



# Excel

# ACKO

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# Welcome to Excel Workshop

Instructor: Amit Agarwal  
E-Mail: amitprabhash73@gmail.com

**Class will start promptly at:  
9:00 AM IST**

**Please put your Cell Phones in Silent Mode**

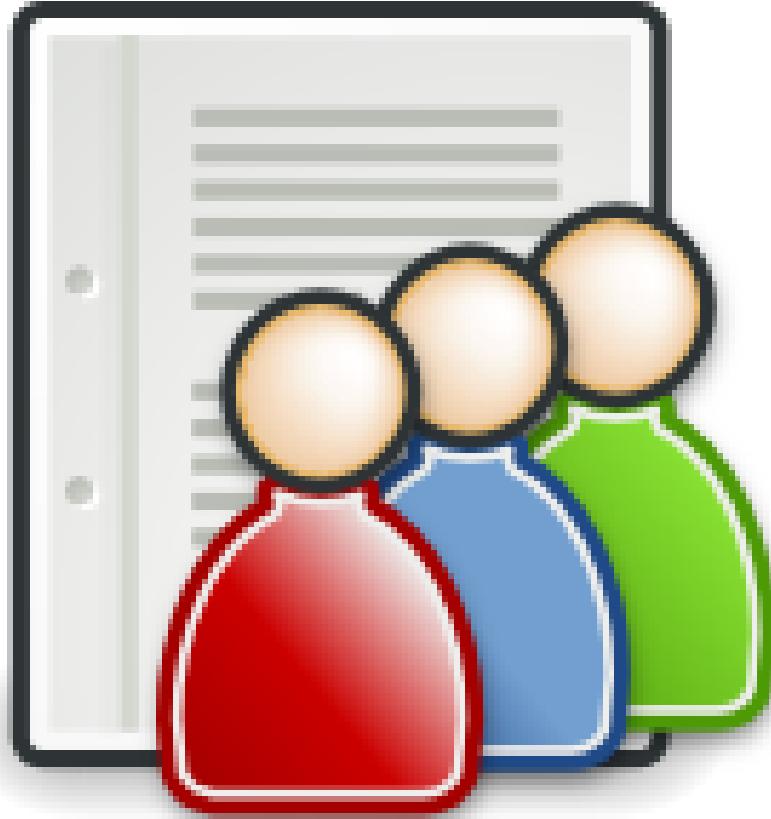
# Everyone Ready – Let's Get Started!



## Instructor Introduction

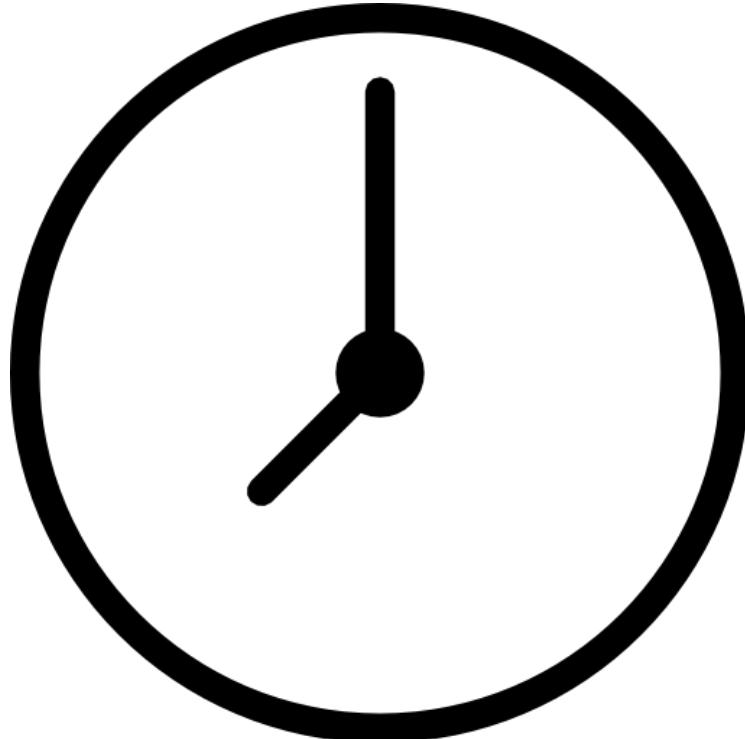
- 25 + years of Industry Experience
- Microsoft & SAP Certified
- Trained more than 8000+ BI Consultants
- Conducted Business Intelligence & Enterprise Information Management Workshops for Kraft, Kellogg, Whirlpool, Verizon, DOI – USA, Sap North America, Accenture, HP, HOLCIM, TCS, ...

# Participants Introduction



- Kindly enter the following details in your chat box:
- Your Name
- Industry/Work Experience
- Business Intelligence, Excel, Reporting & Dashboarding Experience
- Expectation from Course

# Course - Time



**All Times Shown Are IST**

**Delivery Schedule: Friday & Monday:**

- Daily Start: 10:00 AM
- Breaks 1: 11.30 AM - 11:45 AM
- Launch 1:30 PM – 2:15 PM
- Breaks 2: 4:15 PM – 4:30 PM
- Finish: 6:00 PM

# Agenda Day 1

- **1. Introduction to Excel 2021**
  - Excel 2021 Overview
  - Basics of Excel
  - Shortcuts of Excel
  - Keyboard Shortcuts
- **2. Working with Formulas**
  - Text function: Left, Right, Mid, Upper, Lower, Proper, Concatenate, Etc.
  - Statistical function: Sum, Max, Min, Large, Small, Average, Etc.
  - Date/Time Functions: Using The TODAY, NOW & DATE Functions
  - Index and Match with multiple variables

# Agenda Day 1

## 3. Create named ranges

- Create and revise a formula
- Create a formula that references an Excel table
- Use relative and absolute references

## 4. Logical Functions:

- IFs and Nested IF Functions
- Using AND/OR/NOT Functions

## 5. More Statistical Functions:

- Using The SUMIF/COUNTIF, COUNTA,RANK Functions
- Using The AVERAGE / AVERAGEIF / AVERAGEIFS

## 6. Chart Data Techniques:

- The Chart Wizard
- Chart Types -Line, Pie, Bar, Waterfall (stacked Waterfall + Trendline)
- Formatting / Renaming / Deleting Data Series
- Changing the Order of Data Series
- Adding Trend Line, Display data on Secondary Axis

## 7. Data Tools

- Converting Text to Columns
- Remove duplicates
- Data Validation

# Agenda Day 1

## 8. Advanced Conditional formatting:

- Highlight data on basis of certain criteria
- Add data bar

## 9. Trend lines

## 10. LOOKUP Functions:

- The VLOOKUP/HLOOKUP Functions
- Match, Index, Iferror

## 11. What if Analysis

- Goal Seek
- Data Table
- Scenario Reports

# Agenda Day 2

## 12. PivotTables:

- Creating Formatting Simple PivotTables
- Page Field in a PivotTable
- Formatting a PivotTable
- Creating/Modifying a PivotChart
- Insert Calculated Field (formulas)

## • 14. Get Started on VBA

- What is VBA
- Access VBA from Excel
- Write Your First VBA Code
- Message and Input Box
- Macro Record

## 13. Power Query:

- Working with Power Query
- Perform Transformation
- Advanced Transformation

## 15. VBA Programming

- Variables and Constants
- Data Types and Array
- Operators
- Decision
- Loops

# Agenda Day 2

## 16. Function and Sub Procedure

- Worksheet Functions
- Create Charts
- Sub Procedure

## 17. Managing Excel Objects

- Work with Excel Objects
- Error Handling
- Debugging

## 18. Events and User Forms

- Events
- User Forms

## 19. Create 3 Excel Dashboards

- Create dashboard with Sparklines and Conditional Formatting
- Heat Map Dashboard
- Business Sales Dashboard

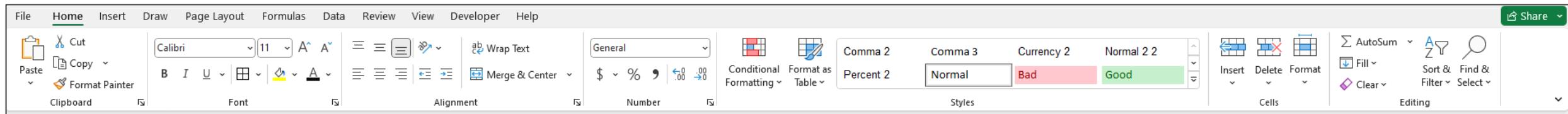
## 20. Excel Final Assignment

Unit 1

# Getting Started with Excel

# Launch Excel

# Excel Ribbon



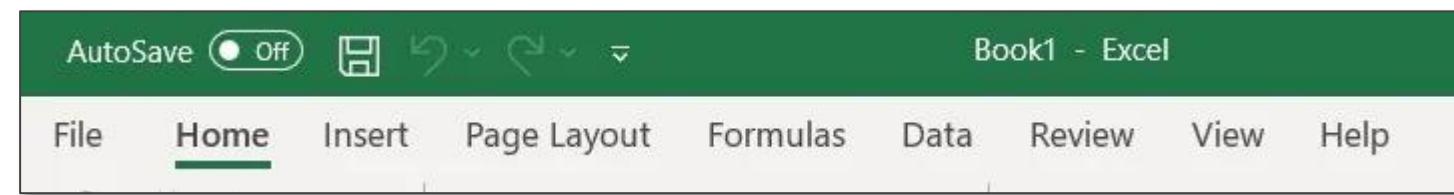
## What is the Excel Ribbon?

The Excel ribbon refers to the tabs at the top of the Excel interface that helps users to navigate and locate the commands when using Excel.

## The Excel Ribbon Tabs

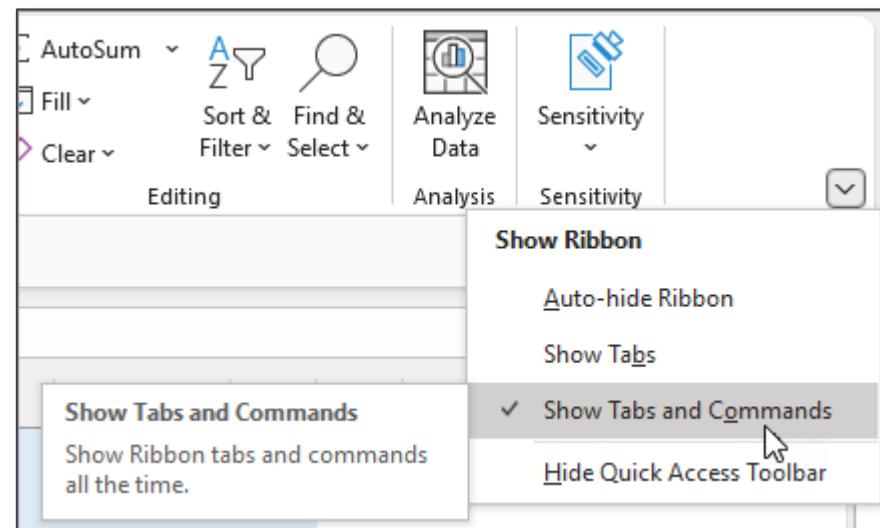
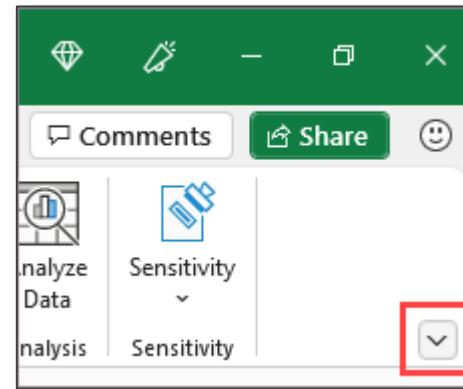
There are nine tabs on the Excel Ribbon: File, Home, Insert, Page Layout, Formulas, Data, Review, View, and Help.

**The Home tab is the default tab when Excel is opened.**

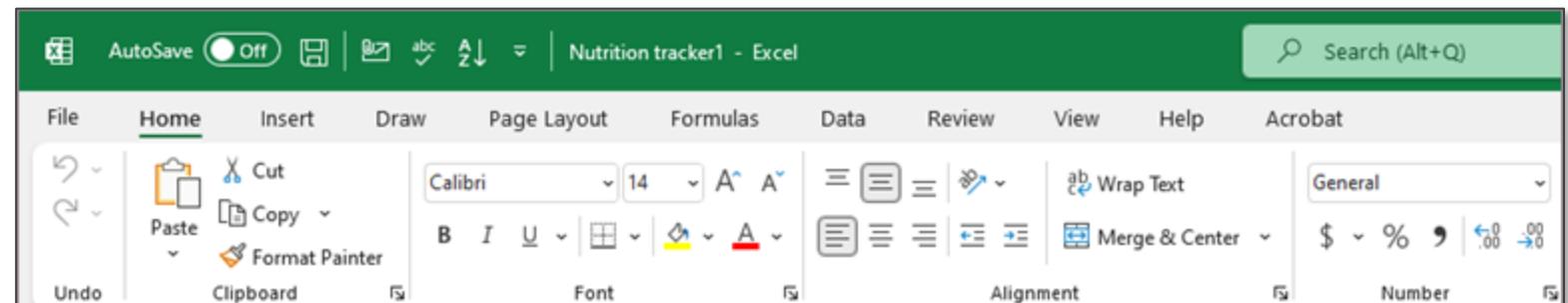


# Ribbon Display Options

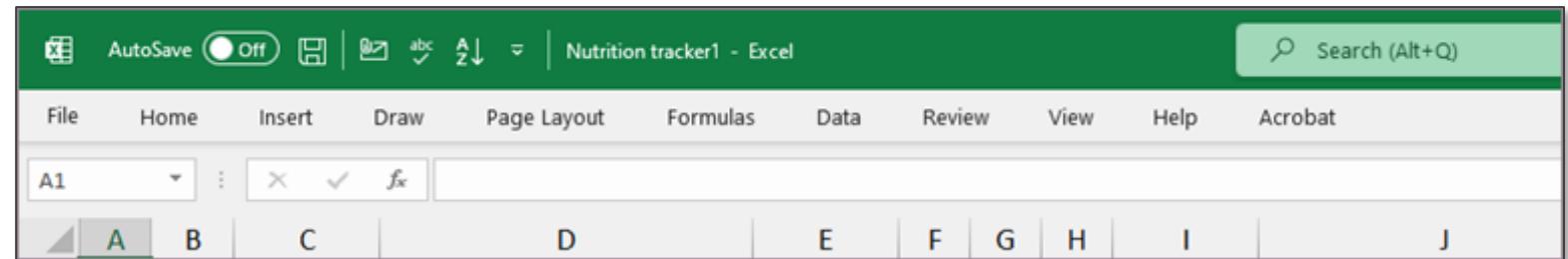
- Using the Ribbon Display Options
  1. Click the **Ribbon Display Options** button in the lower-right corner of the ribbon
  2. In the menu that opens, click **Show Tabs and Commands** to show the Ribbon with all tabs and full commands.



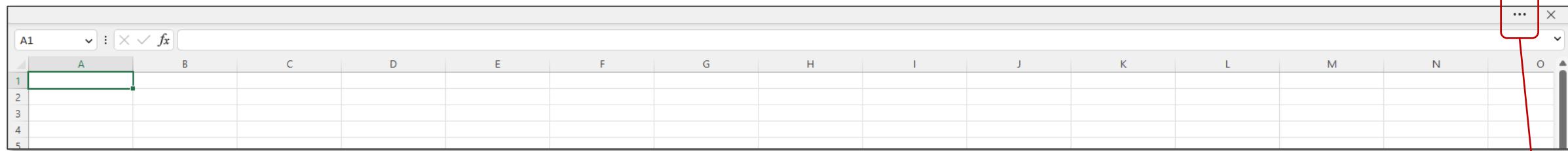
- **“Always Show Ribbon”** This option is the default view. While this option provides quick access to all the commands, it limits the available screen space for your workbook.



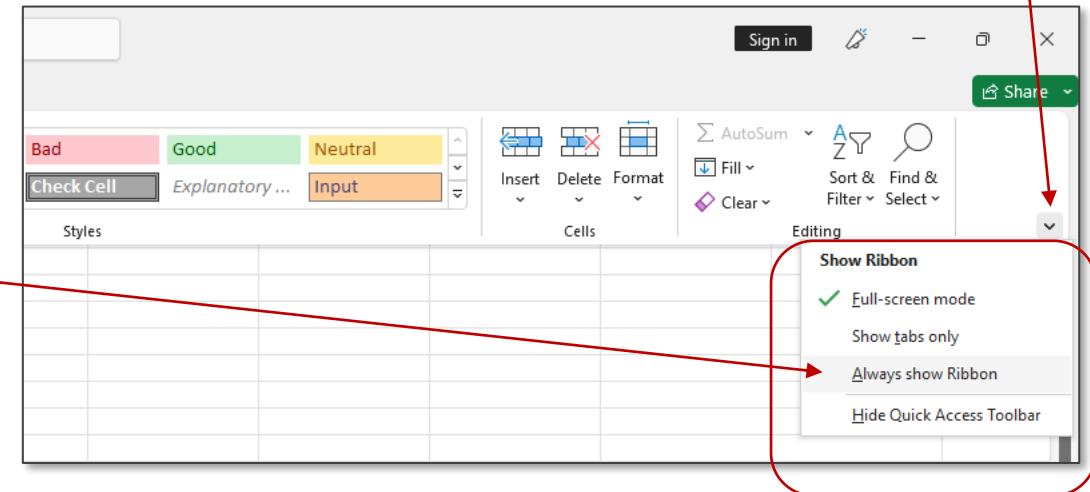
- Click “**Show Tabs Only**” to display the Ribbon tabs without the commands. To access the commands in the Show Tabs option, click any of the tabs.



# Full Screen Mode



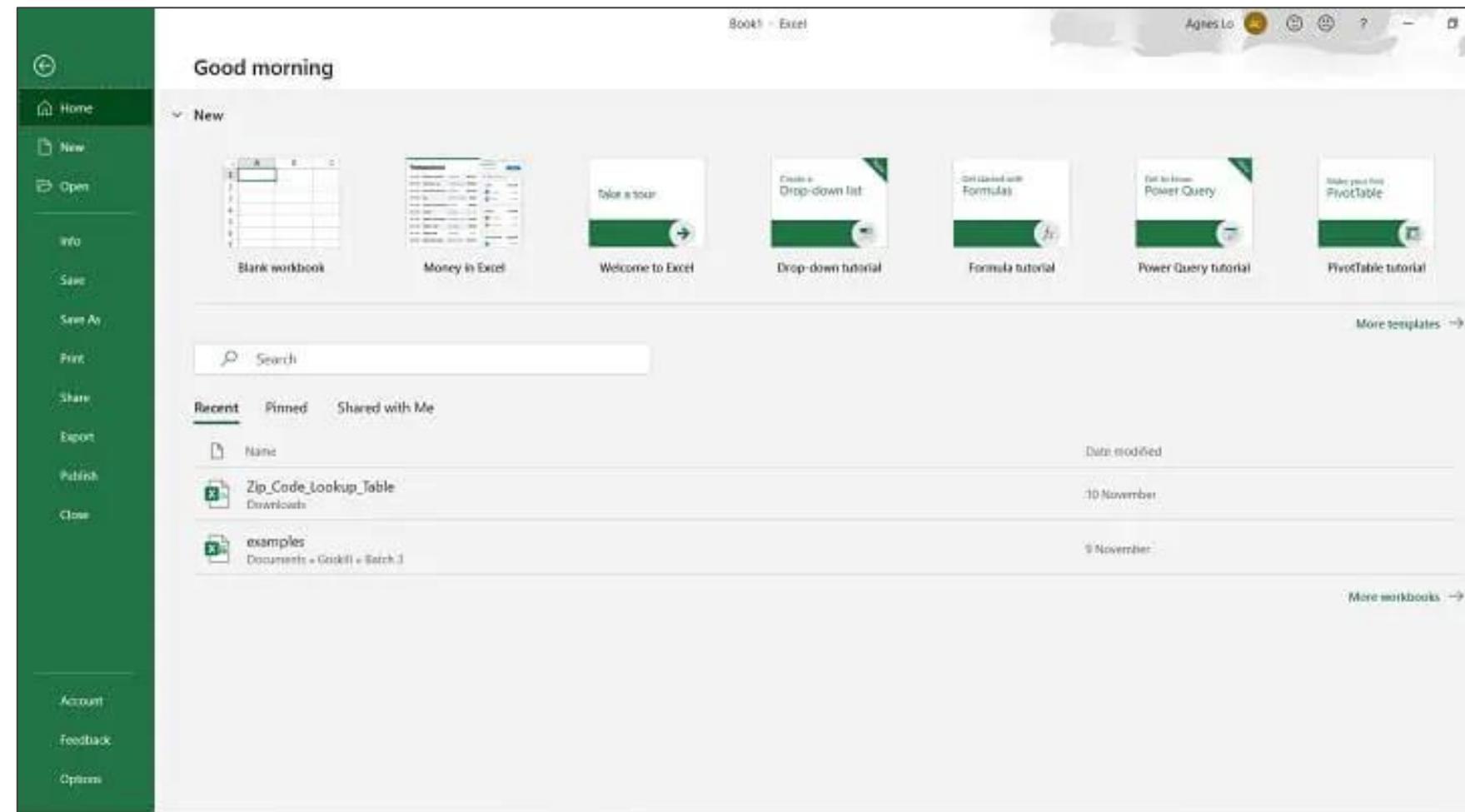
To Return to Default setting, Click on the Three Dot to get the ribbon back and then click on don arrow and select “Always Show Ribbon”



# **Excel Ribbon Tabs**

# 1. File

This provides a backstage view of all the important commands related to the files — to create a new sheet, open a file, save the file, print the file, and export.



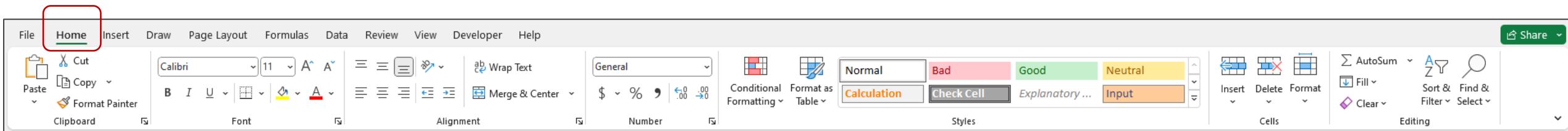
## 2. Home Tab

This features the essential or most frequently used commands in Excel — formatting, font types, and filtering.

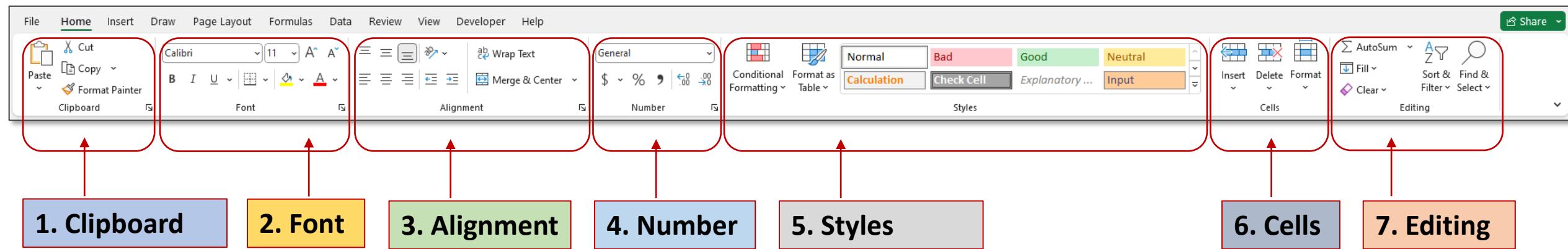
Similar features are organized by group, for example there is a Clipboard group with cut, copy, and paste commands; and a Font group with font styles, colors, and sizes.

Note that your ribbon options may appear differently depending on how big your screen is, and the size of your Excel window (as you make it smaller, you'll notice less buttons appear).

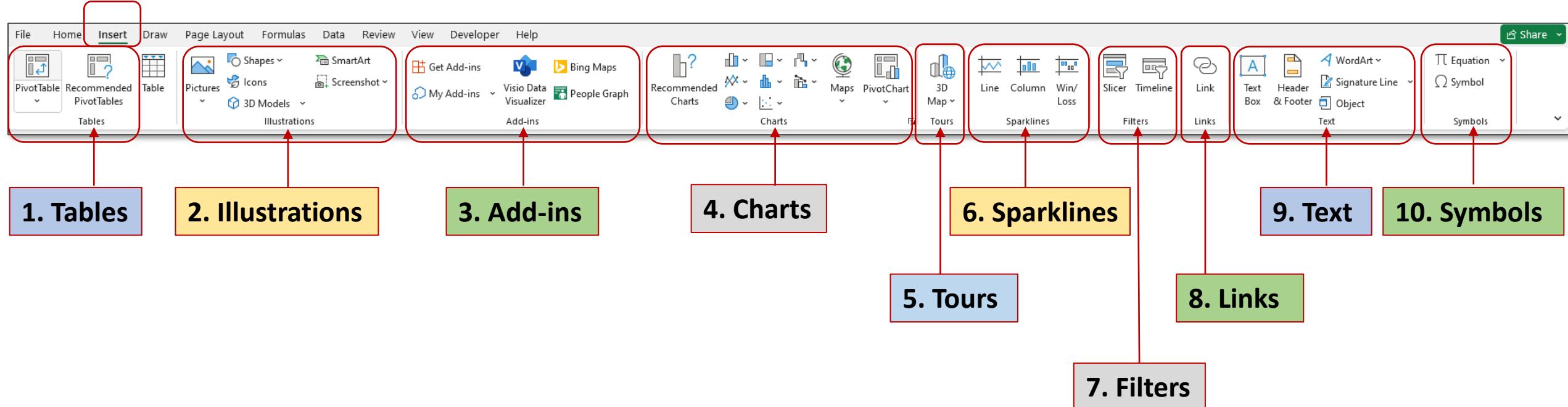
As there are a lot of features, we have divided it into two sections as pictured below, to give you a better look at all the buttons and groups.



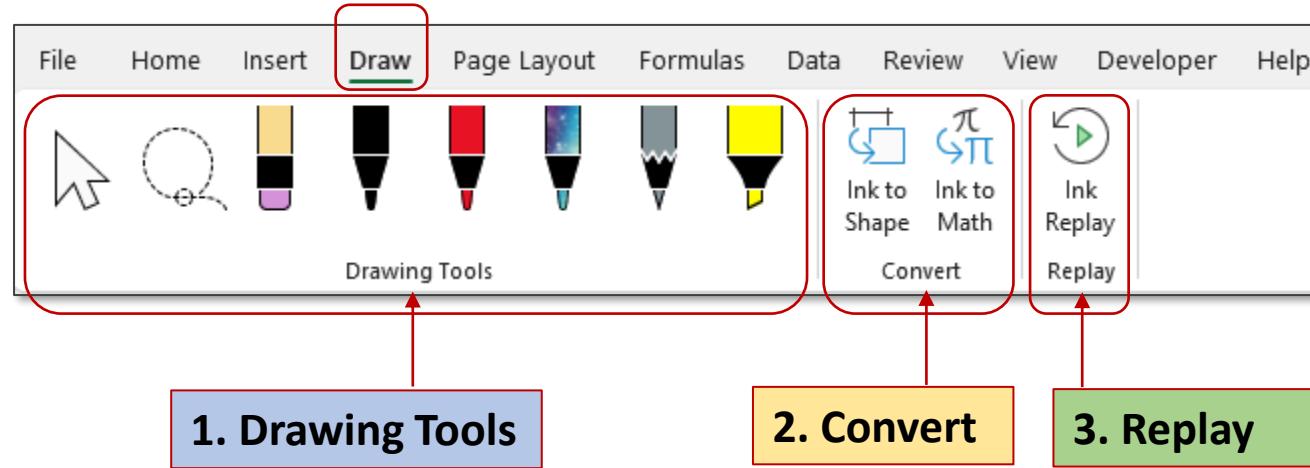
## 2. Groups in Home Tab



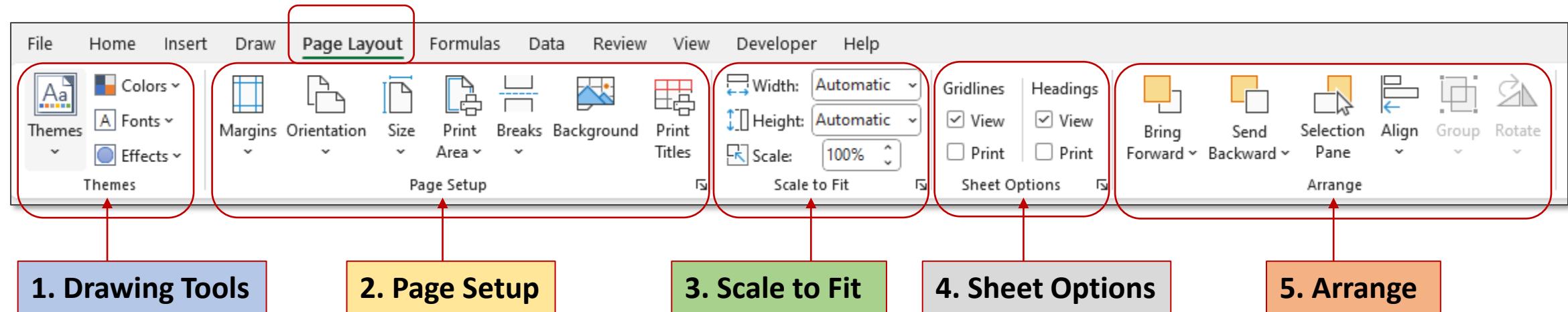
### 3. INSERT TAB & Groups in INSERT Tab



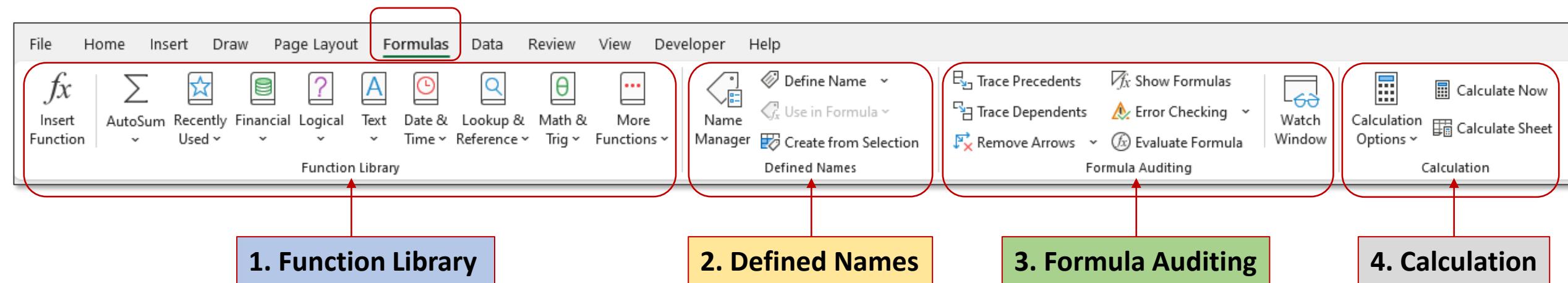
## 4. DRAW Tab & Groups in DRAW Tab



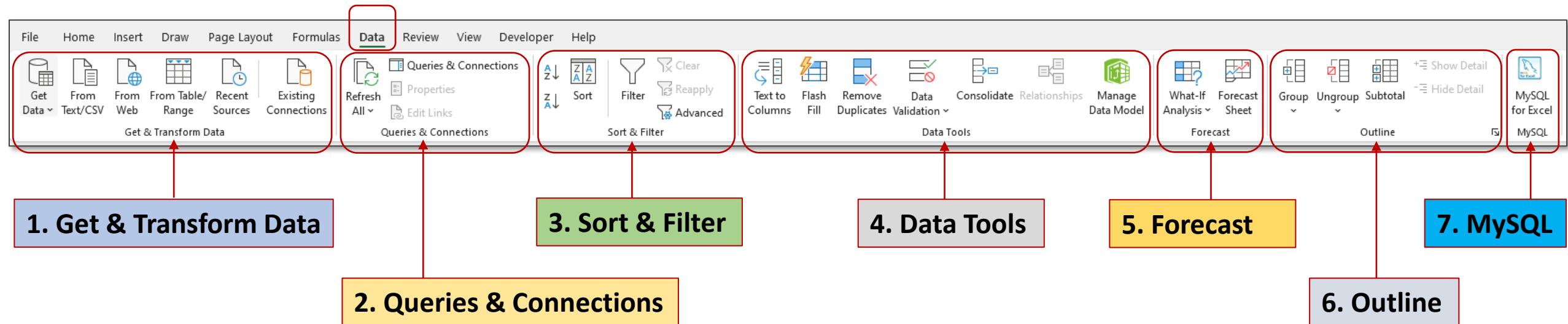
# 5. PAGE LAYOUT Tab & Groups in PAGE LAYOUT



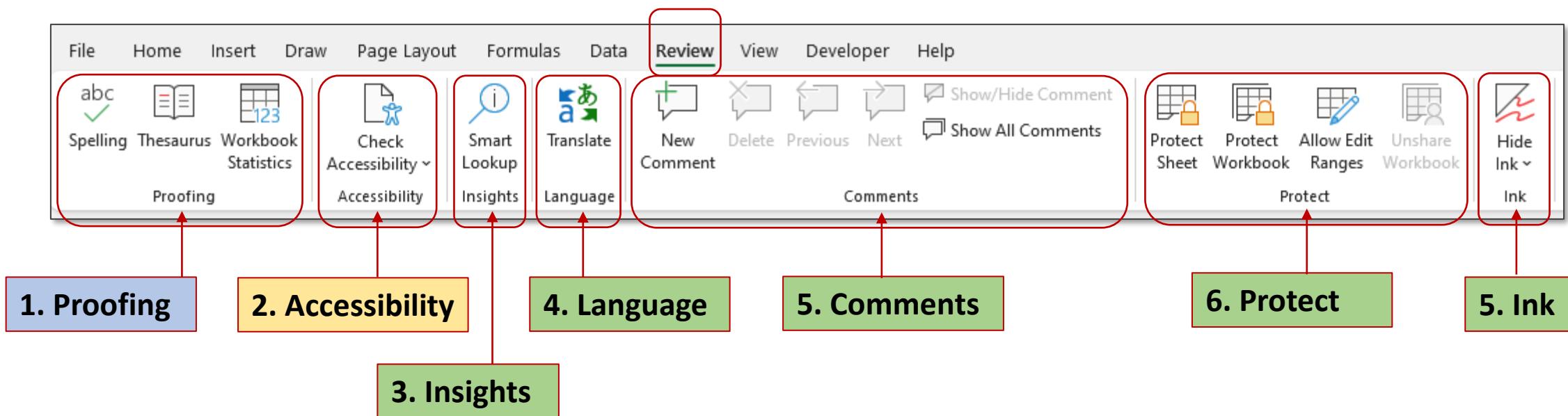
# 6. FORMULAS Tab & Groups in FORMULAS Tab



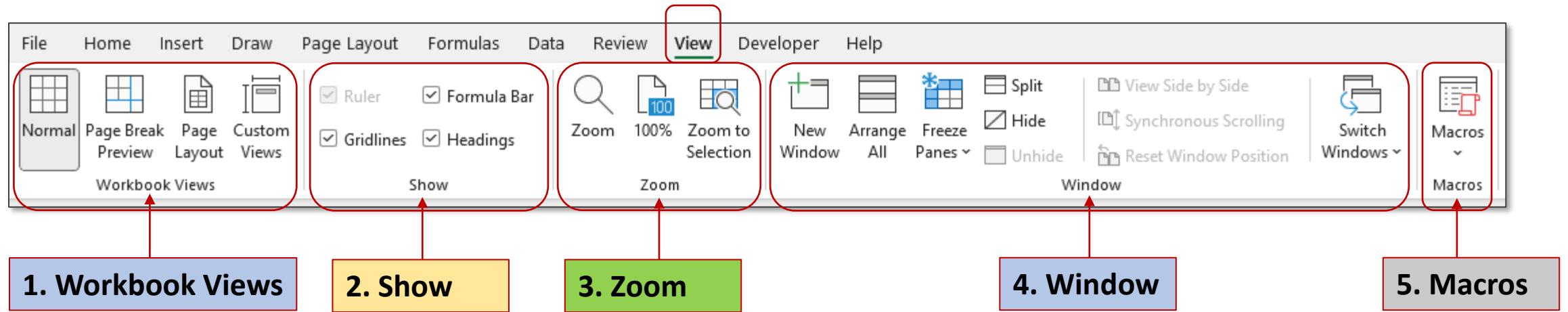
# 7. DATA Tab & Groups in DATA Tab



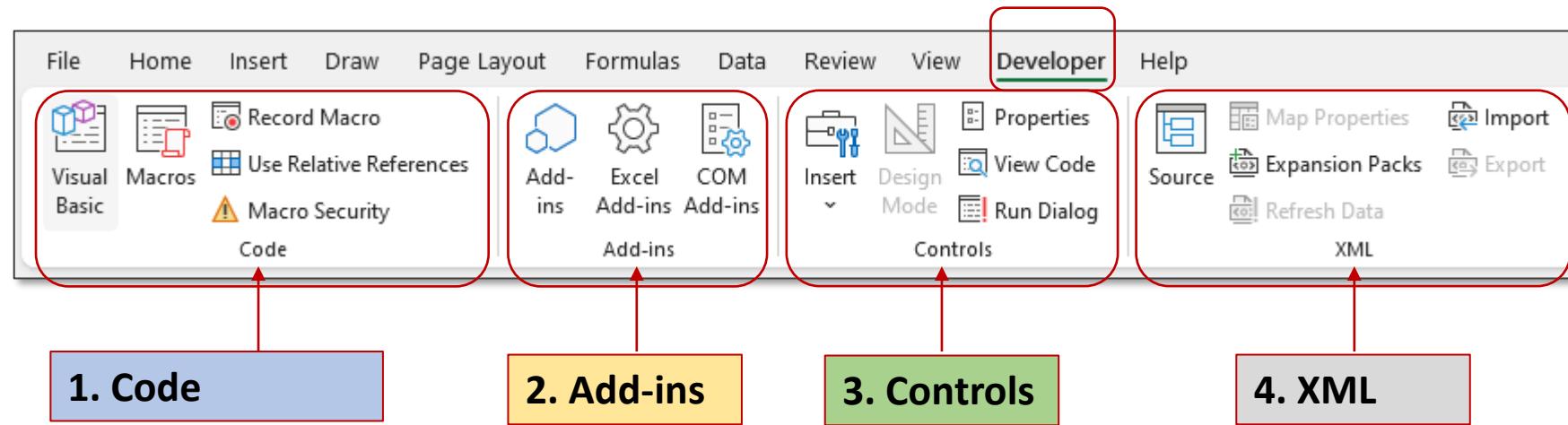
## 8. REVIEW Tab & Groups in REVIEW Tab



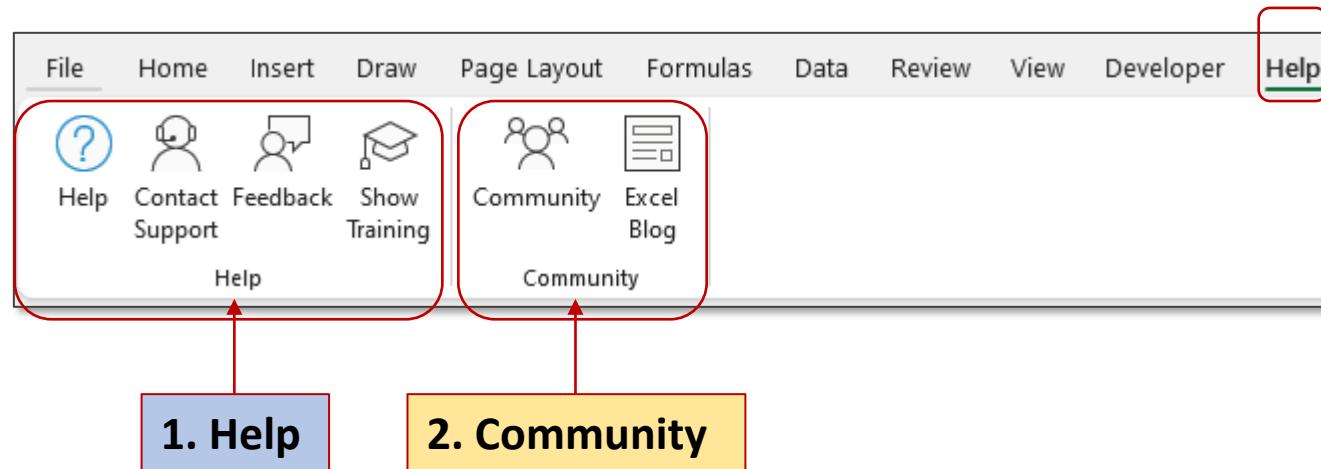
# 9. VIEW Tab & Groups in VIEW Tab



# 10. DEVELOPER Tab & Groups in DEVELOPER Tab



# 11. HELP Tab & Groups in HELP Tab



# Excel Basics

- Open a New File
- Understand various tools on main Excel window.
- Understand the ROW and Column Concept
- Name Box
- Workbook
- Worksheet
- Adding Multiple Worksheets to Excel Workbook
- Rename Worksheets
- Change Worksheet Positions
- Add Color to Worksheet names

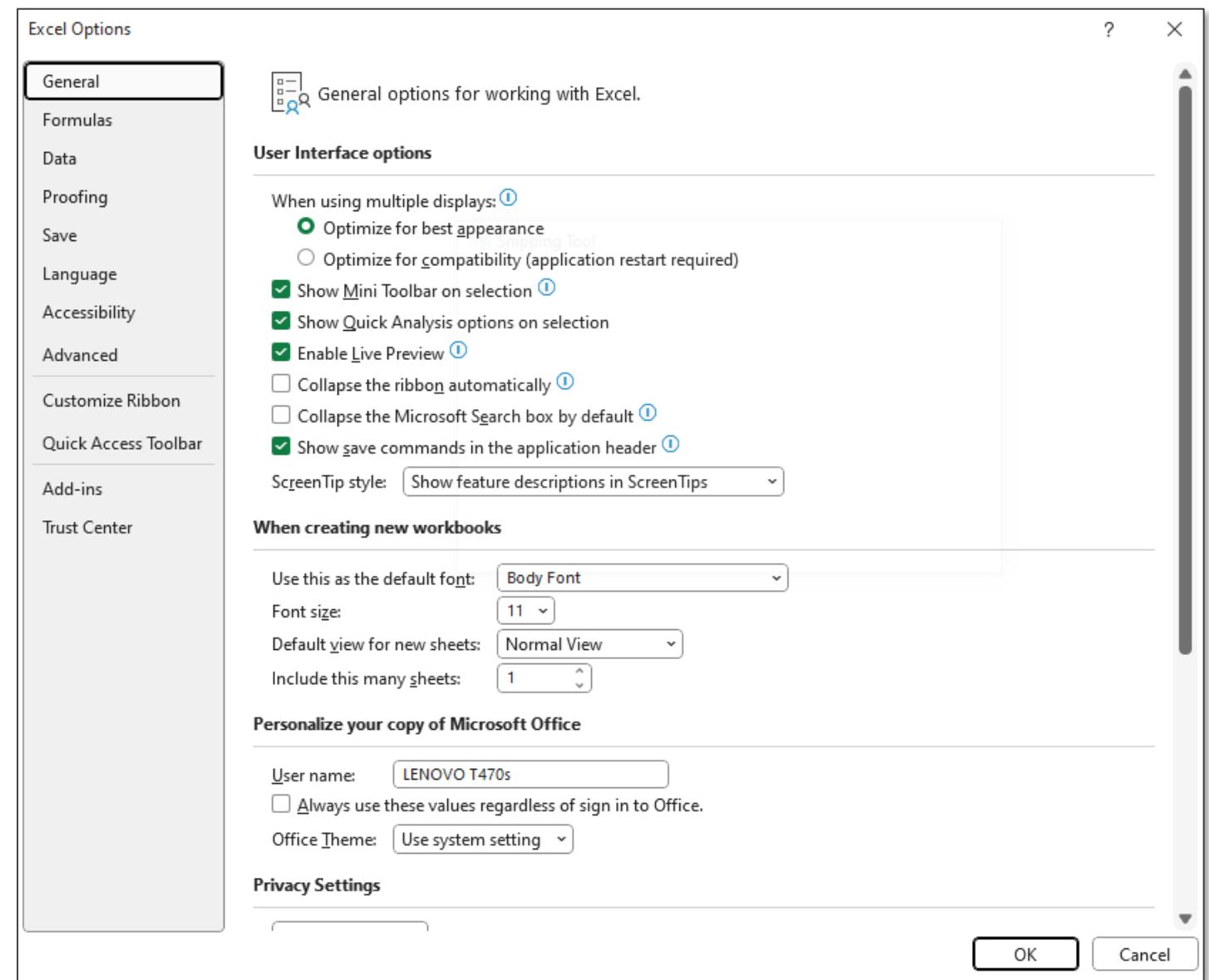
# Excel Basics

- Delete Worksheets
- Entering Data into Worksheets
- Selecting Cells using Shift & Arrow Keys
- Selecting Cells with Mouse
- Selecting Cells using CTRL & Mouse
- Saving a Working
- Closing a Worksheet
- Reopening a Worksheet
- New | Open | Recent Open Files
- Print (settings & options)

- Insert Rows / Delete Rows
- Insert Columns / Delete Columns
- Understand Cell / Cells formatting Concept
- Warp & Merge Cells Concept
- Font Formatting
- Cell Width & Height Formatting
- Align Text & Numbers in Cell (Horizontally & Vertically)
- Number Formats
- Date Formats
- Auto Fill Concept
- Find & Replace

- Sorting
- Freeze Pane
- Split
- Filter
- Styles
- Page Layout / Margins / Print Preview

- Excel Options Window



# Shortcuts

## Workbook Shortcut Keys

Description	Excel Shortcuts
1. To create a new workbook	Ctrl + N
2. To open an existing workbook	Ctrl + O
3. To save a workbook/spreadsheet	Ctrl + S
4. To close the current workbook	Ctrl + W
5. To close Excel	Ctrl + F4
6. To move to the next sheet	Ctrl + PageDown
7. To move to the previous sheet	Ctrl + PageUp
8. To go to the Data tab	Alt + A
9. To go to the View tab	Alt + W
10. To go the Formula tab	Alt + M

## Cell Formatting Shortcut Keys

Description	Excel Shortcuts
11. To edit a cell	F2
12. To copy and paste cells	Ctrl + C, Ctrl + V
13. To italicize and make the font bold	Ctrl + I, Ctrl + B
14. To center align cell contents	Alt + H + A + C
15. To fill color	Alt + H + H
16. To add a border	Alt + H + B
17. To remove outline border	Ctrl + Shift + _
18. To add an outline to the select cells	Ctrl + Shift + &
19. To move to the next cell	Tab
20. To move to the previous cell	Shift + Tab
21. To select all the cells on the right	Ctrl + Shift + Right arrow
22. To select all the cells on the left	Ctrl + Shift + Left Arrow
23. To select the column from the selected cell to the end of the table	Ctrl + Shift + Down Arrow
24. To select all the cells above the selected cell	Ctrl + Shift + Up Arrow
25. To select all the cells below the selected cell	Ctrl + Shift + Down Arrow

## Cell Formatting Shortcut Keys

Description	Excel Shortcuts
26. To add a comment to a cell	Shift + F2
27. To delete a cell comment	Shift + F10 + D
28. To display find and replace	Ctrl + H
29. To activate the filter	Ctrl + Shift + L Alt + Down Arrow
30. To insert the current date	Ctrl + ;
31. To insert current time	Ctrl + Shift + :  Ctrl + Shift + ;
32. To insert a hyperlink	Ctrl + k
33. To apply the currency format	Ctrl + Shift + \$
34. To apply the percent format	Ctrl + Shift + %
35. To go to the “Tell me what you want to do” box	Alt + Q

## Row and Column Formatting Shortcut Keys

Description	Excel Shortcuts
36. To select the entire row	Shift + Space
37. To select the entire column	Ctrl + Space
38. To delete a column	Alt+H+D+C
39. To delete a row	Shift + Space, Ctrl + -
40. To hide selected row	Ctrl + 9
41. To unhide selected row	Ctrl + Shift + 9
42. To hide a selected column	Ctrl + 0
43. To unhide a selected column	Ctrl + Shift + 0
44. To group rows or columns	Alt + Shift + Right arrow
45. To ungroup rows or columns	Alt + Shift + Left arrow

- Complete Exercise 1 to Exercise 5

# End of Unit 1. Getting Started

?

Unit 2

# Formulas

# Unit 2. Formulas

Here are few text functions you should know

## 1. Left()

You can use the Left function when you want to extract the leftmost characters from a string. Syntax =left(text, num\_char)

B1	A	B	C
		f <sub>x</sub> =LEFT(A1,5)	
1	Learn Excel Easily	Learn	
2			
3			
4			

## RIGHT()

B1	A	B	C	D
		f <sub>x</sub> =RIGHT(A1,5)		
1	Learn Excel Easily	asily		
2				
3				
4				
5				
6				

## 2. Len ()

Len function in Excel helps you to know the length of a string that is number of characters in a string. Syntax = **LEN(text)**

**Note** – Spaces are included while calculating length.

B1	A	B	C	D
1	Learn Excel Easily	18		
2				
3				
4				
5				

## 3. Mid ()

Mid function in Excel is used to extract the characters from the middle of a string. Syntax = **MID(text, start\_char, num\_chars)**

B1	A	B	C	D
1	Learn Excel Easily	Excel		
2				
3				
4				
5				

#### 4. Find ()

Find function in Excel is used when you want to know the position of certain characters in a particular string. Syntax =**FIND(find\_text, within\_text,[start\_num])**

B1	f <sub>x</sub>	=FIND("Easi",A1)	
A	B	C	D
1	Learn Excel Easily	13	
2			
3			
4			
5			

#### 5. Proper ()

Proper function in Excel capitalizes each word in the string that is, it converts the case into proper case. Syntax =**PROPER(Text)**

B1	f <sub>x</sub>	=PROPER(A1)	
A	B	C	D
1	learn excel easily	Learn Excel Easily	
2			
3			
4			
5			

## 6. Rept()

Rept function in Excel is used when you want a certain text to be repeated certain number of times. Syntax =REPT(Text, number\_times)

	B1	f <sub>x</sub>	=REPT(A1,2)
	A	B	C
1	learn excel easily	learn excel easilylearn excel easily	
2			
3			
4			
5			
6			

## 7. Trim()

Trim function in Excel removes the unnecessary spaces from a particular string.

Syntax =TRIM(Text)

	B1	f <sub>x</sub>	=TRIM(A1)
	A	B	C
1	learn excel easily	learn excel easily	
2			
3			
4			
5			

## 8. Upper()

Upper function in Excel converts the text into Upper case from lower case. Syntax **=UPPER(Text)**

B1	A	B	C
1	learn excel easily	LEARN EXCEL EASILY	
2			
3			
4			
5			

## 9. Substitute ()

Substitute function in Excel helps to replace existing text with a new text in a particular string. Syntax **=SUBSTITUTE(text, old\_text, new\_text, instance number)**

B1	A	B	C
1	learn excel easily	Understand excel easily	
2			
3			
4			
5			

## 10. Concatenate ()

Concatenate function in Excel helps to join the text of two or more cells.

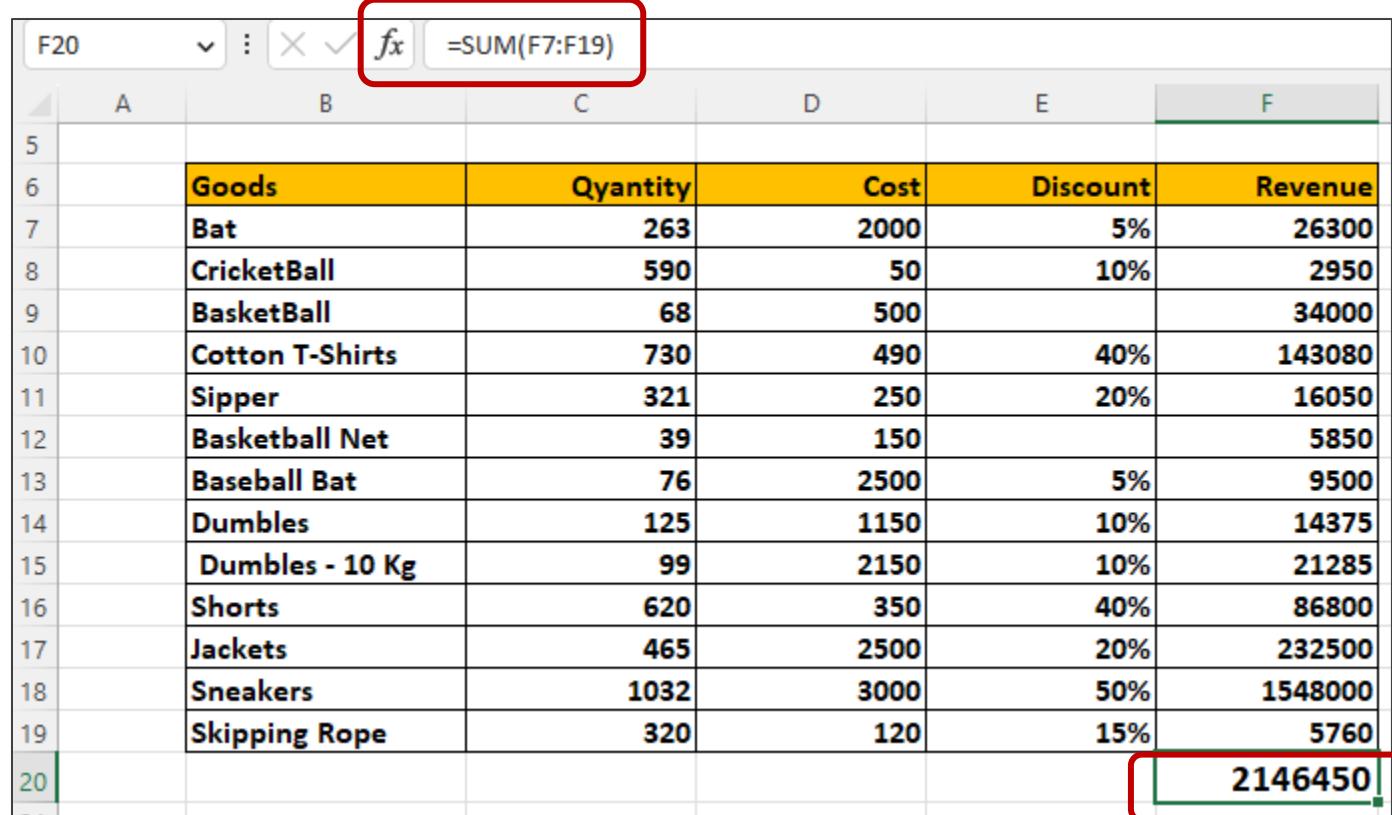
Syntax =**CONCATENATE(text1, text2â€¢.)**

D1	A	B	C	D	E
1	Learn	Excel	Easily	LearnExcelEasily	
2					
3					
4					
5					

# Statistical Functions

- SUM()
- MIN()
- MAX()
- LARGE()
- SMALL()
- AVERAGE()
- Count Function

# SUM()



The screenshot shows a Microsoft Excel spreadsheet with a table of goods and their financial metrics. The table has columns for Goods, Quantity, Cost, Discount, and Revenue. The formula bar at the top shows the formula =SUM(F7:F19) entered into cell F20. The cell F20 contains the result 2146450, which is highlighted with a red border.

	A	B	C	D	E	F
5						
6	Goods	Quantity	Cost	Discount	Revenue	
7	Bat	263	2000	5%	26300	
8	CricketBall	590	50	10%	2950	
9	BasketBall	68	500		34000	
10	Cotton T-Shirts	730	490	40%	143080	
11	Sipper	321	250	20%	16050	
12	Basketball Net	39	150		5850	
13	Baseball Bat	76	2500	5%	9500	
14	Dumbles	125	1150	10%	14375	
15	Dumbles - 10 Kg	99	2150	10%	21285	
16	Shorts	620	350	40%	86800	
17	Jackets	465	2500	20%	232500	
18	Sneakers	1032	3000	50%	1548000	
19	Skipping Rope	320	120	15%	5760	
20					2146450	

- Calculate the SUM Total

# MAX()

- Get the MAX() value from an array.

# MIN()

- Get the MIN() value from an Array

# LARGE()

- Get the Largest Kth number form an array

# SMALL()

- Get the Kth Smallest number form an array

# AVERAGE()

- Counts AVERAGE() of an given array.

# COUNT()

- Count Function
- We use the count function when we need to count the number of cells containing a number.  
Remember, **ONLY NUMBERS!**

A	B	C	D	E	F
1					
2	Goods	Qyantity	Cost	Discount	Revenue
3	Bat	263	2000	5%	26300
4	CricketBall	590	50	10%	2950
5	BasketBall	68	500		34000
6	Cotton T-Shirts	730	490	40%	143080
7	Sipper	321	250	20%	16050
8	Basketball Net	39	150		5850
9	Baseball Bat	76	2500	5%	9500
10	Dumbles	125	1150	10%	14375
11	Dumbles - 10 Kg	99	2150	10%	21285
12	Shorts	620	350	40%	86800
13	Jackets	465	2500	20%	232500
14	Sneakers	1032	3000	50%	1548000
15	Skipping Rope	320	120	15%	5760
16					2146450
17					
18	SUM()	2146450			
19	MAX Revenue	1548000			
20	MIN Revenue	2950			
21	LARGE()	232500			
22	SMALL()	5760			
23	AVERAGE()	165111.54			
24	COUNT() Discount Records	11			
25					

# COUNTA()

- While the count function only counts the numeric values, the COUNTA function counts all the cells in a range that are not blank cells. The function is useful for counting cells containing any type of information, including error values and empty text.

A	B	C	D	E	F
1	Goods	Quantity	Cost	Discount	Revenue
2	Bat	263	2000	5%	26300
3	CricketBall	590	50	10%	2950
4	BasketBall	68	500		34000
5	Cotton T-Shirts	730	490	40%	143080
6	Sipper	321	250	20%	16050
7	Basketball Net	39	150		5850
8	Baseball Bat	76	2500	5%	9500
9	Dumbles	125	1150	10%	14375
10	Dumbles - 10 Kg	99	2150	10%	21285
11	Shorts	620	350	40%	86800
12	Jackets	465	2500	20%	232500
13	Sneakers	1032	3000	50%	1548000
14	Skipping Rope	320	120	15%	5760
15					2146450
16					
17					
18		SUM()	2146450		
19		MAX Revenue	1548000		
20		MIN Revenue	2950		
21		LARGE()	232500		
22		SMALL()	5760		
23		AVERAGE()	165111.54		
24					
25		COUNT() Discount Records	11		
26					
27		COUNTA() on Goods	13		

# COUNTBLANK(range)

- The **COUNTBLANK** function counts the number of empty cells in a range of cells. Cells with formulas that return empty text are also counted here, but cells with zero values are not counted.

D29	fx	=COUNTBLANK(E3:E15)
1	A	B
2	Goods	Quantity
3	Bat	263
4	CricketBall	590
5	BasketBall	68
6	Cotton T-Shirts	730
7	Sipper	321
8	Basketball Net	39
9	Baseball Bat	76
10	Dumbles	125
11	Dumbles - 10 Kg	99
12	Shorts	620
13	Jackets	465
14	Sneakers	1032
15	Skipping Rope	320
16		2146450
17		
18	SUM()	2146450
19	MAX Revenue	1548000
20	MIN Revenue	2950
21	LARGE()	232500
22	SMALL()	5760
23	AVERAGE()	165111.54
24	COUNT() Discount Records	11
25		
26	COUNTA() on Goods	13
27		
28	COUNTBLANK() on Discount	2
29		

# Date Functions: TODAY() & NOW()

TODAY() returns today Date	5/26/2023
NOW() returns current system date & time	5/26/2023 4:41

# Ampersand (&) Operator

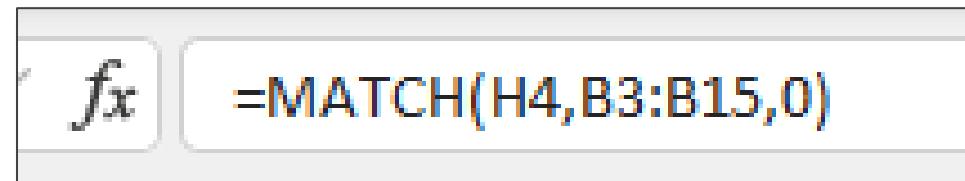
- Can be used to Concatenate and Join

The screenshot shows a Microsoft Excel spreadsheet with data about various goods. The formula bar at the top displays the formula `=B3 & " Qty: " &C3`. The formula in cell G18 is `SUM()`, which results in `2146450`. The cell F18 contains the text `& operator Bat Qty: 263`.

	A	B	C	D	E	F	G
1							
2	Goods	Qyantity	Cost	Discount	Revenue		
3	Bat	263	2000	5%	26300		
4	CricketBall	590	50	10%	2950		
5	BasketBall	68	500		34000		
6	Cotton T-Shirts	730	490	40%	143080		
7	Sipper	321	250	20%	16050		
8	Basketball Net	39	150		5850		
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12	Shorts	620	350	40%	86800		
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14	Sneakers	1032	3000	50%	1548000		
15	Skipping Rope	320	120	15%	5760		
16					2146450		
17							
18		SUM()	2146450	& operator	Bat Qty: 263		

# MATCH()

- Find Position Number of TEXT in entire array



Goods	Qyantity	Cost	Discount	Revenue	
Bat	263	2000	5%	26300	
CricketBall	590	50	10%	2950	
BasketBall	68	500		34000	
Cotton T-Shirts	730	490	40%	143080	
Sipper	321	250	20%	16050	
Basketball Net	39	150		5850	
Baseball Bat	76	2500	5%	9500	
Dumbles	125	1150	10%	14375	
Dumbles - 10 Kg	99	2150	10%	21285	
Shorts	620	350	40%	86800	
Jackets	465	2500	20%	232500	
Sneakers	1032	3000	50%	1548000	
Skipping Rope	320	120	15%	5760	
2146450					

# INDEX()

- Index: Based on the index value you provide to index function it returns the value in the cell at the index location provided in the specified array.

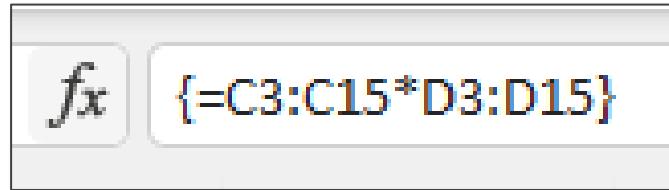
The screenshot shows a Microsoft Excel spreadsheet with a table of goods and their financial metrics. The table has columns for Goods, Quantity, Cost, Discount, and Revenue. To the right of the table, there are two additional columns labeled 'Match Func' and 'Index Func'. The 'Match Func' column contains 'Shorts' and '10'. The 'Index Func' column contains '4' and 'Cotton T-Shirts', which is highlighted with a red box. The formula bar at the top shows the formula =INDEX(B3:B15,H8). The cell H8 contains the value 4, which corresponds to the row index of 'Cotton T-Shirts' in the table.

Goods	Quantity	Cost	Discount	Revenue	Match Func	Index Func
Bat	263	2000	5%	26300		
CricketBall	590	50	10%	2950	Shorts	10
BasketBall	68	500		34000		
Cotton T-Shirts	730	490	40%	143080		
Sipper	321	250	20%	16050		
Basketball Net	39	150		5850		
Baseball Bat	76	2500	5%	9500		
Dumbles	125	1150	10%	14375		
Dumbles - 10 Kg	99	2150	10%	21285		
Shorts	620	350	40%	86800		
Jackets	465	2500	20%	232500		
Sneakers	1032	3000	50%	1548000		
Skipping Rope	320	120	15%	5760		
					2146450	

# Array Formula

- It's a single formula that can be applied to perform various array calculation.
- Generally formulas are applied on a row context basis, hence if there are 100 rows then there be 100 formula calculation and this can slow down the performance if dataset is large.
- How to Use Array Formula:
- First select the entire array where you need to calculate the values.
- Now press =
- Now using Ctrl + Mouse select the entire array you want to include in your calculation
- Now apply the operator and select the second array you need in calculation.
- Now Press **CTRL + SHIFT + ENTER** to apply the Array Calculation

# Array Formula



Use of curly brackets means it's an array formula

The screenshot shows an Excel spreadsheet with a table of goods and their metrics. The table has columns for Goods, Quantity, Cost, Discount, Revenue, and Array Formula. The 'Array Formula' column contains the results of the formula {=C3:C15\*D3:D15} applied across the range G3:G15. The total value for the 'Array Formula' column is 2146450.

Goods	Qtyantity	Cost	Discount	Revenue	Array Formula
Bat	263	2000	5%	26300	526000
CricketBall	590	50	10%	2950	29500
BasketBall	68	500		34000	34000
Cotton T-Shirts	730	490	40%	143080	357700
Sipper	321	250	20%	16050	80250
Basketball Net	39	150		5850	5850
Baseball Bat	76	2500	5%	9500	190000
Dumbles	125	1150	10%	14375	143750
Dumbles - 10 Kg	99	2150	10%	21285	212850
Shorts	620	350	40%	86800	217000
Jackets	465	2500	20%	232500	1162500
Sneakers	1032	3000	50%	1548000	3096000
Skipping Rope	320	120	15%	5760	38400
					2146450

# End of Unit 2. Working with Formulas

?

Unit 3

# Named Ranges

# Unit 3. Named Ranges

- Key Objectives
  - Create Formula that References a Excel Table
  - Relative and Absolute References

# Creating a Named Range



Click on the Cell you want your range to start from

Now either select the entire range by pressing the right mouse button and dragging mouse to the end to range cell.

Or, press **Ctrl + Shift + Arrow Key** in the direction of range you want to select

Furniture Sales - 2018 and 2019							
No shipping charge for orders over \$1,500; others - 2% of cost							
Product	Customer	Date	Item Cost	No.Items	Total Cost	Shipping	Total
Captain Recliner	B&B Spaces	1/2/2018	\$ 289.95	5	\$ 1,449.75	\$ 57.99	\$ 1,507.74
Media Armoire	Home USA	1/2/2018	\$ 329.95	2	\$ 659.90	\$ 26.40	\$ 686.30
Bamboo End Table	Ellington Designs	1/3/2018	\$ 64.95	7	\$ 454.65	\$ 18.19	\$ 472.84
Bamboo Coffee Table	Ellington Designs	1/4/2018	\$ 139.95	3	\$ 419.85	\$ 16.79	\$ 436.64

1. Press Ctrl + Shift + Down Arrow

Total Cost
\$ 1,449.75
\$ 659.90
\$ 454.65
\$ 419.85
\$ 779.40
\$ 2,599.96
\$ 649.50
\$ 1,299.98
\$ 1,979.70
\$ 1,399.50
\$ 4,289.35
\$ 1,319.80
\$ 1,539.45
\$ 2,099.65
\$ 714.45
\$ 3,899.94
\$ 1,399.50

2. Entire range gets selected

3. Go to Name Box & type the name. Eg. Cost

Cost	A	B	C	D	E	F
						Furniture Sales - 2018 and 2019
No shipping charge for orders over \$1,500; others - 2%						
Product	Customer	Date	Item Cost	No.Items	Total Cost	
Captain Recliner	B&B Spaces	1/2/2018	\$ 289.95	5	\$ 1,449.75	
Media Armoire	Home USA	1/2/2018	\$ 329.95	2	\$ 659.90	
Bamboo End Table	Ellington Designs	1/3/2018	\$ 64.95	7	\$ 454.65	
Bamboo Coffee Table	Ellington Designs	1/4/2018	\$ 139.95	3	\$ 419.85	
Bamboo End Table	B&B Spaces	1/4/2018	\$ 64.95	12	\$ 779.40	
Chameleon Couch	Ellington Designs	1/6/2018	\$ 649.99	4	\$ 2,599.96	
Bamboo End Table	Home USA	1/7/2018	\$ 64.95	10	\$ 649.50	
Chameleon Couch	Home USA	1/7/2018	\$ 649.99	2	\$ 1,299.98	
Media Armoire	Home USA	1/7/2018	\$ 329.95	6	\$ 1,979.70	
Bamboo Coffee Table	Home USA	1/10/2018	\$ 139.95	10	\$ 1,399.50	

# Finding Ranges in Excel Document

The screenshot shows a Microsoft Excel window with the title "Logical-Functions-Workbook-1.xlsx - Excel". The ribbon is visible with the "Home" tab selected. In the formula bar, the text "=COUNTIF(COS" is typed. A red arrow points from the text "name of range" in the first callout box to the "COS" part of the formula.

**1. In formula simply start typing the name of range**

The formula bar now shows "=COUNTIF(" with a dropdown menu open. A red arrow points from the text "Ranges in document are displayed." in the second callout box to the "Cost" entry in the "Paste Name" list. The list also includes "Name" and "No".

**2. In formula simply press F3. All Ranges in document are displayed.**

Product	Customer
Captain Recliner	B&B Spaces
Media Armoire	Home USA
Bamboo End Table	Ellington Designs
Bamboo Coffee Table	Ellington Designs
Bamboo End Table	B&B Spaces

# Relative Reference

- This is the default reference style in Excel.



The screenshot shows an Excel spreadsheet with a table of menu items. The table has four columns: MENU ITEM, UNIT PRICE, QUANTITY, and LINE TOTAL. The LINE TOTAL column contains formulas that reference the UNIT PRICE and QUANTITY columns from the same row. The formula in cell D2 is =SUM(B2\*C2). The last row is a total row with cells labeled TOTAL and \$537.85.

	A	B	C	D
1	MENU ITEM	UNIT PRICE	QUANTITY	LINE TOTAL
2	Empanadas: Beef Picadillo	\$2.99	15	\$44.85
3	Empanadas: Chipotle Shrimp	\$3.99	10	\$39.90
4	Tamales: Chicken Tinga	\$2.29	20	\$45.80
5	Tamales: Vegetable	\$2.29	30	\$68.70
6	Arepas: Carnitas	\$2.89	10	\$28.90
7	Arepas: Queso Blanco	\$2.49	20	\$49.80
8	Empanadas: Apple Cinnamon	\$3.19	40	\$127.60
9	Beverages: Horchata	\$1.89	25	\$47.25
10	Beverages: Lemonade	\$1.89	35	\$66.15
11	Beverages: Tamarindo	\$1.89	10	\$18.90
12		TOTAL		\$537.85

# Absolute Referencing

The screenshot shows a Microsoft Excel spreadsheet with a table of menu items. The table has columns for MENU ITEM, UNIT PRICE, QUANTITY, Sales Tax, and LINE TOTAL. A formula bar at the top shows the formula `=B3*C3)*E1` in cell D3. A red box highlights the formula bar. Another red box highlights the cell E1, which contains the value "5%". The cell D13, labeled "TOTAL", contains the formula `=B13*C13)*E1`, which results in "#VALUE!". The entire column D from row 13 down to row 14 is also highlighted in green.

	A	B	C	D	E
1				Tax Rate	5%
2	MENU ITEM	UNIT PRICE	QUANTITY	Sales Tax	LINE TOTAL
3	Empanadas: Beef Picadillo	\$2.99	15	\$2.24	\$47.09
4	Empanadas: Chipotle Shrimp	\$3.99	10	#VALUE!	#VALUE!
5	Tamales: Chicken Tinga	\$2.29	20	\$2,156.84	\$2,202.64
6	Tamales: Vegetable	\$2.29	30	#VALUE!	#VALUE!
7	Arepas: Carnitas	\$2.89	10	\$63,656.19	\$63,685.09
8	Arepas: Queso Blanco	\$2.49	20	#VALUE!	#VALUE!
9	Empanadas: Apple Cinnamon	\$3.19	40	\$8,126,218.10	\$8,126,345.70
10	Beverages: Horchata	\$1.89	25	#VALUE!	#VALUE!
11	Beverages: Lemonade	\$1.89	35	\$537,557,768.24	\$537,557,834.39
12	Beverages: Tamarindo	\$1.89	10	#VALUE!	#VALUE!
13			TOTAL		#VALUE!

- By default relative references are used, hence though the formula is current in first cell, but when copied to the cell below it move the relative reference to next cell, which cause the calculations to go wrong.

# Absolute Reference

Here we use the Absolute references by adding a \$ symbol to the row and column cell reference, as shown in formula bar. This keep the cell reference constant for the rest of calculations which we copy using Fill Handel, hence we get correct value.

			D	E	
1			Tax Rate	5%	
2	MENU ITEM	UNIT PRICE	QUANTITY	Sales Tax	LINE TOTAL
3	Empanadas: Beef Picadillo	\$2.99	15	\$2.24	\$47.09
4	Empanadas: Chipotle Shrimp	\$3.99	10	#VALUE!	#VALUE!
5	Tamales: Chicken Tinga	\$2.29	20	\$2,156.84	\$2,202.64
6	Tamales: Vegetable	\$2.29	30	#VALUE!	#VALUE!
7	Arepas: Carnitas	\$2.89	10	\$63,656.19	\$63,685.09
8	Arepas: Queso Blanco	\$2.49	20	#VALUE!	#VALUE!
9	Empanadas: Apple Cinnamon	\$3.19	40	\$8,126,218.10	\$8,126,345.70
10	Beverages: Horchata	\$1.89	25	#VALUE!	#VALUE!
11	Beverages: Lemonade	\$1.89	35	\$537,557,768.24	\$537,557,834.39
12	Beverages: Tamarindo	\$1.89	10	#VALUE!	#VALUE!
13			TOTAL		#VALUE!
14					
15					
16	MENU ITEM	UNIT PRICE	QUANTITY	Sales Tax	LINE TOTAL
17	Empanadas: Beef Picadillo	\$2.99	15	\$2.24	\$47.09
18	Empanadas: Chipotle Shrimp	\$3.99	10	\$2.00	\$41.90
19	Tamales: Chicken Tinga	\$2.29	20	\$2.29	\$48.09
20	Tamales: Vegetable	\$2.29	30	\$3.44	\$72.14
21	Arepas: Carnitas	\$2.89	10	\$1.45	\$30.35
22	Arepas: Queso Blanco	\$2.49	20	\$2.49	\$52.29
23	Empanadas: Apple Cinnamon	\$3.19	40	\$6.38	\$133.98
24	Beverages: Horchata	\$1.89	25	\$2.36	\$49.61
25	Beverages: Lemonade	\$1.89	35	\$3.31	\$69.46
26	Beverages: Tamarindo	\$1.89	10	\$0.95	\$19.85
27			TOTAL		\$564.74

# Absolute References

- There may be a time when you don't want a cell reference to change when copied to other cells. Unlike relative references, **absolute references** do not change when copied or filled. You can use an absolute reference to keep a row and/or column **constant**.
- An absolute reference is designated in a formula by the addition of a **dollar sign (\$)**. It can precede the column reference, the row reference, or both.

You will generally use the **\$A\$2** format when creating formulas that contain absolute references. The other two formats are used much less frequently.

When writing a formula, you can press the **F4** key on your keyboard to switch between relative and absolute cell references, as shown in the video below. This is an easy way to quickly insert an absolute reference.

\$A\$2	The column and the row do not change when copied
A\$2	The row does not change when copied
\$A2	The column does not change when copied

# End of Unit 3. Named Ranges

?

Unit 4

# Logical Functions

# Logical Functions

- What are Logical Functions?
- Understanding Logical Operators
- Simple IF Statement
- Using AND and OR to return results
- Nested IF Statements
- Use IF Statements with Text
- The new IFS Function

# What are Logical Functions?

Logical functions are some of the most popular and useful in Excel. They can test values in other cells and perform actions dependent upon the result of the test.

- **IF**
- **AND**
- **OR**
- **IFERROR**
- **COUNTIF, SUMIF** (Not really classified as Logical Function, but they use IF).

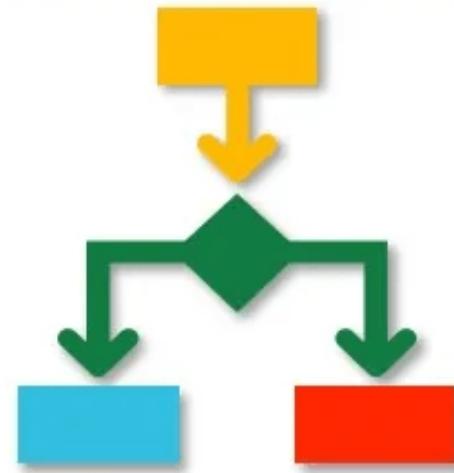


- The IF Function
- Nested IF in Excel
- The IFS Function
- The AND and OR Functions
- COUNTIF and SUMIF
- Error checking Functions IFERROR and IFNA

# IF function

The IF function is one such built-in widely used, most popular Excel function

IF function performs a logical comparison between two values (or cells containing values). The function evaluates if the supplied condition satisfies and then returns an output value depending on whether the result of the condition is TRUE or FALSE.



## Syntax of IF Function

**IF(logical test, value\_if\_true, value\_if\_false)**

## Example:

**=IF(A1>B2, "TRUE", "FALSE")**

# Logical Operator used in IF Function

Operator	Description	Example
=	Equal to	A1=B1
<	Less than	A1<b1< td="">/b1>
<=	Less than or equal to	A1<=B1
>	Greater than	A1>B1
>=	Greater than or equal to	A1>=B1
<>	Not equal to	A1<>B1

# IF()

A	B	C	D	E	F	G	H	I	J	K
1 IF EXAMPLE 1										
2										
3 Name	Score	Result								
4 Deborah	93									
5 Adam	65									
6 Brooke	58									
7 James	79									
8 Rob	41									
9 Kata	60									
10										
11 IF EXAMPLE 2										
12										
13 Name	Spent	Inc of Discount								
14 Claire	\$1,642.00									
15 Julie	\$3,456.00									
16 Max	\$1,543.00									
17 Ben	\$3,672.00									
18 Courtney	\$3,610.00									
19										
20 AND										
21										
22 Name	Score 1	Score2	Result							
23 Claire	93		80							
24 Julie	65		91							
25 Max	50		72							
26 Ben	78		93							
27 Courtney	38		30							
28										
29 OR										
30										
31 Name	Score 1	Score2	Result							
32 Claire	93		80							
33 Julie	65		91							
34 Max	50		72							
35 Ben	78		93							
36 Courtney	38		30							
--										
< >	LOGICAL	IF	NESTED IF	TEXT IF	IFS	Catalogue	VLOOKUP	+	:	◀ ▶

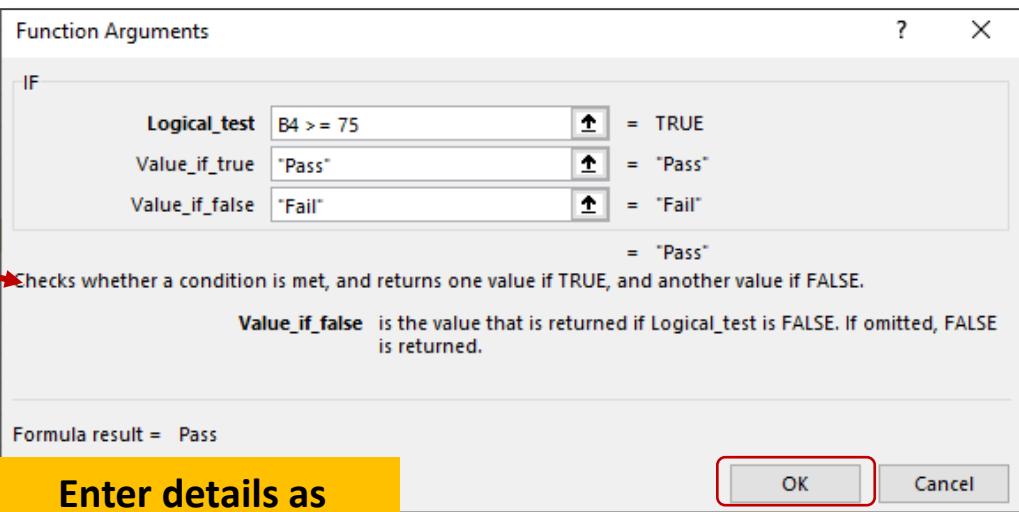
- IF()
- IF() with AND
- IF() with OR

# IF() Function

The screenshot shows the Microsoft Excel interface with the 'Logical-Functions-Workbook-1.xlsx' file open. The 'Formulas' tab is selected, and the 'Logical' button in the Function Library group is highlighted with a red box. A red arrow points from this button to the 'IF' option in the dropdown menu, which is also highlighted with a red box. The 'IF' function is being used in cell C4, as indicated by the formula bar. The 'Logical' dropdown menu lists other functions like AND, FALSE, IFERROR, IFNA, IFS, LET, NOT, OR, SWITCH, TRUE, and XOR.

Appy condition : if score is  $\geq 75$  then Pass else Fail

Click on Formulas Tab & then from Function Library Group select Logical Button and then select IF().



The screenshot shows the 'IF EXAMPLE 1' table with the following data:

Name	Score	Result
Deborah	93	Pass
Adam	65	Fail
Brooke	58	Fail
James	79	Pass
Rob	41	Fail
Kata	60	Fail

# IF() Condition

The screenshot shows a Microsoft Excel spreadsheet with two examples of the IF function.

**IF EXAMPLE 1:** A table with columns **Name**, **Score**, and **Result**. The formula `=IF(B14>3000, B14 * 80%, B14)` is entered in cell C1. The result is "Fail".

Name	Score	Result
Deborah	93	Pass
Adam	65	Fail
Brooke	58	Fail
James	79	Pass
Rob	41	Fail
Kata	60	Fail

**IF EXAMPLE 2:** A table with columns **Name**, **Spent**, and **Inc of Discount**. The formula `=IF(B14>3000, B14 * 80%, B14)` is entered in cell C14. The result is \$1,642.00.

Name	Spent	Inc of Discount
Claire	\$1,642.00	B14)
Julie	\$3,456.00	\$2,764.80
Max	\$1,543.00	\$1,543.00
Ben	\$3,672.00	\$2,937.60
Courtney	\$3,610.00	\$2,888.00

**Function Arguments Dialog Box:**

- Logical\_test:** `B14>3000` (Value: FALSE)
- Value\_if\_true:** `B14 * 80%` (Value: 1313.6)
- Value\_if\_false:** `B14` (Value: 1642)

**Description:** Checks whether a condition is met, and returns one value if TRUE, and another value if FALSE.  
**Logical\_test** is any value or expression that can be evaluated to TRUE or FALSE.

**Formula result =** \$1,642.00

[Help on this function](#) OK Cancel

**Click to get back the IF() condition dialog box**

Ex. 2: Apply condition : if Spent is > 3000 then discount is 20%

# Relative Referencing

The screenshot shows the Microsoft Excel interface with two examples of the IF function.

**IF EXAMPLE 1:** A table with columns Name, Score, and Result. The formula `=IF(B4 >= F3, "Pass", "Fail")` is entered in cell C4. The Function Arguments dialog box is open, showing the logical test `B4 >= F3`, value if true "Pass", and value if false "Fail". The condition is set to "Equal to" and the operator to "=".

**IF EXAMPLE 2:** A table with columns Name, Spent, and Inc of Discount. The formula `=IF(B4 >= F3, "Pass", "Fail")` is entered in cell C4. The Function Arguments dialog box is open, showing the logical test `B4 >= F3`, value if true "Pass", and value if false "Fail". The condition is set to "Equal to" and the operator to "=".

**Function Arguments Dialog Box:**

- Logical\_test:** B4 >= F3
- Value\_if\_true:** "Pass"
- Value\_if\_false:** "Fail"

**Help Text:**

- Checks whether a condition is met, and returns one value if TRUE, and another value if FALSE.
- Logical\_test is any value or expression that can be evaluated to TRUE or FALSE.

**Buttons:** OK, Cancel

Values are incorrect as the formula we created is using **Relative Reference**, while we need **Absolute Reference**.

IF EXAMPLE 1		
Name	Score	Result
Deborah	93	Pass
Adam	65	Pass
Brooke	58	Pass
James	79	Pass
Rob	41	Pass
Kata	60	Pass

Values are incorrect

IF EXAMPLE 1		
Name	Score	Result
Deborah	93	Pass
Adam	65	Pass
Brooke	58	Pass
James	79	Pass
Rob	41	Pass
Kata	60	Pass

# Using Absolute Reference in IF()

- Absolute Reference – Locks the value to a single cell.
- Go back to the formula for the first record. Go to the cell reference you want to change to absolute reference. Press F4 on Keyboard.
- Or, simply type the \$ symbol before the column and row reference as shown.
- Apply Formula to all rows.
- **Test:** Change the value in **Cell F3** from **75** to **85**, it now impacts all the columns as all columns are now referencing to the **Cell F3**.

The screenshot shows a Microsoft Excel interface. In the formula bar, the formula =IF(B4 >= \$F\$3, "Pass", "Fail") is entered. A red arrow points from the text "Press F4 on Keyboard" to the cell reference \$F\$3 in the formula. The main area displays a table titled "IF EXAMPLE 1" with columns "Name", "Score", and "Result". Row 4 contains the formula =IF(B4 >= \$F\$3, "Pass", "Fail"). Rows 5 through 9 show the results: Adam (Fail), Brooke (Pass), James (Pass), Rob (Pass), and Kata (Pass). The formula in row 4 is highlighted with a green border.

	A	B	C
1	IF EXAMPLE 1		
2			
3	Name	Score	Result
4	Deborah	93	=IF(B4 >= \$F\$3, "Pass", "Fail")
5	Adam	65	Pass
6	Brooke	58	Pass
7	James	79	Pass
8	Rob	41	Pass
9	Kata	60	Pass

The screenshot shows the same Microsoft Excel interface after changing the value in Cell F3 from 75 to 85. The formula in the formula bar remains =IF(B4 >= \$F\$3, "Pass", "Fail"). A red arrow points from the text "it now impacts all the columns as all columns are now referencing to the Cell F3." to the cell reference \$F\$3 in the formula. The main area displays the same table as above, but the results are now different: Adam (Fail), Brooke (Fail), James (Pass), Rob (Fail), and Kata (Fail). The formula in row 4 is highlighted with a green border.

	A	B	C
1	IF EXAMPLE 1		
2			
3	Name	Score	Result
4	Deborah	93	Pass
5	Adam	65	Fail
6	Brooke	58	Fail
7	James	79	Pass
8	Rob	41	Fail
9	Kata	60	Fail

# Note

- Always try to use Cell Referencing instead of hard coding the numbers in formula, as it save tremendous time and typo errors if and whenever to need to change values.

# AND Conditions

- Returns TRUE only if all conditions are TRUE
- Returns FALSE if any condition is FALSE

AND			
Name	Score 1	Score2	Result
Claire	93	80	=AND(B2>60, C2>60)
Julie	65	91	
Max	50	72	
Ben	78	93	
Courtney	38	30	

- Apply condition to all the Cell below.

AND			
Name	Score 1	Score2	Result
Claire	93	80	TRUE
Julie	65	91	TRUE
Max	50	72	FALSE
Ben	78	93	TRUE
Courtney	38	30	FALSE

# OR() Conditions

- Returns TRUE if any one condition is TRUE
- Returns FALSE only if all applied conditions are FALSE

OR			
Name	Score 1	Score2	
Claire	93	80	=OR(B3>70, C3>70)
Julie	65	91	OR(logical1, [logical2], [logical3], ...)
Max	50	72	
Ben	78	93	
Courtney	38	30	

- Apply condition to all the Cell below.

OR				
	Name	Score 1	Score2	Result
	Claire	93	80	TRUE
	Julie	65	91	TRUE
	Max	50	72	TRUE
	Ben	78	93	TRUE
	Courtney	38	30	FALSE

- Use IF() to calculate the Shipping Cost

F6      \* : X ✓ fx =IF(F6>=1500,0,F6\*2%

Furniture Sales - 2018 and 2019

No shipping charge for orders over \$1,500; others - 2% of cost

	A	B	C	D	E	F	G	H
1								
2								
3								
4								
5	Product	Customer	Date	Item Cost	No.Items	Total Cost	Shipping	Total
6	Captain Recliner	B&B Spaces	1/2/2018	\$ 289.95		\$ 1,449.75	=IF(F6>=1500,0,F6*2%)	
7	Media Armoire	Home USA	1/2/2018	\$ 329.95		\$ 659.90	IF(logical_test, [value_if_true], [value_if_false])	
8	Bamboo End Table	Ellington Designs	1/3/2018	\$ 64.95	7	\$ 454.65		
9	Bamboo Coffee Table	Ellington Designs	1/4/2018	\$ 139.95	3	\$ 419.85		
10	Bamboo End Table	B&B Spaces	1/4/2018	\$ 64.95	12	\$ 779.40		
11	Chameleon Couch	Ellington Designs	1/6/2018	\$ 649.99	4	\$ 2,599.96		
12	Bamboo End Table	Home USA	1/7/2018	\$ 64.95	10	\$ 649.50		
13	Chameleon Couch	Home USA	1/7/2018	\$ 649.99	2	\$ 1,299.98		
14	Media Armoire	Home USA	1/7/2018	\$ 329.95	6	\$ 1,979.70		
15	Bamboo Coffee Table	Home USA	1/10/2018	\$ 139.95	10	\$ 1,399.50		
16	Media Armoire	B&B Spaces	1/10/2018	\$ 329.95	13	\$ 4,289.35		
17	Media Armoire	Home USA	1/10/2018	\$ 329.95	4	\$ 1,319.80		
18	Bamboo Coffee Table	B&B Spaces	1/11/2018	\$ 139.95	11	\$ 1,539.45		
19	Captain Recliner	B&B Spaces	1/11/2018	\$ 299.95	7	\$ 2,099.65		
20	Bamboo End Table	Ellington Designs	1/12/2018	\$ 64.95	11	\$ 714.45		
21	Chameleon Couch	B&B Spaces	1/12/2018	\$ 649.99	6	\$ 3,899.94		
22	Bamboo Coffee Table	Home USA	1/12/2018	\$ 139.95	10	\$ 1,399.50		

LOGICAL    IF    NESTED IF    TEXT IF    IFS    Catalogue    VLOOKUP    +

- Total is Total Cost + Shipping Cost

H6     :    =SUM(F6:G6)

	A	B	C	D	E	F	G	H
1	Furniture Sales - 2018 and 2019							
2								
3	No shipping charge for orders over \$1,500; others - 2% of cost							
5	Product	Customer	Date	Item Cost	No.Items	Total Cost	Shipping	Total
6	Captain Recliner	B&B Spaces	1/2/2018	\$ 289.95	5	\$ 1,449.75	\$ 29.00	\$ 1,478.75
7	Media Armoire	Home USA	1/2/2018	\$ 329.95	2	\$ 659.90	\$ 13.20	\$ 673.10
8	Bamboo End Table	Ellington Designs	1/3/2018	\$ 64.95	7	\$ 454.65	\$ 9.09	\$ 463.74
9	Bamboo Coffee Table	Ellington Designs	1/4/2018	\$ 139.95	3	\$ 419.85	\$ 8.40	\$ 428.25
10	Bamboo End Table	B&B Spaces	1/4/2018	\$ 64.95	12	\$ 779.40	\$ 15.59	\$ 794.99
11	Chameleon Couch	Ellington Designs	1/6/2018	\$ 649.99	4	\$ 2,599.96	\$ -	\$ 2,599.96
12	Bamboo End Table	Home USA	1/7/2018	\$ 64.95	10	\$ 649.50	\$ 12.99	\$ 662.49
13	Chameleon Couch	Home USA	1/7/2018	\$ 649.99	2	\$ 1,299.98	\$ 26.00	\$ 1,325.98

# Absolute Reference

F4

- Change hard coded Values to Absolute Reference Values

G6	:	X	V	fx	=IF(F6>\$K\$11,0,F6 * \$K\$10)	A	B	C	D	E	F	G	H	I	J	K	
Furniture Sales - 2018 and 2019																	
No shipping charge for orders over \$1,500; others - 2% of cost																	
Product	Customer	Date	Item Cost	No.Items	Total Cost	Shipping	Total	COUNTIF		SUMIF							
Captain Recliner	B&B Spaces	1/2/2018	\$ 289.95	5	\$ 1,449.75	\$ 57.99	\$ 1,507.74	Shipping		Order value		4%		1800.00			
Media Armoire	Home USA	1/2/2018	\$ 329.95	2	\$ 659.90	\$ 26.40	\$ 686.30										
Bamboo End Table	Ellington Designs	1/3/2018	\$ 64.95	7	\$ 454.65	\$ 18.19	\$ 472.84										
Bamboo Coffee Table	Ellington Designs	1/4/2018	\$ 139.95	3	\$ 419.85	\$ 16.79	\$ 436.64										
Bamboo End Table	B&B Spaces	1/4/2018	\$ 64.95	12	\$ 779.40	\$ 31.18	\$ 810.58										
Chameleon Couch	Ellington Designs	1/6/2018	\$ 649.99	4	\$ 2,599.96	\$ -	\$ 2,599.96										

- On completion change the values and see the impact on shipping cost
-

# Nested IF() Statements

Calculate Bonus based on a Job Code Rating

The screenshot shows a Microsoft Excel spreadsheet with data for employees. The columns are labeled A through H, and the rows are numbered 1 through 42. The columns represent Employee Name, Building, Department, Hire Date, Years, Salary, Job Rating, and Bonus respectively. The formula in cell H2 is =IF(G2 = \$J\$9,250, IF(G2 = J8,500, IF(G2 = 3, 900, IF(G2=4,1400,IF(G2=5,2000,0))))). A red box highlights this formula in the formula bar, and a red arrow points from the text "Calculate Bonus based on a Job Code Rating" to the formula. The ribbon at the bottom has tabs for LOGICAL, IF, NESTED IF, TEXT IF, IFS, Catalogue, VLOOKUP, and a plus sign.

	A	B	C	D	E	F	G	H
1	Employee Name	Building	Department	Hire Date	Years	Salary	Job Rating	Bonus
2	Page, Lisa	West	ADC	12/24/2001	21	\$ 60,981.00	1	250
3	Taylor, Hector	West	ADC	2/3/2014	9	\$ 60,915.00	4	1,400
4	Dawson, Jonathan	West	ADC	2/16/2010	13	\$ 97,071.00	5	2,000
5	Duran, Brian	Taft	ADC	8/13/2015	7	\$ 115,421.00	3	900
6	Weber, Larry	Watson	ADC	12/13/2010	12	\$ 115,547.00	4	1,400
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
38	Bullock, Greg	North	Facilities/Engin	12/30/2014	8	\$ 124,698.00	3	900
39	Wheeler, Meegan	West	Facilities/Engin	12/25/2009	13	\$ 106,453.00	4	1,400
40	Cunningham, Denise	Main	Facilities/Engin	1/4/2013	10	\$ 88,169.00	5	2,000
41	Simpson, Jimmy	Watson	Facilities/Engin	12/19/2003	19	\$ 83,157.00	3	900
42	Griffith, Michelle	South	Facilities/Engin	2/6/2013	10	\$ 71,963.00	2	500

NESTED IF

# Change for Absolute Referencing

F4

The screenshot shows an Excel spreadsheet with data for employees. The formula bar at the top contains the formula: =IF(G2 = \$J\$9,250, IF(G2 = \$J\$8,500, IF(G2 = \$J\$7,900, IF(G2=\$J\$6,1400,IF(G2=\$J\$5,2000,0))))). A red box highlights this formula. A red arrow points from the F4 button to the formula bar. Another red arrow points from the formula bar to the value '250' in cell H2, which corresponds to the 'Bonus' column for employee Page, Lisa. To the right of the main table, there is a smaller table titled 'Job Code' with two columns: 'Job Code' and 'Bonus'. This table lists five job codes with their corresponding bonuses: 5 (2000), 4 (1400), 3 (900), 2 (500), and 1 (250). A red box highlights this secondary table.

A	B	C	D	E	F	G	H	I	J	K
1	Employee Name	Building	Department	Hire Date	Years	Salary	Job Rating	Bonus		
2	Page, Lisa	West	ADC	12/24/2001	21	\$ 60,981.00	1	250		
3	Taylor, Hector	West	ADC	2/3/2014	9	\$ 60,915.00	4	1,400		
4	Dawson, Jonathan	West	ADC	2/16/2010	13	\$ 97,071.00	5	2,000		
5	Duran, Brian	Taft	ADC	8/13/2015	7	\$ 115,421.00	3	900		
6	Weber, Larry	Watson	ADC	12/13/2010	12	\$ 115,547.00	4	1,400		
7	Pratt, Erik	North	Training	1/16/2009	14	\$ 69,212.00	2	500		
8	O'Connor, Kent	Taft	Training	2/8/2002	21	\$ 120,198.00	1	250		
9	Spencer, Boyd	Main	Training	3/30/2010	13	\$ 107,635.00	5	2,000		
10	Wiggins, Frank	North	Training	3/23/2002	21	\$ 113,020.00	1	250		
11	Tanner, Timothy	Taft	Training	5/10/2005	18	\$ 82,341.00	4	1,400		

Job Code	Bonus
5	2000
4	1400
3	900
2	500
1	250

# IF() for Text

- Using IF() with Text values.
- For Text values use of "" is mandatory.

The screenshot shows a Microsoft Excel spreadsheet titled "Amazon Shopping List". The data is organized into three columns: "Item", "Delivery Status", and "Action Required". The "Action Required" column contains the formula =IF(B4="Delivered","No Action","Action"). A red arrow points from the formula bar to the formula itself. Another red box highlights the "Action Required" column. The formula bar also shows the formula =IF(B4="Delivered","No Action","Action") with the "TEXT IF" tab selected in the formula bar buttons.

	A	B	C
1	Amazon Shopping List		
2			
3	Item	Delivery Status	Action Required
4	Bathroom Scales	Delivered	No Action
5	Bedroom Lamp	In Transit	Action
6	Swing Top Bin	Out for Delivery	Action
7	Rug	Delivered	No Action
8	Electric Toothbrush	Delivered	No Action
9	Plant Pots	In Transit	Action
10	Headphones	Out for Delivery	Action
11	iPad	In Transit	Action
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			
25			
26			

# COUNTIF() & SUMIF()

- COUNTIF() is used to count the number of records based on a Criteria. Eg. Find the number of records above \$1500 in column Total Cost.

The screenshot shows a Microsoft Excel spreadsheet titled "Furniture Sales - 2018 and 2019". The formula bar at the top displays the formula =COUNTIF(Cost, ">1500"). The cell K5 contains the value 516, which is highlighted with a red box. The table below has columns for Product, Customer, Date, Item Cost, No.Items, Total Cost, Shipping, and Total. The Total column shows values for two items: Captain Recliner (\$1,478.75) and Media Armoire (\$672.10). The COUNTIF formula is also present in the formula bar for the cell K6, which contains the value 516.

	Product	Customer	Date	Item Cost	No.Items	Total Cost	Shipping	Total	COUNTIF	SUMIF
6	Captain Recliner	B&B Spaces	1/2/2018	\$ 289.95	5	\$ 1,449.75	\$ 29.00	\$ 1,478.75	516	
7	Media Armoire	Home USA	1/2/2018	\$ 229.95	2	\$ 659.90	\$ 12.20	\$ 672.10		

# SUMIF()

- SUMIF() is used to sum the numbers in records based on a Criteria.

The screenshot shows a Microsoft Excel spreadsheet titled "Furniture Sales - 2018 and 2019". The formula bar at the top contains the formula =SUMIF(Cost,>1500"). A red box highlights this formula. The table below has columns for Product, Customer, Date, Item Cost, No.Items, Total Cost, Shipping, and Total. The last two columns show aggregate functions: COUNTIF and SUMIF. A red box highlights the COUNTIF cell in row 5, which contains the value 516. Another red box highlights the SUMIF cell in row 6, which contains the formula ">1500".

Product	Customer	Date	Item Cost	No.Items	Total Cost	Shipping	Total	COUNTIF	516
Captain Recliner	B&B Spaces	1/2/2018	\$ 289.95	5	\$ 1,449.75	\$ 29.00	\$ 1,478.75	SUMIF	>1500")
Media Armoire	Home USA	1/2/2018	\$ 329.95	2	\$ 659.90	\$ 13.20	\$ 673.10		
Bamboo End Table	Ellington Designs	1/3/2018	\$ 64.95	7	\$ 454.65	\$ 9.09	\$ 463.74		
Bamboo Coffee Table	Ellington Designs	1/4/2018	\$ 139.95	3	\$ 419.85	\$ 8.40	\$ 428.25		

# IFS

- Simpler way of writing Nested IF's

The screenshot shows an Excel spreadsheet with the following data:

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
1	<b>Day of the Week</b>																	
2	Sunday																	
3	Monday																	
4	Tuesday																	
5	Wednesday																	
6	Thursday																	
7	Friday																	
8	Saturday																	
9																		
10	<b>Day Number</b>	<b>Day</b>																
11			=IFS(A11=1,A2,A11=2,A3,A11=3,A4,A11=4,A5,A11=5,A6,A11=6,A7,A8=7,A8															
12			IFS(logical_test1, value_if_true1, [logical_test2, value_if_true2], [logical_test3, value_if_true3], [logical_test4, value_if_true4], [logical_test5, value_if_true5], [logical_test6, value_if_true6], [logical_test7, value_if_true7], [logical_test8, ...])															
13																		

The formula in cell A8 is =IFS(A11=1,A2,A11=2,A3,A11=3,A4,A11=4,A5,A11=5,A6,A11=6,A7,A8=7,A8. The formula in cell B11 is =IFS(A11=1,A2,A11=2,A3,A11=3,A4,A11=4,A5,A11=5,A6,A11=6,A7,A8=7,A8. The formula bar shows =IFS(A11=1,A2,A11=2,A3,A11=3,A4,A11=4,A5,A11=5,A6,A11=6,A7,A8=7,A8.

# IFNA()

C13	A	B	C	D	E	F	G	H	I	J
	1	Day of the Week								
	2	Sunday								
	3	Monday								
	4	Tuesday								
	5	Wednesday								
	6	Thursday								
	7	Friday								
	8	Saturday								
	9									
	10	Day Number	Day							
	11	0	#N/A							
	12									
	13	0	Allowed Values 1 to 7							

- Get rid of N/A error using IFNA() function
- Drawback of IFNA(): It works only when you get N/A error. It does not work for other error that we get when working with excel like "#value", or "#data", etc...

# IFERROR()

C7			
A	B	C	D
4			
5			
6	Part No.	Description	Unit price
7	19232	Door Handles : Lever On Backplate Modern : Urfic Latch Door Handle Victoria Polished Brass	18.94
8	48133	Plastic Push Fit Fittings : JG Speedfit Fittings : JG Speedfit Reducing Coupler 22mm x 15mm Pack of 5	18.66
9	12345	Part No. not found	Part No. not found
10	75664	Compression Fittings : Conex Compression : Conex Female Wall Plate Elbow 403WL 22mm x 3/4"	19.12
11	51609	Door handles : Lever On Backplate Modern : Serozzetta Cuatro Lever on Backplate Lock Satin Chrome	19.24
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			

To display a message instead of an Error

D7			
A	B	C	D
4			
5			
6	Part No.	Description	Unit price
7	19232	Door Handles : Lever On Backplate Modern : Urfic Latch Door Handle Victoria Polished Brass	18.94
8	48133	Plastic Push Fit Fittings : JG Speedfit Fittings : JG Speedfit Reducing Coupler 22mm x 15mm Pack of 5	18.66
9	12345	Part No. not found	Part No. not found
10	75664	Compression Fittings : Conex Compression : Conex Female Wall Plate Elbow 403WL 22mm x 3/4"	19.12
11	51609	Door handles : Lever On Backplate Modern : Serozzetta Cuatro Lever on Backplate Lock Satin Chrome	19.24
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			

# End of Unit 4. Logical Functions

?

Unit 5

# Statistical Functions

# Unit 5. Statistical Functions

- SUMIF()
- COUNTIF()
- COUNTA()
- RANK()
- AVERAGE()
- AVERAGEIF()
- AVERAGEIFS()
- ARRAY FORMULAE SUMProduct

=SUMIF(B3:B17,"Bat",F3:F17)

B	C	D	E	F
Goods	Qyantity	Cost	Discount	Revenue
Bat	263	2000	5%	26300
CricketBall	590	50	10%	2950
BasketBall	68	500		34000
Cotton T-Shirts	730	490	40%	143080
Sipper	321	250	20%	16050
Basketball Net	39	150		5850
Baseball Bat	76	2500	5%	9500
Dumbles	125	1150	10%	14375
Dumbles - 10 Kg	99	2150	10%	21285
Shorts	620	350	40%	86800
Jackets	465	2500	20%	232500
Sneakers	1032	3000	50%	1548000
Skipping Rope	320	120	15%	5760
Sipper	311	250	20%	19050
Bat	243	2000	5%	22300
				2146450
		SUMIF()	48600	Revenue of BATs

# COUNTIF()

=COUNTIF(E3:E17,"10%")					
	A	B	C	D	E
1					
2	Goods	Qtyantity	Cost	Discount	Revenue
3	Bat	263	2000	5%	26300
4	CricketBall	590	50	10%	2950
5	BasketBall	68	500		34000
6	Cotton T-Shirts	730	490	40%	143080
7	Sipper	321	250	20%	16050
8	Basketball Net	39	150		5850
9	Baseball Bat	76	2500	5%	9500
10	Dumbles	125	1150	10%	14375
11	Dumbles - 10 Kg	99	2150	10%	21285
12	Shorts	620	350	40%	86800
13	Jackets	465	2500	20%	232500
14	Sneakers	1032	3000	50%	1548000
15	Skipping Rope	320	120	15%	5760
16	Sipper	311	250	20%	19050
17	Bat	243	2000	5%	22300
18					2146450
19					
20					
21			SUMIF()	48600 Revenue of BATs	
22			COUNTIF()	3	

# COUNTA()

- While the COUNT() function only counts the numeric values, the COUNTA() function counts all the cells in a range that are not blank cells. The function is useful for counting cells containing any type of information, including error values and empty text.

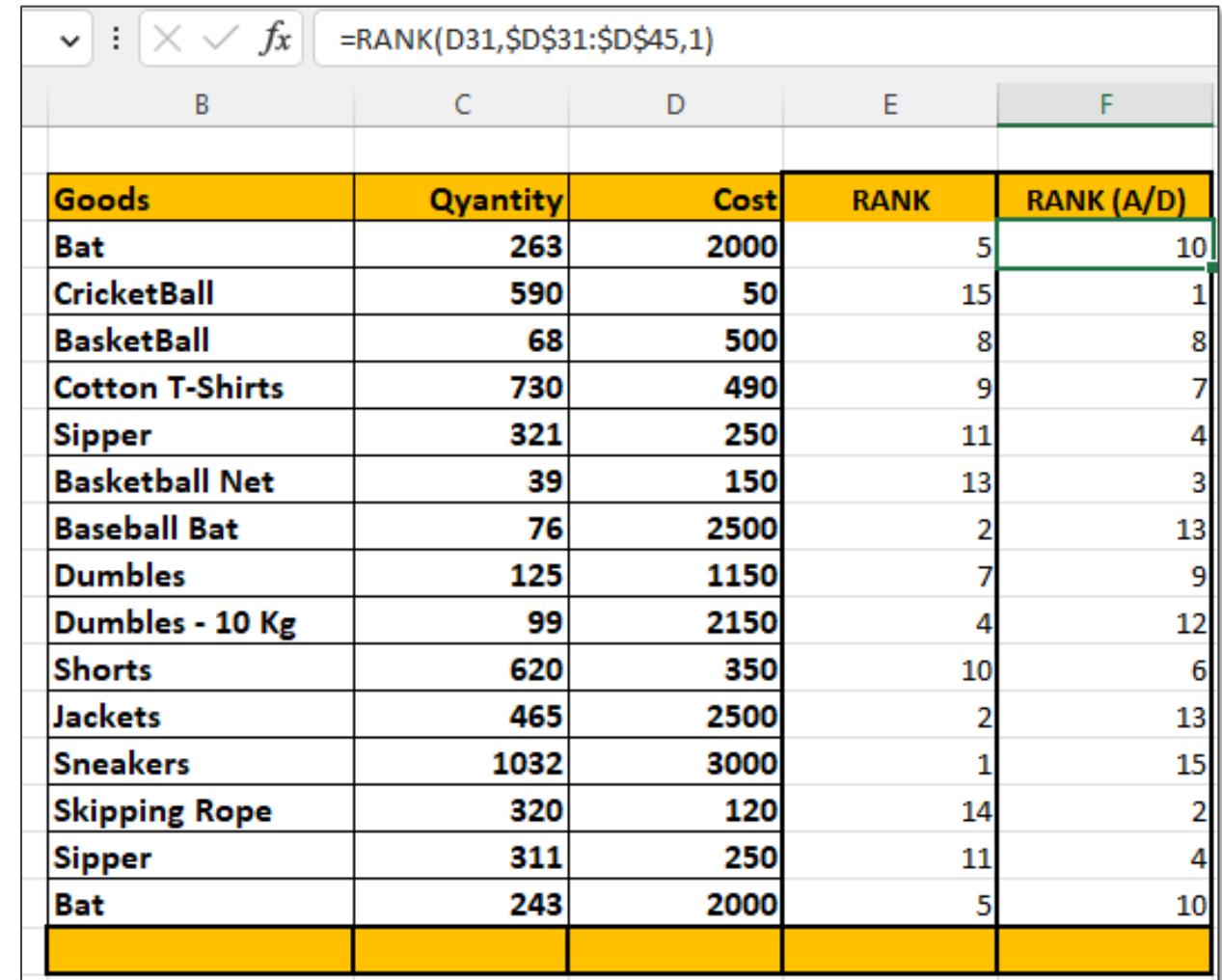
A	B	C	D	E	F
1	Goods	Quantity	Cost	Discount	Revenue
2	Bat	263	2000	5%	26300
3	CricketBall	590	50	10%	2950
4	BasketBall	68	500		34000
5	Cotton T-Shirts	730	490	40%	143080
6	Sipper	321	250	20%	16050
7	Basketball Net	39	150		5850
8	Baseball Bat	76	2500	5%	9500
9	Dumbles	125	1150	10%	14375
10	Dumbles - 10 Kg	99	2150	10%	21285
11	Shorts	620	350	40%	86800
12	Jackets	465	2500	20%	232500
13	Sneakers	1032	3000	50%	1548000
14	Skipping Rope	320	120	15%	5760
15					2146450
16					
17					
18		SUM()	2146450		
19		MAX Revenue	1548000		
20		MIN Revenue	2950		
21		LARGE()	232500		
22		SMALL()	5760		
23		AVERAGE()	165111.54		
24					
25		COUNT() Discount Records	11		
26					
27		COUNTA() on Goods	13		

# RANK()

- Allows you to assign rank

	A	B	C	D	E	F
29						
30	Goods	Qyantity	Cost	RANK	RANK (A/D)	
31	Bat	263	2000	5	10	
32	CricketBall	590	50	15	1	
33	BasketBall	68	500	8	8	
34	Cotton T-Shirts	730	490	9	7	
35	Sipper	321	250	11	4	
36	Basketball Net	39	150	13	3	
37	Baseball Bat	76	2500	2	13	
38	Dumbles	125	1150	7	9	
39	Dumbles - 10 Kg	99	2150	4	12	
40	Shorts	620	350	10	6	
41	Jackets	465	2500	2	13	
42	Sneakers	1032	3000	1	15	
43	Skipping Rope	320	120	14	2	
44	Sipper	311	250	11	4	
45	Bat	243	2000	5	10	
46						

# RANK() in Ascending / Descending Order



The screenshot shows a Microsoft Excel spreadsheet with data in columns B through F. The formula bar at the top displays the formula `=RANK(D31,$D$31:$D$45,1)`. The data table has the following structure:

Goods	Qyantity	Cost	RANK	RANK (A/D)
Bat	263	2000	5	10
CricketBall	590	50	15	1
BasketBall	68	500	8	8
Cotton T-Shirts	730	490	9	7
Sipper	321	250	11	4
Basketball Net	39	150	13	3
Baseball Bat	76	2500	2	13
Dumbles	125	1150	7	9
Dumbles - 10 Kg	99	2150	4	12
Shorts	620	350	10	6
Jackets	465	2500	2	13
Sneakers	1032	3000	1	15
Skipping Rope	320	120	14	2
Sipper	311	250	11	4
Bat	243	2000	5	10

## Average()

- Calculates simple average of an array

# AVERAGEIF()

Calculates the average of a range based on a **true** or **false** condition.

It is typed **=AVERAGEIF** and has three parts:

**=AVERAGEIF(range, criteria, [average\_range])**

The screenshot shows an Excel spreadsheet with a table of goods and their details. The table includes columns for Goods, Quantity, Cost, RANK, and RANK (A/D). The formula bar at the top shows the formula =AVERAGEIF(B31:B45,K33,D31:D45). The cell I2 contains the result 1750, which is highlighted with a green border. To the right of the table, there are three comparison results: AVERAGE() with 1130.67, AVERAGEIF() with 1750, and AVERAGEIFS() with Bat.

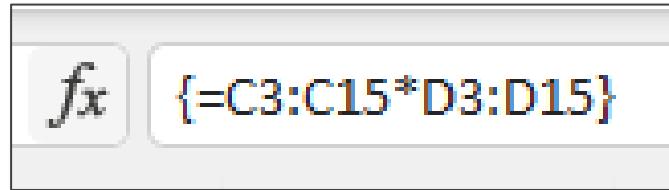
Goods	Qtyantity	Cost	RANK	RANK (A/D)
Bat	263	2000	5	11
CricketBall	590	50	15	1
BasketBall	68	500	8	8
Cotton T-Shirts	730	490	9	7
Sipper	321	250	11	4
Basketball Net	39	150	13	3
Baseball Bat	76	2500	2	13
Dumbles	125	1150	7	9
Dumbles - 10 Kg	99	2150	4	12
Shorts	620	350	10	6
Jackets	465	2500	2	13
Sneakers	1032	3000	1	15
Skipping Rope	320	120	14	2
Sipper	311	250	11	4
Bat	243	1500	6	10

AVERAGE() 1130.67  
AVERAGEIF() 1750  
AVERAGEIFS() Bat

# AVERAGEIFS()

[AVERAGEIFS](#) (average\_range; criteria\_range1; criteria1; [criteria\_range2; criteria2]; [criteria\_range3; ...])

# Array Formula



Use of curly brackets means it's an array formula

The screenshot shows an Excel spreadsheet with data in columns B through H. The formula bar at the top displays the array formula: `{=C3:C15*D3:D15}`. The data consists of 13 rows of products, each with columns for Goods, Quantity, Cost, Discount, Revenue, and Array Formula. The last row is highlighted in yellow and contains the total value 2146450.

Goods	Qtyantity	Cost	Discount	Revenue	Array Formula
Bat	263	2000	5%	26300	526000
CricketBall	590	50	10%	2950	29500
BasketBall	68	500		34000	34000
Cotton T-Shirts	730	490	40%	143080	357700
Sipper	321	250	20%	16050	80250
Basketball Net	39	150		5850	5850
Baseball Bat	76	2500	5%	9500	190000
Dumbles	125	1150	10%	14375	143750
Dumbles - 10 Kg	99	2150	10%	21285	212850
Shorts	620	350	40%	86800	217000
Jackets	465	2500	20%	232500	1162500
Sneakers	1032	3000	50%	1548000	3096000
Skipping Rope	320	120	15%	5760	38400
					2146450

# End of Unit 5. Statistical Functions

?

Unit 6

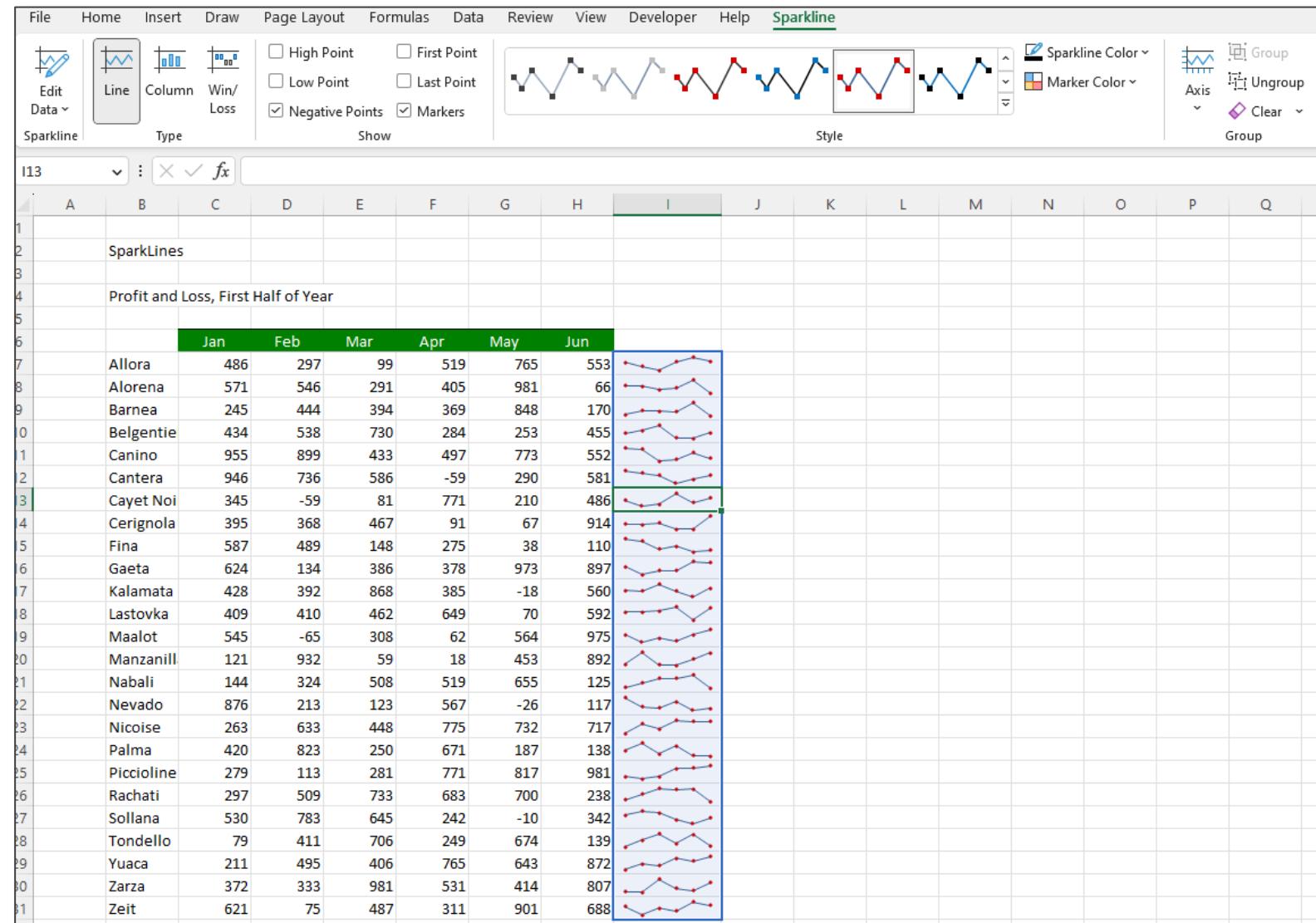
# Charts

# Unit 6. Charts

- Charts Wizard
- Chart Types – Line, Pie, Bar, Etc
- Display Data
- Trend Line
- Secondary Axis

# Sparklines

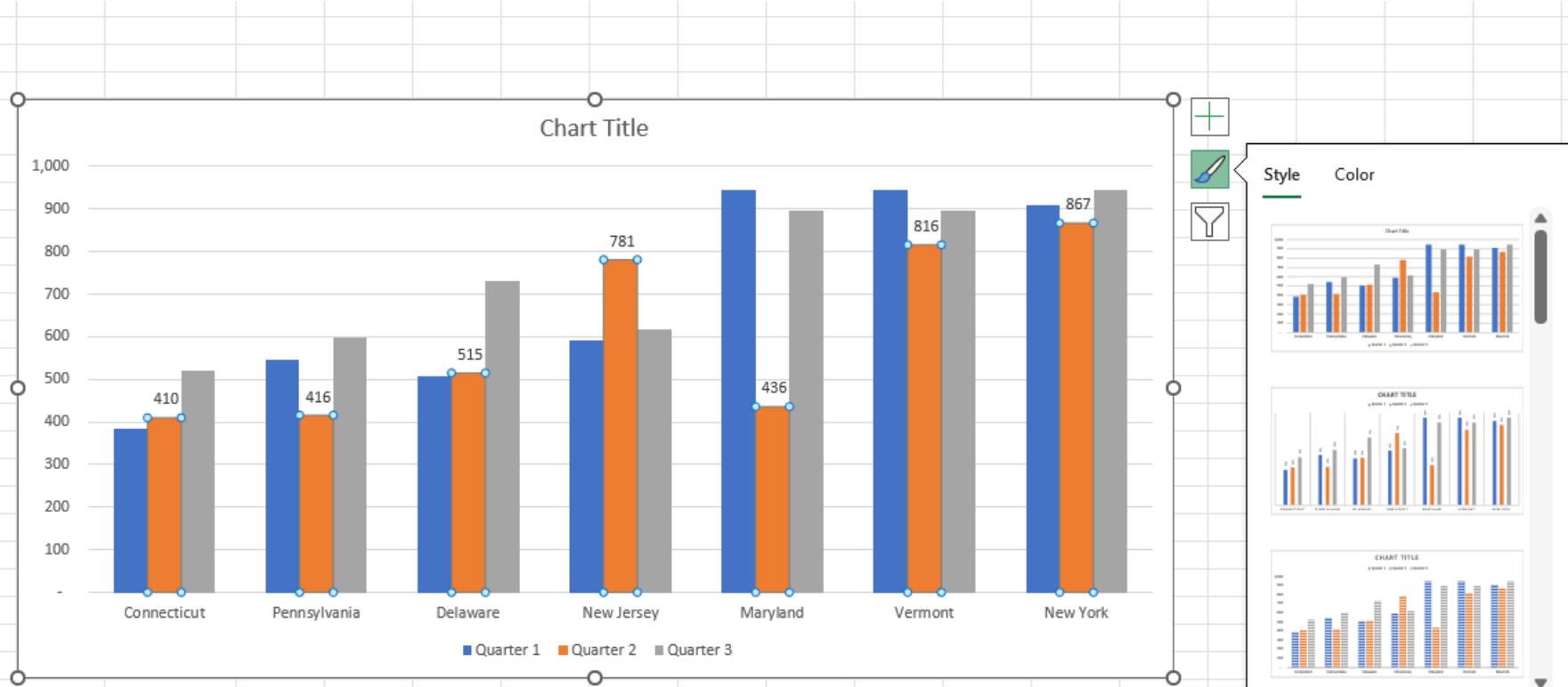
- Explore the formatting options.



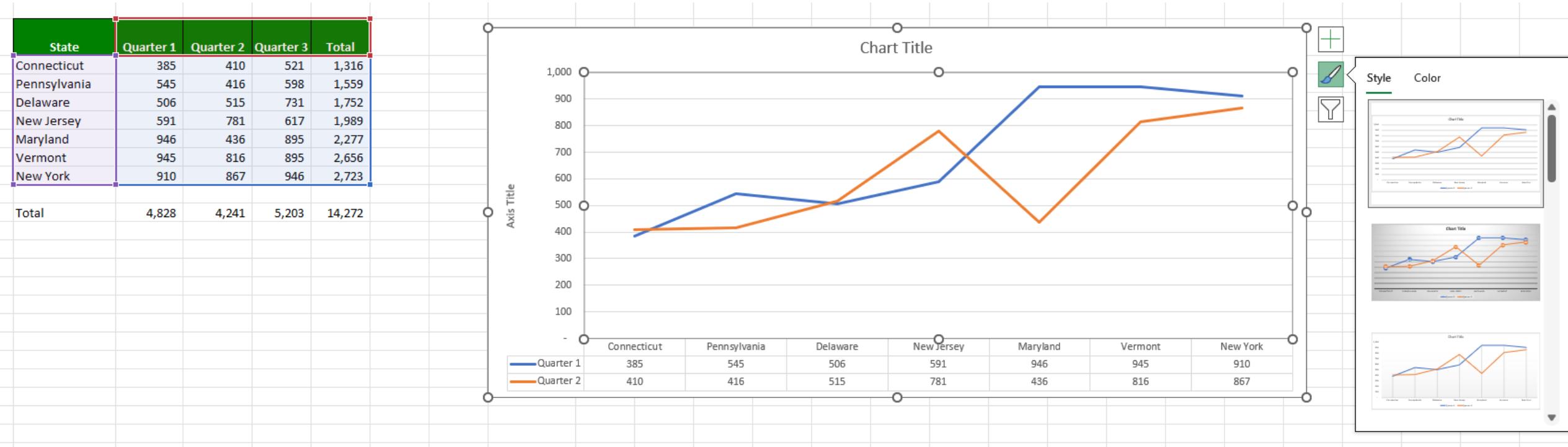
# Column Charts

COLUMN

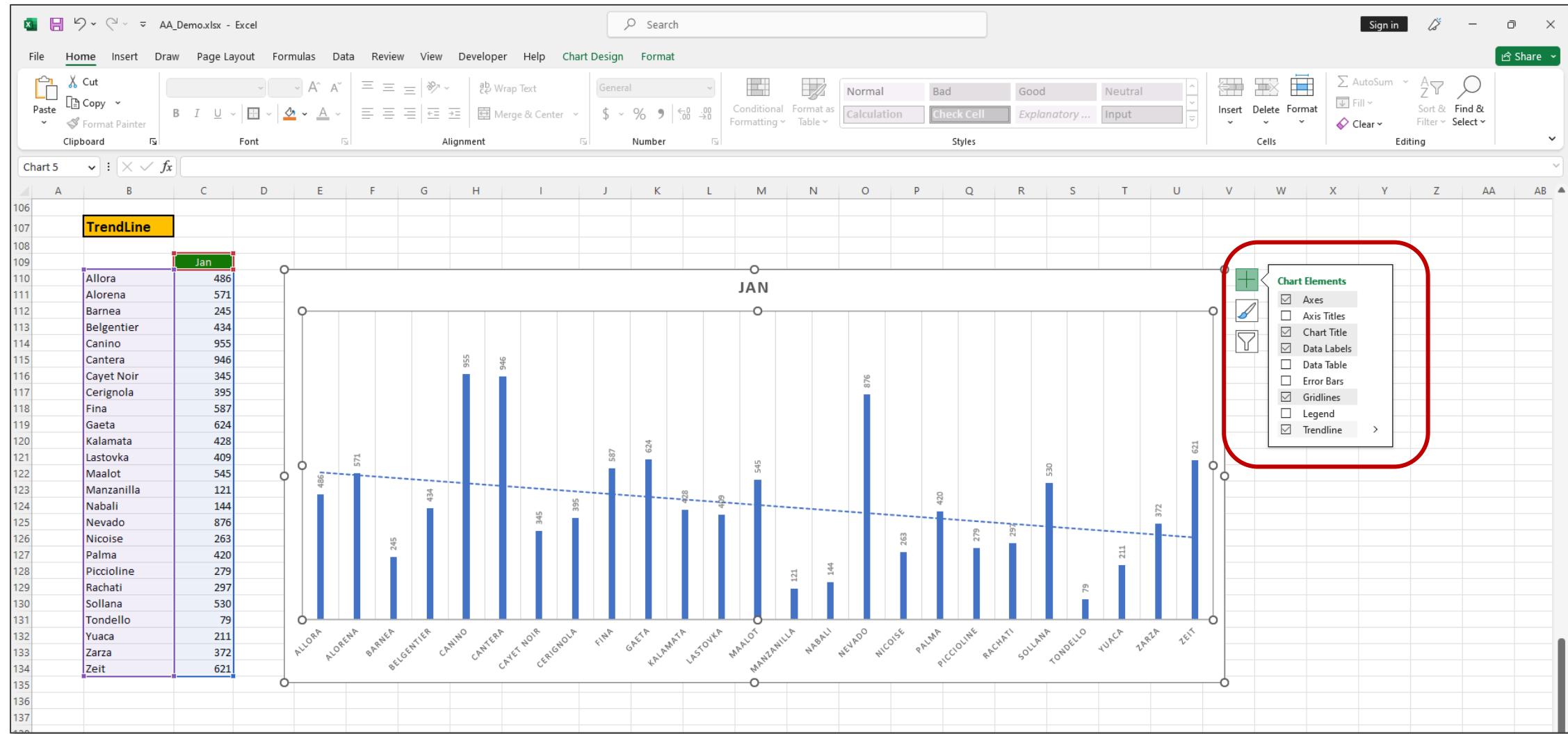
State	Quarter 1	Quarter 2	Quarter 3	Total
Connecticut	385	410	521	1,316
Pennsylvania	545	416	598	1,559
Delaware	506	515	731	1,752
New Jersey	591	781	617	1,989
Maryland	946	436	895	2,277
Vermont	945	816	895	2,656
New York	910	867	946	2,723
Total	4,828	4,241	5,203	14,272



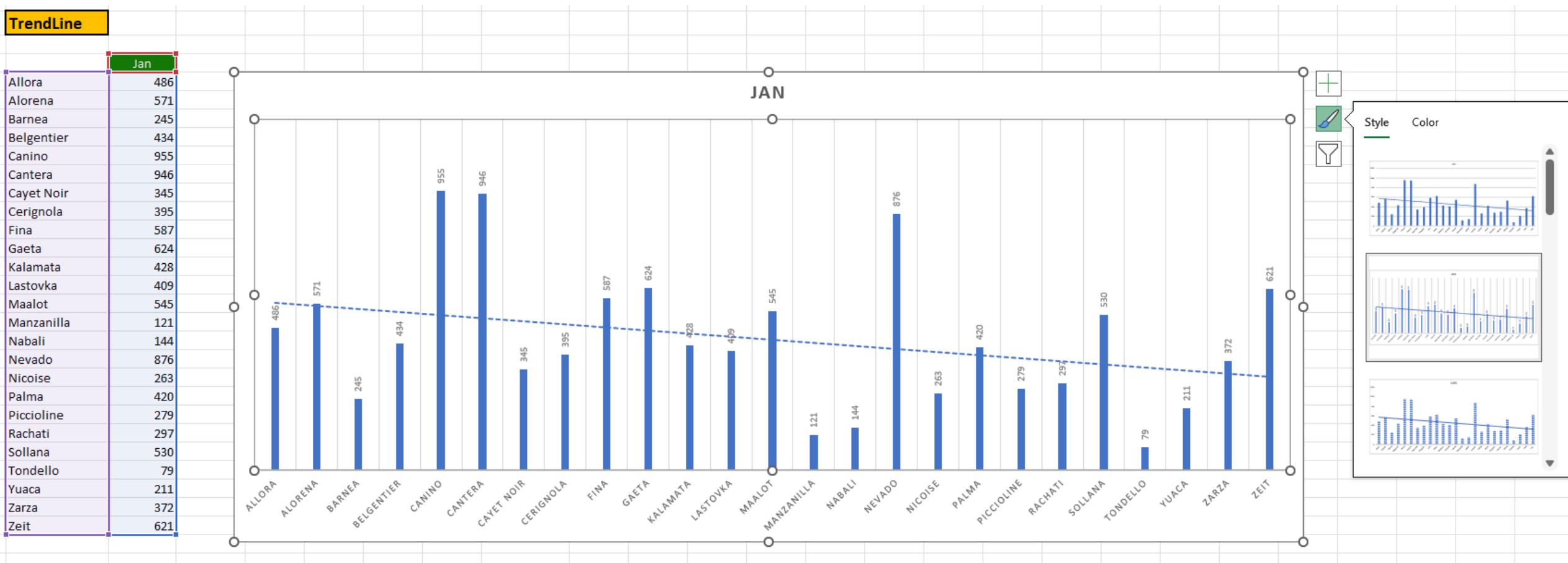
# Line Chart



# Trend Lines



# Trend Lines



# End of Unit 6. Charts

?

Unit 7

# Data Tools

# Unit 7. Data Tools

- Text to Columns
- Remove Duplicates
- Data Validation

Screenshot of Microsoft Excel showing the process of splitting text into columns using the Text to Columns Wizard.

The main Excel window shows a list of food items in column A:

	Names
3	Empanadas: Beef Picadillo
4	Empanadas: Chipotle Shrimp
5	Tamales: Chicken Tinga
6	Tamales: Vegetable
7	Arepas: Carnitas
8	Arepas: Queso Blanco
9	Empanadas: Apple Cinnamon
10	Beverages: Horchata
11	Beverages: Lemonade
12	Beverages: Tamarindo

The "Data" tab is selected, and the "Text to Columns" icon is highlighted in the ribbon.

The "Convert Text to Columns Wizard - Step 1 of 3" dialog box is open:

- Original data type: Delimited (selected)
- Text qualifier: None
- Preview of selected data:

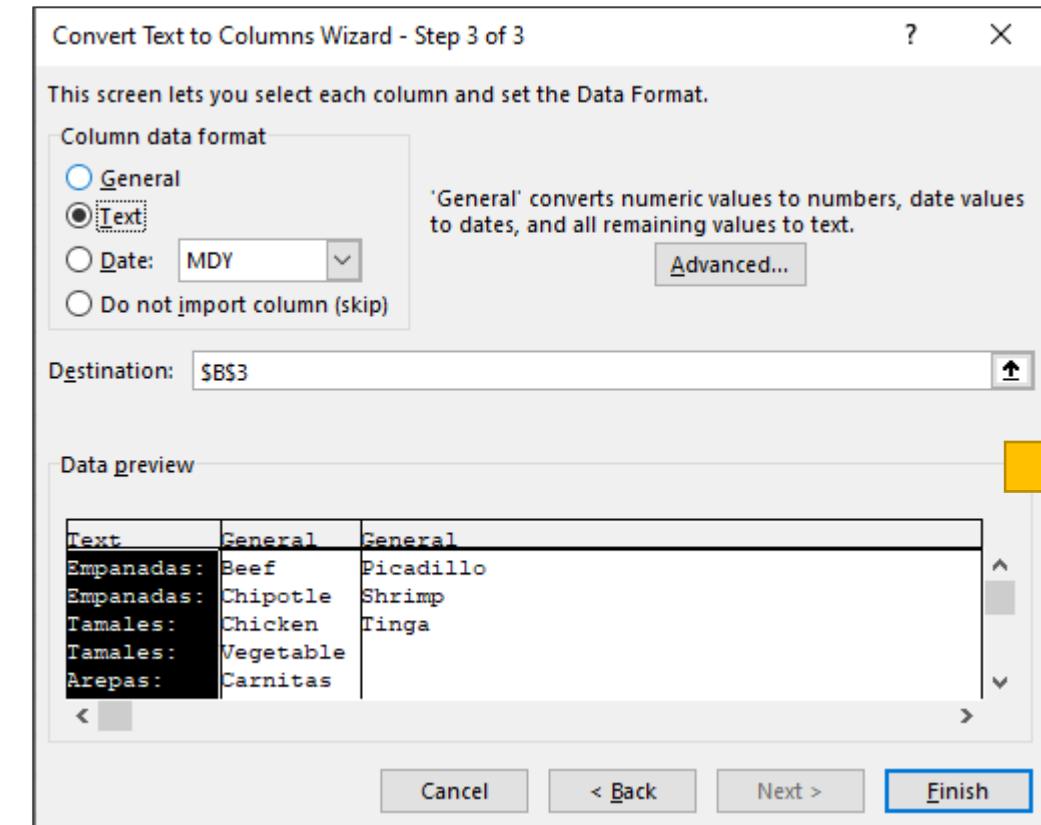
3 Empanadas: Beef Picadillo
4 Empanadas: Chipotle Shrimp
5 Tamales: Chicken Tinga
6 Tamales: Vegetable
7 Arepas: Carnitas

- Buttons: Cancel, < Back, Next >, Finish

The "Convert Text to Columns Wizard - Step 2 of 3" dialog box is open, with a yellow arrow pointing from the "Delimiters" section to the preview area:

- Delimiters:
  - Tab
  - Semicolon
  - Comma
  - Space
  - Other:
- Treat consecutive delimiters as one:
- Text qualifier:
- Data preview:

Empanadas: Beef	Picadillo
Empanadas: Chipotle	Shrimp
Tamales: Chicken	Tinga
Tamales: Vegetable	
Arepas: Carnitas	
- Buttons: Cancel, < Back, Next >, Finish



G21 : X ✓ fx

A	B	C	D
1			
2	<b>Names</b>		
3	Empanadas:	Beef	Picadillo
4	Empanadas:	Chipotle	Shrimp
5	Tamales:	Chicken	Tinga
6	Tamales:	Vegetable	
7	Arepas:	Carnitas	
8	Arepas:	Queso	Blanco
9	Empanadas:	Apple	Cinnamon
10	Beverages:	Horchata	
11	Beverages:	Lemonade	
12	Beverages:	Tamarindo	
13			

# Remove Duplicate values

Remove Duplicates	
Names	
Empanadas:	
Empanadas:	
Tamales:	
Tamales:	
Arepas:	
Arepas:	
Empanadas:	
Beverages:	
Beverages:	
Beverages:	
Empanadas:	
Empanadas:	
Tamales:	
Tamales:	
Arepas:	
Arepas:	
Empanadas:	
Beverages:	
Beverages:	
Beverages:	

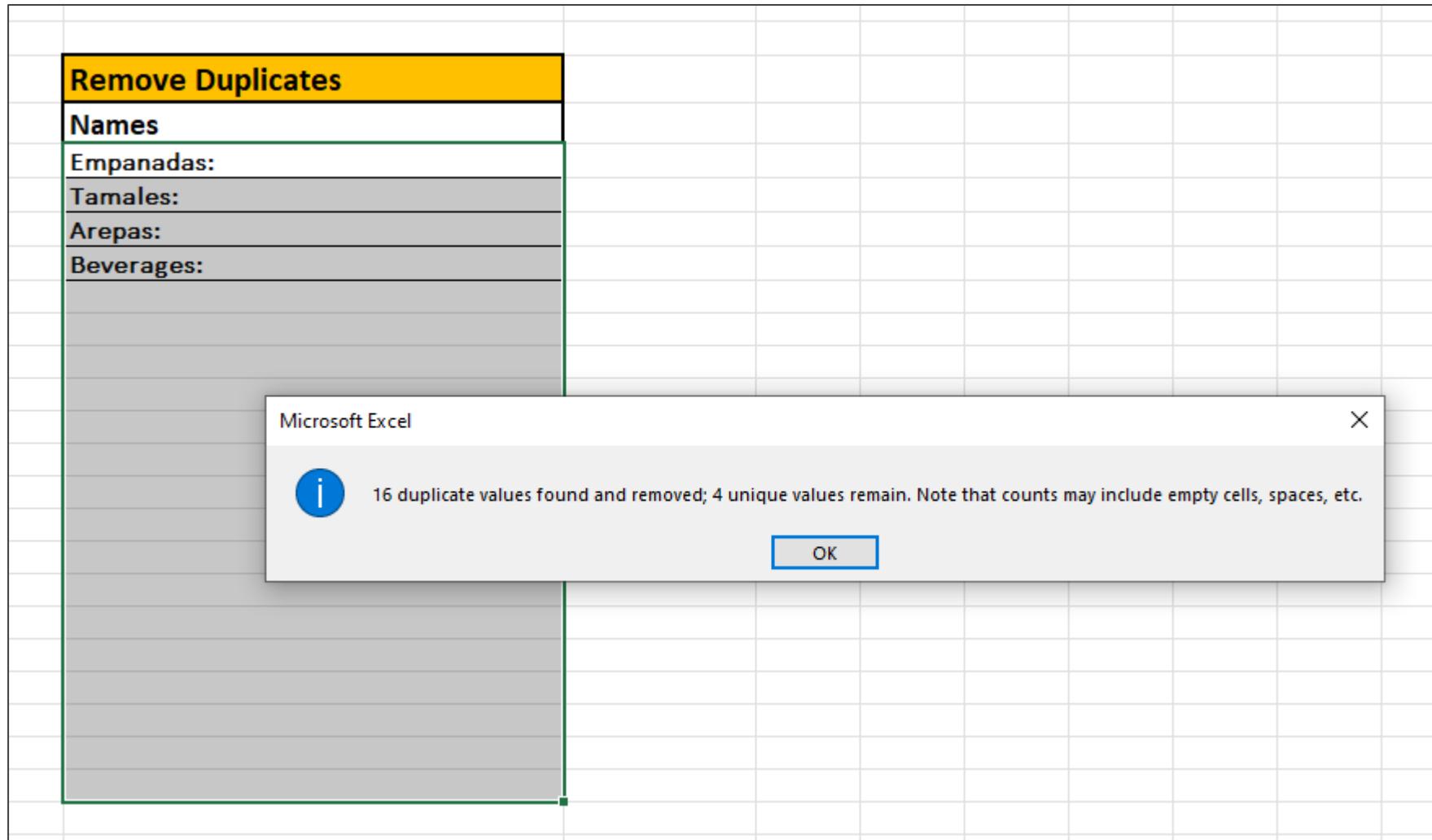
The screenshot shows a Microsoft Excel spreadsheet with data in columns A, B, and C. The data includes three rows of 'Beverages:' entries and three rows of 'Tamales:' entries. A green selection bar highlights the entire range from A1 to C10. An arrow points from the 'Remove Duplicates' button in the ribbon to the 'Remove Duplicates' dialog box.

**Data in Columns A, B, and C:**

A	B	C
Empanadas:	Beverages:	Horchata
Empanadas:	Beverages:	Lemonade
Tamales:	Beverages:	Tamarindo
Tamales:		
Arepas:		
Arepas:		
Empanadas:		
Beverages:		
Beverages:		
Beverages:		
Empanadas:		
Empanadas:		
Tamales:		
Tamales:		
Arepas:		
Arepas:		
Empanadas:		
Beverages:		
Beverages:		
Beverages:		

**Remove Duplicates Dialog Box:**

- Buttons: Select All, Unselect All, OK, Cancel.
- Checkboxes: My data has headers (unchecked), Names (checked).



# DATA Validation

Data Validation

Product	Qty
	Beverages
	Horchata
	Lemonade
	Tamarindo

Product Qty

Beverages

Horchata

Lemonade

Tamarindo

Data Validation

Settings Input Message Error Alert

Validation criteria

Allow:

List

Ignore blank

In-cell dropdown

Data:

between

Source:

=\\$C\$29:\\$C\$31

Apply these changes to all other cells with the same settings

Clear All OK Cancel

The screenshot shows the 'Data Validation' dialog box in Excel. The 'List' option is selected under 'Allow'. The 'Source' field contains the formula '=C\$29:C\$31'. The 'OK' button is highlighted.

25		
26		
27	Data Validation	
28		Beverages
29		Horchata
30		Lemonade
31		Tamarindo
32		
33	Product	Qty
34		
35	Horchata	
36	Lemonade	
	Tamarindo	
37		
38		
39		
40		

# End of Unit 7. Data Tools

?

Unit 8

# Advanced Conditional Formatting

# Unit 8. Advanced Conditional Formatting

- Conditional Formatting
- Adding ICONs
- Adding DATA Bars

Quarterly Sales Data Analysis											
Row ID	State	Quarter 1			Quarter 2			Quarter 3			Overall Total
		Sales	Change	Rank	Sales	Change	Rank	Sales	Change	Rank	
1	Connecticut	385.00	↓	4	410.00	↑	2	521.00	↑	1	1316.00
2	Pennsylvania	545.00	↓	5	416.00	↓	4	598.00	↑	3	1559.00
3	Delaware	506.00	↓	6	515.00	↑	5	731.00	↑	2	1752.00
4	New Jersey	591.00	↑	7	781.00	↑	3	617.00	↓	4	2089.00
5	Maryland	946.00	↓	8	436.00	↓	8	895.00	↑	5	1377.00
6	Vermont	945.00	↑	9	816.00	↓	9	895.00	↑	6	2736.00
7	New York	910.00	↑	10	867.00	↓	10	946.00	↑	7	2723.00

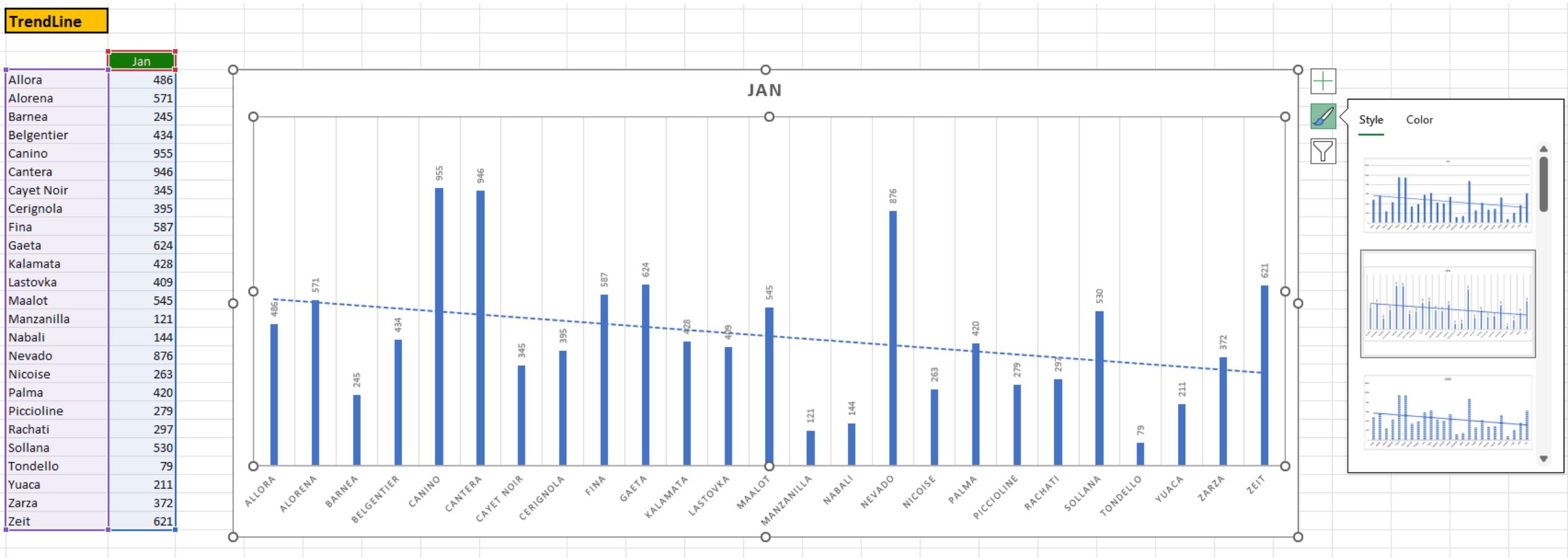
# End of Unit 8. Advanced Conditional Formatting

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Unit 9

# Trend Lines

# Unit 9. Trend Lines



# End of Unit 9. Trend Lines

?

Unit 10

# LOOKUP Functions

# Unit 10. LOOKUP Functions

- VLOOKUP()
- HLOOKUP()
- MATCH()
- INDEX()
- IFERROR()

# End of Unit 10. LOOKUP Functions

?

Unit 11

# Analysis

# Analysis

What is WhatIf Analysis and why is it useful?



The PMT function

Three examples of Goal Seek

Working with Scenario Manager

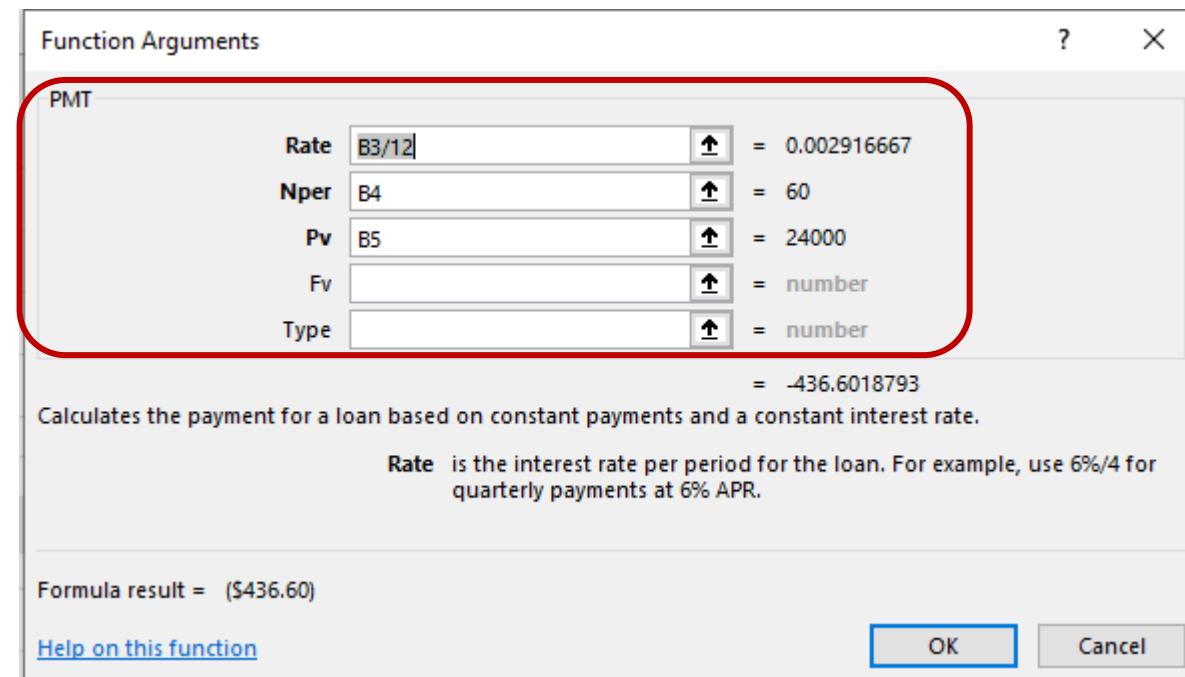
One-variable Data Tables

Two-variable Data Tables

Using the Solver Add-In

# PMT() Function

IF	:	=PMT(B3/12,B4,B5)
A		PMT(rate, nper, pv, [fv], [type])
Loan Payment with PMT and Goal Seek		
3	Rate (per annum)	3.5%
4	Term (months)	60
5	Loan Amount	\$24,000
6	Payment	=PMT(B3/12,B4,B5)
7		
8		
9	Test Scores	
10		
11	Science	75
12	Maths	85
13	History	98
14	Geography	84
15	English Language	76
16	Spanish	78
17	English Literature	
18	Average	
19		



# Handling -ve Value from PMT()

B6	=PMT(B3/12,B4,-B5)
A	B
1	Loan Payment with PMT and Goal Seek
2	
3	Rate (per annum)
4	Term (months)
5	Loan Amount
6	Payment
7	

# Goal Seek

The screenshot shows the Microsoft Excel ribbon with the 'Data' tab selected. In the 'Data Tools' section of the ribbon, the 'What-If Analysis' group is highlighted with a red box. Within this group, the 'Goal Seek...' button is also highlighted with a red box. A green callout bubble with the text 'Launch Goal Seek' points to the 'Goal Seek...' button.

**Loan Payment with PMT and Goal Seek**

1	Rate (per annum)
3	3.5%
4	Term (months)
5	60
5	Loan Amount
6	\$24,000
6	Payment
6	(\$436.60)

**Test Scores**

11	Science
12	Maths
13	History
14	Geography
15	English Language
16	Spanish
17	English Literature
18	Average

# Use Goal Seek

- What's the amount I can borrow if I could pay \$ 500 monthly

The screenshot shows a Microsoft Excel spreadsheet titled "Loan Payment with PMT and Goal Seek". The spreadsheet contains the following data:

	A	B	C	D	E	F
1						
2						
3	Rate (per annum)		3.5%			
4	Term (months)		60			
5	Loan Amount		\$27,485			
6	Payment		\$500.00			
7						

The formula in cell B6 is =PMT(B3/12,B4,-B5). A Goal Seek dialog box is open, showing the following settings:

- Set cell: B6
- To value: 500
- By changing cell: \$B\$5

The "OK" button is highlighted with a blue border.

# Using Goal Seek

- By how many months can I reduce my payment plan

Loan Payment with PMT and Goal Seek

Rate (per annum)	3.5%
Term (months)	60
Loan Amount	\$24,000
Payment	\$436.60

Goal Seek

Set cell: B6  
To value: 500  
By changing cell: \$B\$4

OK Cancel

Loan Payment with PMT and Goal Seek

Rate (per annum)	3.5%
Term (months)	52
Loan Amount	\$24,000
Payment	\$500.00

Goal Seek Status

Goal Seeking with Cell B6 found a solution.

Target value: 500  
Current value: \$500.00

Step Pause OK Cancel

# Using Goal Seek

- What's the Minimum I need to score in English so that my average is 80.

Test Scores	
Science	75
Maths	85
History	98
Geography	84
English Language	76
Spanish	78
English Literature	
Average	



Test Scores	
Science	75
Maths	85
History	98
Geography	84
English Language	76
Spanish	78
English Literature	100
Average	85

Add Calculation and dummy value to English Literature

# Using Goal Seek

Test Scores

Science	75
Maths	85
History	98
Geography	84
English Language	76
Spanish	78
English Literature	100
Average	85

Goal Seek

Set cell: \$B\$18  
To value: 80  
By changing cell: \$B\$17

OK Cancel

Test Scores

Science	75
Maths	85
History	98
Geography	84
English Language	76
Spanish	78
English Literature	64
Average	80

Goal Seek Status

Goal Seeking with Cell B18 found a solution.

Target value: 80  
Current value: 80

Step Pause OK Cancel

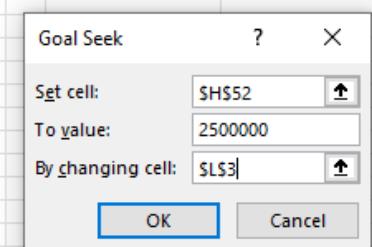
# Example 2

- My Budget is 2.5M, I have given an increase of 2.7%, what max increase can I give to exhaust my budget

	A	B	C	D	E	F	G	H	I	J	K	L
1	Employee Name	Department	Status	Hire Date	Years	Salary	Job Rati	New Salary		Budget(Staff Salaries)	\$ 2,500,000.00	
2	Maude Sweigart	IT	Full Time	9/28/2002	20	\$29,260	4	\$30,050				
3	Leonor Triplett	IT	Full Time	11/21/2009	13	\$39,000	5	\$40,053	Increase (%)	2.7%		
4	Cleotilde Speck	Human Resources	Full Time	10/17/2012	10	\$49,260	3	\$50,590				
5	Criselda Ogle	IT	Full Time	10/28/2013	9	\$24,840	1	\$25,511				
6	Khalilah Holford	IT	Full Time	2/4/2002	21	\$39,000	3	\$40,053				
7	Oren Rawlings	Manufacturing Admin	Contract	5/25/2003	20	\$74,500	4	\$76,512				
8	Suzi Gragg	Manufacturing	Full Time	12/26/2008	14	\$79,730	2	\$81,883				
9	Clifford Mouzon	Creative	Full Time	10/7/2014	8	\$82,500	5	\$84,728				
10	Shaunna Hori	IT	Half-Time	6/18/2014	8	\$35,045	4	\$35,991				
11	Gordon Neidig	IT	Contract	11/10/2013	9	\$89,450	2	\$91,865				
12	Theola Danner	Customer Services	Contract	4/30/2002	21	\$71,300	5	\$73,225				
13	Claire Sergi	Customer Services	Hourly	5/18/2001	22	\$16,688	3	\$17,139				
14	Pamala Laureano	IT	Half-Time	4/30/2013	10	\$16,925	1	\$17,382				
15	Cassie Real	Quality Control	Contract	10/28/2000	22	\$45,030	3	\$46,246				
16	Dwight Kirkendoll	Finance	Full Time	11/23/2012	10	\$22,860	5	\$23,477				
17	Margret Barahona	Customer Services	Full Time	7/23/2013	9	\$63,206	1	\$64,913				
18	Krissy Swiger	Manufacturing	Hourly	4/2/2001	22	\$8,904	3	\$9,144				
19	Tiana Gaxiola	Customer Services	Full Time	12/16/2005	17	\$23,560	3	\$24,196				
20	Kendal Lambert	Customer Services	Full Time	6/7/2010	12	\$62,688	2	\$64,381				
21	Garnett Moglynn	IT	Hourly	8/30/2013	9	\$33,508	4	\$34,413				
22	Faviola Petrey	Customer Services	Full Time	12/28/2009	13	\$23,320	4	\$23,950				
23	Roseanne Withero	Manufacturing	Contract	7/8/2013	9	\$52,940	4	\$54,369				
24	Alphonse Clemmer	Research Center	Full Time	11/29/2005	17	\$42,800	5	\$43,956				
25	Shavonne Flick	Creative	Contract	10/4/2013	9	\$80,050	2	\$82,211				
26	Tonia Jimmerson	IT	Full Time	9/16/2002	20	\$48,250	3	\$49,553				
27	Awilda Herbert	Finance	Full Time	7/25/2015	7	\$87,980	1	\$90,355				
28	Allena Ploss	IT	Full Time	9/30/2009	13	\$87,030	3	\$89,380				
29	Ariana Patchell	IT	Hourly	12/26/2005	17	\$21,648	2	\$22,232				
30	Lorine Madonia	Manufacturing	Full Time	3/18/2002	21	\$37,760	2	\$38,780				
31	Nickole Rizzi	Customer Services	Full Time	12/22/2012	10	\$29,760	2	\$30,564				
32	Fabiola Pitts	IT	Hourly	12/2/2000	22	\$12,836	5	\$13,183				
33	Latia Beets	Human Resources	Full Time	5/21/2011	12	\$47,350	5	\$48,628				
34	Chanda Mccaw	Marketing	Full Time	8/14/2001	21	\$49,770	1	\$51,114				
35	Margene Trimm	Quality Control	Full Time	10/21/2002	20	\$35,460	1	\$36,417				
36	Keri Cass	Manufacturing	Full Time	4/23/2011	12	\$34,480	3	\$35,411				
37	Gaylord Fultz	Professional Training Grou	Full Time	6/29/2014	8	\$44,560	2	\$45,763				
38	Christena Roepke	Professional Training Grou	Full Time	10/5/2013	9	\$71,730	1	\$73,667				
39	Ja Manke	Human Resources	Contract	10/17/2005	17	\$31,970	5	\$32,833				
40	Madison Bachus	Manufacturing	Full Time	3/23/2004	19	\$66,010	5	\$67,792				
41	Janeth Lastra	IT	Half-Time	4/29/2005	18	\$33,810	5	\$34,723				
42	Marilynn Iokes	Manufacturing	Half-Time	10/9/2000	22	\$48,835	5	\$50,154				
43	Twanna Romine	Customer Services	Full Time	2/28/2013	10	\$47,340	2	\$48,618				
44	Gertie Verrett	Quality Control	Half-Time	5/17/2013	10	\$38,105	2	\$39,134				
45	Demetrice Hayford	Quality Control	Full Time	2/21/2003	20	\$65,320	5	\$67,084				
46	Marquerite Brian	Environmental Compliance	Full Time	1/15/2015	8	\$46,220	3	\$47,468				
47	Concepcion Dewo	Facilities/Engineering	Full Time	9/11/2006	16	\$66,890	5	\$68,696				
48	Soila Niemeyer	Manufacturing	Contract	7/20/2010	12	\$35,460	3	\$36,417				
49	Jade Ferri	IT	Full Time	4/7/2013	10	\$66,840	4	\$68,645				
50	Annamarie Chute	Manufacturing	Contract	7/19/2013	9	\$28,260	5	\$29,023				
51	Lucas Keyes	Manufacturing	Contract	11/28/2009	13	\$64,430	4	\$66,170				
52	Total								\$ 2,418,042			

- Use Goal Seek and set parameter values and click OK.

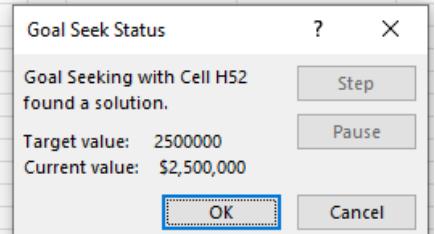
A	B	C	D	E	F	G	H	I	J	K	L
Employee Name	Department	Status	Hire Date	Years	Salary	Job Rate	New Salary			Budget (Staff Salaries)	\$ 2,500,000.00
Maude Sweigart	IT	Full Time	9/28/2002	20	\$29,260	4	\$30,050			Increase (%)	2.7%
Leonor Triplett	IT	Full Time	11/21/2009	13	\$39,000	5	\$40,053				
Cleotilde Speck	Human Resources	Full Time	10/17/2012	10	\$49,260	3	\$50,590				
Criselda Ogle	IT	Full Time	10/28/2013	9	\$24,840	1	\$25,511				
Khalilah Holford	IT	Full Time	2/4/2002	21	\$39,000	3	\$40,053				
Oren Rawlings	Manufacturing Admin	Contract	5/25/2003	20	\$74,500	4	\$76,512				
Suzi Gragg	Manufacturing	Full Time	12/26/2008	14	\$79,730	2	\$81,883				
Clifford Mouzon	Creative	Full Time	10/7/2014	8	\$82,500	5	\$84,728				
Shaunna Hori	IT	Half-Time	6/18/2014	8	\$35,045	4	\$35,991				
Gordon Neidig	IT	Contract	11/10/2013	9	\$89,450	2	\$91,865				
Theola Danner	Customer Services	Contract	4/30/2002	21	\$71,300	5	\$73,225				
Claire Sergi	Customer Services	Hourly	5/18/2001	22	\$16,688	3	\$17,139				
Pamala Laureano	IT	Half-Time	4/30/2013	10	\$16,925	1	\$17,382				
Cassie Real	Quality Control	Contract	10/28/2000	22	\$45,030	3	\$46,246				
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Krissy Swiger	Manufacturing	Hourly	4/2/2001	22	\$8,904	3	\$9,144				
Tiana Gaxiola	Customer Services	Full Time	12/16/2005	17	\$23,560	3	\$24,196				
Kendal Rambert	Customer Services	Full Time	6/7/2010	12	\$62,688	2	\$64,381				
Garnett Moglynn	IT	Hourly	8/30/2013	9	\$33,508	4	\$34,413				
Faviola Petrey	Customer Services	Full Time	12/28/2009	13	\$23,320	4	\$23,950				
Roseanne Withero	Manufacturing	Contract	7/8/2013	9	\$52,940	4	\$54,369				
Alphonse Clemmei	Research Center	Full Time	11/29/2005	17	\$42,800	5	\$43,956				
Shavonne Flick	Creative	Contract	10/4/2013	9	\$80,050	2	\$82,211				
Tonia Jimmerson	IT	Full Time	9/16/2002	20	\$48,250	3	\$49,553				
Awilda Herbert	Finance	Full Time	7/25/2015	7	\$87,980	1	\$90,355				
Allena Ploss	IT	Full Time	9/30/2009	13	\$87,030	3	\$89,380				
Ariana Patchell	IT	Hourly	12/26/2005	17	\$21,648	2	\$22,232				
Lorine Madonia	Manufacturing	Full Time	3/18/2002	21	\$37,760	2	\$38,780				
Nickole Rizzi	Customer Services	Full Time	12/22/2012	10	\$29,760	2	\$30,564				
Fabiola Pitts	IT	Hourly	12/2/2000	22	\$12,836	5	\$13,183				
Latia Betts	Human Resources	Full Time	5/21/2011	12	\$47,350	5	\$48,628				
Chanda Mccaw	Marketing	Full Time	8/14/2001	21	\$49,770	1	\$51,114				
Margene Trimm	Quality Control	Full Time	10/21/2002	20	\$35,460	1	\$36,417				
Keri Cass	Manufacturing	Full Time	4/23/2011	12	\$34,480	3	\$35,411				
Gaylord Fultz	Professional Training Gro	Full Time	6/29/2014	8	\$44,560	2	\$45,763				
Christena Roepek	Professional Training Gro	Full Time	10/5/2013	9	\$71,730	1	\$73,667				
Ja Manke	Human Resources	Contract	10/17/2005	17	\$31,970	5	\$32,833				
Madison Bachus	Manufacturing	Full Time	3/23/2004	19	\$66,010	5	\$67,792				
Janeth Lastra	IT	Half-Time	4/29/2005	18	\$33,810	5	\$34,723				
Marilynn Ickes	Manufacturing	Half-Time	10/9/2000	22	\$48,835	5	\$50,154				
Twanna Romine	Customer Services	Full Time	2/28/2013	10	\$47,340	2	\$48,618				
Gertie Verrett	Quality Control	Half-Time	5/17/2013	10	\$38,105	2	\$39,134				
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Marquerite Brian	Environmental Compliance	Full Time	1/15/2015	8	\$46,220	3	\$47,468				
Concepcion Dewo	Facilities/Engineering	Full Time	9/1/2006	16	\$66,890	5	\$68,696				
Soila Niemeyer	Manufacturing	Contract	7/20/2010	12	\$35,460	3	\$36,417				
Jade Ferri	IT	Full Time	4/7/2013	10	\$66,840	4	\$68,645				
Annamaria Chute	Manufacturing	Contract	7/19/2013	9	\$28,260	5	\$29,023				
Lucas Keyes	Manufacturing	Contract	11/28/2009	13	\$64,430	4	\$66,170				
<b>Total</b>										<b>Budget (Staff Salaries)</b>	<b>\$ 2,418,042</b>



- Goal Seek show we can give an increase of 6.2%

L6

A	B	C	D	E	F	G	H	I	J	K	L
Employee Name	Department	Status	Hire Date	Years	Salary	Job Rat	New Salary			Budget (Staff Salaries)	\$ 2,500,000.00
Maude Sweigart	IT	Full Time	9/28/2002	20	\$23,260	4	\$31,069			Increase (%)	6.2%
Leonor Triplett	IT	Full Time	11/21/2003	13	\$39,000	5	\$41,411				
Cleotilde Speck	Human Resources	Full Time	10/17/2012	10	\$49,260	3	\$52,305				
Criselda Ogle	IT	Full Time	10/28/2013	9	\$24,840	1	\$26,375				
Khalilah Holford	IT	Full Time	2/4/2002	21	\$39,000	3	\$41,411				
Oren Rawlings	Manufacturing Admin	Contract	5/25/2003	20	\$74,500	4	\$79,105				
Suzi Gragg	Manufacturing	Full Time	12/26/2008	14	\$79,730	2	\$84,658				
Clifford Mouzon	Creative	Full Time	10/7/2014	8	\$82,500	5	\$87,599				
Shaunna Hori	IT	Half-Time	6/18/2014	8	\$35,045	4	\$37,211				
Gordon Neidig	IT	Contract	11/10/2013	9	\$89,450	2	\$94,979				
Theola Danner	Customer Services	Contract	4/30/2002	21	\$71,300	5	\$75,707				
Claire Sergi	Customer Services	Hourly	5/16/2001	22	\$16,688	3	\$17,720				
Pamala Laureano	IT	Half-Time	4/30/2013	10	\$16,925	1	\$17,971				
Cassie Real	Quality Control	Contract	10/28/2000	22	\$45,030	3	\$47,813				
Dwight Kirkendoll	Finance	Full Time	11/23/2012	10	\$22,860	5	\$24,273				
Margret Barahona	Customer Services	Full Time	7/23/2013	9	\$63,206	1	\$67,113				
Krissy Swiger	Manufacturing	Hourly	4/2/2001	22	\$8,904	3	\$9,454				
Tiana Gaxiola	Customer Services	Full Time	12/16/2005	17	\$23,560	3	\$25,016				
Kendal Rambert	Customer Services	Full Time	6/7/2010	12	\$62,688	2	\$66,563				
Garnett Moglynn	IT	Hourly	8/30/2013	9	\$33,508	4	\$35,579				
Faviola Petrey	Customer Services	Full Time	12/28/2009	13	\$23,320	4	\$24,761				
Roseanne Wethero	Manufacturing	Contract	7/8/2013	9	\$52,940	4	\$56,212				
Alphonse Clemmer	Research Center	Full Time	11/29/2005	17	\$42,800	5	\$45,446				
Shavonne Flick	Creative	Contract	10/4/2013	9	\$80,050	2	\$84,998				
Tonia Jimmerson	IT	Full Time	9/16/2002	20	\$48,250	3	\$51,232				
Awilda Herbert	Finance	Full Time	7/25/2015	7	\$87,980	1	\$93,418				
Allena Ploss	IT	Full Time	9/30/2009	13	\$87,030	3	\$92,409				
Ariana Patchell	IT	Hourly	12/26/2005	17	\$21,648	2	\$22,986				
Lorine Madonia	Manufacturing	Full Time	3/18/2002	21	\$37,760	2	\$40,094				
Nickole Rizzi	Customer Services	Full Time	12/22/2012	10	\$29,760	2	\$31,600				
Fabiola Pitts	IT	Hourly	12/21/2000	22	\$12,836	5	\$13,629				
Latia Beets	Human Resources	Full Time	5/21/2011	12	\$47,350	5	\$50,277				
Chanda Mccaw	Marketing	Full Time	8/14/2001	21	\$49,770	1	\$52,846				
Margene Trimm	Quality Control	Full Time	10/21/2002	20	\$35,460	1	\$37,652				
Keri Cass	Manufacturing	Full Time	4/23/2011	12	\$34,480	3	\$36,611				
Gaylord Fultz	Professional Training Grou	Full Time	6/23/2014	8	\$44,560	2	\$47,314				
Christena Roepke	Professional Training Grou	Full Time	10/5/2013	9	\$71,730	1	\$76,164				
Ja Manke	Human Resources	Contract	10/17/2005	17	\$31,970	5	\$33,946				
Madison Bachus	Manufacturing	Full Time	3/23/2004	19	\$66,010	5	\$70,090				
Janeth Lastra	IT	Half-Time	4/29/2005	18	\$33,810	5	\$35,900				
Marilynn Ickes	Manufacturing	Half-Time	10/9/2000	22	\$48,835	5	\$51,854				
Twanna Romine	Customer Services	Full Time	2/26/2013	10	\$47,340	2	\$50,266				
Gentie Verrett	Quality Control	Half-Time	5/17/2013	10	\$38,105	2	\$40,460				
Demetrice Hayford	Quality Control	Full Time	2/21/2003	20	\$65,320	5	\$69,358				
Marquerite Brian	Environmental Compliance	Full Time	1/15/2015	8	\$46,220	3	\$49,077				
Concepcion Dewo	Facilities/Engineering	Full Time	9/1/2006	16	\$66,890	5	\$71,025				
Solla Niemeyer	Manufacturing	Contract	7/20/2010	12	\$35,460	3	\$37,652				
Jade Ferri	IT	Full Time	4/7/2013	10	\$66,840	4	\$70,971				
Annamaria Chute	Manufacturing	Contract	7/19/2013	9	\$28,260	5	\$30,007				
Lucas Keyes	Manufacturing	Contract	11/28/2009	13	\$64,430	4	\$68,413				
<b>Total</b>											<b>\$ 2,500,000</b>



# Scenario Manager

- Add named ranges, Load Scenario Manager from Data Tab-> Forecast group ->What-if Analysis-> Scenario Manager. Create 4 Scenarios.

The screenshot shows a Microsoft Excel spreadsheet and the Scenario Manager dialog box. The spreadsheet contains a budget summary with the following data:

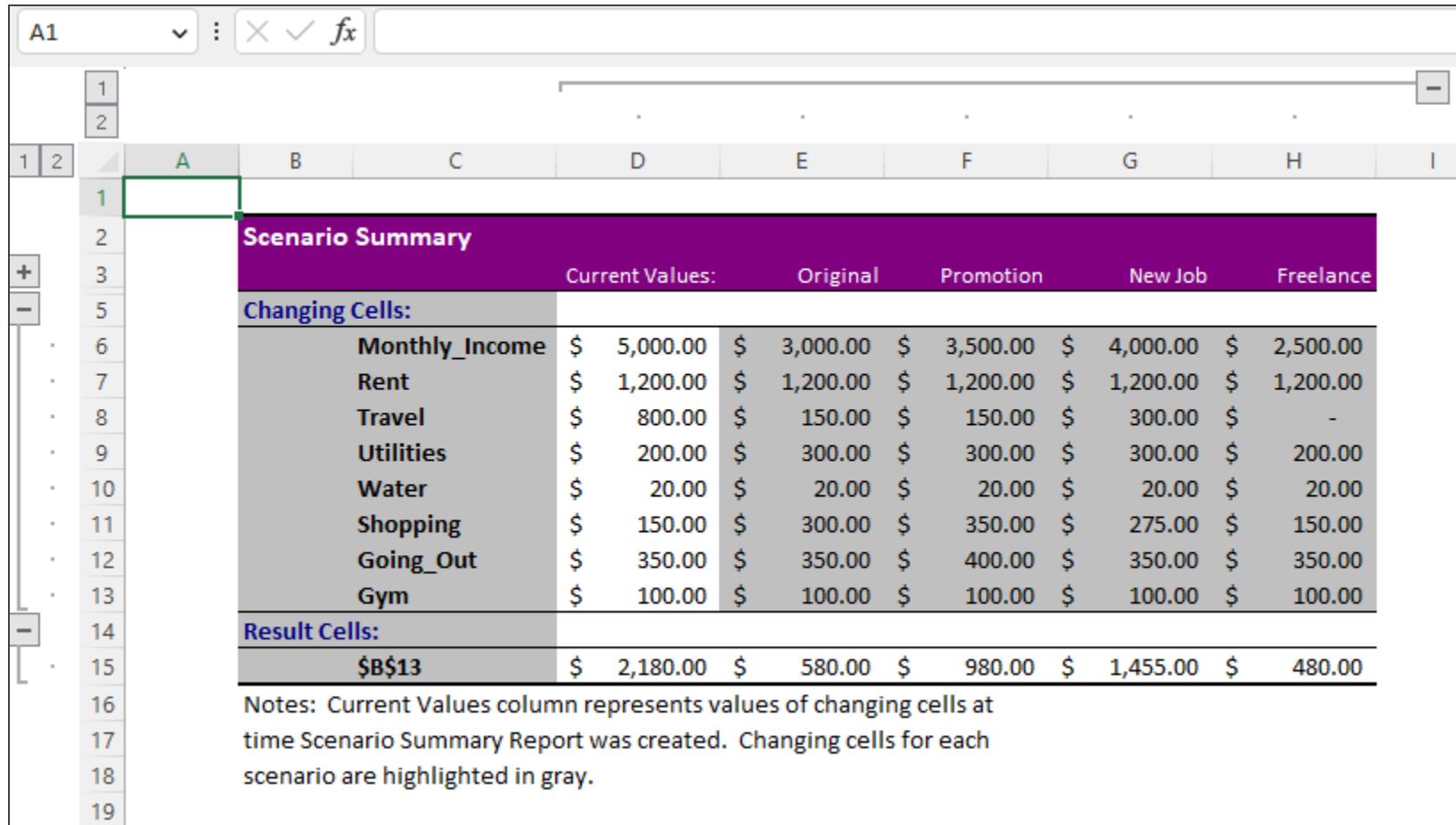
	\$	5,000.00
Monthly Income	\$	5,000.00
Rent	\$	1,200.00
Travel	\$	800.00
Utilities	\$	200.00
Water	\$	20.00
Shopping	\$	150.00
Going Out	\$	350.00
Gym	\$	100.00
Total expenses	\$	2,820.00
Amount Left	\$	2,180.00

The Scenario Manager dialog box is open, displaying four scenarios:

- Original (selected)
- Promotion
- New Job
- Freelance

Buttons in the dialog box include Add..., Delete, Edit..., Merge..., and Summary... At the bottom are Show and Close buttons. The Changing cells field shows "Monthly\_Income,\$B\$3:\$B\$9" and the Comment field shows "Created by Deb Ashby on 5/21/2020".

# Scenario Manager - Summary



The screenshot shows the Microsoft Excel ribbon at the top with tabs like Home, Insert, Page Layout, Formulas, Data, etc. Below the ribbon is the Excel interface with columns A through I and rows 1 through 19. Cell A1 is highlighted. The main area displays a 'Scenario Summary' report. The report has a header row with columns: Current Values:, Original, Promotion, New Job, Freelance. Below this is a section titled 'Changing Cells:' which lists various monthly expenses with their current values under the 'Current Values:' column and their values under different scenarios. At the bottom is a section titled 'Result Cells:' with a single value. A note at the bottom explains the 'Current Values' column.

	Current Values:	Original	Promotion	New Job	Freelance
<b>Scenario Summary</b>					
<b>Changing Cells:</b>					
Monthly_Income	\$ 5,000.00	\$ 3,000.00	\$ 3,500.00	\$ 4,000.00	\$ 2,500.00
Rent	\$ 1,200.00	\$ 1,200.00	\$ 1,200.00	\$ 1,200.00	\$ 1,200.00
Travel	\$ 800.00	\$ 150.00	\$ 150.00	\$ 300.00	\$ -
Utilities	\$ 200.00	\$ 300.00	\$ 300.00	\$ 300.00	\$ 200.00
Water	\$ 20.00	\$ 20.00	\$ 20.00	\$ 20.00	\$ 20.00
Shopping	\$ 150.00	\$ 300.00	\$ 350.00	\$ 275.00	\$ 150.00
Going_Out	\$ 350.00	\$ 350.00	\$ 400.00	\$ 350.00	\$ 350.00
Gym	\$ 100.00	\$ 100.00	\$ 100.00	\$ 100.00	\$ 100.00
<b>Result Cells:</b>					
<b>\$B\$13</b>	\$ 2,180.00	\$ 580.00	\$ 980.00	\$ 1,455.00	\$ 480.00
Notes: Current Values column represents values of changing cells at time Scenario Summary Report was created. Changing cells for each scenario are highlighted in gray.					

- If you ask **Scenario Manager** to insert Summary, it inserts a new sheet.

# Data Tables

**One-variable data table**

Loan Amount	10,000
Interest Rate (yearly)	2.00%
Term (months)	30
Monthly Payment	B3

Function Arguments

PMT

Rate	B4/12	= 0.001666667
Nper	B5	= 30
Pv	-B3	= -10000
Fv		= number
Type		= number

= 342.0137511

Calculates the payment for a loan based on constant payments and a constant interest rate.

Pv is the present value: the total amount that a series of future payments is worth now.

Formula result = \$342.01

[Help on this function](#)

OK Cancel

# Data Table Structure & Link Cell

Prepare Data Table Structure  
with Link Cell

One-variable data table	
Loan Amount	10,000
Interest Rate (yearly)	2.00%
Term (months)	30
Monthly Payment	\$342.01

Link Cell

Interest rates	\$342.01
1.00	
1.25	
1.50	
1.75	
2.00	
2.25	
2.50	
2.75	
3.00	

**One-variable data table**

Loan Amount	10,000
Interest Rate (yearly)	2.00%
Term (months)	30
Monthly Payment	\$342.01

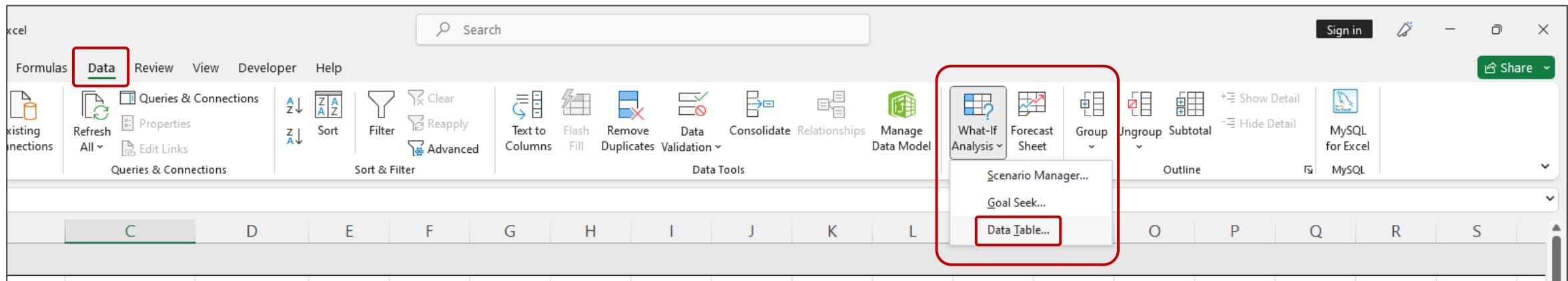
Link Cell

Interest rates	\$342.01
1.00	
1.25	
1.50	
1.75	
2.00	
2.25	
2.50	
2.75	
3.00	

- Select the Columns and Launch Data Table

# Launch Data Table

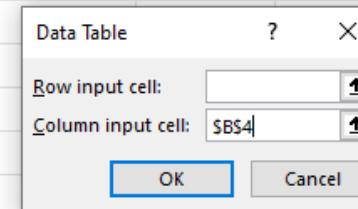


### One-variable data table

Loan Amount	10,000
Interest Rate (yearly)	2.00%
Term (months)	30
Monthly Payment	\$342.01

Link Cell

Interest rates	\$342.01
1.00	
1.25	
1.50	
1.75	
2.00	
2.25	
2.50	
2.75	
3.00	



### One-variable data table

Loan Amount	10,000
Interest Rate (yearly)	2.00%
Term (months)	30
Monthly Payment	\$342.01

Link Cell

Interest rates	\$342.01
1.00	\$916.36
1.25	\$1,097.84
1.50	\$1,287.60
1.75	\$1,483.31
2.00	\$1,683.18
2.25	\$1,885.88
2.50	\$2,090.49
2.75	\$2,296.37
3.00	\$2,503.10



# Two Variable Table

O10       =B5

A	B	C	D	E	F	G	H	I	J	K
1										
2	<b>Loan Amount</b>	\$ 300,000								
3	<b>Interest Rate (yearly)</b>	3.00%								
4	<b>Term (years)</b>	30								
5	<b>Monthly Payment</b>	\$10,392.18								
6										
7										
8		1.00%	1.25%	1.50%	1.75%	2.00%	2.25%	2.75%	3.00%	3.25%
9	\$ 100,000									
10	\$ 125,000									
11	\$ 150,000									
12	\$ 175,000									
13	\$ 200,000									
14	\$ 225,000									
15	\$ 250,000									
16	\$ 275,000									
17	\$ 300,000									
18										

Data Table      ?      X

Row input cell: \$B\$3     

Column input cell: \$O\$10

# Two Variable Table

Loan Amount	\$ 300,000									
Interest Rate (yearly)	3.00%									
Term (years)	30									
Monthly Payment	\$10,392.18									
		1.00%	1.25%	1.50%	1.75%	2.00%	2.25%	2.75%	3.00%	3.25%
\$ 100,000	10129.7	10162.3	10194.92	10227.63	10260.41	10293.26	10359.14	10392.18	10425.28	
\$ 125,000	10129.7	10162.3	10194.92	10227.63	10260.41	10293.26	10359.14	10392.18	10425.28	
\$ 150,000	10129.7	10162.3	10194.92	10227.63	10260.41	10293.26	10359.14	10392.18	10425.28	
\$ 175,000	10129.7	10162.3	10194.92	10227.63	10260.41	10293.26	10359.14	10392.18	10425.28	
\$ 200,000	10129.7	10162.3	10194.92	10227.63	10260.41	10293.26	10359.14	10392.18	10425.28	
\$ 225,000	10129.7	10162.3	10194.92	10227.63	10260.41	10293.26	10359.14	10392.18	10425.28	
\$ 250,000	10129.7	10162.3	10194.92	10227.63	10260.41	10293.26	10359.14	10392.18	10425.28	
\$ 275,000	10129.7	10162.3	10194.92	10227.63	10260.41	10293.26	10359.14	10392.18	10425.28	
\$ 300,000	10129.7	10162.3	10194.92	10227.63	10260.41	10293.26	10359.14	10392.18	10425.28	

# End of unit Logical Functions

?