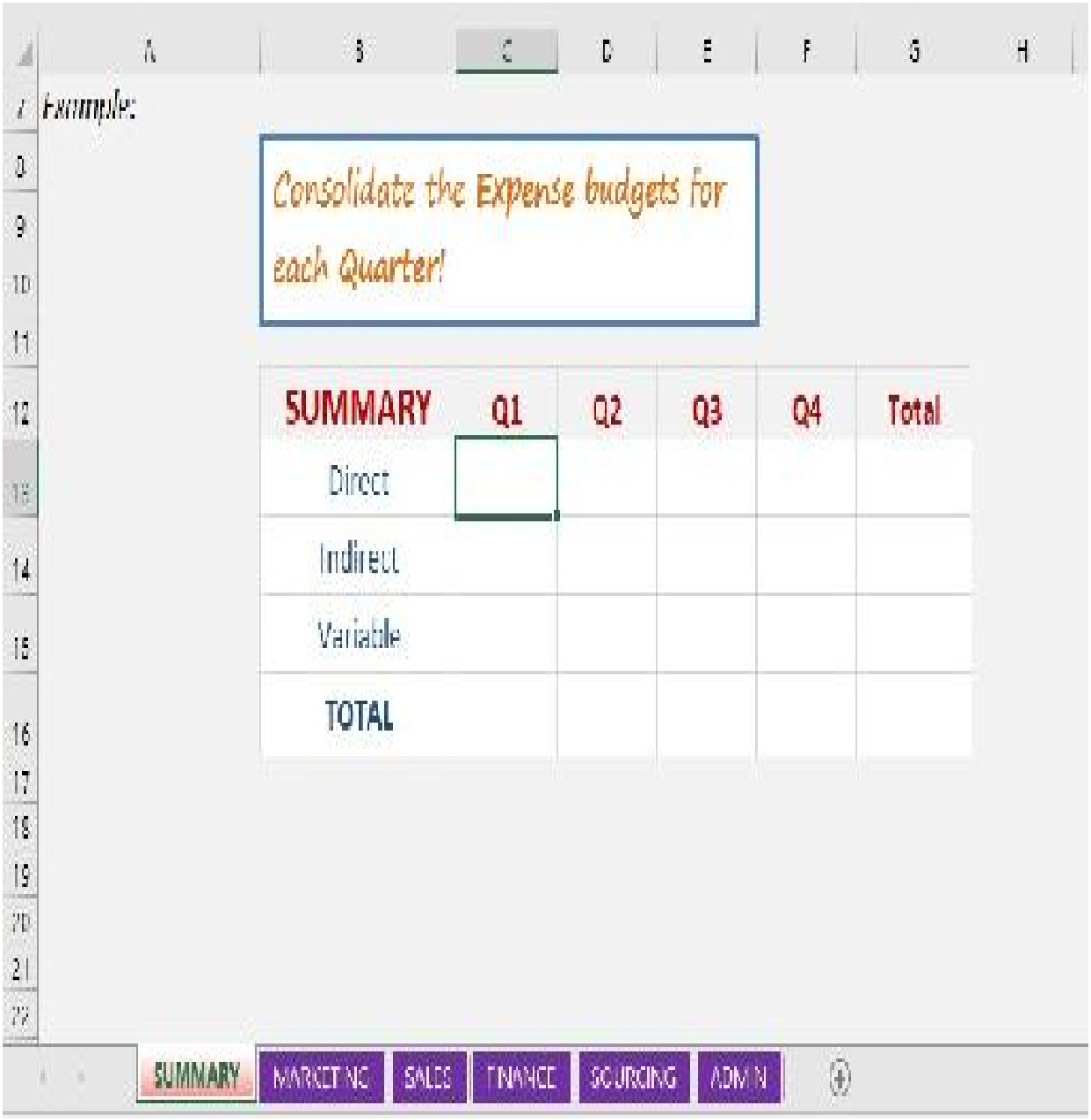
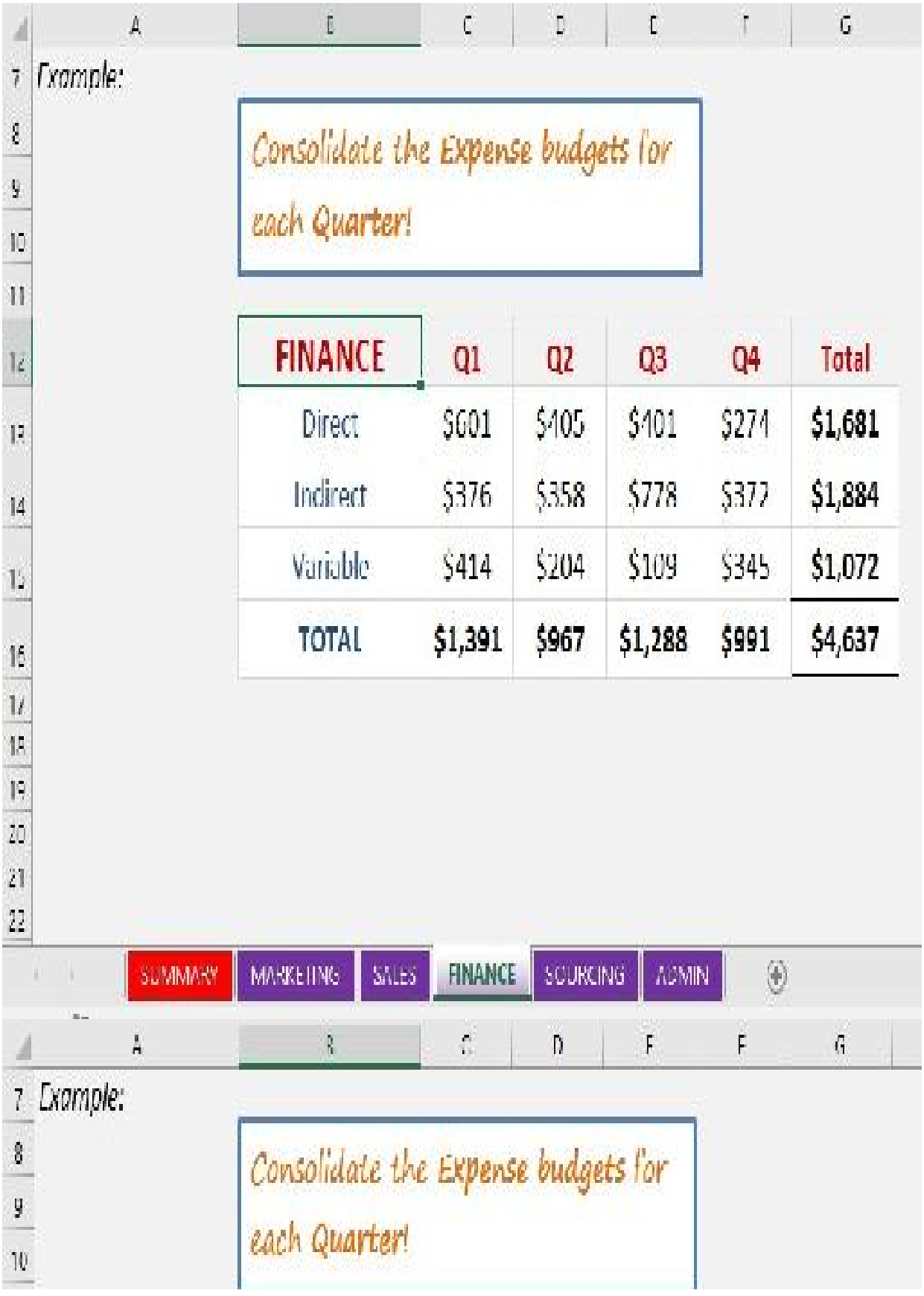
STEP 1: Make sure you have a SUMMARY ***Sheet*** and several sheets where you want to sum your data from;



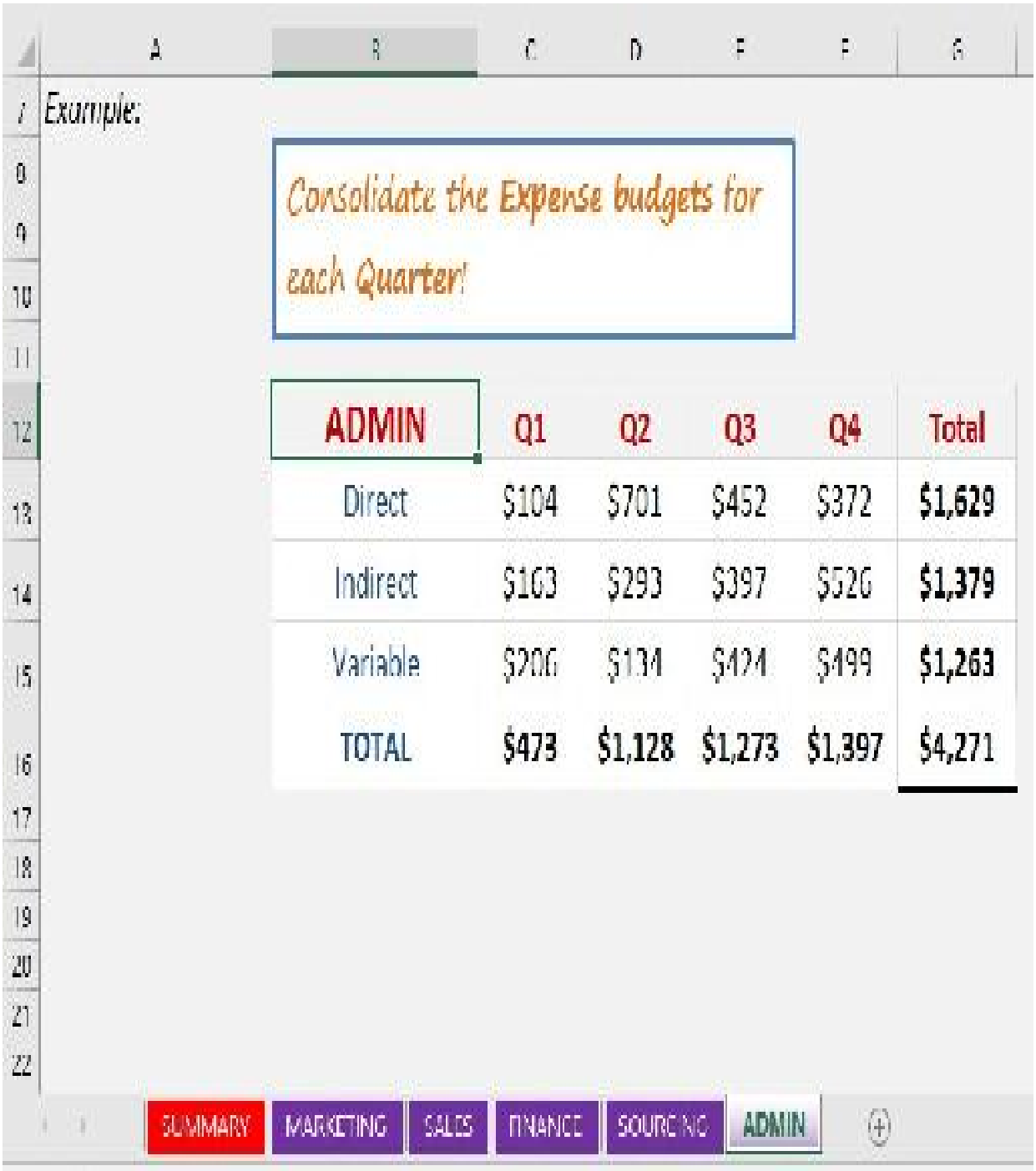
STEP 2: All ***Sheets*** have to have the same structure...so the same number of columns, rows and cells;


Example:
Consolidate the Expense budgets for each Quarter!
MARKETING Q1 Q2 Q3 Q4 Total
Direct $259 $170 $182 $187 $1,098
Indirect $106 $215 $534 $681 $1,536
Variable $600 $342 $357 $480 $1,869
TOTAL $1,055 $727 $1,373 $1,348 $4,503
SUMMARY
MARKETING
SALES
FINANCE
SOURCING
ADMIN

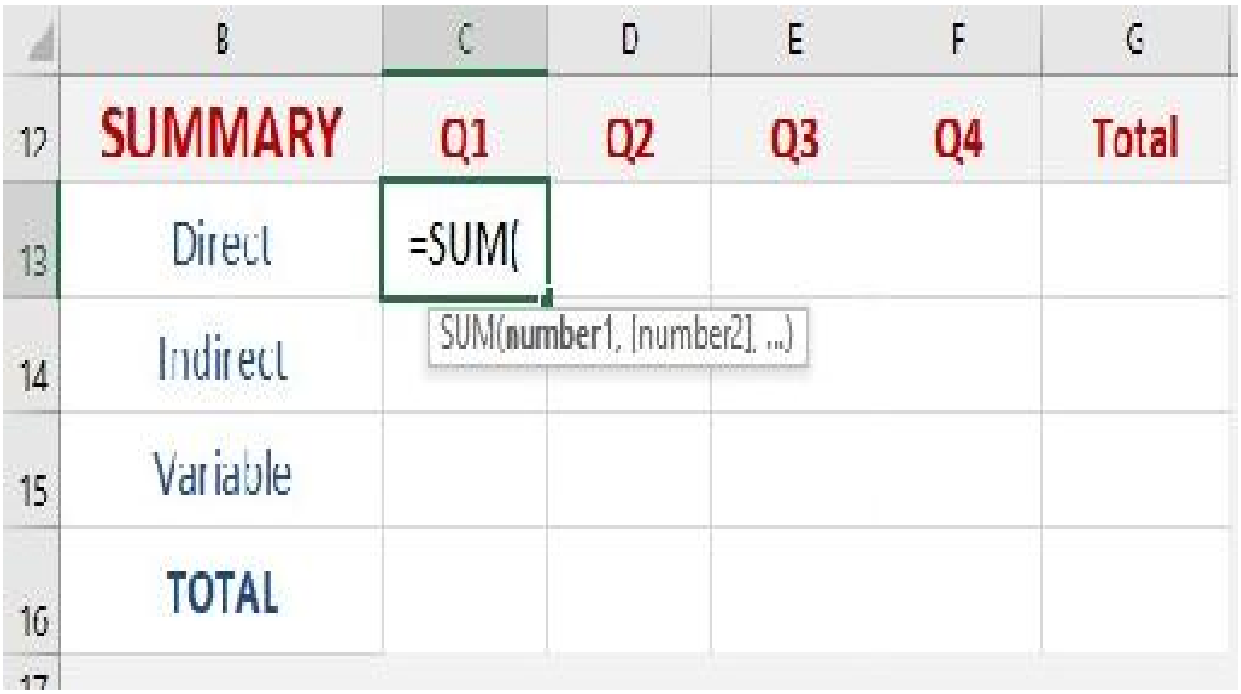

Example:
Consolidate the Expense budgets for each Quarter!
SALES
Q1
Q2
Q3
Q4
Total
Direct
$729
$337
$486
$709
$2,261
Indirect
$690
$537
$186
$150
$1,563
Variable
$320
$187
$538
$508
$1,553
TOTAL
$1,739
$1,061
$1,210
$1,367
$5,377
SUMMARY
MARKETING
SALES
FINANCE
SOURCING
ADMIN


Example:
Consolidate the Expense budgets for each Quarter!
FINANCE Q1 Q2 Q3 Q4 Total
Direct $601 $405 $401 $274 $1,681
Indirect $376 $358 $778 $377 $1,884
Variable $414 $204 $109 $345 $1,072
TOTAL $1,391 $967 $1,288 $991 $4,637
SUMMARY MARKETING SALES FINANCE SOURCING ADMIN
Example:
Consolidate the Expense budgets for each Quarter!

SOURCING	Q1	Q2	Q3	Q4	Total
Direct	$180	$180	$531	$205	$1,096
Indirect	$185	$247	$171	$698	$1,276
Variable	$730	$595	$439	$157	$1,921
TOTAL	$1,095	$1,017	$1,121	$1,060	$4,293



STEP 3: Enter a SUM formula in your SUMMARY ***Sheet***, preferably in the top left hand corner;

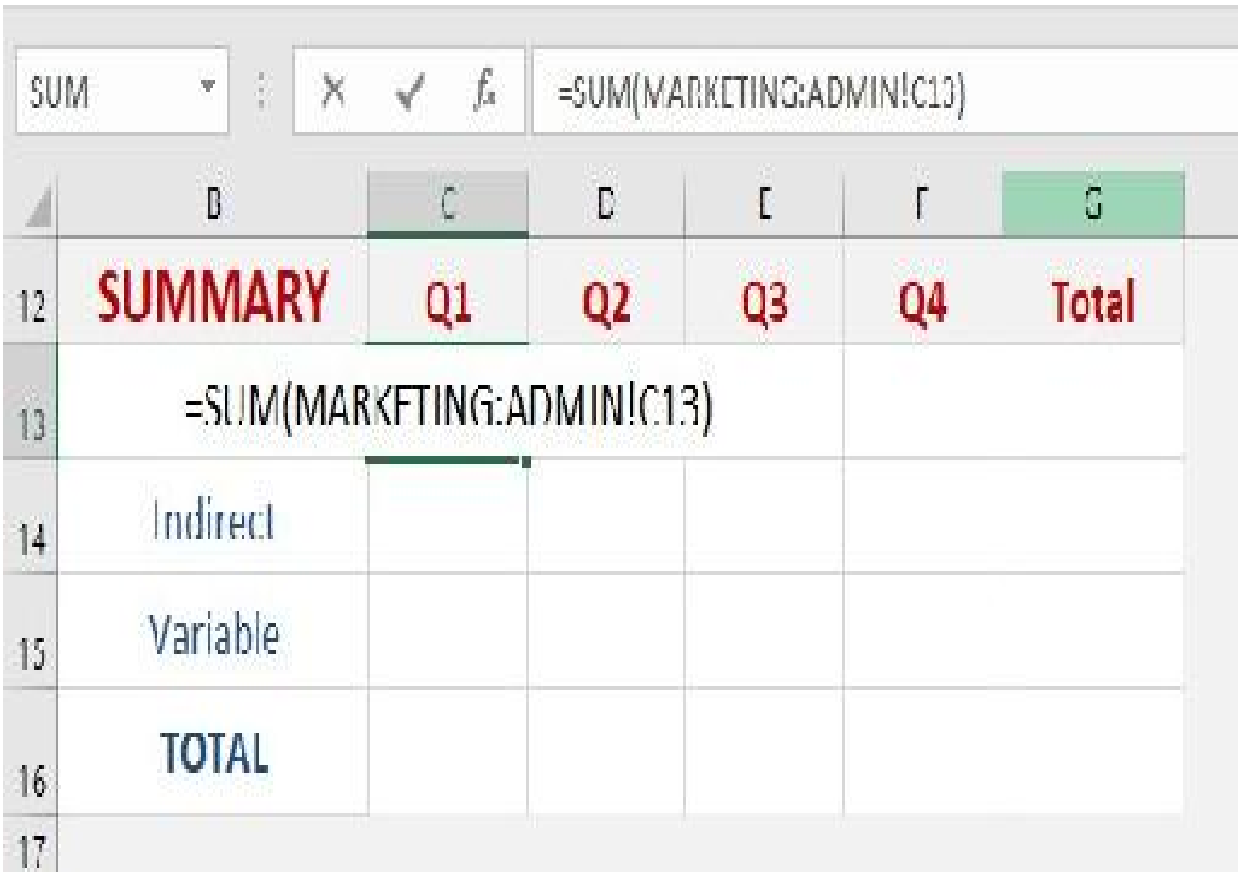


STEP 4: With your mouse select the first ***Sheet*** you want to consolidate;

STEP 5: Hold down the SHIFT key;

STEP 6: Whilst holding the SHIFT key, select the last ***Sheet*** you want to consolidate with your mouse key;

STEP 7: In the formula bar, type in the active cell that you are in (from Step 3) after the **!** and press ***Enter***



STEP 8: Drag the formula across all your cells. That's it!

	B	C	D	E	F	G	H
12	SUMMARY	Q1	Q2	Q3	Q4	Total	
13	Direct	$1,873	$1,793	$2,352	$1,747	$7,765	
14	Indirect						
15	Variable						
16	TOTAL						
17							

	B	C	D	E	F	G	H
12	SUMMARY	Q1	Q2	Q3	Q4	Total	
13	Direct	$1,873	$1,793	$2,352	$1,747	$7,765	
14	Indirect	$1,520	$1,645	$2,046	$2,427	$7,638	
15	Variable	$2,360	$1,462	$1,867	$1,989	$7,678	
16	TOTAL	$5,753	$4,900	$6,265	$6,163	$23,081	
17							
18							

Note: You can change the ***Sheet*** names and this will be reflected in your 3D formula.

You cannot move the positioning of the ***Sheets*** after you create the 3D formula as this throw out the formula.

ARRAY Formulas

What does it do?

An Array Formula performs an Excel operation (math, comparative, join or function argument) on an array or range of data. This could be a range of cells, a worksheet reference or a defined name.

An Array contains more than one cell, so you cannot perform an Array Formula on a single cell.

To turn your formula into an Array Formula, you will need to press **CTRL+SHIFT+ENTER** which will put the squiggly brackets {} outside the formula: **{=MAX(D13:D16-C13:C16)}**

Let's break down the different Excel operations that you can use to create an Array Formula:

MATH: +-*/()

COMPARATIVE: =<>

JOIN: &

FUNCTIONS: MAX, MIN, IF, INDEX, VLOOKUP etc

Creates a cell reference based on the row and column numbers

Example:

{=MAX(D13:D16-C13:C16)}

Exercise Workbook:

DOWNLOAD EXCEL WORKBOOK

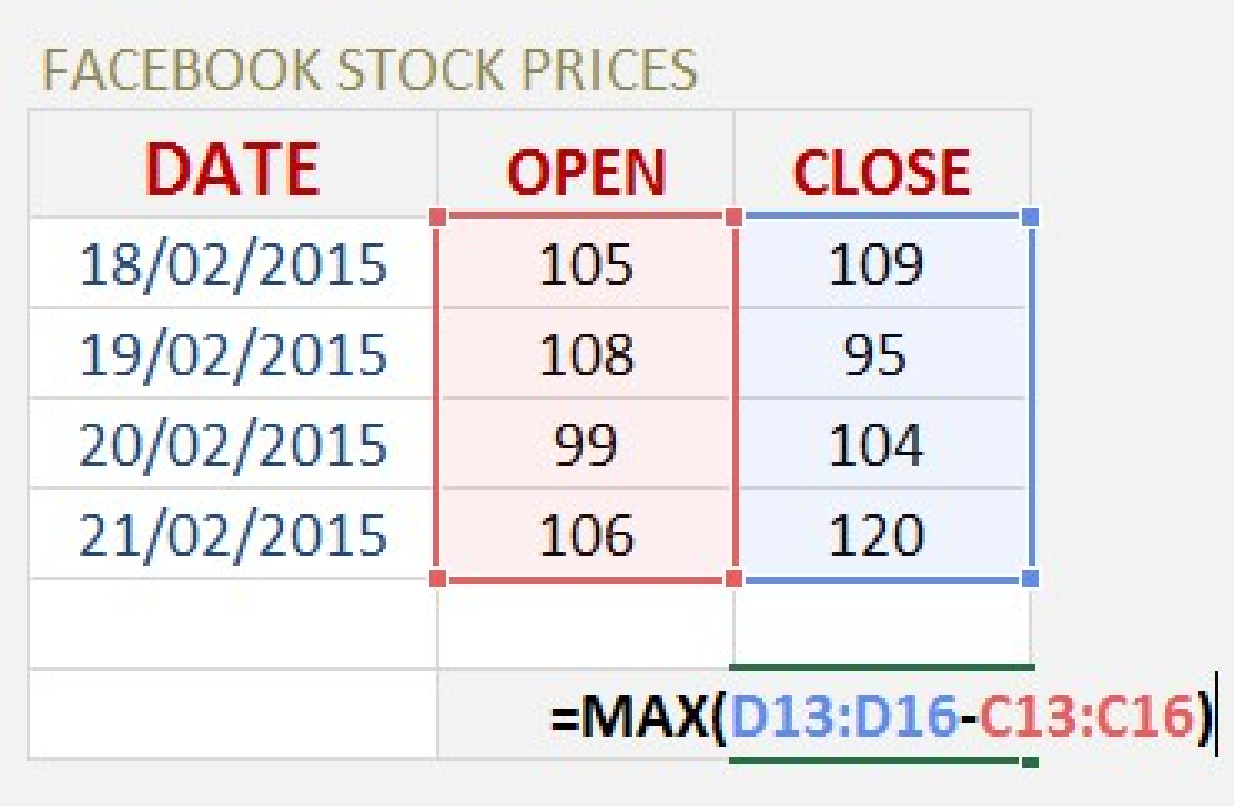
Let's do an example of an Array Formula that calculates the maximum stock value change over a four day period:

STEP 1: Enter the MAX formula

=MAX(

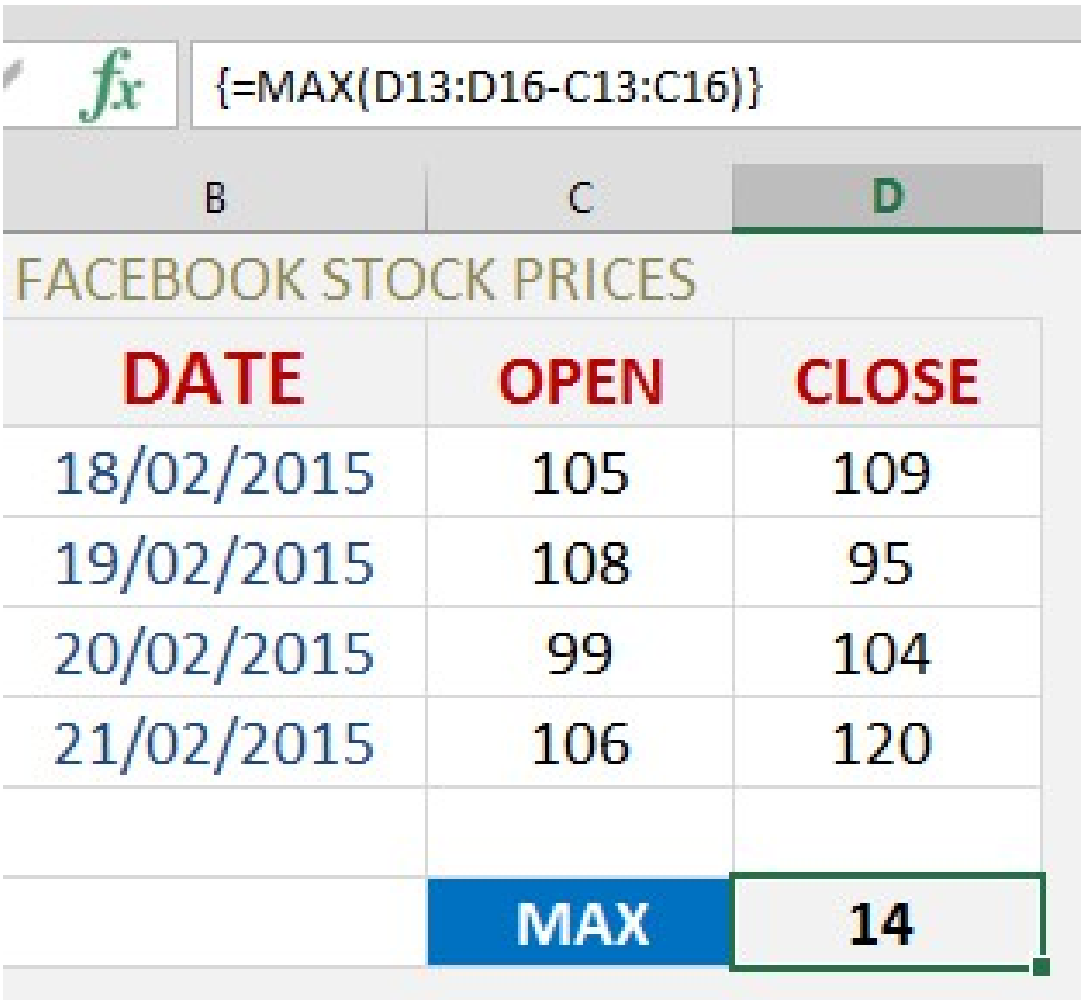
STEP 2: Subtract one array/range of data from another array/range of data

=MAX(D13:D16-C13:C16)

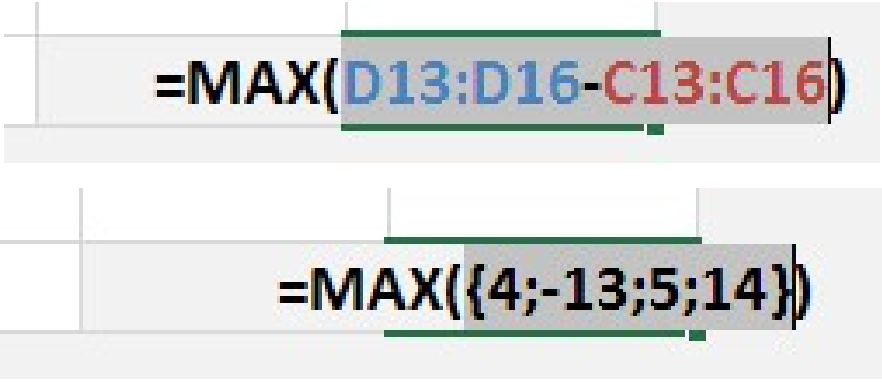


STEP 3: Instead of pressing ENTER to evaluate the formula, you need to press **CTRL+SHIFT+ENTER** to turn the formula into an Array Formula which will look like this:

{=MAX(D13:D16-C13:C16)}



STEP 4: By **pressing F9 on the selected formula array** will give you the resulting array of numbers (press CTRL+Z to get out of this mode when you are done checking the formula results):



If we had to get the above result using a non-Array Formula we would have to create a helper column which subtracts the Open & Close cells and then enter the MAX formula to reference these results. This is double the work!

BETWEEN

What does it do?

There is no explicit **Between formula** in Excel, however we can come up with creative ways to create this functionality. Our goal is to evaluate if a given value is between a range, for example, is 6 between 1 and 10?

We have three possible scenarios: **numbers, dates, and text**.

We want to check if a value is in between two other values.

There are different creative ways so be sure to view them all below!

Exercise Workbook:

DOWNLOAD EXCEL WORKBOOK

STEP 1: For **numbers**, we have a creative use of the **MEDIAN formula**:

=IF(C7=MEDIAN(A7:C7), "Yes", "No")

	A	B	C	D	E
6	START OF RANGE	END OF RANGE	VALUE TO BE EVALUATED	IS THE VALUE IN BETWEEN?	FORMULA
7	20	60	50	Yes	IF(C7 MEDIAN(A7:C7), "Yes", "No")
8	10	40	30	No	-IF(C8-MEDIAN(A8:C8), "Yes", "No")
9	70	100	50	No	=IF(C9=MEDIAN(A9:C9), "Yes", "No")

In our first example above, the range is 20-60, upon checking the value 50, it is in between this range.

The median formula will return the value in the middle of these 3 values when arranged in increasing order: 20, 50, 60. The median value is 50. Since it matches the value we are evaluating, then the answer we get is a **Yes,** this value (50) is in between the range.

STEP 2: For **dates,** we have the same application of the **MEDIAN formula.** Because Excel treats dates as numbers too:

=IF(C10=MEDIAN(A10:C10), "Yes", "No")

	A	B	C	D	E
9	START OF RANGE	END OF RANGE	VALUE TO BE EVALUATED	IS THE VALUE IN BETWEEN?	FORMULA
10	2016-05-01	2016-07-01	2016-06-01	Yes	=IF(C10=MEDIAN(A10:C10), "Yes", "No")
11	2016 01 30	2016 05 30	2016 06 01	No	-IF(C11-MEDIAN(A11:C11), "Yes", "No")

In our first example above, the range is May 1 - July 1, upon checking the date June 1, it is in between this range.

The median formula will return the value in the middle of these 3 dates when arranged in increasing order: May 1, June 1, July 1. The median value is June 1. Since it matches the value we are evaluating, then the answer we get is a **Yes,** this value (June 1) is in between the range.

STEP 3: For text, we are checking if the value is alphabetically in the middle. We will be using the **AND formula:**

=IF(AND(C12>=A12, C12<=B12, "Yes", "No")

	A	B	C	D	E
6	START OF RANGE	END OF RANGE	VALUE TO BE EVALUATED	IS THE VALUE IN BETWEEN?	FORMULA
12	Cat	Dog	Cow	Yes	=IF(AND(C12>=A12, C12<=B12), "Yes", "No")
13	Dog	Mouse	Cow	No	=IF(AND(C13>=A13, C13<=B13), "Yes", "No")

Interestingly enough, you can compare texts using the >= **and** <= **operators.** Excel is able to compare them which goes alphabetically first or last.

In our first example above, the range is Cat - Dog, upon checking the text Cow, it is in between this range. As when arranged alphabetically, it would be: Cat, Cow, Dog.

The And formula checks if **Cow** >= **Cat,** and **Cow** <= **Dog**. You will see that both of these are true, as **Cow** is alphabetically later than **Cat**, while **Cow** is alphabetically ahead of **Dog**. Which is why we get a **Yes** result.

Extract First Name from Full Name

What does it do?

Gets the first name from a full name

Formula breakdown:

=LEFT(full_name, FIND(space, full name) -1)

What it means:

=LEFT(the full name, location of the last character in the first name)

Example:

=LEFT("John Michaloudis", FIND(" ", "John Michaloudis") -1)

Exercise Workbook:

DOWNLOAD EXCEL WORKBOOK

There were countless times when I had a list of full names, and all I needed was the First Name. It would be time-consuming to manually get the first names one by one. Thank goodness there are formulas to make my life easier!

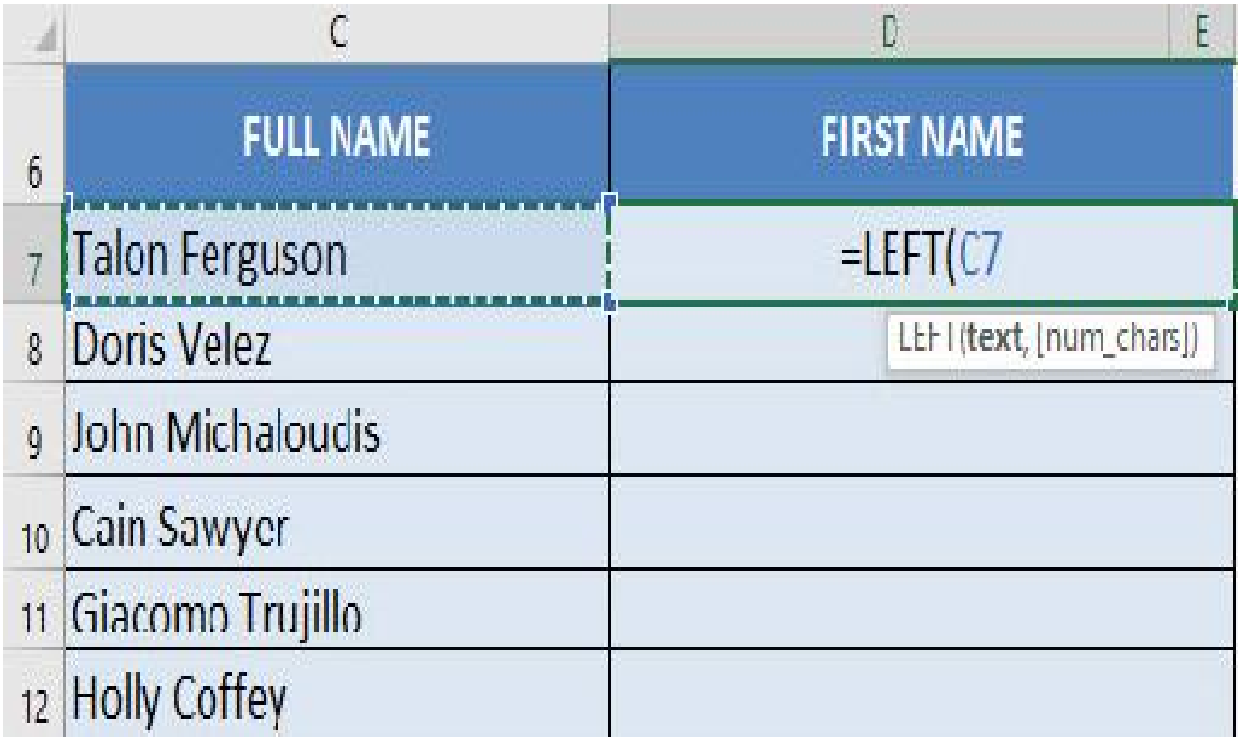
In Excel, it's very easy to do that with the **LEFT and FIND formula!**

Here is the gameplan:

- Use the **FIND** formula to find the location of the space that separates the **First Name** and the **Last Name**
- However we need to deduct this numerical location by 1, so that we have the location of the **end of the First Name**
- With this number, we will use the **LEFT** formula to retrieve the **First Name**!

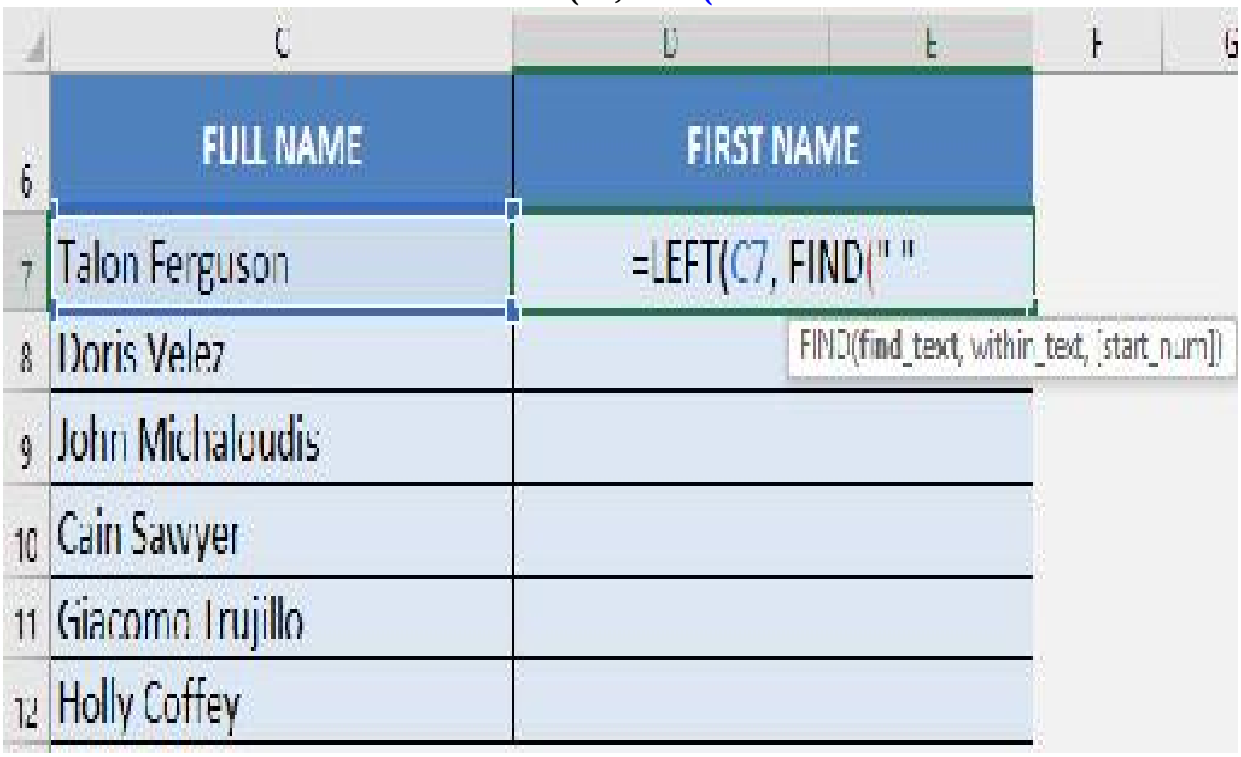
STEP 1: We need to **enter the** *LEFT* **function** and **select the Full Name**:

=LEFT(C7



STEP 2: We need to enter the **FIND formula to get the empty space location between the first and last name**:

=LEFT(C7, FIND(" "

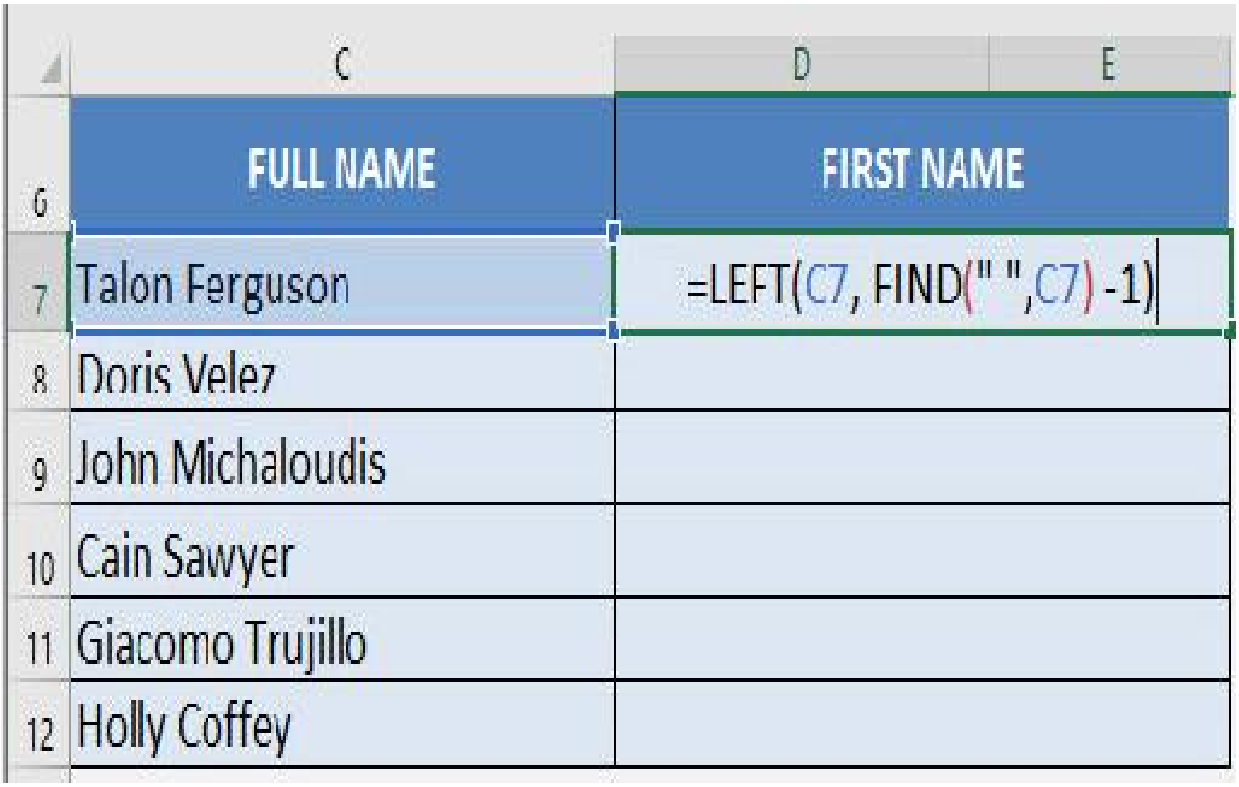


STEP 3: Select the **Full Name** again for the **FIND formula's 2nd argument**:

=LEFT(C7, FIND(" ", C7)

STEP 4: **Deduct 1** from the **FIND formula** so that our result will return us the text up to the last letter of the first name:

=LEFT(C7, FIND(" ", C7) -1)



STEP 5: Do the same for the rest of the cells by dragging the formula all the way down using the left mouse button.

Now you are able to extract all the **First Names from your FULL NAME using the FIND formula in Excel!**

	C	D	E
6	FULL NAME	FIRST NAME	
7	Talon Ferguson	Talon	
8	Doris Velez	Doris	
9	John Michaloudis	John	
10	Cain Sawyer	Cain	
11	Giacomo Irujillo	Giacomo	
12	Holly Coffey	Holly	
13			

Extract Last Name - REPLACE Function

What does it do?

Replaces part of a text string, based on the number of characters you specify, with a different text string

Formula breakdown:

=REPLACE(old_text, start_num, num_chars, new_text)

What it means:

=REPLACE(this cell, starting from this number, all the way to this number, with this new text)

Example:

=REPLACE(“Bryan Hong”,1,SEARCH(" ", “Bryan Hong”),"") =”Hong”

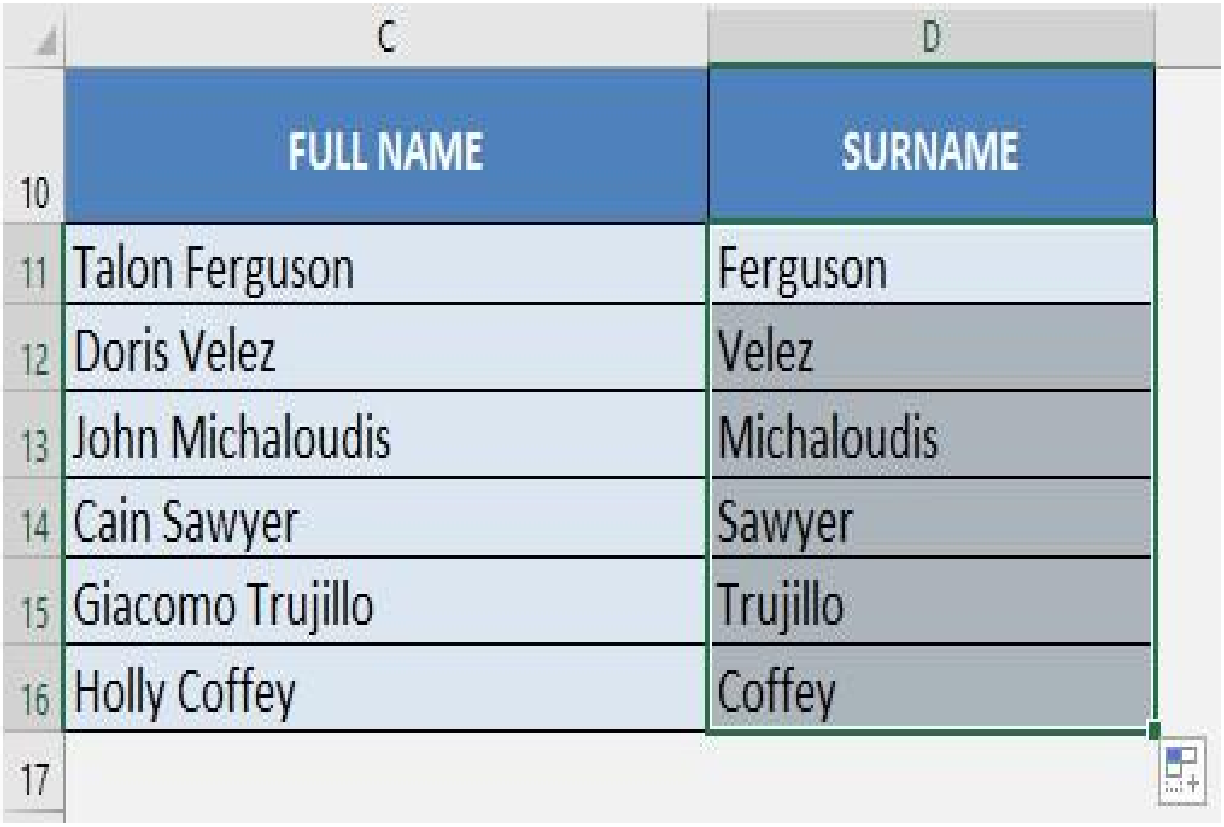
Exercise Workbook:

DOWNLOAD EXCEL WORKBOOK

I had a scenario where I wanted to extract the last names from a list of names using a formula.

Did you know that we can creatively use the **REPLACE formula** to replace the first name with an empty string, leaving us with the SURNAME?

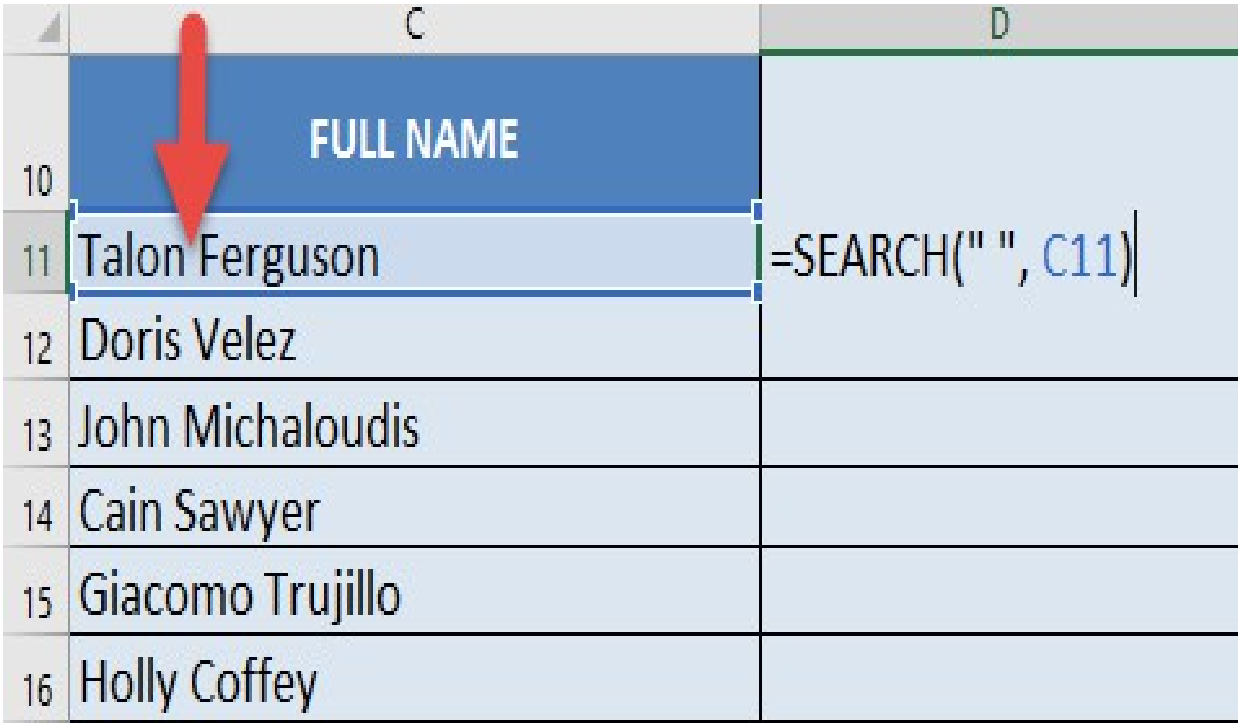
Here is what we want to happen:



	C	D
10	FULL NAME	SURNAME
11	Talon Ferguson	Ferguson
12	Doris Velez	Velez
13	John Michaloudis	Michaloudis
14	Cain Sawyer	Sawyer
15	Giacomo Trujillo	Trujillo
16	Holly Coffey	Coffey
17		

STEP 1: To start off, let us try the **Search function** and see what it will give us. We want to search on which character the space resides on. Type in:

=SEARCH(" ", C11)



You will see that it returned **6**.

This means our space is on the 6th character of the name ***Talon Ferguson***.

We will use this in our **Replace function** later in **STEP 3**.

STEP 2: Clear the Search function. We need to **enter the *Replace* function** next to the cell that we want to clean the data from:

=REPLACE

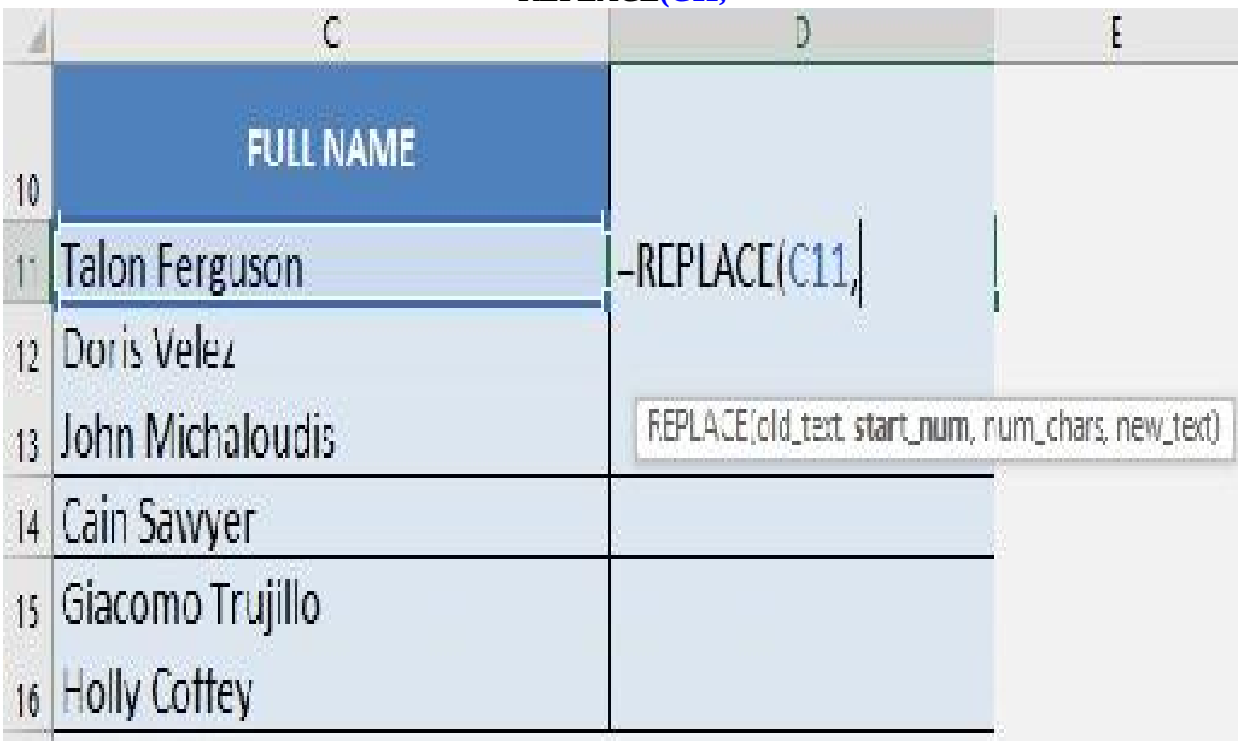
STEP 3: The Replace arguments:

old_text

Which text do we want to change?

Reference the cell that contains the text string:

=REPLACE(C11,

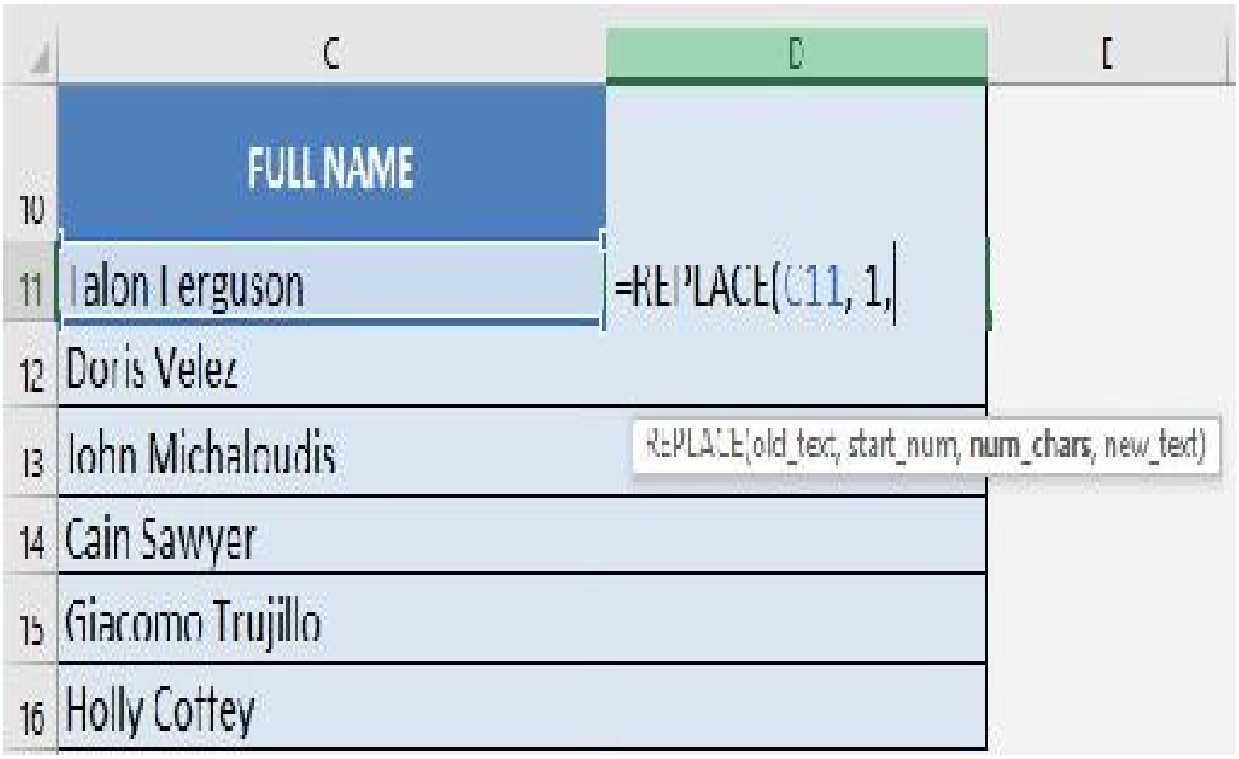


start_num

Which character do we want to start the replacement from?

We want to replace the first name, which resides on the first character:

=REPLACE(C11, 1,



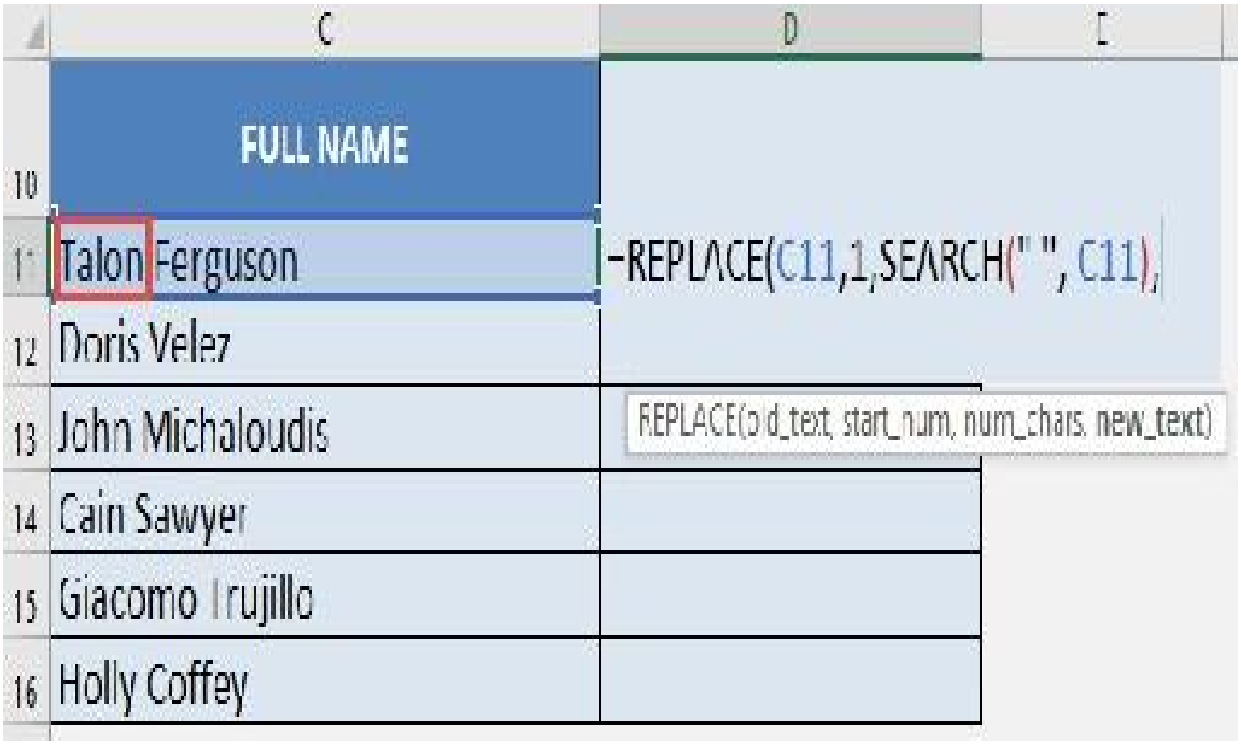
num_chars

How many characters do we need to replace?

We don't have the exact number of characters, so this is where the SEARCH function comes in handy from STEP 1 above.

Search for the space character " " which tells us the end of the First Name:

=REPLACE(C11, 1, SEARCH(" ", C11),



new_text

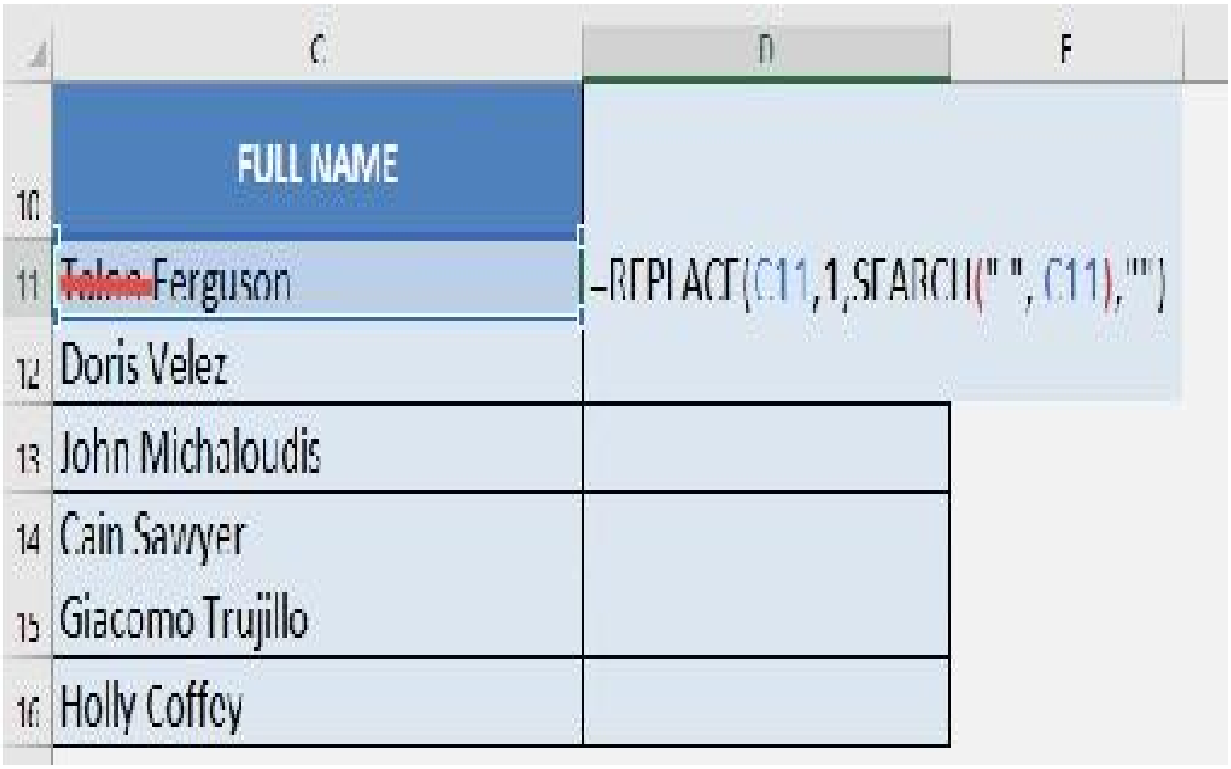
What text will serve as the replacement?

Now that we have accounted for all the characters from the First Name, we need to clear these.

We can do this by replacing it with an empty string.

This will "erase" the First Name, and leave us with the Last Name.

=REPLACE(C11, 1, SEARCH(" ", C11), "")



STEP 4: Do the same for the rest of the cells by dragging the **REPLACE** formula all the way down using the left mouse button.

Now we have all of the last names:

	C	D
10	FULL NAME	SURNAME
11	Talon Ferguson	Ferguson
12	Doris Velez	Velez
13	John Michaloudis	Michaloudis
14	Cain Sawyer	Sawyer
15	Giacomo Trujillo	Trujillo
16	Holly Coffey	Coffey
17		

GETPIVOTDATA

What does it do?

A formula that extracts data stored in a Pivot Table

Formula breakdown:

=GETPIVOTDATA(data_field, pivot_table, [field1, item1], [field2,item2],...)

What it means:

=GETPIVOTDATA(return me this value from the Values Area, any cell within the Pivot Table, [and return me the value that pertains to this Field name, and this Field item],...)

Example:

=GETPIVOTDATA("SALES",A1,"SALES REGION","AMERICAS","FINANCIAL YEAR",2013,"SALES QTR","Q1")

Exercise Workbook:

DOWNLOAD EXCEL WORKBOOK

The GETPIVOTDATA function in Excel returns data stored in a Pivot Table. So essentially it extracts the Pivot Table data to enable a user to create customized reports.

Think of the Pivot Table like your data source, so anything you see in the Pivot Table report can be extracted with the GETPIVOTDATA function and put into a cell within your worksheet.

The GETPIVOTDATA function becomes powerful when you reference cells to create shell reports.

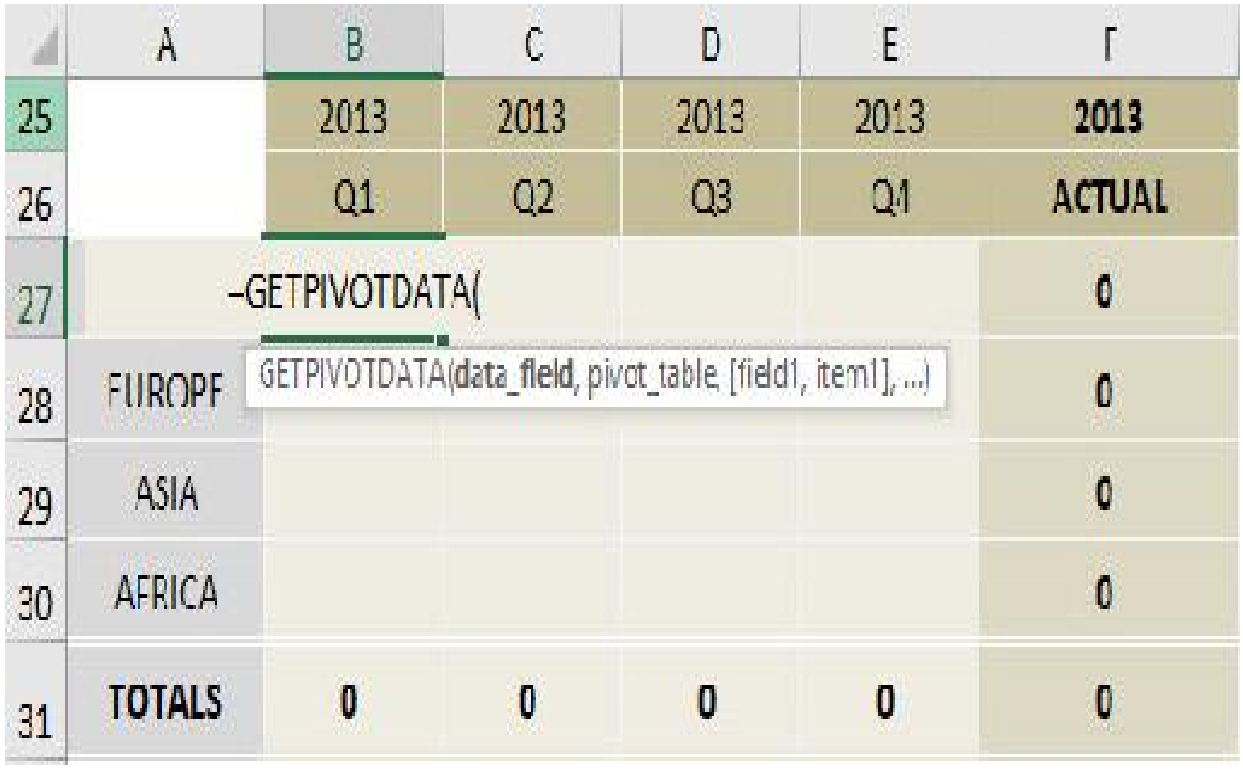
NB. ***Only the Fields and Items that are included in the Pivot Table report (Row/Column Labels and Values area) can be used to extract their values.***

Here is our current Pivot Table:

Sum of SALES	Column Label		
Row Labels	2012	2013	2014
Q1	2,477,547	3,486,643	2,895,541
AMERICAS	494,065	1,564,156	747,145
EUROPE	591,445	698,717	747,267
ASIA	560,250	745,051	614,103
AFRICA	776,787	778,719	786,568
Q2	2,588,623	2,800,107	2,399,630
AMERICAS	512,206	529,990	443,535
EUROPE	758,121	728,137	647,088
ASIA	658,377	723,009	711,729
AFRICA	659,919	819,269	597,278
Q3	2,726,381	2,671,945	2,484,077
AMERICAS	790,175	668,677	585,978
EUROPE	657,629	624,501	620,154
ASIA	693,252	704,110	677,743
AFRICA	585,325	674,607	600,162
Q4	2,650,700	2,732,442	2,878,712
AMERICAS	702,776	639,140	687,234
EUROPE	666,901	670,682	760,947
ASIA	655,099	707,790	697,121
AFRICA	625,924	714,830	733,410

STEP 1: We need to **enter the *GETPIVOTDATA* function**:

=GETPIVOTDATA(



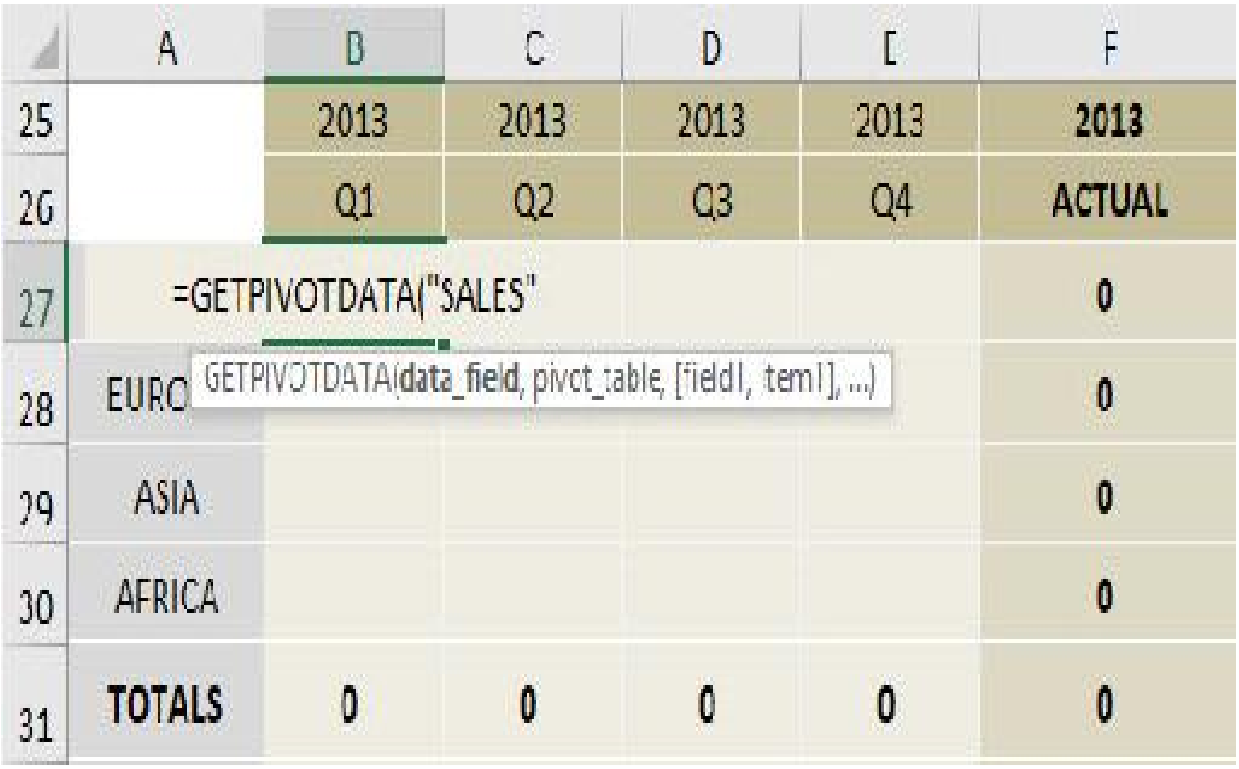
STEP 2: The **GETPIVOTDATA** arguments:

data_field

What is the value that we want to return?

Type in SALES as we want to return the sales value:

=GETPIVOTDATA("SALES",



pivot_table

From which pivot table?

Just reference a cell in the pivot table, let's type in $A$1

=GETPIVOTDATA("SALES", $A$1,

	A	B	C	D	E	F
25		2013	2013	2013	2013	**2013**
26		Q1	Q2	Q3	Q4	**ACTUAL**
27	=GETPIVOTDATA("SALES", $A$1,					**0**
28	EU					**0**
29	ASIA					**0**
30	AFRICA					**0**
31	**TOTALS**	**0**	**0**	**0**	**0**	**0**

GETPIVOTDATA(data_field, pivot_table, [field1, item1], [field2, item2], ...)

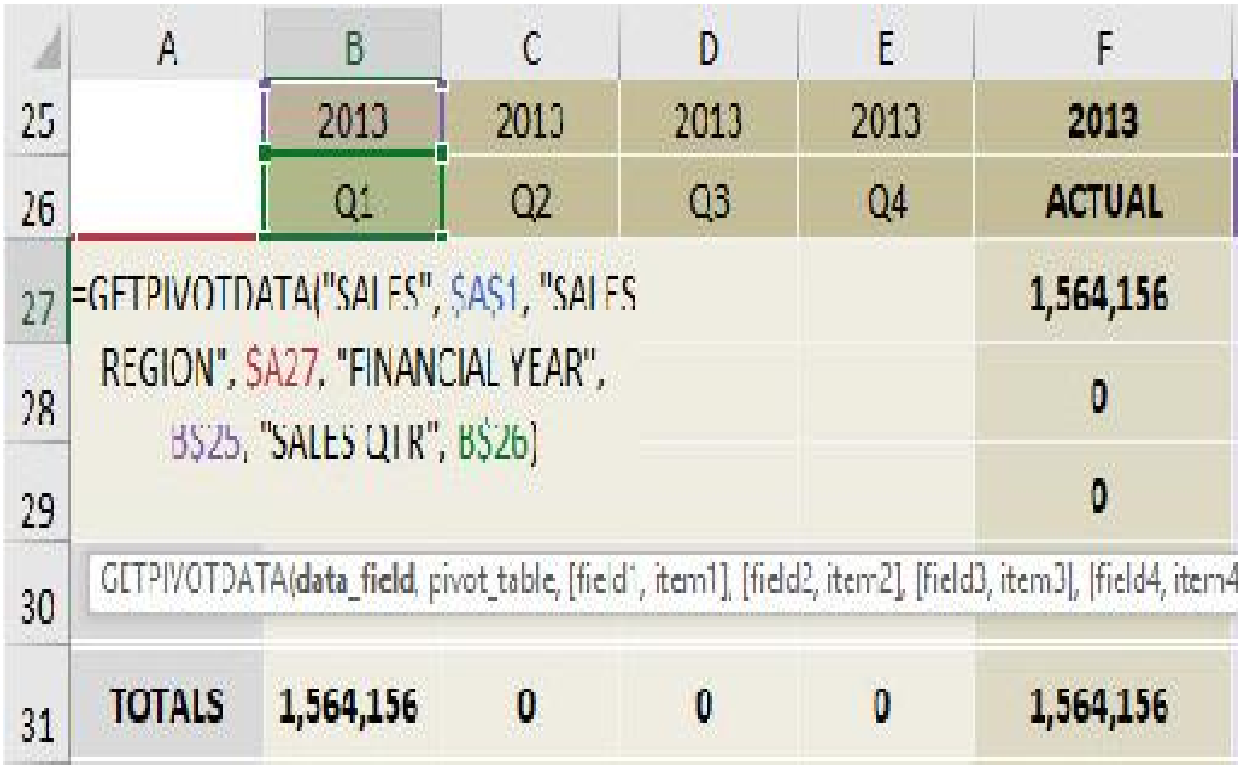
	A	B	C	D
1	Sum of SALE	olumn La		
2	Row Labels	2012	2013	2014
3	Q1	2,422,542	3,786,643	2,895,543
4	AMERICAS	494,065	1,564,156	743,145
5	EUROPE	591,445	698,717	747,267
6	ASIA	560,250	745,031	614,563
7	AFRICA	776,782	778,739	790,568
8	Q2	2,588,623	2,800,407	2,399,630
9	AMERICAS	512,206	529,990	443,535
10	EUROPE	758,121	728,139	647,088
11	ASIA	658,377	723,009	711,729
12	AFRICA	659,919	819,269	597,278

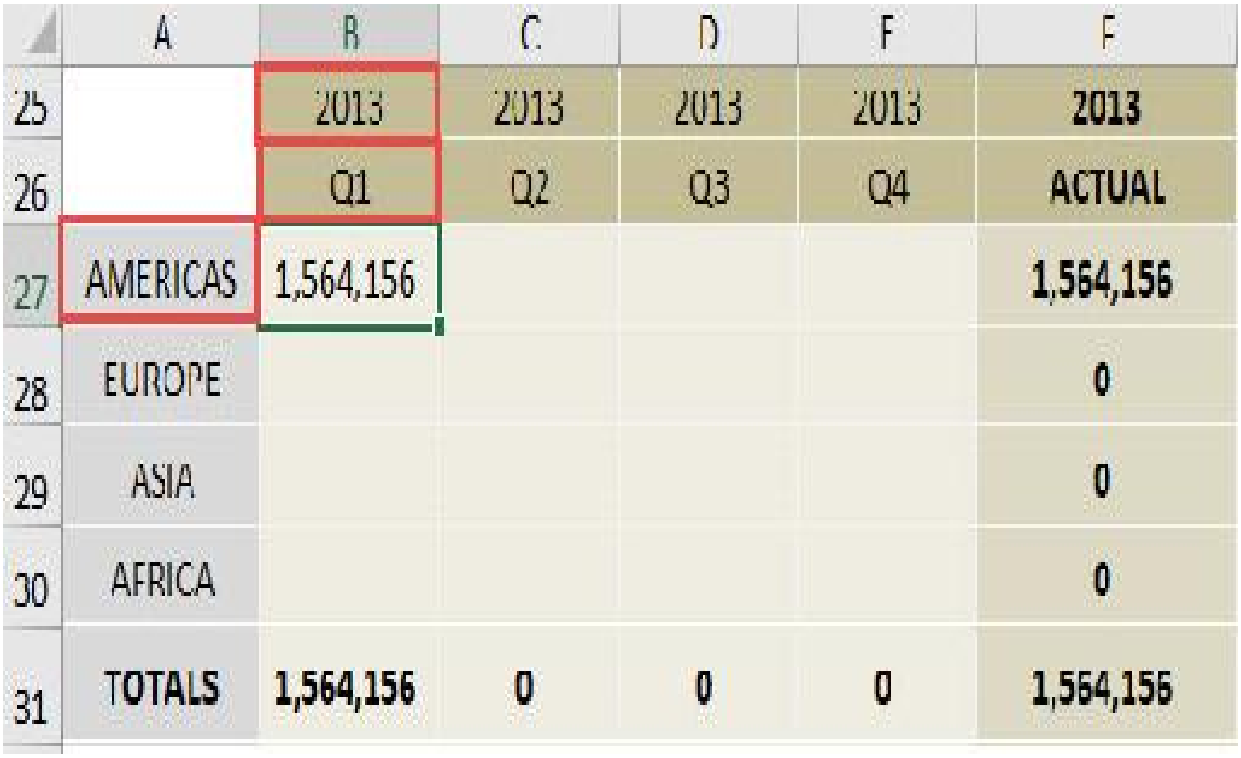
[field1, item1]

What are the fields that would serve as our filtering criteria?

To get our target sales figure, we will need: Sales Region, Financial Year and Sales Quarter. To do this we will need 3 field-item pairs:

=GETPIVOTDATA("SALES", $A$1, "SALES REGION", $A27, "FINANCIAL YEAR", B$25, "SALES QTR", B$26)



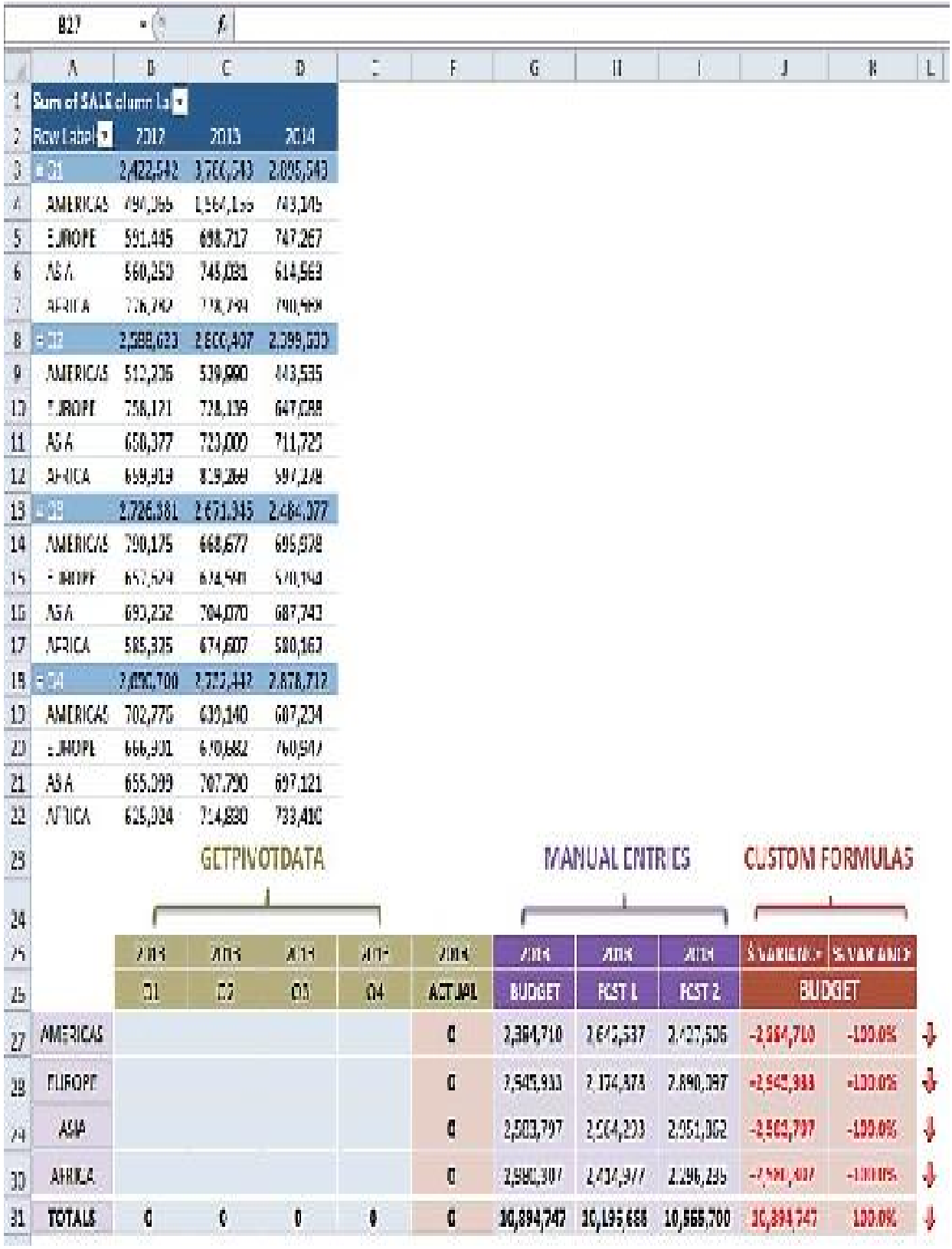


STEP 3: Do the same for the rest of the cells by copying the **GETPIVOTDATA** formula to the rest of the cells.

	A	B	C	D	E	F
25		2013	2013	2013	2013	2013
26		Q1	Q2	Q3	Q4	ACTUAL
27	AMERICAS	1,564,156				1,564,156
28	EUROPE					0
29	ASIA					0
30	AFRICA					0
31	TOTALS	1,564,156	0	0	0	1,564,156

Now your new set of data is ready!

	A	B	C	D	E	F
25		2013	2013	2013	2013	2013
26		Q1	Q2	Q3	Q4	ACTUAL
27	AMERICAS	1,564,156	529,990	668,677	639,140	3,401,963
28	EUROPE	698,717	728,139	624,591	670,682	2,722,129
29	ASIA	745,031	723,009	704,070	707,790	2,879,900
30	AFRICA	778,739	819,269	674,607	714,830	2,987,445
31	TOTALS	3,786,643	2,800,407	2,671,945	2,732,442	11,991,437



Sum of SALES column La			
Row Label	2012	2013	2014
Q1	2,422,542	3,700,343	2,895,943
AMERICAS	490,366	1,564,155	743,105
EUROPE	591,445	698,717	747,267
ASIA	560,253	745,081	614,563
AFRICA	776,742	718,794	791,008
Q2	2,588,623	2,800,407	2,399,000
AMERICAS	512,236	539,990	443,535
EUROPE	756,171	728,139	647,088
ASIA	650,377	723,000	711,722
AFRICA	669,919	809,278	596,654
Q3	2,726,861	2,671,345	2,484,077
AMERICAS	700,175	668,677	695,928
EUROPE	667,624	674,541	590,148
ASIA	693,252	704,070	687,742
AFRICA	585,335	674,607	580,163
Q4	2,830,700	2,722,442	2,878,712
AMERICAS	702,775	630,140	687,234
EUROPE	666,901	670,682	760,507
ASIA	655,099	707,790	697,121
AFRICA	625,924	714,830	733,850

GETPIVOTDATA

MANUAL ENTRIES

CUSTOM FORMULAS

	2012	2013	2014	2015	2016	2017	2018	$ VARIANCE	% VARIANCE	
	Q1	Q2	Q3	Q4	ACTUAL	BUDGET	FCST 1	FCST 2	BUDGET	
AMERICAS					0	2,384,710	2,642,537	2,427,535	-2,384,710	-100.0%
EUROPE					0	2,545,933	2,174,378	2,890,797	-2,545,933	-100.0%
ASIA					0	2,503,797	2,564,233	2,951,062	-2,503,797	-100.0%
AFRICA					0	2,980,307	2,434,977	2,296,236	-2,980,307	-100.0%
TOTALS	0	0	0	0	0	10,894,747	10,195,668	10,565,700	10,894,747	100.0%

IF Combined With The AND Function

What does it do?

It returns a value that you set if a condition is met, and a value if it is not met

Formula breakdown:

=IF(AND(Logical Test),Value if True,Value if False)

What it means:

=IF((Sales are bigger than $3000 & in the North region),"Bonus","No Bonus")

Example:

=IF(AND(1092>3000,"North"="north"),"Bonus","No Bonus")

="No Bonus"

Exercise Workbook:

DOWNLOAD EXCEL WORKBOOK

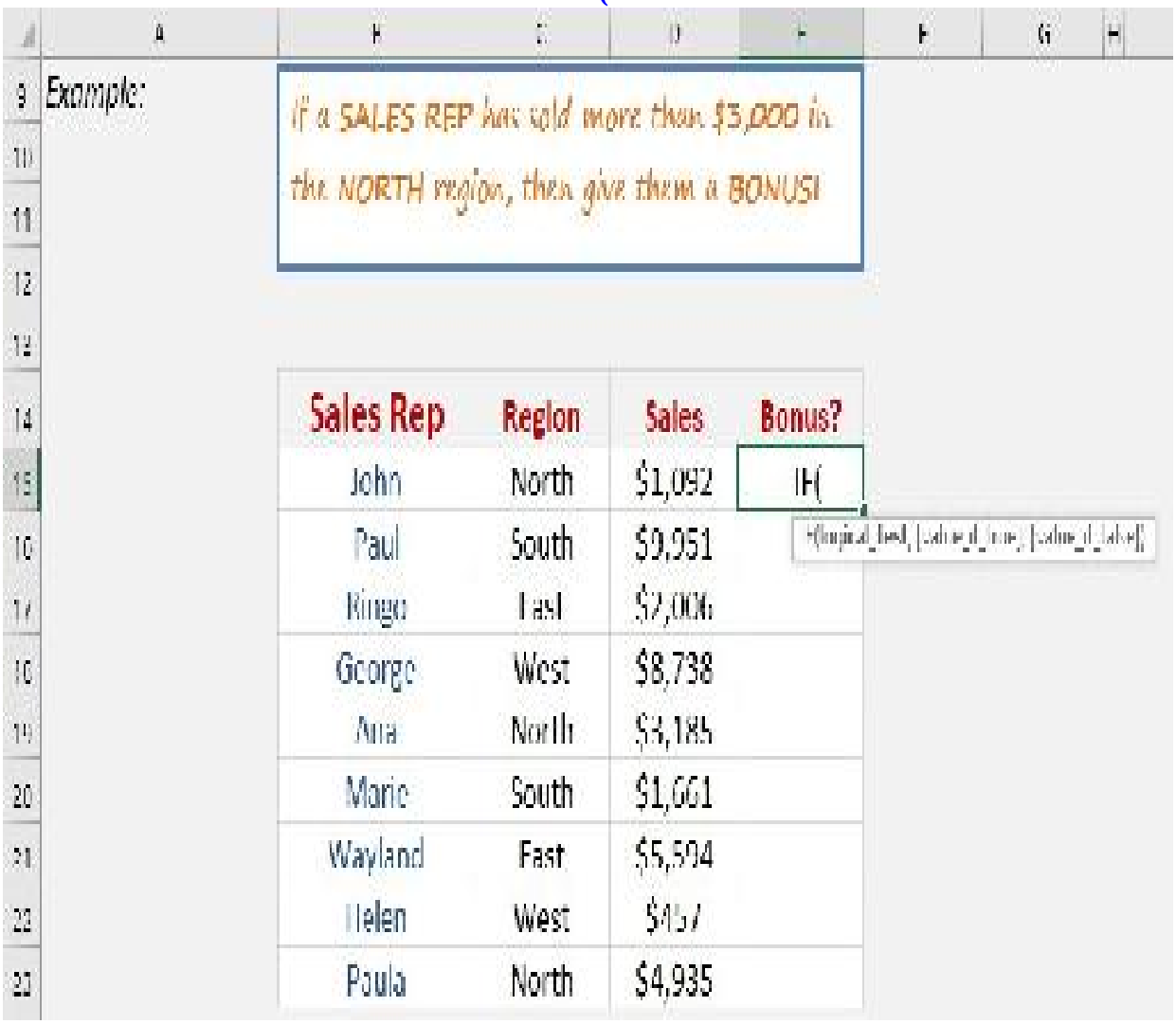
When combining (or nesting) the AND function with the IF function, it allows you to add more than one condition to your formula, something that is not possible with the IF function by itself.

So you can show the results of Sales Reps that have made more than $3,000 of sales AND who are part of the North region, as explained below...

We want to show a Bonus value if sales are bigger than $3000 and comes from the North region, and No Bonus is shown if this condition is not met.

STEP 1: We need to enter the **IF function** in a blank cell:

=IF(



STEP 2: The **IF** arguments:

logical_test

What is your condition?

Sales Rep has sold **more than 3000 dollars** and comes from the **North Region**. Let us use the **AND function** to accomplish this.

=IF(AND(D15>3000, C15="North"),

value_if_true

What value should be displayed if the condition is true?

We want "Bonus" to be displayed

=IF(AND(D15>3000, C15="North"), "Bonus",

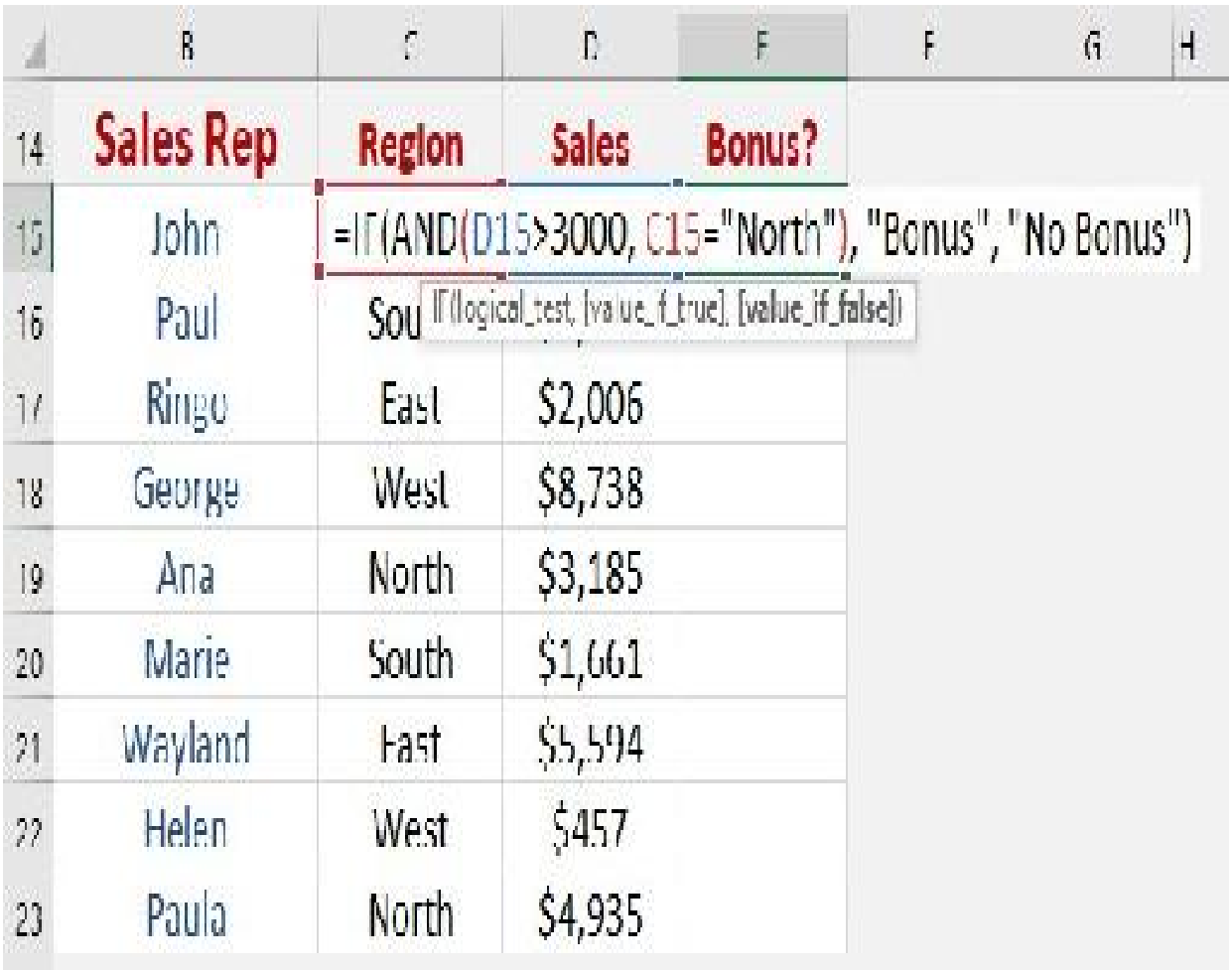
	B	C	D	F	F	G
14	Sales Rep	Region	Sales	Bonus?		
15	John	=IF(AND(D15>3000, C15="North"), "Bonus",				
16	Paul	South	$9,951			
17	Ringo	East	$2,006			
18	George	West	$8,738			
19	Ana	North	$3,185			
20	Marie	South	$1,661			
21	Wayland	East	$5,594			
22	Helen	West	$457			
23	Paula	North	$4,935			

value_if_false

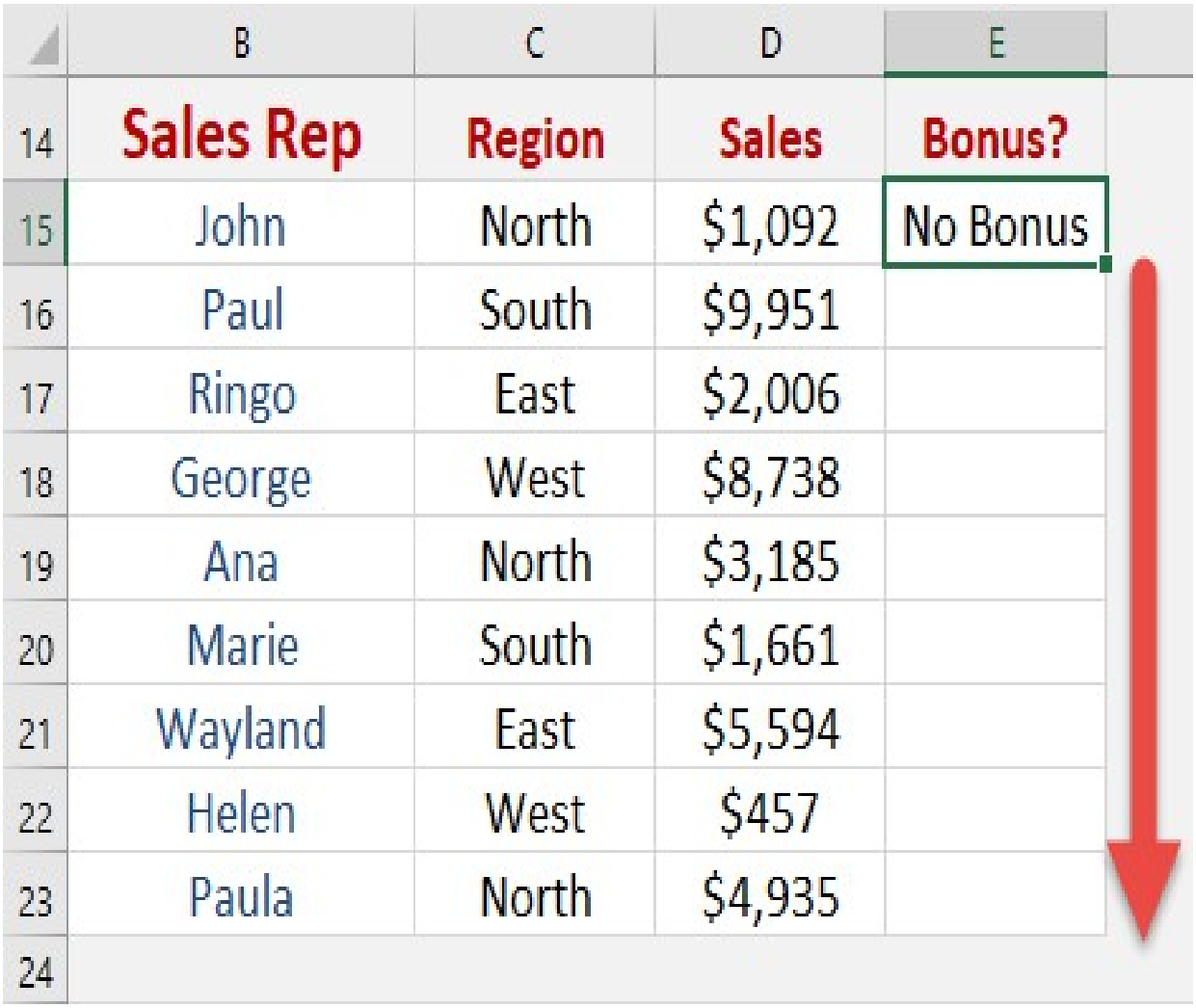
What value should be displayed if the condition is not met?

We want "No Bonus" to be displayed

=IF(AND(D15>3000, C15="North"), "Bonus", "No Bonus")



Apply the same formula to the rest of the cells by dragging the lower right corner downwards.



	B	C	D	E
14	**Sales Rep**	**Region**	**Sales**	**Bonus?**
15	John	North	$1,092	No Bonus
16	Paul	South	$9,951	
17	Ringo	East	$2,006	
18	George	West	$8,738	
19	Ana	North	$3,185	
20	Marie	South	$1,661	
21	Wayland	East	$5,594	
22	Helen	West	$457	
23	Paula	North	$4,935	
24				

You now have all of results!

	B	C	D	E	F
14	**Sales Rep**	**Region**	**Sales**	**Bonus?**	
15	John	North	$1,092	No Bonus	
16	Paul	South	$9,951	No Bonus	
17	Ringo	East	$2,006	No Bonus	
18	George	West	$8,738	No Bonus	
19	Ana	North	$3,185	Bonus	
20	Marie	South	$1,661	No Bonus	
21	Wayland	East	$5,594	No Bonus	
22	Helen	West	$457	No Bonus	
23	Paula	North	$4,935	Bonus	
24					

INDEX-MATCH 2 Criteria with Validation

What does it do?

Searches the row position of a value/text in one column (using the MATCH function) and returns the value/text in the same row position from another column to the left or right (using the INDEX function)

Formula breakdown:

=INDEX(array, MATCH(lookup_value, lookup_array, [match_type])

What it means:

=INDEX(return the value/text, MATCH(from the row position of this value/text))

Example:

=INDEX(INDIRECT("Table1["&$H$14&"]"),MATCH(G14,Table1[SALES REP],0))

Exercise Workbook:

DOWNLOAD EXCEL WORKBOOK

We can use the **INDEX-MATCH** formula and combine it with Data Validation drop down menus to return a value based on 2 criteria.

This is a little advanced so you will need to drop what you are doing and really focus. Let's go...

First we need to convert our data into an Excel Table by pressing Ctrl+T

See detailed tutorial on how to convert to an Excel Table here

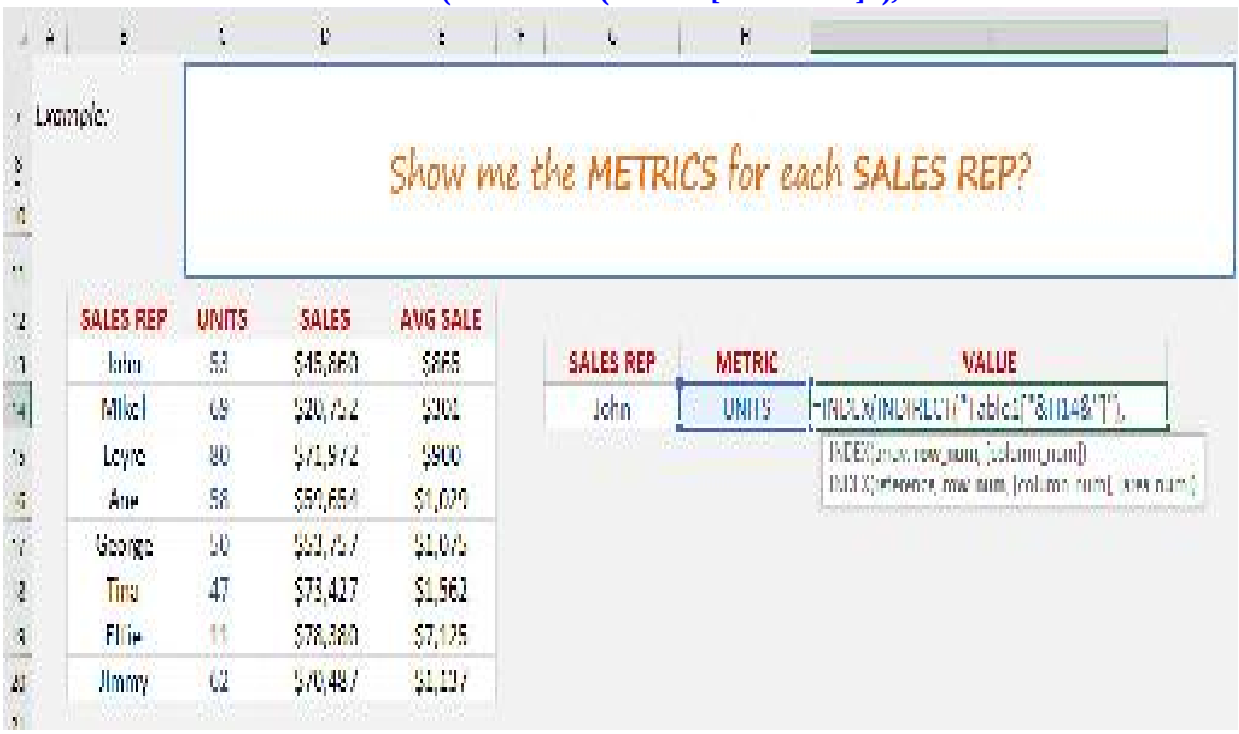
We then create drop down menus for our ***Sales Rep*** column and another one for our ***Units/Sales/Avg Sale*** column names

See detailed tutorial on how to insert drop down menus here

Once the above are done we need to create our formula.

STEP 1: We need to nest an **INDIRECT** function within the **INDEX** function and reference the Metric cell name (H14) with our Table name (Table1):

=INDEX(INDIRECT("Table1["&H14&"]"),

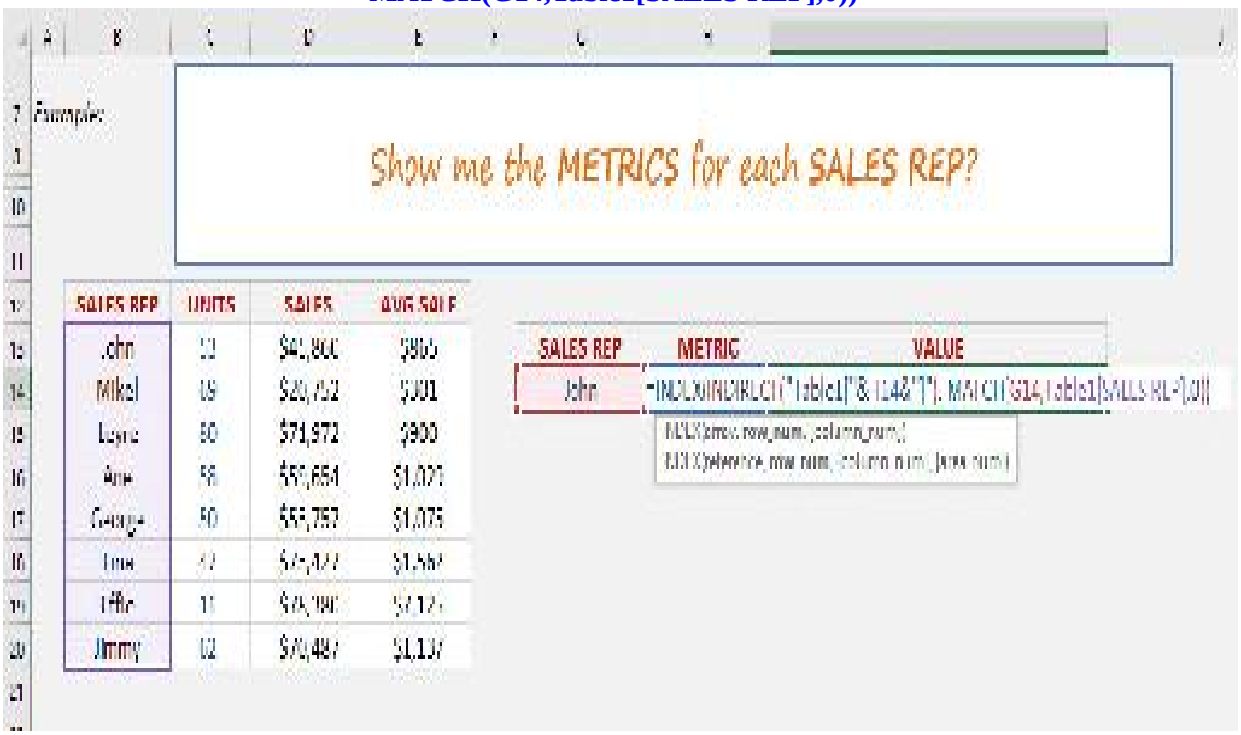


This will give us our dynamic column name within the Excel Table.

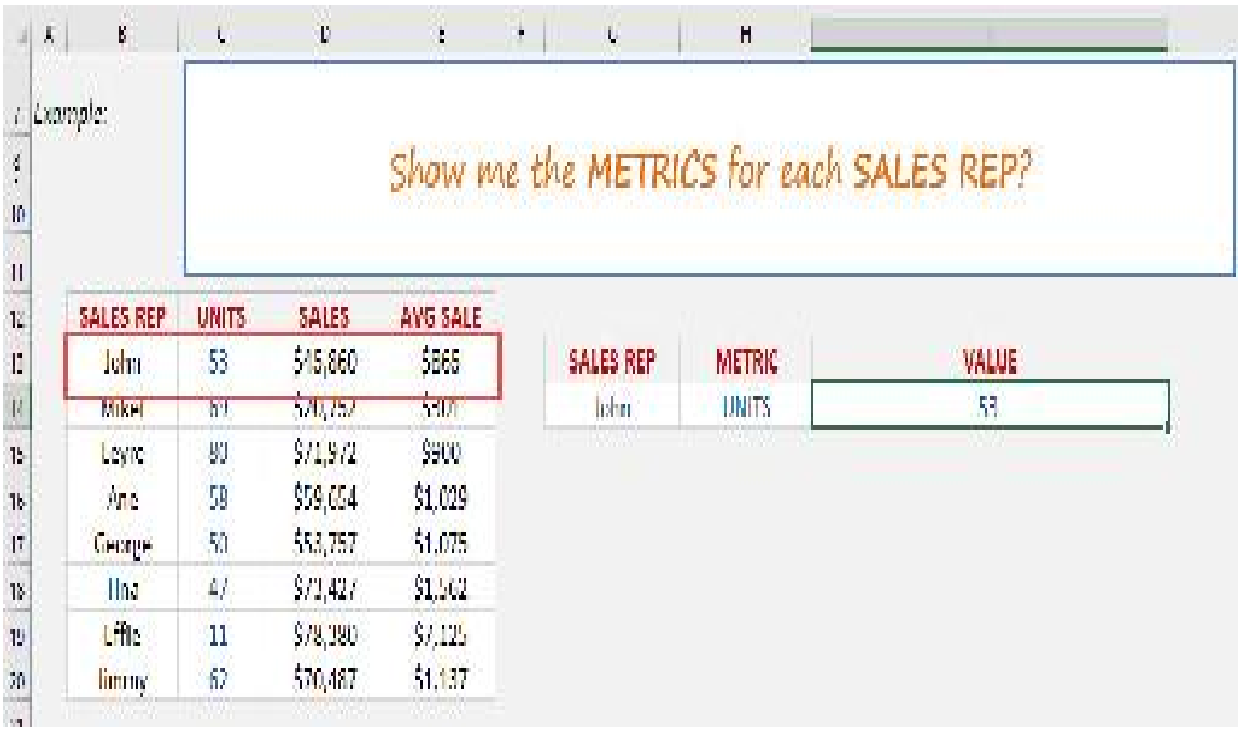
STEP 2: We need to lookup our **Sales Rep** within the Sales Rep column table:

=INDEX(INDIRECT("Table1["&H14&"]"),

MATCH(G14,Table1[SALES REP],0))



So by combining these formulas we can choose two criteria (Sales Rep & Metric name) to return the respective value.


Example:
Show me the METRICS for each SALES REP?
SALES REP
UNITS
SALES
AVG SALE
John
53
$45,860
$865
SALES REP
METRIC
VALUE
John
UNITS
53

Match Two Lists With MATCH Function

What does it do?

It returns the position of an item in a range

Formula breakdown:

=MATCH(lookup_value, lookup_array, [match_type])

What it means:

=MATCH(lookup this value, from this list or range of cells, return me the Exact Match).

Example:

=MATCH(C12,list2!C12:C21,0)

Exercise Workbook:

DOWNLOAD EXCEL WORKBOOK

I am sure that you have come across many occasions where you have two lists of data and want to know if a specific item in ***List1*** exists in ***List2***.

Well I have!

With the MATCH function you can verify if a cell´s item in ***List1*** exists in ***List2***.

The function will return the row position of that item in ***List2*** hence confirming that it exists. If you get a #N/A it means that the cell´s item does not exist in ***List2***.

You can then go ahead and filter your ***List1*** with either the values returned or the #N/As.

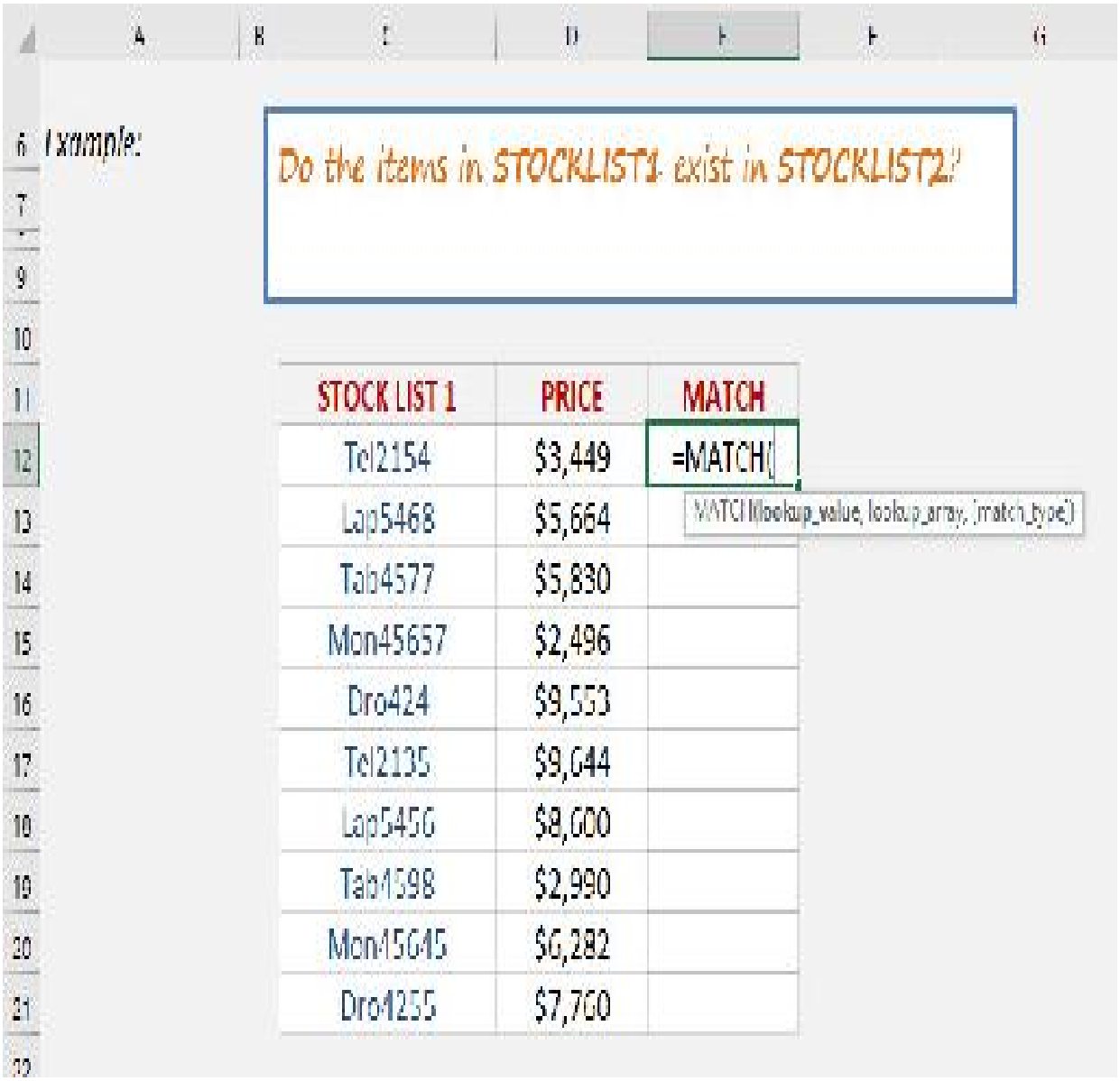
Here are our 2 Lists:

STOCK LIST 1	PRICE	MATCH
Tel2154	$3,449	
Lap5468	$5,664	
Tab4577	$5,830	
Mon45657	$2,496	
Dro424	$9,553	
Tel2135	$9,644	
Lap5456	$8,600	
Tab4598	$2,990	
Mon45645	$6,282	
Dro4255	$7,760	

	STOCK LIST 2	COST
1	Tab4577	$565
2	Tel2154	$515
3	Lap000	$574
4	Dro000	$984
5	Mon45645	$899
6	Tel2135	$646
7	Lap5456	$524
8	Tab000	$503
9	Mon45657	$933
10	Dro4255	$904

STEP 1: We need to enter the **MATCH function** in a blank cell:

=MATCH(



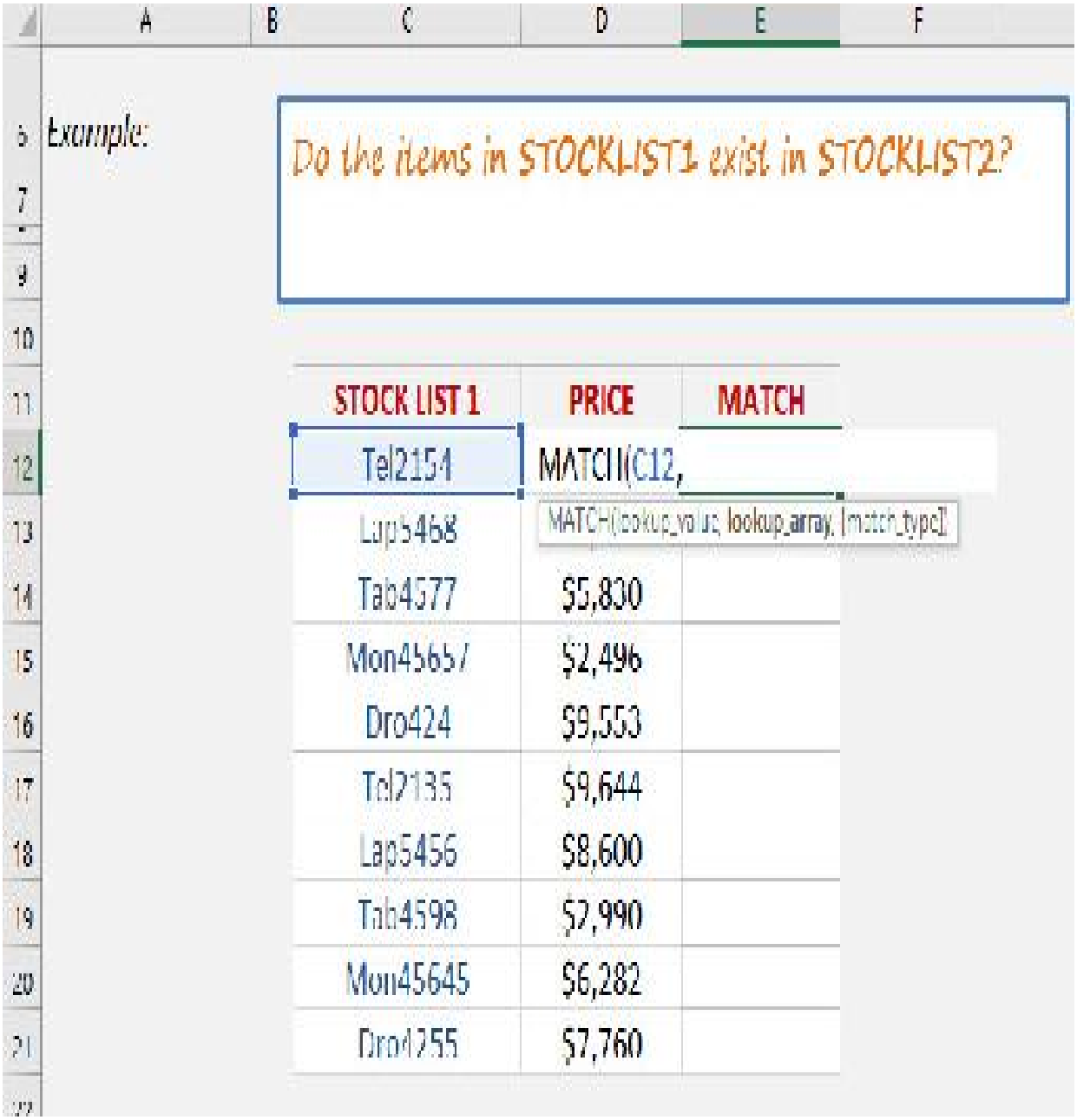
STEP 2: The **MATCH** arguments:

lookup_value

What is the value you want to check?

Select the cell containing the List1 value, as this is what we want to check against List2.

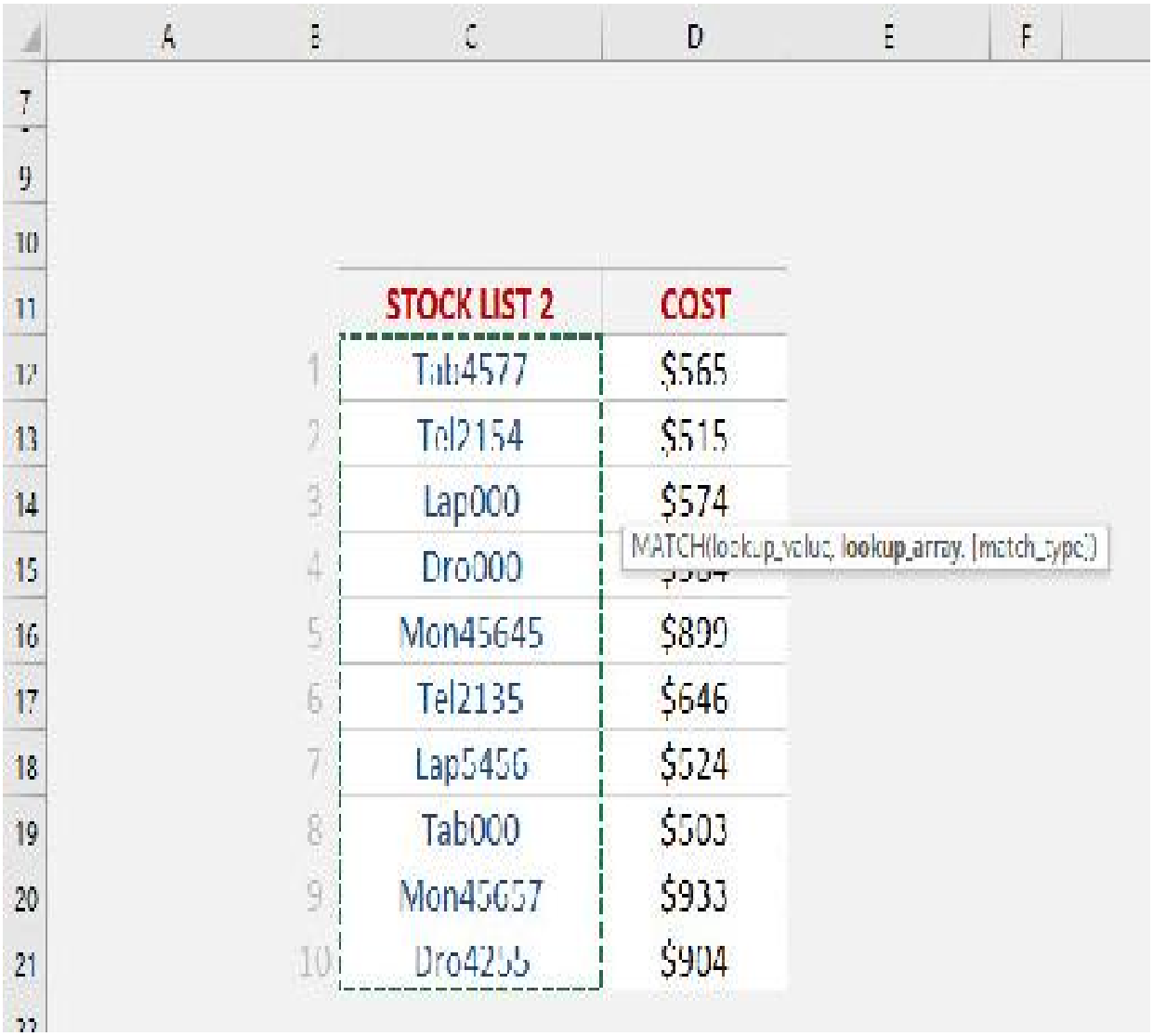
=MATCH(C12,



lookup_array

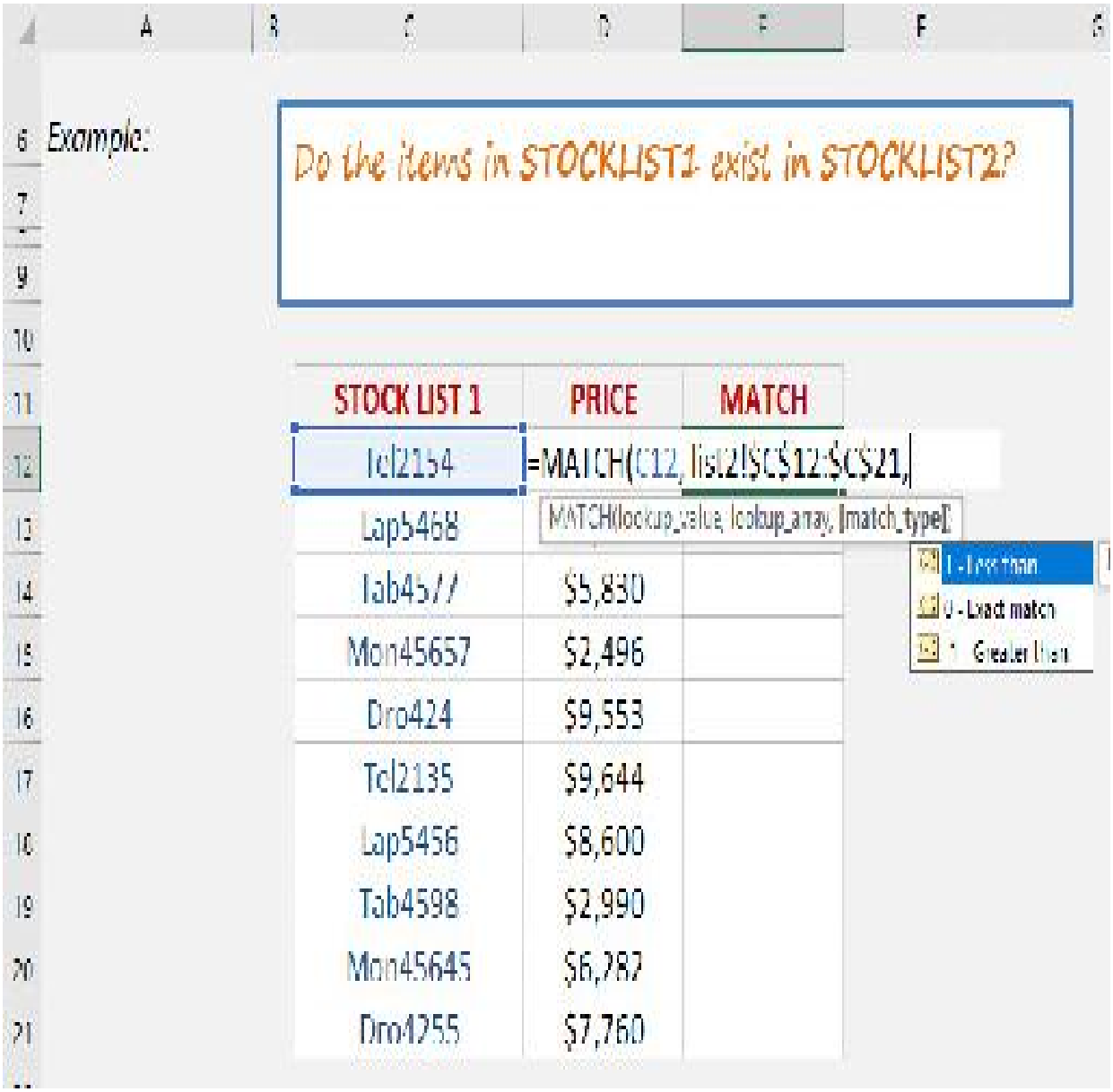
What is the list you want to check against?

Select the entire List2.



And ensure to **press F4** to make it an absolute reference.

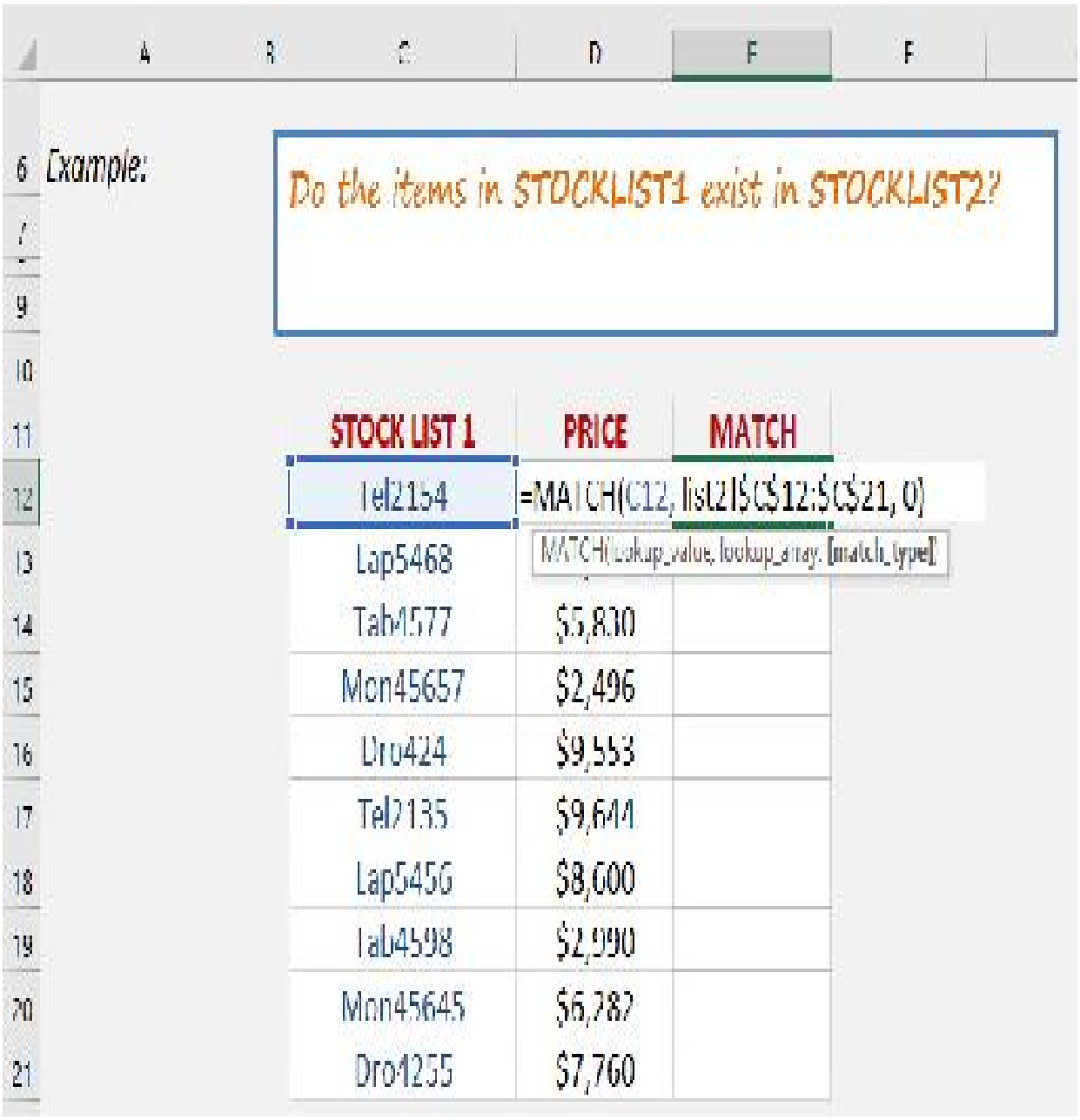
=MATCH(C12, list2!$C$12:$C:21,



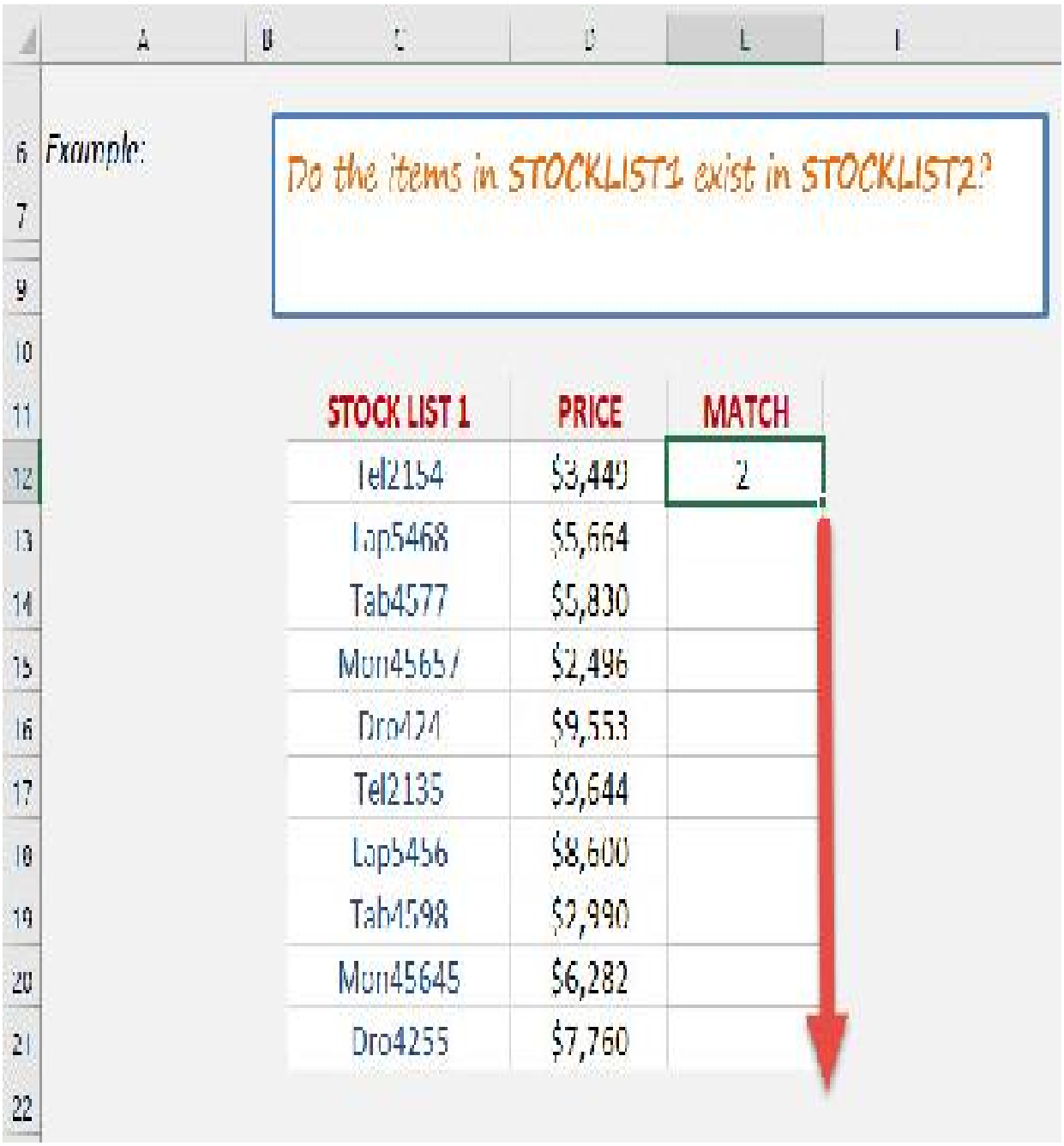
match_type

How specific is your matching?

We want an exact match so place in 0.



Apply the same formula to the rest of the cells by dragging the lower right corner downwards.



You now have all of results! You can see which row numbers the items exist in List2. For example, Mon45657 in List1 exists in List2 Row 9! If it does not exist in List2, then #N/A is displayed.

STOCK LIST 1	PRICE	MATCH
Tel2154	$3,449	2
Lap5468	$5,664	#N/A
Tab4577	$5,830	1
Mon45657	$7,496	9
Dro121	$9,553	#N/A
Tel2135	$8,644	6
Lap5456	$8,600	7
Tab4598	$2,990	#N/A
Mon45645	$6,282	5
Dro4255	$7,760	10

	STOCK LIST 2	COST
1	Tab4577	$565
2	Tel2154	$515
3	Lap000	$574
4	Dro000	$984
5	Mon45645	$899
6	Tel2135	$646
7	Lap5456	$524
8	Tab000	$503
9	Mon45657	$933
10	Dro4255	$904

Named Ranges with VLOOKUP Function

What does it do?

Searches for a value in the first column of a table array and returns a value in the same row from another column (to the right) in the table array.

Formula breakdown:

=VLOOKUP(lookup_value, table_array, col_index_num, [range_lookup])

What it means:

=VLOOKUP(this value, in this Named Range, and get me value in this column, Exact Match/FALSE/0])

Example:

=VLOOKUP("Laptop",StockList,2,FALSE)

Exercise Workbook:

DOWNLOAD EXCEL WORKBOOK

A ***Named Range*** makes it easier to understand Excel formulas, especially if the said formula contains an array argument.

A ***Named Range*** can be a cell, a cell range, a Table, a function or a constant.

STEP 1: To **define a** *Named Range* in Excel you need to select the cell/cell range/Table/function/constant and go to the ***Name Box*** which is located on the top left hand corner of the workbook - next to the ***Formula Bar***.

STEP 2: In here you can name your range whatever you like (make sure there are no spaces) and press ***Enter.*** You can view your ***Named Range*** by clicking on the drop down box in the ***Name Box***. In our example we will give this a name of **StockList.**

You can also **view/edit/delete your *Named Range*** by going to the ***Formulas*** tab in the Ribbon menu and selecting ***Name Manager***.

STEP 3: Now that you are all set, each time you are creating a formula, like a Vlookup formula, it is best to use a ***Named Range*** as it makes the formula easier to understand and maintain.

We need to **enter the *Vlookup* function**:

=VLOOKUP(

	Item	Quantity	Price	Total Price
lookup_value	Laptop		=VLOOKUP(	
lookup_value	Tablet	35		$0
			Total	**$0**

The Vlookup arguments:

lookup_value

What are we looking for?

Reference the cell that contains the text or value:

=VLOOKUP(G15,

table_array

From which list are we doing a lookup on?

Place in the Named Range of the Stock List:

=VLOOKUP(G15, StockList,

col_index_num

From which column do we want to retrieve the value?

We want to retrieve the Price which is the SECOND column from our table array:

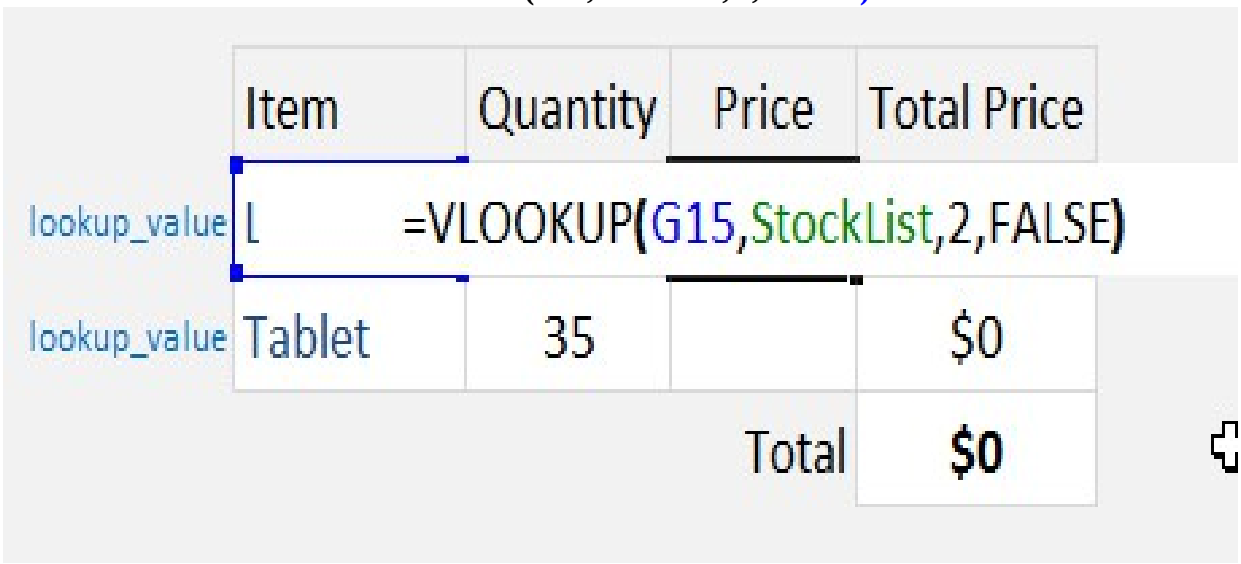
=VLOOKUP(G15, StockList, 2,

[range_lookup]

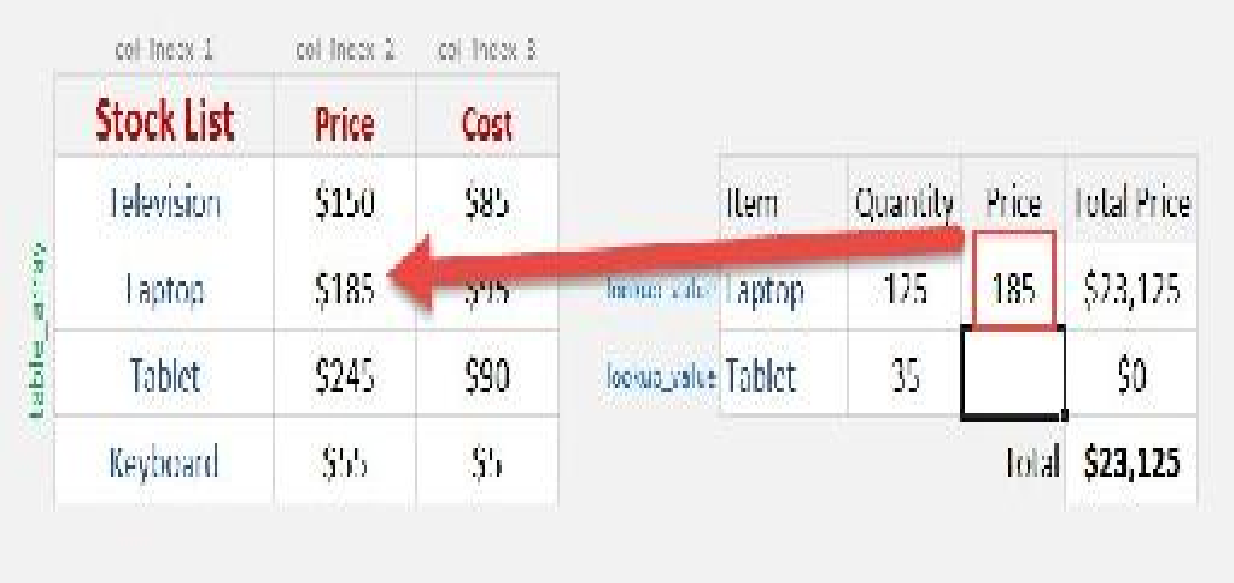
Do we want an exact match?

Place in FALSE to signify that we want an exact match:

=VLOOKUP(G15, StockList, 2, FALSE)



The price now dynamically changes based on your selection:


col_index_1
col_index_2
col_index_3
Stock List
Price
Cost
Television
$150
$85
Laptop
$185
Tablet
$245
$90
Keyboard
table_array
Item
Quantity
Price
Total Price
Laptop
125
185
$23,125
Tablet
35
$0
Total
$23,125

REPT

What does it do?

Repeats text a given number of times

Formula breakdown:

=REPT(text, number_times)

What it means:

=REPT(the text to repeat, number of times the text will be repeated)

Example:

=REPT("a", 3) ="aaa"

Exercise Workbook:

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When you are creating an Excel Dashboard and are limited by space and do not want to insert a chart, you can easily create an in-cell bar chart using the RPT (repeat) function.

We will use the vertical bar character | as the first argument: **text** and references the value cell for the second argument: **number_times**

So it enters the vertical bar character by the amount of times of the value cell, looking something like this:

||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||

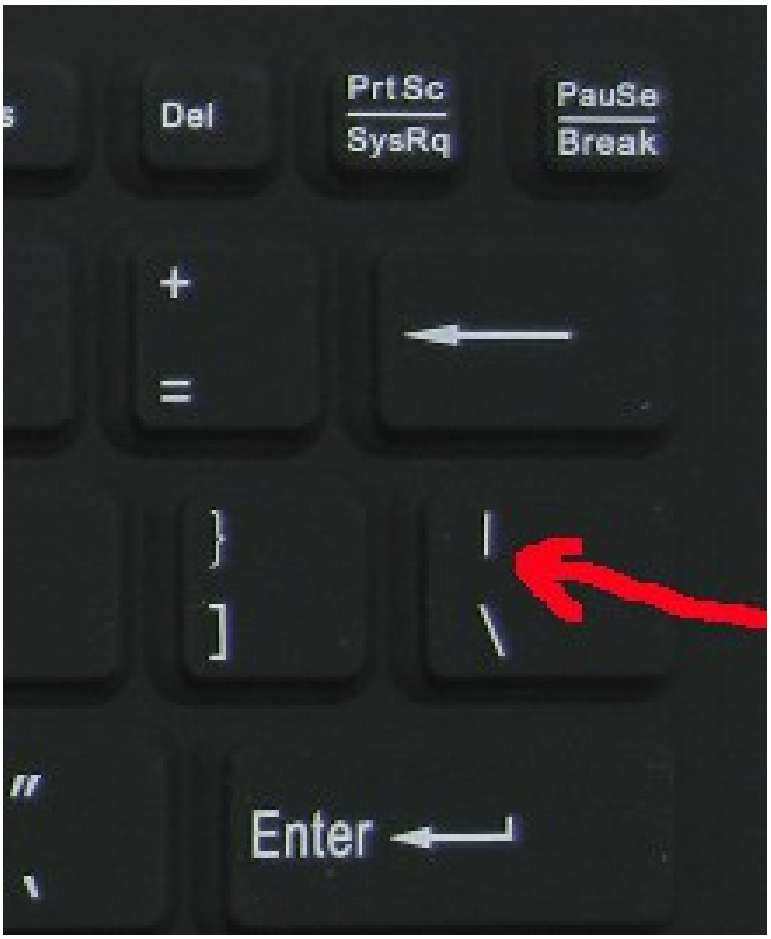
Here is how it is done in just a few steps:

STEP 1: Enter the REPT function in a column next to your values

=REPT

STEP 2: **Enter the vertical bar** keyboard character in the first argument

=REPT("|")



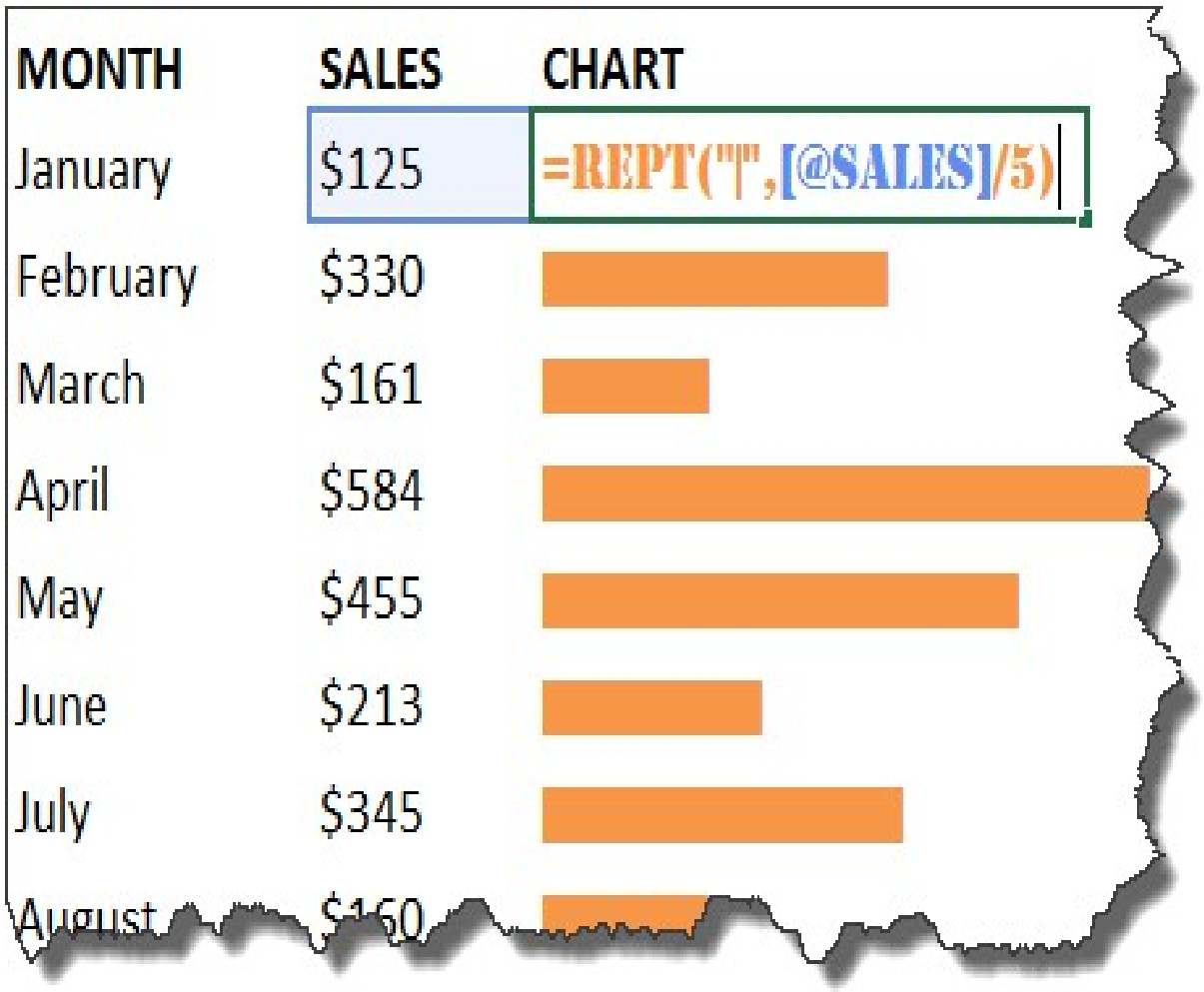
STEP 3: **Reference the value cell** for the second argument

=REPT("|", b6)

STEP 4: Highlight the formula column and **insert the** *Stencil* **font** from the Home menu and choose a font color

STEP 5: If your value cells are high, the bar will go out of your screen. To fix this, you need to enter a divisor in the second argument of your formula which will reduce the length

=REPT("|", b6/5)


MONTH
SALES
CHART
January
$125
=REPT("|",[@SALES]/5)
February
$330
March
$161
April
$584
May
$455
June
$213
July
$345
August
$160

Sum a Range Using the INDEX Function

What does it do?

You can sum a range of values within a table using the INDEX function in Excel. This is valuable when you want to extract key metrics from a table and put them in an Excel Dashboard.

To make this work you firstly need to start your Excel formula with the SUM function followed by the INDEX function.

So it will look something like this:

=SUM(INDEX(Array, Row_Num, Column_Num))

The ***Array*** will be your table of data, the ***Row_Num*** will be blank and the ***Column_Num*** will be the column number where you want to SUM the values.

When we dissect the formula (by highlighting the INDEX function and pressing F9) we can see that the following is happening: =SUM({8959;7840;7507;6690;5802;5487;3949;3836;3587;3210})

So in effect we are summing the array of values within the table. See the example below that shows you how this is done.

Exercise Workbook:

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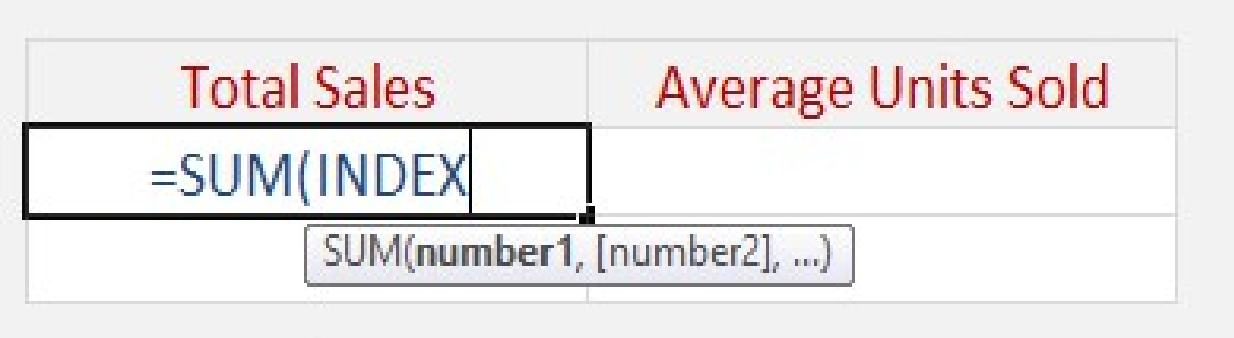
STEP 1: We need to place first the **INDEX** function inside the **SUM** function.

=SUM(INDEX



The Index arguments:

array

What is the range / table?

Reference the range of cells here that we want to get the values from:

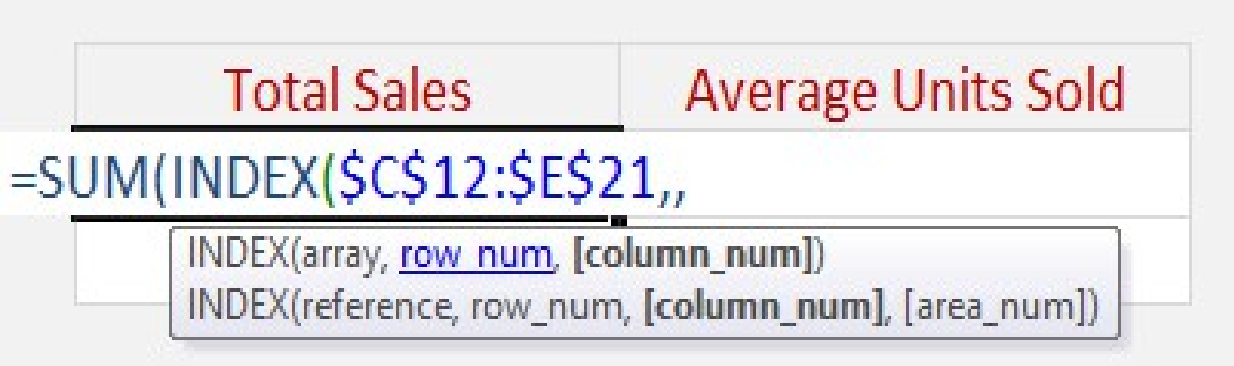
=SUM(INDEX($C$12:$E$21,

row_num

What is the row number we want to return?

We do not need to return the row, as we want to just sum all of the sales. Leave the row number blank:

=SUM(INDEX($C$12:$E$21,,

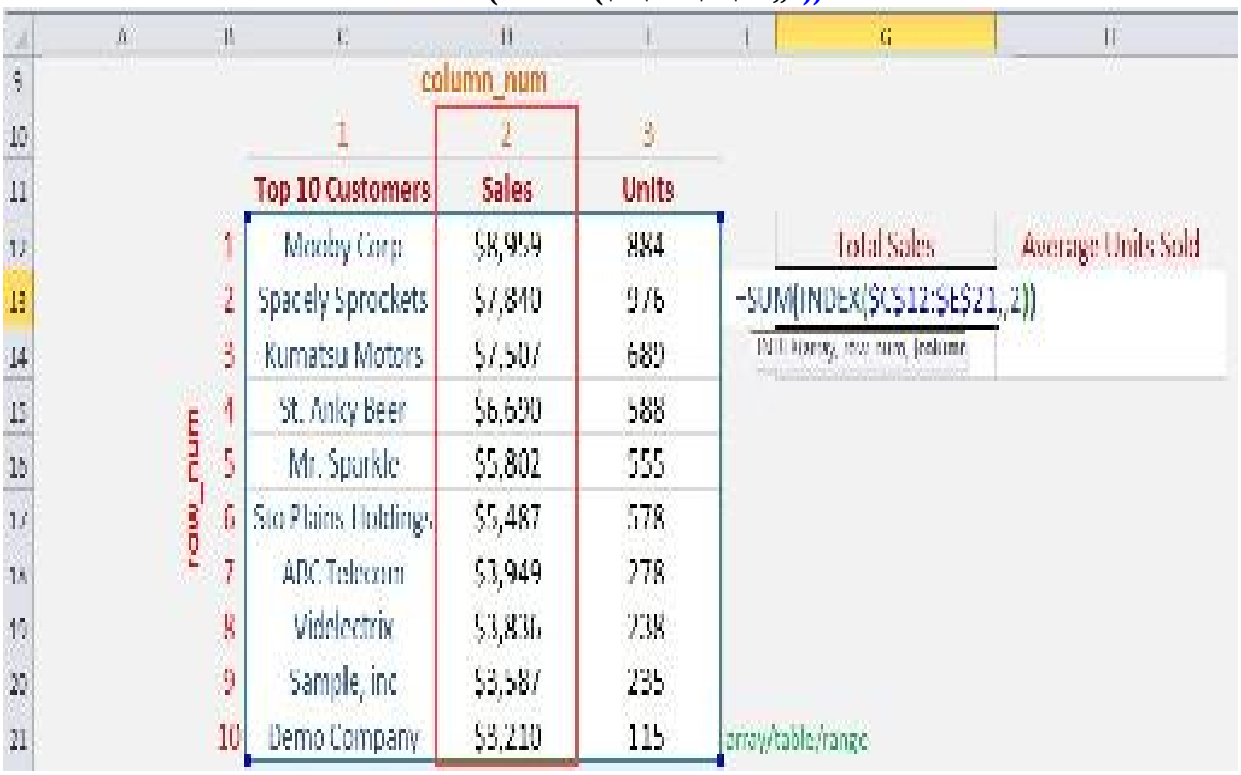


column_num

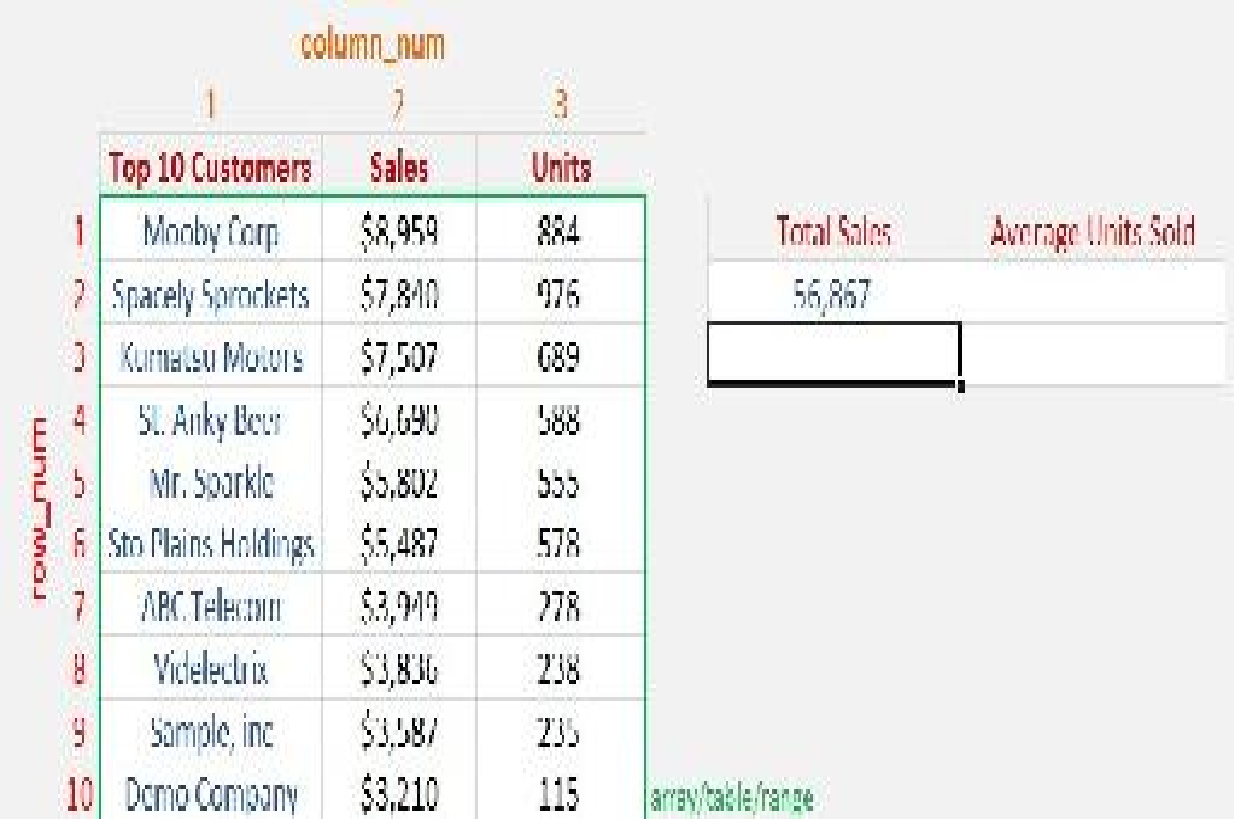
What is the column number we want to return?

Since we want the sales column, this is column number 2. So place in 2:

=SUM(INDEX($C$12:$E$21,,2))

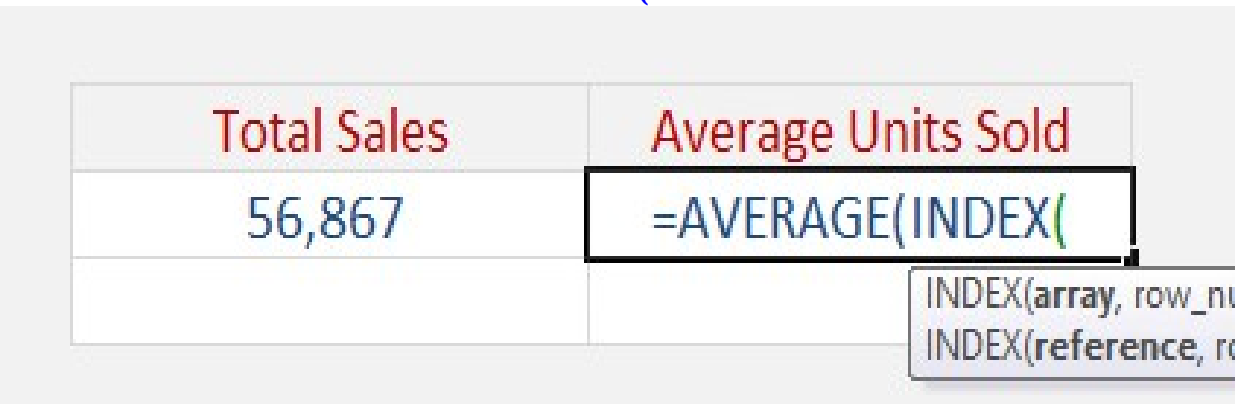


Now you are able to get the **Total Sales**:



STEP 2: Now let us try how we can use this with the **AVERAGE** function. We need to place first the **INDEX** function inside the **AVERAGE** function.

=AVERAGE(INDEX



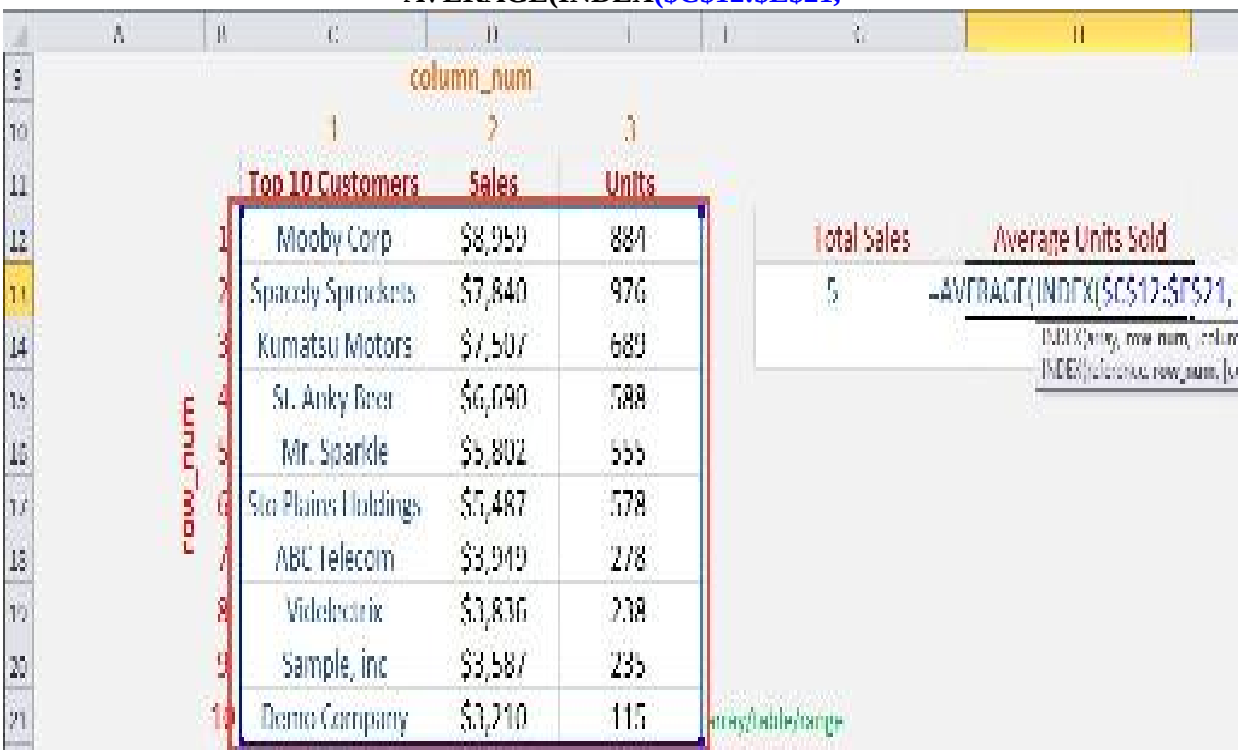
The Index arguments:

array

What is the range / table?

Reference the range of cells here that we want to get the values from:

=AVERAGE(INDEX($C$12:$E$21,

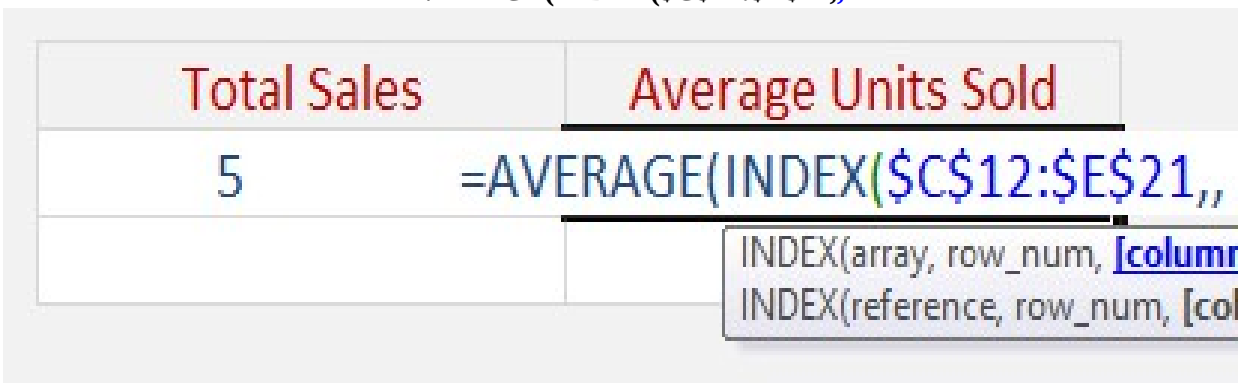


row_num

What is the row number we want to return?

We do not need to return the row, as we want to just average all of the units. Leave the row number blank:

=AVERAGE(INDEX($C$12:$E$21,,

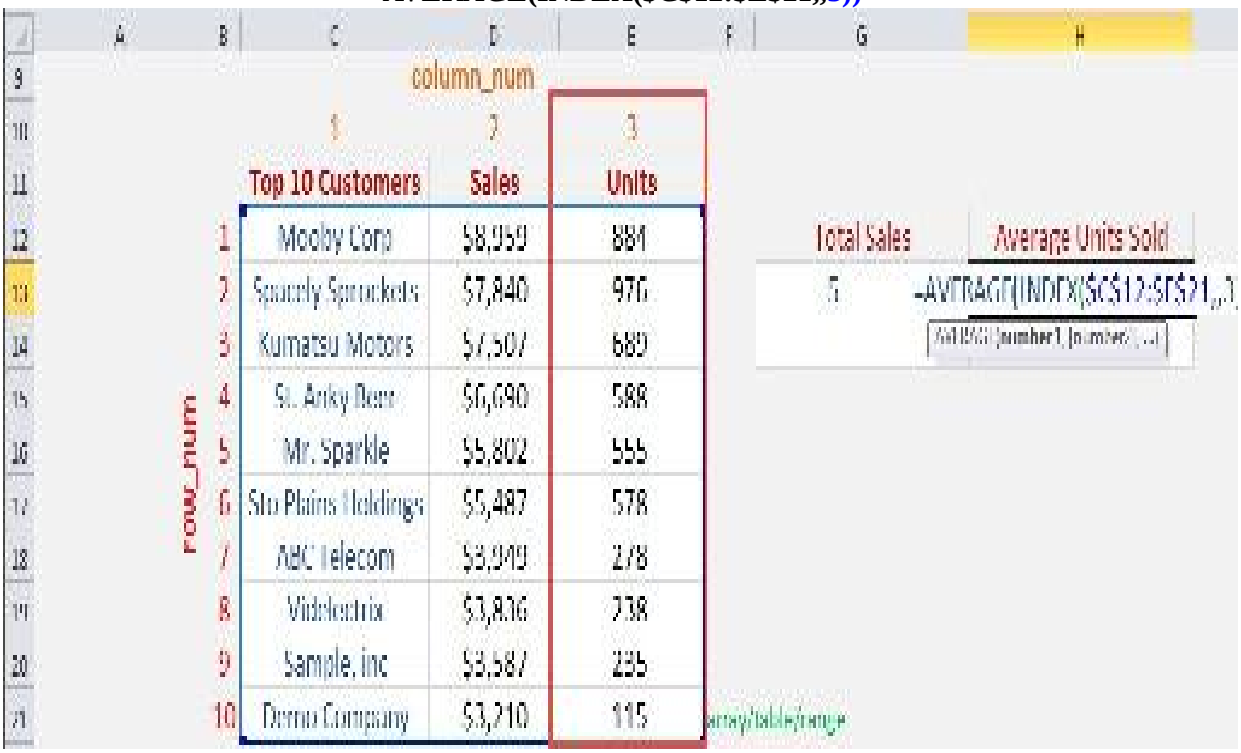


column_num

What is the column number we want to return?

Since we want the units column, this is column number 3. So place in 3:

=AVERAGE(INDEX($C$12:$E$21,,3))



Now you are able to get the **Average Units Sold**:

SUMPRODUCT: Sum Multiple Criteria

What does it do?

It returns the sum of multiple criteria from the corresponding ranges or arrays

Formula breakdown:

=SUMPRODUCT((array 1 criteria) * (array2 criteria) * array values)

What it means:

=SUMPRODUCT((find my criteria in this array) * (find my criteria in that array) * return the values from the values array)

Example:

=SUMPRODUCT((B15:B23="john")*(C15:C23="north")*(E15:E23=1)*D15:D23)

Exercise Workbook:

DOWNLOAD EXCEL WORKBOOK

The SUMPRODUCT function is my favorite Excel function by a stretch! You can create some powerful calculations with the SUMPRODUCT function by creating a criteria for a selected array. For example, you can see how much sales your sales rep did in a particular region and for a particular quarter without having to create a Pivot Table.

It takes some practice to get comfortable with this function but when you master it, it opens up another Excel world!

In our example, we want to get the **total sales of John in the North Region in Q1**:

What is the total sales for JOHN in the NORTH REGION in Q1?

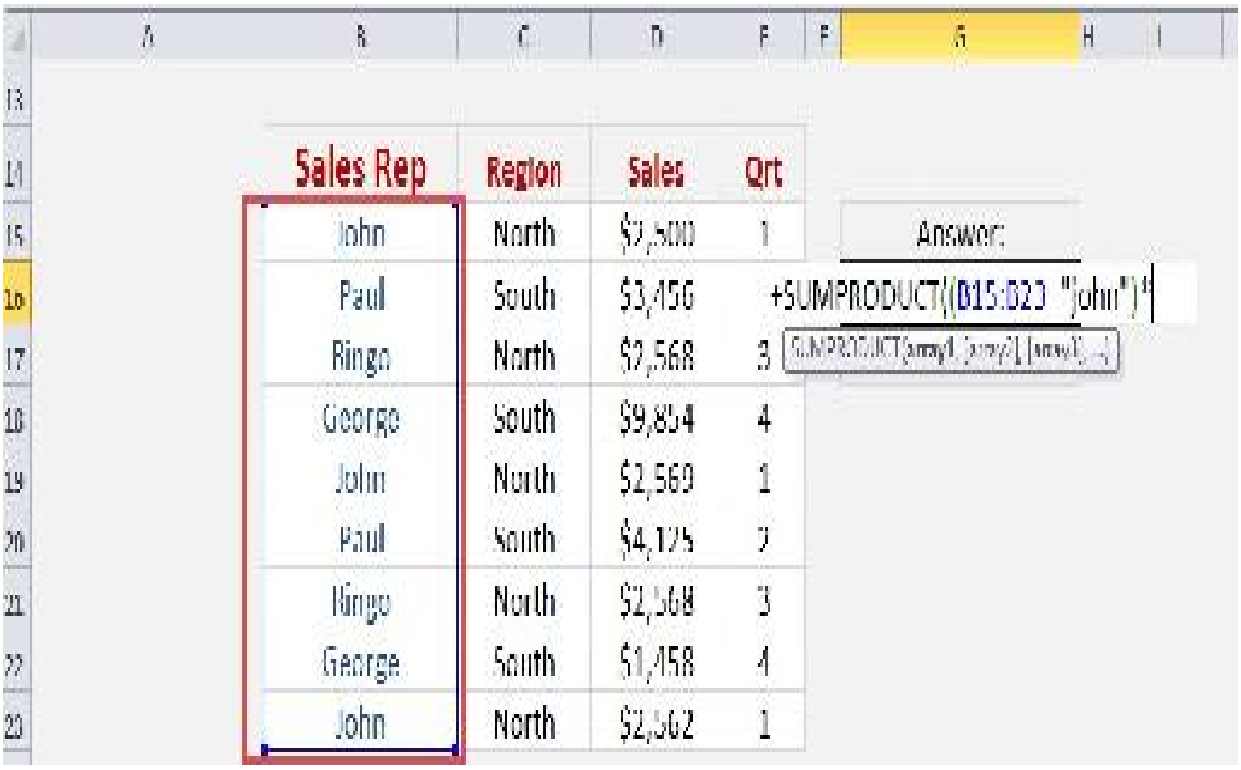
Sales Rep	Region	Sales	Qrt
John	North	$2,500	1
Paul	South	$3,456	2
Ringo	North	$2,568	3
George	South	$9,854	4
John	North	$2,569	1
Paul	South	$4,125	2
Ringo	North	$2,568	3
George	South	$1,458	4
John	North	$2,562	1

STEP 1: We need to **enter the SUMPRODUCT function**:

=SUMPRODUCT(

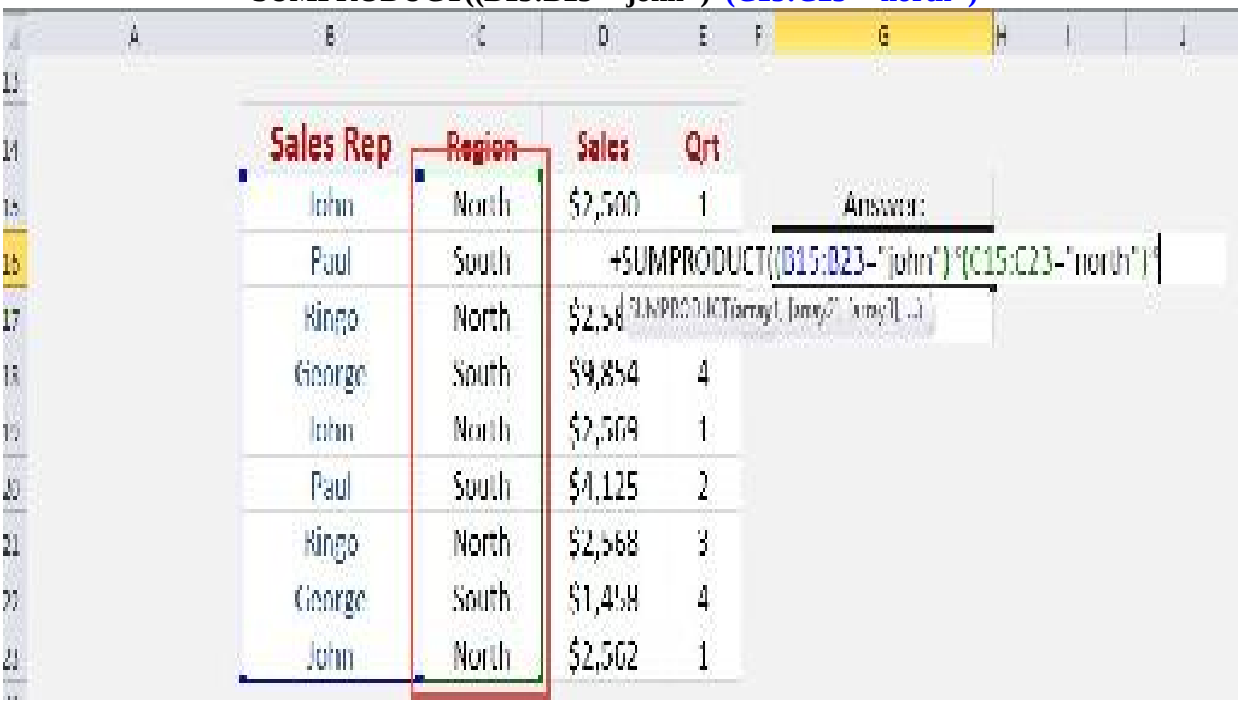
STEP 2: Create the criteria for the **Sales Rep "John"**:

=SUMPRODUCT((B15:B23="john")*



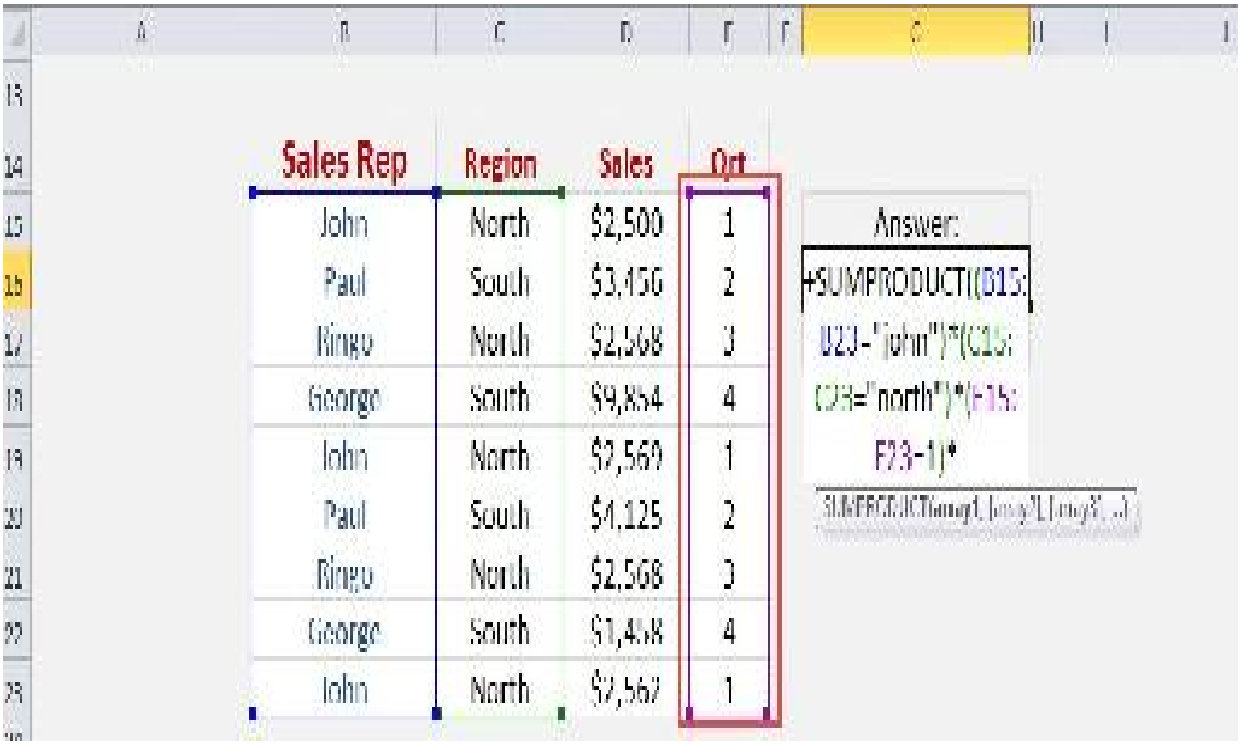
Create the criteria for the **Region "North"**:

=SUMPRODUCT((B15:B23="john")*(C15:C23="north")*



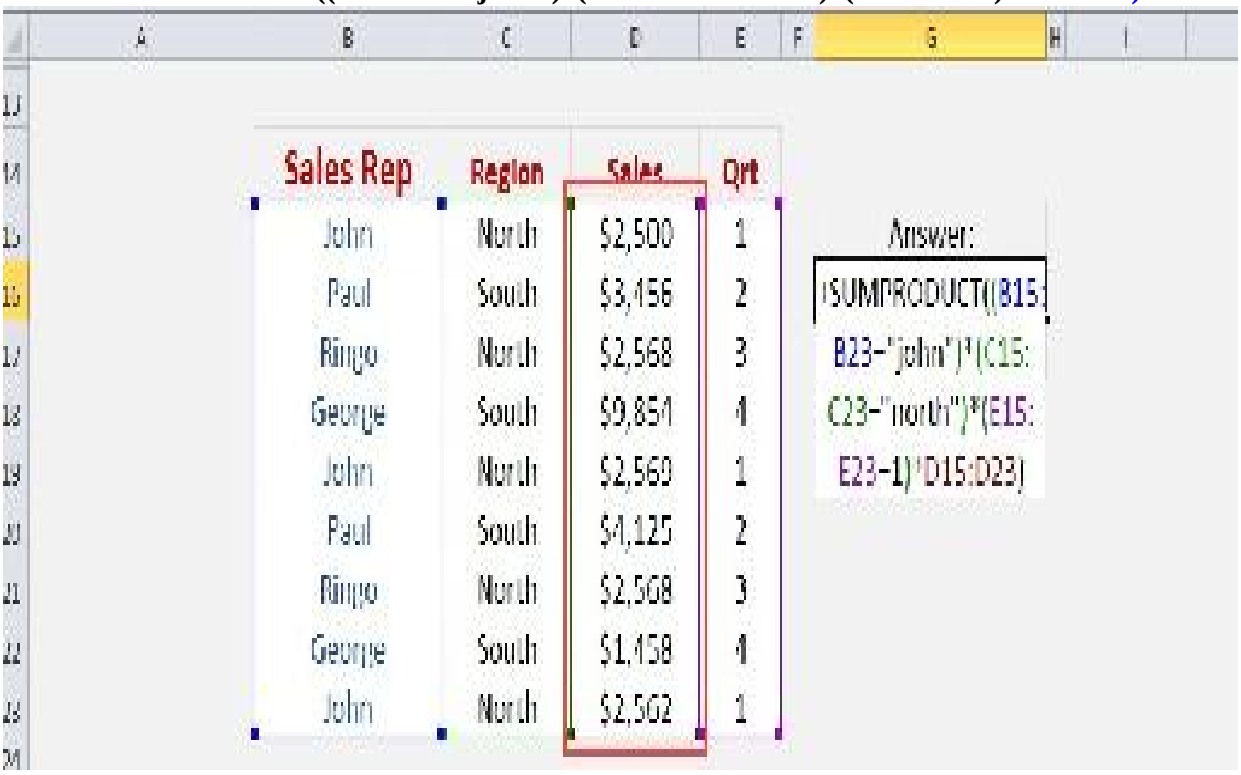
Create the criteria for the **Quarter "1"**:

=SUMPRODUCT((B15:B23="john")*(C15:C23="north")*(E15:E23=1)*



Create the sum array to total the values of the **Sales** column:

=SUMPRODUCT((B15:B23="john")*(C15:C23="north")*(E15:E23=1)*D15:D23)



Once your formula is complete, you can see that it magically calculated the sum of the matching values!

SUMPRODUCT: Sum the Top 3 Sales

What does it do?

It returns the sum of multiple criteria from the corresponding range or array

Formula breakdown:

={SUMPRODUCT(Nested Formula((array 1 criteria) * array values))}

What it means:

={SUMPRODUCT(Return me the largest three values from(Region array) * Sales array)}}

Example:

={SUMPRODUCT(LARGE((C15:C23="north")*(D15:D23),{1,2,3}))}

Exercise Workbook:

DOWNLOAD EXCEL WORKBOOK

This is probably the most advanced level a SUMPRODUCT function can reach and that is by including a nested array formula.

In our example below we want to return the 3 Largest values from the North region and sum them up. As we are asking our formula to perform multiple calculations i.e. *Get the Largest 3 values or large((array,{1,2,3})*, then an array formula is used. So to make this formula work we need to finish it off by pressing CTRL+SHIFT+ENTER

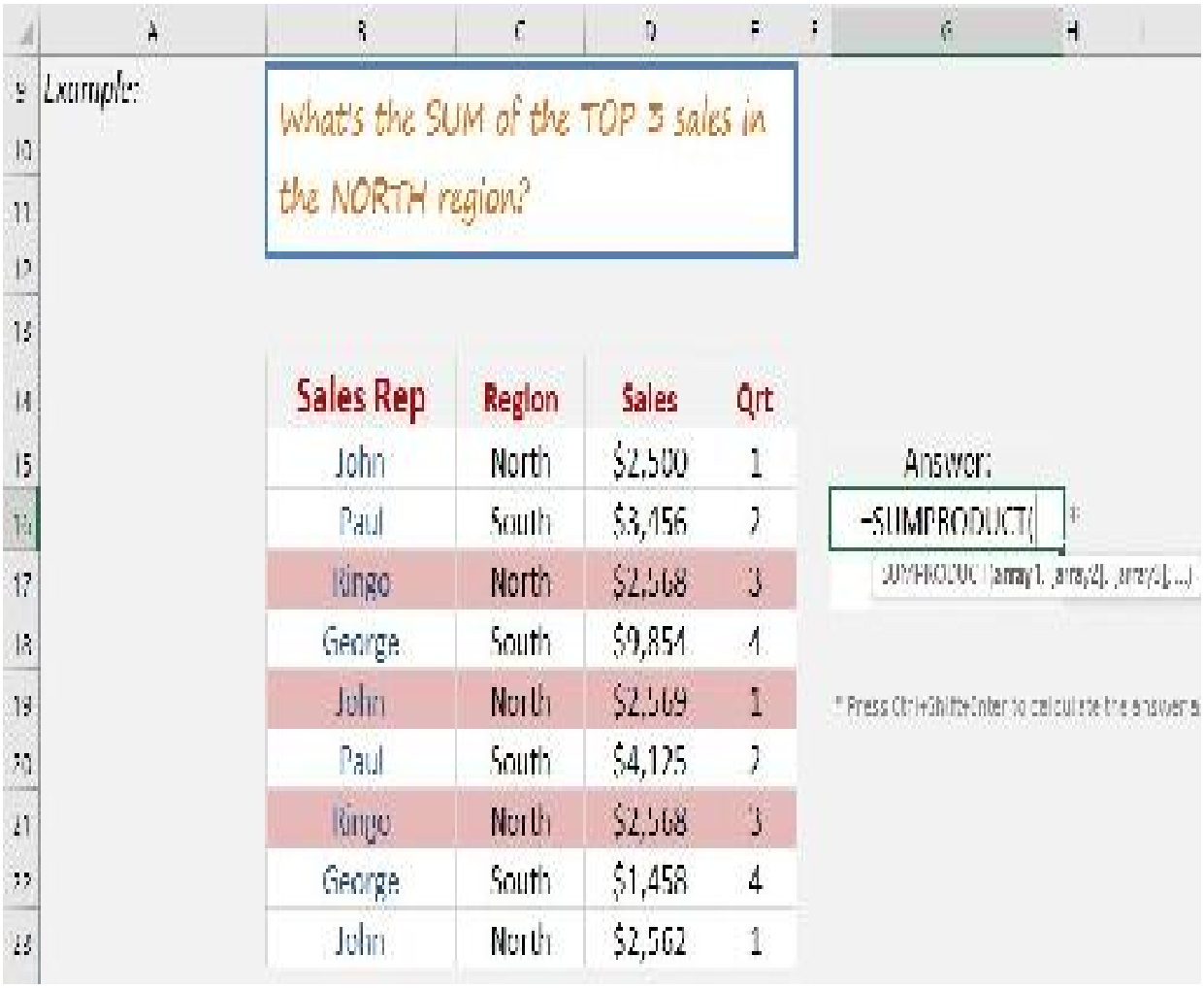
Here is our data set to get the **sum of the top 3 sales in the north region**:

What's the SUM of the TOP 3 sales in the NORTH region?

Sales Rep	Region	Sales	Qrt
John	North	$2,500	1
Paul	South	$3,456	2
Ringo	North	$2,568	3
George	South	$9,854	4
John	North	$2,569	1
Paul	South	$4,125	2
Ringo	North	$2,568	3
George	South	$1,458	4
John	North	$2,562	1

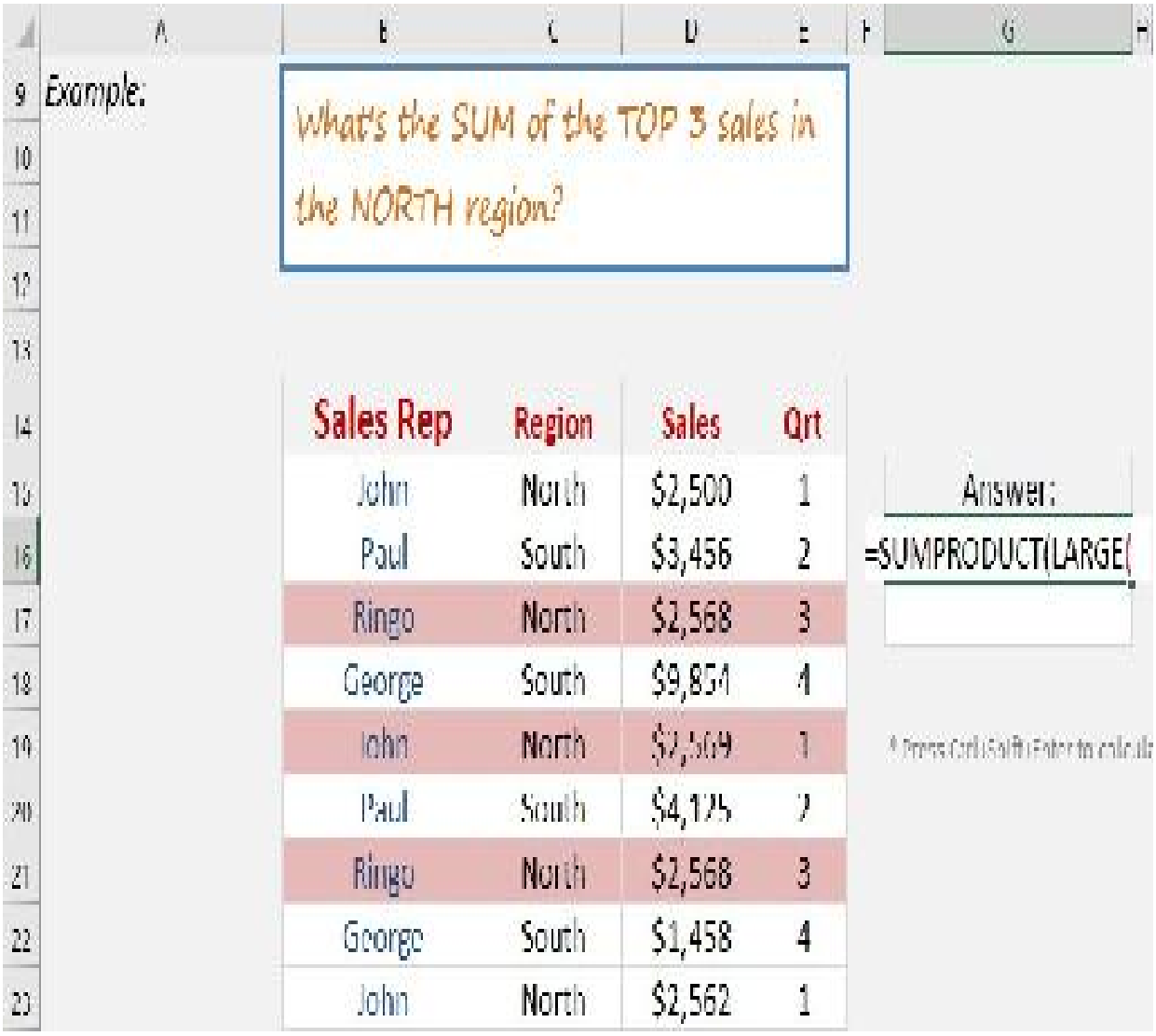
STEP 1: We need to **enter the SUMPRODUCT function**:

=SUMPRODUCT(



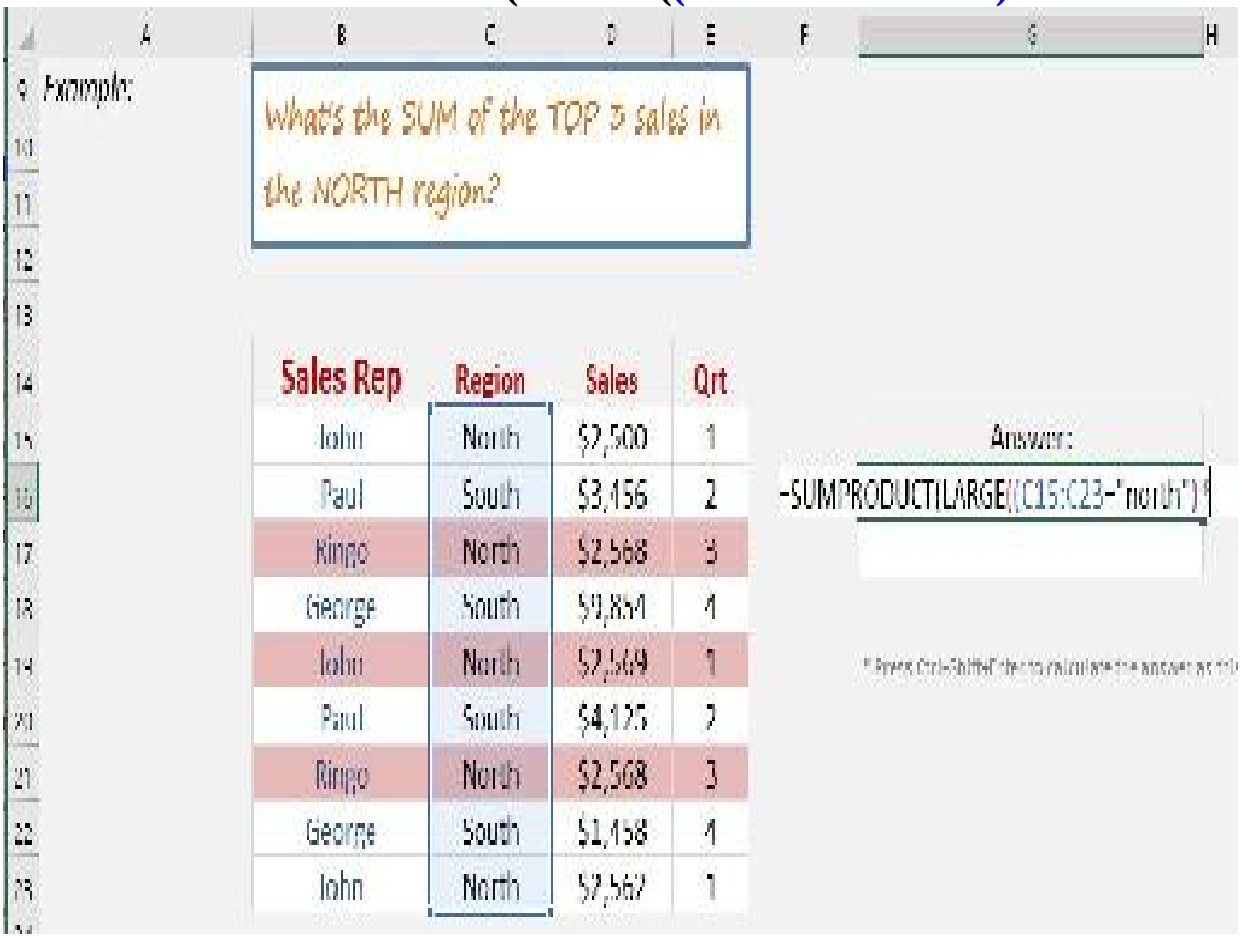
STEP 2: Enter the **LARGE function**:

=SUMPRODUCT(LARGE(



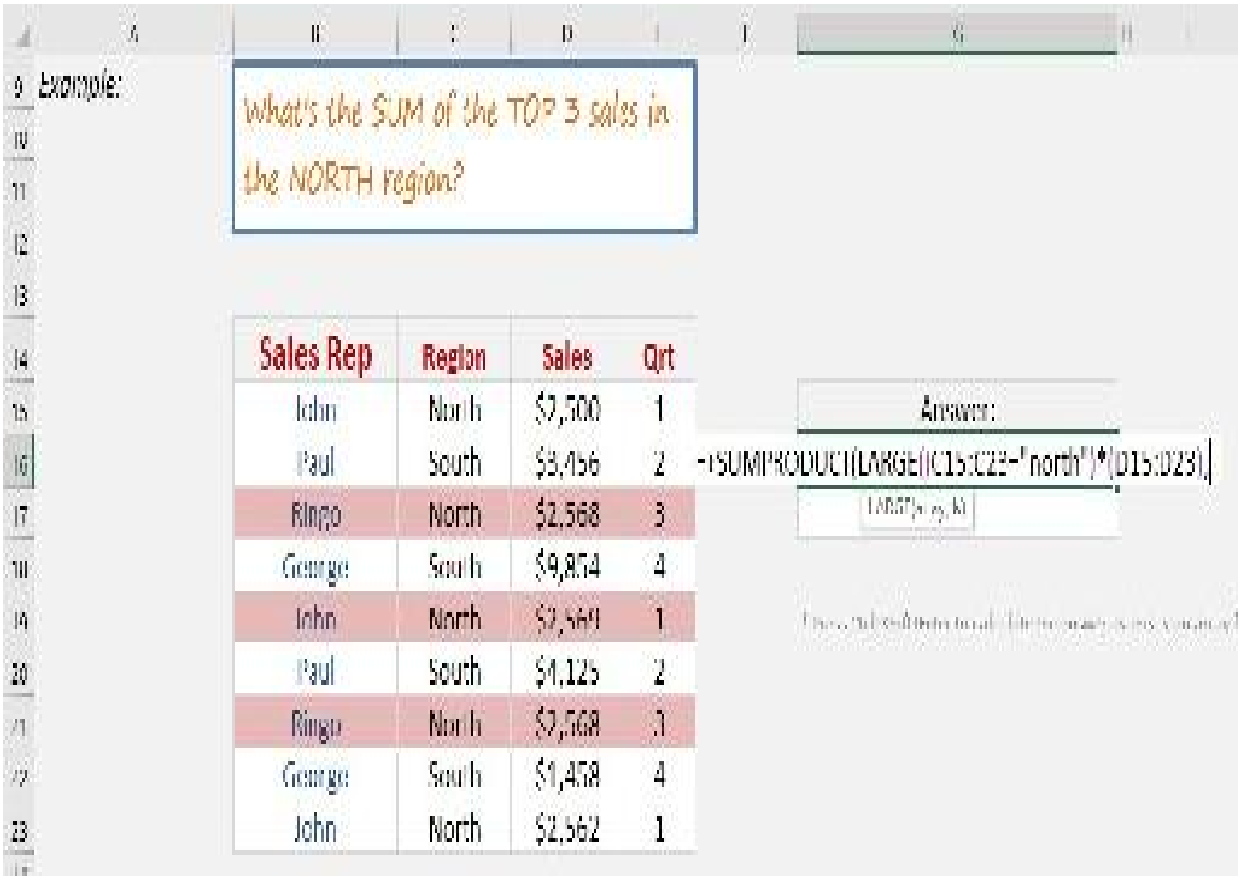
STEP 3: Create the criteria for **Region "North"**:

=SUMPRODUCT(LARGE((C15:C23="north")*



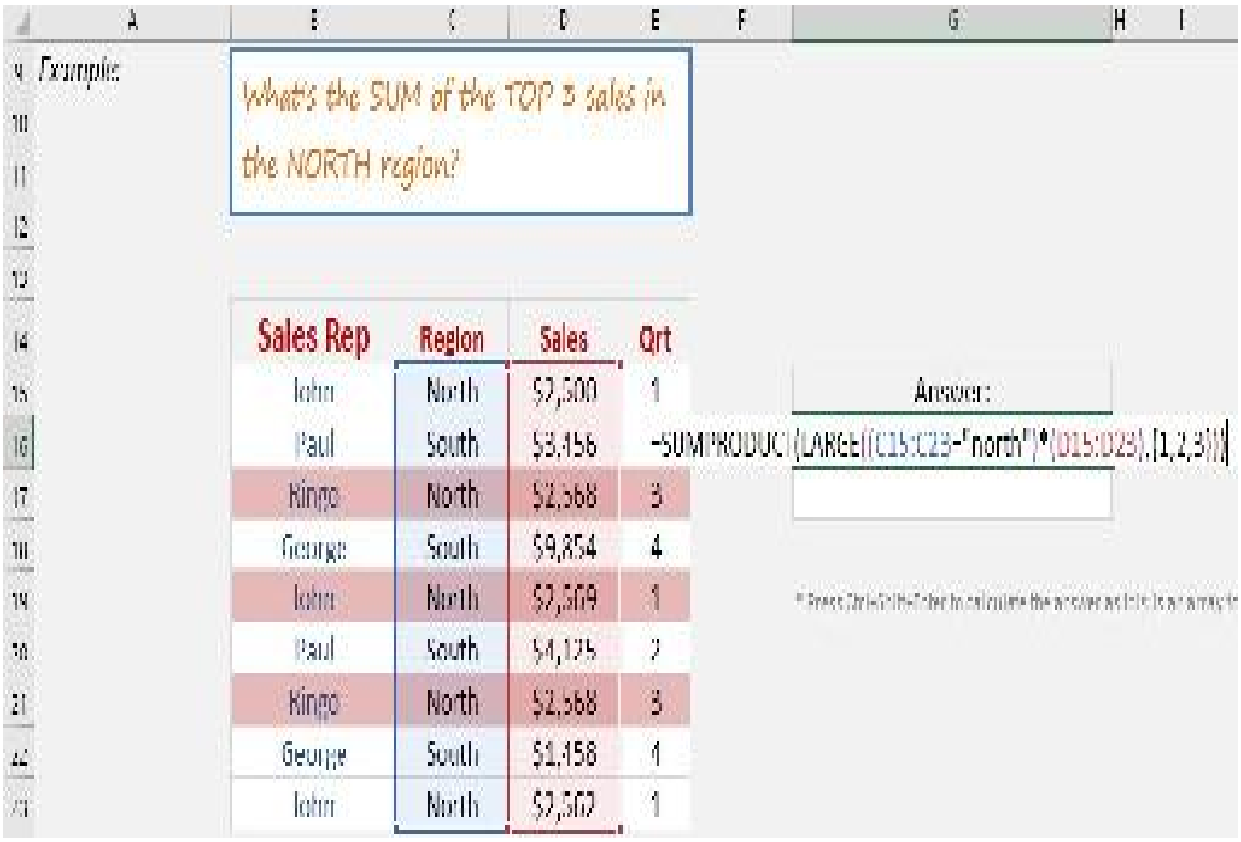
Create the **Sales Array:**

=SUMPRODUCT(LARGE((C15:C23="north")*(D15:D23),



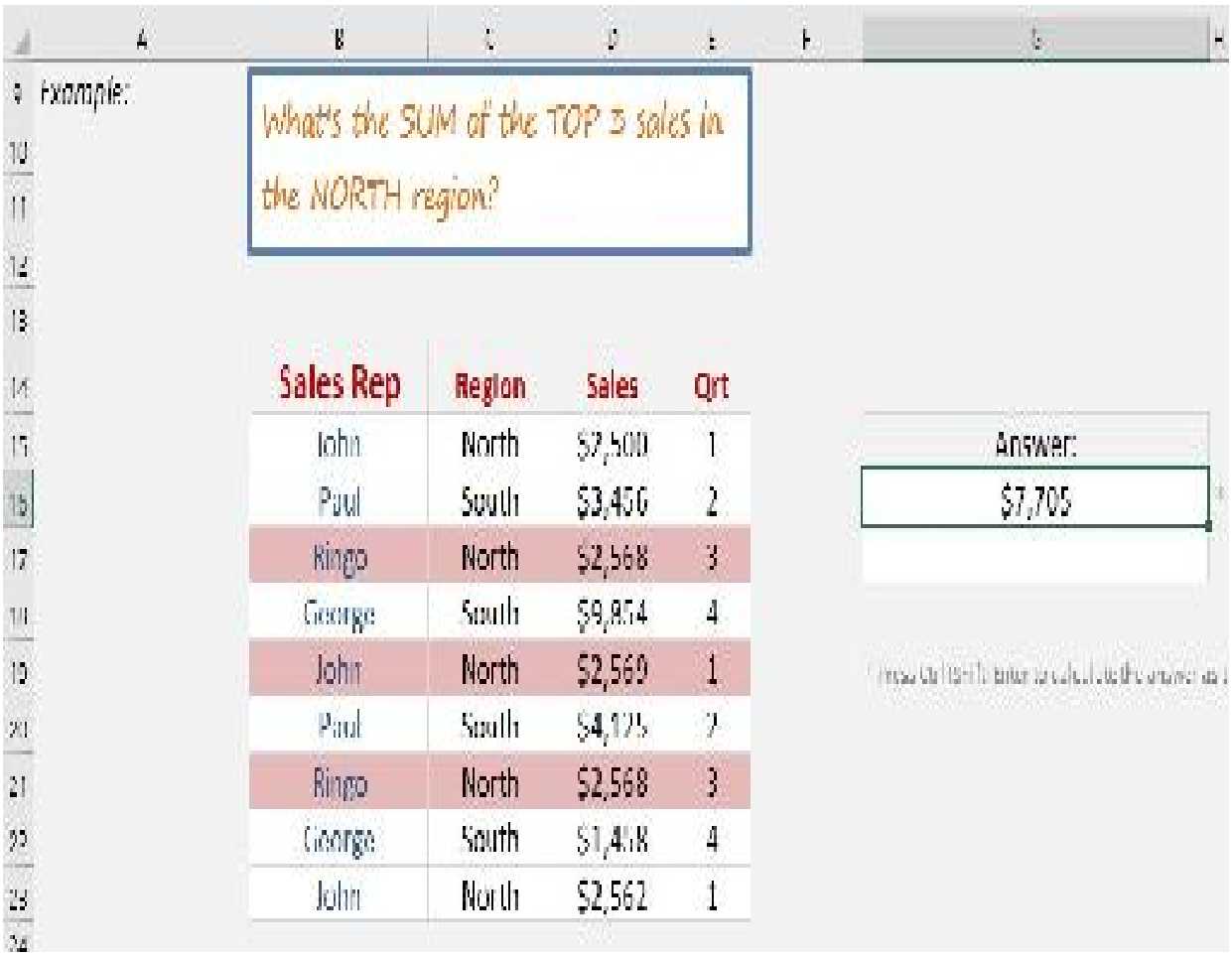
Enter the **Top 3 values {1,2,3}**:

=SUMPRODUCT(LARGE((C15:C23="north")*(D15:D23),{1,2,3}))



STEP 4: Press **CTRL + SHIFT + ENTER** to ensure this gets calculated as an array formula:

={SUMPRODUCT(LARGE((C15:C23="north")*(D15:D23),{1,2,3}))}



You now have the sum of the top 3 sales in the North region!

TIME – Get Elapsed Time

What does it do?

Converts a formula to text and lets you specify the display formatting by using special format strings

Formula breakdown:

=TEXT(value1 - value2, format text)

What it means:

=TEXT(formula, a text string enclosed in quotation marks)

Example:

=TEXT("1/25/2015 8:18:00 PM"-"1/24/2015 7:48:00 PM","[h]:mm")

="24:30"

Exercise Workbook:

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When you have two points in time and you want to calculate the amount of time elapsed, then you will need to use Excel´s TEXT function

Sometimes data gets dumped into Excel with the following date & time format:

24/01/2015 19:48:00.

Using the **TEXT** function and entering a special text string can give you the time elapsed in Days, Hours, Minutes and Hours & Minutes.

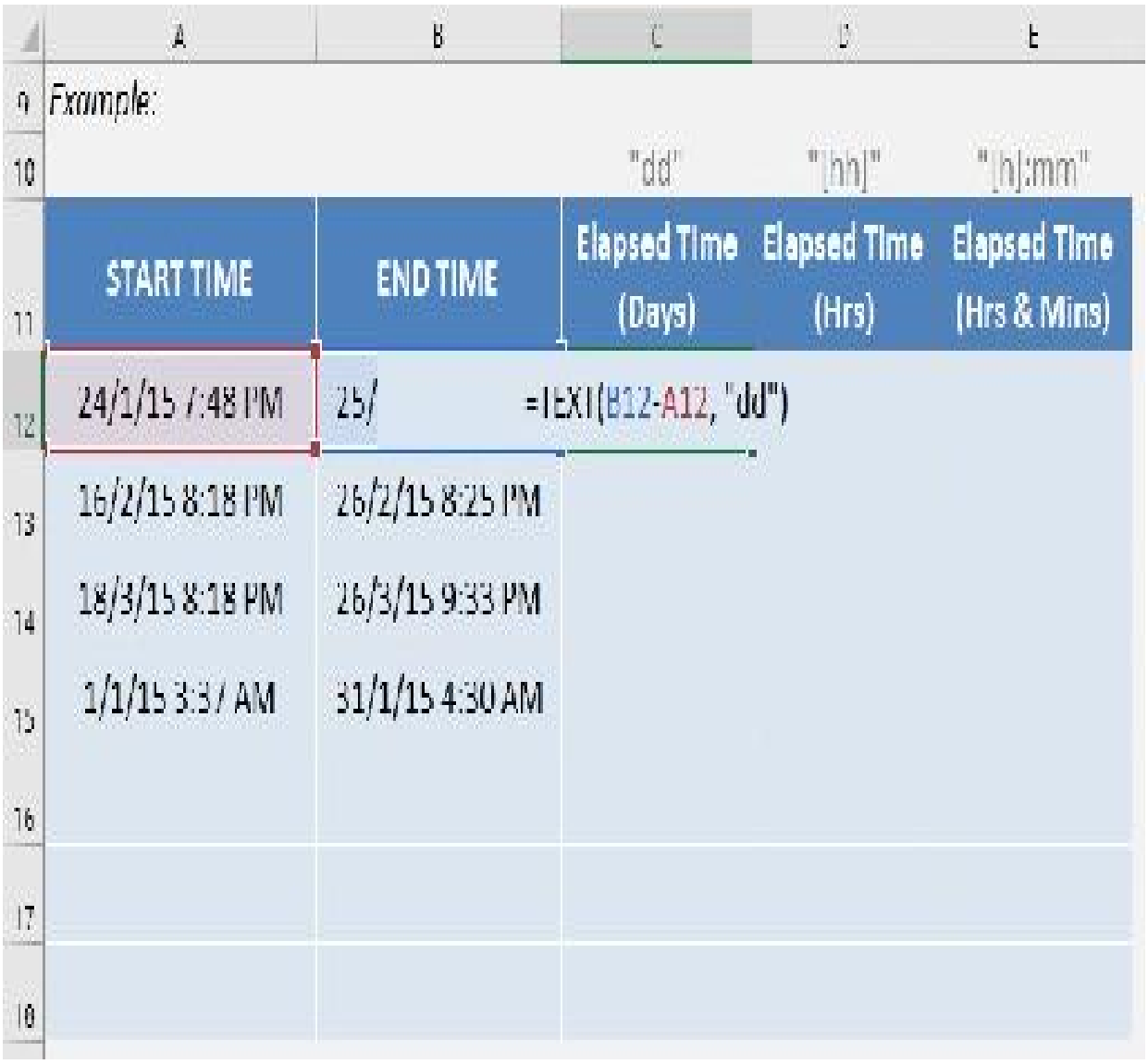
See below how easy this is to implement.

STEP 1: Enter the following to get the elapsed time in days:

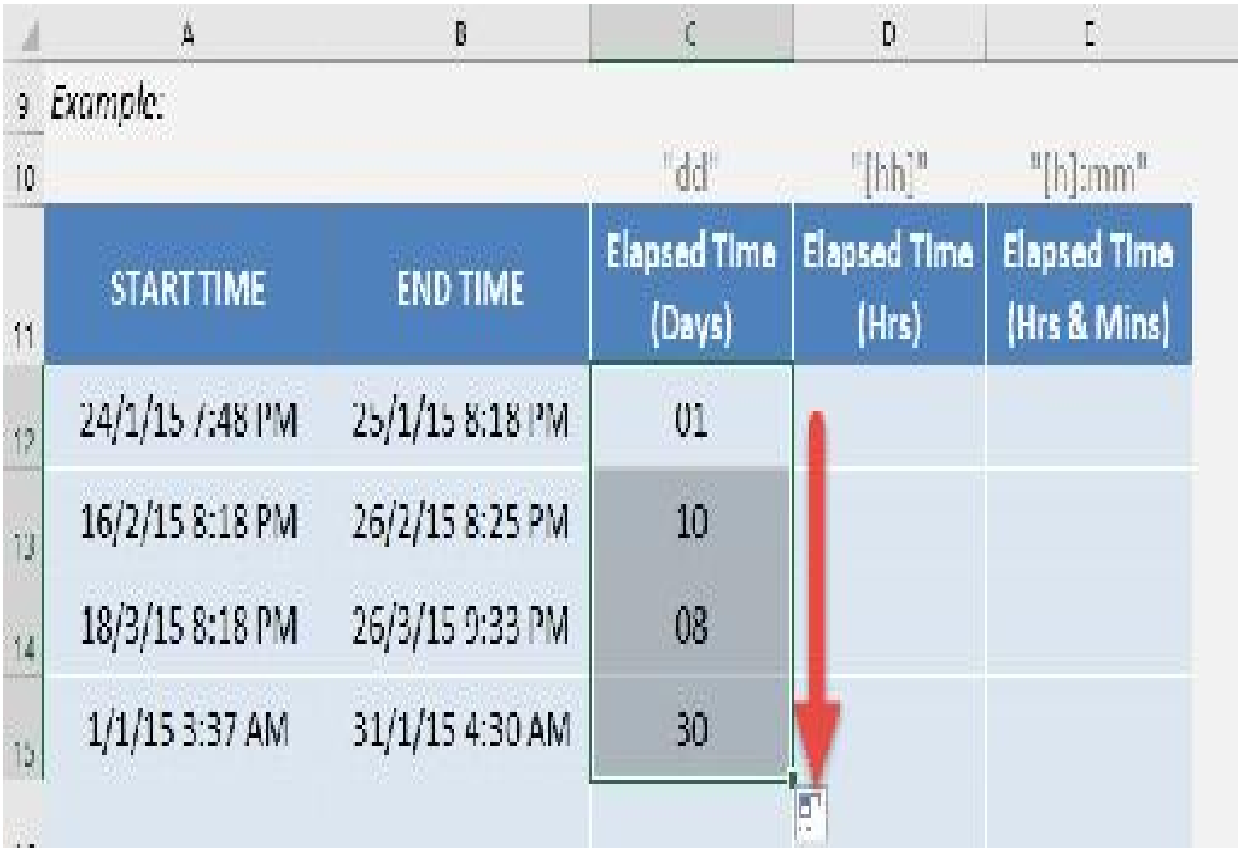
We need to enter the **TEXT** function in a blank cell:

=TEXT(B12-A12, "dd")

value1 is the **end date time**
value2 is the **start date time**
format text is "**dd**" which signifies **days**



STEP 2: Apply the same formula to the rest of the cells by dragging the lower right corner downwards.



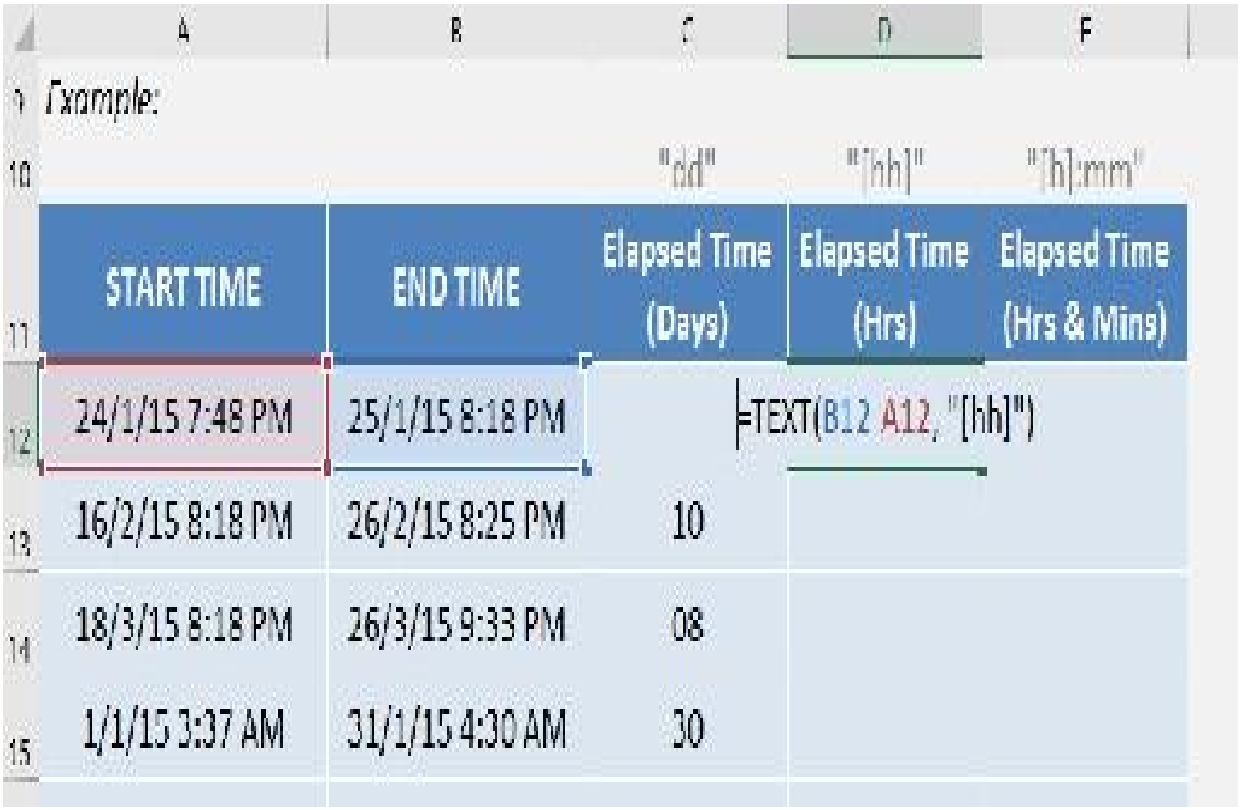
	A	B	C	D	E
9	Example:				
10			"dd"	"[hh]"	"[h]:mm"
11	START TIME	END TIME	Elapsed Time (Days)	Elapsed Time (Hrs)	Elapsed Time (Hrs & Mins)
12	24/1/15 7:48 PM	25/1/15 8:18 PM	01		
13	16/2/15 8:18 PM	26/2/15 8:25 PM	10		
14	18/3/15 8:18 PM	26/3/15 9:33 PM	08		
15	1/1/15 3:37 AM	31/1/15 4:30 AM	30		

STEP 3: Enter the following to get the elapsed time in hours:

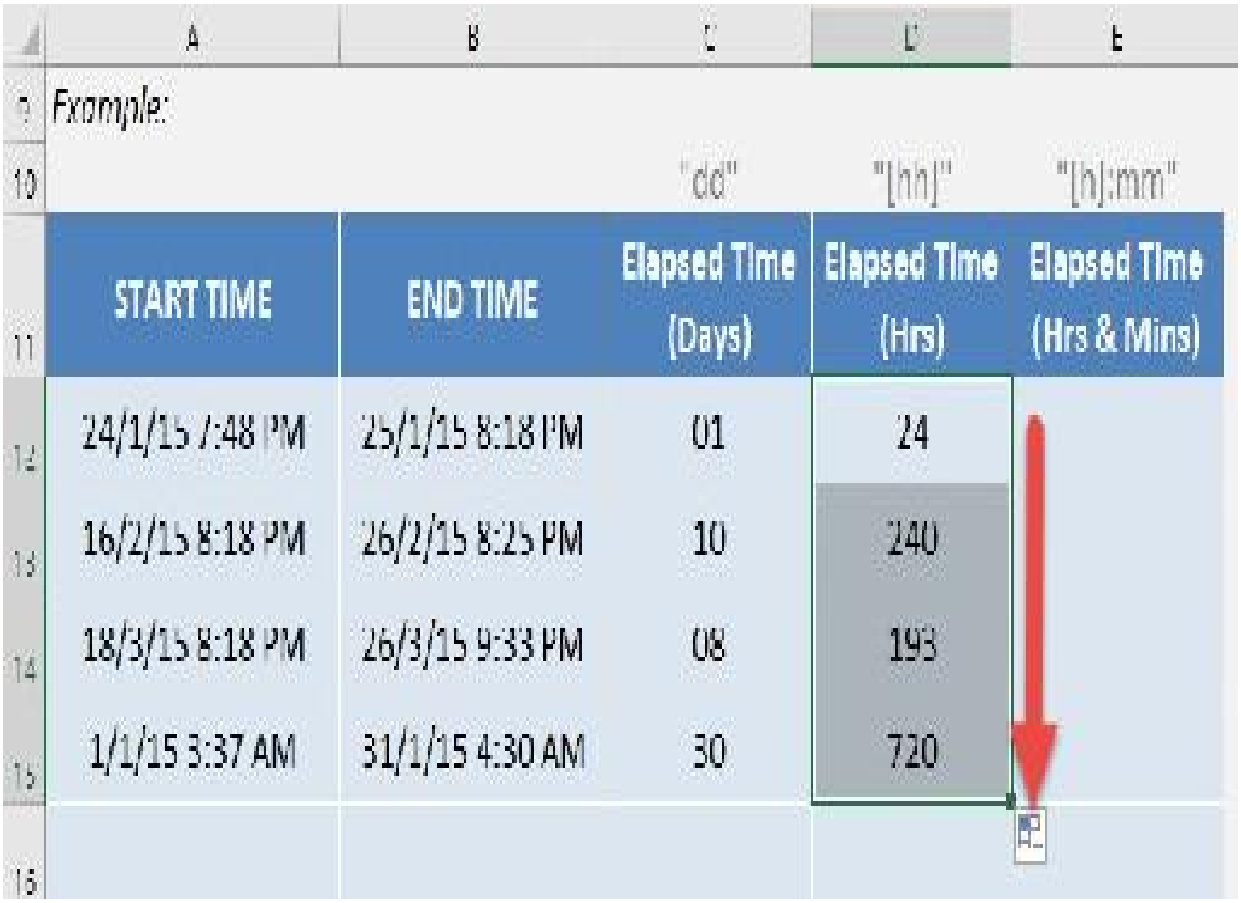
We need to enter the **TEXT** function in a blank cell:

=TEXT(B12-A12, "[hh]")

value1 is the **end date time**
value2 is the **start date time**
format text is "**[hh]**" which signifies **hours**



STEP 4: Apply the same formula to the rest of the cells by dragging the lower right corner downwards.



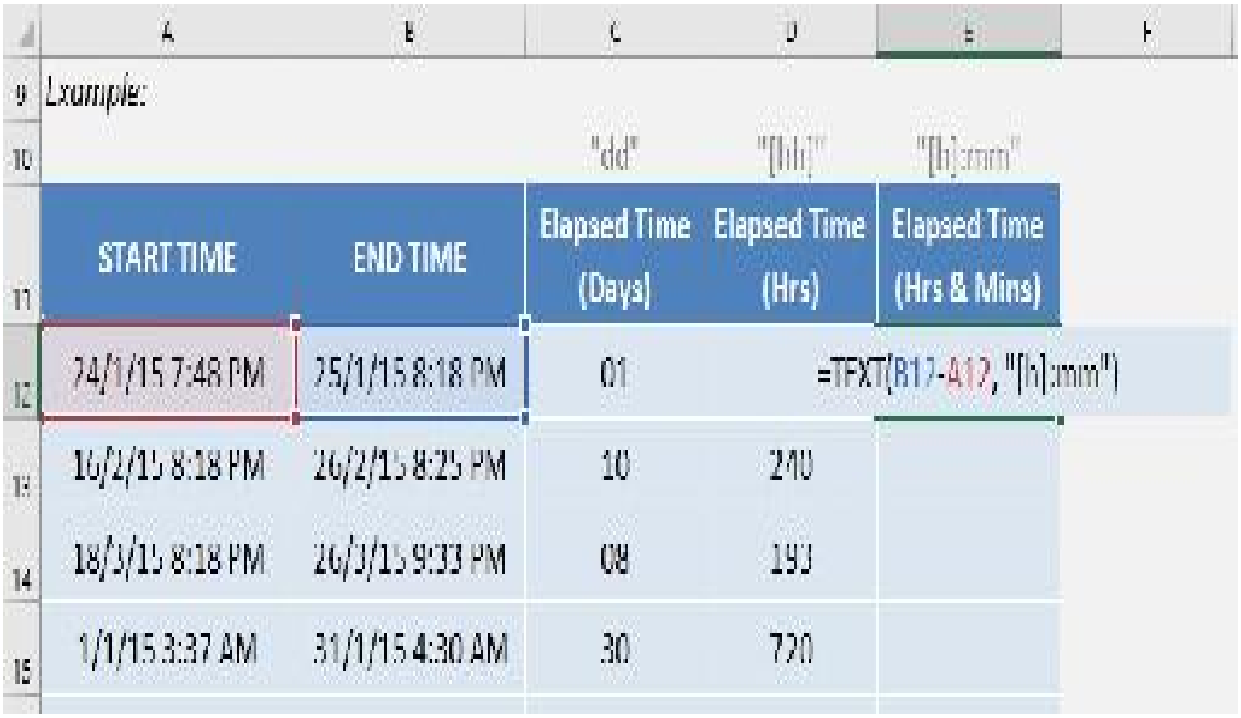
	A	B	C	D	E
9	Example:				
10			"dd"	"[hh]"	"[h]:mm"
11	START TIME	END TIME	Elapsed Time (Days)	Elapsed Time (Hrs)	Elapsed Time (Hrs & Mins)
12	24/1/15 7:48 PM	25/1/15 8:18 PM	01	24	
13	16/2/15 8:18 PM	26/2/15 8:25 PM	10	240	
14	18/3/15 8:18 PM	26/3/15 9:33 PM	08	193	
15	1/1/15 3:37 AM	31/1/15 4:30 AM	30	720	
16					

STEP 5: Enter the following to get the elapsed time in hours and minutes:

We need to enter the **TEXT** function in a blank cell:

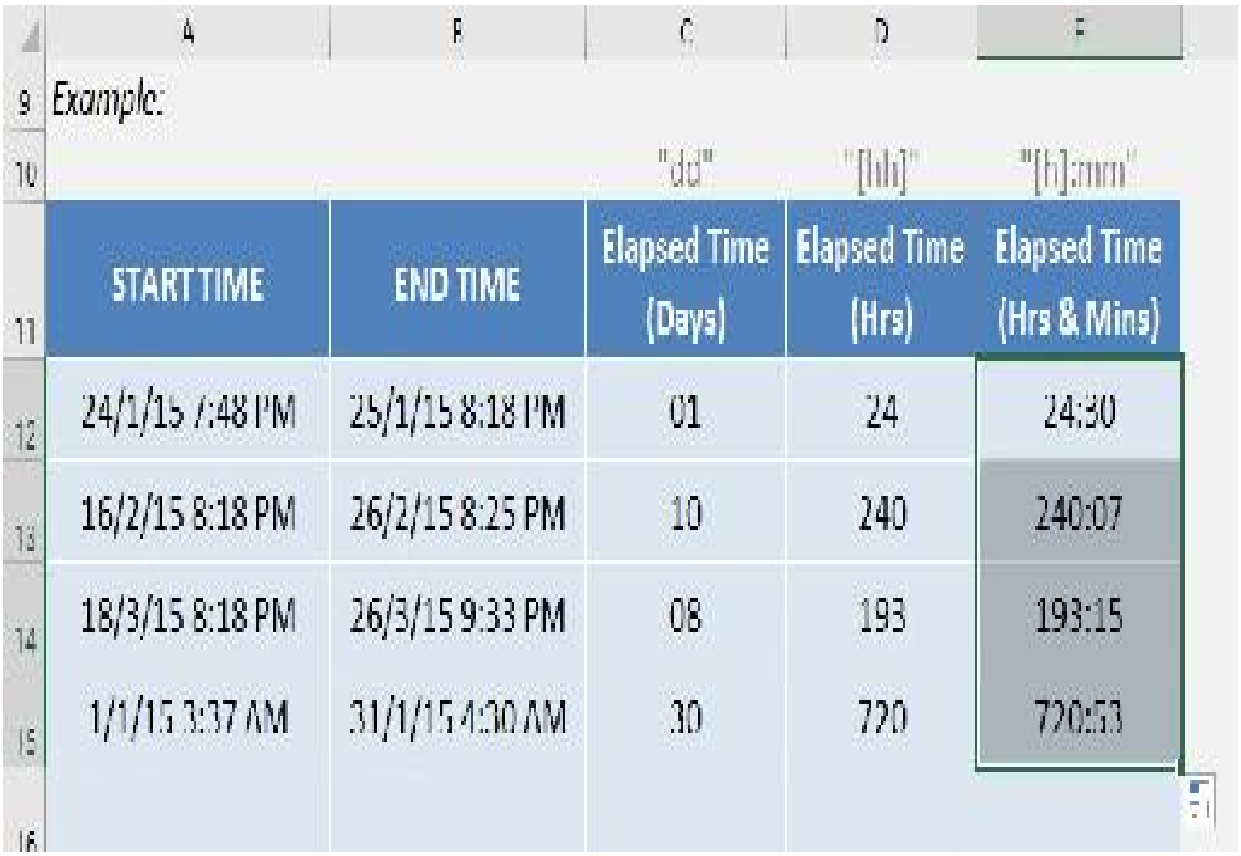
=TEXT(B12-A12, "[h]:mm")

value1 is the **end date time**
value2 is the **start date time**
format text is "**[h]:mm**" which signifies **hours and minutes**



	A	B	C	D	E	F
9	*Example:*					
10			"dd"	"[hh]"	"[h]:mm"	
11	START TIME	END TIME	Elapsed Time (Days)	Elapsed Time (Hrs)	Elapsed Time (Hrs & Mins)	
12	24/1/15 7:48 PM	25/1/15 8:18 PM	01		=TEXT(R12-A12,"[h]:mm")	
13	16/2/15 8:18 PM	26/2/15 8:25 PM	10	240		
14	18/3/15 8:18 PM	26/3/15 9:33 PM	08	193		
15	1/1/15 3:37 AM	31/1/15 4:30 AM	30	720		

STEP 6: Apply the same formula to the rest of the cells by dragging the lower right corner downwards. And your elapsed time results are all ready!



	A	B	C	D	E
9	*Example:*				
10			"dd"	"[hh]"	"[h]:mm"
11	START TIME	END TIME	Elapsed Time (Days)	Elapsed Time (Hrs)	Elapsed Time (Hrs & Mins)
12	24/1/15 7:48 PM	25/1/15 8:18 PM	01	24	24:30
13	16/2/15 8:18 PM	26/2/15 8:25 PM	10	240	240:07
14	18/3/15 8:18 PM	26/3/15 9:33 PM	08	193	193:15
15	1/1/15 3:37 AM	31/1/15 4:30 AM	30	720	720:53
16					

TRANSPOSE

What does it do?

Converts a vertical range of cells to horizontal, or vice versa

Formula breakdown:

=TRANSPOSE(array)

What it means:

=TRANSPOSE(the horizontal or vertical range of cells that you want to flip the orientation)

Example:

{=TRANSPOSE(A9:B13)}

Exercise Workbook:

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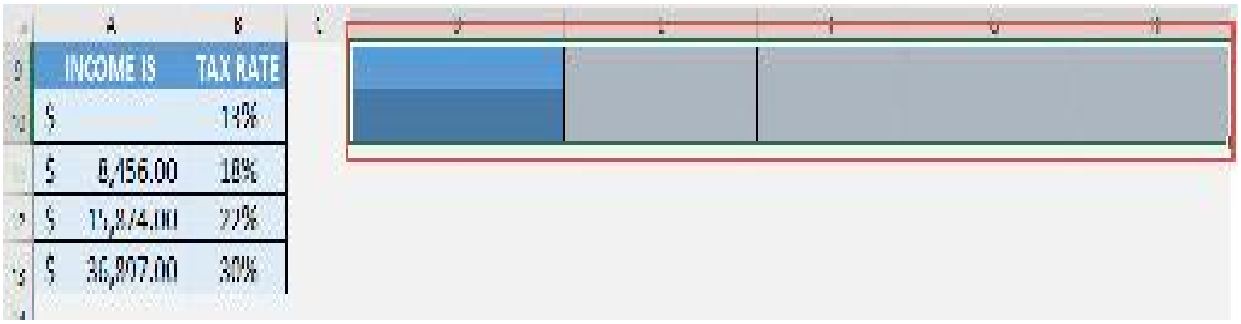
Let us say you have a horizontal table, and you want to flip it to become a vertical table, did you know that there is an Excel formula that can do that for you? That's right, let us use the **TRANSPOSE Formula!**

Whenever you use this function, you should treat it as an **array formula** and it is very easy to do! You can use this to transform your horizontal table to a vertical table, or the other way around from a vertical table to a horizontal one.

I explain how you can do this below:

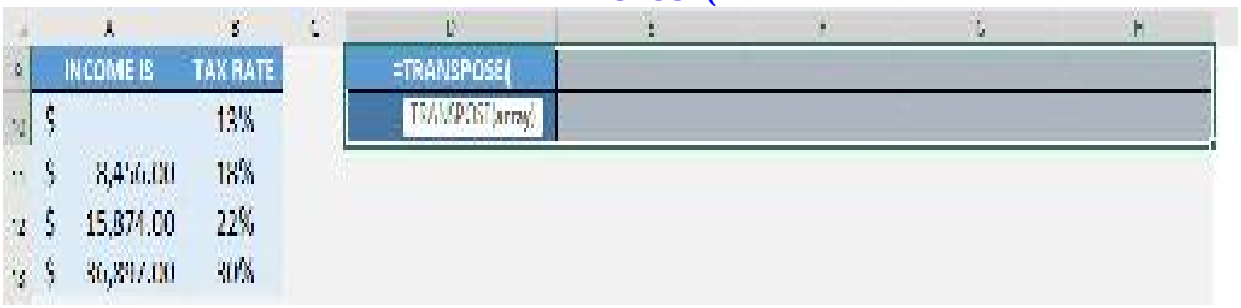
STEP 1: Make sure to select your target table first with the same number of cells.

You can see we have selected a **horizontal table** that has the same number of cells (5 by 2) when compared to the original **vertical table** (2 by 5):



While it is selected, we need to **enter the *TRANSPOSE* function**:

=TRANSPOSE(



STEP 2: The **TRANSPOSE** arguments:

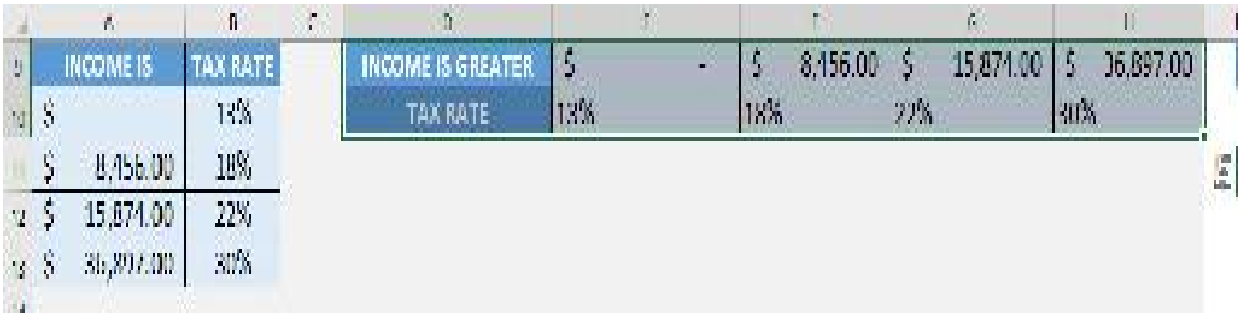
array

What is the range of cells that contains the data?

Select the cells containing the data that you want to flip the orientation:

=TRANSPOSE(A9:B13)

STEP 3: Once you finish typing the formula, ensure you press **CTRL + SHIFT + ENTER** for this to be treated as an **array formula:**



Your table now has a horizontal orientation with just the **TRANSPOSE Formula**!

VLOOKUP Approximate Match

What does it do?

Searches for an approximate value in the first column of a table array and returns a value in the same row from another column (to the right) in the table array.

Formula breakdown:

=VLOOKUP(lookup_value, table_array, col_index_num, [range_lookup])

What it means:

=VLOOKUP(this value, in this list, and get me value in this column, Approximate Match/TRUE/1])

Example:

=VLOOKUP(8500,Tax_Rate,2,TRUE)

Exercise Workbook:

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The VLOOKUP Function in Excel is great when you want to find an exact match in your data table but what happens if you want to find an approximate match?

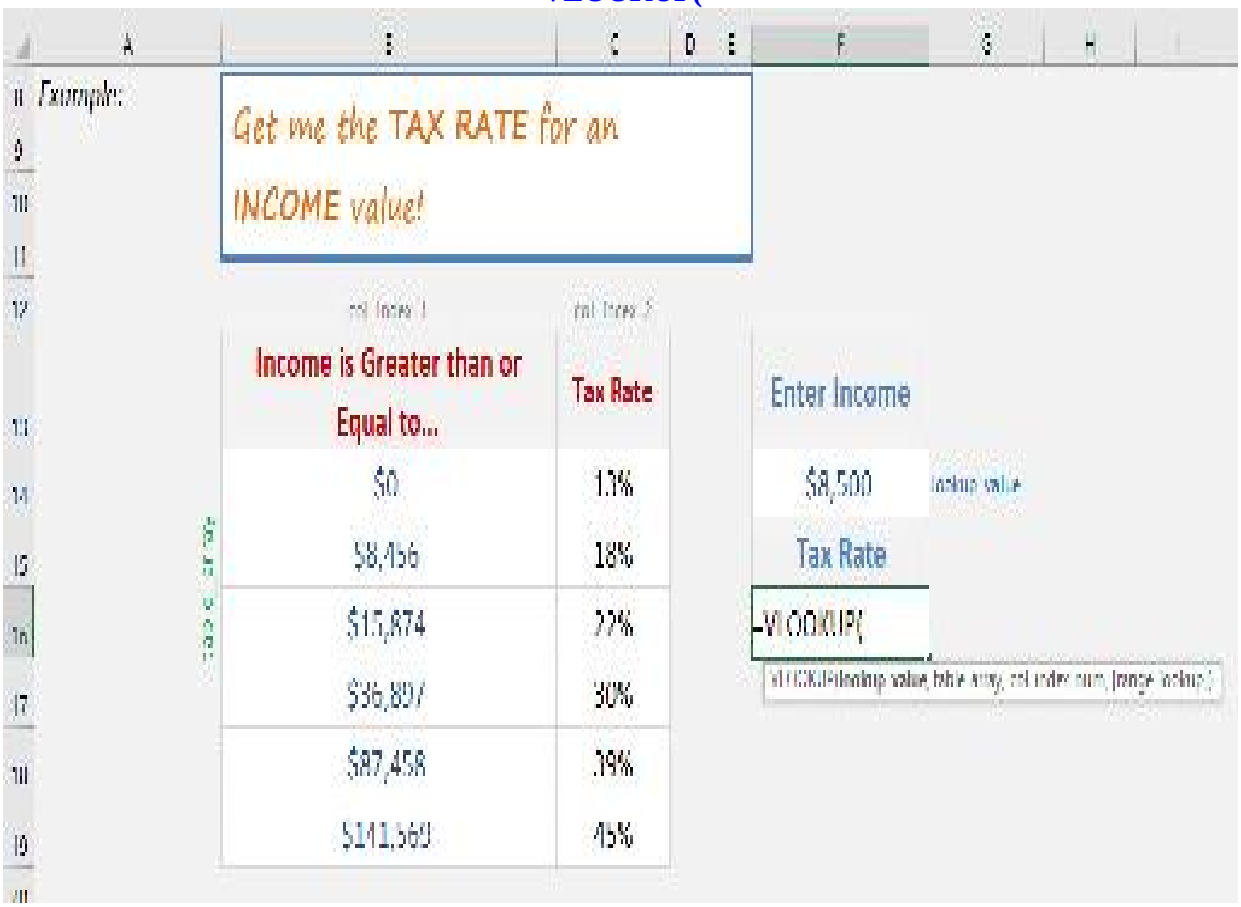
Approximate matches are used when you have an ascending table like ***Commission Bonus Rates*** or ***Income Tax Rates***.

IMPORTANT: ***For the Vlookup Approximate Match to work in Excel, the table_array has to be sorted in ascending order!***

So the way that this formula works is that it looks at the first value in the ***Table_Array*** that is greater than the ***Lookup_Value*** and then goes back one value.

STEP 1: We need to enter the **VLOOKUP function** in a blank cell:

=VLOOKUP(



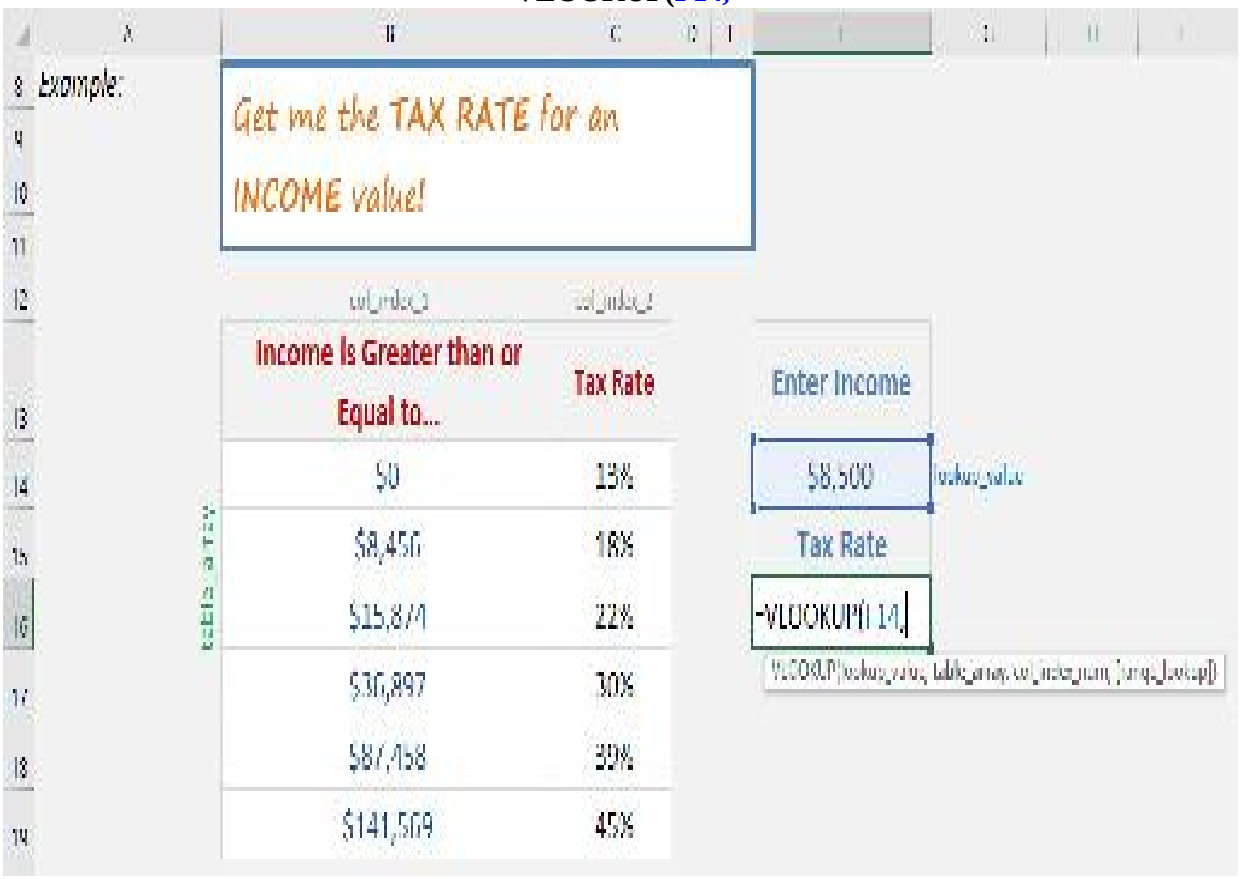
STEP 2: The **VLOOKUP** arguments:

lookup_value

What is the value to be looked up?

Select the cell that contains the income as the lookup value.

=VLOOKUP(F14,

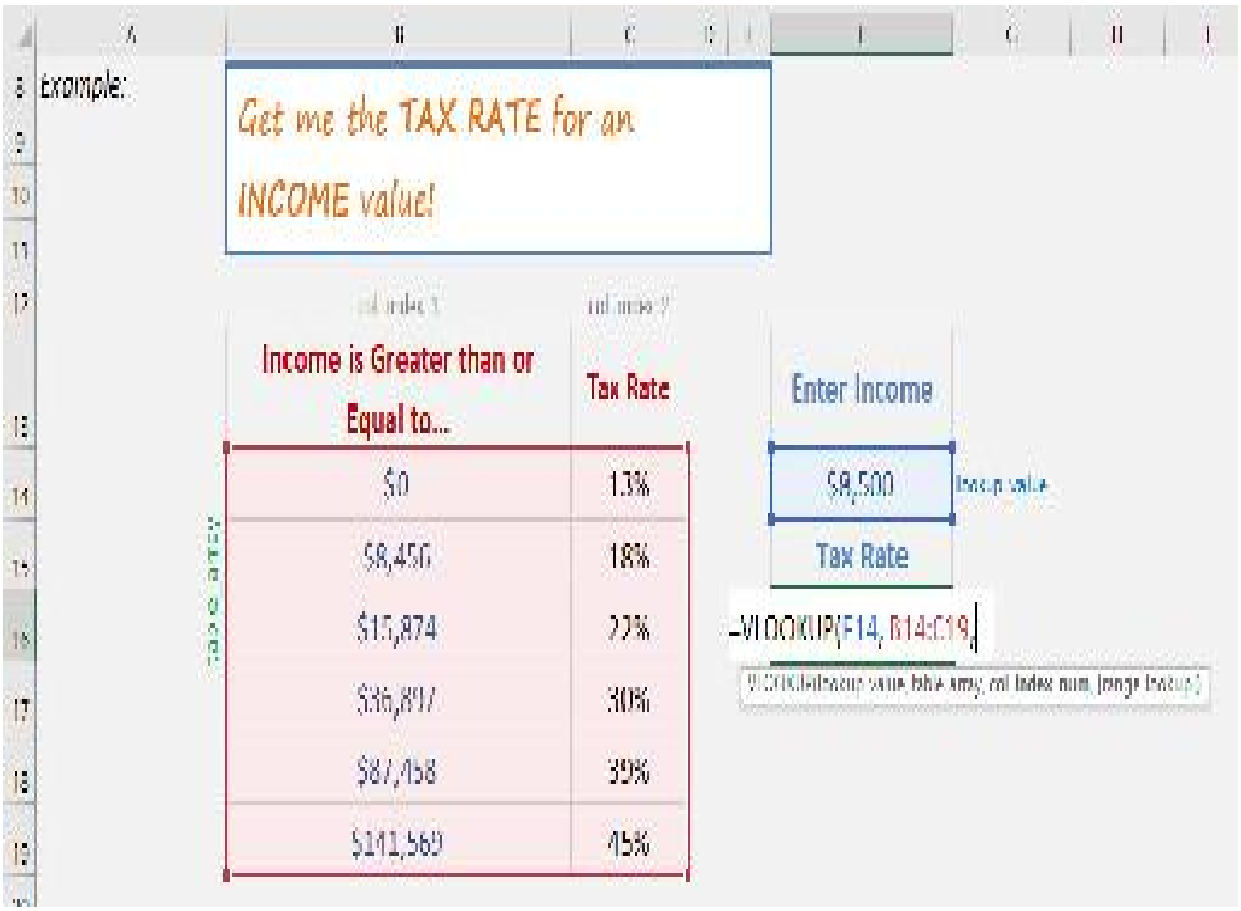


table_array

Where is the list of data?

Select the tax table, as that is where our formula is going to get the tax rate.

=VLOOKUP(F14, B14:C19,

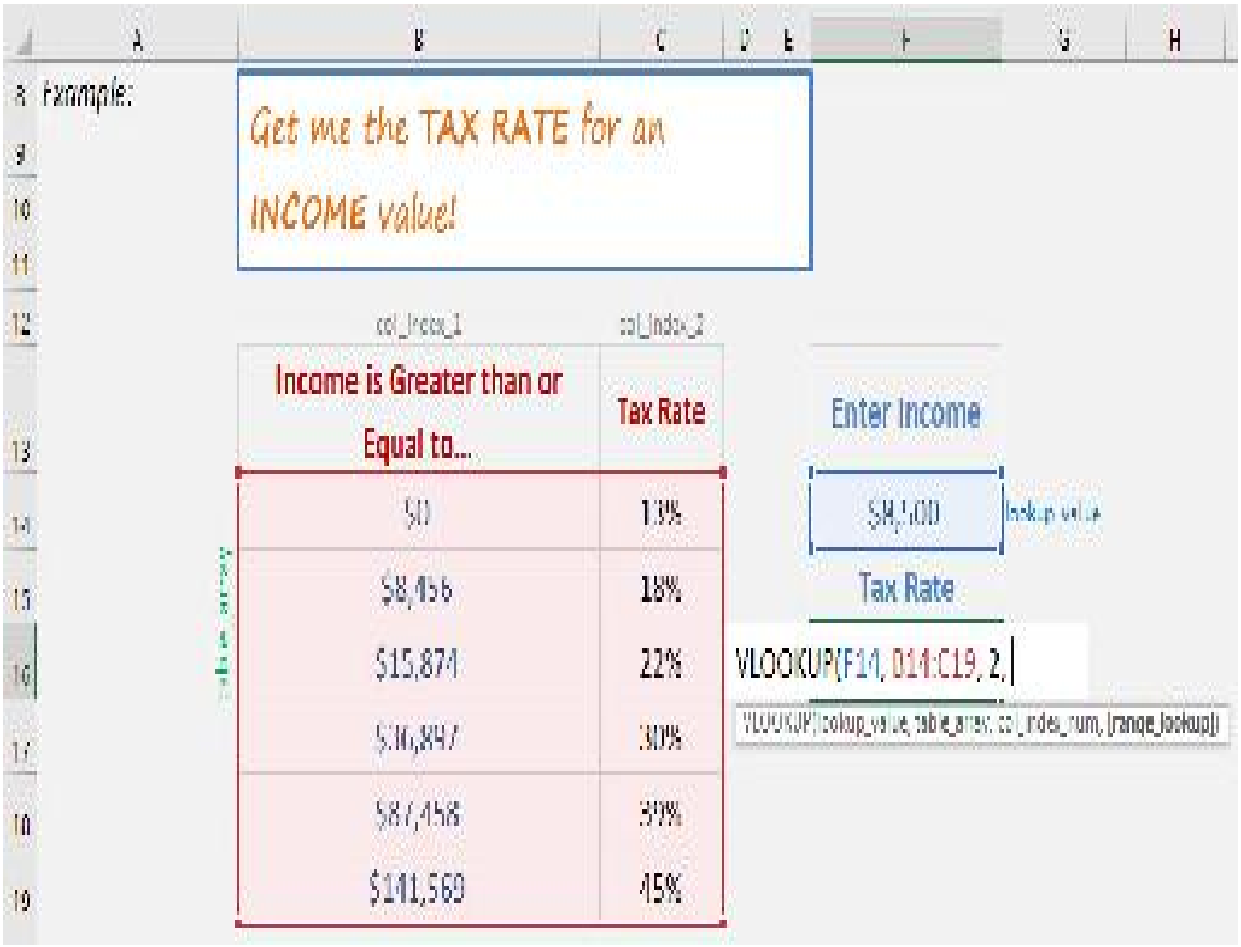


col_index_num

Which column in the table_array contains the data you want to return?

We want the tax rate which is the second column.

=VLOOKUP(F14, B14:C19, 2,

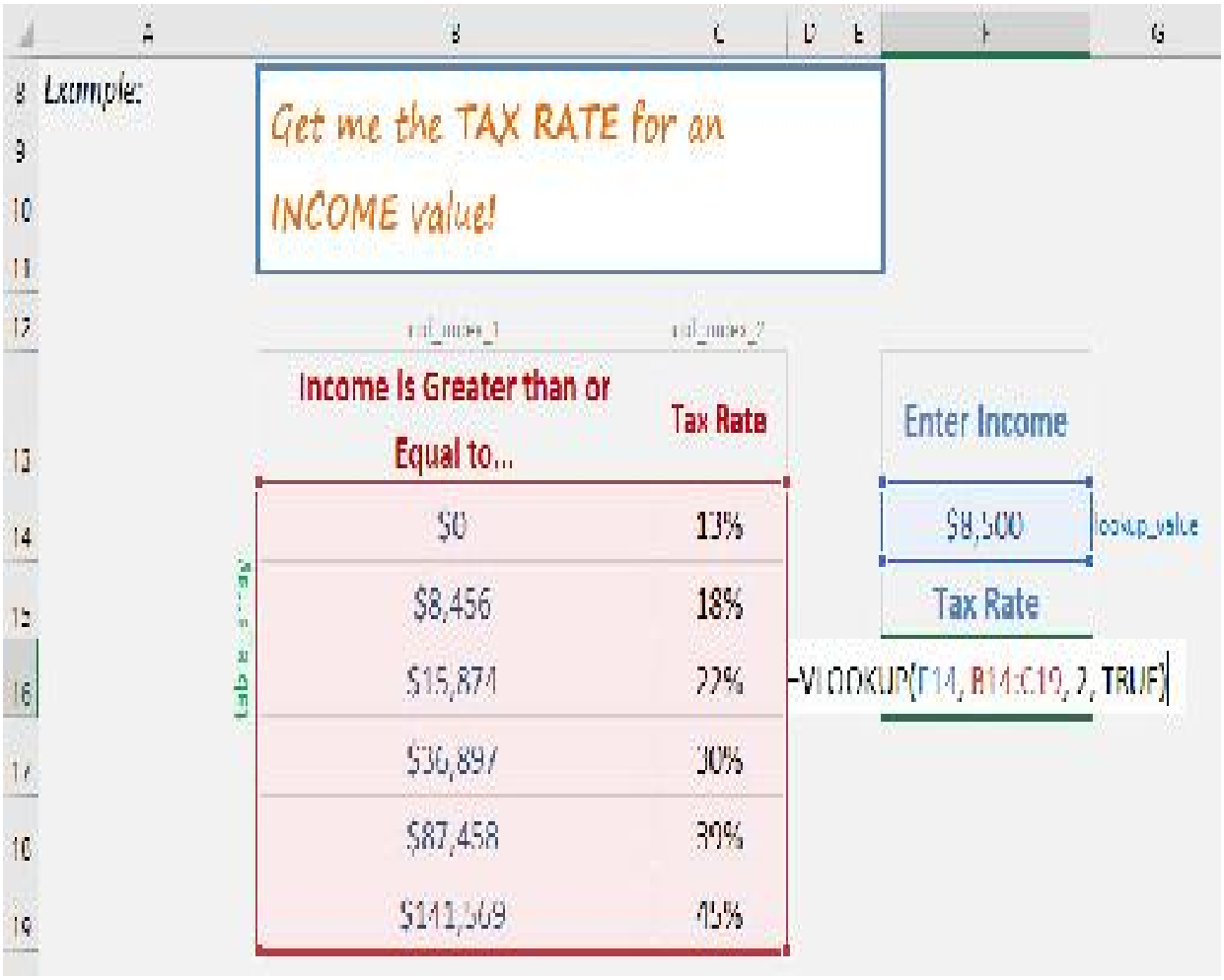


[range_lookup]

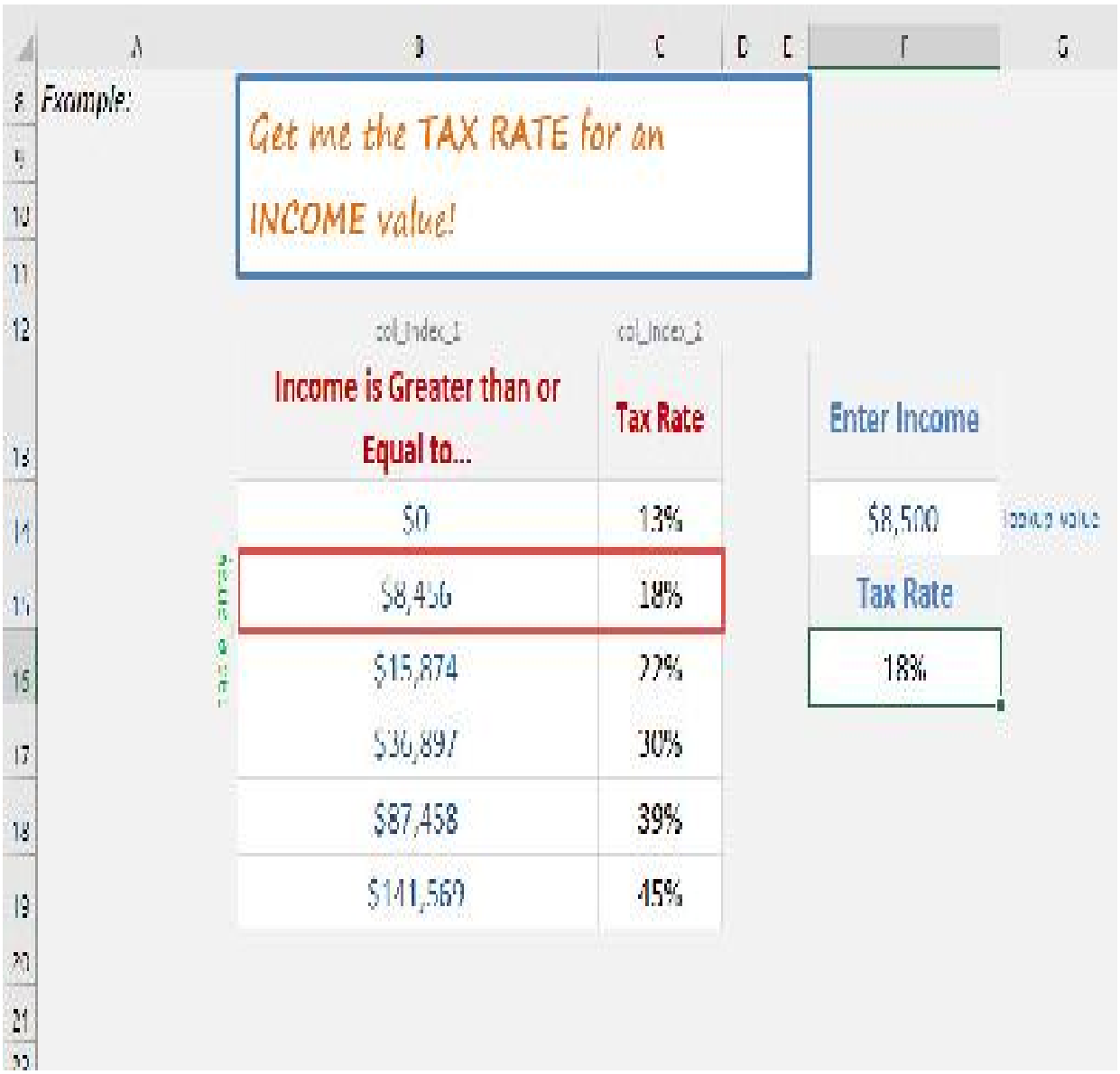
Would it be an approximate match?

Set this to TRUE as we want an approximate match.

=VLOOKUP(F14, B14:C19, 2, TRUE)



You now have your tax rate!


Example:
Get me the TAX RATE for an INCOME value!
col_index_1
col_index_2
Income is Greater than or Equal to...
Tax Rate
$0
13%
$8,456
18%
$15,874
22%
$36,897
30%
$87,458
39%
$141,569
45%
Enter Income
$8,500
Tax Rate
18%

VLOOKUP with a Drop Down List

What does it do?

Searches for a value in the first column of a table array and returns a value in the same row from another column (to the right) in the table array.

Formula breakdown:

=VLOOKUP(lookup_value, table_array, col_index_num, [range_lookup])

What it means:

=VLOOKUP(this value, in this list, and get me value in this column, Exact Match/FALSE/0])

Example:

=VLOOKUP("Keyboard",B14:D17,2,FALSE)

Exercise Workbook:

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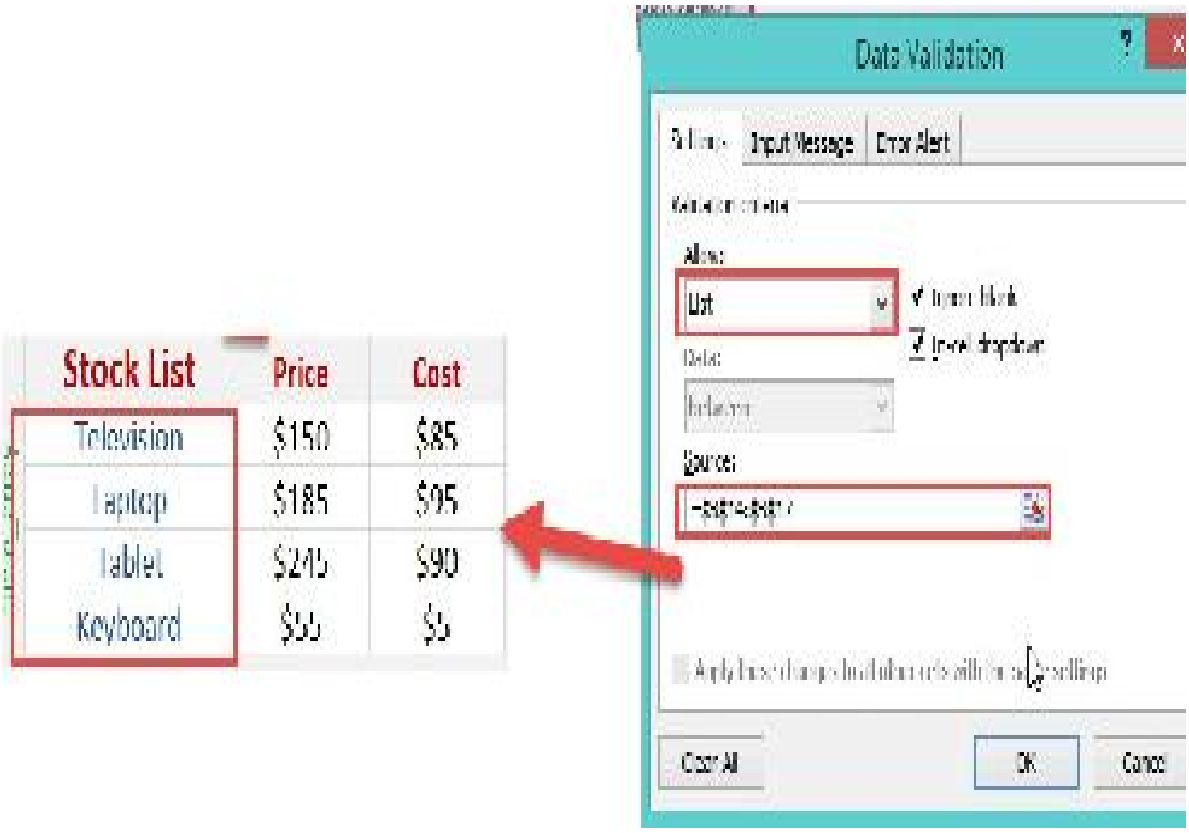
The VLOOKUP function in Excel can become interactive and more powerful when applying a **Data Validation** (drop down menu/list) as the ***Lookup_Value.*** So as you change your selection from the drop down list, the VLOOKUP value also changes.

See how easy it is to apply this with a quick VLOOKUP example below.

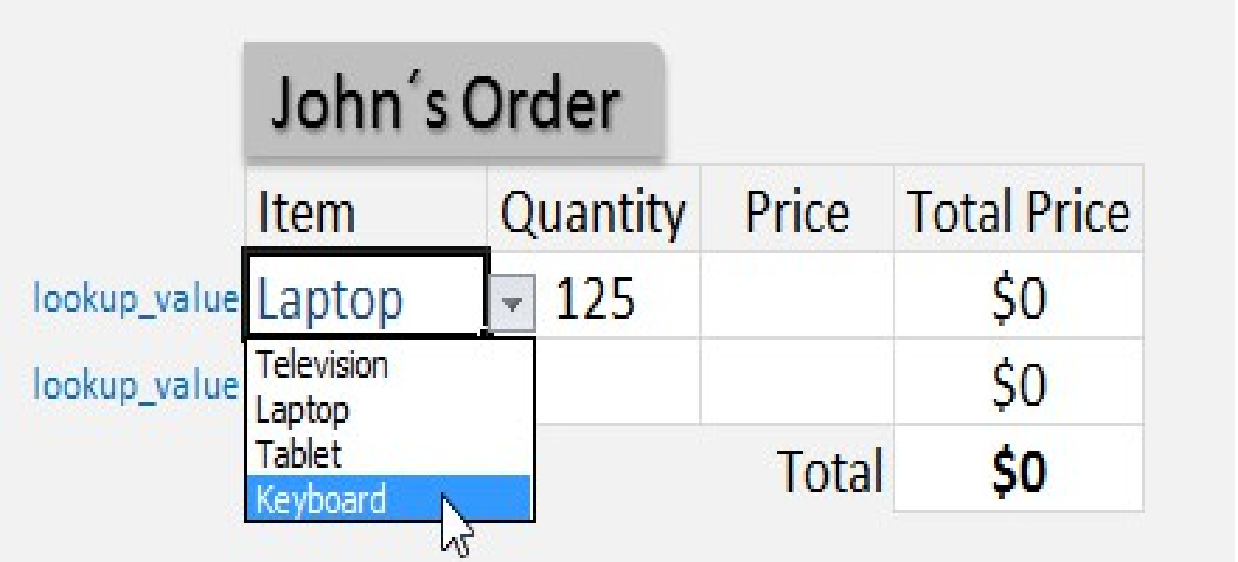
STEP 1: Go to **Data > Data Validation.**

STEP 2: Select **List** in the **Allow dropdown.**

For the **Source,** ensure that it has the 4 Stock List values selected. Click **OK.**

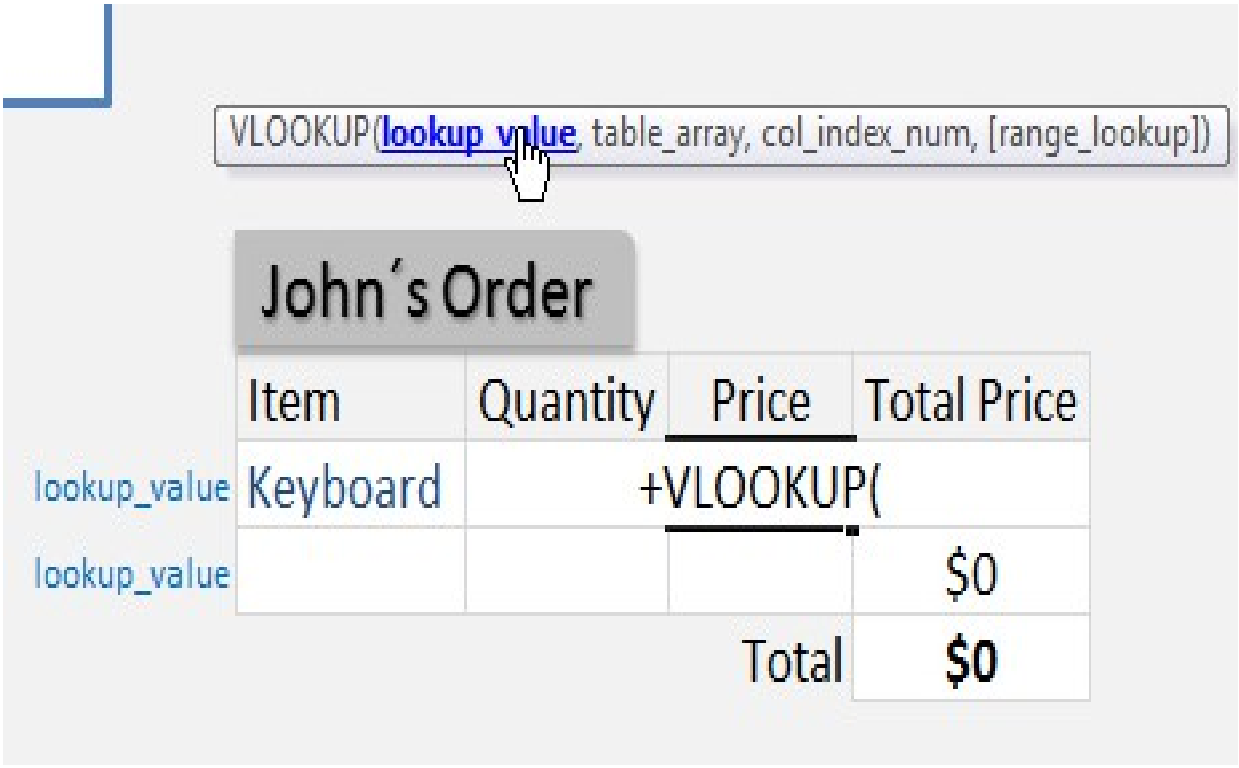


Your dropdown is ready.



STEP 3: We need to **enter the *VLOOKUP* function**:

=VLOOKUP(



The VLOOKUP arguments:

lookup_value

What are we looking for?

Reference the cell that contains the text or value:

=VLOOKUP(G15,

table_array

From which list are we doing a lookup on?

Place in the cell range of the Stock List:

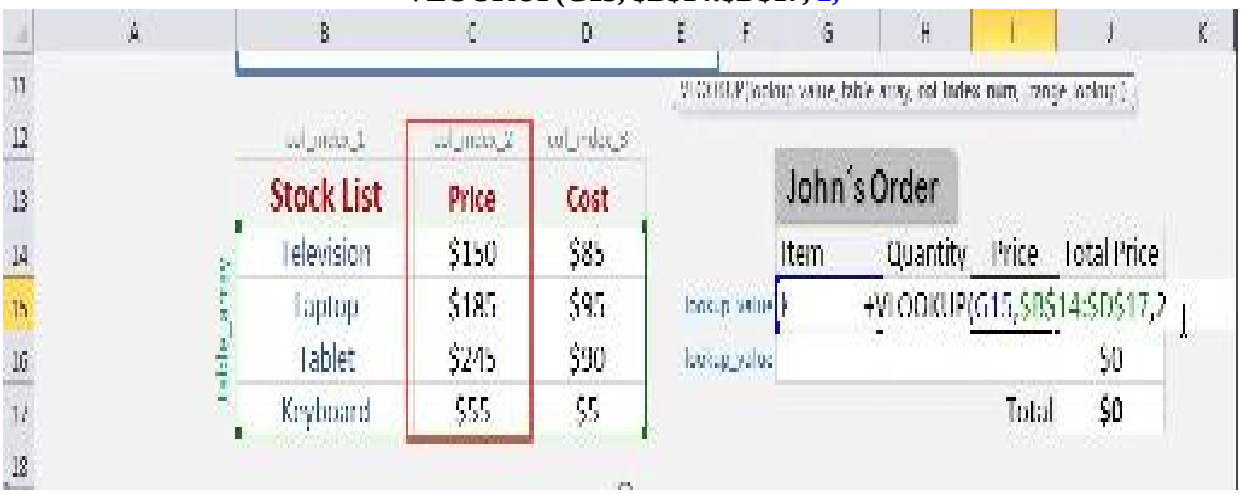
=VLOOKUP(G15, $B$14:$D$17,

col_index_num

From which column do we want to retrieve the value?

We want to retrieve the Price which is the SECOND column from our table array:

=VLOOKUP(G15, $B$14:$D$17, 2,



[range_lookup]

Do we want an exact match?

Place in FALSE to signify that we want an exact match:

=VLOOKUP(G15, $B$14:$D$17, 2, FALSE)

The price now dynamically changes based on your selection:

VLOOKUP Multiple Columns

What does it do?

Searches for a value in the first column of a table array and returns the sum of values in the same row from other columns (to the right) in the table array.

Formula breakdown:

{=SUM(VLOOKUP(lookup_value, table_array, {col_index_num1,col_index_num2}, [range_lookup]))**}**

What it means:

{=SUM(VLOOKUP(this value, in this list, {and sum the value in this column, with the value in this column}, Exact Match/FALSE/0]))**}**

Example:

{=SUM(VLOOKUP("Laptop",B14:D17,{2,3},FALSE))}

Exercise Workbook:

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The VLOOKUP function can be combined with other functions such as the ***Sum, Max*** or ***Average*** to calculate values in multiple columns. As this is an array formula, to make it work we simply need to press **CTRL+SHIFT+ENTER** at the end of the formula. A very powerful feature for any serious analyst!

See how easy it is to implement in less than 1 minute with this VLOOKUP example!

We want to get the total number of units for Laptop (16,700 + 18,700 units).

STEP 1: We need to enter the **VLOOKUP function** in a blank cell:

=VLOOKUP(

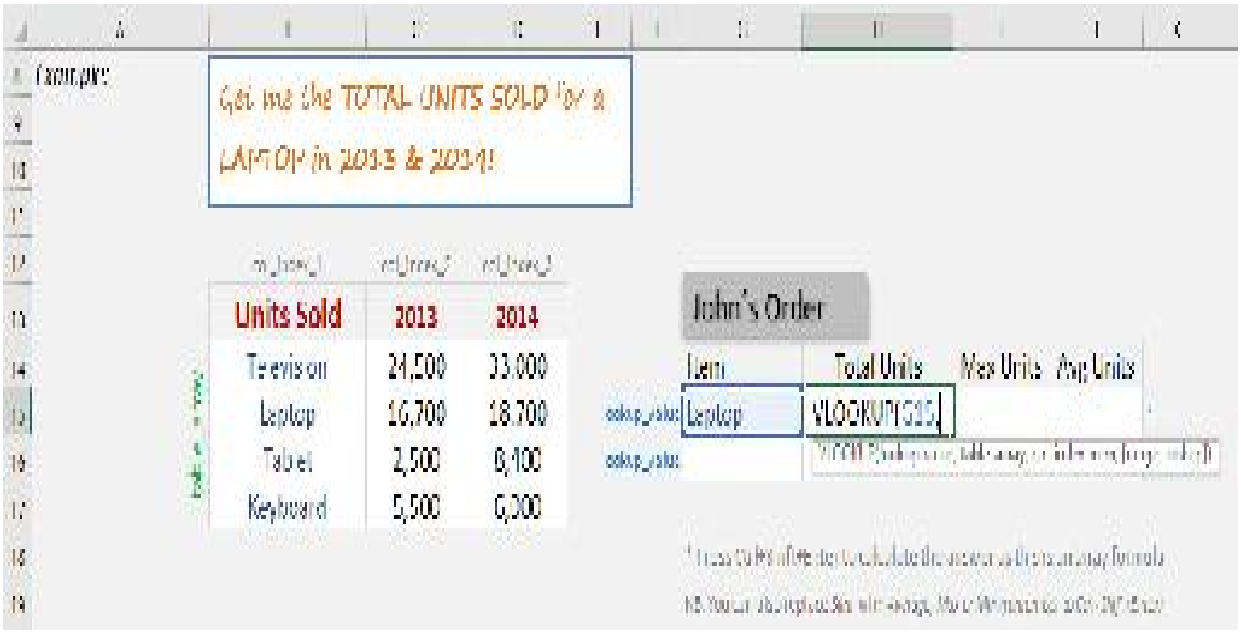
STEP 2: The **VLOOKUP** arguments:

lookup_value

What is the value to be looked up?

Select the cell that contains the item name, which is Laptop.

=VLOOKUP(G15,



table_array

Where is the list of data?

Select the Units Sold table, as that is where our formula is going to get the unit numbers.

=VLOOKUP(G15, B14:D17,

{col_index_num1, col_index_num2}

Which columns in the table_array contains the data you want to return?

We want to get the unit numbers of Years 2013 and 2014. So that will be columns 2 and 3.

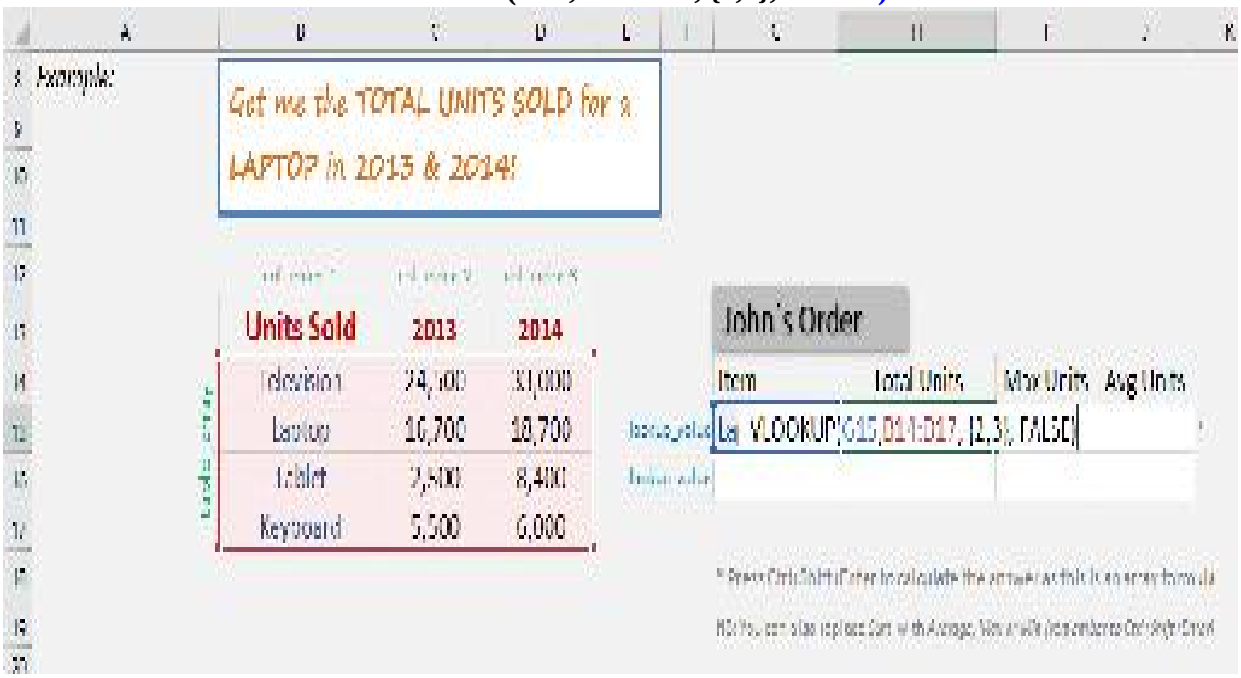
=VLOOKUP(G15, B14:D17, {2,3},

[range_lookup]

Would it be an approximate match?

Set this to FALSE as we want an exact match for Laptop.

=VLOOKUP(G15, B14:D17, {2,3}, FALSE)



STEP 3: Now wrap the formula with the **SUM formula** as we want to get the total number of sold units for Laptop.

=SUM(VLOOKUP(G15, B14:D17, {2,3}, FALSE))

Ensure you are pressing **CTRL+SHIFT+ENTER** as we want to calculate this as an array formula.

Do the exact same formula for **Max Units** and **Average Units**, by changing the **SUM Formula** with the **MAX Formula** and **Average Formula** respectively.


Example:
Get me the TOTAL UNITS SOLD for a LAPTOP in 2013 & 2014!
Units Sold
2013
2014
Television
21,500
33,000
Laptop
Tablet
2,500
8,700
Keyboard
6,000
John's Order
Item
Total Units
Max Units
Avg Units
Laptop
35,400
18,700
17,700

VLOOKUP with Multiple Criteria

What does it do?

Searches for a value in the first column of a table array and returns a value in the same row from another column (to the right) in the table array.

Formula breakdown:

=VLOOKUP(lookup_value, table_array, col_index_num, [range_lookup])

What it means:

=VLOOKUP(this value, in this list, and get me value in this column, Exact Match/FALSE/0])

Example:

=VLOOKUP("Nate Harris"&"HR",C:D,2,FALSE)

Exercise Workbook:

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The challenging thing with VLOOKUP, is we are unable to **add more than one 'criteria'** to search for our value. For example, if we would be searching for 'Nate Harris' in our employee table, we would not want to search the entire table.

Instead, we want to search for 'Nate Harris' but only in the 'Sales department' of the company. This means that we have **two criteria for the search** ('Nate Harris' and 'Sales department').

VLOOKUP cannot do this if you do this the normal way! Thankfully, we can **concatenate the different criteria** so you can use them as a single lookup value.

The concatenation will be done with the **ampersand (&)**. We can get creative and create a helper column for this!

The game plan is to make a separate column that joins the data from the '**Full name**' column and the '**Department**' column, as seen in our table below.

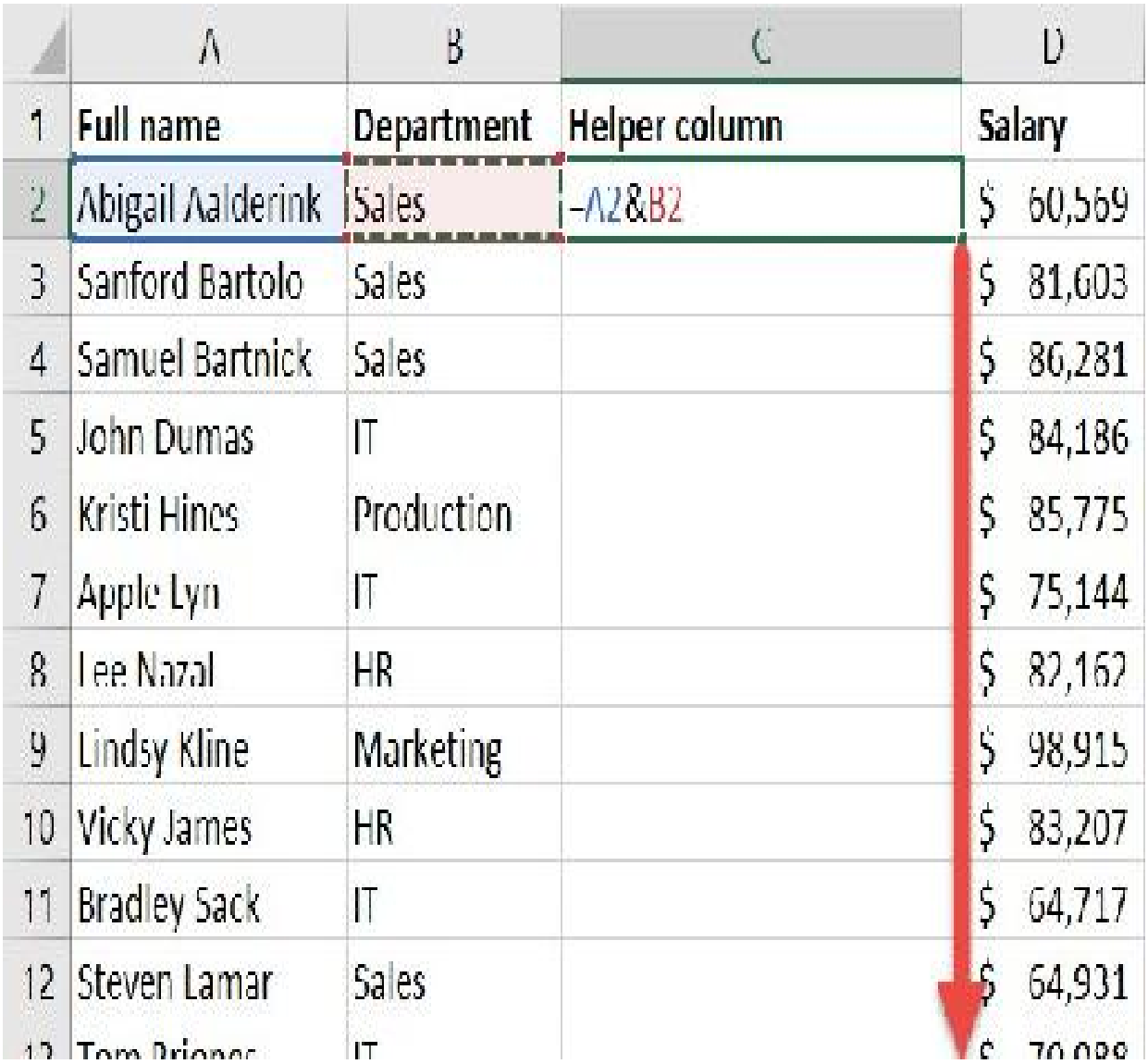
	A	B	C
1	Full name	Department	Salary
2	Abigail Aalderink	Sales	$ 60,569
3	Sanford Bartolo	Sales	$ 81,603
4	Samuel Bartnick	Sales	$ 86,281
5	John Dumas	IT	$ 84,186
6	Kristi Hines	Production	$ 85,775
7	Apple Lyn	IT	$ 75,144
8	Lee Nazal	HR	$ 82,162
9	Lindsy Kline	Marketing	$ 98,915
10	Vicky James	HR	$ 83,207
11	Bradley Sack	IT	$ 64,717
12	Steven Lamar	Sales	$ 64,931
13	Tom Briones	IT	$ 70,988
14	Mike O'Neil	HR	$ 72,254

See how easy it is using our VLOOKUP example.

STEP 1: Let us create our helper column. Insert a column after the Department Column.

Enter this into **cell C2** and copy it down to the rest of the rows in the data.

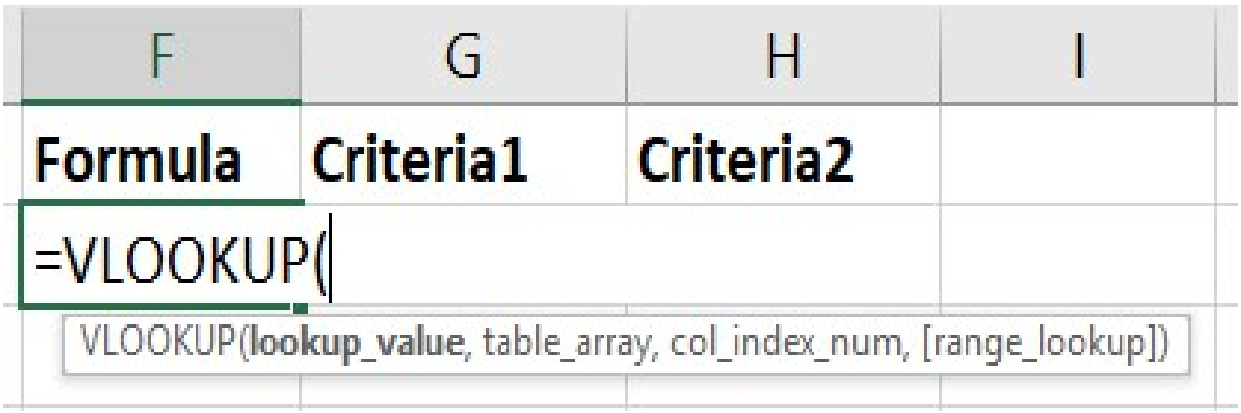
=A2&B2



	A	B	C	D
1	Full name	Department	Helper column	Salary
2	Abigail Aalderink	Sales	=A2&B2	$ 60,569
3	Sanford Bartolo	Sales		$ 81,603
4	Samuel Bartnick	Sales		$ 86,281
5	John Dumas	IT		$ 84,186
6	Kristi Hines	Production		$ 85,775
7	Apple Lyn	IT		$ 75,144
8	Lee Nazal	HR		$ 82,162
9	Lindsy Kline	Marketing		$ 98,915
10	Vicky James	HR		$ 83,207
11	Bradley Sack	IT		$ 64,717
12	Steven Lamar	Sales		$ 64,931
13	Tom Prieper	IT		$ 70,089

STEP 2: We need to **enter the *VLOOKUP* function**:

=VLOOKUP(



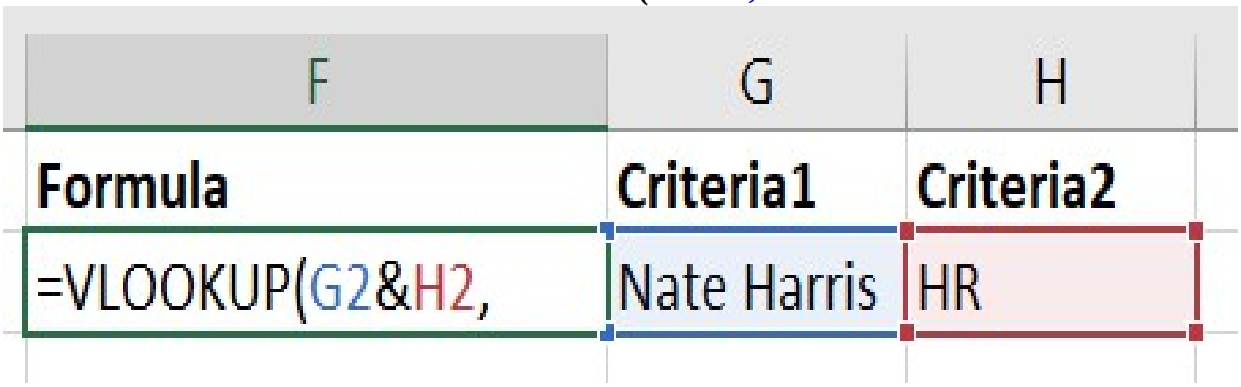
The VLOOKUP arguments:

lookup_value

What are we looking for?

Reference the cell that contains the text or value. Since we are looking in our helper column, ensure your lookup value is a combination of the full name and department:

=VLOOKUP(G2&H2,

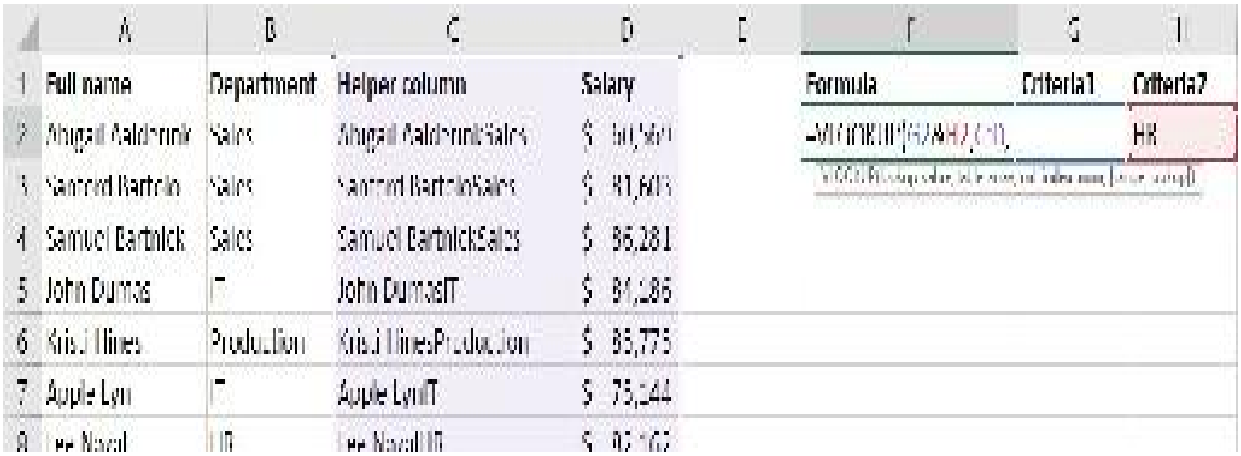


table_array

From which list are we doing a lookup on?

Place in the cell range of the helper column and the salary list:

=VLOOKUP(G2&H2, C:D,



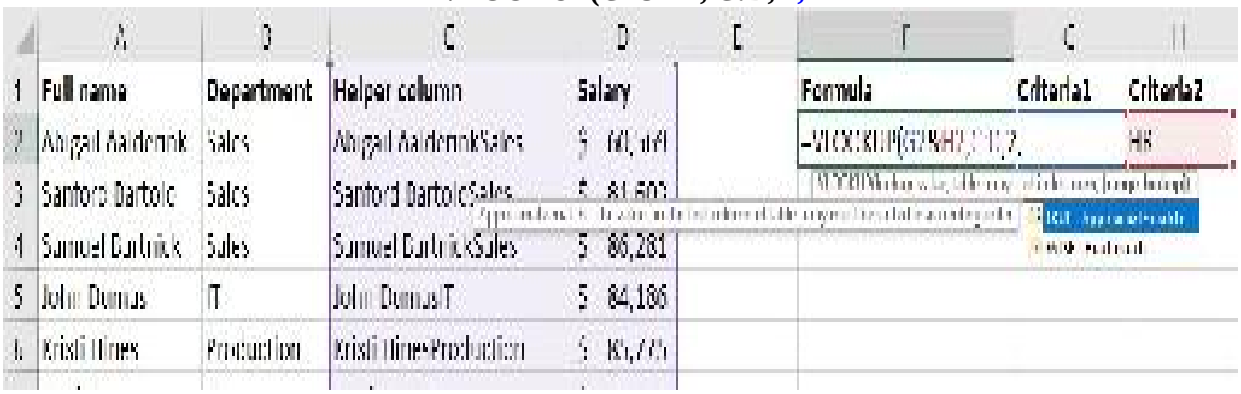
	A	B	C	D	E	F	G	I
1	Full name	Department	Helper column	Salary		Formula	Criteria1	Criteria2
2	Abigail Kaldenmk	Sales	Abigail KaldenmkSales	$ [illegible]		=VLOOKUP(G2&H2,C:D,		HR
3	Sanford Bartolo	Sales	Sanford BartoloSales	$ 81,603				
4	Samuel Barbrick	Sales	Samuel BarbrickSales	$ 86,281				
5	John Dumas	IT	John DumasIT	$ 84,186				
6	Kristi Hines	Production	Kristi HinesProduction	$ 85,775				
7	Apple Lyn	IT	Apple LynIT	$ 75,144				
8	Lee Nasal	IT	Lee NasalIT	$ [illegible]				

col_index_num

From which column do we want to retrieve the value?

We want to retrieve the Salary which is the SECOND column from our table array:

=VLOOKUP(G2&H2, C:D, 2,



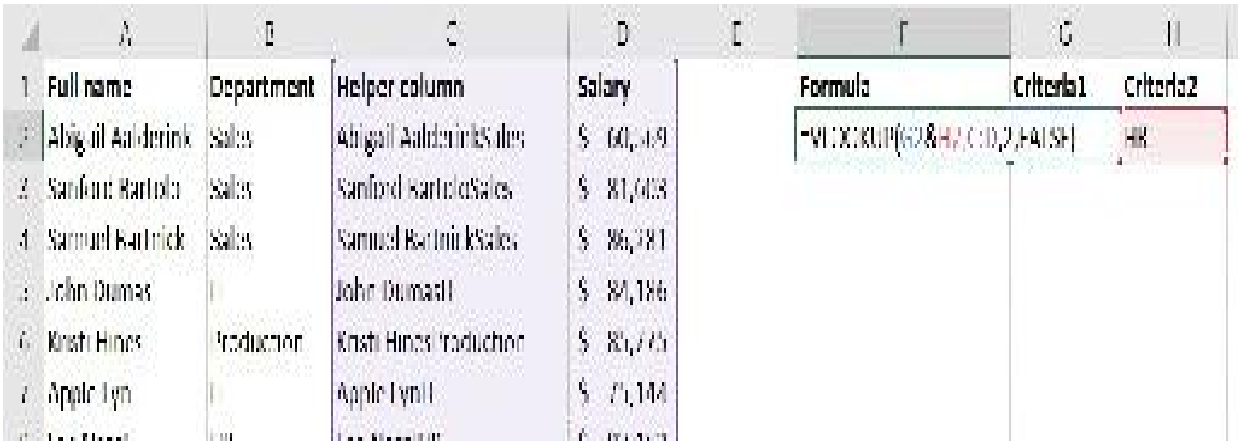
	A	B	C	D	E	F	G	I
1	Full name	Department	Helper column	Salary		Formula	Criteria1	Criteria2
2	Abigail Kaldenmk	Sales	Abigail KaldenmkSales	$ [illegible]		=VLOOKUP(G2&H2,C:D,2,		HR
3	Sanford Bartolo	Sales	Sanford BartoloSales	$ 81,603				
4	Samuel Barbrick	Sales	Samuel BarbrickSales	$ 86,281				
5	John Dumas	IT	John DumasIT	$ 84,186				
6	Kristi Hines	Production	Kristi HinesProduction	$ [illegible]				

[range_lookup]

Do we want an exact match?

Place in FALSE to signify that we want an exact match:

=VLOOKUP(G2&H2, C:D, 2, FALSE)



	A	B	C	D	E	F	G	H
1	Full name	Department	Helper column	Salary		Formula	Criteria1	Criteria2
2	Abigail Aalderink	Sales	Abigail AalderinkSales	$ 60,569		=VLOOKUP(G2&H2,C1:D2,2,FALSE)		HR
3	Sanford Bartolo	Sales	Sanford BartoloSales	$ 81,603				
4	Samuel Bartnick	Sales	Samuel BartnickSales	$ 86,781				
5	John Dumas	IT	John DumasIT	$ 84,186				
6	Kristi Hines	Production	Kristi HinesProduction	$ 85,775				
7	Apple Lyn	IT	Apple LynIT	$ 75,141				

With this, you are now able to get the salary using multiple criteria (full name and department)!

	A	B	C	D	E	F	G	H
1	Full name	Department	Helper column	Salary		Formula	Criteria1	Criteria2
2	Abigail Aalderink	Sales	Abigail AalderinkSales	$ 60,569		70556	Nate Harris	HR
3	Sanford Bartolo	Sales	Sanford BartoloSales	$ 81,603				
4	Samuel Bartnick	Sales	Samuel BartnickSales	$ 86,781				
5	John Dumas	IT	John DumasIT	$ 84,186				
6	Kristi Hines	Production	Kristi HinesProduction	$ 85,775				
7	Apple Lyn	IT	Apple LynIT	$ 75,141				
8	Lee Nacal	HR	Lee NacalHR	$ 82,162				
9	Lindsy Kline	Marketing	Lindsy KlineMarketing	$ 98,915				
10	Vicky James	HR	Vicky JamesHR	$ 83,207				
11	Bradley Sack	IT	Bradley SackIT	$ 64,717				
12	Steven Lamar	Sales	Steven LamarSales	$ 64,931				
13	Tom Briones	IT	Tom BrionesIT	$ 70,988				
14	Mike O'Neil	HR	Mike O'NeilHR	$ 72,754				
15	Filly Kam	Adm	Filly KamAdm	$ 68,434				
16	Steven Davidson	Adm	Steven DavidsonAdm	$ 62,687				
17	Nate Harris	HR	Nate HarrisHR	$ 70,556				
18	Bryan Sloane	IT	Bryan SloaneIT	$ 74,243				
19	Chris Burgoyni	Sales	Chris BurgoyniSales	$ 89,758				

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