



EXCEL

Training

Module

Edition 205

Author:

**MUHAMMAD ALI
SULTAN**



About the Author

Hey there! I'm Muhammad Ali Sultan, a lover of all things tech—especially when it comes to making data work smarter.

I created this Excel module because I know how powerful spreadsheets can be—not just for number crunching but for business intelligence, automation, and decision-making. From beginner to advanced, this guide is designed to take you step by step, with real-world examples and practical exercises to make learning both effective and engaging.

Feel free to reach out—I'd love to connect!

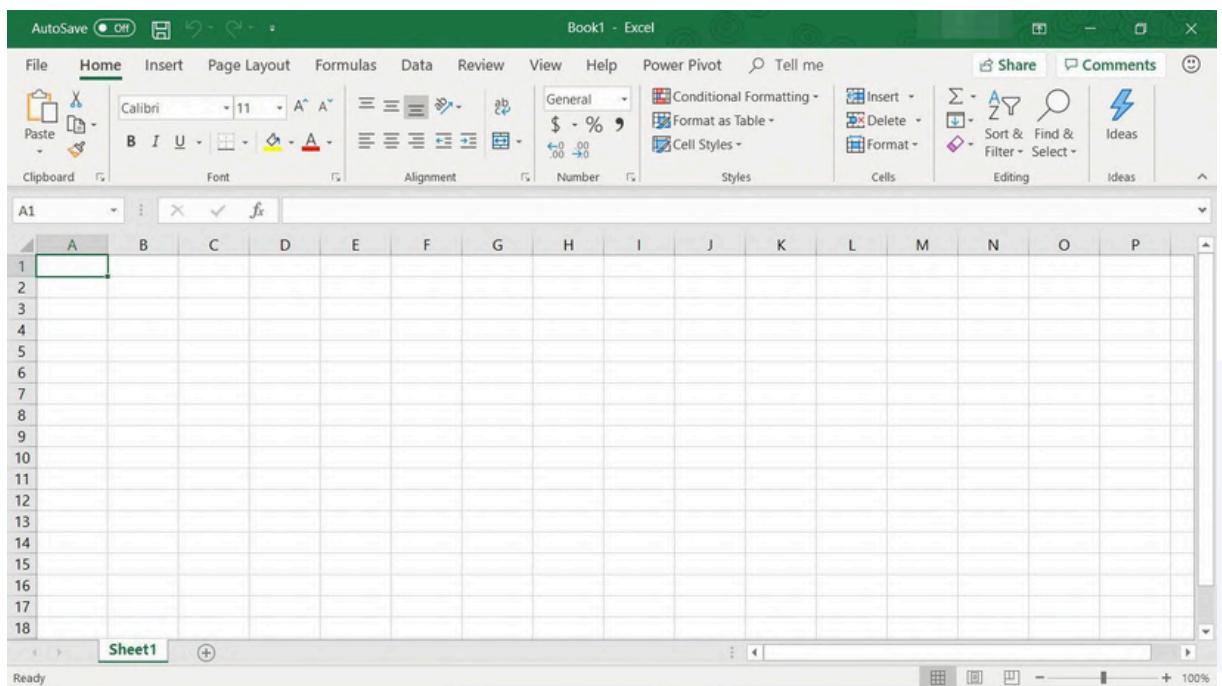
 m.sultan2722@gmail.com
 Jakarta, Indonesia
 +62 852-1922-0152



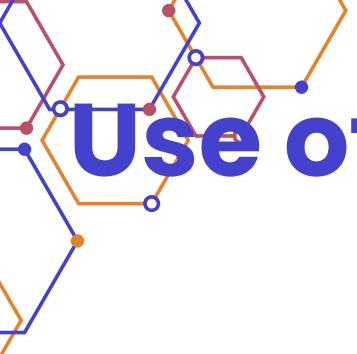
Getting started with excel

What is Excel?

Microsoft Excel is a spreadsheet program developed by Microsoft, used to organize, analyze and store data in tabular format.



- It is part of the Microsoft Office Suite and is widely used in business, education, and personal projects.
- Excel allows users to perform calculations, create graphs, and analyze data using formulas, functions, and tools.



Use of Excel in Personal and Professional Life

Personal use:

- Budgeting and expense tracking.
- Make to-do lists and schedules.
- Manage personal data (e.g. fitness tracking, meal planning).

PERSONAL MONTHLY BUDGET

PROJECTED MONTHLY INCOME		Income 1 Extra income Total monthly income	\$4,300.00 \$300.00 \$4,600.00	PROJECTED BALANCE [Projected income minus expenses]		\$3,405.00			
ACTUAL MONTHLY INCOME		Income 1 Extra income Total monthly income	\$4,000.00 \$300.00 \$4,300.00	ACTUAL BALANCE [Actual income minus expenses]		\$3,044.00			
HOUSING		Projected Cost	Actual Cost	Difference	DIFERENCE [Actual minus projected]				
Mortgage or rent	\$1,000.00	\$1,000.00	\$0.00	\$0.00	(\$341.00)				
Phone	\$54.00	\$100.00	-\$46.00	\$0.00					
Electricity	\$44.00	\$56.00	-\$12.00	\$0.00					
Gas	\$22.00	\$18.00	-\$4.00	\$0.00					
Water and sewer	\$8.00	\$8.00	\$0.00	\$0.00					
Cable	\$34.00	\$34.00	\$0.00	\$0.00					
Waste removal	\$10.00	\$10.00	\$0.00	\$0.00					
Maintenance or repairs	\$23.00	\$0.00	\$23.00	\$0.00					
Supplies	\$0.00	\$0.00	\$0.00	\$0.00					
Other	\$0.00	\$0.00	\$0.00	\$0.00					
Subtotal				-\$41.00					
TRANSPORTATION		Projected Cost	Actual Cost	Difference	ENTERTAINMENT				
Vehicle payment	\$0.00				Projected Cost	Actual Cost	Difference		
Bus/taxi fare					Video/DVD		\$0.00		
Insurance					CDs		\$0.00		
Licensing					Movies		\$0.00		
Fuel					Concerts		\$0.00		
Maintenance					Sporting events		\$0.00		
Other					Live theater		\$0.00		
Subtotal					Other		\$0.00		
FOOD		Projected Cost	Actual Cost	Difference	Subtotal		\$0.00		
Groceries									
Dining out									
Other									
Subtotal				\$0.00					
LOANS		Projected Cost	Actual Cost	Difference	SAVINGS OR INVESTMENTS		Projected Cost	Actual Cost	Difference
Personal					Projected Cost	Actual Cost	Difference		
Student					Retirement account		\$0.00		
Credit card					Investment account		\$0.00		
Credit card					Other		\$0.00		
Other					Subtotal		\$0.00		

Professional

- Financial analysis and reporting.
- Data visualization (diagrams and graphs).
- Inventory management and project planning.
- Statistical analysis and forecasting.

REAL ESTATE SALES REPORT TEMPLATE





Module Overview



This module is designed to take you from beginner to advanced Excel user.

This includes:

Basic data entry and formatting.

Intermediary function and data analysis.

Powerful tools like PivotTables, macros, and automation.

By the end of this module, you will be able to:

Create professional spreadsheets.

Analyze and visualize data effectively.

- Automate repetitive tasks.



How to Use This Module Effectively

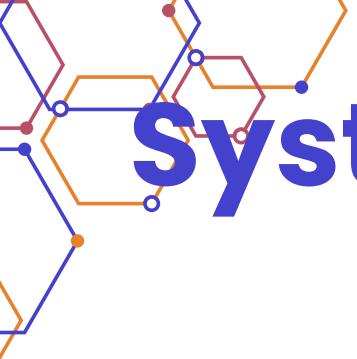
Step-by-Step Learning

Practice Exercises

Hands-On Practice

Take Notes

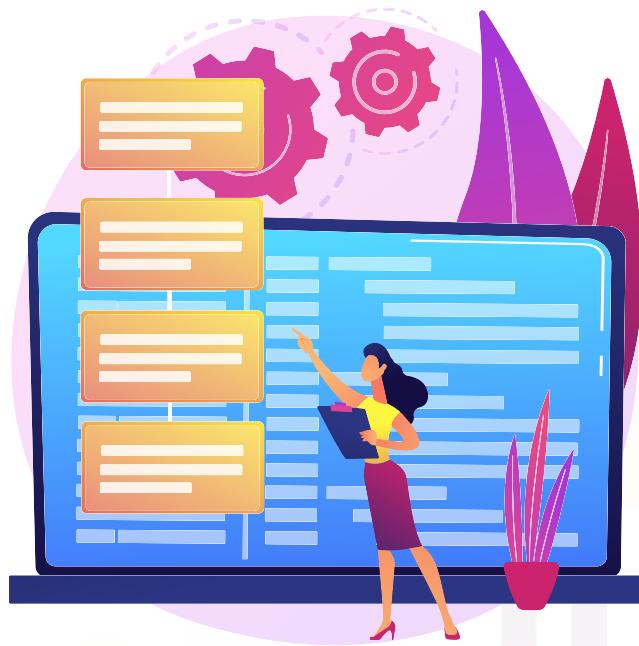
- Step-by-Step Learning: Follow the chapters sequentially, as each chapter is a continuation of the previous chapter.
- Practice Exercises: Complete the exercises at the end of each chapter to reinforce your learning.
- Practical Practice: Open Excel and try out the examples while reading.
- Take Notes: Use margins or a notebook to jot down important points.
- Ask Questions: If you get stuck, look to forums or online communities for help.



System Requirements and Settings

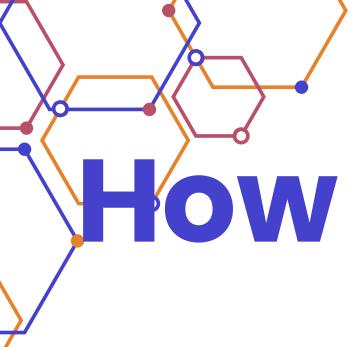
System Requirements

- Operating System: Windows 10/11 or macOS.
- RAM: 4 GB or higher.
- Storage: 4 GB free space.
- Excel version: Microsoft Excel 2016 or later (Excel 365 recommended).



Setup

- Make sure your software is updated to the latest version.



How to download Excel?

Downloading Excel On Windows

- Visit Microsoft Official Website:
- Visit www.microsoft.com.
- Navigate to the Products section and select Office.
- Select Microsoft 365 (formerly Office 365) for the latest version of Excel.
- Choose between Personal, Family, or Business plans based on your needs.
- Sign in with your Microsoft account or create a new one.
- Click the Install Office button.
- Follow the on-screen instructions to download and install Excel.
- Open Excel and sign in with your Microsoft account to activate it.

The screenshot shows the Microsoft 365 download page. At the top, there's a navigation bar with links for Microsoft, Microsoft 365, Products, Plans and pricing, Resources, and Support. Below the navigation is a large blue button labeled "Download Microsoft 365 (Formerly Office 365)". A subtext below the button reads "Speak the universal language of productivity with tools that empower you to create your best work." Two buttons are visible: "Download now" and "Free Office online for the web".

Leverage the cloud when you Download Microsoft 365 (Office 365)

Microsoft 365 has the tools you need to seamlessly create, collaborate, and share from all your devices. And with security features such as encrypted email and data loss prevention, you and your team can work safely from anywhere.

Download Microsoft 365

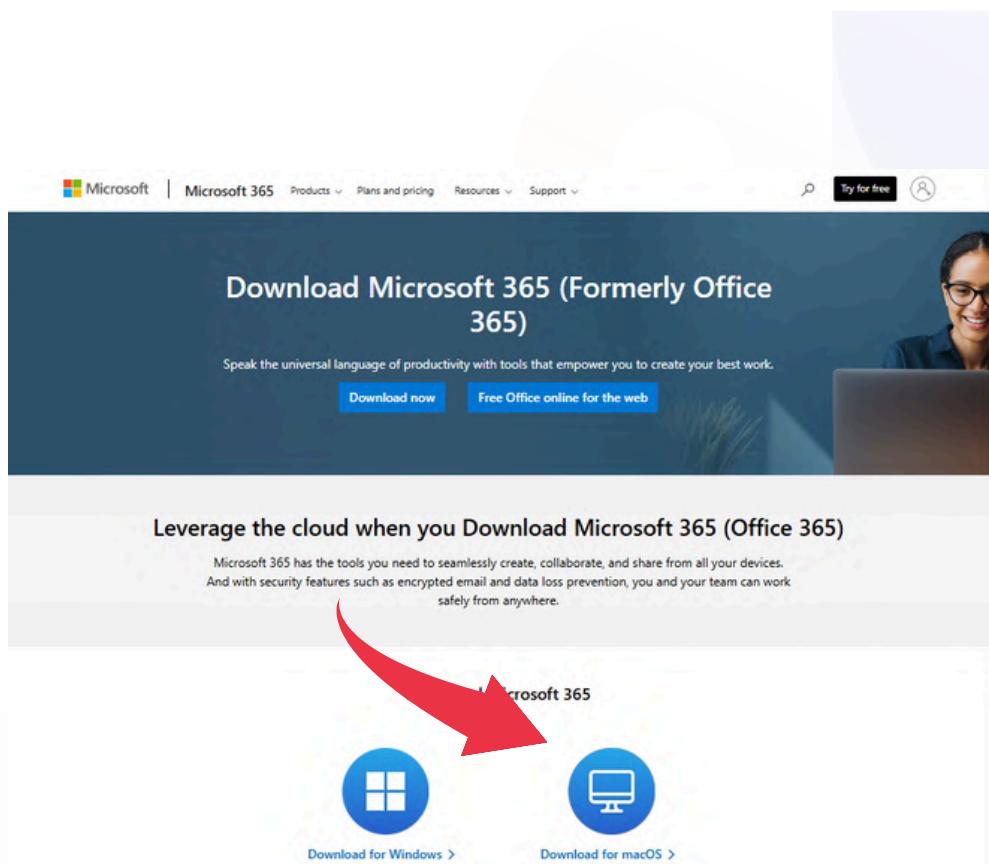


[Download for Windows >](#)



Downloading Excel On MacOS

- Visit Microsoft Official Website:
- Visit www.microsoft.com.
- Navigate to the Products section and select Office.
- Select Microsoft 365 (formerly Office 365) for the latest version of Excel.
- Choose between Personal, Family, or Business plans based on your needs.
- Sign in with your Microsoft account or create a new one.
- Click the Install Office button.
- Follow the on-screen instructions to download and install Excel.
- Open Excel and sign in with your Microsoft account to activate it.

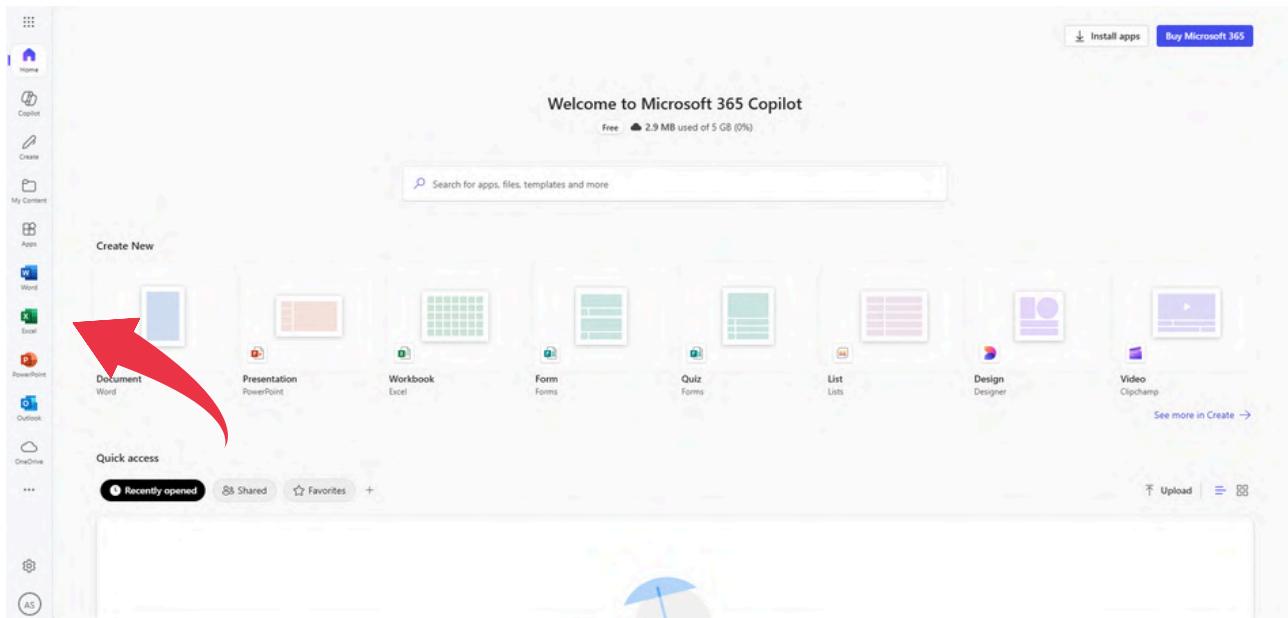




Versi Gratis VS Berbayar

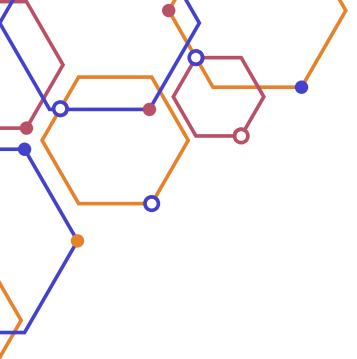
Versi Gratis:

- Excel Online (web-based) is free to use with a Microsoft account.
- The mobile app is free but requires a Microsoft 365 subscription to get full features.



Versi Berbayar:

- A Microsoft 365 subscription provides full access to Excel on all devices.
- Prices start at \$6.99/month for individuals.

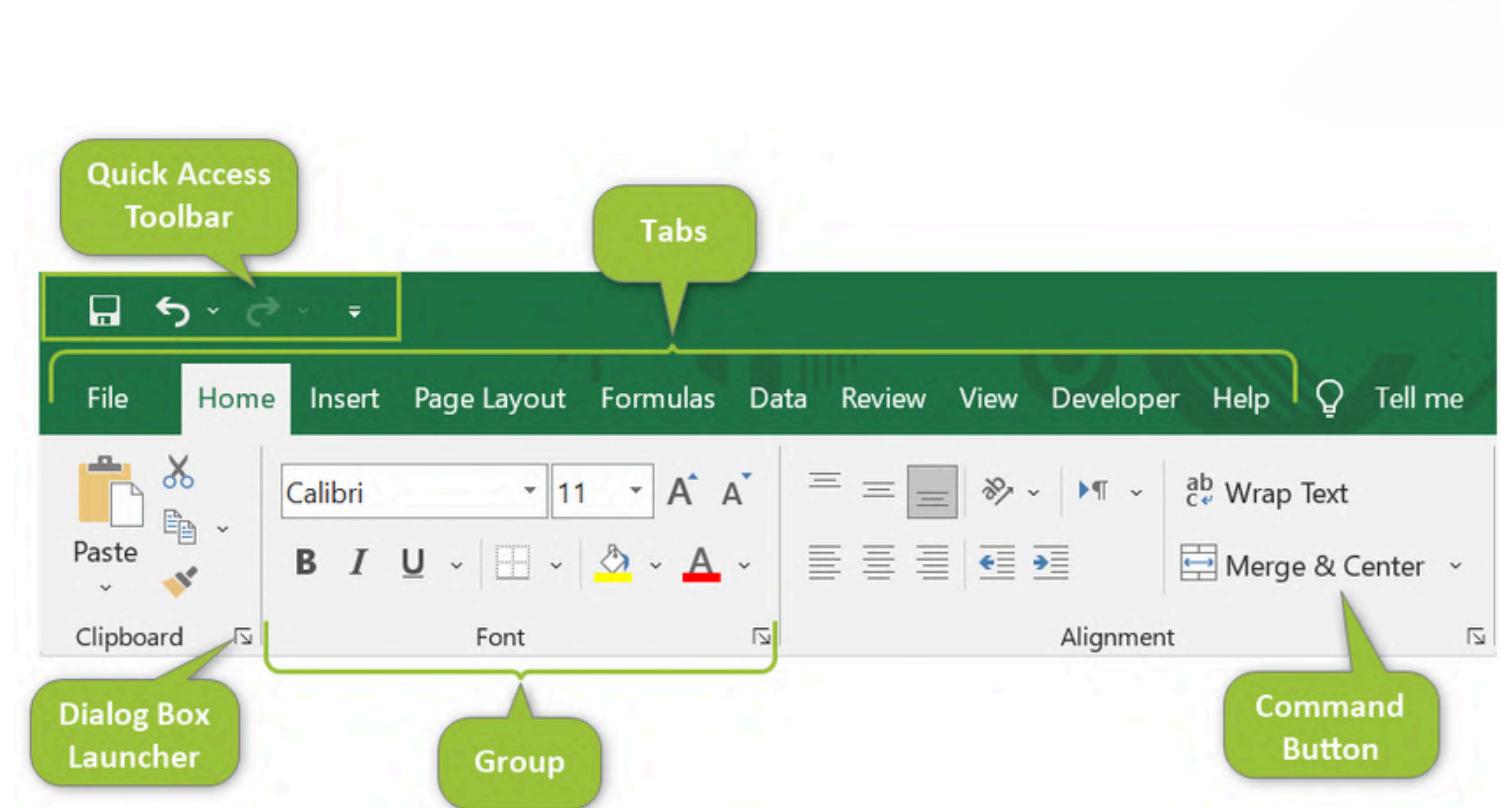


EXCEL INTERFACE OVERVIEW



Ribbon, Tabs, and Toolbars

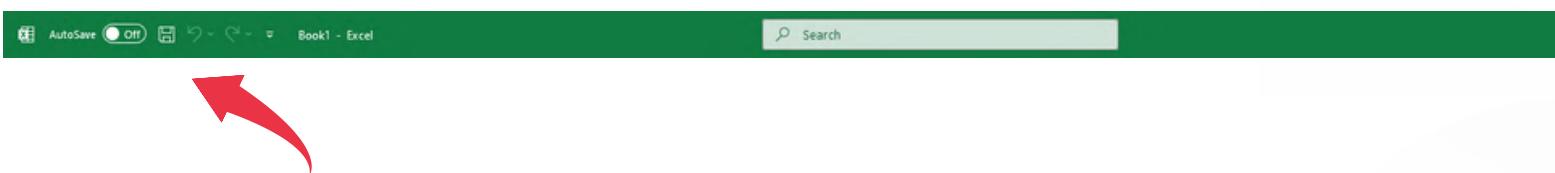
- The Ribbon is the toolbar at the top of the Excel window. It contains tabs, groups, and commands to perform tasks.
- Tabs: Each tab (for example, Home, Insert, Formulas) contains related commands grouped into sections.
- Groups: Within each tab, commands are organized into groups (for example, Font, Alignment, Number).
- Command: A button or dropdown that performs a specific action (for example, Bold, Sort, Insert Chart).





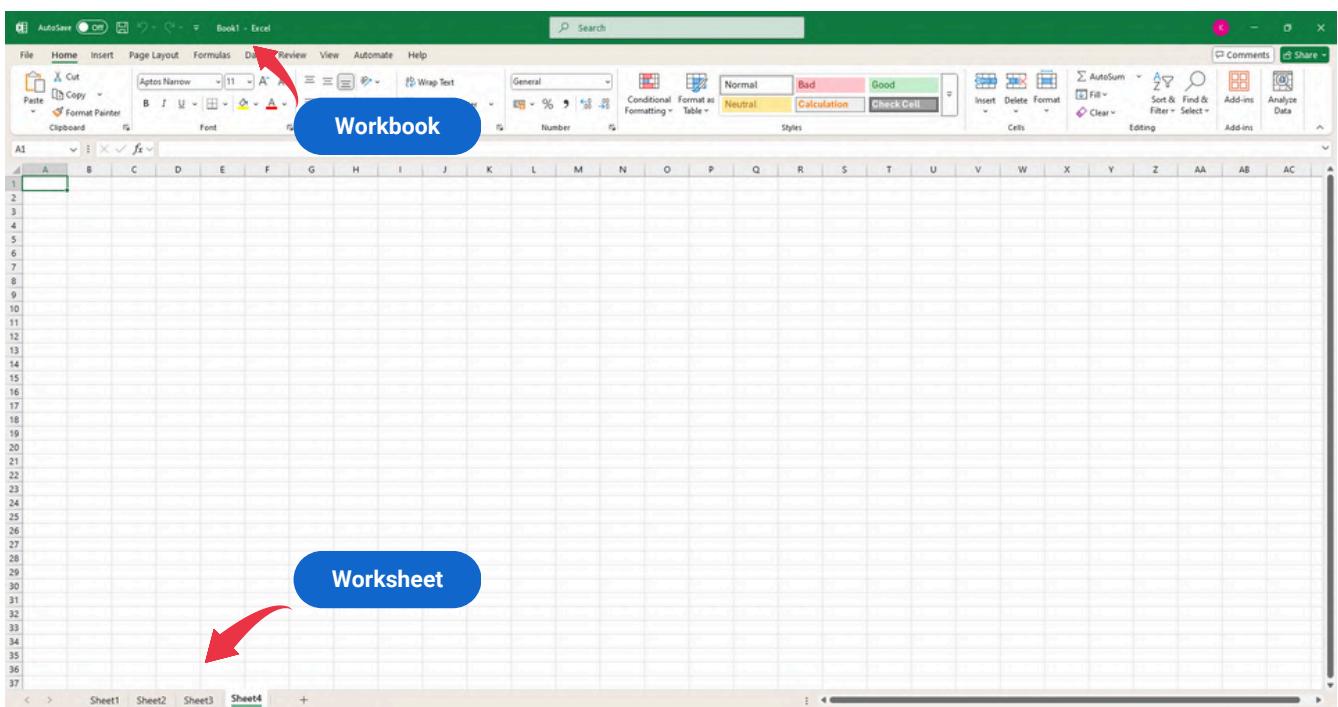
Quick Access Toolbar

- The Quick Access Toolbar is a customizable toolbar located above or below the Ribbon.
- It provides quick access to frequently used commands (e.g., Save, Undo, Redo).
- You can add or remove commands by clicking the dropdown arrow.

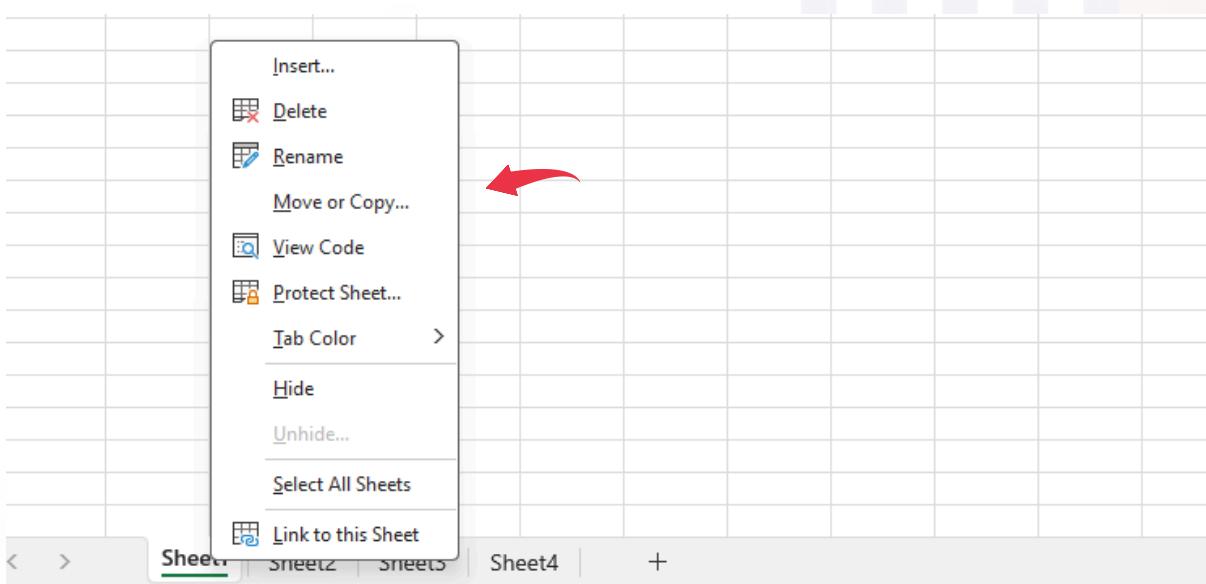


Workbook vs. Worksheet

- A Workbook is an Excel file that contains one or more Worksheets.
- A Worksheet is a single spreadsheet in a workbook, consisting of rows, columns, and cells.



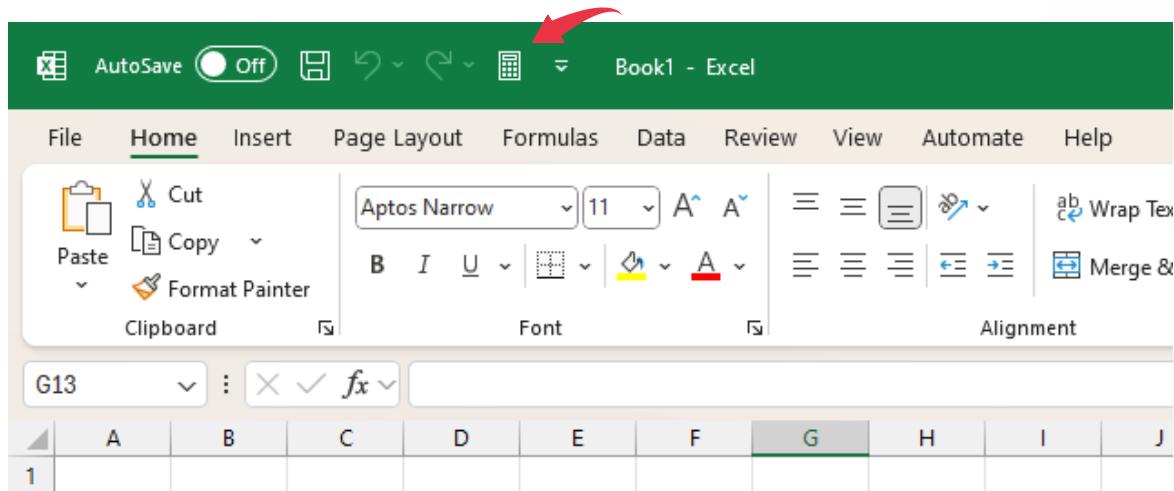
You can add, delete, rename, or rearrange worksheets using the tabs at the bottom of the Excel window. You can do this by right-clicking the menu on the Worksheet tab.



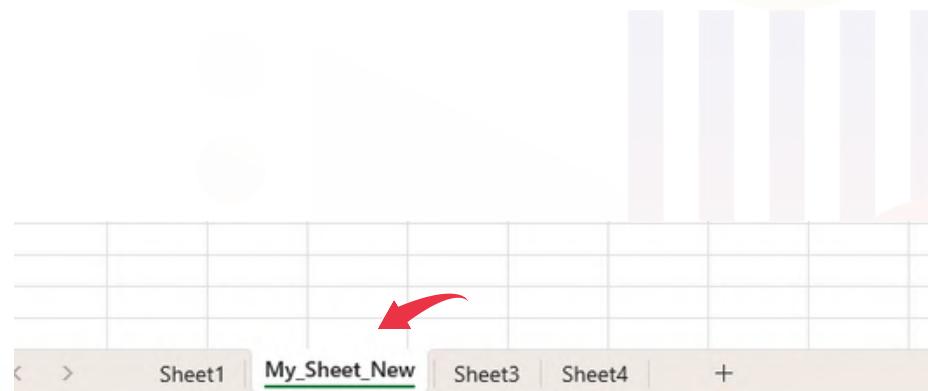


Practice Exercise

1. Open Excel and explore the Ribbon, Quick Access Toolbar, and Worksheets
2. Try adding a new command to the Quick Access Toolbar.



3. Rename the Worksheet and add a new one.



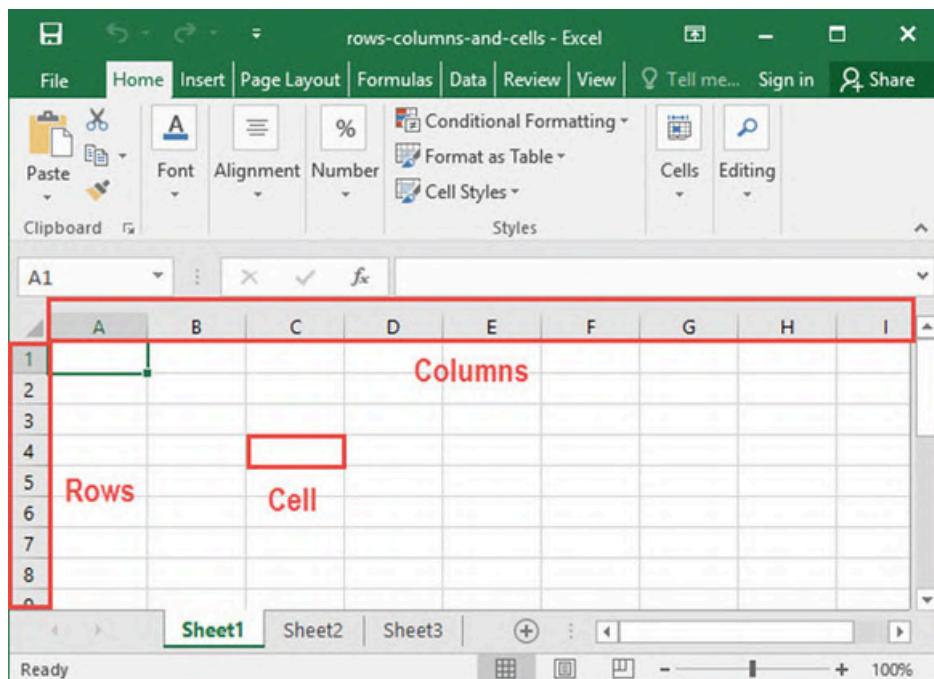
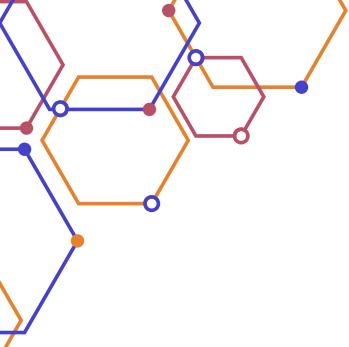
Recap

In this section, you learn about the Ribbon, the Quick Access Toolbar, and the difference between Workbooks and Worksheets. These are the basic elements of the Excel interface, and mastering them will make it easier to navigate and use Excel effectively.

Move Between Cells, Rows, and Columns

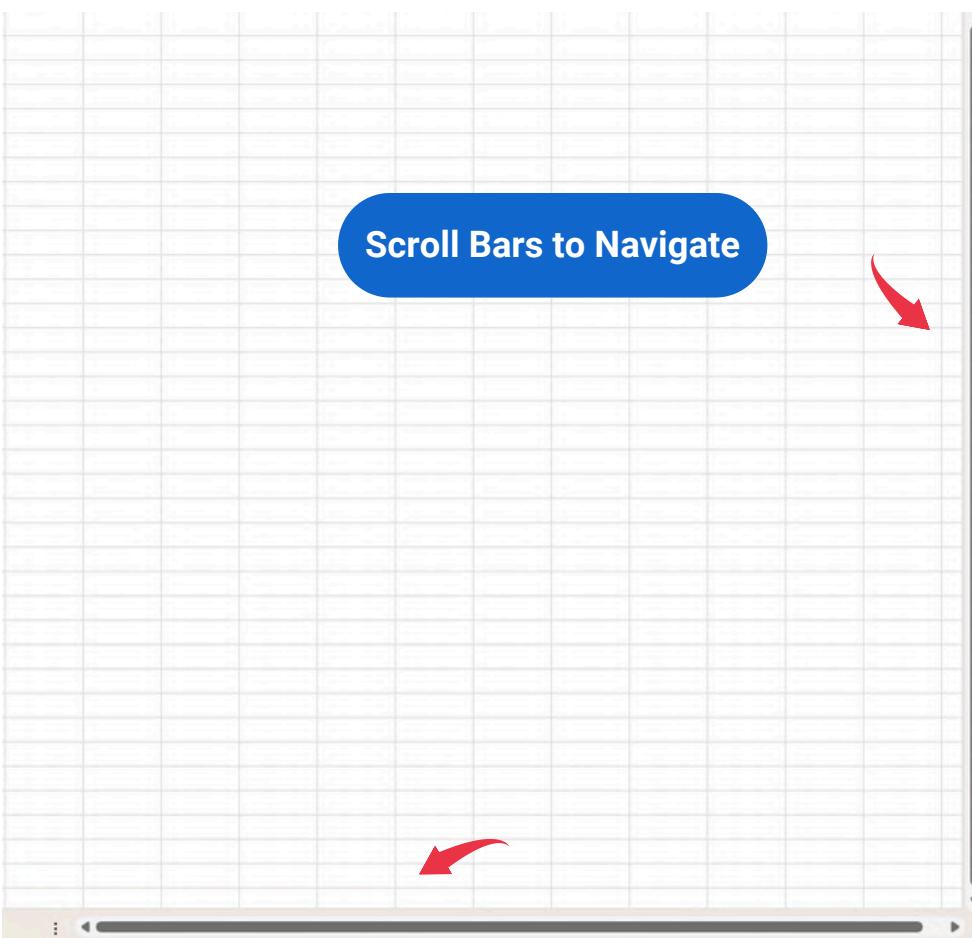
Cells

- Cells are the basic building blocks of an Excel worksheet, identified by their column letter and row number (for example, A1, B2).
- Use the arrow keys to move between cells.
- Click on a cell with the mouse to select it.
- Use the Enter key to move down one cell or Tab to move right.



Move Between Rows and Columns

Use the scroll bars on the right and bottom of the Excel window to navigate rows and columns.





- Click on the row number or column letter to select the entire row or column.
- Use Ctrl + Arrow Keys to jump to the last edge cell of the data range.

	A	B	C	D
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				

Pintasan Keyboard Penting

Navigation Shortcuts:

Ctrl + Arrow Keys: Jump to the edge of the data range.

Ctrl + Home: Go to cell A1.

Ctrl + End: Go to the last cell with data.

Page Up/Page Down: Moves one screen up or down.



Selection Shortcuts:

Shift + Arrow Keys: Select multiple cells.

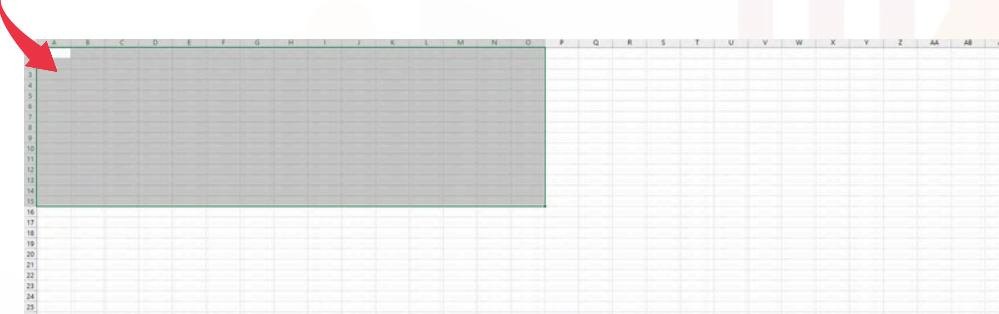
Ctrl + Shift + Arrow Keys: Select an entire row or column.

Ctrl + A: Select the entire worksheet.



Practice Exercise

1. Open Excel and practice moving between cells, rows, and columns using mouse and keyboard shortcuts.
 2. Try using Ctrl + Arrow Keys to navigate to the edge of your data.
 3. Select a range of cells using Shift + Arrow Keys.



Membuat dan Menyimpan Buku Kerja

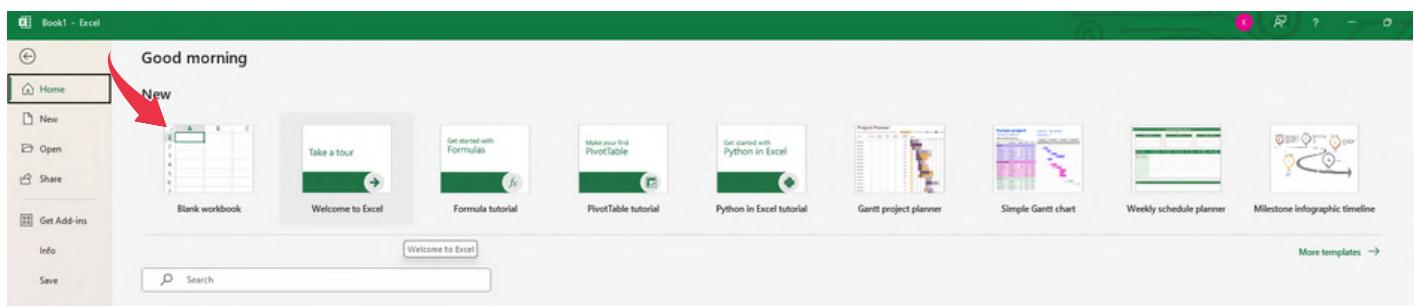
Membuat Buku Kerja Baru

A Workbook is a new Excel file that contains one or more Worksheets.

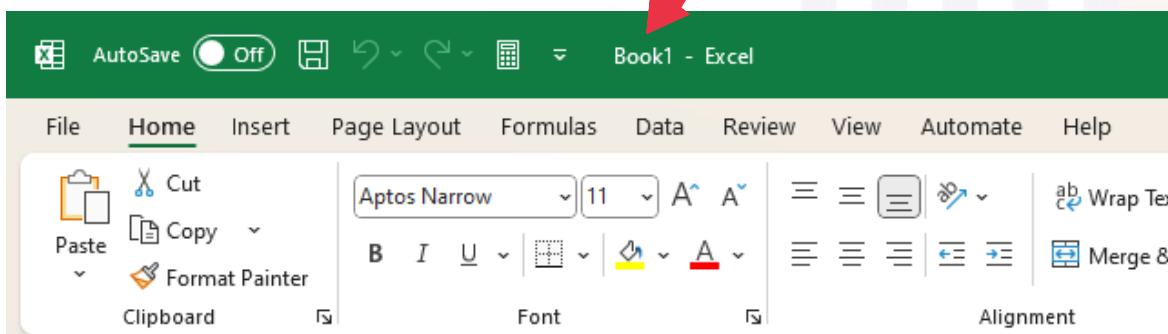
To create a new workbook:

Open Excel.

Click on Blank Workbook or press Ctrl + N.



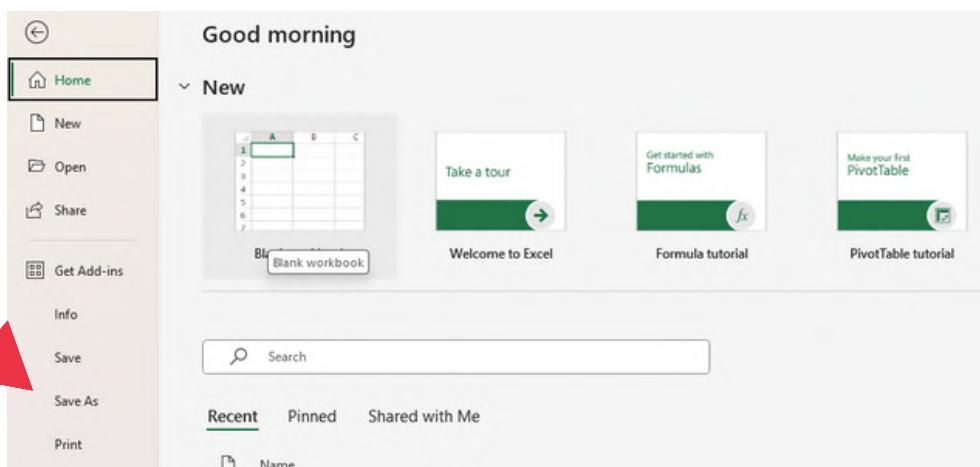
3. A new workbook will open with the default name (for example, Book1).



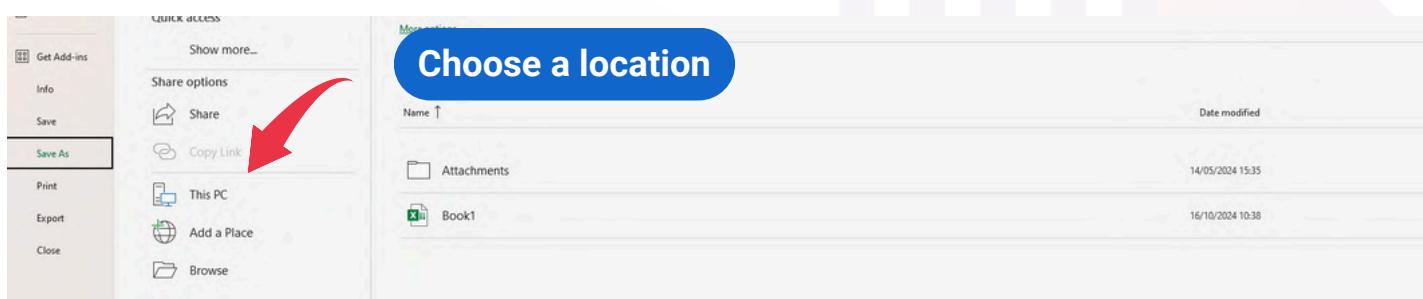
Saving and Opening Files

Saving a Workbook

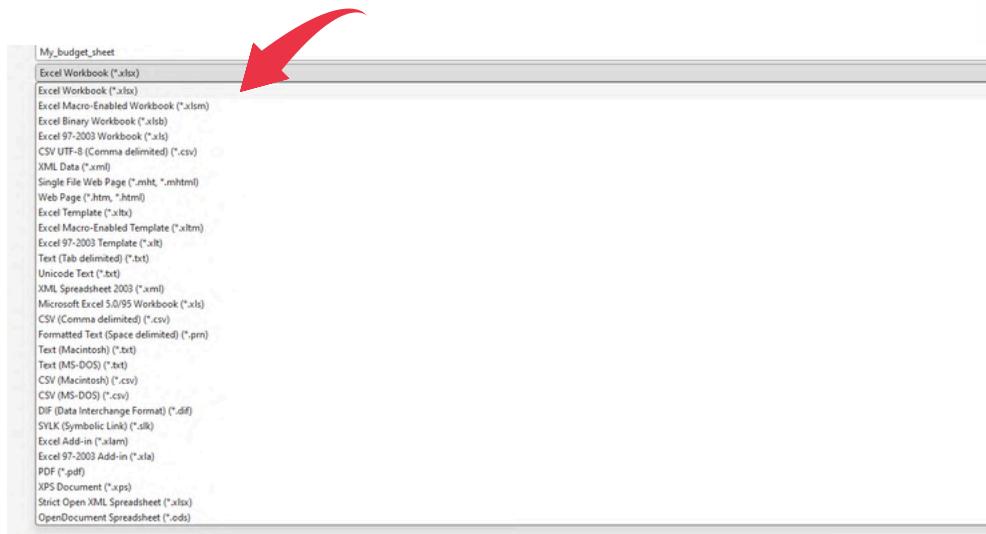
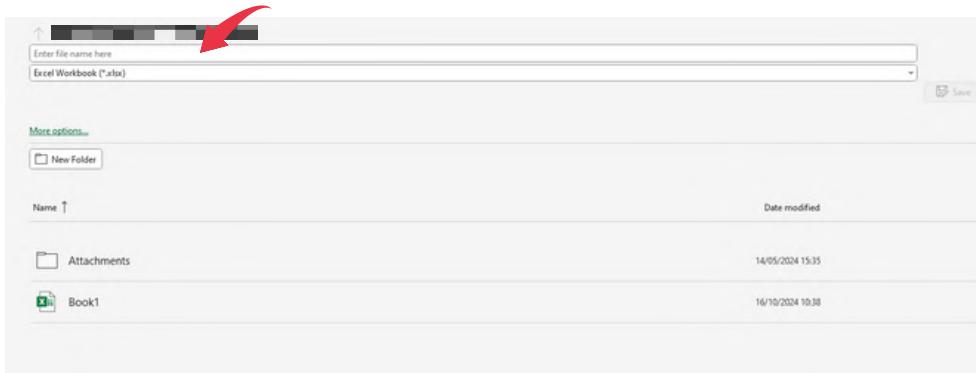
- To save a workbook:
 - a. Click File > Save As.



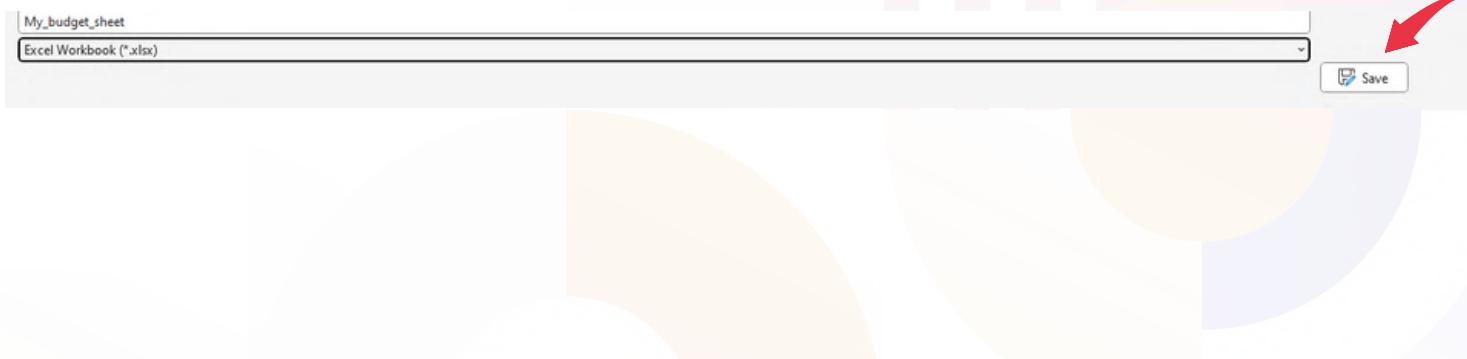
- Select a location (for example, This PC, OneDrive).



- Enter a file name and select a file format (e.g., .xlsx).



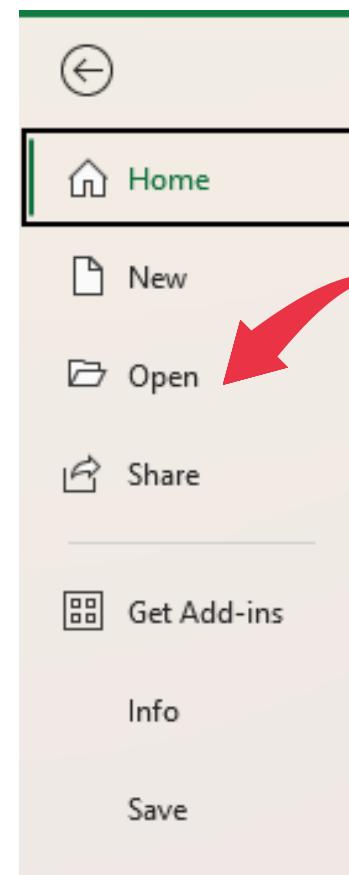
- Click Save.
- Use Ctrl + S to quickly save changes to an existing workbook.





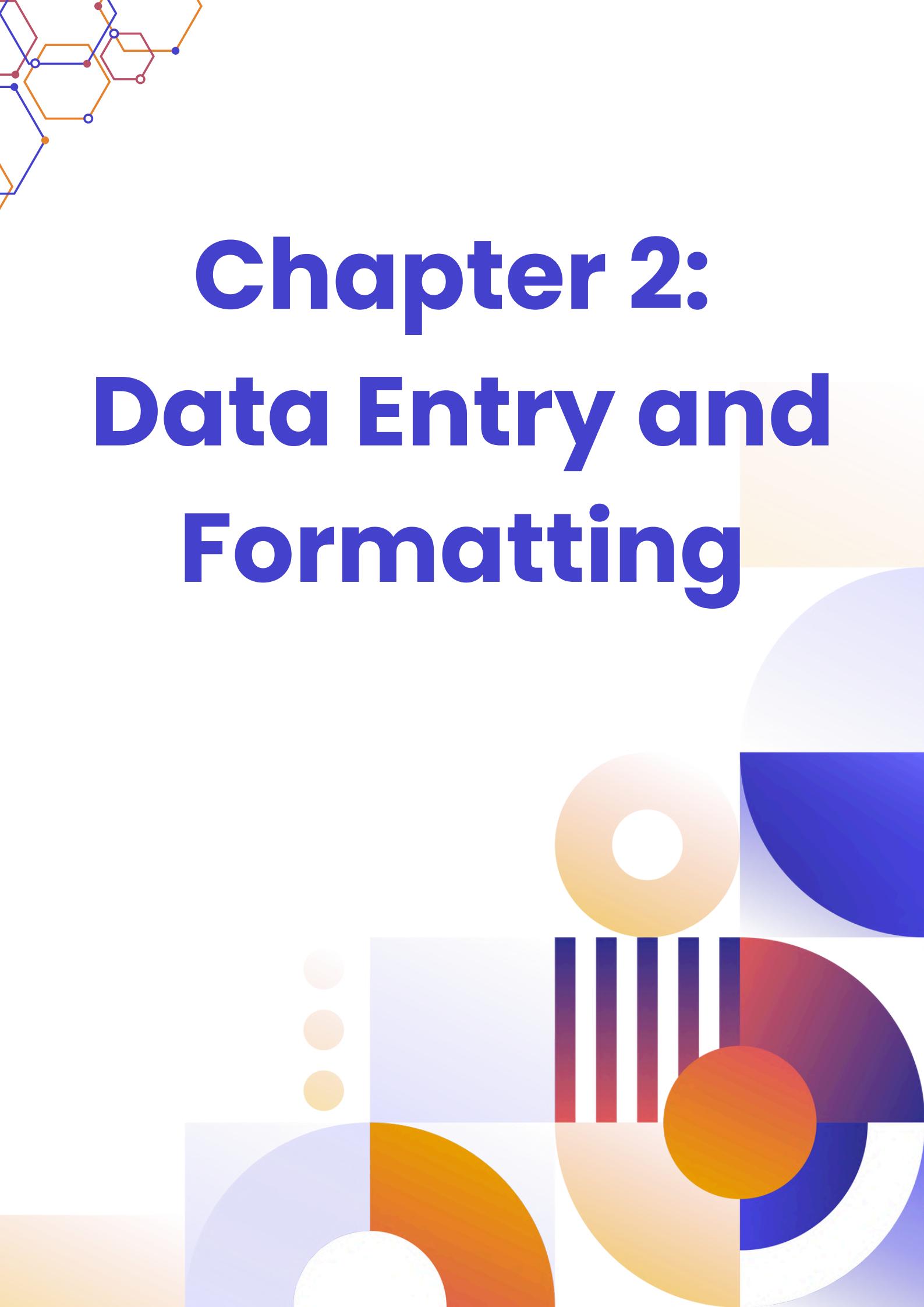
Saving & Opening Workbooks

- To open an existing workbook:
- Click File > Open
- Browse to the file location.
- Select the file and click Open.



Practice Exercise

1. Create a new workbook and add two worksheets.
2. Rename the worksheets to "Budget" and "Expenses".
3. Save the workbook as "MyFinances.xlsx" in your Documents folder.
4. Close and reopen the workbook to make sure it was saved properly.



Chapter 2:

Data Entry and

Formatting

Memasukkan Teks, Angka, dan Tanggal

Text is used for labels, titles, and descriptions.

To enter text:

Click on a cell.

Type the text (for example, "Sales Report").

- Press Enter or Tab to move to the next cell.

Memasukkan Angka

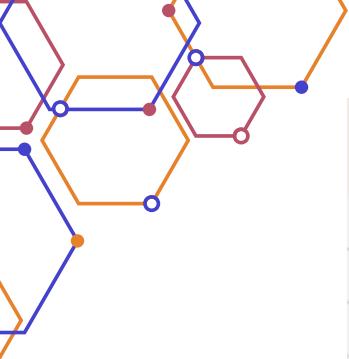
Numbers are used for calculations and data analysis.

To enter a number:

Click on a cell.

Type the number (e.g., 100).

Press Enter or Tab to move to the next cell.



A screenshot of a Microsoft Excel spreadsheet. The active cell is D6. The data in the table is as follows:

1				
2		Sales Report		
3		19900000		
4		213123		
5		123123		
6		12312		
7		23123213		
8				

Memasukkan Tanggal

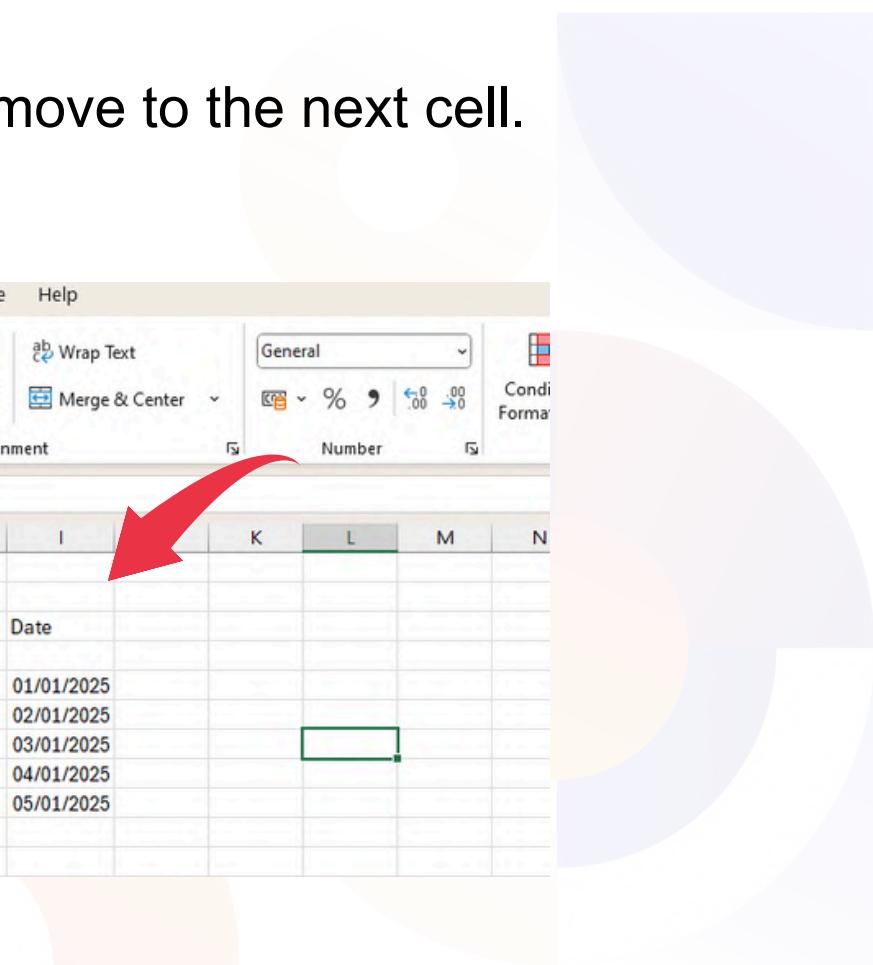
Dates are used for timelines, schedules, and tracking.

To enter a date:

Click on a cell.

Type the date in a known format (for example, 01/01/2023 or January 1, 2023).

- Press Enter or Tab to move to the next cell.



A screenshot of a Microsoft Excel spreadsheet showing the ribbon menu at the top. The active cell is L1. The data in the table is as follows:

Date
01/01/2025
02/01/2025
03/01/2025
04/01/2025
05/01/2025

Using AutoFill

AUTOFILL is a feature that automatically fills cells with data based on a pattern.

To use AutoFill:

Enter a starting value (for example, January or 1).

Select cells and drag the fill handle (the small box in the bottom right corner of the selection) to fill the desired range.

Date
01/01/2025



Date
01/01/2025
02/01/2025
03/01/2025
04/01/2025
05/01/2025
06/01/2025
07/01/2025
08/01/2025
09/01/2025
10/01/2025
11/01/2025
12/01/2025
13/01/2025
14/01/2025
15/01/2025
16/01/2025

Month
January



Month
January
February
March
April
May
June
July
August
September
October
November
December
January
February

Using Flash Fill

Flash Fill automatically fills cells based on patterns detected in your data.

To use Flash Fill:

Enter the first value manually (for example, "John Doe" in the full name field).

Start typing the next value in an adjacent cell.

Excel will detect the pattern and suggest Flash Fill.

Press Enter to accept.

Roster - Excel

File Home Insert Page Layout Formulas Data Review View ACROBAT Tell me what you want to do

B3 A B C D E F G

	Name	First	Last
1	Ned Lanning	Ned	
2	Margo Hendrix	Margo	
3	Dianne Pugh	Dianne	
4	Earlene McCarty	Earlene	
5	Jon Voigt	Jon	
6	Mia Arnold	Mia	
7	Jorge Fellows	Jorge	
8	Rose Winters	Rose	
9	Carmela Hahn	Carmela	
10	Denis Horning	Denis	
11	Johnathan Swope	Johnathan	
12	Delia Cochran	Delia	
13	Marguerite Cervantes	Marguerit	
14	Liliana English	Liliana	
15	Wendy Stephenson	Wendy	
16			

File Home Insert Page Layout Formulas Data Review View Automate Help

Get Data Text/CSV Web From Table/Range From Picture Sources Existing Connections Refresh Workbook Links Queries & Connections All Data Types Sort Filter Advanced Sort & Filter Text to Column Flash Fill Remove Duplicates Data Validation Data Tools Consolidate Data Model

Shortcut Key to Apply Flash Fill

Ctrl + E

	A	B	C
1	First Name	Last Name	Full Name
2	Arjun	Pandit	Arjun-Pandit
3	Andrew	Flintoff	Andrew-Flintoff
4	Surjit	Singh	Surjit-Singh
5	Baldev	Ram	Baldev-Ram
6	Verma	Gopal	Verma-Gopal



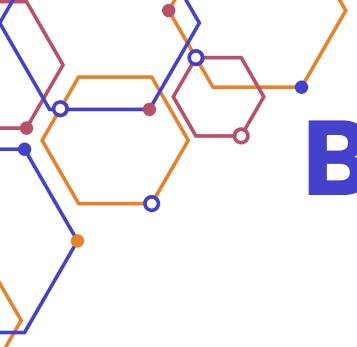
Practice Exercise

1. Enter a list of text labels (e.g., Product A, Product B, Product C).
2. Use AutoFill to create a series of numbers (e.g., 1 to 10).
3. Use Flash Fill to separate first names from a list of full names.

**Example Output
for 3.**



	A	B	C
1	Name	First	Last
2	Ned Lanning	Ned	
3	Margo Hendrix	Margo	Hendrix
4	Dianne Pugh	Dianne	
5	Earlene McCarty	Earlene	
6	Jon Voigt	Jon	
7	Mia Arnold	Mia	
8	Jorge Fellows	Jorge	
9	Rose Winters	Rose	
10	Carmela Hahn	Carmela	
11	Denis Horning	Denis	
12	Johnathan Swope	Johnathan	
13	Delia Cochran	Delia	
14	Marguerite Cervantes	Marguerit	
15	Liliana English	Liliana	
16	Wendy Stephenson	Wendy	



Basic Formatting

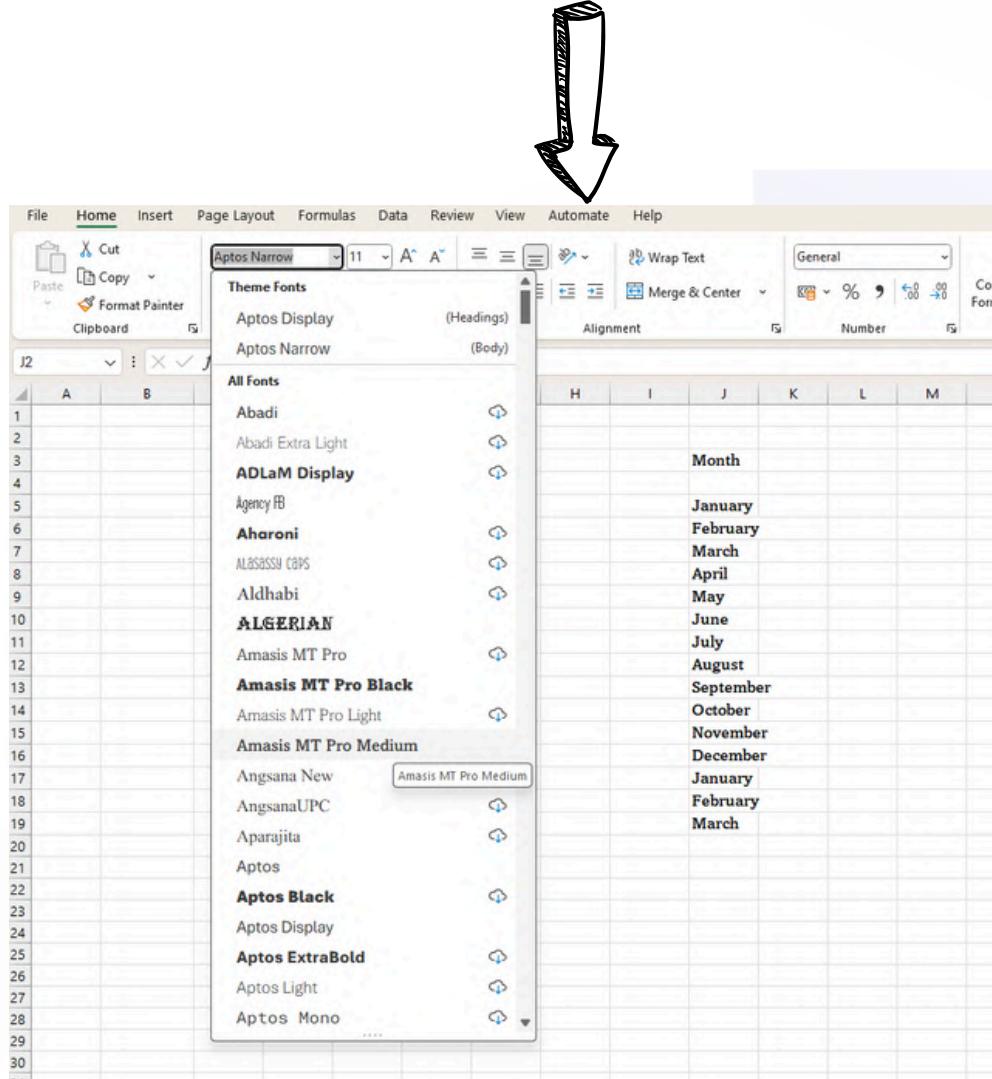
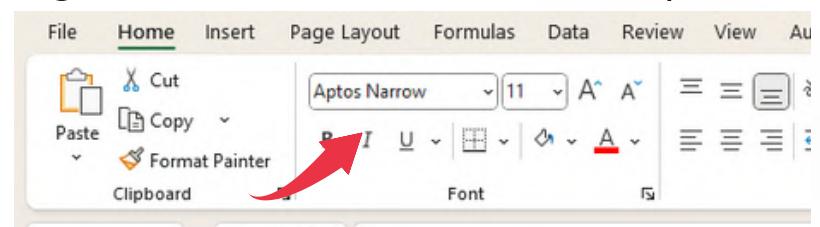
Font Styles

Font styles change the appearance of text (e.g., bold, italic, underline).

To change font styles:

1. Select the cell(s) with the text.
2. Use the Font group in the Home tab.
3. Click the desired style (e.g., Bold, Italic, Underline).

January
February
March
April
May
June
July
August
September
October
November
December



Font Sizes

Font sizes determine how large or small the text appears.

To change font sizes:

- a. Select the cell(s) with the text.
 - b. Use the Font Size dropdown in the Font group.
 - c. Select the desired size (e.g., 12, 14, 16).

- January
- February
- March
- April
- May
- june
- july
- August
- September
- October
- November
- December



A screenshot of the Microsoft Word ribbon. The "Home" tab is selected. In the "Font" group, the "Aptos Narrow" font and size "11" are selected. Below the font name are buttons for bold (B), italic (I), underline (U), and font color. A red arrow points to the font color button. Other options in the group include alignment and spacing buttons.



Font Colors

Font colors change the color of the text.

To change font colors:

- a. Select the cell(s) with the text.
- b. Use the Font Color dropdown in the Font group.
- c. Select the desired color.

The image shows a Microsoft Excel spreadsheet with a list of months from January to December in the first column. The first month, "January", is highlighted with a green border. A red arrow points from the top-left towards the Excel ribbon. The ribbon is shown in two states: a smaller version above the main window and a larger, detailed view below. In the detailed ribbon view, a red arrow points to the "Font Color" dropdown in the "Font" group under the "Home" tab. A large black arrow points downwards from the ribbon towards the open "Font Color" palette. The palette displays a grid of colors, with "Dark Blue, Text 2, Lighter 25%" selected. The main Excel window shows the month names in various colors, with "January" in blue and "February" in purple. The status bar at the bottom right shows "Month" and lists the months from January to March.



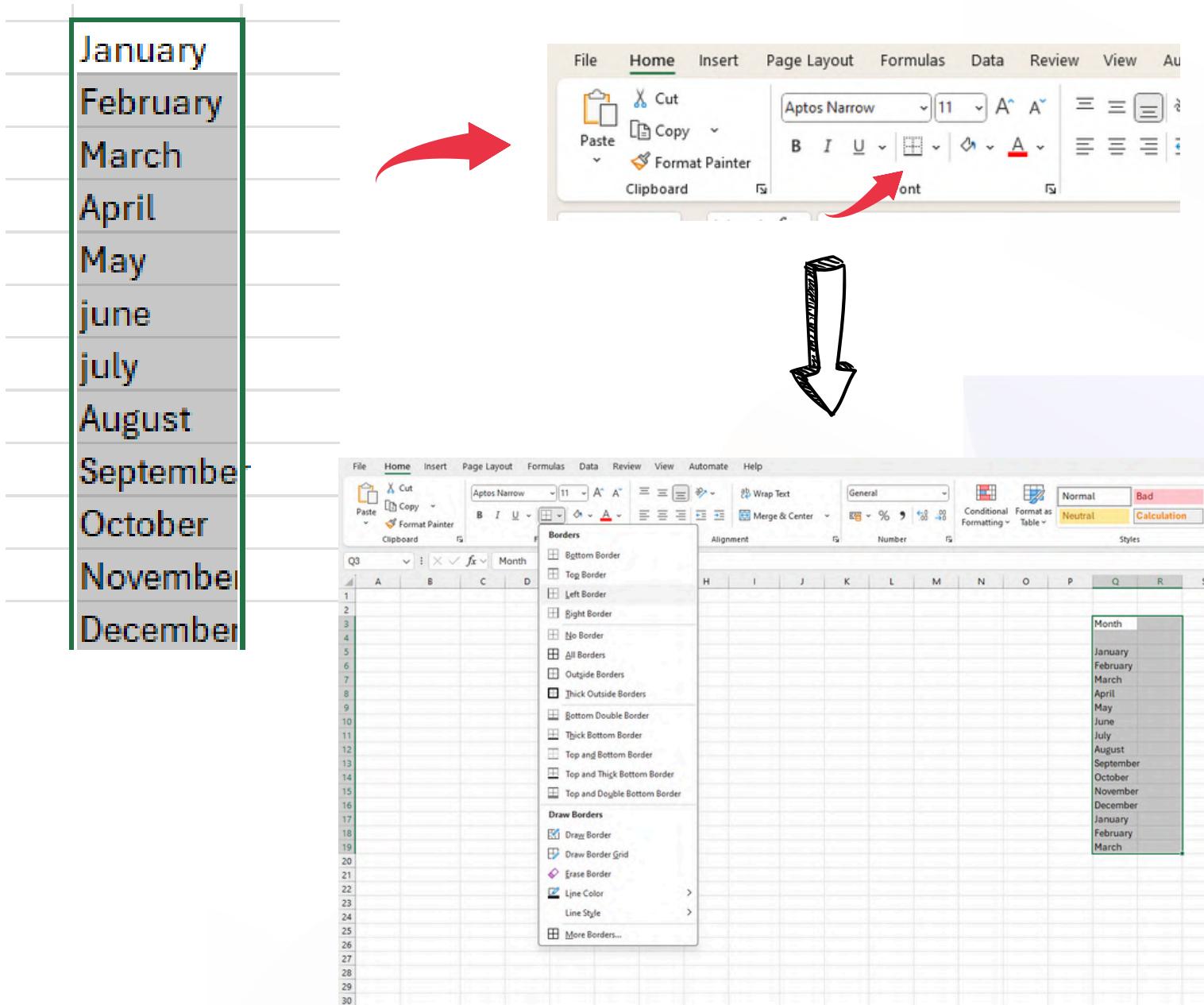
Cell Borders and Shading

Cell Borders

Cell borders add lines around cells to define boundaries.

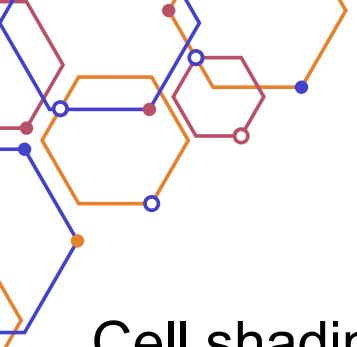
To add cell borders:

1. Select the cell(s).
2. Use the Borders dropdown in the Font group.



The screenshot illustrates the process of applying borders in Microsoft Excel. On the left, a table of months from January to December is shown. The first row ('January') has a prominent green border. A red arrow points from this row to the 'Home' tab in the ribbon. Another red arrow points from the ribbon to the 'Borders' dropdown menu, which is displayed in a floating window. This menu contains options for adding borders to specific sides (Top, Bottom, Left, Right) or all sides ('All Borders'). A large black arrow points down to this dropdown menu. The right side of the screenshot shows the full Excel ribbon and a preview of the bordered table.

Month
January
February
March
April
May
June
July
August
September
October
November
December

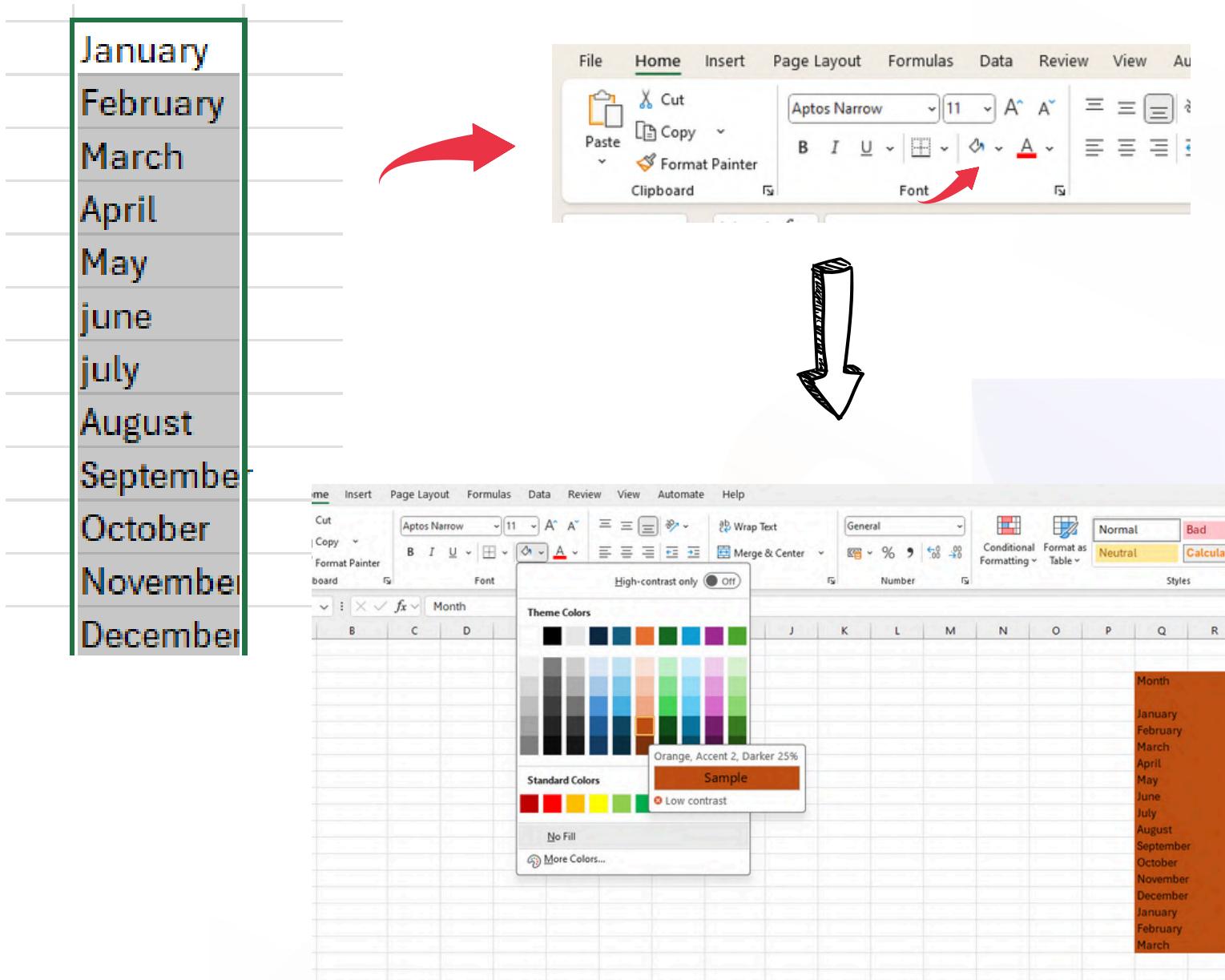


Cell Shading

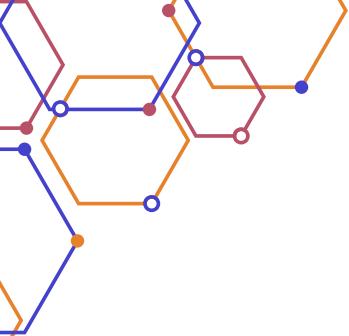
Cell shading adds background color to cells.

To add cell shading:

- a. Select the cell(s).
- b. Use the Fill Color dropdown in the Font group.
- c. Choose the desired color.



The screenshot illustrates the process of applying cell shading in Microsoft Excel. On the left, a column of months from January to December is displayed. A red arrow points from this list to the ribbon at the top. Another red arrow points from the ribbon to the 'Font' group in the 'Home' tab. A large black arrow points down to the 'Fill Color' dropdown in the 'Font' group, which is currently open, showing the 'Theme Colors' palette. The color 'Orange, Accent 2, Darker 25%' is selected and highlighted with a red box. The formula bar shows 'Month' and the data table below has a header row 'Month'.



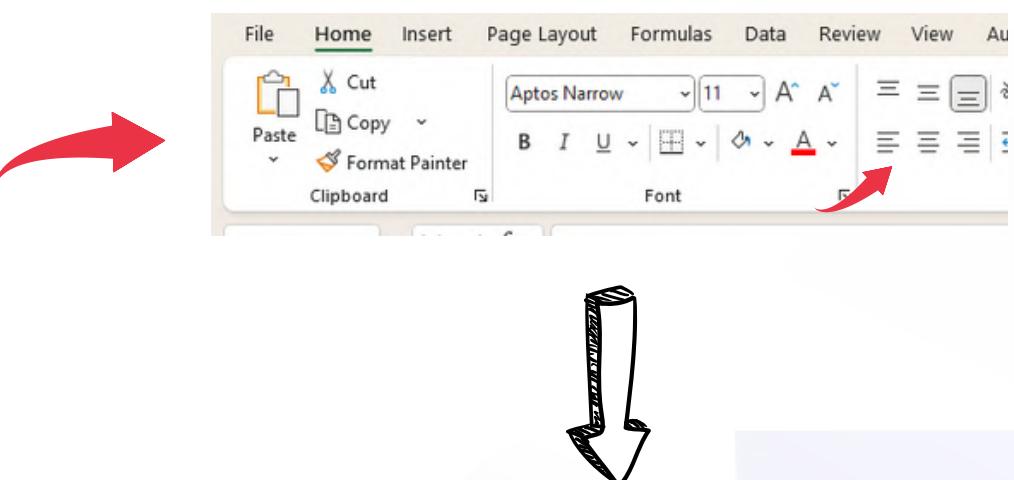
Alignment and Text Wrapping

Alignment

Alignment determines how text is positioned within a cell (e.g., left, center, right).

To change alignment:

1. Select the cell(s).
2. Use the Alignment group in the Home tab.



The screenshot shows a Microsoft Excel spreadsheet with a list of months from January to December in the first column. The first column is selected, indicated by a green border. The ribbon at the top is set to the 'Home' tab, which is underlined in blue. On the far right of the ribbon, there is a 'Font' group containing font style (Aptos Narrow), font size (11), and font color (black). Below the Font group is the Alignment group, which includes icons for horizontal alignment (left, center, right) and vertical alignment (top, middle, bottom). A red arrow points from the selected column on the left towards the Alignment group on the ribbon. A large black arrow points down to the Alignment group in the ribbon. The main workspace shows the month names from January to December in the first column, and a small table in the bottom right corner with columns labeled 'Month', 'January', 'February', 'March', 'April', 'May', 'June', 'July', 'August', 'September', 'October', 'November', and 'December'.

Text Wrapping

Text wrapping allows text to fit within a cell by wrapping to multiple lines.

To enable text wrapping:

1. Select the cell(s).
2. Use the Wrap Text button in the Alignment group.

The image shows a Microsoft Excel spreadsheet with a single row of data. The first cell (D1) contains the word "Names". The subsequent three cells (E1, F1, G1) contain the names "Amanda Hollins", "Rizki Praatama", and "Abdul Fatah Mohammad" respectively. A red arrow points from the "Names" cell to the ribbon menu above. The ribbon shows the "Font" tab selected, and a red arrow highlights the "Wrap Text" button in the "Alignment" group. A large black arrow points downwards from the ribbon area towards the spreadsheet below, indicating the result of applying the wrap text setting.

C	D	E	F	G
	Names	Amanda Hollins	Rizki Praatama	Abdul Fatah Mohammad

Font: Aptos Narrow, Size: 11, Bold: A^b, Italic: I, Underline: U, Alignment: Left & Center, Wrap Text: **Wrap Text**



Practice

1. Apply different font styles, sizes, and colors to a list of text.
2. Add borders and shading to a table of data.
3. Adjust alignment and enable text wrapping for a paragraph of text.

Recap



- Font styles, sizes, and colors enhance the appearance of text.
- Cell borders and shading define and highlight data.
- Alignment and text wrapping improve readability and organization.



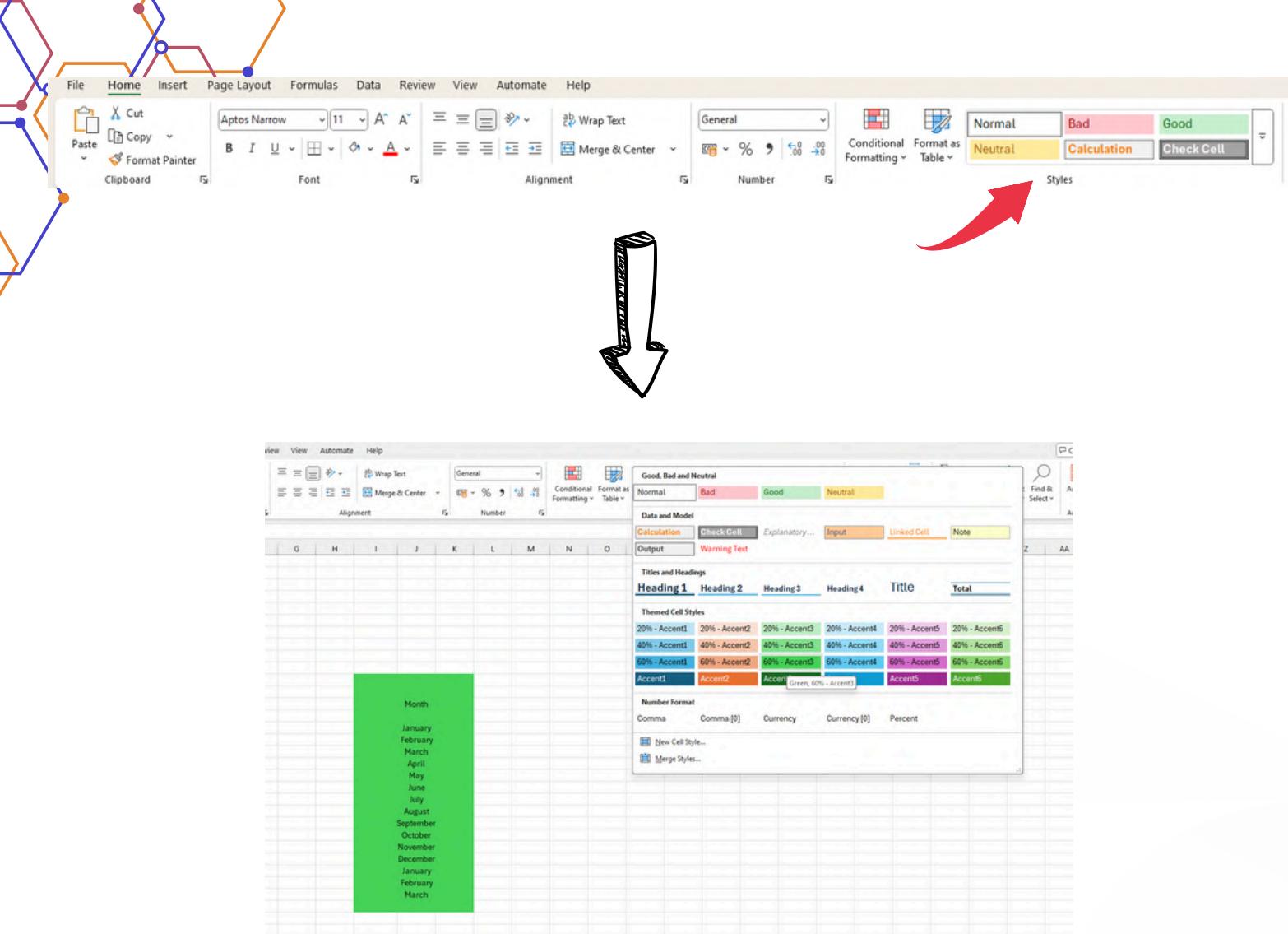
Cell Styles and Themes

What are Cell Styles?

- Cell Styles are predefined formatting options that you can apply to cells to make your data look professional and consistent.
- They include combinations of font styles, colors, borders, and shading

Applying Built-in Styles

- To apply a built-in style:
- Select the cell(s) you want to format.
- Go to the Home tab and click on Cell Styles.
- Choose a style from the gallery (e.g., Good, Bad, Neutral, Heading 1).



Customizing Themes

What are Themes?

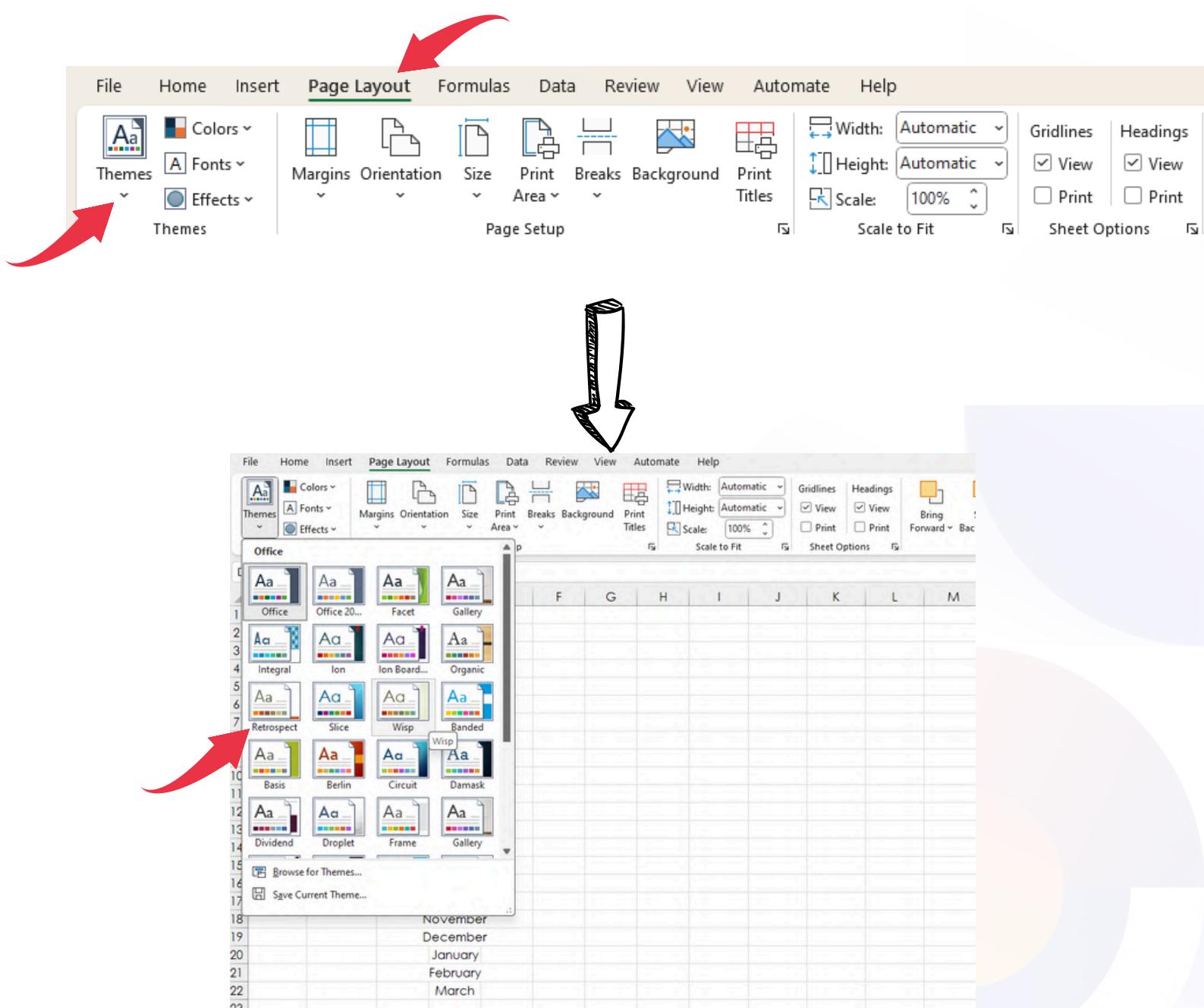
- Themes are predefined sets of colors, fonts, and effects that you can apply to your entire workbook.
- They ensure a consistent look and feel across your worksheets.

Applying a Theme

To apply a theme:

Go to the Page Layout tab.

- Click on Themes.
- Choose a theme from the gallery (e.g., Office, Facet, Integral).

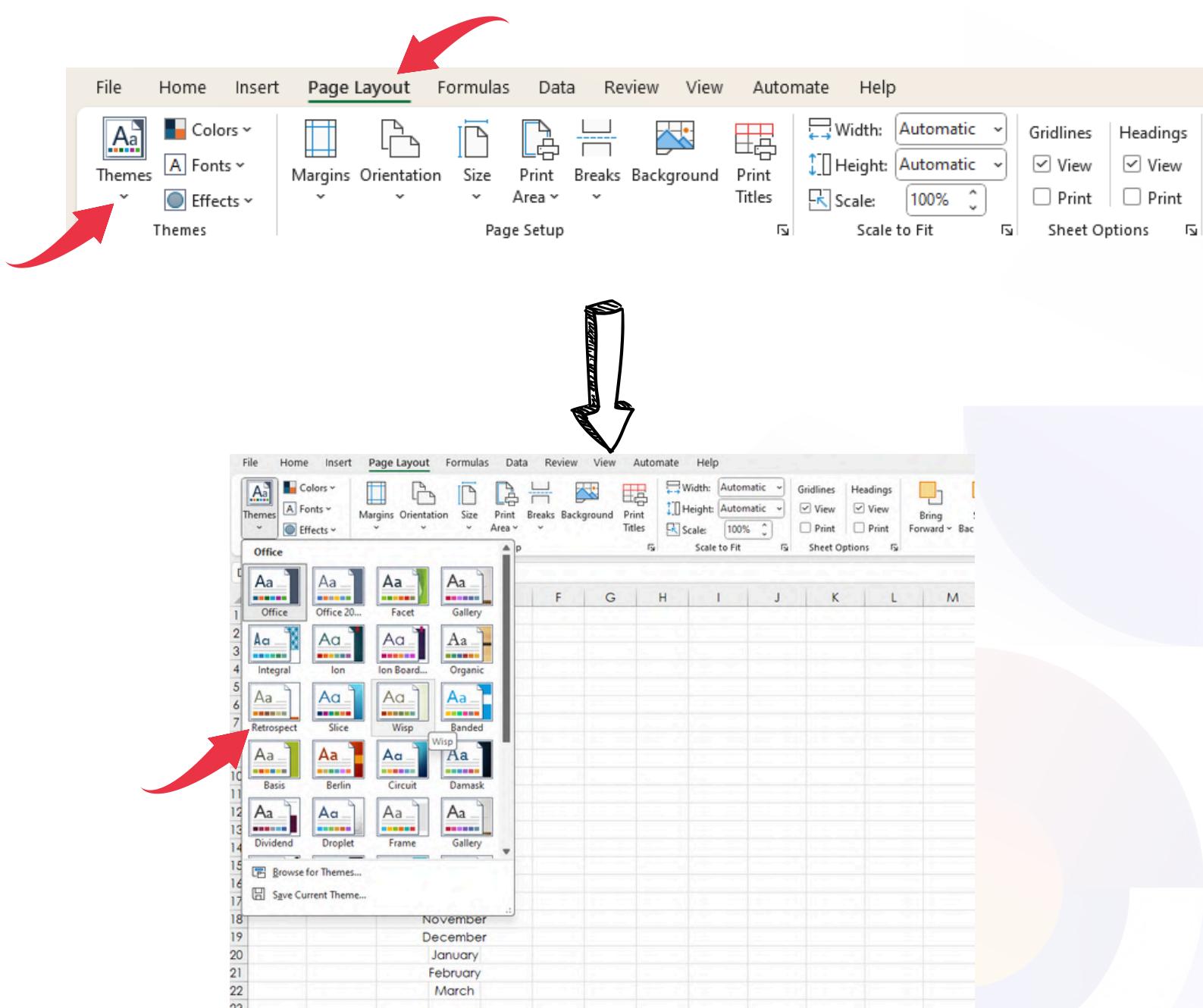


Customizing a Theme

To customize a theme:

Go to the Page Layout tab.

- Click on Colors, Fonts, or Effects to modify the theme.



Save the custom theme for future use.





MAJOR TASK

Objective

Apply built-in cell styles, apply a theme, and customize it to create a professional-looking workbook.

Create a New Workbook

- Open Excel and create a new workbook.
- Save the workbook as "Monthly_Report.xlsx".

Month	Sales	Expenses	Profit
January	5000	3000	2000
February	6000	3500	2500
March	7000	4000	3000
April	8000	4500	3500
May	9000	5000	4000

Enter Data

Apply Built-in Cell Styles

1. Apply the Heading 1 style to the header row (Month, Sales, Expenses, Profit).
2. Apply the Good style to the Profit column.
3. Apply the Bad style to the Expenses column.
4. Apply the Neutral style to the Sales column.



CONTINUED

Apply a Theme

- Go to the Page Layout tab.
- Click on Themes and choose the Facet theme.
- Observe how the colors and fonts change in your table.

Customize the Theme

- Go to the Page Layout tab.
- Click on Colors and choose Customize Colors.
- Change the Accent 1 color to Blue.
- Change the Accent 2 color to Green.
- Click on Fonts and choose Customize Fonts.
- Change the Heading font to Arial.
- Change the Body font to Calibri.
- Save the custom theme as "My_Custom_Theme".

Apply the Custom Theme

1. Apply your custom theme (My_Custom_Theme) to the workbook.
2. Observe how the colors and fonts change based on your customization.

Save and Review

1. Save your workbook.
2. Review your work to ensure:
3. The table is formatted with built-in cell styles.
4. The custom theme is applied.
5. The table has borders and shading.



Formatting Best Practices

Why Consistency Matters

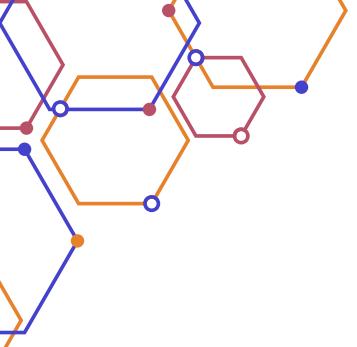
- Consistency in formatting ensures that your workbook looks professional and is easy to read.
- It helps users quickly understand the structure and meaning of your data.

Consistent Formatting

A	B	C	D	E	F	G	H	I	J	K
1	CUSTOMER	REGION	ORDER DATE	SALES	MONTH	YEAR				
2	Acme, inc.	NORTH	4/13/2014	\$55,815	April	2014				
3	Widget Corp	SOUTH	12/21/2014	\$94,908	December	2014				
4	123 Warehousing	EAST	2/15/2014	\$57,088	February	2014				
5	Demo Company	WEST	5/14/2014	\$56,539	May	2014				
6	Smith and Co.	NORTH	6/28/2015	\$63,116	June	2015				
7	Foo Bars	SOUTH	1/15/2015	\$38,281	January	2015				
8	ABC Telecom	EAST	8/22/2015	\$57,650	August	2015				
9	Fake Brothers	WEST	12/31/2015	\$90,967	December	2015				
10										
11										
12										
13										
14										
15										
16										

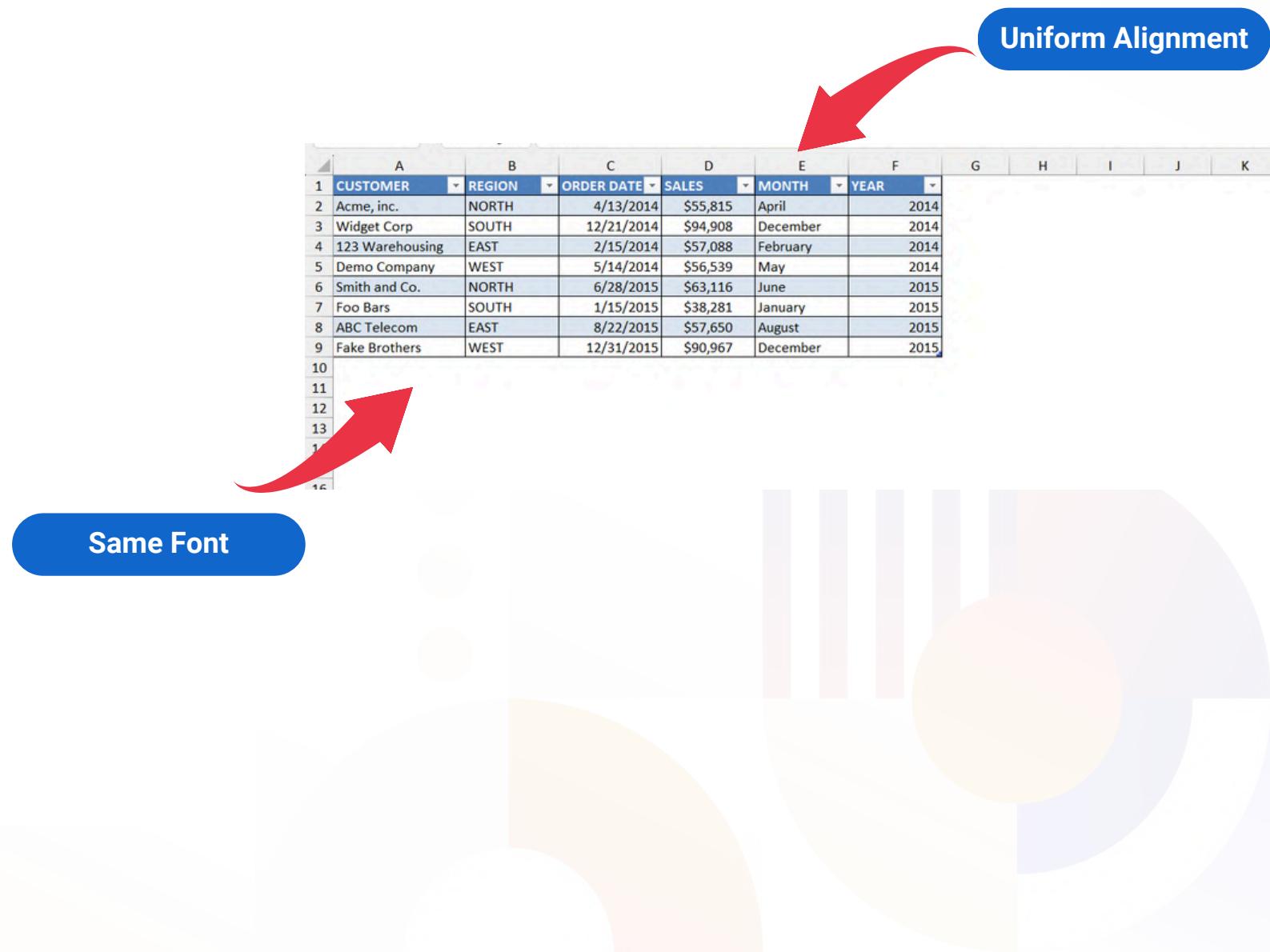
Inconsistent Formatting

B	C	D	E
order_date			
Sun	18/07/2022	Thursday, 13 July 1905	10:38 pm IST
Tue	Wednesday	Thursday, 13 July 1905	6:05 pm IST
Sun	Monday	Thursday, 13 July 1905	10:20 pm IST
Wed	Thursday	Thursday, 13 July 1905	4:06 am IST
Tue	Wednesday	Thursday, 13 July 1905	2:50 pm IST
Thu	Friday	Thursday, 13 July 1905	9:12 pm IST
Thu	Friday	Thursday, 13 July 1905	8:03 pm IST
Wed	Thursday	Thursday, 13 July 1905	2:55 pm IST
Sat	Sunday	Thursday, 13 July 1905	7:37 pm IST
Mon	Tuesday	Thursday, 13 July 1905	4:47 pm IST
Sat	Sunday	Thursday, 13 July 1905	11:53 am IST
Tue	Wednesday	Thursday, 13 July 1905	7:43 am IST
Sat	Sunday	Thursday, 13 July 1905	10:11 am IST
Mon	Tuesday	Thursday, 13 July 1905	10:05 am IST
Thu	Friday	Thursday, 13 July 1905	11:14 pm IST
Sun	Monday	Thursday, 13 July 1905	9:10 am IST
Wed	Thursday	Thursday, 13 July 1905	7:10 am IST



Tips for Consistent Formatting

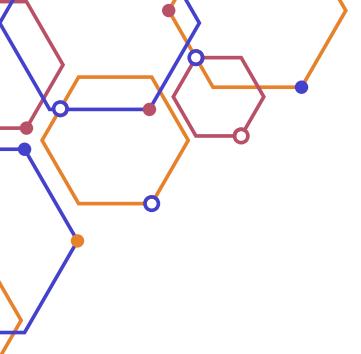
- Use the same font and size for all headers and data.
- Apply consistent cell styles (e.g., Heading 1 for all headers).
- Align data uniformly (e.g., center-align headers, right-align numbers).
- Use consistent colors for similar data types (e.g., green for profits, red for losses).



A	B	C	D	E	F	G	H	I	J	K
1	CUSTOMER	REGION	ORDER DATE	SALES	MONTH	YEAR				
2	Acme, inc.	NORTH	4/13/2014	\$55,815	April	2014				
3	Widget Corp	SOUTH	12/21/2014	\$94,908	December	2014				
4	123 Warehousing	EAST	2/15/2014	\$57,088	February	2014				
5	Demo Company	WEST	5/14/2014	\$56,539	May	2014				
6	Smith and Co.	NORTH	6/28/2015	\$63,116	June	2015				
7	Foo Bars	SOUTH	1/15/2015	\$38,281	January	2015				
8	ABC Telecom	EAST	8/22/2015	\$57,650	August	2015				
9	Fake Brothers	WEST	12/31/2015	\$90,967	December	2015				

Same Font

Uniform Alignment



Tips for Improving Readability

- Use headers and subheaders to organize data.
- Apply conditional formatting to highlight key data points (e.g., top 10% in green).
- Use borders and shading to separate sections.
- Avoid clutter by keeping formatting simple and clean.



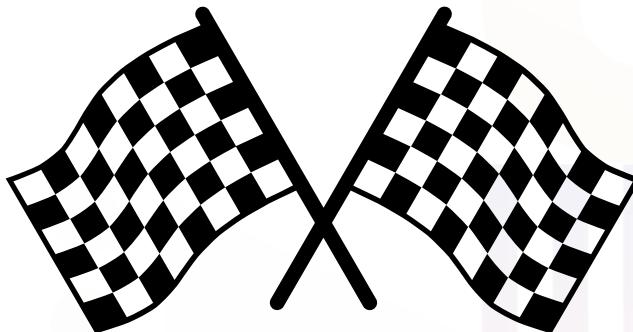
Monthly Family Budget

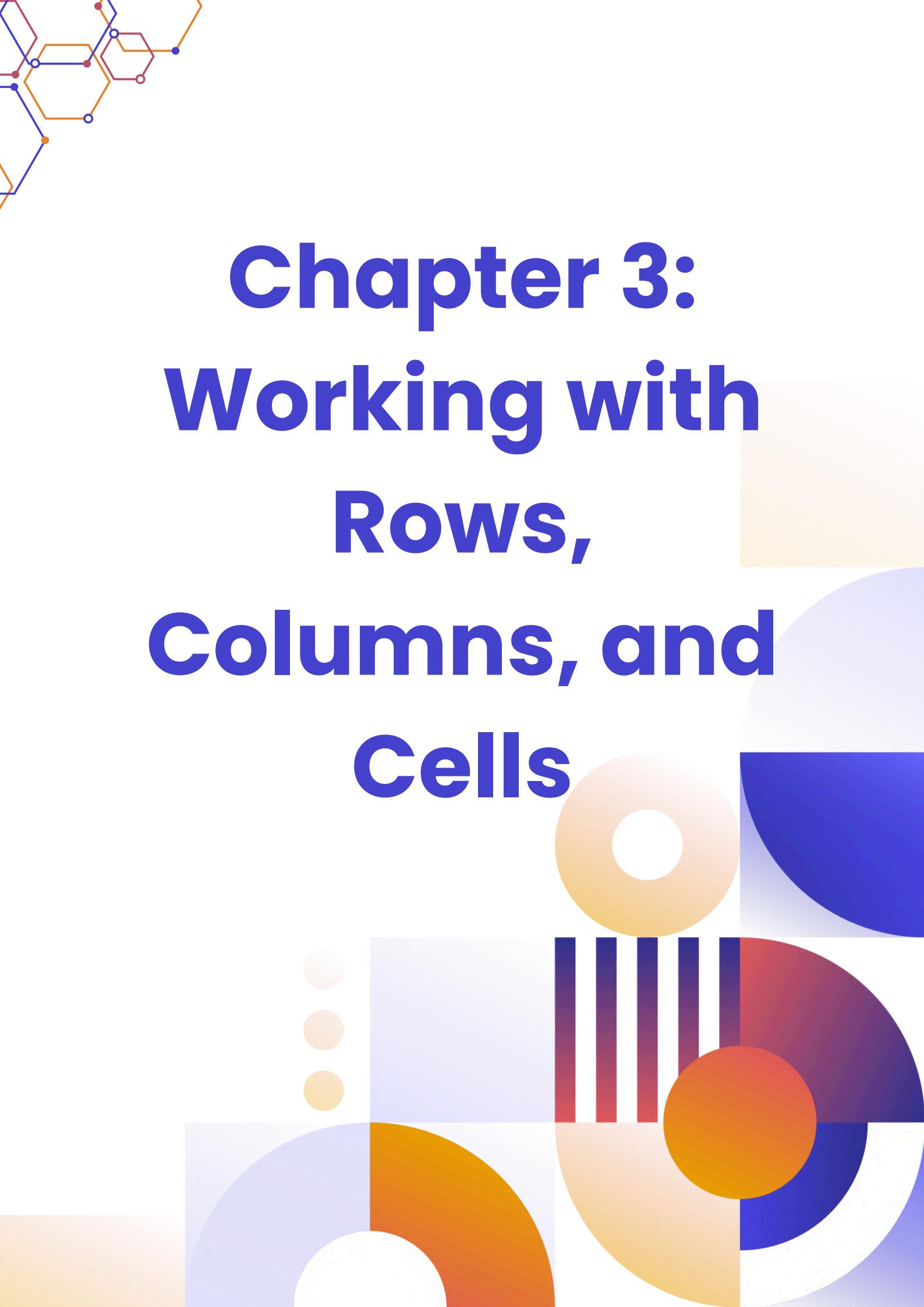
Summary	Total Projected Cost	Total Actual Cost	Total Difference
	\$1,203	\$1,317	(\$114)
Housing			
	Projected Cost	Actual Cost	Difference
Mortgage or rent	\$1,000	\$1,000	-\$0
Second mortgage or rent	\$0	\$0	-\$0
Phone	\$62	\$100	+\$38
Electricity	\$44	\$125	+\$81
Gas	\$22	\$35	+\$13
Water and sewer	\$8	\$8	-\$0
Cable	\$34	\$39	+\$5
Waste removal	\$10	\$10	-\$0
Maintenance or repairs	\$23	\$0	-\$23
Supplies	\$0	\$0	-\$0
Other	\$0	\$0	-\$0
Total	\$1,203	\$1,317	(\$114)
Transportation			
	Projected Cost	Actual Cost	Difference
Vehicle 1 payment			-\$0
Vehicle 2 payment			-\$0
Loans			
	Projected Cost	Actual Cost	Difference
Personal			-\$0
Student			-\$0



Practice

1. Open the "Monthly_Report.xlsx" workbook from the previous exercise.
2. Ensure all headers use the same font, size, and style.
3. Apply conditional formatting to highlight profits above \$3000 in green.
4. Add borders and shading to separate the table from the rest of the sheet.





Chapter 3: **Working with** **Rows,** **Columns, and** **Cells**

Inserting Rows

Rows are horizontal lines of cells in a worksheet.

To insert a row:

1. Select the row below where you want the new row to appear.
2. Right-click and choose Insert from the context menu.
3. A new row will be added above the selected row.

The screenshot shows a Microsoft Excel spreadsheet with a list of months from January to March. The cell D21 is selected. A context menu is open over the cell D21, with a red arrow pointing to the 'Insert...' option under the 'Cells' section. The 'Insert' dialog box is also visible, showing options for shifting cells right, down, or entire row/column. The 'Shift cells right' option is selected.

D21 fx February

A	B	C	D	E	F	G	H
1	2	3	4	5	6	7	8
January	February	March	April	May	June	July	August
September	October	November	December	January	February	March	

Month

Corbel 11 A A % , B I

Search the menus

- Cut
- Copy
- Paste Options:
- Paste Special...
- Smart Lookup
- Insert...
- Delete...
- Clear Contents
- Translate
- Quick Analysis
- Filter

Insert ? X

Shift cells right

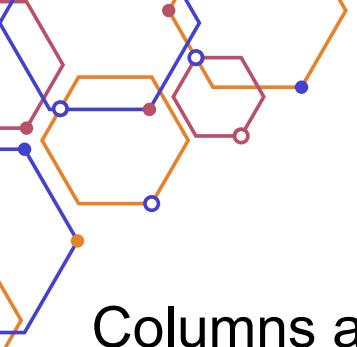
Shift cells down

Entire row

Entire column

OK Cancel

You have the option of choosing where to add rows, whether to your right, left, up or down

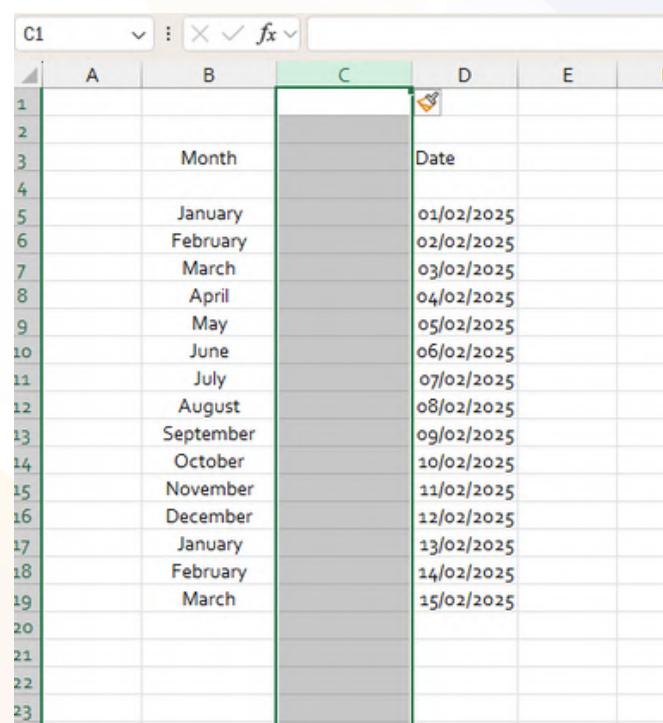
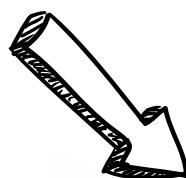
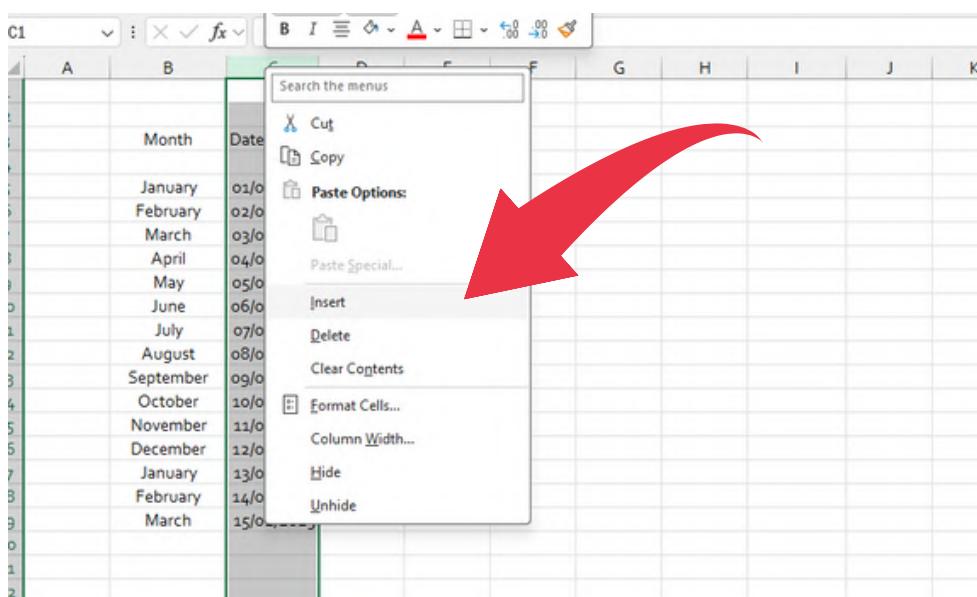


Inserting Columns

Columns are vertical lines of cells in a worksheet.

To insert a column:

1. Select the column to the right of where you want the new column to appear.
2. Right-click and choose Insert from the context menu.
3. A new column will be added to the left of the selected column.

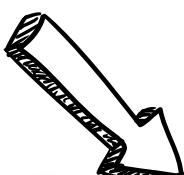
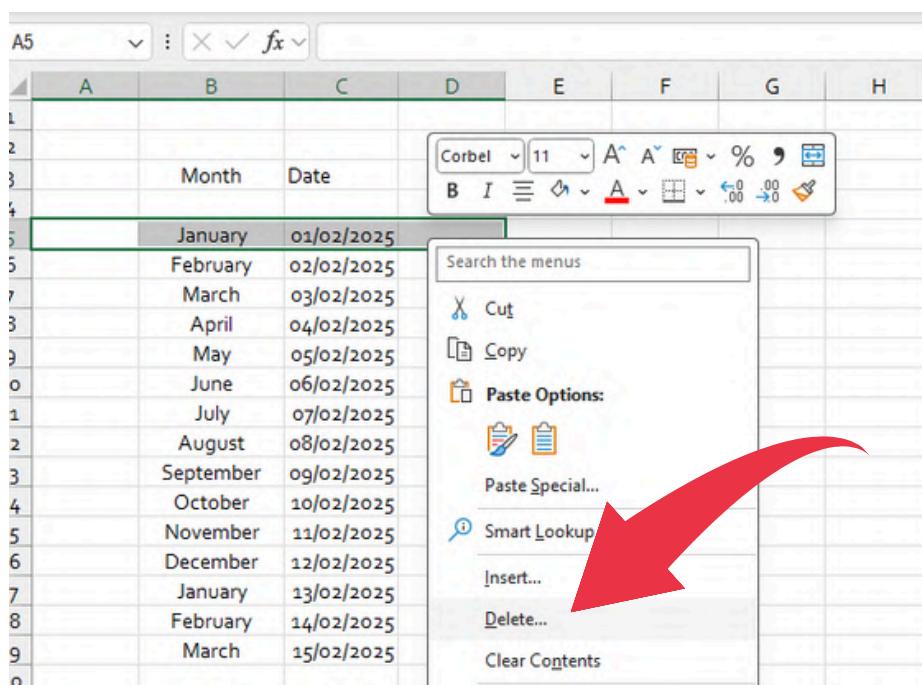


C1	A	B	C	D	E
		Month	Date		
1		January	01/02/2025		
2		February	02/02/2025		
3		March	03/02/2025		
4		April	04/02/2025		
5		May	05/02/2025		
6		June	06/02/2025		
7		July	07/02/2025		
8		August	08/02/2025		
9		September	09/02/2025		
10		October	10/02/2025		
11		November	11/02/2025		
12		December	12/02/2025		
13		January	13/02/2025		
14		February	14/02/2025		
15		March	15/02/2025		

Deleting Rows and Columns

To delete a row:

1. Select the row or column you want to delete.
2. Right-click and choose Delete from the context menu.
3. The selected row or column will be removed, and the respective rows and columns below will shift up.

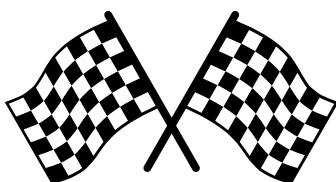


	Month	Date
	February	02/02/2025
	March	03/02/2025
	April	04/02/2025
	May	05/02/2025
	June	06/02/2025
	July	07/02/2025
	August	08/02/2025
	September	09/02/2025
	October	10/02/2025
	November	11/02/2025
	December	12/02/2025
	January	13/02/2025
	February	14/02/2025
	March	15/02/2025

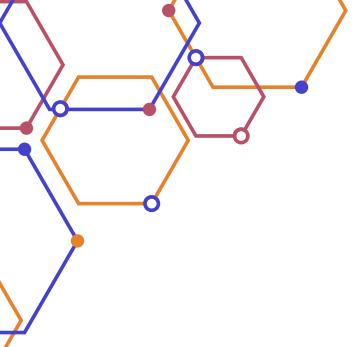


Practice

1. Open the "Monthly_Report.xlsx" workbook.
2. Insert a new row between February and March.
3. Insert a new column between Sales and Expenses.
4. Delete the newly inserted row and column.



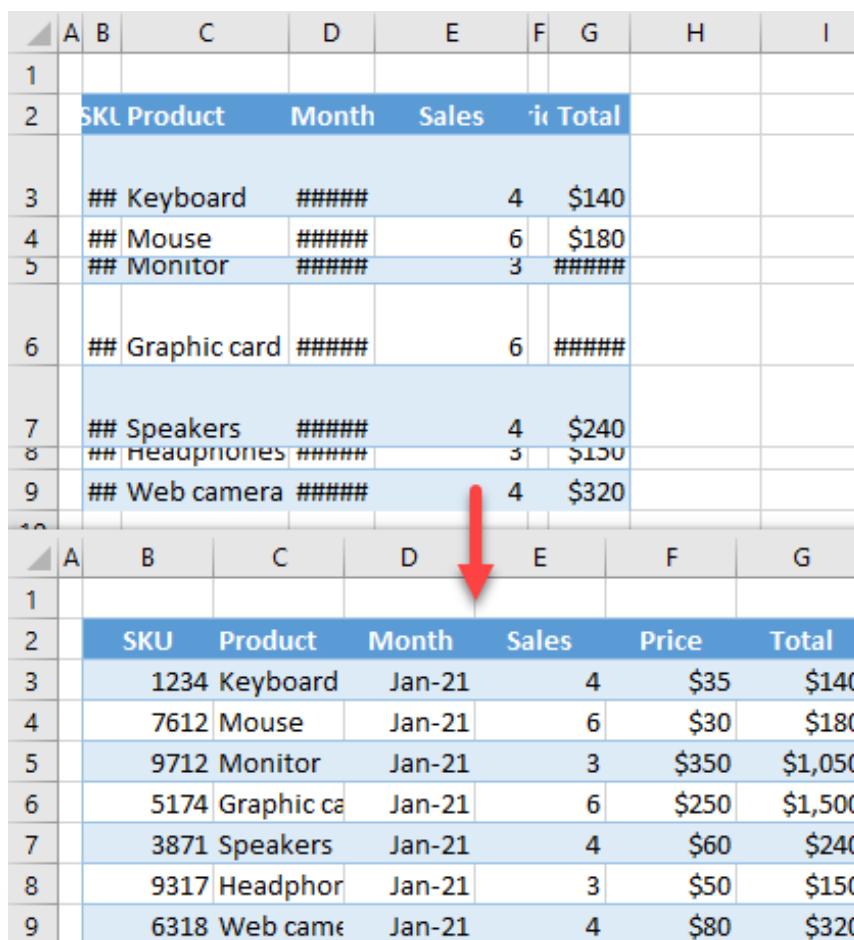
Adjusting Row Height and Column Width



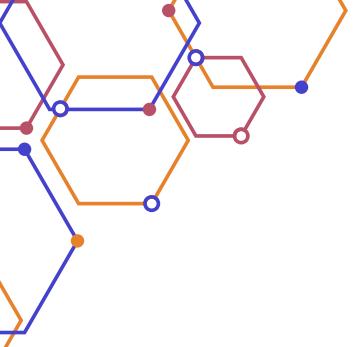
Adjusting Row Height

Why Adjust Row Height?

1. Row height determines the vertical space of a row.
2. Adjusting row height improves readability, especially for cells with wrapped text or large fonts.



A	B	C	D	E	F	G	H	I
1								
2	SKU	Product	Month	Sales	Price	Total		
3	## Keyboard	#####		4	\$140			
4	## Mouse	#####		6	\$180			
5	## Monitor	#####		3	#####			
6	## Graphic card	#####		6	#####			
7	## Speakers	#####		4	\$240			
8	## Headphones	#####		3	\$150			
9	## Web camera	#####		4	\$320			
10	A	B	C	D	E	F	G	
1								
2	SKU	Product	Month	Sales	Price	Total		
3	1234	Keyboard	Jan-21	4	\$35	\$140		
4	7612	Mouse	Jan-21	6	\$30	\$180		
5	9712	Monitor	Jan-21	3	\$350	\$1,050		
6	5174	Graphic ca	Jan-21	6	\$250	\$1,500		
7	3871	Speakers	Jan-21	4	\$60	\$240		
8	9317	Headphor	Jan-21	3	\$50	\$150		
9	6318	Web came	Jan-21	4	\$80	\$320		



How to Adjust Row Height

Manual Adjustment:

- Hover over the bottom border of the row header (the number on the left).
- Click and drag to adjust the height.



5	Activity	Comment
6		
7	Morning Meeting	Discussed project updates and assigned tasks.
8	Data Analysis	Reviewed dataset and cleaned missing values.
9	Model Training	Started training Vision Transformer model.
10	Lunch Break	Took a short break and recharged.
11	Team Collaboration	Brainstormed solutions for improving model accuracy.
12	Report Writing	Documented progress and key findings.
13	Presentation Prep	Created slides for the upcoming meeting.
14	Evening Review	Summarized the day's work and planned next steps.
15		
16		
17		
18		
19		
20		

Using the Ribbon

- Select the row(s).
- Go to the Home tab > Format > Row Height.
- Enter the desired height and click OK.

The screenshot shows the Microsoft Excel interface with the Home tab selected. In the top right corner, there is a 'Format' button. A red arrow points from this button to the 'Format Cells...' option in the 'Cells' section of the dropdown menu. The table below contains activity logs with columns for 'Activity' and 'Comment'.

	Activity	Comment
7	Morning Meeting	Discussed project updates and assigned tasks.
8	Data Analysis	Reviewed dataset and cleaned missing values.
9	Model Training	Started training Vision Transformer model.
10	Lunch Break	Took a short break and recharged.
11	Team Collaboration	Brainstormed solutions for improving model accuracy.
12	Report Writing	Documented progress and key findings.
13	Presentation Prep	Created slides for the upcoming meeting.
14	Evening Review	Summarized the day's work and planned next steps.

AutoFit

- Double-click the bottom border of the row header to automatically adjust the height to fit the content.

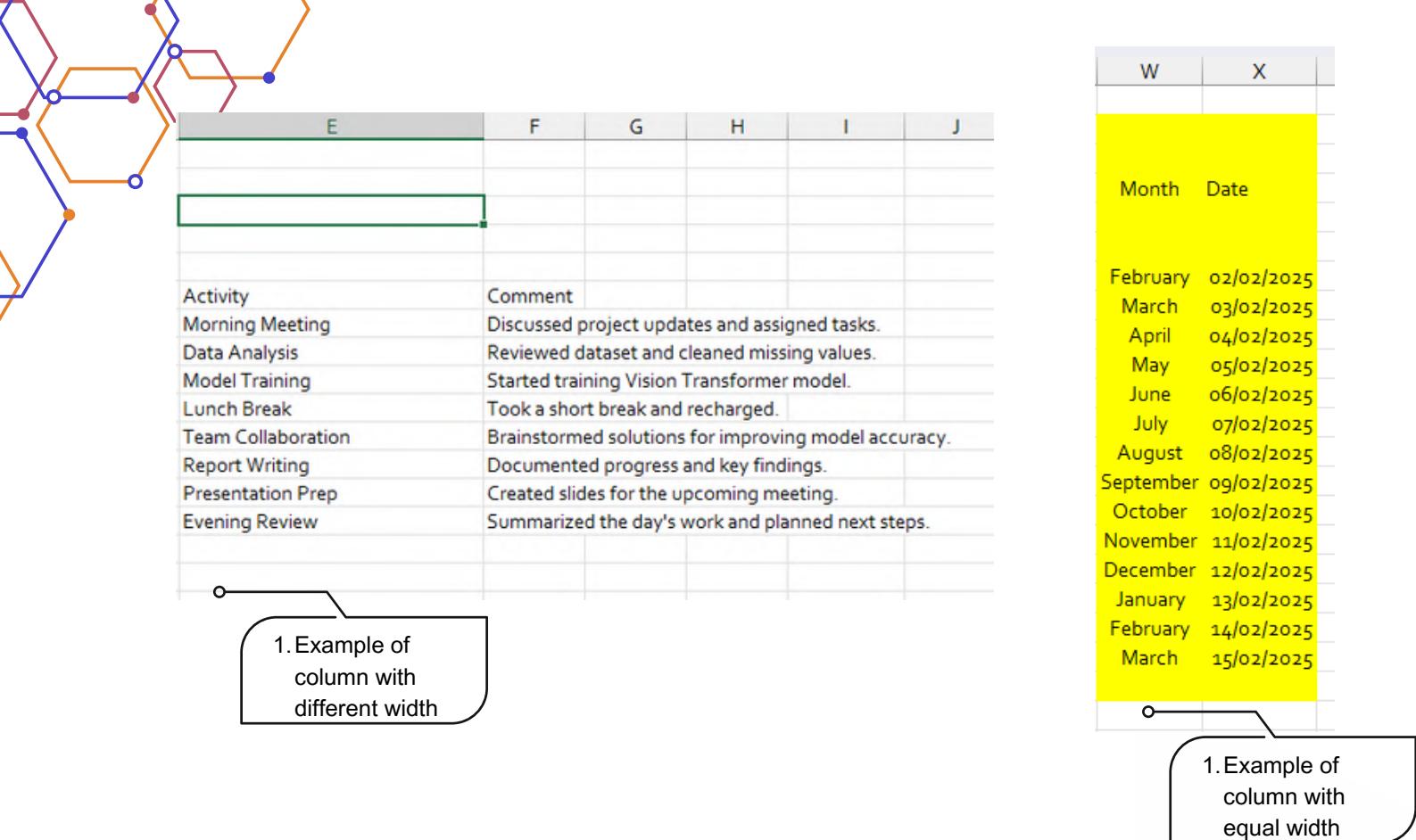
The screenshot shows the same table as above, but with rows 7 through 15 visible. A red arrow points to the bottom border of row 8, specifically highlighting the area where you would double-click to auto-fit the row height. The table data remains the same as in the previous screenshot.

7	Morning Meeting	Discussed project updates and assigned tasks.
8	Data Analysis	Reviewed dataset and cleaned missing values.
9	Model Training	Started training Vision Transformer model.
10	Lunch Break	Took a short break and recharged.
11	Team Collaboration	Brainstormed solutions for improving model accuracy.
12	Report Writing	Documented progress and key findings.
13	Presentation Prep	Created slides for the upcoming meeting.
14	Evening Review	Summarized the day's work and planned next steps.
15		

Adjusting Column Width

Why Adjust Column Width?

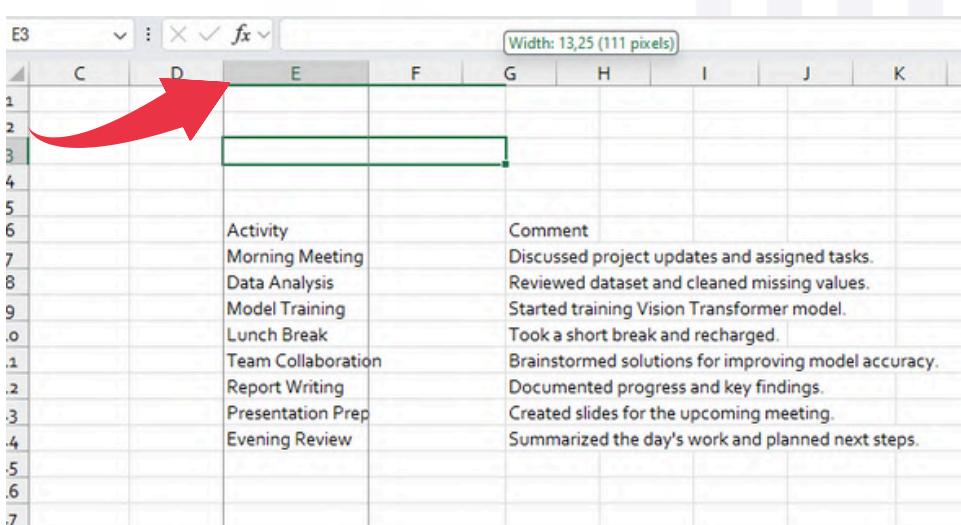
- Column width determines the horizontal space of a column.
- Adjusting column width ensures that all data is visible and properly aligned.



How to adjust Column Width?

Manual Adjustment

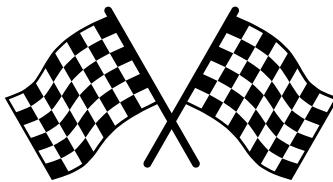
1. Hover over the right border of the column header (the letter at the top).
 2. Click and drag to adjust the width.





Practice

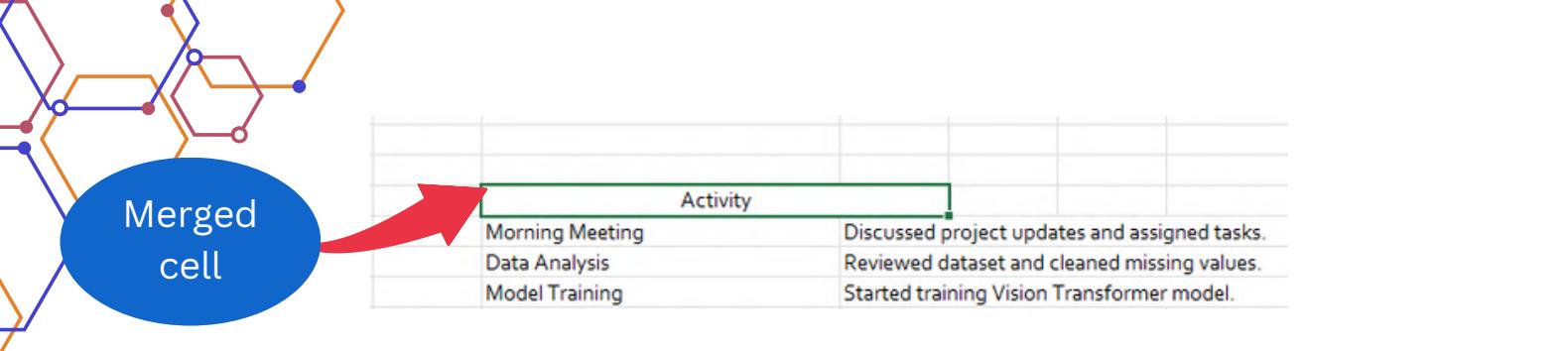
1. Open the "Monthly_Report.xlsx" workbook.
2. Adjust the height of the header row to 30.
3. Adjust the width of the Sales column to 15.
4. Use AutoFit to adjust the width of the Expenses and Profit columns.



Merging and Splitting Cells

What is Merging Cells?

1. Merging cells combines two or more cells into a single cell.
2. This is useful for creating headers, labels, or centering text across multiple columns.



How to Merge Cells

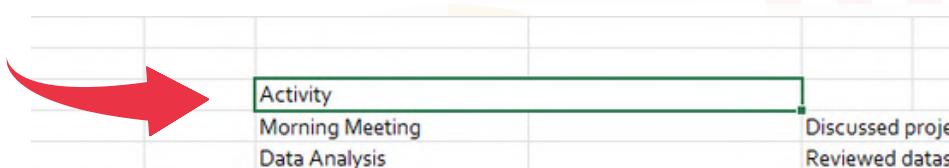
To merge cells:

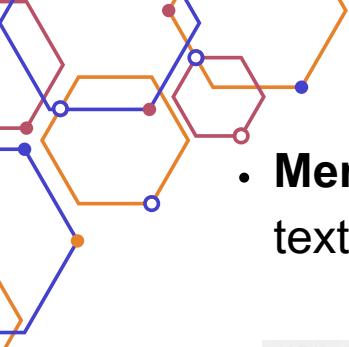
1. Select the cells you want to merge.
2. Go to the Home tab > Merge & Center.
3. Choose one of the following options:
 - **Merge & Center:** Combines cells and centers the text.

A screenshot of Microsoft Excel showing the ribbon menu. The "Home" tab is selected, and the "Merge & Center" option is highlighted in the "Alignment" group. A tooltip for "Merge & Center" is displayed, stating: "Combine and center the contents of the selected cells in a new larger cell. This is a great way to create a label that spans multiple columns." A red arrow points from this tooltip to a screenshot of the table below, which shows the "Activity" column merged across multiple rows.

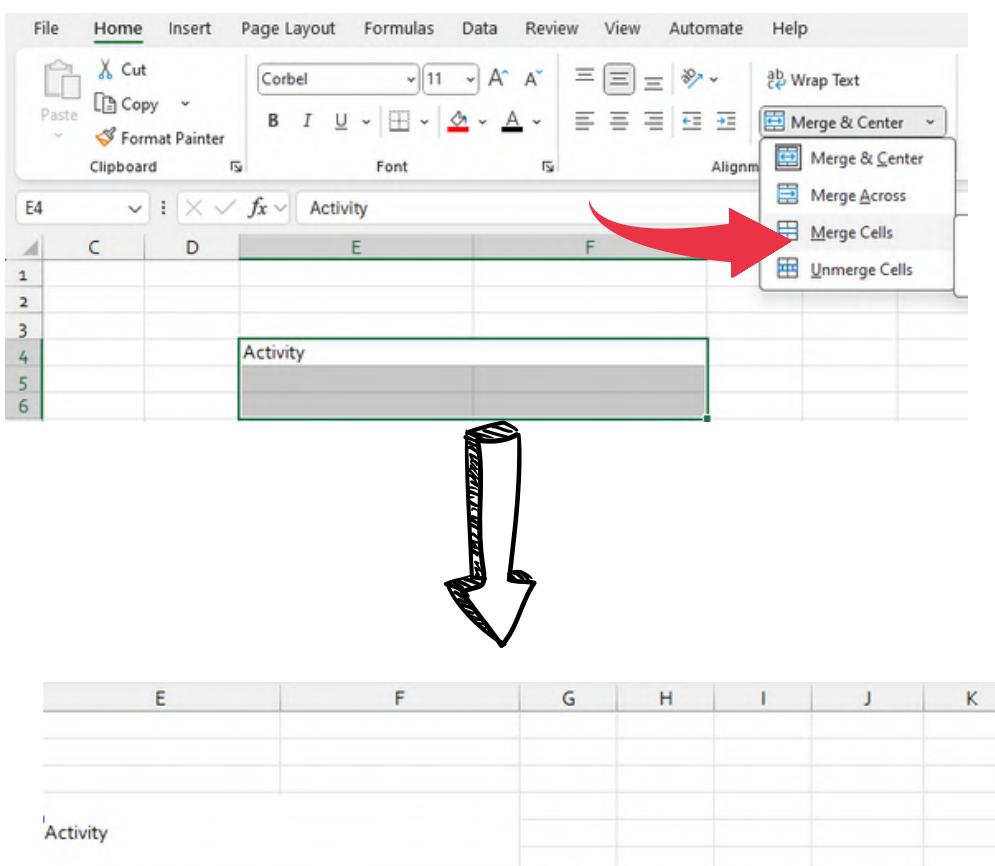
Activity	
Morning Meeting	Discussed project updates and assigned tasks.
Data Analysis	Reviewed dataset and cleaned missing values.
Model Training	Started training Vision Transformer model.

- **Merge Across:** Merges cells in each row individually.





- **Merge Cells:** Combines cells without centering the text.

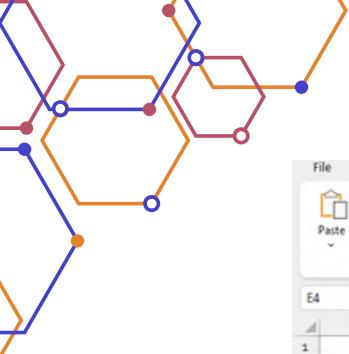


What is Splitting Cells?

- Splitting cells reverses the merging process, dividing a merged cell back into individual cells.
- This is useful if you need to edit or reorganize data.

How to Split Cells

- To split cells:
- Select the merged cell.
- Go to the Home tab > Merge & Center.
- Click Unmerge Cells.

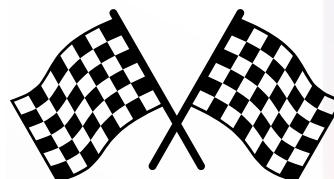


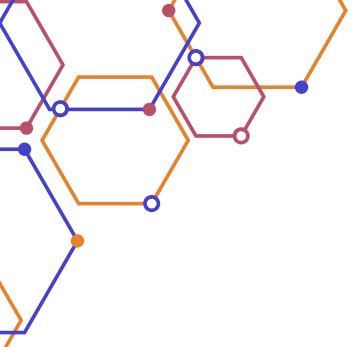
The screenshot shows the Microsoft Excel interface with the 'Home' tab selected. In the 'Alignment' group, the 'Merge & Center' button is highlighted. A red arrow points from this button to a callout box containing the text: 'Unmerge Cells' and 'Split the current cell into multiple cells.' This indicates that the 'Merge & Center' button has a dropdown menu that includes the 'Unmerge Cells' option.



Practice

1. Open the "Monthly_Report.xlsx" workbook.
2. Merge cells A1:D1 to create a header titled "Monthly Sales Report".
3. Center the text in the merged cells.
4. Split the merged cells and observe the changes.

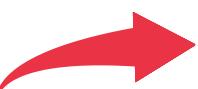




Hiding and Unhiding Rows/Columns

Why Hide Rows and Columns?

- Hiding rows and columns allows you to temporarily remove them from view without deleting them.
- This is useful for focusing on specific data or simplifying the view of your worksheet.



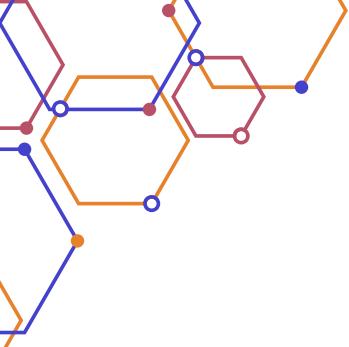
5		
6		
7	Activity	
9	Morning Meeting	Discussed project updates and assigned tasks.
10	Model Training	Started training Vision Transformer model.
	Lunch Break	Took a short break and recharged.

Example
of Hidden
row

How to Hide Rows

To hide a row:

- Select the row(s) you want to hide.
- Right-click and choose Hide from the context menu.
- The selected row(s) will be hidden.



Why Hide Columns?

To hide a column:

- Select the column(s) you want to hide.
 - Right-click and choose Hide from the context menu.
 - The selected column(s) will be hidden.

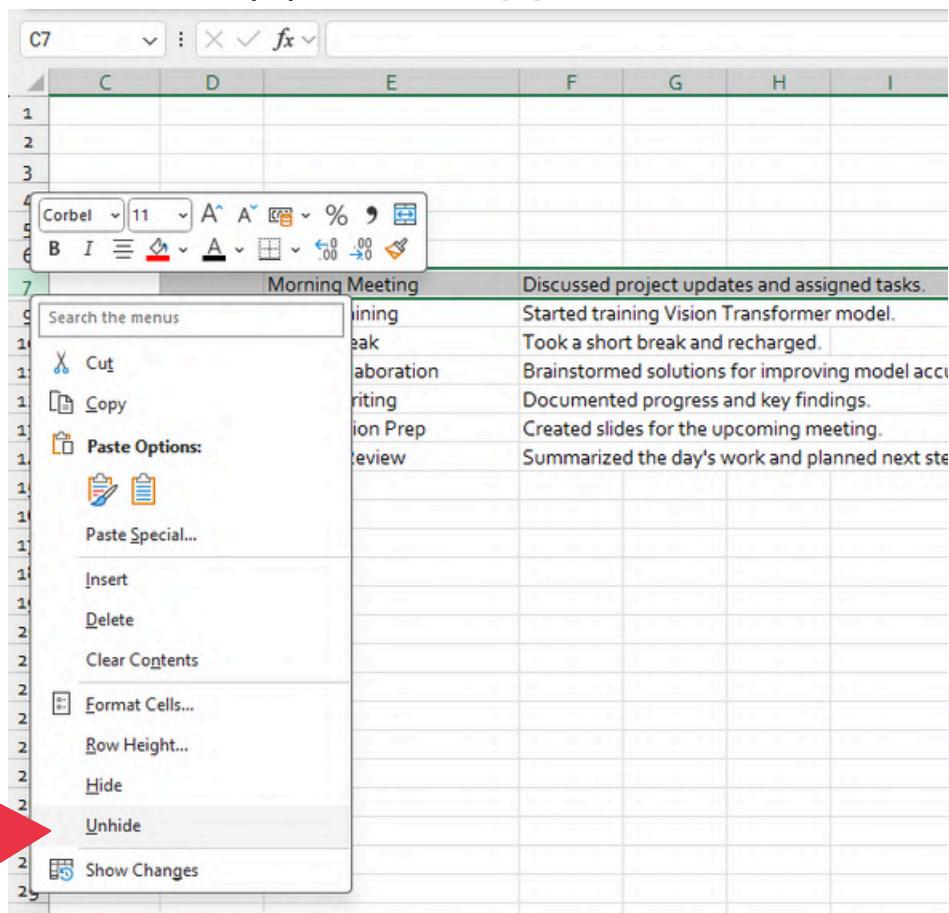
A screenshot of Microsoft Excel illustrating how to use the context menu for text selection. The 'Morning Meeting' text in cell E7 has been selected, and a context menu is open over it. The menu includes options like Cut, Copy, Paste Options, Insert Cut Cells, Delete, Clear Contents, Format Cells, Column Width, Hide, Unhide, and Show Changes. A red arrow points from the bottom left towards the 'Format Cells...' option in the menu.



Unhiding Rows and Columns

To unhide a row:

1. Select the rows above and below the hidden row(s).
2. Right-click and choose Unhide from the context menu.
3. The hidden row(s) will reappear.



To unhide a column:

1. Select the columns to the left and right of the hidden column(s).
2. Right-click and choose Unhide from the context menu.
3. The hidden column(s) will reappear.

A screenshot of a Microsoft Excel spreadsheet titled "Corbel". The spreadsheet has columns labeled C through J and rows labeled 1 through 21. A red arrow points from the text "Right-click on a cell" to the context menu that is open over cell E1. The context menu is titled "Activity" and contains the following options: Cut, Copy, Paste Options..., Insert Cut Cells, Delete, Clear Contents, Format Cells..., Column Width..., Hide, Unhide, and Show Changes.

C	D	E	F	G	H	I	J
1		Activity					
2		Morning Meetin					
3		Data Analysis					
4		Model Training					
5		Lunch Break					
6		Team Collabora					
7		Report Writing					
8		Presentation Pr					
9		Evening Review					
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							



Practice

1. Open the "Monthly_Report.xlsx" workbook.
2. Hide the Expenses column.
3. Hide the row for March.
4. Unhide the Expenses column and the row for March.





MAJOR TASK 2

Objective

Practice data entry, formatting, and basic Excel features.

Create a New Workbook

- Create a new workbook and save it as "Employee_Data.xlsx".

Employee ID	Name	Department	Salary
101	John Doe	Sales	50000
102	Jane Smith	Marketing	55000
103	Alice Johnson	HR	60000
104	Bob Brown	IT	65000

Enter Data

Apply The Following Formatting:

1. Apply the following formatting:
2. Merge cells A1:D1 and enter the title "Employee Data".
3. Apply the Heading 1 style to the title.
4. Center-align the text in the header row (Employee ID, Name, Department, Salary).

CONTINUED

5. Apply All Borders to the table.
6. Use Conditional Formatting to highlight salaries above \$55,000 in green.



EXERCISE 2: ADVANCED

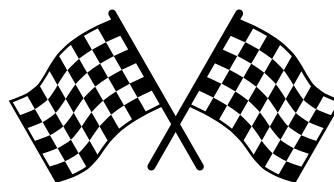
Objective

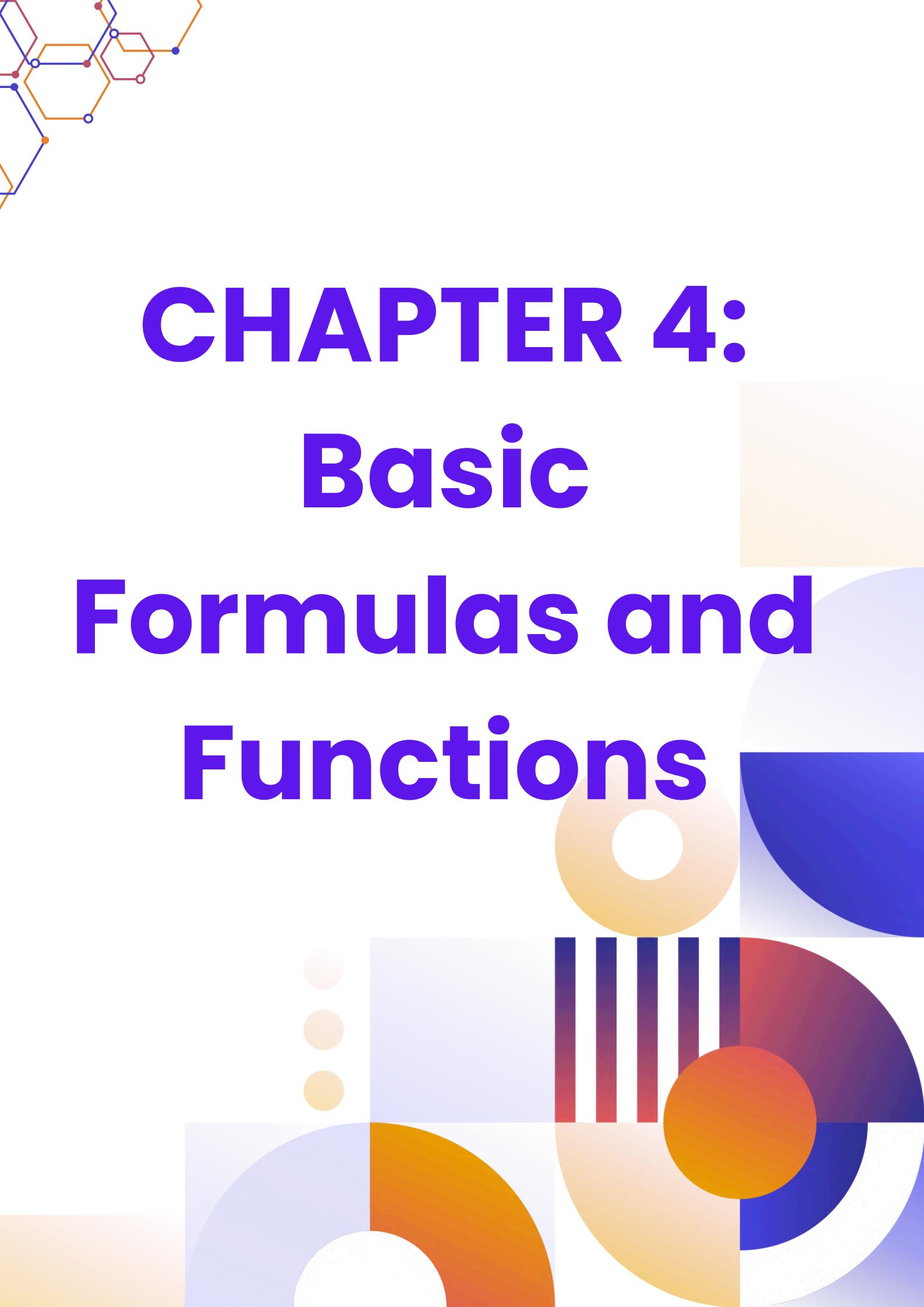
- Practice advanced Excel features like hiding rows/columns, adjusting row height/column width, and using AutoFill.

Instructions:

- Open the "Employee_Data.xlsx" workbook.
- Hide the Salary column.

- Adjust the row height of the header row to 25.
- Adjust the column width of the Department column to 15.
- Use AutoFill to add more employees:
 - Add Employee ID 105 to 110.
 - Use AutoFill to complete the Name, Department, and Salary columns with sample data.
- Unhide the Salary column.





CHAPTER 4:

Basic

Formulas and

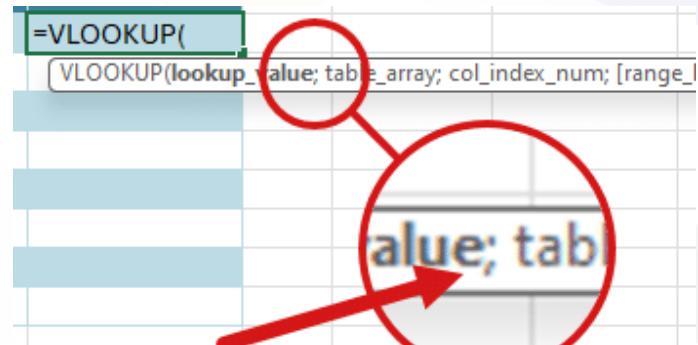
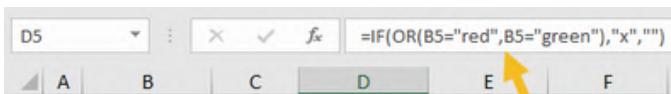
Functions



IMPORTANT THINGS TO CONSIDER:

Function Separators and Decimal/Thousand Separators

- Excel settings vary depending on the region and version of Excel.
- These settings affect how functions are written (e.g., commas vs. semicolons) and how numbers are displayed (e.g., dots vs. commas).
- Understanding these differences is crucial for writing formulas that work across different Excel environments.



Example of formula with comma on the left and semicolon on the right



CONTINUED

Comma as a Function Separator

- In US and many other regions, Excel uses commas to separate function arguments.
- Example: =SUM(A1, B1, C1).

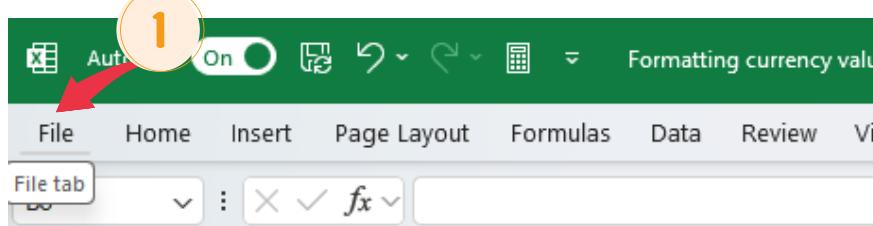
Semicolon as a Function Separator

- In European and some other regions, Excel uses semicolons to separate function arguments.
- Example: =SUM(A1; B1; C1).

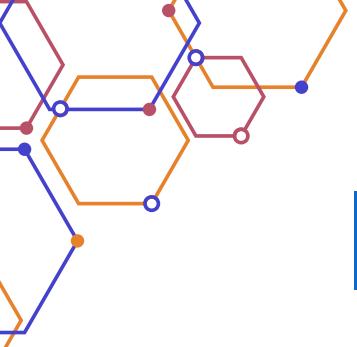
How to Check and Change Function Separators

- To check or change the function separator:
- Go to File > Options > Advanced.
- Scroll down to the Editing options section.
- Check or uncheck the Use system separators box.
- Manually set the Decimal separator and Thousands separator.

CONTINUED



A screenshot of the 'Excel Options' dialog box. The left sidebar lists categories: General, Formulas, Data, Proofing, Save, Language, Accessibility, Advanced (which is selected and highlighted with a red arrow and a large orange circle containing the number '3'), Customize Ribbon, Quick Access Toolbar, Add-ins, and Trust Center. The right pane is titled 'Editing options' and contains several settings with checkboxes. One setting, 'Use system separators' (circled with a large orange circle containing the number '4'), has its checkbox checked. Other settings include 'Using Enter, move selection' (set to 'Down'), 'Automatically insert a decimal point' (set to '2'), 'Enable fill handle and cell drag-and-drop', 'Alert before overwriting cells', 'Allow editing directly in cells', 'Extend data range formats and formulas', 'Enable automatic percent entry', 'Enable AutoCorrect for all values' (set to 'Automatic'), 'Zoom on scroll wheel' (unchecked), 'Alert the user when a potentially time consuming operation occurs' (unchecked), and a dropdown for 'this number of cells (in thousands) is affected' set to '33,554'. At the bottom are 'OK' and 'Cancel' buttons.



Introduction to Formulas

What is a Formula?

A formula in Excel is an expression that performs calculations using numbers, cell references, operators, and built-in functions. It allows users to automate calculations instead of manually computing values.

Why are Formulas Essential in Excel?

- Automation: Saves time by eliminating manual calculations.
- Accuracy: Reduces the risk of human errors in calculations.
- Dynamic Updates: Automatically updates results when input values change.



Difference Between Formulas and Functions

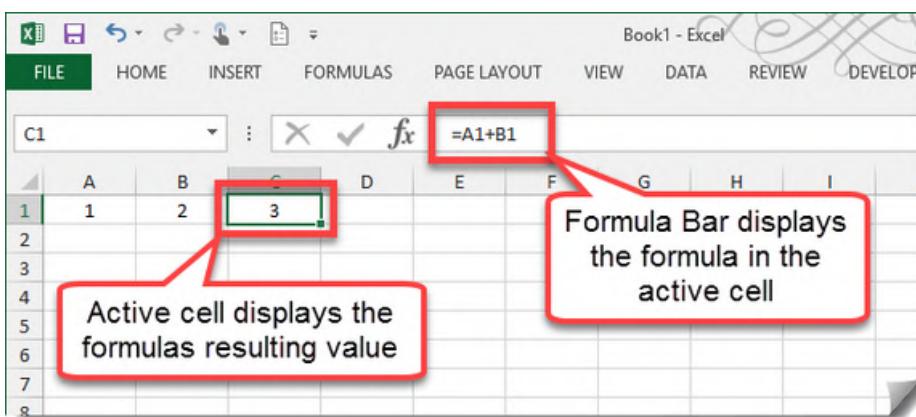
- Formula: A user-defined expression

e.g., **=A1+B1*2)**

Function: A predefined operation in Excel

e.g., **=SUM(A1:A10),
=AVERAGE(A1:A10))**

Understanding the Formula Bar



- The Formula Bar (located above the worksheet) displays the contents of the currently selected cell.
- When entering a formula, Excel automatically updates the result in the cell while keeping the formula visible in the Formula Bar.

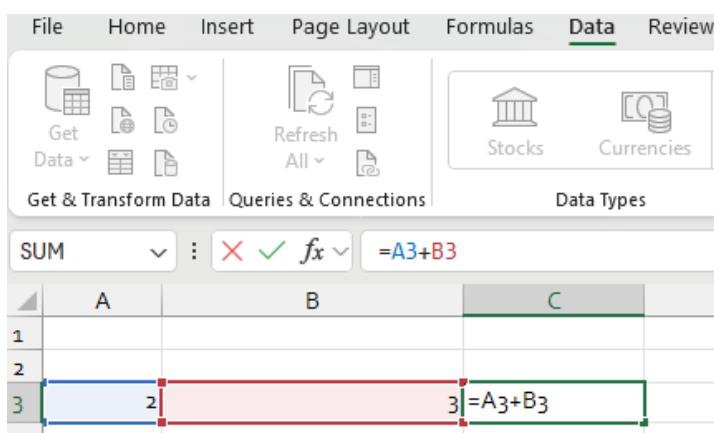


Writing Basic Formulas

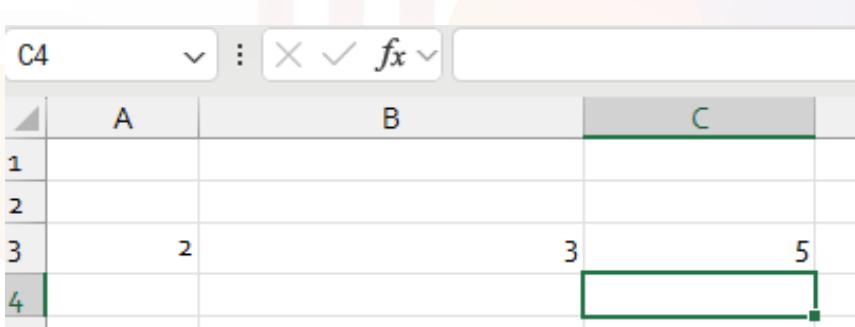
How to Start Writing a Formula

1. Select a cell where you want the result.
2. Type = to indicate the start of a formula.
3. Enter numbers, cell references, or functions.
4. Press Enter to compute the result.

+	Addition	=A1+B1
-	Subtraction	=A1-B1
*	Multiplication	=A1*B1
/	Division	=A1/B1
^	Exponentiation	=A1^B1



A screenshot of Microsoft Excel demonstrating the process of entering a formula. The ribbon is visible at the top with the 'Data' tab selected. In the formula bar, the formula $=A3+B3$ is typed. Below the ribbon, the Excel interface shows columns A, B, and C with rows 1, 2, and 3. Cell C3 contains the formula $=A3+B3$, which is highlighted with a red selection bar. A large black arrow points from the 'ENTER' button at the bottom left towards cell C4, indicating the next step in the process.



A screenshot of Microsoft Excel showing the result of the formula being computed. The formula $=A3+B3$ has been executed, and the result, 5, is displayed in cell C4. The formula bar still shows the original formula $=A3+B3$. The rest of the spreadsheet area is visible with other cells containing values like 1, 2, and 3.



Order of Operations (BODMAS/PEMDAS Rule in Excel)

Excel follows a specific order of operations:

1. Parentheses ()
2. Exponents ^
3. Multiplication and Division *, /
4. Addition and Subtraction +, - Example: =5+2*3 will result in 11, not 21, because multiplication is calculated first.

Cell References in Formulas

What Are Cell References?

Instead of using fixed numbers, formulas can reference cells, making calculations dynamic and automatically updating when values change.

Types of Cell References

1. Relative Reference: Adjusts automatically when copied ($=A1+B1$).

2. Absolute Reference: Stays fixed with \$ ($=$A$1+$B1).

3. Mixed Reference: Locks either the row or column ($=$A1+B1).

The screenshot shows three rows of an Excel spreadsheet. Row 2 contains the formula $=G2*H2$ in cell I2, with a callout bubble labeled "Relative Cell Reference". Row 3 contains the formula $=SUMIFS($C$2:$C$17,$A$2:$A$17,$F2,B2:B17,G$1)$ in cell G2, with a callout bubble labeled "Mixed Cell Reference". Row 4 contains the formula $=$A1 in cell C1, with a callout bubble labeled "Absolute Cell Reference". The spreadsheet has columns F, G, H, and I, and rows 1 through 12.

	F	G	H	I
1	Product	Unit Price	Units Sold	Sales Manager
2	Product	20	10	Manisha
3	Product	21	10	Shalu
4	Product	22	10	Neelika
5	Product-4	2,956.00	22	Ruchi
6	Product-5	5,956.00	23	89,685.00
7	Product-6	6,956.00	24	15,164.00
8	Product-7	7,956.00	1	31,152.00
9	Product-8	8,956.00	7	
10	Product-9	9,956.00	10	
11	Product-10	1,056.00	11	
12				

Using Basic Functions in Excel

What is a Function?

A function is a built-in Excel command designed to perform specific calculations easily.

Understanding Function Syntax

1. All Excel functions follow this structure:

- Example: =SUM(A1:A5) adds up the values from A1 to A5.

**=FUNCTION(argument1,
argument2, ...)**

Commonly Used Functions

COUNT: =COUNT(A1:A7) - Counts numeric values.

SUM: =SUM(A:A) - Adds up values.

IF: =IF(CONDITION) - checks whether a condition is met, and returns one value if true and another value if false..

	A	B	C	D	E	F	G	H	I
1	Name	Score	Result						
2	Richard	93	Pass						
3	Jennifer	60	Pass						
4	James	58	Fail						
5	Lisa	79	Pass						
6	Sharon	41	Fail						
7									

Explanation: if the score is greater than or equal to 60, the IF function shown above returns Pass, else it returns Fail. To quickly copy this formula to the other cells, click on the lower right corner of cell C2 and drag it down to cell C6.

AVERAGE: =AVERAGE(A1:A10) - Finds the mean.

	A	B	C	D	E	F	G	H	I
1	9								
2	15								
3	2								
4	10								
5	1								
6	20								
7									
8	15								
9									

Explanation: the LARGE function returns the array constant {20,15,10}. This array constant is used as an argument for the AVERAGE function, giving a result of 15.

MIN/MAX: =MIN(A1:A10), =MAX(A1:A10) - Finds the smallest/largest value.

=MIN(A1:O1)																
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	
1	0	7	8	6	5	9	8	7	4	8	0	3	5	6	8	
2																
3	0															
4																

=MAX(A1:O1)																
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	
1	0	7	8	6	5	9	8	7	4	8	0	3	5	6	8	
2																
3	9															
4																

COUNTIF: =COUNTIF(A1:A7,"star")

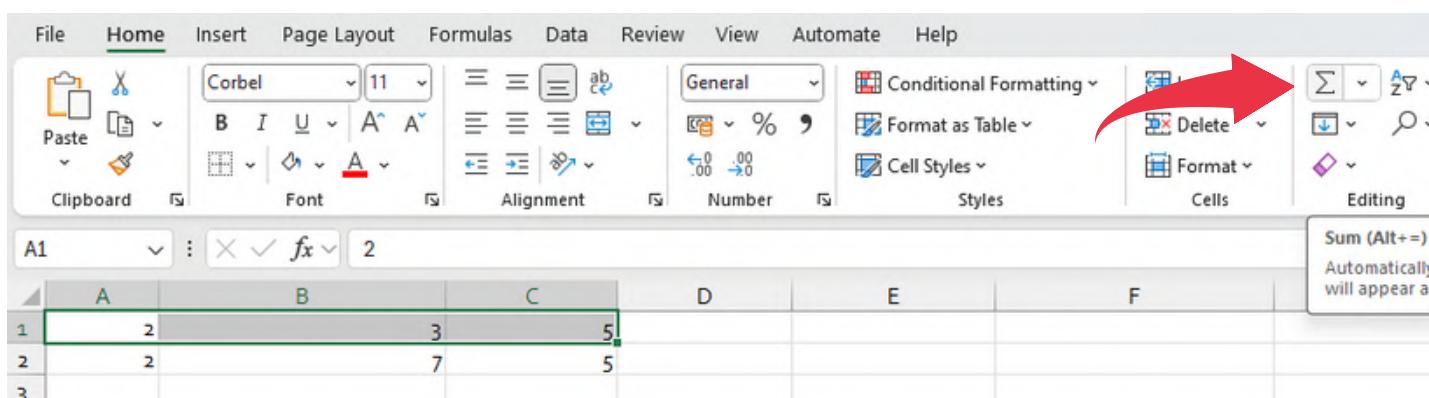
=COUNTIF(A1:A7,"star*")																
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	
1	star															
2	moon															
3	stars															
4		9														
5	star															
6	star															
7	star12															
8																
9		4														
10																

Explanation: an asterisk (*) matches a series of zero or more characters



Using AutoSum Shortcut:

- Select a column of numbers.
- Click AutoSum (Σ) on the toolbar.
- Excel will automatically insert the `=SUM(range)` function.



Formula Errors and Troubleshooting

Common Formula Errors and Their Meanings

Error Meaning Fix

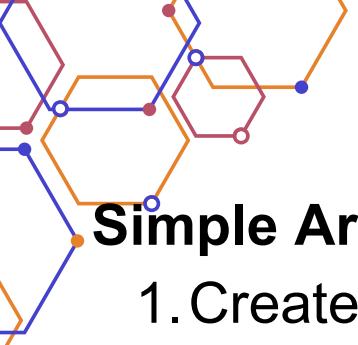
Error	Meaning	Fix
#DIV/0!	Division by zero	Ensure the divisor is non-zero
#VALUE!	Wrong data type	Check for text in numeric calculations
#NAME?	Undefined function or reference	Check for typos in function names
#REF!	Invalid cell reference	Ensure all referenced cells exist

How to Fix Errors Effectively

- Use =IFERROR(formula, "Error message") to handle errors.
- Use Ctrl + ~ to display all formulas in the sheet for debugging.



**Practice
(Short drill)**



Simple Arithmetic Formulas:

1. Create a formula to add two numbers.
2. Subtract one cell's value from another.
3. Multiply and divide numbers in different cells.

Using Cell References:

1. Create a dynamic formula using relative and absolute references.

Fix the Errors:

1. Identify and correct errors in given formulas.

MAJOR EXAM

Case Study:

Create a grade sheet that calculates total marks, averages, and highest scores using formulas.

Challenge: Build a small financial budget sheet using SUM, AVERAGE, and COUNT functions



SECTION 2

Intermediate

Excel

skills





Chapter 5:

Data

Management

Sorting Data

What is Sorting?

- Sorting organizes data in a specific order (ascending or descending) based on one or more columns.
- It helps in analyzing data, finding trends, and making data more readable.

Example of sorted data

	A	B
1	Name1 Sorted	ID Sorted
2	A	id1
3	B	id2
4	C	id3
5	D	id4
6	E	id5
7	F	id6
8	G	id7
9		

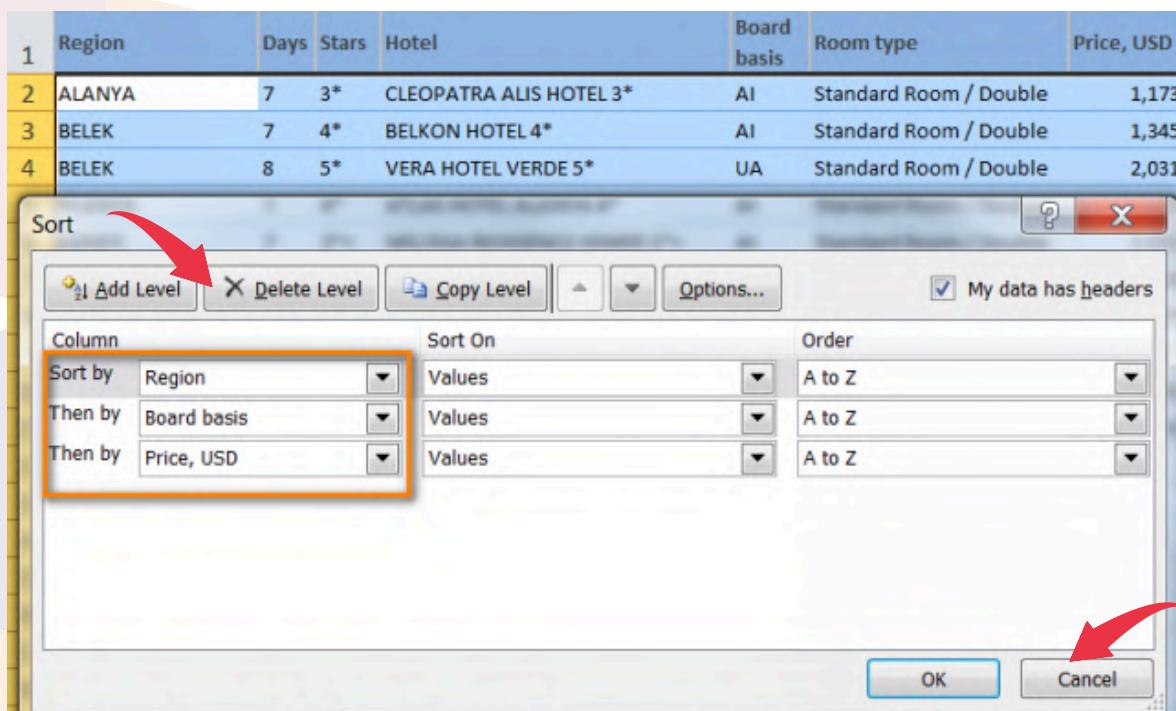
Example of unsorted data

	C	D
1	Name1 Unsorted	ID Unsorted
2	F	id6
3	E	id5
4	D	id4
5	A	id1
6	B	id2
7	C	id3
8	G	id7
9		

Multiple Column Sorting

Sorting Multiple Columns

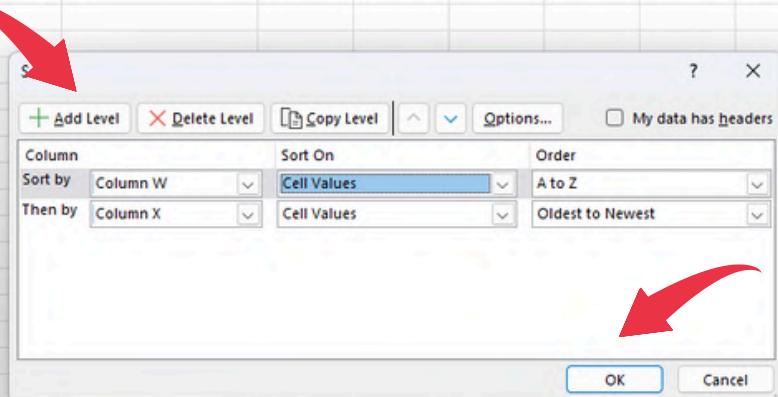
- To sort multiple columns:
 - a. Select the range of data you want to sort.
 - b. Go to the Data tab > Sort.
 - c. In the Sort dialog box, add levels for each column you want to sort by.
 - d. Choose the sort order (ascending or descending) for each level.
 - e. Click OK.



Multiple Column Sorting

Sorting Multiple Columns

- To sort multiple columns:
 - a. Select the range of data you want to sort.
 - b. Go to the Data tab > Sort.
 - c. In the Sort dialog box, add levels for each column you want to sort by.
 - d. Choose the sort order (ascending or descending) for each level.
 - e. Click OK.



Month	Date
February	02/02/2025
April	04/02/2025
May	05/02/2025
June	06/02/2025
July	07/02/2025
August	08/02/2025
September	09/02/2025
October	10/02/2025
November	11/02/2025
December	12/02/2025
January	13/02/2025
February	14/02/2025
March	15/02/2025

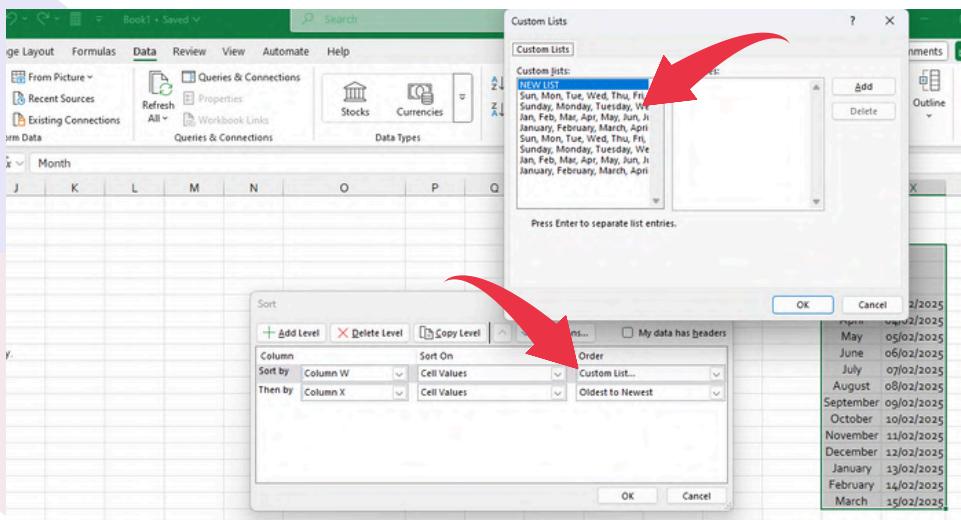
Month	Date
April	04/02/2025
August	08/02/2025
December	12/02/2025
February	02/02/2025
February	14/02/2025
January	13/02/2025
July	07/02/2025
June	06/02/2025
March	15/02/2025
May	05/02/2025
Month	Date
November	11/02/2025
October	10/02/2025
September	09/02/2025

Custom Sorting

Custom sorting allows you to sort data based on custom criteria (e.g., days of the week, months of the year).

To perform a custom sort:

- Select the range of data you want to sort.
- Go to the Data tab > Sort.
- In the Sort dialog box, choose the column to sort by.
- Click on Order and select Custom List.
- Choose or create a custom list and click OK.

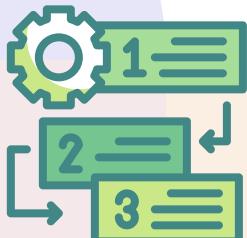


April	04/02/2025
August	08/02/2025
December	12/02/2025
February	02/02/2025
February	14/02/2025
January	13/02/2025
July	07/02/2025
June	06/02/2025
March	15/02/2025
May	05/02/2025
Month	Date
November	11/02/2025
October	10/02/2025
September	09/02/2025



Practice and Recap

- Open the "Employee_Data.xlsx" workbook.
- Sort the Salary column in descending order.
- Sort the data first by Department in ascending order and then by Salary in descending order.
- Perform a custom sort on the Department column using a custom list (e.g., Sales, Marketing, HR, IT).



Recap

- Sorting organizes data in a specific order based on one or more columns.
- Single column sorting sorts data in ascending or descending order.
- Multiple column sorting sorts data based on multiple criteria.
- Custom sorting allows sorting based on custom criteria.

Introduction to Filtering

What is Filtering?

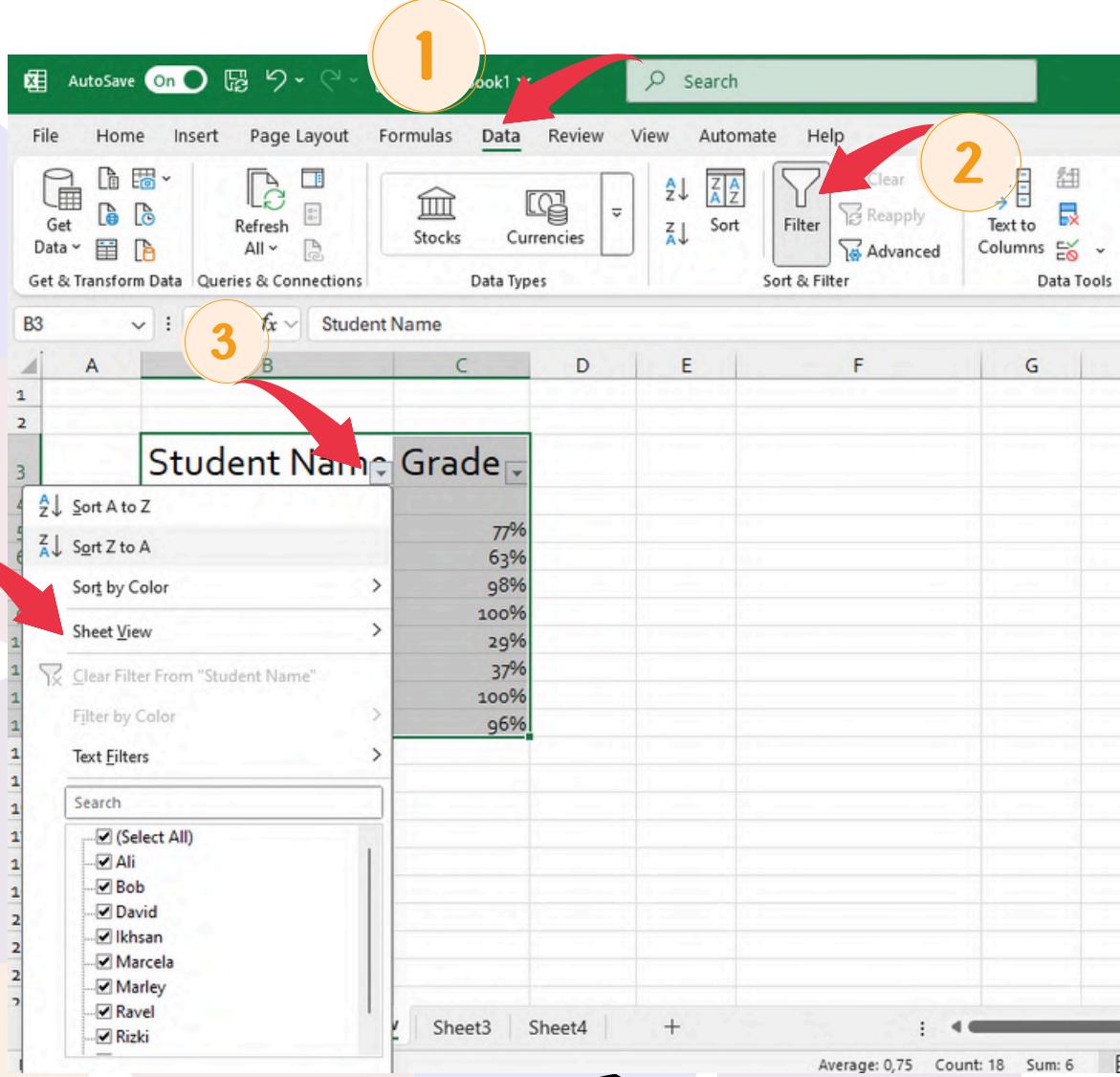
- Filtering allows you to display only the rows that meet certain criteria, hiding the rest.
- It helps in analyzing specific subsets of data without altering the original dataset.

D3	A	B	C	D	E
	Unfiltered Data			Filtered Data	
1	Student Name	Grade		Student Name	Grade
2					
3	Bob	77.00%		Bob	77.00%
4	Garry	63.00%		Jenny	98.00%
5	Jenny	98.00%		Susan	100.00%
6	Susan	100.00%		Lindsay	87.00%
7	Bill	29.00%		Johnny	100.00%
8	Jordan	0.00%		Dominic	96.00%
9	Lindsay	87.00%			
10	Laura	37.00%			
11	Johnny	100.00%			
12	Dominic	96.00%			

Basic Filters

To apply a basic filter:

- Select the range of data you want to filter.
- Go to the Data tab > Filter.
- Click the dropdown arrow in the header of the column you want to filter.
- Choose the criteria (e.g., specific values, text filters, number filters).
- Click OK.



For example, if we use a text filter in order to only filter out the data where the names start with letter A, we get the following:

A	B	C	D
1			
2			
3	Student Name	Grade	
12	Ali	100%	
14			
15			

Advanced Filters

Advanced filters allow you to apply complex criteria using multiple conditions.

To apply an advanced filter:

1. Set up a criteria range above or below your data.
2. Go to the Data tab > Advanced.
3. In the Advanced Filter dialog box, specify the list range and criteria range.
4. Choose to filter the list in place or copy to another location.
5. Click OK.

Channel	Product	Date	Sales Value
Online	Laptop	15/01/2023	1200
Retail	Smartphone	10/02/2023	800
Online	Tablet	05/03/2023	450
Retail	Laptop	20/04/2023	1100
Online	Smartphone	12/05/2023	750
Retail	Tablet	18/06/2023	500
Online	Laptop	22/07/2023	1300
Retail	Smartphone	30/08/2023	850
Online	Tablet	14/09/2023	470
Retail	Laptop	25/10/2023	1150

The screenshot shows a Microsoft Excel spreadsheet with data from row 21 to 31. The first four rows (21-24) are headers. The data starts at B21 with columns Channel, Product, Date, and Sales Value. A green dashed box highlights the entire data range A21:D31. The ribbon is visible at the top with the 'Data' tab selected. In the Data Tools group, the 'Advanced' filter icon is highlighted with a red arrow and a circled number 3. A context menu is open over the data range, with the 'Advanced' option selected and highlighted with a red arrow and a circled number 4. The 'Advanced' dialog box is displayed, showing the 'List range' set to \$B\$21:\$E\$31.

List Range

The List Range is the actual data you want to filter. It includes all the rows and columns of your dataset, including the headers.

Key Points:

- The List Range must include the column headers (e.g., Channel, Product, Date, Sales Value).
- It should cover all the rows and columns of your data.
- Example: If your data is in cells A1:D11 (including headers), then A1:D11 is your List Range.



	Channel	Product	Date	Sales Value
22	Online	Laptop	15/01/2023	1200
23	Retail	Smartphone	10/02/2023	800
24	Online	Tablet	05/03/2023	450
25	Retail	Laptop	20/04/2023	1100
26	Online	Smartphone	12/05/2023	750
27	Retail	Tablet	18/06/2023	500
28	Online	Laptop	22/07/2023	1300
29	Retail	Smartphone	30/08/2023	850
30	Online	Tablet	14/09/2023	470
31	Retail	Laptop	25/10/2023	1150

For example:

In our case, the list range is B21:E31

Criteria Range

The Criteria Range is where you define the conditions for filtering your data. It tells Excel what rules to follow when filtering the List Range.

- The Criteria Range must include column headers that match the headers in your List Range.
- Below the headers, you specify the conditions (e.g., >1000 , $=\text{Online}$, ≤ 500).
- You can use logical operators like $>$, $<$, \geq , \leq , $=$, and \neq (not equal to).
- You can also use wildcards like $*$ (e.g., Lap^* for products starting with "Lap").

Example:

If we want to filter the cells where the channel is online and the product is laptop, we will do the step by step process as mentioned below:

The screenshot shows a Microsoft Excel spreadsheet with the following data:

Channel	Product	Date	Sales Value
Online	Laptop	15/01/2023	1200
Retail	Smartphone	10/02/2023	800
Online	Tablet	05/03/2023	450
Retail	Laptop	20/04/2023	1100
Online	Smartphone	12/05/2023	750
Retail	Tablet	18/06/2023	500
Online	Laptop	22/07/2023	1300
Retail	Smartphone	30/08/2023	850
Online	Tablet	14/09/2023	470
Retail	Laptop	25/10/2023	1150

The Advanced Filter dialog box is open, with the following settings:

- Action: Filter the list, in-place
- List range: \$B\$21:\$E\$31
- Criteria range: \$G\$21:\$G\$22
- Copy to: (empty)
- Unique records only

Red arrows and numbered circles indicate the steps:

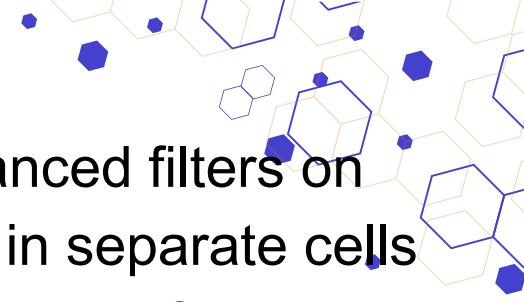
- A red arrow points from the number 1 to the data table.
- A red arrow points from the number 2 to the criteria range \$G\$21:\$G\$22, which contains "channel" and "online".
- A red arrow points from the number 3 to the "OK" button in the Advanced Filter dialog box.

Below the main table, a smaller table shows the filtered results:

Channel	Product	Date	Sales Value
Online	Laptop	15/01/2023	1200
Online	Tablet	05/03/2023	450
Online	Smartphone	12/05/2023	750
Online	Laptop	22/07/2023	1300
Online	Tablet	14/09/2023	470

So in the above example, we follow the step by step process as follows:

1. Select the data you want to apply advanced filters on
2. Then we write about our criteria range in separate cells



3. Select the data you want to apply advanced filters on
4. Then we write about our criteria range in separate cells
5. While in criteria range, we select our range of cells and it automatically writes the criteria range inside the specified field.

Click Ok, and we will have filtered our data to only show the cells where the channel is online.

How List Range and Criteria Range Work Together

- To give you an idea of what happened in the above example, here is a breakdown:
- List Range: This is your full dataset (e.g., B21:E31).
 - Criteria Range: This is where you define the rules for filtering (e.g., G21:H22).
- Excel uses the Criteria Range to filter the List Range and display only the rows that meet the conditions.

Example 2: Using symbols

We can also use multiple criterias to filter our data. For example, if we want to only filter out the data where the:

- Product is Laptop
- Channel is online
- Sales value > 750

F21 : fx Channel

Channel	Product	Date	Sales Value
Online	Laptop	15/01/2023	1200
Retail	Smartphone	10/02/2023	800
Online	Tablet	05/03/2023	450
Retail	Laptop	20/04/2023	1100
Online	Smartphone	12/05/2023	750
Retail	Tablet	18/06/2023	500
Online	Laptop	22/07/2023	1300
Retail	Smartphone	30/08/2023	850
Online	Tablet	14/09/2023	470
Retail	Laptop	25/10/2023	1150



B21 : fx Channel

Channel	Product	Date	Sales Value
Online	Laptop	15/01/2023	1200
Online	Laptop	22/07/2023	1300

In the same manner you can also use various other symbols such as:

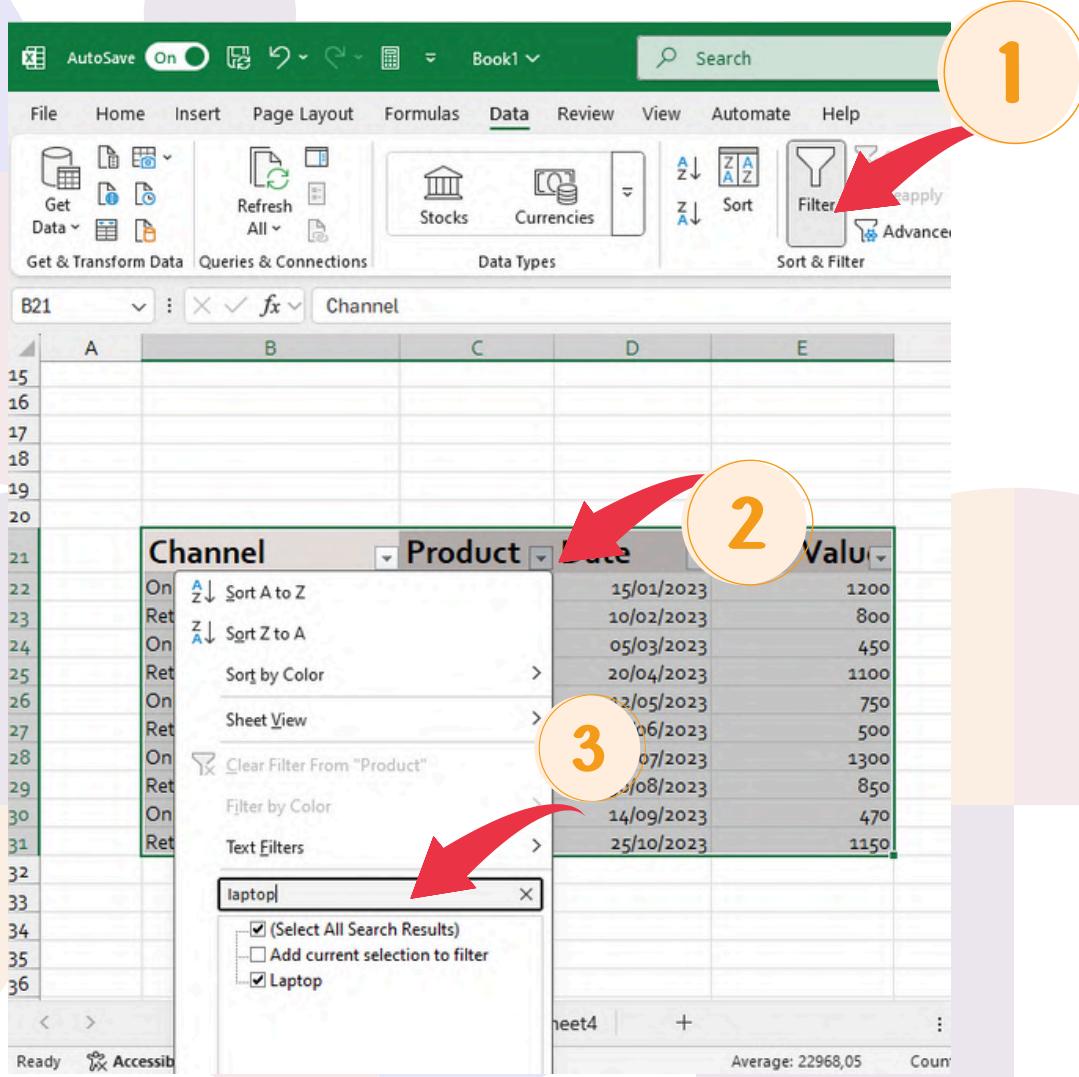
- $>$, $<$, \geq , \leq , $=$, and \neq
- You can also use wildcards like $*$ (e.g., Lap* for products starting with "Lap").

Using Search In Filters

The search box in filters allows you to quickly find and select specific items.

To use the search box:

1. Click the dropdown arrow in the header of the column you want to filter.
2. Type your search term in the search box.
3. Select the items you want to filter by.
4. Click OK.





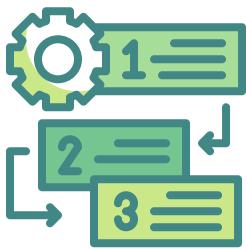
A screenshot of a Microsoft Excel spreadsheet titled "Channel". The table has columns labeled "Channel", "Product", "Date", and "Sales Value". The data shows four rows of sales records:

Channel	Product	Date	Sales Value
Online	Laptop	15/01/2023	1200
Retail	Laptop	20/04/2023	1100
Online	Laptop	22/07/2023	1300
Retail	Laptop	25/10/2023	1150

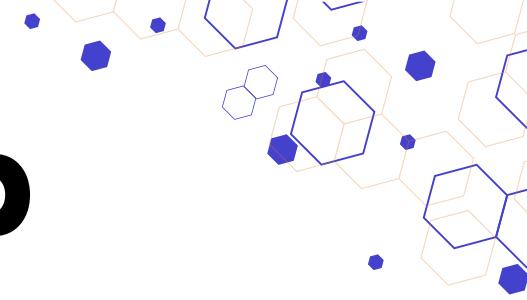
Filtered using search box

Practice and Recap

- Open the "Employee_Data.xlsx" workbook.
- Apply a basic filter to display only employees in the Sales department.
- Apply an advanced filter to display employees with salaries greater than \$55,000.
- Use the search box to filter for employees with names containing "John".



Recap



- Filtering allows you to display only the rows that meet certain criteria.
- Basic filters are used for simple criteria.
- Advanced filters allow for complex criteria using multiple conditions.
- The search box in filters helps you quickly find and select specific items.

Removing Duplicates

What are Duplicates?

- Duplicates are repeated entries in a dataset that can skew analysis and lead to incorrect conclusions.
- Removing duplicates ensures data accuracy and integrity.

1	Item	Duplicate
2	Apples	Duplicate
3	Bananas	
4	Oranges	
5	Apples	Duplicate
6	Green bananas	Duplicate
7	Apples	Duplicate
8	Green bananas	Duplicate

Why Remove Duplicates?

- **Data Accuracy:** Ensures that each entry is unique and accurate.
- **Efficiency:** Reduces the size of the dataset, making it easier to work with.
- **Analysis:** Prevents skewed results in data analysis and reporting.

1	Item
2	Apples
3	Bananas
4	Oranges

How to Identify Duplicates

Before removing duplicates, it's important to identify them.

Use Conditional Formatting to highlight duplicates:

- Select the range of data.
- Go to the Home tab > Conditional Formatting > Highlight Cells Rules > Duplicate Values.
- Choose a formatting style and click OK.

1

2

3

Channel	Product	Date	Sales
Online	Laptop	15/01/2023	
Retail	Smartphone	10/02/2023	
Online	Tablet	05/03/2023	450
Retail	Laptop	20/04/2023	1100
Online	Smartphone	12/05/2023	750
Retail	Tablet	18/06/2023	500
Online	Laptop	22/07/2023	1300
Retail	Smartphone	30/08/2023	850
Online	Tablet	14/09/2023	470
Retail	Laptop	25/10/2023	1150

Duplicate Values

Format cells that contain:

Duplicate values with Light Red Fill with Dark Red Text

OK Cancel

Channel	Product	Date	Sales Value
Online	Laptop	15/01/2023	1200
Retail	Smartphone	10/02/2023	800
Online	Tablet	05/03/2023	450
Retail	Laptop	20/04/2023	1100
Online	Smartphone	12/05/2023	750
Retail	Tablet	18/06/2023	500
Online	Laptop	22/07/2023	1300
Retail	Smartphone	30/08/2023	850
Online	Tablet	14/09/2023	470
Retail	Laptop	25/10/2023	1150

We can even check the unique cells where there are no duplicates.

To do that, just go to the popup box and then in the dropdown arrow, choose the unique term and if you highlight it with green text, it would be visualized as follows:

The screenshot shows an Excel spreadsheet with a table of sales data. The table has columns for Channel, Product, Date, and Sales Value. The first row is a header. The data includes various combinations of Channel (Online, Retail), Product (Laptop, Smartphone, Tablet), and Date (e.g., 15/01/2023, 10/02/2023). The 'Sales Value' column contains numerical values like 1200, 800, 450, etc. An orange circle labeled '1' is around the 'Format cells that contain:' dropdown. Another orange circle labeled '2' is around the 'values with:' dropdown, which is set to 'Green Fill with Dark Green Text'. A red arrow points from the '1' circle to the '2' circle.

Channel	Product	Date	Sales Value
Online	Laptop	15/01/2023	1200
Retail	Smartphone	10/02/2023	800
Online	Tablet	05/03/2023	450
Retail	Laptop	20/04/2023	1100
Online	Smartphone	12/05/2023	750
Retail	Tablet	18/06/2023	500
Online	Laptop	22/07/2023	1300
Retail	Smartphone	30/08/2023	850
Online	Tablet	14/09/2023	470
Retail	Laptop	25/10/2023	1150

Removing Duplicates

To remove duplicates:

- Select the range of data.
- Go to the Data tab > Remove Duplicates.
- In the Remove Duplicates dialog box, select the columns to check for duplicates.
- Click OK.
- Excel will remove the duplicates and display a message with the number of duplicates removed and unique values remaining.

1

3

2

To delete duplicate values, select one or more columns that contain duplicates.

Select All Unselect All My data has headers

Columns

Channel

Product

Date

Sales Value

OK Cancel

Channel	Product	Date	Sales Value
Online	Laptop	15/01/2023	1200
Retail	Smartphone	10/02/2023	800
Online	Tablet	05/03/2023	450
Retail	Laptop	20/04/2023	1100
Online	Smartphone	12/05/2023	750
Retail	Tablet	18/06/2023	500
Online	Laptop	22/07/2023	1300
Retail	Smartphone	30/08/2023	850
Online	Tablet	14/09/2023	470
Retail	Laptop	25/10/2023	1150

Microsoft Excel

i 4 duplicate values found and removed; 6 unique values remain. Note that counts may include empty cells, spaces, etc.

OK

Channel	Product	Date	Sales Value
Online	Laptop	15/01/2023	1200
Retail	Smartphone	10/02/2023	800
Online	Tablet	05/03/2023	450
Retail	Laptop	20/04/2023	1100
Online	Smartphone	12/05/2023	750
Retail	Tablet	18/06/2023	500



Practice and Recap

- Open the "Employee_Data.xlsx" workbook.
- Add duplicate entries to the dataset.
- Use Conditional Formatting to highlight the duplicates.
- Remove the duplicates using the Remove Duplicates feature.



Recap

- Duplicates are repeated entries that can affect data accuracy and analysis.
- Identifying duplicates using Conditional Formatting helps in visualizing repeated data.
- Removing duplicates ensures data integrity and efficiency.

Data Validation

What is Data Validation?

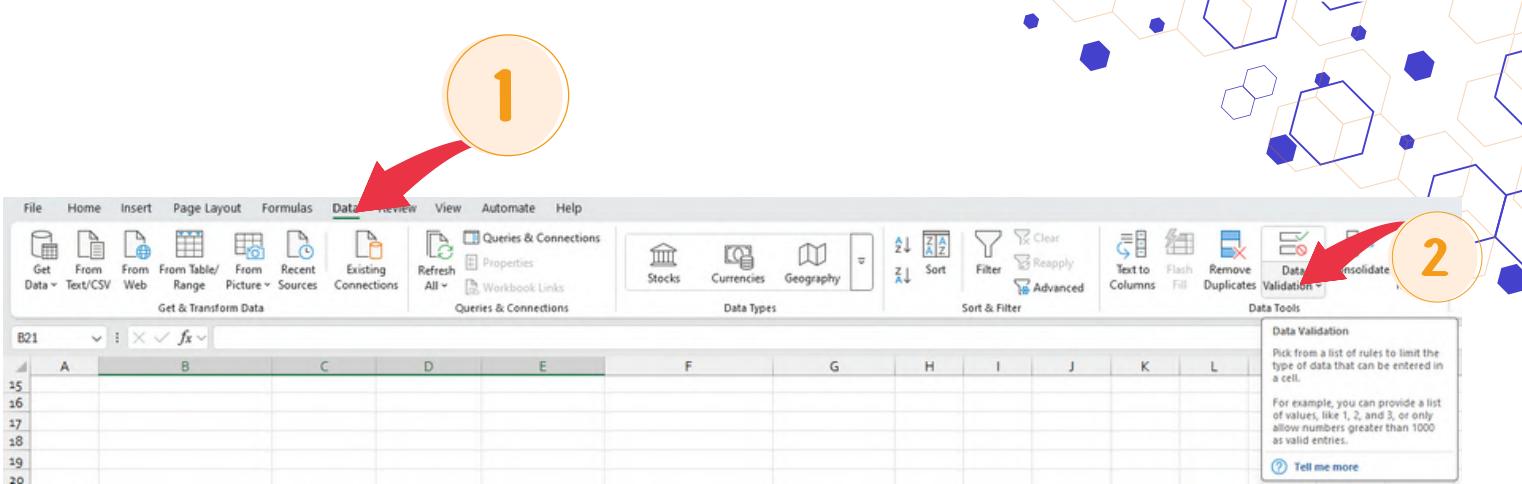
Data Validation is a feature in Excel that helps control what users can enter into a cell. It ensures data accuracy, consistency, and prevents errors. By setting rules, users can restrict inputs to meet specific criteria, such as allowing only numbers, dates within a range, or predefined list items.

Why is Data Validation Important?

- Prevents data entry errors
- Ensures consistency across spreadsheets
- Guides users with messages and dropdowns
- Helps maintain data integrity for analysis and reports

Where to Find Data Validation in Excel?

- Go to the ‘Data’ tab on the Ribbon.
- Click ‘Data Validation’ in the Data Tools group.
- The Data Validation dialog box appears, where you can set rules.



Creating Drop-Down Lists

What is a Drop-Down List?

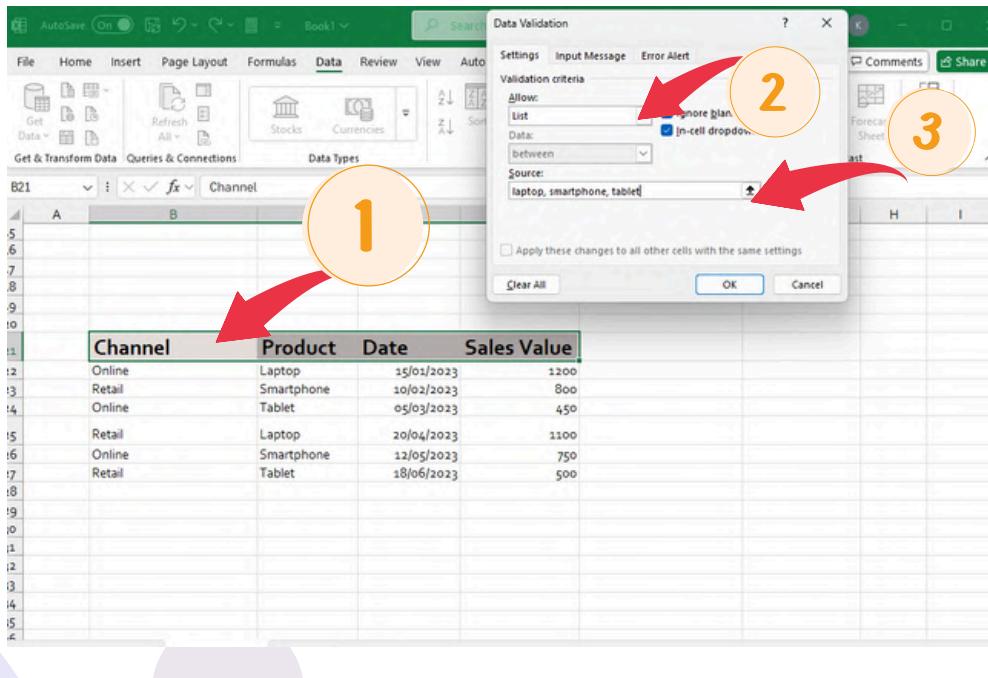
A drop-down list allows users to select from predefined options, reducing errors and speeding up data entry.

Methods to Create a Drop-Down List in Excel

Method 1: Using a Direct List (For small lists)

- Select the cell(s) where the drop-down list should appear.
- Go to Data > Data Validation.
- In the Settings tab:

- Under Allow, select List.
- In the Source box, enter values separated by commas (e.g., Apple, Banana, Orange).
- Click OK to apply the drop-down



B21 : X ✓ f x Channel

A	B	C	D	E
1	2	3	4	5
6	7	8	9	10
11	12	13	14	15
16	17	18	19	20
21	22	23	24	25
26	27	28		

Channel

Channel	Product	Date	Sales Value
laptop, smartphone, tablet	Laptop	15/01/2023	1200
Retail	Smartphone	10/02/2023	800
Online	Tablet	05/03/2023	450
Retail	Laptop	20/04/2023	1100
Online	Smartphone	12/05/2023	750
Retail	Tablet	18/06/2023	500

C21 : X ✓ f x Product

A	B	C	D	E
15	16	17	18	19
20	21	22	23	24
25	26	27	28	
	Channel	Product	Date	Sales V

Channel

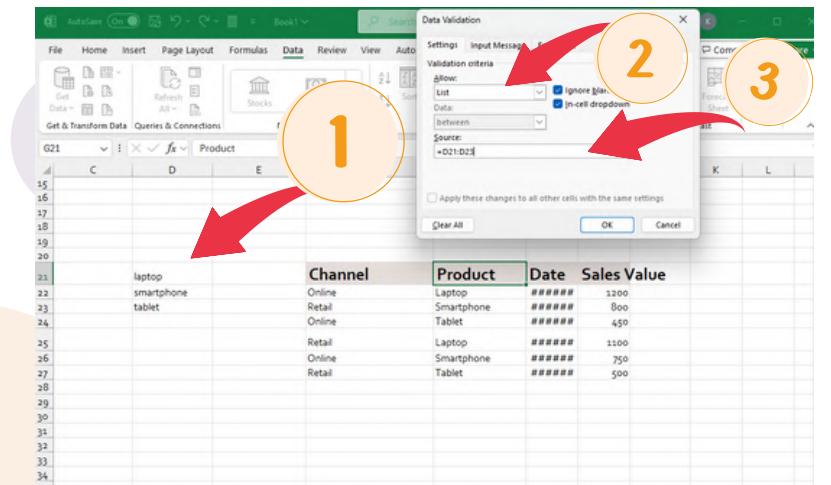
Channel	Product	Date	Sales V
Online	Laptop	15/01/2023	1200
Retail	Smartphone	10/02/2023	800
Online	Tablet	05/03/2023	450
Retail	Laptop	20/04/2023	1100
Online	Smartphone	12/05/2023	750
Retail	Tablet	18/06/2023	500

Sales Value

1200
800
450
1100
750

Method 2: Using a Cell Range (For longer lists)

- Type the list items in a column (e.g., D21:D23 in our case).
- Select the cell(s) where the drop-down should appear.
- Go to Data > Data Validation.
- Under Allow, choose List.
- In the Source box, enter the range (e.g., =D21:D23).
- Click OK.



	Channel	Product	Date	Sales Value
21	Online	Laptop	#####	1200
22	Retail	Smartphone	#####	800
23	Online	Tablet	#####	450
24				
25	Retail	Laptop	#####	1100
26	Online	Smartphone	#####	750
27	Retail	Tablet	#####	500
28				
29				
30				
31				
32				
33				
34				

Editing & Removing Drop-Down Lists



- To edit, reopen Data Validation and update the Source field.
- To remove, open Data Validation and click Clear All.

Short Exercise

- ✓ Create a drop-down list for product categories: Electronics, Clothing, Home Decor, Beauty, Books.
- ✓ Modify it to include Toys.
- ✓ Delete the list without removing data.

Input Restrictions and Error Messages

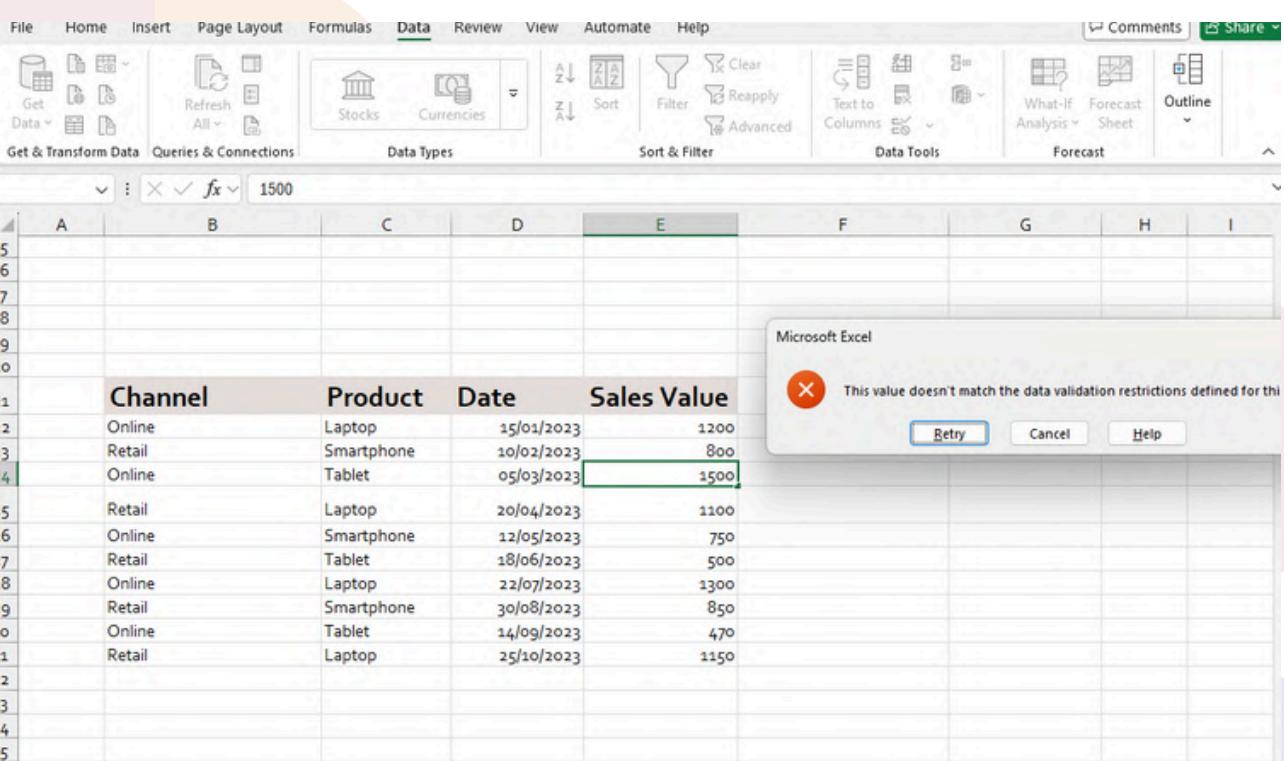
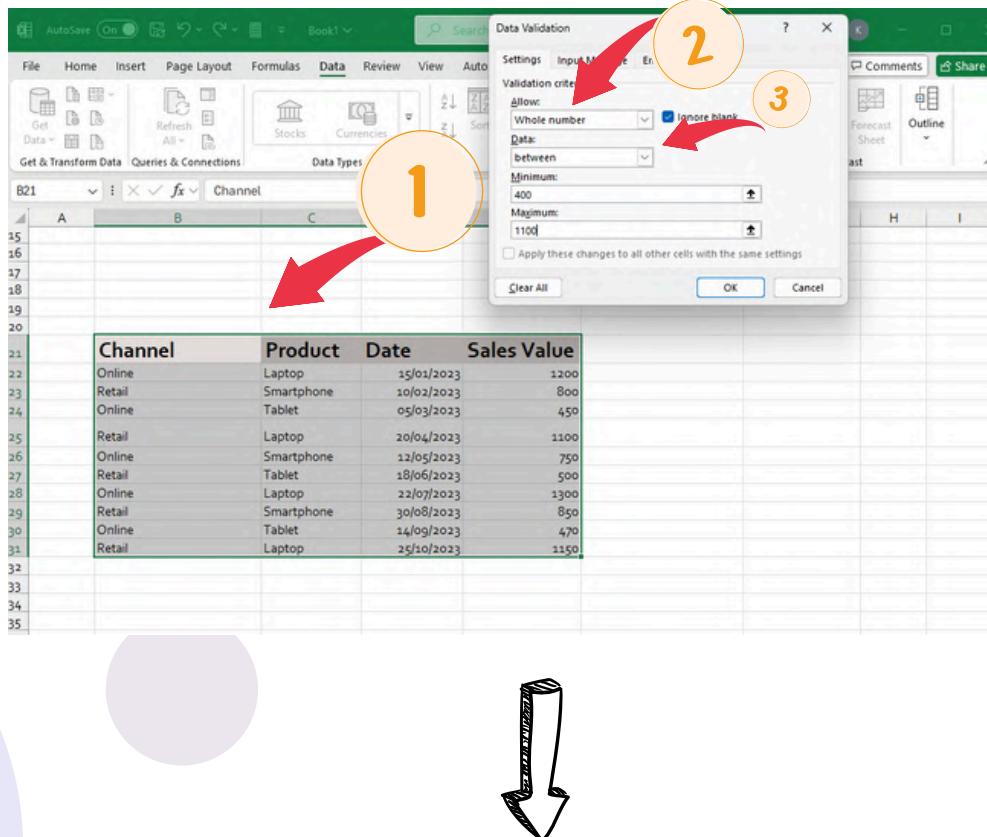
Setting Input Restrictions

Input restrictions limit the type of data that can be entered into a cell.

To set input restrictions:

- Select the cell(s) where you want to apply restrictions.
- Go to the Data tab > Data Validation.
- In the Data Validation dialog box, go to the Settings tab.

- In the Allow dropdown, select the type of restriction (e.g., Whole number, Decimal, Date, Text length).
- Set the criteria (e.g., between, not between, equal to, etc.).
- Click OK.



You can see in the above example that when I try to add a value of 1500, which is above the data validation restriction that I applied, it gives me an error.

Restrict Input to Future Dates Only

- Select the cell(s).
- In Data Validation, choose Date.
- Set Start Date as =TODAY() (prevents past dates).
- Click OK.

The screenshot shows a Microsoft Excel spreadsheet with a data validation dialog box overlaid. The dialog box is titled 'Data Validation' and has three numbered steps:

1. The 'Allow' dropdown is set to 'Date'. The 'Data' dropdown is set to 'greater than or equal to'. The 'Start date:' field contains the formula '=TODAY()'.
2. A red arrow points from the 'OK' button in the dialog to the 'OK' button in the Excel ribbon.
3. A red arrow points from the 'OK' button in the dialog to the 'OK' button in the bottom right corner of the dialog box.

The main Excel window shows a table with columns: Channel, Product, Date, and Sales Value. The 'Date' column is selected. The data validation settings apply to this column. The 'Sales Value' column contains values like 1200, 800, 450, etc. An arrow points from the 'Sales Value' column to the 'OK' button in the dialog.

In the bottom right corner of the main Excel window, a message box is displayed:

This value doesn't match the data validation restrictions defined for this cell.

Buttons in the message box: Retry, Cancel, Help.

Channel	Product	Date	Sales Value
Online	Laptop	15/01/2023	1200
Retail	Smartphone	10/02/2023	800
Online	Tablet	05/03/2023	450
Retail	Laptop	20/04/2023	1100
Online	Smartphone	12/05/2023	750
Retail	Tablet	18/06/2023	500
Online	Laptop	22/07/2023	1300
Retail	Smartphone	30/08/2023	850
Online	Tablet	14/09/2023	470
Retail	Laptop	25/10/2023	1150

You can see in the above example that when I try to add a value of 2022, which is THREE years ago, and is not satisfying the data validation restriction that I applied, it gives me an error.

Restrict Text Length to 10 Characters

- Select the cell(s).
- In Data Validation, choose Text Length.
- Set Maximum to 10.
- Click OK.

The screenshot shows a Microsoft Excel spreadsheet titled "Book1". The Data tab is selected in the ribbon. A data validation dialog box is open over the spreadsheet, specifically the "Text length" option under "Allow". The "Maximum" field is set to 10. The spreadsheet contains a table with columns: Channel, Product, Date, Sales Value. The table has a green border and is located in rows 21 to 32. An arrow points downwards from the dialog box towards the table.

Channel	Product	Date	Sales Value
Online	Laptop	15/01/2023	1200
Retail	Smartphone	10/02/2023	800
Online	Tablet	05/03/2023	450
Retail	Laptop	20/04/2023	1100
Online	Smartphone	12/05/2023	750
Retail	Tablet	18/06/2023	500
Online	Laptop	22/07/2023	1300
Retail	Smartphone	30/08/2023	850
Online	Tablet	14/09/2023	470
Retail	Laptop	25/10/2023	1150

A screenshot of Microsoft Excel showing a data validation error. The error message box says: "This value doesn't match the data validation restrictions defined for this cell". The cell containing the invalid value (E6) has a red border. The data validation settings for column E are set to "Text length" with a maximum of 10 characters.

	Channel	Product	Date	Sales Value
2	Online	Laptop	15/01/2023	1200
3	Retail	Smartphone	10/02/2023	800
4	Online	Tablet	05/03/2023	450
5	Retail	Laptop	20/04/2023	1100
6	Online	Smartphone	12/05/2023	1231212312321
7	Retail	Tablet	18/06/2023	500
8	Online	Laptop	22/07/2023	1300
9	Retail	Smartphone	30/08/2023	850
0	Online	Tablet	14/09/2023	470
1	Retail	Laptop	25/10/2023	1150

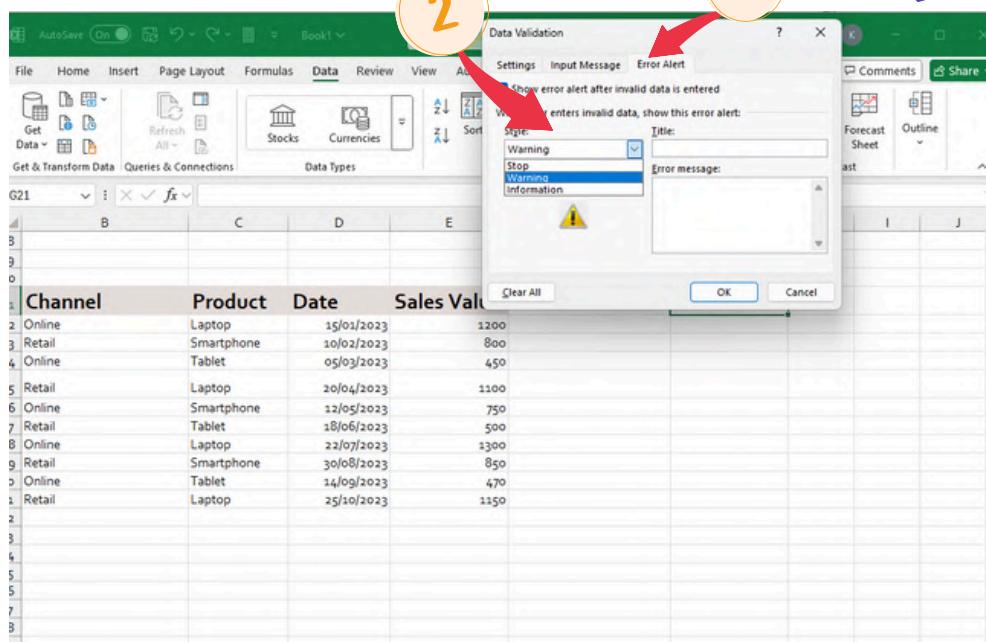
You can see in the above example that when I try to add a value greater than the specified length of the data validation step, it gives me an error.

Error Messages

Error messages alert users when invalid data is entered.

To create an error message:

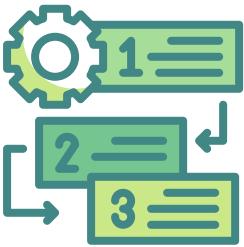
- Select the cell(s) with data validation.
- Go to the Data tab > Data Validation.
- In the Data Validation dialog box, go to the Error Alert tab.
- Check the Show error alert after invalid data is entered box.
- Enter a title and error message.
- Choose the style (Stop, Warning, Information).
- Click OK.



Practice and Recap

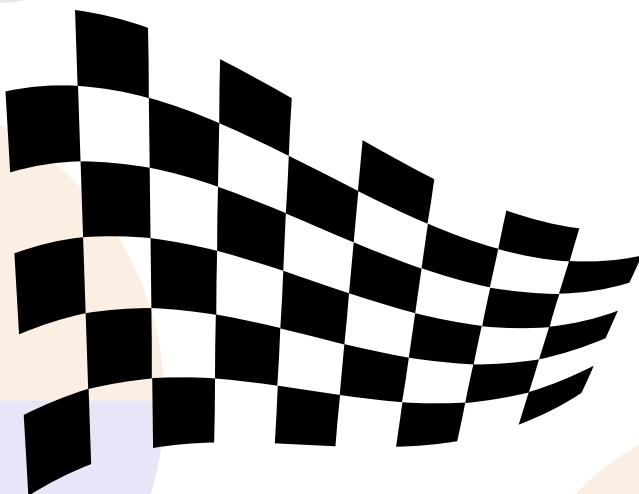


- Open the "Employee_Data.xlsx" workbook.
- Create a drop-down list for the Department column with options: Sales, Marketing, HR, IT.
- Set input restrictions for the **Salary** column to allow only whole numbers between 30,000 and 100,000.
- Create an error message for the **Salary** column that displays when invalid data is entered.



Recap

- Data Validation controls the type of data entered into a cell, ensuring accuracy and consistency.
- Drop-down lists allow users to select from predefined options.
- Input restrictions limit the type of data that can be entered.
- Error messages alert users when invalid data is entered.



MAJOR TASK 2

Objective

Practice single and multiple column sorting, as well as custom sorting.

Create a New Workbook

- Create a new workbook and save it as "Sales_Data.xlsx".

Data for "Sales_Data.xlsx":

Region	Month	Sales
East	January	50000
West	February	60000
North	March	55000
South	April	70000
East	May	45000
West	June	80000
North	July	65000
South	August	75000
East	September	60000
West	October	85000
North	November	70000
South	December	90000

Enter Data

CONTINUED

- Open the "Sales_Data.xlsx" workbook.

Single Column Sorting:

- Sort the Sales column in descending order.

Multiple Column Sorting:

- Sort the data first by Region in ascending order and then by Sales in descending order.

Custom Sorting:

- Create a custom sort for the Month column to order the months chronologically (January to December).

EXERCISE 2

Objective

Practice basic and advanced filtering, as well as using the search box in filters

Instructions

- Open the "Sales_Data.xlsx" workbook.

Basic Filter:

- Apply a basic filter to display only sales in the East region.

CONTINUED

Advanced Filter:

- Apply an advanced filter to display sales greater than \$70,000 in the West region.

Using Search in Filters:

- Use the search box in the filter to display sales for June and December.

EXERCISE 3

Objective

Practice identifying and removing duplicates.

Instructions

- Open the "Sales_Data.xlsx" workbook.
- Add duplicate entries for East region and January month.
- Use Conditional Formatting to highlight the duplicates.
- Remove the duplicates using the Remove Duplicates feature.

CONTINUED

EXERCISE 4

Objective

Practice creating drop-down lists, setting input restrictions, and creating error messages.

Instructions

- Open the "Sales_Data.xlsx" workbook.

Drop-Down List:

- Create a drop-down list for the Region column with options: East, West, North, South.

Input Restrictions:

- Set input restrictions for the Sales column to allow only whole numbers between 30,000 * * and * * 100,000.

Error Messages:

- Create an error message for the Sales column that displays when invalid data is entered.



RECAP



- Sorting Data: Organizes data in a specific order based on one or more columns.
- Filtering Data: Displays only the rows that meet certain criteria.
- Removing Duplicates: Ensures data accuracy by removing repeated entries.
- Data Validation: Controls the type of data entered into a cell, ensuring accuracy and consistency.

ADDITIONAL PRACTICE

- Create a new workbook and enter sample data (e.g., product inventory, student grades).
- Apply sorting, filtering, removing duplicates, and data validation to the dataset.
- Experiment with different scenarios to reinforce your skills.

Chapter 6:

Advanced

Formatting

Introduction to Advanced Formatting

Formatting is an essential skill in Excel that enhances the readability, presentation, and usability of data. Basic formatting covers simple adjustments like font changes and cell alignment, while advanced formatting techniques provide powerful tools to make data more visually informative and interactive.

Why Formatting is Important

- Makes data easier to read and interpret
- Highlights key information effectively
- Enhances presentation for reports and dashboards
- Helps maintain consistency across multiple sheets

Differences Between Basic and Advanced Formatting

- **Basic Formatting:** Font adjustments, cell colors, bold/italic styles, borders
- **Advanced Formatting:** Conditional formatting, custom number formats, styles, and templates

Conditional Formatting

Introduction to Conditional Formatting

Conditional Formatting allows users to automatically format cells based on certain conditions, making it easier to analyze and highlight key insights.

What is Conditional Formatting?

- A tool that changes the appearance of cells based on specific criteria
- Helps in identifying trends, anomalies, and key values in datasets

Benefits of Using Conditional Formatting

- Automatically updates formatting when data changes
- Makes large datasets easier to interpret
- Saves time compared to manual formatting
- Screenshot Suggestion: Show the Conditional Formatting menu in Excel.

Module 6 Worksheet.xlsx - Excel

File Home Insert Page Layout Formulas Data Review View Foxit PDF Tell me Share

Clipboard Font Alignment Number

D12

	A	B	C	D
1	Month	Sales Total		
2	January	\$5,000.00		
3	February	\$500.00		
4	March	\$50,000.00		
5	April	\$4,876.00		
6	May	\$80,000.00		
7	June	\$250.00		
8	July	\$45,689.00		
9	August	\$10,000.00		
10	September	\$34,245.00		
11	October	\$987.00		
12	November	\$76,000.00		
13	December	\$8,764.00		
14				
15				

Sheet1

Ready

Using Built-in Rules:

- Greater than, less than, between, equal to
- Text that contains
- Date-based rules

A small example is that of choosing the less than built-in rule and the results are as follows

Channel	Product	Date	Sales Value
Online	Laptop	15/01/2023	1200
Retail	Smartphone	10/02/2023	800
Online	Tablet	05/03/2023	450
Retail	Laptop	20/04/2023	1100
Online	Smartphone	12/05/2023	750
Retail	Tablet	18/06/2023	500
Online	Laptop	22/07/2023	1300
Retail	Smartphone	30/08/2023	850
Online	Tablet	14/09/2023	470
Retail	Laptop	25/10/2023	1150

Channel	Product	Date	Sales Value
Online	Laptop	15/01/2023	1200
Retail	Smartphone	10/02/2023	800
Online	Tablet	05/03/2023	450
Retail	Laptop	20/04/2023	1100
Online	Smartphone	12/05/2023	750
Retail	Tablet	18/06/2023	500
Online	Laptop	22/07/2023	1300
Retail	Smartphone	30/08/2023	850
Online	Tablet	14/09/2023	470
Retail	Laptop	25/10/2023	1150

Custom Formulas for Conditional Formatting

Apart from built-in rules, you can create custom rules using formulas to apply formatting based on complex conditions.

Example

Imagine a dataset containing sales data with columns: Employee, Sales, and Target. We want to highlight rows where sales are below the target.

1. Select the Entire Data Range.
2. Open Conditional Formatting: Click Home → Conditional Formatting → New Rule.
3. Choose "Use a Formula to Determine Which Cells to Format".
4. Enter the Formula: **= $B2 < C2$**
5. This checks if the value in the "Sales" column (B) is lower than the corresponding "Target" column (C).
6. Click "Format..." and Choose a Fill Color (e.g., Light Red).
7. Click OK to apply the rule.

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

	Employee	Sales	Target	Region
1	Sarah	12000	11000	South
2	Mike	8000	9500	East
3	Anna	15000	14000	West
4	David	9200	10000	North
5	Emma	11000	10500	South
6	Chris	7300	8500	East
7	Linda	16000	15000	West
8	Brian	10200	11000	North
9	Sophie	13000	12500	South

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

26

27

28

	Employee	Sales	Target	Region
1	John	9500	10000	North
2	Sarah	12000	11000	South
3	Mike	8000	9500	East
4	Anna	15000	14000	West
5	David	9200	10000	North
6	Emma	11000	10500	South
7	Chris	7300	8500	East
8	Linda	16000	15000	West
9	Brian	10200	11000	North
10	Sophie	13000	12500	South

New Formatting Rule

Select a Rule Type:

- Format all cells based on their values
- Format only cells that contain
- Format only top or bottom ranked values
- Format only values that are above or below average
- Format only unique or duplicate values
- Use a formula to determine which cells to format

Edit the Rule Description:

Format values where this formula is true:

=\\$B2<\\$C2

Preview: No Format Set

OK Cancel

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

26

27

28

29

30

31

32

33

34

35

36

37

38

39

40

41

42

43

44

45

46

47

48

49

50

51

52

53

54

55

56

57

58

59

60

61

62

63

64

65

66

67

68

69

70

71

72

73

74

75

76

77

78

79

80

81

82

83

84

85

86

87

88

89

90

91

92

93

94

95

96

97

98

99

100

101

102

103

104

105

106

107

108

109

110

111

112

113

114

115

116

117

118

119

120

121

122

123

124

125

126

127

128

129

130

131

132

133

134

135

136

137

138

139

140

141

142

143

144

145

146

147

148

149

150

151

152

153

154

155

156

157

158

159

160

161

162

163

164

165

166

167

168

169

170

171

172

173

174

175

176

177

178

179

180

181

182

183

184

185

186

187

188

189

190

191

192

193

194

195

196

197

198

199

200

201

202

203

204

205

206

207

208

209

210

211

212

213

214

215

216

217

218

219

220

221

222

223

224

225

226

227

228

229

230

231

232

233

234

235

236

237

238

239

240

241

242

243

244

245

246

247

248

249

250

251

252

253

254

255

256

257

258

259

260

261

262

263

264

265

266

267

268

269

270

271

272

273

274

275

276

277

278

279

280

281

282

283

284

285

286

287

288

289

290

291

292

293

294

295

296

297

298

299

300

301

302

303

304

305

306

307

308

309

310

311

312

313

314

315

316

317

318

319

320

321

322

323

324

325

326

327

328

329

330

331

332

333

334

335

336

337

338

339

340

341

342

343

344

345

346

347

348

349

350

351

352

353

354

355

356

357

358

359

360

361

362

363

364

365

366

367

368

369

370

371

372

373

374

375

376

377

378

379

380

381

382

383

384

385

386

387

388

389

390

391

392

393

394

395

396

397

398

399

400

401

402

403

404

405

406

407

408

409

410

411

412

413

414

415

416

417

418

419

420

421

422

423

424

425

426

427

428

429

430

431

432

433

434

435

436

437

438

439

440

441

442

443

444

445

446

447

448

449

450

451

452

453

454

455

456

457

458

459

460

461

462

463

464

465

466

467

468

469

470

471

472

473

474

475

476

477

478

479

480

481

482

483

484

485

486

487

488

489

490

491

492

493

494

495

496

497

498

499

500

501

502

503

504

505

506

507

508

509

510

511

512

513

514

515

516

517

518

519

520

521

522

523

524

525

526

527

528

529

530

531

532

533

534

535

536

537

538

539

540

541

542

543

544

545

546

547

548

549

550

551

552

553

554

555

556

557

558

559

560

561

562

563

564

565

566

567

568

569

570

571

572

573

574

575

576

577

578

579

580

581

582

583

584

585

586

587

588

589

590

591

592

593

594

595

596

597

598

599

600

601

602

603

604

605

606

607

608

609

610

611

612

613

614

615

616

617

618

619

620

621

622

623

624

625

626

627

628

629

630

631

632

633

634

635

636

637

638

639

640

641

642

643

644

645

646

647

648

649

650

651

652

653

654

655

656

657

658

659

660

661

662

663

664

665

666

667

668

669

670

671

672

673

674

675

676

677

678

679

680

681

682

683

684

685

686

687

688

689

690

691

692

693

694

695

696

697

698

699

700

701

702

703

704

705

706

707

708

709

710

711

712

713

714

715

716

717

718

719

720

721

722

723

724

725

726

727

728

729

730

731

732

733

734

735

736

737

738

739

740

741

742

743

744

745

746

747

748

749

750

751

752

753

754

755

756

757

758

759

760

761

762

763

764

765

766

767

768

769

770

771

772

773

774

775

776

777

778

779

780

781

782

783

784

785

786

787

788

789

790

791

792

793

794

795

796

797

798

799

800

801

802

803

804

805

806

807

808

809

810

811

812

813

814

815

816

817

818

819

820

821

822

823

824

825

826

827

828

829

830

831

832

833

834

835

836

837

838

839

840

841

842

843

844

845

846

847

848

849

850

851

852

853

854

855

856

857

858

859

860

861

862

863

864

865

866

867

868

869

870

871

872

873

874

875

876

877

878

879

880

881

882

883

884

885

886

887

888

889

890

891

892

893

894

895

896

897

898

899

900

901

902

903

904

905

906

907

908

909

910

911

912

913

914

915

916

917

918

919

920

921

922

923

924

925

926

927

928

929

930

931

932

933

934

935

936

937

938

939

940

941

942

943

944

945

946

947

948

949

950

951

952

953

954

955

956

957

958

959

960

961

962

963

964

965

966

967

968

969

970

971

972

973

974

975

976

977

978

979

980

981

982

983

984

985

986

987

988

989

990

991

992

993

994

995

996

997

998

999

1000



An Excel screenshot showing a data table. The table has columns labeled 'Employee', 'Sales', 'Target', and 'Region'. The 'Sales' and 'Target' columns contain numerical values, while 'Region' contains categorical names. Row 8 is selected, indicated by a green border around the row.

	A	B	C	D	E	F
1	Employee	Sales	Target	Region		
2	John	9500	10000	North		
3	Sarah	12000	11000	South		
4	Mike	8000	9500	East		
5	Anna	15000	14000	West		
6	David	9200	10000	North		
7	Emma	11000	10500	South		
8	Chris	7300	8500	East		
9	Linda	16000	15000	West		
10	Brian	10200	11000	North		
11	Sophie	13000	12500	South		
12						
13						
14						
15						

Data Bars, Color Scales, and Icon Sets

Excel provides additional visualization tools, including:

- 1. Data Bars:** Horizontal bars within cells proportional to the cell value.
- 2. Color Scales:** Gradient colors that visually represent value magnitude.
- 3. Icon Sets:** Symbols (✓, !, ✗) based on predefined conditions.

The screenshot shows the Microsoft Excel ribbon with the 'Home' tab selected. In the top-left corner, there is a red arrow pointing to the 'AutoSave' button. In the top-right corner, there is a red arrow pointing to the 'Conditional Formatting' dropdown menu. A callout bubble labeled '3' points to the 'Gradient Fill' option under 'Data Bars'. Another callout bubble labeled '4' points to the 'Green Data Bar' description. The main area of the screen displays a table with four columns: Employee, Sales, Target, and Region. The 'Sales' and 'Target' columns are highlighted with green data bars.

Employee	Sales	Target	Region
John	9500	10000	North
Sarah	12000	11000	South
Mike	8000	9500	East
Anna	15000	14000	West
David	9200	10000	North
Emma	11000	10500	South
Chris	7300	8500	East
Linda	16000	15000	West
Brian	10200	11000	North
Sophie	13000	12500	South

Employee	Sales	Target	Region
John	9500	10000	North
Sarah	12000	11000	South
Mike	8000	9500	East
Anna	15000	14000	West
David	9200	10000	North
Emma	11000	10500	South
Chris	7300	8500	East
Linda	16000	15000	West
Brian	10200	11000	North
Sophie	13000	12500	South

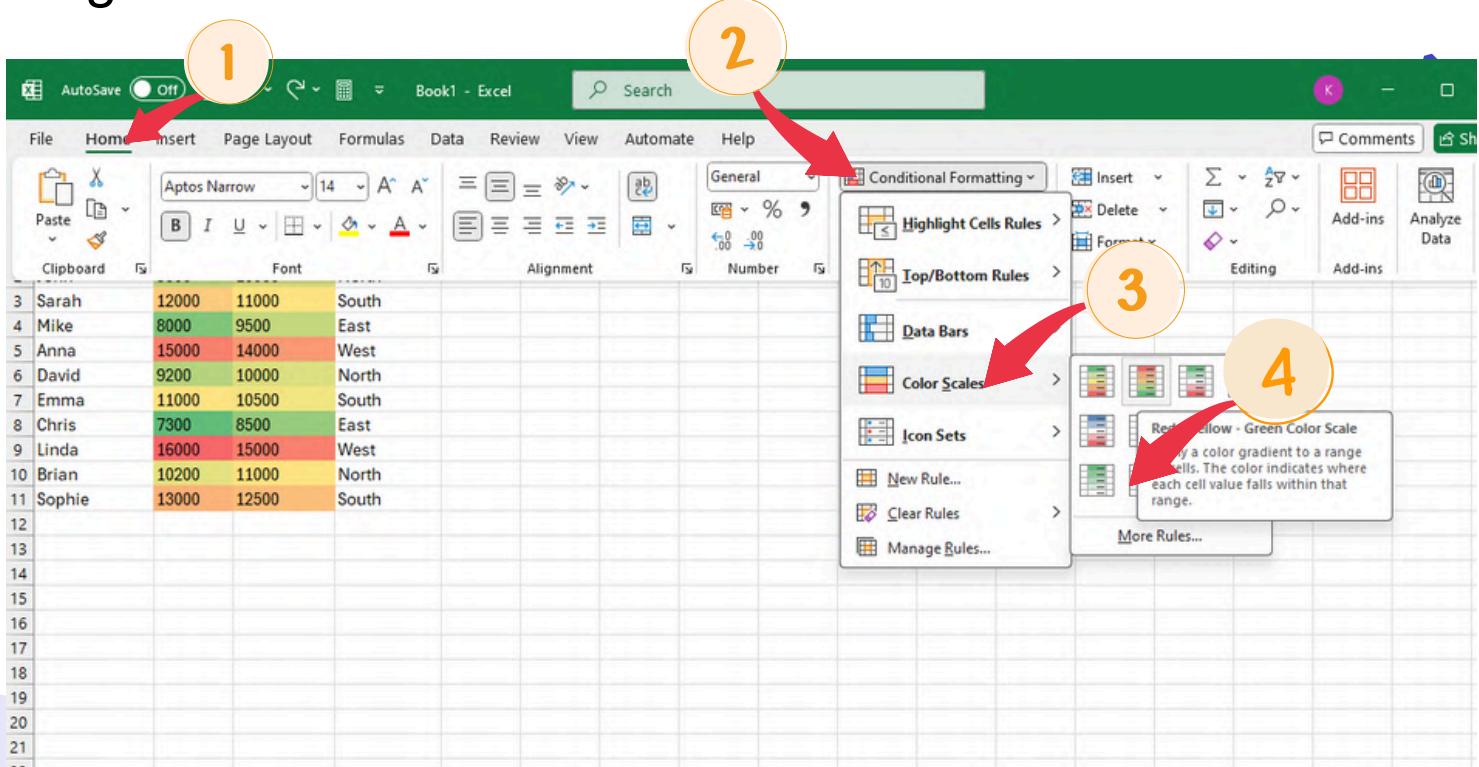
BEFORE

AFTER

Employee	Sales	Target	Region
John	9500	10000	North
Sarah	12000	11000	South
Mike	8000	9500	East
Anna	15000	14000	West
David	9200	10000	North
Emma	11000	10500	South
Chris	7300	8500	East
Linda	16000	15000	West
Brian	10200	11000	North
Sophie	13000	12500	South

Color Scales:

Gradient colors that visually represent value magnitude.



Employee	Sales	Target	Region
John	9500	10000	North
Sarah	12000	11000	South
Mike	8000	9500	East
Anna	15000	14000	West
David	9200	10000	North
Emma	11000	10500	South
Chris	7300	8500	East
Linda	16000	15000	West
Brian	10200	11000	North
Sophie	13000	12500	South

BEFORE

AFTER

A	B	C	D
Employee	Sales	Target	Region
John	9500	10000	North
Sarah	12000	11000	South
Mike	8000	9500	East
Anna	15000	14000	West
David	9200	10000	North
Emma	11000	10500	South
Chris	7300	8500	East
Linda	16000	15000	West
Brian	10200	11000	North
Sophie	13000	12500	South

Icon Sets:

Symbols (✓, !, ✗) based on predefined conditions

The screenshot shows a Microsoft Excel spreadsheet titled "Book1 - Excel". The data is organized into four columns: Employee, Sales, Target, and Region. The "Sales" and "Target" columns contain numerical values, while the "Employee" and "Region" columns contain text labels. The "Conditional Formatting" dialog box is open, specifically the "Icon Sets" section. A red arrow points from the "Icon Sets" button in the ribbon to the "Icon Sets" section of the dialog box. Another red arrow points from the "Icon Sets" section to the "3 Symbols (Circled)" section, which contains three icons: a green checkmark, an orange exclamation mark, and a red X. A red arrow points from the "3 Symbols (Circled)" section to a circled number "4" in the bottom right corner of the dialog box. A large red button labeled "BEFORE" is positioned below the dialog box.

Employee	Sales	Target	Region
Sarah	12000	11000	South
Mike	8000	9500	East
Anna	15000	14000	West
David	9200	10000	North
Emma	11000	10500	South
Chris	7300	8500	East
Linda	16000	15000	West
Brian	10200	11000	North
Sophie	13000	12500	South

The screenshot shows the same Microsoft Excel spreadsheet after applying icon sets. The "Sales" and "Target" columns now contain icons instead of numbers. The icons are color-coded: green for values above the target, orange for values equal to the target, and red for values below the target. The "Employee" and "Region" columns remain text labels. A large black curved arrow points from the "BEFORE" state to the "AFTER" state. A green button labeled "AFTER" is positioned below the "BEFORE" button.

Employee	Sales	Target	Region
John	✗ 9500	✗ 10000	North
Sarah	! 12000	! 11000	South
Mike	✗ 8000	✗ 9500	East
Anna	✓ 15000	✓ 14000	West
David	✗ 9200	✗ 10000	North
Emma	! 11000	! 10500	South
Chris	✗ 7300	✗ 8500	East
Linda	✓ 16000	✓ 15000	West
Brian	! 10200	! 11000	North
Sophie	! 13000	! 12500	South



Best Practices for Conditional Formatting

- Use sparingly to avoid excessive visual clutter.
- Keep formatting rules simple to ensure readability.
- Regularly review and remove unused rules to maintain optimal workbook performance.



Practice and Recap

- Highlight all sales figures below 9000 using red fill.
- Apply a custom rule to highlight sales figures that are greater than their respective targets using green fill.
- Use icon sets to represent sales performance:
 - Green check for sales exceeding target.
 - Yellow warning for sales close to target (within 5%).
 - Red cross for sales below target.

- Apply a color scale to the Sales column to differentiate high, medium, and low sales values.
- Use data bars to visualize sales distribution.
- Instructions for Submission:
 - Save the file as "Conditional_Formatting_Exam.xlsx."
 - Ensure all applied formatting is visible.
 - Submit the completed file for review.



Recap

- **Conditional Formatting Basics:** Helps dynamically highlight important data points based on predefined conditions.
- **Highlighting Rules:** Built-in features allow users to highlight values above/below certain thresholds, duplicates, or top/bottom performers.
- **Custom Rules with Formulas:** Provides flexibility for complex conditions, such as highlighting underperforming sales compared to targets.
- **Data Bars, Color Scales, and Icon Sets:** Useful tools for enhancing data visualization, making trends easier to interpret.
- **Best Practices:** Keeping rules simple, avoiding excessive formatting, and regularly managing conditional rules ensures an optimal workbook experience.

Introduction to Custom Number Formats

What are Custom Number Formats?

Custom Number Formats allow you to display numbers, dates, and text in a specific format without changing the actual data.

They are useful for improving readability and consistency in your worksheets.

Why Use Custom Number Formats?

- **Readability:** Makes data easier to understand at a glance.
- **Consistency:** Ensures uniformity in how data is displayed.
- **Flexibility:** Allows you to create formats tailored to your needs.

How to Create Custom Number Formats

To create a custom number format:

1. Select the cell(s) you want to format.
2. Right-click and choose Format Cells.
3. Go to the Number tab and select Custom.
4. Enter your custom format code in the Type box.
5. Click OK.

The screenshot shows a Microsoft Excel spreadsheet with a table of employee sales data. The table has columns for Employee, Sales, Target, and Region. The 'Sales' column is selected, indicated by a red arrow labeled '1'. A context menu is open over the selected cells, with 'Format Cells...' highlighted. The 'Format Cells' dialog box is also visible, showing the 'Number' tab selected. The 'Custom' section of the dialog box is open, with a custom format code like '#,##0.00' entered in the 'Type' field. The background of the slide features abstract geometric shapes in orange, blue, and purple.

	Employee	Sales	Target	Region
1	John	9500	10000	North
2	Sarah	12000	11000	South
3	Mike	8000	10000	East
4	Anna	15000	12000	West
5	David	9200	10000	North
6	Emma	11000	10000	South
7	Chris	7300	8000	East
8	Linda	16000	15000	West
9	Brian	10200	10000	North
10	Sophie	13000	12000	South
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				
31				
32				
33				
34				
35				
36				
37				
38				
39				
40				
41				
42				

In the example shown here, we try to do a custom currency format for our data

Format Cells

Number Alignment Font Border Fill Protection

Category:

- General
- Number
- Currency
- Accounting
- Date
- Time
- Percentage
- Fraction
- Scientific
- Text
- Special
- Custom**

Sample
Employee

Type:

- \$#,##0.00
- General
- 0
- 0,00
- ,###0
- ,###0,00
- ,###0;-,###0
- ,###0;[Red]-#,###0
- ,###0,00;-,###0,00
- ,###0,00;[Red]-#,###0,00
- Rp#,##0;-[Rp#],##0
- Rp#,##0;[Red]-Rp#,##0
- Rp#,##0,00;-[Rp#],##0,00

4

3

Delete

Type the number format code, using one of the existing codes as a starting point.

OK**Cancel**

Employee	Sales	Target	Region
John	9500	10000	North
Sarah	12000	11000	South
Mike	8000	9500	East
Anna	15000	14000	West
David	9200	10000	North
Emma	11000	10500	South
Chris	7300	8500	East
Linda	16000	15000	West
Brian	10200	11000	North
Sophie	13000	12500	South

BEFORE**AFTER**

Employee	Sales	Target	Region
John	\$9500,000	\$10000,000	North
Sarah	\$12000,000	\$11000,000	South
Mike	\$8000,000	\$9500,000	East
Anna	\$15000,000	\$14000,000	West
David	\$9200,000	\$10000,000	North
Emma	\$11000,000	\$10500,000	South
Chris	\$7300,000	\$8500,000	East
Linda	\$16000,000	\$15000,000	West
Brian	\$10200,000	\$11000,000	North
Sophie	\$13000,000	\$12500,000	South

Common Custom Number Format Codes

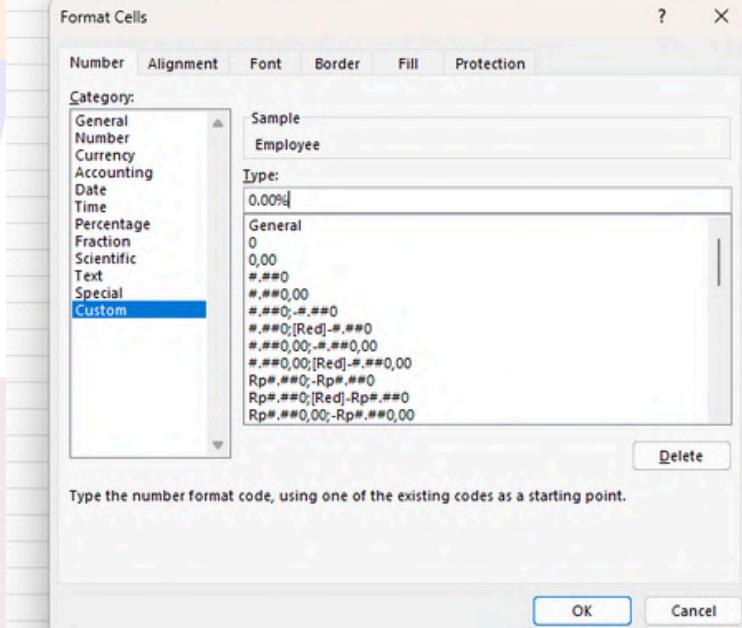
- Currency: `$#,##0.00`

- Percentage: `0.00%`

- Date: `dd-mmm-yyyy`

- Text: `"Text: @"`

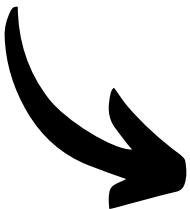
Employee	Sales	Target	Region
John	9500	10000	North
Sarah	12000	11000	South
Mike	8000	9500	East
Anna	15000	14000	West
David	9200	10000	North
Emma	11000	10500	South
Chris	7300	8500	East
Linda	16000	15000	West
Brian	10200	11000	North
Sophie	13000	12500	South



Employee	Sales	Target	Region
John	9500	10000	North
Sarah	12000	11000	South
Mike	8000	9500	East
Anna	15000	14000	West
David	9200	10000	North
Emma	11000	10500	South
Chris	7300	8500	East
Linda	16000	15000	West
Brian	10200	11000	North
Sophie	13000	12500	South

BEFORE

AFTER

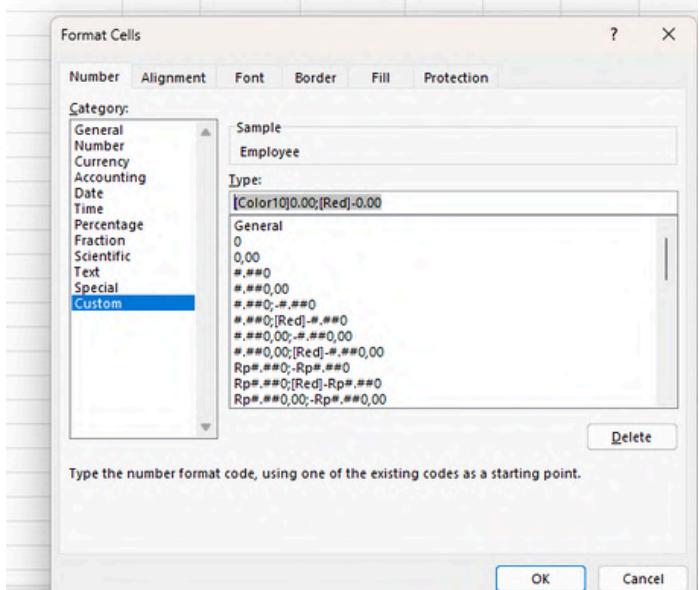


Employee	Sales	Target	Region
John	950.000%	1.000.000%	North
Sarah	1.200.000%	1.100.000%	South
Mike	800.000%	950.000%	East
Anna	1.500.000%	1.400.000%	West
David	920.000%	1.000.000%	North
Emma	1.100.000%	1.050.000%	South
Chris	730.000%	850.000%	East
Linda	1.600.000%	1.500.000%	West
Brian	1.020.000%	1.100.000%	North
Sophie	1.300.000%	1.250.000%	South

Advanced Custom Number Formats

1. Conditional Formatting: **[Color10]0.00;[Red]-0.00** (positive numbers in green, negative numbers in red).
2. Leading Zeros: **00000** (ensures 5-digit numbers, e.g., 00123).
3. Fractions: **# ?/?** (displays numbers as fractions).

Employee	Sales	Target	Region
John	9500	10000	North
Sarah	-12000	11000	South
Mike	8000	9500	East
Anna	15000	14000	West
David	9200	10000	North
Emma	-11000	10500	South
Chris	7300	8500	East
Linda	16000	15000	West
Brian	-10200	11000	North
Sophie	13000	12500	South



Employee	Sales	Target	Region
John	9500	10000	North
Sarah	-12000	11000	South
Mike	8000	9500	East
Anna	15000	14000	West
David	9200	10000	North
Emma	-11000	10500	South
Chris	7300	8500	East
Linda	16000	15000	West
Brian	-10200	11000	North
Sophie	13000	12500	South

BEFORE



AFTER

Employee	Sales	Target	Region
John	9.500	10.000	North
Sarah	-12.000	11.000	South
Mike	8.000	9.500	East
Anna	15.000	14.000	West
David	9.200	10.000	North
Emma	-11.000	10.500	South
Chris	7.300	8.500	East
Linda	16.000	15.000	West
Brian	-10.200	11.000	North
Sophie	13.000	12.500	South

Quick Practice: Custom Number Formats

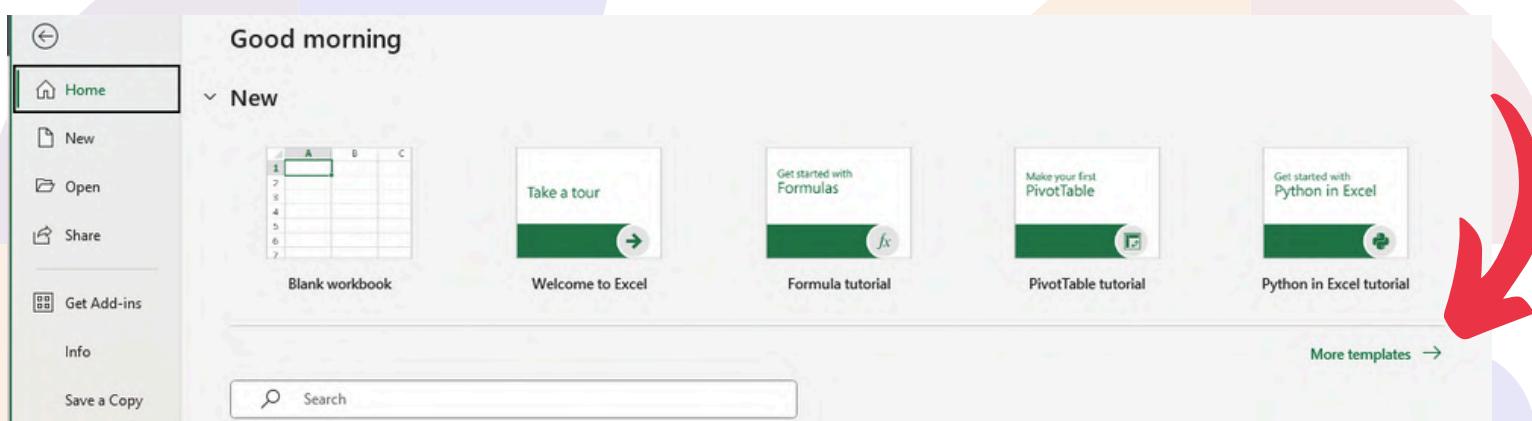
1. Open the "Sales_Data.xlsx" workbook.
2. Apply the Heading 1 style to the header row.
3. Create a custom style for the Sales column with bold text and a light blue background.

Using Templates

Using Built-in Templates

To use a built-in template:

1. Go to File > New.
2. Choose a template from the gallery (e.g., Budget, Calendar).
3. Click Create.





The grid displays the following templates:

- Gantt project planner
- Simple Gantt chart
- Weekly schedule planner
- Milestone infographic timeline
- Inventory list with highlighting
- Basic business invoice
- Invoice (worksheet)
- Milestone and task project...
- Any year calendar (single...)
- Employee absence schedule
- Sales invoice tracker
- Project tracker
- Shift work calendar
- Timesheet (weekly)
- Expense report basic
- General ledger with budget



The screenshot shows the 'Project Planner' template in Excel. The main area features a Gantt chart with activities listed in rows and time periods in columns. A legend at the top right defines the color coding for the chart segments.

Period Highlight: 1

Legend:

- Plan Duration
- Actual Start
- % Complete
- Actual (beyond plan)
- % Complete (beyond plan)

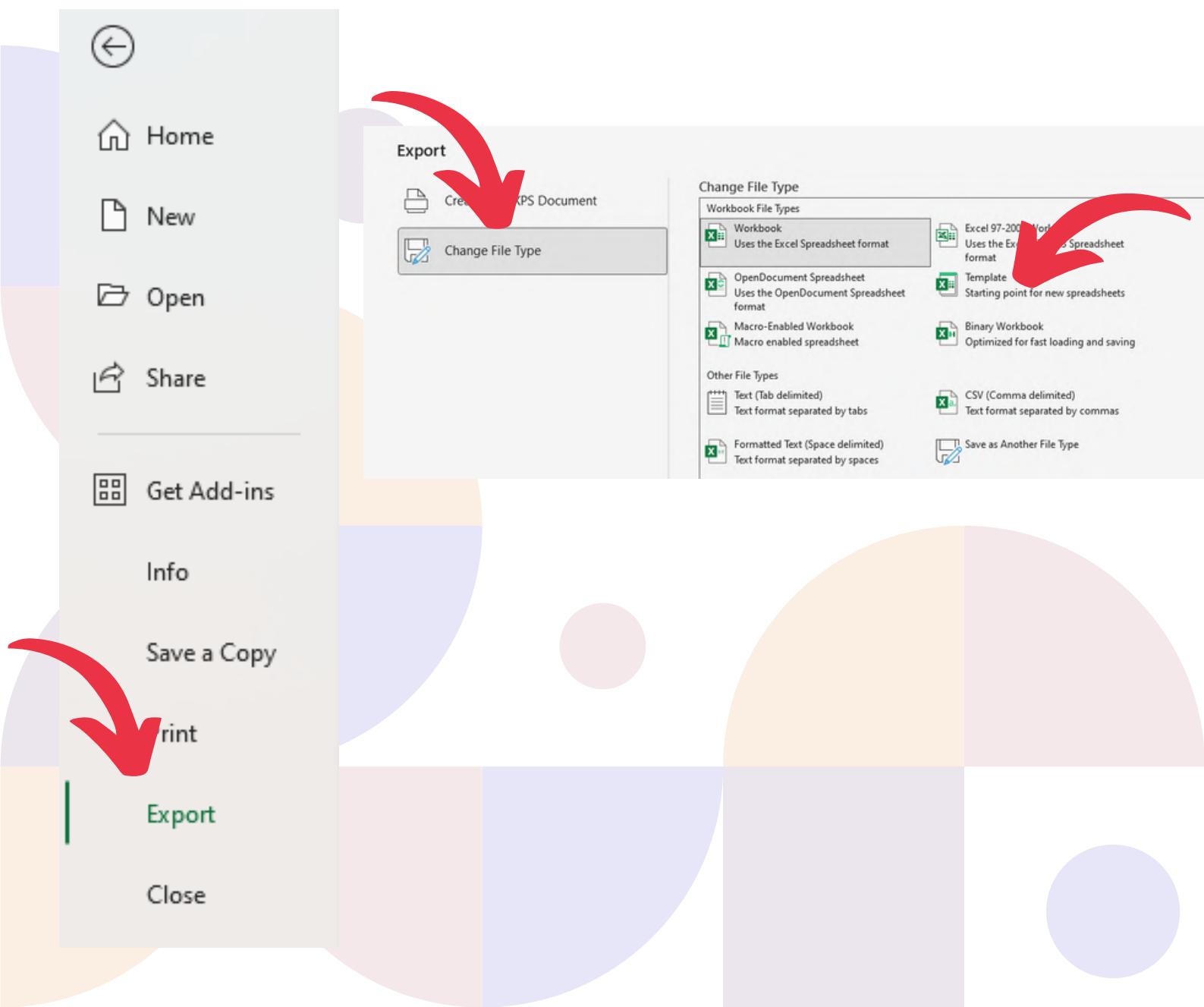
Project Planner Data:

ACTIVITY	PLAN START	PLAN DURATION	ACTUAL START	ACTUAL DURATION	PERCENT COMPLETE	PERIODS
Activity 01	1	5	1	4	25%	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55
Activity 02	1	6	1	6	100%	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55
Activity 03	2	4	2	5	35%	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55
Activity 04	4	8	4	6	10%	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55
Activity 05	4	2	4	8	85%	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55
Activity 06	4	3	4	6	85%	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55
Activity 07	5	4	5	3	50%	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55
Activity 08	5	2	5	5	60%	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55
Activity 09	5	2	5	6	75%	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55
Activity 10	6	5	6	7	100%	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55
Activity 11	6	1	5	8	60%	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55
Activity 12	9	3	9	3	0%	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55
Activity 13	9	6	9	7	50%	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55
Activity 14	9	3	9	1	0%	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55
Activity 15	9	4	8	5	1%	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55
Activity 16	10	5	10	3	80%	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55

Creating Custom Templates



1. To create a custom template:
2. Design a workbook with the desired formatting and layout.
3. Go to File > Export
4. Choose different file type if you prefer.
5. Save the template in the default templates folder.





Practice Exercises

Practice Exercise 1: Custom Number Formats

- Open the "**Sales_Data.xlsx**" workbook.
- Apply a custom number format to the Sales column to display values as currency with two decimal places.
- Apply a custom number format to the Month column to display dates as **dd-mmm-yyyy**.

Practice Exercise 2: Using Styles

- Open the "Sales_Data.xlsx" workbook.
- Apply the Heading 1 style to the header row.
- Create a custom style for the Sales column with bold text and a light blue background.



Practice Exercise 3: Using Templates



- Create a new workbook using a built-in template (e.g., Budget).
- Customize the template with your own data and formatting.
- Save the customized workbook as a new template.



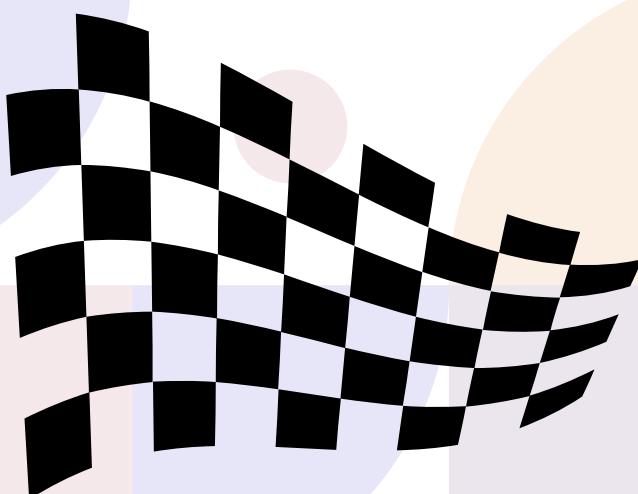
Recap and Additional Practice

- Custom Number Formats: Allow you to display numbers, dates, and text in a specific format.
- Styles: Predefined or custom formatting options that you can apply to cells.
- Templates: Pre-designed workbooks that you can use as a starting point for new projects.

Additional Practice



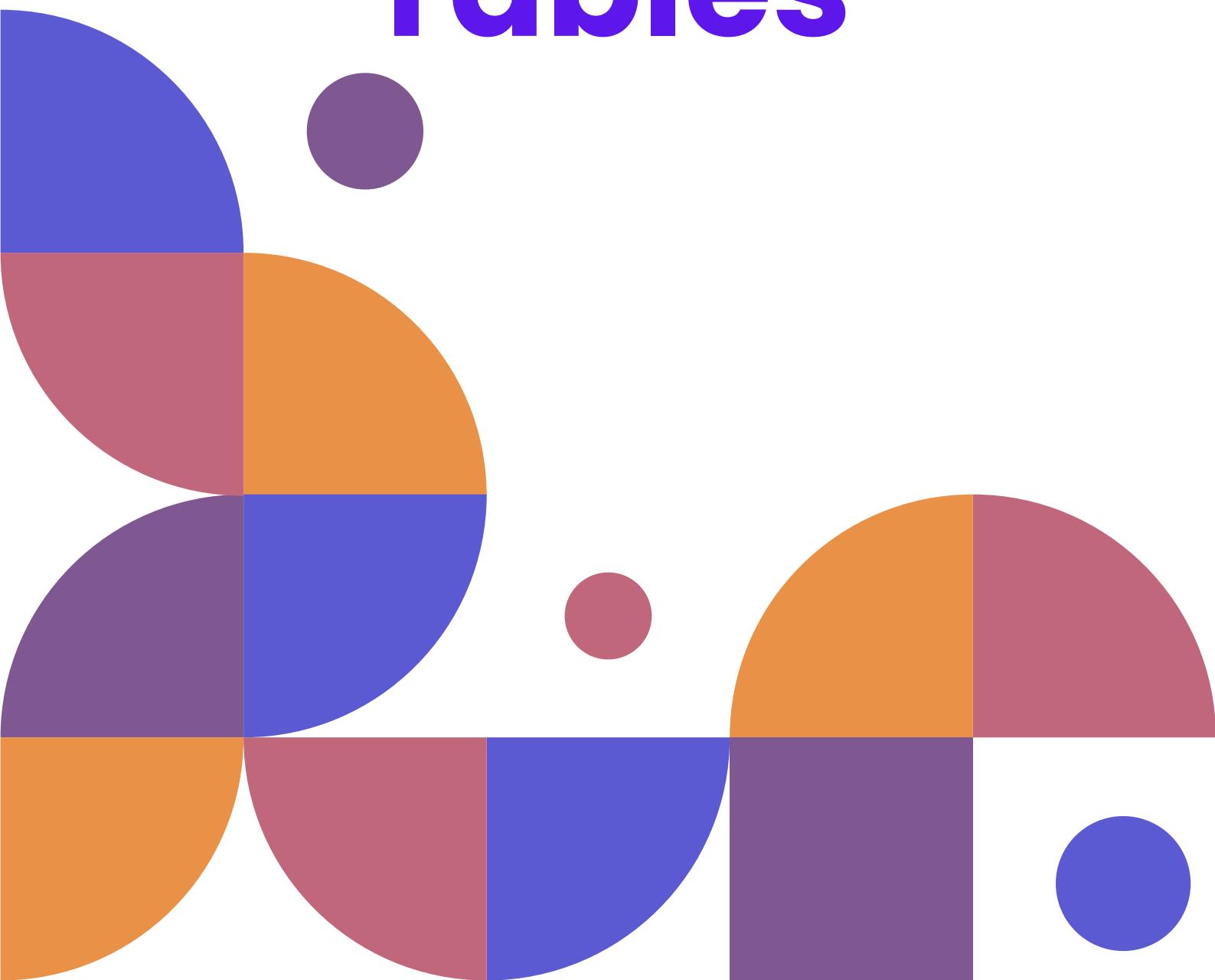
- Create a new workbook and enter sample data (e.g., product inventory, student grades).
- Apply custom number formats, styles, and templates to the dataset.
- Experiment with different scenarios to reinforce your skills.



Chapter 7:

Working with

Tables



Introduction to Tables

What are Tables in Excel?

Tables in Excel are structured ranges of data with built-in features like filtering, sorting, and formatting.

Tables make it easier to manage and analyze data dynamically.

Why Use Tables?

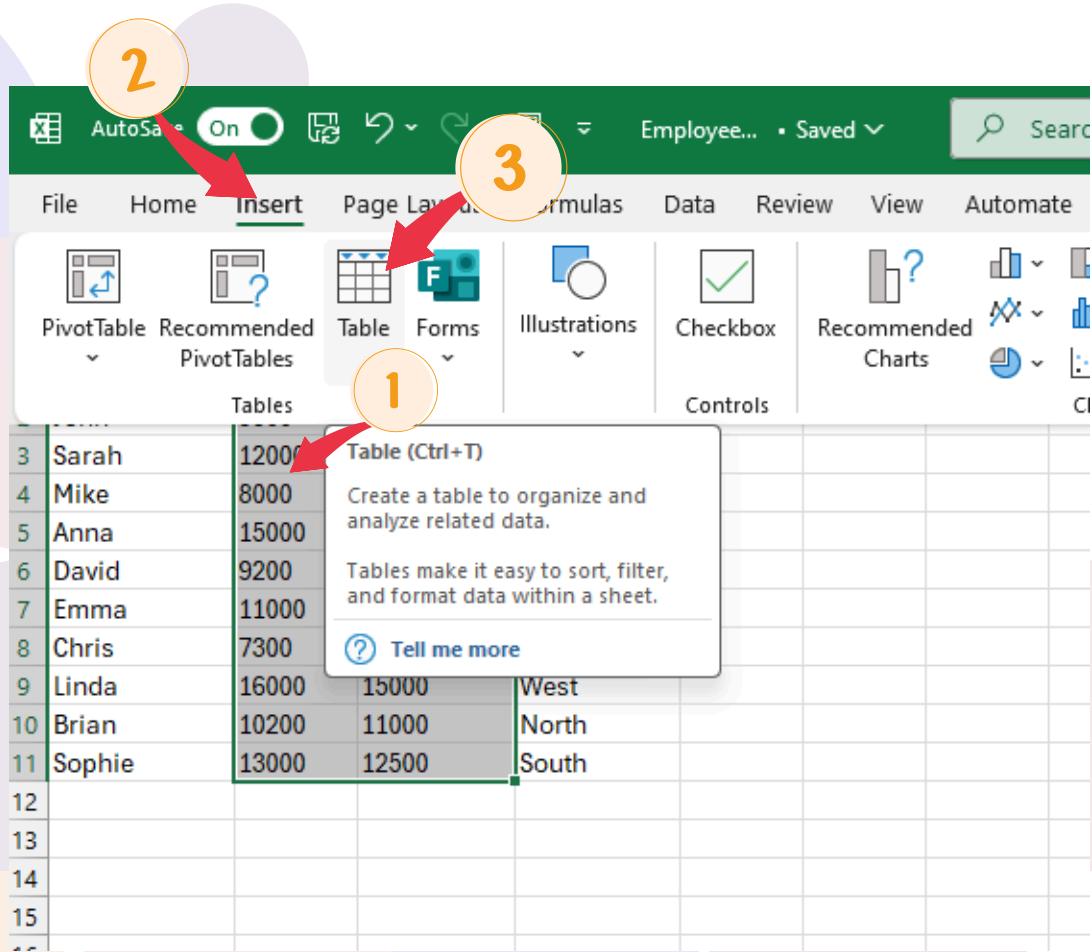
- **Dynamic Range:** Automatically expands to include new data.
- **Built-in Features:** Includes filtering, sorting, and structured references.
- **Formatting:** Automatically applies consistent formatting.
- **Data Analysis:** Enables quick calculations and visualizations.

Creating a Table

How to Create a Table

To create a table:

1. Select the range of data you want to convert into a table.
2. Go to the Insert tab > Table.
3. Ensure the My table has headers checkbox is selected if your data has headers.
4. Click OK.



Employee **Sales** **Target** **Region**

John	9500	10000	North
Sarah	12000	11000	South
Mike	8000	9500	East
Anna	15000	14000	West
David	9200	10000	North
Emma	11000	10500	South
Chris	7300	8500	East
Linda	16000	15000	West
Brian	10200	11000	North
Sophie	13000	12500	South

Create Table ? X
 Where is the data for your table? SBS1:SCS11
 My table has headers
 OK Cancel

File Home Insert Page Layout Formulas Data Review V

C14 : X ✓ fx ▾

	A	B	C	D	E	F
1	Employee	Sales	Target	Region		
2	John	9500	10000	North		
3	Sarah	12000	11000	South		
4	Mike	8000	9500	East		
5	Anna	15000	14000	West		
6	David	9200	10000	North		
7	Emma	11000	10500	South		
8	Chris	7300	8500	East		
9	Linda	16000	15000	West		
10	Brian	10200	11000	North		
11	Sophie	13000	12500	South		
12						

Quick Exercise: Creating a Table

- Open the "Sales_Data.xlsx" workbook.
- Convert the data range into a table.
- Observe how the table automatically applies formatting and includes filtering options.

**For
Example:**

The screenshot shows a Microsoft Excel interface with a table named 'Employee' containing columns for Sales and Target. The 'Table Tools' ribbon tab is selected. A red arrow points to the dropdown menu next to the 'Target' column header. The dropdown menu includes options for sorting (Sort Smallest to Largest, Sort Largest to Smallest), filtering (Filter by Color, Number Filters), and clearing filters. A search bar and a list of numerical values (8500, 9500, 10000, 10500, 11000, 12500, 14000, 15000) are also visible.

Formatting Tables

Applying Table Styles

Excel provides built-in table styles for consistent formatting.

To apply a table style:

- Select any cell in the table.
- Go to the Table Design tab > Table Styles.
- Choose a style from the gallery.

1

2

3

Customizing Table Styles

To customize a table style:

Select any cell in the table.

1. Go to the Table Design tab > Table Styles > New Table Style.
2. Define the formatting for each table element (e.g., header row, first column).
3. Save the custom style.

2

1

Table Name: Table1

Summarize with PivotTable Remove Duplicates Insert Slicer To Properties Export Refresh Open in Browser External Table Data

Header Row First Column Filter Buttons
 Total Row Last Column Banded Rows Banded Columns

Table Style Options

Sarah	12000	11000	South
Mike	8000	14000	East
Anna	15000	9200	West
David	10000	11000	North
Emma	11000	10500	South
Chris	7300	8500	East
Linda	16000	15000	West
Brian	10200	11000	North
Sophie	13000	12500	South

Light

Medium

Dark

New Table Style... Clear



3

4

5

New Table Style

Name: My custom table style

Table Element:

- Second Column Stripe
- First Row Stripe
- Second Row Stripe
- Last Column
- First Column
- Header Row**
- Total Row
- First
- Last Header Cell

Format Clear

Preview

Element Formatting:

Set as default table style for this document

OK Cancel

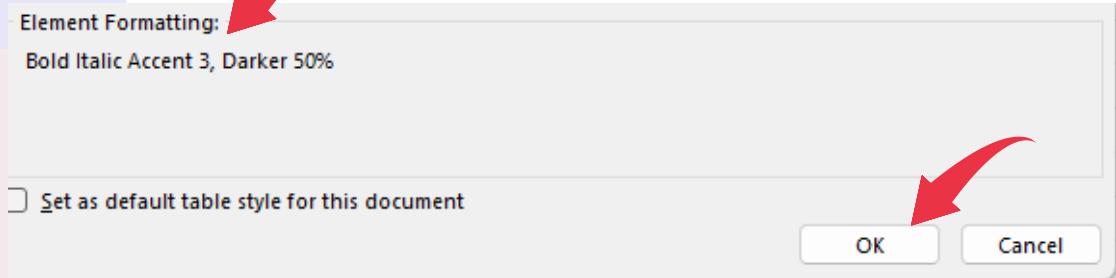
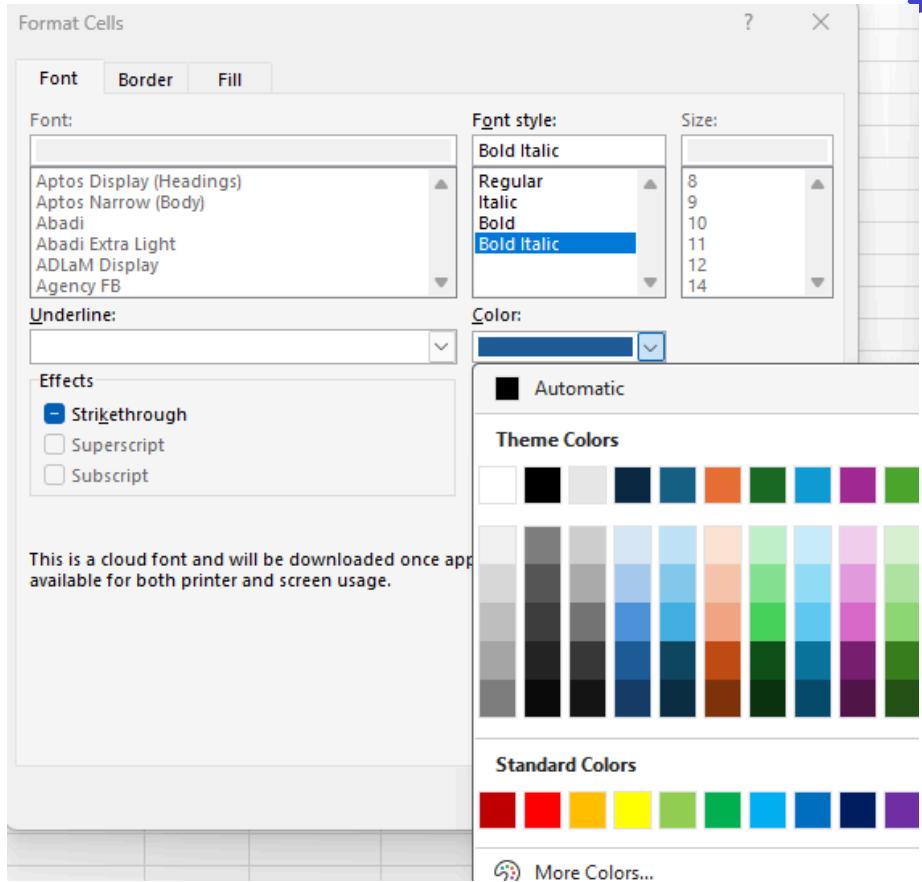


Table Features

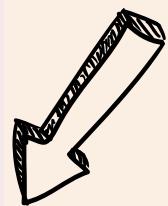
Filtering and Sorting in Tables

Tables come with built-in filtering and sorting options.

To filter or sort:

1. Click the dropdown arrow in the header of the column you want to filter or sort.
2. Choose the desired criteria (e.g., filter by value, sort ascending/descending).

A	B	C	D	
1	Employee	Sales	Target	Region
2	John	9500	10000	North
3	Sarah	12000	Sales: (Showing All)	South
4	Mike	8000	9500	East
5	Anna	15000	14000	West
5	David	9200	10000	North
7	Emma	11000	10500	South
3	Chris	7300	8500	East
9	Linda	16000	15000	West
0	Brian	10200	11000	North
1	Sophie	13000	12500	South
2				



Sort Smallest to Largest
Sort Largest to Smallest
Sort by Color
Sheet View
Clear Filter From "Sales"
Filter by Color
Number Filters

Search

- 8000
- 9200
- 9500
- 10200
- 11000
- 12000
- 13000
- 15000
- 16000

OK Cancel

10000	North
11000	South
9500	East
14000	West
10000	North
10500	South
8500	East
15000	West
11000	North
12500	South

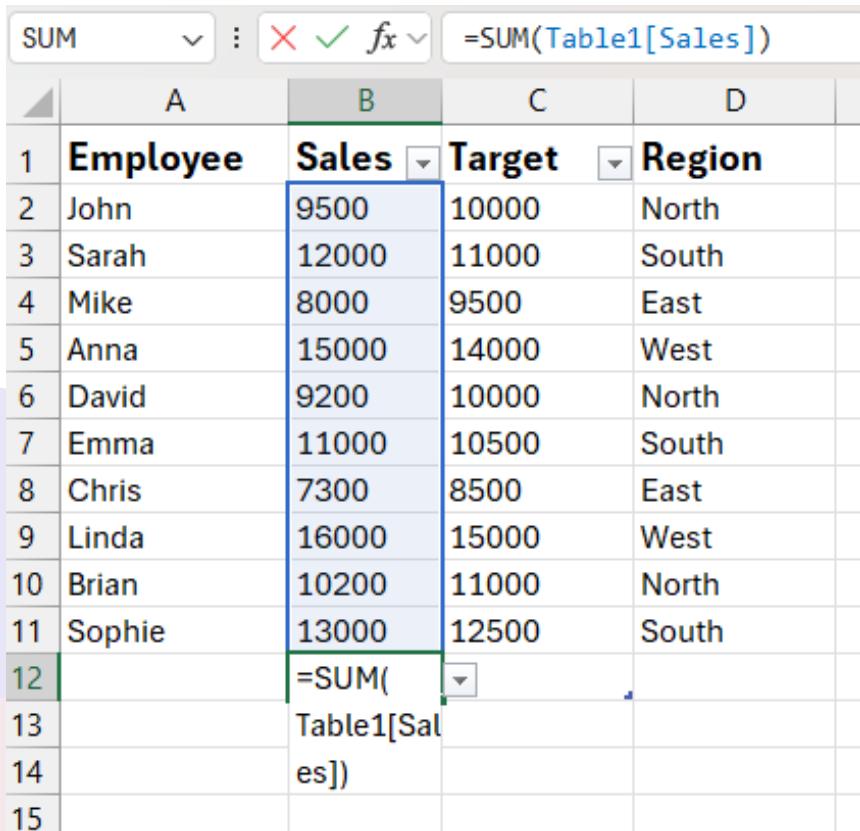


A	B	C	D	
1	Employee	Sales	Target	Region
2	John	9500	10000	North
3	Sarah	12000	11000	South
4	Mike	8000	9500	East
6	David	9200	10000	North
7	Emma	11000	10500	South
9	Linda	16000	15000	West
11	Sophie	13000	12500	South
12				

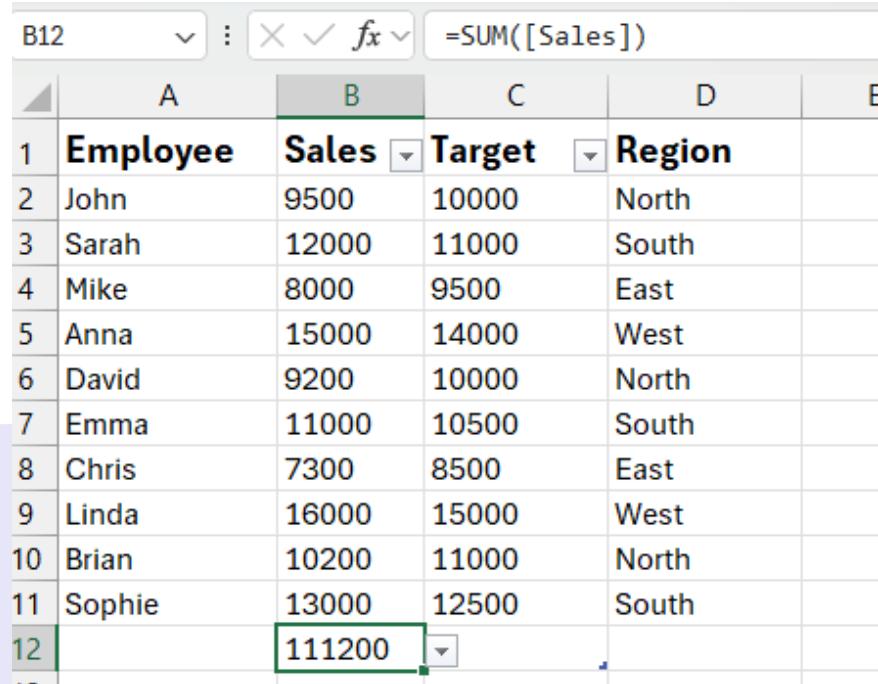
Structured References

Structured references allow you to refer to table elements by name instead of cell references.

- Example: `=SUM(Table1[Sales])` sums the Sales column in Table1.



	A	B	C	D
1	Employee	Sales	Target	Region
2	John	9500	10000	North
3	Sarah	12000	11000	South
4	Mike	8000	9500	East
5	Anna	15000	14000	West
6	David	9200	10000	North
7	Emma	11000	10500	South
8	Chris	7300	8500	East
9	Linda	16000	15000	West
10	Brian	10200	11000	North
11	Sophie	13000	12500	South
12		=SUM(Table1[Sal es])		
13				
14				
15				



	A	B	C	D
1	Employee	Sales	Target	Region
2	John	9500	10000	North
3	Sarah	12000	11000	South
4	Mike	8000	9500	East
5	Anna	15000	14000	West
6	David	9200	10000	North
7	Emma	11000	10500	South
8	Chris	7300	8500	East
9	Linda	16000	15000	West
10	Brian	10200	11000	North
11	Sophie	13000	12500	South
12		111200		

Quick Exercise: Working with Tables

Open the "Sales_Data.xlsx" workbook.

- Convert the data range into a table.
- Apply a table style and customize it.
- Use filtering to display only sales in the East region.
- Use structured references to calculate the total sales.

Advanced Table Features

Adding Total Rows

Tables can include a Total Row for quick calculations.

To add a Total Row:

1. Select any cell in the table.
2. Go to the Table Design tab > Total Row.
3. Use the dropdown in the Total Row to choose a calculation (e.g., Sum, Average).

Employee data • Saved

1 A cell in the Sales column is selected.

2 The Table Design ribbon tab is selected.

3 The Total Row checkbox is checked.

The Total Row (Ctrl+Shift+T) button is highlighted with a red arrow.

The Total Row checkbox is checked, and a tooltip explains its function: "Turn on or off the total row of the table." It also states: "The total row is a row at the end of the table which displays totals for each column."

	Sales	Target	Region
1	John	9500	10000
2	Sarah	12000	11000
3	Mike	8000	9500
4	Anna	15000	14000
5	David	9200	10000
6	Emma	11000	10500
7	Chris	7300	8500
8	Linda	16000	15000
9	Brian	10200	11000
10	Sophie	13000	12500
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			



C12

1 The cell C12 contains a dropdown menu with various functions: None, Average, Count, Count Numbers, Max, Min, Sum, StdDev, Var, and More Functions...

A	B	C	D
1	Employee	Sales	Target
2	John	9500	10000
3	Sarah	12000	11000
4	Mike	8000	9500
5	Anna	15000	14000
6	David	9200	10000
7	Emma	11000	10500
8	Chris	7300	8500
9	Linda	16000	15000
10	Brian	10200	11000
11	Sophie	13000	12500
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			



1 The cell D12 contains the value 112000, which is the sum of the Sales column.

Employee	Sales	Target	Region
John	9500	10000	North
Sarah	12000	11000	South
Mike	8000	9500	East
Anna	15000	14000	West
David	9200	10000	North
Emma	11000	10500	South
Chris	7300	8500	East
Linda	16000	15000	West
Brian	10200	11000	North
Sophie	13000	12500	South
D12	112000		

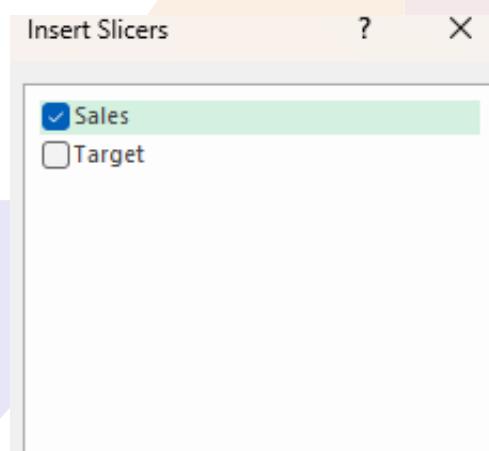
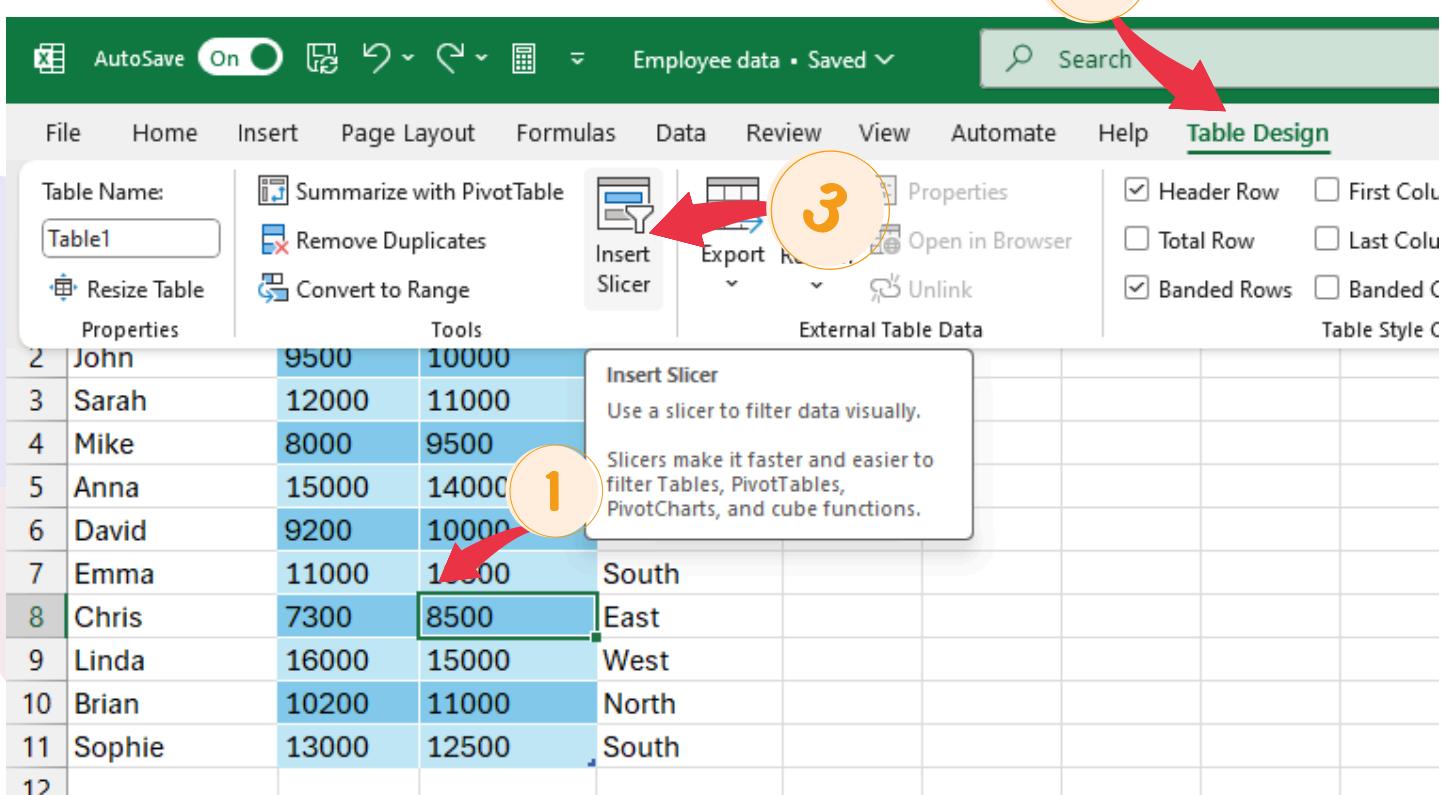
SUM

Slicers for Tables

Slicers are visual filters that make it easy to filter table data.

To add a slicer:

1. Select any cell in the table.
2. Go to the Table Design tab > Insert Slicer.
3. Choose the columns you want to filter by and click OK.



	A	B	C	D	E	F	G	H	I	J	K
1	Employee	Sales	Target	Region							
2	John	9500	10000	North							
3	Sarah	12000	11000	South							
4	Mike	8000	9500	East							
5	Anna	15000	14000	West							
6	David	9200	10000	North							
7	Emma	11000	10500	South							
8	Chris	7300	8500	East							
9	Linda	16000	15000	West							
10	Brian	10200	11000	North							
11	Sophie	13000	12500	South							
12											
13											
14											
15											
16											
17											
18											
19											
20											
21											
22											
23											
24											
25											
26											
27											

Table Options

1. Table Options allow you to control various aspects of the table, such as headers, total rows, and banded rows.
2. To access table options:
3. Select any cell in the table.
4. Go to the Table Design tab.
5. Use the checkboxes to enable or disable options (e.g., Header Row, Total Row, Banded Rows)

The screenshot shows the Microsoft Excel ribbon with the 'Table Design' tab selected. The 'Table Style Options' button is highlighted with a red arrow. The 'Table Design' tab is also circled in orange with the number '1'. The 'Table Style Options' button is circled in orange with the number '2'.



Practice Exercise



- Open the "Sales_Data.xlsx" workbook.
- Add a Total Row to calculate the average sales.
- Insert slicers for the Region and Month columns.
- Use the slicers to filter the table dynamically.



Recap

- Tables in Excel provide dynamic ranges, built-in features, and consistent formatting.
- Formatting: Apply and customize table styles.
- Features: Use filtering, sorting, structured references, Total Rows, and slicers.



Additional Practice

- Create a new workbook and enter sample data (e.g., product inventory, student grades).
- Convert the data into a table and apply formatting.
- Use filtering, sorting, structured references, Total Rows, and slicers to analyze the data.



Chapter 8:

Intermediate

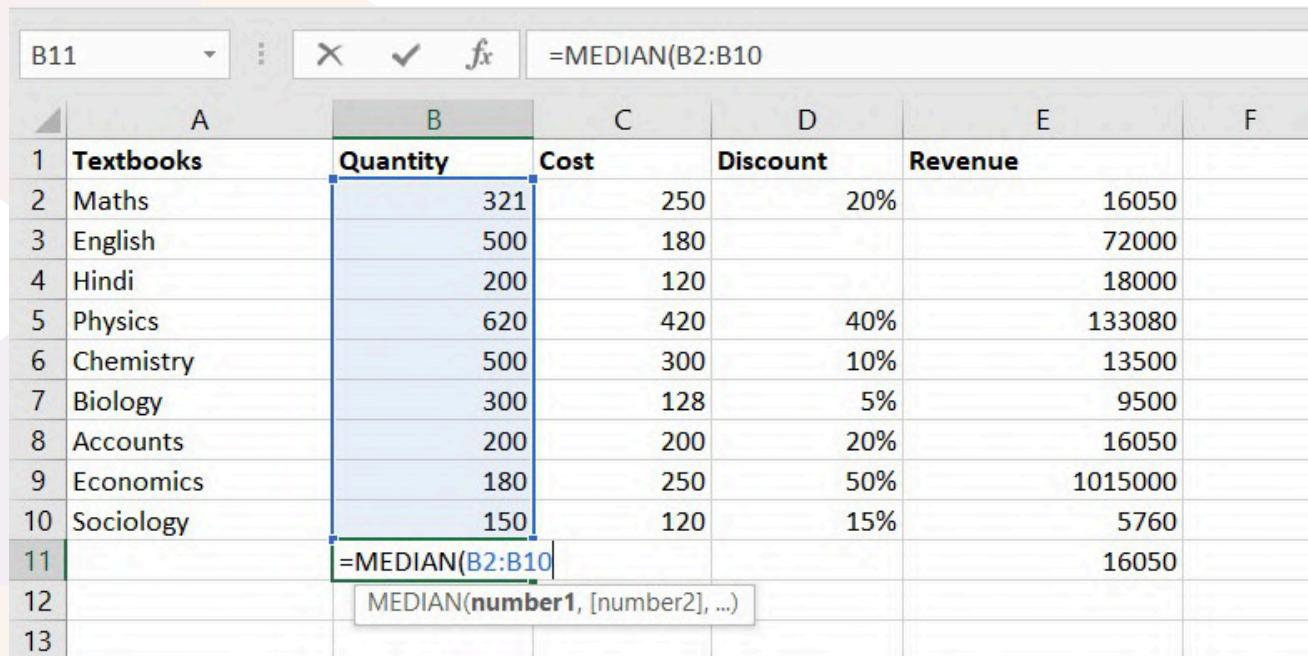
Functions



What are Intermediate Functions?

Intermediate Functions in Excel allow you to perform complex calculations, manipulate text, work with dates and times, and retrieve data from tables.

They are essential for advanced data analysis and reporting



The screenshot shows a Microsoft Excel spreadsheet with a table of textbook sales data. The table has columns for Textbooks (A), Quantity (B), Cost (C), Discount (D), and Revenue (E). Row 11 contains the formula =MEDIAN(B2:B10) in cell B11, and the formula bar also displays =MEDIAN(B2:B10). A tooltip for the MEDIAN function is visible below the formula bar, showing the syntax MEDIAN(number1, [number2], ...).

A	B	C	D	E	F
1	Textbooks	Quantity	Cost	Discount	Revenue
2	Maths	321	250	20%	16050
3	English	500	180		72000
4	Hindi	200	120		18000
5	Physics	620	420	40%	133080
6	Chemistry	500	300	10%	13500
7	Biology	300	128	5%	9500
8	Accounts	200	200	20%	16050
9	Economics	180	250	50%	1015000
10	Sociology	150	120	15%	5760
11		=MEDIAN(B2:B10)			16050
12		MEDIAN(number1, [number2], ...)			
13					

LOGICAL FUNCTIONS

Logical functions in Excel help in making decisions based on specified conditions. They return results based on whether a condition is TRUE or FALSE. The most commonly used logical functions are IF, AND, OR, and Nested IF Statements.

IF Function

The IF function is used to perform a logical test and return one value if the condition is TRUE and another value if the condition is FALSE.

Syntax

```
=IF(logical_test, value_if_true, value_if_false)
```

- **logical_test** – The condition to evaluate (e.g., A1>50).
- **value_if_true** – The value returned if the condition is TRUE.
- **value_if_false** – The value returned if the condition is FALSE.

Example:

Determine if a student has passed or failed based on a passing mark of 50.

```
=IF(A2>=50, "Pass", "Fail")
```

	A	B	C	D	E	F	G	H	I
1	Name	Score	Result						
2	Richard	93	Pass						
3	Jennifer	60	Pass						
4	James	58	Fail						
5	Lisa	79	Pass						
6	Sharon	41	Fail						
7									

IF function

AND & OR Functions

- AND Function: Returns TRUE if all conditions are TRUE.
- OR Function: Returns TRUE if at least one condition is TRUE

Syntax

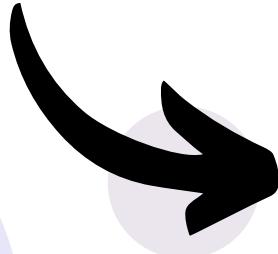
```
=AND(condition1, condition2, ...)  
=OR(condition1, condition2, ...)
```

Example for AND function:

AutoSave On Book1 Search

SUM : $=\text{AND}(\text{B40}=\text{"Fire"};\text{C40}>70)$

A	B	C	D	E
32				
33				
34				
35				
36				
37				
38				
39	Name	Type 1	Speed	Fire Type AND more than 70 Speed
40	Bulbasaur	Grass	45	=\text{AND}(\text{B40}=\text{"Fire"};\text{C40}>70)
41	Ivysaur	Grass	60	
42	Venusaur	Grass	80	
43	Charmander	Fire	65	
44	Charmeleon	Fire	80	
45	Charizard	Fire	100	
46	Squirtle	Water	43	
47	Wartortle	Water	58	
48	Blastoise	Water	78	
49				
50				
51				
52				
53				
54				
55				
56				
57				
58				
59				
60				



Name	Type 1	Speed	Fire Type AND more than 70 Speed
Bulbasaur	Grass	45	FALSE
Ivysaur	Grass	60	
Venusaur	Grass	80	

If we extend the function to all the other cells by holding the bottom right corner of the cell, we can calculate it for all the cells in the column

Name	Type 1	Speed	Fire Type AND more than 70 Speed
Bulbasaur	Grass	45	FALSE
Ivysaur	Grass	60	FALSE
Venusaur	Grass	80	FALSE
Charmander	Fire	65	FALSE
Charmeleon	Fire	80	TRUE
Charizard	Fire	100	TRUE
Squirtle	Water	43	FALSE
Wartortle	Water	58	FALSE
Blastoise	Water	78	FALSE

Example AND Function (with IF)

Combining the AND function with an IF function lets you check multiple conditions for the IF function.

Here is the syntax:

```
=IF(logical_test, [value_if_true], [value_if_false])
```

Name	Type 1	Speed	Fire Type AND more than 70 Speed
Bulbasaur	Grass	45	
Ivysaur	Grass	60	
Venusaur	Grass	80	
Charmander	Fire	65	
Charmeleon	Fire	80	
Charizard	Fire	100	
Squirtle	Water	43	
Wartortle	Water	58	
Blastoise	Water	78	

For the above data, Apply The Following Formatting:

Example AND function as the condition for IF function,
step by step:

1. Select cell C40
2. Type =IF
3. Double click the IF command
4. Type AND
5. Double click the AND command
6. Specify the first condition B40="Fire"
7. Type ,
8. Specify the second condition C40>70
9. Type),
10. Specify the value "Yes" for when both conditions are TRUE
11. Type ,
12. Specify the value "No" for when either, or both, conditions are FALSE
13. Type) and hit enter

The function can be repeated with the filling function for each row to perform the same check for each Pokemon

Now each row has a check for both being Fire type and Speed greater than 70:

AutoSave On

File Home Insert Page Layout Formulas Data Review View Automate Help

SUM : =IF(AND(B40="Fire"; C40>70); "Yes"; "No")

A	B	C	D	E
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19	Name	Type 1	Speed	Fire Type AND more than 70 Speed
20	Bulbasaur	Grass	45	=IF(AND(B40="Fire"; C40>70); "Yes"; "No")
21	Ivysaur	Grass	60	
22	Venusaur	Grass	80	
23	Charmander	Fire	65	
24	Charmeleon	Fire	80	
25	Charizard	Fire	100	
26	Squirtle	Water	43	
27	Wartortle	Water	58	
28	Blastoise	Water	78	



Name	Type 1	Speed	Fire Type AND more than 70 Speed
Bulbasaur	Grass	45	No
Ivysaur	Grass	60	
Venusaur	Grass	80	
Charmander	Fire	65	
Charmeleon	Fire	80	
Charizard	Fire	100	
Squirtle	Water	43	
Wartortle	Water	58	
Blastoise	Water	78	



Name	Type 1	Speed	Fire Type AND more than 70 Speed
Bulbasaur	Grass	45	No
Ivysaur	Grass	60	No
Venusaur	Grass	80	No
Charmander	Fire	65	No
Charmeleon	Fire	80	Yes
Charizard	Fire	100	Yes
Squirtle	Water	43	No
Wartortle	Water	58	No
Blastoise	Water	78	No

Now each row has a check for both being Fire type and Speed greater than 70:

Example OR Function

Name	Type 1	Speed	Speed greater than 80 or fire
Bulbasaur	Grass	45	=OR(B4="Fire"; C4>80)
Ivysaur	Grass	60	
Venusaur	Grass	80	
Charmander	Fire	65	
Charmeleon	Fire	80	
Charizard	Fire	100	
Squirtle	Water	43	
Wartortle	Water	58	
Blastoise	Water	78	



Name	Type 1	Speed	Speed greater than 80 or fire
Bulbasaur	Grass	45	FALSE
Ivysaur	Grass	60	
Venusaur	Grass	80	
Charmander	Fire	65	
Charmeleon	Fire	80	



Name	Type 1	Speed	Speed greater than 80 or fire
Bulbasaur	Grass	45	FALSE
Ivysaur	Grass	60	FALSE
Venusaur	Grass	80	FALSE
Charmander	Fire	65	TRUE
Charmeleon	Fire	80	TRUE
Charizard	Fire	100	TRUE
Squirtle	Water	43	FALSE
Wartortle	Water	58	FALSE
Blastoise	Water	78	FALSE

Example OR Function (with IF)

Combining the OR function with an IF function lets you check multiple conditions for the IF function:

Example OR function as the condition for IF function, step by step:

1. Select cell B40
2. Type =IF
3. Double click the IF command
4. Type OR
5. Double click the OR command
6. Specify the first condition B40="Water"
7. Type ,
8. Specify the second condition C40>60
9. Type),
10. Specify the value "Yes" for when either or both conditions are TRUE
11. Type ,
12. Specify the value "No" for when both conditions are FALSE
13. Type) and hit enter

The function can be repeated with the filling function for each row to perform the same check for each Pokemon

Now, each row has a check for Water Type or Defense greater than 60:

=IF(OR(B40="Water";C40>60); "Yes";"No")

	A	B	C	D	E
32					
33					
34					
35					
36					
37					
38					
39	Name	Type 1	Speed	Water Type OR more than 60 Defense	
40	Bulbasaur	Grass	45	=IF(OR(B40="Water";C40>60); "Yes";"No")	
41	Ivysaur	Grass	60		
42	Venusaur	Grass	80		
43	Charmander	Fire	65		
44	Charmeleon	Fire	80		
45	Charizard	Fire	100		
46	Squirtle	Water	43		
47	Wartortle	Water	58		
48	Blastoise	Water	78		
49					
50					
51					
52					
53					
54					
55					
56					



Name	Type 1	Speed	Water Type OR more than 60 Defense
Bulbasaur	Grass	45	No
Ivysaur	Grass	60	No
Venusaur	Grass	80	Yes
Charmander	Fire	65	Yes



	Name	Type 1	Speed	Water Type OR more than 60 Defense
9	Bulbasaur	Grass	45	No
0	Ivysaur	Grass	60	No
1	Venusaur	Grass	80	Yes
2	Charmander	Fire	65	Yes
3	Charmeleon	Fire	80	Yes
4	Charizard	Fire	100	Yes
5	Squirtle	Water	43	Yes
6	Wartortle	Water	58	Yes
7	Blastoise	Water	78	Yes
8				
9				
0				
1				
2				

Nested IF Statements

Nested IF statements allow you to test multiple conditions within a single formula

Syntax:

```
IF(condition1, result1, IF(condition2, result2,  
IF(condition3, result3, result4)))
```

Example:

As an example, let's find out commissions for a number of sellers based on the amount of sales they've made:

Commission	Sales
3%	\$1 - \$50
5%	\$51 - \$100
7%	\$101 - \$150
10%	Over \$150

In math, changing the order of addends does not change the sum. In Excel, changing the order of IF functions changes the result. Why?

Because a nested IF formula returns a value corresponding to the first TRUE condition. Therefore, in your nested IF statements, it's very important to arrange the conditions in the right direction - high to low or low to high, depending on your formula's logic. In our case, we check the "highest" condition first, then the "second highest", and so on:

	C2	=IF(B2>150,10%, IF(B2>=101,7%, IF(B2>=51,5%, IF(B2>=1,3%,""))))				
1	Seller	Sales	Commission		Sales	Commission
2	Mike	\$150	7%		\$1 - \$50	3%
3	Sally	\$95	5%		\$51 - \$100	5%
4	Amy	\$180	10%		\$101 - \$150	7%
5	Neal	\$45	3%		Over \$150	10%
6	Peter	\$80	5%			
7	Olivia	\$45	3%			
8	Aiden	\$130	7%			

If we placed the conditions in the reverse order, from the bottom up, the results would be all wrong because our formula would stop after the first logical test ($B2 \geq 1$) for any value greater than 1. Let's say, we have \$100 in sales - it is greater than 1, so the formula would not check other conditions and return 3% as the result.

If you'd rather arrange the conditions from low to high, then use the "less than" operator and evaluate the "lowest" condition first, then the "second lowest", and so on as shown below:

=IF(\$B2<1, 0%, IF(\$B2<51, 3%, IF(\$B2<101, 5%,
IF(\$B2<=150, 7%, 10%))))

As you see, it takes quite a lot of thought to build the logic of a nested IF statement correctly all the way to the end. And although Microsoft Excel allows nesting up to 64 IF functions in one formula, it is not something you'd really want to do in your worksheets.



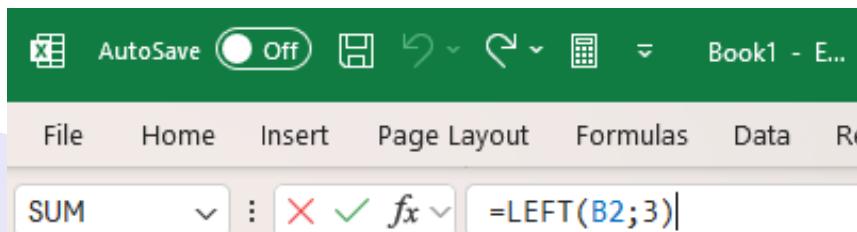
Quick Practice: Logical Functions

- Open the "Sales_Data.xlsx" workbook.
- Use the IF function to classify sales as "High" if greater than 70,000,"Medium" if greater than 70,000,"Medium"if greater than 50,000, and "Low" otherwise.
- Use the AND function to check if sales are greater than \$50,000 and the region is "East".
- Use the OR function to check if sales are greater than \$70,000 or the region is "West"

Text Functions – LEFT, RIGHT, MID, CONCATENATE, TEXT

LEFT Function:

- The LEFT function extracts a specified number of characters from the beginning (left side) of a text string.



Name	Phone Number	AREA CODE
John Doe	987-654-3210	987
Alice Lee	654-321-9876	654
Mark Smith	123-456-7890	123
Sarah Khan	789-654-1234	789
David Kim	456-789-0123	456

- In the above example, we extract the first three digits from a phone number which is essentially the area code from a phone number:

RIGHT Function

- The RIGHT function extracts a specified number of characters from the end (right side) of a text string.

A screenshot of Microsoft Excel showing a table with columns for Name and Phone Number. In cell C2, the formula `=RIGHT(B2;4)` is entered to extract the last four digits of the phone number in B2. A red arrow points from the text "In the above example, we extract the last four digits from a phone number." to the formula in cell C2.

	A	B	C	D
1	Name	Phone Number		
2	John Doe	987-654-3210	=RIGHT(B2;4)	
3	Alice Lee	654-321-9876		
4	Mark Smith	123-456-7890		
5	Sarah Khan	789-654-1234		
6	David Kim	456-789-0123		
7				
8				
9				
10				
11				

In the above example, we extract the last four digits from a phone number.

A screenshot of Microsoft Excel showing the result of the RIGHT function extraction. The last four digits of each phone number are highlighted in a green box. A red arrow points from the text "In the above example, we extract the last four digits from a phone number." to the highlighted area.

	A	B	C
1	Name	Phone Number	
2	John Doe	987-654-3210	3210
3	Alice Lee	654-321-9876	9876
4	Mark Smith	123-456-7890	7890
5	Sarah Khan	789-654-1234	1234
6	David Kim	456-789-0123	0123
7			

MID Function

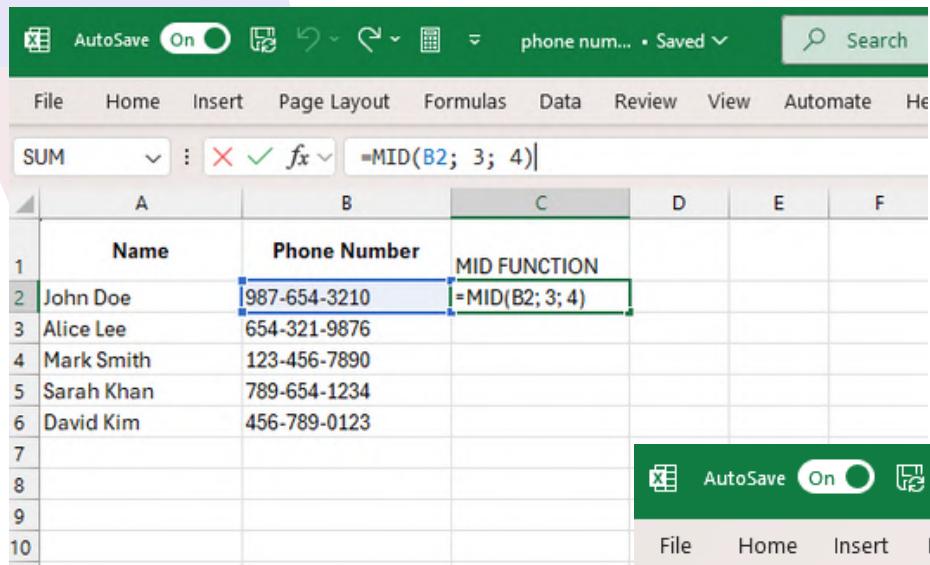
- The MID function extracts a specific number of characters from the middle of a text string

Example

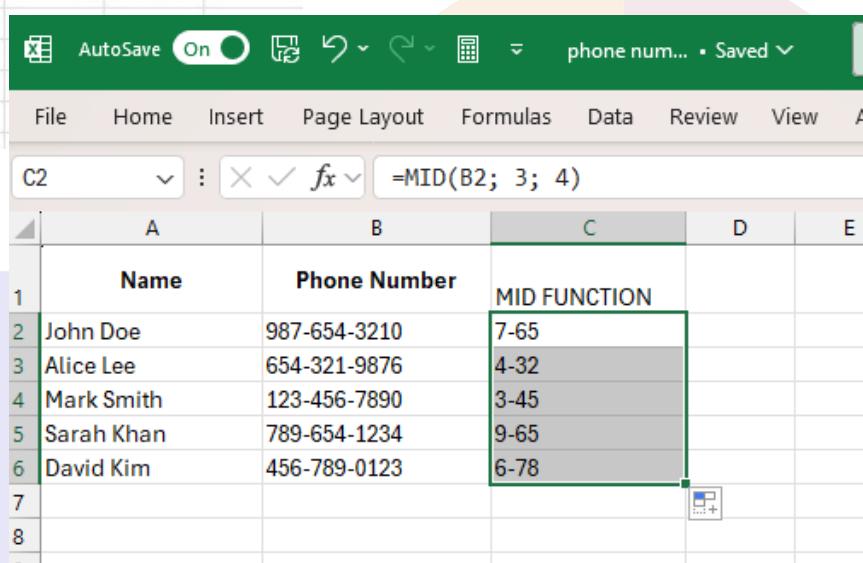
- Extracting the middle three digits of a phone number:

Syntax:

```
=MID(text; start_num; num_chars)
```



phone num... • Saved					
File	Home	Insert	Page Layout	Formulas	Data
SUM		: X ✓ fx		=MID(B2; 3; 4)	
A	B	C	D	E	F
1	Name	Phone Number	MID FUNCTION		
2	John Doe	987-654-3210	=MID(B2; 3; 4)		
3	Alice Lee	654-321-9876			
4	Mark Smith	123-456-7890			
5	Sarah Khan	789-654-1234			
6	David Kim	456-789-0123			
7					
8					
9					
10					
11					



phone num... • Saved					
File	Home	Insert	Page Layout	Formulas	Data
C2		: X ✓ fx		=MID(B2; 3; 4)	
A	B	C	D	E	F
1	Name	Phone Number	MID FUNCTION		
2	John Doe	987-654-3210	7-65		
3	Alice Lee	654-321-9876	4-32		
4	Mark Smith	123-456-7890	3-45		
5	Sarah Khan	789-654-1234	9-65		
6	David Kim	456-789-0123	6-78		
7					
8					
9					
10					
11					

It is important to note here that the formula writes the digits 7-65 even though we give the instructions to extract four characters.

This is mainly due to the fact that Excel considers the slash “-” as a character also. That is why we get to see that our instructions are properly followed by excel to extract four characters starting from the 3rd digit in our numbers example.

CONCATENATE Function(TEXTJOIN in Newer Excel Versions)

The CONCATENATE function (or TEXTJOIN in newer Excel versions) is used to join multiple text values, numbers, or cell contents into a single string.

◆ Why use it?

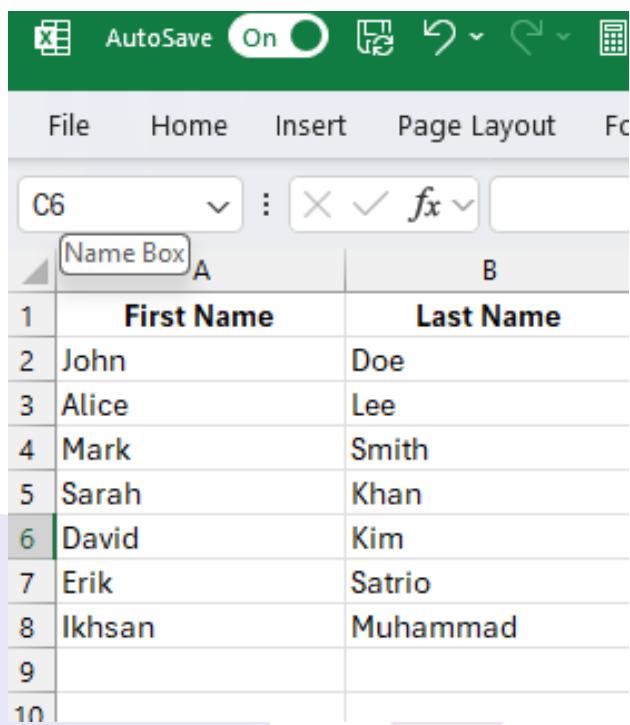
- Combine first and last names into a full name.
- Merge addresses from different columns into one.
- Format text in reports dynamically.

Syntax:

```
=CONCATENATE(text1; text2; ...)
```

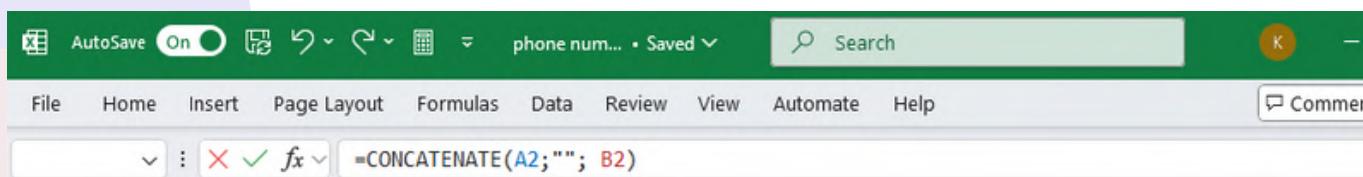
Example:

So imagine we have the data as shown below and we wish to concatenate the first name and last names columns into one column



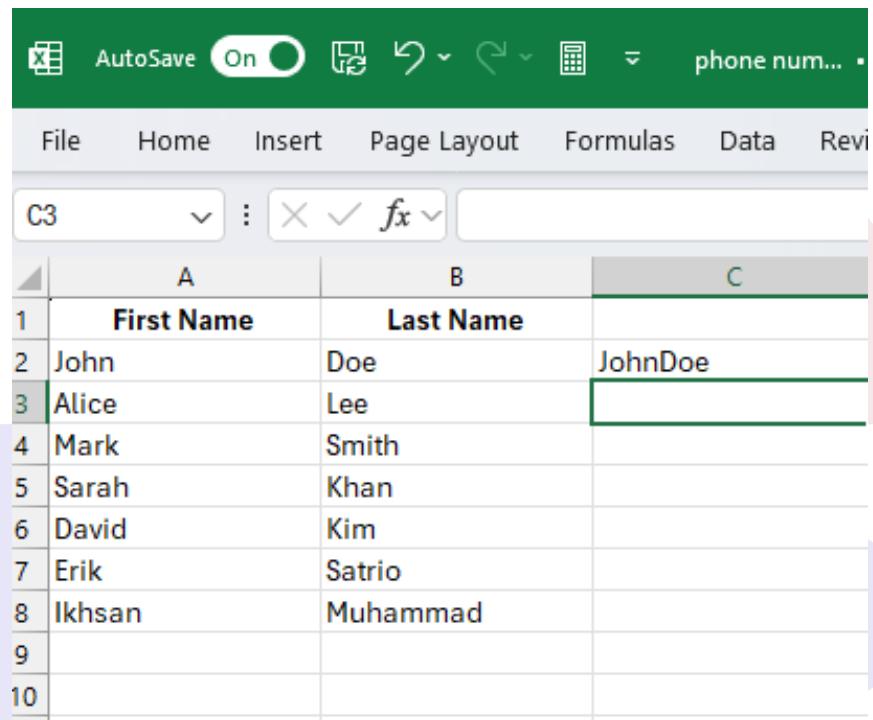
	A	B
1	First Name	Last Name
2	John	Doe
3	Alice	Lee
4	Mark	Smith
5	Sarah	Khan
6	David	Kim
7	Erik	Satrio
8	Ikhsan	Muhammad
9		
10		

We write the following formula in the function field above the cells.

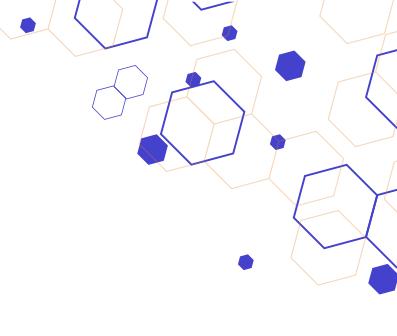


	A	B
1	First Name	Last Name
2	John	Doe
3	Alice	Lee
4	Mark	Smith
5	Sarah	Khan
6	David	Kim
7	Erik	Satrio
8	Ikhsan	Muhammad
9		
10		

And we get the results as follows:



	A	B	C
1	First Name	Last Name	
2	John	Doe	JohnDoe
3	Alice	Lee	
4	Mark	Smith	
5	Sarah	Khan	
6	David	Kim	
7	Erik	Satrio	
8	Ikhsan	Muhammad	
9			
10			



AutoSave On

File Home Insert Page Layout Formulas Data Review

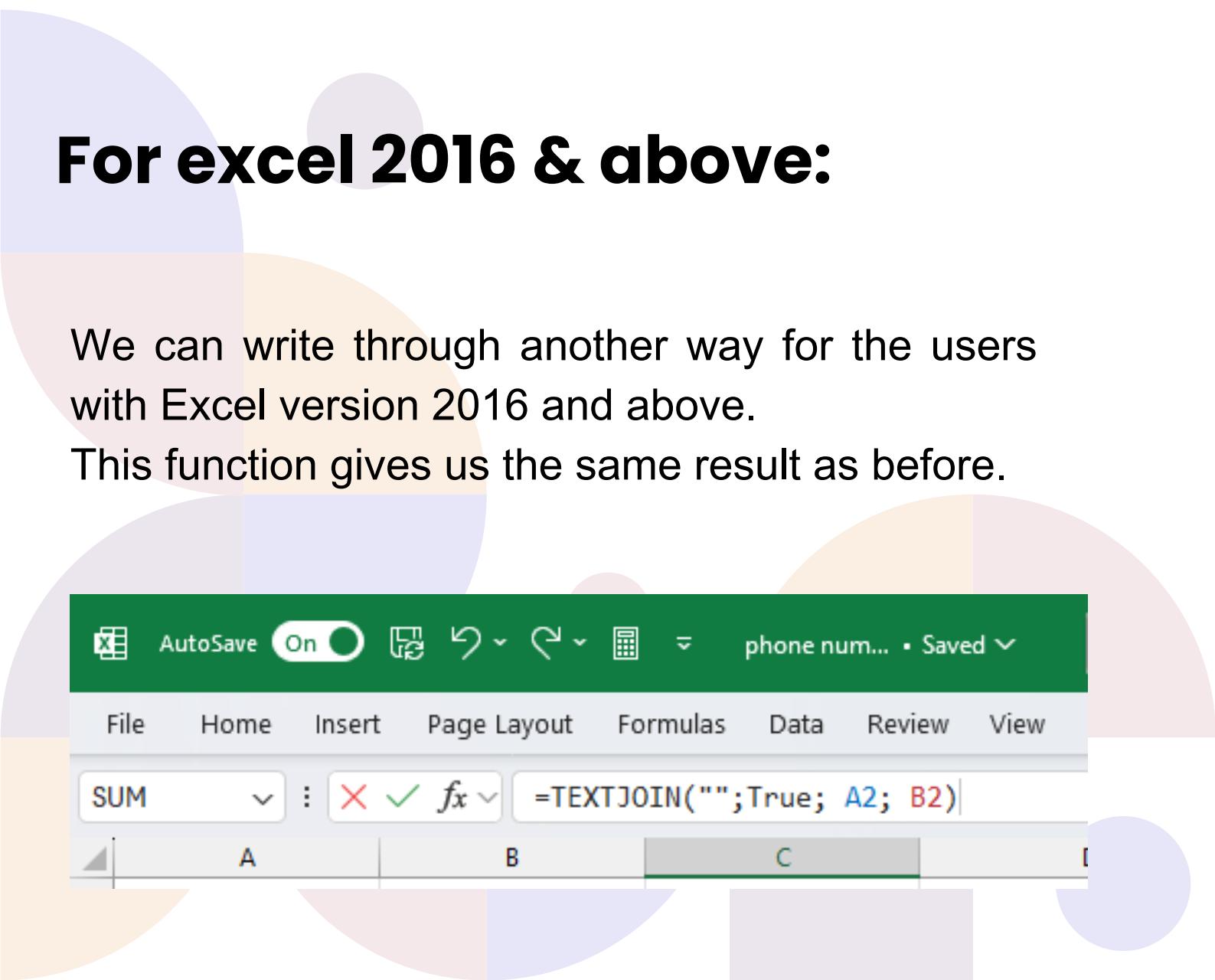
C2 : =CONCATENATE(A2,""; B2)

	A	B	C
1	First Name	Last Name	
2	John	Doe	JohnDoe
3	Alice	Lee	Alice Lee
4	Mark	Smith	Mark Smith
5	Sarah	Khan	Sarah Khan
6	David	Kim	David Kim
7	Erik	Satrio	ErikSatrio
8	Ikhsan	Muhammad	IkhsanMuhammad

Extending that to all the rows, we can get the final output as given above.

For excel 2016 & above:

We can write through another way for the users with Excel version 2016 and above.
This function gives us the same result as before.



AutoSave On

File Home Insert Page Layout Formulas Data Review View

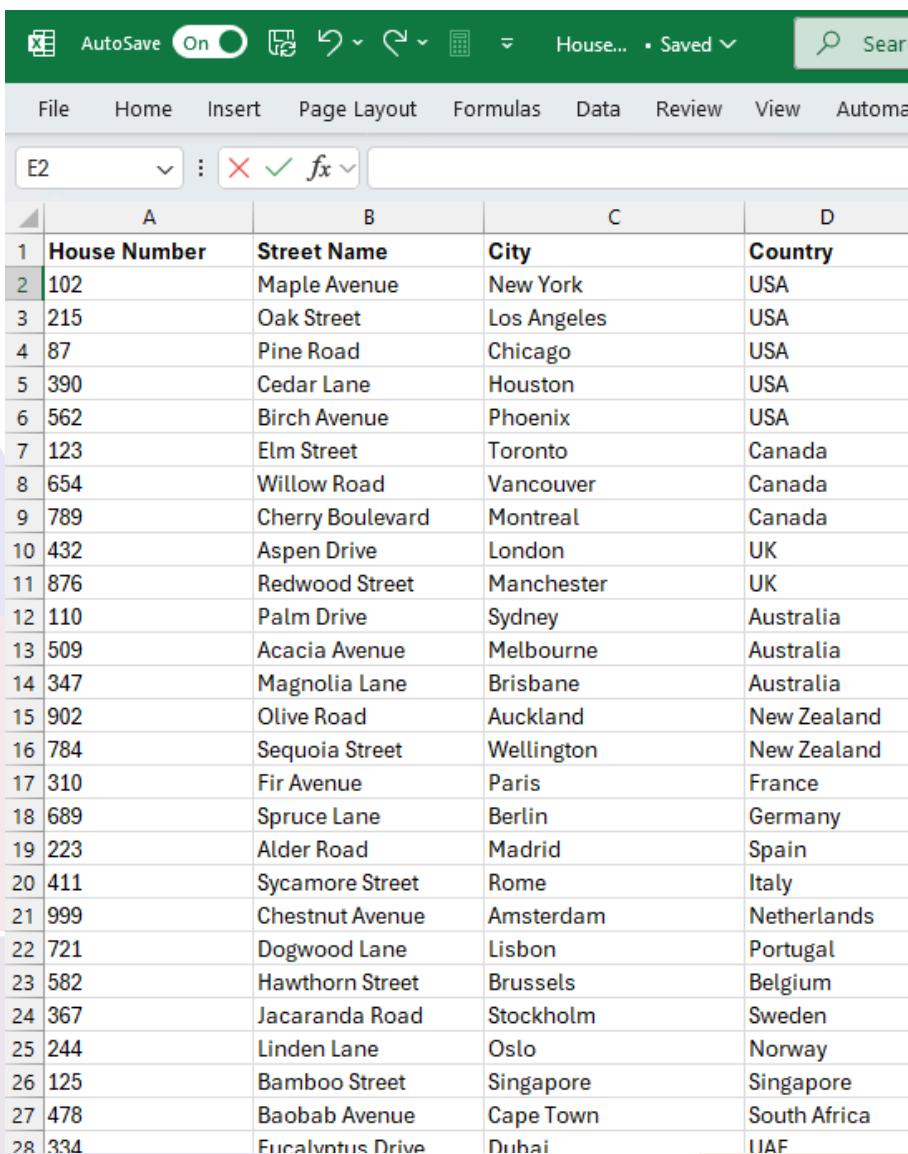
SUM : =TEXTJOIN("",True; A2; B2)

	A	B	C	D

Scenario # 2:

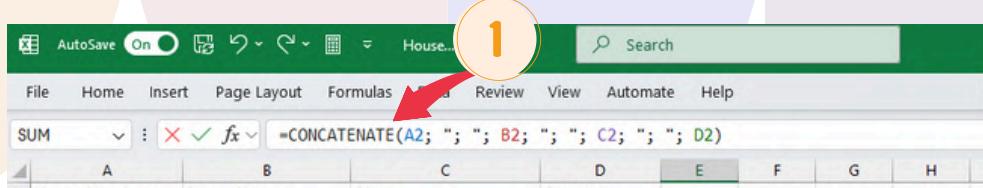
You have House Number (A2), Street Name (B2), City (C2), and Country (D2), and you need to merge them into a full address in Column E.

- Enter address details in A2:D2.



	A	B	C	D
1	House Number	Street Name	City	Country
2	102	Maple Avenue	New York	USA
3	215	Oak Street	Los Angeles	USA
4	87	Pine Road	Chicago	USA
5	390	Cedar Lane	Houston	USA
6	562	Birch Avenue	Phoenix	USA
7	123	Elm Street	Toronto	Canada
8	654	Willow Road	Vancouver	Canada
9	789	Cherry Boulevard	Montreal	Canada
10	432	Aspen Drive	London	UK
11	876	Redwood Street	Manchester	UK
12	110	Palm Drive	Sydney	Australia
13	509	Acacia Avenue	Melbourne	Australia
14	347	Magnolia Lane	Brisbane	Australia
15	902	Olive Road	Auckland	New Zealand
16	784	Sequoia Street	Wellington	New Zealand
17	310	Fir Avenue	Paris	France
18	689	Spruce Lane	Berlin	Germany
19	223	Alder Road	Madrid	Spain
20	411	Sycamore Street	Rome	Italy
21	999	Chestnut Avenue	Amsterdam	Netherlands
22	721	Dogwood Lane	Lisbon	Portugal
23	582	Hawthorn Street	Brussels	Belgium
24	367	Jacaranda Road	Stockholm	Sweden
25	244	Linden Lane	Oslo	Norway
26	125	Bamboo Street	Singapore	Singapore
27	478	Baobab Avenue	Cape Town	South Africa
28	334	Eucalyptus Drive	Dubai	UAE

- Click on E2, and either type in the cell or you can also type in the function field given above:



- Press Enter and drag the formula down.

SUM : $=\text{CONCATENATE}(A2; "; "; B2; "; "; C2; "; "; D2)$

A	B	C	D	E	F	G	H	I
House Number	Street Name	City	Country					
102	Maple Avenue	New York	USA	=CONCATENATE(A2; "; "; B2; "; "; C2; "; "; D2)				
215	Oak Street	Los Angeles	USA					
87	Pine Road	Chicago	USA					
390	Cedar Lane	Houston	USA					
562	Birch Avenue	Phoenix	USA					
123	Elm Street	Toronto	Canada					
654	Willow Road	Vancouver	Canada					

E2 : $=\text{CONCATENATE}(A2; "; "; B2; "; "; C2; "; "; D2)$

102	Maple Avenue	New York	USA	102; Maple Avenue; New York; USA
215	Oak Street	Los Angeles	USA	215; Oak Street; Los Angeles; USA
87	Pine Road	Chicago	USA	87; Pine Road; Chicago; USA
390	Cedar Lane	Houston	USA	390; Cedar Lane; Houston; USA
562	Birch Avenue	Phoenix	USA	562; Birch Avenue; Phoenix; USA
123	Elm Street	Toronto	Canada	123; Elm Street; Toronto; Canada
654	Willow Road	Vancouver	Canada	654; Willow Road; Vancouver; Canada
789	Cherry Boulevard	Montreal	Canada	789; Cherry Boulevard; Montreal; Canada
432	Aspen Drive	London	UK	432; Aspen Drive; London; UK
876	Redwood Street	Manchester	UK	876; Redwood Street; Manchester; UK
110	Palm Drive	Sydney	Australia	110; Palm Drive; Sydney; Australia
509	Acacia Avenue	Melbourne	Australia	509; Acacia Avenue; Melbourne; Australia
347	Magnolia Lane	Brisbane	Australia	347; Magnolia Lane; Brisbane; Australia
902	Olive Road	Auckland	New Zealand	902; Olive Road; Auckland; New Zealand
784	Sequoia Street	Wellington	New Zealand	784; Sequoia Street; Wellington; New Zealand
310	Fir Avenue	Paris	France	310; Fir Avenue; Paris; France
689	Spruce Lane	Berlin	Germany	689; Spruce Lane; Berlin; Germany
223	Alder Road	Madrid	Spain	223; Alder Road; Madrid; Spain
411	Sycamore Street	Rome	Italy	411; Sycamore Street; Rome; Italy
999	Chestnut Avenue	Amsterdam	Netherlands	999; Chestnut Avenue; Amsterdam; Netherlands
721	Dogwood Lane	Lisbon	Portugal	721; Dogwood Lane; Lisbon; Portugal
582	Hawthorn Street	Brussels	Belgium	582; Hawthorn Street; Brussels; Belgium
367	Jacaranda Road	Stockholm	Sweden	367; Jacaranda Road; Stockholm; Sweden
244	Linden Lane	Oslo	Norway	244; Linden Lane; Oslo; Norway
125	Bamboo Street	Singapore	Singapore	125; Bamboo Street; Singapore; Singapore
478	Baobab Avenue	Cape Town	South Africa	478; Baobab Avenue; Cape Town; South Africa
334	Eucalyptus Drive	Dubai	UAE	334; Eucalyptus Drive; Dubai; UAE
902	Banyan Road	Mumbai	India	902; Banyan Road; Mumbai; India
765	Teak Avenue	Bangkok	Thailand	765; Teak Avenue; Bangkok; Thailand
531	Mahogany Street	Kuala Lumpur	Malaysia	531; Mahogany Street; Kuala Lumpur; Malaysia

- Click on E2, and either type in the cell or you can also type in the function field given above:

Scenario # 3: Creating Custom Email IDs

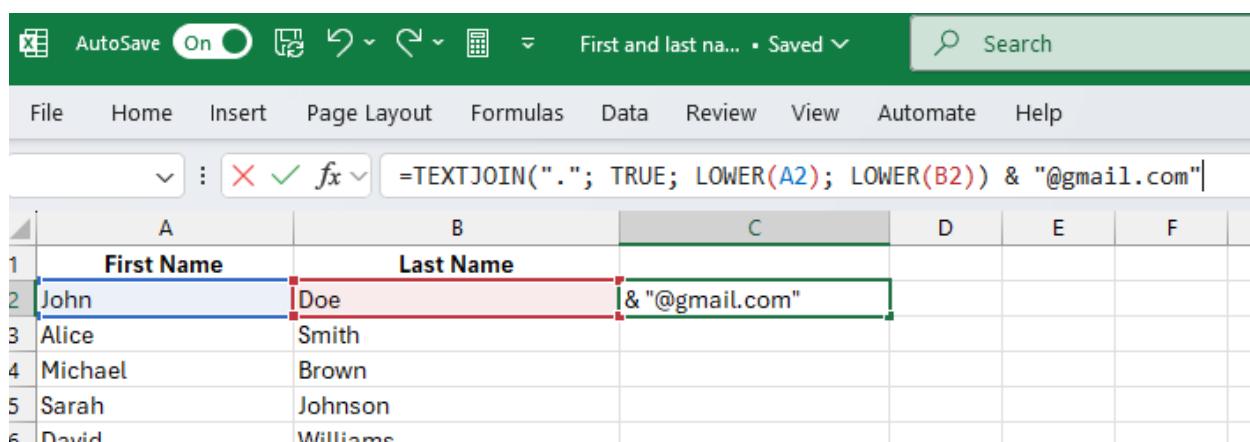
Imagine we have the following data:



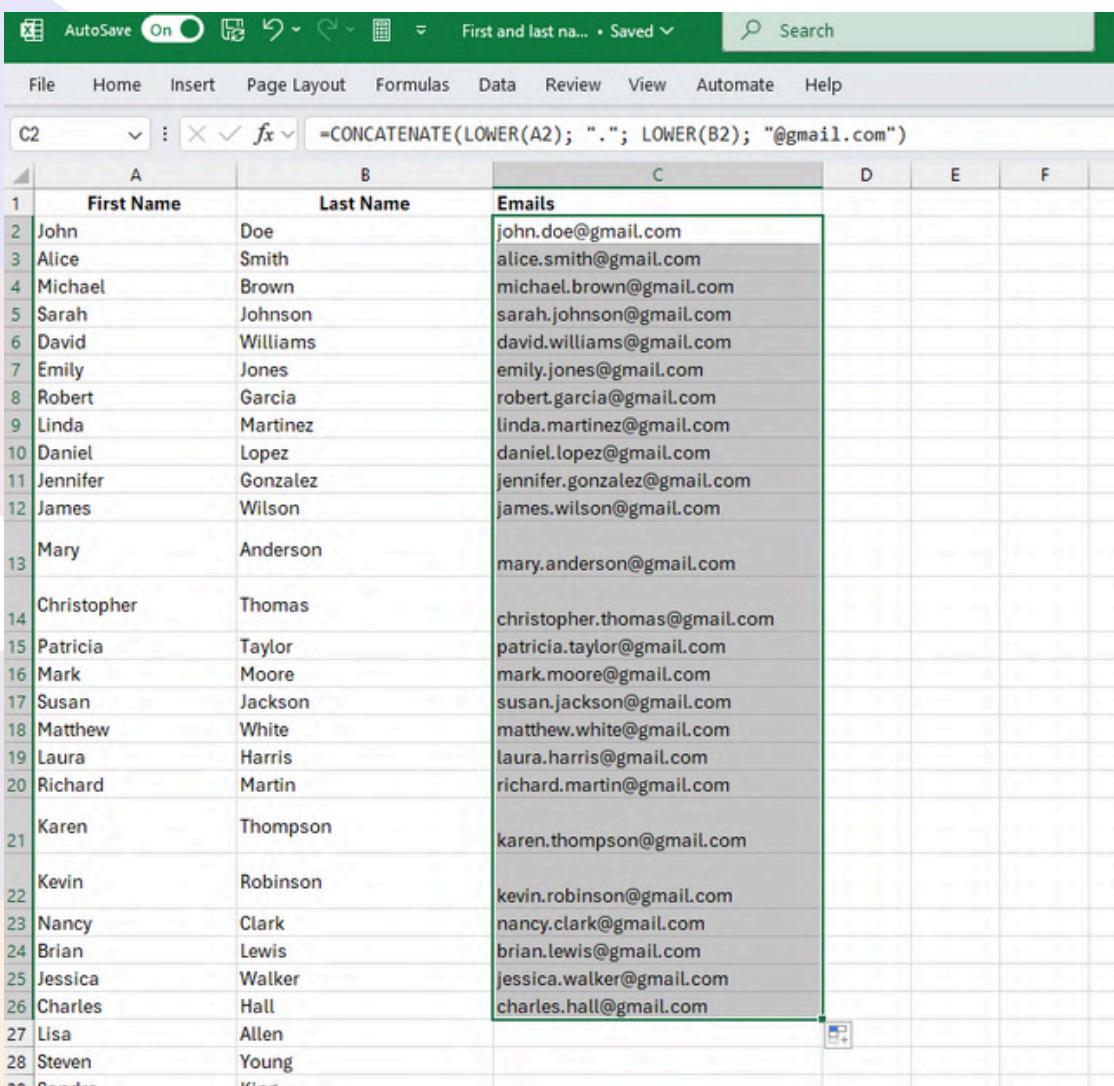
	A	B
	First Name	Last Name
1		
2	John	Doe
3	Alice	Smith
4	Michael	Brown
5	Sarah	Johnson
6	David	Williams
7	Emily	Jones
8	Robert	Garcia
9	Linda	Martinez
10	Daniel	Lopez
11	Jennifer	Gonzalez
12	James	Wilson
13	Mary	Anderson
14	Christopher	Thomas
15	Patricia	Taylor
16	Mark	Moore
17	Susan	Jackson
18	Matthew	White
19	Laura	Harris
20	Richard	Martin
21	Karen	Thompson
22	Kevin	Robinson
23	Nancy	Clark

	A	B	C	D	E	F
1	First Name	Last Name				
2	John	Doe	"@gmail.com")			
3	Alice	Smith				
4	Michael	Brown				
5	Sarah	Johnson				
6	David	Williams				
7	Emily	Jones				
8	Robert	Garcia				
9	Linda	Martinez				
10	Daniel	Lopez				
11	Jennifer	Gonzalez				
12	James	Wilson				

Or you can also use the following code for getting the same output:



	A	B	C	D	E	F
1	First Name	Last Name				
2	John	Doe	=& "@gmail.com"			
3	Alice	Smith				
4	Michael	Brown				
5	Sarah	Johnson				
6	David	Williams				



	A	B	C	D	E	F
1	First Name	Last Name	Emails			
2	John	Doe	john.doe@gmail.com			
3	Alice	Smith	alice.smith@gmail.com			
4	Michael	Brown	michael.brown@gmail.com			
5	Sarah	Johnson	sarah.johnson@gmail.com			
6	David	Williams	david.williams@gmail.com			
7	Emily	Jones	emily.jones@gmail.com			
8	Robert	Garcia	robert.garcia@gmail.com			
9	Linda	Martinez	linda.martinez@gmail.com			
10	Daniel	Lopez	daniel.lopez@gmail.com			
11	Jennifer	Gonzalez	jennifer.gonzalez@gmail.com			
12	James	Wilson	james.wilson@gmail.com			
13	Mary	Anderson	mary.anderson@gmail.com			
14	Christopher	Thomas	christopher.thomas@gmail.com			
15	Patricia	Taylor	patricia.taylor@gmail.com			
16	Mark	Moore	mark.moore@gmail.com			
17	Susan	Jackson	susan.jackson@gmail.com			
18	Matthew	White	matthew.white@gmail.com			
19	Laura	Harris	laura.harris@gmail.com			
20	Richard	Martin	richard.martin@gmail.com			
21	Karen	Thompson	karen.thompson@gmail.com			
22	Kevin	Robinson	kevin.robinson@gmail.com			
23	Nancy	Clark	nancy.clark@gmail.com			
24	Brian	Lewis	brian.lewis@gmail.com			
25	Jessica	Walker	jessica.walker@gmail.com			
26	Charles	Hall	charles.hall@gmail.com			
27	Lisa	Allen				
28	Steven	Young				
29	Gender					

TEXT Function

The TEXT function is used to format numbers, dates, and currency values as text in a specific format.

◆ Why use it?

- Format dates as "January 1, 2025" instead of "01/01/25".
- Display currency with a symbol (e.g., "\$1,500.00").
- Format percentages properly.

◆ Syntax

```
=TEXT(value; format_text)
```

- value – The number, date, or reference to format.
- format_text – The format code (e.g., "MM/DD/YYYY", "\$#,##0.00", "0.00%").

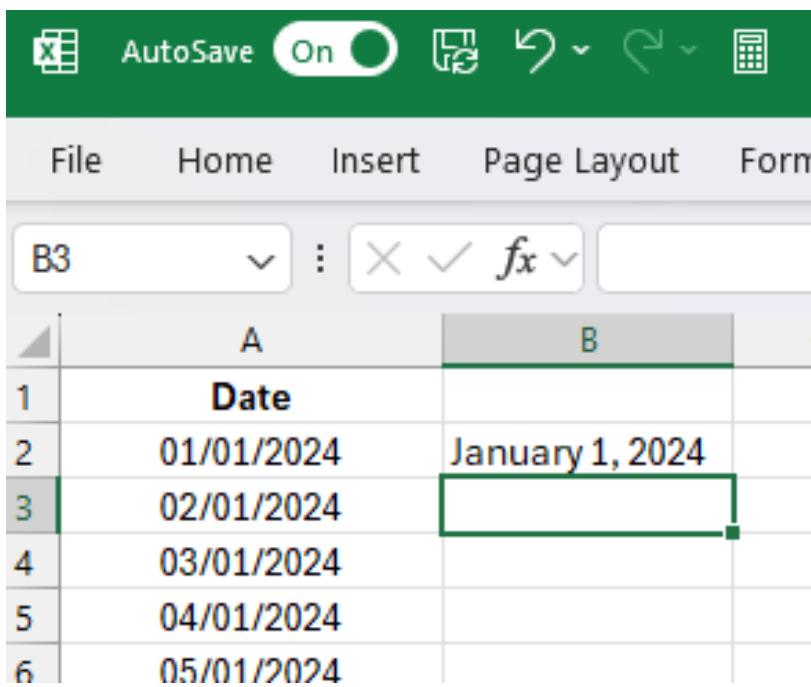
Scenario # 1: Formatting Dates Properly

Imagine you have dates in column A (e.g., 01/01/2025), and you want them to appear as January 1, 2025.

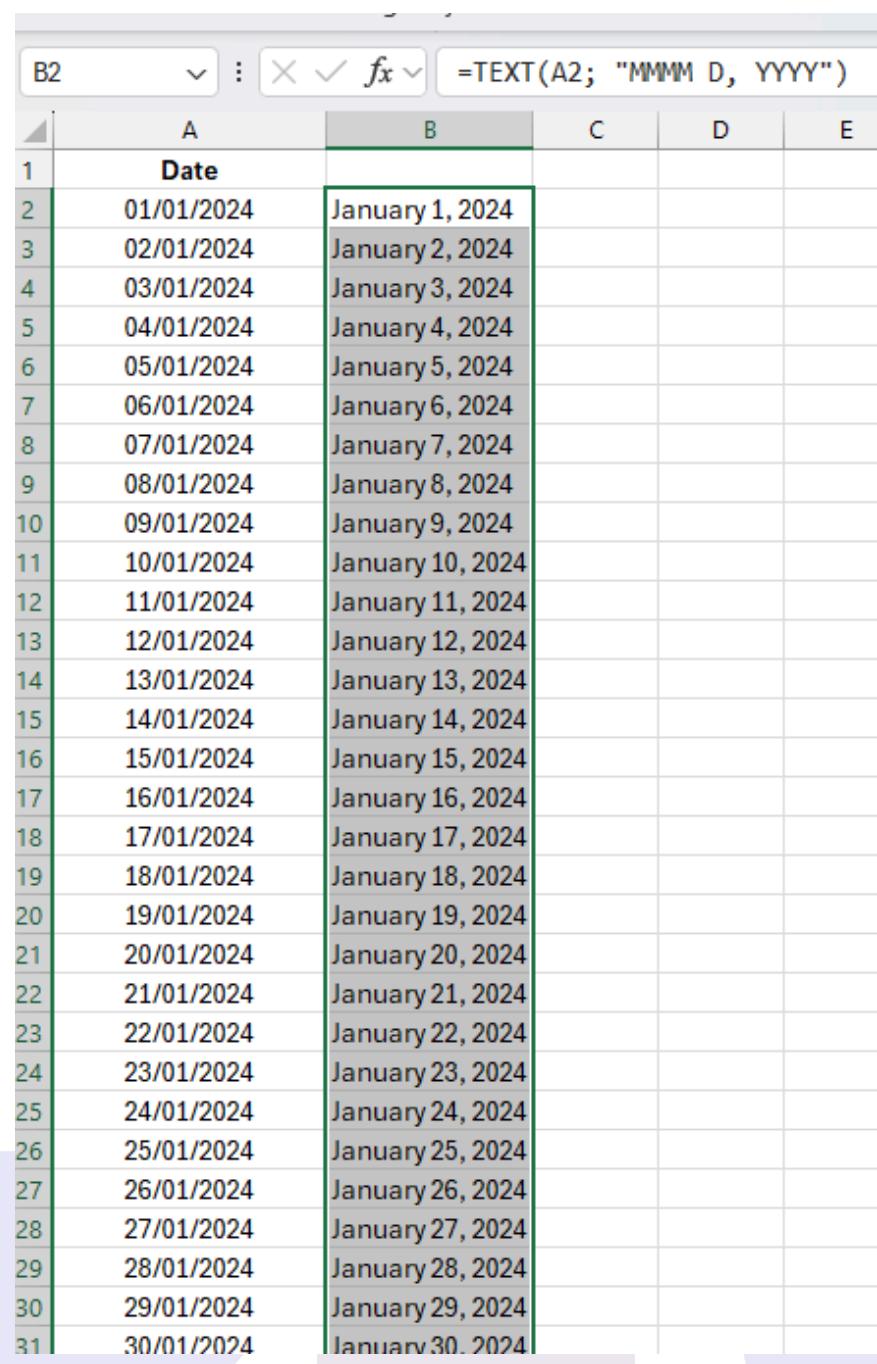
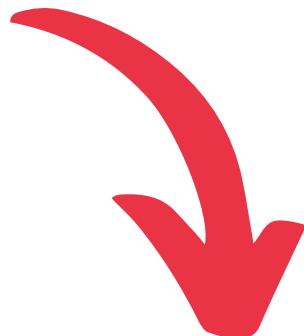
- Enter dates in A2:A50.
 - Click on B2, type the formula as mentioned in the screenshot below

	A	B	C
1	Date		
2	01/01/2024		
3	02/01/2024		
4	03/01/2024		
5	04/01/2024		
6	05/01/2024		
7	06/01/2024		
8	07/01/2024		
9	08/01/2024		
10	09/01/2024		
11	10/01/2024		
12	11/01/2024		
13	12/01/2024		
14	13/01/2024		
15	14/01/2024		
16	15/01/2024		
17	16/01/2024		
18	17/01/2024		
19	18/01/2024		
20	19/01/2024		
21	20/01/2024		
22	21/01/2024		
23	22/01/2024		
24	23/01/2024		
25	24/01/2024		
26	25/01/2024		
27	26/01/2024		
28	27/01/2024		
29	28/01/2024		
30	29/01/2024		

The screenshot shows the Microsoft Excel interface. The formula bar at the top contains the text '=TEXT(A2; "MMMM D, YYYY")'. The ribbon menu below it includes tabs for File, Home, Insert, Page Layout, Formulas, Data, Review, View, Automate, and Help. A 'Comments' button is also visible. The main workspace shows a single row of cells labeled A through L, with cell B being the active cell.



	A	B
1	Date	
2	01/01/2024	January 1, 2024
3	02/01/2024	
4	03/01/2024	
5	04/01/2024	
6	05/01/2024	



	A	B	C	D	E
1	Date				
2	01/01/2024	January 1, 2024			
3	02/01/2024	January 2, 2024			
4	03/01/2024	January 3, 2024			
5	04/01/2024	January 4, 2024			
6	05/01/2024	January 5, 2024			
7	06/01/2024	January 6, 2024			
8	07/01/2024	January 7, 2024			
9	08/01/2024	January 8, 2024			
10	09/01/2024	January 9, 2024			
11	10/01/2024	January 10, 2024			
12	11/01/2024	January 11, 2024			
13	12/01/2024	January 12, 2024			
14	13/01/2024	January 13, 2024			
15	14/01/2024	January 14, 2024			
16	15/01/2024	January 15, 2024			
17	16/01/2024	January 16, 2024			
18	17/01/2024	January 17, 2024			
19	18/01/2024	January 18, 2024			
20	19/01/2024	January 19, 2024			
21	20/01/2024	January 20, 2024			
22	21/01/2024	January 21, 2024			
23	22/01/2024	January 22, 2024			
24	23/01/2024	January 23, 2024			
25	24/01/2024	January 24, 2024			
26	25/01/2024	January 25, 2024			
27	26/01/2024	January 26, 2024			
28	27/01/2024	January 27, 2024			
29	28/01/2024	January 28, 2024			
30	29/01/2024	January 29, 2024			
31	30/01/2024	January 30, 2024			

Other Date Formats:

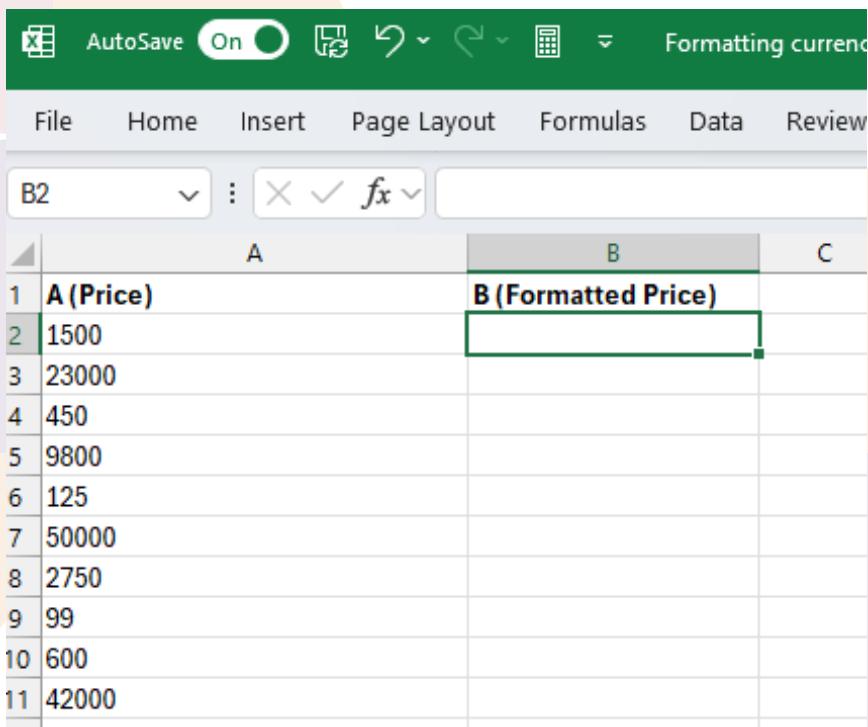
"MM/DD/YYYY"

"DD-MMM-YYYY"

"YYYY-MM-DD"

Scenario #2: Formatting Currency Values

- You have prices in column A (e.g., 1500), and you want them to appear as \$1,500.00.



	A	B	C
1	A (Price)	B (Formatted Price)	
2	1500		
3	23000		
4	450		
5	9800		
6	125		
7	50000		
8	2750		
9	99		
10	600		
11	42000		



AutoSave On

Formatting currency values • Saved

File Home Insert Page Layout Formulas Data Review View Automate Help

SUM : $=\text{TEXT}(A2; "\$\#,##0.00")$

	A	B	C	D	E	F	G	H
1	A (Price)	B (Formatted Price)						
2	1500	$=\text{TEXT}(A2; "\$\#,##0.00")$						
3	23000							
4	450							
5	9800							
6	125							
7	50000							
8	2750							
9	99							
10	600							
11	42000							
12								
13								
14								
15								
16								
17								



File Home Insert Page Layout Formulas Data F

B3 : $=\text{TEXT}(A2; "\$\#,##0.00")$

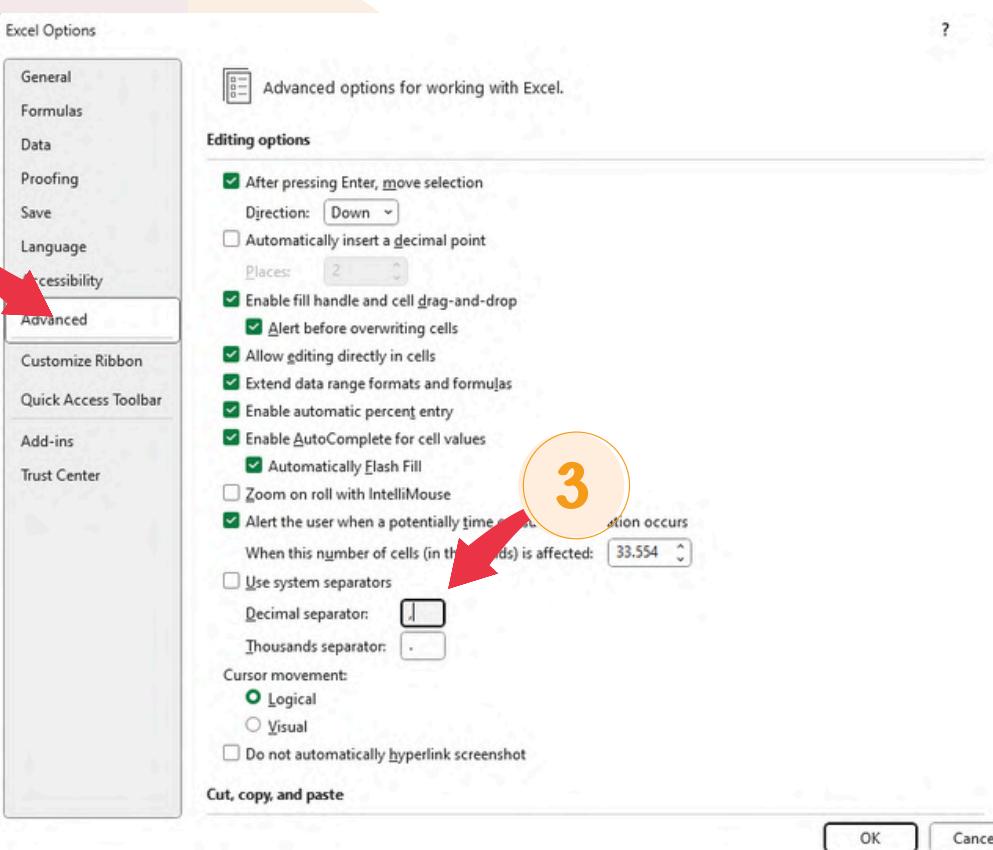
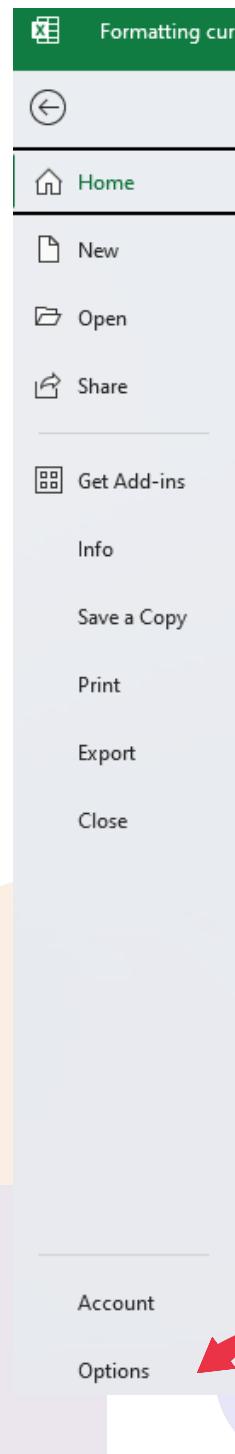
	A	B
1	A (Price)	B (Formatted Price)
2	1500	\$1500,000
3	23000	
4	450	
5	9800	
6	125	

Why is it showing "\$1500,000" instead of "\$1,500.00"?

This issue happens when Excel misinterprets the decimal separator and thousand separator.

To fix it:

- Check Your Regional Settings in Excel:
- Go to File > Options > Advanced.
- Under Editing Options, find Use system separators.
- If the Decimal separator is , and the Thousands separator is ., change it to:
- Decimal separator: 
- Thousands separator: 
- Click OK and try the formula again.



This issue happens when Excel misinterprets the decimal separator and thousand separator.

To fix it:

- Check Your Regional Settings in Excel:
- Go to File > Options > Advanced.
- Under Editing Options, find Use system separators.
- If the Decimal separator is , and the Thousands separator is ., change it to:
- Decimal separator: .
- Thousands separator: ,
- Click OK
- Restart Excel
- try the formula again.

SUM : $=\text{TEXT}(A2; "\$#,##0.00")$

A	B
A (Price)	B (Formatted Price)
1500	$=\text{TEXT}(A2; "\$#,##0.00")$
23000	TEXT(value; format_text)
450	
9800	
125	
50000	
2750	
99	
600	
42000	

B2 : $=\text{TEXT}(A2; "\$#,##0.00")$

A	B
A (Price)	B (Formatted Price)
1500	\$1,500.00
23000	\$23,000.00
450	\$450.00
9800	\$9,800.00
125	\$125.00
50000	\$50,000.00
2750	\$2,750.00
99	\$99.00
600	\$600.00
42000	\$42,000.00

Scenario # 3: Displaying Percentages

Convert decimal values into percentage format.

- If we have data for example as shown below:

A screenshot of a Microsoft Excel spreadsheet. The ribbon at the top shows 'AutoSave On'. The menu bar includes 'File', 'Home', 'Insert', 'Page Layout', 'Formulas', 'Data', 'Review', and 'Formatting'. The formula bar shows 'D2' and a dropdown arrow. The main area contains a table with 13 rows. Row 1 is labeled 'A (Decimal)'. Rows 2 through 13 contain decimal values: 0.85, 0.45, 0.923, 0.75, 0.678, 0.12, 0.99, 0.31, 0.555, 0.08, and empty cells for rows 12 and 13.

	A (Decimal)
1	0.85
2	0.45
3	0.923
4	
5	0.75
6	0.678
7	0.12
8	0.99
9	0.31
10	0.555
11	0.08
12	
13	



A screenshot of a Microsoft Excel spreadsheet. The ribbon at the top shows 'AutoSave On'. The formula bar shows 'SUM' and a dropdown arrow, followed by '=TEXT(A2; "0.00%")'. The main area contains a table with 22 rows. Row 1 is labeled 'A (Decimal)'. Row 2 contains the formula '=TEXT(A2; "0.00%")'. Rows 3 through 22 contain decimal values: 0.45, 0.923, 0.75, 0.678, 0.12, 0.99, 0.31, 0.555, 0.08, and empty cells for rows 12 to 22. The formula in row 2 is highlighted with a green border.

	A	B
1	A (Decimal)	
2	0.85	=TEXT(A2; "0.00%")
3	0.45	
4	0.923	
5	0.75	
6	0.678	
7	0.12	
8	0.99	
9	0.31	
10	0.555	
11	0.08	
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		



A	B	C	D
1 A(Decimal)			
2 0.85	85.00%		
3 0.45	45.00%		
4 0.923			
5 0.75	92.30%		
6 0.678	75.00%		
7 0.12	67.80%		
8 0.99	12.00%		
9 0.31	99.00%		
10 0.555	31.00%		
11 0.08	55.50%		
12	8.00%		
13			
14			
15			

Date and Time Functions

Date and time functions in Excel are essential for managing schedules, calculating durations, and automating date-related tasks. The most commonly used functions include TODAY, NOW, DATEDIF, and NETWORKDAYS

1. TODAY Function

The TODAY function returns the current date based on the system clock. It updates automatically each day.

Syntax

=TODAY()

Example:

Scenario: Displaying the current date in an invoice.

1. Click on a cell where you want the current date to appear.
2. Type =TODAY() and press Enter.
3. The cell will display today's date in your system's default format.

	A
1	A (Invoice Number)
2	INV001
3	INV002
4	INV003
5	INV004
6	INV005
7	INV006
8	INV007
9	INV008
10	INV009
11	INV010
12	

File	Home	Insert	Page Layout	Formulas	Data	Re
SUM		fx		=TODAY()		
1	A		B			
2	A (Invoice Number)		Date	=TODAY()		
3	INV001					
4	INV002					
5	INV003					
6	INV004					
7	INV005					
8	INV006					
9	INV007					
10	INV008					
11	INV009					
12	INV010					
13						
14						



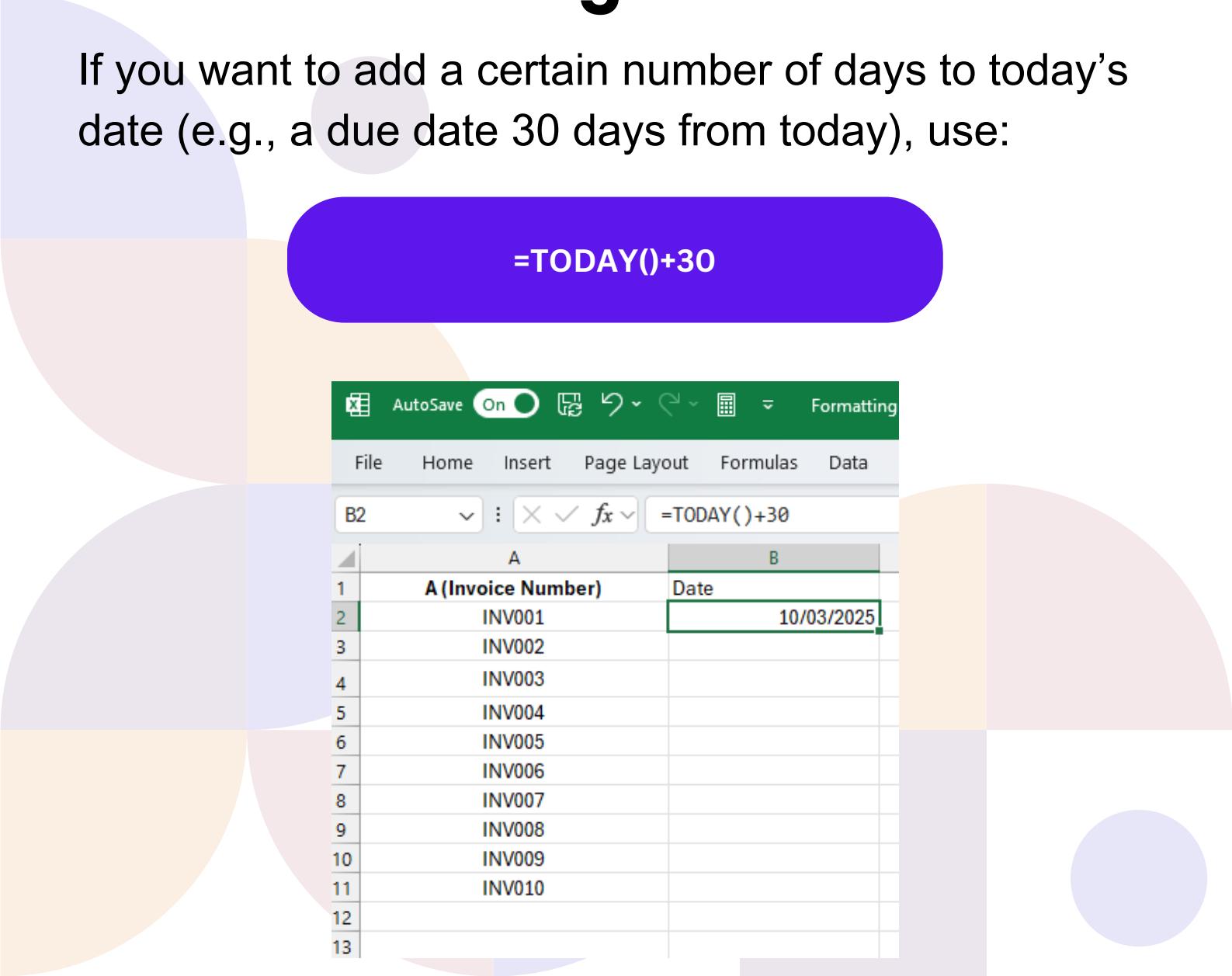
A screenshot of a Microsoft Excel spreadsheet. The ribbon menu at the top includes File, Home, Insert, Page Layout, Formulas, and Data. The formula bar shows "B2" and the formula "=TODAY()". The main table has two columns: "A (Invoice Number)" and "Date". Column A contains rows from 1 to 11 with values INV001 through INV010. Column B contains row 1 with the header "Date" and row 2 with the value "08/02/2025".

	A	B
1	A (Invoice Number)	Date
2	INV001	08/02/2025
3	INV002	
4	INV003	
5	INV004	
6	INV005	
7	INV006	
8	INV007	
9	INV008	
10	INV009	
11	INV010	

Advanced Usage:

If you want to add a certain number of days to today's date (e.g., a due date 30 days from today), use:

=TODAY()+30



A screenshot of a Microsoft Excel spreadsheet showing the result of the formula =TODAY()+30. The formula bar now displays "=TODAY()+30". The table structure is identical to the first screenshot, with column A containing invoice numbers and column B containing dates. The date in cell B2 is now "10/03/2025".

	A	B
1	A (Invoice Number)	Date
2	INV001	10/03/2025
3	INV002	
4	INV003	
5	INV004	
6	INV005	
7	INV006	
8	INV007	
9	INV008	
10	INV009	
11	INV010	

2. NOW Function

The NOW function returns the current date and time.

Syntax

=NOW()

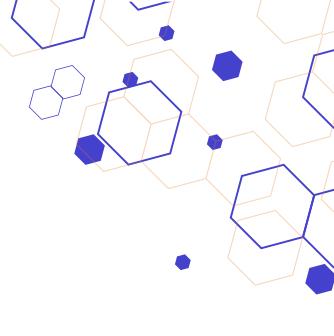
Example:

Scenario: Displaying the current timestamp when an order is placed.

1. Click on a cell where you want to display the current time.
2. Type =NOW() and press Enter.
3. The result will show both the date and time.

A screenshot of a Microsoft Excel spreadsheet. The ribbon at the top shows tabs for File, Home, Insert, Page Layout, Formulas, Data, Review, View, and Auto. The 'Formulas' tab is selected. The formula bar shows the formula =NOW(). The main area contains a table with three columns: A (Invoice Number), Date, and Time. Column A has rows from 1 to 12 with values INV001 through INV010. Column B has row 1 labeled 'A (Invoice Number)' and row 2 labeled 'Date' with value '10/03/2025'. Column C has row 1 labeled 'Time' and row 2 labeled '=NOW()' with a green border. The background features abstract colored shapes.

	A A (Invoice Number)	Date	Time
1	INV001		
2	INV002	10/03/2025	=NOW()
3	INV003		
4	INV004		
5	INV005		
6	INV006		
7	INV007		
8	INV008		
9	INV009		
10	INV010		
11			
12			

Formatting currency values • Saved

	A	B	C	D
1	A (Invoice Number)	Date	Time	
2	INV001	10/03/2025	08/02/2025 13:57	
3	INV002			
4	INV003			
5	INV004			
6	INV005			
7	INV006			
8	INV007			
9	INV008			
10	INV009			
11	INV010			
12				
13				
14				

it is important to note that the format of the time and date may vary with different time zones and different regions.

If you wish to change your default date and time settings, you can go to

- Search Bar
- Type Control Panel and hit enter
- Go to Clock and Region
- You can change the date, time and number format here as you wish.

3. DATEDIF Function

The DATEDIF function calculates the difference between two dates in terms of years, months, or days.

Syntax

=DATEDIF(start_date, end_date, unit)

=DATEDIF(start_date, end_date, unit)

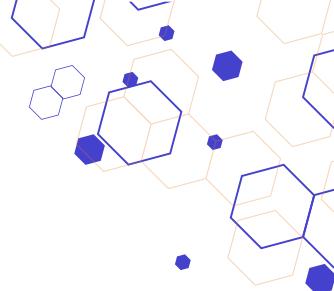
- "Y" – Returns the number of complete years.
- "M" – Returns the number of complete months.
- "D" – Returns the number of days.

Example:

Scenario: Calculating the age of an employee based on birthdate.

	A
1	A (Birthdate)
2	15/03/1990
3	20/07/1985
4	05/10/1995
5	12/12/2000
6	30/06/1978
7	25/09/1992
8	03/04/1983
9	14/08/1988
10	07/01/1999
11	22/11/1975

	A	B
1	A (Birthdate)	Calculate AGE
2	15/03/1990	=DATEDIF(A2; TODAY(); "Y")
3	20/07/1985	
4	05/10/1995	
5	12/12/2000	
6	30/06/1978	
7	25/09/1992	
8	03/04/1983	
9	14/08/1988	
10	07/01/1999	
11	22/11/1975	
12		
13		



Formatting currency values		
File	Home	Insert
B2	<input type="button" value="X"/> <input type="button" value="✓"/> <input type="button" value="fx"/> =DATEDIF(A2; TODAY(); "Y")	
1	A (Birthdate)	Calculate AGE
2	15/03/1990	34
3	20/07/1985	39
4	05/10/1995	29
5	12/12/2000	24
6	30/06/1978	46
7	25/09/1992	32
8	03/04/1983	41
9	14/08/1988	36
10	07/01/1999	26
11	22/11/1975	49
12		
13		

So, these ages are calculated based on the current year which is 2025 as we saw in our previous example in the NOW function.

4. NETWORKDAYS Function

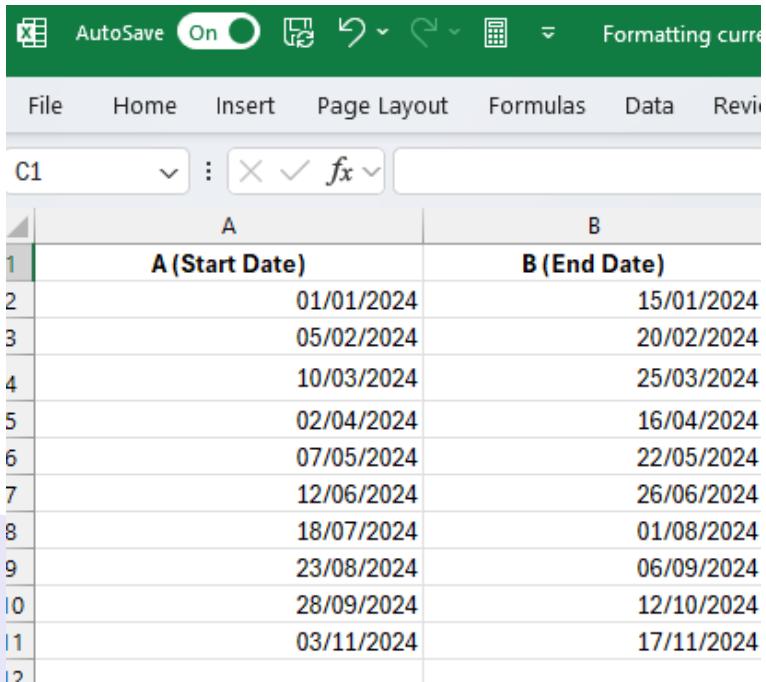
The NETWORKDAYS function calculates the number of working days between two dates, excluding weekends and optionally excluding holidays.

Syntax

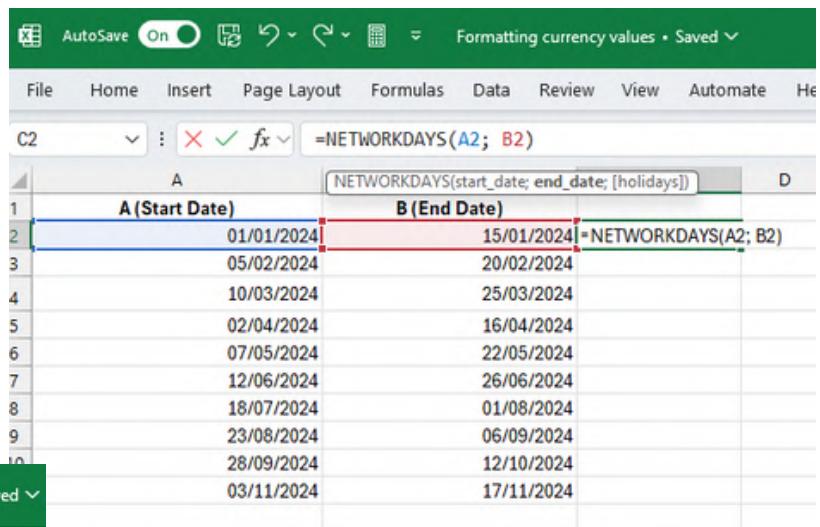
```
=NETWORKDAYS(start_date; end_date;  
[holidays])
```

Example:

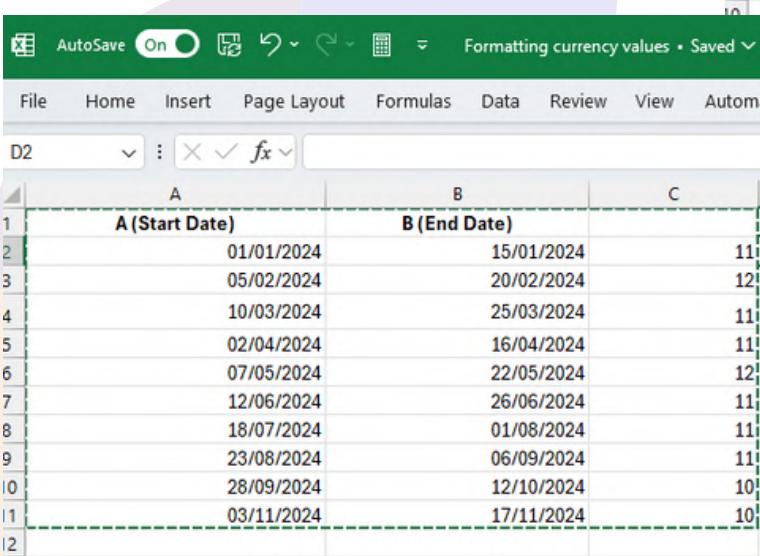
Scenario: Calculating the number of business days to complete a project.



	A	B
1	A (Start Date)	B (End Date)
2	01/01/2024	15/01/2024
3	05/02/2024	20/02/2024
4	10/03/2024	25/03/2024
5	02/04/2024	16/04/2024
6	07/05/2024	22/05/2024
7	12/06/2024	26/06/2024
8	18/07/2024	01/08/2024
9	23/08/2024	06/09/2024
10	28/09/2024	12/10/2024
11	03/11/2024	17/11/2024



C2	=NETWORKDAYS(A2; B2)
1	NETWORKDAYS(start_date; end_date; [holidays])
2	01/01/2024
3	15/01/2024
4	20/02/2024
5	25/03/2024
6	16/04/2024
7	22/05/2024
8	26/06/2024
9	01/08/2024
10	06/09/2024
11	12/10/2024
12	17/11/2024



	A	B	C
1	A (Start Date)	B (End Date)	
2	01/01/2024	15/01/2024	11
3	05/02/2024	20/02/2024	12
4	10/03/2024	25/03/2024	11
5	02/04/2024	16/04/2024	11
6	07/05/2024	22/05/2024	12
7	12/06/2024	26/06/2024	11
8	18/07/2024	01/08/2024	11
9	23/08/2024	06/09/2024	11
10	28/09/2024	12/10/2024	10
11	03/11/2024	17/11/2024	10
12			

Lookup Functions In EXCEL

Lookup functions in Excel allow you to search for specific values within a dataset and return corresponding data from another column or row. They are essential for handling large amounts of data efficiently.

The most commonly used lookup functions in Excel are:

1. VLOOKUP – Vertical Lookup
2. HLOOKUP – Horizontal Lookup

Each of these functions has practical applications in various scenarios, which we will explore with detailed explanations and sample data.

1. VLOOKUP Function

The VLOOKUP (Vertical Lookup) function is used to search for a value in the first column of a table and return a corresponding value from another column in the same row.

Syntax

```
=VLOOKUP(lookup_value;table_array;  
col_index_num; [range_lookup])
```

- `lookup_value`: The value you want to search for.
- `table_array`: The range of data containing the `lookup_value`.
- `col_index_num`: The column number from which the result is retrieved.
- `range_lookup`: (Optional) `TRUE` for an approximate match, `FALSE` for an exact match.

Example:

You want to find the department of employee 103 in the sample data given below:

A (Employee ID)	B (Name)	C (Department)	D (Salary)
101	Alice	HR	5000
102	Bob	IT	6000
103	Charlie	Finance	5500
104	David	Marketing	5800
105	Emily	Sales	6200

A (Employee ID)	B (Name)	C (Department)	D (Salary)	E
101	Alice	HR	5000	A2:D6; 3; FALSE)
102	Bob	IT	6000	
103	Charlie	Finance	5500	
104	David	Marketing	5800	
105	Emily	Sales	6200	



A	B	C	D	E
A (Employee ID)	B (Name)	C (Department)	D (Salary)	
101	Alice	HR	5000	
102	Bob	IT	6000	
103	Charlie	Finance	5500	
104	David	Marketing	5800	
105	Emily	Sales	6200	
				Finance

Using VLOOKUP with Approximate Match

When searching for approximate values (e.g., tax brackets), use TRUE as the last parameter.

2. HLOOKUP Function

The HLOOKUP (Horizontal Lookup) function searches for a value in the first row of a table and returns a corresponding value from a specified row.

Syntax

```
=HLOOKUP(lookup_value; table_array; row_index_num;  
[range_lookup])
```

- **lookup_value**: The value to be searched in the first row.
- **table_array**: The range containing the lookup value.
- **row_index_num**: The row number from which the result is retrieved.
- **range_lookup**: (Optional) TRUE for an approximate match, FALSE for an exact match.

Example Scenario:

You want to find the marks of student D in management in the data give below:

	A	B	C	D	E
1	Student name	A	B	C	D
2	Accounts	75	65	70	60
3	ECONOMICS	65	72	78	80
4	management	70	68	90	89
5	mathematics	80	90	75	65
6					
7					

	A	B	C	D	E
1	Student name	A	B	C	D
2	Accounts	75	65	70	60
3	ECONOMICS	65	72	78	80
4	management	70	68	90	89
5	mathematics	80	90	75	65
6					
7					
8					
9	Marks of D in management	=HLOOKUP("D"; A1:E5; 4;)			
10					




A	B	C	D	
Student name	A	B	C	D
Accounts	75	65	70	60
ECONOMICS	65	72	78	80
management	70	68	90	89
mathematics	80	90	75	65
Marks of D in management		89		

Handling Errors in Lookup Functions

When using lookup functions, errors can occur due to:

- The lookup value not being found.
- Incorrect table array selection.
- Mismatched data types.

#N/A Error (Value Not Found)

- Use IFERROR to handle missing values gracefully.
- Example:

```
=IFERROR(VLOOKUP(106; A2:D6; 3; FALSE); "Not Found")
```

If the number 106 is not in the list, it returns "Not Found" instead of an error.

#REF! Error (Invalid Column Number)



Ensure that col_index_num is within the table_array range.

- Example:

```
=VLOOKUP(103; A2:D6; 5; FALSE) → #REF! (Column 5 doesn't exist in A2:D6)
```

#VALUE! Error (Incorrect Data Type)

Ensure lookup values are correctly formatted (e.g., numbers should not be stored as text).

Handling Approximate Matches

If working with approximate matches, make sure the table is sorted in ascending order.



Quick Practice: Logical Functions

Scenario:

- You are managing employee records and need to calculate bonuses, working days, employee age, and department lookups using various Excel functions.

	A	B	C	D	E	F	G	H	I
1	Employee ID	Name	Birthdate	Start Date	End Date	Rating	Experience (Years)	Department Code	Base Salary
2	101	Alice	12/15/1990	01/10/2020	02/15/2024	5	4	D001	50,000
3	102	Bob	07/20/1985	03/01/2018	01/31/2024	3	6	D002	45,000
4	103	Charlie	05/10/1995	06/15/2021	12/31/2023	4	2	D003	55,000
5	104	David	09/25/1988	11/01/2019	05/20/2024	4	5	D001	48,000
6									

Tasks to Solve in Excel:

1. Calculate Employee Age (Using DATEDIF)

Expected Output: Employee's age in years.

Calculate Business Days Worked (Using NETWORKDAYS)

2. Expected Output: Number of working days between Start Date and End Date.



Continued



Assign Bonuses (Using IF & AND)

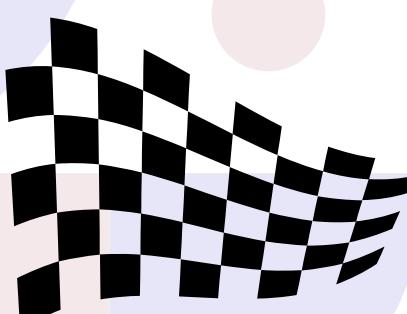
- Employees with Rating ≥ 4 and Experience ≥ 3 years get a \$1,000 bonus, others get \$500.

Expected Output: Bonus amount for each employee.

Find Department Name (Using VLOOKUP)

- Use the Department Code to fetch the Department Name from the lookup table below:

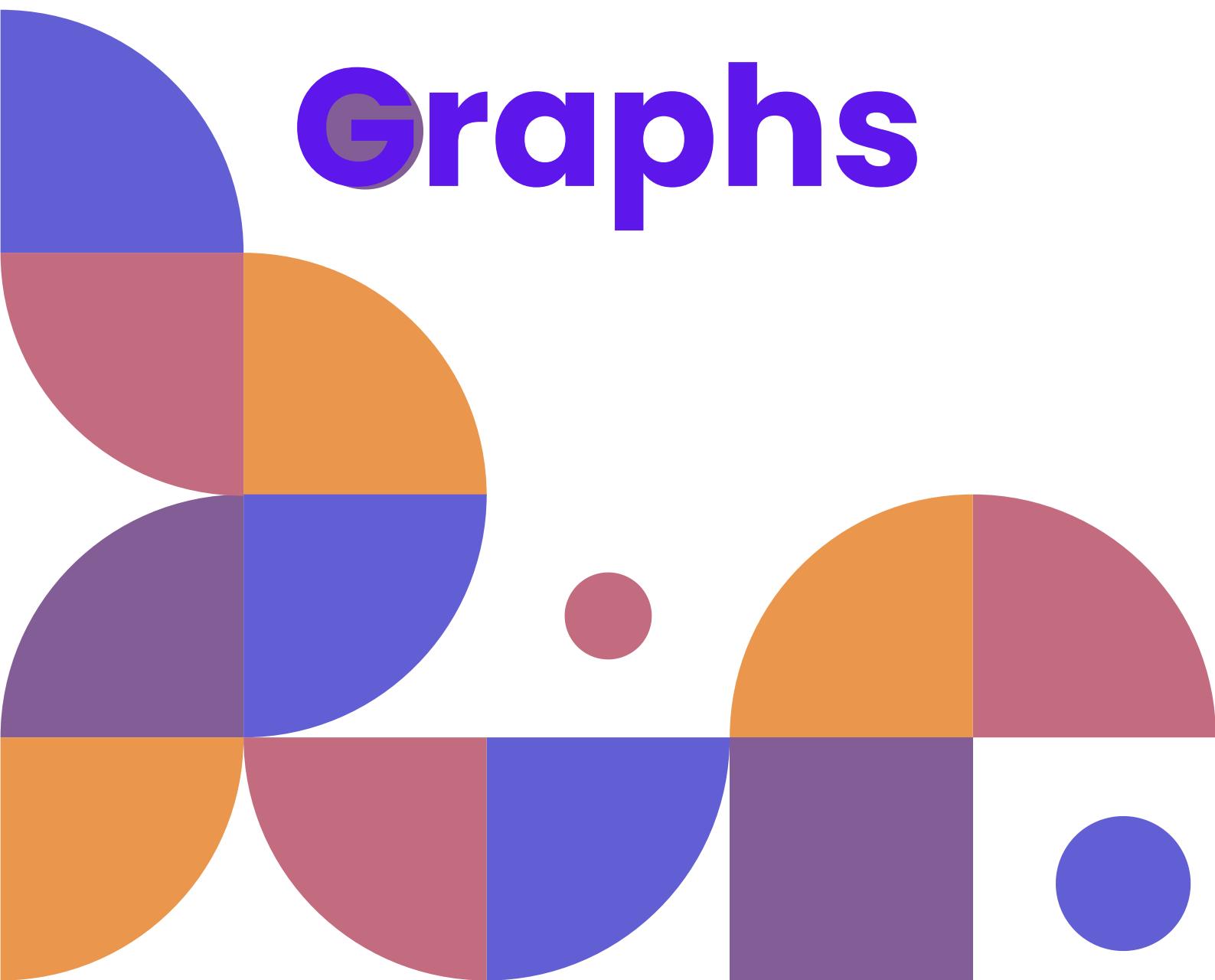
Expected Output: Department name (e.g., "Sales" for D001).



Chapter #9

Charts and

Graphs



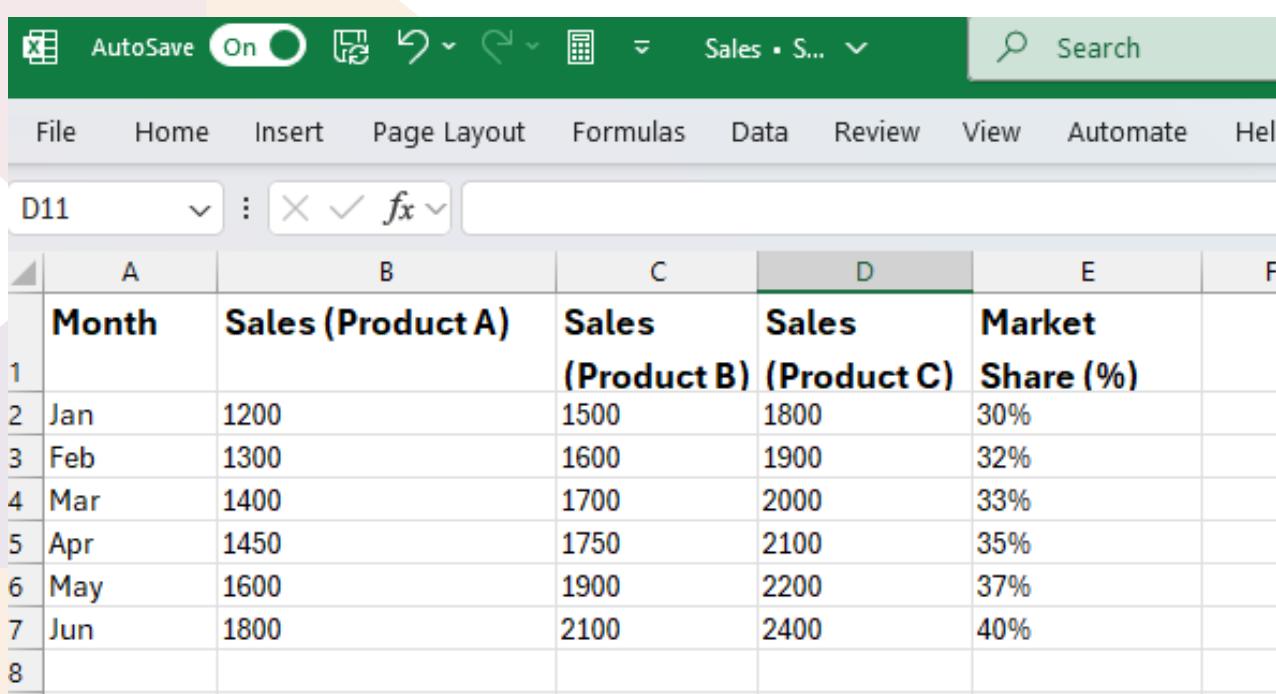
Creating Charts

Charts and graphs help visualize data in a meaningful way. In Excel, you can create various types of charts, each suitable for different kinds of data:

- **Bar Chart** – Best for comparing different categories.
- **Line Chart** – Ideal for showing trends over time.
- **Pie Chart** – Used to show proportions of a whole.
- **Area Chart** – Similar to a line chart but emphasizes volume.

Example:

If we have the data for the sales of a particular company as shown below:



A screenshot of the Microsoft Excel application interface. The ribbon menu at the top includes AutoSave, Sales, and Search. Below the ribbon, the menu bar shows File, Home, Insert, Page Layout, Formulas, Data, Review, View, Automate, and Help. The active cell is D11. The data is presented in a table with the following columns: Month, Sales (Product A), Sales (Product B), Sales (Product C), and Market Share (%). The data points are as follows:

Month	Sales (Product A)	Sales (Product B)	Sales (Product C)	Market Share (%)
Jan	1200	1500	1800	30%
Feb	1300	1600	1900	32%
Mar	1400	1700	2000	33%
Apr	1450	1750	2100	35%
May	1600	1900	2200	37%
Jun	1800	2100	2400	40%

- Select A1:D7 (Month and Sales data).
- Go to Insert > Charts.
- Choose Clustered Bar Chart.
- Click OK.

This chart compares the monthly sales for different products.

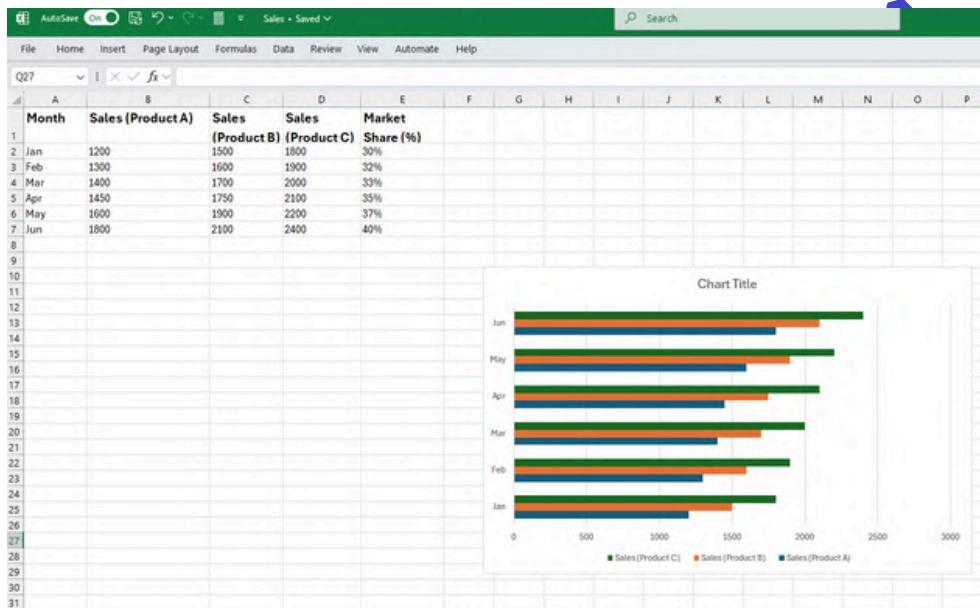
The screenshot shows a Microsoft Excel interface with a green decorative background featuring hexagonal patterns. A table of sales data is open on the worksheet:

	Product A	Product B	Product C	Share (%)
Jan	1200	1500	1800	30%
Feb	1300	1600	1900	32%
Mar	1400	1700	2000	33%
Apr	1450	1750	2100	35%
May	1600	1900	2200	37%
Jun	1800	2100	2400	40%

Annotations numbered 1 through 5 guide the user through the process:

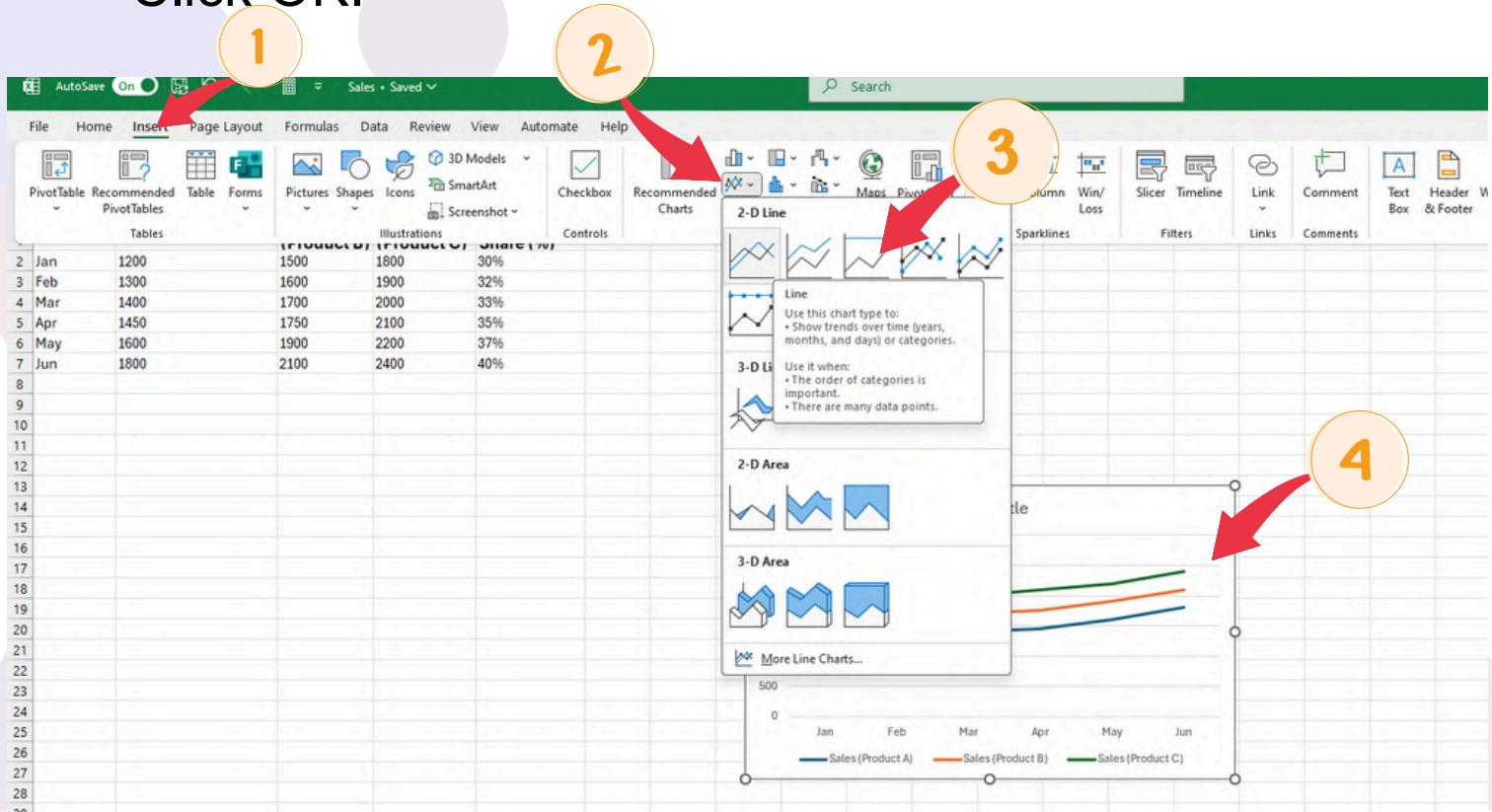
- Annotation 1: Points to the 'Insert' tab in the ribbon.
- Annotation 2: Points to the 'Tables' icon in the ribbon's 'Tables' group.
- Annotation 3: Points to the 'Recommended Charts' button in the 'Charts' group of the ribbon.
- Annotation 4: Points to the 'Clustered Column' chart preview in the 'Insert Chart' dialog box.
- Annotation 5: Points to the 'Column' chart type in the 'Insert Chart' dialog box's left sidebar.

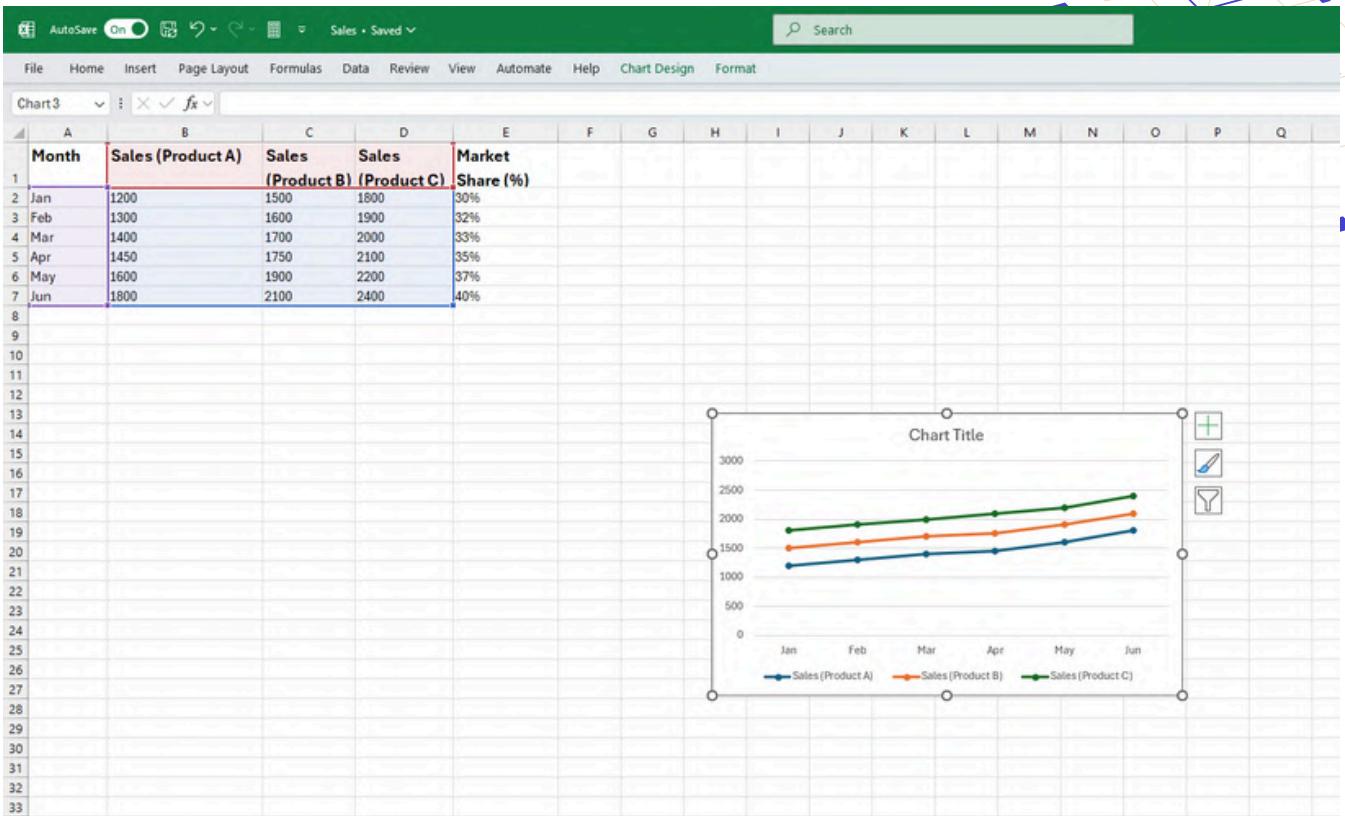
The 'Insert Chart' dialog box is open, showing the 'Recommended Charts' tab selected. It displays several clustered column chart options. The 'Column' chart type is highlighted in the sidebar. The 'OK' button is visible at the bottom right of the dialog.



Creating a Line Chart

- Select A1:D7.
- Click Insert > Line Chart.
- Choose 2D Line Chart.
- Click OK.

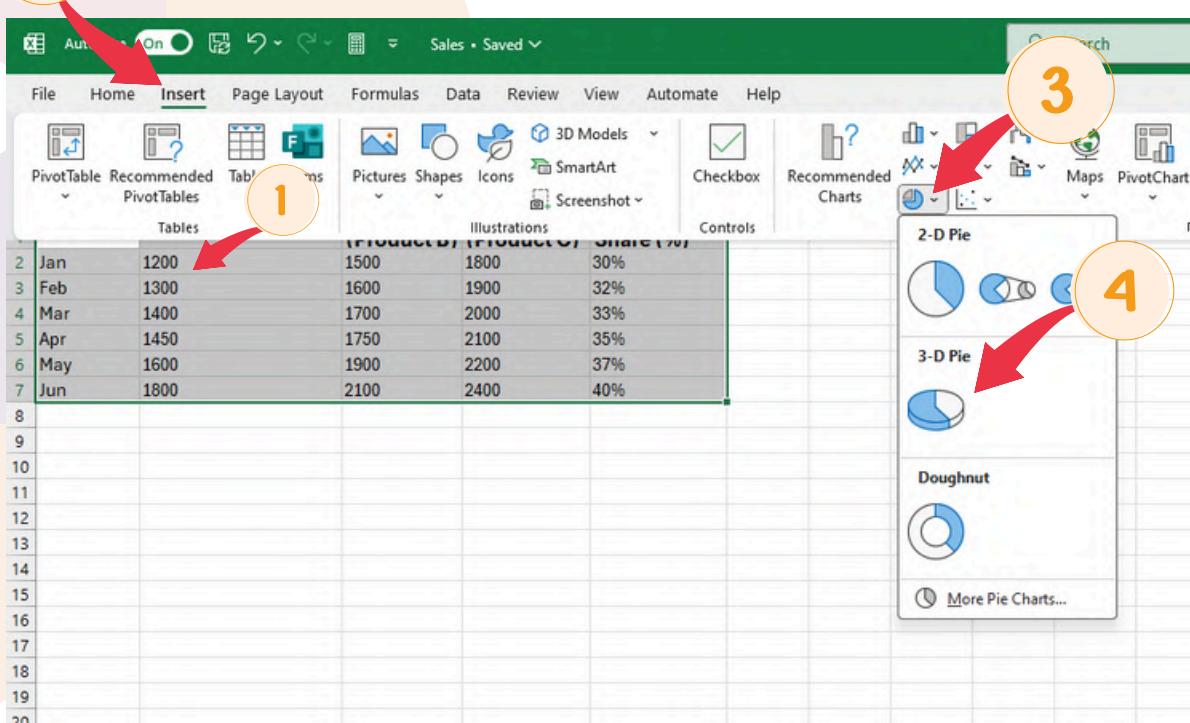


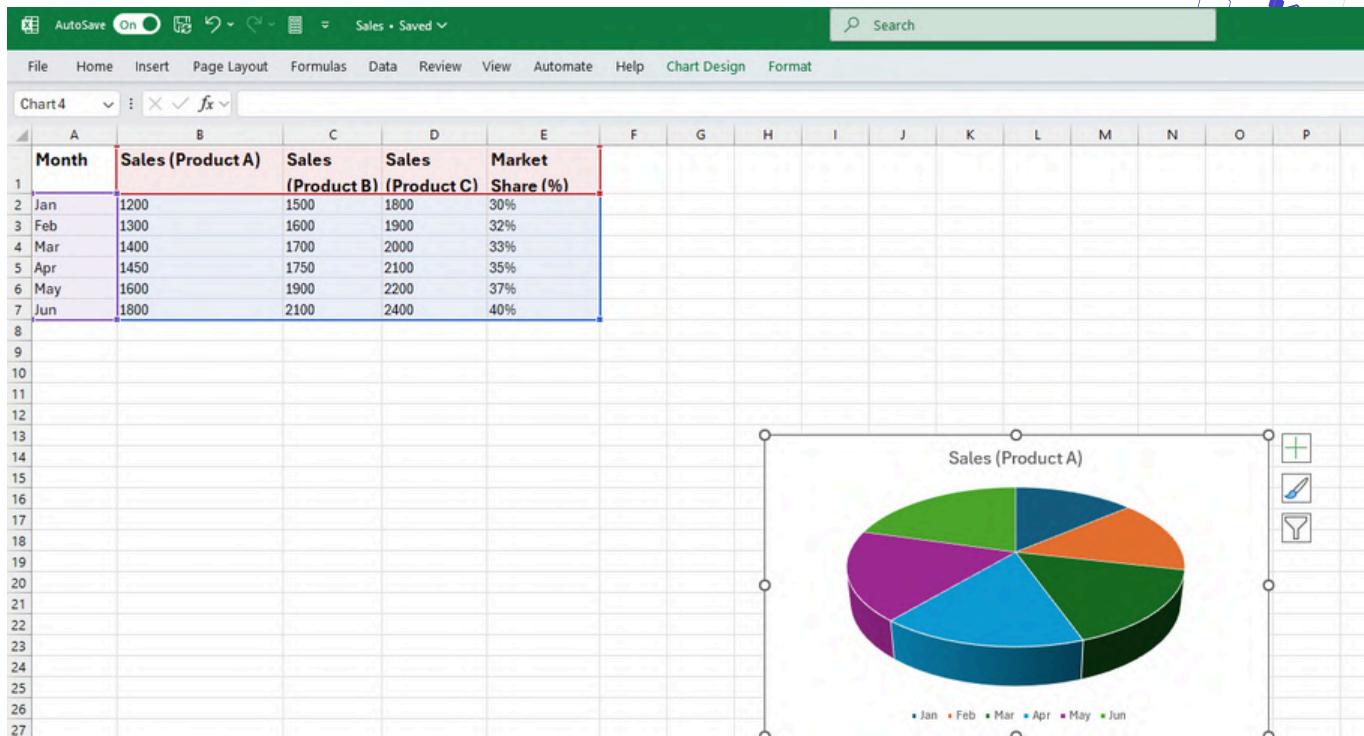


This shows how sales change over time.

Creating a Pie Chart

- Select A1 & E1:E7 (Month & Market Share %).
- Click Insert > Pie Chart.
- Select a 3D Pie Chart.
- Click OK.

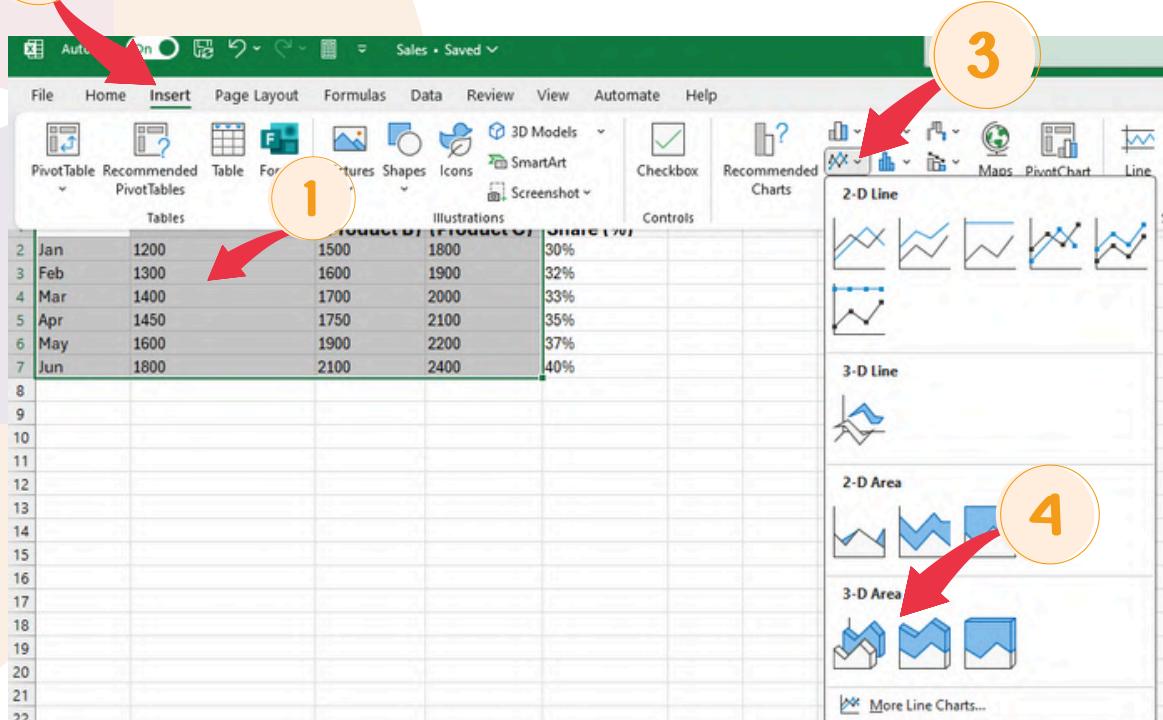


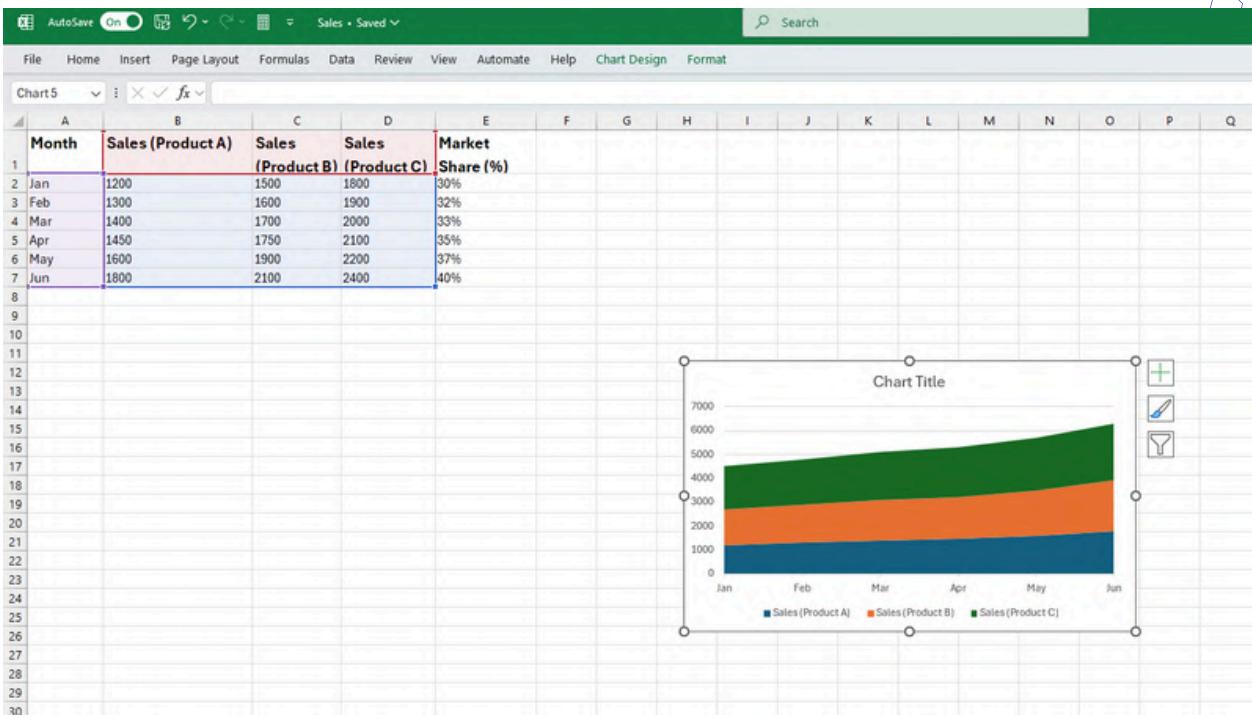


This chart shows market share distribution.

Creating an Area Chart

- Select A1:D7.
- Go to Insert > Area Chart.
- Choose Stacked Area Chart.
- Click OK.





This chart emphasizes total sales volume over months.

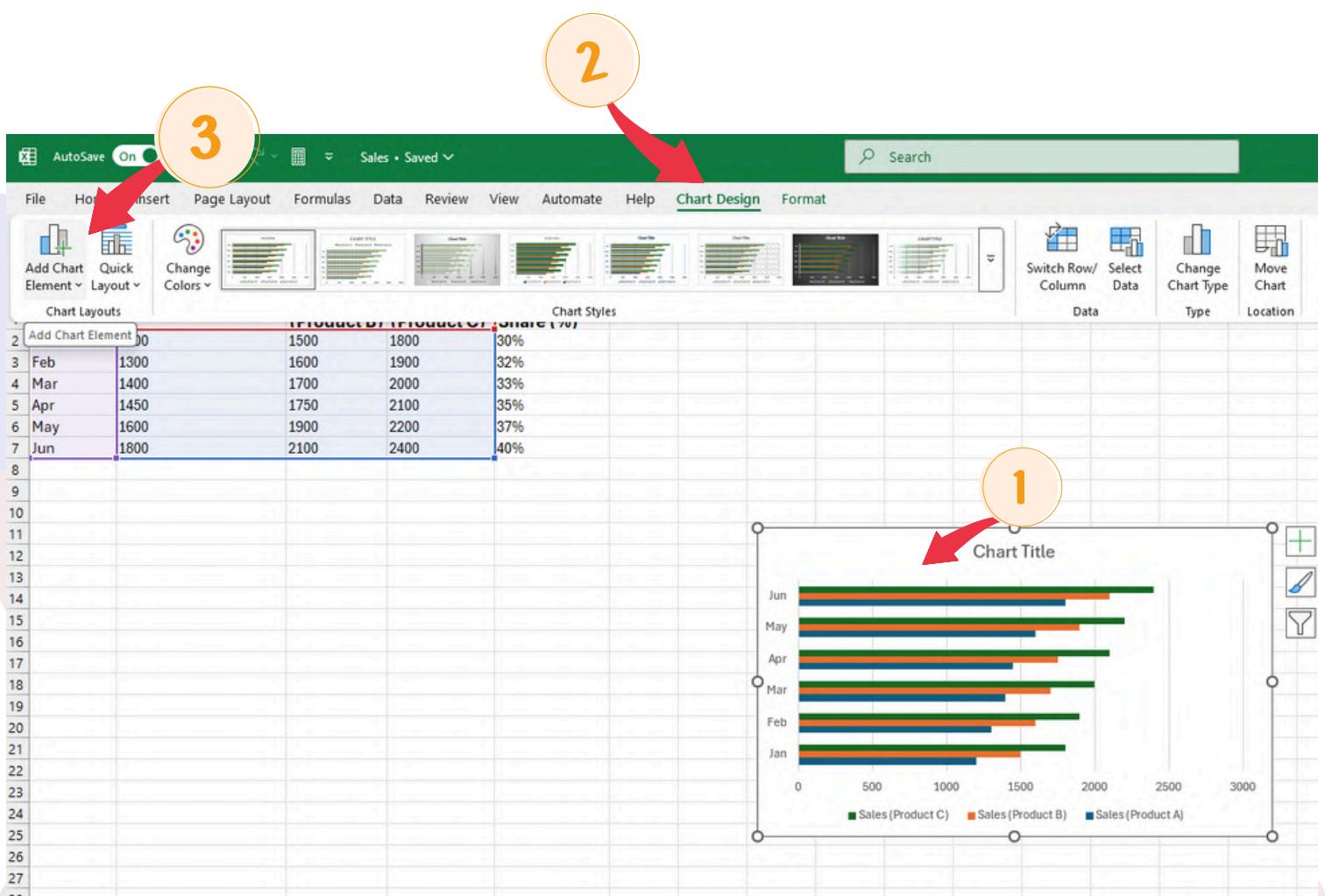
Customizing Charts

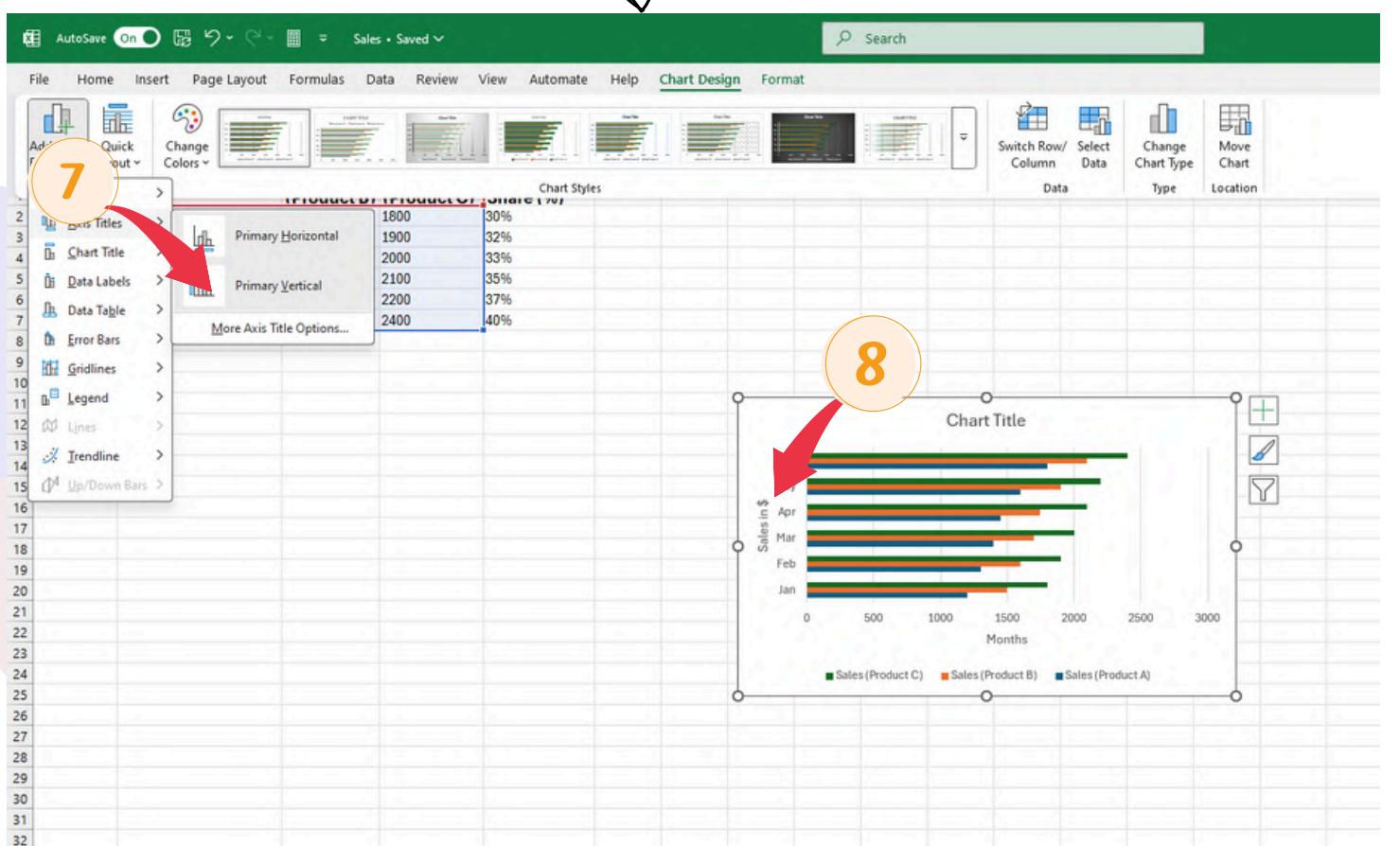
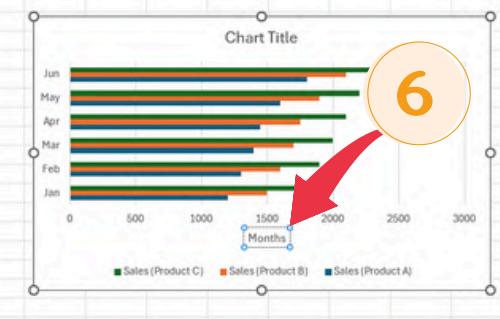
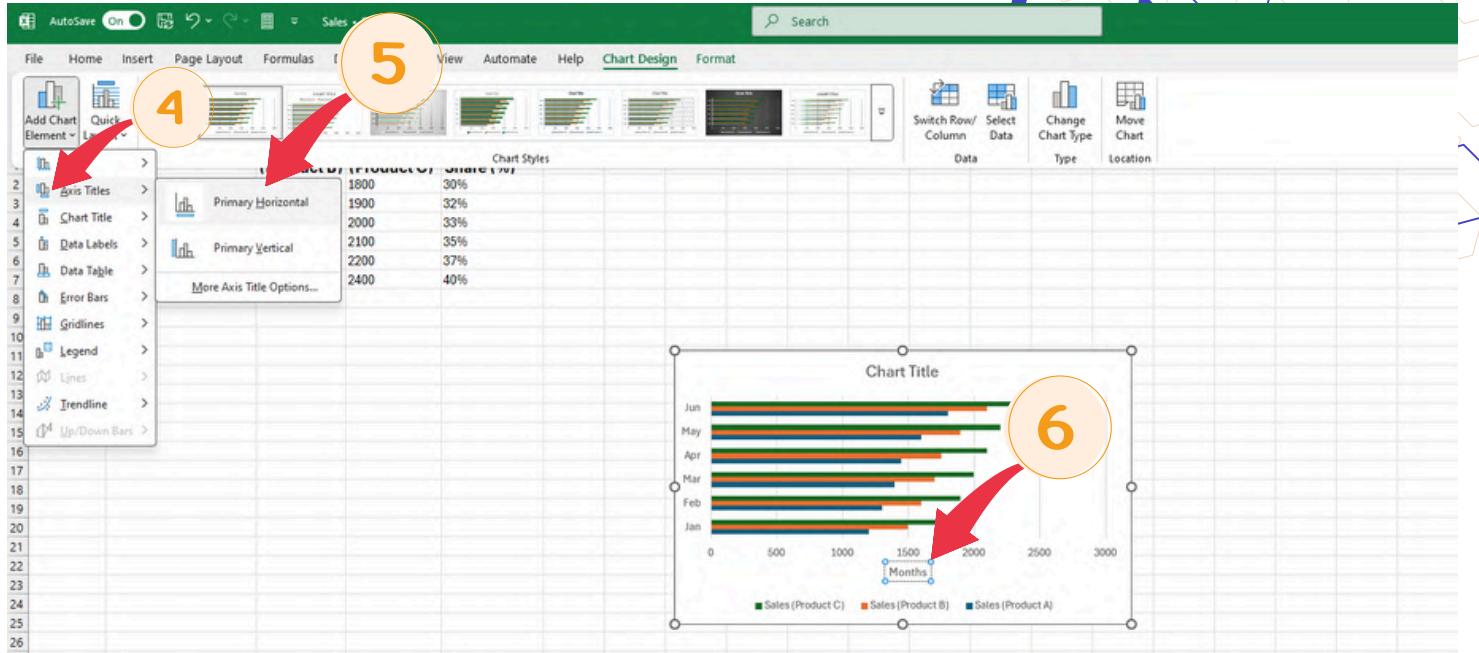
- Once you create a chart, you can customize it by modifying:
- Titles – Add a descriptive title.
- Axes – Format x-axis and y-axis.
- Legends – Identify series in the chart.
- Data Labels – Show exact values.

Example

Using the Bar Chart from the previous section:

1. Click the chart.
2. Go to Chart Design > Add Chart Element.
3. Click Axes Titles, add "Months" for X-axis and "Sales (in \$)" for Y-axis.

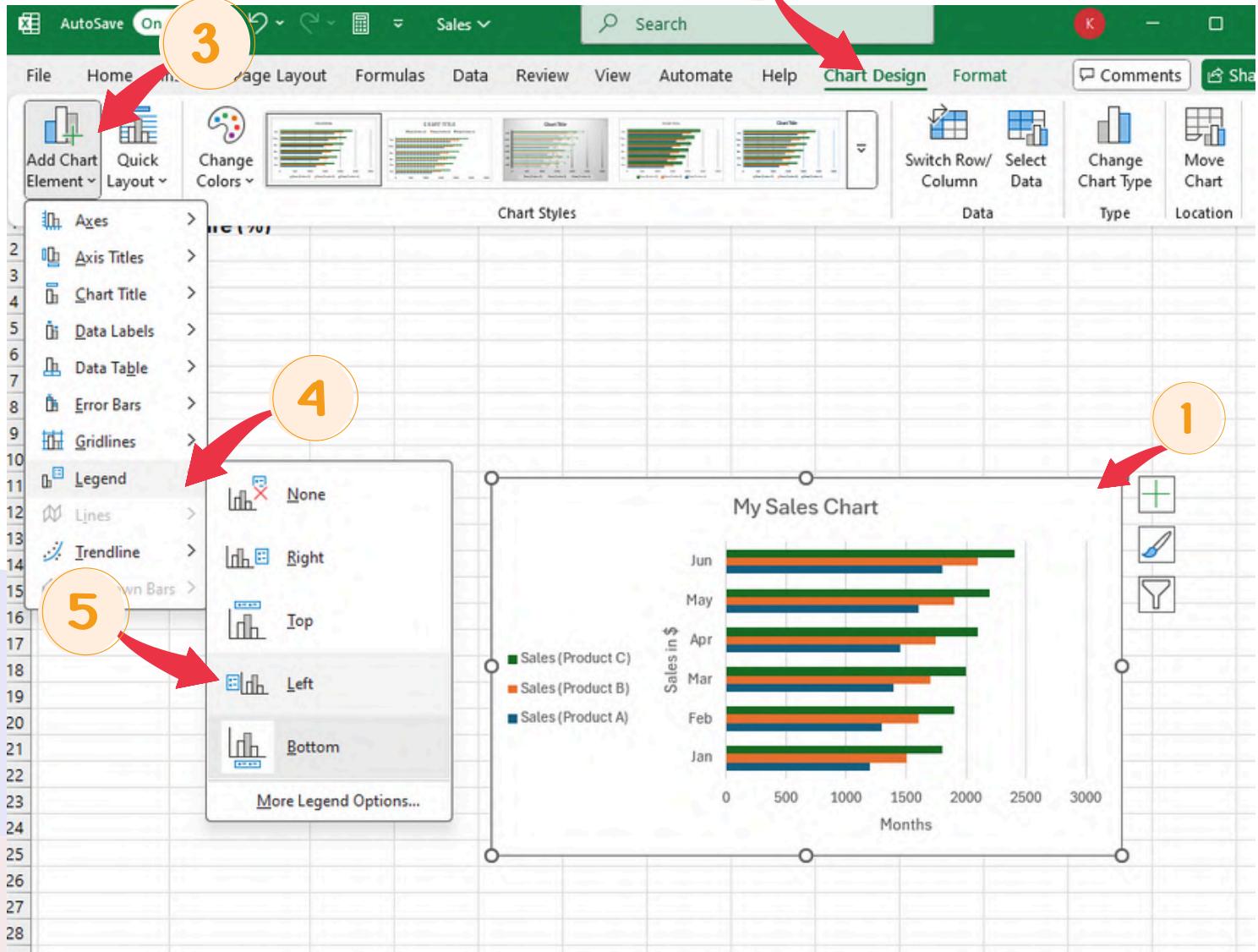




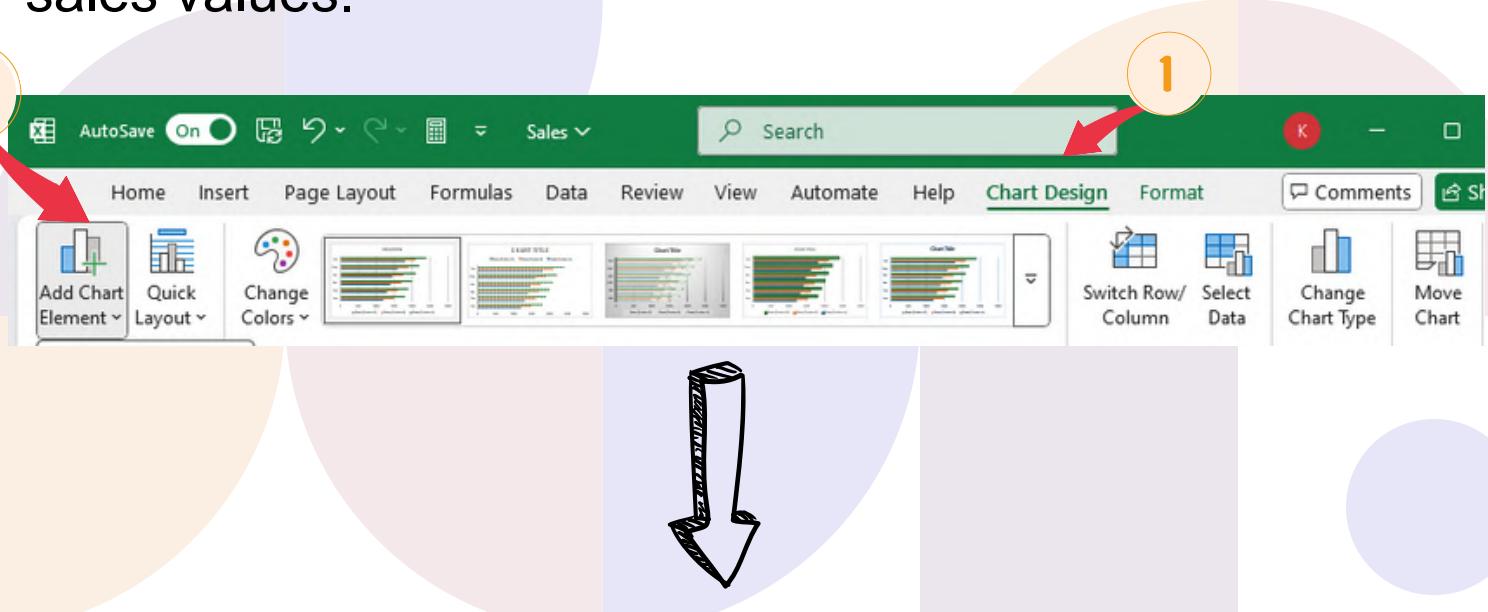
4. Select Chart Title >
Above Chart and type
"My Sales Chart"

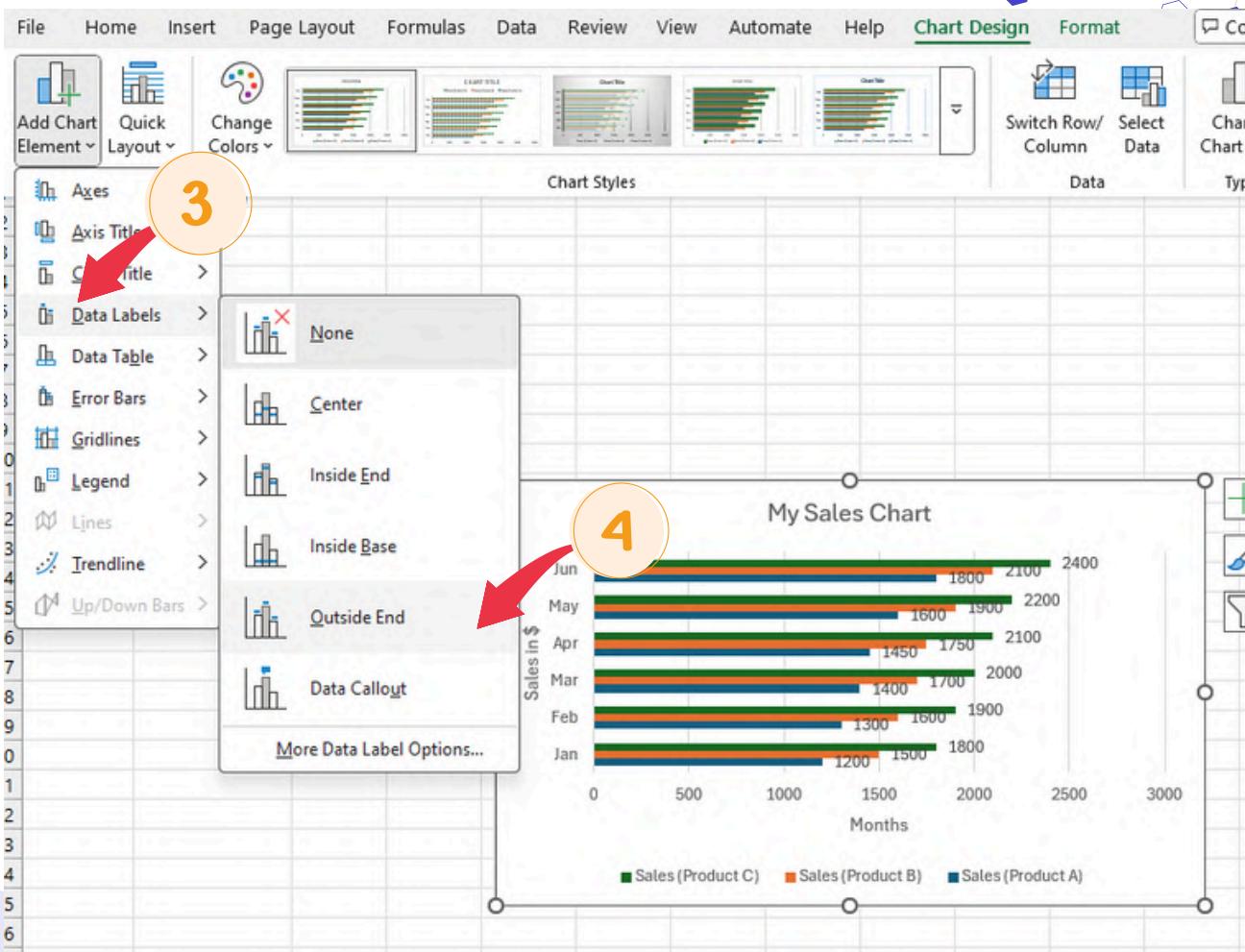


5. Click Legend, select Left to reposition.



6. Click Data Labels, select Outside End to show exact sales values.





Sparklines

Sparklines are mini charts inside a single cell that show trends. They're useful for visualizing data quickly.

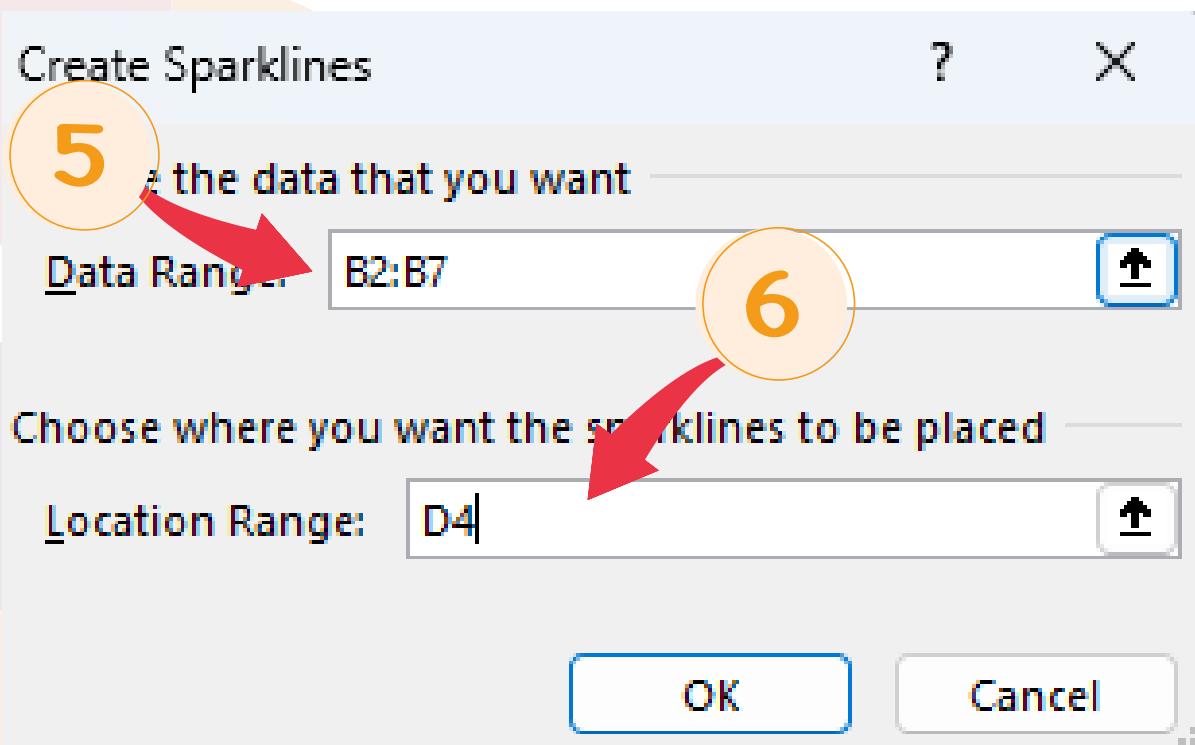
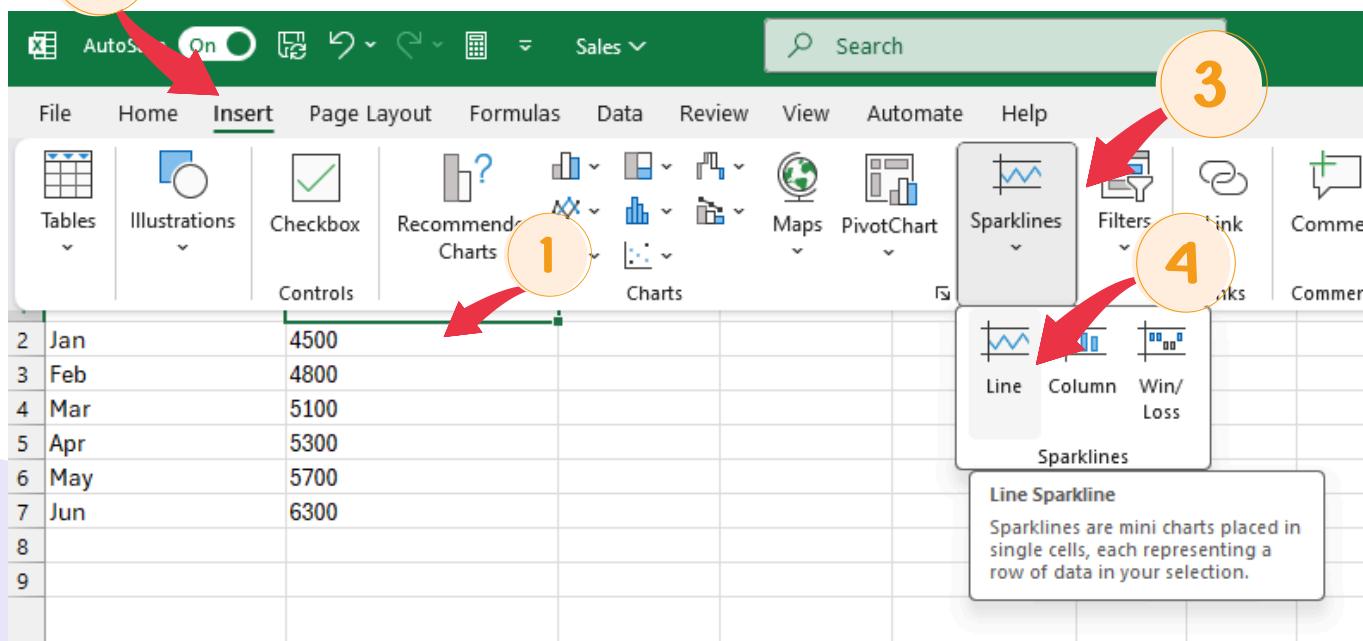
Example

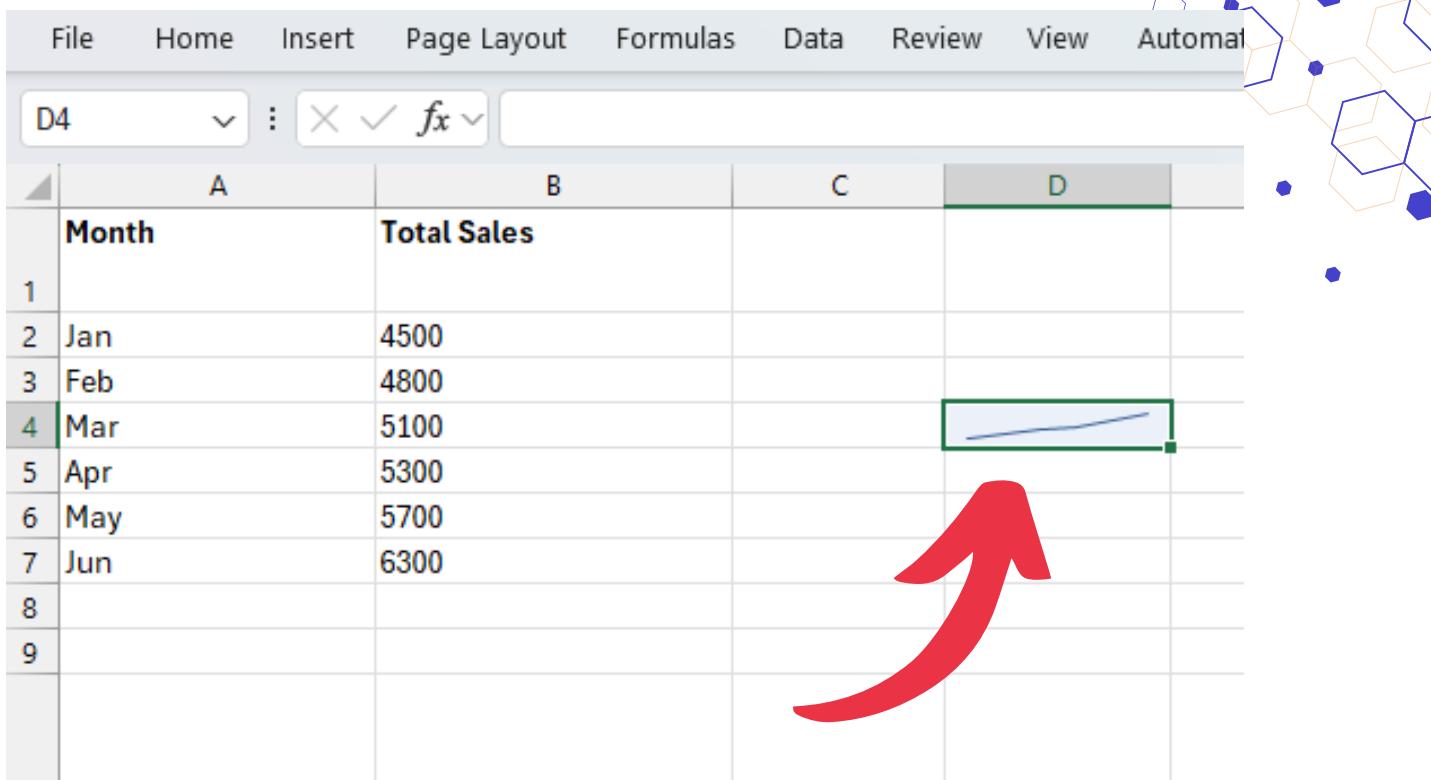
If we have the following data in our worksheet as shown below:

A	B
Month	Total Sales
1	
2 Jan	4500
3 Feb	4800
4 Mar	5100
5 Apr	5300
6 May	5700
7 Jun	6300

Creating a Sparkline

- Select H2.
- Click Insert > Sparklines > Line.
- Select data range B2:B7.
- Click OK.





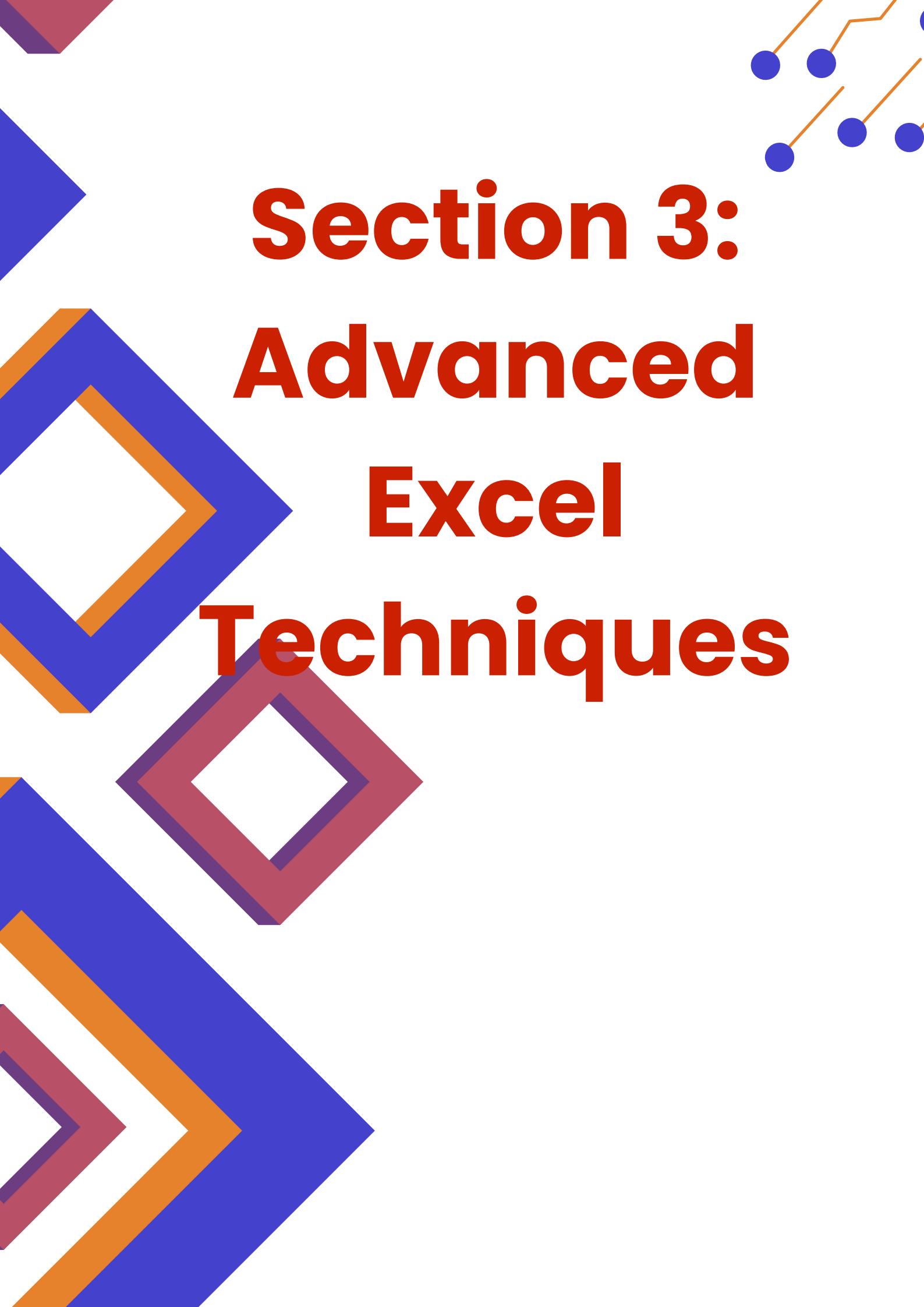
This mini-chart now shows the trend of total sales.



Practice Exercises

Complete the following assignment:

- Create a column chart for daily temperatures.
- Customize a line chart with axis titles and legends.
- Create a pie chart to visualize product sales.
- Insert a sparkline for stock price trends.

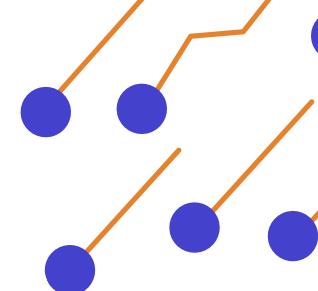


Section 3:

Advanced

Excel

Techniques



Chapter 10:

PivotTables

and

PivotCharts

Introduction to PivotTables

- PivotTables are powerful tools in Excel that allow users to summarize, analyze, and explore large datasets dynamically.
- They help in quickly aggregating data without the need for complex formulas or manual sorting.
- Users can drag and drop fields to rearrange data for different views.

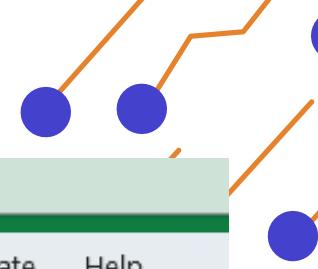
Key Features of PivotTables

- ✓ Summarize large amounts of data quickly
- ✓ Perform calculations like sum, average, count, min, and max
- ✓ Group data based on categories (e.g., months, regions)
- ✓ Apply filters and slicers for deeper analysis

Practical Example

Scenario:

You work in a sales department and have a dataset containing sales transactions. You want to analyze total sales by region and product category.



Sales					Search				
File	Home	Insert	Page Layout	Formulas	Data	Review	View	Automate	Help
H4									
Date		Salesperson		Region		Product Category	Sales Amount		
1	01-Jan-24	Alice	East	Electronics	1,200				
2	02-Jan-24	Bob	West	Furniture	850				
3	05-Jan-24	Charlie	North	Clothing	500				
4	06-Jan-24	Alice	East	Electronics	1,500				
5	08-Jan-24	Bob	West	Furniture	1,200				
6									
7									
8									

Task

- Create a PivotTable to summarize Total Sales per Region.
- Create another PivotTable to analyze Sales per Product Category.

Step by Step Procedure

- 1 Select your dataset (A1:E6).
- 2 Go to Insert > PivotTable.
- 3 Choose New Worksheet and click OK.
- 4 Drag Region to Rows, Sales Amount to Values.

2

3

4

5

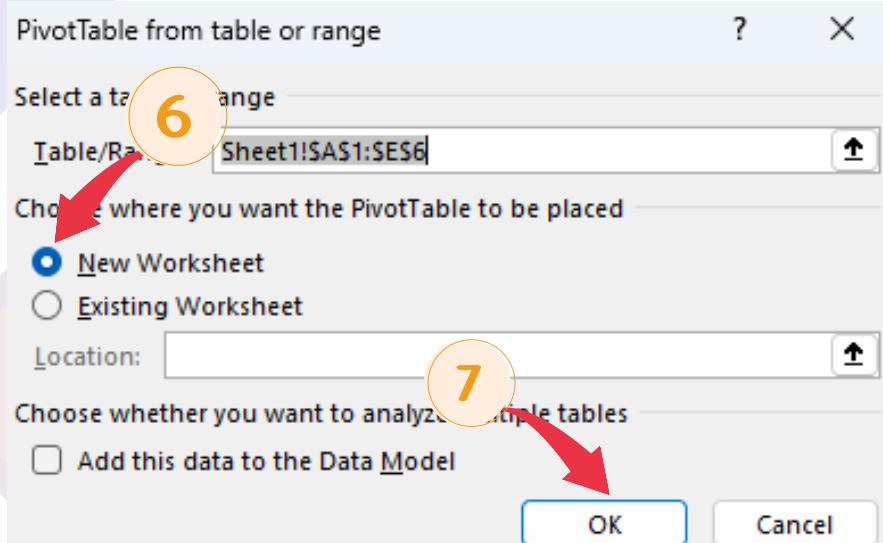
6

7

1

The screenshot shows the Microsoft Excel ribbon with the 'Insert' tab selected. In the 'Tables' group, the 'PivotTable' icon is highlighted with a red arrow and circled with orange number 4. A dropdown menu is open from this icon, containing three options: 'From Table/Range' (circled with orange number 6), 'From External Data Source', and 'From Data Model'. The 'From Table/Range' option is also circled with orange number 6. A red arrow points from the 'From Table/Range' option to the 'PivotTable from table or range' dialog box. The dialog box has several fields: 'Select a table or range' (containing 'Sheet1!\$A\$1:\$E\$6'), 'Choose where you want the PivotTable to be placed' (with 'New Worksheet' selected and circled with orange number 6), 'Location:' (empty), 'Choose whether you want to analyze multiple tables' (with 'Add this data to the Data Model' checkbox unchecked), and 'OK' and 'Cancel' buttons. The main Excel window shows a table of sales data with columns for Region, Product Category, and Sales Amount.

	Region	Product Category	Sales Amount
1	East	Electronics	1,200
2	West	Furniture	850
3	North	Clothing	500
4	East	Electronics	1,500
5	West	Furniture	1,200



1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

26

27

28

29

30

31

32

33

34

35

36

37

38

39

40

41

42

43

44

45

46

47

48

49

50

51

52

53

54

55

56

57

58

59

60

61

62

63

64

65

66

67

68

69

70

71

72

73

74

75

76

77

78

79

80

81

82

83

84

85

86

87

88

89

90

91

92

93

94

95

96

97

98

99

100

101

102

103

104

105

106

107

108

109

110

111

112

113

114

115

116

117

118

119

120

121

122

123

124

125

126

127

128

129

130

131

132

133

134

135

136

137

138

139

140

141

142

143

144

145

146

147

148

149

150

151

152

153

154

155

156

157

158

159

160

161

162

163

164

165

166

167

168

169

170

171

172

173

174

175

176

177

178

179

180

181

182

183

184

185

186

187

188

189

190

191

192

193

194

195

196

197

198

199

200

201

202

203

204

205

206

207

208

209

210

211

212

213

214

215

216

217

218

219

220

221

222

223

224

225

226

227

228

229

230

231

232

233

234

235

236

237

238

239

240

241

242

243

244

245

246

247

248

249

250

251

252

253

254

255

256

257

258

259

260

261

262

263

264

265

266

267

268

269

270

271

272

273

274

275

276

277

278

279

280

281

282

283

284

285

286

287

288

289

290

291

292

293

294

295

296

297

298

299

300

301

302

303

304

305

306

307

308

309

310

311

312

313

314

315

316

317

318

319

320

321

322

323

324

325

326

327

328

329

330

331

332

333

334

335

336

337

338

339

340

341

342

343

344

345

346

347

348

349

350

351

352

353

35

PivotTable Fields

Choose fields to add to report:

Search

Date
 Salesperson
 Region
 Product Category
 Sales Amount
[More Tables...](#)

Drag fields between areas below:

<input type="checkbox"/> Filters	<input type="checkbox"/> Columns
<input type="checkbox"/> Rows	<input type="checkbox"/> Values
Region	Sum of Sales Amount

Defer Layout Update

AutoSave On Sales

File Home Insert Page Layout Formulas Data Review View Automate Help PivotTable Analyze Design

A3 Row Labels Sum of Sales Amount

A	B	C	D	E
1				
2				
3	Row Labels	Sum of Sales Amount		
4	East	2700		
5	North	500		
6	West	2050		
7	Grand Total	5250		
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				

PivotTable Fields

Choose fields to add to report:

Search

Date
 Salesperson
 Region
 Product Category
 Sales Amount
[More Tables...](#)

Drag fields between areas below:

<input type="checkbox"/> Filters	<input type="checkbox"/> Columns
<input type="checkbox"/> Rows	<input type="checkbox"/> Values
Region	Sum of Sales A

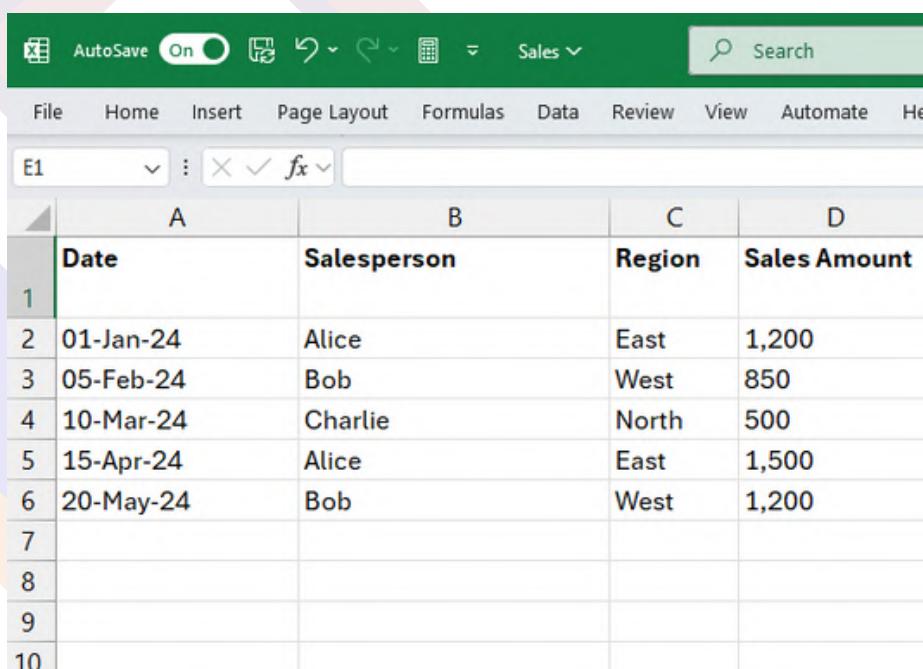
Creating and Customizing PivotTables

After creating a PivotTable, you can customize it by:

- Changing field layouts (Rows/Columns)
- Applying PivotTable Styles
- Adding calculated fields
- Sorting and filtering data

Example

📌 Scenario: You need to analyze monthly sales performance by salesperson for the following data.



The screenshot shows a Microsoft Excel spreadsheet with the ribbon menu at the top. The table below contains six rows of data, with the first row serving as the header. The columns are labeled A, B, C, and D, corresponding to Date, Salesperson, Region, and Sales Amount respectively. The data shows sales transactions for four different months, with two salespeople (Alice and Bob) contributing to the total sales amount for each month.

	A	B	C	D
1	Date	Salesperson	Region	Sales Amount
2	01-Jan-24	Alice	East	1,200
3	05-Feb-24	Bob	West	850
4	10-Mar-24	Charlie	North	500
5	15-Apr-24	Alice	East	1,500
6	20-May-24	Bob	West	1,200
7				
8				
9				
10				

- Task**
- Group data by Months to analyze Monthly Sales per Salesperson.
 - Customize the PivotTable with a different color theme.

1 Insert PivotTable (Follow previous steps).

2 In the PivotTable Field List:

- Drag Salesperson to the Rows area.
- Drag Sales Amount to the Values area.
- Drag Date to the Rows area (below Salesperson).

		Sum of Sales Amount
Salesperson	Date	
Alice	01-Jan-24	2700
	15-Apr-24	1200
Bob		2050
	05-Feb-24	850
	20-May-24	1200
Charlie		500
	10-Mar-24	500
		Grand Total: 5250

A red arrow points from the text below to this screenshot.

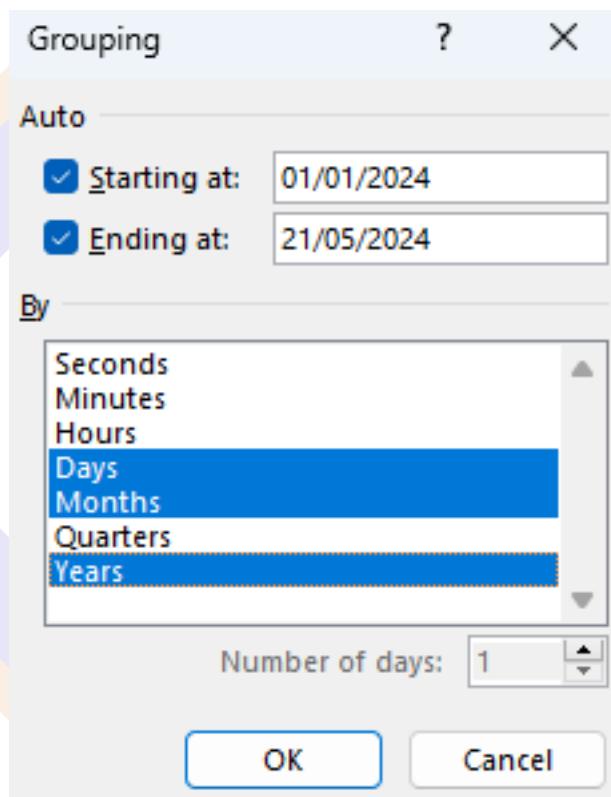
The context menu is open over the cell containing "01-Jan-24". The "Subtotal" option is checked.

In the PivotTable, right-click on any date in the Date column.

- Select Group from the context menu.

- In the Grouping dialog box:
 - Under By, select Months (ensure Years is also selected if your data spans multiple years).

- Click OK.



- Now, your PivotTable will show sales data grouped by months for each salesperson.



Row Labels	Sum of Sales Amount
■ Alice	2700
■ 2024	2700
■ Jan	1200
01-Jan	1200
■ Apr	1500
15-Apr	1500
■ Bob	2050
■ 2024	2050
■ Feb	850
05-Feb	850
■ May	1200
20-May	1200
■ Charlie	500
■ 2024	500
■ Mar	500
10-Mar	500
Grand Total	5250

TASK#2: Apply a Different PivotTable Style

- Click anywhere inside the PivotTable.
- Go to the Design tab on the ribbon (this tab appears only when the PivotTable is selected).
- In the PivotTable Styles group, click the drop-down arrow to see all available styles.
- Choose a different style/color theme that you like.

The screenshot shows a Microsoft Excel spreadsheet with a PivotTable. The PivotTable has 'Row Labels' set to 'Sales Amount' and contains data for three salespeople: Alice, Bob, and Charlie, with details for specific dates and their sales amounts. The 'Design' tab is selected on the ribbon. A red arrow points from step 1 to the Row Labels dropdown in the PivotTable. Another red arrow points from step 2 to the 'PivotTable Styles' dropdown in the ribbon. A third red arrow points from step 3 to the 'PivotTable Analyze' button in the ribbon. A large orange arrow at the bottom points downwards towards the bottom right corner of the screen.

	Row Labels	Column Labels	Sum of Sales Amount
3	Alice		2700
4	2024		2700
5	Jan		1200
6	01-Jan		1200
7	Apr		1500
8	15-Apr		1500
9	Bob		2050
10	2024		2050
11	Feb		850
12	05-Feb		850
13	May		1200
14	20-May		1200
15	Charlie		500
16	2024		500
17	Mar		500
18	10-Mar		500
19	Grand Total		5250
20			
21			
22			
23			

The screenshot shows the Microsoft Excel ribbon with the 'Sales' tab selected. In the 'PivotTable Analyze' group, the 'Design' tab is active. On the left, a PivotTable is displayed with 'Row Labels' set to 'Sum of Sales Amount'. The data shows sales for Alice, Bob, and Charlie across different months and years. The 'Layout' section of the ribbon is visible, showing options for Subtotals, Grand Totals, Report Layout, and Blank Rows. To the right, the 'PivotTable Style Options' are shown, divided into 'Light', 'Medium', and 'Dark' categories, with numerous style swatches. The 'Dark' category has a specific style labeled 'Dark Teal, Pivot Style Dark 2' highlighted.

	Sum of Sales Amount
Alice	2700
2024	2700
Jan	1200
01-Jan	1200
Apr	1500
15-Apr	1500
Bob	2050
2024	2050
Feb	850
05-Feb	850
May	1200
20-May	1200
Charlie	500
2024	500
Mar	500
10-Mar	500
Grand Total	5250

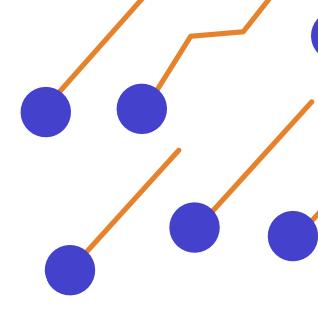
Grouping and Summarizing Data

PivotTables allow grouping data by:

- ✓ Date (Months, Quarters, Years)
- ✓ Categories (e.g., product types)
- ✓ Numeric Ranges (e.g., sales brackets)

Practical Example

- 📌 Scenario: You have salary data and want to group employees by Salary Ranges.



Employee	Department	Salary
John	IT	40,000
Sara	HR	55,000
David	Finance	75,000
Mike	IT	90,000
Linda	HR	120,000

Task:

- Create a PivotTable to analyze Salary Distribution.
- Group salaries into ranges: 40K-60K, 60K-80K, 80K-100K, 100K+.

Task#1:

Insert PivotTable

- Select your dataset.
- Go to Insert → PivotTable.
- Choose New Worksheet and click OK.

Set Up PivotTable

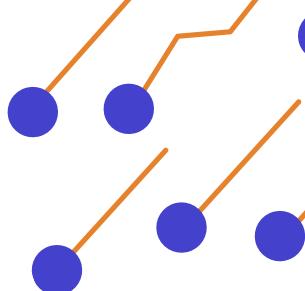
- Drag Salary into the Rows area.
- Drag Employee (or Count of Employee) into the Values area to count employees.

Group Salary Ranges

- Right-click on any salary value in the PivotTable.
- Select Group.
- Set the Starting at: 40000, Ending at: 120000, and By: 20000.
- Click OK.

Adjust Labels for Readability

- Rename grouped ranges for clarity:
 - 40,000 - 60,000 → "40K-60K"
 - 60,000 - 80,000 → "60K-80K"
 - 80,000 - 100,000 → "80K-100K"
 - 100,000+ → "100K+"

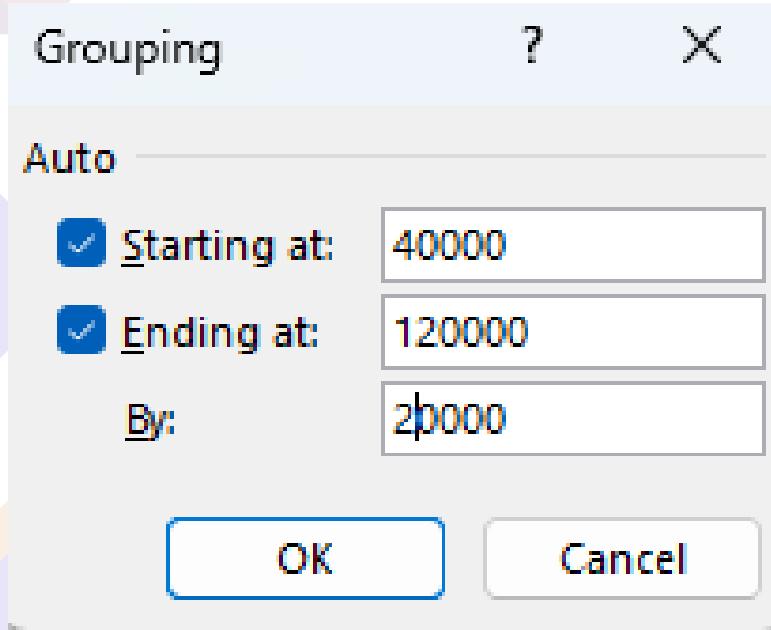


Screenshot of Microsoft Excel showing a PivotTable setup. The PivotTable Fields pane shows fields: Employee, Department, and Salary. The Rows section is set to Salary, and the Values section is set to Count of Employee, resulting in a table showing the count of employees for each salary group.

Salary	Count of Employee
40,000	1
55,000	1
75,000	1
90,000	1
120,000	1
Grand Total	5

A red arrow points from the bottom right towards the PivotTable Fields pane, indicating the context of the following right-click menu options:

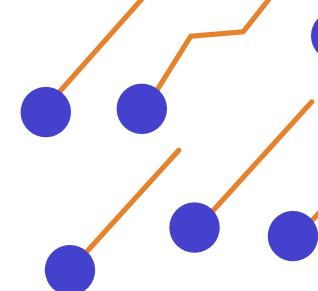
- Row Label
- Search the menus
- Copy
- Format Cells...
- Refresh
- Delete PivotTable
- Sort
- Filter
- Subtotal "Salary"
- Expand/Collapse
- Group...
- Ungroup...



	A	B	C	D
1				
2				
3	Row Labels	Count of Employee		
4	40000-59999	2		
5	60000-79999	1		
6	80000-99999	1		
7	100000-120000	1		
8	Grand Total	5		
9				
10				
11				
12				
13				

Adjust Labels for Readability

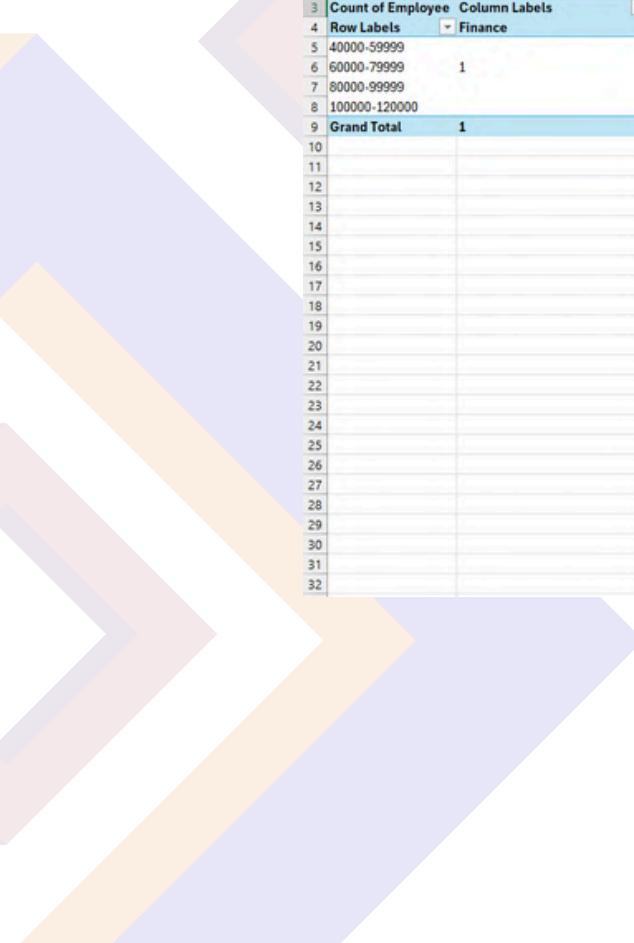
- Rename grouped ranges for clarity:
 - 40,000 - 60,000 → "40K-60K"
 - 60,000 - 80,000 → "60K-80K"
 - 80,000 - 100,000 → "80K-100K"
 - 100,000+ → "100K+"



A	B
1	
2	
3 Row Labels	Count of Employee
4 40k-60k	2
5 60k-80k	1
6 80k-100k	1
7 100k+	1
8 Grand Total	5
9	
10	

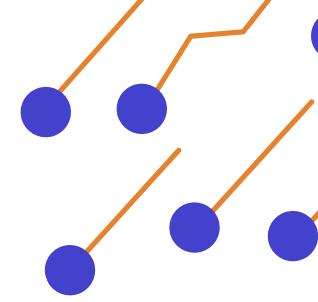
Format the PivotTable

- You can drag Department into the Columns area if you want to see salary distribution by department.



The screenshot shows the Microsoft Excel ribbon at the top with various tabs like File, Home, Insert, etc. Below the ribbon is a PivotTable in the worksheet area. The PivotTable has 'Count of Employee' in the Row Labels and 'Salary' in the Column Labels. The data shows counts for salary ranges: 40000-59999 (1), 60000-79999 (1), 80000-99999 (1), and 100000-120000 (1). The Grand Total is 5. To the right of the PivotTable is the 'PivotTable Fields' pane, which lists fields: Employee, Department, and Salary. Under 'Rows', 'Salary' is selected. Under 'Values', 'Count of Employee' is selected. In the 'Columns' section, 'Department' is listed. The status bar at the bottom shows 'File' and 'PivotTable'.

PivotCharts



PivotCharts are interactive charts linked to PivotTables. When you modify the PivotTable, the PivotChart updates automatically.

Types of PivotCharts include:

- Column Charts (Compare categories)
- Pie Charts (Show percentage breakdowns)
- Line Charts (Track trends over time)

Practical Example

📌 Scenario: You need a visual report for sales trends by region.

Step by Step Procedure

Insert PivotTable

1. Enter the Sales Data in Excel with columns:
 - Region (East, West, North, South)
 - Total Sales (50,000, 45,000, etc.)
2. Select the data.
3. Go to Insert → Click PivotTable.
4. Choose New Worksheet → Click OK.
5. Drag Region into the Rows area.
6. Drag Total Sales into the Values area.

The screenshot shows a Microsoft Excel window with a PivotTable Fields pane open on the right. The PivotTable Fields pane lists 'Region' and 'Total Sales' under 'Choose fields to add to report'. In the main area, a PivotTable is displayed with the following data:

	Sum of Total Sales
East	50,000
North	30,000
South	35,000
West	45,000
Grand Total	160,000

Insert PivotChart

1. Click anywhere on the PivotTable.
2. Go to Insert → Click PivotChart.
3. Select Column Chart (Clustered Column) → Click OK.

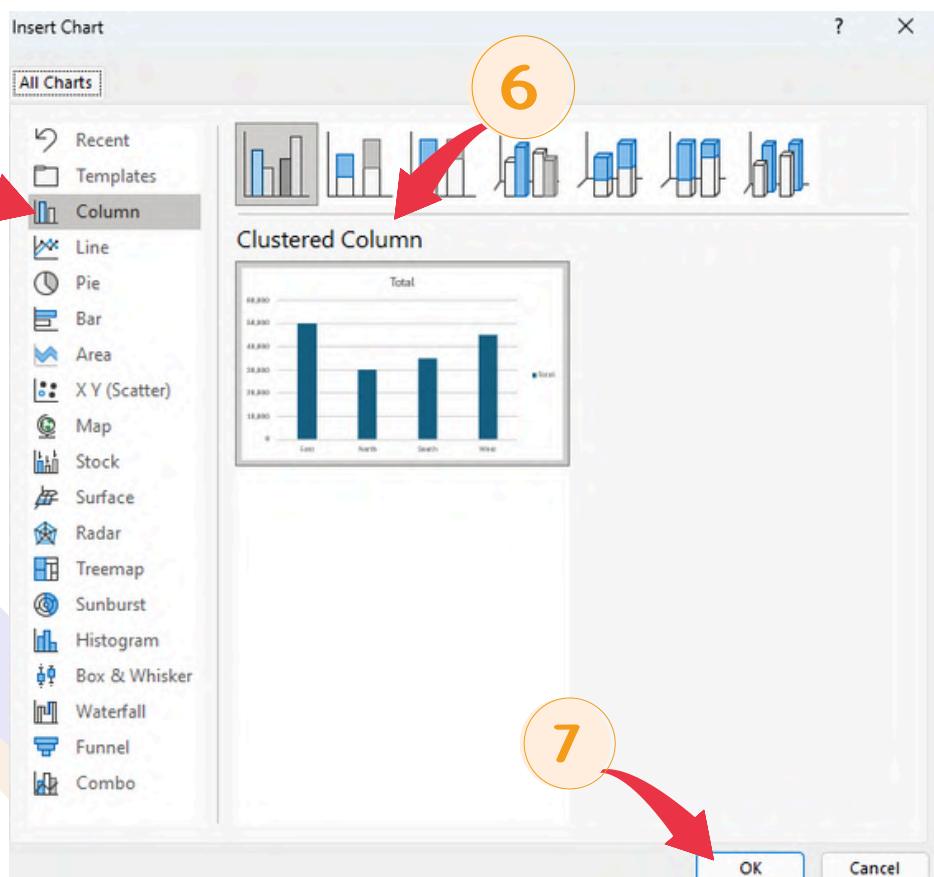
The screenshot shows the Microsoft Excel ribbon with the 'Insert' tab selected. A red arrow points from step 1 to the 'PivotTable Fields' pane where the 'Sum of Total Sales' field is highlighted. Another red arrow points from step 2 to the 'Insert' tab. A red arrow points from step 3 to the 'PivotChart' icon in the Charts group. A red arrow points from step 4 to the 'PivotChart & PivotTable' option in the dropdown menu. A callout box provides a description of PivotCharts.

1. Sum of Total Sales

2. Insert

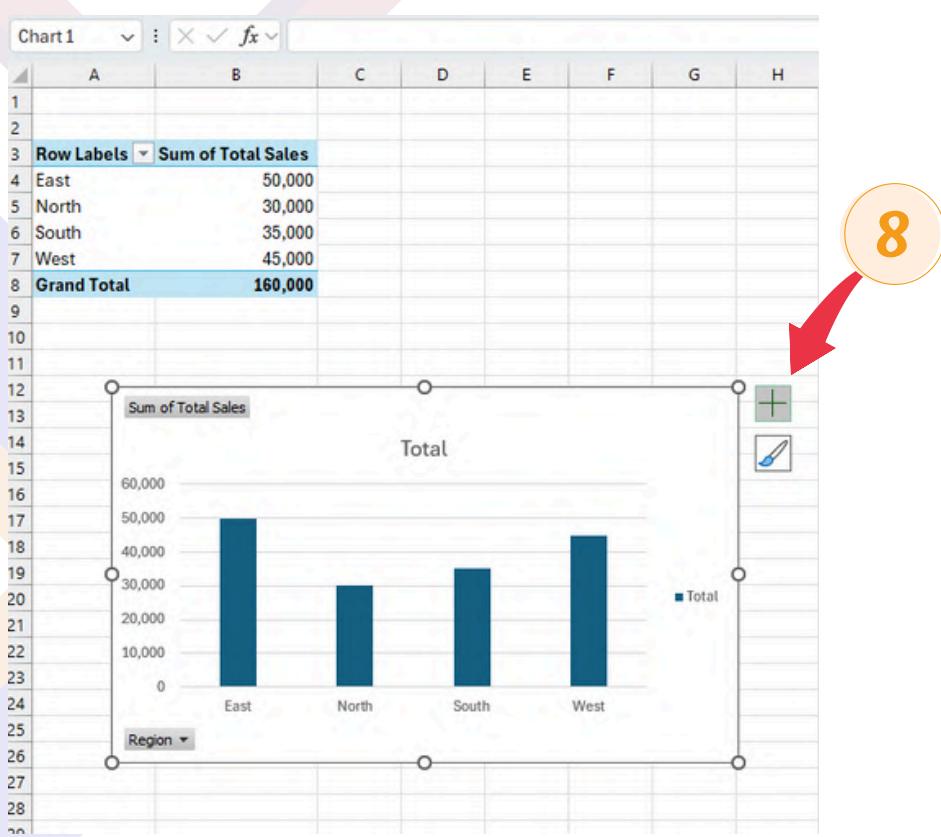
3. PivotChart

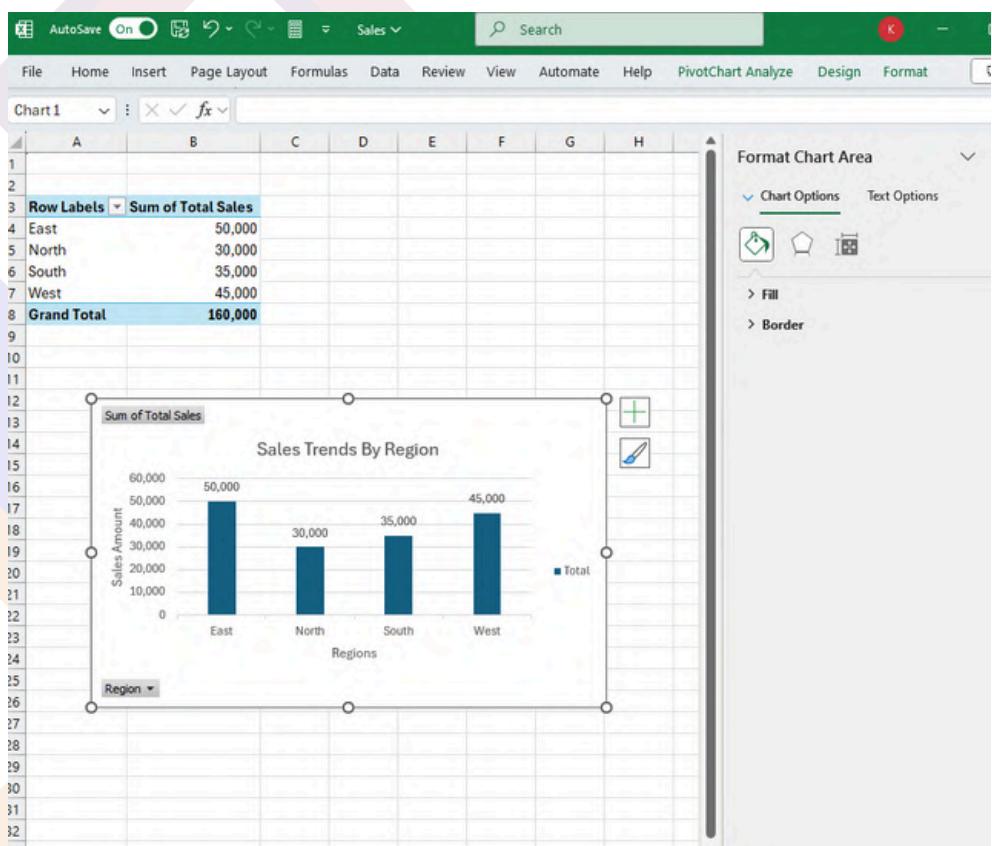
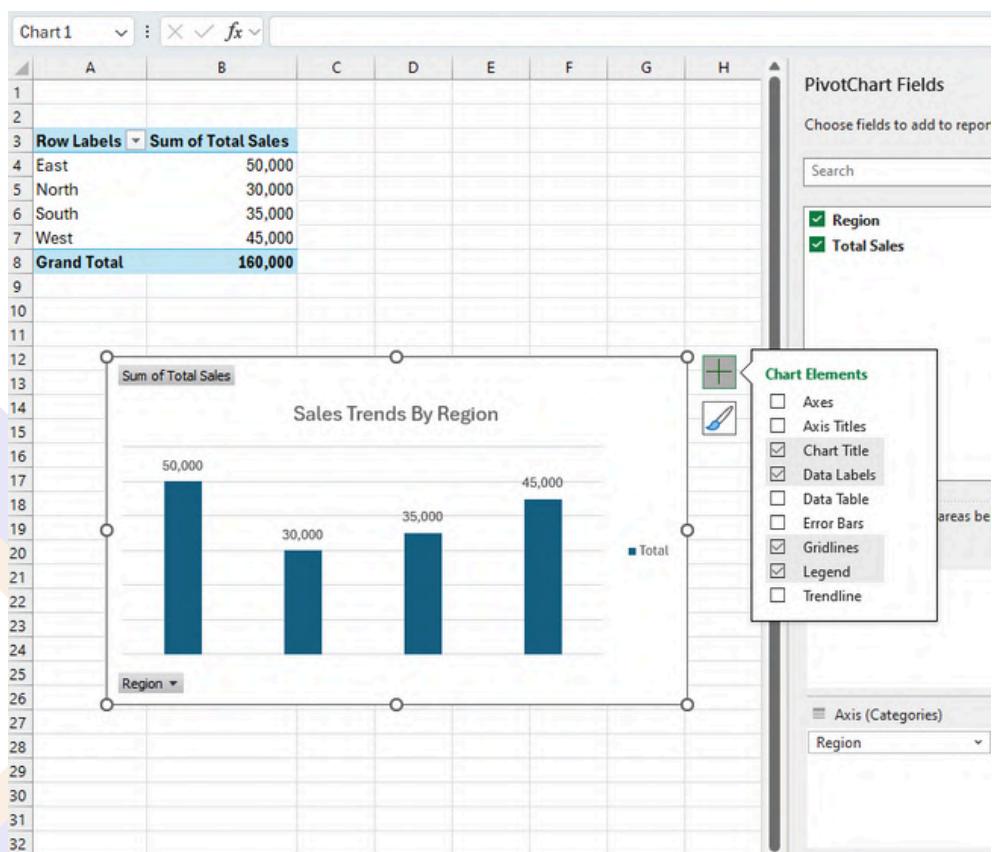
4. PivotChart & PivotTable

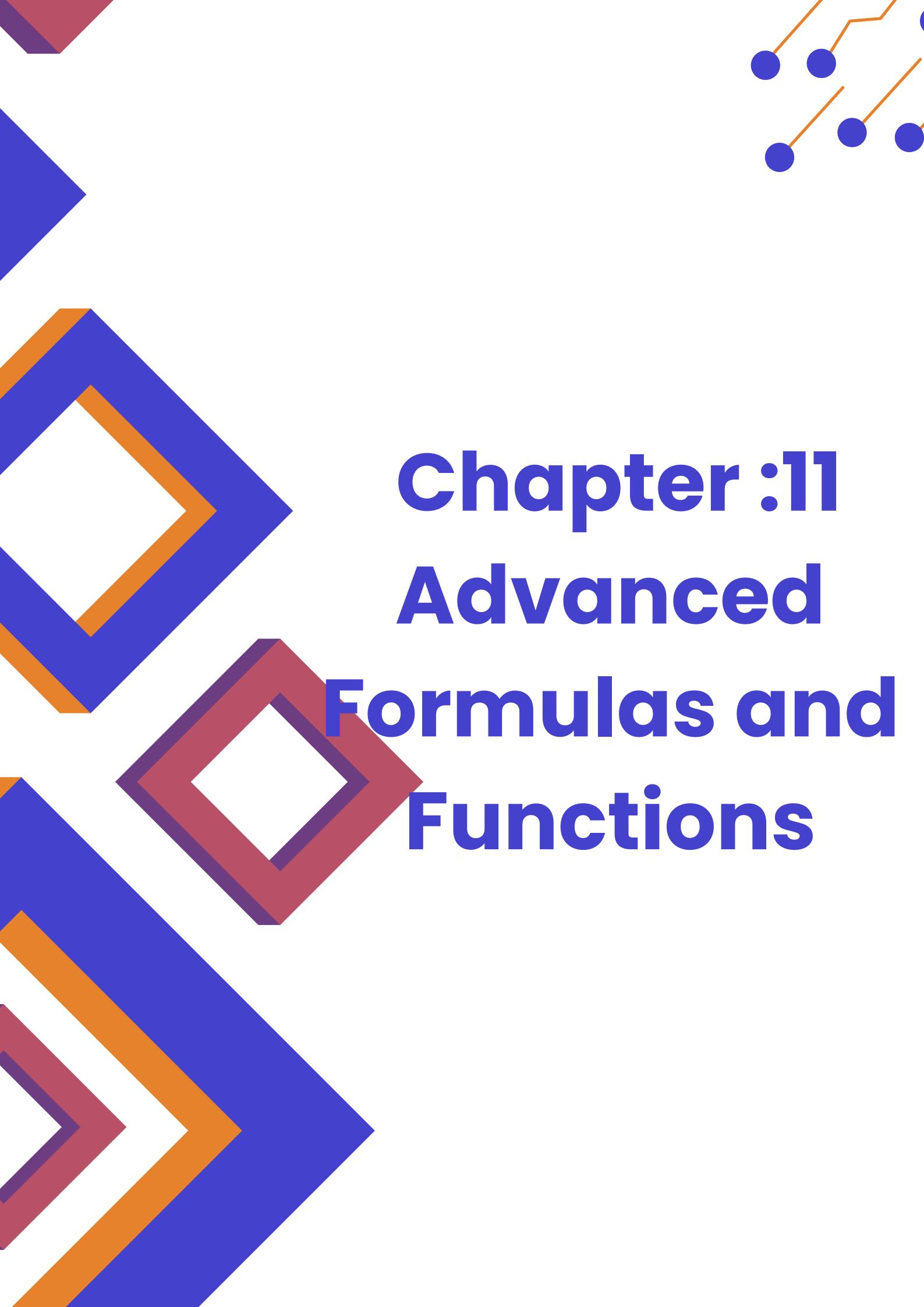


Format the Chart

1. Click on the chart → Chart Elements (+ icon)
2. Add Chart Title (e.g., "Sales Trends by Region").
3. Enable Data Labels for better readability.
4. Customize colors if needed.







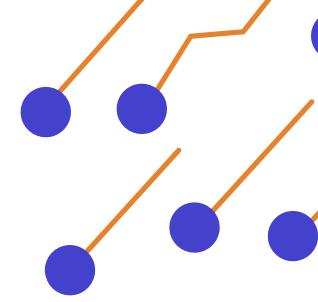
Chapter :11

Advanced

Formulas and

Functions

Array Formulas



Array formulas allow you to perform multiple calculations on a range of values and return either a single result or multiple results. These formulas work with entire arrays rather than individual cells.

There are two types of array formulas:

- **Single-cell array formulas:** Return a single value.
- **Multi-cell array formulas:** Return multiple values.

From Excel 365 onward, dynamic arrays are automatically spilled across multiple cells.

Example Use Cases:

- Performing calculations on a dataset without creating additional helper columns.
- Returning multiple results at once (e.g., extracting top 3 sales values).

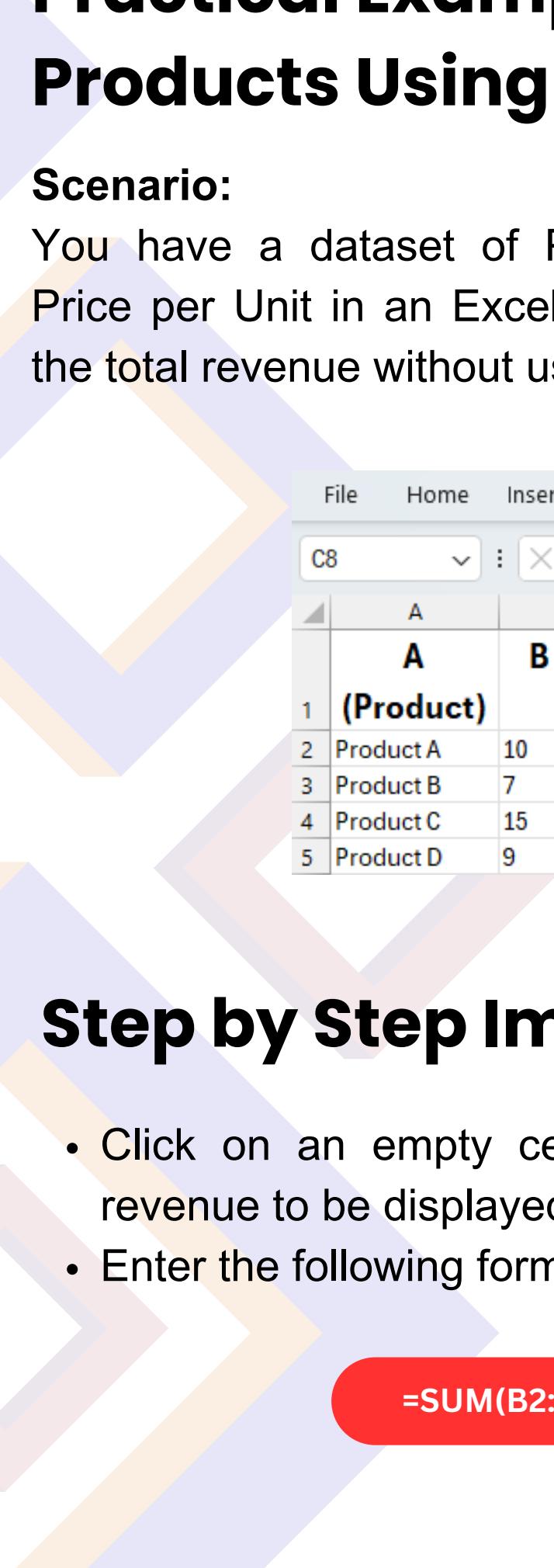
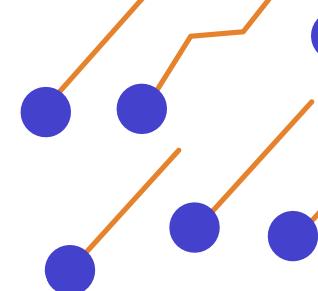
Benefits of Using Array Formulas

- Reduce the need for helper columns.
- Improve efficiency by performing calculations in a single formula.
- Enable advanced calculations that are difficult or impossible with standard formulas.
- Automatically update results when the data changes.

Practical Example 1: Sum of Products Using an Array Formula

Scenario:

You have a dataset of Products, Quantity Sold, and Price per Unit in an Excel table. You need to calculate the total revenue without using a helper column.

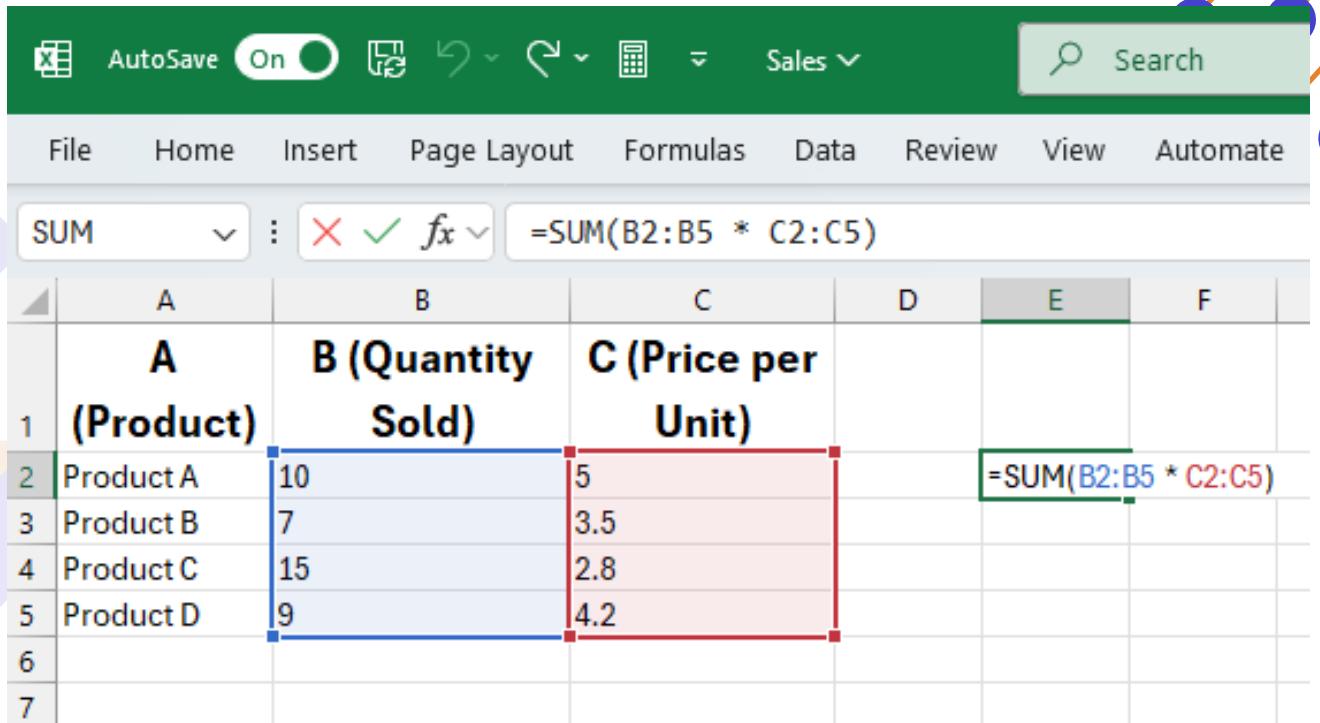


	A	B (Quantity Sold)	C (Price per Unit)
1	(Product)		
2	Product A	10	5
3	Product B	7	3.5
4	Product C	15	2.8
5	Product D	9	4.2

Step by Step Implementation:

- Click on an empty cell where you want the total revenue to be displayed (e.g., E2).
- Enter the following formula:

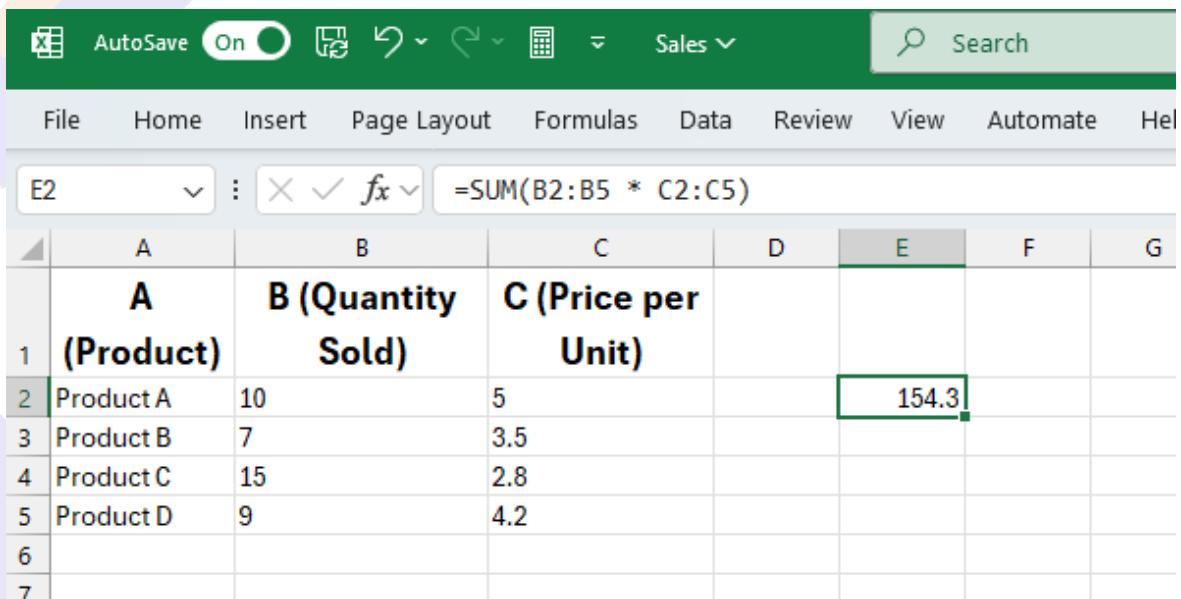
```
=SUM(B2:B5 * C2:C5)
```



File Home Insert Page Layout Formulas Data Review View Automate

SUM : $=\text{SUM}(\text{B2:B5} * \text{C2:C5})$

	A	B	C	D	E	F
1	A (Product)	B (Quantity Sold)	C (Price per Unit)			
2	Product A	10	5		$=\text{SUM}(\text{B2:B5} * \text{C2:C5})$	
3	Product B	7	3.5			
4	Product C	15	2.8			
5	Product D	9	4.2			
6						
7						

File Home Insert Page Layout Formulas Data Review View Automate Help

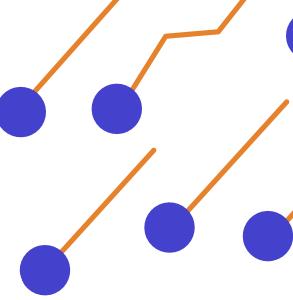
E2 : $=\text{SUM}(\text{B2:B5} * \text{C2:C5})$

	A	B	C	D	E	F	G
1	A (Product)	B (Quantity Sold)	C (Price per Unit)				
2	Product A	10	5		154.3		
3	Product B	7	3.5				
4	Product C	15	2.8				
5	Product D	9	4.2				
6							
7							

Press *Ctrl + Shift + Enter* (for older Excel versions) to execute as an array formula.

- In newer Excel versions, just press *Enter* (Excel automatically applies the array formula).**

Example# 2: Extracting the Top 3 Sales Values



Scenario:

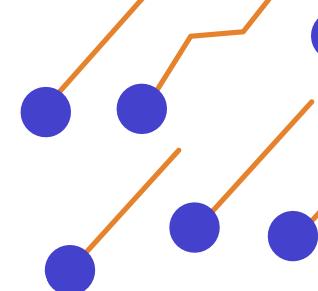
- You need to find the top 3 highest sales figures from a dataset without sorting it manually.

	A	B
	Salesperson	Sales (\$)
1		
2	Alice	15,000
3	Bob	12,500
4	Charlie	18,200
5	Diana	9,800
6	Ethan	20,500
7		
8		

Implementation

1. Select three empty cells where you want the top 3 sales figures to appear.
2. Enter the following formula in the first cell:

```
=LARGE(B2:B6; {1,2,3})
```



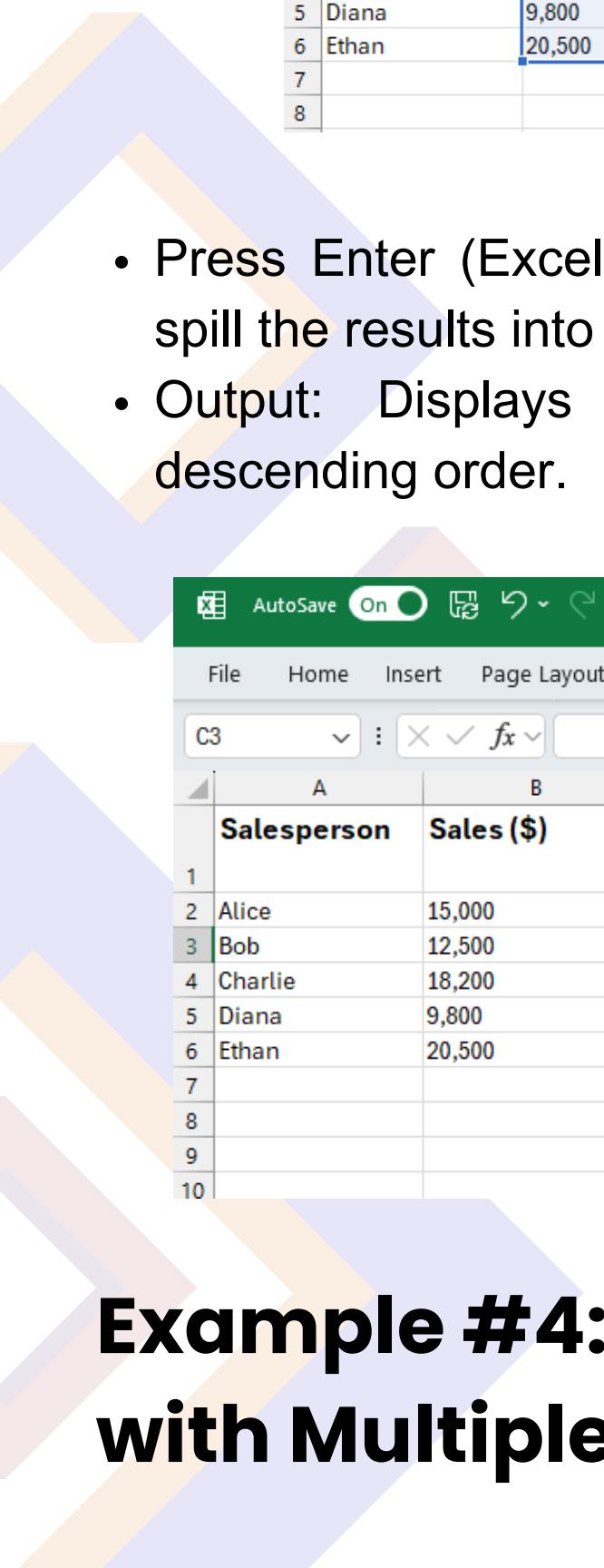
AutoSave On

Sales

A B C D

	Salesperson	Sales (\$)	
1			
2	Alice	15,000	=LARGE(B2:B6; {1,2,3})
3	Bob	12,500	
4	Charlie	18,200	
5	Diana	9,800	
6	Ethan	20,500	
7			
8			

- Press Enter (Excel 365 and later will automatically spill the results into three separate cells).
- Output: Displays the top 3 sales values in descending order.



AutoSave On

Sales

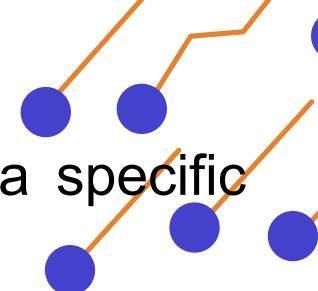
C3 A B C D E F G

	Salesperson	Sales (\$)					
1							
2	Alice	15,000					
3	Bob	12,500	20500	18200	15000		
4	Charlie	18,200					
5	Diana	9,800					
6	Ethan	20,500					
7							
8							
9							
10							

Example #4: Conditional Sum with Multiple Conditions

Scenario:

- You need to calculate the total sales for a specific region and product category.

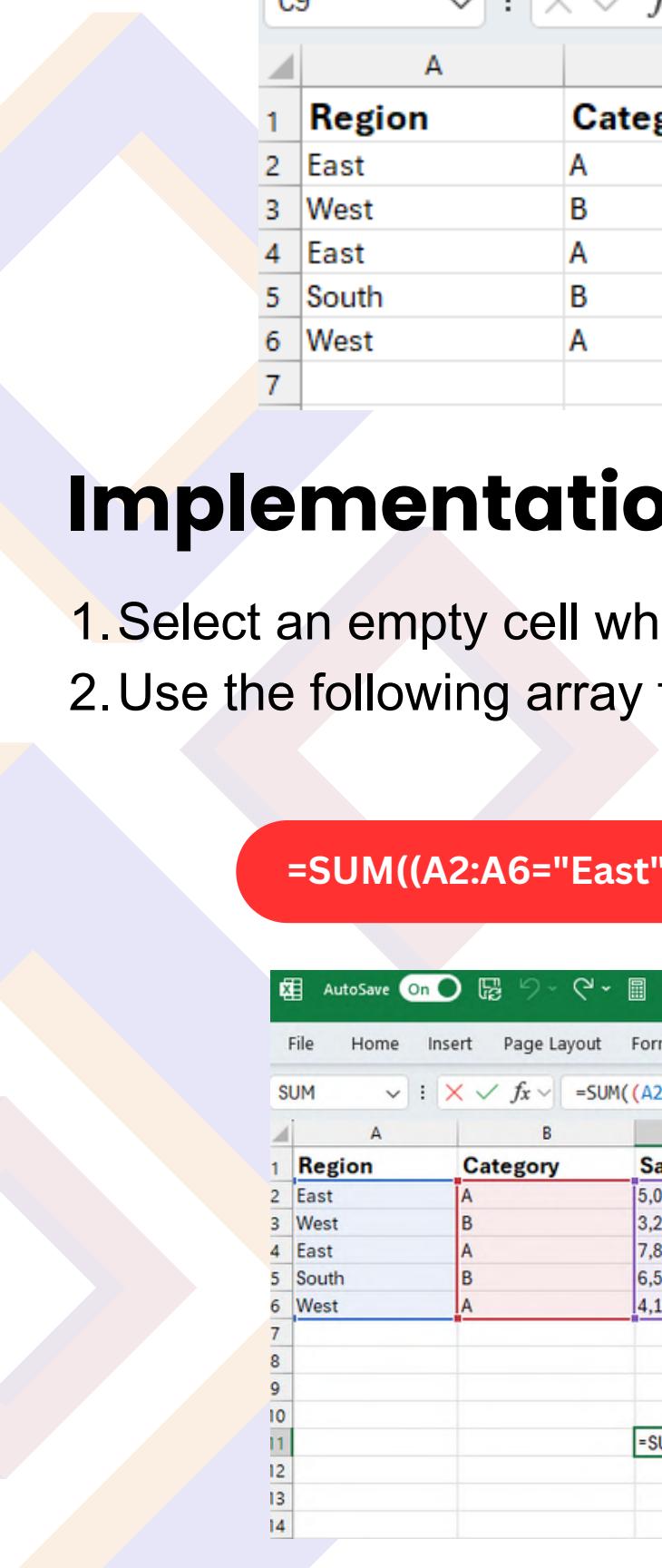


	A	B	C	D
1	Region	Category	Sales (\$)	
2	East	A	5,000	
3	West	B	3,200	
4	East	A	7,800	
5	South	B	6,500	
6	West	A	4,100	
7				

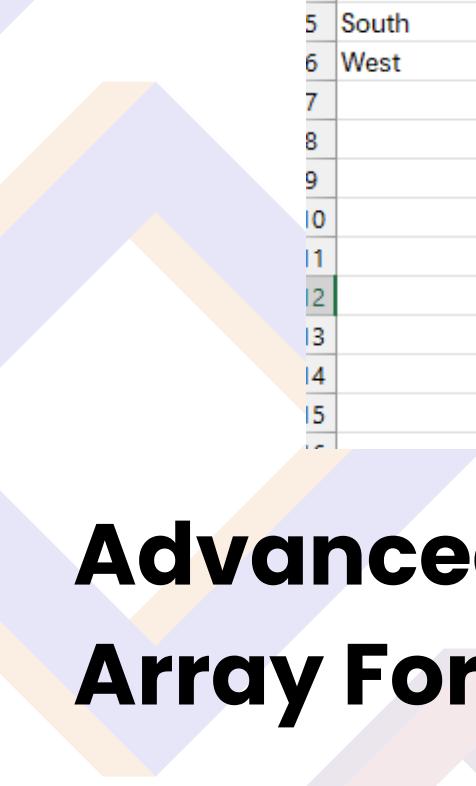
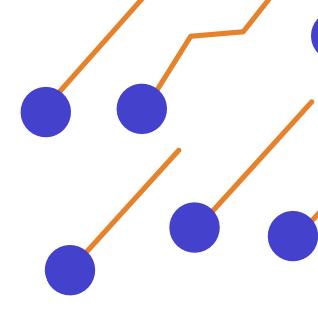
Implementation

1. Select an empty cell where the result should appear.
2. Use the following array formula:

```
=SUM((A2:A6="East") * (B2:B6="A") * C2:C6)
```



	A	B	C	D	E	F	G
1	Region	Category	Sales (\$)				
2	East	A	5,000				
3	West	B	3,200				
4	East	A	7,800				
5	South	B	6,500				
6	West	A	4,100				
7							
8							
9							
10							
11				=SUM((A2:A6="East")*(B2:B6="A")*C2:C6)			
12							
13							
14							



A screenshot of a Microsoft Excel spreadsheet titled "Sales". The ribbon menu shows "File", "Home", "Insert", "Page Layout", "Formulas", "Data", and "Review". The formula bar shows "C12". The table has columns A, B, C, and D. Column A is labeled "Region", column B is "Category", and column C is "Sales (\$)". The data is as follows:

	A	B	C	D
1	Region	Category	Sales (\$)	
2	East	A	5,000	
3	West	B	3,200	
4	East	A	7,800	
5	South	B	6,500	
6	West	A	4,100	
7				
8				
9				
10				
11				12800
12				
13				
14				
15				

Advanced Techniques with Array Formulas

1. You can use IF inside an array formula to perform conditional calculations. Example:

```
=SUM(IF(A2:A6="East"; C2:C6; 0))
```

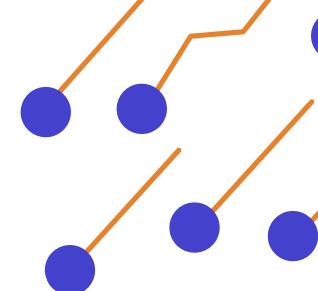
This sums sales where the region is "East".

2. To sort sales values in ascending order.

```
=SORT(B2:B6)
```

3. To show sales data only for "East" region:

=FILTER(A2:C6; A2:A6="East")



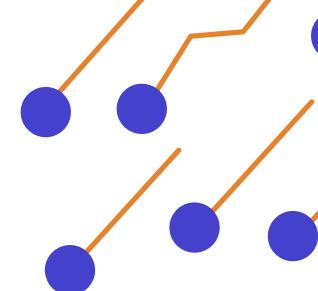
Best Practices for Array Formulas

1. Use Named Ranges: Helps in readability (e.g.,
=SUM(Quantity * Price)).
2. Avoid Excessive Array Formulas: They can slow down performance in large datasets.
3. Use Dynamic Arrays Where Possible: Modern Excel functions (SORT, FILTER, UNIQUE) are easier and more efficient.
4. Check for Compatibility: If sharing files, ensure recipients use a version that supports dynamic arrays.

Statistical Functions in Excel

1. Excel provides powerful statistical functions that enable users to perform conditional calculations on datasets. Three of the most commonly used functions are COUNTIF, SUMIF, and AVERAGEIF, which help in counting, summing, and averaging values based on specific conditions.

These functions are particularly useful in analyzing sales data, financial reports, student grades, and various business-related datasets.

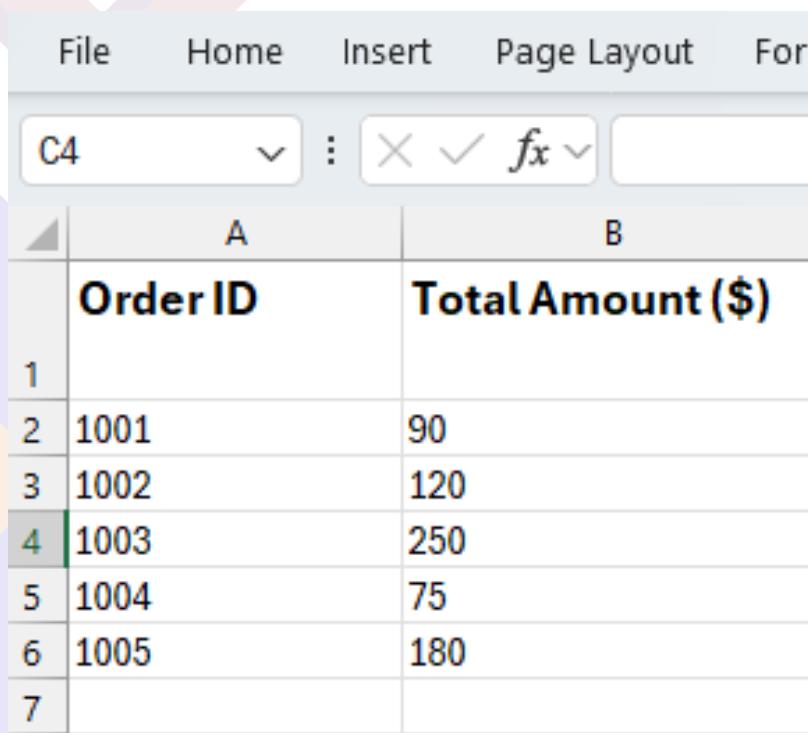


1. COUNTIF Function

The COUNTIF function counts the number of cells in a range that meet a specified condition. This is useful when you need to determine the frequency of certain values within a dataset.

Example 1: Counting Orders Over a Threshold

Scenario: You have a sales dataset and need to count how many orders exceed \$100.



	Order ID	Total Amount (\$)
1		
2	1001	90
3	1002	120
4	1003	250
5	1004	75
6	1005	180
7		

Enter the following formula:

=COUNTIF(B2:B6; ">100")

A screenshot of Microsoft Excel showing a table of order data. The table has columns for Order ID and Total Amount (\$). The formula `=COUNTIF(B2:B6; ">100")` is being typed into cell B11. The formula bar at the top shows the formula being entered.

	A	B	C
1	Order ID	Total Amount (\$)	
2	1001	90	
3	1002	120	
4	1003	250	
5	1004	75	
6	1005	180	
7			
8			
9			
10			
11		=COUNTIF(B2:B6; ">100")	
12			
13			

A screenshot of Microsoft Excel showing the result of the COUNTIF formula. Cell B12 contains the value 3, indicating that three orders exceed \$100. The formula bar at the top shows the result 3.

	A	B
1	Order ID	Total Amount (\$)
2	1001	90
3	1002	120
4	1003	250
5	1004	75
6	1005	180
7		
8		
9		
10		
11		

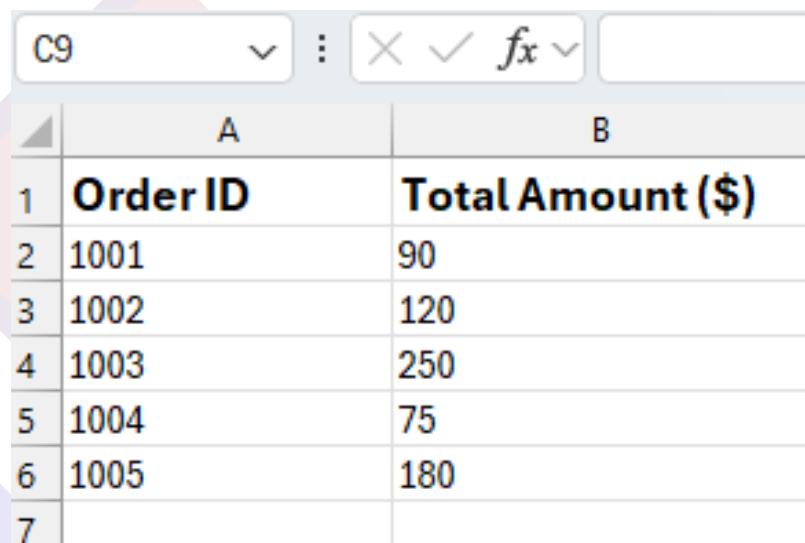
(Three orders exceed \$100)

2. SUMIF Function

The SUMIF function adds up the values in a range that meet a specific condition. This function is useful when calculating total sales for a specific category or summing up expenses over a certain limit.

Example 1: Total Sales Over a Threshold

Scenario: You have sales data and need to calculate the total revenue from orders over \$100.



	A	B
1	Order ID	Total Amount (\$)
2	1001	90
3	1002	120
4	1003	250
5	1004	75
6	1005	180
7		

FORMULA

```
=SUMIF(B2:B6; ">100"; B2:B6)
```

SUM : $=\text{SUMIF}(\text{B2:B6}; ">100"; \text{B2:B6})$

	A	B	C	D
1	Order ID	Total Amount (\$)		
2	1001	90		
3	1002	120		
4	1003	250		
5	1004	75		
6	1005	180		

 $">100"; \text{B2:B6})$ 

	A	B	C	D
1	Order ID	Total Amount (\$)		
2	1001	90		
3	1002	120		
4	1003	250		
5	1004	75		
6	1005	180		

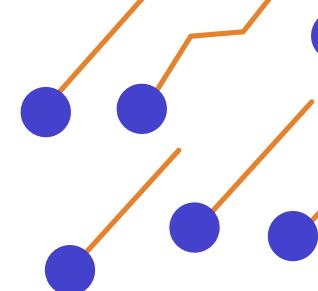
550

3. AVERAGEIF Function

- The AVERAGEIF function calculates the average of values in a range that meet a given condition. This is useful for analyzing average sales, grades, or customer spending patterns.

Example 1: Average Sales Over a Threshold

- Scenario: You need to find the average sales amount for orders over \$100.



Screenshot of an Excel spreadsheet showing Order ID and Total Amount (\$). The data is as follows:

	A	B
1	Order ID	Total Amount (\$)
2	1001	90
3	1002	120
4	1003	250
5	1004	75
6	1005	180

FORMULA

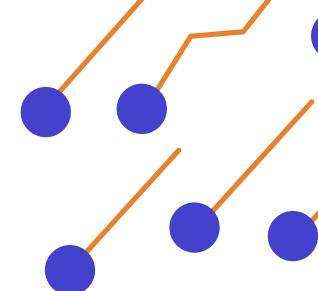
=AVERAGEIF(B2:B6; ">100")

Screenshot of the Excel ribbon showing the formula bar with =AVERAGEIF(B2:B6; ">100"). The range B2:B6 is selected, and the formula is being typed into the formula bar. The data table below shows the same six rows of order data.

	A	B
1	Order ID	Total Amount (\$)
2	1001	90
3	1002	120
4	1003	250
5	1004	75
6	1005	180

Screenshot of the Excel ribbon showing the formula bar with =AVERAGEIF(B2:B6; ">100"). The formula has been completed, and the result 183.3333333 is displayed in cell C8. A red arrow points from the formula bar to the result cell.

	A	B	C
1	Order ID	Total Amount (\$)	
2	1001	90	
3	1002	120	
4	1003	250	
5	1004	75	
6	1005	180	
7			
8			183.3333333
9			
10			
11			
12			
13			
14			



Financial Functions in Excel

Excel provides various financial functions to help users manage loans, investments, and financial planning efficiently. One of the most commonly used financial functions is the PMT function, which calculates loan payments based on a fixed interest rate and payment period.

1. PMT Function (Loan Payment Calculation)

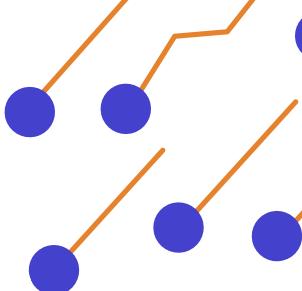
The PMT function in Excel calculates the periodic payment required to fully repay a loan with a fixed interest rate over a specified number of periods.

```
=PMT(rate; nper; pv; [fv]; [type])
```

Where:

- rate = Interest rate per period.
- nper = Total number of payment periods.
- pv = Present value (loan amount).

- fv (optional) = Future value after last payment (default is 0).
- type (optional) = Payment timing (0 for end of period, 1 for beginning).



Example 1: Calculating Monthly Loan Payment

- Scenario: You take a \$10,000 loan with an annual interest rate of 5% for 3 years. Payments are made monthly.

Formula

=PMT(5%/12; 3*12; -10000)

Example 2: Car Loan Payment Calculation

- Scenario: You finance a car with a \$25,000 loan at an annual interest rate of 7% for 5 years. Payments are made monthly.

Formula

=PMT(7%/12; 5*12; -25000)

- fv (optional) = Future value after last payment (default is 0).
- type (optional) = Payment timing (0 for end of period, 1 for beginning).

2. PMT Function with Different Payment Timing

Example 3: Loan Payments with Beginning-of-Period Payments

Scenario: You take a \$15,000 loan at 6% annual interest for 4 years, but payments are made at the beginning of each month.

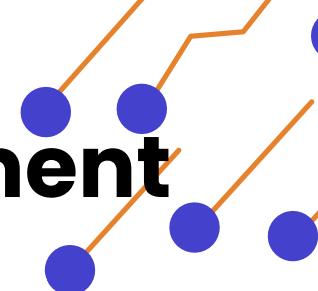
```
=PMT(6%/12; 4*12; -15000;0; 1)
```

Example 4: Total Interest Paid Over Loan Duration

To find the total interest paid over the duration of the loan:

```
=(PMT(6%/12; 4*12; -15000) * 4*12) - 15000
```

3. PMT Function in Investment Planning



Example 5: Saving for a Future Goal

Scenario: You want to save \$50,000 in 10 years by making monthly contributions into an account earning 4% annual interest.

=PMT(4%/12; 10*12; 0; -50000)

Understanding PMT Function in Real-Life Scenarios

- Mortgage Loans: Calculate home loan payments based on interest rates and loan duration.
- Car Loans: Determine monthly car loan payments with different interest rates and terms.
- Personal Loans: Manage debt repayment strategies using different payment structures.
- Retirement Planning: Estimate monthly savings required to reach financial goals.

Error Handling in Excel

Error-handling functions ensure calculations remain accurate and readable, preventing issues like #DIV/0! and #VALUE! errors.

IFERROR Function

The IFERROR function catches errors in calculations and replaces them with a custom message.

```
=IFERROR(value; value_if_error)
```

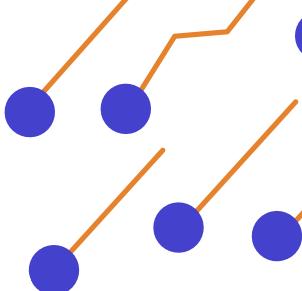
Example: Handling #DIV/0 Errors

Scenario:

You are calculating sales per unit but want to avoid division errors.

If we use =A4/B4, it results in #DIV/0!

As shown in the illustration below:

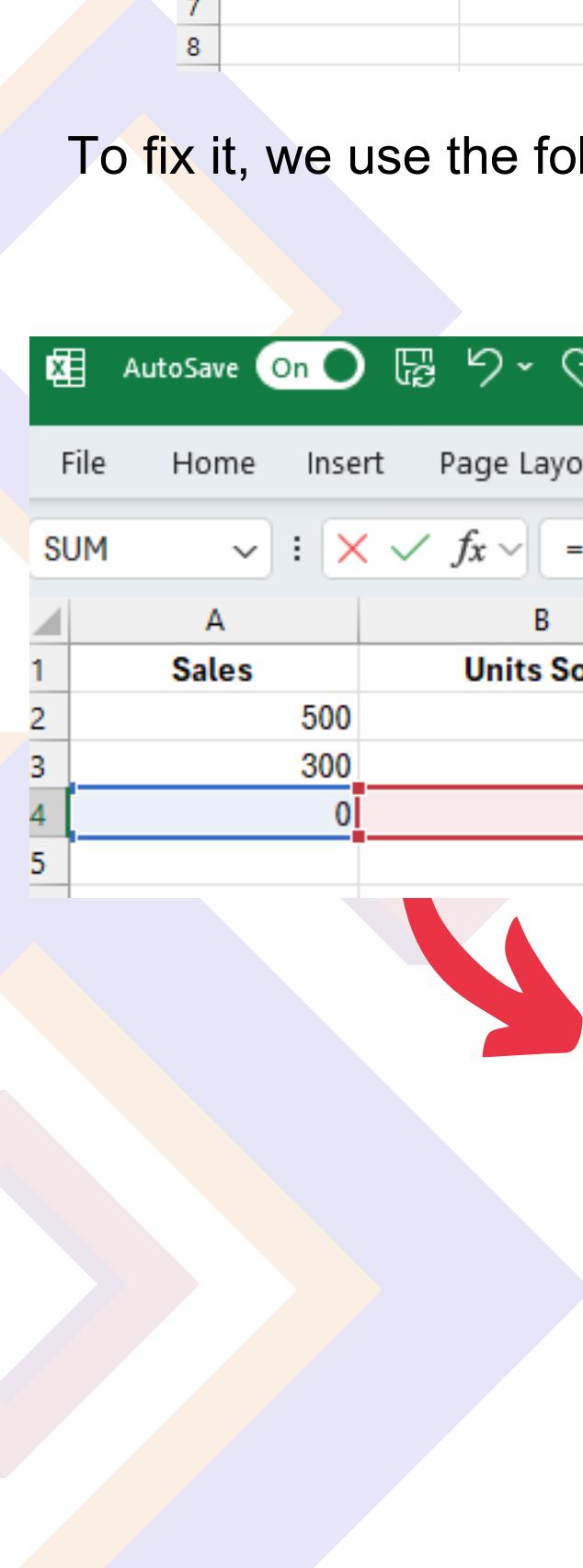


File Home Insert Page Layout Formulas Data Review View

C5 :

	A	B	C	D
1	Sales	Units Sold	Sales per Unit	
2	500		5	100
3	300		3	100
4	0		0	#DIV/0!
5				
6				
7				
8				

To fix it, we use the following formula:



AutoSave On Sales

File Home Insert Page Layout Formulas Data Review

SUM : =IFERROR(A4/B4; "No Sales")

	A	B	C	D
1	Sales	Units Sold	Sales per Unit	
2	500		5	100
3	300		3	100
4	0		0	"No Sales")
5				



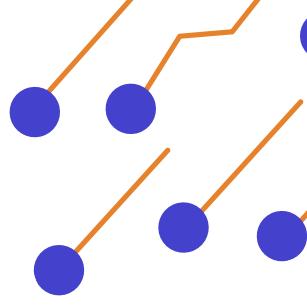

AutoSave On Sales

File Home Insert Page Layout Formulas Data Review

C5 :

	A	B	C	D
1	Sales	Units Sold	Sales per Unit	
2	500		5	100
3	300		3	100
4	0		0	No Sales
5				
6				
7				

ISERROR Function



The ISERROR function identifies errors in calculations, returning TRUE if an error exists and FALSE otherwise.

Syntax

=ISERROR(value)

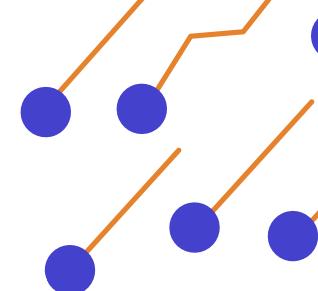
Example 6: Identifying Errors in a Dataset

	A	B	C
1	Data	Error Check	
2	50	=ISERROR(A2)	
3	#N/A	TRUE	
4	100	FALSE	
5			



	A	B	C
1	Data	Error Check	
2	50	FALSE	
3	#N/A	TRUE	
4	100	FALSE	
5			
6			
7			

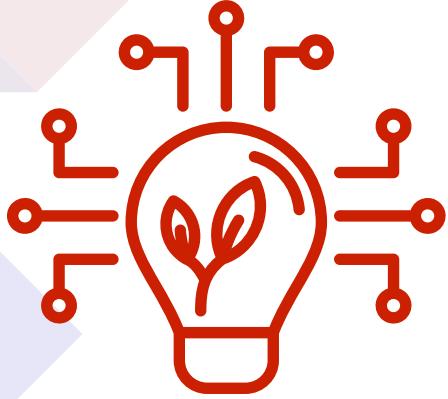
Best Practices for Error Handling



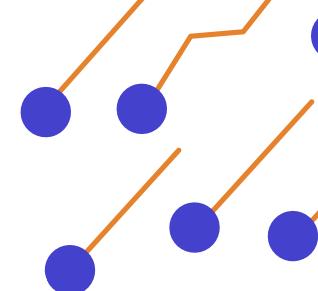
1. Use IFERROR for User-Friendly Reports - Prevent formulas from breaking due to unexpected inputs.
2. Use ISERROR for Data Validation - Identify errors before running reports.
3. Combine with Conditional Formatting - Highlight problematic cells visually.
4. Test with Edge Cases - Ensure formulas work in various scenarios.
5. Document Handling Rules - Define how errors are treated in financial models.

Key Takeaways:

1. PMT function is useful for calculating loan payments and interest.
2. IFERROR function ensures formulas return meaningful values instead of errors.
3. ISERROR function helps identify problematic data.
4. Applying these functions improves accuracy and reliability in financial models.



Exam

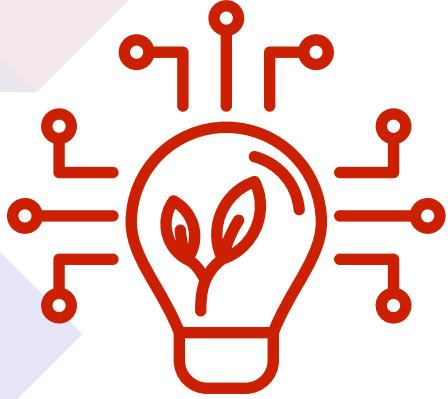


Scenario

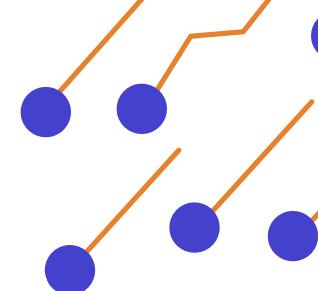
You are given a dataset of sales transactions for a company. Your task is to analyze the data using advanced Excel formulas and functions. The dataset includes the following columns:

- Transaction ID (Unique ID for each transaction)
- Salesperson (Name of the salesperson)
- Region (Region where the sale was made)
- Product (Product sold)
- Quantity (Number of units sold)
- Price per Unit (Price of one unit)
- Discount (Discount applied to the transaction)
- Date (Date of the transaction)

Transaction ID	Salesperson	Region	Product	Quantity	Price per Unit	Discount	Date
1	John	North	Laptop	2	1200	5%	15/01/2023
2	Sarah	South	Monitor	5	300	10%	20/02/2023
3	John	North	Keyboard	10	50	0%	10/03/2023
4	Mike	East	Laptop	1	1200	15%	05/04/2023
5	Sarah	South	Mouse	20	25	5%	12/05/2023
6	John	North	Monitor	3	300	0%	18/06/2023



Exam

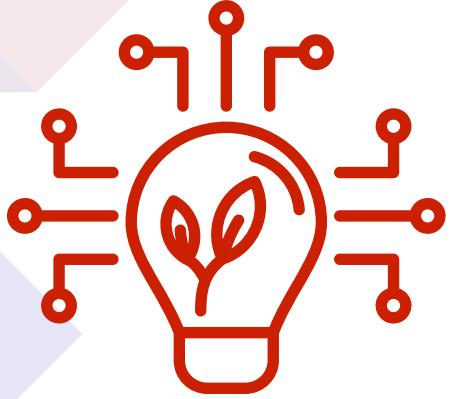


Scenario

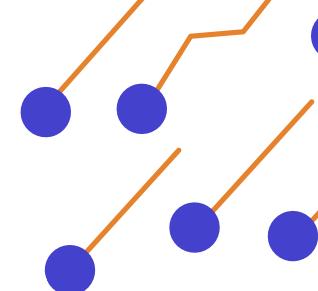
You are given a dataset of sales transactions for a company. Your task is to analyze the data using advanced Excel formulas and functions. The dataset includes the following columns:

- Transaction ID (Unique ID for each transaction)
- Salesperson (Name of the salesperson)
- Region (Region where the sale was made)
- Product (Product sold)
- Quantity (Number of units sold)
- Price per Unit (Price of one unit)
- Discount (Discount applied to the transaction)
- Date (Date of the transaction)

Transaction ID	Salesperson	Region	Product	Quantity	Price per Unit	Discount	Date
1	John	North	Laptop	2	1200	5%	15/01/2023
2	Sarah	South	Monitor	5	300	10%	20/02/2023
3	John	North	Keyboard	10	50	0%	10/03/2023
4	Mike	East	Laptop	1	1200	15%	05/04/2023
5	Sarah	South	Mouse	20	25	5%	12/05/2023
6	John	North	Monitor	3	300	0%	18/06/2023



CONTINUED



TASKS

1. Array Formulas

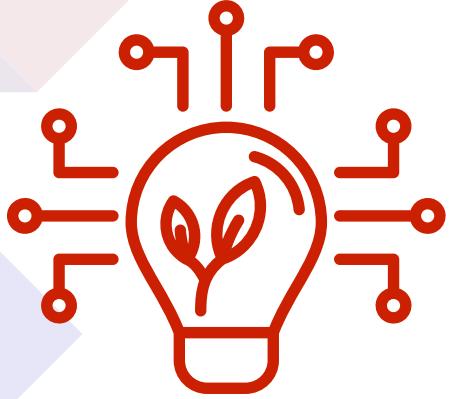
- Calculate the Total Revenue for each transaction ($\text{Quantity} \times \text{Price per Unit} \times (1 - \text{Discount})$). Use an array formula to calculate this for all rows at once.

2. Statistical Functions

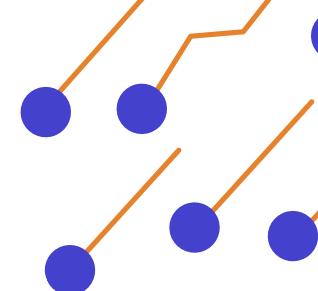
- Calculate the following:
 - Average Price per Unit across all transactions.
 - Maximum Quantity sold in a single transaction.
 - Minimum Discount applied.

3. Conditional Functions

- Use COUNTIF, SUMIF, and AVERAGEIF to:
 - Count the number of transactions where the Region is "North".
 - Calculate the total revenue for transactions where the Salesperson is "John".
 - Find the average discount for transactions where the Product is "Laptop".



CONTINUED



4. Financial Functions

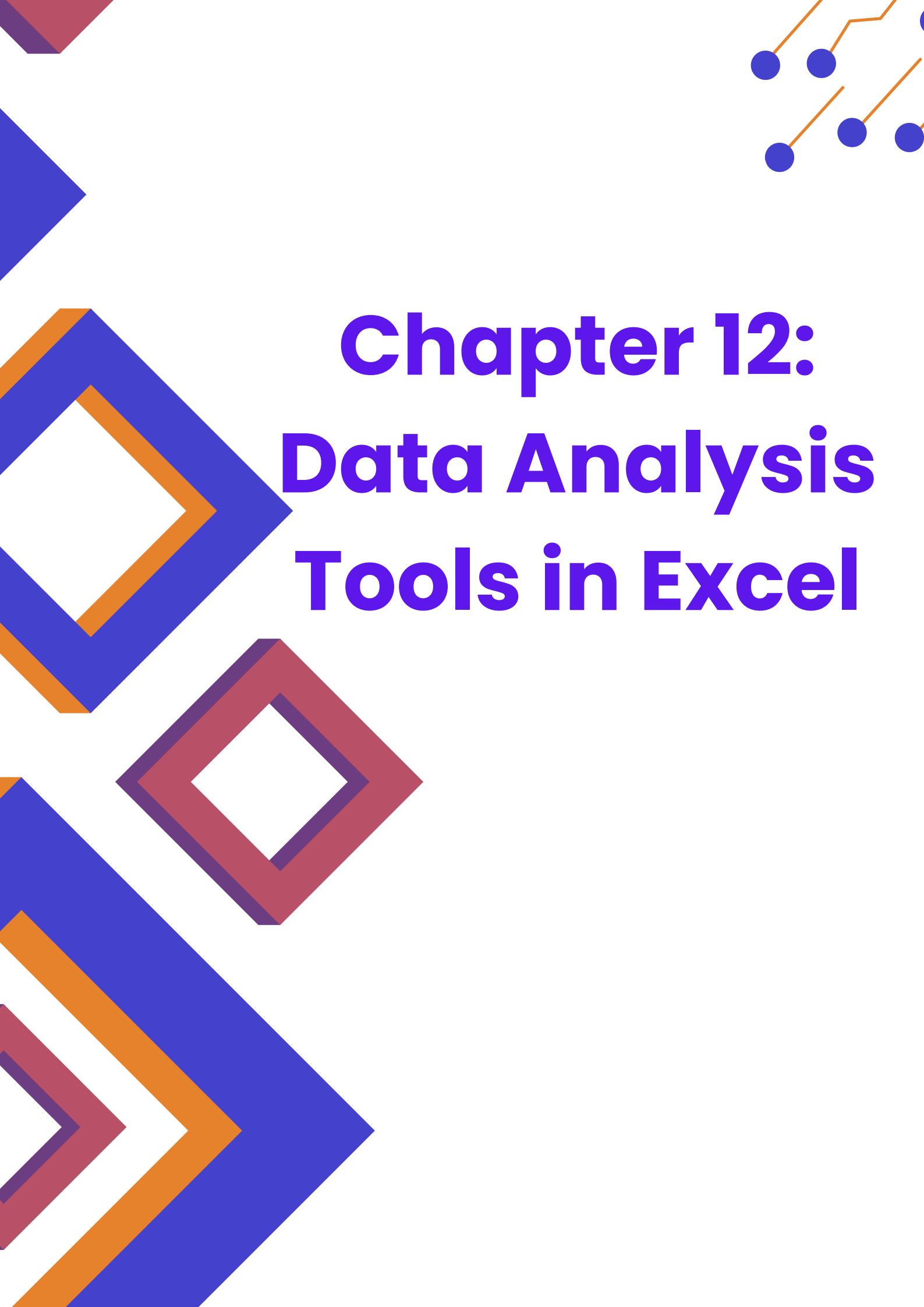
- Assume the company wants to evaluate an investment opportunity:
- Calculate the Monthly Payment (PMT) for a loan of \$50,000 at an annual interest rate of 5% over 5 years.
- Calculate the Future Value (FV) of an investment of \$10,000 at an annual interest rate of 7% over 10 years.
- Calculate the Net Present Value (NPV) of a series of cash flows: Year 1: 5,000, Year 2: 5,000, Year 3: 7,000, Year 4: \$10,000, with a discount rate of 6%.

5. Error Handling

- Add a column called "Revenue Status":
- Use IFERROR to display "Valid" if the revenue calculation is correct and "Error" if there's an error (e.g., due to missing data).
- Use ISERROR to count how many transactions have errors in the revenue calculation.

- *For array formulas, use Ctrl + Shift + Enter (in older Excel versions) or simply press Enter (in newer versions with dynamic arrays).*
- *For financial functions, ensure the interest rate and periods are consistent (e.g., monthly vs. annual).*
- *Use absolute references (\$) where necessary to avoid errors when copying formulas.*

HINT

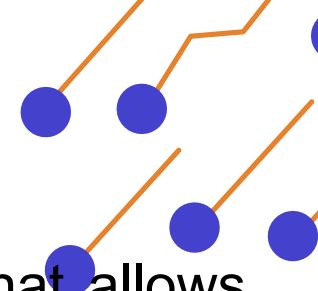


Chapter 12:

Data Analysis

Tools in Excel

1. What-If Analysis



What-If Analysis is a powerful Excel feature that allows users to explore various scenarios by changing input values to see how they affect results. It helps in decision-making and forecasting by testing different possibilities before implementing a final decision.

Three key What-If Analysis tools:

1. Goal Seek – Finds the required input value to achieve a desired output.
2. Data Tables – Analyzes multiple input values and their impact on the outcome.
3. Scenario Manager – Compares different sets of input values and their effects on calculations.

Practical Example 1: Using Goal Seek

Scenario: Loan Payment Calculation

You are planning to take out a loan and want to determine the maximum loan amount you can afford based on a fixed monthly payment.

Given:

- Desired Monthly Payment: \$500
- Annual Interest Rate: 5%
- Loan Term: 5 years (60 months)

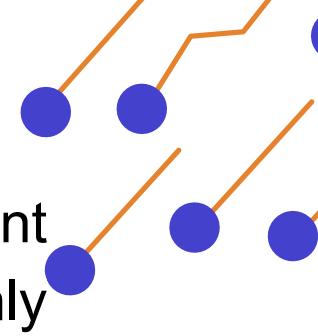
Objective:

Use Goal Seek to find the maximum loan amount you can borrow while keeping the monthly payment at \$500.

Step-by-Step Instructions

Step 1: Set Up the Worksheet

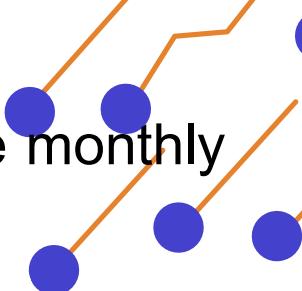
1. Open Excel and create a new worksheet.
2. Enter the following labels and values in cells:
 - A1: Desired Monthly Payment
 - B1: \$500
 - A2: Annual Interest Rate
 - B2: 5%
 - A3: Loan Term (Months)
 - B3: 60
 - A4: Loan Amount
 - B4: (Leave this blank for now)
 - A5: Calculated Monthly Payment
 - B5: (This will contain the formula)



File Home Insert Page Layout Formulas Data Review						
H6		:	X	✓	fx	▼
	A	B	C	D	E	F
1	Desired Monthly Payment	\$500				
2	Annual Interest Rate		5%			
3	Loan Term(Months)		60			
4	Loan Amount					
5	Calculated Monthly Payment					
6						
7						
8						

Step 2: Enter the Formula

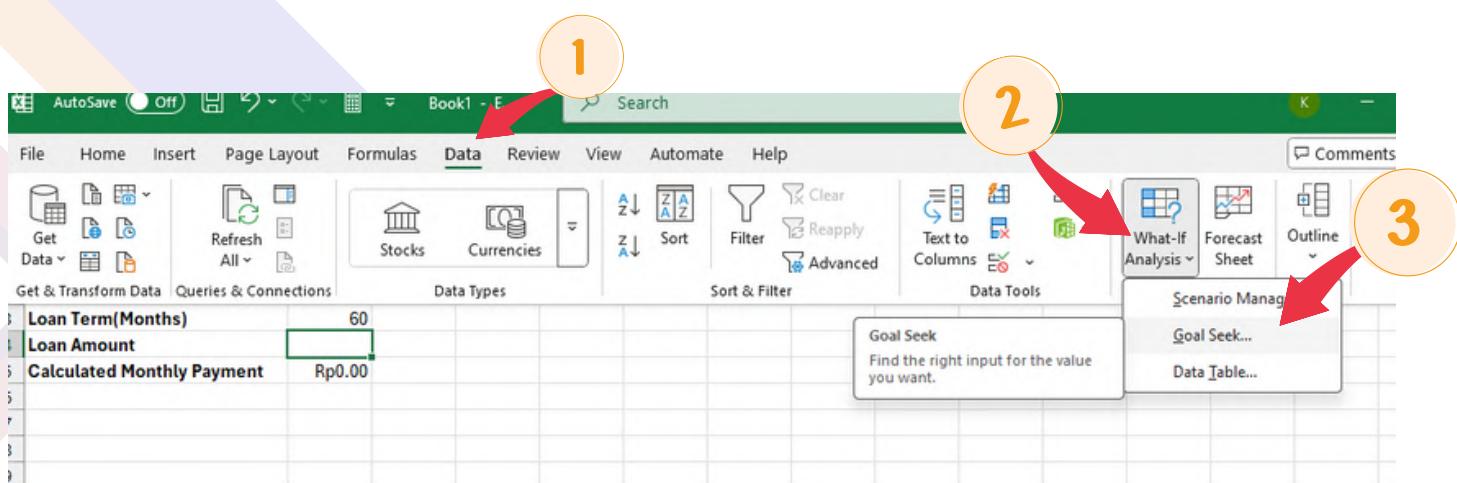
- In cell B5, enter the formula to calculate the monthly payment using the PMT function:



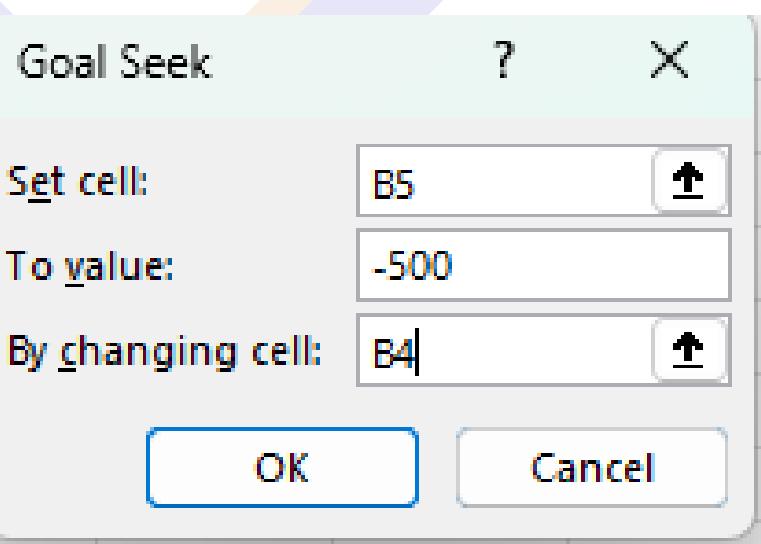
File Home Insert Page Layout Formulas Data					
SUM	▼	:	X ✓ fx ▾	=PMT(B2/12; B3; B4)	D
1 Desired Monthly Payment	\$500				
2 Annual Interest Rate	5%				
3 Loan Term(Months)	60				
4 Loan Amount					
5 Calculated Monthly Payment	=PMT(B2/12; B3; B4)				
6					
7					
8					

- B2/12: Converts the annual interest rate to a monthly rate.
- B3: Loan term in months.
- B4: Loan amount (this is the value we'll find using Goal Seek).

- Press Enter.(ignore the output for now)



- Go to the Data tab on the ribbon.
- In the Forecast group, click What-If Analysis.
- Select Goal Seek from the dropdown menu.
- In the Goal Seek dialog box:
- Set cell: Select B5 (the cell with the PMT formula).
- To value: Enter -500 (the desired monthly payment). Use a negative value because the PMT function returns a negative number (representing an outgoing payment).
- By changing cell: Select B4 (the loan amount).
- Click OK.



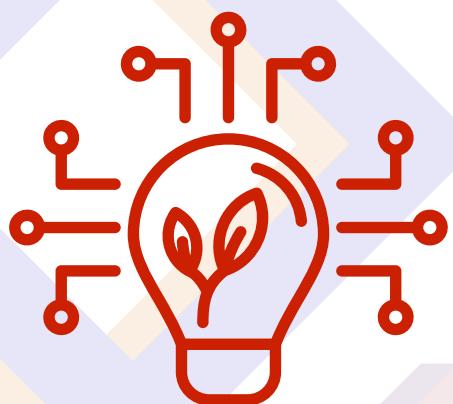
The screenshot shows an Excel spreadsheet with the following data:

	A	B
1	Desired Monthly Payment	\$500
2	Annual Interest Rate	5%
3	Loan Term(Months)	60
4	Loan Amount	26495.35
5	Calculated Monthly Payment	#####
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		

At the bottom right, the 'Goal Seek Status' dialog box is open with the message: 'Goal Seeking with Cell B5 found a solution.' It also shows 'Target value: -500' and 'Current value: -Rp500.00'. There are 'Step', 'Pause', 'OK', and 'Cancel' buttons.

review result:

- Excel will calculate and display the loan amount in B4 that results in a monthly payment of \$500.
- For example, if the result is \$26,500, this means you can borrow up to 26,500 to keep your monthly payment at 26,500 to keep your monthly payment at 500.



Quick Practice Exercise:

Try using Goal Seek to solve the following problem:

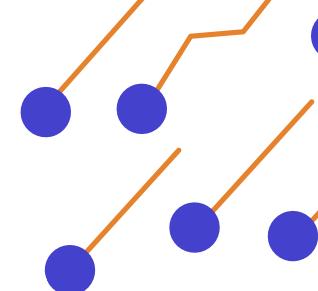
- **Scenario:**

- You want to save \$10,000 in 3 years. You can invest money at an annual interest rate of 4%. Use Goal Seek to determine how much you need to invest today to reach your goal.

2. Solver Add-In

Solver is an Excel add-in used for optimization problems. It helps find the optimal value for a formula in a cell (called the objective cell) by changing the values of other cells (called decision variables), subject to constraints.

- It's commonly used for:
 - Maximizing profits.
 - Minimizing costs.
 - Allocating resources efficiently.



Practical Example: Product Mix Optimization

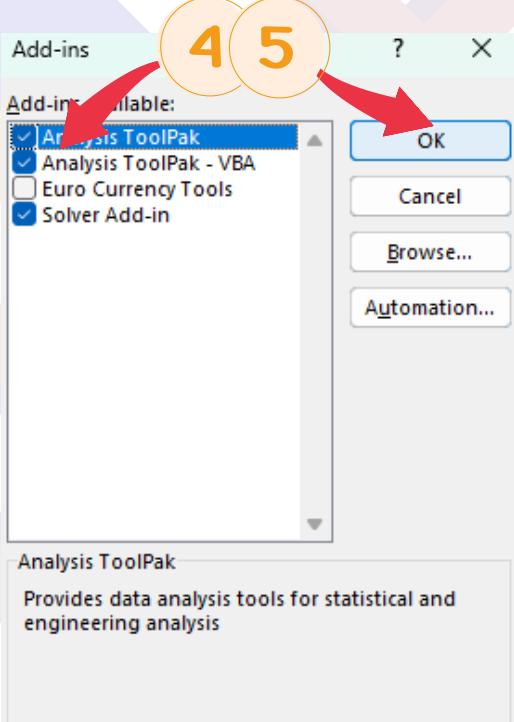
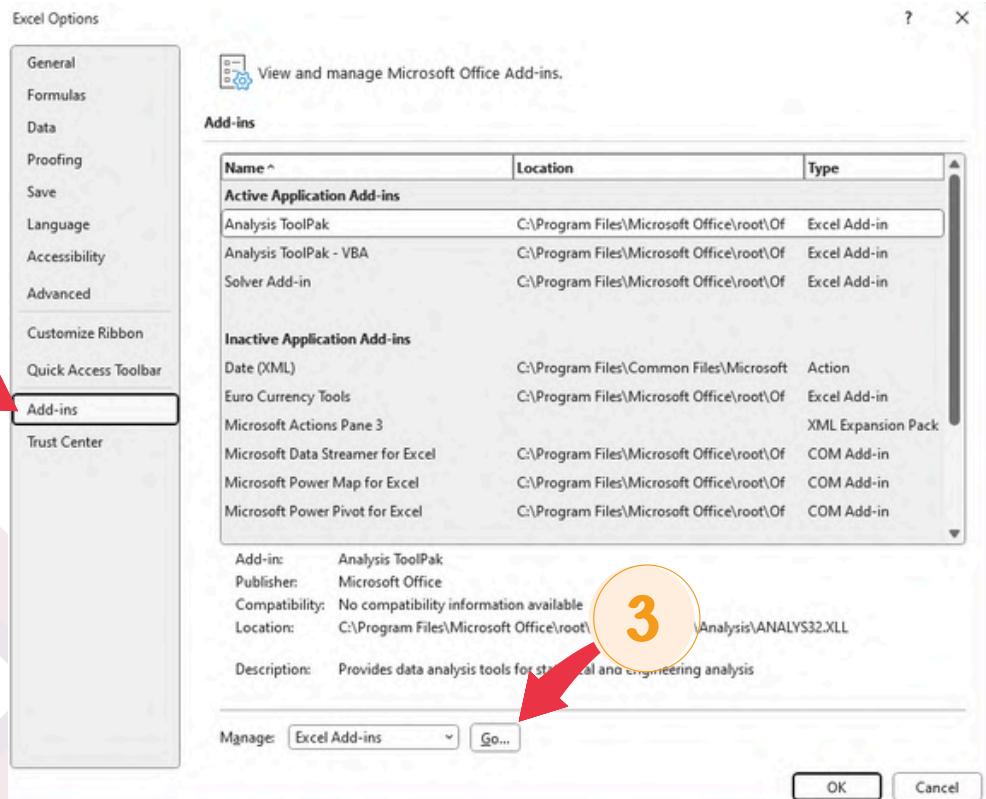
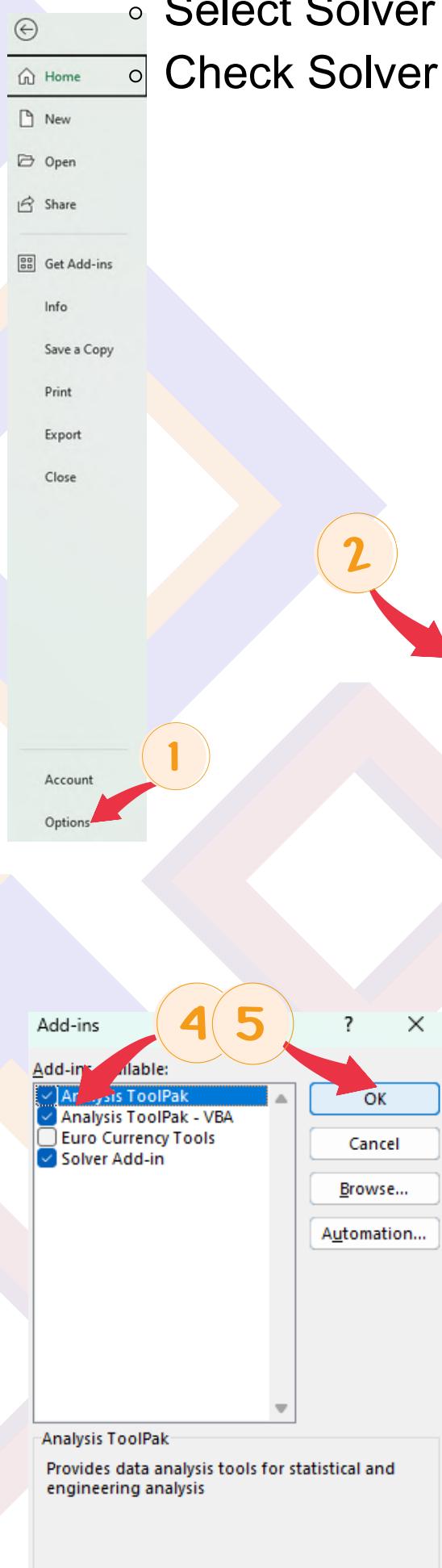
Scenario

- Supposing, you are the owner of a beauty salon and you are planning on providing a new service to your clients. For this, you need to buy a new equipment that costs \$40,000, which should be paid by instalments within 12 months.
- Goal: Calculate the minimal cost per service that will let you pay for the new equipment within the specified timeframe.

	A	B	C	D
1	NEW SERVICE ANALYSIS			
2				
3	Cost of new equipment	\$40,000		
4	Projected clients per month	50		
5	Cost per service	?		
6				
7	No. of months to pay for equipment	=B3/(B4*B5)	=	12

1. Enable Solver:

- Go to File → Options → Add-ins.
- Select Solver Add-in and click Go.
- Check Solver Add-in and click OK.



Step By Step Implementation

On the Data tab, in the Analysis group, click the Solver button.

The Solver Parameters window will open where you have to set up the 3 primary components:

- Objective cell
- Variable cells
- Constraints

The Objective cell (Target cell in earlier Excel versions) is the cell containing a formula that represents the objective, or goal, of the problem. The objective can be to maximize, minimize, or achieve some target value.

In this example, the objective cell is B7, which calculates the payment term using the formula $=B3/(B4*B5)$ and the result of the formula should be equal to 12:

The screenshot shows a Microsoft Excel spreadsheet with a table titled "NEW SERVICE ANALYSIS". The table contains the following data:

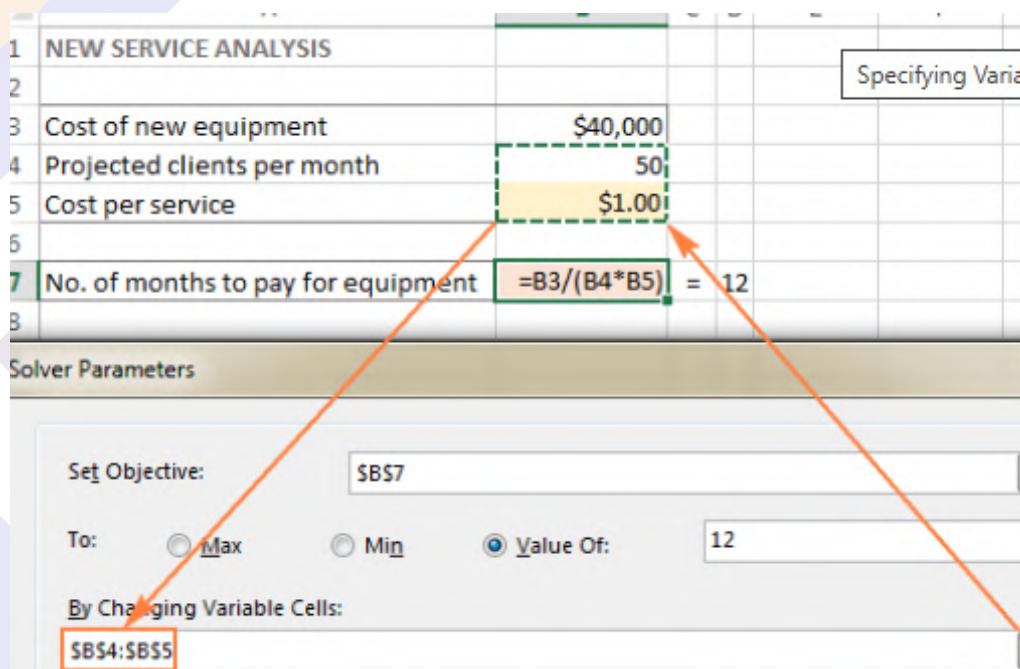
NEW SERVICE ANALYSIS	
3	Cost of new equipment
4	Projected clients per month
5	Cost per service
7	No. of months to pay for equipment

Cell B7 contains the formula $=B3/(B4*B5)$. The result of the formula, 12, is displayed in the cell. Below the table, the "Solver Parameters" dialog box is open. The "Set Objective:" field is set to \$B\$7. The "To:" field has the radio button for "Max" selected. The "Value Of:" field is set to 12. Arrows point from the formula in cell B7 to the "Set Objective:" field and from the value 12 in the "Value Of:" field back to the formula in cell B7.

Variable cells (Changing cells or Adjustable cells in earlier versions) are cells that contain variable data that can be changed to achieve the objective. Excel Solver allows specifying up to 200 variable cells.

In this example, we have a couple of cells whose values can be changed:

- Projected clients per month (B4) that should be less than or equal to 50; and
- Cost per service (B5) that we want Excel Solver to calculate.

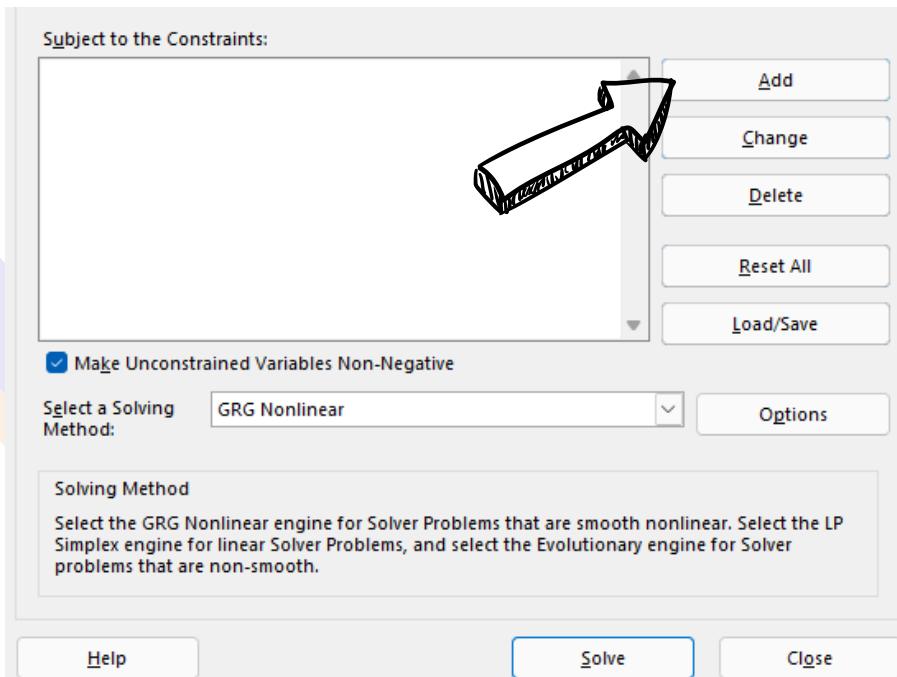
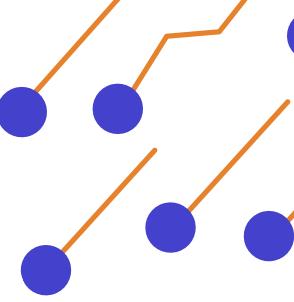


Constraints:

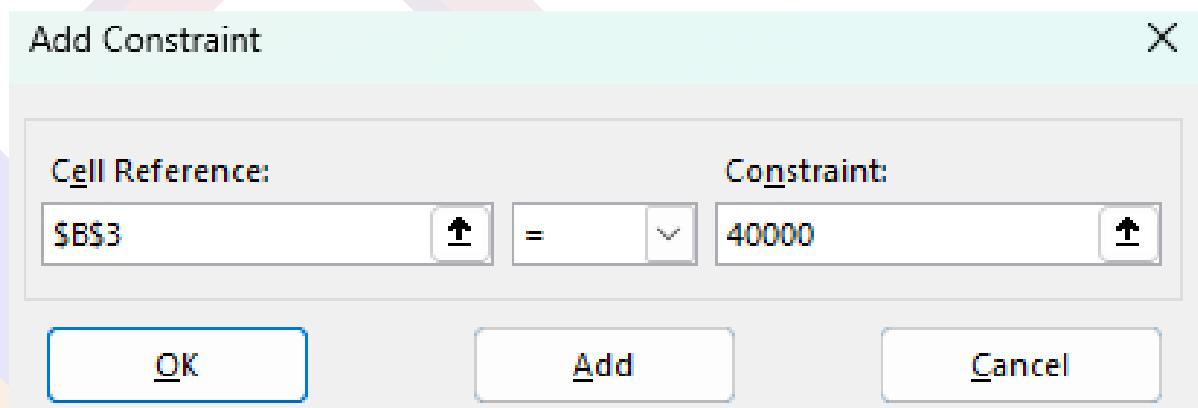
The Excel Solver Constraints are restrictions or limits of the possible solutions to the problem. To put it differently, constraints are the conditions that must be met.

To add a constraint(s), do the following:

- Click the Add button right to the "Subject to the Constraints" box.



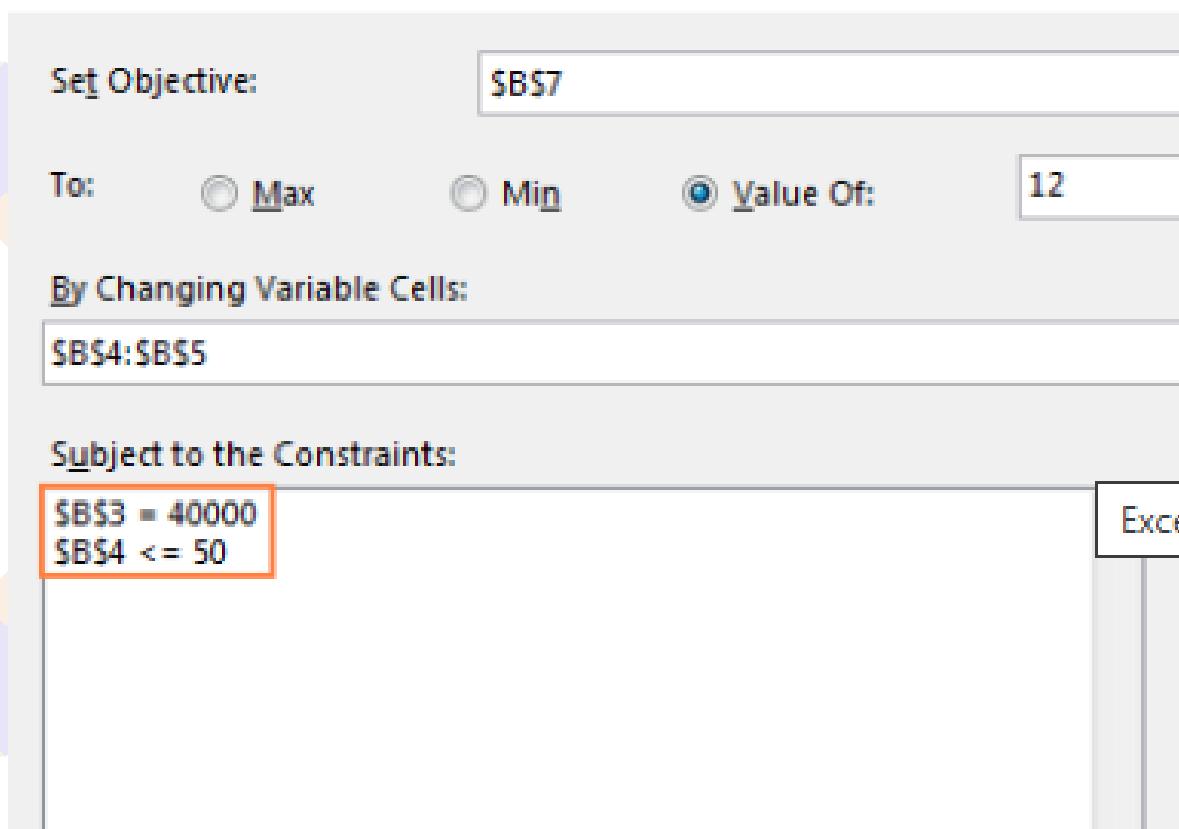
- In the Constraint window, enter a constraint.
- Click the Add button to add the constraint to the list.



- Continue entering other constraints.
- After you have entered the final constraint, click OK to return to the main Solver Parameters window.

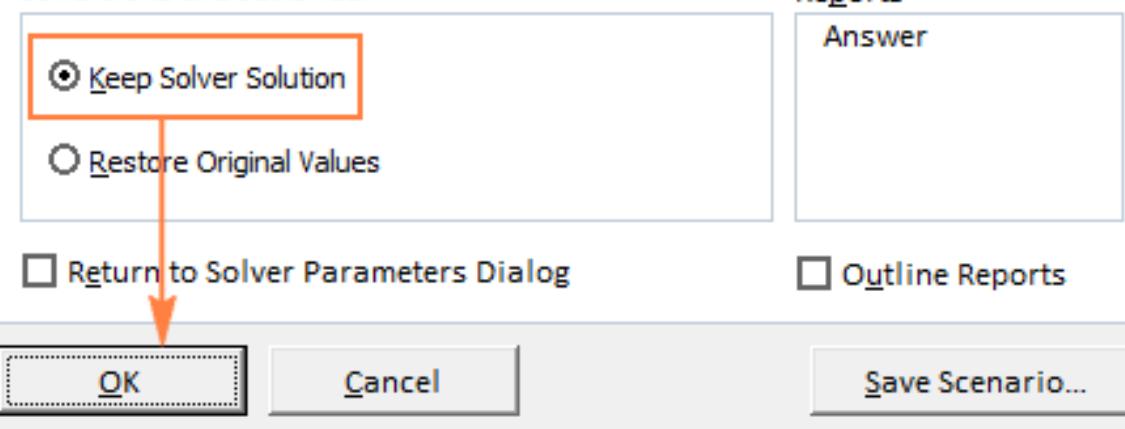
In this example, the constraints are:

- $B3=40000$ - cost of the new equipment is \$40,000.
- $B4 \leq 50$ - the number of projected patients per month is under 50.



- After you've configured all the parameters, click the Solve button at the bottom of the Solver Parameters window and let the Excel Solver add-in find the optimal solution for your problem.
- Depending on the model complexity, computer memory and processor speed, it may take a few seconds, a few minutes, or even a few hours.
- When Solver has finished processing, it will display the Solver Results dialog window, where you select Keep the Solver Solution and click OK:

Solver found a solution. All Constraints and optimality conditions are satisfied.



- The Solver Result window will close and the solution will appear on the worksheet right away.
- In this example, \$66.67 appears in cell B5, which is the minimal cost per service that will let you pay for the new equipment in 12 months, provided there are at least 50 clients per month:

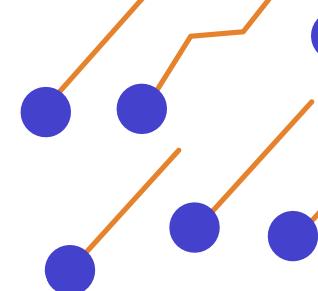
A	B	C	D
L	NEW SERVICE ANALYSIS		
3	Cost of new equipment	\$40,000	
4	Projected clients per month	50	
5	Cost per service	\$66.67	
7	No. of months to pay for equipment	11.99999972	= 12

2. Analysis ToolPak

- Analysis ToolPak is an Excel add-in that provides advanced statistical and engineering analysis tools.

It includes tools like:

- Histograms.
- Regression analysis.
- Descriptive statistics.
- ANOVA.



Practical Example: Descriptive Statistics

Scenario

You have a dataset of student exam scores and want to analyze the data using descriptive statistics.

	A	B
1	Student	Score
2	1	85
3	2	90
4	3	78
5	4	92
6	5	88
7	6	76
8	7	95
9	8	81
10	9	89
11	10	84
12		

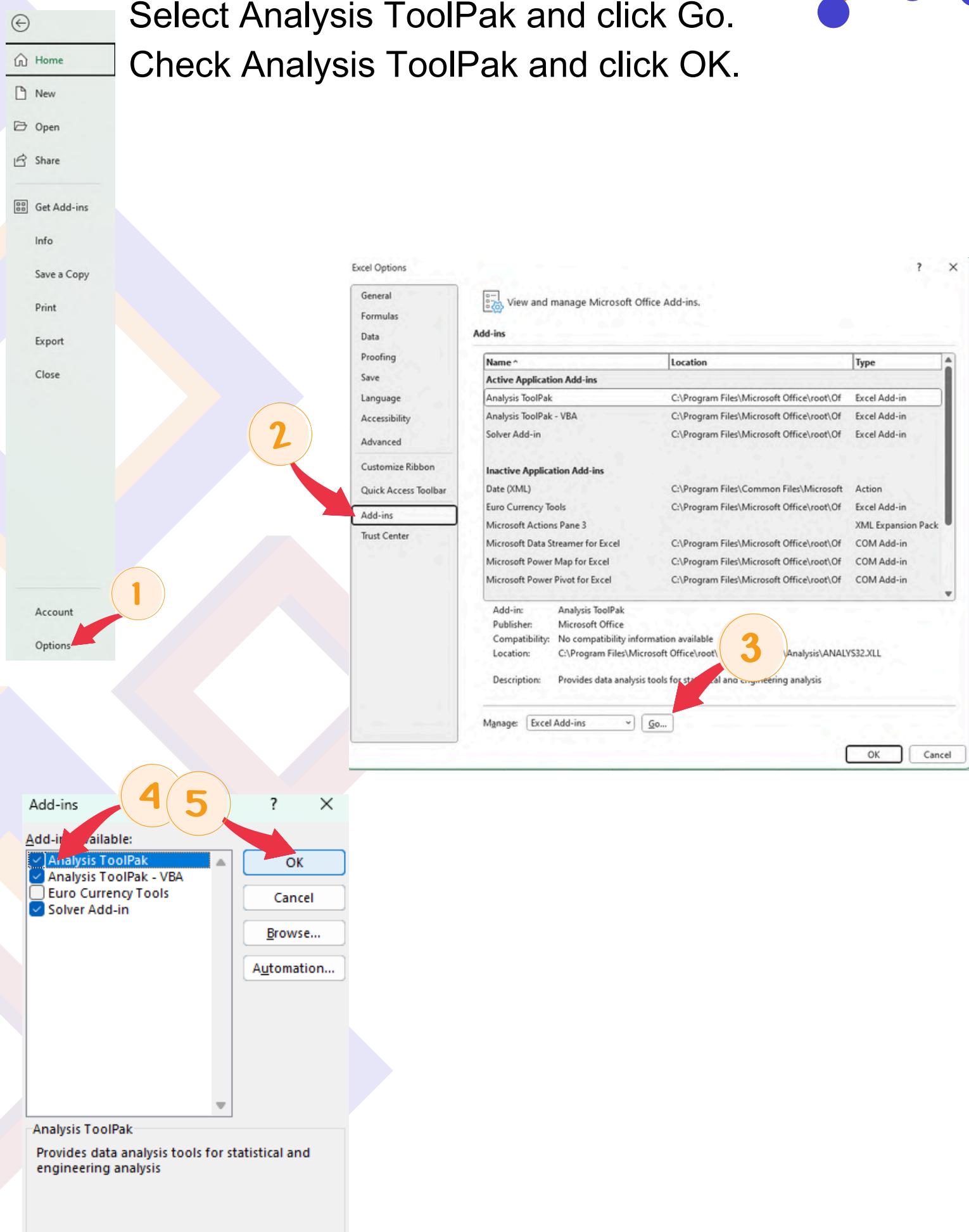
Step-by-Step Implementation

1. Enable Analysis ToolPak:

- Go to File → Options → Add-ins.

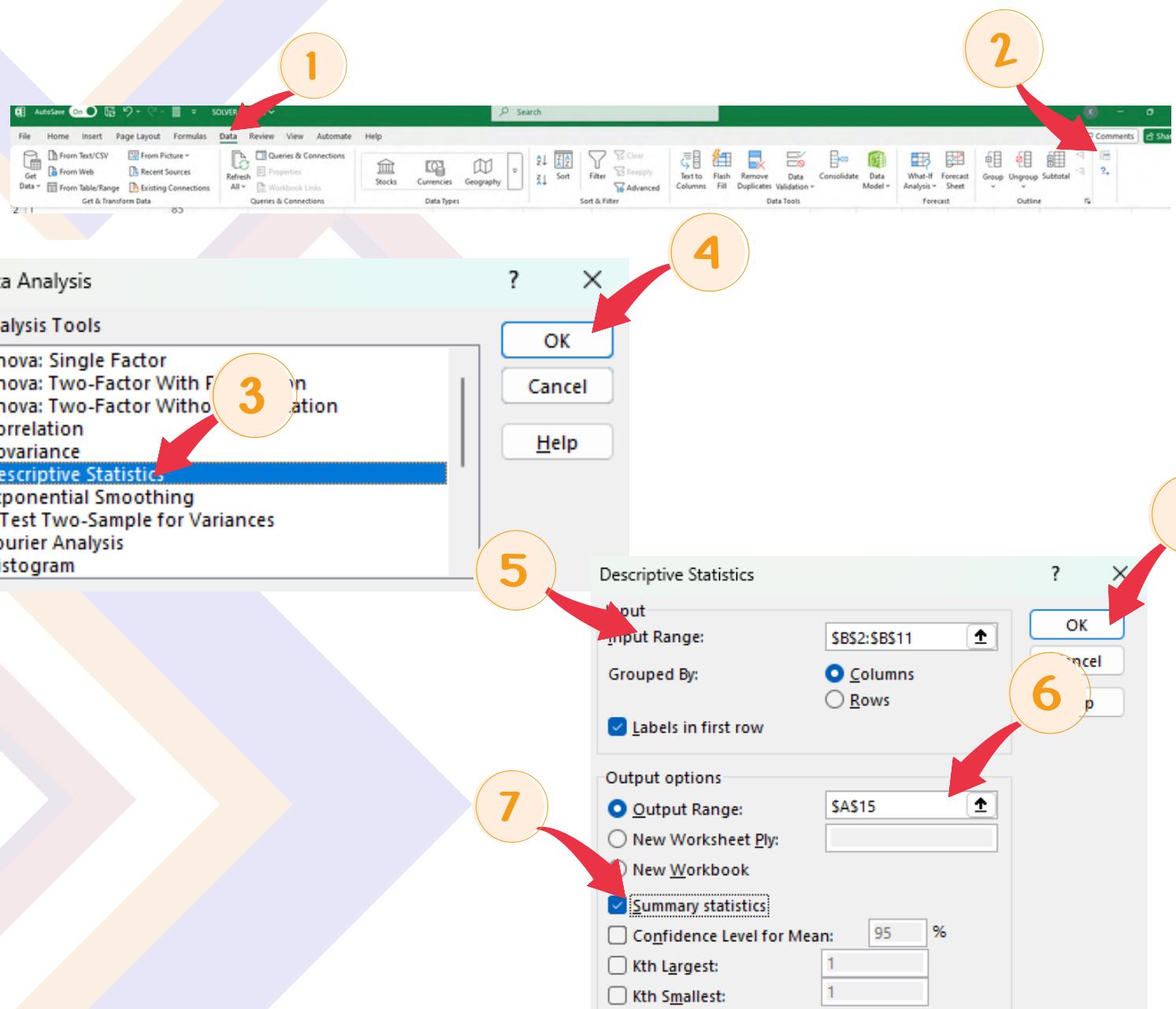
Select Analysis ToolPak and click Go.

Check Analysis ToolPak and click OK.

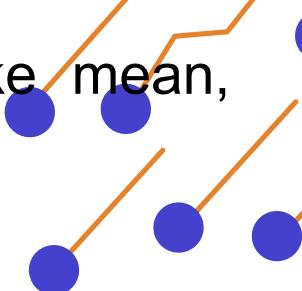


2. Run Descriptive Statistics:

- Go to the Data tab and click Data Analysis.
- Select Descriptive Statistics and click OK.
- In the dialog box:
 - Input Range: Select the Score column (B2:B11).
 - Grouped By: Columns.
 - Labels in First Row: Check if your data has headers.
 - Output Range: Select a cell for the results.
 - Check Summary Statistics.
- Click OK.



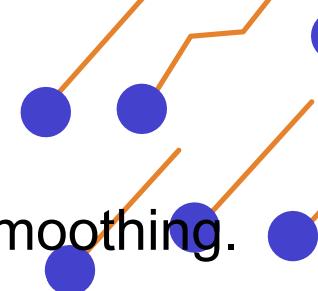
Excel will generate a table with statistics like mean, median, standard deviation, etc.



A	B	C	D
1 Student	Score		
2 1	85		
3 2	90		
4 3	78		
5 4	92		
6 5	88		
7 6	76		
8 7	95		
9 8	81		
10 9	89		
11 10	84		
12			
13			
14			
15 85			
16			
17 Mean	85.888888889		
18 Standard Error	2.169513799		
19 Median	88		
20 Mode	#N/A		
21 Standard Deviation	6.508541397		
22 Sample Variance	42.36111111		
23 Kurtosis	-1.182284946		
24 Skewness	-0.284475758		
25 Range	19		
26 Minimum	76		
27 Maximum	95		
28 Sum	773		
29 Count	9		
30			
31			
32			
33			

3. Forecasting Trends

Forecasting involves predicting future values based on historical data.



Excel provides tools like:

- Trendlines in charts.
- FORECAST.ETS function for exponential smoothing.
- Moving Averages.

Practical Example: Sales Forecasting

Scenario

You have monthly sales data for the past year and want to forecast sales for the next 6 months.

	A	B
1	Month	Sales
2	Jan-23	200
3	Feb-23	220
4	Mar-23	250
5	Apr-23	300
6	May-23	280
7	Jun-23	320
8	Jul-23	350
9	Aug-23	400
10	Sep-23	380
11	Oct-23	420
12	Nov-23	450
13	Dec-23	500

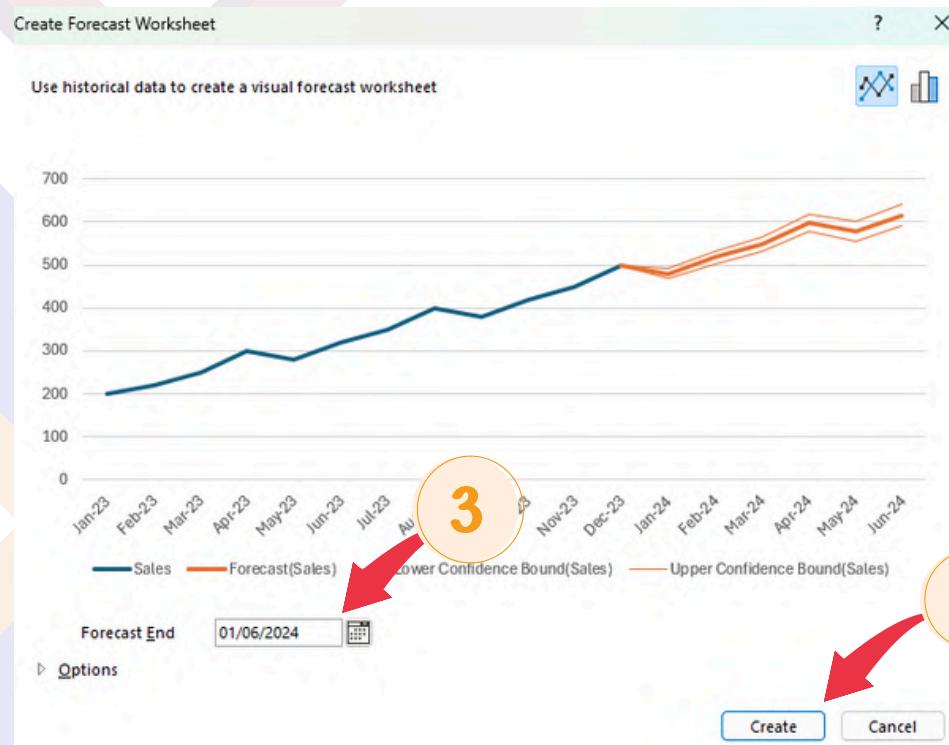
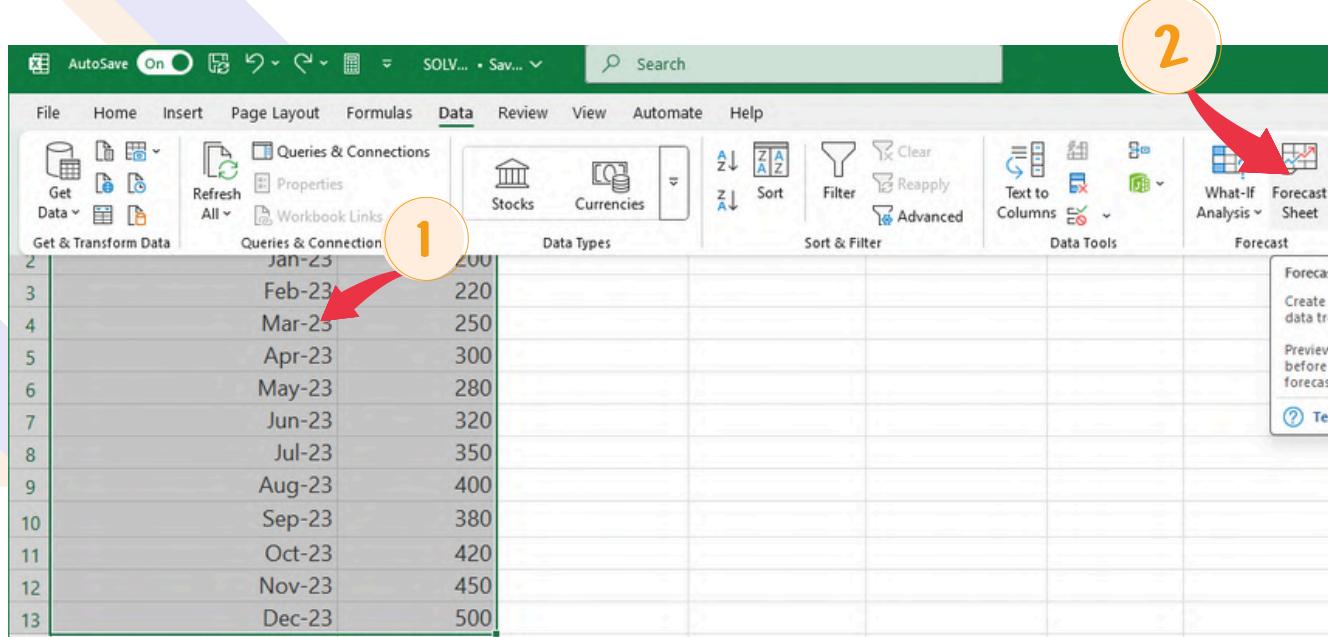
Step-by-Step Implementation

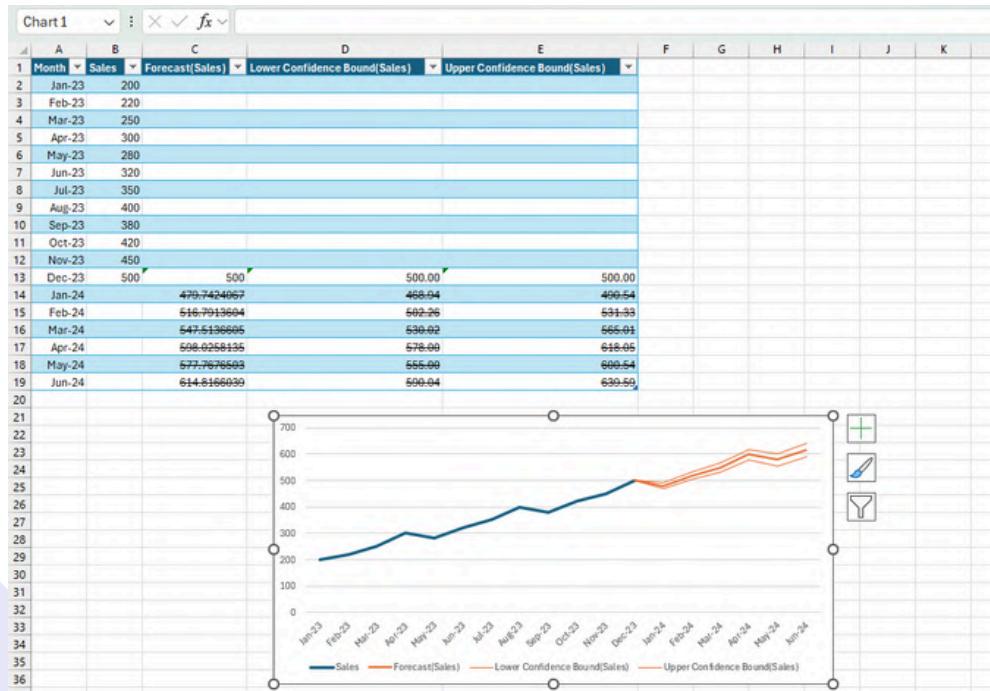
1. Add Forecast Sheet:

- Select the data range (A1:B13).
- Go to the Data tab and click Forecast Sheet.
- In the dialog box, set the forecast end date (e.g., Jun 2024).
- Click Create.

2. Review the Forecast:

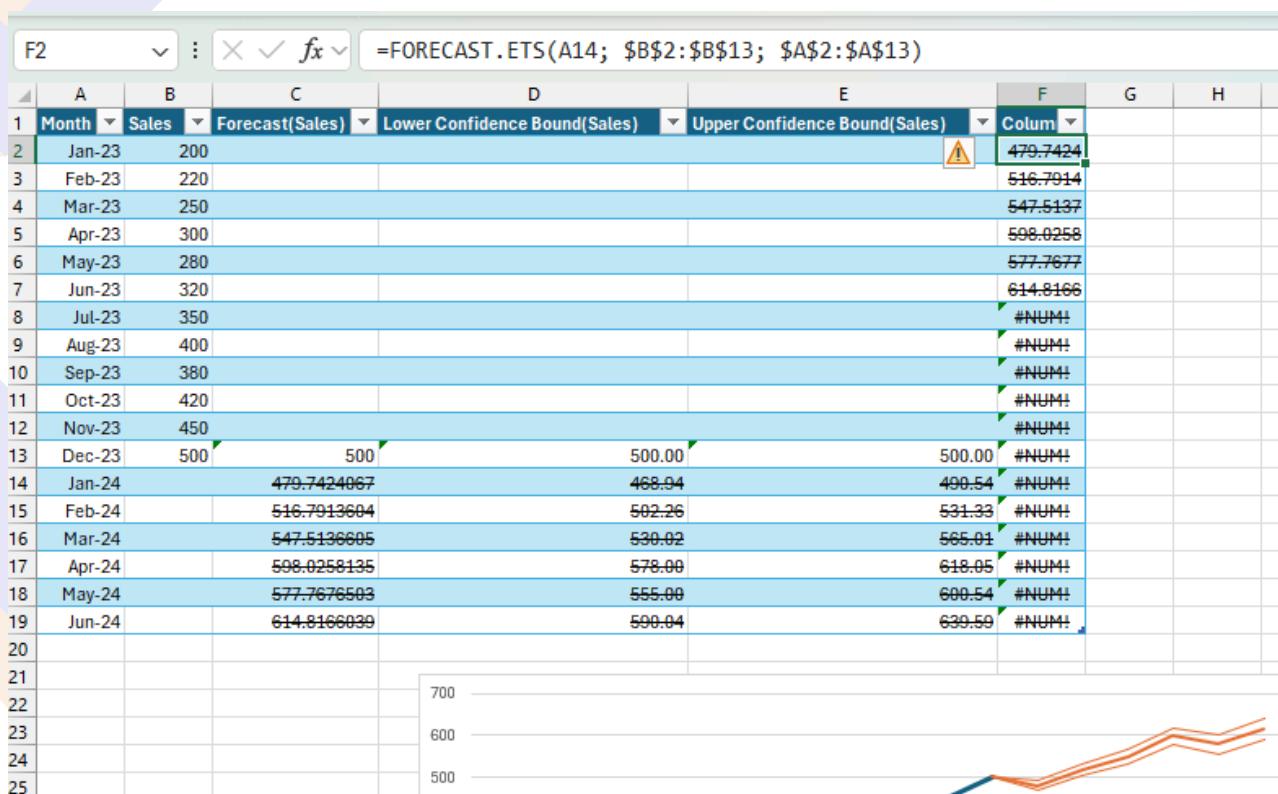
- Excel will generate a forecast chart and table with predicted values and confidence intervals.



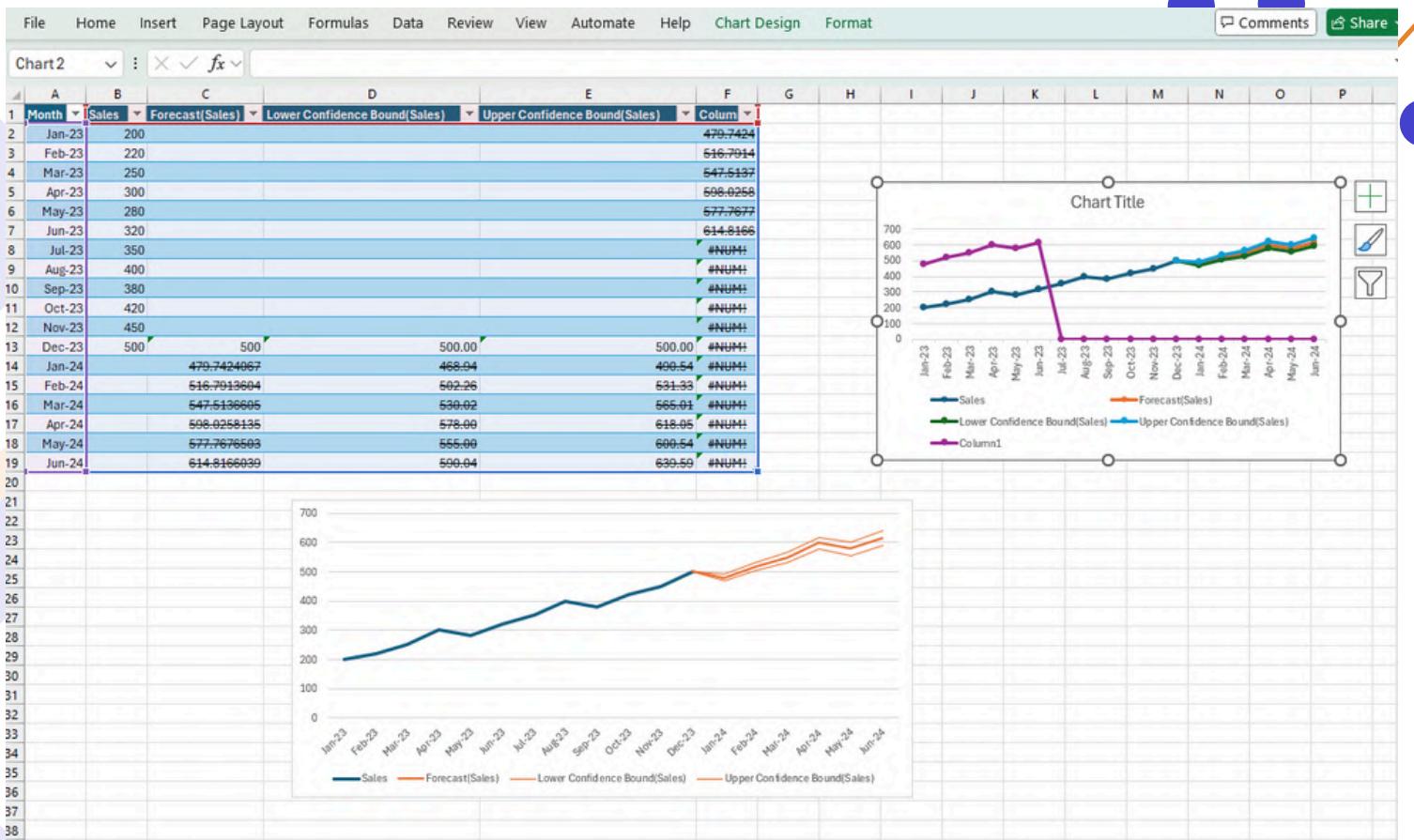


3. Use FORECAST.ETS Function:

- In a new column, use the formula:



Additionally, we can also create a line chart in order to show and visualize the whole data in a more organized way.



Trendlines in Charts

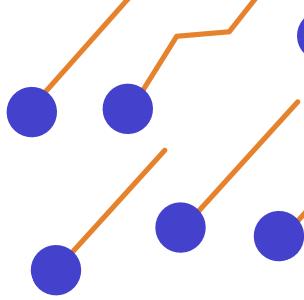
A trendline is a line added to a chart to show the general direction (trend) of the data.

It's useful for identifying patterns, such as upward, downward, or flat trends.

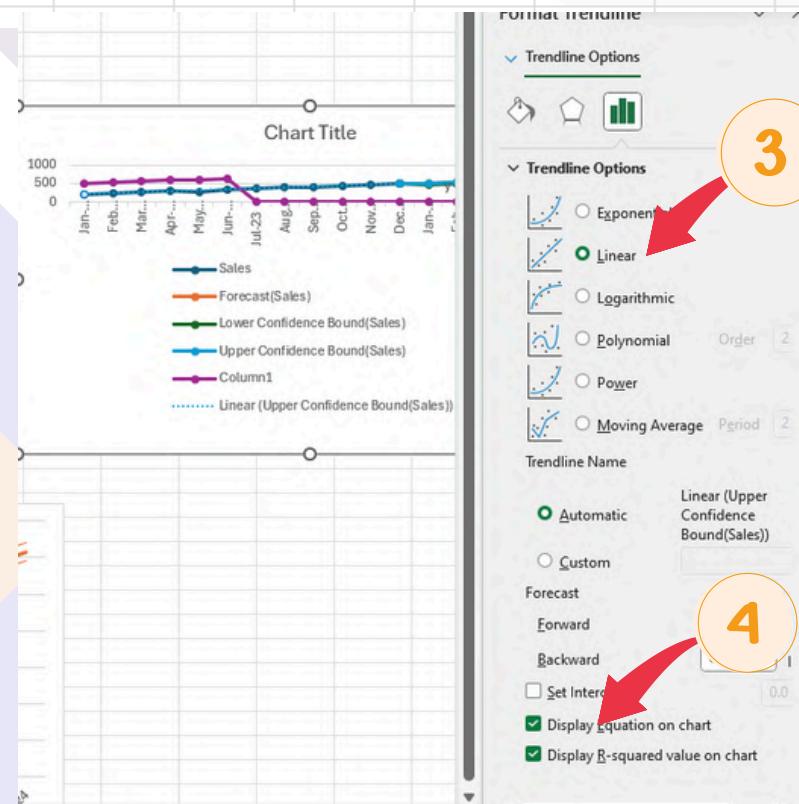
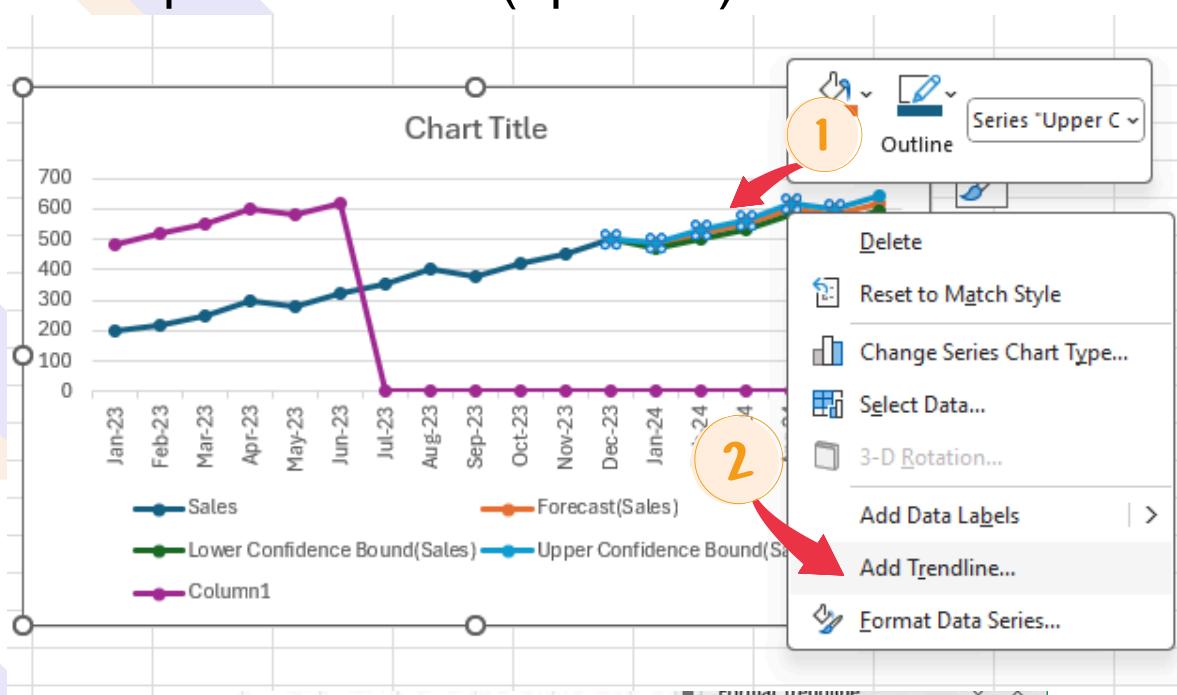
- Types of trendlines in Excel:
 - Linear.
 - Exponential.
 - Polynomial.
 - Moving Average.

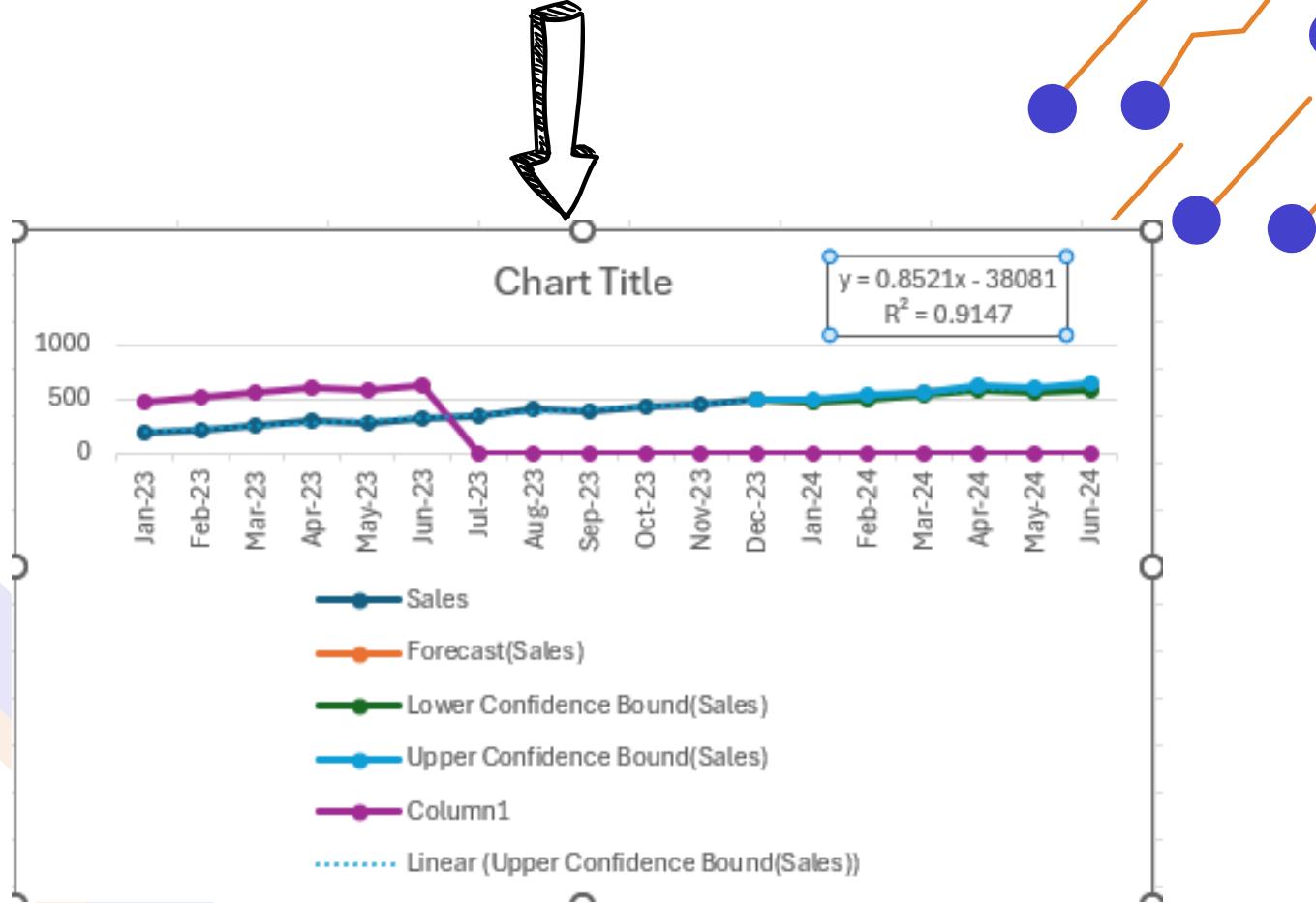
In our last example, we can add a trendline to our line chart in the following way

Step by Step Implementation



- Click on the line in the chart to select it.
- Right-click and choose Add Trendline.
- In the Format Trendline pane:
 - Choose the type of trendline (e.g., Linear).
 - Check Display Equation on Chart and Display R-squared Value (optional).





Moving Averages

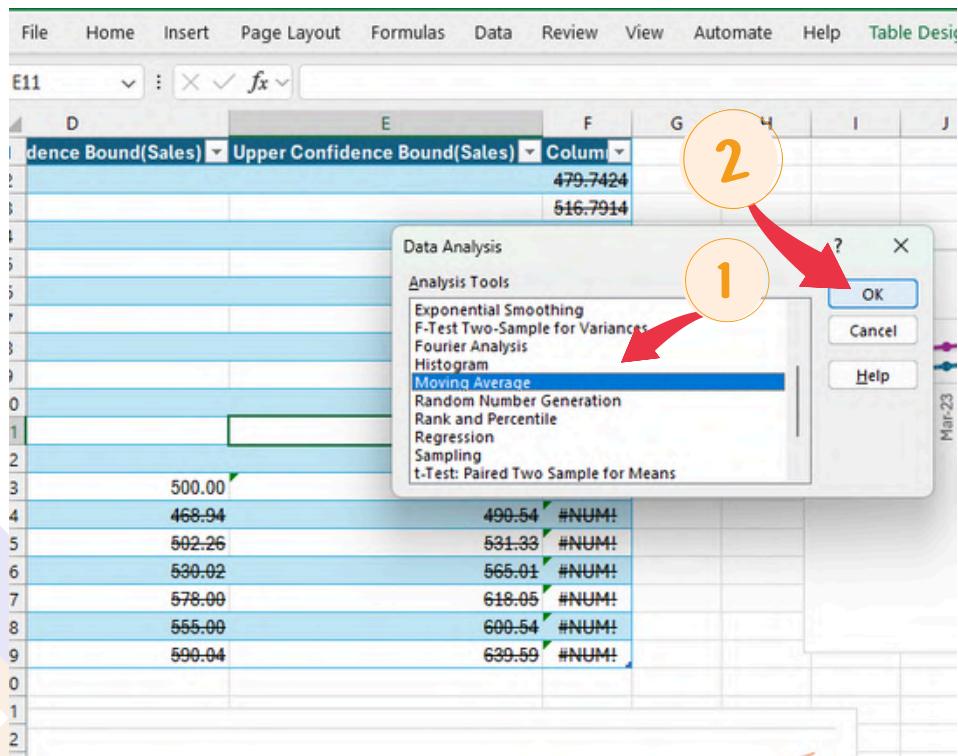
A Moving Average smooths out fluctuations in data to highlight trends.

It calculates the average of a specific number of past data points (e.g., 3-month moving average).

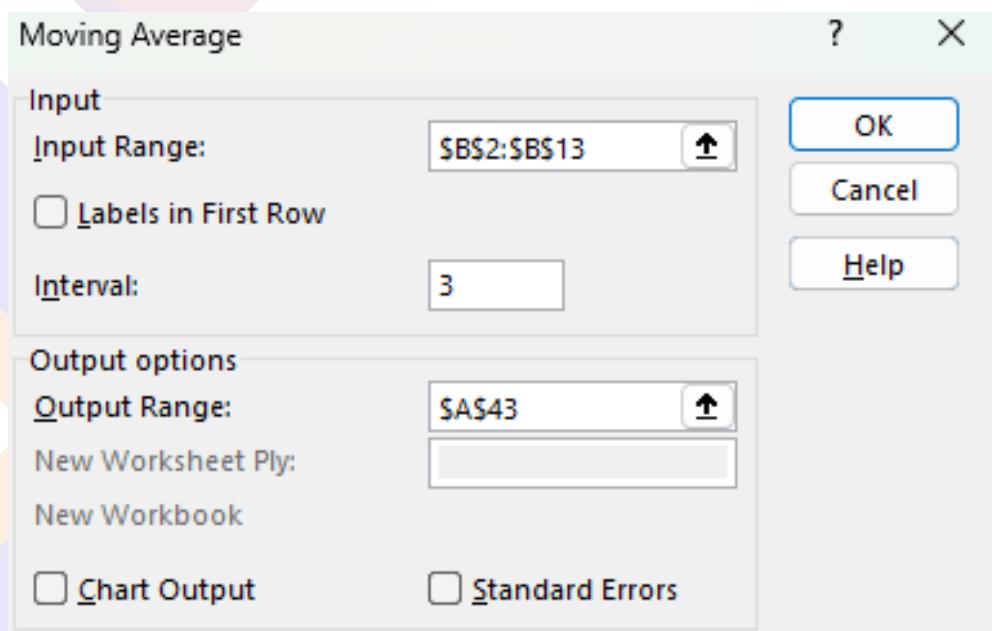
Commonly used in financial analysis, sales forecasting, and stock market trends.

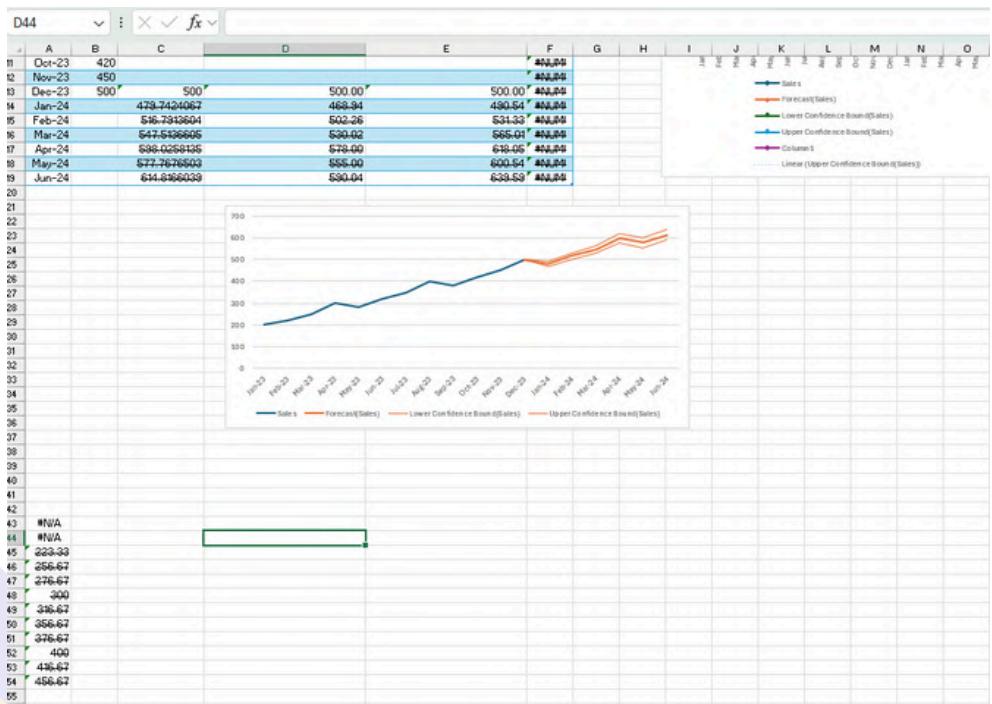
Example:

We can implement the moving average by going to the data analysis section and then clicking on moving average



- Go to the Data tab and click Data Analysis.
- Select Moving Average and click OK.
- In the dialog box:
 - Input Range: Select the Sales column (B2:B13).
 - Interval: Enter 3 (for a 3-month moving average).
 - Output Range: Select a cell for the results.
- Click OK.





Chapter 13:

Collaboration

and Sharing

Sharing Workbooks

Sharing workbooks in Excel allows multiple users to collaborate on a document simultaneously. This feature is essential for teams working on financial reports, project management, or any shared dataset that requires real-time updates.

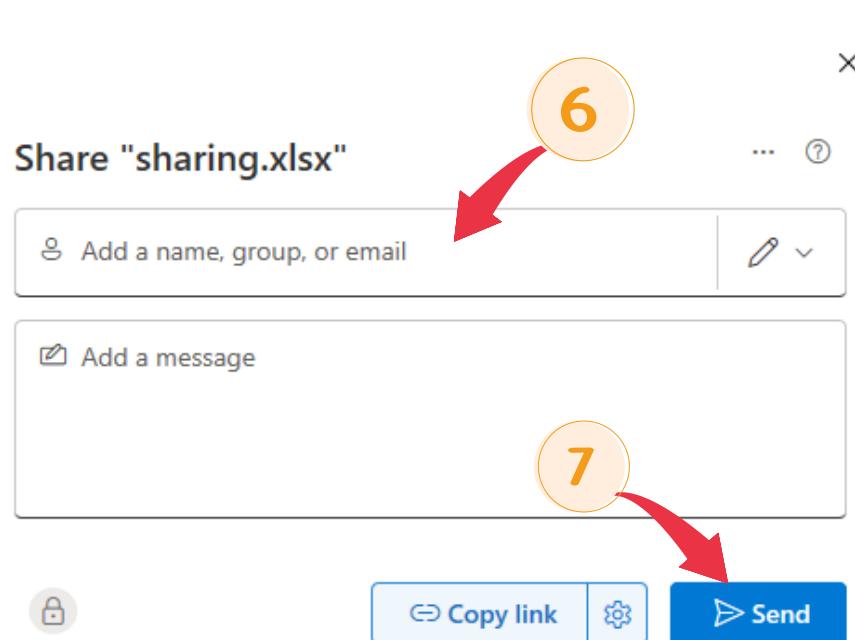
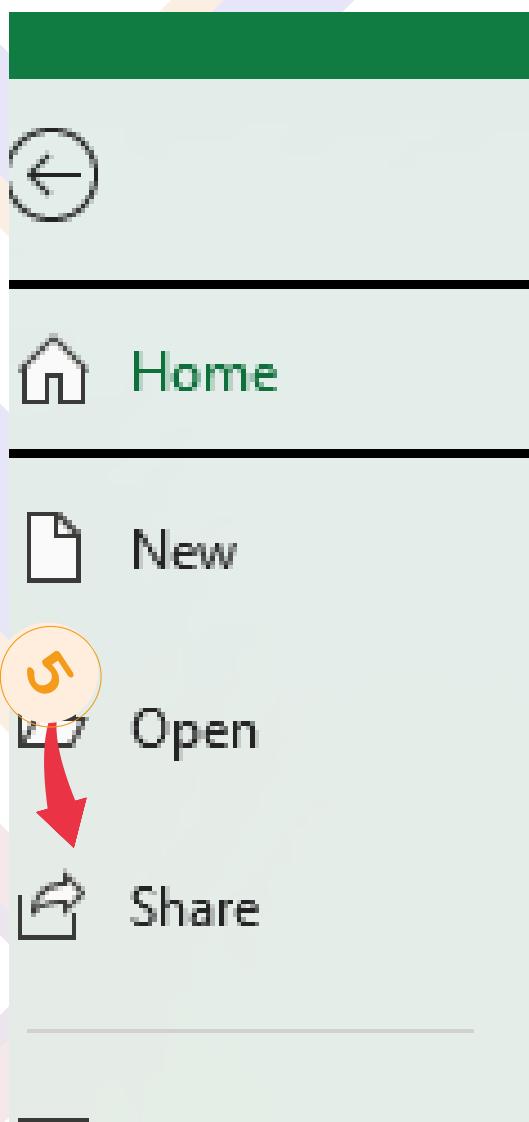
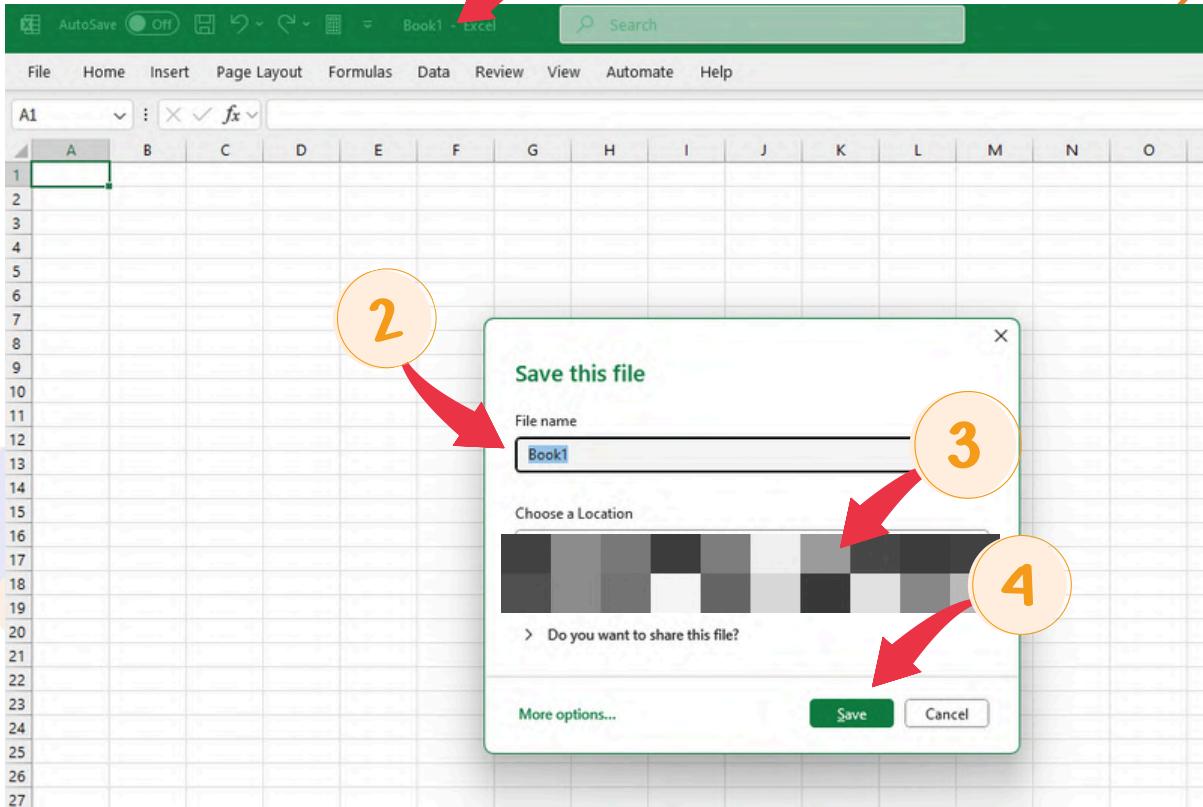
There are three primary ways to share a workbook:

1. Using OneDrive
2. Enabling Shared Workbook Feature (Older Versions)
 - Allows multiple users to edit simultaneously.
3. Co-Authoring in Excel 365 – Provides real-time collaboration with automatic updates.

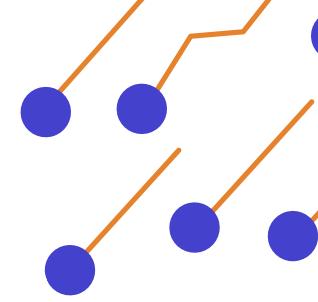
Practical Example: Team Collaboration on a Sales Report

Step-by-Step Guide to Sharing via OneDrive

1. Save your workbook to OneDrive:
 - Click File > Save As > OneDrive.
2. Share with team members:
 - Click File > Share.
 - Enter email addresses of collaborators.
 - Choose Can Edit or View Only.
3. Monitor changes in real-time:
 - Each user's edits will appear instantly.



2. Tracking Changes and Comments



Tracking changes allows users to monitor edits made to a workbook, while comments provide a way to discuss specific data points within a shared file. This feature is useful for auditing data modifications and collaborative feedback.

To use the Excel tracking feature most effectively, there are a few points for you to remember.

1. Track Changes is only available in shared workbooks

Excel's Track Changes works only in shared workbooks. So, whenever you turn on tracking in Excel, the workbook becomes shared, meaning that multiple users can make their edits simultaneously. That sounds great, but sharing a file has its drawbacks too. Not all Excel features are fully supported in shared workbooks including conditional formatting, data validation, sorting and filtering by format, merging cells, to name a few. For more information, please see our Excel shared workbook tutorial.

2. Track Changes cannot be used in workbooks that contain tables

If the Track Changes button is unavailable (grayed out) in your Excel, most likely your workbook contains one or more tables or XML maps, which are not supported in shared workbooks. In that case, convert your tables to ranges and remove XML maps.

3. It's not possible to undo changes in Excel

In Microsoft Excel, you cannot revert the worksheet back in time by undoing changes like you can do in Microsoft Word. Excel's Track Changes is rather a log file that records information about the changes made to a workbook. You can manually review those changes and choose which ones to keep and which ones to override.

4. Not all changes are tracked in Excel

Excel does not track every single change. Any edits you make to cell values are tracked, but some other changes like formatting, hiding/unhiding rows and columns, formula recalculations are not.

5. Change history is kept for 30 days by default

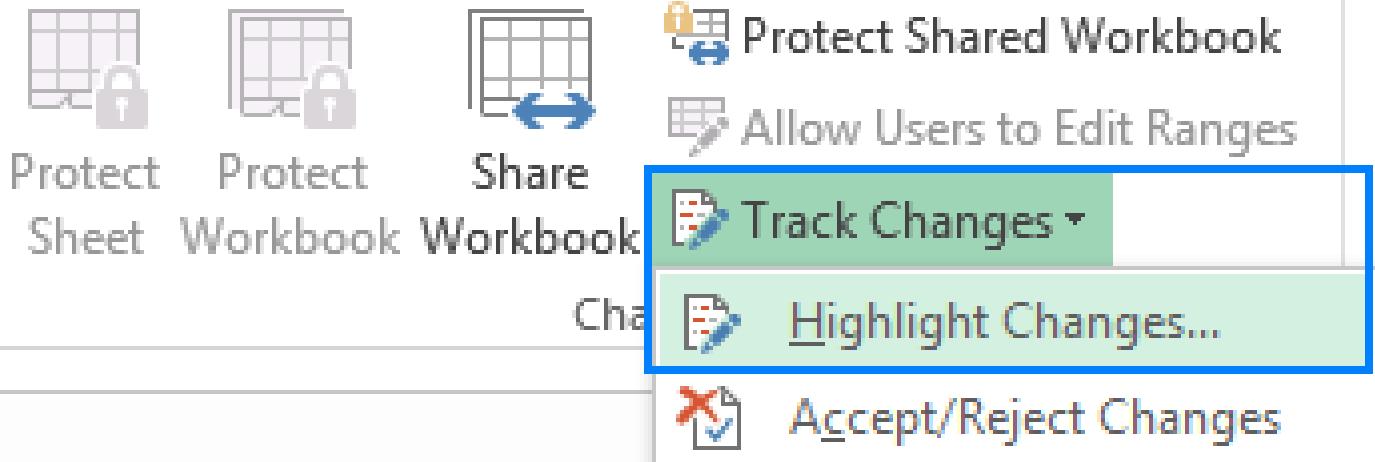
By default, Excel keeps the change history for 30 days. If you open an edited workbook, say, in 40 days, you will see the change history for all 40 days, but only until you close the workbook. After closing the workbook, any changes older than 30 days will be gone. However, it's possible to change the number of days for keeping change history.

How to track changes in Excel

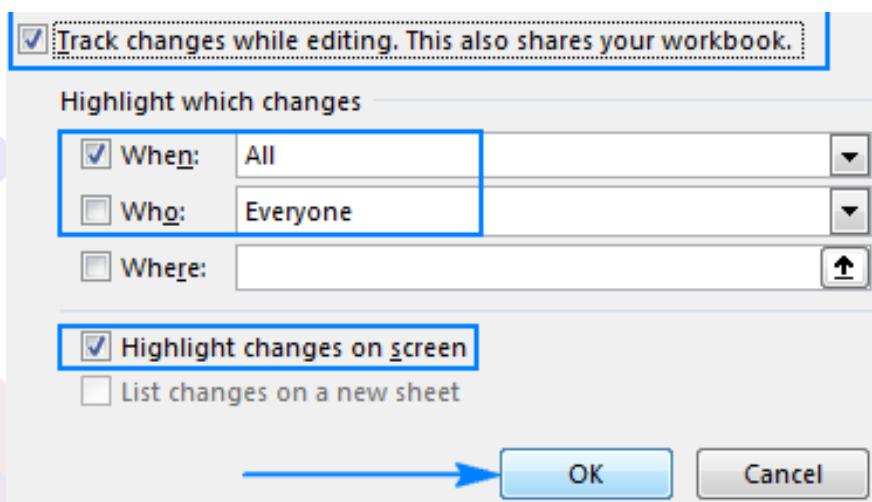
Turn on Excel Track Changes feature

To view the changes made to a given workbook by you or other users, perform these steps:

1. On the Review tab, in the Changes group, click the Track Changes button, and then select Highlight Changes....



- In the Highlight Changes dialog box, do the following:
- Check the Track changes while editing. This also shares your workbook. box
 - Under Highlight which changes, select the desired time period in the When box, and whose changes you want to see in the Who box (the screenshot below shows the default settings).
 - Select the Highlight changes on screen option.
 - Click OK.



If prompted, allow Excel to save your workbook, and you are done!

Excel will highlight edits by different users in different colors as shown in the next section. Any new changes will be highlighted as you type.

Tip. If you are enabling Excel Track Changes in a shared workbook (which is indicated by the word [Shared] appended to the workbook name), the List changes on a new sheet will also be available. You can select this box too to view full details about each change on a separate sheet.

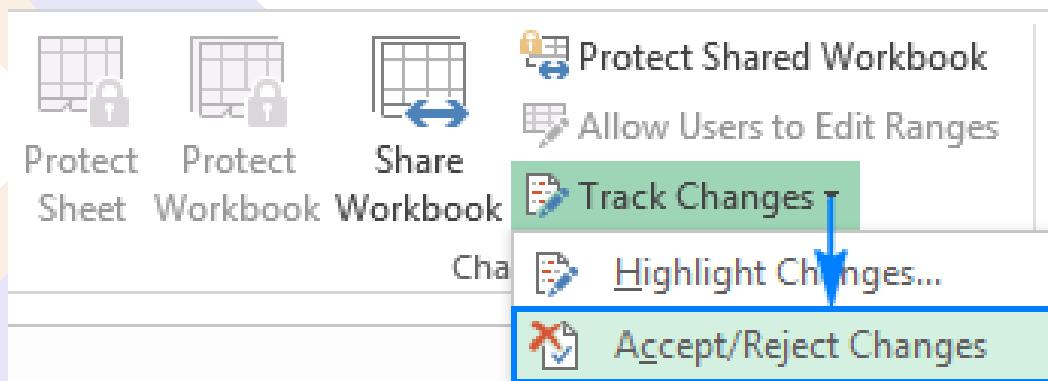
Highlight changes on screen

With Highlight changes on screen selected, Microsoft Excel shades the column letters and row numbers where changes were made in a dark red color. At the cell level, edits from different users are marked in different colors - a colored cell border and a small triangle in the upper-left corner. To get more information about a specific change, just hover over the cell:

	A	B	C	D	E	F	G	H	I
1	Order ID	Item	Amount	Status					
2	1001	Apples	\$100	Canceled					
3	1002	Oranges	\$120	In transit					
4	1003	Bananas	\$150	Delivered					
5	1004	Bananas	\$130	Delivered					
6	1005	Oranges	\$170	Canceled					
7	1006	Apples	\$150	Delivered					
8	1007	Lemons	\$210	Canceled					
9	1008	Oranges	\$175	In transit					
10	1009	Lemons	\$220	Delivered					

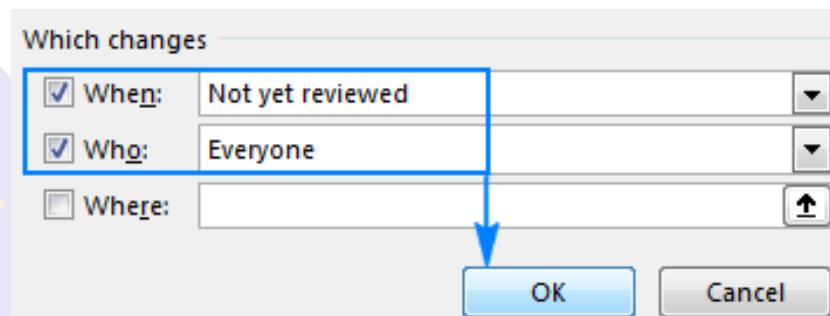
Accept or reject changes

To accept or reject changes made by different users, go to the Review tab > Changes group, and click Track Changes > Accept/Reject Changes.

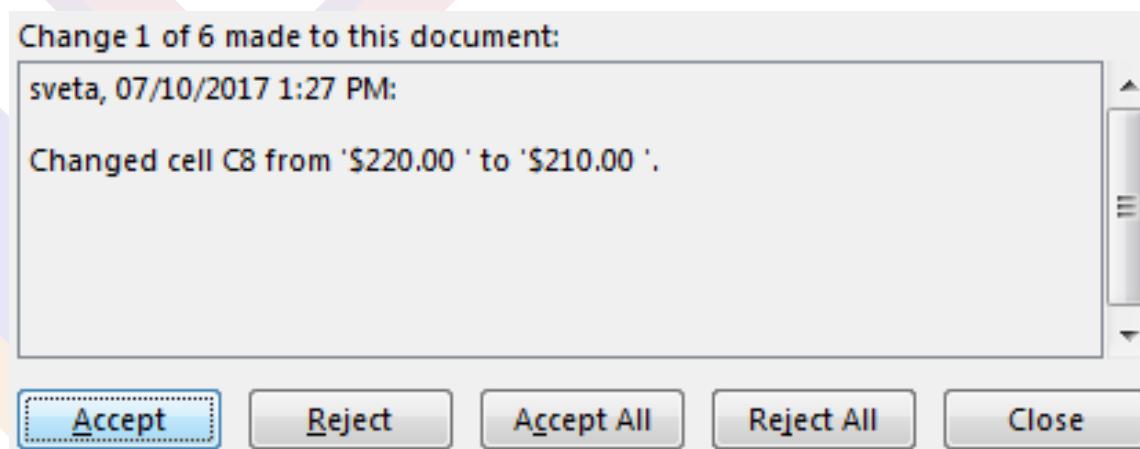


In the Select Changes to Accept or Reject dialog box, configure the following options, and then click OK:

- In the When list, choose either Not yet reviewed or Since date.
- In the Who list, select the user whose changes you want to review (Everyone, Everyone but me or a specific user).
- Clear the Where box.



Excel will show you the changes one by one, and you click Accept or Reject to keep or cancel each change individually.



If several edits were made to a given cell, you will be asked which of the changes you want to keep:



Protecting and Securing Workbooks

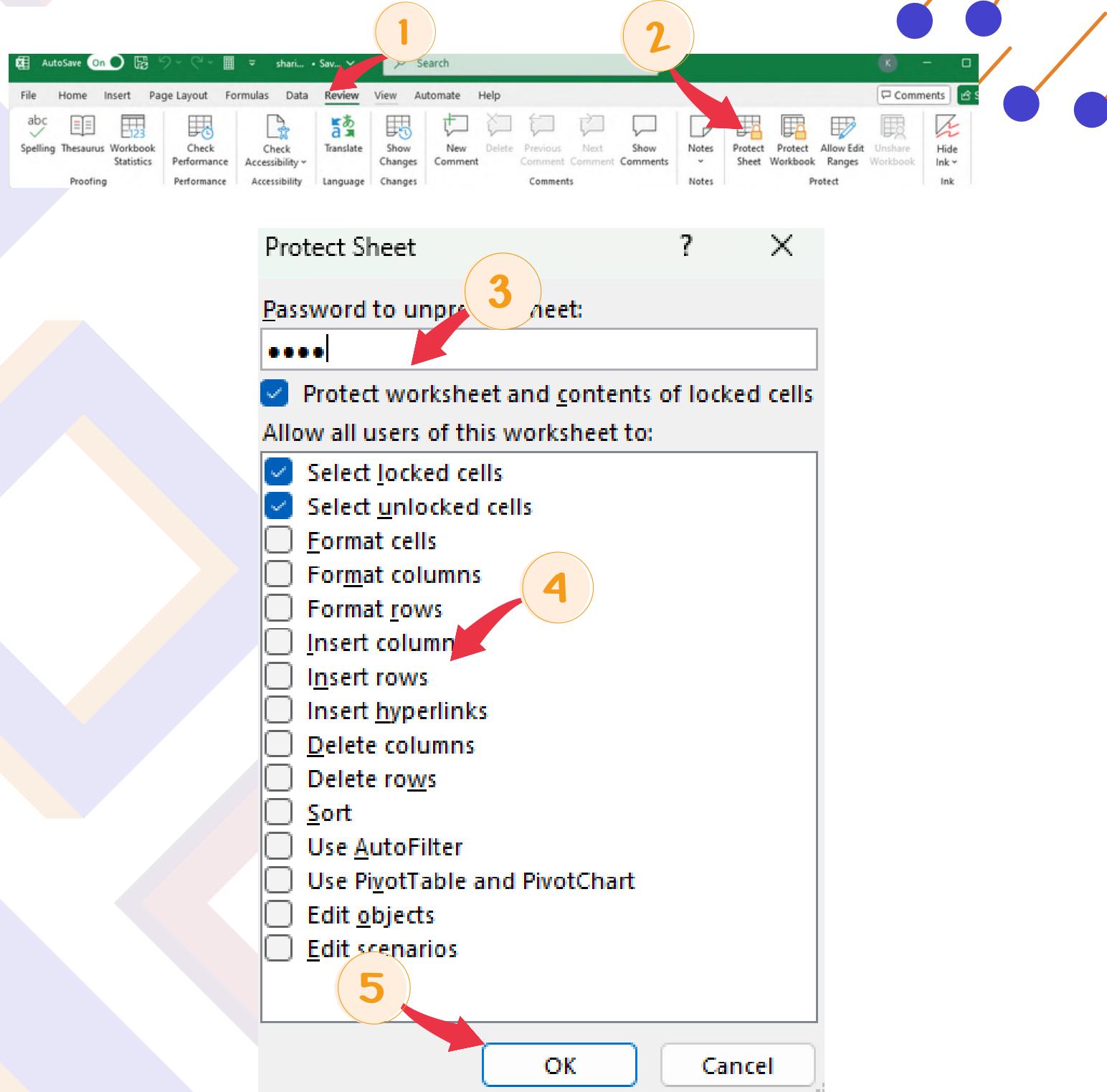
Protecting workbooks ensures data integrity by preventing unauthorized modifications. You can:

- Protect individual sheets (e.g., lock specific formulas).
- Restrict editing permissions.
- Encrypt with a password.

Practical Example: Locking a Financial Report

Step-by-Step Guide to Protecting a Sheet

1. Click Review > Protect Sheet.
2. Set a password (optional) and select elements to restrict.
3. Click OK to apply protection.



Step-by-Step Guide to Encrypting a Workbook

1. Click File > Info > Protect Workbook.
2. Select Encrypt with Password.
3. Enter a password and confirm it.
4. Save the workbook to apply security settings.



Home

New

Open

Share

Get Add-ins

1

Info



Save a Copy

Print

Export

Close

sharing • Saved



Home

New

Open

Share

Get Add-ins

Info

Save a Copy

Print

Export

Info

sharing

OneDrive - Universitas Mercubuana

Share

Copy path

Copy local path

Open file location



Protect Workbook

Control what types of changes people can make to this workbook.

Inspect Workbook

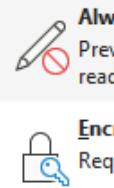
Before publishing this file, be aware that it contains:

- Document properties, document server properties, content type information, author's name and absolute path
- Custom XML data



Protect Workbook

Control what types of changes people can make to this workbook.



Always Open Read-Only

Prevent accidental changes by requiring readers to opt-in to editing.

3



Encrypt with Password

Require a password to open this workbook.



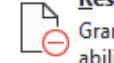
Protect Current Sheet

Control what types of changes people can make to the current sheet.



Protect Workbook Structure

Prevent unwanted changes to the structure of the workbook, such as adding sheets.



Restrict Access

Grant people access while removing their ability to edit, copy, or print.



Add a Digital Signature

Ensure the integrity of the workbook by adding an invisible digital signature.



Mark as Final

Let readers know the document is final.

Encrypt the contents of this file

Password:

••••

Caution: If you lose or forget the password, it cannot be recovered. It is advisable to keep a list of passwords and their corresponding document names in a safe place.
(Remember that passwords are case-sensitive.)

OK

Cancel

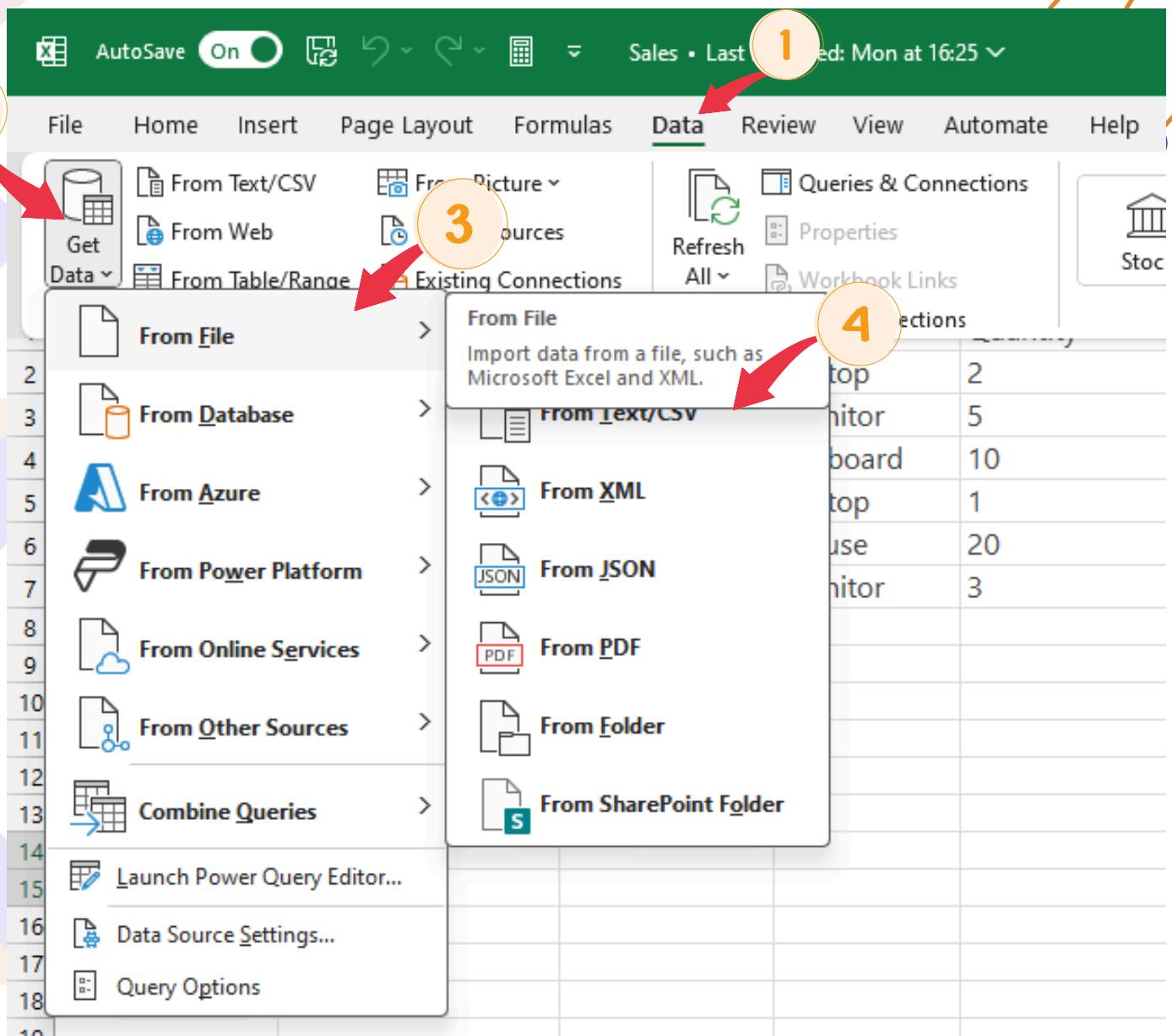
Exporting and Importing Data

Excel supports importing and exporting data from various sources like CSV files, databases, and external applications (e.g., Google Sheets, SQL databases).

Practical Example: Importing a CSV File of Customer Data

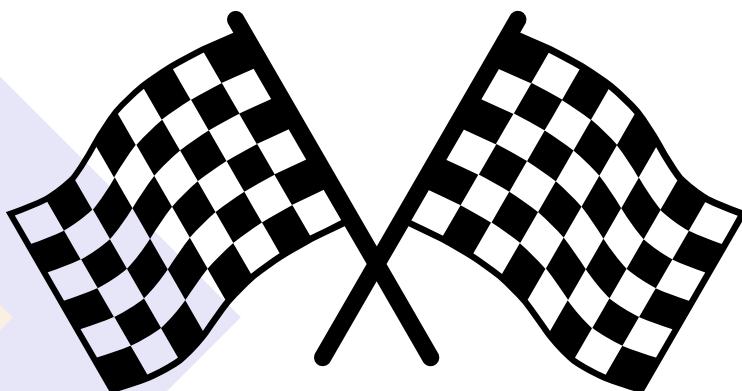
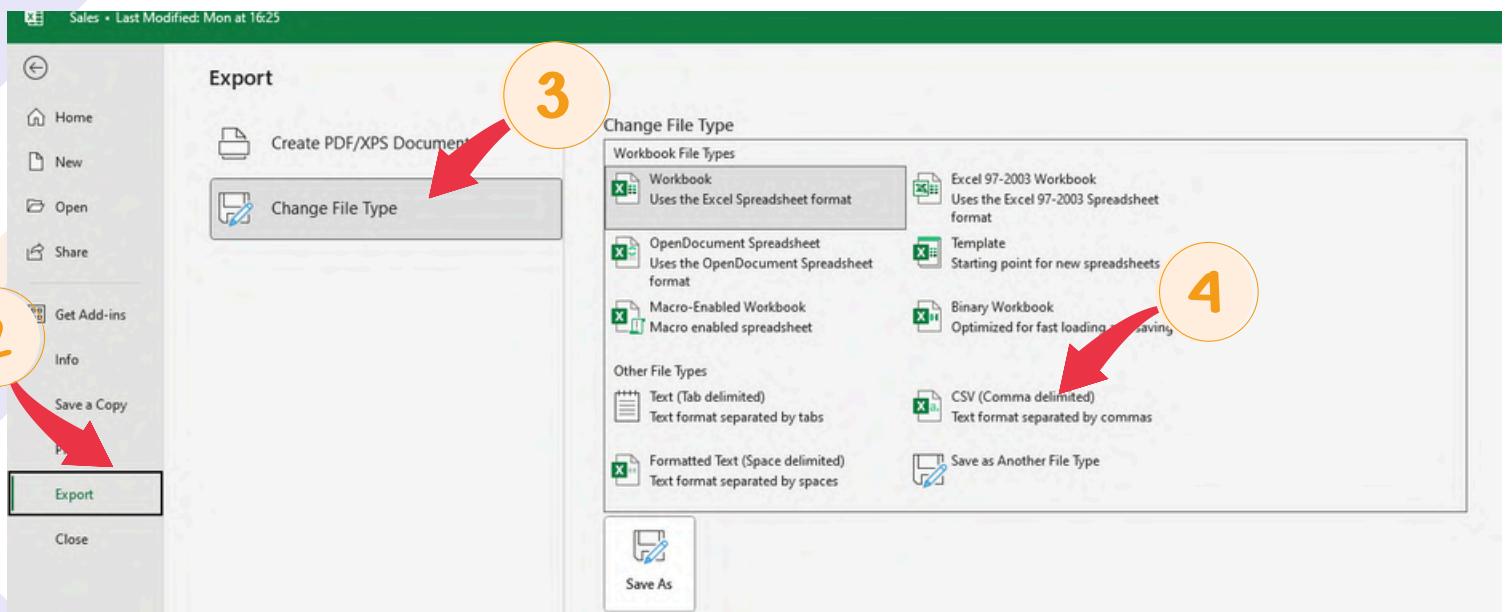
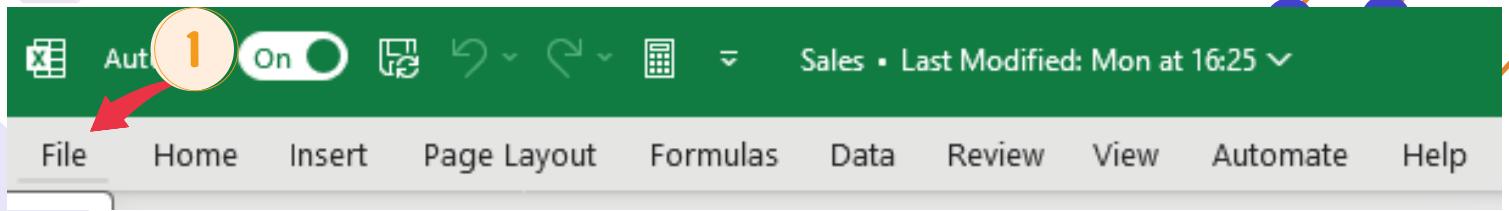
Step-by-Step Guide to Importing a CSV File

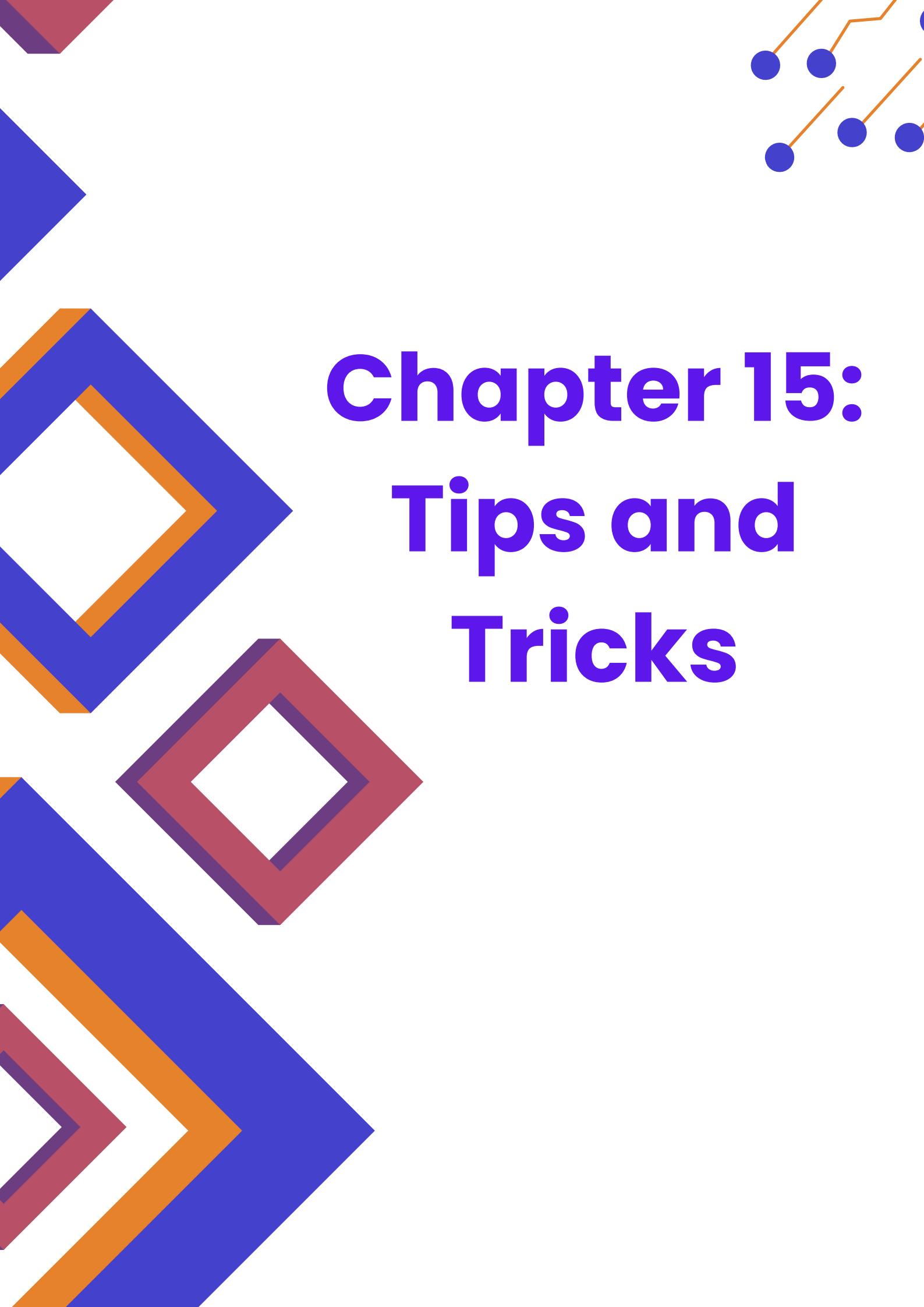
1. Go to Data > Get External Data > From Text/CSV.
2. Select the CSV file and click Import.
3. Choose delimiter settings and click Load.



Practical Example: Exporting Excel Data to a CSV File

1. Click File > Save As.
2. Select CSV format and choose a save location.
3. Click Save to export.



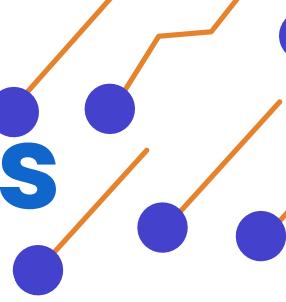


Chapter 15:

Tips and

Tricks

Keyboard Shortcuts



- Keyboard shortcuts are combinations of keys that perform specific tasks in Excel, saving time and reducing reliance on the mouse.
- They are essential for improving efficiency, especially when working with large datasets or repetitive tasks.

Practical Example: Essential Keyboard Shortcuts

Scenario

- You are working on a large dataset and want to perform common tasks quickly using keyboard shortcuts.

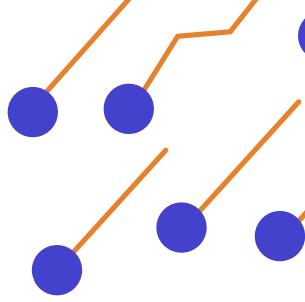
Step-by-Step Implementation

1. Navigation Shortcuts

- Ctrl + Arrow Key: Move to the edge of the data region.
- Ctrl + Home: Go to the beginning of the worksheet (cell A1).
- Ctrl + End: Go to the last cell with data.

2. Selection Shortcuts:

- Shift + Arrow Key: Select cells in a direction.
- Ctrl + Shift + Arrow Key: Select an entire range of data.
- Ctrl + A: Select the entire dataset.



3. Editing Shortcuts:

- F2: Edit the active cell.
- Ctrl + C: Copy selected cells.
- Ctrl + V: Paste copied cells.
- Ctrl + Z: Undo the last action.
- Ctrl + Y: Redo the last action.

4. Formatting Shortcuts

- Ctrl + B: Apply or remove bold formatting.
- Ctrl + I: Apply or remove italic formatting.
- Ctrl + U: Apply or remove underline formatting.

5. Formula Shortcuts:

- Alt + =: Auto-sum selected cells.
- F4: Toggle between absolute and relative references in formulas.

File management		Formatting		Text	
New workbook	Ctrl + N	Bold	Ctrl + B	Find	Ctrl + F
Open	Ctrl + O	Underline	Ctrl + U	Replace	Ctrl + H
Save	Ctrl + S	Italic	Ctrl + I	Delete 1 character to the left	Backspace
Save as	F12	Remove fill color	Alt H H N	Delete 1 word to the left	Ctrl + Backspace
Close workbook	Ctrl + W	Remove borders	Alt H B N	Contextual menu (=right-click)	Shift + F10
Close application	Alt + F4	Add borders (all)	Alt H B A	Run a spelling and grammar check	F7
Move to the next/previous sheet	Ctrl + [/]	Add borders (external)	Alt H B S		
Add new sheet	Shift + Alt + F1	Add borders (thick)	Alt H B T		
Rename active sheet	Alt H O R	Format as percentage	Ctrl + Shift + %		
Delete active sheet	Alt H D S	Open the format dialog box	Ctrl + Shift + F		
Copy and paste		Autofit columns		Data	
Copy	Ctrl + C	Autofit rows	Alt H O I	Merge cells	Alt H M C
Paste	Ctrl + V		Alt H O A	Unmerge cells	Alt H M U
Paste to the right	Ctrl + R			Add/remove filter	Ctrl + Shift + L
Paste down	Ctrl + D			Show values in a filter or list	Alt + ↓
Cut	Ctrl + X			Check/uncheck values in a filter's list	Space
Duplicate	Ctrl + D			Insert Table	Alt N T
Paste as formula	Alt H V F			Insert PivotTable	Alt N V
Paste as value	Alt H V V				
Delete selection	Ctrl + -				
Insert cells/rows/columns	Ctrl + +				
Cancel and repeat		Selection		Windows	
Cancel	Ctrl + Z	Select all	Ctrl + A	Go to Desktop	Alt + D
Cancel cancellation	Ctrl + Y	Go to end of range	Ctrl + Arrow	Open Computer	Alt + E
Repeat last action	F4	Add 1 cell to the selection	Shift + Arrow	Open Clipboard history	Alt + V
Date and time		Add 1 range to the selection	Ctrl + Shift + Arrow	Lock computer	Alt + L
Insert current date	Ctrl + ;	Move item up/down in bulleted list	Alt + Shift + Arrow	Launch speech-to-text	Alt + H
Insert current time	Ctrl + Shift + ;	Activation Selection Mode	F8	Show screen display options	Alt + P
		Select current row	Shift + Space	Screen clipping	Alt + Shift + S
		Select current column	Ctrl + Space	Move a window to screen corner	Alt + Arrow
		Hide active row	Ctrl + Shift + 9	Insert emoji or animated Gif	Alt + .
Formulas				Move to previous folder	Alt + ←
		Edit active cell	F2	Move to parent folder	Alt + ↑
		View and insert named ranges	F3	Open new tab	Ctrl + T
		Validate the suggested formula	Tab	Close current tab	Ctrl + W
		Add a line break in the formula	Alt + Enter	Restore last closed tab	Ctrl + Shift + T
		Sum all cells above	Alt + =	Full screen ON/OFF	F11
		Expand the formula bar	Ctrl + Shift + U		
		Flash fill the selected range	Ctrl + E		

Time-Saving Tips

- Time-saving tips are techniques or features in Excel that help you work more efficiently.
- These include using Flash Fill, AutoFill, and Quick Analysis.

Practical Example: Using Flash Fill and AutoFill

Scenario

- You have a list of full names and want to separate them into first and last names. You also want to fill a series of dates.

Step-by-Step Implementation

1. Using Flash Fill:

- Enter the first name manually in the first cell (e.g., John).
- Start typing the second name in the next cell (e.g., Sarah).
- Press Ctrl + E to use Flash Fill and automatically fill the remaining first names.

2. Using AutoFill:

- Enter a date in a cell (e.g., 01/01/2023).
- Drag the fill handle (small square at the bottom-right corner of the cell) to fill a series of dates.

***Refer to the Autofill and Flash fill explanation on
PAGE 26, 27, 28 AND 29***

3. Customizing the Quick Access Toolbar

The Quick Access Toolbar (QAT) is a customizable toolbar in Excel that provides quick access to frequently used commands.

You can add buttons for commands like Save, Undo, Redo, and Print.

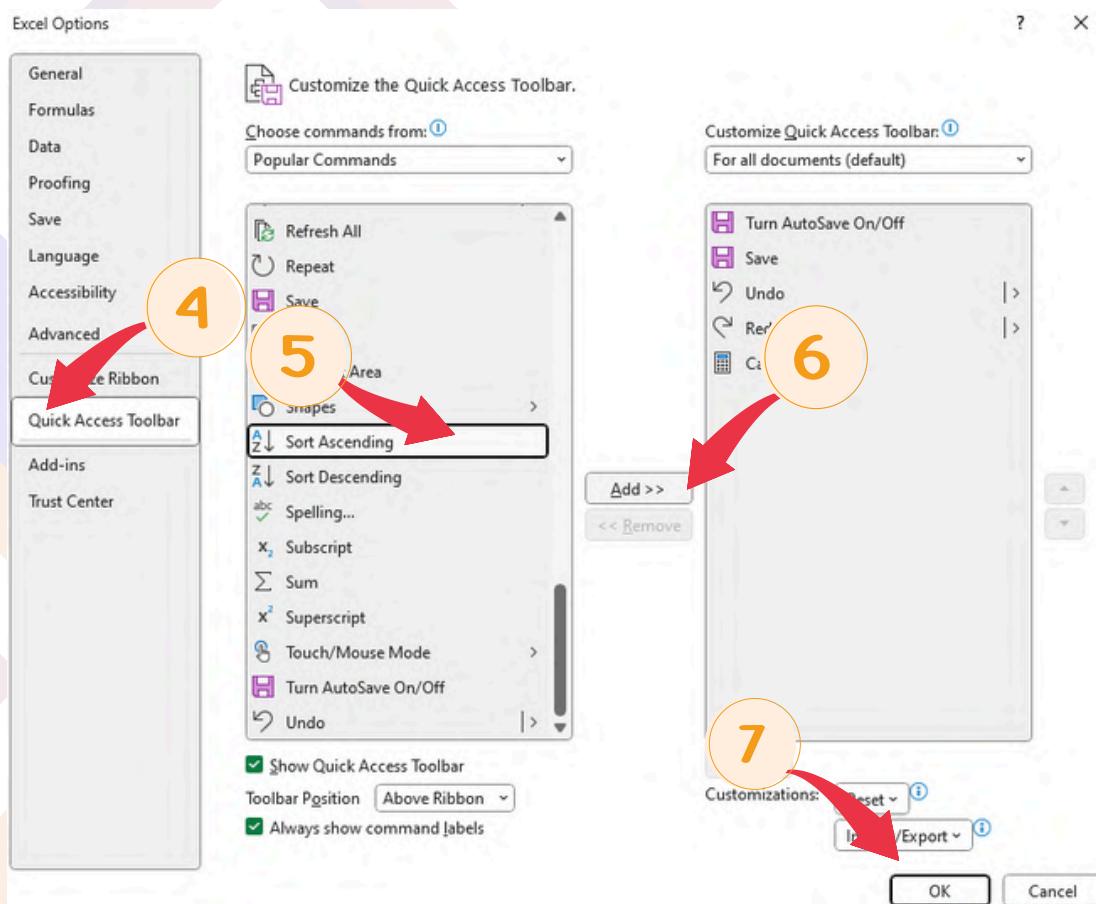
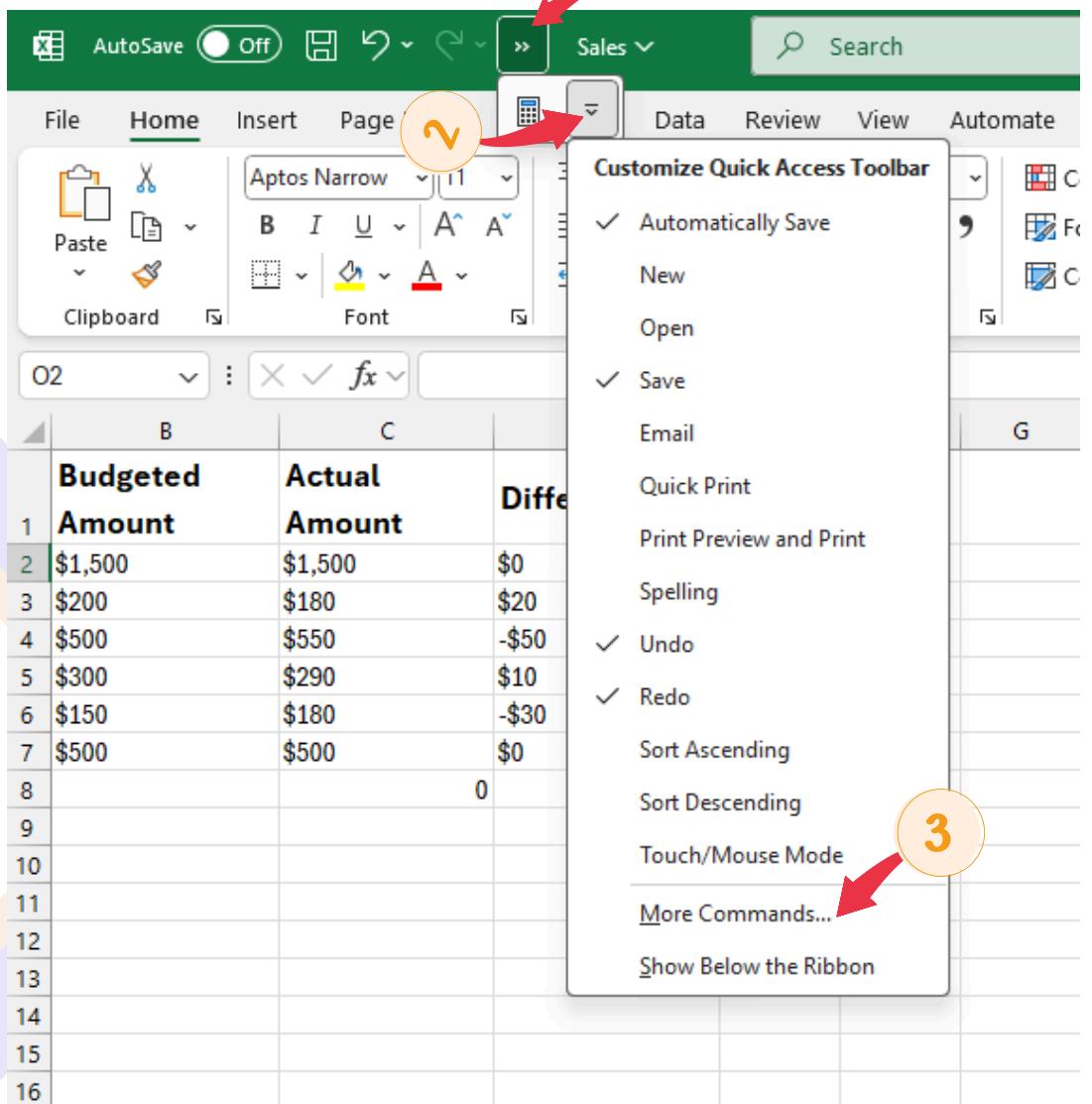
Practical Example: Adding Commands to the QAT

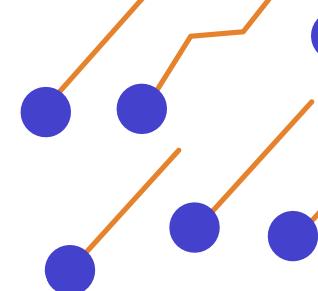
Scenario

- You frequently use the Sort Ascending, Sort Descending, and Filter commands and want to add them to the QAT

Step-by-Step Implementation

1. Open the Customize Quick Access Toolbar Menu:
 - Click the small dropdown arrow at the end of the QAT.
 - Select More Commands.
2. Add Commands:
 - In the Choose commands from dropdown, select All Commands.
 - Scroll down and select Sort Ascending, Sort Descending, and Filter.
 - Click Add >> to add them to the QAT.
 - Click OK.
3. Use the QAT:
 - The added commands will now appear in the QAT.
 - Click the buttons to quickly sort or filter data.





Chapter 16: Best Practices for Excel Users

1. Organizing Data Effectively

Organizing data effectively ensures that your work is easy to understand, maintain, and analyze.

Proper organization includes structuring data logically, using consistent formatting, and avoiding common pitfalls like merged cells.

Practical Example: Structuring a Sales Dataset

Scenario

You have a sales dataset with information about products, regions, and sales figures. You want to organize it for easy analysis.

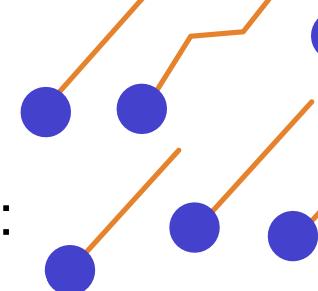
Step-by-Step Implementation

1. Use a Tabular Format:

Ensure your data is in a table format with headers in the first row.

2. Avoid Merged Cells:

- Merged cells can cause issues with sorting, filtering, and formulas. Use Center Across Selection instead:
 - Select the cells you want to center.
 - Go to Home → Alignment → Merge & Center dropdown → Center Across Selection.



3. Use Tables:

- Convert your data range into an Excel table:
 - Select the data range.
 - Go to Insert → Table.
 - Check My table has headers and click OK.

4. Add filters:

- Use filters to quickly analyze data:
 - Select the header row.
 - Go to Data → Filter.

5. Use Named Ranges:

- Assign names to important data ranges for easier reference:
 - Select the range.
 - Go to Formulas → Define Name.
 - Enter a name (e.g., SalesData) and click OK.

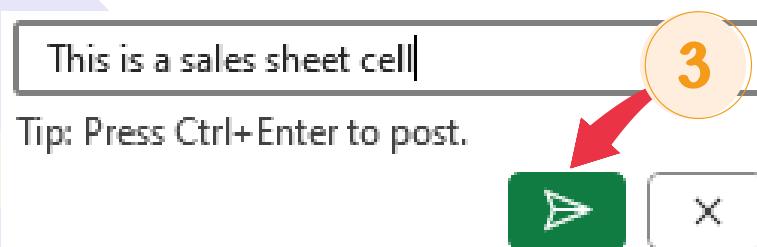
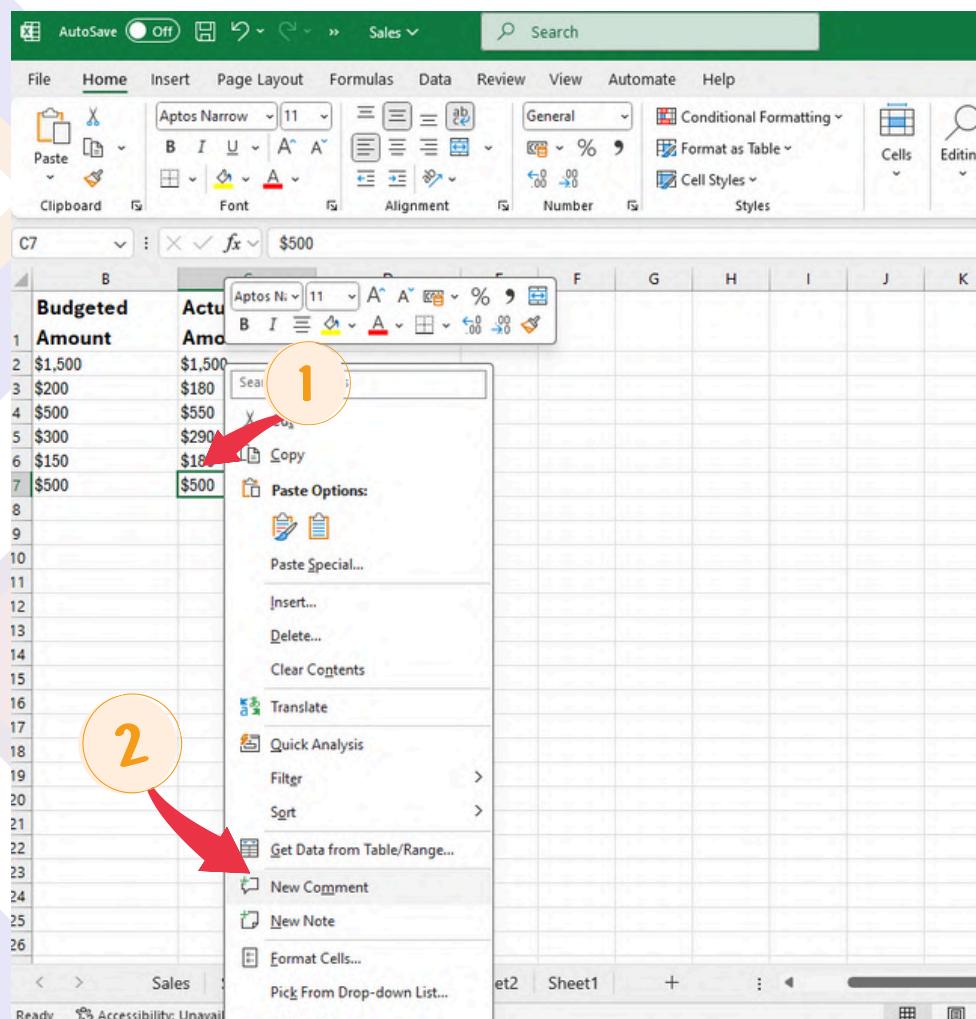
2. Documenting Your Work

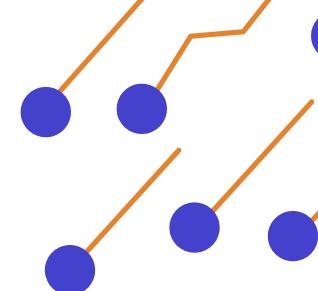
Documenting your work ensures that others (or your future self) can understand and replicate your analysis. Documentation includes adding comments, creating a README sheet, and using cell notes.

Step-by-Step Implementation

1. Add Comments:

- Right-click a cell (e.g., the total formula) and select Insert Comment.
- Add a note explaining the formula (e.g., "This formula calculates the total budgeted amount").





2. Create a README Sheet:

- Add a new worksheet named README.
- Include:
 - A description of the workbook's purpose.
 - Instructions for use.
 - Definitions of key terms or formulas.

1. Use Cell Notes:

- Add notes to cells for quick reference:
 - Select a cell and go to Review → New Note.
 - Enter the note (e.g., "This cell contains the monthly rent").

3. Staying Updated with New Features

Staying updated with new features ensures you're leveraging the latest tools and improvements in Excel. Microsoft regularly releases updates with new functions, features, and enhancements.

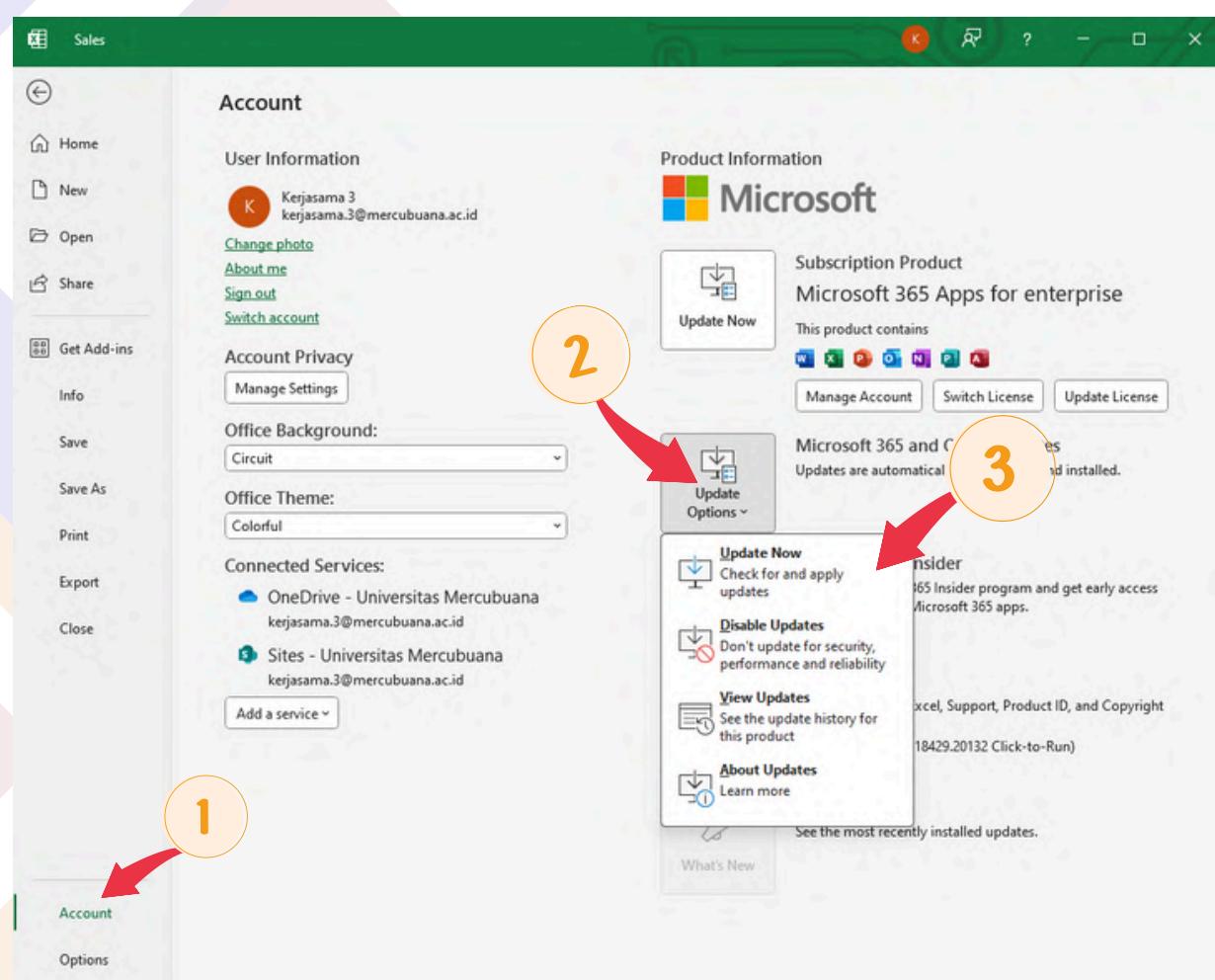
Practical Example: Exploring New Features

1. Check for Updates:

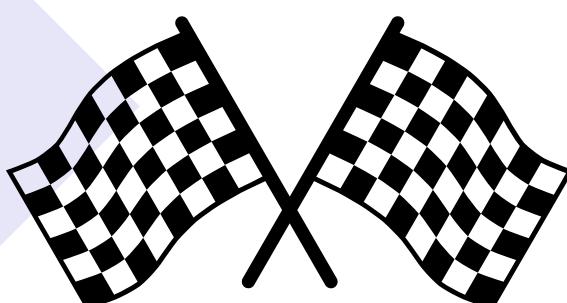
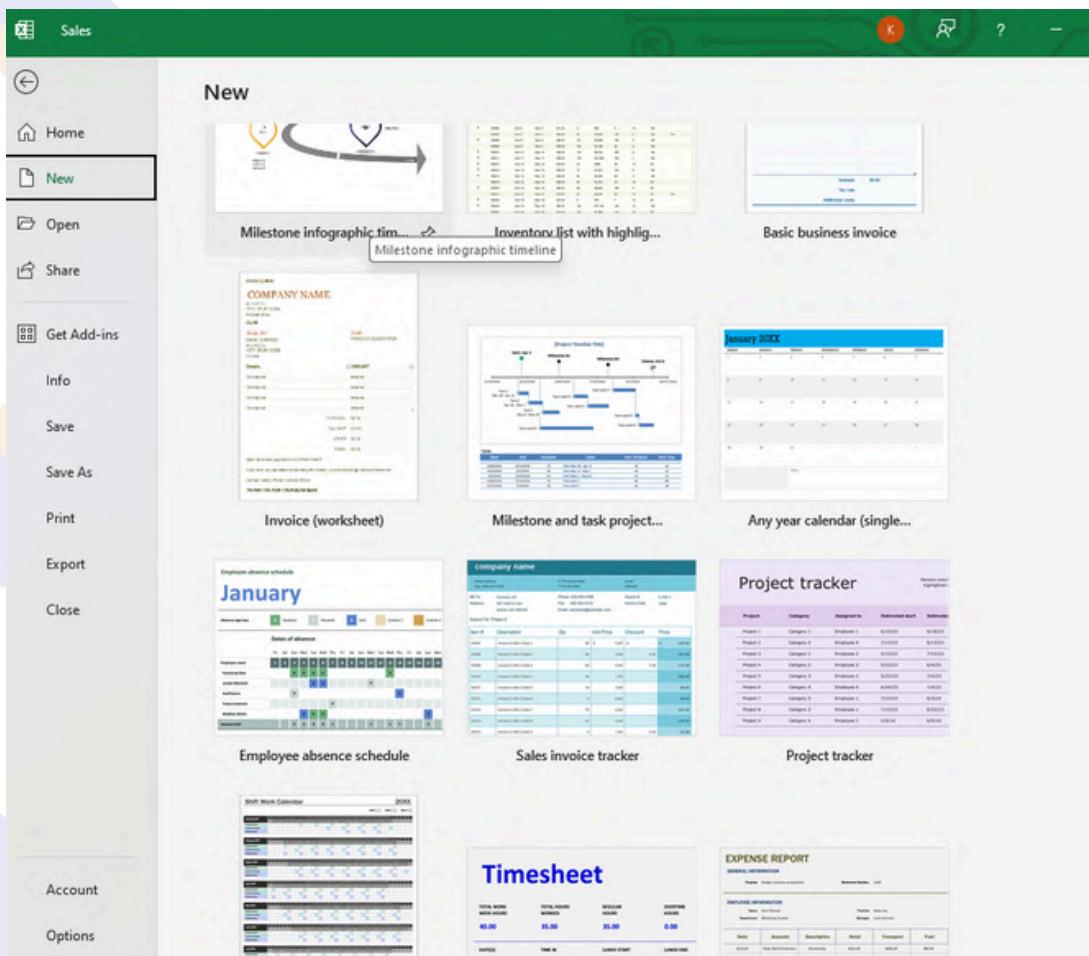
- Open Excel and go to File → Account.
- Under Product Information, click Update Options → Update Now.

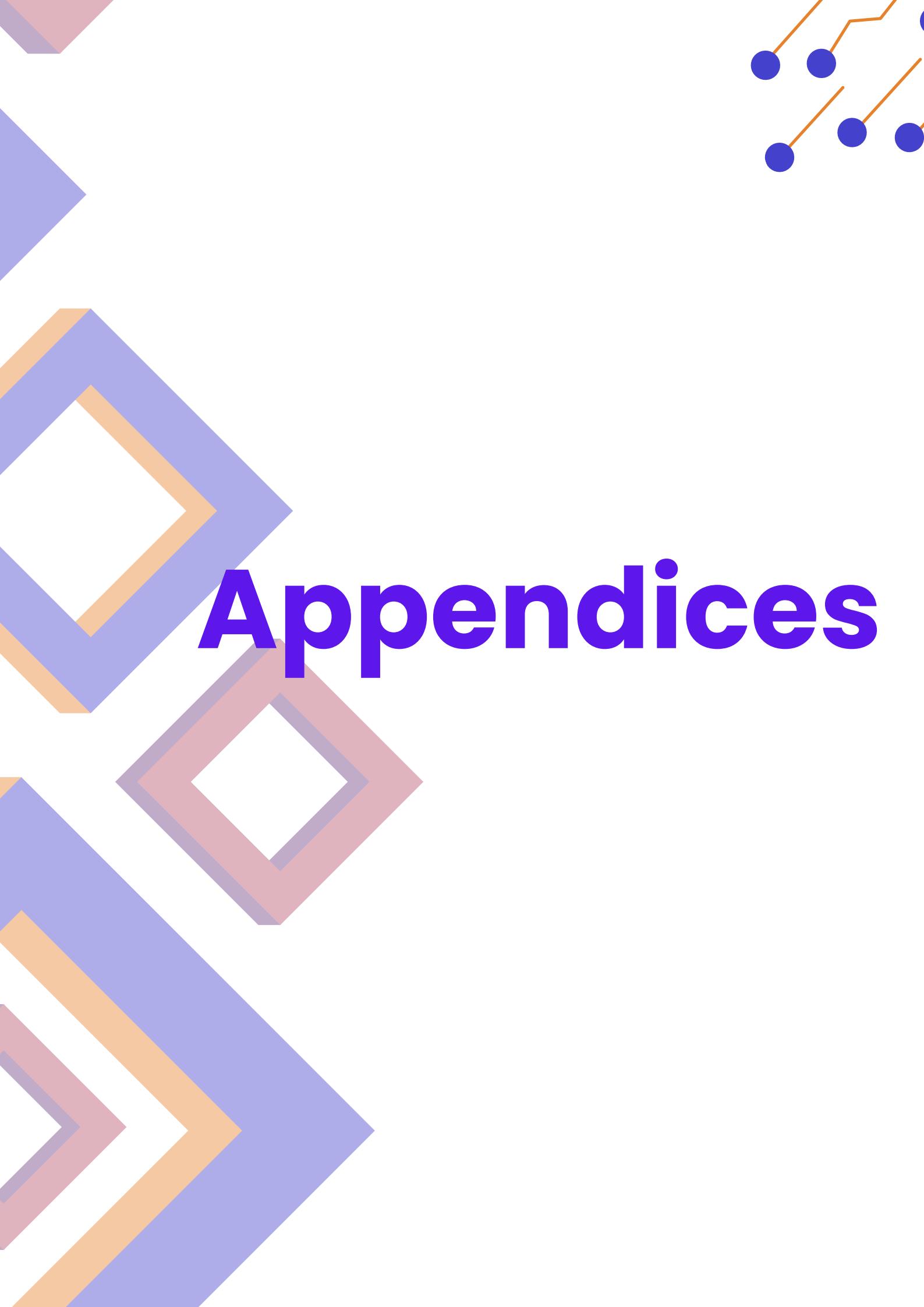
2. Learn New Functions:

- Experiment with new functions like XLOOKUP, FILTER, and DYNAMIC ARRAYS.
- Use Excel's built-in help or online tutorials to learn how they work.

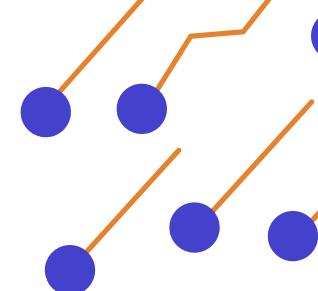


- Explore New Features:
 - Go to File → New and look for templates or features labeled as "New".
 - Visit the Microsoft Excel Blog or What's New in Excel page for updates.





Appendices



Glossary of Excel Terms

Term	Definition
Cell	The intersection of a row and column in a worksheet, identified by a reference (e.g., A1).
Formula	An expression that calculates a value, starting with an equals sign (=).
Function	A predefined formula in Excel (e.g., SUM, AVERAGE).
Worksheet	A single sheet in an Excel workbook.
Workbook	An Excel file containing one or more worksheets.
Range	A group of cells selected for a specific purpose (e.g., A1:B10).
PivotTable	A tool for summarizing and analyzing large datasets.
Macro	A set of automated instructions written in VBA.
Conditional Formatting	Formatting applied to cells based on specific conditions (e.g., highlight values > 100).
Absolute Reference	A cell reference that does not change when copied (e.g., \$A\$1).
Relative Reference	A cell reference that changes when copied (e.g., A1).
Filter	A tool for displaying only rows that meet specific criteria.
Chart	A visual representation of data (e.g., bar chart, line chart).
VBA	Visual Basic for Applications, the programming language used in Excel macros.

List of Excel Functions and Their Uses

Function	Syntax	Description
SUM	=SUM(range)	Adds up all numbers in a range.
AVERAGE	=AVERAGE(range)	Calculates the average of numbers in a range.
IF	=IF(condition, value_if_true, value_if_false)	Performs a logical test and returns one value if true, another if false.
VLOOKUP	=VLOOKUP(lookup_value, table, col_index, [range_lookup])	Looks up a value in a table and returns a corresponding value.
HLOOKUP	=HLOOKUP(lookup_value, table, row_index, [range_lookup])	Similar to VLOOKUP but searches horizontally.
XLOOKUP	=XLOOKUP(lookup_value, lookup_array, return_array)	A modern replacement for VLOOKUP and HLOOKUP.
COUNT	=COUNT(range)	Counts the number of cells with numbers in a range.
COUNTIF	=COUNTIF(range, criteria)	Counts the number of cells that meet a specific condition.
SUMIF	=SUMIF(range, criteria, [sum_range])	Adds up cells that meet a specific condition.
AVERAGEIF	=AVERAGEIF(range, criteria, [average_range])	Calculates the average of cells that meet a specific condition.
CONCATENATE	=CONCATENATE(text1, text2, ...)	Combines multiple text strings into one.
TEXT	=TEXT(value, format_text)	Converts a value to text in a specific format.
PMT	=PMT(rate, nper, pv)	Calculates the payment for a loan.
FV	=FV(rate, nper, pmt, [pv])	Calculates the future value of an investment.
NPV	=NPV(rate, value1, value2, ...)	Calculates the net present value of an investment.
IFERROR	=IFERROR(value, value_if_error)	Returns a custom value if a formula results in an error.

3. Recommended Resources

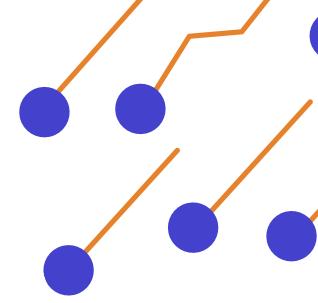
Online Tutorials

- Microsoft Excel Help Center: <https://support.microsoft.com/excel>
- Exceljet: <https://exceljet.net> (Short, practical tutorials and tips).
- Chandoo.org: <https://chandoo.org> (Excel tutorials and advanced techniques).

Books

- "**Excel for Dummies**" by Greg Harvey: A beginner-friendly guide to Excel.
- "**Excel 2021 Bible**" by Michael Alexander and Richard Kusleika: A comprehensive guide for all skill levels.
- "**Power Excel with MrExcel**" by Bill Jelen: Tips and tricks for advanced users.

YouTube Channels



- Leila-Gharani:

<https://www.youtube.com/c/ExcelTutorialsbyLeilaGharani>

- MyOnlineTrainingHub:

<https://www.youtube.com/c/MyOnlineTrainingHub>

- Excel-Campus-Jon:

<https://www.youtube.com/c/ExcelCampus>

End