10 Formulas

10 Analysis

10 Charts

10 Tricks

Written by

Chandoo

Chandoo.org
BECOME AWESOME IN EXCEL

Fast track your Excel Skills

10 FORMULAS

10 ANALYSIS

10 CHARTS

10 TRICKS

Fast Track your Excel Skills

A book by Chandoo

Chandoo.org

This page is intentionally left blank

to make this book look like a professional one 😉

TABLE OF CONTENTS

INTRODUCTION

In all my years as a trainer, consultant and Excel evangelist, I heard one question hundreds of times. "What do I learn?". Excel has hundreds of features, so it is daunting to figure out which things to learn first. This book is my answer to that challenge. In the next four chapters, I am going to list 10 formulas, 10 data analysis techniques, 10 charts and 10 tips to supercharge your Excel journey. Learn these and you will be well ahead of your peers. Each topic has extra resources at the end. Refer to them to learn more about the topics presented.

HOW TO READ THIS BOOK?

This book has four modules, one each on formulas, data analysis, charting and Excel tricks. Read them in any order. But the chapters inside the modules are meant to be read one to ten. Most chapters have additional resource links at the bottom. Click on them to learn more about the techniques.

For 3rd module (on charts), you can also download example workbook to see the instructions and outputs clearly. Please refer to the link at the start of module to get it.

ABOUT ME – CHANDOO

My name is Purnachandra Duggirala. But everyone calls me **Chandoo**, a short version of my rather long name. You too can call me that. It means *moon* in Telugu (my mother tongue). I started Chandoo.org in 2004 as a place to share my story with world. In the first few years, it was a simple personal blog. But around 2007, I started to use Excel *a lot* in my day job. So, one day, I thought of writing about Excel on my personal blog. This triggered a lifelong passion for learning new things, sharing them with the world and making people awesome.

Today, after 15 odd years, Chandoo.org is a thriving community of Excel & Power BI users talking about data analysis, visualization, reporting and automation. There are more than 1,000 articles, videos and examples on all things data at Chandoo.org.

I live in beautiful but rather windy Wellington, New Zealand with my family – Jo (my wife), Nishanth & Nakshatra (our 10-year-old twins).

You can read more about me here – https://chandoo.org/wp/about/

10 FORMULAS

Formulas make Excel smart. Without them, Excel is a simple data keeping software. Once you unleash formulas on your data, you can do magic. But Excel has hundreds of formulas, so which ones to learn first? In this chapter, I present ten most important formulas for you. Master these and you will be able to answer most business analysis questions quickly.

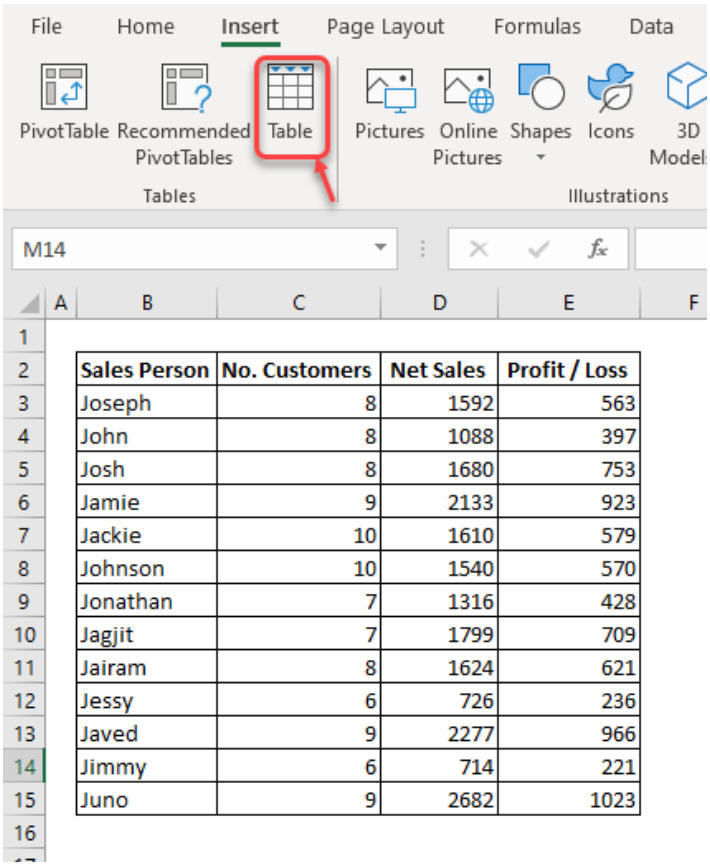
I am assuming that you are familiar with simple formulas like IF, SUM, COUNT, AVERAGE etc. So, in this section, we will only focus on intermediate to advanced formula concepts.

#1 TABLES & STRUCTURAL REFERENCES

If you don't know how to effectively talk to your data, then your formulas will suck. That is why, my #1 formula is not even a formula. Learn how to refer to data in the spreadsheet, especially in tables.

Excel offers various three ways to refer to data in a spreadsheet.

1. Cell address referencing
2. Named referencing
3. Structural referencing



Sales Person	No. Customers	Net Sales	Profit / Loss
Joseph	8	1592	563
John	8	1088	397
Josh	8	1680	753
Jamie	9	2133	923
Jackie	10	1610	579
Johnson	10	1540	570
Jonathan	7	1316	428
Jagjit	7	1799	709
Jairam	8	1624	621
Jessy	6	726	236
Javed	9	2277	966
Jimmy	6	714	221
Juno	9	2682	1023

You can use cell address based reference (for example, A1, B23, Sheet2!C7 etc.), name-based referencing by creating named ranges or **structural refencing** when your data is in a table. Of the three styles of referencing, **structural referencing** is most relevant for business data analysis. This is because, in most business settings, your data is already in tabular format.

Imagine you have some data as shown aside:

To sum up total sales, you can use a formula like `=SUM(D3:D15)`

While this formula works ok, it is not easy to read and doesn't work when you add more salespersons at the end.

Both problems can be elegantly solved by converting your data to a table. Simply select any cell in the range and press CTRL+T to convert your data to a table. Alternatively, you can press the Table button in Insert Ribbon (shown in the above illustration).

You can also name these tables. In fact, I recommend that you name the table whenever you create one. To do this, just go to Design ribbon and specify the name in the corner.

Once you have a table, you can use tablename[column name] notation to refer to entire columns of data. You can also use [@column] to refer to column value in the current row of table.

For example, you can write formulas like these:

- `SUM(mySales[no. of customers])` to find how many customers we had.
- `SUMIFS(mySales[no. of customers], mySales[Sales Person], "Jimmy")` to find how many customers “jimmy” had.

LEARN MORE ABOUT STRUCTURAL REFERENCING & TABLES

- Introduction to Structural Referencing
- 13 tips for working with tables

#2 IFS, GOODBYE NESTED IF STATEMENTS

IF formula is one of the first ones most people would learn in Excel. You can test a condition and return one of the two outcomes thru IF formula. But many real-life situations are not so black and white. So, we start to write nested IF formulas. These will get long and confusing.

The newly introduce IFS formula makes your life simple. You can replace long nested IF statements with a single IFS formula.

Note: IFS formula is only available in Excel 365, Excel online or Excel 2019 (and future versions) only.

SITUATION FOR IFS FORMULA

Let's say you have age in A1 and qualification in A2. You want to calculate eligibility based on below logic.

- Age < 17 – Ineligible
- Age >= 17 and Qualification = High School then Eligibility = Yes with condition 1
- Age >=17 and Qualification = Bachelors then Eligibility = Yes with condition 2
- Age >=17 and Qualification is anything then Eligibility = Yes with condition 3
- Age >= 23 then Eligibility = Yes with condition 4
- Age > 25 then Eligibility = Yes

To implement this logic, a normal IF formula would look like this. Remember, A1 has Age and A2 has Qualification.

```
=IF(A1>25, "Yes", IF(A1>=23, "Yes with condition 4", IF(A1<17,
"Ineligible", IF(A2="High School", "Yes with condition 1",
IF(A2="Bachelors", "Yes with condition 2", "Yes with condition 3")))))
```

The same formula can be rewritten using IFS like this:

```
=IFS(A1>25, "Yes", A1>=23, "Yes with condition 4", A1<17,
"Ineligible", A2="High School", "Yes with condition 1",
A2="Bachelors", "Yes with condition 2", TRUE, "Yes with condition 3")
```

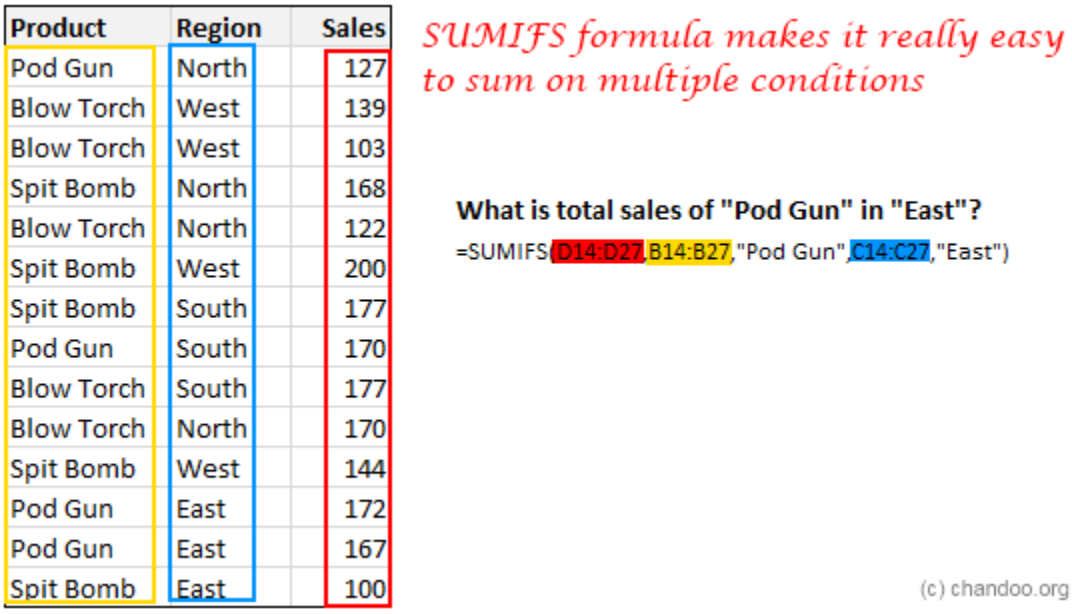
This formula is easier to read and to extend. You just write condition, output in pairs.

Notice the last TRUE option. This acts as a default option. If all other conditions are not met, then the output will be "Yes with condition 3"

#3 SUMIFS

If you listen very carefully, you can hear thousands of managers around the world screaming… “How many x we did in region A, product B, customer type C in month M?” right now.

To answer this question without the song and dance of excessive filtering & selecting, you must learn SUMIFS formula.



This magical formula can sum up a set of values that meet several conditions.

The syntax of SUMIFS is like this:

=SUMIFS(what you want to sum-up,
condition column 1, condition,
condition column 2, condition….)

Example:

```
=SUMIFS(sales,
         regions, “A”,
         products, “B”,
         customer types, “C”,
         month, “M”)
```

Meet the cousins too…

SUMIFS has a few cousins. They are,

- COUNTIFS
- AVERAGEIFS
- Excel 365 or 2019 or above only
    - MAXIFS
    - MINIFS

In future, you might even see MEDIANIFS, PERCENTILEIFS etc.

All these formulas follow same blueprint. You tell what you want summed up or averaged or *minned* etc. and then specify a bunch of conditions.

ADVANCED XIFS TRICKS:

USE WITH STRUCTURAL REFERENCES:

You can use cell references or structural references with these formulas. When you use table references (as shown in formula #1), you can write better formulas.

Example:

```
=SUMIFS(Sales[Net Sales], Sales[Sales Person], "Jackie")
```

USE LESS THAN / GREATER THAN OPERATORS:

You can include conditional operators like = < > in the SUMIFS, COUNTIFS etc. to count how many values meet that condition.

Example:

```
=COUNTIFS(Sales[Net Sales], ">1500")
```

How many [Net Sales] in the Sales table are greater than 1500.

APPLY WILD CARDS * ?

Excel has two wildcard characters. These are * and ?. You can use them with xIFS formulas to check based on a pattern. * is for checking any number of letters and ? is for checking a single letter.

For example, you can sum up all sales where the person name ends with **n.**

```
=SUMIFS(Sales[Net Sales], Sales[Sales Person], "*n")
```

You can also use ? wild card to check a single letter, like this.

```
=SUMIFS(Sales[Net Sales], Sales[Sales Person], "Jo??")
```

Adds up sales for all the people with 4 lettered names that begin with Jo.

LEARN MORE ABOUT SUMIFS AND OTHER SUMMING FORMULAS

- SUMIFS formula syntax and tips
- SUM neither A nor B values (DSUM)
- SUM between two dates
- Count and sum filtered lists based on criteria
- Sum of top 3 values in filtered list matching criteria

#4 VLOOKUP

Pop quiz time ….

Which of the below things would bring world to a grinding halt?

A. All smartphones stop working suddenly

B. A virus attacks all the pets and they are now wild

C. Suddenly VLOOKUP formula stops working in all computers, world-wide, forever

If you answered A or B, then its high time you removed your head from sand and saw the world.

The answer is C (Well, if all coffee machines in the world unite & miraculously malfunction that would make a mayhem. But thankfully that option is not there)

VLOOKUP formula lets you search for a value in a table and return a corresponding value. For example, you can ask What is the name of the customer with ID=C00023 or How much is the product price for product code =p0089 and VLOOKUP would give you the answers.

The syntax for VLOOKUP is simple.

=VLOOKUP(what you want to lookup,
table where your data is,
column from which you want the output,
is your table sorted?)

Example:

Assuming you have below data:

	A	B	C	D	E
1					
2		Sales Person	No. Customers	Net Sales	Profit / Loss
3		Joseph	8	1592	563
4		John	8	1088	397
5		Josh	8	1680	753
6		Jamie	9	2133	923
7		Jackie	10	1610	579
8		Johnson	10	1540	570
9		Jonathan	7	1316	428
10		Jagjit	7	1799	709
11		Jairam	8	1624	621
12		Jessy	6	726	236
13		Javed	9	2277	966
14		Jimmy	6	714	221
15		Juno	9	2682	1023

```
=VLOOKUP(“Jamie”, Sales, 2, false)
```

Lookup "Jamie" in Sales table and return value from 2nd column – *i.e. No. Customers.*

The answer will be 9

False option at the end tells VLOOKUP to look for exact match.

CHANDOO'S TOP 9 VLOOKUP TIPS, IN NO PARTICULAR ORDER

Since VLOOKUP is the most popular Excel function, I am betting that you already know how to use it. So, here are my top 10 tips on getting *even more* out of it.

1	**Use wild cards with lookups**	You can use * and ? with VLOOKUP, HLOOKUP and MATCH too. These can help look based on a pattern.
2	**Lookups are faster if you sort the data**	One of the big complaints with lookups is that they are slow on *lots of data.* A simple trick is to sort your data. Then you can use the *approximate match* OPTION with lookups. This option is very fast. Mind you, it will return next value if the lookup value cannot be found.
3	**Get multiple column values with one lookup**	You can provide an array for column number parameter. This will return the array to Excel. You can either, • Use the array in another formula like SUM / AVERAGE • Or Spill the result to a range (works only Excel 365 with dynamic arrays)
4	**Lookup very high number to get the last number in a column**	This is a cool trick. Just use VLOOKUP with approximate match (last parameter TRUE) and search for very high number – like 9999999999. This will just return the last value in your data. Works only with numbers. For text, try searching REPT("z",100) or something.
5	**Lookups return only the first matching value**	Any lookup (VLOOKUP / HLOOKUP / XLOOKUP / MATCTH / LOOKUP) just returns the first matching result. If you want to return all matching values, use:

		• FILTER() – works only in Excel 365 with Dynamic Arrays • xIFS functions – SUMIFS etc. will consider all matching values to return the sum. • Use array formulas
6	**Use IFNA instead of IFERROR**	While most of us put VLOOKUP inside IFERROR, it is better to use IFNA(). This way you can still see other errors but avoid the NA error when lookup result can't be found.
7	**Replace column number with MATCH for stability**	One of the biggest drawbacks of VLOOKUP is the column number parameter. When you insert new columns, you must remember to change the number. A simple option is to use MATCH to lookup the column number of result column. Like this: =VLOOKUP("Jamie", Sales, MATCH("Net Sales", Sales[#Headers], 0), False)
8	**Don't be shy to use INDEX+MATCH or XLOOKUP**	VLOOKUP has lots of fans. But it is clumsy to use when you want to lookup in the middle. Try newly introduced XLOOKUP or INDEX+MATCH combination if possible.
9	**Try table relationships instead of multiple lookups**	If you need to get matching values for a column from another table and fill down, consider relationship feature instead. This will keep the data separate, makes your analysis faster and still provides all the answers (thru Pivot tables)

LEARN MORE ABOUT VLOOKUP

The reference links in this chapter are same as next chapter.

- VLOOKUP syntax, how-to and tutorial
- XLOOKUP syntax, examples and tips
- Get VLOOKUP + 1 value
- VLOOKUP or INDEX+MATCH – interview question
- VLOOKUP multiple matches with TEXTJOIN
- VLOOKUP last value
- Ultimate VLOOKUP trick – multi-condition lookup
- Use Linked Tables and Pivots – VLOOKUP ALTERNATIVE

#5 INDEX+MATCH COMBINATION FORMULA

For every 10 people using VLOOKUP, there is someone realizing its most annoying limitation. VLOOKUP formula can only search on left most column.

That means, if a table of customers has customer ID in left column and name in right column, when using VLOOKUP, you can search for customer ID only.

You cannot ask questions like what is the customer ID of “Samuel Jackson”?

VLOOKUP would choke and bring Excel to knees.

Thankfully, INDEX+MATCH formulas come to rescue. These 2 beautiful formulas help us lookup on any column and return corresponding value from any other column.

Syntax:

=INDEX(list of values,
MATCH(what you want to lookup, lookup column, is your lookup column sorted?))

Example:

```
=INDEX(customer IDs, MATCH(“Samuel Jackson”, Customer names, 0) )
```

OR USE XLOOKUP

As INDEX+MATCH combination is more versatile, Microsoft introduced a new formula to fill this VLOOKUP gap. Meet XLOOKUP. Think of it as VLOOKUP 2.0, it works just as VLOOKUP, but offers more flexibility and options.

Here is XLOOKUP substitute for the INDEX+MATCH shown in earlier section.

```
=XLOOKUP("Samuel Jackson", CustomerNames, CustomerIDs)
```

LEARN MORE ABOUT INDEX+MATCH

The reference links in this chapter are same as previous chapter.

- VLOOKUP syntax, how-to and tutorial
- XLOOKUP syntax, examples and tips
- Get VLOOKUP + 1 value
- VLOOKUP or INDEX+MATCH – interview question
- VLOOKUP multiple matches with TEXTJOIN
- VLOOKUP last value
- Ultimate VLOOKUP trick – multi-condition lookup
- Use Linked Tables and Pivots – VLOOKUP ALTERNATIVE

#6 WORKING WITH DATE & TIME VALUES IN EXCEL FORMULAS

> Time is an illusion; Date is a bigger illusion.

Nobody said it, but it is true for Excel date & times values. While you may think Excel supports Date & Time datatypes, in reality, they are just numbers.

Each day is one number. For example, 15th of September 2019 is 43,723.

16th of September 2019 is 43,724.

Why 43,723?

The answer is simple. Excel date system began on 1 January 1900. So that date corresponds to number 1. Every day since then is a number, increased by one. 15th September 2019 is 43,723 because it has been that many days since 1st of January 1900.

SO, WHAT ABOUT TIME?

If each day is one number, then each hour is 1/24th. Each minute is 1/24/60.

For example, 6AM is 0.25 (since 6/24 = 0.25)

Once you know these concepts, working with date values becomes a breeze.

A QUICK PRIMER ON DATE & TIME FORMULAS

1	**DATE(), TIME()**	Use DATE function to create any date. For example, DATE(2019,9,15) makes 15th September 2019. TIME(9,30,0) makes 9:30 AM
2	**TODAY(), NOW()**	These dynamic functions give you current date and time respectively. Remember, NOW() returns current date along with time.
3	**Add with + subtract with -**	You can calculate date after one week by simply adding 7 to a date. Likewise, you can calculate time after 8hrs by adding 8/24 to a date or time value.
4	**Compare with > and <**	To check if a date is in future, simply write =IF(mydate>TODAY(), "it's in future…", "nope")
5	**Add / subtract months with EDATE()**	Use =EDATE(TODAY(),3) to find out date after 3 months from today. Use negative number to subtract months.
6	**WORKDAY.INTL() and NETWORKDAYS.INTL() for dealing with working days only**	If you want to ignore weekends, holidays during a calculation, then use these functions. • WORKDAY.INTL for calculating future / past working dates • NETWORKDAYS.INTL for calculating gap between two dates in working days
7	**EOMONTH() for end of month**	Given a date, to get the end of month, use =EOMONTH. =EOMONTH(DATE(2019,9,16), 0) gives end of month for September 2019 – *i.e.* 30 September 2019.  Trick: Use =EOMONTH(TODAY(), 0)+1 to get first date of next month.

8	**DAY(), WEEKDAY(), MONTH(), YEAR() to extract bits**	• DAY() for day part of the date • WEEKDAY() for number of weekday, default 1 for Sunday, 7 for Saturday • MONTH() for month number in the year
9	**Calculate Quarter**	To get Quarter number, just use MONTH() and divide with 4, like this: =ROUNDUP(MONTH(TODAY())/4,0) will give 1 to 4 based on current month.
10	**Calculate AGE in years**	Try =DATEDIF("1-Jan-1984",TODAY(), "y") to see age in years from 1-Jan-1984 to today.

LEARN MORE ABOUT EXCEL DATE / TIME FORMULAS

- 42 tips & formulas for Excel Time Travelers
- Working with date & time values in Excel – top 10 tips
- Simple trick to add days, weeks, months or years to any date
- How to calculate working hours between two dates

#7 WORKING WITH TEXT VALUES IN EXCEL

Excel is primarily for working with numbers. That said, we often deal with text values. Excel offers many useful functions and operators to deal with these. In this section, let's look at the most important ones.

LEN() TO GET LENGTH OF TEXT

`=LEN("Chandoo")` will say 7

EXTRACT PARTS WITH LEFT, RIGHT AND MID

`=LEFT("Excel is powerful", 5)` will be Excel

`=RIGHT("I love Pivot Tables", 6)` will be Tables

`=MID("Become awesome", 9,2)` will be we

LOOK FOR PARTS OF TEXT WITH FIND

`=FIND("some", "awesome")` will return 4 as ***some*** is found at the 4th position in the text "awesome"

Tip: FIND is case sensitive, so =FIND("SOME", "awesome") will return #VALUE! Error. **Use SEARCH()** if you want to find things ignoring case.

CHANGE CASE WITH LOWER, UPPER OR PROPER

`=LOWER("Microsoft Excel")` will be microsoft excel

`=UPPER("pivot tables")` will be PIVOT TABLES

`=PROPER("BECOME AWESOME IN EXCEL")` will be Become Awesome In Excel

CHANGE TEXT WITH SUBSTITUTE

Want to replace parts of your text with something else. Use either SUBSTITUTE or REPLACE.

`=SUBSTITUTE("Expel", "p", "c")` will be Excel

`=REPLACE("someone",5,3,"thing")` will be something

CHANDOO'S TOP 5 TEXT FORMULAS

All these formulas assume A1 has input value (either a sentence or name or text)

1	**Count words with LEN and SUBSTITUTE**	=LEN(A1) – LEN(SUBSITUTE(A1, " ","")) + 1 Note: This assumes words are punctuated by spaces alone. If you want to consider other symbols like comma, semi-colon etc, then you need to substitute them with blank spaces too.
2	**Combine a bunch of cells with TEXTJOIN**	=TEXTJOIN(",", TRUE, A1:A10) Returns A1:A10 values in one cell with comma separated.
3	**Extract username from email address**	=LEFT(A1, FIND("@",A1)-1)
4	**Check if two text values are same (case sensitive)**	=EXACT("Chandoo", "chandoo") will be FALSE
5	**Extract number from**	Works only when text has single positive whole number anywhere, like "Price $375 per user" will return 375, but

	alphanumeric strings	"Price $375 per user, $600 per two" will return wrong answer. =TEXTJOIN("",TRUE, IFERROR(VALUE(MID(A1,ROW(A1:A100),1)),""))

LEARN MORE TEXT FORMULAS

- Extract nth word using FILTERXML
- Use Power Query to extract things – currency from text
- Reverse text using formulas
- Find if a text is palindrome

#8 IMPLEMENT BUSINESS LOGIC WITH AND / OR / NOT

Often, you may want to check multiple conditions using Excel formulas. Learning how to use AND / OR / NOT formulas will be super helpful in such situations.

Examples:

Give 10% discount to repeat customers in the age group 19 to 25

Discount % Formula:

=IF(AND(customer_type="repeat", age>=19 , age<=25), 10%, 0%)

Any female customers and all male customers over 30 get 5% discount

Formula:

=IF(OR(Gender="Female", AND(Gender="Male", Age>30)), 5%,0%)

8% discount for all except New York store or customers under 20

Formula:

=IF(AND(NOT(Store="New York"), NOT(Age<20)), 0%, 8%)

Alternative formula:

=IF(AND(Store<>"New York", Age>=20), 8%, 0%)

LEARN MORE ABOUT LOGIC FUNCTIONS IN EXCEL

- Business logic in Excel – Podcast episode

- XOR formula
- Between formula

#9 SUMMARIZE FILTERED VALUES WITH SUBTOTAL

Excel Filters are a powerful way to perform ad-hoc analysis of data. You can quickly narrow down a large list to the rows that matter by applying filters. What if you want to sum or average etc. these filtered cells?

Simple, use SUBTOTAL.

SUBTOTAL Syntax

=SUBTOTAL(Operation, Range of cells)

The first parameter is called "Function number". For example, 1 means you want average.

SUBTOTAL has several function numbers, as shown below. Use 1 for Average including hidden values and 101 for excluding hidden values.

Function number	Function
1, 101	Average
2, 102	Count numbers
3, 103	Count all
4, 104	Max
5, 105	Min
6, 106	Product (multiplication)
7, 107	Standard Deviation
8, 108	Standard Deviation (population)

9, 109	Sum
10, 110	Variance
11, 111	Variance (population)

SUBTOTAL EXAMPLES:

```
=SUBTOTAL(1, Sales[Net Sales])
```

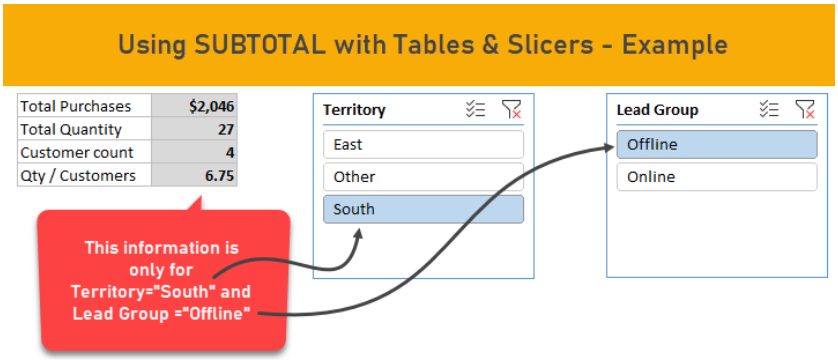
Average of Net Sales column in Sales Table. If you filter away some rows, they will be ignored when calculating average.

```
=SUBTOTAL(9, Sales[No. Customers])
```

Sum of total customers in the Sale table after applying any filters.

Tip: Use SUBTOTAL with Table level slicers

You can apply slicers to any Excel table. These act as *visual* filters. If you use SUBTOTAL on such a table, it will show the statistics for filtered results. See below demo.



LEARN MORE ABOUT SUBTOTAL FORMULA

- SUBTOTAL formula – syntax, tutorial and help
- Summarize filtered values with SUBTOTAL / AGGREGATE formulas
- Sum & count filtered values based on criteria
- Extract values meeting criteria with FILTER function (works in Office 365 with Dynamic Arrays)

#10 ERRORS IN FORMULAS

> My Excel sheet just hash tagged me.

Well, it's not trying to be social or trending. #VALUE!, #N/A etc. are Excel errors.

It is not enough if you learn how to write formulas, you must also learn how to deal with errors. That is why my #10 formula tip is all about errors.

COMMON ERRORS IN EXCEL FORMULAS

- **#N/A** Occurs when the value you are looking up is not there. You can also generate this with NA() function. When #N/A is in a cell, any chart referring to it will ignore that value.
- **#VALUE!** happens when you try to convert something to a number, but Excel couldn't succeed. For example, ="Chandoo"+7 will be #VALUE!
- **#NAME?** is Excel's way of telling that you either have a typo or you are referring to a table / named range / function that doesn't exist. For example, `=vlook("James", Sales, 2, FALSE)` will be #NAME? as there is no such function as vlook.
- **#REF!** means you are referring to a cell / address that doesn't exist or got deleted. You get #REF! when you write a formula referring to a cell and then delete that row / column.
- **#DIV/0!** means you are dividing with zero. This happens often when you try to calculate average for a criterion that doesn't exist.
- ###### has two meanings. Either your cell is too small to show the content (adjust column width) or you have formatted negative number as a date. Remember, Excel dates are positive numbers starting with 1 Jan 1900 as number 1.

- **#SPILL!** is a new error. It means, a dynamic array generated by Excel formula cannot spill down or sideways because there is something else in those cells.

HOW TO AVOID ERRORS IN OUTPUTS

You can use error handling functions to elegantly deal with errors. There are a few of them in Excel. Here is a quick summary.

1	**IFERROR**	Replace any possible error with another output. =IFERROR(your formula, "there was an error") will be either the result of your formula or the message "there was an error"
2	**ISERROR**	To check if there is an error in your formula. =ISERROR(your formula) will be either true or false depending on the formula.
3	**IFNA**	Replace only #N/A error. Useful for dealing with lookup related errors.
4	**ERROR.TYPE**	Returns the error type as a number. Use it with conditional formatting to highlight all errors of specific type (say #REF errors) in a colour.
5	**CTRL+` (back quote symbol)**	Use this to quickly switch between formula view and result view. Helpful when working with formulas and trying to understand which cells have them.

LEARN MORE ABOUT ERROR HANDLING IN EXCEL

- IFERROR function – syntax, help and examples
- How to hide formula errors while printing
- Excel formula errors – understand & debug them

- Error error on the wall – Podcast episode

Introducing

Excel School

Are you looking for an **advanced Excel course**? I am glad to tell you that I run one of the BEST online Excel classes in the world at Excel School. This in-depth course helps you master data analysis, charting, dashboard reporting and productive usage of Excel. There are 6 + 1 modules in this program, each focusing on one core area of Excel usage.

1. **Getting started:** Intro, basics, tips & tricks
2. **Working with data:** Power Query, tables, clean-up and formatting
3. **Writing formulas:** referencing, summarizing, lookups, date, text and advanced formulas
4. **Data analysis:** Pivot tables, relationships, interactive analysis, slicers, forecasting
5. **Charting:** Picking right charts, advanced combination charts, interactive charts, sparklines
6. **Productivity:** Data validation, templates, protection, publish to web etc.

+

7. **Dashboard Reporting:** Full module on creating dashboards with 6 examples

> I love it. Very insightful and lots of useful tips and tricks. Looking forward to immersing myself in more lessons soon. ☆☆☆☆☆
>
> Harry F, Texas
>
> Excel School Student

Join Excel School with 10% discount:

Please accept my invitation to this world-class online training and become awesome. As a reader of this book, you get 10% discount. Use the coupon code **10101010** to get your personal discount.

Click here to know more and join Excel School.

10 DATA ANALYSIS

There are a million ways to analyze data in Excel. But as an intermediate level user you should focus on learning the core analysis concepts first before moving to advanced topics. In this chapter, I will be talking about top 10 ways to analyze data in Excel.

#1 BASIC STATISTICS

Any time you are presented with a bunch of data, you should quickly calculate basic statistics to understand the nature of the data. These are,

- Counts – count of rows, blanks, errors, numbers & text values
- Average
- Median – Midpoint of the data
- Quartiles – 25th and 75th percentile of the data
- Range – difference between minimum and maximum value, also known as spread.
- Mode – most frequent item in your data. Useful when analyzing text values or survey responses.
- Standard Deviation – Tells you how the values in the data differ from the average. Higher values indicate that your data has too much variation.

AVERAGE OR MEDIAN?

There is a tendency to summarize business data with average whenever possible. I suggest calculating MEDIAN too so that you can compare the values and see if there are any anomalies.

Pro tip: How to calculate MEDIAN by category or condition?

Excel doesn't have MEDIANIFS function. So, replicating calculations like AVERAGEIFS but for MEDIAN is tricky. You can use this simple formula.

=MEDIAN(IF(column=value, number_column))

Make sure you press CTRL+Shift+Enter after typing this to get correct answer.

#2 WEIGHTED AVERAGE

Imagine you have data like this, and you want to find out the average salary for entire company. How would you do it?

Department	Avg. Salary	Employees
IT	$75,000	120
Accounting	$72,000	32
HR	$80,000	16
Sales & Service	$91,000	14
Call Centre	$68,000	80
Production	$83,000	64

Simple, use **WEIGHTED AVERAGE.**

But there is no weighted average formula in Excel!!!

Well, we can use SUMPRODUCT to get the answer we need.

The average salary for entire company = $\frac{Total\ Salary\ of\ all\ employees}{Count\ of\ employees}$

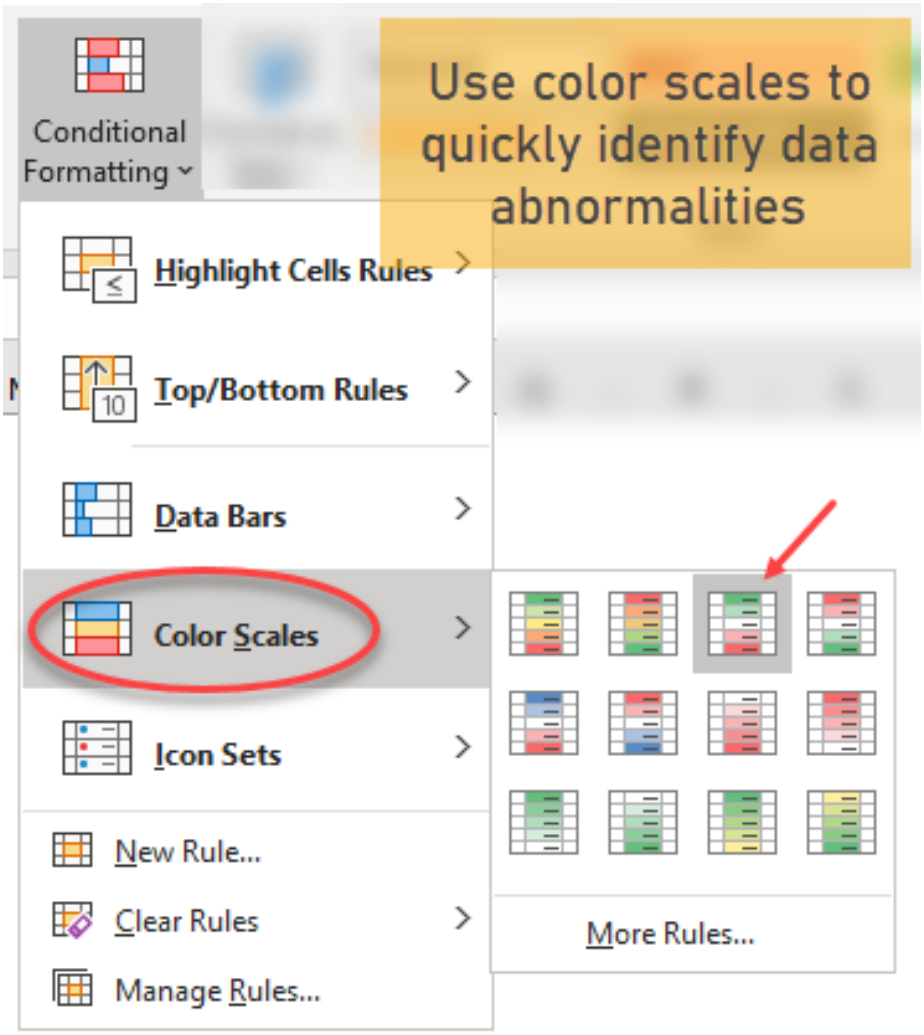
Excel formula

```
=SUMPRODUCT(data[Avg. Salary], data[Employees]) / SUM(data[Employees])
```

- Read more about weighted averages

#3 QUICKLY SPOT OUTLIERS

Whenever you are looking at lots of data, you need to identify any abnormalities. This can be easily done by applying color scales on the data thru conditional formatting. Just select your data, go to Home > Conditional Formatting > Color Scales and apply a color scale that suits your needs.



Tip: Use diverging (3 color) scales when you have mix of positive and negative numbers, 2 color scale otherwise.

Some numbers			
-13	-3	206	123
148	33	206	80
15	-31	100	49
18	152	176	73
-37	220	123	40
2	177	87	270
23	-9	1	239
32	119	166	-11
148	30	369	209
142	-23	96	135
0	164	95	174
194	55	-6	54
24	156	57	155
187	-57	233	24
182	60	275	89
213	184	53	208
63	173	174	-69

Some numbers			
-13	-3	206	123
148	33	206	80
15	-31	100	49
18	152	176	73
-37	220	123	40
2	177	87	270
23	-9	1	239
32	119	166	-11
148	30	369	209
142	-23	96	135
0	164	95	174
194	55	-6	54
24	156	57	155
187	-57	233	24
182	60	275	89
213	184	53	208
63	173	174	-69

Quickly spot abnormalities in data with color scales

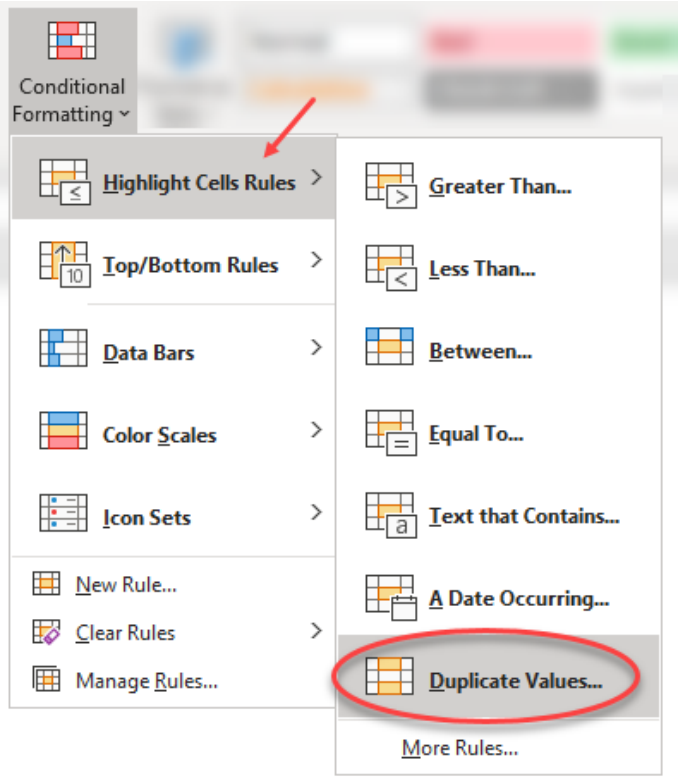
- Working with conditional formatting in Excel – Basics
- Conditional formatting + Slicers

#4 FIND COMMON VALUES BETWEEN LISTS

A big part of our work is comparison.

- Compare sales this month with last month
- Which patients booked appointments in both quarters
- Who purchased from us twice this year?

You can answer some of the questions easily with **highlight duplicates** feature of Excel.



To use this, just select first list, now hold CTRL and select the second list. Then go to Home > Conditional Formatting > Highlight Cells Rules > Duplicate Values…

Specify whether you want to highlight "Unique" or "Duplicate" values.

Excel will do the rest.

Customers - August 2019
Thoughtworks
Twimm
JumpXS
Flashset
Quire
Vipe
Meevee
Zoonoodle
Meevee
Edgeblab
Cogibox
Quinu

Customers - September 2019
Meevee
Zoonoodle
Meevee
Edgeblab
Cogibox
Quinu
Dabjam
Photobean
Realbuzz
Quinu
Trilith

- Another method to find and extract common values – with Power Query

#5 EXTRACT TOP / BOTTOM 5 VALUES

When you have too many items, often you just want to show the top 5 or bottom 10 values. You can use either formulas or pivot tables to quickly do this. In this chapter, we will look at formula-based approach. In the next one, I will explain how to do the same with pivot tables.

The trick is to use LARGE and SMALL formulas.

To see top 5 values in a list, use

```
=LARGE(list, 1) for 1st value

=LARGE(list, 2) for 2nd value
```

…

```
=LARGE(list, 5) for 5th value
```

Apply similar logic with SMALL for seeing bottom values.

HOW TO SEE TOP 5 BY CONDITION / CATEGORY

Unlike AVERAGEIFS, Excel doesn't have LARGEIFS. But you can use below technique.

```
=LARGE(IF(Sales[Product]="Apple", Sales[Quantity]), 5)
```

Will return 5th largest "Apple" product.

Note: You must press CTRL+Shift+Enter after typing this formula to get correct answer.

HOW TO GET THE CORRESPONDING NAMES / OTHER DETAILS

Once you found the 3rd largest value, how to display the customer name or product ID?

Simple, use INDEX+MATCH to extract other bits.

Like this:

```
=LARGE(Sales[Revenue], 3) for 3rd largest revenue item.
```

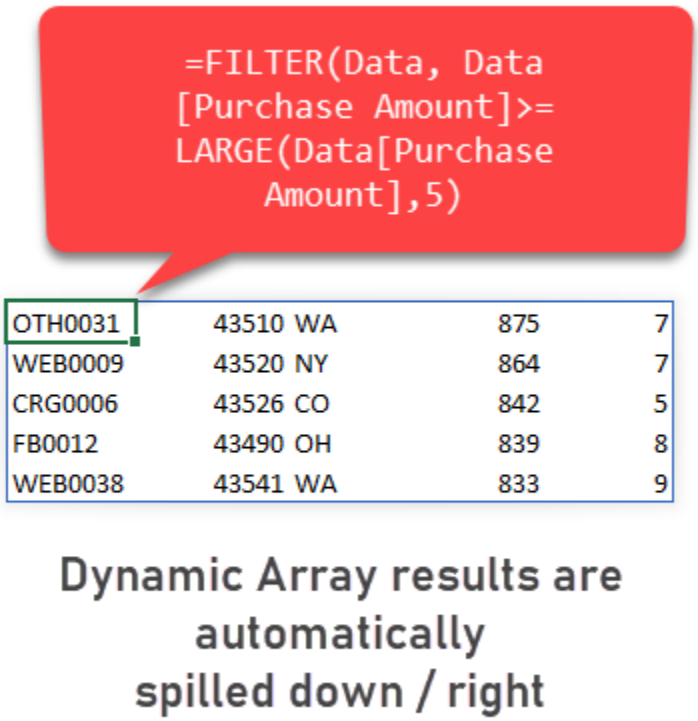
To see the corresponding product name,

```
=INDEX(Sales[Product], MATCH(LARGE(Sales[Revenue], 3), Sales[Revenue], 0))
```

HOW TO FILTER TOP 5 ITEMS FROM A TABLE WITH FILTER() FORMULA?

Excel 365 is going to add FILTER() formula *very soon.* This **dynamic array** formula makes several calculations in Excel much simpler. Top 5 values in a table can be easily extracted by using FILTER formula, as shown aside.

Learn more about FILTER formula.



#6 TOP 5 VALUES – EASIER METHOD

As looking at top / bottom values is a favorite pastime of business analytics, Microsoft made it easy with Pivot Tables. You can insert a pivot table, apply **value filters** to see the top or bottom values.

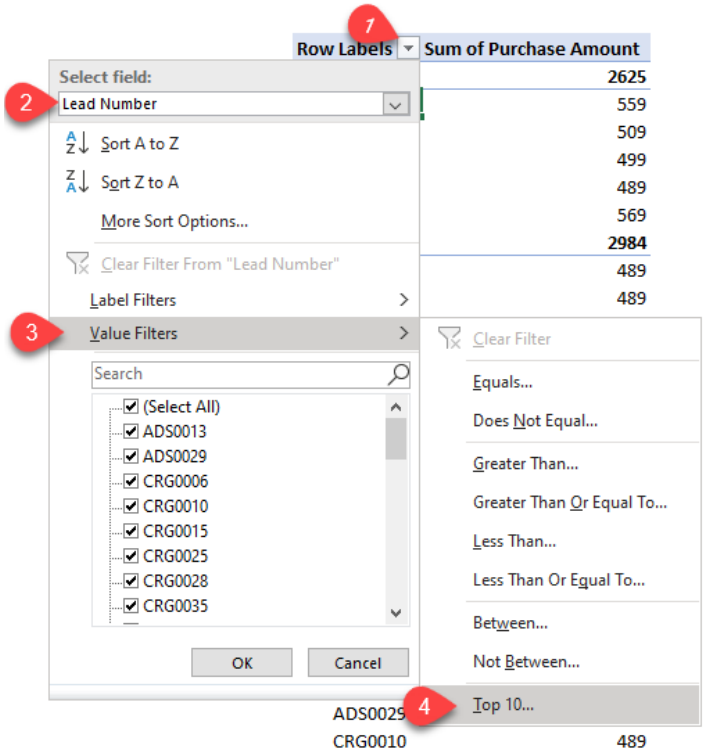
A quick intro to Pivot Tables

Although I have not introduced Pivot Tables in this book, I am assuming you are familiar with them. If you need to quickly brush-up your pivot skills, **check out Excel Pivot Tables intro page**.

Say, you have some data like below and you want to see Top 2 leads by purchase amount in each state.

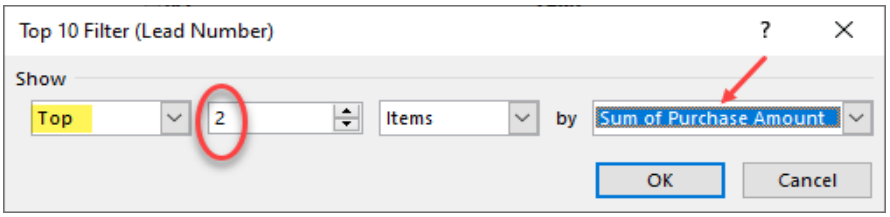
Lead Number	Date	State	Purchase Amount	Quantity
OTH0001	22-Jan-19	CO	$569	5
WEB0002	16-Jan-19	WA	$519	4
WEB0003	23-Jan-19	NY	$479	9
FB0004	17-Jan-19	WA	$549	9
FB0005	16-Feb-19	WA	$489	7
CRG0006	02-Mar-19	CO	$559	5
OTH0007	11-Jan-19	WA	$499	5
OTH0008	11-Mar-19	NY	$479	7
WEB0009	24-Feb-19	NY	$539	7
CRG0010	29-Jan-19	TX	$489	4
WEB0011	21-Feb-19	WA	$539	9
FB0012	25-Jan-19	OH	$519	8
ADS0013	09-Mar-19	TX	$539	9
NP0014	07-Jan-19	OH	$479	4
CRG0015	21-Jan-19	WA	$419	5
OTH0016	02-Feb-19	TX	$489	7
FB0017	12-Mar-19	NY	$489	4
NP0018	08-Mar-19	TX	$499	4
FB0019	21-Jan-19	CO	$509	7
OTH0020	13-Feb-19	TX	$519	8

Insert a regular pivot table. Add State, Lead Number to row label area and Purchase Amount to values area.

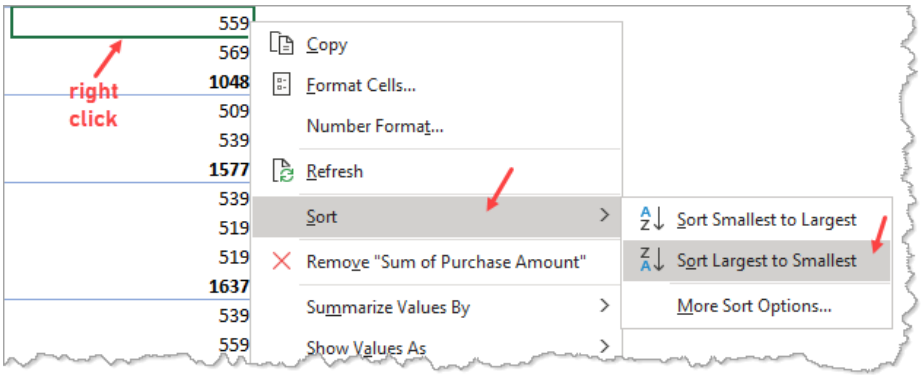


1. Now, click on Row label filter button
2. Select "Lead Number" as the field
3. Go to Value Filters
4. Select top 10 filter

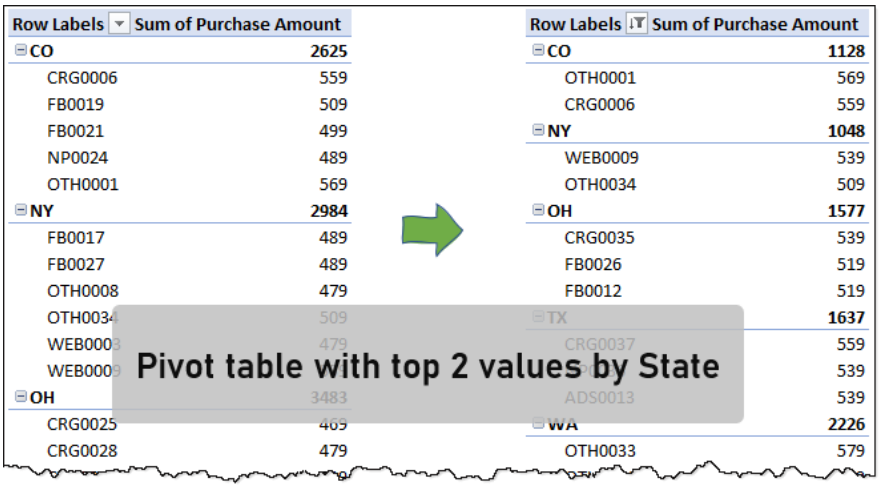
Set up the filter to show top 2 values by "sum of purchase amount"



Finally sort your pivot table to show purchase amount in large to small order.

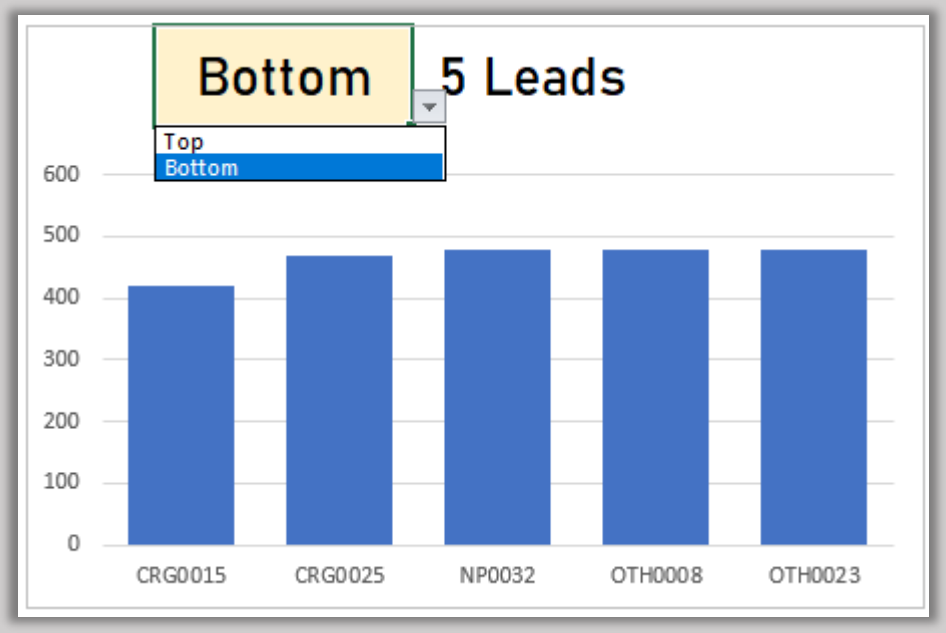


Done, your pivot table now tells the story of who are your top leads in each state.



Pro tip: Create two pivot tables (top 5, bottom 5) and make interactive chart to show either values on selection.

If you make two pivot tables, then using simple IF formula you can return either value to be shown in charts based on what your user wants. You can make something like this very quickly. Give it a try.



- Create your first dynamic chart in Excel with data validation

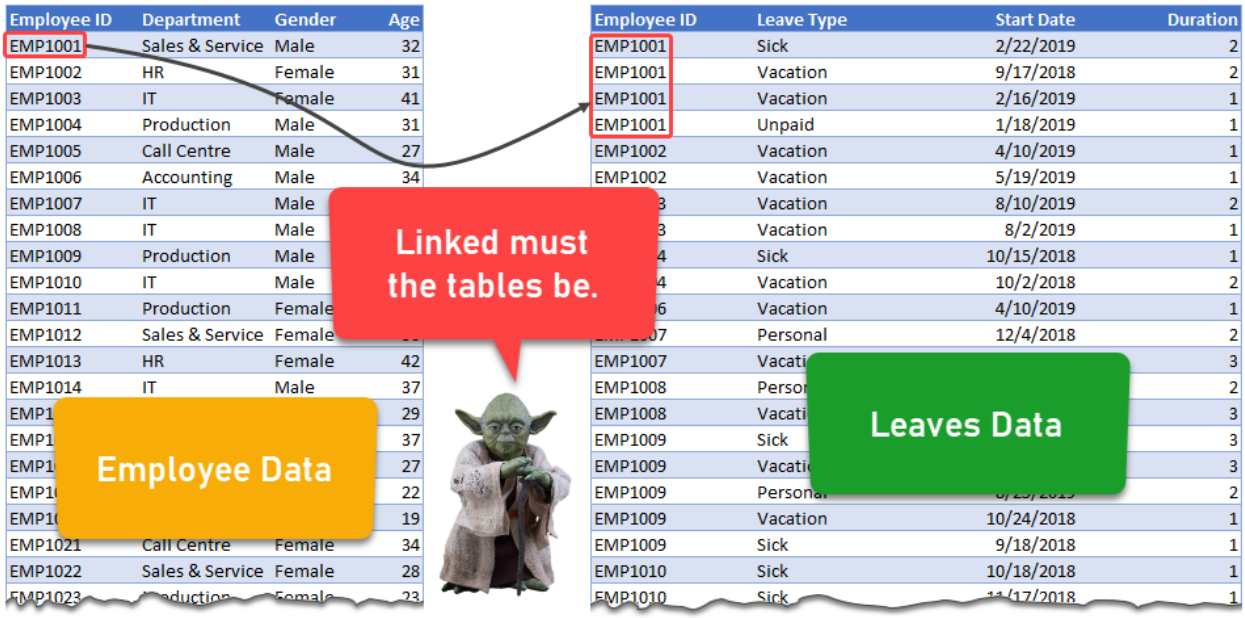
#7 AVOID VLOOKUPS WITH MULTI-TABLE PIVOTS

Excel has a *rather* hidden but very powerful feature. You can link two tables with a relationship. Once you have such relationships, you can combine data from both places

to generate Multi-Table Pivots. These can offer powerful insights without writing any formulas.

Here is a quick overview of how it works.

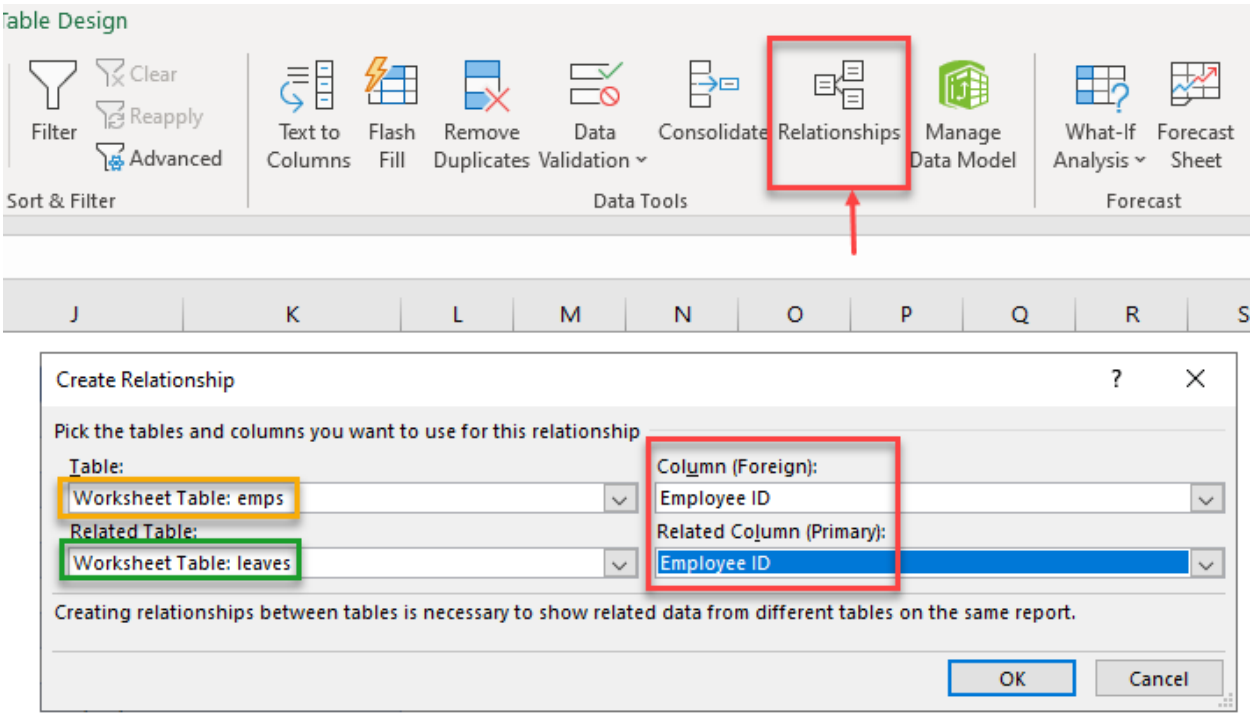
Imagine you have two tables. Employee table has a list of all employees, their gender, department, age and other details. Leaves table has a record employee leaves (sick leave, vacation, personal days etc.)



You can connect these two tables on Employee ID column. To do so, go to Data ribbon and click on Relationships.

Note: Relationships feature is available in Excel 2013 or above only.

Follow the screen instructions to connect both tables based on Employee ID column.



Once that is done, you can insert a pivot table from either table. Make sure to tick the "Add this to data model" option as shown below. This will enable us to analyze data from both tables in a single pivot report.

Now you can ask questions like,

- What is average leave duration by Department?
- Who take more leaves – Male or Female employees?
- What is the sick leave usage by age?

Row Labels	Total Days	Total Leaves	Average Duration
Accounting	86	44	2.0
Call Centre	71	34	2.1
HR	69	37	1.9
IT	162	74	2.2
Production	75	42	1.8
Sales & Service	92	39	2.4
Grand Total	555	270	2.1

Department Leave Summary

Here is a sample report.

- [Full Tutorial – Table Relationships & Pivots]

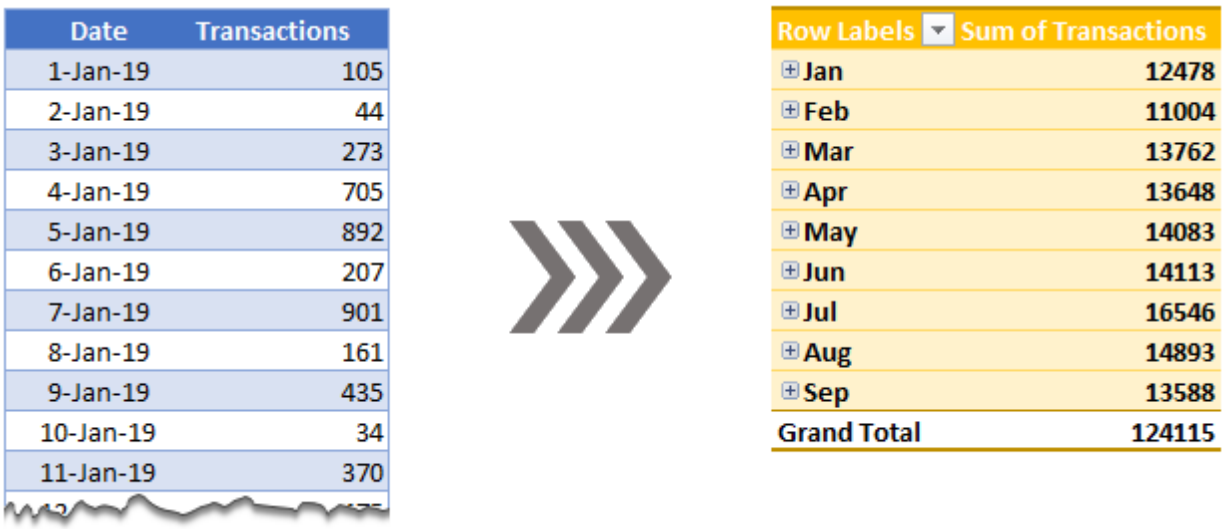
- Linking slicers to multiple pivots

#8 MONTHLY / QUARTERLY TOTALS FROM DAILY DATA

Aggregation is one of the most common types of analysis. If you have daily data and want to quickly calculate monthly or quarterly or yearly totals from it, look no further than Pivot Tables.

Just drop the date column into row labels area of the pivot table and Excel instantly groups the data at a level that is appropriate for your data (yearly / quarterly or monthly).

Note: this feature is available by default in Excel 2016 / Office 365. In older versions of Excel, right click on the date in row labels and select "Group" to group dates at different levels.



Date	Transactions
1-Jan-19	105
2-Jan-19	44
3-Jan-19	273
4-Jan-19	705
5-Jan-19	892
6-Jan-19	207
7-Jan-19	901
8-Jan-19	161
9-Jan-19	435
10-Jan-19	34
11-Jan-19	370

Row Labels	Sum of Transactions
⊞Jan	12478
⊞Feb	11004
⊞Mar	13762
⊞Apr	13648
⊞May	14083
⊞Jun	14113
⊞Jul	16546
⊞Aug	14893
⊞Sep	13588
Grand Total	124115

WHAT IF I WANT TO TOTAL BY FINNACIAL YEAR / QUARTER?

If your financial year is not aligned with calendar year, then you cannot use the default behavior of Pivot tables.

I recommend two methods to solve the problem.

Extra columns in your data:

1. Add quarter and FY as columns to your data table by either calculating them or importing them.
   OR

Separate calendar table:

1. Add a separate calendar table with all dates. Insert FY and Quarter as columns to this table thru calculation.
2. Link calendar table to original data tables thru relationships
3. Analyze by using FY / Quarter / Month from calendar table in row label area and values from data table.

#9 CHANGE FROM PREVIOUS MONTH / PERIOD

A big part of business analysis is understanding trends and changes. You can quickly explore both with a pivot table showing monthly totals (previous chapter) and change from previous month. As shown below:

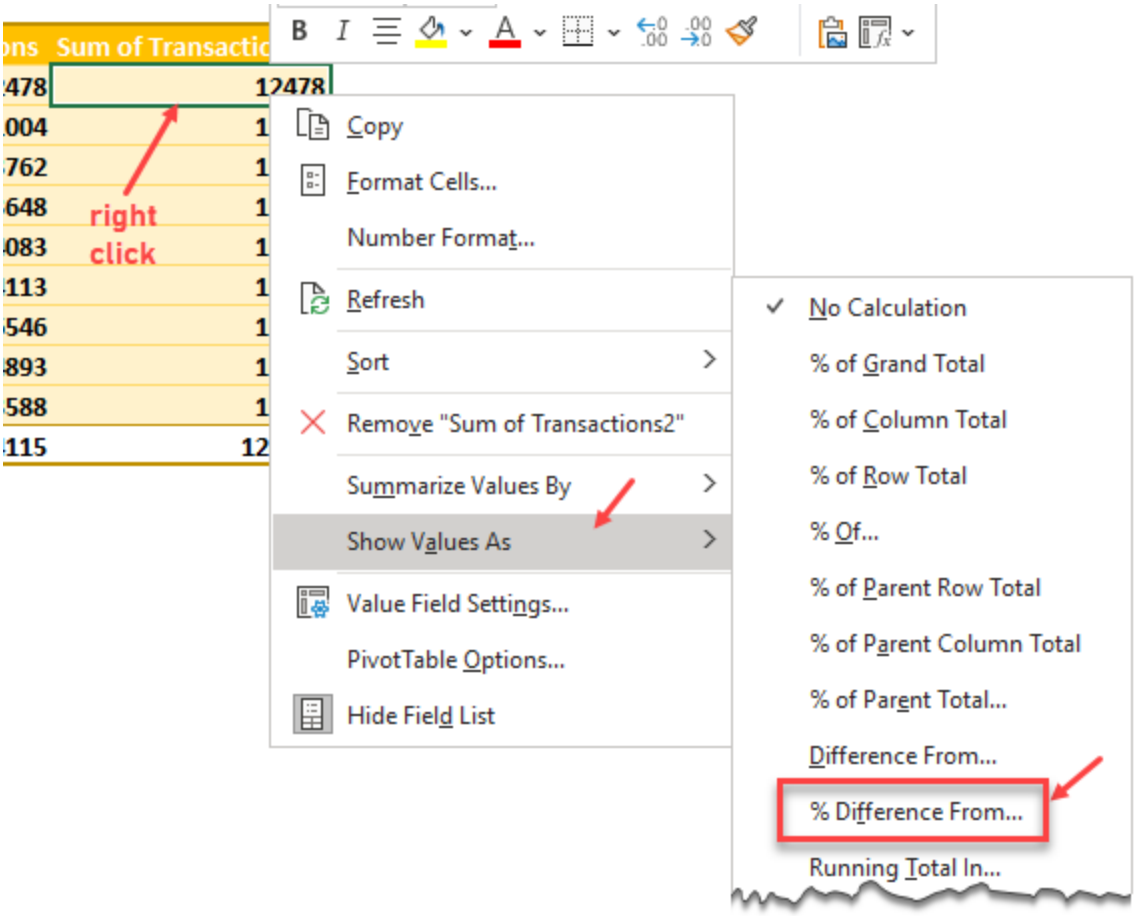
Row Labels	Sum of Transactions
Jan	12478
Feb	11004
Mar	13762
Apr	13648
May	14083
Jun	14113
Jul	16546
Aug	14893
Sep	13588
Grand Total	124115

Row Labels	Sum of Transactions	% Change
Jan	12478	
Feb	11004	-12%
Mar	13762	25%
Apr	13648	-1%
May	14083	3%
Jun	14113	0%
Jul	16546	17%
Aug	14893	-10%
Sep	13588	-9%
Grand Total	124115	

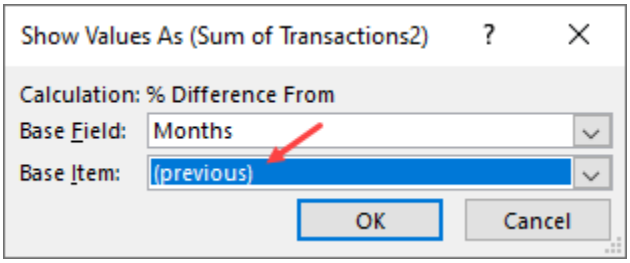
To show this,

1. Add regular pivot table

2. Now add the same value field again to the pivot table. You will now have two "Sum of Transactions" for example.
3. Right click on the second field, go to "Show value as" and select "% Difference From…" option.



4. Select (Previous) as Base item.



5. That is all. You will now have both value and % change in the pivot.

HOW TO SHOW CHANGE AS ICON ▼▲?

Once you have the % difference values in the pivot table, you can apply conditional formatting on them to see icons. Just go to Home > Conditional Formatting > Icon Sets to set them up.

Pro tip: Rename columns in your pivots

Pivot tables are awesome, but the names they show in report can be meh! To fix the problem, just select the cell and type what you want. Simple.

#10 MAKE YOUR ANALYSIS INTERACTIVE

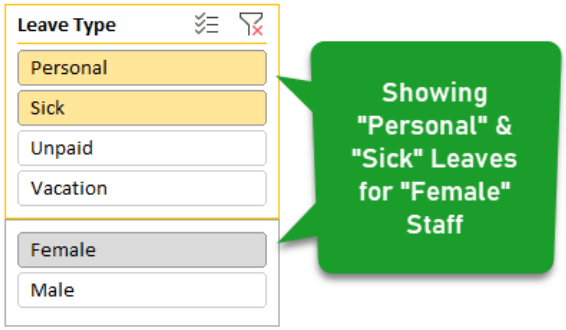
My top 10 tip for data analysis is simple but effective. Every time you present data analysis, think of ways to make it interactive and playable. Our job as analyst / reporting professional is to present stories. The best stories are the ones where audience are emotionally involved.

How do we make people involve?

Simple, make the outputs interactive. That way, your manager / client / user will play with the workbook and get what they want.

Here is a simple example of Interactive Pivot Table.

Row Labels	Employee Count	Total Days	Average Duration
Accounting	9	23	2.6
Call Centre	10	20	2.0
HR	9	20	2.2
IT	15	34	2.3
Production	11	20	1.8
Sales & Service	8	15	1.9
Grand Total	62	132	2.1



TIPS & EXAMPLES ON INTERACTIVE EXCEL FEATURES

- A complete guide to interactive Excel features – Drop downs, form controls, slicers, hyperlinks, VBA and more
- How to setup, use, customize and optimize slicers – Massive guide
- Excel hyperlinks – examples, tutorial and tips

10 CHARTS

We all know how to make column charts, lines and pies. But when it comes to business analysis and reporting, it is necessary to learn how to make few different types of advanced charts in Excel. In this chapter, I will discuss top 10 charts for data analysis.

EXAMPLE FILE FOR THIS MODULE

Please download the sample file for this module from below link. Use it to practice the ideas and learn better.

https://files.chandoo.org/free/10-charts.xlsx

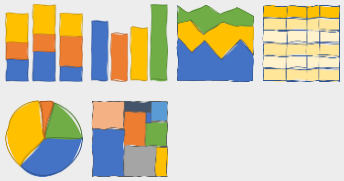
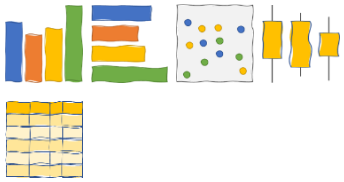
#0 KNOW WHICH CHART TO USE

Before we get in to the top 10 charts, first let me highlight the importance of picking right type of chart for each situation.

The process for picking a chart is simple.

1. **Figure out what information you want to present.** This is easy because most of the time, you know it, or someone asks you for it. But for the rare occasions when you are asked to *analyze this data and present something,* select one of the below six key messages.
    a. Comparison
    b. Trend
    c. Distribution
    d. Relationship
    e. Parts of Whole
    f. Deviation
2. **Gather your data and turn it in to information.** Now that you know what your chart needs to say, take your data and turn it in to necessary information. This can be done by either formulas or pivot tables or other tools.

3. **Make the chart.** Pick the chart that conveys the message you want in a concisely. When in doubt, use below mapping table to decide which chart goes with each message.

	Message	Recommended Charts	
1	**Comparison**	Column or Bar charts, Tables, Line charts	
2	**Trend**	Line or Column charts, sparklines	
3	**Distribution**	Histograms, Box plots, XY plots for 2D distribution, Map charts, Line charts	
4	**Relationship**	XY charts, line charts	
5	**Parts of Whole**	Stacked column or bar charts, Area charts, Tables, Pie charts, Tree maps	
6	**Deviation**	Column or bar charts, XY plots, Box plots, Table	

4. **Format the chart.** Most of the times, the default chart in Excel is not ready for distribution. Format the chart by removing any distractions, adding necessary title, caption and apply labels if needed. Align & size it properly.

That is all. Your chart is now ready.

[Read more about Chart Selection Process]

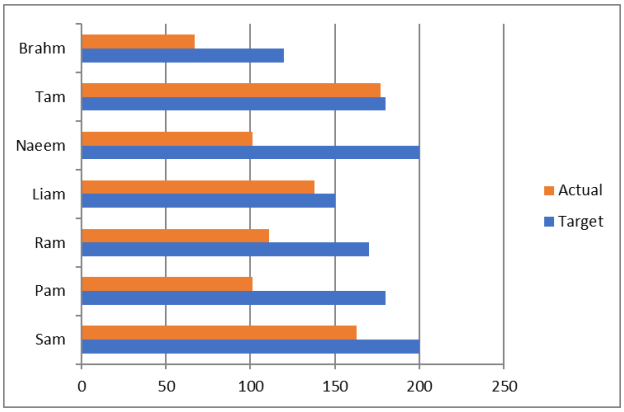
#1 THERMOMETER CHART

Thermometer charts are great for comparing actual with target values (or budgets). As there is no “insert thermometer chart” button in Excel, they present an interesting challenge. In this chapter, learn how to create them. As a bonus, you will also learn how Excel chart series behave and how to control the layout. So, win-win.

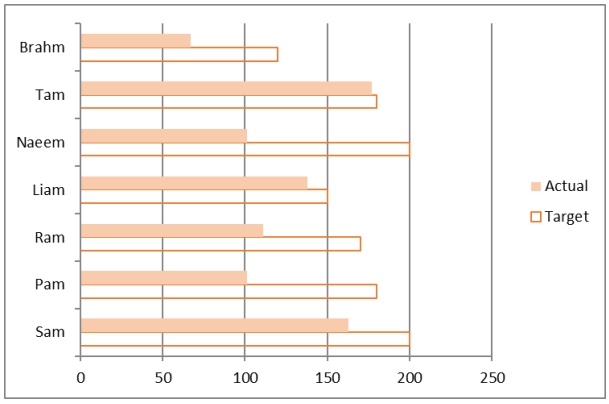
1. Start by laying out data like this.

Sales Person	Target	Actual
Sam	200	163
Pam	180	101
Ram	170	111
Liam	150	138
Naeem	200	101
Tam	180	177
Brahm	120	67

2. Insert a regular bar or column chart.

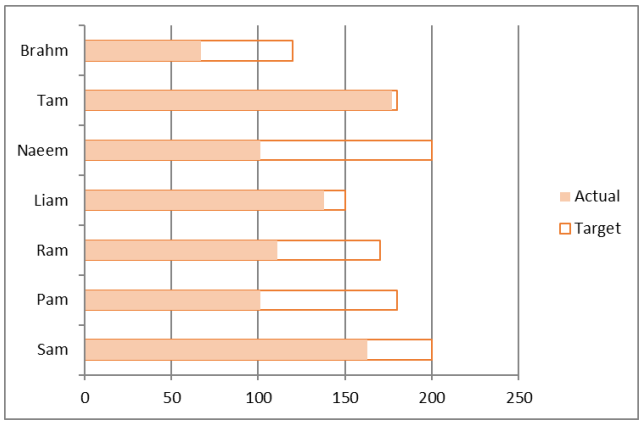


3. Color the bars so that targets look like outline and actuals look like the insides of a thermometer.

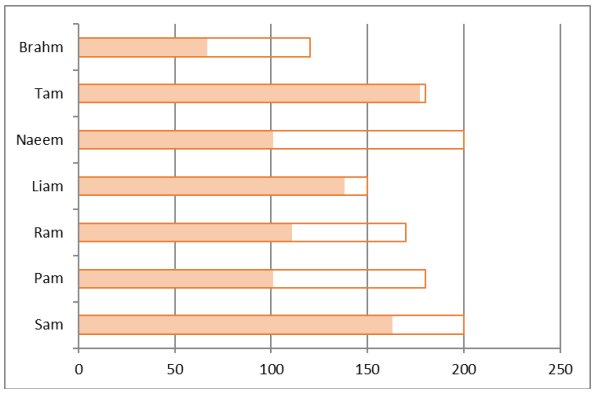


4. Right click on any series of bars and select “Format series”. Alternatively, press CTRL+1 to activate format screen.

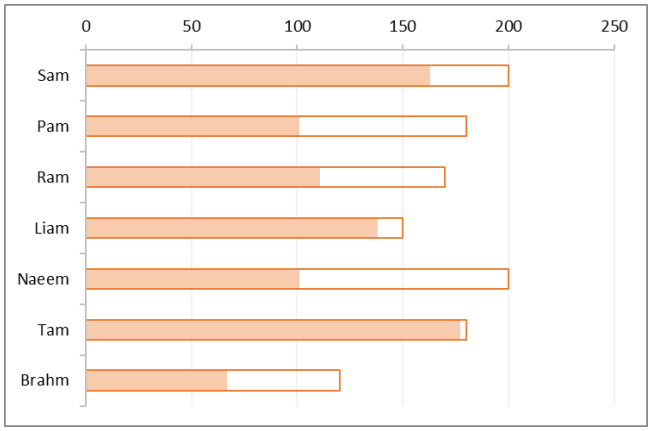
5. From “series options” set series overlap to 100%. This makes the bars sit one on top of another, resulting in a *nearly* ready thermometer.



6. Since “Actual” series sits on top of “Target”, we can’t see the outline clearly. So right click on the chart, go to “Select Data”. From here, use the up/down buttons to move targets under actual. This will redraw the chart so “Target” series sits on top of “Actual” series.



7. [Optional] Change the order of axis labels. This is necessary if you are making a bar chart as Excel bar charts are always drawn from the bottom up.



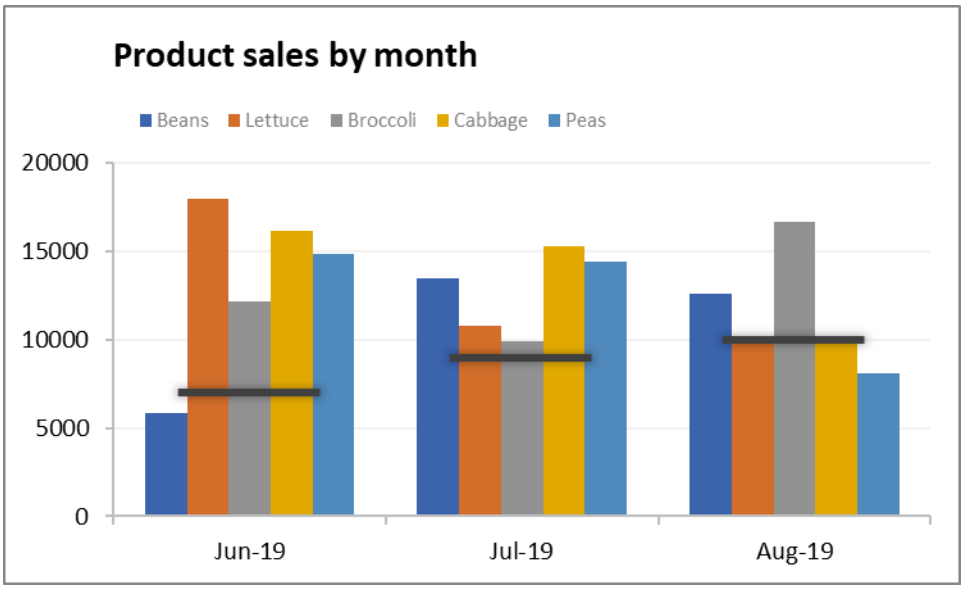
READ MORE ABOUT THERMOMETER CHARTS

- Thermometer chart with last year value as marker

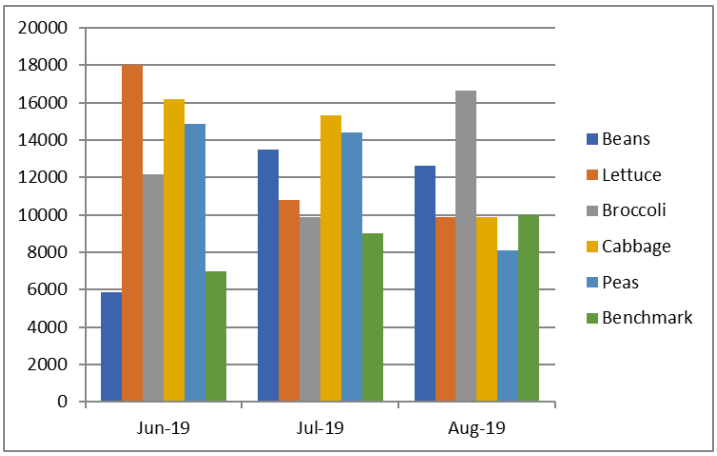
#2 COMBO CHART

A combo chart or combination chart is a mixture of two types of charts in one. In modern versions of Excel, it is rather easy to create combination charts. So, let me throw a twist to the problem.

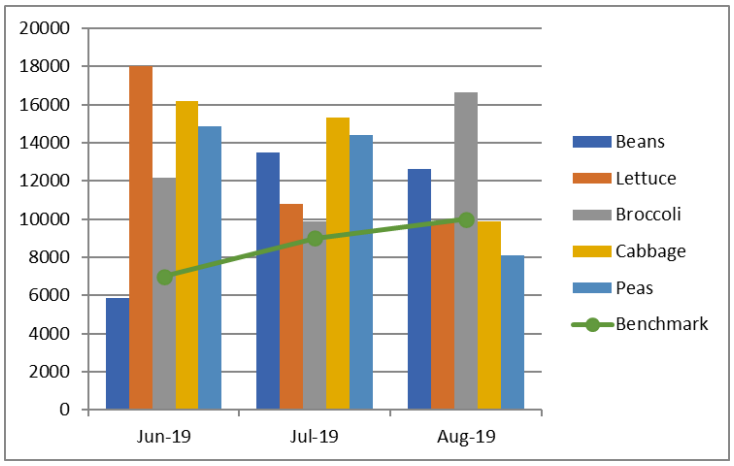
How can we compare actual sales by product with monthly benchmark? Something like this:



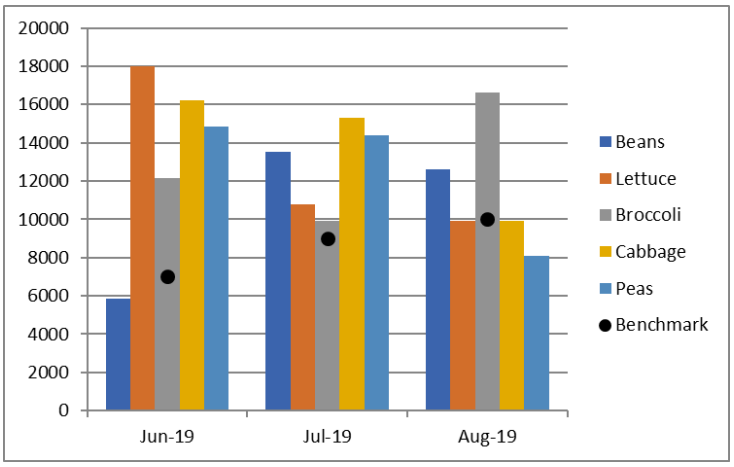
1. Start by making a regular clustered column chart



2. Now, convert benchmark series to line with dots. To do this, simply right click on "Benchmark" series and select "change series chart type".



3. Format the line chart so only markers show up, but not the line.



4. Now in a blank space in the workbook, draw a straight line. Format it the way you prefer.

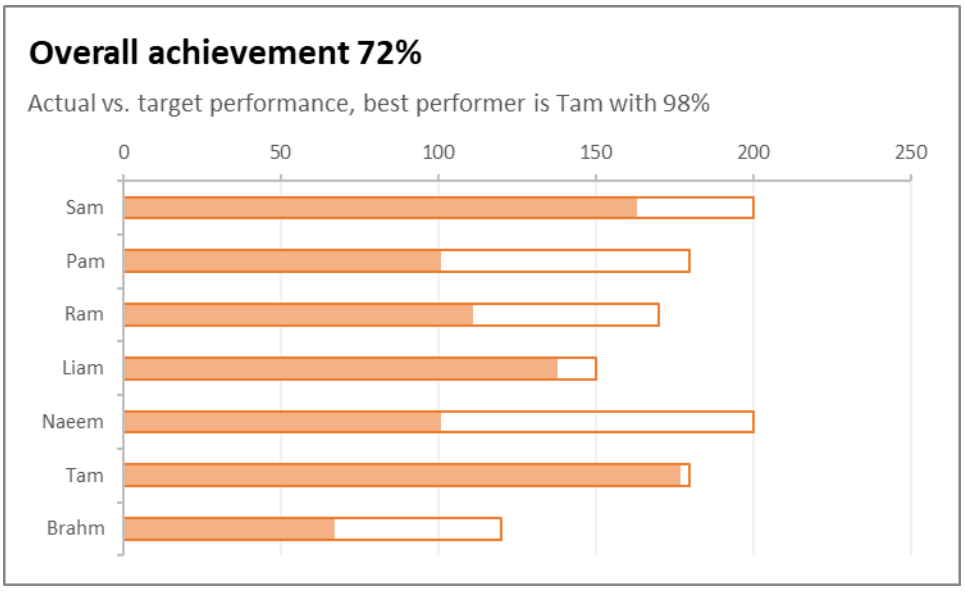
5. Copy this line shape (CTRL+C)

6. Select the markers on chart and press CTRL+V to replace them with line. You get the combination chart with benchmark as straight line.

Pro-tip: You can replace anything in Excel chart with external shapes or images. Give it a try to see what fun + awesome things you can create.

#3 SMART TITLES & CAPTIONS ON YOUR CHARTS

A chart without title (and caption) is like a burger without buns. The content is there, but it's not that appealing. That is why you should add meaningful titles & smart captions to your charts.



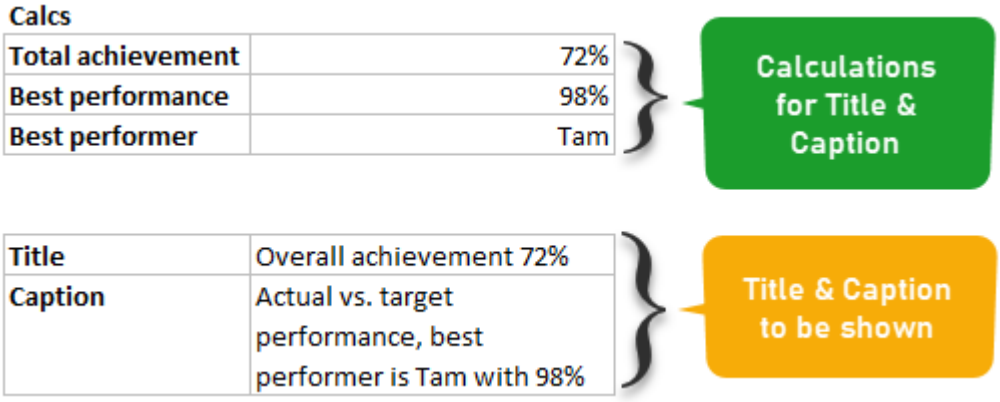
DEFAULT TITLES ARE NO GO

When you add a title to Excel charts, it will default to something lame like "Chart Title". This is no good. But you can easily edit the title and type something over.

But why not go one step further and make interesting, informative titles? Like this:

HOW TO CREATE SMART TITLES & CAPTIONS

1. Create necessary title and caption sentences in Excel cells by using formulas (or type them manually). Here is a sample for the Thermometer chart shown in earlier chapter.



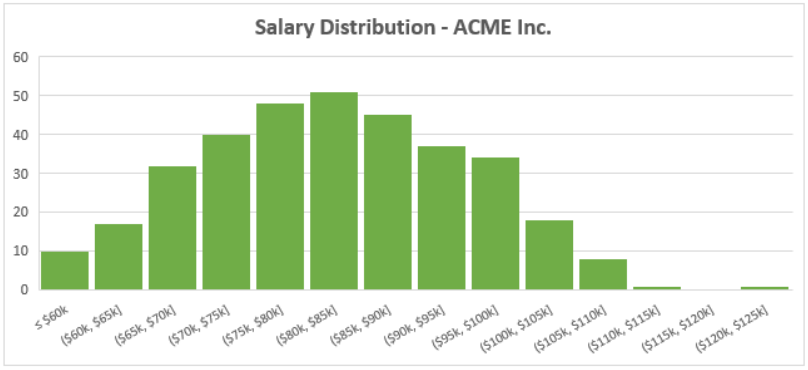
2. Insert normal title to the chart.
3. Click on the title, now click on the formula bar, press = and point to the cell with title.
4. Insert a text box on the chart (select the chart first, now go to Insert > Text box and draw a box *inside* the chart).
5. Click on the text box, click on formula bar, press = and point to the cell with caption.
6. Adjust formatting, alignment and colors for both title and caption.
7. Your chart is ready.

TIPS ON HOW TO SET UP SMART LABELS

- Smart titles
- Smart labels, conditionally formatted labels
- Using text boxes and shapes with charts

#4 ANALYZE DISTRIBUTION WITH HISTOGRAMS

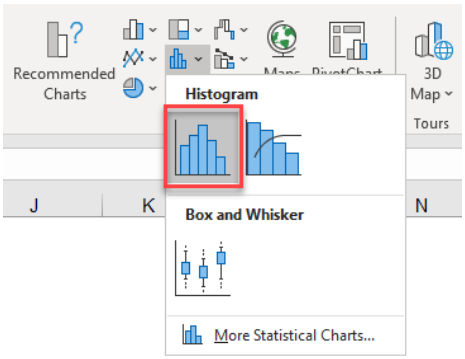
Employee ID	Salary
E1001	$79,999
E1002	$104,309
E1003	$97,236
E1004	$79,726
E1005	$75,007
E1006	$83,436
E1007	$88,511
E1008	$80,681
E1009	$88,469
E1010	$87,939
E1011	$77,374
E1012	$74,482
E1013	$109,220
E1014	$71,273
E1015	$94,169
E1016	$100,840



Histograms are one of the best ways to analyze distribution of values. In earlier versions of Excel, making them used to be very tricky. But Microsoft added native support to Histograms & Box plots (next chapter) in Excel 2016. You can now easily create these with a simple click.

HOW TO CREATE A HISTOGRAM IN EXCEL 2016 / 365 OR ABOVE

1. Select your data.
2. Go to Insert > Histogram
3. Adjust axis settings if needed.
    a. You can specify bin width or number of bins.
    b. You can also add underflow and overflow bins
4. That is all. Your histogram will be ready.



Pro tip: Try Pareto Analysis too

You can also conduct 80/20 or Pareto Analysis with histograms. Excel will automatically add cumulative total line and sort your bins. It is very useful to understand 20% of things that contribute to 80% of outcome.

HOW TO MAKE HISTOGRAMS IN EARLIER VERSIONS OF EXCEL?

If you have an older version of Excel (say 2013 or below), you can't use Histogram chart button. But you can still create these in a few different ways.

OPTION 1 – USE DATA ANALYSIS TOOLPAK

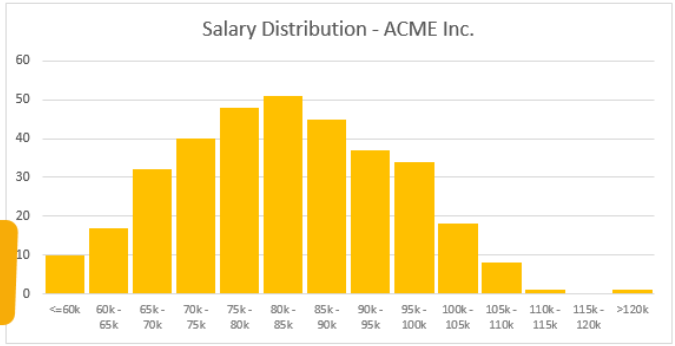
Just go to Developer and Excel Add-ins. Enable Analysis Toolpak. This add-in is available in most versions of Excel since 2003. This toolpak offers many data analysis features including histogram.

OPTION 2 – CREATE YOUR OWN WITH FORMULAS + CHARTS

You can write COUNTIFS formulas to count how many values are there by bucket, as shown below. Once you have the numbers, you can make a regular column chart and format it to see the distribution.

Salary Range			
From	To	Label	Employee Count
0	60000	<=60k	10
60000	65000	60k - 65k	17
65000	70000	65k - 70k	32
70000	75000	70k - 75k	40
75000	80000	75k - 80k	48
80000	85000	80k - 85k	51
85000	90000	85k - 90k	45
90000	95000	90k - 95k	37
95000	100000	95k - 100k	34
100000	105000	100k - 105k	18
105000	110000	105k - 110k	8
110000	115000	110k - 115k	1
115000	120000	115k - 120k	0
120000	200000	>120k	1

COUNTIFS formula to get the counts



OPTION 3 – CREATE YOUR OWN WITH PIVOT TABLES + CHARTS

You can also use "Group" feature in Pivot Tables to make histograms quickly. For our salary example,

1. Add Salary to Row label area
2. Add Employee ID to values area.
3. You will get count of people for *each salary point.*
4. Now right click on the Salary and select "Group"
5. Specify group size and Excel will create groups for you.
6. Make a pivot chart now and you will get distribution.

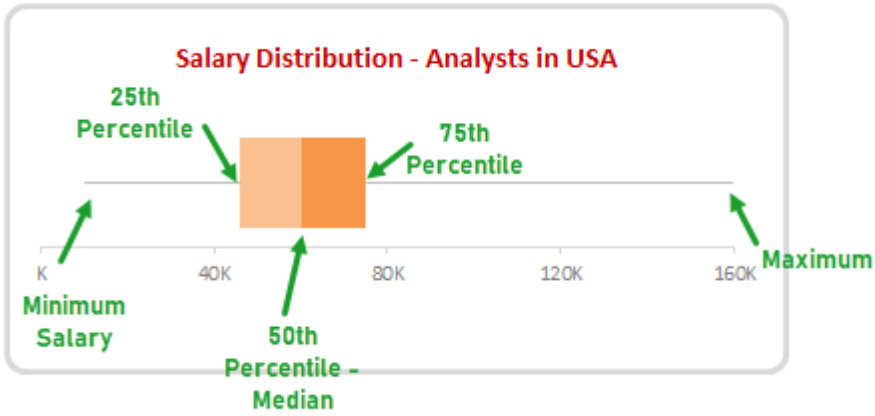
Note: You cannot use group feature with Data Model or multi-table pivots (as discussed in Chapter 7 in Data Analysis module)

Learn more about histograms and pareto analysis.

#5 BOX PLOTS

Box plots are another popular and effective way to explain how things are spread out. According to Wikipedia, a box plot is a convenient way of graphically depicting groups of numerical data through their five-number summaries: the smallest observation (sample minimum), lower quartile (Q1), median (Q2), upper quartile (Q3), and largest observation (sample maximum) [more].

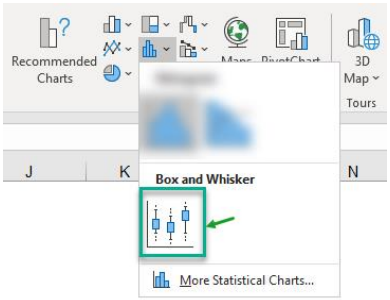
Here is a sample Box Plot.

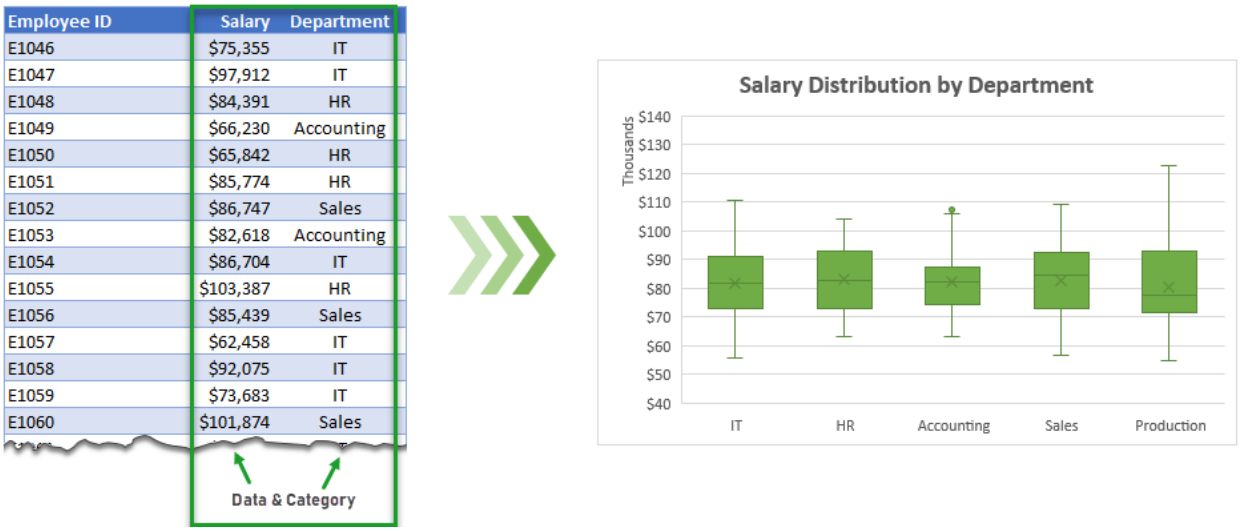


Prior to Excel 2016, creating these box plots involved advanced charting trickery. But Excel 2016 introduced Box Plot as a chart type. Now you can make them before saying *coffee.*

HOW TO CREATE A BOX PLOT IN EXCEL 2016 / 365 OR ABOVE

1. Select your data. If you have two columns (numbers and categories), then select numbers alone first.
2. Go to Insert > Statistic Chart > Box & Whisker Plot
3. You will get a single box plot with all the numbers.
4. Now right click on the box plot and go to "Select Data"
5. Add Horizontal / category labels and point them to category column.
6. Your box plots will be ready.





HOW TO CREATE BOX PLOTS IN OLDER VERSION OF EXCEL?

You can use a few different options to make such charts.

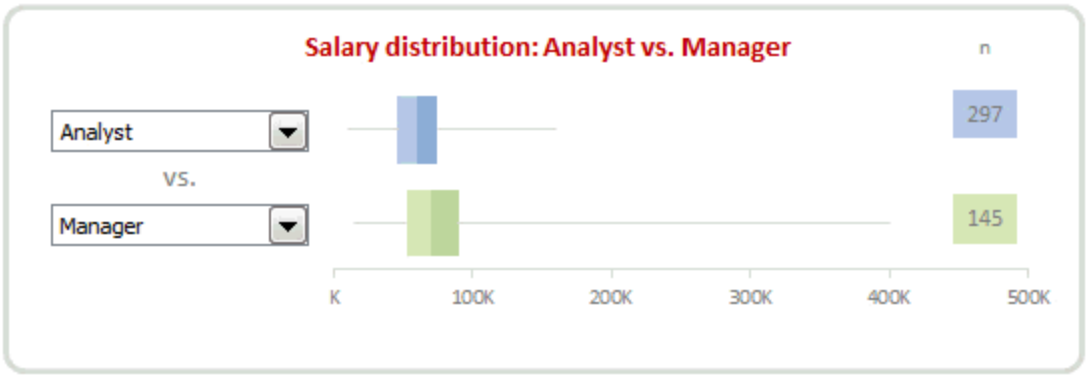
OPTION 1 – USE AN EXCEL ADD-IN

Jon Peltier, Excel Charting Guru has developed an excellent add-in for creating box plots and few other exotic charts using your Excel data. **Get the add-in here**.

OPTION 2 – LEARN HOW TO MAKE THEM

You can create a box plot by layout stacked bar / column charts and adding error bars. It takes a bit of work to calculate and format everything, but nothing too complex. I wrote **a tutorial on the process here**. Check it out and make your own box plots.

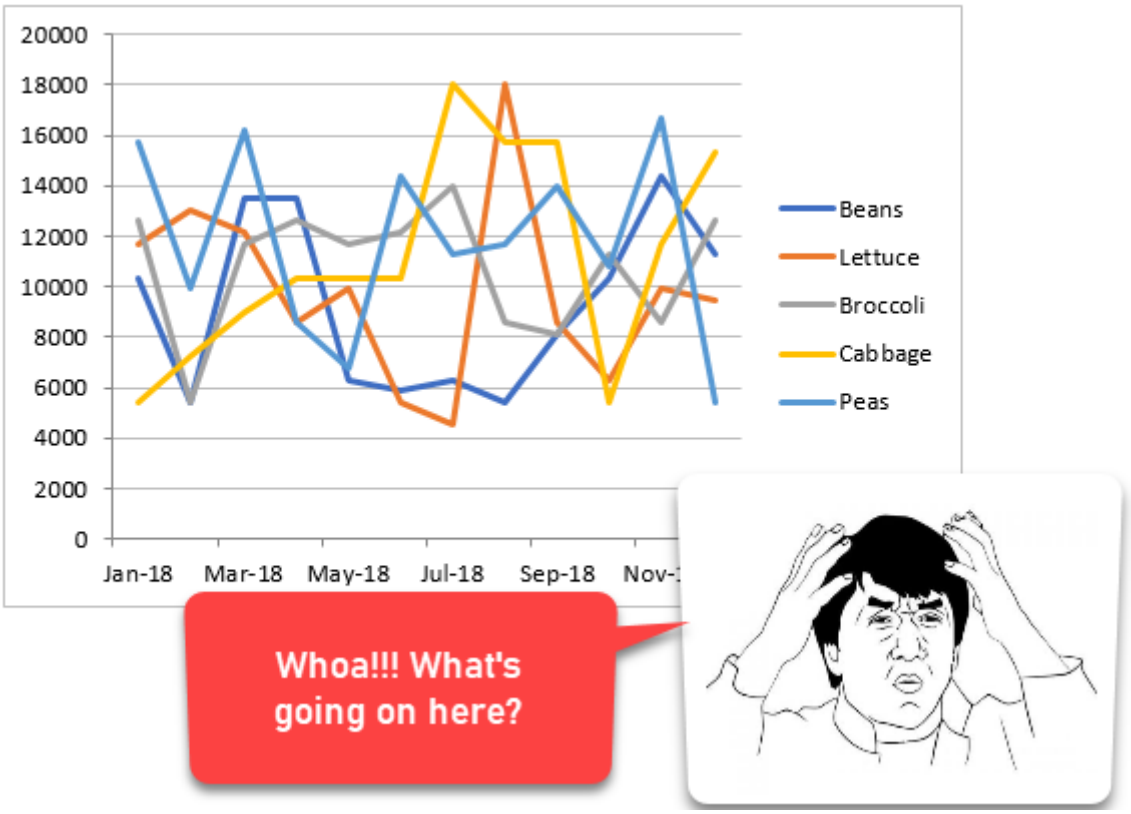
You can learn how to create single box plot as well as interactive ones as shown below in that article.


Salary distribution: Analyst vs. Manager
n
Analyst
vs.
Manager
297
145
K
100K
200K
300K
400K
500K

#6 INDEXED CHARTS

One of the most common business analyses is comparing trends over time. But if you have too many trends, all over the place, then the charts can get busy. This is when indexatoin helps.

For example, look at the 2018 sales trend for a vegetable exporter.



It hides the fact that Cabbage had a growth spurt while Peas were left behind.

INDEXATION HELPS

One way to compare apples with oranges or in this case Beans with Broccoli is to simply index the numbers. The idea is simple.

We assume the first month numbers for all vegetables is 100%. We then calculate the values for subsequent months. This is known as indexation. Once indexed, we can then compare numbers easily and spot any interesting patterns.

HOW TO MAKE INDEXED CHARTS IN EXCEL

Imagine you have data like this.

Product

Month	Beans	Lettuce	Broccoli	Cabbage	Peas
Jan-18	10350	11700	12600	5400	15750
Feb-18	5400	13050	5400	7200	9900
Mar-18	13500	12150	11700	9000	16200
Apr-18	13500	8550	12600	10350	8550
May-18	6300	9900	11700	10350	6750
Jun-18	5850	5400	12150	10350	14400
Jul-18	6300	4500	13950	18000	11250
Aug-18	5400	18000	8550	15750	11700
Sep-18	8100	8550	8100	15750	13950
Oct-18	10350	6300	11250	5400	10800
Nov-18	14400	9900	8550	11700	16650
Dec-18	11250	9450	12600	15300	5400

Simply turn this to indexed numbers using simple formulas. I am not showing the formulas here, but you can easily implement them from what you learned so far.

Month	Beans	Lettuce	Broccoli	Cabbage	Peas	Baseline
Jan-18	100%	100%	100%	100%	100%	100%
Feb-18	52%	112%	43%	133%	63%	100%
Mar-18	130%	104%	93%	167%	103%	100%
Apr-18	130%	73%	100%	192%	54%	100%
May-18	61%	85%	93%	192%	43%	100%
Jun-18	57%	46%	96%	192%	91%	100%
Jul-18	61%	38%	111%	333%	71%	100%
Aug-18	52%	154%	68%	292%	74%	100%
Sep-18	78%	73%	64%	292%	89%	100%
Oct-18	100%	54%	89%	100%	69%	100%
Nov-18	139%	85%	68%	217%	106%	100%
Dec-18	109%	81%	100%	283%	34%	100%

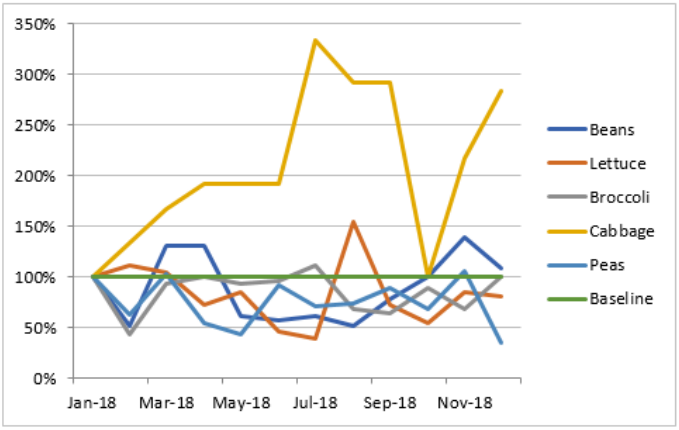
Assume first month is 100%

Calculate these values now

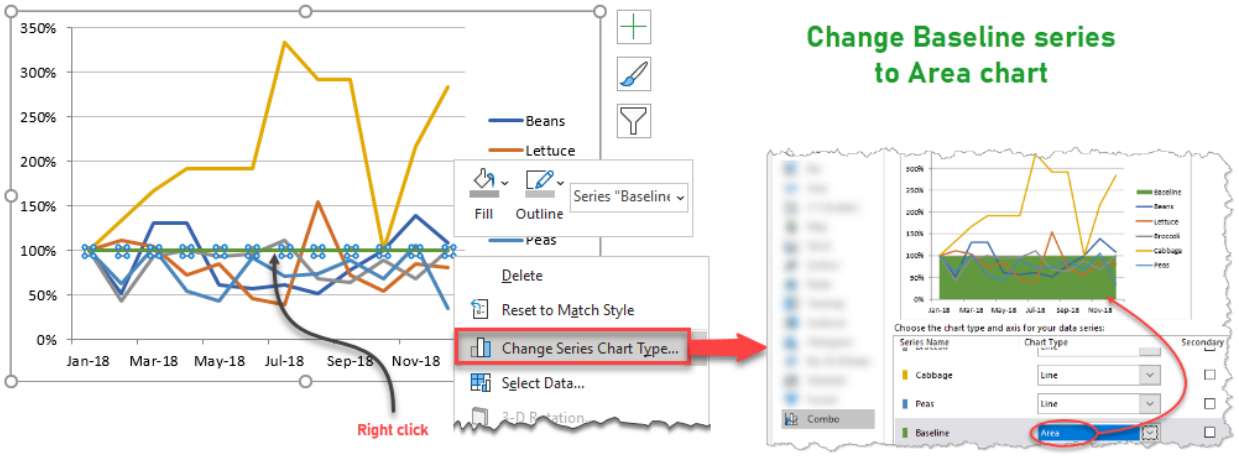
Baseline is always 100%

I added "Baseline" series to help with comparison. Now make a normal line chart from this new set of data.

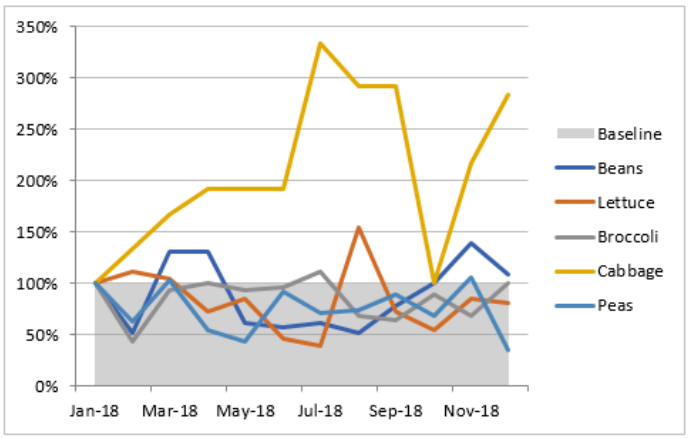
We get this.



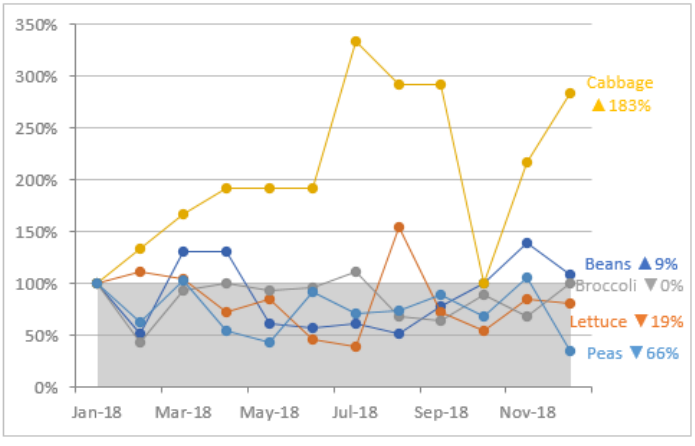
Let's convert the baseline series to area chart. To do this, right click on baseline and select "Change series chart type" option. Select "Area Chart" for baseline series.



We end up with this chart.



You can stop here or go one more step and **apply data labels to only last point.** This is an advanced variation of the "smart titles" technique you learned in chapter 3 of this module.



Our final indexed chart looks like this.

[Learn more about indexed charts](#).

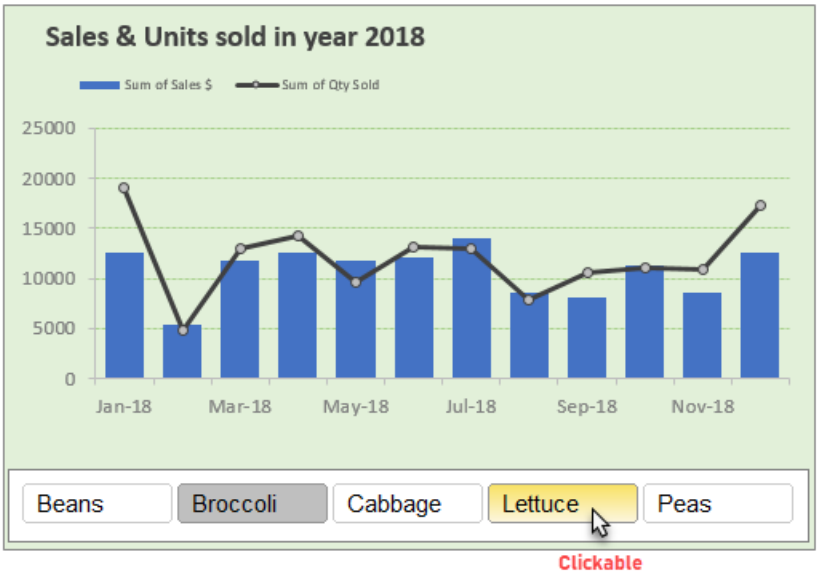
#7 INTERACTIVE CHARTS

Charts are helpful, but you know what makes them better? A bit of interaction. If your audience can talk to the charts, they can get more out of them. This takes us back to the Chapter 10 on Analytics module.

You can add interactive abilities to your charts thru,

- Slicers
- Timelines
- Form controls
- Data Validation
- Picture links
- Hyperlinks
- VBA

In this chapter, we will learn how to set up an interactive chart quickly using Slicers + Pivot Table.



For other methods to add interactivity, [please refer to this page](#).

Let's say we have some data like this:

Month	Product	Sales $	Qty Sold
Jan-18	Beans	10350	13269
Feb-18	Beans	5400	4737
Mar-18	Beans	13500	15341
Apr-18	Beans	13500	12617
May-18	Beans	6300	5207
Jun-18	Beans	5850	5969
Jul-18	Beans	6300	5294
Aug-18	Beans	5400	6667
Sep-18	Beans	8100	7864
Oct-18	Beans	10350	10895
Nov-18	Beans	14400	12632
Dec-18	Beans	11250	12097
Jan-18	Lettuce	11700	17727
Feb-18	Lettuce	13050	21393
Mar-18	Lettuce	12150	29634
Apr-18	Lettuce	8550	13790
May-18	Lettuce	9900	16500
Jun-18	Lettuce	5400	10800
Jul-18	Lettuce	4500	11250
Aug-18	Lettuce	18000	42857

First create a pivot table to see monthly trend of Sales $ and Qty Sold.

We get this.

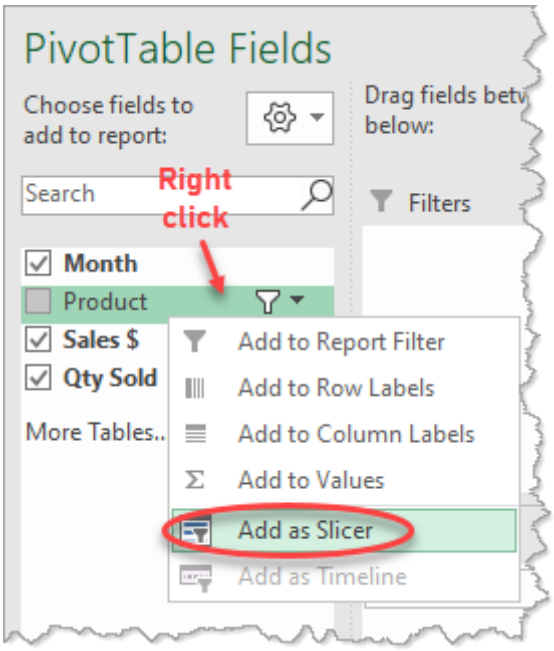
Row Labels	Sum of Sales $	Sum of Qty Sold
Jan-18	18000	23343
Feb-18	12600	19779
Mar-18	20700	19000
Apr-18	22950	19545
May-18	22050	15004
Jun-18	22500	18752
Jul-18	31950	27793
Aug-18	24300	18865
Sep-18	23850	19950
Oct-18	16650	19600
Nov-18	20250	19201
Dec-18	27900	26647
Grand Total	**263700**	**247479**

Now, add a pivot chart. Format the chart so Sales $ shows up as column and Qty sold as line.

TIME FOR SOME ACTION, INTERACTION THAT IS...

Now that we have a chart going on, let's make it interactive.

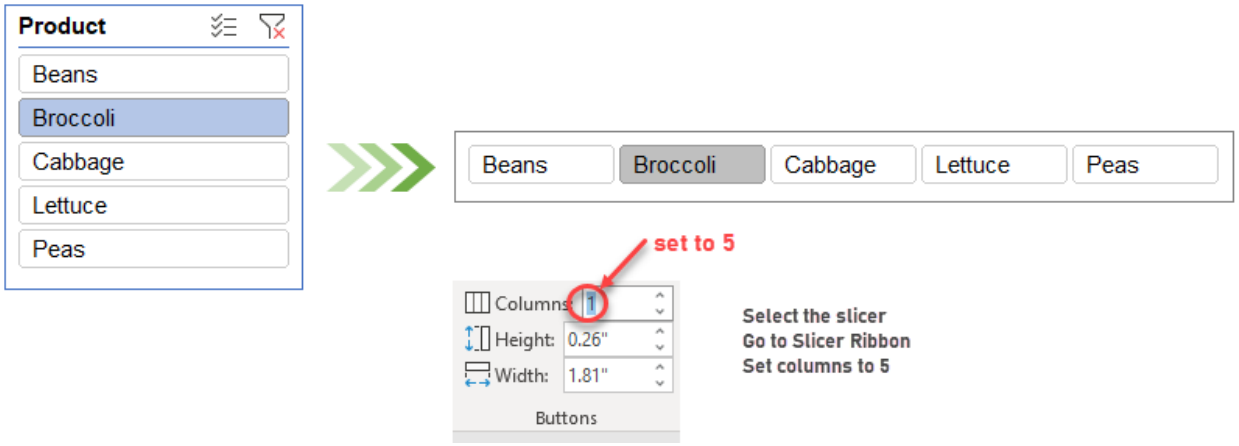
Go to Pivot Table fields list, right click on "Product" and select Add as slicer option.



Now, if you play with the slicer, your chart will change.

BUT MY SLICER IS IN ONE COLUMN!?!

By default, Excel slicers are in one column. If you are using them for product / category / gender etc. then you may want to show the options side by side. To do this, just go to Slicer ribbon (you must select the slicer to activate this ribbon) and adjust columns as illustrated below.



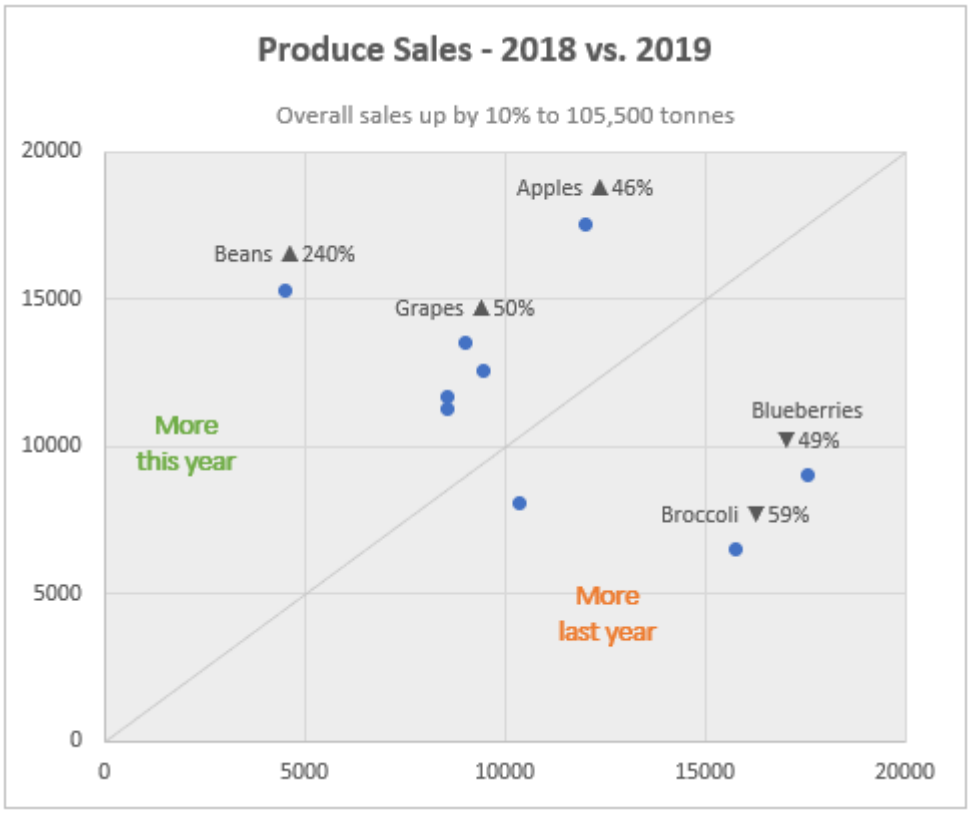
WANT TO LEARN MORE ABOUT THIS?

One of my specialties is interactive charts. In fact, you will probably find Chandoo.org THE BEST PLACE in the world for interactive charting techniques. If you want to learn more about interactive charting, check out below pages.

- Make your first interactive chart in Excel
- Interactive chart with on/off buttons for series
- Dynamic Sales Analysis chart
- One chart, multiple visuals

#8 LAST YEAR VS. THIS YEAR ANALYSIS

Another popular analysis in business situations is comparison with previous period. For example, ***how did our products do this year compared to last year?*** There are many ways to visualize such information, but my favorite is an XY Plot. You can quickly spot things that changed a lot thru this method. Here is a sample.



HOW TO CREATE THIS CHART IN 4 STEPS

Imagine you have vegetable sales data for an exporter in this format.

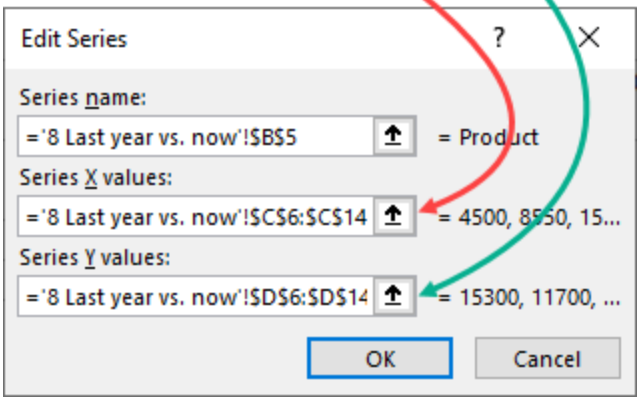
Product	FY 2018	FY 2019
Beans	4500	15300
Lettuce	8550	11700
Broccoli	15750	6500
Cabbage	10350	8100
Peas	8550	11250
Apples	12000	17550
Grapes	9000	13500
Pears	9450	12600
Blueberries	17550	9000

STEP 1: INSERT XY CHART (SCATTER PLOT) AND SET DATA TO IT

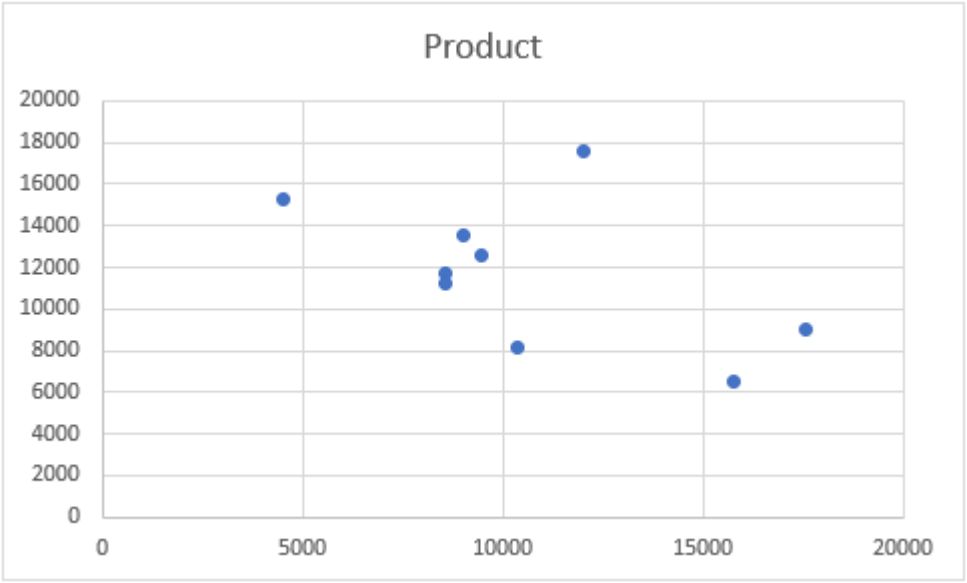
I find that when you have data in above format and select it to make XY chart, Excel tends to get it wrong. So, the preferred method is just select nothing, go to Insert and click on Scatter plot button. This will give you a scatter chart with nothing in it.

Now, right click on the chart, go to "Select data" and point X&Y values to the source table, as illustrated below.

Product	FY 2018	FY 2019
Beans	4500	15300
Lettuce	8550	11700
Broccoli	15750	6500
Cabbage	10350	8100
Peas	8550	11250
Apples	12000	17550
Grapes	9000	13500
Pears	9450	12600
Blueberries	17550	9000



You will end up with this chart.

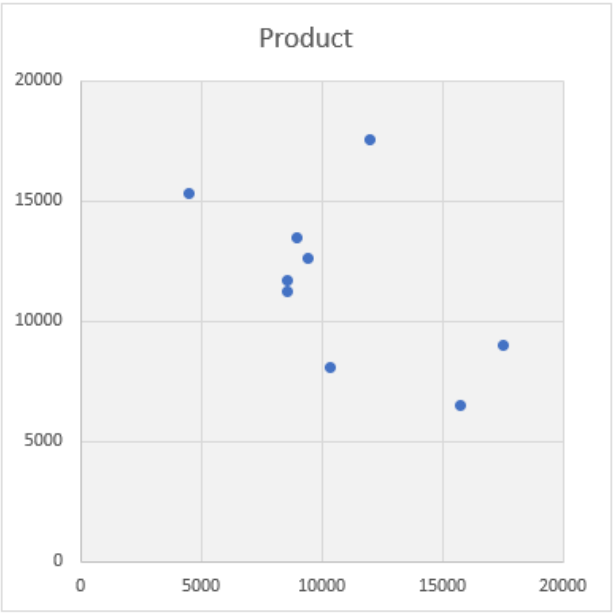


STEP 2: FORMAT THE CHART

This is easy. Just format the chart,

- Make it square (adjust sizes by going to format ribbon, size options for finer control)
- Set both axis limits to same values, do it for grid lines too
- Apply plot area background if you prefer.

Our chart looks like this now.



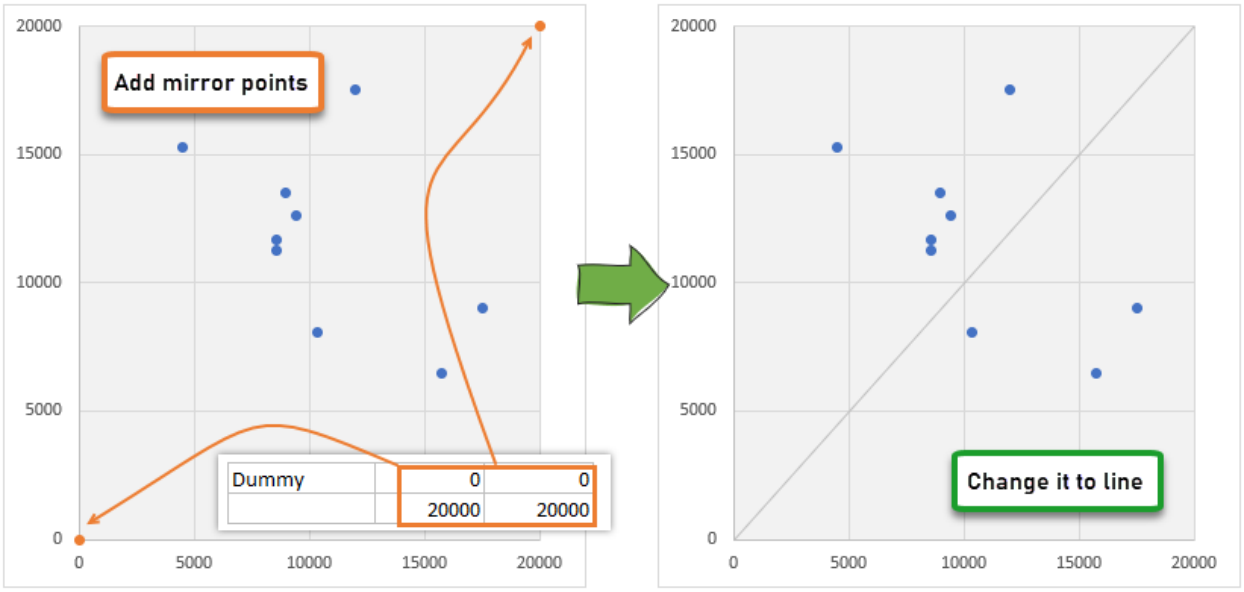
STEP 3: ADD MIRROR LINE

In a separate range, set two pairs of XY values like below.

Change 20,000 to the maximum value as per your data. (Tip: should be same as your axis max)

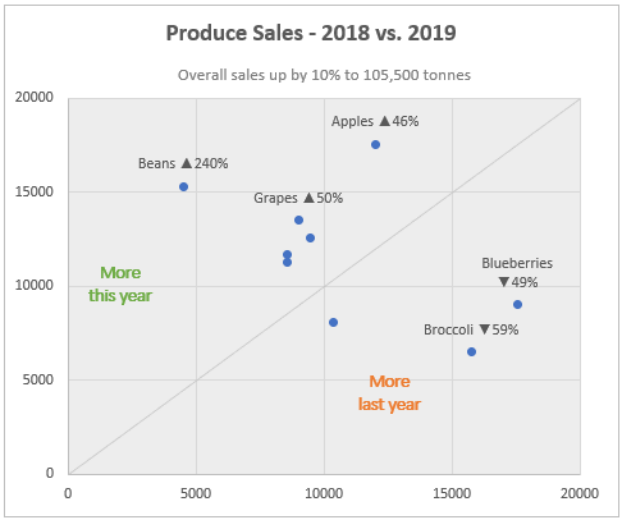
Dummy	0	0
	20000	20000

Now, add this dummy series to chart. Initially, this will be another set of dots. Right click on the dots, change series type to scatter with just line (no markers). Format the line and you will end up with the image to right.



STEP 4: APPLY SMART LABELS, TITLE & CAPTION

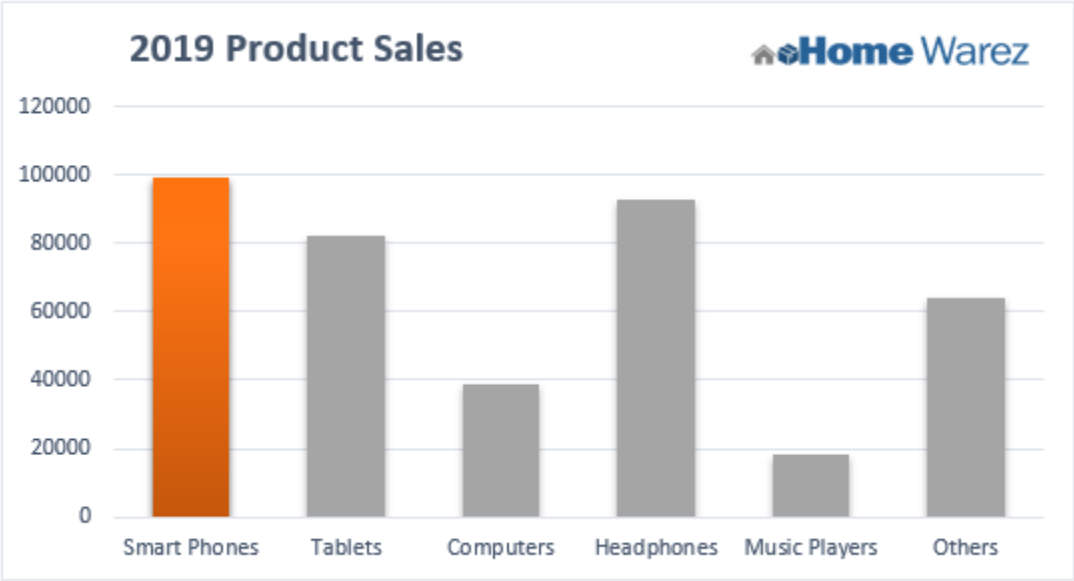
Nearly there. Just apply labels to only important points, calculate a title & caption and set them too. Our rocking previous year vs. this year chart is now ready.



#9 HIGHLIGHT IMPORTANT POINTS IN CHARTS

Excel Charts are essential for business reporting and analysis. But one of the drawbacks of a normal chart is that every data point gets equal attention. How do we **highlight** the important ones? If you want to do it for one-off situations, you can manually recolor the point. But how to make it *dynamic?*

Pictured below is a chart with best product highlighted. It is dynamic, so if your data changes, the highlighted column changes too.

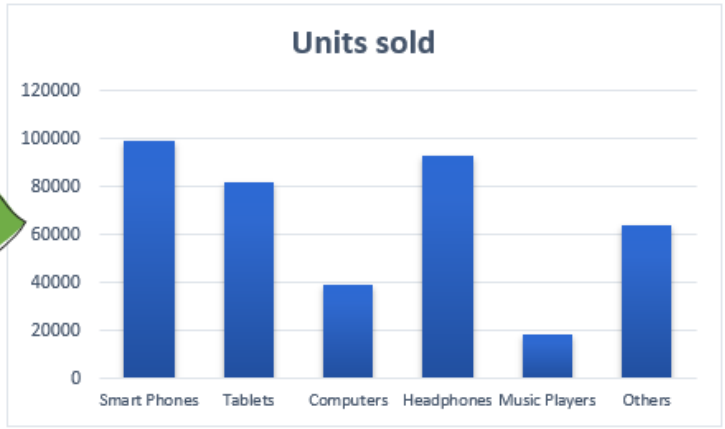


In this chapter, let me present you the basic mechanism for highlighting important data points. You can easily extend this idea for many situations.

SAMPLE DATA – HIGHLIGHTING MAX VALUES IN CHARTS

Let's say you have some data like this. If you make a chart, you get the output shown to right.

Product	Units sold
Smart Phones	99000
Tablets	82000
Computers	39000
Headphones	93000
Music Players	18000
Others	64000



TO HIGHLIGHT VALUES, JUST ADD EXTRA SERIES

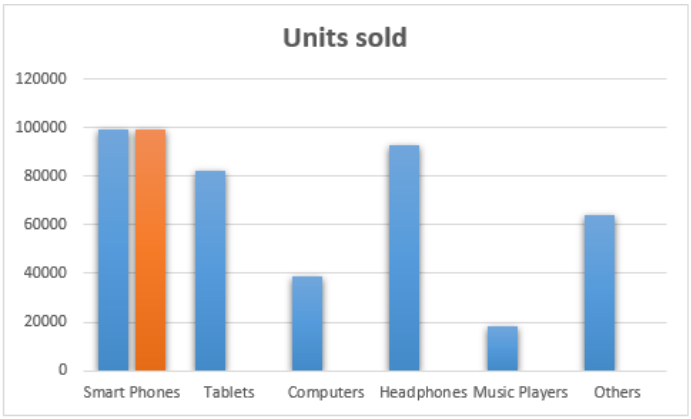
Now the fun part begins. To highlight values in Excel charts, we simply need to add extra series with the values you want to highlight. Let's say you want to highlight the

product with maximum units sold. Add an extra column to calculate the values, as shown below.

Product	Units sold	Maximum?
Smart Phones	99000	99000
Tablets	82000	#N/A
Computers	39000	#N/A
Headphones	93000	#N/A
Music Players	18000	#N/A
Others	64000	#N/A

```
=IF([@[Units sold]]= MAX([Units sold]),
[@[Units sold]],NA())
```

Now, our chart becomes this:



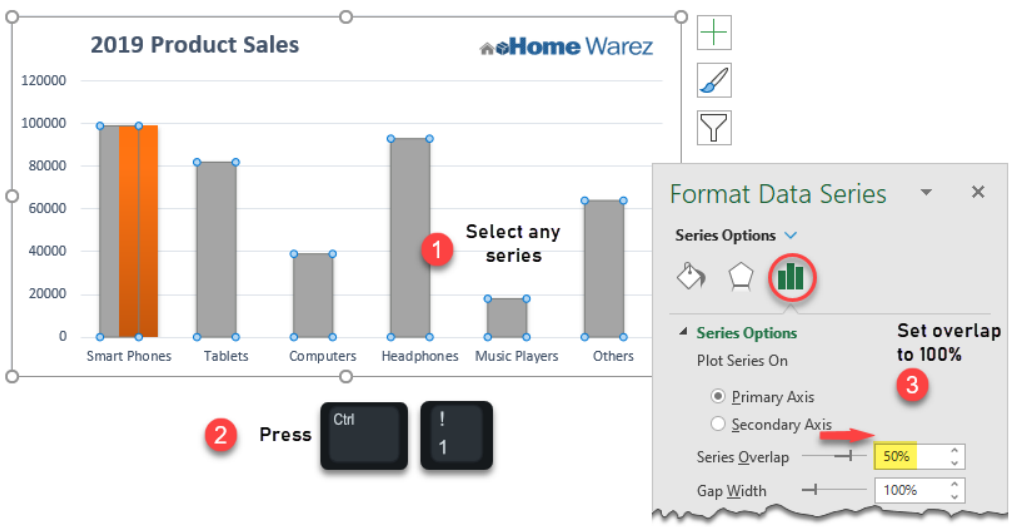
But we just want one series, not two!!!

While this chart highlights max value in a different color, it doesn't quite cut it. We just need to remove the original value.

Or, we could simply overlap one series on top of another, like layering.

Select the chart series and go to format series (Click on the series, press CTRL+1).

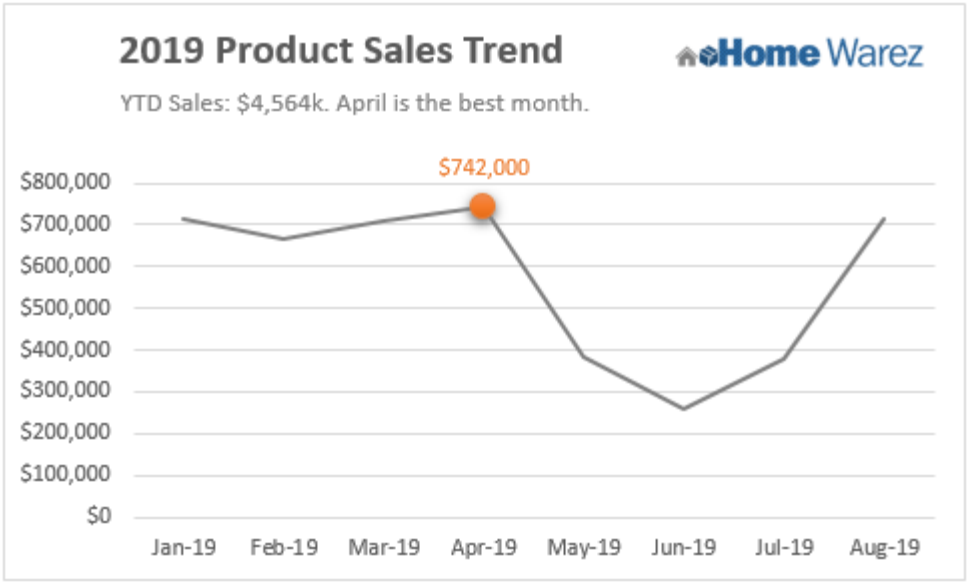
Now, set up series overlap to 100% and your maximum value is highlighted.



That is all. In just a few minutes and clicks, your chart highlights maximum value.

LINE CHART WITH MAXIMUM VALUE HIGHLIGHTED

Here is another example of this technique. This time with a line chart.



APPLY THIS IDEA FOR OTHER SITUATIONS TOO…

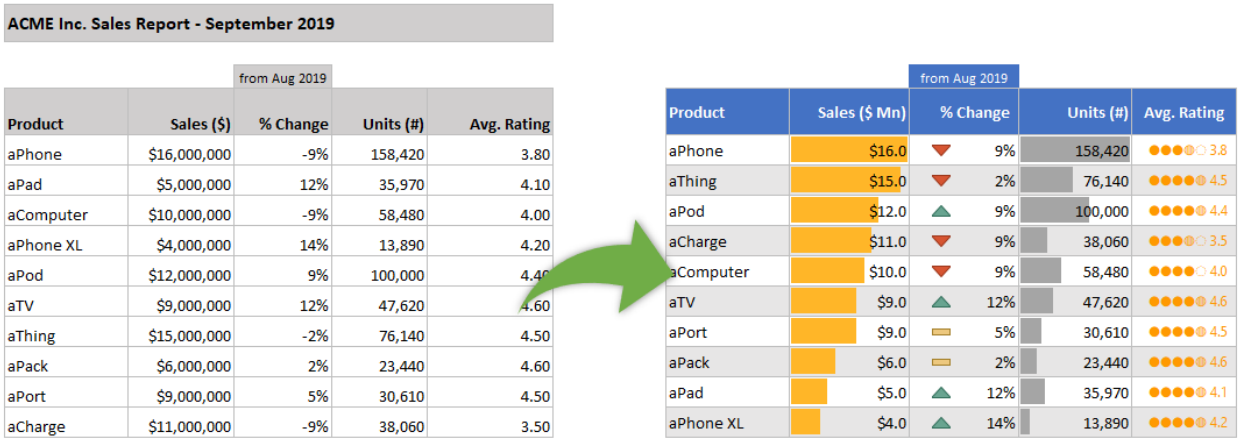
You can apply this technique to highlight various kinds of things, like:

- Minimum values
- Above average values
- Values that meet certain target
- User selection values

#10 TABLES ARE CHARTS TOO

With all the charting glory in Excel, it is easy to forget that **tables are most elegant way to present data.** Tables offer naked and unobstructed view of data. When you combine tables with conditional formatting, sparklines, filters and sorting, they can be true workhorses for presenting complex data.

Here is a sample visualization of September 2019 product sales data for ACME Inc.



ACME Inc. Sales Report - September 2019

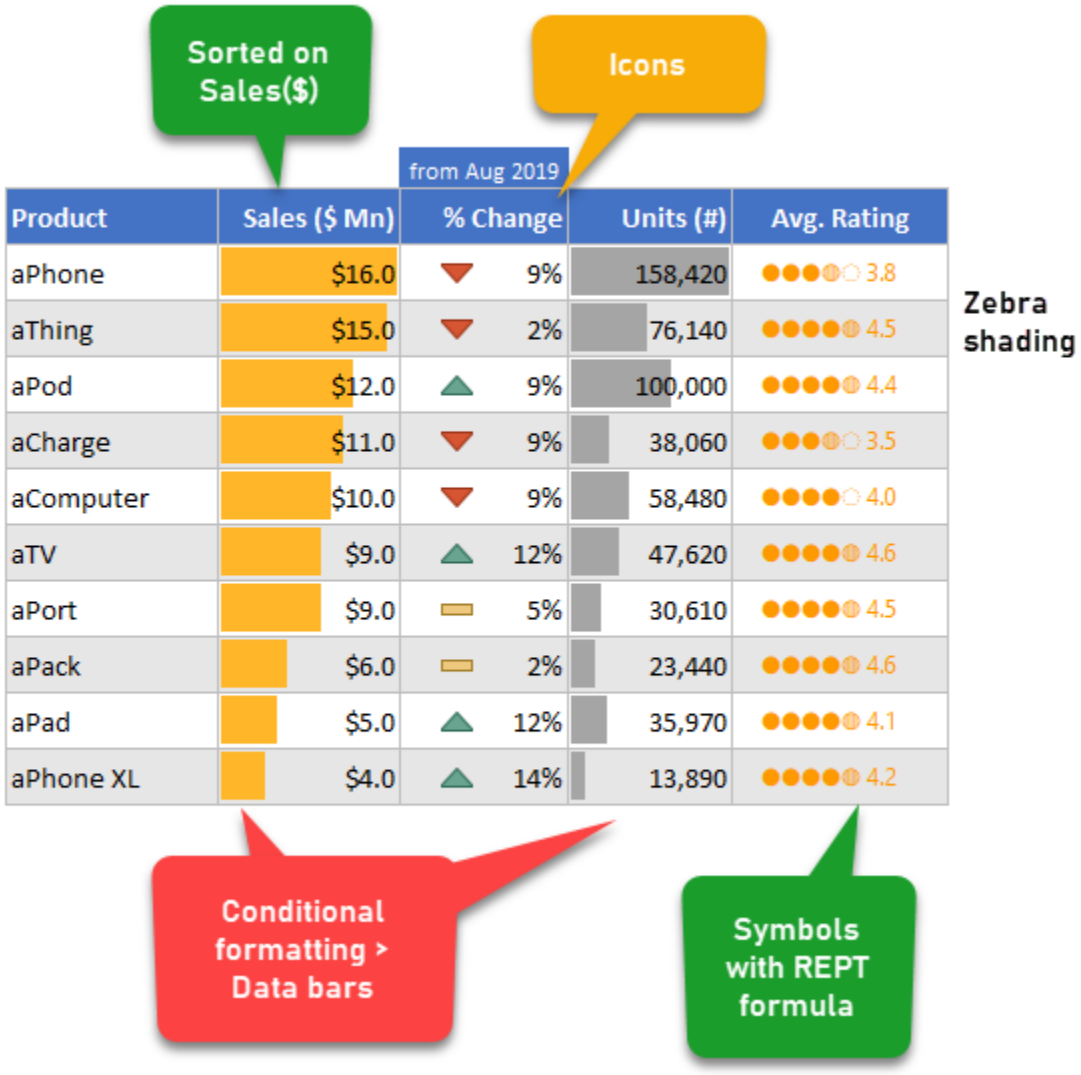
Product	Sales ($)	% Change (from Aug 2019)	Units (#)	Avg. Rating
aPhone	$16,000,000	-9%	158,420	3.80
aPad	$5,000,000	12%	35,970	4.10
aComputer	$10,000,000	-9%	58,480	4.00
aPhone XL	$4,000,000	14%	13,890	4.20
aPod	$12,000,000	9%	100,000	4.40
aTV	$9,000,000	12%	47,620	4.60
aThing	$15,000,000	-2%	76,140	4.50
aPack	$6,000,000	2%	23,440	4.60
aPort	$9,000,000	5%	30,610	4.50
aCharge	$11,000,000	-9%	38,060	3.50

Product	Sales ($ Mn)	% Change (from Aug 2019)	Units (#)	Avg. Rating
aPhone	$16.0	9%	158,420	3.8
aThing	$15.0	2%	76,140	4.5
aPod	$12.0	9%	100,000	4.4
aCharge	$11.0	9%	38,060	3.5
aComputer	$10.0	9%	58,480	4.0
aTV	$9.0	12%	47,620	4.6
aPort	$9.0	5%	30,610	4.5
aPack	$6.0	2%	23,440	4.6
aPad	$5.0	12%	35,970	4.1
aPhone XL	$4.0	14%	13,890	4.2

You can generate the beautiful table on right in just a few clicks and taps.

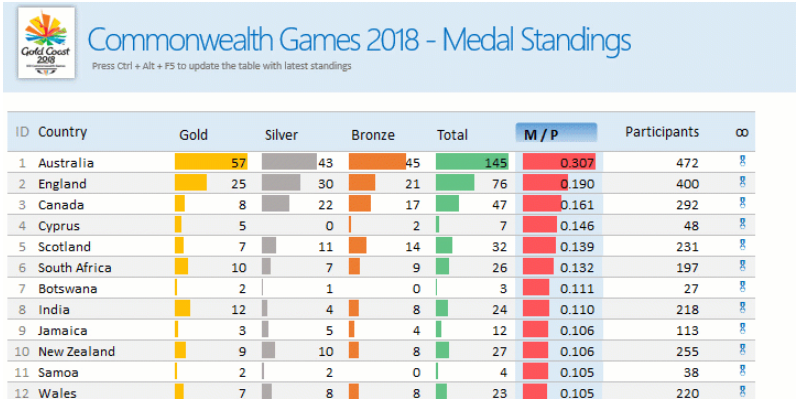
- Start by sorting the data on a column that meaningful (for example Sales $)
- Round numbers to millions or thousands as needed.
- Apply data bars to a column or two. Don't overdo this and keep the focus on one by selecting a strong color for one and dull colors for rest.
- Add icons or traffic lights to columns like % Change from previous month.
- Try REPT formula based in-cell chart for star rating.
- Apply zebra shading to the table (color alternative rows) either manually or thru conditional formatting.
- Make the header bold
- Your beautiful table is ready.

Here is a quick overview the techniques used on the ACME Sales Table.



EXAMPLE TABLE VISUALIZATIONS

- [Commonwealth Game Tally in Excel Tables]



Commonwealth Games 2018 - Medal Standings

Press Ctrl + Alt + F5 to update the table with latest standings

ID	Country	Gold	Silver	Bronze	Total	M / P	Participants	∞
1	Australia	57	43	45	145	0.307	472	
2	England	25	30	21	76	0.190	400	
3	Canada	8	22	17	47	0.161	292	
4	Cyprus	5	0	2	7	0.146	48	
5	Scotland	7	11	14	32	0.139	231	
6	South Africa	10	7	9	26	0.132	197	
7	Botswana	2	1	0	3	0.111	27	
8	India	12	4	8	24	0.110	218	
9	Jamaica	3	5	4	12	0.106	113	
10	New Zealand	9	10	8	27	0.106	255	
11	Samoa	2	2	0	4	0.105	38	
12	Wales	7	8	8	23	0.105	220	

- How to visualize survey results with tables & in-cell charts
- KPI dashboard with tables

Introducing

Excel School

Online class by me to make you awesome in Data Analysis & Reporting with Excel.

[Click here to know more about Excel School](#).

10 TIPS & TRICKS

Now that you have good understanding how to use Excel for data analysis, charting and reporting, let us focus on getting most out of it with some tricks. Excel has hundreds of features and applications that selecting just 10 tricks is hard. But here is a collection of my favorite Excel tricks that help users get more out of it.

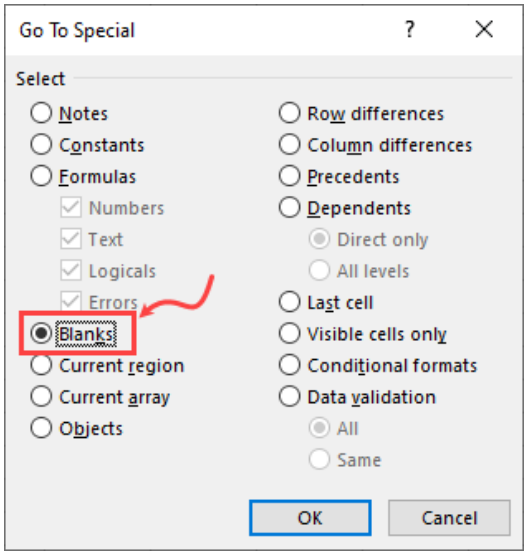
#1 REMOVE BLANK CELLS

Blank rows or Blank cells is a problem we all inherit one time or another. This is very common when you try to import data from somewhere else (like a text file or a CSV file). Let me show a very simple trick to delete blank rows from excel spreadsheets.

Customer	Age
John	23
James	28
Joey	29
Jenny	24
Kate	25
Kathy	29
Kerry	31
Karen	30

Customer	Age
John	23
James	28
Joey	29
Jenny	24
Kate	25
Kathy	29
Kerry	31
Karen	30

- Select your data
- Press F5
- This opens “Go to” dialog in Excel. Now hit on that “select” button.
- From “select special” screen, select “Blanks” (shown aside)
- Now, all the blank cells will be selected.
- Just press CTRL and Minus sign (-)
- Select “shift cells up” or “entire row” as needed.
- That is all. Now you have successfully removed blank rows.



Bonus tip:

If you are looking for keyboard short-cut for this, here it is. Press them in the same order once you select the cells.

F5 ALT+s k Enter CTRL+ – u Enter

#2 REMOVE DUPLICATE COMBINATIONS

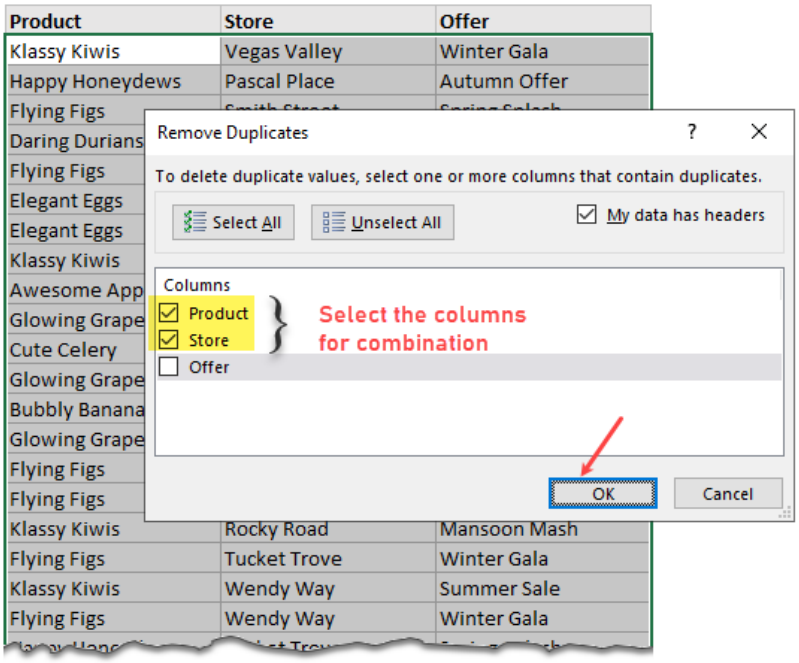
You may already know about the "Remove Duplicates" button in Excel. It is a god send. I have used it countless times to clean up my data. But do you know that you can use Remove Duplicates to get rid of *duplicate combinations* too?

REMOVE DUPLICATE COMBINATIONS – TUTORIAL

To remove duplicate combinations in your data, just follow below 4 steps:

- Select your data
- Click on Data > Remove Duplicates button
- Select columns for combinations
- Click ok and done!

See the illustration aside.



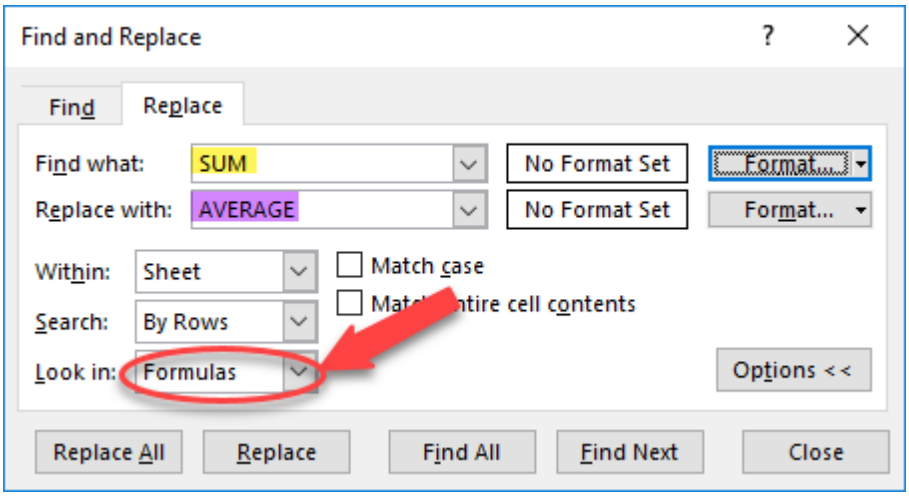
#3 CHANGE FORMULAS QUICKLY WITH FIND REPLACE

Do you know that we can use Excel Find / Replace (CTRL+H) to modify formulas too?

Say you have a bunch of SUM formulas in a workbook and want to quickly turn them all to AVERAGE. No need to edit the formulas individually.

First enable formula view with CTRL+` (backquote symbol) or using the Show formulas button in Formula ribbon.

Then launch Find Replace box with CTRL+H and replace them as shown below.

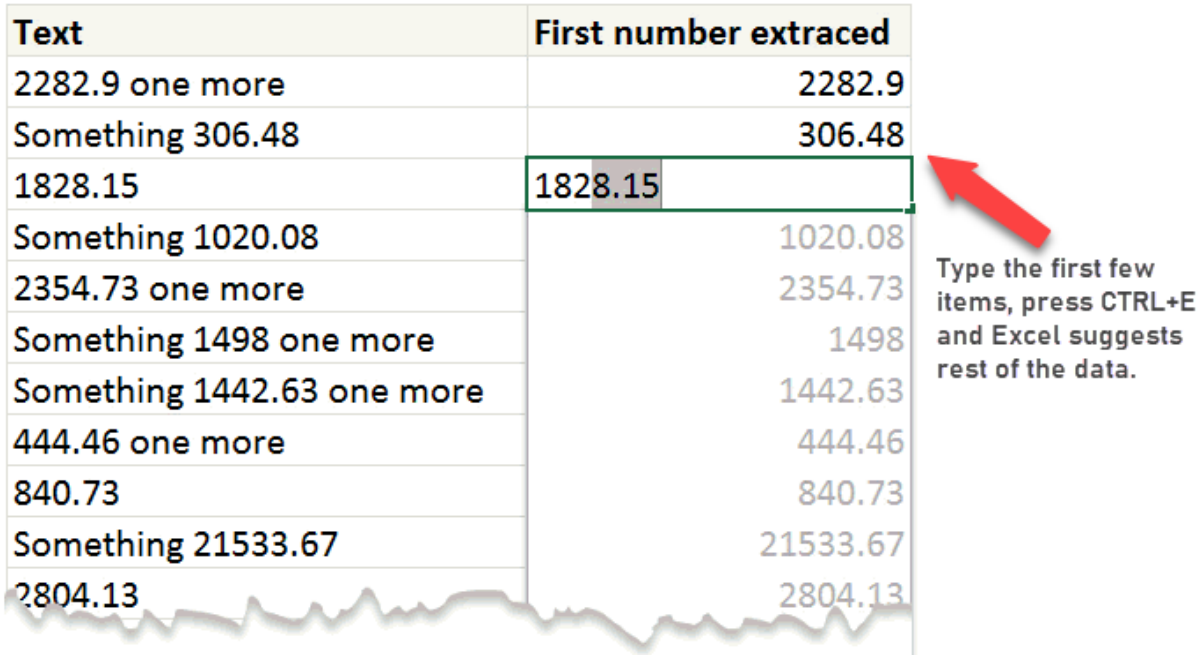


[You can also use Find Replace to change formatting](#).

#4 USE FLASH FILL TO EXTRACT DATA QUICKLY

Power Query is all the rage these days, but it may be overkill for something ad-hoc. Say, you have some data in cells and you just want the first number to be extracted. Just use Flash Fill (CTRL+E) to do the job. This little rule-based fill logic in Excel can learn from what you are typing and extract rest of the data for you.

Here is a quick demo:



FLASH FILL TIPS & TRICKS:

- Press CTRL+E to trigger flash fill. Excel will look at previously typed data and guesses the rest.
- To ignore Flash Fill suggestion, press ESC.
- By default, Flash Fill will be always listening and offers suggestions whenever it can. If you want to disable this, Use File > Options > Advanced and uncheck “Automatically Flash Fill” option. Click here for a screenshot of this process.

Learn more about Flash Fill.

FLASH FILL ALTERNATIVES – POWER QUERY

Flash fill is powerful but not versatile. If your data cleaning is complex, then FF won't detect patterns. I suggest using Power Query. You can load your spreadsheet data (either a table or named range) to Power Query from Data Ribbon > From Table / Range option in the "Get & Transform Data" tools. Once in Power Query, use the myriad transformation options to clean up your data.

Power Query is out of scope for this book, so I suggest checking this link for a getting started guide.

#5 DISTINCT COUNTS – THE EASY WAY WITH PIVOT TABLES

Ever wanted to count distinct values in your pivot tables? Something like this:

Date	Orders	Distinct Count
07-05-2018	16	8
08-05-2018	13	10
09-05-2018	17	10
10-05-2018	24	12
11-05-2018	11	8
12-05-2018	16	10
13-05-2018	15	9
Grand Total	112	13

Here is a simple trick to add distinct count to Excel pivot tables quickly.

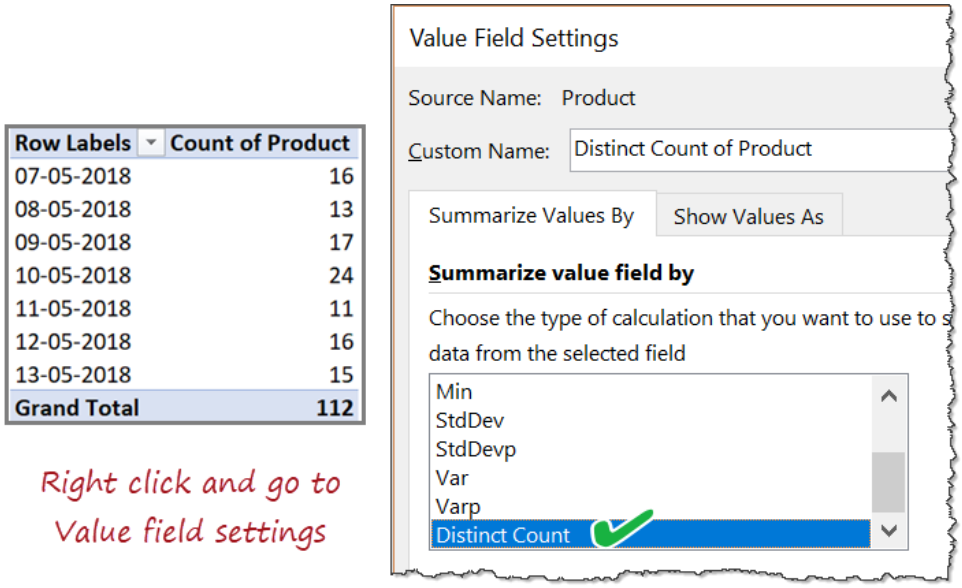
Let's say you have data like this:

Date	Product
07 May 2018	Cappuccino
07 May 2018	Tall Black
07 May 2018	Americano
07 May 2018	Apple Juice
07 May 2018	Cappuccino
07 May 2018	Americano
07 May 2018	Chai Latte
07 May 2018	Mocha
07 May 2018	Tall Black
07 May 2018	Frappe
07 May 2018	Mocha
07 May 2018	Tall Black
07 May 2018	Tall Black
07 May 2018	Americano
07 May 2018	Hot Milk
07 May 2018	Mocha

As you can see, several products are repeated on each day. When you make a pivot table from this data and add product count, Excel counts all products. But we want to see just the distinct count (i.e. if there is a duplicate product in a day, we want to count it just once). To get distinct count in the pivot table,

These instructions work only in Excel 2016, Office 365 and Excel 2013.

- Insert a pivot table from your data
- In the create pivot dialog, enable “Add this data to data model” option. (refer to chapter 7 in Data Analysis module for more on this)
- Once you have the pivot table canvas, add the product (or any other field for which you want to calculate distinct count) to the values area.
- Right click on the values, go to “Value field settings”.

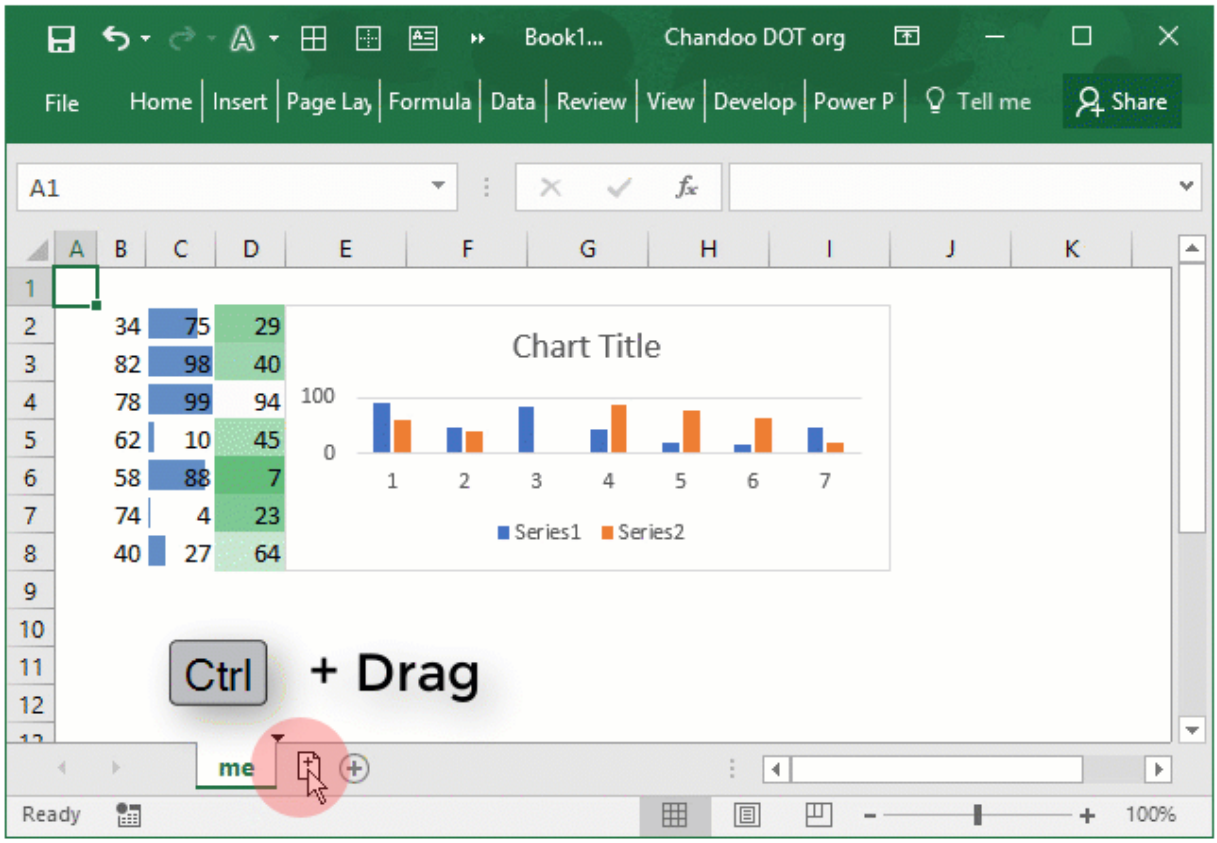


- Summarize the value by “Distinct count”. This is the last option.

#6 CLONE WITH CTRL

We make copies all the time. That is why this is my favourite trick. You can quickly copy a chart, a range of cells or even an entire spreadsheet by holding down CTRL key and dragging them. This will instantly create a copy for you.

The best part of this tip? It works in other Office applications too. Say you have a Power Point presentation and want to copy a slide? Just CTRL+Drag it.



SINCE WE ON THE TOPIC OF CTRL...

Few cooler CTRL combo click tricks (say that six times) for you.

- **Use CTRL+Enter to type same value into multiple cells**. Just select the cells, type what you want and press CTRL+Enter to get it in all of them.
- **CTRL+F1 to collapse ribbon.** I love ribbon, but sometimes it can be too much. Just collapse it with CTRL+F1. Works in all Office applications where Ribbon is found.

- **CTRL+Click to speed up formula writing.** Whenever a formula has multiple parameters (like SUM, VLOOKUP etc.) you can specify them by just CTRL+Clicking on the ranges. This can save you hours of time in the long run. See this page for a demo of the tip.

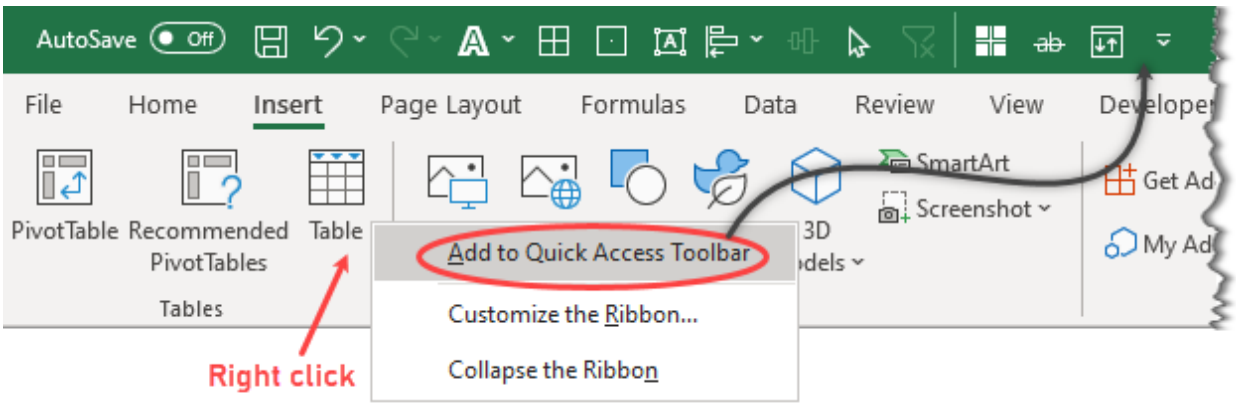
#7 CUSTOMIZE QUICK ACCESS TOOLBAR + RIBBON

I am sure you spend most of your working life in Excel. Why else would you read this book? Here is one powerful idea that can save time and effort every day. Customize your quick access toolbar and ribbons.

WHAT IS QUICK ACCESS TOOLBAR – QAT?

QAT is the tiny little toolbar on the top of your Excel window. It comes loaded with few buttons like Save, Undo etc. But you can also add more to this. I added buttons like alignment tools, borders, text box to it as I use them almost every day and don't want to go looking for the button in ribbon.

To add a feature to QAT, right click on the button in Ribbon and select "Add to Quick Access Toolbar".

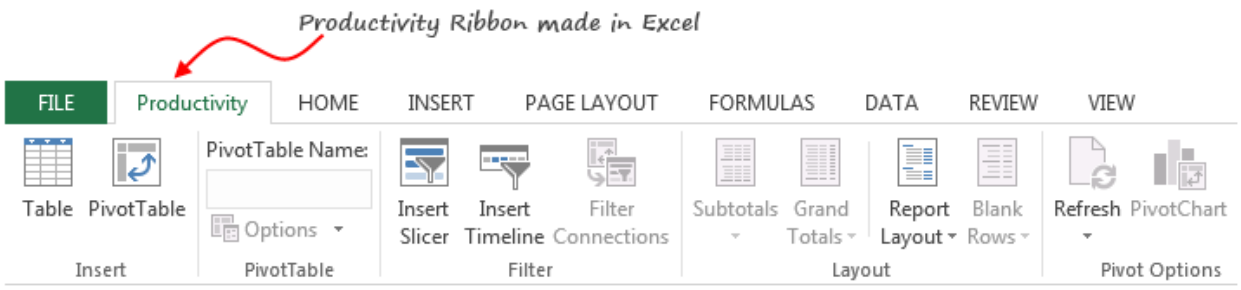


You can also right click on QAT and customize it for more options.

HOW TO CUSTOMIZE THE RIBBON?

Right click on any ribbon to select "Customize the Ribbon" option. This will take you to a backstage screen where you can add additional groups to any existing ribbons or even create a brand-new ribbon with all the features that you frequently use.

Here is an example of "Productivity" ribbon made in Excel.



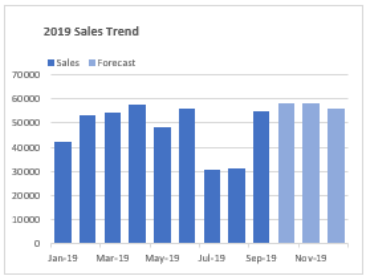
It has all the commonly used options from multiple ribbons in one place.

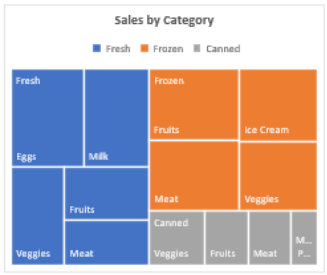
MORE WAYS TO CUSTOMIZE EXCEL...

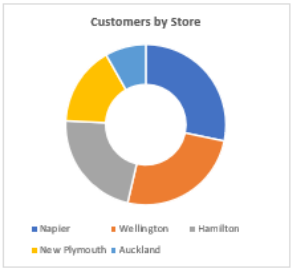
- Create custom ribbons in Excel – video tutorial
- Excel Customization – Chandoo.org Podcast episode

#8 ALIGNMENT TOOLS

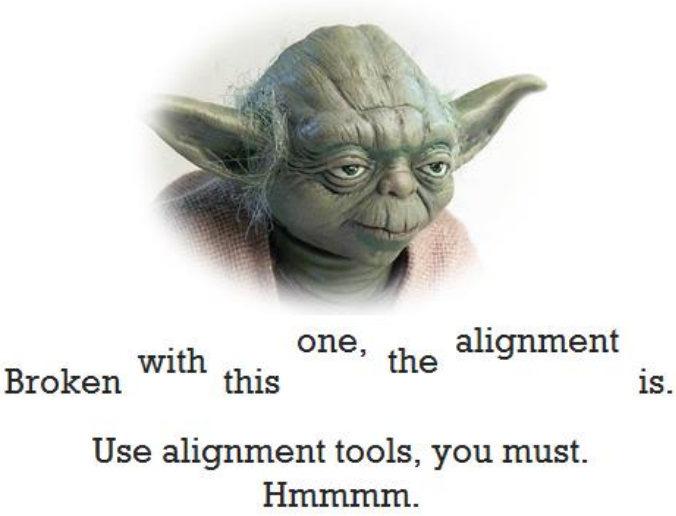
Inconsistent alignment and sizing can cause confusion. See this for example:







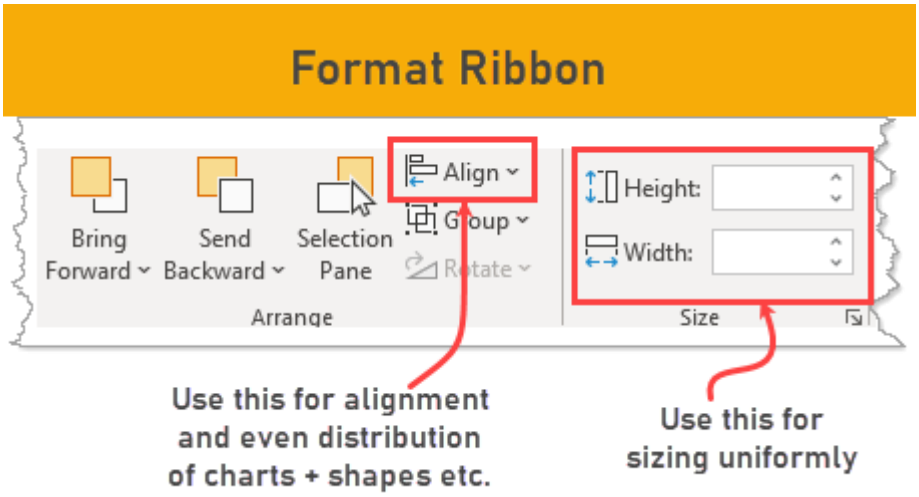
As Yoda says, alignment is critical for business reports and workbooks. Excel has many features to quickly and elegantly align your charts, objects and images.



Consistently sized and properly aligned reports look professional and elegant. See this for example.

HOW TO SIZE AND ALIGN?

1. Select all your charts (you can hold down CTRL key and select them)
2. Go to "format" ribbon (in newer versions of Excel this will be Shape format ribbon)
3. Use the Size tools to the right to make all of them same size.
4. Use alignment tools in the "Arrange" area of the ribbon to align and space the charts evenly.



Pro tip: Hold ALT key while moving things to align quickly

Whenever you are moving or resizing things (charts, images, shapes etc.), hold down ALT key. This will ensure that your object is aligned with cell boundaries.

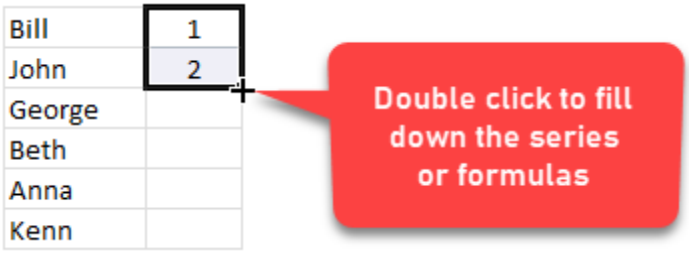
#9 MOUSE SHORTCUTS

We all love keyboard shortcuts (it's the next chapter of this book btw), but I think mouse shortcuts need some love too. In this chapter, let's look at 5 situations where mouse really shines.

#1 Use mouse to move range of cells too

Just select the cells, Excel will show a thick border around the range. Now click on the edge of this box, drag to move it anywhere.

#2 Fill down formulas by double clicking

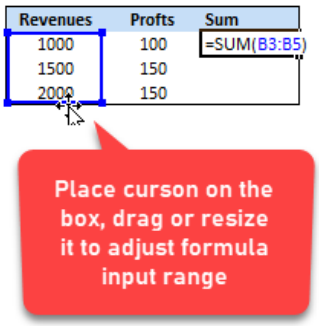


Say you have a range of cells and you want to fill down with same formula. Type your formula in first cell. Select the cell. Place your mouse pointer at the bottom right corner. It will change to a + symbol. Double click now and Excel will fill down the formula.

#3 Lock a feature with Double Click

If you want to repeatedly use a feature (drawing a shape or applying format painter etc.), you can double click on the icon in ribbon to lock it. You can then use mouse pointer to repeatedly create as many shapes as you want and then press ESC to unlock.

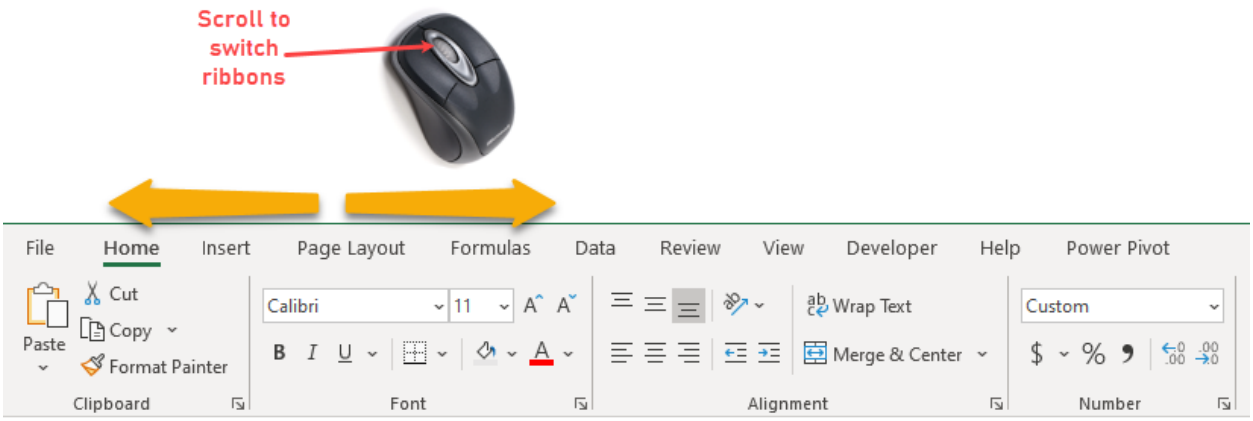
#4 Adjust chart or formula input ranges with mouse



This is an extension of Tip #1. Say you have a chart or formula and want to edit the input range. First edit the formula (select the cell with formula, press F2), now Excel will show boxes around all input ranges. Place your mouse cursor on any range box and carefully move or resize the box to instantly adjust your formula input range.

#5 Use mouse scroll wheel to switch between ribbons

Place your cursor on ribbon and use the scroll wheel on your mouse to switch between various ribbons.



#10 KEYBOARD SHORTCUTS

You can't have an Excel book without some shortcuts. But which ones? Excel has 100s of shortcuts. There is no point memorizing everything. In this chapter, let me share my favorite top 10 keyboard shortcuts. Learn these and you will save hours of time.

BUT FIRST, SHORT CUT #0 – ALT KEY

This is so important that I had to present it as shortcut #0. The lovable ALT key. Just hold it down for a second and Excel will show you shortcuts for everything on the ribbon & quick access toolbar. You can press the key to activate that feature. No need to memorize 100s of shortcuts or reach for that mouse every time. Just use ALT key instead.

CHANDOO'S FAVORITE KEYBOARD SHORTCUTS

	Shortcut	What it does?
1	**F2**	Edit a cell
2	**CTRL+1**	Format selected thing. Works for cells, chart items, shapes etc.
3	**F4**	**When editing a cell:** Change reference style between relative, absolute and mixed. **When outside:** Repeats last action - redo
4	**F5**	Opens Goto dialog, allows you to jump to any place in the workbook or select special types of cells.
5	**CTRL+Shift+L**	On / off filters
6	**CTRL+T**	Convert a range of cells to table
7	**CTRL+Shift+3**	Format selected cells as dates (use CTRL+Shift+2 for time and CTRL+Shift+4 for currency)

8	ALT N V	This is a sequence shortcut. Inserts a pivot table from your selected data or table.
9	CTRL+*	Select the current region. Useful for picking entire range from a cell within.
10	CTRL+ALT+V	Opens Paste Special options.
*	CTRL+S	Save the file. Of course, you can't do much if you don't save.

WANT MORE SHORTCUTS?

Of course, who doesn't love a good shortcut. Here are few more shortcut pages for you to learn.

- Top 5 shortcuts for formula writing
- Shortcuts for formatting
- Top 5 shortcuts for charts
- 10 shortcuts I can't live without
- Complete list of Excel Shortcuts with best ones tagged

Love this book? Please share

If you love this book, please forward it to a colleague or friend. I am sure they will enjoy it too. You can either email the file or ask them to visit https://chandoo.org/wp/subscribe/ to get their own copy.

Introducing

Excel School

Are you looking for an **advanced Excel course**? I am glad to tell you that I run one of the BEST online Excel classes in the world at Excel School. This in-depth course helps you master data analysis, charting, dashboard reporting and productive usage of Excel. There are 6 + 1 modules in this program, each focusing on one core area of Excel usage.

1. **Getting started:** Intro, basics, tips & tricks
2. **Working with data:** Power Query, tables, clean-up and formatting
3. **Writing formulas:** referencing, summarizing, lookups, date, text and advanced formulas
4. **Data analysis:** Pivot tables, relationships, interactive analysis, slicers, forecasting
5. **Charting:** Picking right charts, advanced combination charts, interactive charts, sparklines
6. **Productivity:** Data validation, templates, protection, publish to web etc.

+

7. **Dashboard Reporting:** Full module on creating dashboards with 6 examples

> Your sense of humor, kindness and enthusiasm for Excel are fantastic. The numerous shortcuts that you teach are invaluable. ☆☆☆☆☆
>
> Mary Scott, HR Professional
>
> Excel School Student

Join Excel School with 10% discount:

Please accept my invitation to this world-class online training and become awesome. As a reader of this book, you get 10% discount. Use the coupon code **10101010** to get your personal discount.

Click here to know more and join Excel School.