ResearchGate

See discussions, stats, and author profiles for this publication at: https://www.researchgate.net/publication/365603102

Excel for Financial Analysis

Book · November 2022

CITATIONS
0

READS
634

1 author:

Abid Hasan
University of Dhaka

3 PUBLICATIONS **0** CITATIONS

SEE PROFILE

All content following this page was uploaded by Abid Hasan on 20 November 2022.

The user has requested enhancement of the downloaded file.

FOX GROUP

FIRST EDITION

Microsoft

Excel *for* Financial Analysis

ABID HASAN

About the Author…

Abid Hasan is currently studying Bachelor of Business Administration major in Marketing at the University of Dhaka. He is a 4th-year student. Also, he has completed the Financial Modeling and Valuation Analyst (FMVA) program from the Corporate Finance Institute (CFI) in Vancouver, Canada.

Introduction…

Welcome to the Book “Excel for Financial Analysis”. A book to guide you through the journey of a Financial Analyst.

In this book you are about to start reading will introduce you to the Basic formulas and functions which are mostly used for analysis. The book starts with the common shortcuts in Excel. This will introduce you to working effectively, and efficiently while working on Excel. Then, it will take you to the most used functions for financial analysis. You will learn about the Data & time, Statistical, Logical, and Financial functions also how to develop even more powerful formulas by combining several functions. Each function follows step-by-step instructions with several examples that are easily understandable. Prior Excel knowledge is an advantage though it’s not required.

Brief Table of Content

Reading: 1	Introduction to Excel.
Reading: 2	Most Useful Excel Shortcuts for PC.
Reading: 3	Most Useful Date and Time Function for Financial Analysis
Reading: 4	Most Useful Statistical Functions for Financial Analysis
Reading: 5	Most Useful Logical & Financial Functions for Financial Analysis

Table of Content

Reading:1

		Page no.
Reading 1.1	Introduction to Excel	7

Reading:2

Most Useful Excel Shortcuts for PC

Reading 2.1	Shortcuts for Editing	9
Reading 2.2	Shortcuts for Formatting	10
Reading 2.3	Shortcuts for Navigating	11
Reading 2.4	File Shortcuts	12
Reading 2.5	Shortcuts for Ribbon	13
Reading 2.6	Shortcuts for Paste Special	13
Reading 2.7	Shortcuts for Selection	14
Reading 2.8	Shortcuts for Data Editing	15
Reading 2.9	Shortcuts (Inside cell), Date, and Other Shortcuts for Data Editing	15
Reading 2.10	Why should we Use Shortcuts?	16

Reading:3

Most Useful Date and Time Function for Financial Analysis.

Reading 3.1	DATE FUNCTION	17
Reading 3.2	YEAR FUNCTION	21
Reading 3.3	YEAR-FRAC	23
Reading 3.4	EOMONTH	25

Reading:4

Most Useful Statistical Function for Financial Analysis.

Reading 4.1	AVERAGE	27
Reading 4.2	SMALL	29
Reading 4.3	LARGE	31
Reading 4.4	COUNT	33
Reading 4.5	COUNTA	36
Reading 4.6	COUNTIF	38

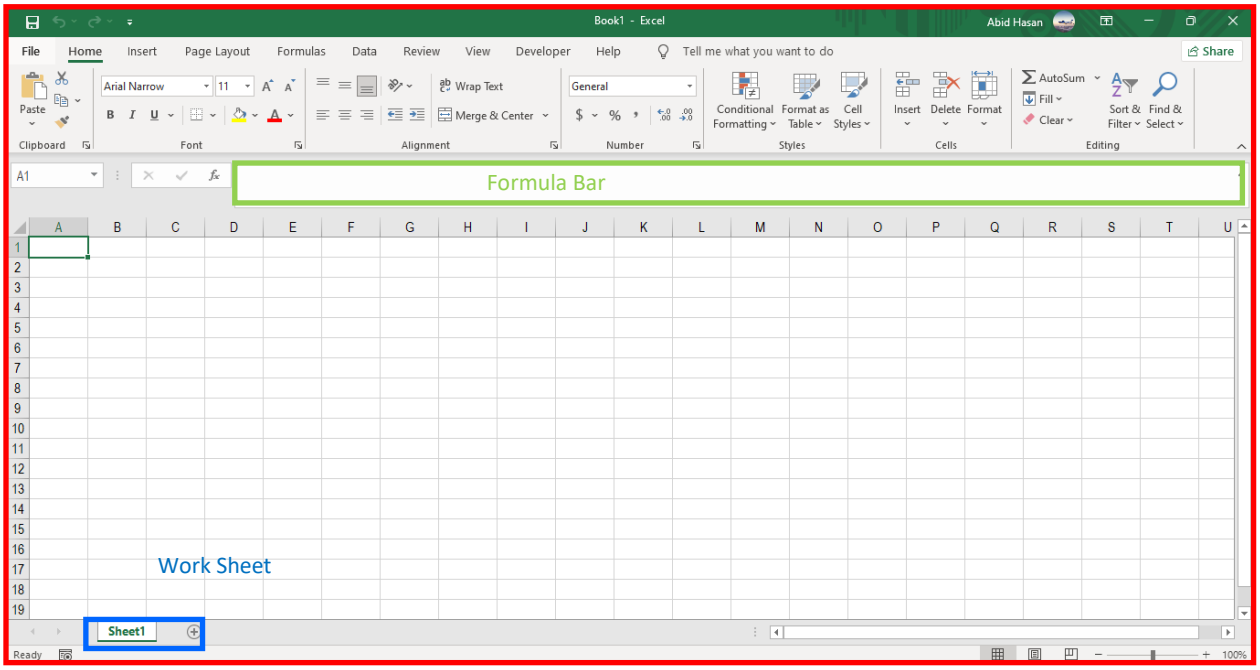
Reading:5

Most Useful Logical and Financial Function for Financial Analysis.

Reading 5.1	IF	40
Reading 5.2	IFERROR	47
Reading 5.3	CHOOSE	52
Reading 5.4	VLOOKUP	65
Reading 5.5	OFFSET	71
Reading 5.6	INDEX	75
Reading 5.7	MATCH	79
Reading 5.8	INDEX AND MATCH	81
Reading 5.9	XNPV	86
Reading 5.10	XIRR	88

Reading 1.1

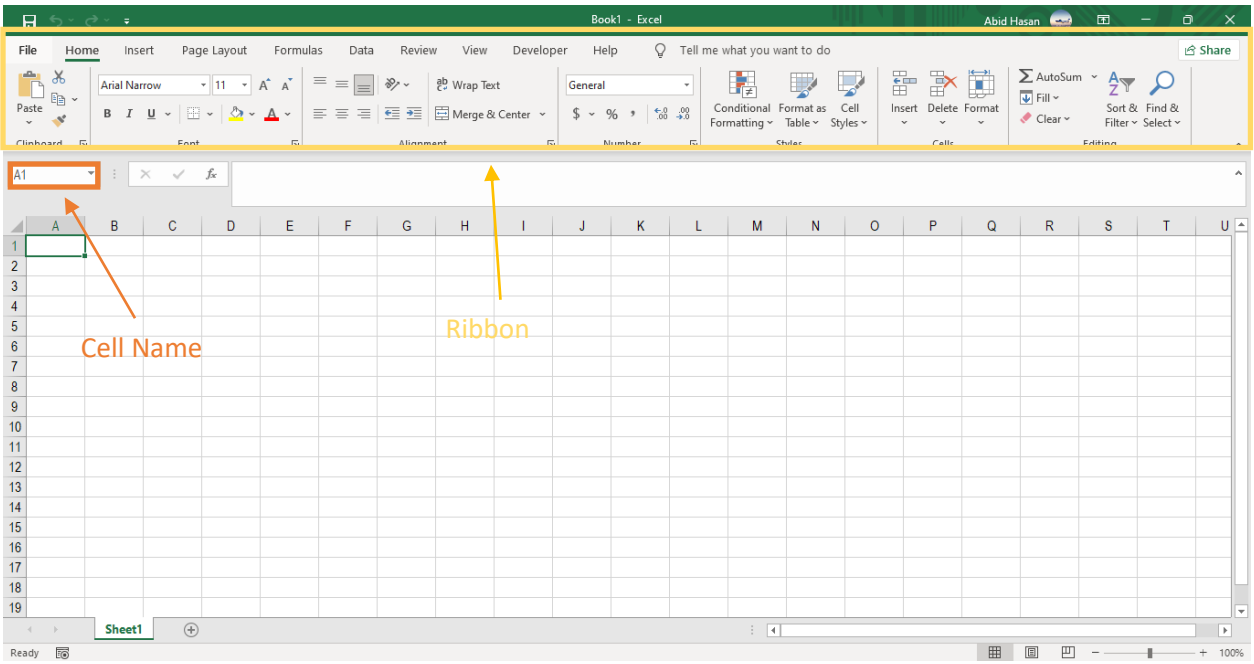
Workbook



Workbook: The entire section is called a workbook. It's a file that contains one or more worksheets. We can create a workbook from a blank workbook or template.

Formula bar: In the formula bar we can type any formula by taking the equal sign (=) at the beginning. Also, we can select the formula by clicking the *fx* sign. Note: there is another way to build a formula. By taking the "=" sign in a particular cell, manually typing a formula, and then choosing a preferred one by pressing the tab key on the keyboard.

Worksheet: worksheet also known as a spreadsheet where we can enter data and calculate. We can add more worksheets by clicking "+" on the sign. Worksheet stored in the workbook. The number of worksheets we take in a single workbook is stored in that workbook.



Cell name: cell name shows the name of a particular cell. We can manually type any name of a cell.

Ribbon: The ribbon is the top portion of the worksheet. It consists of several items from “File” to “Help” and Several options contain in each item.

Reading 2.1

Basic Shortcuts for editing in Excel for PC

Edit active cell	F2			
Cut	Ctrl	X		
Copy	Ctrl	C		
Paste	Ctrl	V		
Paste special	Alt	E	S	
Repeat the previous action	F4	or	Ctrl	Y
To start a new line within the cell	Alt	Enter		
Insert new worksheet	Shift	F11		
Autofill down	Ctrl	D		
Autofill right	Ctrl	R		
Insert new row	Alt	I	R	
Insert new column	Alt	I	C	

Reading 2.2

Basic Shortcuts for formatting in Excel for PC

Bring up the format cell menu	Ctrl	1	
Bold	Ctrl	B	
Italic	Ctrl	I	
Undo	Ctrl	Z	
Select all entire cells (select the entire sheet if the command is repeated)	Ctrl	A	
Number formatting	Ctrl	Shift	!
Date formatting	Ctrl	Shift	#
To increase indent	Alt	h	6
To decrease indent	Alt	h	5
Percent formatting	Ctrl	Shift	%
To increase decimal	Ctrl	h	0
To decrease decimal	Ctrl	h	9

Reading 2.3

Basic Shortcuts for navigation in Excel for PC

Move among cells (up/down/left/right)	Arrows		
Go To	F5		
Go to the first top cell (A1)	Ctrl	Home	
Go to starting of the cell	Home		
Select adjacent cell (up/down/loft/right)	Shift	Arrows	
Select entire row	Shift	Spacebar	
Select entire column	Ctrl	Spacebar	
Select up to the end of the last used cell/current cell Up to the last character	Ctrl	Shift	Arrows
Select the last used cell (up/down/left/right)	Ctrl	Arrows	
Move up	PageUp		
Move down	PageDown		
Move left	Alt	PageUp	
Move right	Alt	PageDown	
Move up with select cell	Shift	PageUp	
Move down with select cell	Shift	PageDown	

Move down with select cell	Shift	Alt	PageUp
Move down with select cell	Shift	Alt	PageDown
Move to the next cell	Tab		
Move to the right worksheet	Ctrl	Pg up	
Move to the left worksheet	Ctrl	Pg dn	

Reading 2.4

Basic File Shortcuts in Excel for PC

New workbook	Ctrl	N
Open the folder to save a workbook	Ctrl	O
Save workbook	Ctrl	S
Save as	F12	
Print sheet	Ctrl	P
Open print preview window	Ctrl	F2
Go on to the following workbook	Ctrl	Tab

Close file	Ctrl	F4
Close all excel files	Alt	F4

Note: Alt+F4 closes the selected window on the screen and also brings up the power menu.

Reading 2.5

Basic Ribbon Shortcuts in Excel for PC

To show the ribbon option	Alt	
To show/hide the ribbon	Ctrl	F1

Reading 2.6

Basic Paste Special Shortcuts in Excel for PC

Paste formats from copied item	Ctrl	Alt	V	t
Paste values	Ctrl	Alt	V	v
Paste formulas	Ctrl	Alt	V	f
Paste comments	Ctrl	Alt	V	c

Note: paste special formulas can also be found in the “Home” option in the ribbon by using

Alt - h - p - v

Reading 2.7

Shortcuts for selection in Excel for PC

Select a range of cells	Shift	Arrows	
Highlight adjacent cell	Ctrl	Shift	Arrows
Expand selection UP	Shift	Pg up	
Expand selection Down	Shift	Pg dn	
Expand selection left	Alt	Shift	Pg up
Expand selection right	Alt	Shift	Pg dn
Select all at a time	Ctrl	A	

Reading 2.8

Shortcuts for Data Editing in Excel for PC

Fill down	Ctrl	D
Fill Right	Ctrl	R
Find and replace.	Ctrl	F

Reading 2.9

Shortcuts for Data Editing (inside the cell), Date and other shortcuts in Excel for PC.

Edit active cell	F2	
Save changes in a cell	Enter	
Cancel change	Esc	
To insert a line break	Alt	Enter
Highlight in editing cell	Shift	Left/Right
Jump to the beginning of cell content	Home	
Jump to end	End	
Delete character right	Delete	

Delete character left	Backspace		
Accept suggestion	Tab		
Reference a cell from another worksheet	Ctrl	Pg Up/Dn	Arrows
Enter Date	Ctrl	;	
Enter time	Ctrl	:	
Auto sum	Alt	=	
Menu bar	Alt		
Next open program	Alt	Tab	

Reading 2.10

Why should we use shortcuts?

The shortcut is a faster way to do anything. To be faster, more productive, and more effective analysts need to use shortcuts when they have to build modeling and financial data analysis in excel. We can use keyboard shortcuts rather using the mouse. It's a fun and easy way to work on Excel as well as time safer. Some investment banking programs will put off the mouse from the desktop. Professionals use shortcuts to do a good job in Excel.

Reading 3

Date and Time

Reading 3.1

DATE Function

The date is important for financial modeling as analysts need a specific date for forecasting and other valuation activities. When we calculate XNPV and XIRR, we need a specific date. These two functions are immensely important for forecasting So, the date function in excel is very useful, and we need to know how to use this function.

Function

Date (Year, Month, Day)

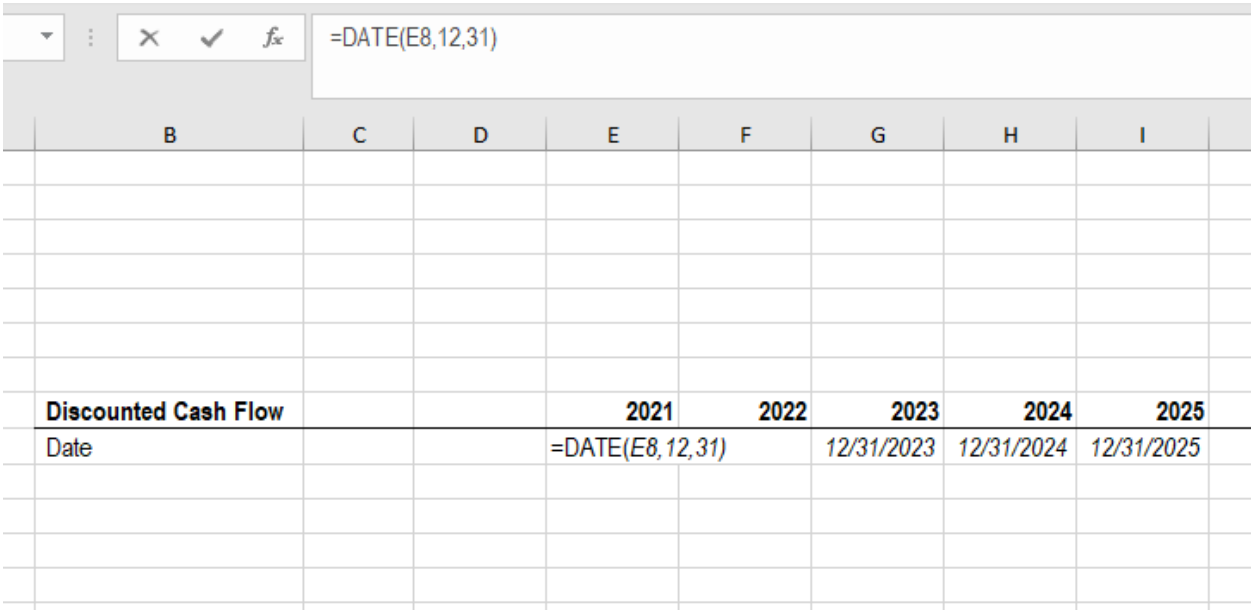
Year: Year is a required argument in that function which indicates a particular year.

Month: Month is also a required argument that indicates a particular month. The month can be any number from 1-12 (January to December) the number can be positive or negative. If you use a negative number such as Date (2022, -3, 1) it will return as September 2, 2021.

Day: Day is another required argument in this function. The number can be positive or negative from 1 to 31 which indicates the days of the month.

- if you use a negative number such as -3, it will bring you to the previous month. Such as the Date (2021, 2, -2), it will show January 29, 2021.
- in contrast if you use a number more than days of a month it will bring to the next month. Such as Date (2021,2,35). It will show on July 3, 2021.

How to use the DATE function in Excel:



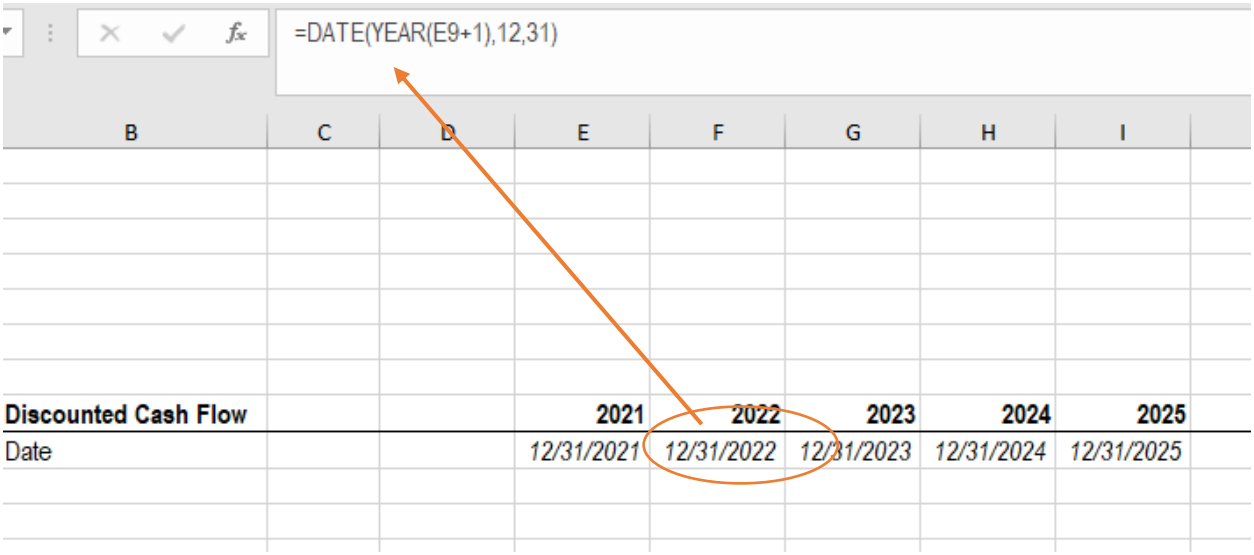
Here, in the function

- The cell E8 refers to the year 2021 in the sheet.
- 12 refers to the month 12 (December)
- And lastly, 31 is the date of the month

That means we command the function as the year is 2021, the month is December the and day is the 31 of December.

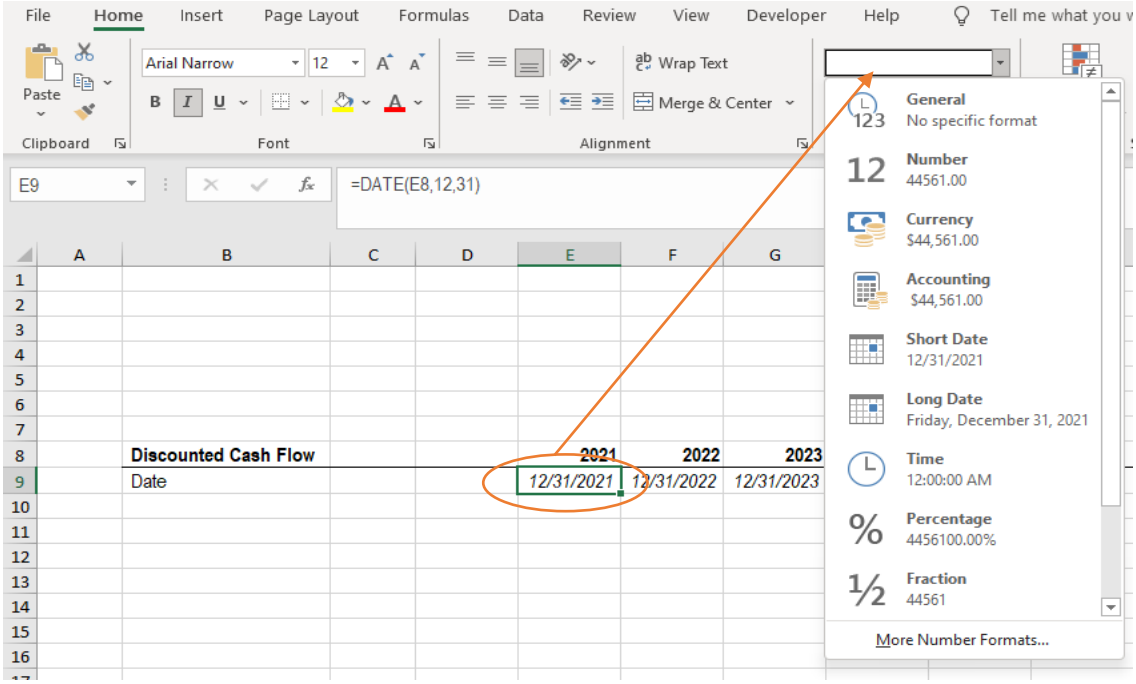
So, it will show the “12/31/2021 (31 December 2021)”

How to make it effective in modeling:

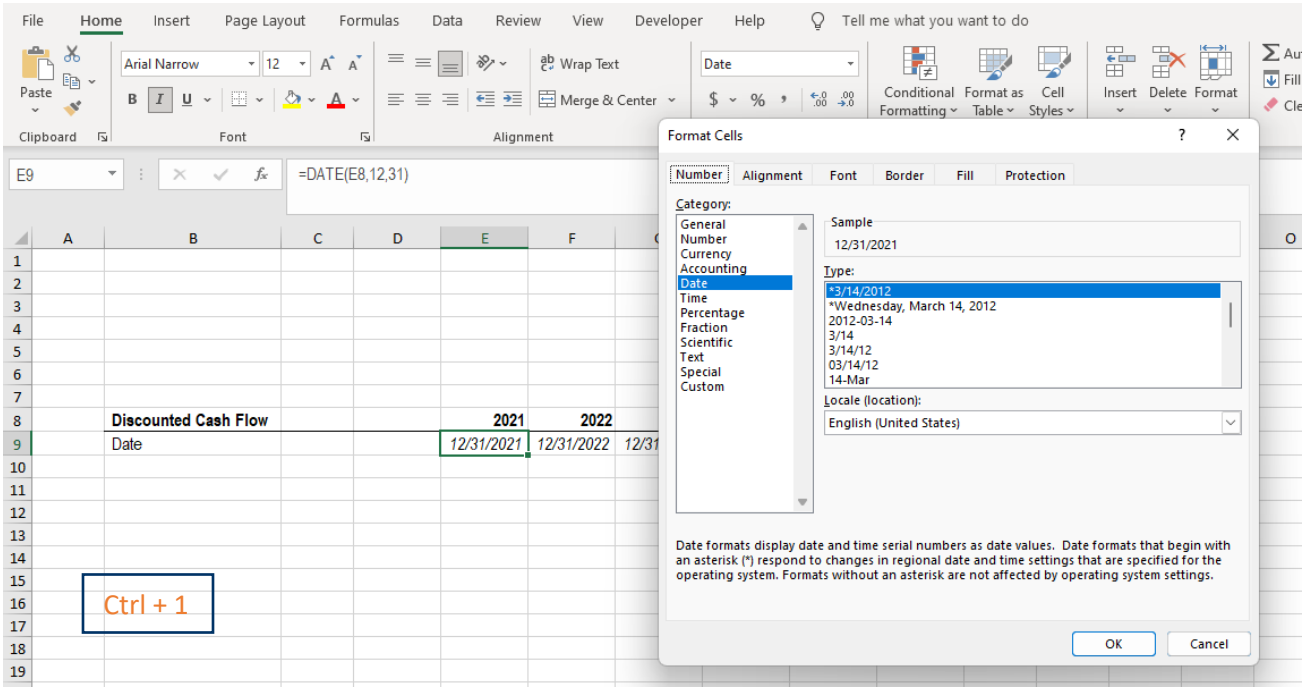


Step 1: First, build the formula in the above manner.
Step 2: Insert the date function in the circled cell. Under the year argument insert the year as a function by typing year manually and refer to 2021 +1 shown in the above formula. Keep the rest of the argument the same as before. It will automatically show 2022. Select that cell and select up to 2025 (cell I9) then press Ctrl + R (to auto-fill to the end).

Note: If the result in a cell comes with a general number (e.g.44561) instead of 12/31/2021 then go to the number option under the "home" ribbon and select the "*date*"



Or



Select the cell and press Ctrl + 1. It will take you to the cell format section and you can easily select the date form there.

Reading 3.2

YEAR FUNCTION

Get the year from any data.

It finds a year from any data and shows 4 digits integer. e.g. if we enter the data “12/31/2021” in the formula it will take a year from it and will show “2021”.

FORMULA

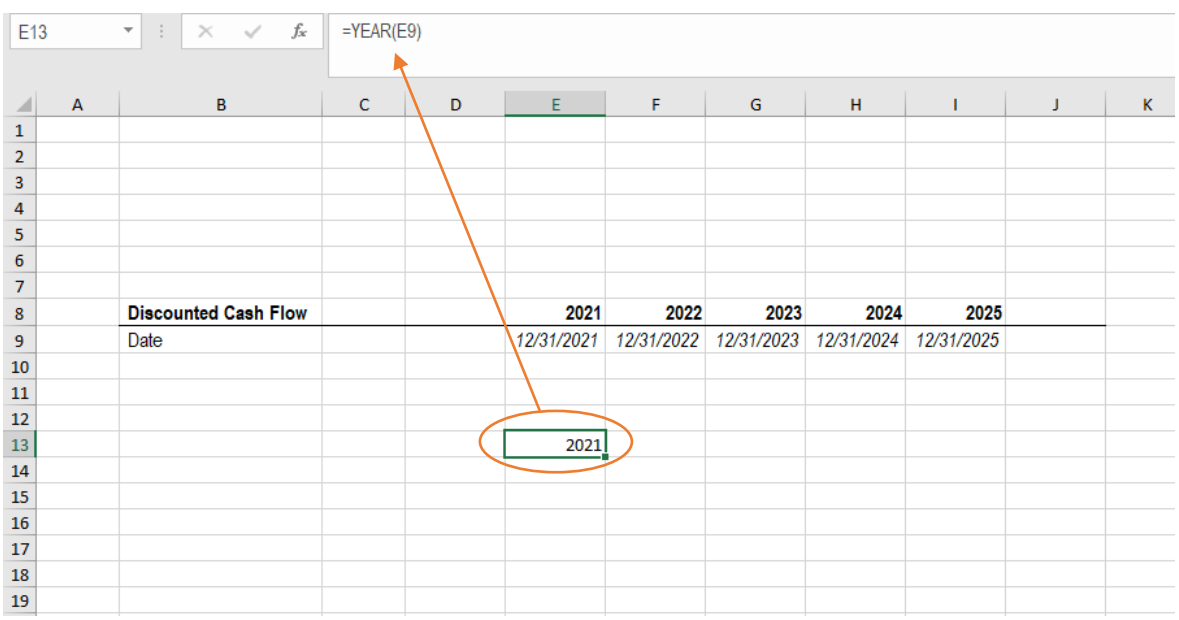
Year(serial number)

Serial-number: Serial-number is a required argument in the function. It’s the data of the year from where we want to get the year. In this argument, we enter the data.

- We can use the year function in the date function (previous function) to get the year for the date function. e.g. Date (Year function, 12.31)

How to use the YEAR function in excel:

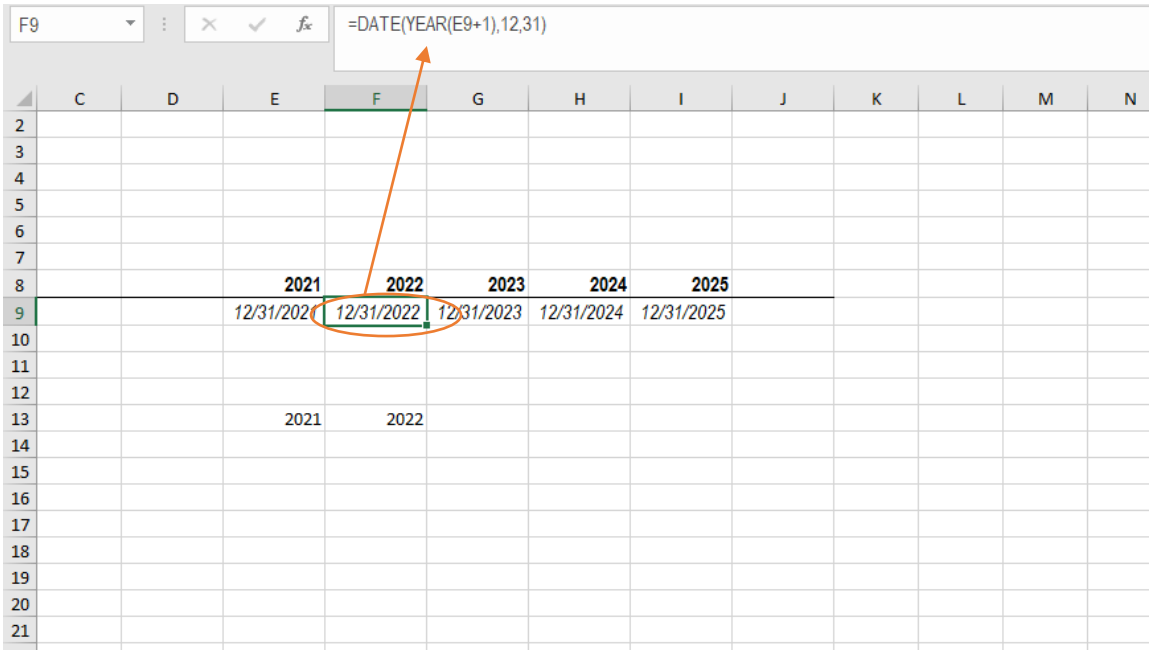
Example-1



In the above example, we enter the YEAR function

In cell E13, we enter the function as Year (12/31/2021). The function brings up the year from the data as 2021.

Example-2



This time we enter the YEAR function under the DATE Function. So that we can get a year in a date.

How to use it:

- Take the DATE Function
- Enter the YEAR function under the DATE function.
- Refer previous year and add 1 (shown as in the above formula) because we want to update the year. Now it will automatically update the years. This function takes the year 2021 and adds 2021+1 and shows 2022.

Note: Select cell F9. Press Ctrl + Shift and select up to a particular cell. In this case, we select up to cell I9 and then use Ctrl + R to auto-fill. The function takes the previous year and adds 1 to update the year each time.

Reading 3.3

YEARFRAC

Finds a fraction of the year between two dates.

As a financial analyst when you calculate XNPV based on past data for future forecasting, you need to find out the fraction between two dates. YEARFRAC shows one year as 1, Less than one year shows as a fraction of 1, and more than 1 year shows as greater than 1.

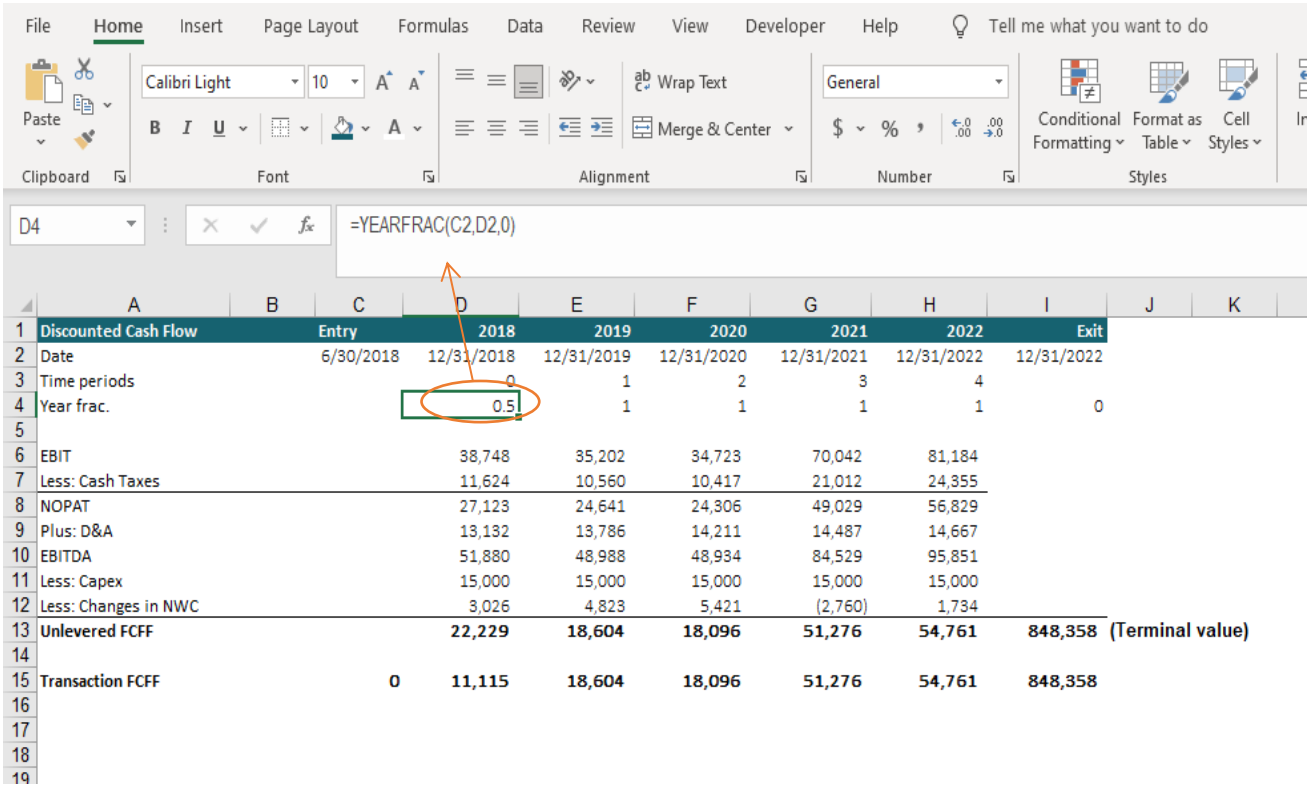
Formula

YEARFRAC (Start_date, End_date, Basis)

- Start _date: A required argument indicates the Start date. YEARFRAC function takes it into the calculation as a start date.
- End_date: It's also a required date that indicates the end date. YEARFRAC function takes it into the calculation as the end date.
- Basis and their different meaning

[basis]	Day Count
0 or omitted	US(NASD)30/360
1	Actual/Actual
2	Actual/360
3	Actual/365
4	European30/360

How to use the YEARFRAC Function in Excel:



	A	B	C	D	E	F	G	H	I	J	K
1	Discounted Cash Flow		Entry	2018	2019	2020	2021	2022	Exit		
2	Date		6/30/2018	12/31/2018	12/31/2019	12/31/2020	12/31/2021	12/31/2022	12/31/2022		
3	Time periods			0	1	2	3	4			
4	Year frac.			0.5	1	1	1	1	0		
5											
6	EBIT			38,748	35,202	34,723	70,042	81,184			
7	Less: Cash Taxes			11,624	10,560	10,417	21,012	24,355			
8	NOPAT			27,123	24,641	24,306	49,029	56,829			
9	Plus: D&A			13,132	13,786	14,211	14,487	14,667			
10	EBITDA			51,880	48,988	48,934	84,529	95,851			
11	Less: Capex			15,000	15,000	15,000	15,000	15,000			
12	Less: Changes in NWC			3,026	4,823	5,421	(2,760)	1,734			
13	**Unlevered FCFF**			**22,229**	**18,604**	**18,096**	**51,276**	**54,761**	**848,358**	**(Terminal value)**	
14											
15	**Transaction FCFF**		**0**	**11,115**	**18,604**	**18,096**	**51,276**	**54,761**	**848,358**		
16											
17											
18											
19											

Here, in cell D4, we enter the YEARFRAC function. We take “cell C2” as a start date, “cell D2” as an end date, and 0 as a basis. The function shows “0.5” as a fraction between two dates. If we calculate manually, we also get half of a year as a fraction (30 June 2018 to Dec 31, 2018, 6 months difference between two dates or half of a full year).

In this section, we will learn how YEARFRAC is helpful to calculate NPV.

	A	B	C	D	E	F	G	H	I	J	K	L
1	Discounted Cash Flow		Entry	2018	2019	2020	2021	2022	Exit			
2	Date		6/30/2018	12/31/2018	12/31/2019	12/31/2020	12/31/2021	12/31/2022	12/31/2022			
3	Time periods			0	1	2	3	4				
4	Year frac.			0.5	1	1	1	1	1			
5												
6	EBIT			38,748	35,202	34,723	70,042	81,184				
7	Less: Cash Taxes			11,624	10,560	10,417	21,012	24,355				
8	NOPAT			27,123	24,641	24,306	49,029	56,829				
9	Plus: D&A			13,132	13,786	14,211	14,487	14,667				
10	EBITDA			51,880	48,988	48,934	84,529	95,851				
11	Less: Capex			15,000	15,000	15,000	15,000	15,000				
12	Less: Changes in NWC			3,026	4,823	5,421	(2,760)	1,734				
13	**Unlevered FCFF**			**22,229**	**18,604**	**18,096**	**51,276**	**54,761**	**848,358**	**(Terminal value)**		
14												
15	**Transaction FCFF**		**0**	**11,115**	**18,604**	**18,096**	**51,276**	**54,761**	**848,358**			
16												
17												
18												
19												
20												
21												

See D4 is half of a year so, we need to take the half-year forecasting value to calculate NPV. If we take 22229 (cell D15) to calculate NPV it won't be practical because the period is half. In that case, we multiply Row 4 with Row 15 to the get exact value needed to calculate NPV.

Reading 3.4

EOMONTH

This function helps us to get the last date of a particular month after adding a specific number to the month. As financial analysts, we need to calculate accounts payable or other payables that require the last date of a month.

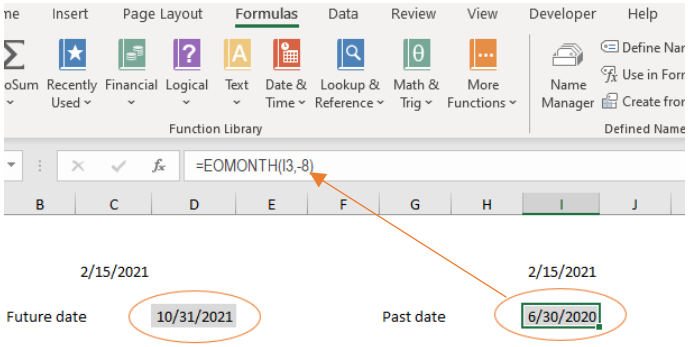
FORMULA:

EOMONTH (Start-date, Months)

Start-date: It's a required argument where we need to insert the date. The date in a text will result in an Error. e.g. if we insert the date as "September 2, 2021" it will result in an "Error". The date must be a numerical value. Instead of this date should be 2/9/2021

Months: It is the number of months that will be added or subtracted by month. A negative number produces a past date and a positive number produce a future date.

How to use the EOMONTH Function in Excel:



See here the first example, we enter the EOMONTH function.

- Refer to the cell C3 as a Start-date and
- We use a positive number which is “8” as a “month” to get a future value.

The function adds 8 with the previous value of 2 and results 10 which means October. And as the function shows the End of the Month so the result comes on 31 October 2021.

Now let’s explore the second example

- Here we enter the EOMONTH function in the cell i5.
- Referring to the same value (cell i3) as the previous function as a Start-date.
- In this case, under the Months argument, we enter “-8” to get a past date.

This function subtracted 8 from the previous month which means it will take us 8 months past. The result is 6/30/2020 which is 8 months past 2/15/2021. And lastly, the function will show the end date of June.

Reading 4

STATISTICAL

Reading 4.1

AVERAGE

The function is used to the get average of a group of numbers.

Average function is important and useful for everyone. In many cases, we need to use the average function. Such as, an analyst wants to find out the last 5 months average revenue or moving average. A student wants to get his average point. An online shop wants to know his last 5 months' average visitors to his online store.

FORMULA:

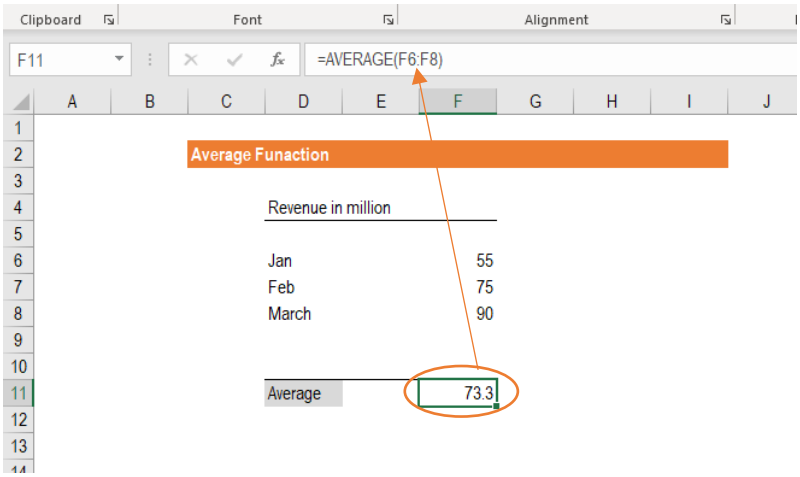
AVERAGE (Number 1, [Number 2], …)

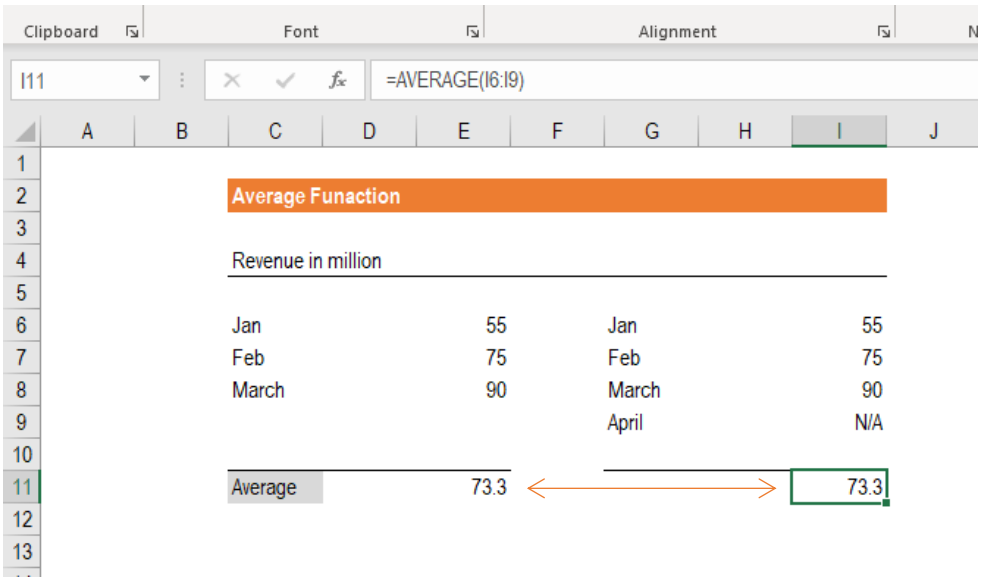
Number 1: It's a required argument that indicates the first number or first cell of reference or it can be the range of numbers we want to make an average.

Number 2: An optional argument indicates the additional number or range of numbers. A Maximum of 255 numbers is allowed in excel.

How to use AVERAGE in Excel:

Example-1





Example-2

See the first example, we have hypothetical revenue data for 3 months of a company. Now, enter the Average function in cell F11 and refer cell F6 to F8 by using Ctrl + Shift + arrow. The function comes with an average of three values.

In the second example, we add an extra month “April” but there is no data for the month. As previously, this time we refer 4 months from cell I6 to I9. But the function comes with the same result as the previous that’s because, the Average Function ignores the text, logical value, and an empty cell.

Reading 4.2

SMALL

This function is used to get the smallest value of a range of values.

When analyzing financial data, we might need to know about the smallest cost or the smallest revenue in 12 months or several years in the financial statement. Also, we need this function for many purposes. e.g. a student might want to know his smallest course number for the final exam.

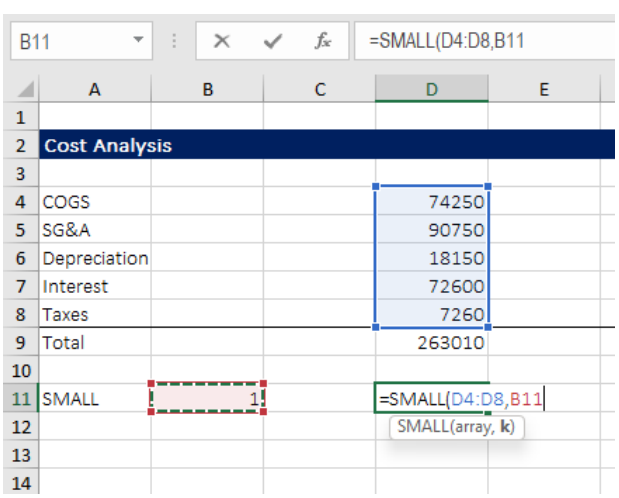
FORMULA:

SMALL (array, k)

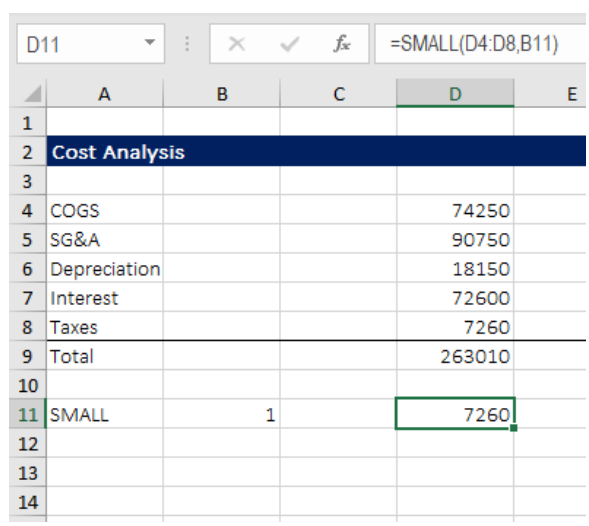
Array: It's a required argument that indicates the array of values from which we want to get the K smallest value.

K: It's also a required argument. K indicates the position of the smallest value. If "K" is 1, the function finds out the smallest value. If "K" is 2, the function finds out the 2nd smallest value. If it's 3 then the function finds out the 3rd smallest value.

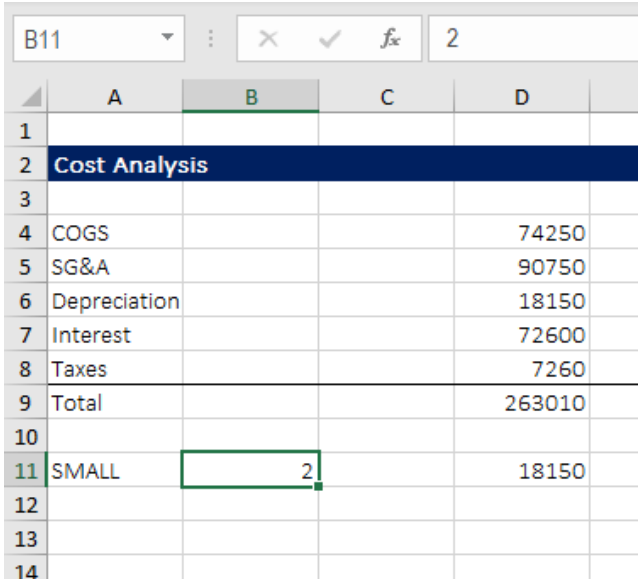
How to use the SMALL function in Excel:



Picture-1



Picture-2



B11 | 2

	A	B	C	D
1				
2	Cost Analysis			
3				
4	COGS			74250
5	SG&A			90750
6	Depreciation			18150
7	Interest			72600
8	Taxes			7260
9	Total			263010
10				
11	SMALL	2		18150
12				
13				
14				

Picture-3

Here, we have hypothetical data on cost and are told to analyze costs. From this data, we will find out the K smallest value.

Step 1: Enter the SMALL function in cell D11 by typing manually =small and pressing the tab key to select.

Step 2: After entering the SMALL function refer from cell D4 to D8 under the array argument as we want k smallest value from this data set.

Step 3: Under the K argument, refer to “cell B11”. We have set value 1 in cell B11 as we want to get the smallest value of the data set. You can manually type 1 in the function but in that case, the function doesn’t automatically update the K value so if you want to get the 2nd smallest value you need to update again by typing manually “2” in the function. So, we refer to “cell B11” so that we can get updated results when we change the value in cell B11.

After pressing Enter, we got the smallest value from the data set (see 2nd picture).

See picture no. 3, this time we change the K to “2”. The function automatically updated the result as 2nd smallest value. Because we referred the cell B11 as the K value that’s why the function automatically updated the result. Now, we can change the K value to get our desired result.

Note:

If there is any text in the referred values under the array, the function might show the wrong result. Make sure there is no text.

The value of K must be numeric between 1 and the number of referred values.

Reading 4.3

LARGE

This function is used to get the largest value in a range of values.

It's the opposite of the SMALL function. Sometimes we must look at the biggest cost and manage it. It's also an important function, easy to use, and a very handy tool to find out the k largest value.

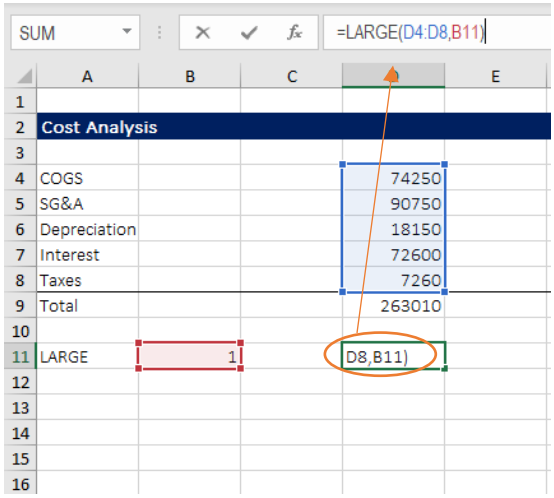
FORMULA

LARGE (array, k)

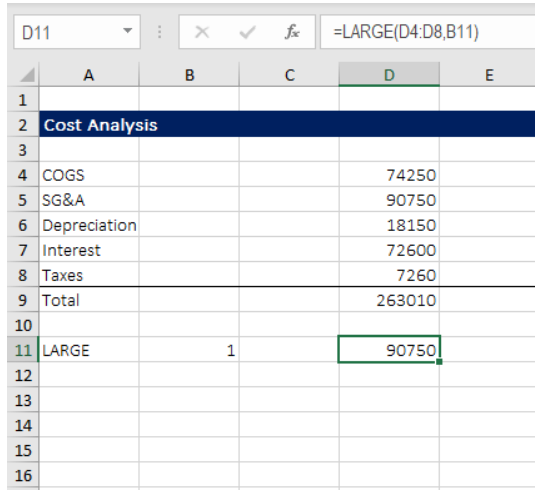
Array: It's a required argument that indicates the array of values we want to get the K largest value.

K: Same as SMALL Function. It's also a required argument. K indicates the position of the largest value. If "K" is 1, the function finds out the largest value. If "K" is 2, the function finds out the 2nd largest value. If it's 3 then the function finds out the 3rd largest value

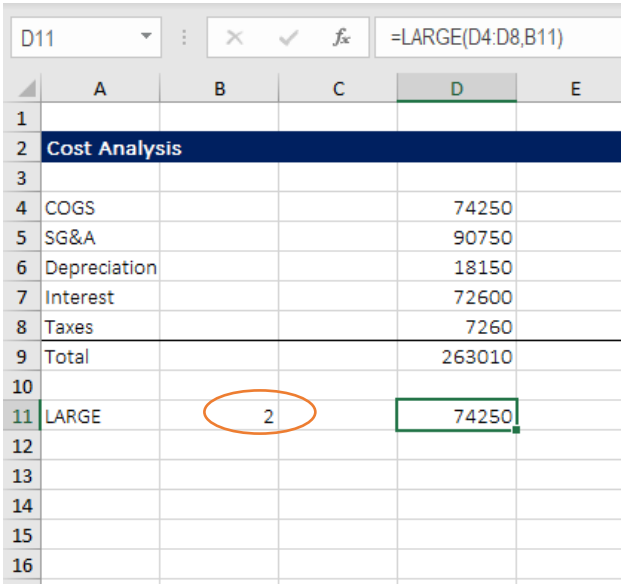
How to use the LARGE Function in Excel:



Picture-1



Picture-2



Picture-3

Here, the same data as the previous but we will find out the K largest value instead of the small value.

Step 1: Enter the LARGE function in cell D11 by typing manually =large.

Step 2: After entering the LARGE function refer from cell D4 to D8 under the array argument as we want the k largest value from this data set.

Step 3: Under K argument refers to “cell B11”. We have set value 1 in cell B11 as we want to get the largest value of the data set. You can manually type 1 in the function but in that case, the function doesn’t automatically update the K value so if you want to get the 2nd largest value you need to update again by typing manually “2” in the function. So, we refer to “cell B11” so that we can get updated results when we change the value in cell B11.

After pressing Enter, we got the largest value from the data set (see 2nd picture).

See picture no. 3, this time we change the K to “2”. The function automatically updated the result as 2nd largest value. Because we referred the cell B11 as the K value that’s why the function automatically updated the result. Now, we can change the K value to get our desired result.

Note:

If there is any text in the referred values under the array, the function might show the wrong result. Make sure there is no text.

The value of K must be numeric between 1 and the number of referred values.

Reading 4.4

COUNT

The function counts the number of cells in a range that contains numbers.

The count function counts the cell that contains numbers only. If there is any text in the cell this function doesn’t count that cell. As a financial analyst, it’s important when we work and need to count numbers of a specific range.

FORMULA:

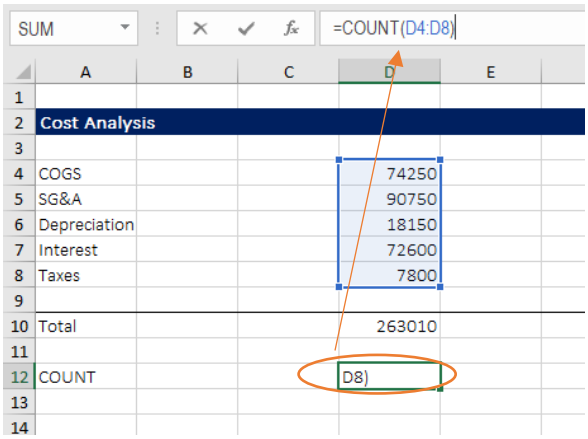
COUNT (Value 1, [Value 2]…)

Value 1: It’s a required argument that indicates the range of values we wish to count. It might be a value or a range of values

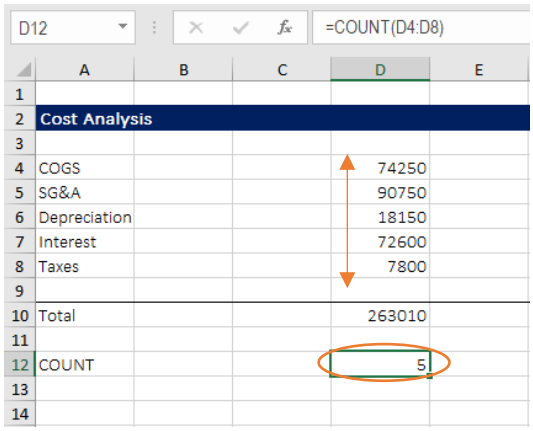
Value 2: It’s an optional argument that indicates the addition of values or a range of values. A maximum number of 255 values can be taken.

How to use the COUNT Function in Excel:

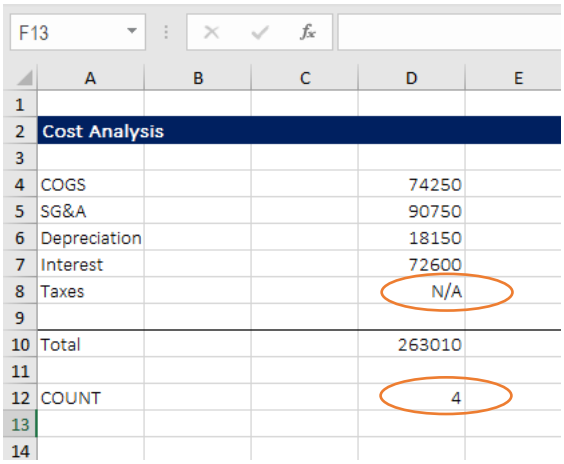
To understand let's consider these examples.



Picture-1



Picture-2



Picture-3

See the first example, we have hypothetical data from which we wish to count the cell containing numbers.

Step 1: Enter the COUNT function in cell D12. It's easy to type manually. Remember when typing a function must start with the "=" sign otherwise it would not work.

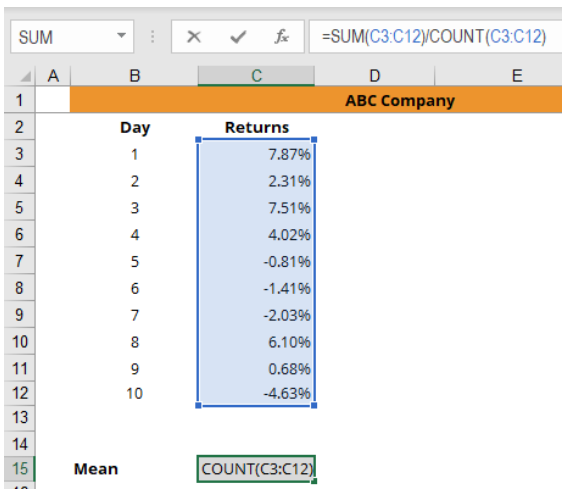
Step 2: Refer from cell D4 to D8 as we wish to find cells containing numbers from the data set.

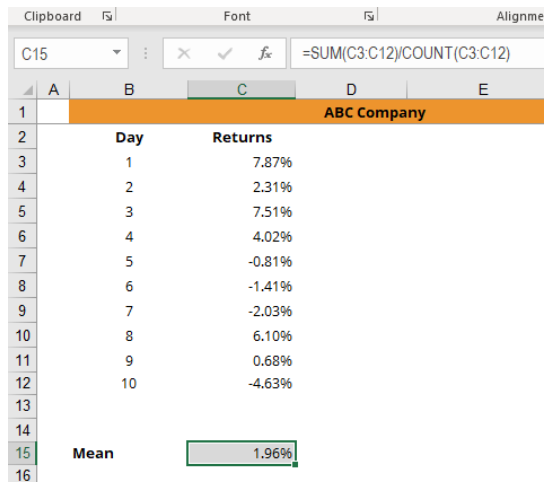
By pressing enter the function comes with the result which is 5 shown in the 2nd example.

Let's discuss the 3rd example. Here instead of numbers, we enter text in cell D8. The COUNT function automatically updated the result to 4 and that's because the count function considers only the cell that contains the number. If there is a mix of numbers and text in a cell, the function doesn't count that cell also.

Here are the simple examples shown above. When you work on a complex analysis this function will help.

Here is another example to show how the count function can help to analyze data.





See the example, here we have hypothetical data of ABC Company about its 10 days share return. We are told to find out the mean return from the senior analyst. The formula of mean is $\frac{\sum X}{N}$. ∑X, indicates the sum of all data and N indicates the number of all data points.

So here, we are going to find out the mean by using the COUNT Function.

Step 1: We enter the SUM function in cell C15 to get the total.

Step 2: In this step, we use the COUNT function. See the formula shown above, we need to divide the total by the number of data points to get the mean. So, we enter the COUNT function in the formula to count the cell containing numbers. The COUNT function calculates the cell containing numbers which are "10". Then the formula divides the total by the number of data points to get the mean. In the example, we use simple data set to make the thing easy. But in real life, we work in a complex situation with a complex data set. This time COUNT Function helps a lot.

Reading 4.5

COUNTA

Counts the number of cells that contain values (non-blank cells).

The function is useful if we wish to cunt the non-blank cell in a given range. Unlike the COUNT function, the COUNTA function counts non-blank cells. The cell can contain text, numbers, or any kind of value. As a financial analyst, we might need to count no-blank cells. In such a scenario, the COUNTA function is useful.

FORMULA:

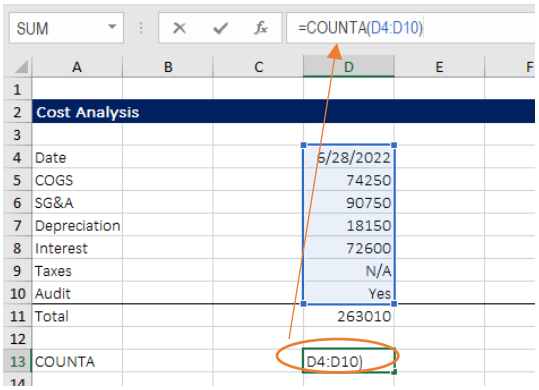
COUNTA (Value 1, [Value 2]…)

Value 1: It's a required argument that indicates the range of values we wish to count. It might be a value or a range of values

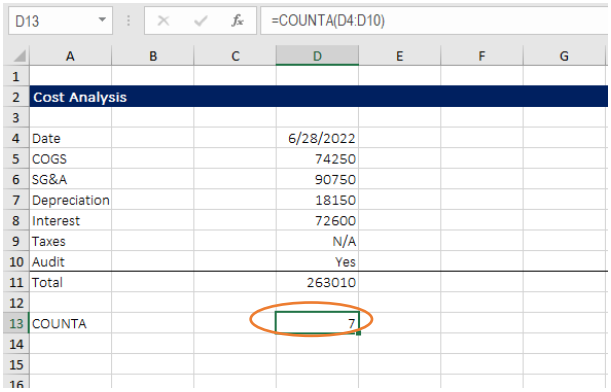
Value 2: It's an optional argument that indicates the added value or range of values. A maximum number of 255 values can be taken.

How to use the COUNT Function in Excel:

To understand let's consider these examples.



Picture-1



Picture-2

See the first example, we have hypothetical data from which we wish to count the cell containing a value.

Step 1: Enter the COUNTA function in cell D13. It's easy to type manually. Remember when typing any function in a cell must start with the "=" sign otherwise it would not work.

Step 2: Refer from cell D4 to D10 as we wish to find out the cells that contain a value from the data set.

By pressing enter the function comes with the result which is 7 shown in the 2nd example.

Unlike the COUNT function, here the COUNTA function considers all the cells that contain a value. What if we enter the COUNT function instead of the COUNTA function?

The COUNT function came with 5, Why? Because the COUNT function ignores cells that contain other values instead of the number. So, it would ignore the last two cells that contain text.

Reading 4.6

COUNTIF

This function counts the cells that meet a specific criterion.

COUNTIF function is very important in every aspect. It's quite helpful for Business analysis. Suppose we might need to fund out the monthly sales that exceed expectations. We will explore some examples to make it clear.

FORMULA

COUNTIF (range, criteria…)

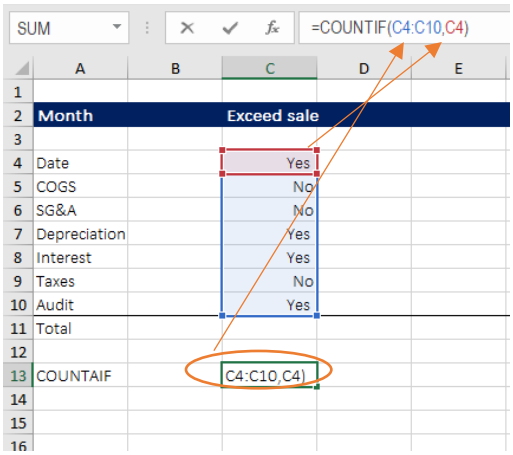
Range: It's a required argument. The range indicates the range of cells/values from which we wish to count cells that meet a specific criterion.

Criteria: It's also a required argument. The condition indicates the specific criterion on the basis we wish to count cells.

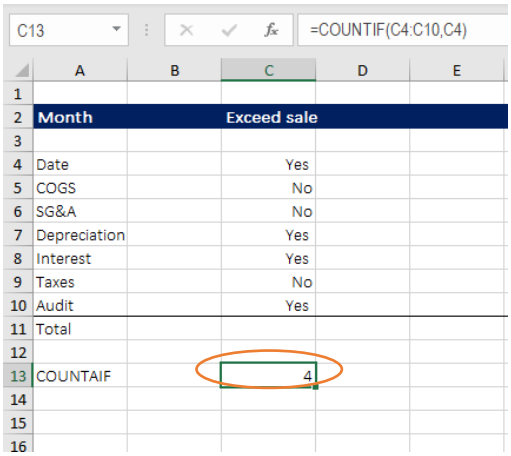
How to use the COUNTIF function in Excel:

We are going to see some examples to make this thing clear.

Here, we are provided with some data on monthly cells and told to count months that exceeded the expected sales.



Picture-1



Picture-2

See the first example, we used the COUNTIF function to find out our desired result. In that case, COUNT and COUNTA functions cannot find out our desired result by using specific criteria. Let's consider a step-by-step instruction to understand how we can solve our problem.

Step 1: We entered the COUNTIF function in cell C13.

Step 2: We refer cell C4 to cell C10 under the range argument.

Step 3: In this step, we need to set out our criterion on the basis we wish to find out our expected result. So, we refer the cell C4 as we wish to find out the months that exceeded sales expectations. In the example, the month exceeded sales expectation is categorized as yes. So, under the criteria argument, we can refer to any cell that contains "yes". The function automatically finds out the cell contains "yes".

Step 4: Now see the 2nd example, the function comes with result 4 as 4 four months exceeded monthly sales expectations.

This is how the COUNTIF function works in Excel shown above in a very easy way. In real life, it's a very useful Function.

Reading 5

LOGICAL & Financial

Reading 5.1

IF

The function is used to test a specific condition.

IF function tests a condition and returns for a value true or false. Suppose, we want to know whether sales revenue is more than 50 million or not. We command if sales revenue is more than 50 million then show true otherwise false. If the sales revenue is more than 50 million the function shows True and if the statement is incorrect, it shows false. We test a condition by this function.

IF Function is very useful for financial analysis. We not only check values, and text but also conduct mathematical conditions.

Formula:

IF (logical-test, [value-if-true],[value-if-false)

Logical-test: It's a required argument that we wish to check whether it meets our criteria or not.

Value-if-true: It's an optional argument that indicates the value if the function meets the specific criteria.

Value-if-false: It's also an optional argument that indicates the value if the function doesn't meet the condition.

Logical operation for IF function:

= [equal to]

< [less than]

> [greater than]

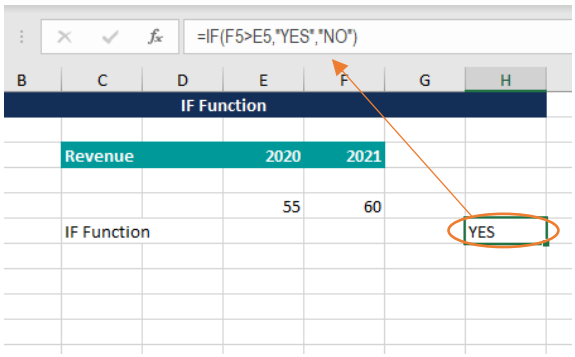
<> [not equal to]

>= [greater than or equal to]

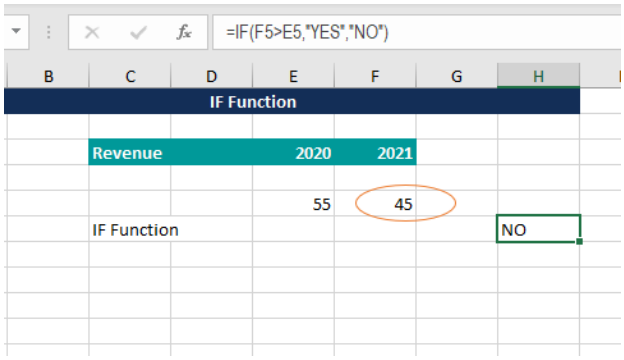
<= [less than equal to]

How to use the IF function in Excel.

Let's begin with a simple example. Here we have two years of sales data. We are going to test whether the 2021 sale is greater than the 2020 sale or not.



Picture-1



Picture-2

Follow step-by-step instructions:

Step 1: Enter the IF function in cell H6.

Step2: We are going to test if 2021 sales revenue is greater than 2020 or not. So, refer to 2021 sales revenue (cell F5) using the ">" sign as we wish to see it greater. Then refer to 2020 sale revenue.

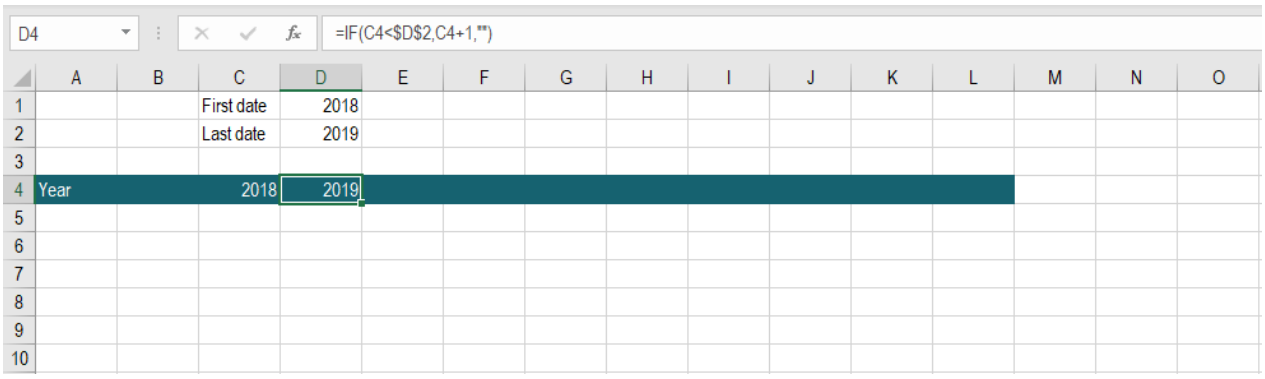
Step 3: Set "YES" if the logical statement is current and set "NO" if the logical statement is incorrect. Use the " sign before and after any text in the excel function otherwise, it wouldn't work.

Step 4: After finishing the function press the "Enter" key on your keyboard. The function tells us the statement is correct and shows YES as we commended.

See picture 2, let's test the function in another way. This time we keep everything the same as previously except for one change. Under 2021 sales revenue we decreased the value to 45 million. The function automatically updated the result as NO. As of this time 2021 sales revenue is not greater than 2020. The statement is incorrect and the function shows No as we commended.

Now, let's dive into a complex example.

How we can set a date and time with the IF function



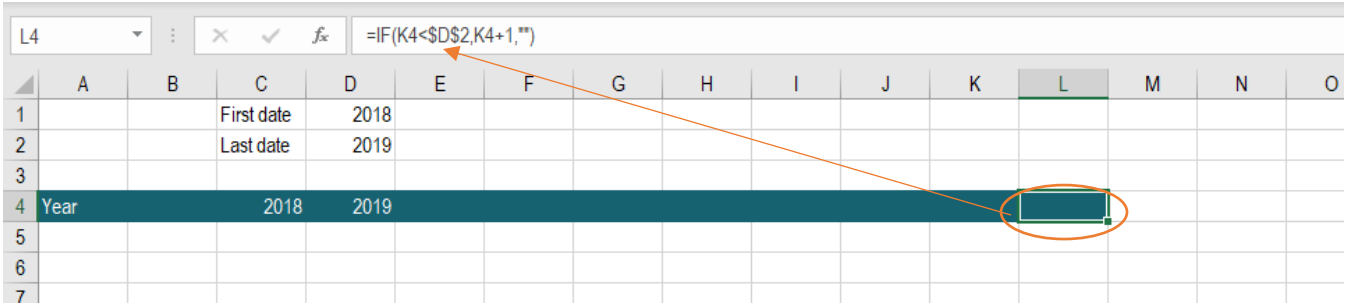
See here, we are going to set our year for financial statements. Let's explore how we can get an impressive function with the IF function.

Step 1: In cell C4, enter 2018. You can manually enter it or use the YEAR function and refer the cell D1.

Step 2: In cell D4, enter the If function. Refer to cell C4. And enter less than the "<" sign and refer to cell D2. Lock cell D2 as we wish the function always refers to this cell for each function.

Step 3: If the statement is true then make the value, previous year +1. So, refer previous year (cell C4) and add 1.

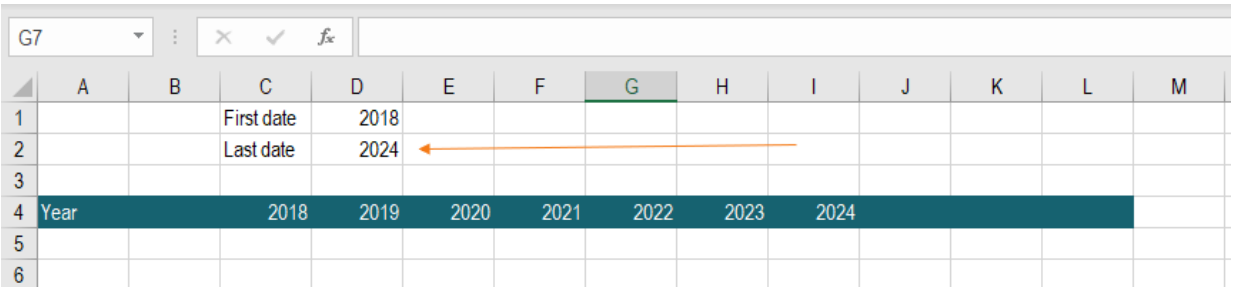
Step 4: Left blank if the statement is false. So, use the "" sign to leave the cell blank.

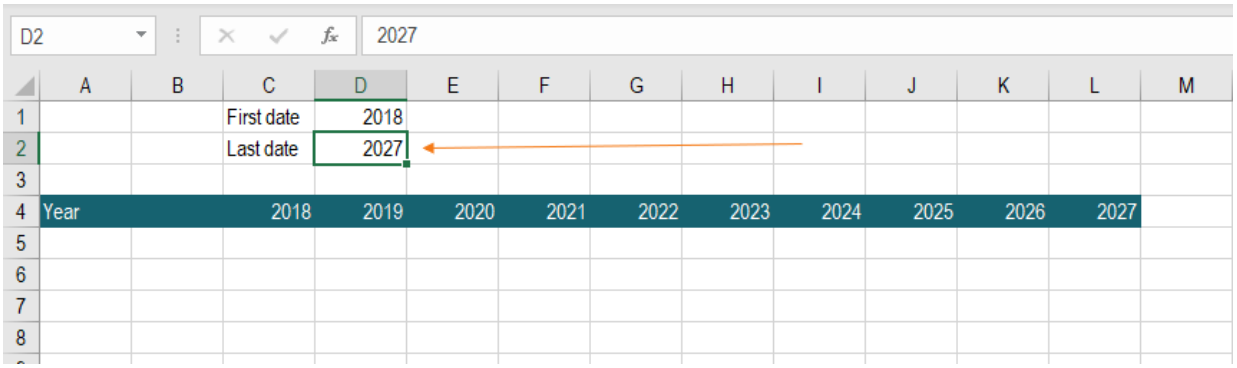


Step 5: Press enter and use Ctrl + Shift + arrow to select L4. Use Ctrl+ R to autofill right.

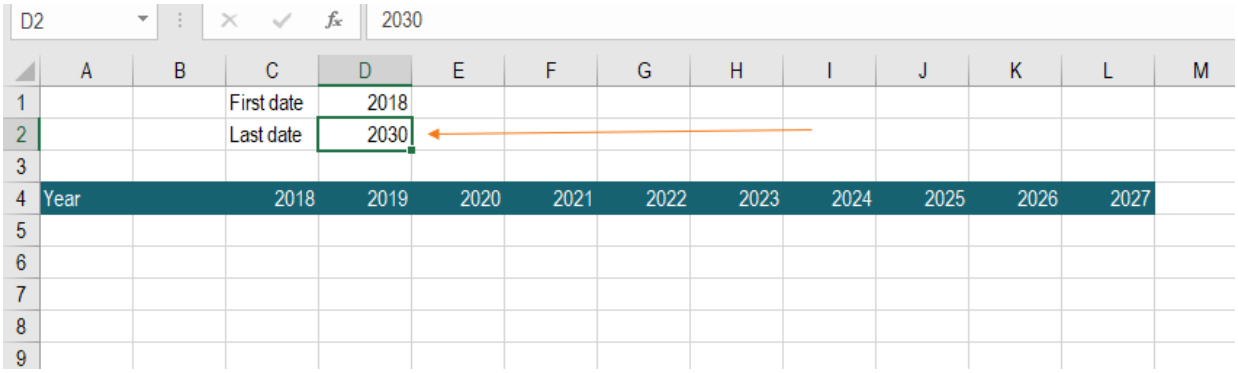
Description: Our logical statement is if the previous year is less than the Last date (cell D2) then show the next year. If the previous year is not less than the last date then left the cell blank.

As we can see the previous year is less than the last date and show the result up to the last date. If we update the last date, the function will automatically show the result.





We updated as 2027 and so the function automatically updated as we commended.



The function will update up to the cell we build our function.

Example-2:

So, we can build a powerful function with the IF function. If we wish to analyze 5/7/2….. years of data from 10 years of data. We can also do this with the if function. Here is how we can do this.

D15 =IF(D$13<=$E$2,D5,"")

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1				First date	2018									
2				Last date	2027									
3	Year			2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	
4														
5	Revenue			100500	110148	120832	131707	142244	156253	171642	188546	207115	227513	
6	COGS			38672	43486	48333	52024	58320	64064	70373	77304	84917	93280	
7	Gross Profit			61828	66662	72499	79683	83924	92189	101269	111242	122198	134233	
8	Salaries			23789	26812	27859	28859	29659	32580	35789	39313	43185	47438	
9	Marketing			12871	13897	18652	18952	19652	21587	23714	26049	28614	31433	
10	Rent			5000	5000	5000	5100	5100	5602	6154	6760	7426	8157	
11	Earnings Before Tax			20168	20953	20988	26772	29513	32420	35612	39120	42973	47205	
12														
13	Analysis			2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	
14														
15	Revenue			100500										
16	COGS													
17	Gross Profit													
18	Salaries													
19	Marketing													
20	Rent													
21	Earnings Before Tax													
22														

Here, we are provided with 10 years of Income statement data. We will learn how to analyze the number of particular years we wish.

Step 1: Build function in cell D15 shown above. In that case, we want to see the value in cell D15 if D13 is less than or equal to cell E2. If the statement is correct then show the result of cell D5. If it's not correct then left the cell blank.

D15

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
2				Last date	2027											
3	Year			2018	2019	2020	2021	2022	2023	2024	2025	2026	2027			
4																
5	Revenue			100500	110148	120832	131707	142244	156253	171642	188546	207115	227513			
6	COGS			38672	43486	48333	52024	58320	64064	70373	77304	84917	93280			
7	Gross Profit			61828	66662	72499	79683	83924	92189	101269	111242	122198	134233			
8	Salaries			23789	26812	27859	28859	29659	32580	35789	39313	43185	47438			
9	Marketing			12871	13897	18652	18952	19652	21587	23714	26049	28614	31433			
10	Rent			5000	5000	5000	5100	5100	5602	6154	6760	7426	8157			
11	Earnings Before Tax			20168	20953	20988	26772	29513	32420	35612	39120	42973	47205			
12																
13	Analysis			2018	2019	2020	2021	2022	2023	2024	2025	2026	2027			
14																
15	Revenue			100500												
16	COGS															
17	Gross Profit															
18	Salaries															
19	Marketing															
20	Rent															
21	Earnings Before Tax															
22																
23																

Step 2: Select cells the same as shown above. We selected those cells we wish to see the value.

Step 3: To autofill down press Ctrl + D and Ctrl + R to fill right.

We are all done. Now, we can update the value of the last date to see our desired values.

T10

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1				First date	2018											
2				Last date	2023											
3	Year			2018	2019	2020	2021	2022	2023	2024	2025	2026	2027			
4																
5	Revenue			100500	110148	120832	131707	142244	156253	171642	188546	207115	227513			
6	COGS			38672	43486	48333	52024	58320	64064	70373	77304	84917	93280			
7	Gross Profit			61828	66662	72499	79683	83924	92189	101269	111242	122198	134233			
8	Salaries			23789	26812	27859	28859	29659	32580	35789	39313	43185	47438			
9	Marketing			12871	13897	18652	18952	19652	21587	23714	26049	28614	31433			
10	Rent			5000	5000	5000	5100	5100	5602	6154	6760	7426	8157			
11	Earnings Before Tax			20168	20953	20988	26772	29513	32420	35612	39120	42973	47205			
12																
13	Analysis			2018	2019	2020	2021	2022	2023							
14																
15	Revenue			100500	110148	120832	131707	142244	156253							
16	COGS			38672	43486	48333	52024	58320	64064							
17	Gross Profit			61828	66662	72499	79683	83924	92189							
18	Salaries			23789	26812	27859	28859	29659	32580							
19	Marketing			12871	13897	18652	18952	19652	21587							
20	Rent			5000	5000	5000	5100	5100	5602							
21	Earnings Before Tax			20168	20953	20988	26772	29513	32420							

V11

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1				First date	2018										
2				Last date	2025										
3	Year			2018	2019	2020	2021	2022	2023	2024	2025	2026	2027		
4															
5	Revenue			100500	110148	120832	131707	142244	156253	171642	188546	207115	227513		
6	COGS			38672	43486	48333	52024	58320	64064	70373	77304	84917	93280		
7	Gross Profit			61828	66662	72499	79683	83924	92189	101269	111242	122198	134233		
8	Salaries			23789	26812	27859	28859	29659	32580	35789	39313	43185	47438		
9	Marketing			12871	13897	18652	18952	19652	21587	23714	26049	28614	31433		
10	Rent			5000	5000	5000	5100	5100	5602	6154	6760	7426	8157		
11	Earnings Before Tax			20168	20953	20988	26772	29513	32420	35612	39120	42973	47205		
12															
13	Analysis			2018	2019	2020	2021	2022	2023	2024	2025				
14															
15	Revenue			100500	110148	120832	131707	142244	156253	171642	188546				
16	COGS			38672	43486	48333	52024	58320	64064	70373	77304				
17	Gross Profit			61828	66662	72499	79683	83924	92189	101269	111242				
18	Salaries			23789	26812	27859	28859	29659	32580	35789	39313				
19	Marketing			12871	13897	18652	18952	19652	21587	23714	26049				
20	Rent			5000	5000	5000	5100	5100	5602	6154	6760				
21	Earnings Before Tax			20168	20953	20988	26772	29513	32420	35612	39120				
22															

Example 3:

This is the last example of the IF function. We will learn how we can set an alarm with the function. When we build a statement of balance sheet. We need to balance the liability side and the asset side. So, in that case, we can use the IF function to make an alert if there is any imbalance.

D3 =IF(D17>1,"ERROR","OK")

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	**Statement of Balance sheet**			**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	
2														
3	*Error Check*			*OK*	*OK*	*OK*	*OK*	*OK*	*OK*	*OK*	*OK*	*OK*	*OK*	
4														
5	**Asset**													
6	Current asset			25142	27656.2	30421.82	33464	36810.4	40491.44	44540.59	48994.65	53894.11	59283.52	
7	Non- current asset			19263	21189.3	23308.23	25639.05	28202.96	31023.25	34125.58	37538.14	41291.95	45421.15	
8	Total asset			44405	48845.5	53730.05	59103.06	65013.36	71514.7	78666.17	86532.78	95186.06	104704.7	
9														
10	**Liabilities**													
11	Non-current liabilities			17599.4	19359.34	21295.27	23424.8	25767.28	28344.01	31178.41	34296.25	37725.88	41498.46	
12	Current liabilities			7542.6	8296.86	9126.546	10039.2	11043.12	12147.43	13362.18	14698.39	16168.23	17785.06	
13	Total Liabilities			25142	27656.2	30421.82	33464	36810.4	40491.44	44540.59	48994.65	53894.11	59283.52	
14	Share holders' equity			19263	21189.3	23308.23	25639.05	28202.96	31023.25	34125.58	37538.14	41291.95	45421.15	
15	Total Liabilities and equity			44405	48845.5	53730.05	59103.06	65013.36	71514.7	78666.17	86532.78	95186.06	104704.7	
16														
17	*check*			*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	

See cell D3 to understand how we build the function. If all sides are balanced then show OK otherwise show ERROR. As the sides are balanced the function shows OK. See next.

R6

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	**Statement of Balance sheet**			**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	
2														
3	*Error Check*			*OK*	*OK*	*OK*	*OK*	*OK*	*OK*	*OK*	*OK*	*OK*	*ERROR*	
4														
5	**Asset**													
6	Current asset			25142	27656.2	30421.82	33464	36810.4	40491.44	44540.59	48994.65	53894.11	59283.52	
7	Non- current asset			19263	21189.3	23308.23	25639.05	28202.96	31023.25	34125.58	37538.14	41291.95	45421.15	
8	Total asset			44405	48845.5	53730.05	59103.06	65013.36	71514.7	78666.17	86532.78	95186.06	104704.7	
9														
10	**Liabilities**													
11	Non-current liabilities			17599.4	19359.34	21295.27	23424.8	25767.28	28344.01	31178.41	34296.25	37725.88	50000	
12	Current liabilities			7542.6	8296.86	9126.546	10039.2	11043.12	12147.43	13362.18	14698.39	16168.23	17785.06	
13	Total Liabilities			25142	27656.2	30421.82	33464	36810.4	40491.44	44540.59	48994.65	53894.11	67785.06	
14	Share holders' equity			19263	21189.3	23308.23	25639.05	28202.96	31023.25	34125.58	37538.14	41291.95	45421.15	
15	Total Liabilities and equity			44405	48845.5	53730.05	59103.06	65013.36	71514.7	78666.17	86532.78	95186.06	113206.2	
16														
17	*check*			*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*8501.535*	
18														

Here, two sides are not balanced and the function shows ERROR as we commended. Now, we can easily understand there is a problem in the 2017 balance sheet that needs to fix.

Hope you can understand how we can build powerful formula with the IF function. It's a very handy and useful function for financial analysis.

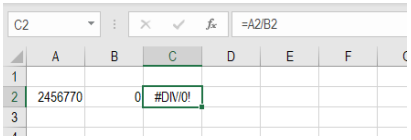
Reading 5.2

IFERROR

The function is used to trap the error and handle it.

This function finds out the error and makes it correct in our desired way. As a financial analyst, we need to work with formulas, functions, and other data. Sometimes we need to handle errors. Errors are likely, #NAME?, #NULL!, #NUM!, #DIV/0!, #VALUE!, #REF!, #N/A.

For example, if we divided cell A2 by cell C2 it doesn't show any result. It shows #DIV/0! meaning the value is divided by 0. We can fix it instead of an error.



FORMULA

IFERROR (value, value-if-error)

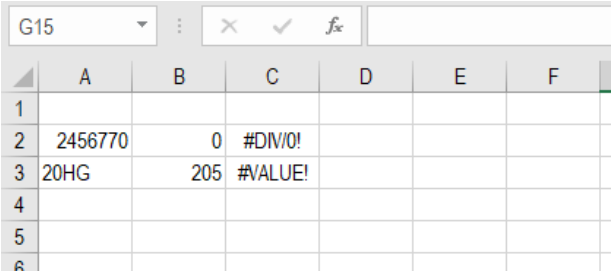
Value: It is a required argument that indicates the value needs to be tested. It's an address of a cell.

Value-if-error: It's also a required argument that indicates the value we wish to see for the result. Suppose, the value is an error, and want to see "N/A" or left the cell blank if the value is an error. Then, in this argument, we set our desired result if the value is Error.

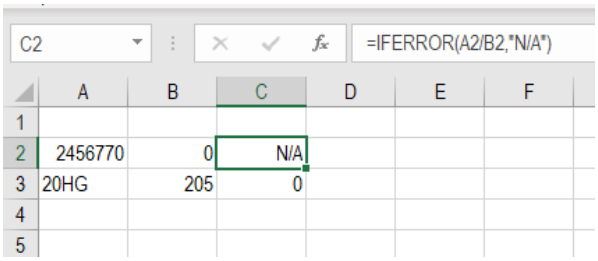
How to use the IFERROR function in Excel:

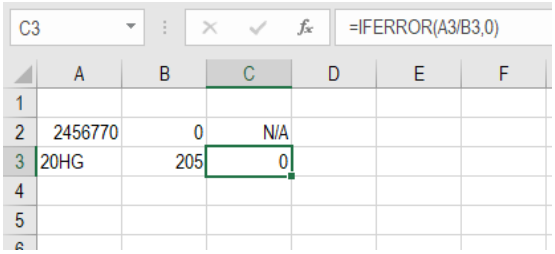
Let's explore simple examples before diving into a complex example to make it clear.

See the example first.



We have this data set. When we divide "column A" by "column B" instead of showing a result it shows errors. We will learn how to fix them instead of showing errors.





See the first example first, instead of #DIV/0! We want to see the N/A. Follow step-by-step instructions.

Step 1: We want to fix the error in cell C2. So, under the "value" argument refer the cell C2.

Step 2: Under the "value-if-error" argument write "N/A" as we want to see the result N/A if the value is an error.

Step 3: Close the Parentheses and press enter.

The function fixed the error in our desired way. We get a result instead of an error.

See the 2nd example now.

Step 1: We want to fix the error in cell C3. So, under the "value" argument refer the cell C3.

Step 2: Under the "value-if-error" argument write 0 as we want to see the result 0 if the value is an error.

Step 3: Close the Parentheses and press enter.

In this case, we want to see 0 if the result is an error. The function automatically fixed the error and showed the result we wish.

Hope we understand now how the IFERROR function works. In financial analysis, we use the IFERROR function to make mathematical calculations free from error. So, let's explore how it's useful and important in financial analysis.

Example 1:

K6 =($D6/G6)

Precedent M&A Transaction

	Transaction		Financial Data			Valuation		
Target	Value ($M)	Buyer	Sales	EBITDA	EBIT	EV/Sales	EV/EBITDA	EV/EBIT
Twitter	3,500	Tesla	2,700	na	na	1.3x	#VALUE!	#VALUE!
Google	6,500	ABCD co.	4,742	808	515	1.4x	8.0x	12.6x
Bell	2,550	PhyoPhyo Ei	1,690	249	178	1.5x	10.3x	14.3x
Black Rock	600	Enterprises	200	na	na	3.0x	#VALUE!	#VALUE!
Square	320	Company	65	17	15	4.9x	18.5x	21.2x
RFL	250	Partners	70	16	na	3.6x	15.5x	#VALUE!
Average								

We are provided with some data on some precedent transactions. Here we can find buyers, target companies, and transaction value. Next, we have financial data. With the help of financial data, we evaluate the transaction through some valuation multiples such as EV/sales, EV/EBITDA, and EV/EBIT. We find some errors When we calculate valuation multiples. What type of problems may we face if we don't fix the problem? See the next example.

K13 =AVERAGE(K6:K11)

Precedent M&A Transaction

	Transaction		Financial Data			Valuation		
Target	Value ($M)	Buyer	Sales	EBITDA	EBIT	EV/Sales	EV/EBITDA	EV/EBIT
Twitter	3,500	Tesla	2,700	na	na	1.3x	#VALUE!	#VALUE!
Google	6,500	ABCD co.	4,742	808	515	1.4x	8.0x	12.6x
Bell	2,550	PhyoPhyo Ei	1,690	249	178	1.5x	10.3x	14.3x
Black Rock	600	Enterprises	200	na	na	3.0x	#VALUE!	#VALUE!
Square	320	Company	65	17	15	4.9x	18.5x	21.2x
RFL	250	Partners	70	16	na	3.6x	15.5x	#VALUE!
Average						2.6x	#VALUE!	#VALUE!

we didn't fix errors yet. So, the Average function cannot calculate the average of the values. It's a big issue for financial analysis. We need to fix those errors to get the average value. let's see how we can fix it.

K6 =IFERROR($D6/G6,"NA")

Precedent M&A Transaction

	Transaction		Financial Data			Valuation		
Target	Value ($M)	Buyer	Sales	EBITDA	EBIT	EV/Sales	EV/EBITDA	EV/EBIT
Twitter	3,500	Tesla	2,700	na	na	1.3x	#VALUE!	#VALUE!
Google	6,500	ABCD co.	4,742	808	515	1.4x	8.0x	12.6x
Bell	2,550	PhyoPhyo Ei	1,690	249	178	1.5x	10.3x	14.3x
Black Rock	600	Enterprises	200	na	na	3.0x	#VALUE!	#VALUE!
Square	320	Company	65	17	15	4.9x	18.5x	21.2x
RFL	250	Partners	70	16	na	3.6x	15.5x	#VALUE!
Average						2.6x	#VALUE!	#VALUE!

Follow step-by-step instructions:

Step 1: Enter the IFERROR function in cell K6.

Step 2: Divide transaction value by the sale of the same row under the value argument as shown above. And lock column D as $D as we wish transaction value to be numerator every time.

Step 3: Write "NA" or anything you wish to see if the value is an error. In that case, we type "NA" and press enter.

Note: When you enter any text in the function use quotation mark.

Step 4: Select the Right cells and down cells up to the cell wishing to fix the error.

Valuation		
EV/Sales	EV/EBITDA	EV/EBIT
1.3x	#VALUE!	#VALUE!
1.4x	8.0x	12.6x
1.5x	10.3x	14.3x
3.0x	#VALUE!	#VALUE!
4.9x	18.5x	21.2x
3.6x	15.5x	#VALUE!
2.6x	#VALUE!	#VALUE!

Step 5: Use Ctrl + D to fill down and Ctrl + R to fill right.

Let's see what it looks like as we've corrected all the errors in the picture below.

K6 =IFERROR($D6/G6,"NA")

Precedent M&A Transaction

	Transaction		Financial Data			Valuation		
Target	Value ($M)	Buyer	Sales	EBITDA	EBIT	EV/Sales	EV/EBITDA	EV/EBIT
Twitter	3,500	Tesla	2,700	na	na	1.3x	NA	NA
Google	6,500	ABCD co.	4,742	808	515	1.4x	8.0x	12.6x
Bell	2,550	PhyoPhyo Ei	1,690	249	178	1.5x	10.3x	14.3x
Black Rock	600	Enterprises	200	na	na	3.0x	NA	NA
Square	320	Company	65	17	15	4.9x	18.5x	21.2x
RFL	250	Partners	70	16	na	3.6x	15.5x	NA
Average						2.6x	13.1x	16.1x

We are very happy to see it now. The IFERROR function fixed all the errors and we got the average value without any errors.

Hope you understand the power of the IFERROR function and how it's impactful in financial analysis. Now, you can build your own IFERROR function in a complex situation.

Reading 5.3

CHOOSE

This function chooses a value or criteria from the given value based on the index number.

This function is used to see a particular value from a set of different values or a range of values. Suppose, we have 3 different scenarios based on which we are testing a different value. Every time, we need to select a scenario from 3 different scenarios. The CHOOSE function helps us to select a particular scenario and help to test.

The CHOOSE function is very much important for financial analysis. We need to work with forecasting. We develop some different scenarios based on which we test future forecasting and examine how different scenarios affect future forecasting and many more.

FORMULA

CHOOSE (index-num, value-1, [value-2]…)

Index-num:

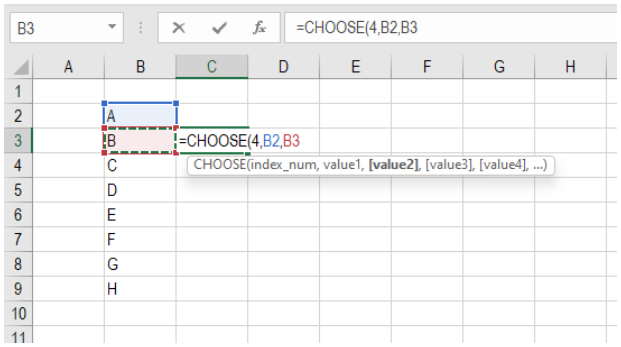
This is a required argument. This argument can be a number from 1 to 254. This is the number that specifies the particular value argument. Suppose we have 7 different scenarios and our index-num is 5. That means the function would show the 5th argument.

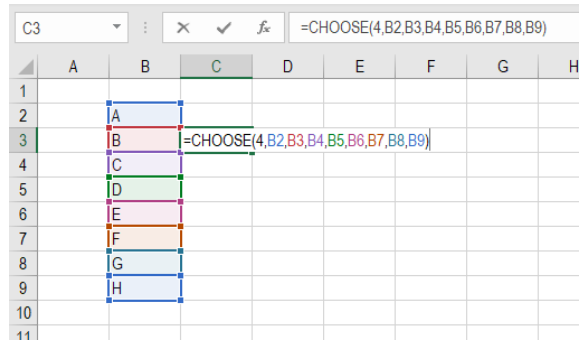
Value-1, [value-2]…:

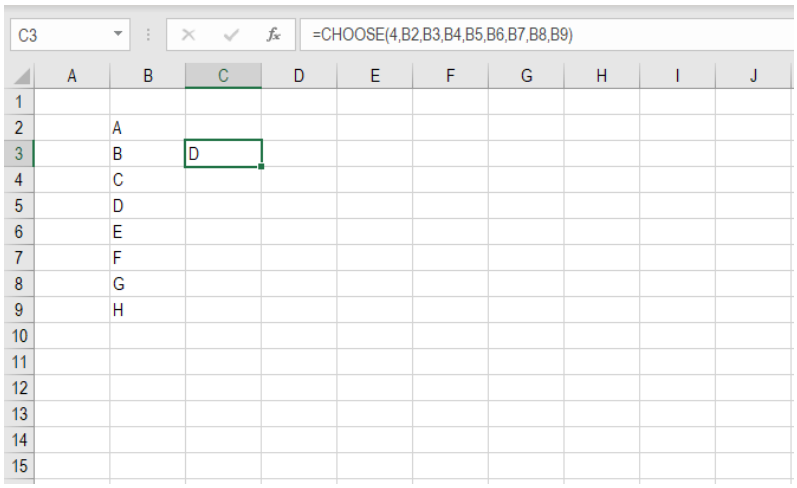
Value-1 is a required argument. That specifies the list of values that we want to see as a return value. [value-2] and others are optional

How to use the CHOOSE function in Excel:

Example-1







Here is a simple example to understand how the CHOOSE function works in Excel. Suppose, we have 8 different data sets from A-H. Our task is to choose a particular set of data among the data set. So that we can work with a set of data among different data sets. We will choose data from A-H.

Let's examine step-by-step instructions.

Step 1: Enter CHOOSE function in cell C3.

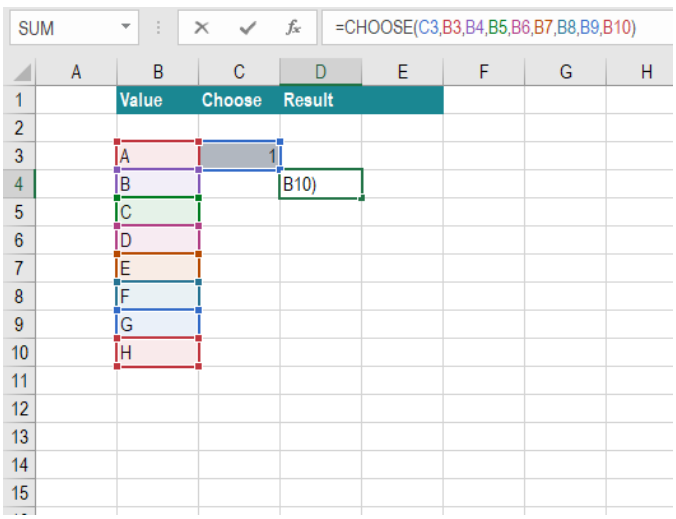
Step 2: Listen, we will see the value as a result based on the index-num argument. So, if we put 4 in this section the function will display the value which we set the 4th position in the function. In this case, we want to see the 4th position value. So, we set 4 in the index-num argument.

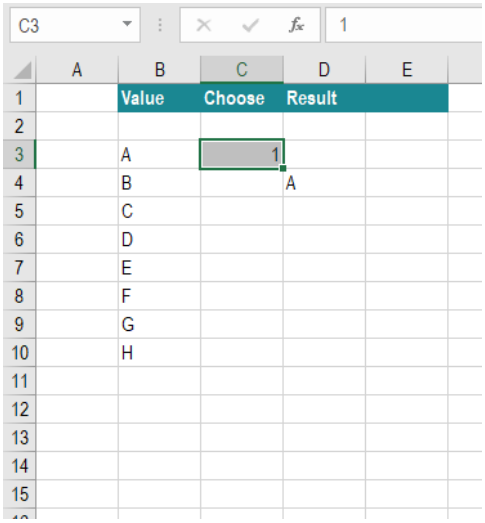
Step 3: Now, we must refer to values from which we want to display a particular value. Refer to values in the "Value" argument as shown above and press enter.

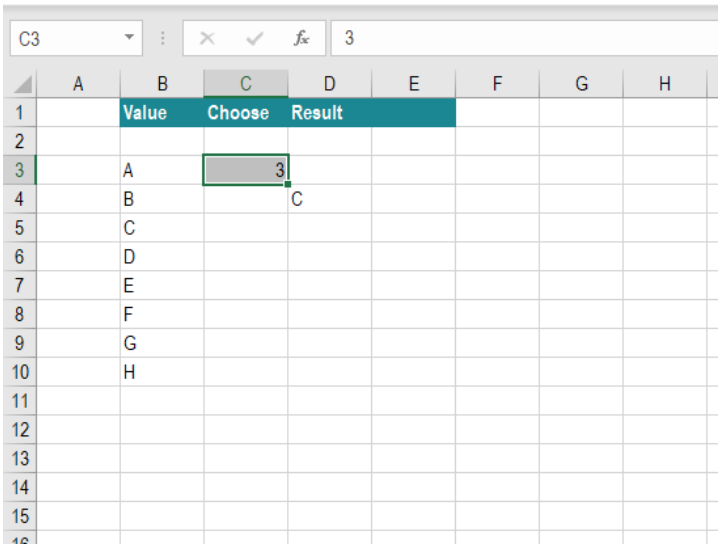
After pressing enter we can see a particular value which is "D". As we want to see the 4th position value, the function comes with the 4th position value.

But look, here is a problem. We cannot change the value automatically. We can only see the 4th position value. We cannot see others' positions without changing the function. We are going to learn how we can see our preferred result automatically in the next example.

Example 2:







Here, we are going to develop a more powerful function. We can see our preferred value without any change in the function.

Let's examine step-by-step instructions.

Step 1: We will refer to a cell Instead of putting any value in the function under the index-num argument. So, we refer the cell C3 in the index-num argument. Now, the function will always show the value we refer to in cell C3.

Step 2: Keep other things the same as previous (simply, refer to values from A-H) and press enter.

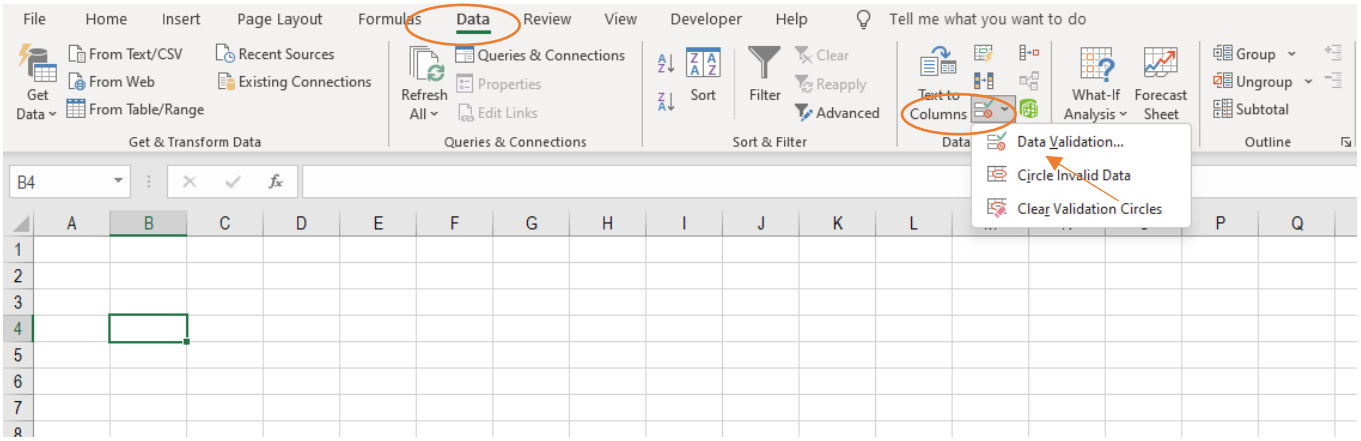
After pressing Enter we can see the value based on Cell C3 which we referred to in the index-num argument.

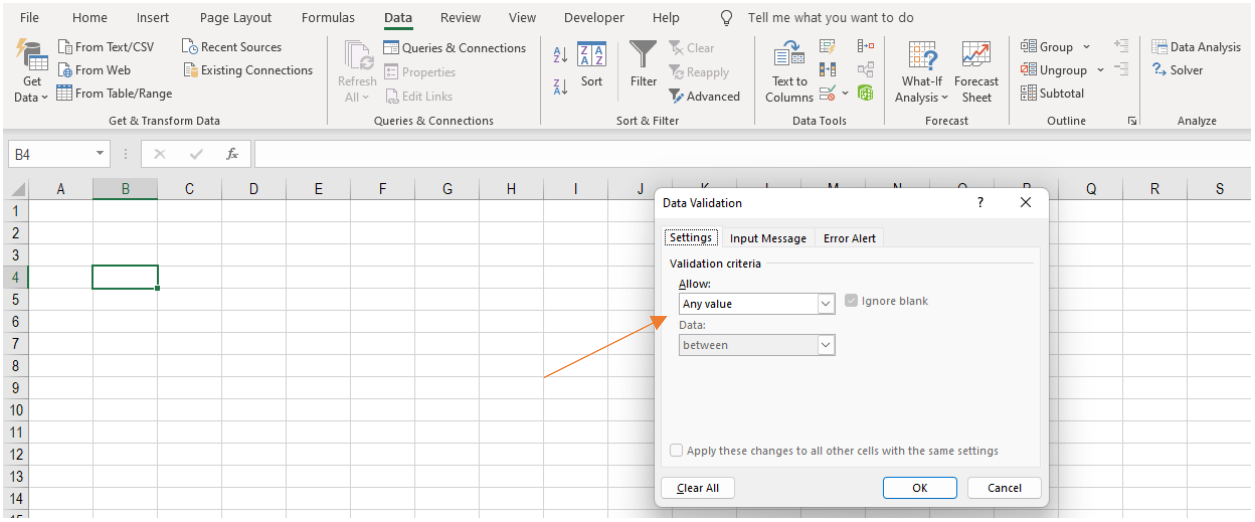
You can test the function by changing the value in cell C3. If you set 3 in cell C3 you can see the updated value. You can set other values to test the result. We can update the result automatically by only changing the value of cell C3.

Note: We cannot exceed the value of cell C3 more than the number of data sets. In the example, we cannot exceed 8 as we have 8 data sets. If we exceed the function does not work. We can increase the data set as well as the value of the cell C3 but remember we cannot exceed 256.

DROPDOWN LIST

Now, we are going to build an even more powerful function with help of a dropdown list. A dropdown list is a data validation function that will help us to choose a data among the list of data.

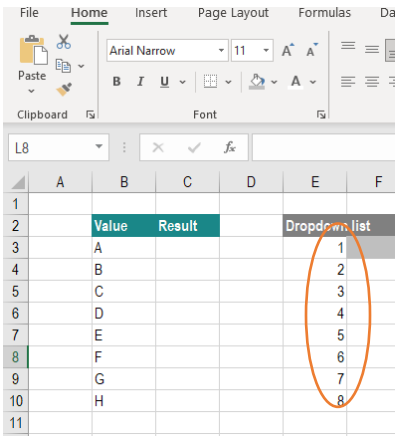


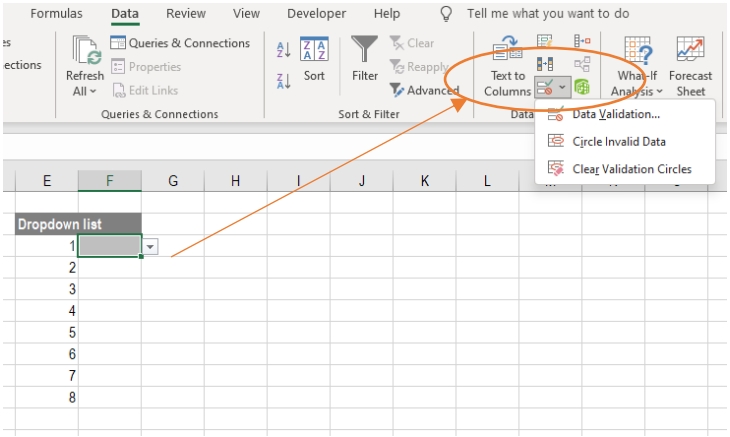


We can find a dropdown list under the data ribbon. Open the data ribbon and view data tools. You can find the data validation option there.

First, we will learn how to create a dropdown list. We will follow the step-by-step instructions.

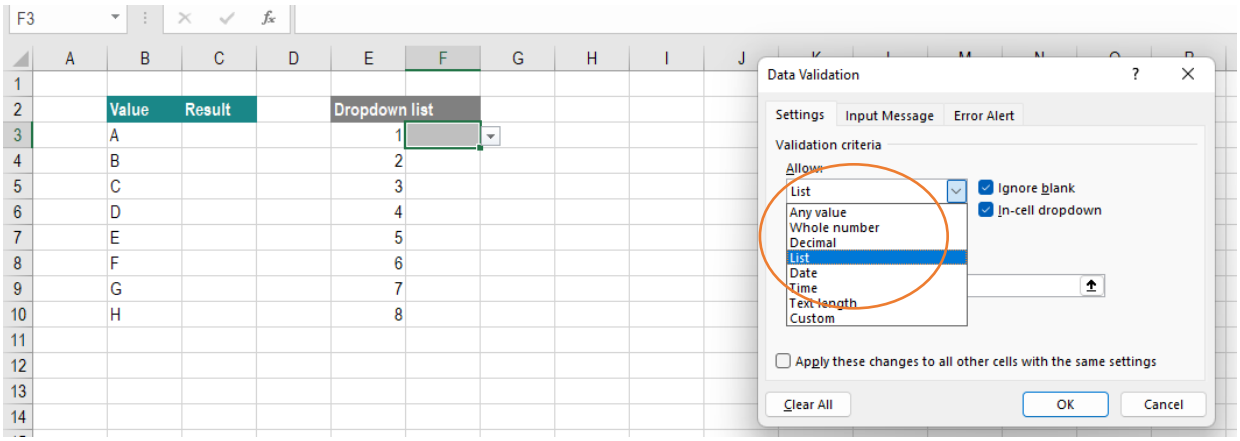
How to create a dropdown list:



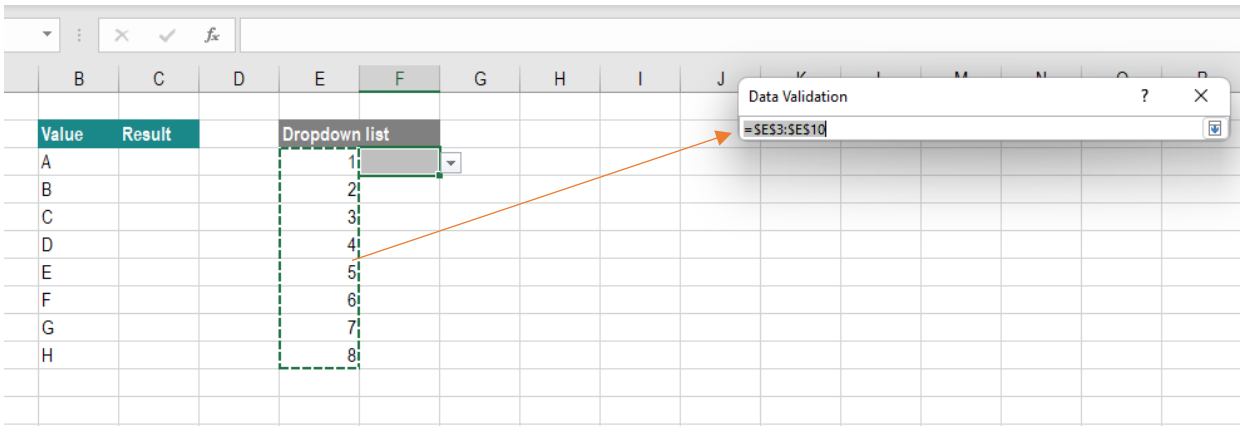


Step 1: First we create a list of numbers from 1 to 8. We have 8 different sets of data from A-H. So, we created 8 lists of numbers.

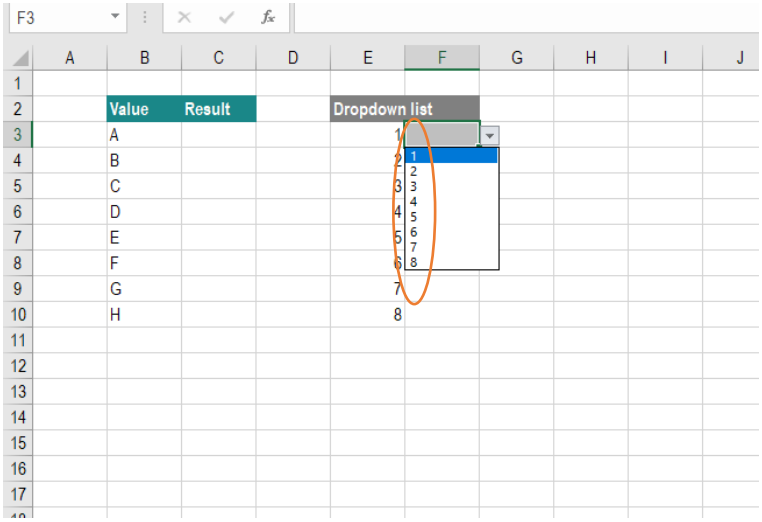
Step 2: After creating a list of numbers, we will create a dropdown list in cell F3. Put the cursor in cell F3 and go into the data ribbon. Under data tools, select the data validation option.



Step 3: After selecting the data validation option, we have a data validation dialogue box now. Select “list” among the options.



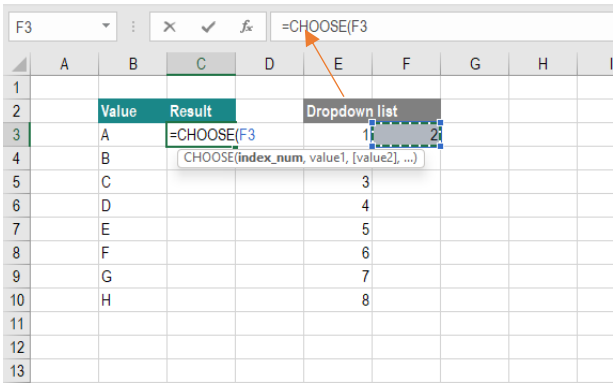
Step 4: Refer data from cell E3 to cell E10 under source argument and press OK. As we want to create a list with numbers from 1 to 8.

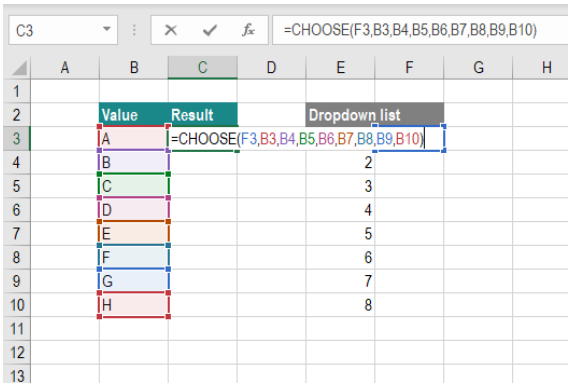


Step 5: After pressing OK, we have a dropdown list. From the list, we can choose any option from 1 to 8.

How to use the CHOOSE function with the help of a dropdown list:

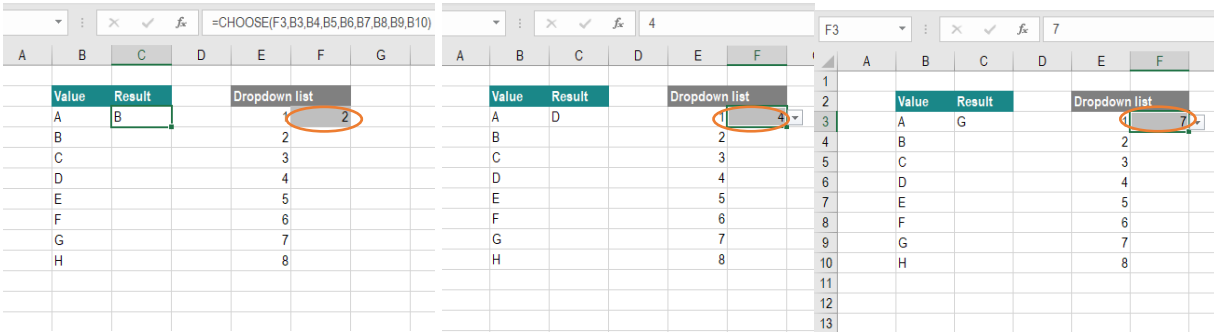
It's super easy and handy to build a CHOOSE function with the help of a dropdown list. We will learn with step-by-step instructions.





Step 1: Keep unchanged as in previous examples. We enter CHOOSE function in cell C3. Refer to F3 in the index-num argument as we created a dropdown list in that cell.

Step 2: Same as previous, refer cell B3 to cell B10 in the value argument. Close the parentheses and press enter.



Step 3: We are done. The function shows the result based on the dropdown list. Now, choose any option in the dropdown list the function will automatically update the result.

Here, you can see the result above. When we selected 2, 4, and 7 in the dropdown list the function show the result B, D, and G respectively. That means the function automatically updates the result. This is now even more powerful than the previous function.

Now we know how to build CHOOSE function combined with the dropdown list. It's time to know how we can use it in financial modeling. As a financial analyst, we need to analyze financial data. It's important to know how functions work in Excel. We are going to learn how we can build powerful modeling with that function.

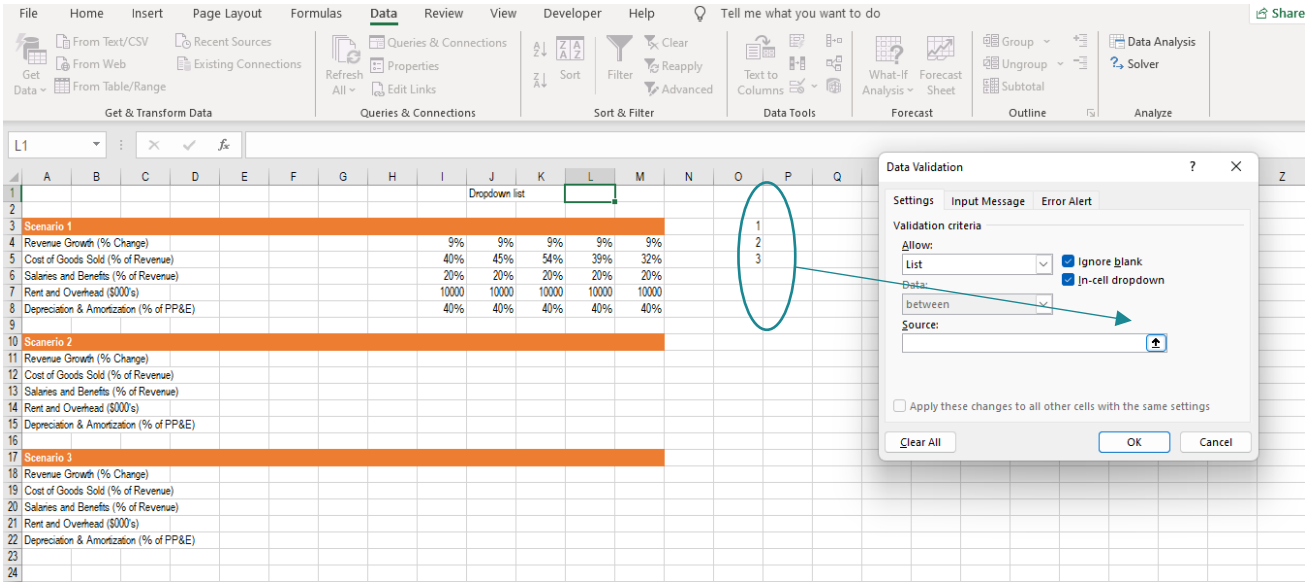
CHOOSE function in financial modeling (advanced)

We will create 3 different scenarios for our financial analysis. Think that, we build 3 different future forecasting for revenue based on past data. CHOOSE function will help us to choose one scenario among the 3 different scenarios. Instead of creating 3 different financial models we will create one and choose one option among 3 options at a time.

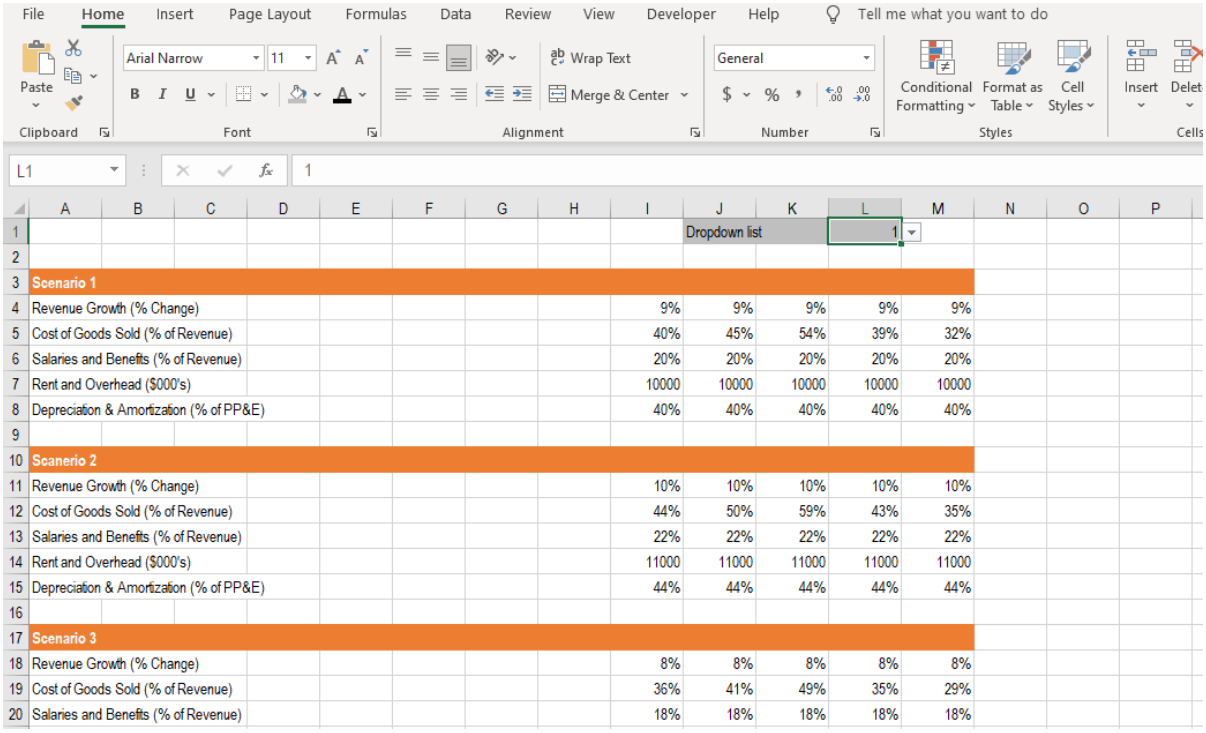
Let's explore Excel.

	A	I	J	K	L	M
3	Scenario 1					
4	Revenue Growth (% Change)	9%	9%	9%	9%	9%
5	Cost of Goods Sold (% of Revenue)	40%	45%	54%	39%	32%
6	Salaries and Benefits (% of Revenue)	20%	20%	20%	20%	20%
7	Rent and Overhead ($000's)	10000	10000	10000	10000	10000
8	Depreciation & Amortization (% of PP&E)	40%	40%	40%	40%	40%
9						
10	Scanerio 2					
11	Revenue Growth (% Change)	10%	10%	10%	10%	10%
12	Cost of Goods Sold (% of Revenue)	44%	50%	59%	43%	35%
13	Salaries and Benefits (% of Revenue)	22%	22%	22%	22%	22%
14	Rent and Overhead ($000's)	11000	11000	11000	11000	11000
15	Depreciation & Amortization (% of PP&E)	44%	44%	44%	44%	44%
16						
17	Scenario 3					
18	Revenue Growth (% Change)	8%	8%	8%	8%	8%
19	Cost of Goods Sold (% of Revenue)	36%	41%	49%	35%	29%
20	Salaries and Benefits (% of Revenue)	18%	18%	18%	18%	18%
21	Rent and Overhead ($000's)	9000	9000	9000	9000	9000
22	Depreciation & Amortization (% of PP&E)	36%	36%	36%	36%	36%

See here, we have 3 different future forecasting for our financial modeling. We will test our revenue with 3 scenarios. But first, we will create a dropdown list.

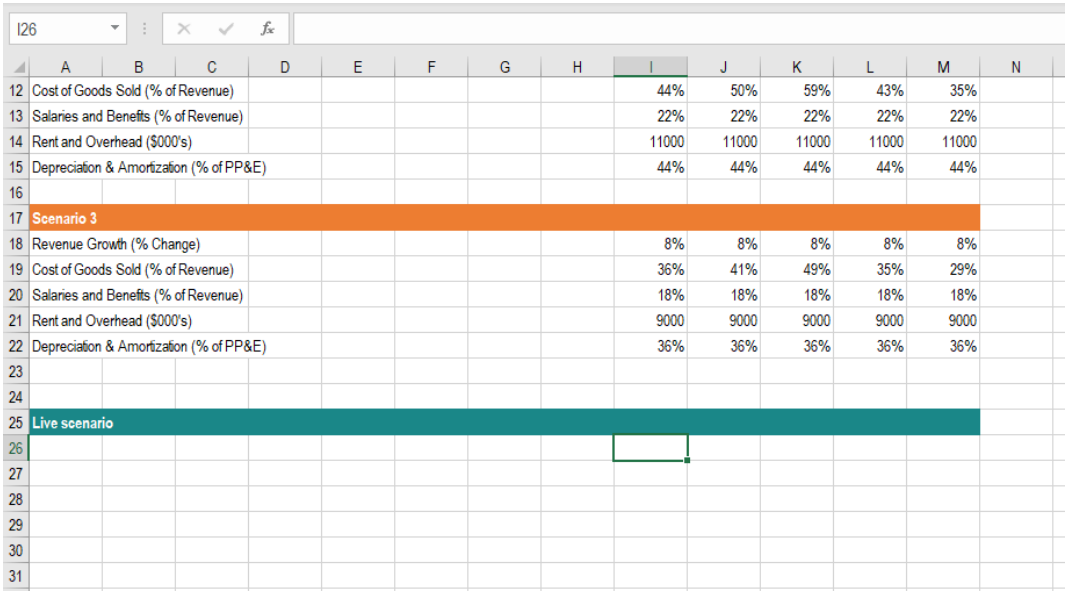


You already know how to create a dropdown list. In cell L1 we enter a dropdown list before that create a list of numbers according to our scenario. See we created a list of numbers in the cell O3 to cell O5. Refer to these numbers in the dropdown source.



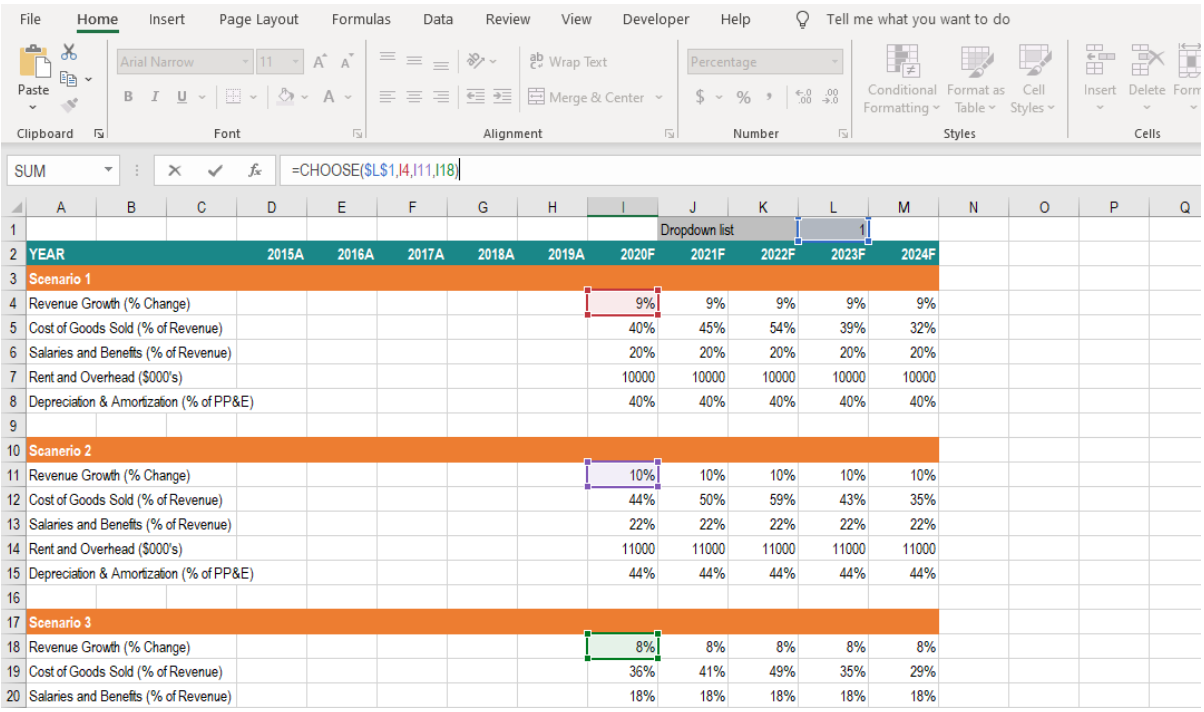
After creating our dropdown list our financial model should look like the above one.

We are all done about the scenario and dropdown list. One thing we must need to do is enter an extra scenario below named Live Scenario. In that Live Scenario, we will build CHOOSE function combined with the dropdown list.



	I	J	K	L	M
Cost of Goods Sold (% of Revenue)	44%	50%	59%	43%	35%
Salaries and Benefits (% of Revenue)	22%	22%	22%	22%	22%
Rent and Overhead ($000's)	11000	11000	11000	11000	11000
Depreciation & Amortization (% of PP&E)	44%	44%	44%	44%	44%
Scenario 3					
Revenue Growth (% Change)	8%	8%	8%	8%	8%
Cost of Goods Sold (% of Revenue)	36%	41%	49%	35%	29%
Salaries and Benefits (% of Revenue)	18%	18%	18%	18%	18%
Rent and Overhead ($000's)	9000	9000	9000	9000	9000
Depreciation & Amortization (% of PP&E)	36%	36%	36%	36%	36%
Live scenario					

Step 1: Enter the Live scenario shown above. Our financial model will work based on this scenario.



=CHOOSE($L$1,I4,I11,I18)

Dropdown list: 1

YEAR	2015A	2016A	2017A	2018A	2019A	2020F	2021F	2022F	2023F	2024F
Scenario 1										
Revenue Growth (% Change)						9%	9%	9%	9%	9%
Cost of Goods Sold (% of Revenue)						40%	45%	54%	39%	32%
Salaries and Benefits (% of Revenue)						20%	20%	20%	20%	20%
Rent and Overhead ($000's)						10000	10000	10000	10000	10000
Depreciation & Amortization (% of PP&E)						40%	40%	40%	40%	40%
Scanerio 2										
Revenue Growth (% Change)						10%	10%	10%	10%	10%
Cost of Goods Sold (% of Revenue)						44%	50%	59%	43%	35%
Salaries and Benefits (% of Revenue)						22%	22%	22%	22%	22%
Rent and Overhead ($000's)						11000	11000	11000	11000	11000
Depreciation & Amortization (% of PP&E)						44%	44%	44%	44%	44%
Scenario 3										
Revenue Growth (% Change)						8%	8%	8%	8%	8%
Cost of Goods Sold (% of Revenue)						36%	41%	49%	35%	29%
Salaries and Benefits (% of Revenue)						18%	18%	18%	18%	18%

Step 2: Enter CHOOSE function in cell I26. Refer to our dropdown list in the index-num argument which is cell L1 and lock the cell by pressing the f4 button on the keyboard. Refer to cells I4, I11, and I18 respectively in the Value argument.

L1 | 1

	A	I	J	K	L	M
11	Revenue Growth (% Change)	10%	10%	10%	10%	10%
12	Cost of Goods Sold (% of Revenue)	44%	50%	59%	43%	35%
13	Salaries and Benefits (% of Revenue)	22%	22%	22%	22%	22%
14	Rent and Overhead ($000's)	11000	11000	11000	11000	11000
15	Depreciation & Amortization (% of PP&E)	44%	44%	44%	44%	44%
16						
17	Scenario 3					
18	Revenue Growth (% Change)	8%	8%	8%	8%	8%
19	Cost of Goods Sold (% of Revenue)	36%	41%	49%	35%	29%
20	Salaries and Benefits (% of Revenue)	18%	18%	18%	18%	18%
21	Rent and Overhead ($000's)	9000	9000	9000	9000	9000
22	Depreciation & Amortization (% of PP&E)	36%	36%	36%	36%	36%
23						
24						
25	Live scenario					
26		9%	9%	9%	9%	9%
27		40%	45%	54%	39%	32%
28		20%	20%	20%	20%	20%
29		1000000%	1000000%	1000000%	1000000%	1000000%
30		40%	40%	40%	40%	40%

Step 3: Use Ctrl + R to autofill right and Ctrl + D to autofill down. After filling all in the live scenario it should look like the above one.

Here we are all regarding CHOOSE function but we will explore it a little bit more to know how it works in a financial model.

I26 | =H32*(1+I26)

	A	D	E	F	G	H	I	J	K	L	M
20	Salaries and Benefits (% of Revenue)						18%	18%	18%	18%	18%
21	Rent and Overhead ($000's)						9000	9000	9000	9000	9000
22	Depreciation & Amortization (% of PP&E)						36%	36%	36%	36%	36%
23											
24											
25	Live scenario										
26							9%	9%	9%	9%	9%
27							40%	45%	54%	39%	32%
28							20%	20%	20%	20%	20%
29							1000000%	1000000%	1000000%	1000000%	1000000%
30							40%	40%	40%	40%	40%
31											
32	Reveneue	102007	118086	131345	142341	150772	=H32*(1+I26)				
33	Cost of Goods Sold (COGS)	39023	48004	49123	52654	56710					
34	Gross Profit	62984	70082	82222	89687	94062					
35	Expenses										
36	Salaries and Benefits	26427	22658	23872	23002	25245					
37	Rent and Overhead	10963	10125	10087	11020	11412					
38	Depreciation & Amortization	19500	18150	17205	16543.5	16080.45					
39											

Step 1: Build the formula in cell I32 according to the above model. We are doing this as next year's revenue is increased as (last year's revenue+ forecasting percentage).

O32

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
23														
24														
25	**Live scenario**													
26									8%	8%	8%	8%	8%	
27									36%	41%	49%	35%	29%	
28									18%	18%	18%	18%	18%	
29									9000.00	9000.00	9000.00	9000.00	9000.00	
30									36%	36%	36%	36%	36%	
31														
32	**Reveneue**			**102007**	**118086**	**131345**	**142341**	**150772**	**162984.53**	**176186.28**	**190457.37**	**205884.41**	**222561.05**	
33	Cost of Goods Sold (COGS)			39023	48004	49123	52654	56710	77125.60	108361.47	161025.14	217544.97	280197.92	
34	Salaries and Benefits			26427	22658	23872	23002	25245	29789.10	35151.14	41478.34	48944.44	57754.44	
35	Rent and Overhead			10963	10125	10087	11020	11412	9000.00	9000.00	9000.00	9000.00	9000.00	
36	Depreciation & Amortization			19500	18150	17205	16543.5	16080.45	21869.41	29742.40	40449.66	55011.54	74815.70	
37	**Net Income**			**6094**	**19149**	**31058**	**39121.5**	**41324.55**	**25200.42**	**-6068.7272**	**-61495.781**	**-124616.54**	**-199207.01**	
38														
39														
40														
41														

Step 2: When we are done in cell I32. Use Ctrl + R to autofill right and Ctrl + D to autofill right but note that here rent and overhead cost is hardcoded number so instead of building any formula just refer to the cell e.g. refer to cell I29 in cell I35. After finishing all the model should look like the above one.

We have done all the things. It's time to check the financial model. When we choose any option in the dropdown list the model is automatically updated with that. We have created a powerful model to analyze. This is how the CHOOSE function works in Excel.

L1 | 1

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
19	Cost of Goods Sold (% of Revenue)								36%	41%	49%	35%	29%		
20	Salaries and Benefits (% of Revenue)								18%	18%	18%	18%	18%		
21	Rent and Overhead ($000's)								9000	9000	9000	9000	9000		
22	Depreciation & Amortization (% of PP&E)								36%	36%	36%	36%	36%		
23															
24															
25	**Live scenario**														
26									9%	9%	9%	9%	9%		
27									40%	45%	54%	39%	32%		
28									20%	20%	20%	20%	20%		
29									10000.00	10000.00	10000.00	10000.00	10000.00		
30									40%	40%	40%	40%	40%		
31															
32	**Reveneue**			**102007**	**118086**	**131345**	**142341**	**150772**	**164341.48**	**179132.21**	**195254.11**	**212826.98**	**231981.41**		
33	Cost of Goods Sold (COGS)			39023	48004	49123	52654	56710	79394.00	115121.30	177286.80	246428.65	325285.82		
34	Salaries and Benefits			26427	22658	23872	23002	25245	30294.00	36352.80	43623.36	52348.03	62817.64		
35	Rent and Overhead			10963	10125	10087	11020	11412	10000.00	10000.00	10000.00	10000.00	10000.00		
36	Depreciation & Amortization			19500	18150	17205	16543.5	16080.45	22512.63	31517.68	44124.75	61774.66	86484.52		
37	**Net Income**			**6094**	**19149**	**31058**	**39121.5**	**41324.55**	**22140.85**	**-13859.569**	**-79780.804**	**-157724.36**	**-252606.57**		
38															

L1 | 2

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1										Dropdown list		2			
2	**YEAR**			**2015A**	**2016A**	**2017A**	**2018A**	**2019A**	**2020F**	**2021F**	**2022F**	**2023F**	**2024F**		
3	**Scenario 1**														
4	Revenue Growth (% Change)								9%	9%	9%	9%	9%		
5	Cost of Goods Sold (% of Revenue)								40%	45%	54%	39%	32%		
6	Salaries and Benefits (% of Revenue)								20%	20%	20%	20%	20%		
7	Rent and Overhead ($000's)								10000	10000	10000	10000	10000		
8	Depreciation & Amortization (% of PP&E)								40%	40%	40%	40%	40%		
9															
10	**Scanerio 2**														
11	Revenue Growth (% Change)								10%	10%	10%	10%	10%		
12	Cost of Goods Sold (% of Revenue)								44%	50%	59%	43%	35%		
13	Salaries and Benefits (% of Revenue)								22%	22%	22%	22%	22%		
14	Rent and Overhead ($000's)								11000	11000	11000	11000	11000		
15	Depreciation & Amortization (% of PP&E)								44%	44%	44%	44%	44%		
16															
17	**Scenario 3**														
18	Revenue Growth (% Change)								8%	8%	8%	8%	8%		
19	Cost of Goods Sold (% of Revenue)								36%	41%	49%	35%	29%		
20	Salaries and Benefits (% of Revenue)								18%	18%	18%	18%	18%		

Reading 5.4

VLOOKUP

This function looks for a value in the leftmost column of a table by the best matching.

VLOOKUP function is extremely important for the financial analyst. We need the help of the VLOOKUP function when we evaluate M&A transactions or look for value in financial statements and many more.

FORMULA:

VLOOKUP (lookup_value, table_array, col-index_num, [range_lookup])

Lookup_value: It's a required argument that indicates the value we look for in a table.

Table_array: This is also a required argument. It indicates the array of data we search for a value.

Col_index_num: That's a required argument. It's an integer that specifies the column number of the data table form where we want to see a value.

[Range_lookup]: It's an optional argument implies that what the function will bring if there is no exact match. There are two options:

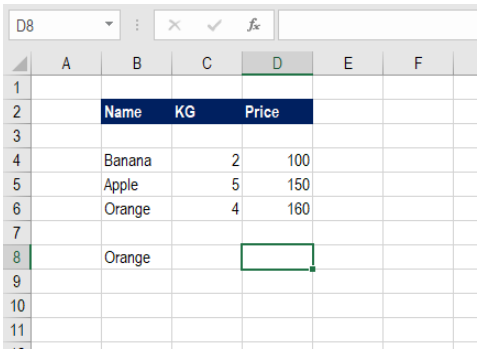
TRUE: Under this argument, the function looks for the nearest result if there is no exact match.

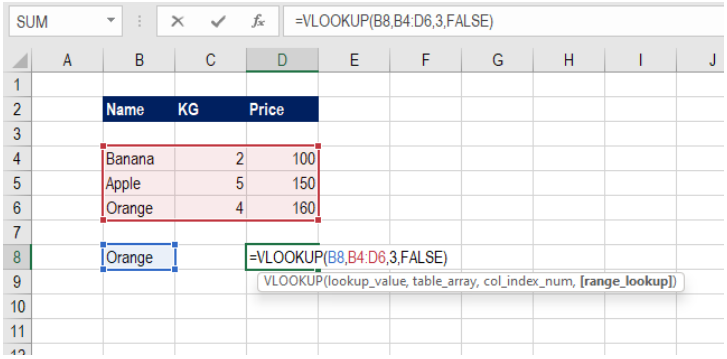
FALSE: Under this argument, the function brings an error if there is no exact match.

How to use the VLOOKUP function in Excel:

Example 1

Here we have a simple example. We have three different fruits and their price. We will find the price of fruit from the data table. In that case, we will find the price of "Orange".





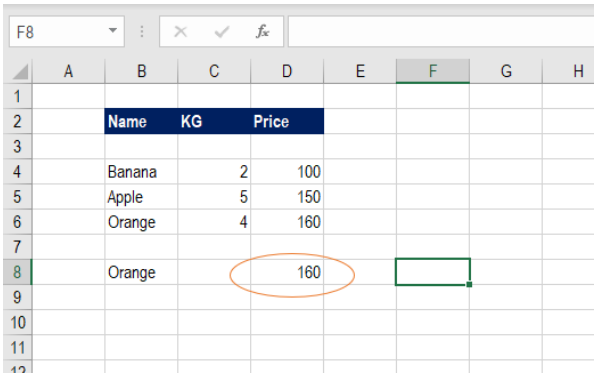
We will follow step-by-step instructions.

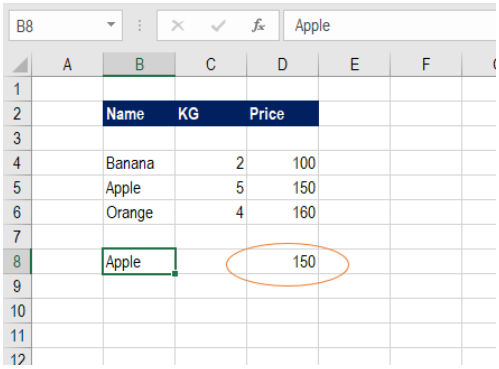
Step 1: Enter the VLOOKUP function in cell D8.

Step 2: Refer the cell B8 under the lookup_value argument as we want to find out the price of the “Orange”.

Step 3: The column number of the price is 3. So, enter an integer of the column number.

Step 4: Under the range_lookup argument, write false as we want an exact match. Close Parentheses and press enter.





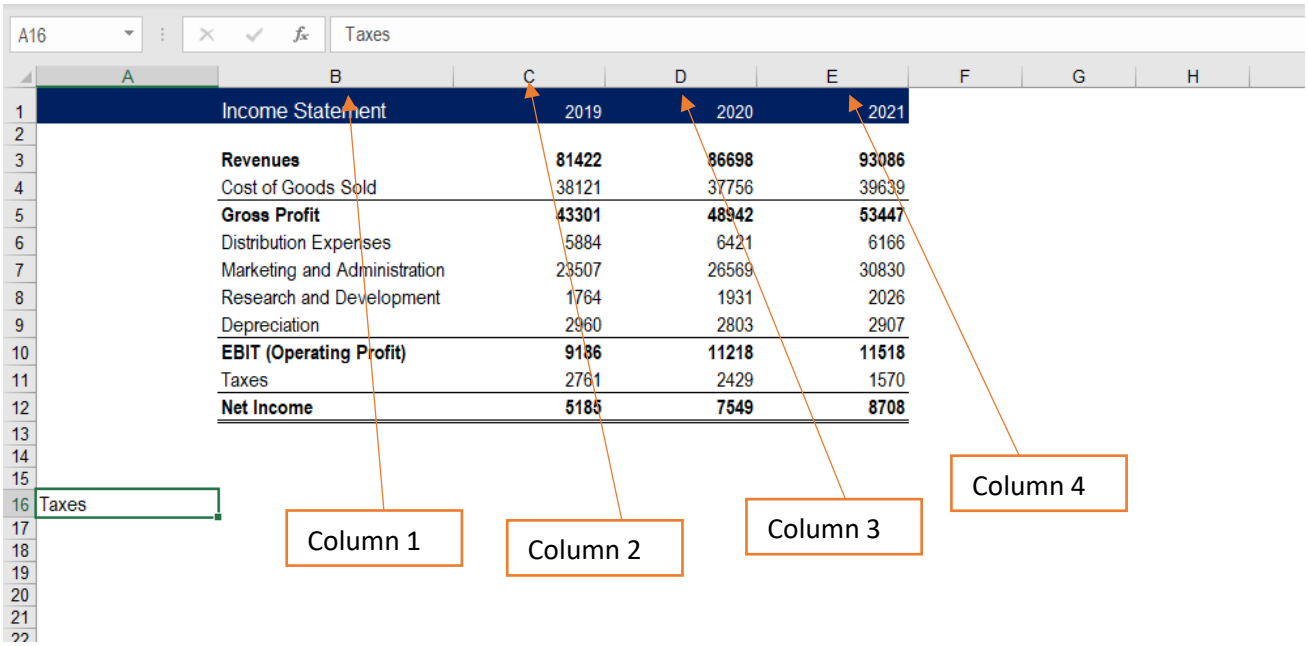
You can see the function find out the exact value from the data set. Also, you can change the fruit name in cell B8. The function will automatically update the result.

This is the basic example of how the function work. We will explore another example.

Example-2 (Advanced)

Here we are given an income statement of a business. There are several types of costs given and we are considering and analyzing those costs. There are 3 years of income statement data. Our task is to analyze those costs. Every time we take a particular cost among those costs and make an analysis. We can use the VLOOKUP function to make the task easier. Excel will automatically update when we change the cost name in cell A16.

Let's explore how can we do this.



First of all, we work with the Marketing and Administration cost. From the table, we find out the Marketing and Administration cost.

Step 1: Enter the VLOOKUP function in cell C16.

Step 2: Refer the cell A16 under the lookup_value argument as we want to find out the corresponding data every time based on the value of cell A16.

SUM =VLOOKUP($A$16,$B$3:$E$12,2,FALSE)

	A	B	C	D	E	F	G	H
1		Income Statement	2019	2020	2021			
2								
3		Revenues	81422	86698	93086			
4		Cost of Goods Sold	38121	37756	39639			
5		Gross Profit	43301	48942	53447			
6		Distribution Expenses	5884	6421	6166			
7		Marketing and Administration	23507	26569	30830			
8		Research and Development	1764	1931	2026			
9		Depreciation	2960	2803	2907			
10		EBIT (Operating Profit)	9186	11218	11518			
11		Taxes	2761	2429	1570			
12		Net Income	5185	7549	8708			
13								
14								
15								
16	Marketing and Administration		=VLOOKUP($A$16,$B$3:$E$12,2,FALSE)					
17								
18								
19								
20								
21								
22								

Step 3: Our total data starts from cell B to cell E. So, under the table_array argument we refer to our all data and lock this using f4.

Step 4: We want to see 2019 cost data in cell C16 so enter 2 as a numerical value under the column_index_num.

Step 5: We type false under the [range_lookup] as we want an exact match.

After finishing the function, we can see our desired result. We have done 2019 data. In the same manner, we fill the next 2 years' data also.

Keep everything unchanged except Column_index_num. Under this argument, we put the numerical value of the column number.

See the below illustration to make this thing clear.

SUM =VLOOKUP($A$16,$B$3:$E$12,3,FALSE)

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

	A	B	C	D	E
1		Income Statement	2019	2020	2021
2					
3		**Revenues**	**81422**	**86698**	**93086**
4		Cost of Goods Sold	38121	37756	39639
5		**Gross Profit**	**43301**	**48942**	**53447**
6		Distribution Expenses	5884	6421	6166
7		Marketing and Administration	23507	26569	30830
8		Research and Development	1764	1931	2026
9		Depreciation	2960	2803	2907
10		**EBIT (Operating Profit)**	**9186**	**11218**	**11518**
11		Taxes	2761	2429	1570
12		**Net Income**	**5185**	**7549**	**8708**
16	Marketing and Administration		23507	$E$12,3,	

We are all done. Now, time to check the function.

A16 Depreciation

	A	B	C	D	E
1		Income Statement	2019	2020	2021
2					
3		**Revenues**	**81422**	**86698**	**93086**
4		Cost of Goods Sold	38121	37756	39639
5		**Gross Profit**	**43301**	**48942**	**53447**
6		Distribution Expenses	5884	6421	6166
7		Marketing and Administration	23507	26569	30830
8		Research and Development	1764	1931	2026
9		Depreciation	2960	2803	2907
10		**EBIT (Operating Profit)**	**9186**	**11218**	**11518**
11		Taxes	2761	2429	1570
12		**Net Income**	**5185**	**7549**	**8708**
16	Depreciation		2960	2803	2907

When we change the cost name in cell A16. The function automatically updates the result. The function comes with the corresponding data.

Here we choose Depreciation as our cost. The function finds out the cost of depreciation from the data table. This is a very handy function to work with analysis.

If we change Depreciation to taxes the function will automatically update. See the illustration below.

So, we are all known about the function. Surely, this is a very powerful and easy-to-use function while analyzing financial data.

A16 | Taxes

	A	B	C	D	E	F	G	H
1		**Income Statement**	**2019**	**2020**	**2021**			
2								
3		**Revenues**	**81422**	**86698**	**93086**			
4		Cost of Goods Sold	38121	37756	39639			
5		**Gross Profit**	**43301**	**48942**	**53447**			
6		Distribution Expenses	5884	6421	6166			
7		Marketing and Administration	23507	26569	30830			
8		Research and Development	1764	1931	2026			
9		Depreciation	2960	2803	2907			
10		**EBIT (Operating Profit)**	**9186**	**11218**	**11518**			
11		Taxes	2761	2429	1570			
12		**Net Income**	**5185**	**7549**	**8708**			
13								
14								
15								
16	Taxes		2761	2429	1570			
17								
18								
19								

Reading 5.5

OFFSET

This function returns a reference to a range that is a given number of rows and columns from a given reference.

OFFSET is very useful to make charts and graph dynamic. As a financial analyst, we often work with pivot tables, charts, and graphs. We have learned about the IF function and how to make dynamic analyses with data. With the help of the OFFSET function, we also can make charts, graphs, and data very dynamic.

FORMULA

OFFSET (reference, rows, cols, [height], [width])

Reference: It's a required argument that indicates the cell range that we wish to offset. It can be a single cell or multiple cells.

Rows: It's also a required argument. It's the number of rows from the starting row to be offset.

Cols: Last required argument. It's the number of columns from the starting column to be offset.

Height: It's an optional argument that specifies the height of the returned range.

Width: This is also an optional argument that specifies the width of the returned range.

How to use the OFFSET function in excel:

In the first example, we will learn the very basics of the OFFSET function.

Name	Math	English	Bangla	History
Abid	75%	70%	74%	79%
Anusha	90%	85%	89%	95%
Rakib	65%	60%	63%	68%
Afrin	70%	67%	70%	74%
Khalid	80%	89%	93%	84%
Jahid	60%	70%	74%	63%

Anusha (History)

Suppose, we have 6 student exam marks percentage in 4 different courses. Our first task is to find out the History course marks of Anusha.

Let's explore how can we find out the value with the help of the OFFSET function.

Name	Math	English	Bangla	History
Abid	75%	70%	74%	79%
Anusha	90%	85%	89%	95%
Rakib	65%	60%	63%	68%
Afrin	70%	67%	70%	74%
Khalid	80%	89%	93%	84%
Jahid	60%	70%	74%	63%

Anusha (History) =OFFSET(B4,0,4)

Picture-1

Name	Math	English	Bangla	History
Abid	75%	70%	74%	79%
Anusha	90%	85%	89%	95%
Rakib	65%	60%	63%	68%
Afrin	70%	67%	70%	74%
Khalid	80%	89%	93%	84%
Jahid	60%	70%	74%	63%

Anusha (History) 95%

Picture-2

See the first picture:

Step 1: Enter the OFFSET function in cell D10.

Step 2: Under reference argument, refer to Anusha (cell B4) as we want to find her marks.

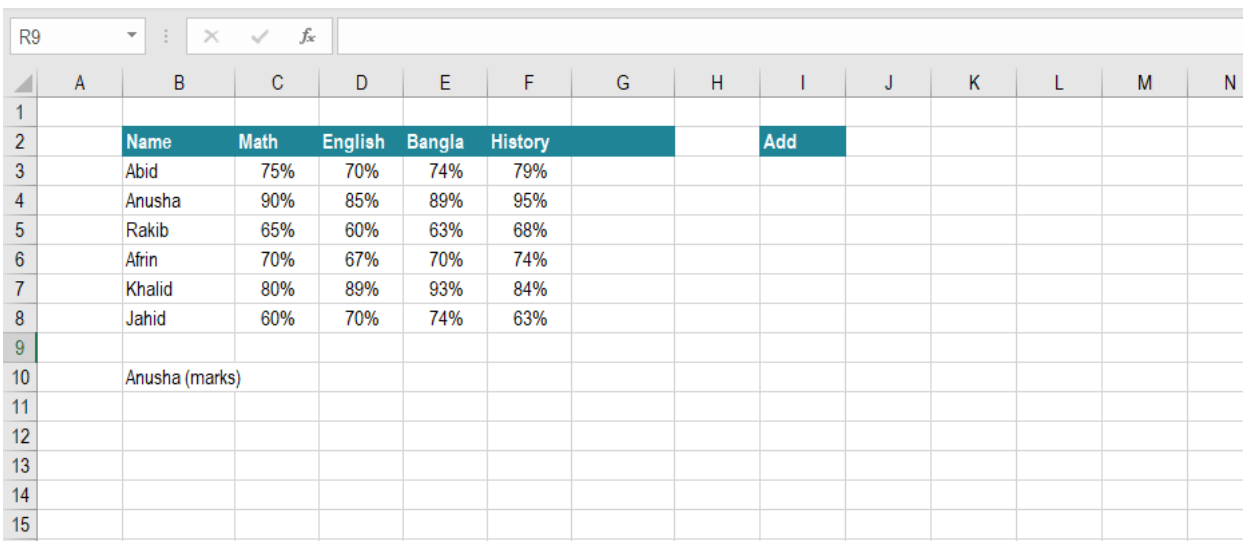
Step 3: Put 0 under the “rows” argument. The reason is the data is located only in row 4 which is our reference row. So, we use 0 to remain in that row.

Step 4: We want to find the value of the History course which is located 4th column distance from the reference column. So, enter 4 under the “cols” argument.

After finishing all press enter. We got the marks for the History course of Anusha. This is how the OFFSET function works. In the next example, we will build a more advanced formula.

OFFSET & SUM Functions

In this phase, we will learn how to build an even more advanced formula with the combination of offset and sum functions.



	Name	Math	English	Bangla	History
	Abid	75%	70%	74%	79%
	Anusha	90%	85%	89%	95%
	Rakib	65%	60%	63%	68%
	Afrin	70%	67%	70%	74%
	Khalid	80%	89%	93%	84%
	Jahid	60%	70%	74%	63%
	Anusha (marks)				

This is our previous example. This time we will find out the marks of Anusha. We can sum manually but when we work with complex data sets it’s very hard to do anything manually. So, how can we add the marks automatically?

Here are the step-by-step instructions:

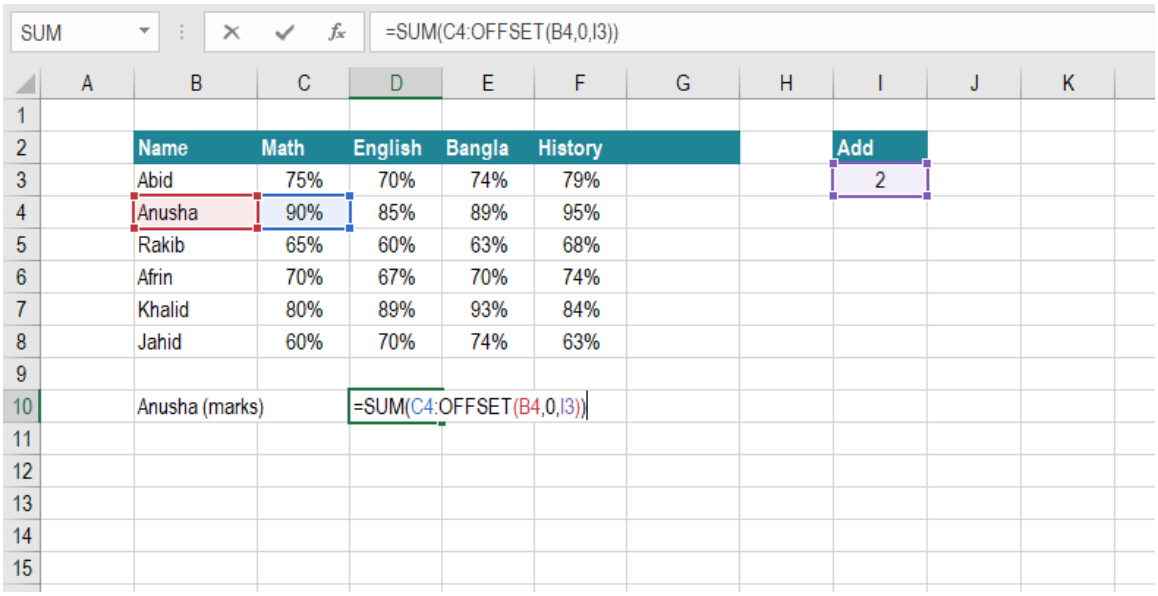
Step 1: As we want to add her marks enter the SUM function in cell D10.

Step 2: Refer to C4 as the starting point. Our function will start adding from this cell.

Step 3: As shown in the example below enter the OFFSET function.

Step 4: Refer the cell B2 under the reference argument as we want to get Anusha's marks.

Step 5: Same as the previous example enter 0 under the "rows" argument.

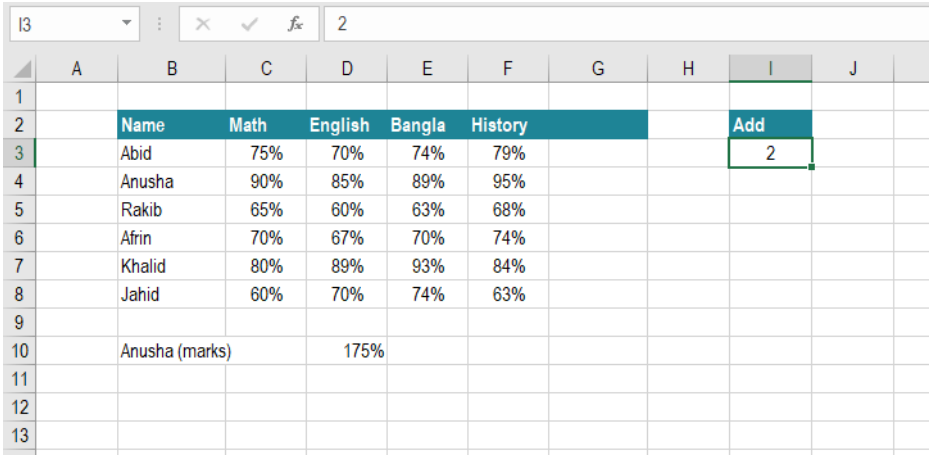


Step 6: Now, under the "cols" argument, refer the cell I3. The reason behind this is that every time we change the value in the cell the function automatically updates the result. We put 2 to add

first 2 subject marks, 3 for the first 3 subject marks, and so on.

After finishing all. We have our results.

See the example below:



Anusha's first 2 course marks are 175%. We can change the value in cell I3 to see whether the function updates automatically or not. We put 4 to see the total marks of Anusha.

I3 | 4

	Name	Math	English	Bangla	History	Add
	Abid	75%	70%	74%	79%	4
	Anusha	90%	85%	89%	95%	
	Rakib	65%	60%	63%	68%	
	Afrin	70%	67%	70%	74%	
	Khalid	80%	89%	93%	84%	
	Jahid	60%	70%	74%	63%	
	Anusha (marks)		359%			

We are happy to see the result. The function automatically updates the result.

Reading 5.6

INDEX

This function returns a value or reference of the cell at the intersection of a particular row or column, in a given range.

As a financial analysis, we use the INDEX function for looking up a value in a table or a range of data. Particularly, this function is used with the MATCH function which creates a powerful formula.

INDEX function has two formats:

1. Array format.
2. Reference format.

Array Format:

We use this format when we wish to find out the value of specific cells or an array of cells.

FORMULA

INDEX (array,row_num,[col_num)

Array: It's a required argument that specifies the range of cells.

Row_num: It's also a required argument that specifies the row number of a specific range of cells.

Col_num: It's an optional argument that specifies the column number of a specific range of cells.

Reference format:

We use this format when we wish to return a cell of the intersection of a row and column.

INDEX (reference, row_num, [col_num], [area_num])

Reference: It's a required argument. It specifies the reference of one or more cells.

Row_num: It's also a required argument that specifies the row number of a particular area.

Col_num: It's an optional argument that specifies the column number of a particular area.

Area_num: if there is more than one reference then we use area_num which indicates which reference is going to use.

How to use the INDEX function in excel:

We will see an example to understand how the function work.

Year	2018	2019	2020	2021	2022	2023
Revenue	**100500**	**110148**	**120832**	**131707**	**142244**	**156253**
COGS	38672	43486	48333	52024	58320	64064
Gross Profit	**61828**	**66662**	**72499**	**79683**	**83924**	**92189**
Salaries	23789	26812	27859	28859	29659	32580
Marketing	12871	13897	18652	18952	19652	21587
Rent	5000	5000	5000	5100	5100	5602
Earnings Befo	**20168**	**20953**	**20988**	**26772**	**29513**	**32420**
Tax	5445	5867	5877	7737	8854	9726
Net Income	**14723**	**15086**	**15111**	**19035**	**20659**	**22694**

INDEX

We have 6 years of income statement data. From the data, we are going to find out the value that intersects the 3rd row and 3rd column. Our data array starts from B3 to H11.

Let's Jump into the example.

C14 =INDEX(B3:H11,3,3)

Year	2018	2019	2020	2021	2022	2023
Revenue	**100500**	**110148**	**120832**	**131707**	**142244**	**156253**
COGS	38672	43486	48333	52024	58320	64064
Gross Profit	**61828**	**66662**	**72499**	**79683**	**83924**	**92189**
Salaries	23789	26812	27859	28859	29659	32580
Marketing	12871	13897	18652	18952	19652	21587
Rent	5000	5000	5000	5100	5100	5602
Earnings Befo	**20168**	**20953**	**20988**	**26772**	**29513**	**32420**
Tax	5445	5867	5877	7737	8854	9726
Net Income	**14723**	**15086**	**15111**	**19035**	**20659**	**22694**

INDEX =INDEX(B3:H11,3,3)

We wish to see the 3x3 intersection value. So, our column is 3 and our row is 3

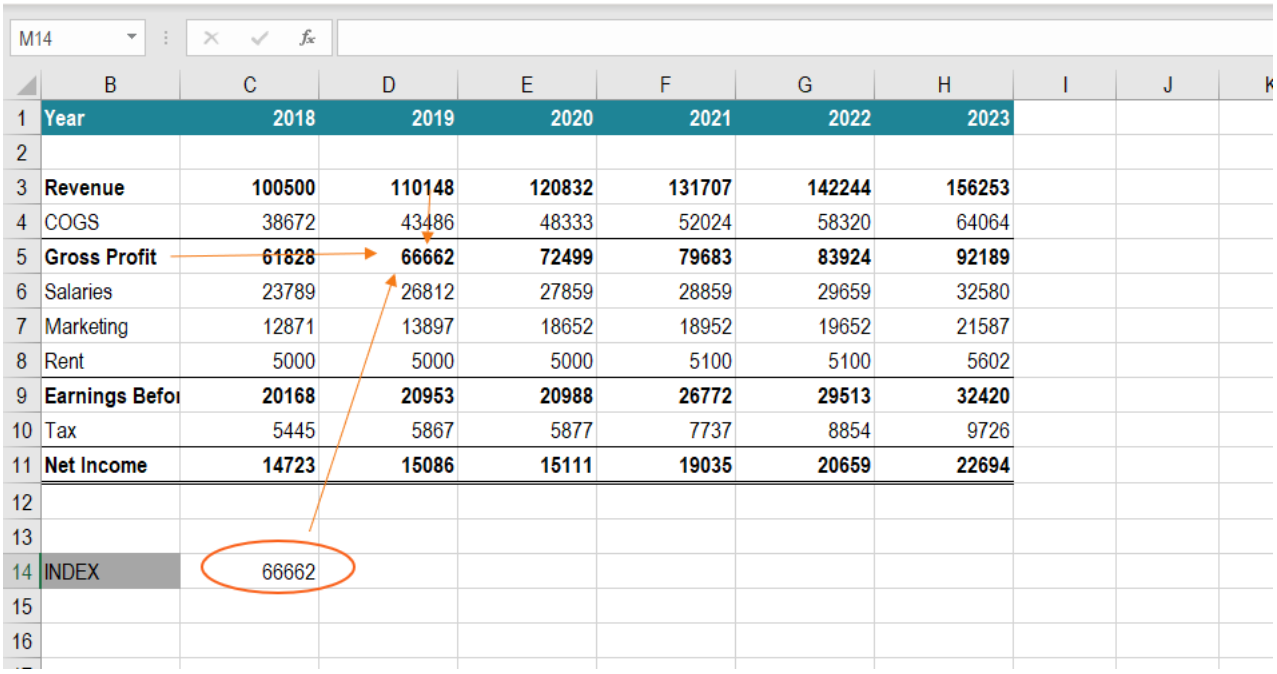
Step 1: Enter the INDEX function in cell C14.

Step 2: Refer B3 to H11 as our data array as shown in the illustration.

Step 3: As we wish to see the value of 3 no row. Enter 3 under the row_num argument.

Step 4: As we wish to see the value of 3 no column. Enter 3 under the col_num argument.

We are all done. Now, press “Enter” to see the result.



	B	C	D	E	F	G	H
1	Year	2018	2019	2020	2021	2022	2023
2							
3	Revenue	100500	110148	120832	131707	142244	156253
4	COGS	38672	43486	48333	52024	58320	64064
5	Gross Profit	61828	66662	72499	79683	83924	92189
6	Salaries	23789	26812	27859	28859	29659	32580
7	Marketing	12871	13897	18652	18952	19652	21587
8	Rent	5000	5000	5000	5100	5100	5602
9	Earnings Befor	20168	20953	20988	26772	29513	32420
10	Tax	5445	5867	5877	7737	8854	9726
11	Net Income	14723	15086	15111	19035	20659	22694
12							
13							
14	INDEX	66662					
15							
16							

Our result is located at the intersection point of the 3rd row and 3rd column. This is how the INDEX function works. We can build an even more powerful formula with the combination of INDEX and MATCH functions. In the next reading, we will dive into INDEX and MATCH functions.

Reading 5.7

INDEX & MATCH Functions

We know how the INDEX function works. First, we are going to be introduced to the MATCH Function.

MATCH function

This function returns the relative positive of an item in an array that matches a specific value in a specific order.

MATCH (lookup_value, Lookup_array, [match_type])

Lookup_value: It's a required argument that specifies the value we wish to look up.

Lookup_array: It's also a required argument that specifies the array of data. From the data array, we wish to look up.

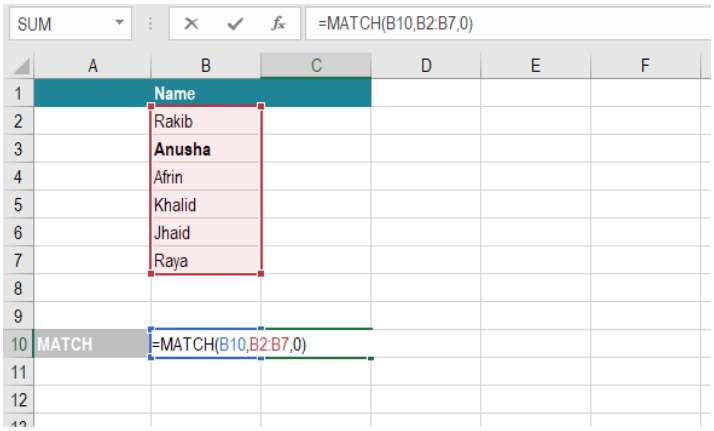
Match type: It's an optional argument. There are 3 options which are 1, 0, -1

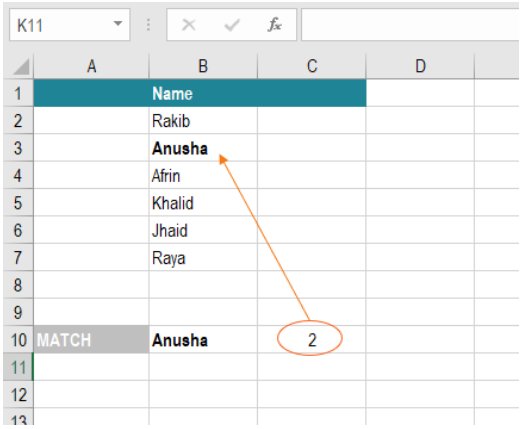
- 1 or omitted: Finds the largest value that is less than or equal to look up the value. lookup array must be placed in ascending order.
- 0: Exact match. Finds the first value that is exactly equal to the look_up value. Look-up array can be placed in any order.
- -1: finds the smallest value that is greater than or equal to look up the value. The lookup array must be placed in descending order.

How to use the MATCH Function in Excel:

Let's see the example

Here we have the names of our friends. From the name, we will find the position of Anusha's name. With the help of the MATCH function, we can easily find out the result.





Step 1: Enter the MATCH function in cell B11.

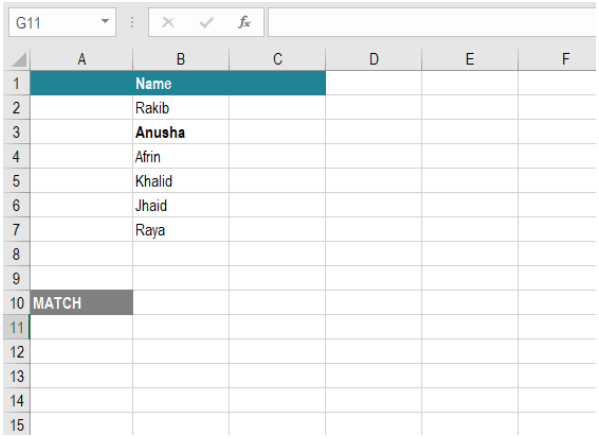
Step 2: Refer to "Anusha" or cell B10 which contains her name under the lookup_value argument.

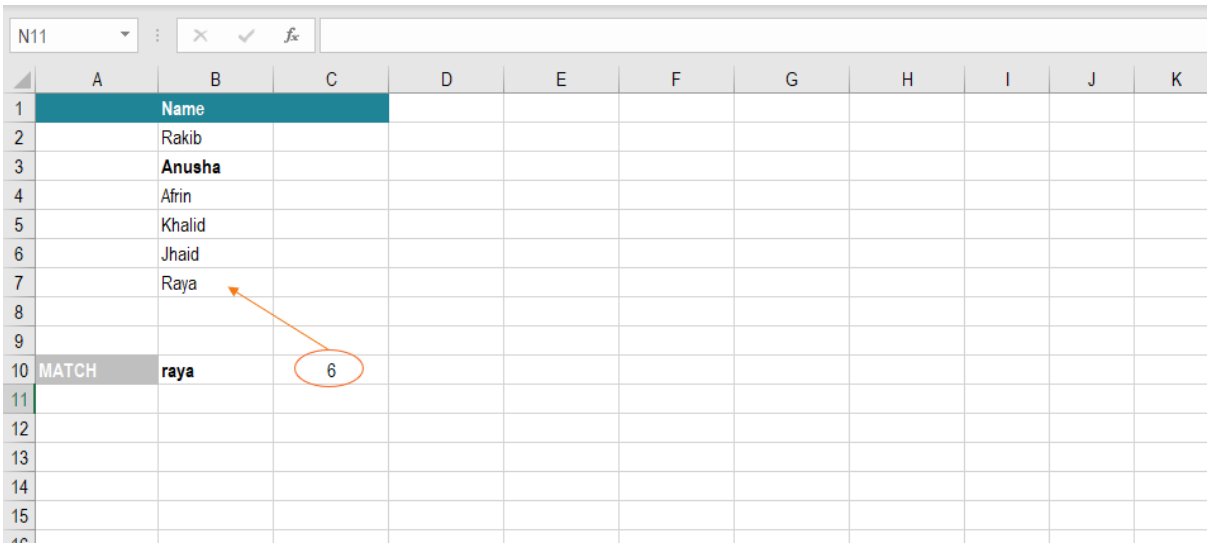
Step 3: Refer to our data set under the Lookup_array argument which is from cell B2 to cell B7.

Step 4: Choose 0 as we want an exact match. Close the parenthesis and press enter key.

We can see our result. The position of her name is 2. And the function shows that result.

We can also change the name. Now, enter Raya in cell B10. The function comes with the correct result.





Reading 5.8

INDEX & MATCH Function

Now we are going to learn how to build powerful formulas with the combination of INDEX and MATCH functions.

We have the same example used in the INDEX function. We are analyzing the revenue, gross profit, and net income for that example. In this example, we are going to see how can we use the index and match function to make things easier. We have revenue, gross profit, and net income and wish to get 2018 data for our analysis.

Let's jump into the example:

O8

	A	B	C	D	E	F	G	H	I	J
1		Year	2018	2019	2020	2021	2022	2023		
2										
3		**Revenue**	**100500**	**110148**	**120832**	**131707**	**142244**	**156253**		
4		COGS	38672	43486	48333	52024	58320	64064		
5		**Gross Profit**	**61828**	**66662**	**72499**	**79683**	**83924**	**92189**		
6		Salaries	23789	26812	27859	28859	29659	32580		
7		Marketing	12871	13897	18652	18952	19652	21587		
8		Rent	5000	5000	5000	5100	5100	5602		
9		**Earnings Befo**	**20168**	**20953**	**20988**	**26772**	**29513**	**32420**		
10		Tax	5445	5867	5877	7737	8854	9726		
11		**Net Income**	**14723**	**15086**	**15111**	**19035**	**20659**	**22694**		
12										
13										
14				2018						
15		**Revenue**								
16		**Gross Profit**								
17		**Net Income**								
18										
19										

SUM

=INDEX($B$3:$H$11,MATCH(B15,$B$3:$B$11,0),MATCH($D$14,$B$1:$H$1,0))

	A	B	C	D	E	F	G	H	I	J	K
1		Year	2018	2019	2020	2021	2022	2023			
2											
3		**Revenue**	**100500**	**110148**	**120832**	**131707**	**142244**	**156253**			
4		COGS	38672	43486	48333	52024	58320	64064			
5		**Gross Profit**	**61828**	**66662**	**72499**	**79683**	**83924**	**92189**			
6		Salaries	23789	26812	27859	28859	29659	32580			
7		Marketing	12871	13897	18652	18952	19652	21587			
8		Rent	5000	5000	5000	5100	5100	5602			
9		**Earnings Befo**	**20168**	**20953**	**20988**	**26772**	**29513**	**32420**			
10		Tax	5445	5867	5877	7737	8854	9726			
11		**Net Income**	**14723**	**15086**	**15111**	**19035**	**20659**	**22694**			
12											
13											
14				2018							
15		**Revenue**		=INDEX($B$3:$H$11,MATCH(B15,$B$3:$B$11,0),MATCH($D$14,$B$1:$H$1,0))							
16		**Gross Profit**		61,828							
17		**Net Income**		14,723							
18											
19											

This time we have a complex example. Let's follow step-by-step instructions.

Step 1: Enter the INDEX function in cell D15.

Step 2: Under the array argument we must need to refer our array of data. So, refer from B3 to H11. Use the f4 key to lock the cells. Here, we have finished our array argument.

Step 3: Now, we will work with the row_num argument. Under that argument enter the MATCH function

Step 4: Very first argument in the match function is Lookuo_value. As we wish to look up Revenue, refer to the cell B15.

Step 5: The second argument in the MATCH function is Lookup_array. Under this argument refer to the cell from B3 to B11 and lock the cells. Now, choose 0 as we want an exact match and close the parenthesis. Here, we have finished the row argument our next is the column argument.

Step 6: Again, enter the MATCH function under the Col_num argument.

Step 7: The first argument in the MATCH function is Lookup_value. As we wish to look up 2018 data. So, refer the cell D14 which contains 2018, and lock the cell as shown above.

Step 8: The second argument in the MATCH function is Lookuo_array. Refer from cell B1 to H1 as our year is located in those cells and lock the cells.

Step 9: Choose 0 as we want an exact match. Close the parenthesis 2 times. One is for closing the MATCH function and another is for the INDEX function.

Step 10: Select the cells from D15 to D17 and use Ctrl + d to autofill down.

We are all done. We can see our result. The function finds Revenue, Gross profit, and Net income from the table array and finds the corresponding value in 2018.

Now, we can change 2018 and choose any year available above. The function automatically updates the result.

M14

	A	B	C	D	E	F	G	H	I	J
1		Year	2018	2019	2020	2021	2022	2023		
2										
3		Revenue	100500	110148	120832	131707	142244	156253		
4		COGS	38672	43486	48333	52024	58320	64064		
5		Gross Profit	61828	66662	72499	79683	83924	92189		
6		Salaries	23789	26812	27859	28859	29659	32580		
7		Marketing	12871	13897	18652	18952	19652	21587		
8		Rent	5000	5000	5000	5100	5100	5602		
9		Earnings Befo	20168	20953	20988	26772	29513	32420		
10		Tax	5445	5867	5877	7737	8854	9726		
11		Net Income	14723	15086	15111	19035	20659	22694		
12										
13										
14				2022						
15		Revenue		142,244						
16		Gross Profit		83,924						
17		Net Income		20,659						
18										

We enter 2022 in cell D14. The function provides the corresponding data for 2022. We can enter any year the function will show the corresponding data.

We can also change anything in the row cell. We can enter Tax or anything available in our data. In that case, we enter Tax and Marketing.

N12

	A	B	C	D	E	F	G	H	I	J
1		Year	2018	2019	2020	2021	2022	2023		
2										
3		Revenue	100500	110148	120832	131707	142244	156253		
4		COGS	38672	43486	48333	52024	58320	64064		
5		Gross Profit	61828	66662	72499	79683	83924	92189		
6		Salaries	23789	26812	27859	28859	29659	32580		
7		Marketing	12871	13897	18652	18952	19652	21587		
8		Rent	5000	5000	5000	5100	5100	5602		
9		Earnings Befo	20168	20953	20988	26772	29513	32420		
10		Tax	5445	5867	5877	7737	8854	9726		
11		Net Income	14723	15086	15111	19035	20659	22694		
12										
13										
14				2022						
15		Tax		8,854						
16		Marketing		19,652						
17		Net Income		20,659						
18										

We can see the result updates automatically. We entered tax and marketing. The function provided the tax and marketing data from the year 2022. We can enter as we wish. The function is ready to provide the result.

This is how we can build powerful formulas with the combination of INDEX and MATCH.

FINANCIAL

Reading 5.9

XNPV

This function returns the net present value for a schedule of cash flow.

As a financial analyst, we must work with forecasting the future. All the forecasted value must be converted into net present value. We evaluate a project through NPV. When there is a positive NPV means the project is profitable and a negative NPV means the project is negative. When NPV is positive the shareholders' wealth as well as stock price also will be increased. Sometimes, companies are evaluated through discounted cash flow method. In that case, we need to use the XNPV function.

FORMULA

XNPV (rate, values, dates)

Rate: This is a required argument that specifies the discount rate to be used through the length of time. In other words, it can be said as WACC (weighted average cost of capital) or hurdle rate.

Values: It's also a required argument. The numeric value of cash flow. This is the value we get from the investment. Where positive values indicate positive cash flow and negative values indicate negative cash flow.

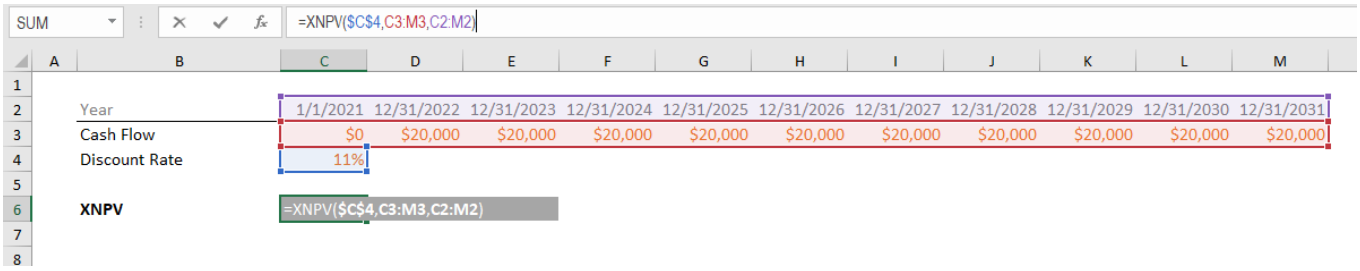
Dates: The corresponding date of the future cash flow.

NPV formula:

$$\mathbf{NPV} = \Sigma \frac{CF_n}{(1 + i)^n} \text{ - Initial Investment}$$

Here, CFn is the sum of the cash flow of all periods. If it is invested for 10 years then CFn is the sum of 10 years' cash flow. And i is the discount rate, n is the number of periods.

How to use the XNPV function in excel?



Here is the step-by-step instruction:

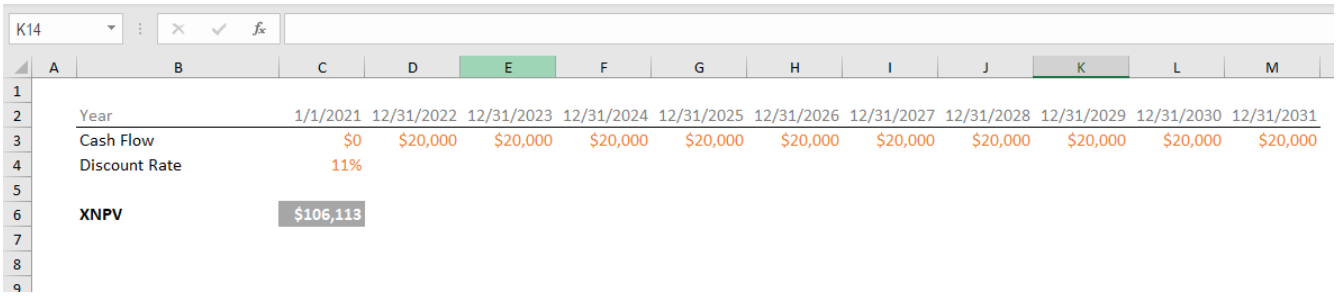
Step 1: Enter the XNPV function in cell C6.

Step 2: The very first argument is rate. So, our discount rate is 11%, or refer the cell C4 and lock it under this argument.

Step 3: Our second argument is the "value". Value started from cell C3 to M3. Refer to C3:M3 under this argument.

Step 4: The last argument is "dates". In this argument, we must refer to the corresponding date. So, refer C2 to M2.

We have finished all the work. Now, we can see the answer.



The result is $106,113. If our initial investment is less than this amount that means our NPV is positive. If the initial investment is greater than this amount that means the NPV is negative and this is not profitable. This is the basic learning of the XNPV function. This function is crucial for financial analysis.

Reading 5.10

XIRR

This function returns the internal rate of return for a schedule of cash flow.

The internal rate of return is the minimum required rate of return. The IRR makes the value of NPV zero. IRR is important to find out the minimum rate of return. In excel, we use the XIRR function to find out the rate. It helps us to choose between investments.

FORMULA

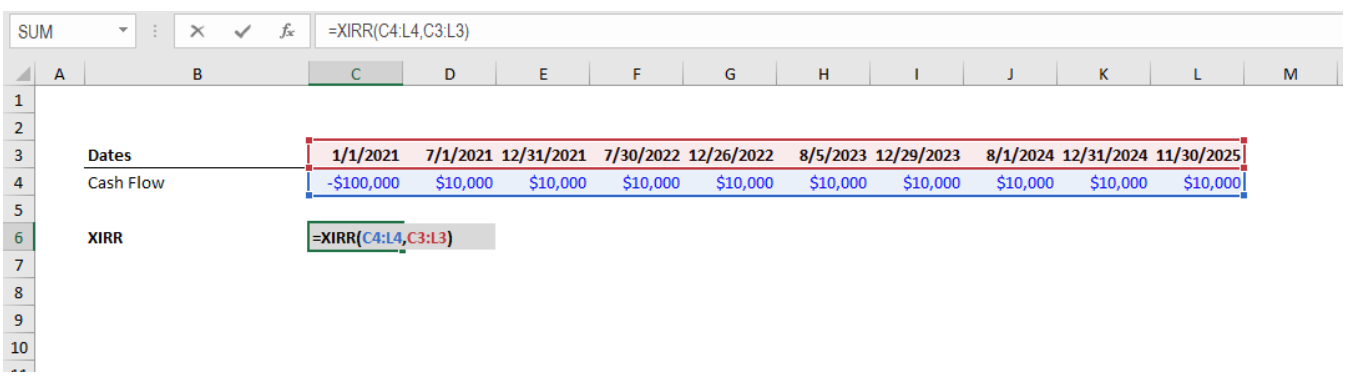
XIRR (values, dates, [guess])

Values: It's a required argument that specifies the array of values which are the cash flows.

Dates: It's also a required argument. These are the dates that correspond to the values.

Guess: An optional argument. It's an initial guess of what would be the IRR.

How to use the XIRR function in Excel?



Here is the step-by-step instruction:

Step 1: Enter the XIRR function in cell C6.

Step 2: The first argument is Values. The values contain the cells C4 to L4. So, refer to those cells under the Values argument.

Step 3: The second argument is the “dates”. We have to refer to the corresponding dates. The dates contain the cells C3 to L3. So, refer to those cells.

We have finished all work. Now, we can see the result.

Dates	**1/1/2021**	**7/1/2021**	**12/31/2021**	**7/30/2022**	**12/26/2022**	**8/5/2023**	**12/29/2023**	**8/1/2024**	**12/31/2024**	**11/30/2025**
Cash Flow	-$100,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000
XIRR	**-4%**									

The result is 4%. So, the minimum required rate of return is 4%. If we use 4% in the XNPV function the result would be zero.

View publication stats