Excel: Tables, Pivot Tables & More

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http://bit.ly/PivotTables_FMI (Booklet)

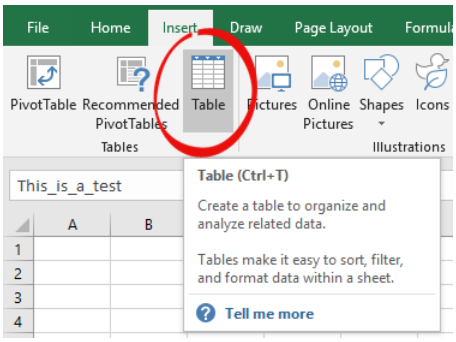
Contents

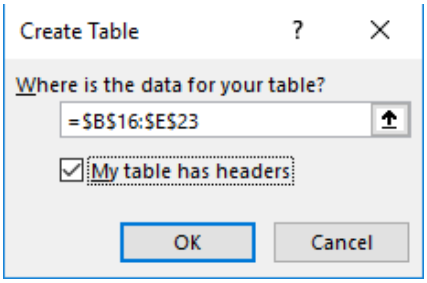
Tables

A Table is defined as a range of Excel data. Each row in the range is one record of data. Each row might describe, for example, an invoice or a customer or an inventory item. Each column in the table creates another field for each row. Fields might include invoice number, customer name, total sales, and so on. A table usually has headings in the first row.

There are two ways to create a table in Excel:

- Select a cell in the dataset and choose Insert, Table, OK





- Select a cell in the dataset, and press CTRL t (or CTRL l)

Once a table is created, the table is highlighted with a different background and has an arrow listed beside each heading. This allows the user to filter and sort the table however they choose. The background color can also be changed to whatever color is desired.

Region	Customer	Revenue	Cost
West	Leading Camera Traders	65073	31235
East	Magnificient Sandal Company	23345	12840
Central	Special Edger Corporation	98274	51102
West	Cool Scooter Company	20619	10310
East	Hip Calculator Corporation	71626	34380
Central	Different Radio Inc.	45541	20949
West	Matchless Clipboard Company	45521	24126

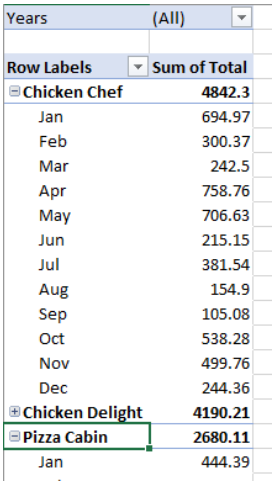
Different ways of creating pivot tables

Compact, Outline & Tabular

When you create a new pivot table, it is automatically created in the compact layout.

Compact Form

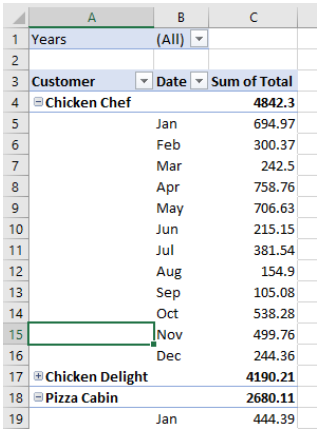
The default report layout for a pivot table is Compact Form. There are two row fields – customer and date. The Compact Form layout may be useful when you reduce the pivot table width, and aren't concerned about the Row field headings.



Years	(All)
Row Labels	**Sum of Total**
Chicken Chef	**4842.3**
Jan	694.97
Feb	300.37
Mar	242.5
Apr	758.76
May	706.63
Jun	215.15
Jul	381.54
Aug	154.9
Sep	105.08
Oct	538.28
Nov	499.76
Dec	244.36
Chicken Delight	**4190.21**
Pizza Cabin	**2680.11**
Jan	444.39

Outline Form

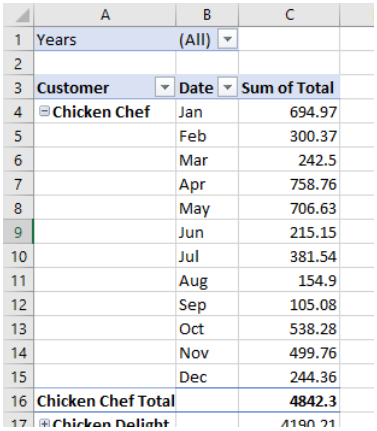
In Outline Form, each row field is in a separate column. There are two Row fields – Customer and Date. The Outline Form layout may be useful when you want to show all the field names as heading labels and aren't concerned about the width of the pivot table.



	A	B	C
1	Years	(All)	
2			
3	**Customer**	**Date**	**Sum of Total**
4	**Chicken Chef**		**4842.3**
5		Jan	694.97
6		Feb	300.37
7		Mar	242.5
8		Apr	758.76
9		May	706.63
10		Jun	215.15
11		Jul	381.54
12		Aug	154.9
13		Sep	105.08
14		Oct	538.28
15		Nov	499.76
16		Dec	244.36
17	**Chicken Delight**		**4190.21**
18	**Pizza Cabin**		**2680.11**
19		Jan	444.39

Tabular Form

In Tabular Form, each Row field is in a separate column. There are two Row fields – Customer and Date. The Row labels are not in a separate row. The Tabular Form layout may be useful when you want to show all the field names as heading labels and aren't concerned about the width of the pivot table but want to reduce the number of rows.



	A	B	C
1	Years	(All)	
2			
3	**Customer**	**Date**	**Sum of Total**
4	**Chicken Chef**	Jan	694.97
5		Feb	300.37
6		Mar	242.5
7		Apr	758.76
8		May	706.63
9		Jun	215.15
10		Jul	381.54
11		Aug	154.9
12		Sep	105.08
13		Oct	538.28
14		Nov	499.76
15		Dec	244.36
16	**Chicken Chef Total**		**4842.3**
17	**Chicken Delight**		4190.21

Profit & Loss Statements in Excel using Pivot Tables

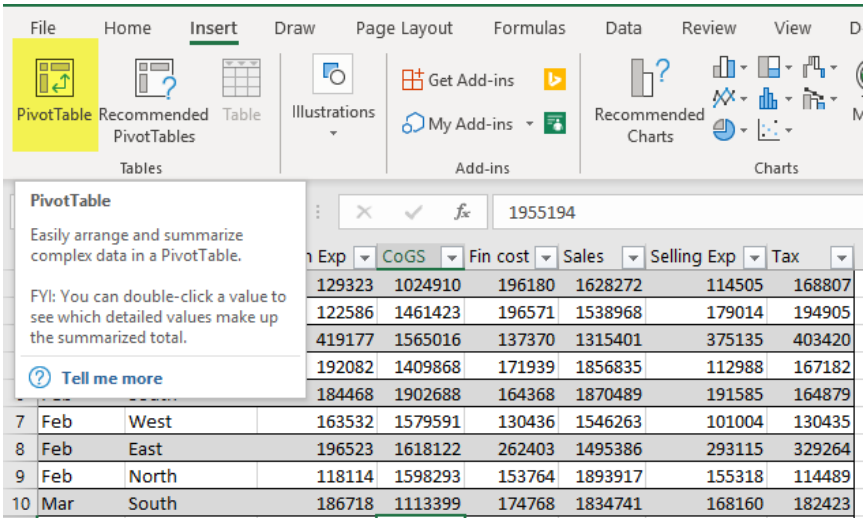
Excel does a great job of storing data in rows and columns, and is very flexible. Pivot Tables are an example of this flexibility. This example will show how to use Pivot Tables to make a Profit and Loss statement.

Before we begin, there are some potential problems we need to address:

- Data is not structured or not columnar. If this is the case, then we will need to get it structured in some way. This can be done by using a Pivot Table.
- Data is scattered over multiple workbooks or worksheets. In this case, we would need to use lookup formulas to get the data into a structured format to continue with this example.

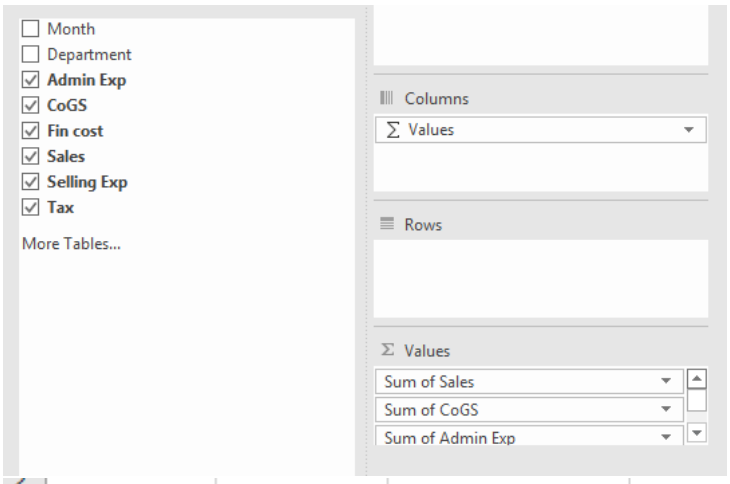
Create a Pivot Table

- Insert / Pivot Table



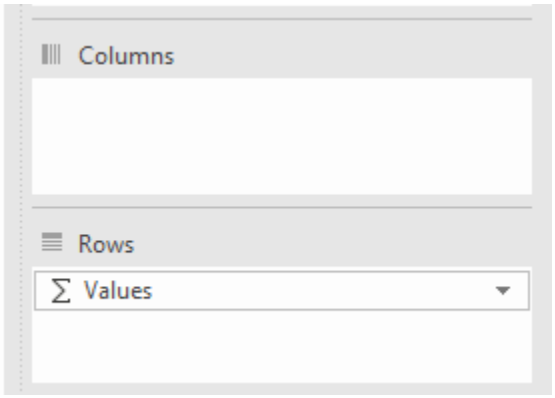
			Exp	CoGS	Fin cost	Sales	Selling Exp	Tax
			129323	1024910	196180	1628272	114505	168807
			122586	1461423	196571	1538968	179014	194905
			419177	1565016	137370	1315401	375135	403420
			192082	1409868	171939	1856835	112988	167182
			184468	1902688	164368	1870489	191585	164879
7	Feb	West	163532	1579591	130436	1546263	101004	130435
8	Feb	East	196523	1618122	262403	1495386	293115	329264
9	Feb	North	118114	1598293	153764	1893917	155318	114489
10	Mar	South	186718	1113399	174768	1834741	168160	182423

- Move the fields to the values box



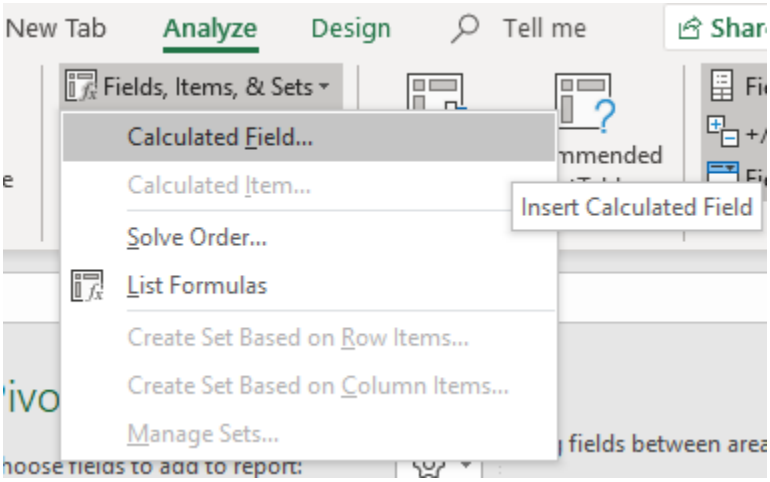
	Sum of Sales	Sum of CoGS	Sum of Admin Exp	Sum of Selling Exp	Sum of Fin cost	Sum of Tax
4	73971722	74204246	8290684	8972437	9351645	8629187

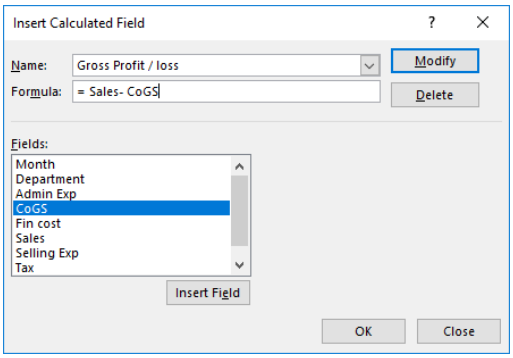
- Move the “Values” field from the Columns box to the Rows box

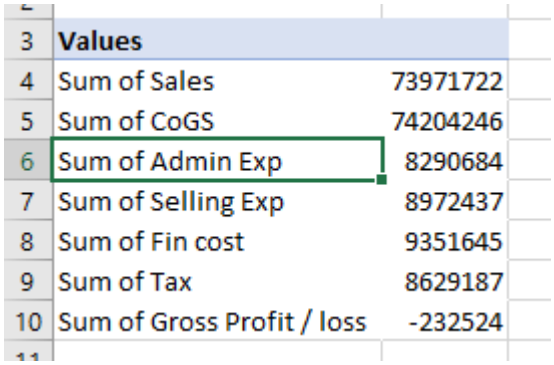


	Values	
4	Sum of Sales	73971722
5	Sum of CoGS	74204246
6	Sum of Admin Exp	8290684
7	Sum of Selling Exp	8972437
8	Sum of Fin cost	9351645
9	Sum of Tax	8629187

- At this point, we now have all the figures in place. We need some subtotals for gross profit or loss, operating profit or loss, profit before tax and profit after tax. Click anywhere inside the pivot table, click the analyze tab / calculations group / Fields, Items, Sets / click Calculated field.

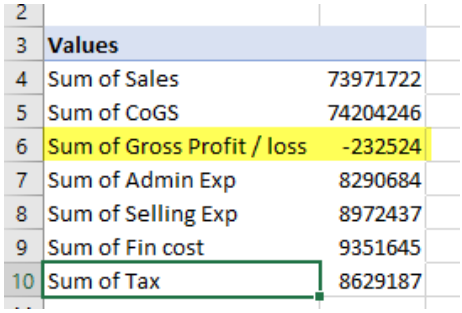






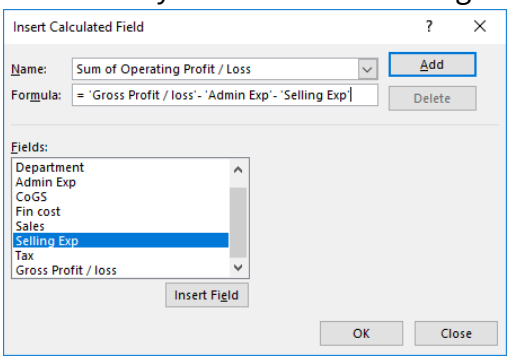
3	Values	
4	Sum of Sales	73971722
5	Sum of CoGS	74204246
6	Sum of Admin Exp	8290684
7	Sum of Selling Exp	8972437
8	Sum of Fin cost	9351645
9	Sum of Tax	8629187
10	Sum of Gross Profit / loss	-232524

  - Drag the field you just created immediately below the “Sum of COGS” field.



2		
3	Values	
4	Sum of Sales	73971722
5	Sum of CoGS	74204246
6	Sum of Gross Profit / loss	-232524
7	Sum of Admin Exp	8290684
8	Sum of Selling Exp	8972437
9	Sum of Fin cost	9351645
10	Sum of Tax	8629187

- Add another calculated field for operating profit/loss and move it to the spot immediately below “Sum of Selling Exp”.

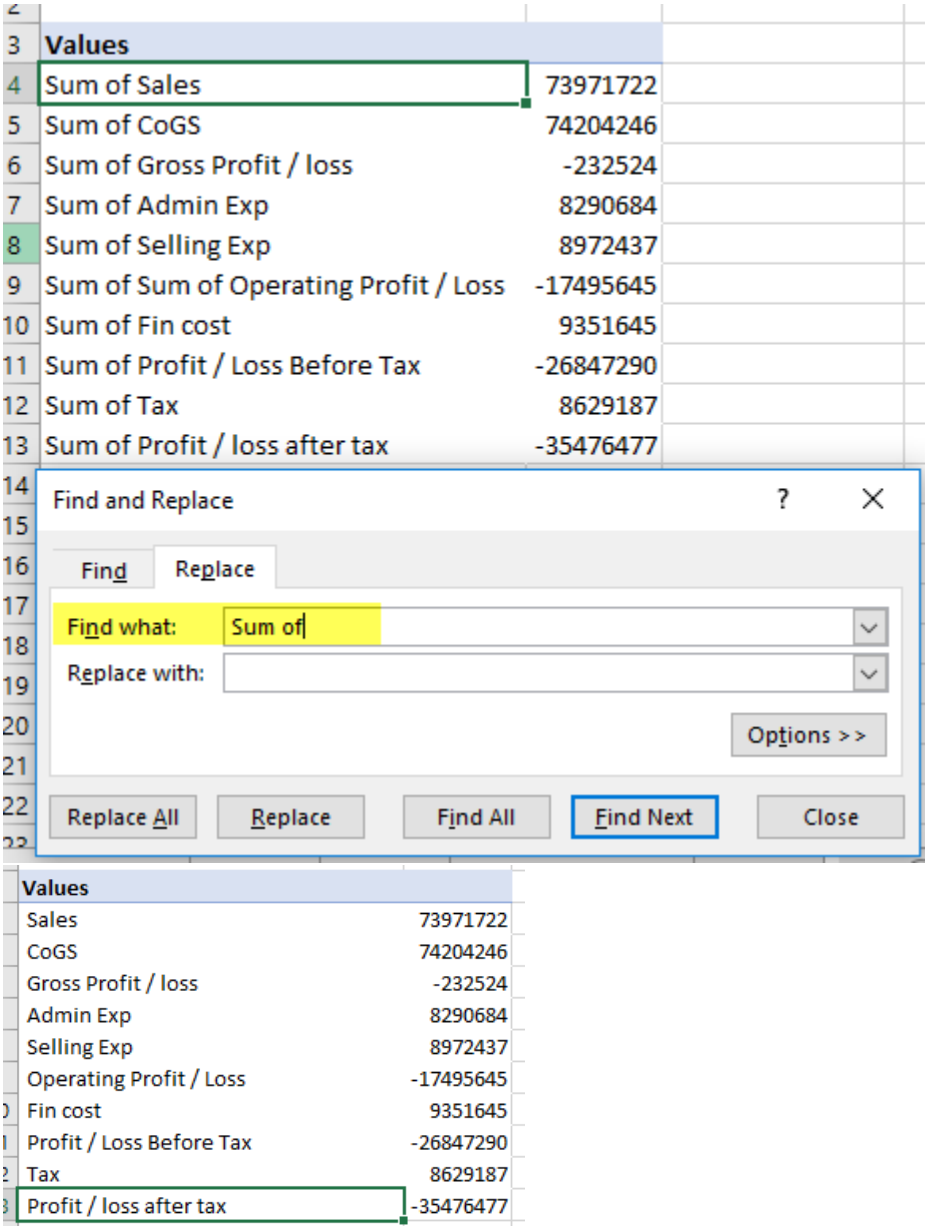


3	Values	
4	Sum of Sales	73971722
5	Sum of CoGS	74204246
6	Sum of Gross Profit / loss	-232524
7	Sum of Admin Exp	8290684
8	Sum of Selling Exp	8972437
9	Sum of Sum of Operating Profit / Loss	-17495645
10	Sum of Fin cost	9351645
11	Sum of Tax	8629187

- Add two more calculated fields and insert them in the appropriate place.

3	Values	
4	Sum of Sales	73971722
5	Sum of CoGS	74204246
6	Sum of Gross Profit / loss	-232524
7	Sum of Admin Exp	8290684
8	Sum of Selling Exp	8972437
9	Sum of Sum of Operating Profit / Loss	-17495645
10	Sum of Fin cost	9351645
11	Sum of Profit / Loss Before Tax	-26847290
12	Sum of Tax	8629187
13	Sum of Profit / loss after tax	-35476477

- Once we've completed adding all the calculated fields, we get a bunch of labels that state "Sum of….". Let's get rid of those words but doing a find and replace (CTRL + H).



- Change the number formats to the format you desire. Then add lines to the cells that need to it, in order to make the report more readable.

	Values	
4	Sales	73,971,722
5	CoGS	74,204,246
6	Gross Profit / loss	-232,524
7	Admin Exp	8,290,684
8	Selling Exp	8,972,437
9	Operating Profit / Loss	-17,495,645
10	Fin cost	9,351,645
11	Profit / Loss Before Tax	-26,847,290
12	Tax	8,629,187
13	Profit / loss after tax	-35,476,477

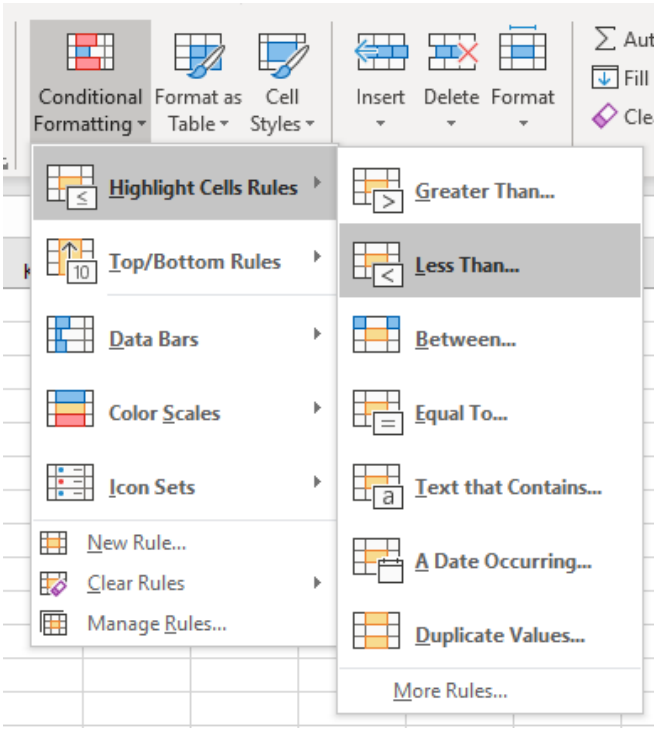
Variance Reports

Colors for positive or negative

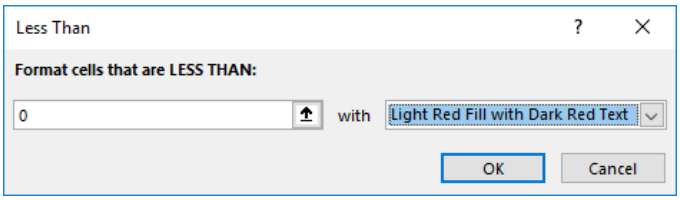
There are scenarios where we may want to display reports that have numbers highlighted that fit certain criteria. To do this, we will use Conditional Formatting.

	Actual	Budget	Variance
Sales	73,971,722	75,042,349	(1,070,627)
CoGS	68,243,484	69,785,243	(1,541,759)
Gross Profit	5,728,238	5,257,106	471,132
Admin Exp	3,218,540	2,994,234	224,306
Selling Exp	192,432	184,000	8,432
Operating Profit	2,317,266	2,078,872	238,394
Finance Cost	689,244	675,000	14,244
Profit Before Tax	1,628,022	1,403,872	224,150
Tax	1,278,924	1,250,000	28,924
Profit after Tax	349,098	153,872	195,226

Once we have picked the table that we want to add colors to, select Conditional Formatting from the Home Tab. We will start by highlighting the “Less Than” criteria.



The first box allows you to choose the criteria to determine what to highlight. Then choose the type of formatting you want. In this example, we are selecting anything with the value as less than zero, and we will format the cell with “Light Red Fill with Dark Red Text”.



The result shows up like this (we only chose the CoGS variance).

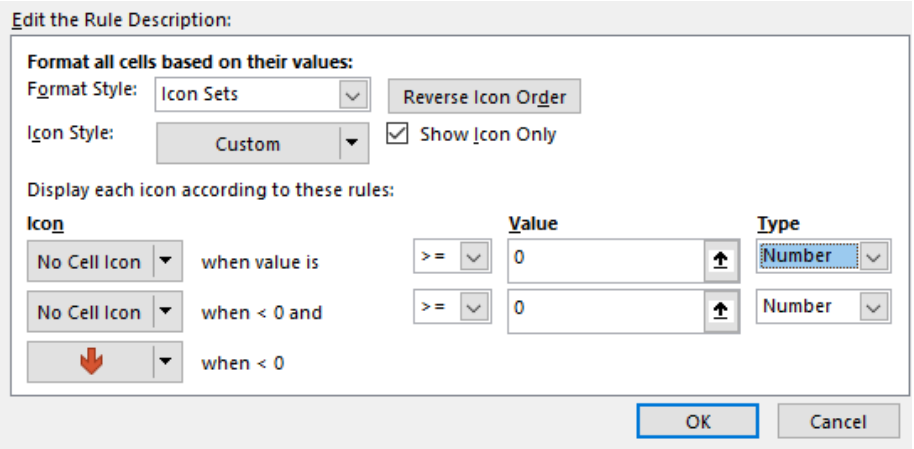
	Actual	Budget	Variance
Sales	73,971,722	75,042,349	(1,070,627)
CoGS	68,243,484	69,785,243	(1,541,759)
Gross Profit	5,728,238	5,257,106	471,132
Admin Exp	3,218,540	2,994,234	224,306
Selling Exp	192,432	184,000	8,432
Operating Profit	2,317,266	2,078,872	238,394
Finance Cost	689,244	675,000	14,244
Profit Before Tax	1,628,022	1,403,872	224,150
Tax	1,278,924	1,250,000	28,924
Profit after Tax	349,098	153,872	195,226

Arrows for positive vs. negative

Some reports may require arrows instead of color as the conditional formatting. Choose Conditional Formatting from the Home Tab. Choose Icon Sets, which will open the following screen.

To show an arrow for only the negative numbers, change the values, and only select an arrow for the bottom number. Change the other two options to “No Cell Icon”.

If you don’t want to see the number, but only the arrow (or any other icon), make sure to enter a checkmark in the “Show Icon Only” option.



The result looks like this:

	Actual	Budget	
Sales	73,971,722	75,042,349	
CoGS	68,243,484	69,785,243	
Gross Profit	5,728,238	5,257,106	
Admin Exp	3,218,540	2,994,234	
Selling Exp	192,432	184,000	
Operating Profit	2,317,266	2,078,872	
Finance Cost	689,244	675,000	
Profit Before Tax	1,628,022	1,403,872	
Tax	1,278,924	1,250,000	
Profit after Tax	349,098	153,872	

Working with Dates

Dates and times are two of the most common data types people work with in Excel, but they are also possibly the most frustrating to work with. This is because Excel uses a serial number to represent the date instead of a proper month, day, or year. It is made even more complicated by the fact that dates are also days of the week, like Monday or Friday, even though Excel doesn't explicitly store that information in the cells.

How Excel Stores Dates

Excel stores dates as a serial number that represents the number of days that have taken place since the beginning of the year 1900. This means that January 1, 1900 is really just a 1. January 2, 1900 is 2, and so on. By the time we get all the way to the present dates, the numbers have gotten quite large… October 24, 2017 is stored as 43032.

Date Function

=DATE(YEAR, MONTH, DAY)

In this function, specify the year month and day as numbers and it will return the correct date.

=DATE(2017,10,24) will return October 24, 2017

#

TODAY()

The TODAY function always returns the current date's serial number. The TODAY function is just entered as:

=TODAY()

This function will always return the current date. It refreshes every time something is changed in a workbook.

WORKDAY()

Occasionally, it may be useful to count ahead based on work-days (Monday – Friday) instead of all 7 days of the week. For that, Excel has provided WORKDAY.

=WORKDAY(START_DATE, DAYS)

Example

Let's find the date 6 work days before November 17.

	A	B
1	November 17, 2017	
2		
3	=WORKDAY(A1,-6)	Formula
4		
5	43048	Non-Formatted Date (result of formula)
6		
7	November 9, 2017	Formatted Date (result of formula)
8		

=WORKDAY(A1,-6) returns November 9, 2017

Retrieving Dates in Excel

Serial numbers don't make it easy to extract months, years, and days from a cell. That's why Excel has specific functions for pulling out each of these values. For working with the calendar, there is DAY, MONTH and YEAR.

For example, if cell A1 stores October 24, 2017, then:

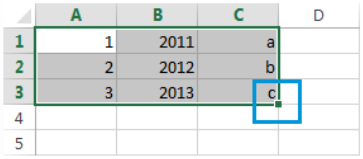
=DAY(A1) – Returns the number 24 as a numeric value

=Month(A1) – Returns the number 11 as a numeric value

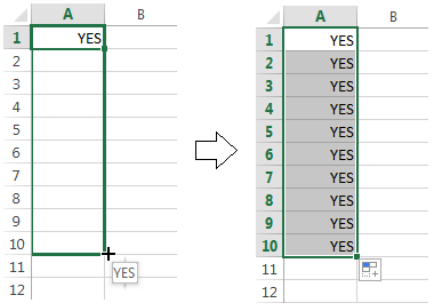
=YEAR(A1) – Returns the number 2017 as a numeric value

Auto Fill

Whether you just want to copy the same value down or need to get a series of numbers or text values, fill handle in Excel is the feature to help. It's an irreplaceable part of the AutoFill option. Fill handle is a small square that appears in the bottom-right corner when you select a cell or range.

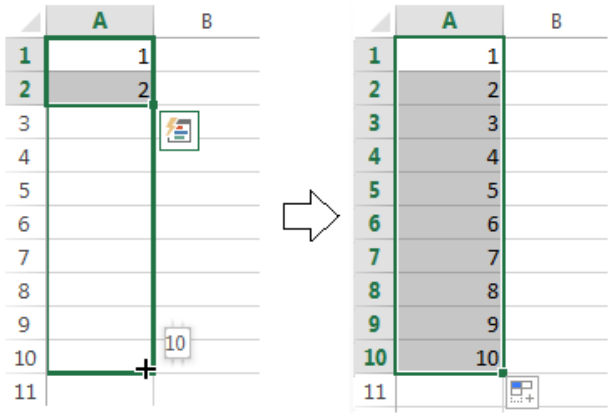


Whenever you need to get a series of values in the adjacent cells, just click on the Excel fill handle to see a small black cross and drag it vertically or horizontally. As you release the mouse button, you will see the selected cells filled with the values depending on the pattern you specify.

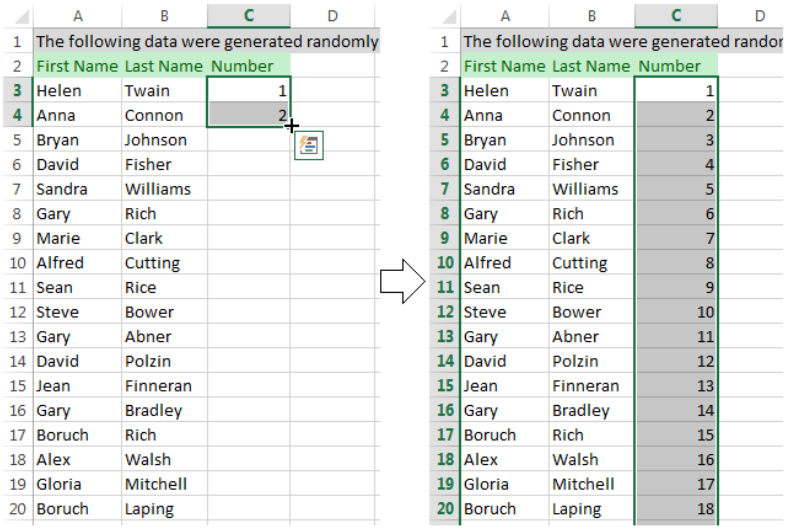


One of the more popular questions we get at workshops like this are how to autofill numbers in Excel. This can also be dates, times, days of the week, months, years and so on. IN addition, Excel's AutoFill will follow any pattern.

For example, if you need to continue a sequence, just enter the first two values into the starting cell and grab the fill handle to copy the data across the specified range.



Then, to take this concept of AutoFill one step further, suppose you have a huge database with names, and you need to assign a number to each name. You can do it in a flash by entering the first two numbers and double-clicking the Excel fill handle.



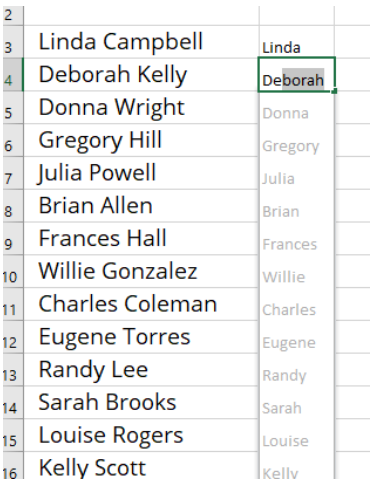
	A	B	C	D
1	The following data were generated randomly			
2	First Name	Last Name	Number	
3	Helen	Twain	1	
4	Anna	Connon	2	
5	Bryan	Johnson		
6	David	Fisher		
7	Sandra	Williams		
8	Gary	Rich		
9	Marie	Clark		
10	Alfred	Cutting		
11	Sean	Rice		
12	Steve	Bower		
13	Gary	Abner		
14	David	Polzin		
15	Jean	Finneran		
16	Gary	Bradley		
17	Boruch	Rich		
18	Alex	Walsh		
19	Gloria	Mitchell		
20	Boruch	Laping		

	A	B	C	D
1	The following data were generated randor			
2	First Name	Last Name	Number	
3	Helen	Twain	1	
4	Anna	Connon	2	
5	Bryan	Johnson	3	
6	David	Fisher	4	
7	Sandra	Williams	5	
8	Gary	Rich	6	
9	Marie	Clark	7	
10	Alfred	Cutting	8	
11	Sean	Rice	9	
12	Steve	Bower	10	
13	Gary	Abner	11	
14	David	Polzin	12	
15	Jean	Finneran	13	
16	Gary	Bradley	14	
17	Boruch	Rich	15	
18	Alex	Walsh	16	
19	Gloria	Mitchell	17	
20	Boruch	Laping	18	

Flash Fill

In Excel 2016, there is a feature called Flash Fill. It will give you the ability to take part of the data entered into one column of a worksheet table and enter just that data in a new table column using only a few keystrokes.

The series of entries will appear in the new column literally in a flash, the moment Excel detects a pattern in your initial data entry that enables it to figure out the data you want to copy. The beauty is that all this happens without the need for you to construct or copy any kind of formula.



2		
3	Linda Campbell	Linda
4	Deborah Kelly	Deborah
5	Donna Wright	Donna
6	Gregory Hill	Gregory
7	Julia Powell	Julia
8	Brian Allen	Brian
9	Frances Hall	Frances
10	Willie Gonzalez	Willie
11	Charles Coleman	Charles
12	Eugene Torres	Eugene
13	Randy Lee	Randy
14	Sarah Brooks	Sarah
15	Louise Rogers	Louise
16	Kelly Scott	Kelly

As soon as it detects this information, and it makes sense, hit enter, and it will automatically fill in the information.

If Statements

Many calculations in our lives are not straightforward. Say that a manager offers a bonus program if her team meets its goals. Or perhaps a commission plan offers a bonus if a certain profit goal is met. These types of calculations can be solved using an IF statement.

There are three arguments in the IF function.

=IF(LOGICAL_TEST,VALUE_IF_TRUE,VALUE_IF_FALSE)

- The first argument is any logical test that will result in a TRUE or FALSE. For example, you may have logical tests such as these:

  A2>100

  B5=”WEST”

  C99<=D99

  - All logical tests involve one of the comparison operators shown here:

Operator	Meaning	Example
=	Equal to	C1=D1
>	Greater Than	A1>B1
<	Less Than	A1<B1
>=	Greater than or equal to	A1>=0
<=	Less than or equal to	A1<=99
<>	Not equal to	A2<>B2

- The remaining two arguments are the formula or value to use if the logical test is tru and the formula or value to use if the logical test is false.

When reading an IF statement, the first comma should be read as the word then, and the second comma should be read as otherwise.

- =IF(A2>10,25,0) should be read as “IF A2 is greater than 10, then 25, otherwise 0”

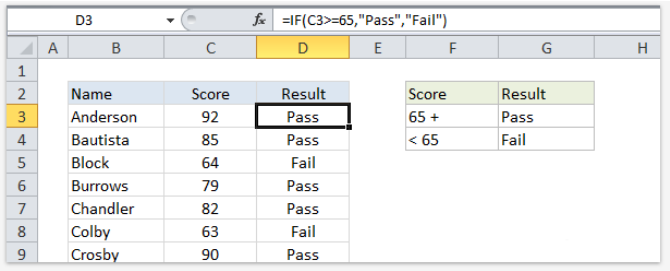
Another example of a simple IF statement is as follows:

A teacher maintains a spreadsheet that holds the student’s marks and determines based on the percentage marks whether the student passes or not. The IF statement will be entered like this:

=IF(C3>=65,”Pass”,”Fail”)

In plain English, we read this statement like this:

If the score is greater than or equal to 65, then enter pass, otherwise enter fail.



Nested IF Statements

A limitation of IF Statements is that it has only two outcomes. If you are dealing with multiple conditions then there may be a need to nest multiple IF statements into a formula.

Nested IF statements are the formulas that are formed by multiple IF statements inside one another. This nesting makes it possible for a single formula to make multiple decisions. It is possible to create up to 64 "nests" inside a single formula. (Just because you can doesn't mean you should)

You will often see nested IF statements to handle levels of something. For example, as a teacher, you may want to determine what letter grade a student receives based on the percentage based number in the previous example. We can nest an IF statement to do this for us.

Score	Grade	Condition
0 – 63	F	<64
64 – 72	D	<73
73 – 84	C	<85
85 – 94	B	<95
95 – 100	A	

With the conditions clearly understood, we can enter the first IF statement:

=IF(C5 < 64, "F")

This takes care of "F". Now to handle "D", we need to add another condition:

=IF(C5 < 64, "F",IF(C5 < 73, "D"))

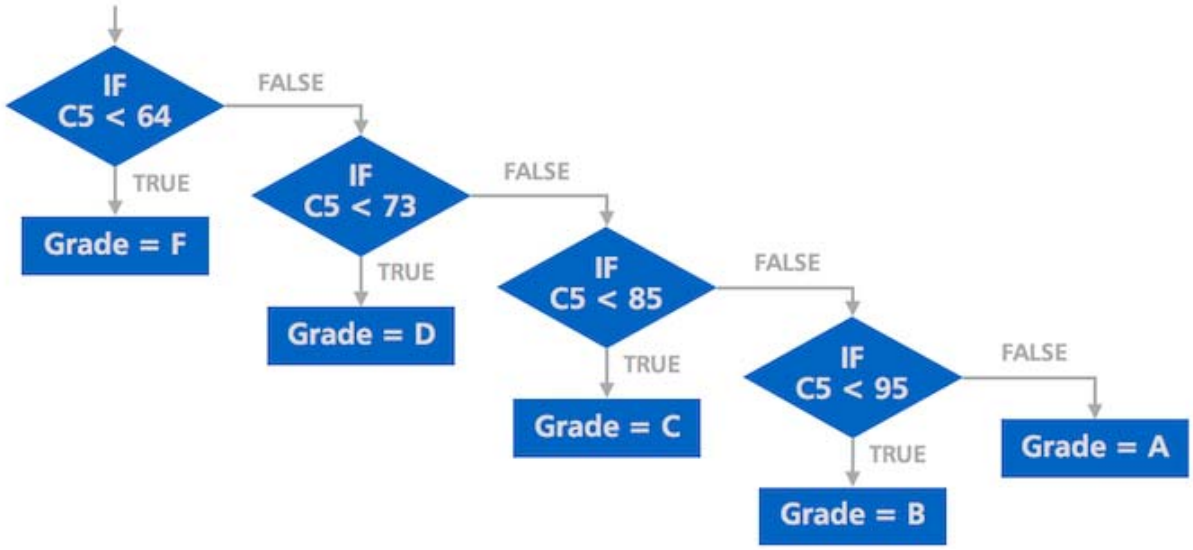
Note that I simply dropped another IF statement into the first IF for the "false" result. To extend the formula to handle "C", we repeat the process:

=IF(C5 < 64, "F",IF(C5 < 73, "D",IF(C5 < 85, "C")))

We continue on this way until we reach the last grade. Then, instead of adding another IF statement, just add the final grade for false.

=IF(C5 < 64, "F",IF(C5 < 73, "D",IF(C5 < 85, "C",IF(C5 < 95, "B", "A"))))

The diagram below visualizes the logical flow of this formula.



IFERROR

In Excel, there are often formulas that contain an error or even those that return an error when making calculations. Instead of displaying that error, error formulas can return a specific value in an error rather than N/A or ERROR.

=IFERROR(VALUE,VALUE_IF_ERROR) – This function will return a custom result when a formula generates an error, and a standard result when no error is detected. IFERROR is an elegant way to trap and manage errors without using more complicated nested IF statements.

IFERROR checks for the following errors: #N/A, #VALUE!, #REF!, #DIV/0!, #NUM!, #NAME?, or #NULL!.

A copy of this booklet is available at