Competency Based Learning Material (CBLM)

Accounting for Freelancing

Level-4

Module: Using Spreadsheets

Code: CBLM- OU-AF-002-L4-V1

National Skills Development Authority
Chief Advisor's Office
Government of the People's Republic of Bangladesh

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This Competency Based Learning Materials (CBLM) on "Use Spreadsheets" under the Accounting for Freelancing , Level-4" qualification is developed based on the national competency standard approved by National Skills Development Authority (NSDA)

This document is to be used as a key reference point by the competency-based learning materials developers, teachers/trainers/assessors as a base on which to build instructional activities.

It serves as the document for providing training consistent with the requirements of industry in order to meet the qualification of individuals who graduated through the established standard via competency-based assessment for a relevant job.

This document has been developed by NSDA in association with industry representatives, academia, related specialist, trainer and related employee.

Public and private institutions may use the information contained in this CBLM for activities benefitting Bangladesh.

Approved by the Authority…….. meeting held on .....

How to use this Competency Based Learning Material (CBLM)

The module, contains training materials and activities for you to complete. These activities may be completed as part of structured classroom activities or you may be required you to work at your own pace. These activities will ask you to complete associated learning and practice activities in order to gain knowledge and skills you need to achieve the learning outcomes.

1. Review the **Learning Activity** page to understand the sequence of learning activities you will undergo. This page will serve as your road map towards the achievement of competence.

2. Read the **Information Sheets.** This will give you an understanding of the jobs or tasks you are going to learn how to do. Once you have finished reading the **Information Sheets** complete the questions in the **Self-Check.**

3. **Self-**Checks are found after each **Information Sheet**. **Self-Checks** are designed to help you know how you are progressing. If you are unable to answer the questions in the **Self-Check** you will need to re-read the relevant **Information Sheet**. Once you have completed all the questions check your answers by reading the relevant **Answer Keys** found at the end of this module.

4. Next move on to the **Job Sheets. Job Sheets** provide detailed information about *how to do the job* you are being trained in. Some **Job Sheets** will also have a series of **Activity Sheets**. These sheets have been designed to introduce you to the job step by step. This is where you will apply the new knowledge you gained by reading the Information Sheets. This is your opportunity to practise the job. You may need to practise the job or activity several times before you become competent.

5. Specification **sheets**, specifying the details of the job to be performed will be provided where appropriate.

6. A review of competency is provided on the last page to help remind if all the required assessment criteria have been met. This record is for your own information and guidance and is not an official record of competency

When working though this Module always be aware of your safety and the safety of others in the training room. Should you require assistance or clarification please consult your trainer or facilitator.

When you have satisfactorily completed all the Jobs and/or Activities outlined in this module, an assessment event will be scheduled to assess if you have achieved competency in the specified learning outcomes. You will then be ready to move onto the next Unit of Competency or Module

Table of Contents

Module Content

Unit of Competency	**Use Spreadsheets**
Unit Code	**OU-AF-002-L4-V1**
Module Title	**Use Spreadsheets**
Module Descriptor	This Module covers the knowledge, skills and atlitude required to use Spreadsheet (MS Excel and Google Sheet) applications. It specifically includes formatting and layout sheet, using formula and functions, creating chart, table and pivot, using tools and developing real life projects
Nominal Hours	50 Hours
Lerning Outcome	After completing the practice of the module, the trainees will be able to perform the following jobs**:** 1. Create Sheet formats and layouts . 2. Use Formulas and functions. 3. Create Charts. 4. Create Tables and pivots. 5. Utilize Tools. 6. Develop Real-life projects.

Assessment Criteria

1. Sheet is prepared
2. Sheet is formatted as per requirement
3. Layout is made as required
4. Functions are used as per requirements
5. Functions are selected as required
6. Data is accessed as per client's requirements
7. Chart type is selected as per client's requirements
8. Chart is created as required
9. Chart is formatted as required
10. Chart is presented as required
11. Data is accessed as per client's requirements
12. Data is formatted as Table
13. Report is designed in Pivot as requirement
14. Report is submitted to client
15. Tools are selected
16. Tools are learned
17. Project type is determined
18. Structure of project is designed
19. Project is developed as per design

Learning Outcome 1: Sheet formats and layouts can be created.

Assessment Criteria	1. Sheets can be prepared. 2. Sheet formats can be edited as needed. 3. Layouts can be created as needed.
Conditions and Resources	1. Real or simulated workplace 2. CBLM 3. Handouts 4. Laptop 5. Multimedia Projector 6. Paper, Pen, Pencil, Eraser 7. Internet facilities 8. White board and marker 9. Audio Video Device
Contents	1 Prepare Sheet 2 Format Sheet as per requirement 3 Make Layout as required
Activities/job/Task	1 Create a Sample Spreadsheet Demonstrating Formatting Tools
Training Methods	1. Discussion 2. Presentation 3. Demonstration 4. Guided Practice 5. Individual Practice 6. Project Work 7. Problem Solving 8. Brainstorming
Assessment Methods	Assessment methods may include but not limited to 1. Written Test 2. Demonstration 3. Oral Questioning 4. Portfolio

Learning Experience 1: Creating Sheet formats and layouts

In order to achieve the objectives stated in this learning guide, you must perform the learning steps below. Beside each step are the resources or special instructions you will use to accomplish the corresponding activity.

Learning Activities	Recourses/Special Instructions
1. Trainee will ask the instructor about about the learning materials	1. Instructor will provide the learning materials 'Create Sheet formats and layouts'
2. Read the Information sheet and complete the Self Checks & Check answer sheets on "Create Sheet formats and layouts"	2. Read Information sheet 1**:** Create Sheet formats and layouts 3. Answer Self-check 1**:** Create Sheet formats and layouts 4. Check your answer with Answer key 1**:** Create Sheet formats and layouts
3. Read the Job/Task Sheet and Specification Sheet and perform job/Task	5. Job/Task Sheet and Specification Sheet Job Sheet 1.1**:** Create a Sample Spreadsheet Demonstrating Formatting Tools

Information Sheet 1: Create Sheet formats and layouts

Learning Objective:

After completion of this information sheet, the learners will be able to explain, define and interpret the following contents**:**

1.1. Prepare Sheet
1.2. Format Sheet
1.3. Make Layout

1.1. Prepare Sheet

This section covers the basic steps involved in creating a new spreadsheet in both Google Sheets and Microsoft Excel.

A. Google Sheets

Creating a new spreadsheet

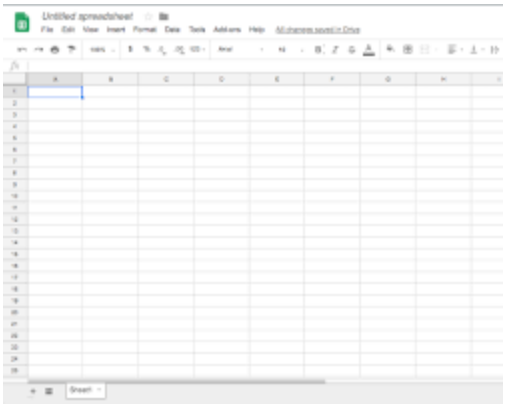
Here's a detailed guide with pictures on how to create a new spreadsheet in Google Sheets**:**

1. Access Google Sheets

- Open your web browser and go to https**:**//docs.google.com/spreadsheets/create.

2. Create a New Spreadsheet

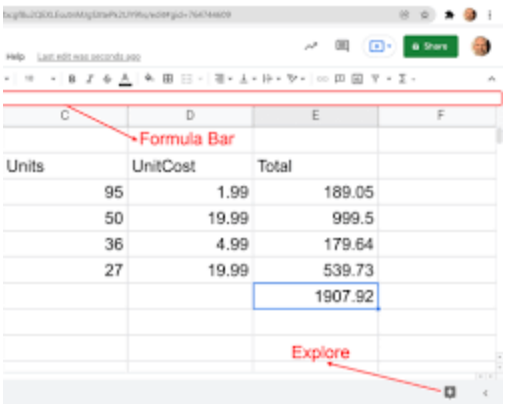
- You'll see a new blank spreadsheet automatically created and titled "Untitled Spreadsheet."



New blank spreadsheet in Google Sheets

3. Rename the Spreadsheet**:**

- Click on the title bar "Untitled Spreadsheet" to rename it.



Clicking on the title bar in Google Sheets

- Enter your desired name for the spreadsheet and press Enter.

Opening an existing spreadsheet

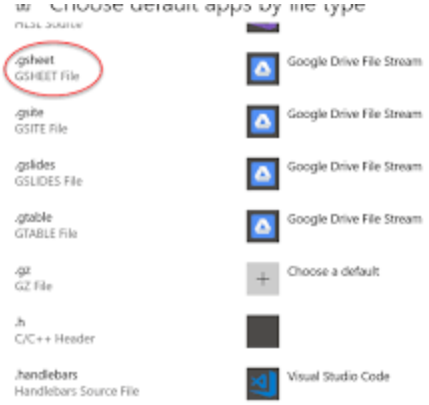
Here's a detailed guide with pictures on how to open an existing spreadsheet in Google Sheets**:**

1. Access Google Drive: Open your web browser and go to https://www.google.com/drive/.

2. Locate Your Spreadsheet: In your Google Drive, browse through your files and folders to find the existing spreadsheet you want to open.

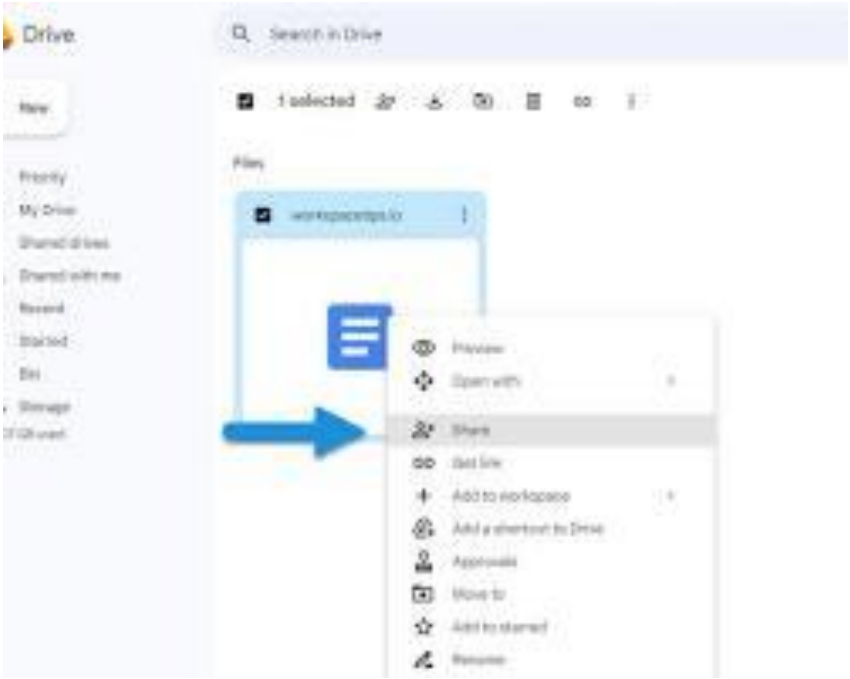
3. Open the Spreadsheet: There are two ways to open the spreadsheet

- **Double-click:** Simply double-click on the spreadsheet file to open it directly in Google Sheets.



Doubleclicking on a spreadsheet file in Google Drive

* **Right-click and choose "Open":** Right-click on the spreadsheet file and select "Open" from the context menu.



Rightclicking on a spreadsheet file and selecting Open in Google Drive

B. Microsoft Excel

Creating a new workbook (spreadsheet)

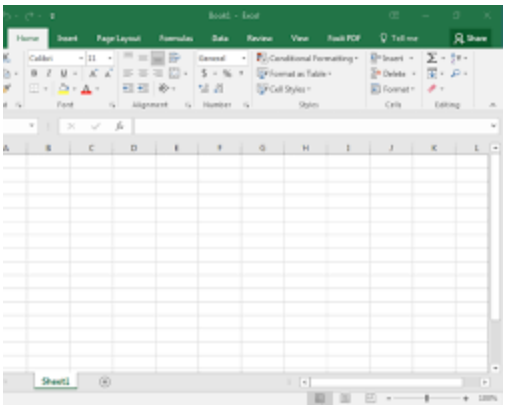
Open Microsoft Excel:

Locate the Microsoft Excel icon on your computer. It's typically found in the Start menu or on your desktop. Double-click the icon to launch the program.

New Blank Workbook Creation:

Once Excel opens, you'll see a new blank workbook automatically created and displayed.

This workbook contains a single worksheet by default, named "Sheet1."



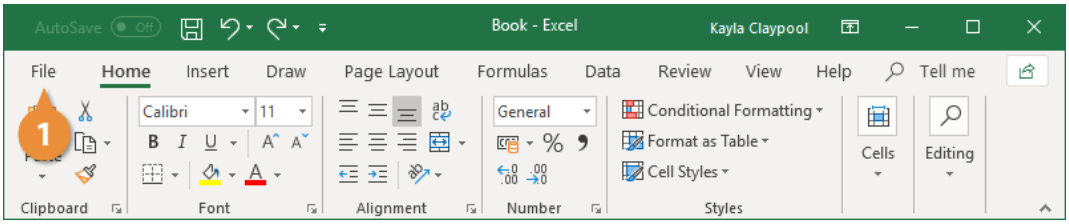
New blank workbook in Microsoft Excel

You've successfully created a new workbook in Microsoft Excel. Now you can start entering data, formatting it, and building your spreadsheet for various purposes.

Opening an existing workbook

You can locate a workbook on your computer and simply double-click it to open it, but you can also open a workbook from within the Excel program.

1. Click the **File** tab.



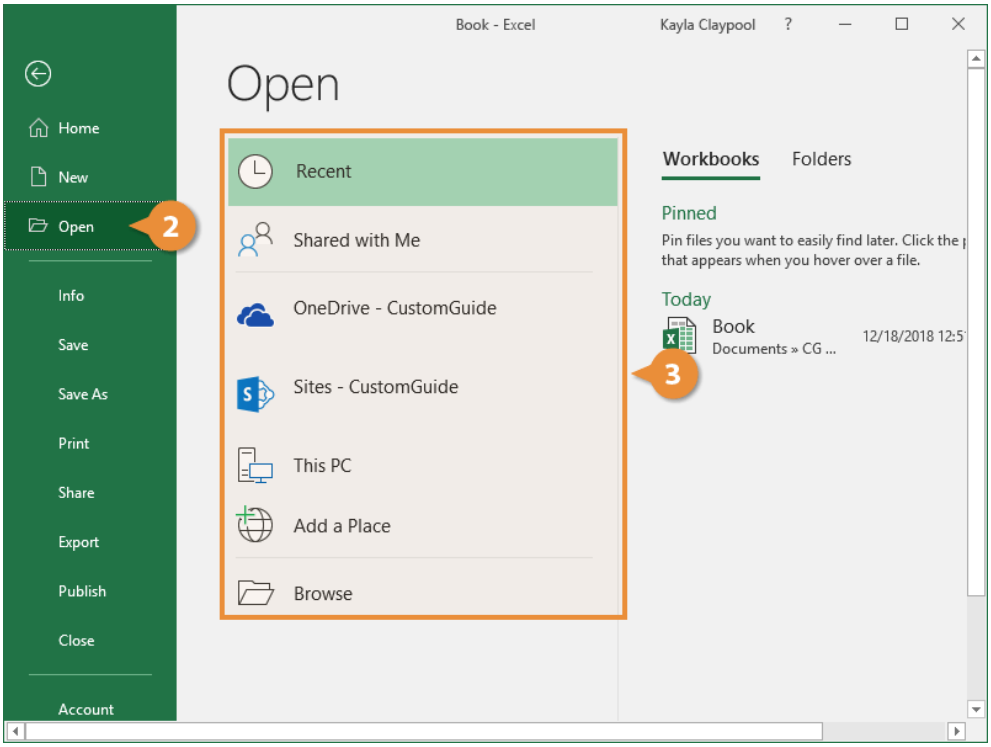
2. Click **Open**.

Press **Ctrl** + **O** to quickly display the Open tab of the Backstage view.

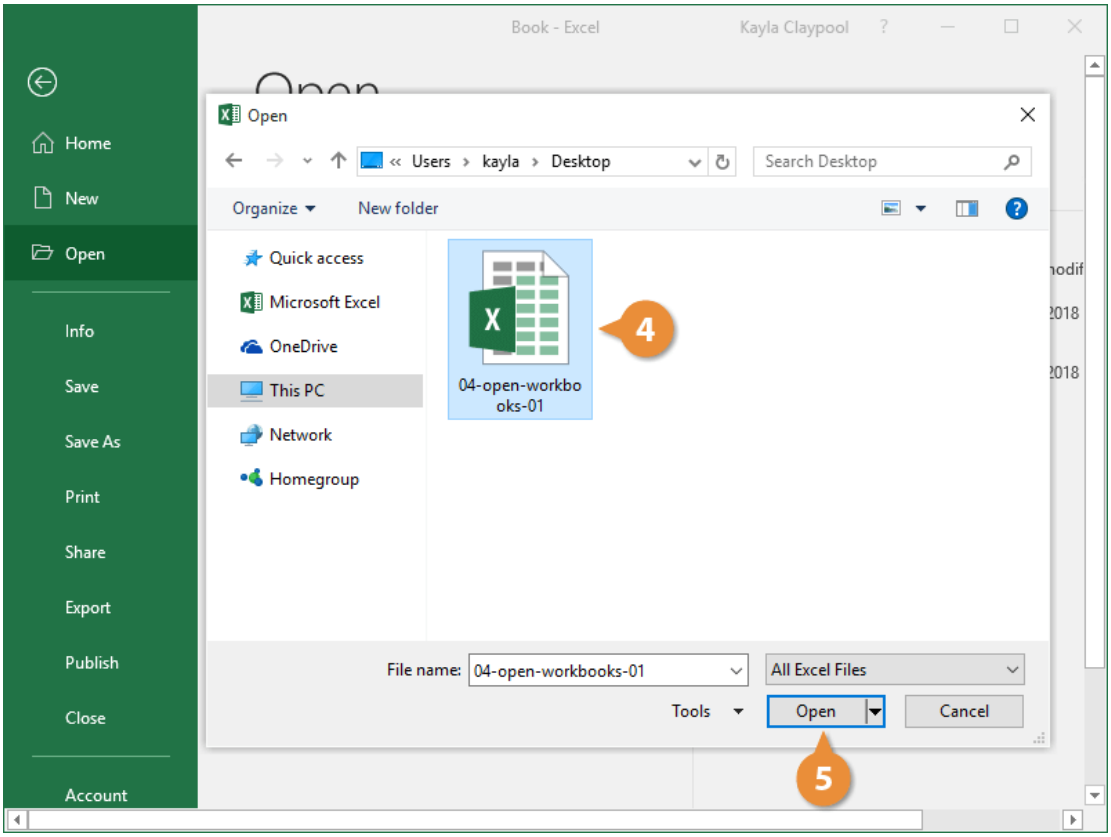
3. Select the location where the file is saved.

You can choose from:

- **Recent:** Recent files you've worked on.
- **Shared with Me:** Files others have shared with you on OneDrive or SharePoint Online.
- **OneDrive:** Microsoft's cloud-based storage.
- **This PC:** Browse files on your local computer.
- **Browse:** Opens a dialog box where you can browse through your computer's folders, drives, and network shares.



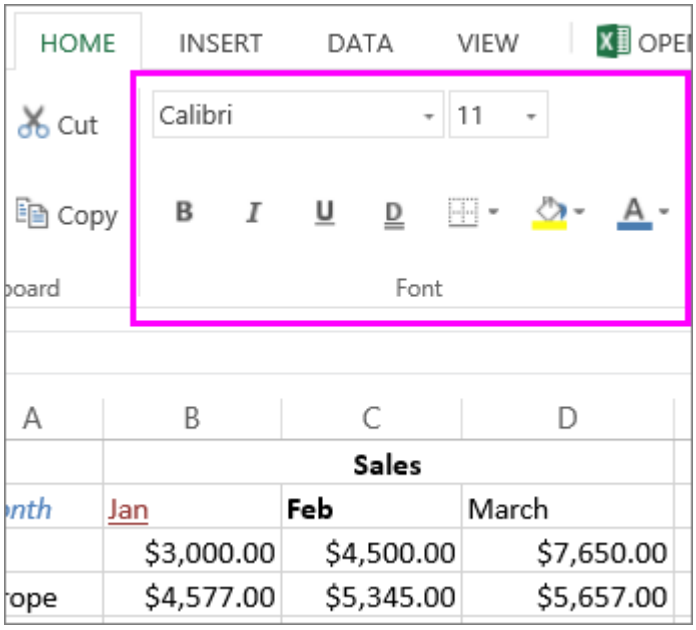
4. Select the file you want to open.
5. Click **Open**.



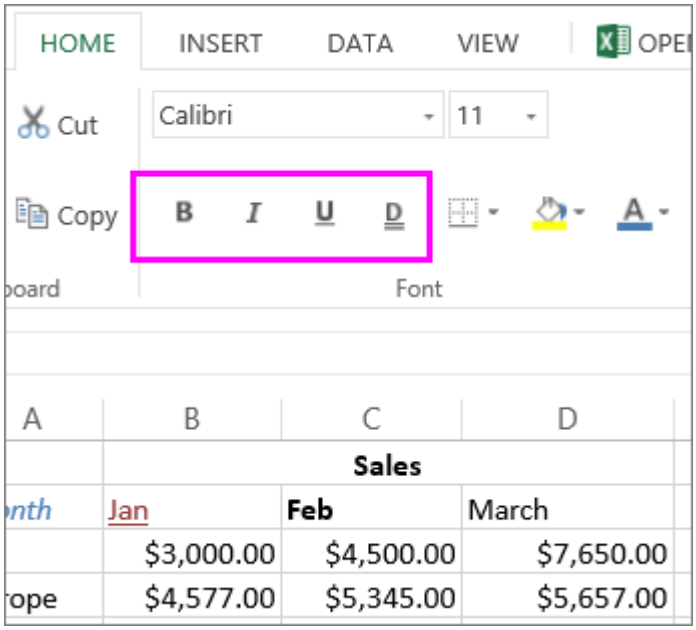
1.2. Format Sheet

A. Font

Formatting text or numbers can make them appear more visible especially when you have a large worksheet. Changing default formats includes things like changing the font color, style, size, text alignment in a cell, or apply formatting effects. This article shows you how you can apply different formats and also undo them.



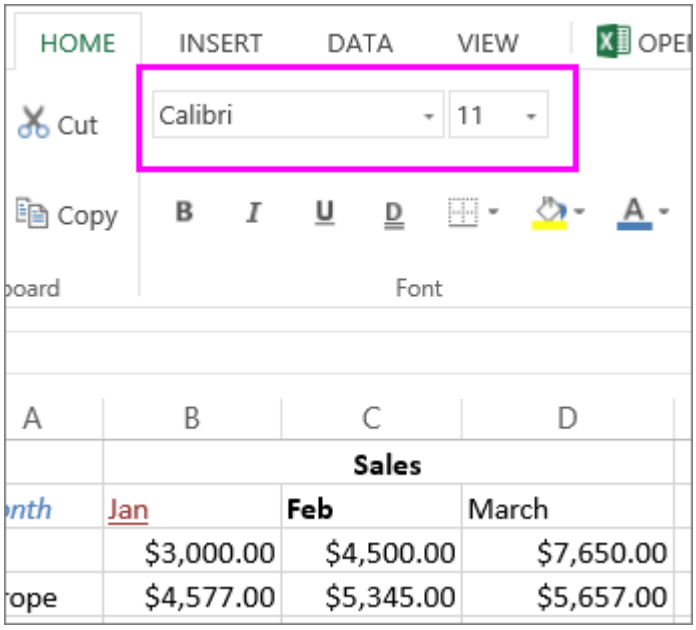
If you want text or numbers in a cell to appear bold, italic, or have a single or double underline, select the cell and on the **Home** tab, pick the format you want



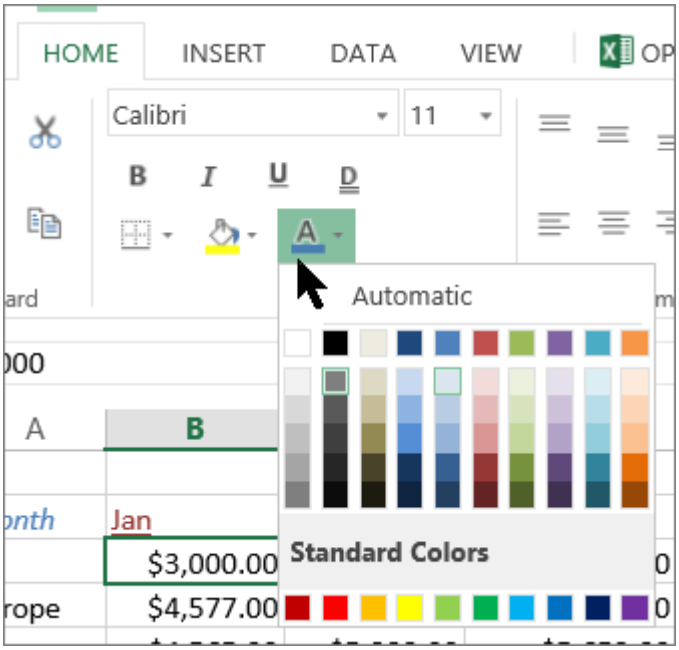
Change font style, size, color, or apply effects

Click **Home** and

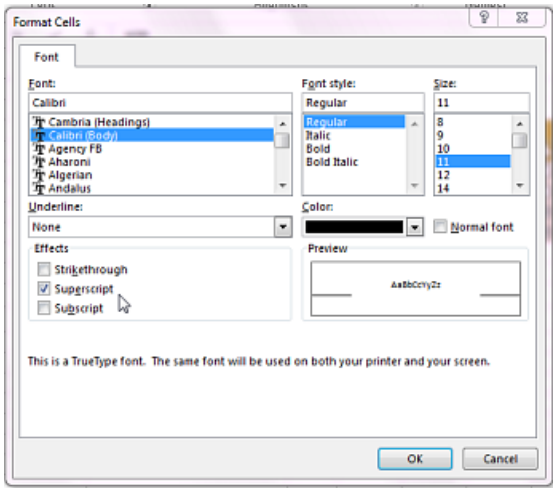
- For a different font style, click the arrow next to the default font **Calibri** and pick the style you want.
- To increase or decrease the font size, click the arrow next to the default size 11 and pick another text size.



- To change the font color, click **Font Color** and pick a color.
- To add a background color, click **Fill Color** next to **Font Color.**

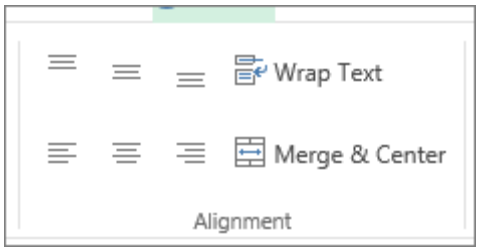


To apply strikethrough, superscript, or subscript formatting, click the Dialog Box Launcher, and select an option under **Effects**.



B. Alignment

You can position the text within a cell so that it is centered, aligned left or right. If it's a long line of text, you can apply **Wrap Text** so that all the text is visible.
Select the text that you want to align, and on the **Home** tab, pick the alignment option you want.

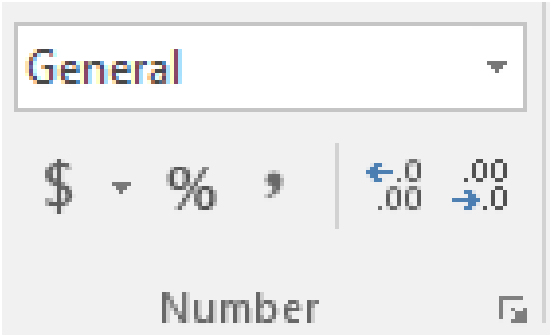


C. Advanced formatting

i. <u>Available number formats in Excel</u>

In Excel, you can format numbers in cells for things like currency, percentages, decimals, dates, phone numbers, or social security numbers.

1. Select a cell or a cell range.
2. On the **Home** tab, select **Number** from the drop-down.



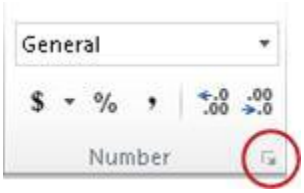
Or, you can choose one of these options**:**

- Press CTRL + 1 and select **Number**.
- Right-click the cell or cell range, select **Format Cells…** , and select **Number**.
- Select the small arrow, dialog box launcher, and then select **Number**.

3. Select the format you want.

ii. Number formats

To see all available number formats, select the Dialog Box Launcher next to **Number** on the **Home** tab in the **Number** group.



Format	Description
General	The default number format that Excel applies when you type a number. For the most part, numbers that are formatted with the **General** format are displayed just the way you type them. However, if the cell is not wide enough to show the entire number, the **General** format rounds the numbers with decimals. The **General** number format also uses scientific (exponential) notation for large numbers (12 or more digits).
Number	Used for the general display of numbers. You can specify the number of decimal places that you want to use, whether you want to use a thousands separator, and how you want to display negative numbers.
Currency	Used for general monetary values and displays the default currency symbol with numbers. You can specify the number of decimal places that you want to use, whether you want to use a thousands separator, and how you want to display negative numbers.

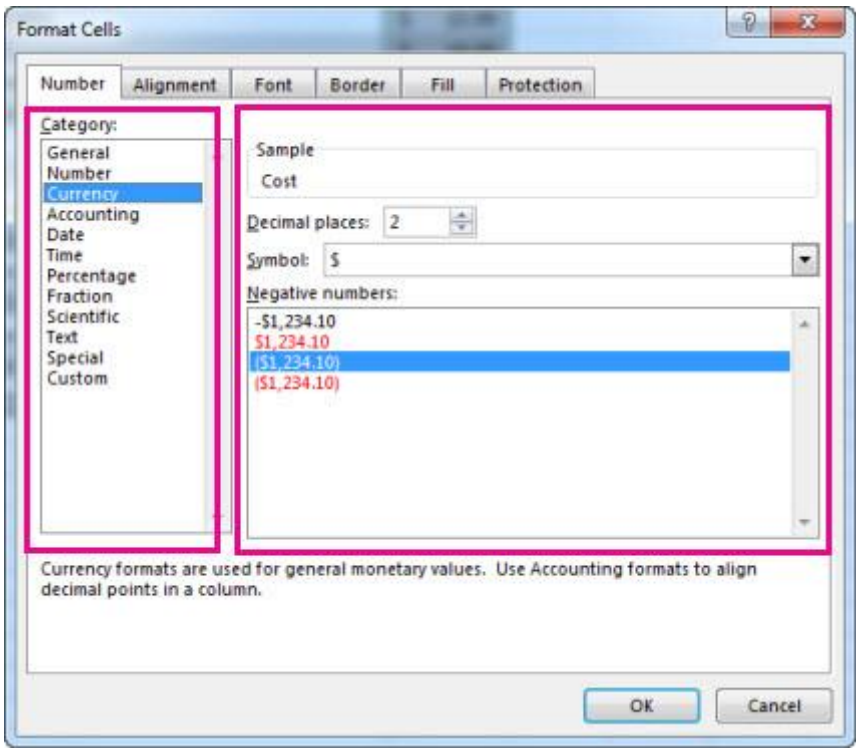
Format	Description
Accounting	Also used for monetary values, but it aligns the currency symbols and decimal points of numbers in a column.
Date	Displays date and time serial numbers as date values, according to the type and locale (location) that you specify. Date formats that begin with an asterisk (*****) respond to changes in regional date and time settings that are specified in Control Panel. Formats without an asterisk are not affected by Control Panel settings.
Time	Displays date and time serial numbers as time values, according to the type and locale (location) that you specify. Time formats that begin with an asterisk (*****) respond to changes in regional date and time settings that are specified in Control Panel. Formats without an asterisk are not affected by Control Panel settings.
Percentage	Multiplies the cell value by 100 and displays the result with a percent (**%**) symbol. You can specify the number of decimal places that you want to use.
Fraction	Displays a number as a fraction, according to the type of fraction that you specify.
Scientific	Displays a number in exponential notation, replacing part of the number with E+n, where E (which stands for Exponent) multiplies the preceding number by 10 to the nth power. For example, a 2-decimal **Scientific** format displays 12345678901 as 1.23E+10, which is 1.23 times 10 to the 10th power. You can specify the number of decimal places that you want to use.
Text	Treats the content of a cell as text and displays the content exactly as you type it, even when you type numbers.
Special	Displays a number as a postal code (ZIP Code), phone number, or Social Security number.
Custom	Allows you to modify a copy of an existing number format code. Use this format to create a custom number format that is added to the list of number format codes. You can add between 200 and 250 custom number formats, depending on the language version of Excel that is installed on your computer. For more information about custom formats,

D. Format numbers

Apply number formats such as dates, currency, or fractions to cells in a worksheet. For example, if you're working on your quarterly budget, you can use the **Currency** number format so your numbers represent money. Or, if you have a column of dates, you can specify that you want the dates to appear as March 14, 2012, 14-Mar-12, or 3/14.

Follow these steps to format numbers**:**

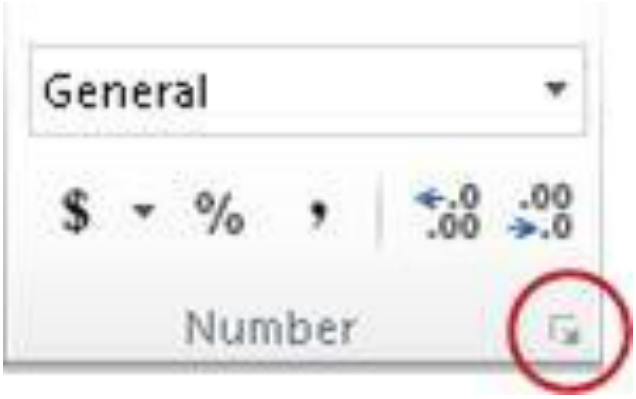
1. Select the cells containing the numbers you need to format.
2. Select CTRL+1.
3. In the window that displays, select the **Number** tab (skip this step if you're using Microsoft 365 for the web).
4. Select a **Category** option, and then select specific formatting changes on the right.



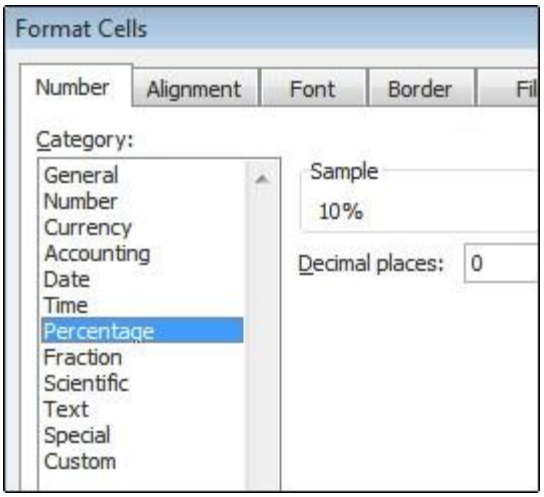
i. <u>Display numbers as percentages</u>

To quickly apply percentage formatting to selected cells, click **Percent Style** % in the **Number** group on the **Home** tab, or press **Ctrl+Shift+%**. If you want more control over the format, or you want to change other aspects of formatting for your selection, you can follow these steps.

1. On the **Home** tab, in the **Number** group, select the icon next to **Number** to display the **Format Cells** dialog box.



2. In the **Format Cells** dialog box, in the **Category** list, select **Percentage**.



3. In the **Decimal places** box, enter the number of decimal places that you want to display. For example, if you want to see **10%** instead of **10.00%**, enter **0** in the **Decimal places** box.

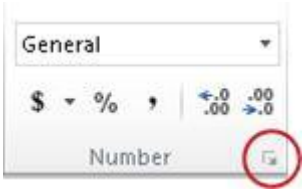
ii. Format numbers as currency

You can display a number with the default currency symbol by selecting the cell or range of cells, and then clicking **Accounting Number Format** $ in the **Number** group on the **Home** tab. (If you want to apply the Currency format instead, select the cells, and press Ctrl+Shift+$.)

If you want more control over either format, or you want to change other aspects of formatting for your selection, you can follow these steps.

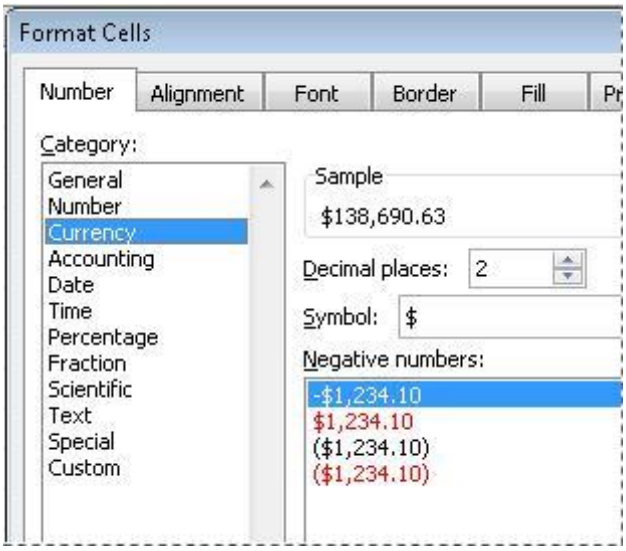
Select the cells you want to format

On the **Home** tab, click the Dialog Box Launcher next to **Number**.



Tip: You can also press Ctrl+1 to open the **Format Cells** dialog box.

In the **Format Cells** dialog box, in the **Category** list,
click **Currency** or **Accounting**.



In the **Symbol** box, click the currency symbol that you want.

Note: If you want to display a monetary value without a currency symbol, you can click **None**.

In the **Decimal places** box, enter the number of decimal places that you want for the number. For example, to display **$138,691** instead of **$138,690.63** in the cell, enter **0** in the **Decimal places** box.

As you make changes, watch the number in the **Sample** box. It shows you how changing the decimal places will affect the display of a number.

In the **Negative numbers** box, select the display style you want to use for negative numbers. If you don't want the existing options for displaying negative numbers, you can create your own number format.

To close the **Format Cells** dialog box, click **OK**.

iii. Conditional formatting

Conditional formatting can help make patterns and trends in your data more apparent. To use it, you create rules that determine the format of cells based on their

values, such as the following monthly temperature data with cell colors tied to cell values.

	A	B	C	D	E	F	G
1	City	Jan	Feb	Mar	Apr	May	Jun
2	Barstow	80	84	84	97	95	98
3	California City	78	86	84	96	98	102
4	Cinco	83	86	86	97	95	103
5	Hesperia	78	85	87	98	97	102
6	Lancaster	78	85	86	99	95	101
7	Mojave	82	85	86	98	96	99
8	Palmdale	81	84	85	97	95	101
9	Ridgecrest	81	87	87	97	96	98
10	Rosamond	82	86	88	99	97	101
11	Santa Clarita	79	85	87	95	96	103

You can apply conditional formatting to a range of cells (either a selection or a named range), an Excel table, and in Excel for Windows, even a PivotTable report.

Conditional formatting makes it easy to highlight certain values or make particular cells easy to identify. This changes the appearance of a cell range based on a condition (or criteria). You can use conditional formatting to highlight cells that contain values which meet a certain condition. Or you can format a whole cell range and vary the exact format as the value of each cell varies.

Temperature information with conditional formatting applied that shows top 10% and bottom 10% values

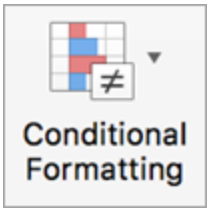
	A	B	C	D	E	F	G	H	I	J	K	L	M
1		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2	Avg Hi	40	38	44	46	51	56	67	72	70	59	45	41
3	Avg Lo	34	33	39	41	45	48	51	55	54	45	41	38

Temperature information with 3-color scale conditional formatting applied

	A	B	C	D	E	F	G	H	I	J	K	L	M
1		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2	Avg Hi	40	38	44	46	51	56	67	72	70	59	45	41
3	Avg Lo	34	33	39	41	45	48	51	55	54	45	41	38

Apply conditional formatting

1. Select the range of cells, the table, or the whole sheet that you want to apply conditional formatting to.
2. On the **Home** tab, click **Conditional Formatting**.

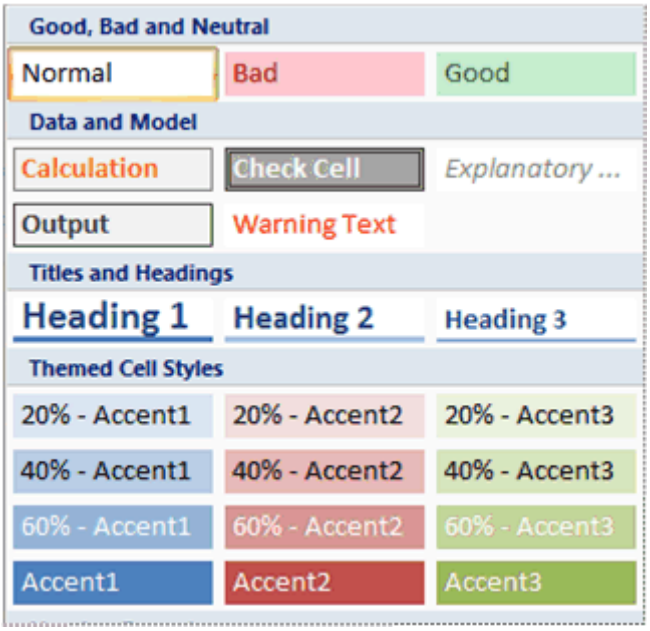


3. Do one of the following**:**

To highlight	Do this
Values in specific cells. Examples are dates after this week, or numbers between 50 and 100, or the bottom 10% of scores.	Point to **Highlight Cells Rules** or **Top/Bottom Rules**, and then click the appropriate option.
The relationship of values in a cell range. Extends a band of color across the cell. Examples are comparisons of prices or populations in the largest cities.	Point to **Data Bars**, and then click the fill that you want.
The relationship of values in a cell range. Applies a color scale where the intensity of the cell's color reflects the value's placement toward the top or bottom of the range. An example is sales distributions across regions.	Point to **Color Scales**, and then click the scale that you want.
A cell range that contains three to five groups of values, where each group has its own threshold. For example, you might assign a set of three icons to highlight cells that reflect sales below $80,000, below $60,000, and below $40,000. Or you might assign a 5-point rating system for automobiles and apply a set of five icons.	Point to **Icon Sets**, and then click a set.

E. Styles

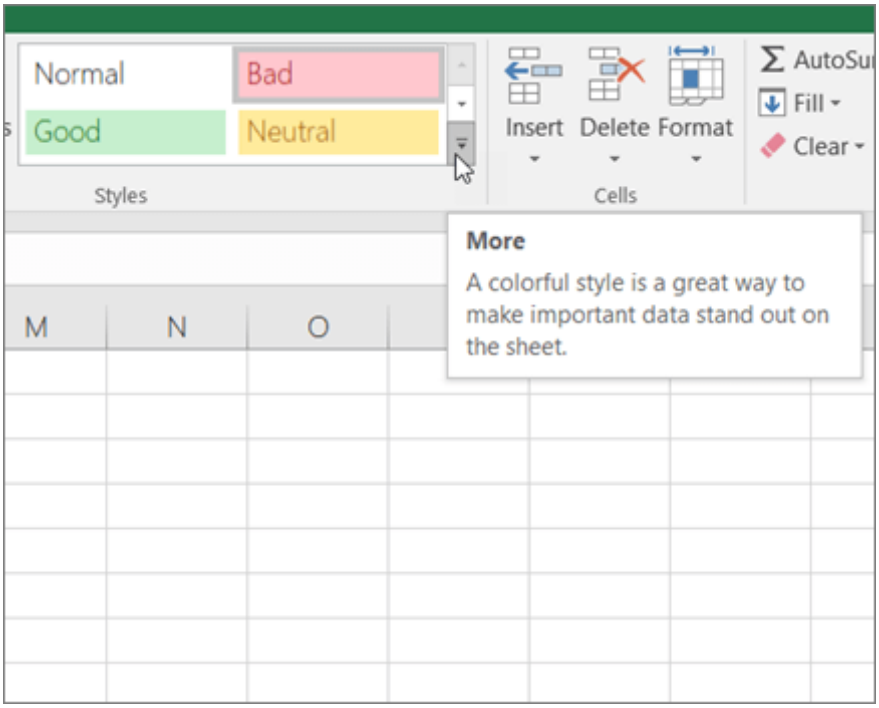
To apply several formats in one step, and to make sure that cells have consistent formatting, you can use a cell style. A cell style is a defined set of formatting characteristics, such as fonts and font sizes, number formats, cell borders, and cell shading. To prevent anyone from making changes to specific cells, you can also use a cell style that locks cells.



Microsoft Office Excel has several built-in cell styles that you can apply or modify. You can also modify or duplicate a cell style to create your own, custom cell style.

i. Apply a cell style

1. Select the cells that you want to format.
2. On the **Home** tab, in the **Styles** group, click the **More** dropdown arrow in the style gallery, and select the cell style that you want to apply.

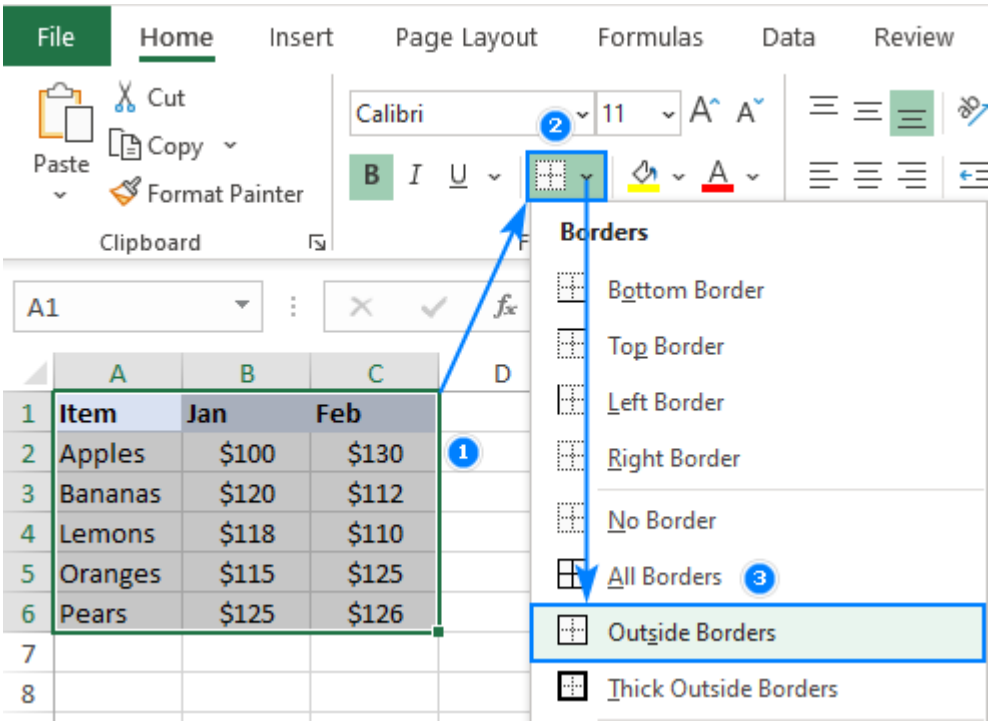


F. Border

The fastest way to make a border in Excel is to apply one of the inbuilt options directly from the ribbon. Here's how**:**

1. Select a cell or a range of cells to which you want to add borders.
2. On the *Home* tab, in the *Font* group, click the down arrow next to the **Borders** button, and you will see a list of the most popular border types.
3. Click the border you want to apply, and it will be immediately added to the selected cells.

For example, this is how you can apply an outside border around cells in Excel



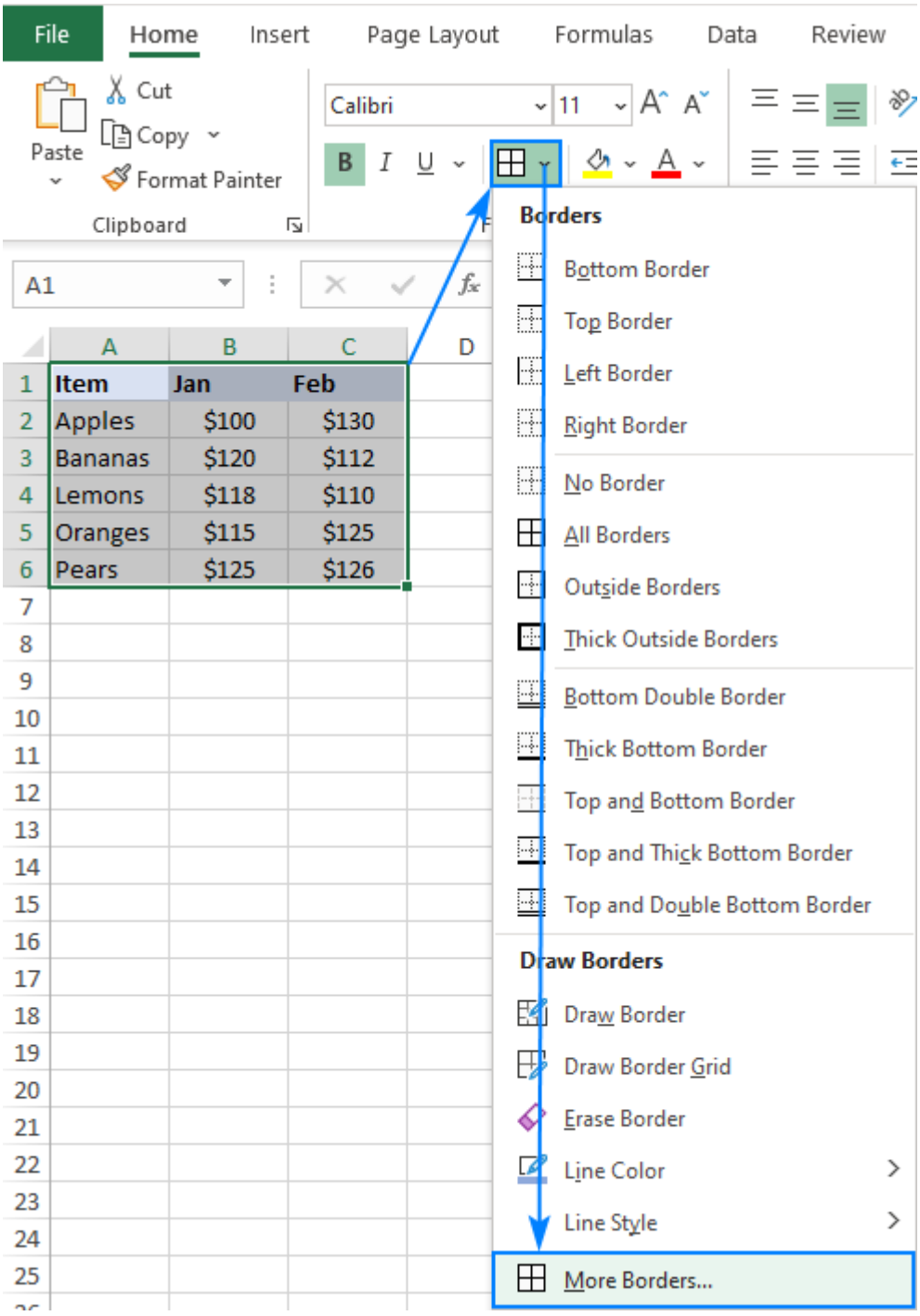
How to insert border in Excel with Format Cells dialog

The *Format Cells* dialog is the most effective method of adding borders in Excel. It gives you easy access to all the settings including the line color and thickness as well as a nice diagram preview.

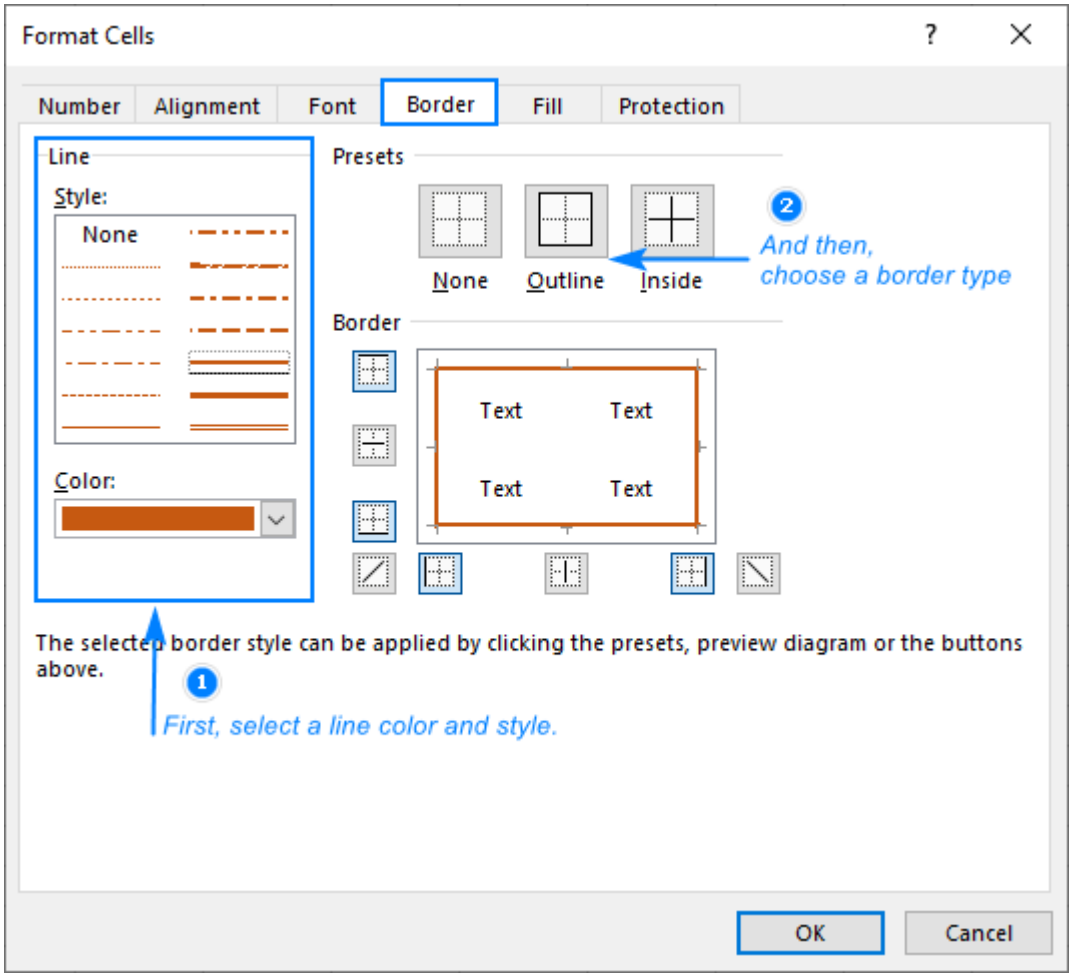
To insert a border via the *Format Cells* dialog, this is what you need to do

1. Select one or more cells to which you'd like to add borders.
2. Open the *Format Cells* dialog box by doing one of the following**:**
   - Click the down arrow next to the *Borders* button, and then click **More Borders** at the bottom of the drop-down list.
   - Right click the selected cells and choose *Format Cells…* from the context menu.

- Press Ctrl+1 shortcut.



3. In the *Format Cells* dialog box, switch to the **Border** tab and choose the line style and color first. And then, either use *Presets* to add the outside or inside borders or construct the desired border by selecting individual elements such as border top, bottom, right or left. The preview diagram will reflect the changes immediately.
4. When done, click OK.

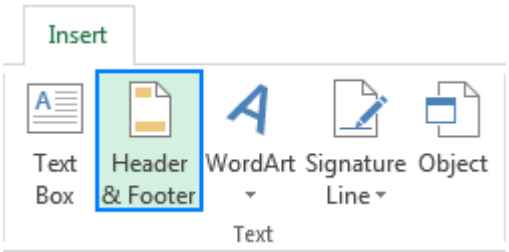


G. Header and footer

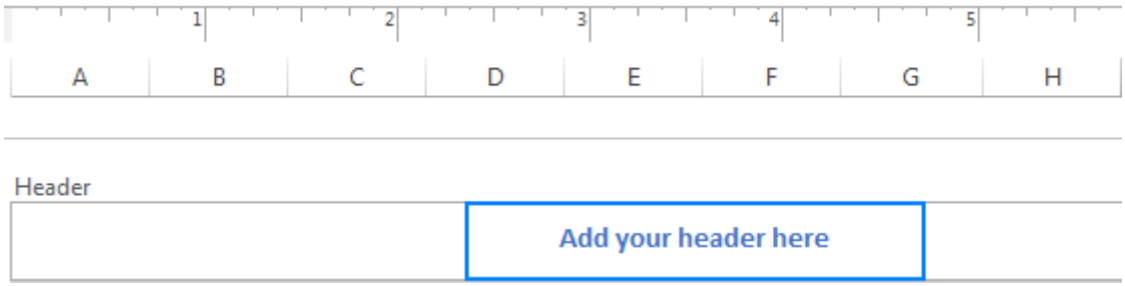
i. How to add header in Excel

Inserting a header in an Excel worksheet is quite easy. Here's what you do**:**

1. Go to the *Insert* tab > *Text* group and click the **Header & Footer** button. This will switch the worksheet to **Page Layout** view.



2. Now, you can type text, insert a picture, add a preset header or specific elements in any of the three *Header* boxes at the top of the page. By default, the central box is selected



If you wish the header to appear in the top left or top right corner of the page, click the left or right box and enter some information there.

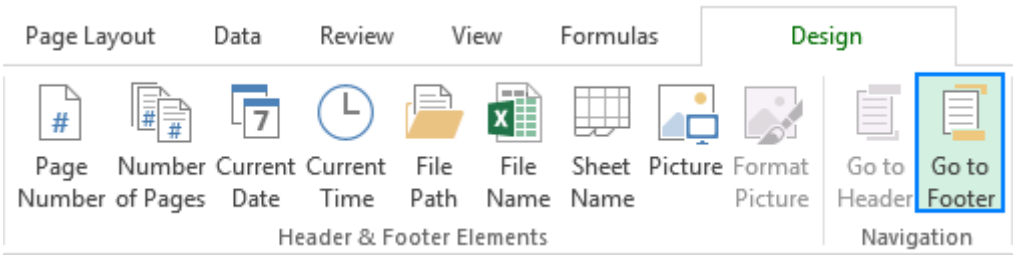
3. When finished, click anywhere in the worksheet to leave the header area. To exit the header box without keeping the changes, press Esc.

When you print out your worksheet, the header will be repeated on each page.

ii. How to insert footer in Excel

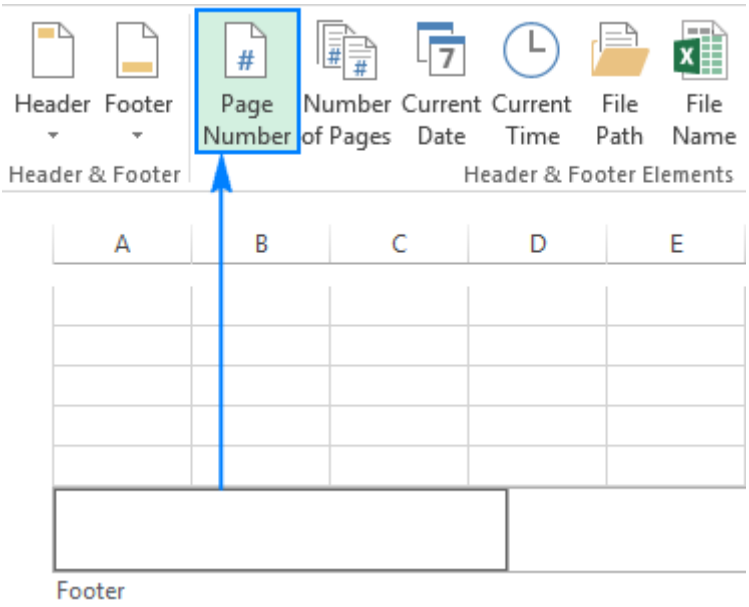
Like an Excel header, a footer can also be inserted in a few easy steps

1. On the *Insert* tab, in the *Text* group and click the **Header & Footer** button.
2. On the *Design* tab, click **Go to Footer** or scroll down to the footer boxes at the bottom of the page.



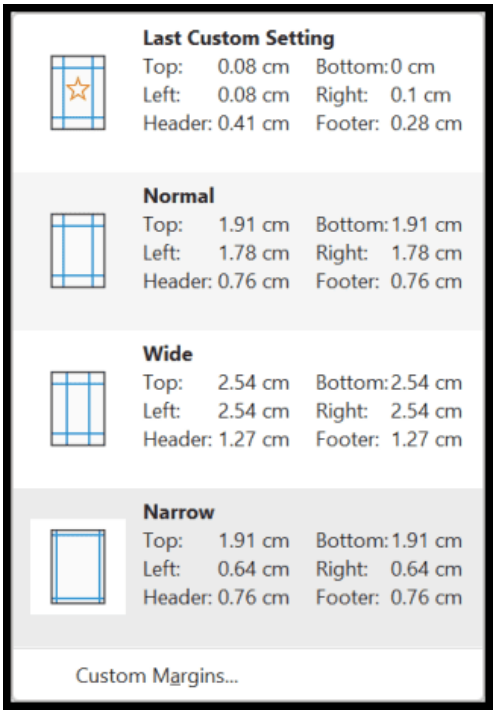
3. Depending on the desired location, click the left, center, or right footer box, and type some text or insert the element you want.
4. When done, click anywhere in the worksheet to exit the footer area.

For example, to insert page numbers at the bottom of the worksheet, select one of the footer boxes and click **Page Number** on the *Design* tab, in the *Header & Footer* group.



H. Page Setup/Margin

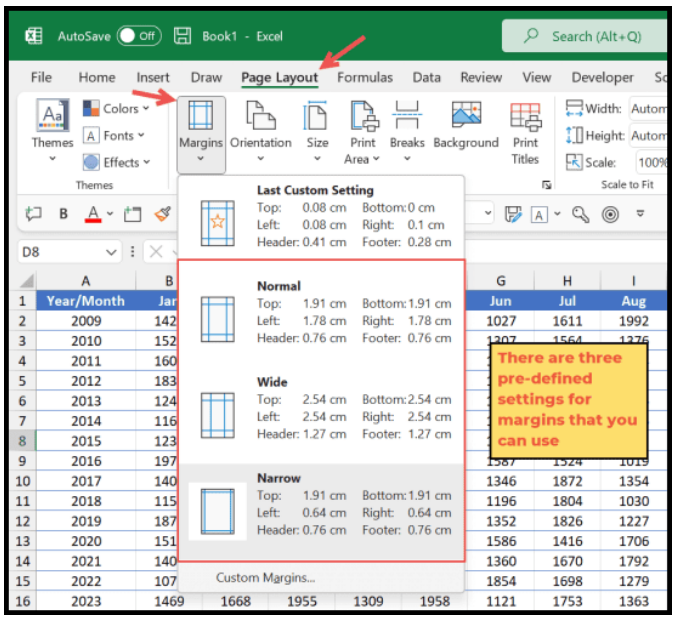
In Excel, if you want to print a paper report, you have the option to change the page margins according to your need. By default, the margins that you have are 1.78 cm for the left and right, and 1.91 for the bottom and top.



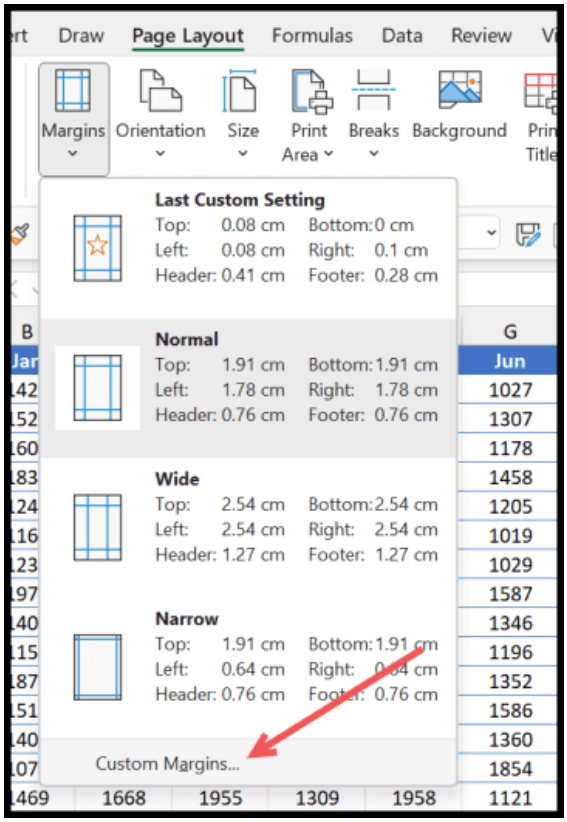
You can change these margins as per your requirement. In this tutorial, we will look at all the different options and methods that you have in Excel to change the page margins.

i. Change Page Margin in Excel

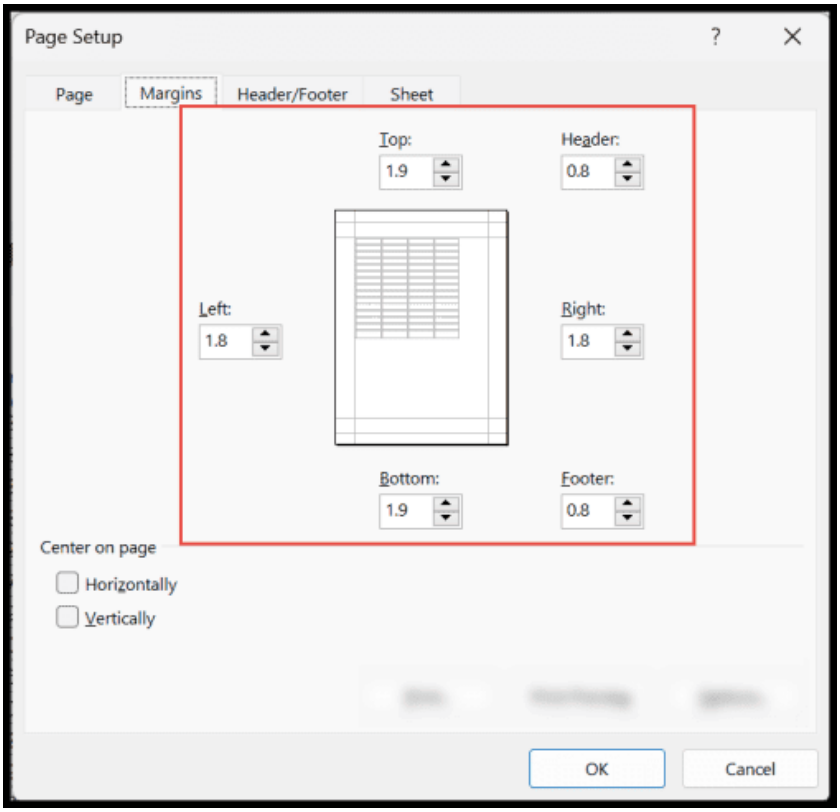
1. First, go to the Page Layout Tab.
2. After that, go to the page setup option group.
3. Next, click on the “Page Layout” drop-down.
4. In the end, select the page margin setting that you want to use.



There are three major pre-defined settings you can use**:** Normal (Default), Wide, and Narrow.



In the dialog box, you can change the page margin values and set a new one.



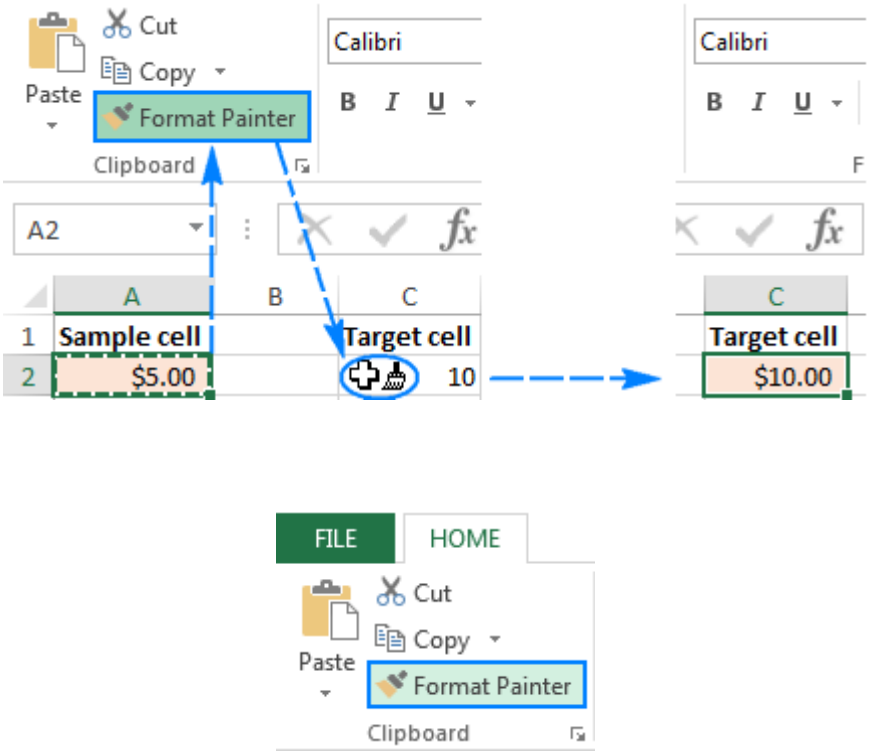
ii. Format painter in Excel

When it comes to copying formatting in Excel, Format Painter is one of the most helpful and underused features. It works by copying the formatting of one cell and applying it to other cells.

With just a couple of clicks, it can help you reproduce most, if not all of the formatting settings, including**:**

- Number format (General, Percentage, Currency, etc.)
- Font face, size, and color
- Font characteristics such as bold, italic, and underline
- Fill color (cell background color)
- Text alignment, direction and orientation
- Cell borders

In all Excel versions, the **Format Painter** button is located on the *Home* tab, in the *Clipboard* group, right next to the *Paste* button



iii. How to use Format Painter in Excel

To copy cell formatting with the Excel Format Painter, just do the following**:**

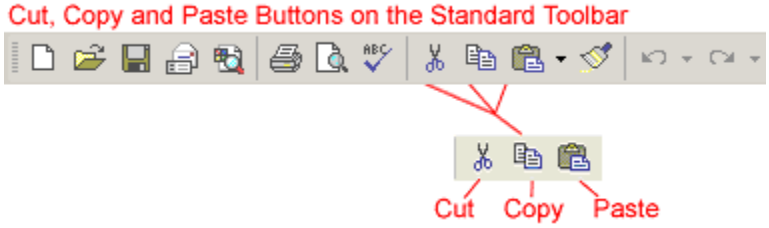
1. Select the cell with the formatting you want to copy.
2. On the *Home* tab, in the *Clipboard* group, click the **Format Painter** button. The pointer will change to a paint brush.
3. Move to the cell where you want to apply the formatting and click on it.

Done! The new formatting is copied to your target cell.

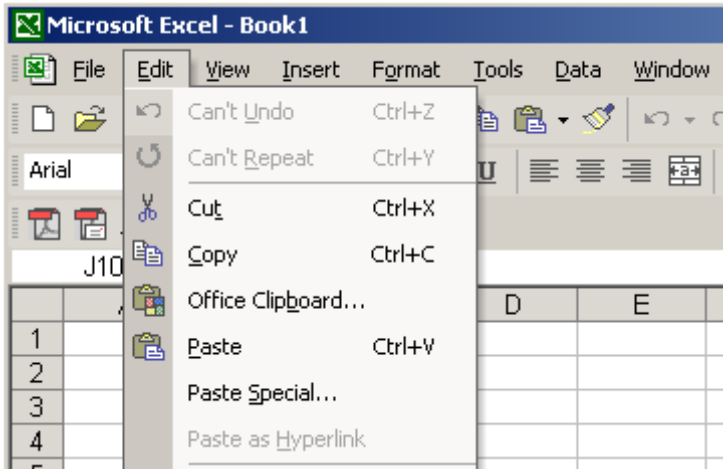
I. Cut Copy Paste

Cut, Copy, and **Paste** are useful operations in Excel XP. You can quickly copy and/or cut information in cells and paste them into other cells. These operations save you from having to type and retype the same information.

The **Cut, Copy**, and **Paste** buttons are located on the Standard toolbar.



The **Cut, Copy**, and **Paste** operations also appear as choices in the **Edit** menu.



The **Cut, Copy**, and **Paste** operations can also be performed using shortcut keys.

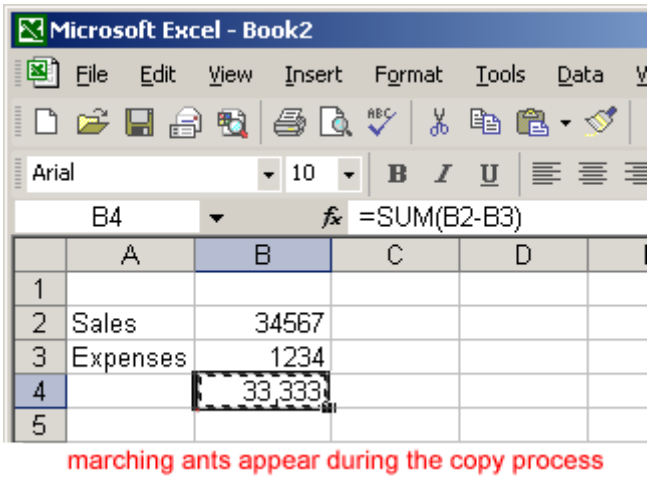
Cut	Ctrl+X
Copy	Ctrl+C
Paste	Ctrl+V

i. Copying and pasting cell contents

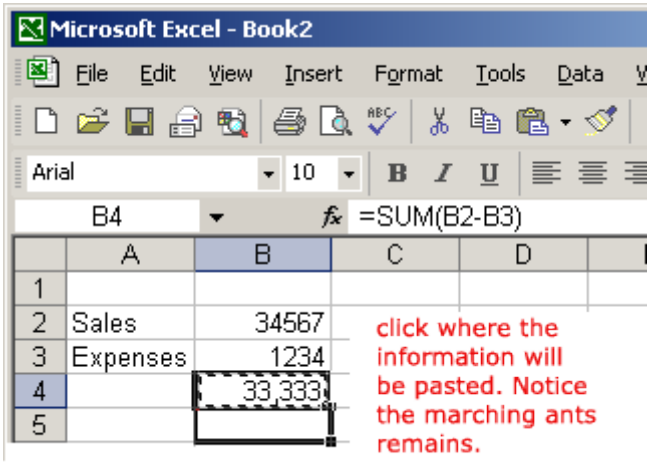
The **Copy** feature allows you to copy selected information from the spreadsheet and temporarily place it on the Clipboard, which is a temporary storage file in your computer's memory. The **Paste** feature allows you to select any of the collected items on the Clipboard and paste it in a cell of the same or different spreadsheet.

To copy and paste**:**

- Select a cell or cells to be duplicated.
- Click the **Copy button** on the **Standard toolbar**.
- The border of the copied cell(s) takes on the appearance of marching ants.



- Click the cell where you want to place the duplicated information. The cell will be highlighted. If you are copying contents into **more than one cell**, click the **first cell** where you want to place the duplicated information.



- Press the **Enter** key. Your information is copied to the new location.

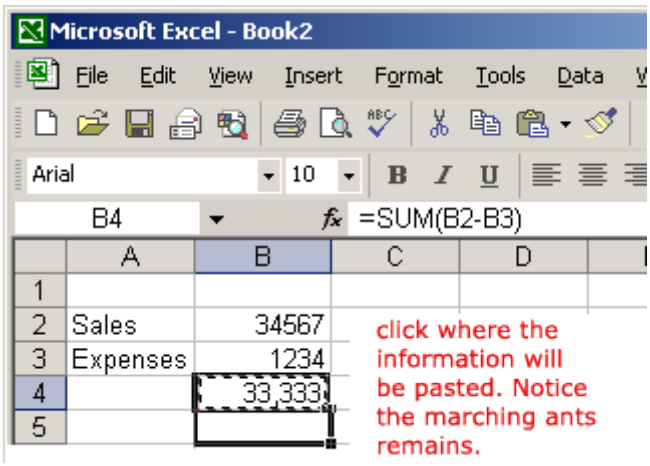
ii. Cutting and pasting cell contents

The **Cut** feature allows you to remove information from cells in the spreadsheet. Information that is cut can be pasted in another cell, as long as the pasting occurs before you perform another operation. If you don't paste the cut information immediately, it is removed from the Office clipboard.

To cut and paste**:**

- Select a cell or cells to be cut.
- Click the **Cut** button on the **Standard toolbar**.
- The information in the cell is deleted.
- The border of the cut cell(s) take on the appearance of marching ants.

- Click the cell where you want to place the duplicated information. The cell will be highlighted. If you are copying contents into **more than one cell**, click the **first cell** where you want to place the duplicated information.



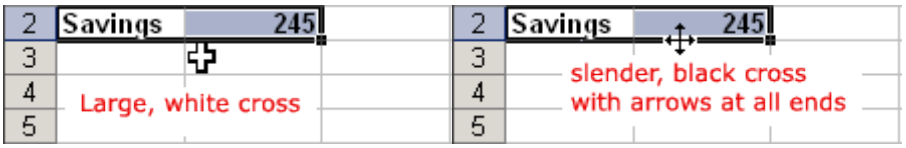
- Press the **Enter** key. Your information is pasted to the new location.

iii. Moving information using the drag-and-drop method

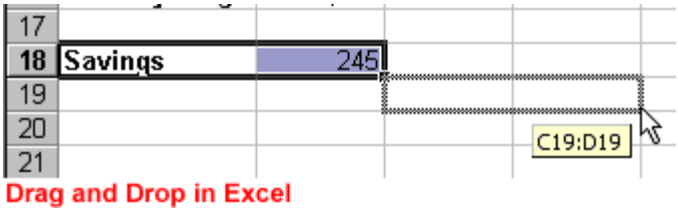
Another way to move information from one cell to another is to use the drag-and-drop method. You use the cursor to point to the information to be moved and then drag the cell to its new location.

To use drag and drop**:**

- Highlight and select the cell(s) you want to **move** to a new location.
- Position the mouse pointer near one of the **outside edges** of the selected cell(s). The mouse pointer changes from a large white cross into a slender black cross with arrows at all ends.



- Keep the mouse pointer on the **outer edge** of the selected cell, click and hold the left mouse button, and **drag** the cell(s) to a new location.



- Release the mouse button to move the information to its new location.

1.3. Make Layouts

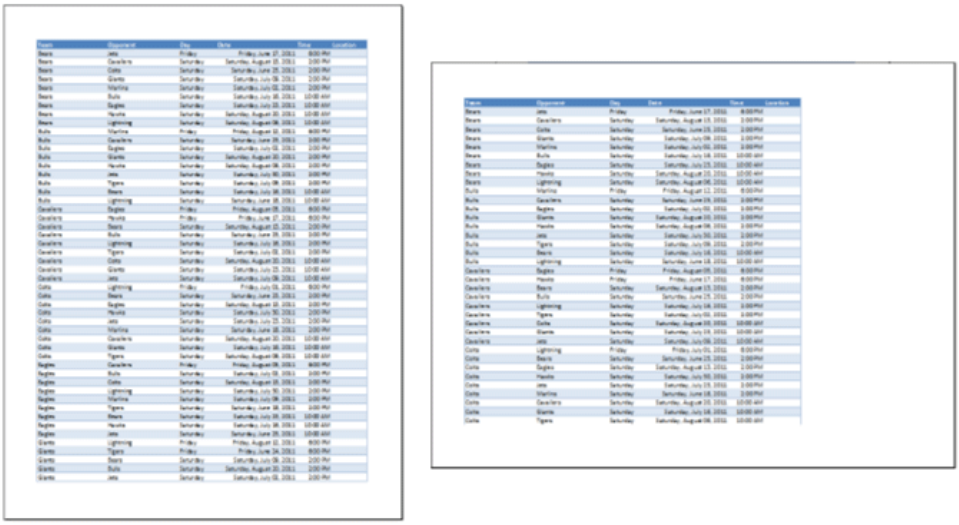
i. Page Layout view

Before you start modifying a workbook's page layout, you may want to view the workbook in **Page Layout view**, which can help you visualize your changes.

- To access Page Layout view, locate and select the **Page Layout view** command in the bottom-right corner of your workbook.

ii. Page orientation

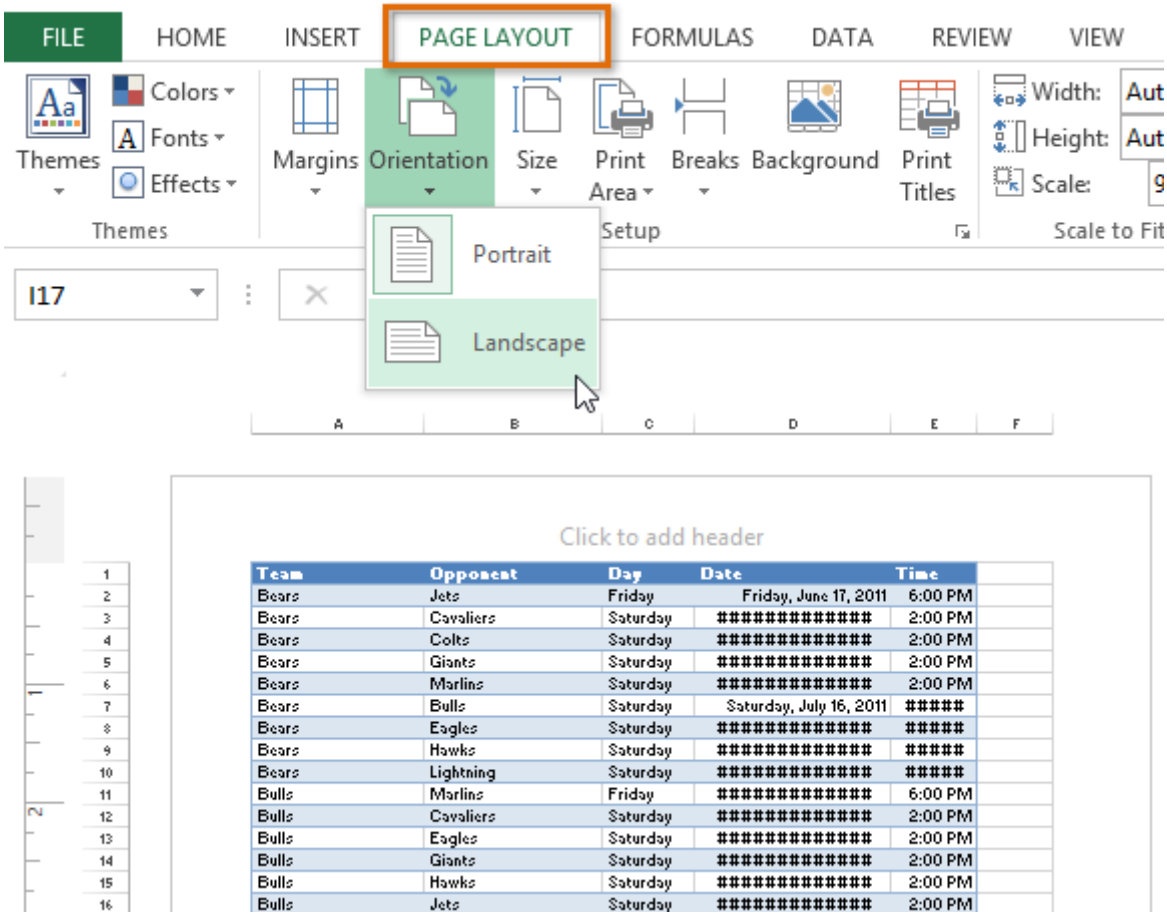
Excel offers two page orientation options: landscape and portrait. Landscape orients the page horizontally, while portrait orients the page vertically. Portrait is especially helpful for worksheets with a lot of rows, while landscape is best for worksheets with a lot of columns. In the example below, portrait orientation works best because the worksheet includes more rows than columns.



Portrait Landscape

iii. To change page orientation

1. Click the **Page Layout** tab on the **Ribbon**.
2. Select the **Orientation** command, then choose either **Portrait** or **Landscape** from the drop-down menu.



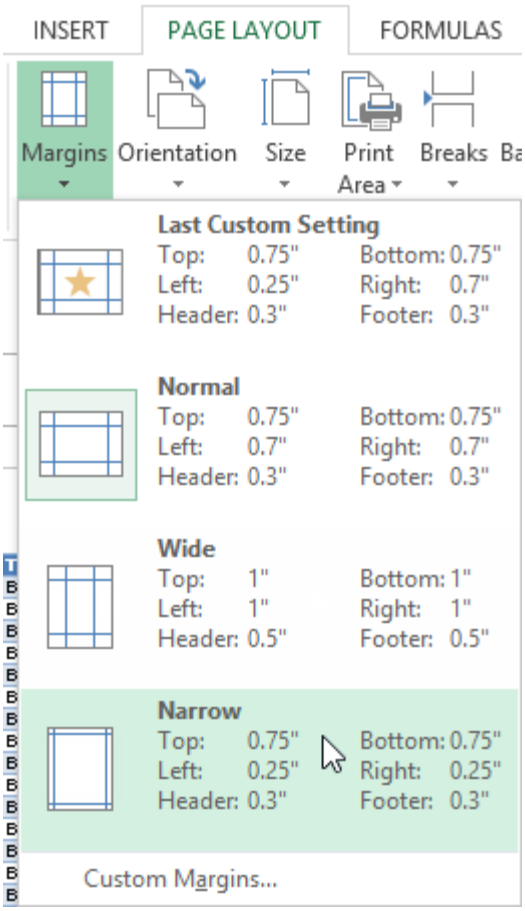
Team	Opponent	Day	Date	Time
Bears	Jets	Friday	Friday, June 17, 2011	6:00 PM
Bears	Cavaliers	Saturday	##########	2:00 PM
Bears	Colts	Saturday	##########	2:00 PM
Bears	Giants	Saturday	##########	2:00 PM
Bears	Marlins	Saturday	##########	2:00 PM
Bears	Bulls	Saturday	Saturday, July 16, 2011	#####
Bears	Eagles	Saturday	##########	#####
Bears	Hawks	Saturday	##########	#####
Bears	Lightning	Saturday	##########	#####
Bulls	Marlins	Friday	##########	6:00 PM
Bulls	Cavaliers	Saturday	##########	2:00 PM
Bulls	Eagles	Saturday	##########	2:00 PM
Bulls	Giants	Saturday	##########	2:00 PM
Bulls	Hawks	Saturday	##########	2:00 PM
Bulls	Jets	Saturday	##########	2:00 PM

3. The page orientation of the workbook will be changed.

iv. To format page margins

A **margin** is the space between your content and the edge of the page. By default, every workbook's margins are set to **Normal**, which is a one-inch space between the content and each edge of the page. Sometimes you may need to **adjust** the margins to make your data fit more comfortably on the page. Excel includes a variety of **predefined margin sizes**.

1. Click the **Page Layout** tab on the **Ribbon**, then select the **Margins** command.
2. Select the **desired margin size** from the drop-down menu. In our example, we'll select **Narrow** to fit more of our content on the page.

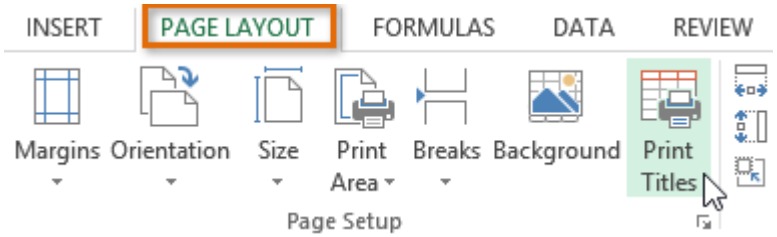


3. The margins will be changed to the selected size.

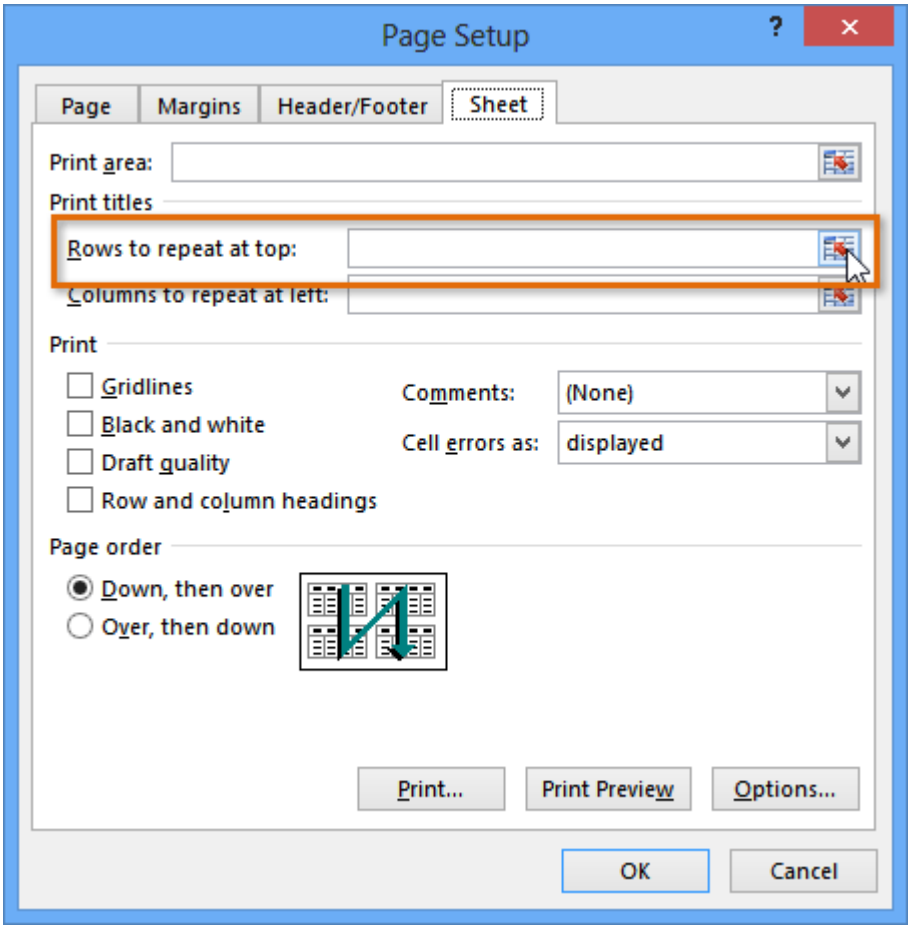
v. To include Print Titles:

If your worksheet uses **title headings**, it's important to include these headings on each page of your printed worksheet. It would be difficult to read a printed workbook if the title headings appeared only on the first page. The **Print Titles** command allows you to select specific rows and columns to appear on each page.

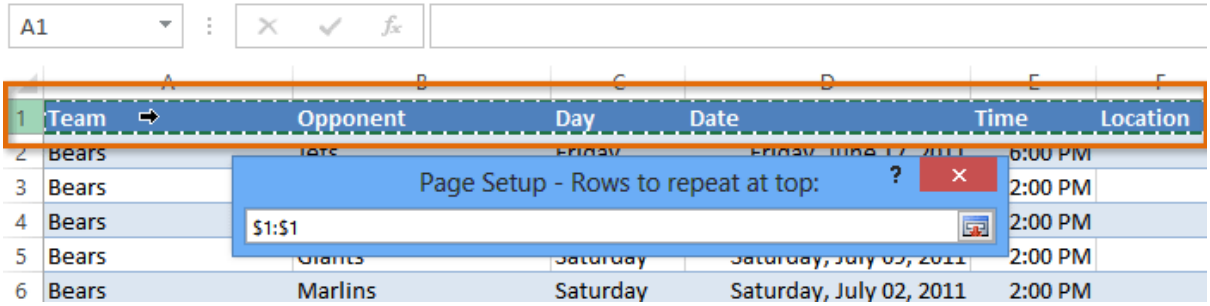
1. Click the **Page Layout** tab on the **Ribbon**, then select the **Print Titles** command.



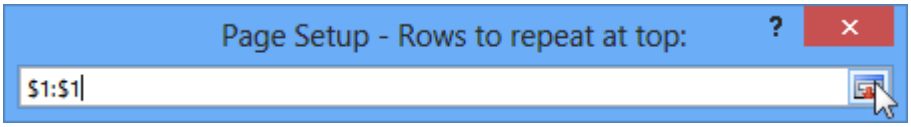
2. The **Page Setup** dialog box will appear. From here, you can choose **rows** or **columns** to repeat on each page. In our example, we'll repeat a row.
3. Click the **Collapse Dialog** button next to the **Rows to repeat at top:** field.



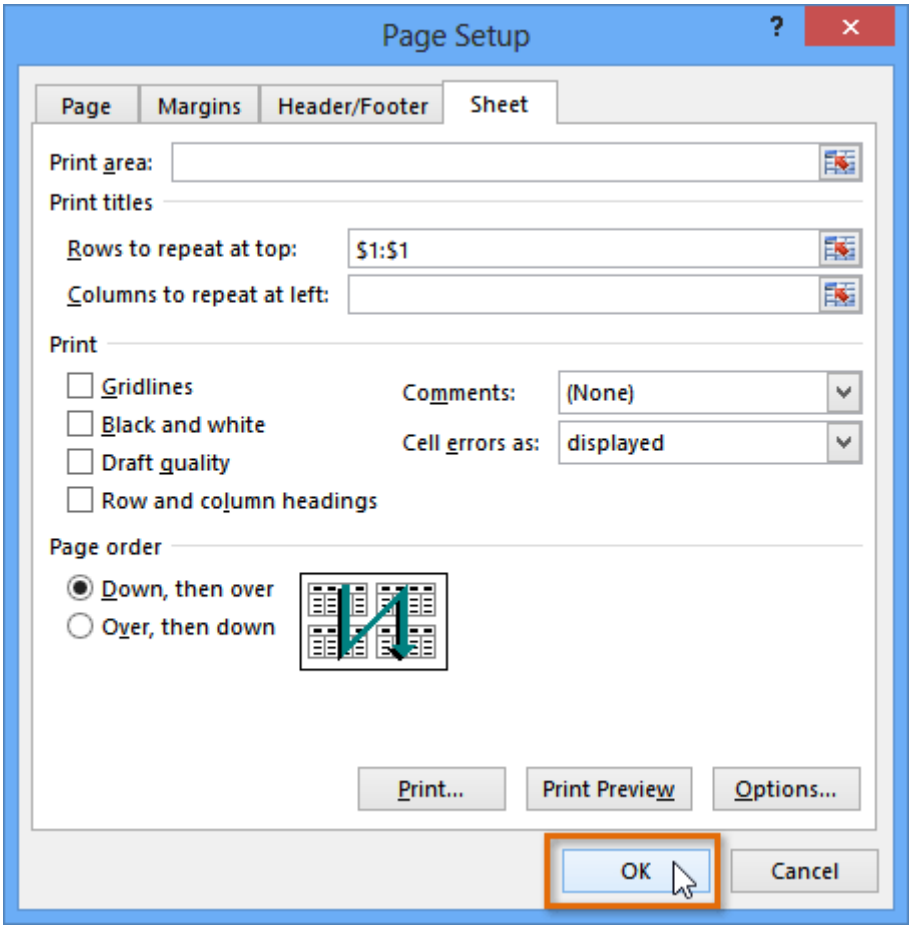
4. The cursor will become a small **selection arrow**➡and the **Page Setup** dialog box will be collapsed. Select the **row(s)** you want to repeat at the top of each printed page. In our example, we'll select row 1.



5. Row 1 will be added to the **Rows to repeat at top:** field. Click the **Collapse Dialog** button again.



6. The **Page Setup** dialog box will expand. Click **OK**. Row 1 will be printed at the top of every page.



vi. To insert a page break

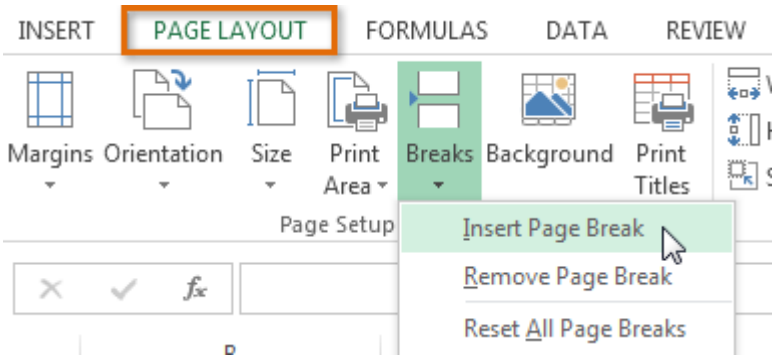
If you need to print different parts of your workbook across separate pages, you can insert a **page break**. There are two types of page breaks**: vertical** and **horizontal**. Vertical page breaks separate columns, while horizontal page breaks separate rows. In our example, we'll insert a horizontal page break.

1. Locate and select the **Page Break view** command. The worksheet will appear in Page Break view.

2. Select the **row** below where you want the page break to appear. For example, if you want to insert a page break between rows 28 and 29, select row 29.

	A	B	C	D	E	F
19	Bulls	Lightning	Saturday	Saturday, June 18, 2011	10:00 AM	
20	Cavaliers	Eagles	Friday	Friday, August 05, 2011	6:00 PM	
21	Cavaliers	Hawks	Friday	Friday, June 17, 2011	6:00 PM	
22	Cavaliers	Bears	Saturday	Saturday, August 13, 2011	2:00 PM	
23	Cavaliers	Bulls	Saturday	Saturday, June 25, 2011	2:00 PM	
24	Cavaliers	Lightning	Saturday	Saturday, July 16, 2011	2:00 PM	
25	Cavaliers	Tigers	Saturday	Saturday, July 02, 2011	2:00 PM	
26	Cavaliers	Colts	Saturday	Saturday, August 20, 2011	10:00 AM	
27	Cavaliers	Giants	Saturday	Saturday, July 23, 2011	10:00 AM	
28	Cavaliers	Jets	Saturday	Saturday, July 09, 2011	10:00 AM	
29	Colts	Lightning	Friday	Friday, July 01, 2011	6:00 PM	
30	Colts	Bears	Saturday	Saturday, June 25, 2011	2:00 PM	
31	Colts	Eagles	Saturday	Saturday, August 13, 2011	2:00 PM	
32	Colts	Hawks	Saturday	Saturday, July 30, 2011	2:00 PM	
33	Colts	Jets	Saturday	Saturday, July 23, 2011	2:00 PM	
34	Colts	Marlins	Saturday	Saturday, June 18, 2011	2:00 PM	
35	Colts	Cavaliers	Saturday	Saturday, August 20, 2011	10:00 AM	

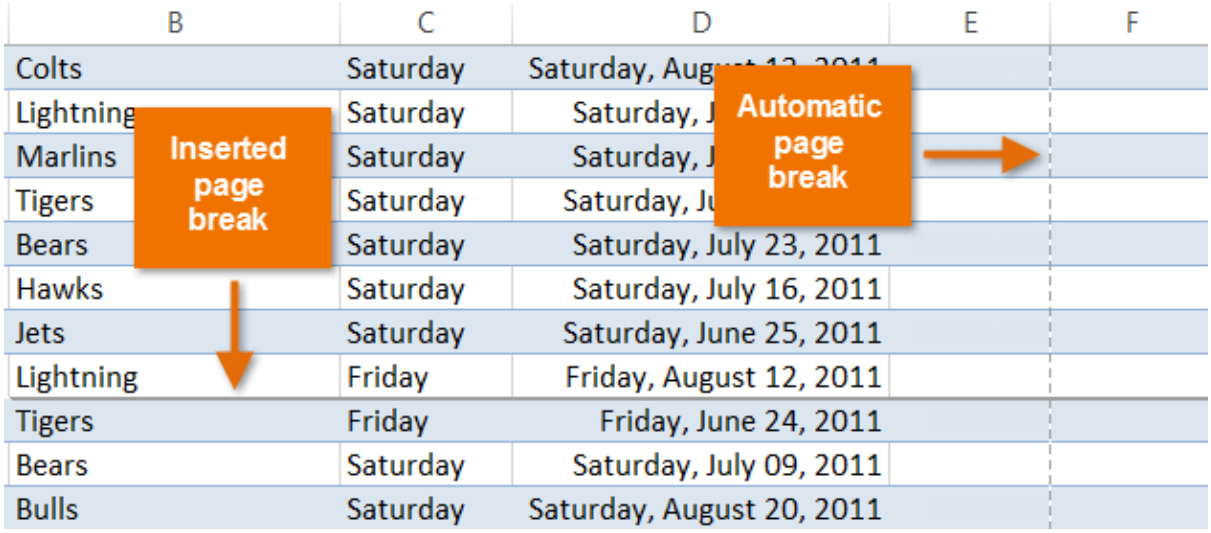
3. Click the **Page Layout** tab on the **Ribbon**, select the **Breaks** command, then click **Insert Page Break**.



4. The page break will be **inserted**, represented by a **dark blue line**.

	A	B	C	D	E	F
19	Bulls	Lightning	Saturday	Saturday, June 18, 2011	10:00 AM	
20	Cavaliers	Eagles	Friday	Friday, August 05, 2011	6:00 PM	
21	Cavaliers	Hawks	Friday	Friday, June 17, 2011	6:00 PM	
22	Cavaliers	Bears	Saturday	Saturday, August 13, 2011	2:00 PM	
23	Cavaliers	Bulls	Saturday	Saturday, June 25, 2011	2:00 PM	
24	Cavaliers	Lightning	Saturday	Saturday, July 16, 2011	2:00 PM	
25	Cavaliers	Tigers	Saturday	Saturday, July 02, 2011	2:00 PM	
26	Cavaliers	Colts	Saturday	Saturday, August 20, 2011	10:00 AM	
27	Cavaliers	Giants	Saturday	Saturday, July 23, 2011	10:00 AM	
28	Cavaliers	Jets	Saturday	Saturday, July 09, 2011	10:00 AM	
29	Colts	Lightning	Friday	Friday, July 01, 2011	6:00 PM	
30	Colts	Bears	Saturday	Saturday, June 25, 2011	2:00 PM	
31	Colts	Eagles	Saturday	Saturday, August 13, 2011	2:00 PM	
32	Colts	Hawks	Saturday	Saturday, July 30, 2011	2:00 PM	
33	Colts	Jets	Saturday	Saturday, July 23, 2011	2:00 PM	
34	Colts	Marlins	Saturday	Saturday, June 18, 2011	2:00 PM	
35	Colts	Cavaliers	Saturday	Saturday, August 20, 2011	10:00 AM	

When viewing your workbook in **Normal view**, inserted page breaks are represented by a **solid gray line**, while automatic page breaks are represented by a **dashed line**.



Self-Check Sheet - 1: Create Sheet formats and layouts

1. Which of the following is NOT a way to format text in a cell of Microsoft Excel?

A. Change the font style (bold, italic, underline)
B. Increase the font size
C. Change the text color
D. Add a background image

2. What does wrapping text in Excel do?

A. Bolds the text
B. Makes the text all uppercase
C. Allows long text to display completely within a cell
D. Underlines the text

3. In Excel, what format would you use to display a number as a percentage?

A. Currency
B. Number
C. Percentage
D. Date

4. What is the purpose of conditional formatting in Excel?

A. To create a border around a cell
B. To highlight data based on specific rules or conditions
C. To merge cells together
D. To change the font style of all text in a worksheet

5. What does the Format Painter tool in Excel do?

A. Copies formatting from one cell and applies it to other cells
B. Inserts a page break
C. Changes the orientation of the page
D. Adds a header or footer

6. In Excel, what is the difference between portrait and landscape page orientation?

A. There is no difference.
B. Portrait displays the page vertically, while landscape displays it horizontally.
C. Portrait displays more rows, while landscape displays more columns.
D. Portrait is used for text-heavy documents, while landscape is used for images.

7. What does the "Margin" setting in Excel control?

A. The space between text and the edge of the cell
B. The font size of the text
C. The space between the content of your worksheet and the edge of the page
D. The color of the cell borders

Answer Key - 1: Create Sheet formats and layouts

1. Which of the following is NOT a way to format text in a cell of Microsoft Excel?

E. Change the font style (bold, italic, underline)
F. Increase the font size
G. Change the text color
H. Add a background image

Answer: D

2. What does wrapping text in Excel do?

E. Bolds the text
F. Makes the text all uppercase
G. Allows long text to display completely within a cell
H. Underlines the text

Answer: C

3. In Excel, what format would you use to display a number as a percentage?

E. Currency
F. Number
G. Percentage
H. Date

Answer: C

4. What is the purpose of conditional formatting in Excel?

E. To create a border around a cell
F. To highlight data based on specific rules or conditions
G. To merge cells together
H. To change the font style of all text in a worksheet

Answer: B

5. What does the Format Painter tool in Excel do?

E. Copies formatting from one cell and applies it to other cells
F. Inserts a page break
G. Changes the orientation of the page
H. Adds a header or footer

Answer: A

6. In Excel, what is the difference between portrait and landscape page orientation?

E. There is no difference.
F. Portrait displays the page vertically, while landscape displays it horizontally.
G. Portrait displays more rows, while landscape displays more columns.
H. Portrait is used for text-heavy documents, while landscape is used for images.

Answer: B

7. What does the "Margin" setting in Excel control?

E. The space between text and the edge of the cell
F. The font size of the text
G. The space between the content of your worksheet and the edge of the page
H. The color of the cell borders

Answer: C

Job Sheet-1.1: Create a Sample Spreadsheet Demonstrating Formatting Tools

Steps to Follow

1. **Create a New Spreadsheet:** Open your preferred spreadsheet software and start a new document.
2. **Sample Data:** Enter some sample data into the spreadsheet. This could be a list of products, expenses, or any data that allows you to showcase formatting options.
3. **Formatting Tools:** Dedicate a section of your spreadsheet for each of the following formatting tools and demonstrate its functionality:
    - **Font:** Change the font style, size, and color of text in a designated area.
    - **Alignment:** Align text in cells to the left, right, center, or justify within a specific section.
    - **Advanced Formatting:** Apply strikethrough, underline, or subscript/superscript to text in a designated area.
4. **Conditional Formatting:** Create a rule that changes the cell color based on a specific condition (e.g., highlight cells with values greater than 10).
5. **Styles:** Create a custom cell style that includes specific font, alignment, and border settings. Apply this style to a designated section of your data.
6. **Border:** Apply different border styles to cells or groups of cells to visually separate sections.
7. **Header and Footer:** Add a header with your name and a footer with the page number to your spreadsheet.
8. **Page Setup/Margin:** Adjust the margins of your spreadsheet and potentially change the page orientation (portrait/landscape) to demonstrate these settings.
9. **Format Painter:** Choose a formatted cell or group of cells, then use the format painter tool to copy the formatting and apply it to another section.
10. **Cut, Copy, Paste:** Demonstrate cutting, copying, and pasting content within the spreadsheet.
11. **Sorting and Filtering:** Sort a column of your data alphabetically (ascending or descending). Additionally, apply a filter to show only specific data sets within your sample data.

Deliverable:

- A completed spreadsheet showcasing the use of each formatting tool listed above.
- Each section of the spreadsheet should be clearly labeled to indicate the specific formatting tool being demonstrated.

Specification Sheet-1.1: Create a Sample Spreadsheet Demonstrating Formatting Tools

Necessary Tools

Sl. No	Name of Tools	Specification	Unit	Quantity
1				

Necessary Equipment

Sl. No	Name of Equipment	Specification	Unit	Quantity
1.	Computer	As Need	No.	01
2.	Spreadsheet Software	As Need	No.	01

Learning Outcome 2: Formulas and functions can be used.

Assessment Criteria	1. functions are identified 2. Functions are used
Conditions and Resources	1. Real or simulated workplace 2. CBLM 3. Handouts 4. Laptop 5. Multimedia Projector 6. Paper, Pen, Pencil, Eraser 7. Internet facilities 8. White board and marker 9. Audio Video Device
Contents	1. Functions a. Logical Functions are learned b. Text Functions are learned c. Financial Functions are learned d. Math Functions are learned e. Information Function for error checking f. Lookup Functions g. Date and Time Functions 2. Use of functions
Activities/job/Task	1. Demonstrate communication with customers. 2. Demonstrate rapport building techniques
Training Methods	1. Discussion 2. Presentation 3. Demonstration 4. Guided Practice 5. Individual Practice 6. Project Work 7. Problem Solving 8. Brainstorming
Assessment Methods	Assessment methods may include but not limited to 1. Written Test 2. Demonstration 3. Oral Questioning 4. Portfolio

Learning Experience 2: Use Formulas and functions

In order to achieve the objectives stated in this learning guide, you must perform the learning steps below. Beside each step are the resources or special instructions you will use to accomplish the corresponding activity.

Learning Activities	Recourses/Special Instructions
a. Trainee will ask the instructor about about the learning materials	1. Instructor will provide the learning materials 'Use Formulas and functions'
b. Read the Information sheet and complete the Self Checks & Check answer sheets on "Use Formulas and functions"	2. Read Information sheet 1**:** Use Formulas and functions 3. Answer Self-check 1**:** Use Formulas and functions 4. Check your answer with Answer key 1**:** Use Formulas and functions
c. Read the Job/Task Sheet and Specification Sheet and perform job/Task	5. Job/Task Sheet and Specification Sheet Job Sheet-2**:** Create a worksheet using Logical, Text and Financial Function

Information Sheet 2: Use Formulas and functions

Learning Objective:

After completion of this information sheet, the learners will be able to explain, define and interpret the following contents**:**

2.1. Functions

2.2. Use of Functions

2.1. And 2.2 Identify and use Functions

Excel functions are pre-written formulas that help you perform calculations, manipulate data, and analyze information in your spreadsheets. They offer a powerful way to automate tasks and save you time.

Here's a breakdown of key points about Excel functions**:**

- **Variety of Functions:** Excel boasts a vast library of functions categorized by their purpose. Common categories include**:**
    - **Basic:** SUM, AVERAGE, COUNT, MAX, MIN (for performing calculations)
    - **Statistical:** Functions to analyze data distribution (e.g., STDEV for standard deviation)
    - **Logical:** Functions to make comparisons and test conditions (e.g., IF, AND, OR)
    - **Text:** Functions to manipulate text data (e.g., CONCATENATE to combine text)
    - **Date & Time:** Functions to work with dates and times (e.g., TODAY, DATEDIF)
    - Many more!
- **Using Functions:** All functions begin with an equal sign (=) followed by the function name and then parentheses containing arguments. Arguments are the values or cell references the function uses for calculations.
- **Benefits of Functions:**
    - **Automation:** Functions automate repetitive tasks, saving you time and effort.

- **Accuracy:** They minimize errors compared to manual calculations.
- **Flexibility:** Functions can handle complex calculations and data manipulation.
- **Consistency:** Ensure consistent formulas across your spreadsheet.

i. Logical Functions

Microsoft Excel provides 4 logical functions to work with the logical values. The functions are AND, OR, XOR and NOT. You use these functions when you want to carry out more than one comparison in your formula or test multiple conditions instead of just one. As well as logical operators, Excel logical functions return either TRUE or FALSE when their arguments are evaluated.

The following table provides a short summary of what each logical function does to help you choose the right formula for a specific task.

Function	Description	Formula Example	Formula Description
AND	Returns TRUE if all of the arguments evaluate to TRUE.	**=AND(A2>=10, B2<5)**	The formula returns TRUE if a value in cell A2 is greater than or equal to 10, and a value in B2 is less than 5, FALSE otherwise.
OR	Returns TRUE if any argument evaluates to TRUE.	**=OR(A2>=10, B2<5)**	The formula returns TRUE if A2 is greater than or equal to 10 or B2 is less than 5, or both conditions are met. If neither of the conditions it met, the formula returns FALSE.

Function	Description	Formula Example	Formula Description
XOR	Returns a logical Exclusive Or of all arguments.	**=XOR(A2>=10, B2<5)**	The formula returns TRUE if either A2 is greater than or equal to 10 or B2 is less than 5. If neither of the conditions is met or both conditions are met, the formula returns FALSE.
NOT	Returns the reversed logical value of its argument. I.e. If the argument is FALSE, then TRUE is returned and vice versa.	**=NOT(A2>=10)**	The formula returns FALSE if a value in cell A1 is greater than or equal to 10; TRUE otherwise.

In additions to the four logical functions outlined above, Microsoft Excel provides 3 "conditional" functions - IF, IFERROR and IFNA.

Excel logical functions - facts and figures

1. In arguments of the logical functions, you can use cell references, numeric and text values, Boolean values, comparison operators, and other Excel functions. However, all arguments must evaluate to the Boolean values of TRUE or FALSE, or references or arrays containing logical values.
2. If an argument of a logical function contains any **empty cells**, such values are ignored. If all of the arguments are empty cells, the formula returns #VALUE! error.
3. If an argument of a logical function contains numbers, then zero evaluates to FALSE, and all other numbers including negative numbers evaluate to TRUE. For example, if cells A1**:**A5 contain numbers, the formula =AND(A1**:**A5) will return TRUE if none of the cells contains 0, FALSE otherwise.

4. A logical function returns the #VALUE! error if none of the arguments evaluate to logical values.
5. A logical function returns the #NAME? error if you've misspell the function's name or attempted to use the function in an earlier Excel version that does not support it. For example, the XOR function can be used in Excel 2016 and 2013 only.
6. In Excel 2007 and higher, you can include up to 255 arguments in a logical function, provided that the total length of the formula does not exceed 8,192 characters. In Excel 2003 and lower, you can supply up to 30 arguments and the total length of your formula shall not exceed 1,024 characters.

A. Using the AND function in Excel

The AND function is the most popular member of the logic functions family. It comes in handy when you have to test several conditions and make sure that all of them are met. Technically, the AND function tests the conditions you specify and returns TRUE if all of the conditions evaluate to TRUE, FALSE otherwise.
The syntax for the Excel AND function is as follows

AND(logical1, [logical2], …)

Where logical is the condition you want to test that can evaluate to either TRUE or FALSE. The first condition (logical1) is required, subsequent conditions are optional.

And now, let's look at some formula examples that demonstrate how to use the AND functions in Excel formulas.

Formula	Description
=AND(A2="Bananas", B2>C2)	Returns TRUE if A2 contains "Bananas" and B2 is greater than C2, FALSE otherwise.
=AND(B2>20, B2=C2)	Returns TRUE if B2 is greater than 20 and B2 is equal to C2, FALSE otherwise.
=AND(A2="Bananas", B2>=30, B2>C2)	Returns TRUE if A2 contains "Bananas", B2 is greater than or equal to 30 and B2 is greater than C2, FALSE otherwise.

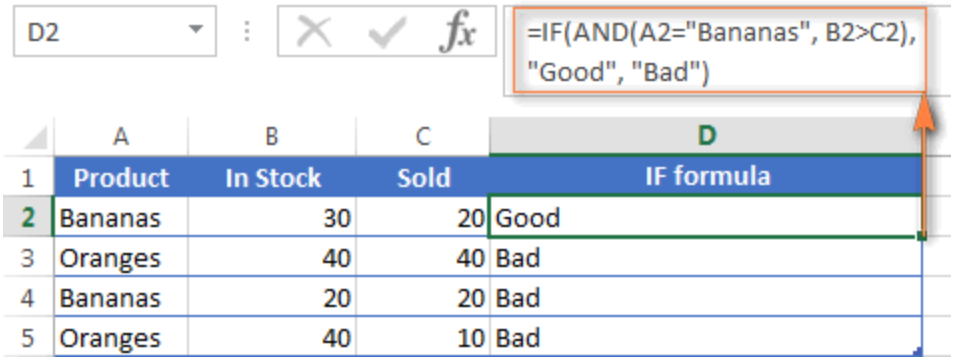
	A	B	C	D	E	F
1	Product	In Stock	Sold	Formula 1	Formula 2	Formula 3
2				=AND(A2="Bananas", B2>C1)	=AND(B2>20, B2=C2)	=AND(A2="Bananas", B2>=30, B2>C2)
3	Bananas	30	20	TRUE	FALSE	TRUE
4	Oranges	40	40	FALSE	TRUE	FALSE
5	Bananas	20	20	FALSE	FALSE	FALSE
6	Oranges	40	10	FALSE	FALSE	FALSE

B. Excel AND function – common uses

By itself, the Excel AND function is not very exciting and has narrow usefulness. But in combination with other Excel functions AND can significantly extend the capabilities of your worksheets.

One of the most common uses of the Excel AND function is found in the logical_test argument of the IF function to test several conditions instead of just one. For example, you can nest any of the AND functions above inside the IF function and get a result similar to this**:**

=IF(AND(A2="Bananas", B2>C2), "Good", "Bad")



	A	B	C	D
1	Product	In Stock	Sold	IF formula
2	Bananas	30	20	Good
3	Oranges	40	40	Bad
4	Bananas	20	20	Bad
5	Oranges	40	10	Bad

An Excel formula for the BETWEEN condition

If you need to create a between formula in Excel that picks all values between the given two values, a common approach is to use the IF function with AND in the logical test.

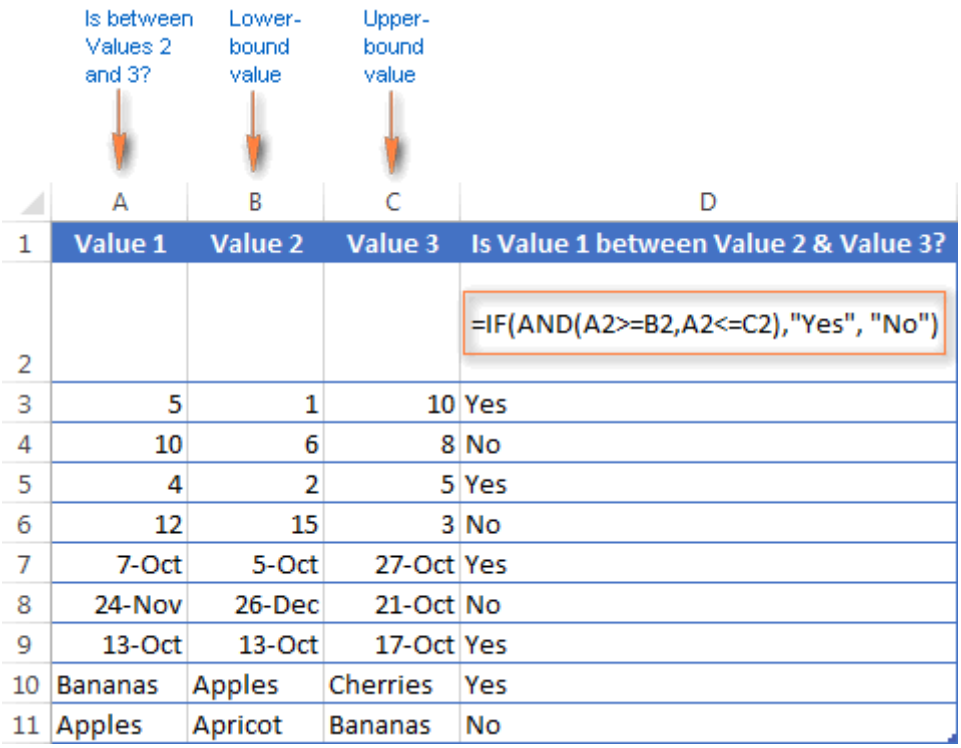
For example, you have 3 values in columns A, B and C and you want to know if a value in column A falls between B and C values. To make such a formula, all it takes is the IF function with nested AND and a couple of comparison operators**:**

Formula to check if X is between Y and Z, inclusive

=IF(AND(A2>=B2,A2<=C2),"Yes", "No")

Formula to check if X is between Y and Z, not inclusive

=IF(AND(A2>B2, A2<C2),"Yes", "No")



	A	B	C	D
1	Value 1	Value 2	Value 3	Is Value 1 between Value 2 & Value 3?
2				=IF(AND(A2>=B2,A2<=C2),"Yes", "No")
3	5	1	10	Yes
4	10	6	8	No
5	4	2	5	Yes
6	12	15	3	No
7	7-Oct	5-Oct	27-Oct	Yes
8	24-Nov	26-Dec	21-Oct	No
9	13-Oct	13-Oct	17-Oct	Yes
10	Bananas	Apples	Cherries	Yes
11	Apples	Apricot	Bananas	No

As demonstrated in the screenshot above, the formula works perfectly for all data types - numbers, dates and text values. When comparing text values, the formula checks them character-by-character in the alphabetic order. For example, it states that *Apples* in not between *Apricot* and *Bananas* because the second "p" in *Apples* comes before "r" in *Apricot*.

As you see, the IF /AND formula is simple, fast and almost universal. I say "almost" because it does not cover one scenario. The above formula implies that a value in column B is smaller than in column C, i.e. column B always contains the lower bound value and C - the upper bound value. This is the reason why the formula returns "*No*" for row 6, where A6 has 12, B6 - 15 and C6 - 3 as well as for row 8 where A8 is 24-Nov, B8 is 26-Dec and C8 is 21-Oct.

But what if you want your between formula to work correctly regardless of where the lower-bound and upper-bound values reside? In this case, use the Excel MEDIAN function that returns the median of the given numbers (i.e. the number in the middle of a set of numbers).
So, if you replace AND in the logical test of the IF function with MEDIAN, the formula will go like**:**

=IF(A2=MEDIAN(A2:C2),"Yes","No")

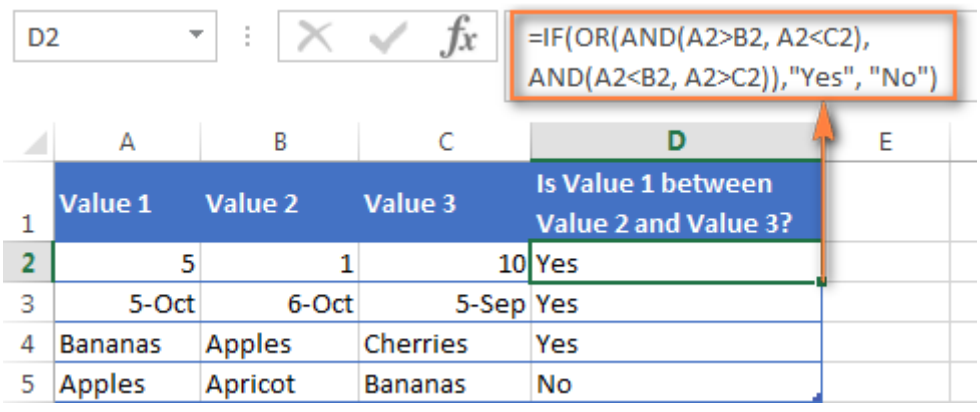
And you will get the following results

	A	B	C	D
1	Value 1	Value 2	Value 3	Is Value 1 between Value 2 & Value 3?
2				=IF(A2=MEDIAN(A2:C2),"Yes","No")
3	5	1	10	Yes
4	10	6	8	No
5	4	2	5	Yes
6	12	15	3	Yes
7	7-Oct	5-Oct	27-Oct	Yes
8	24-Nov	26-Dec	21-Oct	Yes
9	13-Oct	13-Oct	17-Oct	Yes
10	Bananas	Apples	Cherries	#NUM!
11	Apples	Apricot	Bananas	#NUM!

As you see, the MEDIAN function works perfectly for numbers and dates, but returns the #NUM! error for text values.

If you want a perfect Between formula that works for text values as well as for numbers and dates, then you will have to construct a more complex logical text using the AND / OR functions, like this

=IF(OR(AND(A2>B2, A2<C2), AND(A2<B2, A2>C2)), "Yes", "No")



	A	B	C	D	E
1	Value 1	Value 2	Value 3	Is Value 1 between Value 2 and Value 3?	
2	5	1	10	Yes	
3	5-Oct	6-Oct	5-Sep	Yes	
4	Bananas	Apples	Cherries	Yes	
5	Apples	Apricot	Bananas	No	

C. Using the OR function in Excel

As well as AND, the Excel OR function is a basic logical function that is used to compare two values or statements. The difference is that the OR function returns TRUE if at least one if the arguments evaluates to TRUE, and returns FALSE if all arguments are FALSE. The OR function is available in all versions of Excel 2016 - 2000.

The syntax of the Excel OR function is very similar to AND

OR(logical1, [logical2], …)

Where logical is something you want to test that can be either TRUE or FALSE. The first logical is required, additional conditions (up to 255 in modern Excel versions) are optional.

And now, let's write down a few formulas for you to get a feel how the OR function in Excel works.

Formula	Description
=OR(A2="Bananas", A2="Oranges")	Returns TRUE if A2 contains "Bananas" or "Oranges", FALSE otherwise.
=OR(B2>=40, C2>=20)	Returns TRUE if B2 is greater than or equal to 40 or C2 is greater than or equal to 20, FALSE otherwise.
=OR(B2=" ", C2="")	Returns TRUE if either B2 or C2 is blank or both, FALSE otherwise.

	A	B	C	D	E	F
1	Product	In Stock	Sold	Formula 1	Formula 2	Formula 3
2				=OR(A2="Bananas", A2="Oranges")	=OR(B2>=40, C2>=20)	=OR(B2="", C2="")
3	Bananas	30	10	TRUE	FALSE	FALSE
4	Oranges		20	TRUE	TRUE	TRUE
5	Cherries	20		FALSE	FALSE	TRUE
6	Oranges	30	10	TRUE	FALSE	FALSE
7	Cherries			FALSE	FALSE	TRUE

As well as Excel AND function, OR is widely used to expand the usefulness of other Excel functions that perform logical tests, e.g. the IF function. Here are just a couple of examples**:**

IF function with nested OR
=IF(OR(B2>30, C2>20), "Good", "Bad")

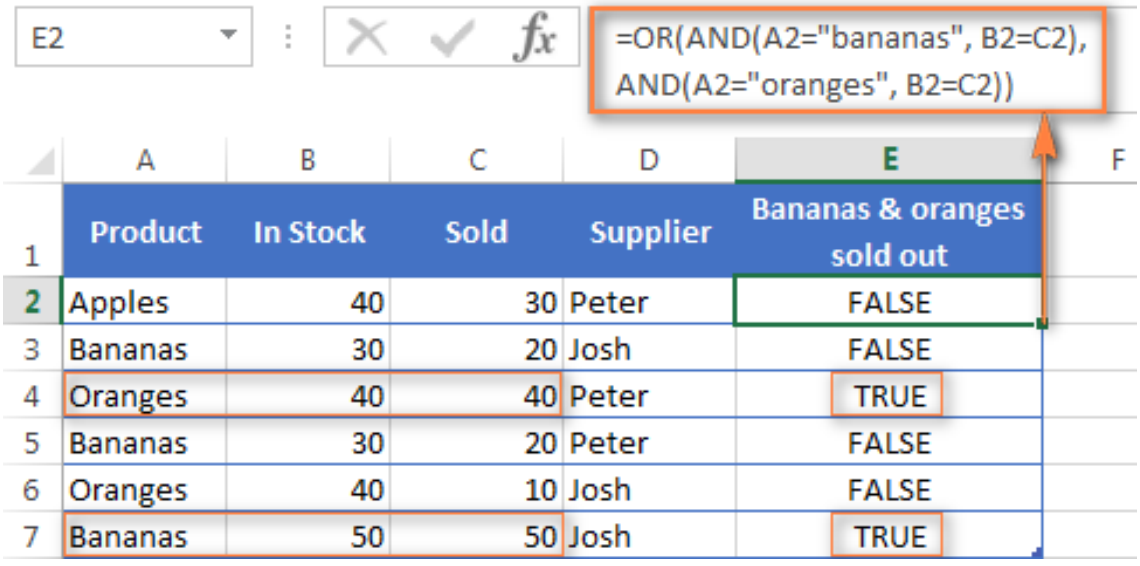
The formula returns "*Good*" if a number in cell B3 is greater than 30 or the number in C2 is greater than 20, "*Bad*" otherwise.

Excel AND / OR functions in one formula

Naturally, nothing prevents you from using both functions, AND & OR, in a single formula if your business logic requires this. There can be infinite variations of such formulas that boil down to the following basic patterns**:**

=AND(OR(Cond1, Cond2), Cond3)
=AND(OR(Cond1, Cond2), OR(Cond3, Cond4)
=OR(AND(Cond1, Cond2), Cond3)
=OR(AND(Cond1,Cond2), AND(Cond3,Cond4))
For example, if you wanted to know what consignments of bananas and oranges are sold out, i.e. "In stock" number (column B) is equal to the "Sold" number (column C), the following OR/AND formula could quickly show this to you**:**

=OR(AND(A2="bananas", B2=C2), AND(A2="oranges", B2=C2))

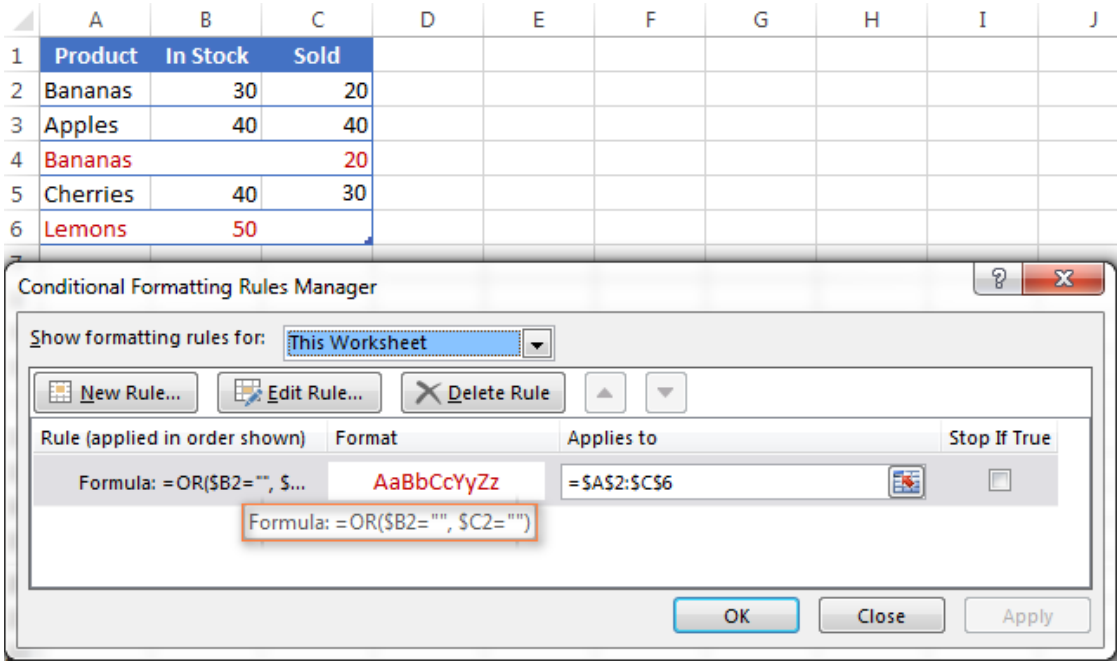


	A	B	C	D	E	F
1	Product	In Stock	Sold	Supplier	Bananas & oranges sold out	
2	Apples	40	30	Peter	FALSE	
3	Bananas	30	20	Josh	FALSE	
4	Oranges	40	40	Peter	TRUE	
5	Bananas	30	20	Peter	FALSE	
6	Oranges	40	10	Josh	FALSE	
7	Bananas	50	50	Josh	TRUE	

D. OR function in Excel conditional formatting

=OR($B2="", $C2="")

The rule with the above OR formula highlights rows that contain an empty cell either in column B or C, or in both.



E. Using the XOR function in Excel

In Excel 2013, Microsoft introduced the XOR function, which is a logical **Exclusive OR** function. This term is definitely familiar to those of you who have some knowledge of any programming language or computer science in general. For those who don't, the concept of 'Exclusive Or' may be a bit difficult to grasp at first, but hopefully the below explanation illustrated with formula examples will help.

The syntax of the XOR function is identical to OR's

XOR(logical1, [logical2],…)

The first logical statement (Logical 1) is required, additional logical values are optional. You can test up to 254 conditions in one formula, and these can be logical values, arrays, or references that evaluate to either TRUE or FALSE.

In the simplest version, an XOR formula contains just 2 logical statements and returns

- TRUE if either argument evaluates to TRUE.
- FALSE if both arguments are TRUE or neither is TRUE.

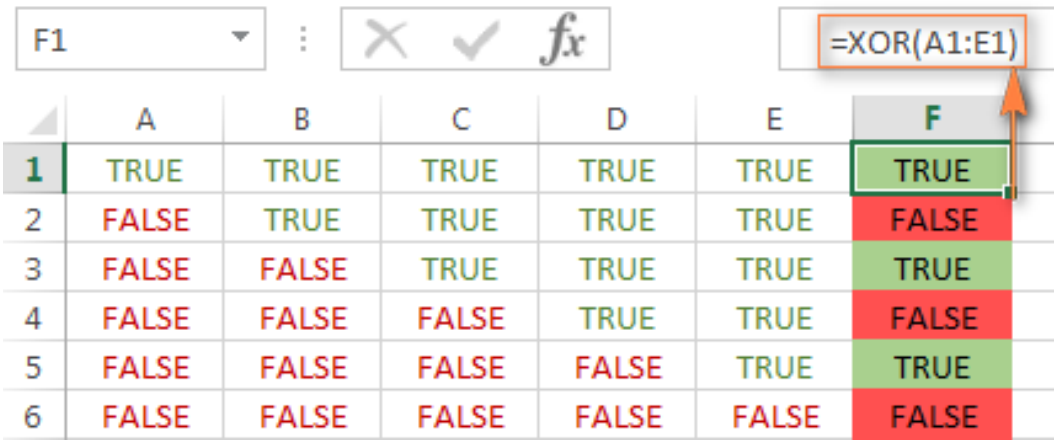
This might be easier to understand from the formula examples

Formula	Result	Description
=XOR(1>0, 2<1)	TRUE	Returns TRUE because the 1st argument is TRUE and the 2nd argument is FALSE.
=XOR(1<0, 2<1)	FALSE	Returns FALSE because both arguments are FALSE.
=XOR(1>0, 2>1)	FALSE	Returns FALSE because both arguments are TRUE.

When more logical statements are added, the XOR function in Excel results in

- TRUE if an odd number of the arguments evaluate to TRUE;
- FALSE if is the total number of TRUE statements is even, or if all statements are FALSE.

The screenshot below illustrates the point

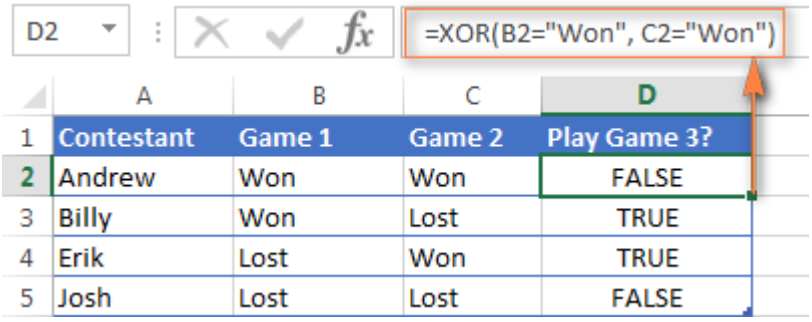


If you are not sure how the Excel XOR function can be applied to a real-life scenario, consider the following example. Suppose you have a table of contestants and their results for the first 2 games. You want to know which of the payers shall play the 3rd game based on the following conditions

- Contestants who won Game 1 and Game 2 advance to the next round automatically and don't have to play Game 3.
- Contestants who lost both first games are knocked out and don't play Game 3 either.
- Contestants who won either Game 1 or Game 2 shall play Game 3 to determine who goes into the next round and who doesn't.

A simple XOR formula works exactly as we want

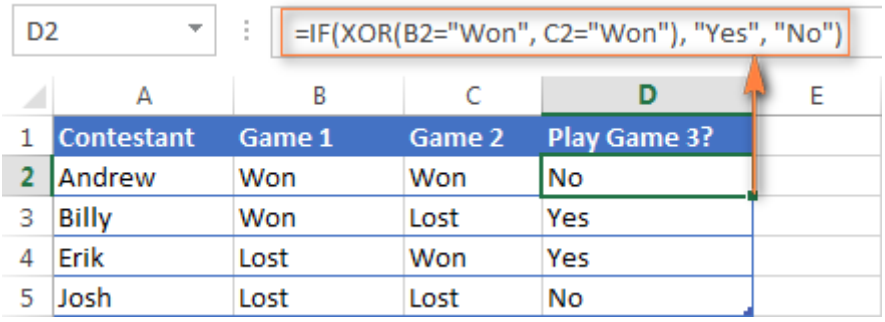
=XOR(B2="Won", C2="Won")



	A	B	C	D
1	Contestant	Game 1	Game 2	Play Game 3?
2	Andrew	Won	Won	FALSE
3	Billy	Won	Lost	TRUE
4	Erik	Lost	Won	TRUE
5	Josh	Lost	Lost	FALSE

And if you nest this XOR function into the logical test of the IF formula, you will get even more sensible results

=IF(XOR(B2="Won", C2="Won"), "Yes", "No")



	A	B	C	D	E
1	Contestant	Game 1	Game 2	Play Game 3?	
2	Andrew	Won	Won	No	
3	Billy	Won	Lost	Yes	
4	Erik	Lost	Won	Yes	
5	Josh	Lost	Lost	No	

F. Using the NOT function in Excel

The NOT function is one of the simplest Excel functions in terms of syntax

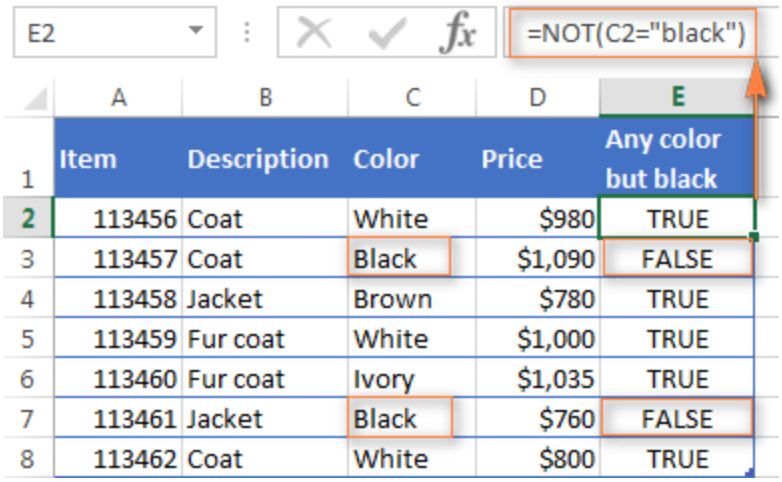
NOT(logical)

You use the NOT function in Excel to reverse a value of its argument. In other words, if logical evaluates to FALSE, the NOT function returns TRUE and vice versa. For example, both of the below formulas return FALSE

=NOT(TRUE)
=NOT(2*2=4)

Why would one want to get such ridiculous results? In some cases, you might be more interested to know when a certain condition isn't met than when it is. For example, when reviewing a list of attire, you may want to exclude some color that does not suit you. I'm not particularly fond of black, so I go ahead with this formula

=NOT(C2="black")



	A	B	C	D	E
1	Item	Description	Color	Price	Any color but black
2	113456	Coat	White	$980	TRUE
3	113457	Coat	Black	$1,090	FALSE
4	113458	Jacket	Brown	$780	TRUE
5	113459	Fur coat	White	$1,000	TRUE
6	113460	Fur coat	Ivory	$1,035	TRUE
7	113461	Jacket	Black	$760	FALSE
8	113462	Coat	White	$800	TRUE

As usual, in Microsoft Excel there is more than one way to do something, and you can achieve the same result by using the Not equal to operator**:** =C2<>"black".
If you want to test several conditions in a single formula, you can use NOT in conjunctions with the AND or OR function. For example, if you wanted to exclude black and white colors, the formula would go like

=NOT(OR(C2="black", C2="white"))

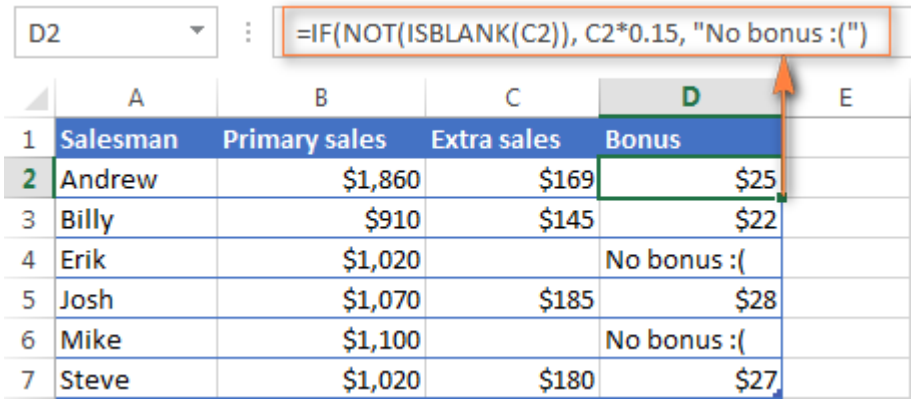
And if you'd rather not have a black coat, while a black jacket or a back fur coat may be considered, you should use NOT in combination with the Excel AND function**:**

=NOT(AND(C2="black", B2="coat"))

Another common use of the NOT function in Excel is to reverse the behavior of some other function. For instance, you can combine NOT and ISBLANK functions to create the ISNOTBLANK formula that Microsoft Excel lacks.

As you know, the formula =ISBLANK(A2) returns TRUE of if the cell A2 is blank. The NOT function can reverse this result to FALSE**:** =NOT(ISBLANK(A2))
And then, you can take a step further and create a nested IF statement with the NOT / ISBLANK functions for a real-life task

=IF(NOT(ISBLANK(C2)), C2*0.15, "No bonus :(")



	A	B	C	D	E
1	Salesman	Primary sales	Extra sales	Bonus	
2	Andrew	$1,860	$169	$25	
3	Billy	$910	$145	$22	
4	Erik	$1,020		No bonus :(	
5	Josh	$1,070	$185	$28	
6	Mike	$1,100		No bonus :(	
7	Steve	$1,020	$180	$27	

Translated into plain English, the formula tells Excel to do the following. If the cell C2 is not empty, multiply the number in C2 by 0.15, which gives the 15% bonus to each salesman who has made any extra sales. If C2 is blank, the text "No bonus **:(**" appears.

In essence, this is how you use the logical functions in Excel. Of course, these examples have only scratched the surface of AND, OR, XOR and NOT capabilities. Knowing the basics, you can now extend your knowledge by tackling your real tasks and writing smart elaborate formulas for your worksheets.

ii. Text Functions

A. Excel TEXT function - syntax and basic uses

In its pure essence, TEXT in Excel is used to convert a numeric value to a text string in a specific format.

The syntax for the Excel TEXT function is as follows

TEXT(value, format_text)

Where

- **Value** - the numeric value to be converted to text. It can be a number, date, reference to a cell containing a numeric value or another function that returns a number or date.
- **Format_text** - the format that you want to apply. It is supplied in the form of a format code enclosed in the quotation marks, e.g. "mm/dd/yy".

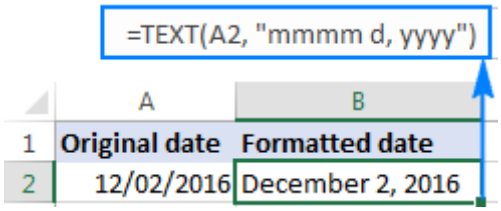
The TEXT function is available in all versions of Excel 365, Excel 2021, Excel 2019, Excel 2016, Excel 2013, Excel 2010, Excel 2007, and lower.

Generally, an Excel TEXT formula is used in the following situations**:**

- To display numbers in a more readable way or in a format that makes more sense for your users.
- To display dates in a specific format.
- To combine numbers or dates with certain text or characters.

For example, if you want to pull the date from cell A2 and show it in another cell in the traditional date format like "January 1, 2016", you use the following Excel TEXT formula**:**

=TEXT(A2, "mmmm d, yyyy")



The result will look similar to this

Important note! The TEXT function in Excel **converts a numeric value to a text strings**. Consequently, you won't be able to use the result of your Text formula in other calculations. If there's such a need, you can keep the original values (hidden or kept out of sight), and use them in other formulas.

B. Excel TEXT function format codes

As you have just seen, the syntax of the Excel TEXT function is very straightforward, a tricky part is supplying a proper format code that will output your number the way you want. Essentially, the TEXT function accepts most of the format codes used in Excel number formats. The table below lists the most common and frequently used ones.

Code	Description	Format code example
0	Digit placeholder that displays insignificant zeros.	#.00 - always displays 2 decimal places. If you type 2.5 in the referenced cell, it will display as 2.50.
#	Digit placeholder that does not display extra zeros.	#.## - displays up to 2 decimal places. If you type 2.5, it will display as 2.5. If you type 2.555, it will display as 2.56.
?	Digit placeholder that leaves a space for insignificant zeros but doesn't display them. It is generally used to align numbers in a column at a decimal point.	#.?? - displays a maximum of 2 decimal places and aligns the decimal points in a column.

Code	Description	Format code example
. (period)	Decimal point	
, (comma)	Thousands separator.	###,###.## - displays a thousands separator and 2 decimal places. If you type 250000, it will display as 250,000.00

Additionally, you can include any of the following characters in the format code, and they will be displayed exactly as entered.

Symbol	Description
+ and -	Plus and minus signs
( )	Left and right parenthesis
:	Colon
^	Caret
'	Apostrophe
{ }	Curly brackets
< >	Less-than and greater than signs
=	Equal sign
/	Forward slash
!	Exclamation point
&	Ampersand
~	Tilde
	Space character

The following spreadsheet shows how you can use a Text formula in Excel to apply different formatting types to the same value.

	A	B	C
1	**Original Value**	**Formatted Value**	**Formula**
2	5.5	5.50	=TEXT(A2, "0.00")
3		550%	=TEXT(A2,"#%")
4		$5.50	=TEXT(A2, "$#,##0.00")
5		+ $5.50	=TEXT(A2, "+ $#,##0.00;- $#,##0.00;$0.00")
6		- $5.50	=TEXT(A2, "- $#,##0.00;- $#,##0.00;$0.00")
7		5 1/2	=TEXT(A2,"# ?/?")
8		5.50E+00	=TEXT(A2,"0.00E+00")
9		~6 !	=TEXT(A2,"~# !")

When using the Excel TEXT function with **dates** and **times**, you can use any of the following format codes.

Format code	Description	Examples
d	Day of month, or day of week	*d* - one or two-digit number without a leading zero (1 to 31) *dd* - two-digit number with a leading zero (01 to 31) *ddd* - three-letter abbreviation (Mon to Sun) *dddd* - full name of day of week (Monday to Sunday)
m	Month (when used as part of a date)	*m* - one or two-digit number without a leading zero (1 to 12) *mm* - two-digit number with a leading zero (01 to 12) *mmm* - abbreviated month (Jan to Dec)

Format code	Description	Examples
		mmmm - full name of month (January to December)
y	Year	*yy* - two-digit number (e.g. 06 meaning 2006 or 16 meaning 2016) *yyyy* - four digit number (e.g. 2006, 2016)
h	Hour	*h* - one or two-digit number without a leading zero (1 to 24) *hh* - two-digit number with a leading zero (01 to 24)
m	Minute (when used as part of time)	*m* - one or two-digit number without a leading zero (1 to 60) *mm* - two-digit number with a leading zero (01 to 60)
s	Second	*s* - one or two-digit number without a leading zero (1 to 60) *ss* - two-digit number with a leading zero (01 to 60)
AM/PM	Time represented as a 12-hour clock, followed by "AM" or "PM"	

The following spreadsheet shows a few Excel Text formulas for dates

	A	B	C
1	**Original Date**	**Formatted Date**	**Formula**
2	12/09/2016	Dec 09 2016	=TEXT(A2, "mmm dd yyyy")
3		Friday 09 December, 2016	=TEXT(A2, "dddd dd mmmm, yyyy")
4		9-Dec-16	=TEXT(A2, "d-mmm-yy")
5		Friday	=TEXT(A2,"dddd")

C. How to use TEXT function in Excel - formula examples

So far, you might have an impression that the use of the Excel TEXT function is quite limited (because a value's display can easily be changed using the *Format Cells* dialog available via a cell's context menu or Ctrl+1 shortcut). The situation changes as soon as you start using TEXT in combination with other Excel functions. The below examples will give you a few inspirational ideas.

Concatenate text and number (or date) in a custom format

When creating summary sheets or reports, you may often want not only calculate totals, percentages and the like, but also explain to your users what this or that number means. To do this, use the CONCATENATE function to join text and numbers, and the TEXT function to display the number (or date) like you want it.

Example 1. Format numbers inside a text string

Supposing you calculate the total amount based on the unit price in cell A2, quantity in B2, and discount percentage in C2 using this calculation**: =A2*B2*(1-C2)**. For your users to know exactly what the output number means, you wish to display it together with some explanatory text like "*Your price is*". Additionally, you want to show the currency symbol, thousands separator and two decimal places.

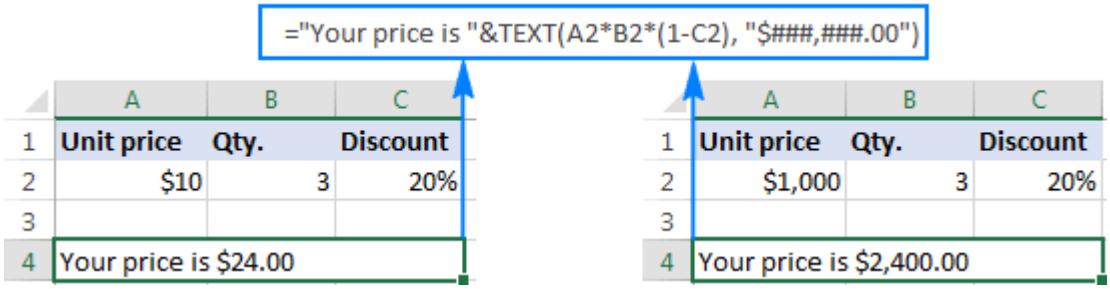
To have it done, supply the above calculation in the 1st argument of the TEXT function, include the corresponding format code in the 2nd argument, and concatenate the Text formula with a string using either the ampersand operator or CONCATENATE function**:**

="Your price is "&TEXT(A2*B2*(1-C2), "$###,###.00")

or

= CONCATENATE("Your price is ",TEXT(A2*B2*(1-C2), "$###,###.00"))

The following screenshot demonstrates the result



Example 2. Combine text and date in the desired format

When you return the current date using TODAY() or NOW() function, you may also want to display it in combination with some text so that no one has any doubt what day this date refers to.

However, if you try to concatenate a text and date in the usual way

=CONCATENATE("Today is ", TODAY())

Excel will return a very odd result, something like "*Today is 42198*".

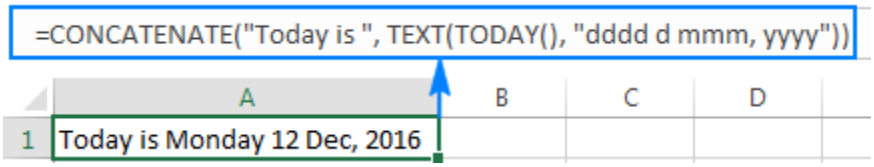
The point is that in the internal Excel system, dates are stored as numbers, and that number appears in a concatenated text string. To fix this, use the TEXT function to display the date the way you want.

For example, embedding the TODAY function in the Text formula with the format code "dddd d mmm, yyyy" will return a string similar to this**:** "Today is Monday 12 Dec, 2016".

The complete formula goes as follows

=CONCATENATE("Today is ", TEXT(TODAY(), "dddd d mmm, yyyy"))

Or



="Today is " & TEXT(TODAY(), "dddd d mmm, yyyy")

D. Add leading zeros to numbers with variable lengths

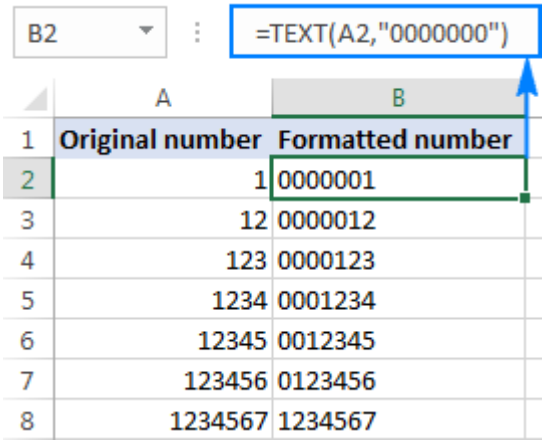
As you know, Microsoft Excel automatically removes leading zeros typed before a number in a cell, which works fine in most situations. But what if you want to keep the preceding zeros?

The Excel TEXT function can be an easy solution to pad numbers with leading zeros in a column, even if the original values are not the same length. Simply use the format code containing only zero placeholders like "0000000", where the number of zeros corresponds to the number of digits you want to display.

For example, to display 7-digit numbers with leading zeros, use this formula (where A2 is the original number)

=TEXT(A2,"00000 00")

As you can see in the screenshot below, our Excel Text formula adds as many leading zeros as necessary to make a 7-character long string (please remember, the result of the TEXT function in Excel is always a text string, even if it looks like a number).



E. Convert values to phone numbers in a specific format

Turning a column of numeric values into telephone numbers may sound like a tricky task, but only until you remember that the Excel TEXT function allows using dashes and parentheses in format codes.

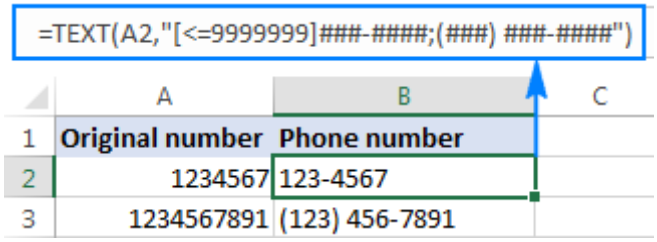
So, to display a number in A2 in a traditional US local 7-digit phone format like 123-456, use this formula

=TEXT(A2, "###-####")

If some of the original values may contain a domestic prefix (i.e. there can be both 7-digit or 10-digit numbers), include the following conditional format code to display 10-digit numbers in the (123) 456-789 format

=TEXT(A2,"[<=9999999]###-####;(###) ###-####")

The screenshot below shows this Excel Text formula in action



F. Excel TEXT function not working – reasons and solutions

Compared to other Excel functions, TEXT is very simple and painless, and you are unlikely to have any difficulties when using it in your spreadsheets. If, against all expectations, a Text formula is not working for you, in most cases it's because of an incorrect format code input in the *format_text* argument. Here are two most typical issues

1. The TEXT function returns the #NAME? error if you omit the quotation marks around the format code.

For example the formula **=TEXT(A2, mm/dd/yy)** is incorrect and should be written this way**: =TEXT(A2, "mm/dd/yy")**

2. The TEXT function in Excel is **language-specific**, and requires using region-specific date and time format codes.

For example, the formula **=TEXT(A2, "mm/dd/yy")** that works fine for English users may return the #VALUE error in other locales. In particular, in Germany, you'd need to use the following format codes**:** "*t*" instead of "*d*" and "*j*" instead of "*y*" because "day" in German is "tag" and year is "jahr"; "m"(month) is fine because in German it also begins with "m" (monat). So, in German Excel, the above formula will read as follows**: =TEXT(A2; "mm/tt/jj")**. In France, you'd use the "mm/jj/aa" format code because "day" is "jour", "month" is "mois", and "year" is "an".

Also, please pay attention that in European countries, the List Separator is usually set to semicolon, not comma, and therefore ";" should be used to separate the formula's arguments.

iii. Financial Functions

A. Applications of Financial Functions

Financial functions are used for calculating a diverse set of common key performance indicators in a business, or for predicting the value of money through time. The time value of money theory states that money loses value as time passes. It is a simple concept that is ingrained in every business decision because it is important for a business to use financial instruments and investments to increase the value of their savings or idle cash. One way you can see this theory in practice is in the steady increase in the sales prices of goods over time.

B. Common Financial Functions in Practice

You were introduced to the Excel function PMT in The Advantages of a Data Table for determining the monthly (or yearly, daily, or quarterly) payment of an investment or loan. There are other important variables involved in the financial

functions related to the time value of money theory, which can help a business determine profitability. This section will focus on an annual payment rather than a monthly payment. But keep in mind, many loans require monthly payments and the variables in the function will need to be adjusted accordingly.

There are five main time value of money variables (PMT, RATE, NPER, PV, and FV) used in these calculations. Table lists these variables and what they represent in Excel. To find the answer to a time value of money problem, you must have the values of at least three of the five variables. There is an additional variable that you need to consider and that is "Type." In the functions, "Type" represents when payments are made. If they are made at the beginning of the term, use 1 in the function. If you do not enter anything, Excel will use the default of "0," meaning payments are made at the end of the term. The timing of the payments impacts the amount of interest paid.

One way to calculate any of these time value of money variables is to use a financial calculator, which works like a regular calculator, except that it has certain financial functions programmed into it. A financial calculator has a button associated with each of the time value of money variables. Excel also has these functions programmed into it.

Variable	Definition
PMT	The payment of an investment or loan per period (usually monthly)
RATE	The interest rate on an investment, loan, or bond yield
NPER	The number of periods in a calculation (usually years, quarters, or months)
PV	The initial investment of a business or security purchase
FV	The monetary value of a business or security investment at the end of all periods
Type	Whether payments are made at the beginning of the term or at the end of the term; the default is "0" or at the end of the term

Table: Time Value of Money Variables

a. PMT

To calculate PMT, you need at least three of the other variables. For this example, assume that WorldCorp is building a new manufacturing plant, at a cost of $4,743,542. To finance the investment, they will borrow the money from a bank, rather than use their savings. The bank terms are 5.6 percent for a twelve-year loan. You will use these variables to find the amount WorldCorp will pay each year for a loan. You know the loan term (NPER, which is the number of periods for the loan), the interest rate (RATE), and the original amount of the loan (PV). You do not know the future value (FV) or the yearly payment installment (PMT).

Excel performs these time value of money calculations using functions and the values of the known variables. First, construct a table that lists the five variables and the values you have. You can then use the Excel function to calculate PMT. Recall that this function can be found on the Formulas tab under Financial in the Function Library command group. You enter all of the values into the dialog box or in the Formula Bar using the cell references.

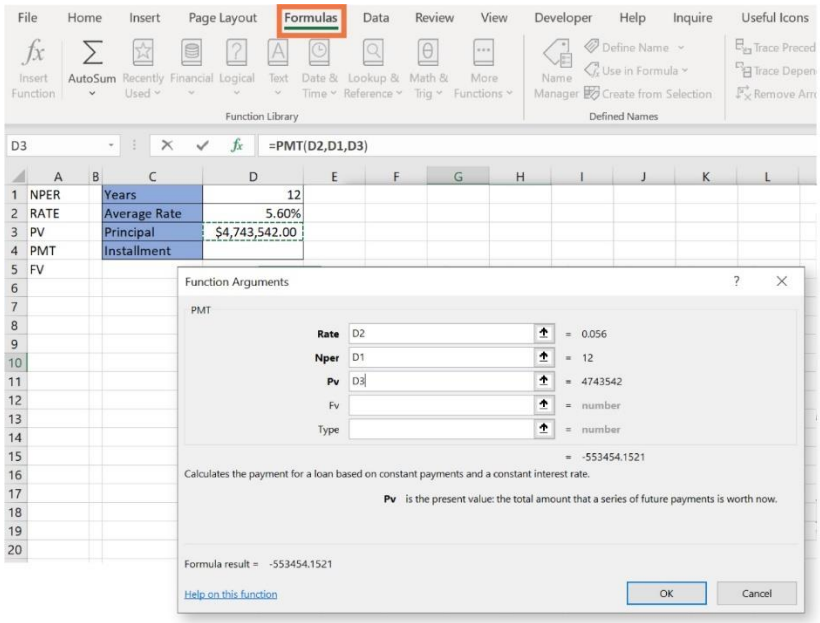


Figure: If you do not know the installment, but you know the periods, the interest, and the principal, you can calculate the installment. Excel will use the default of "0" for type. You do not need to enter anything for FV.

Figure shows the yearly installment WorldCorp will have to pay on this loan. As was noted in The Advantages of a Data Table, Excel gives the PMT answer as a negative number by default. You can change this by putting a "-" sign in front of the PV cell reference or after the "=" in the formula in the Formula Bar.

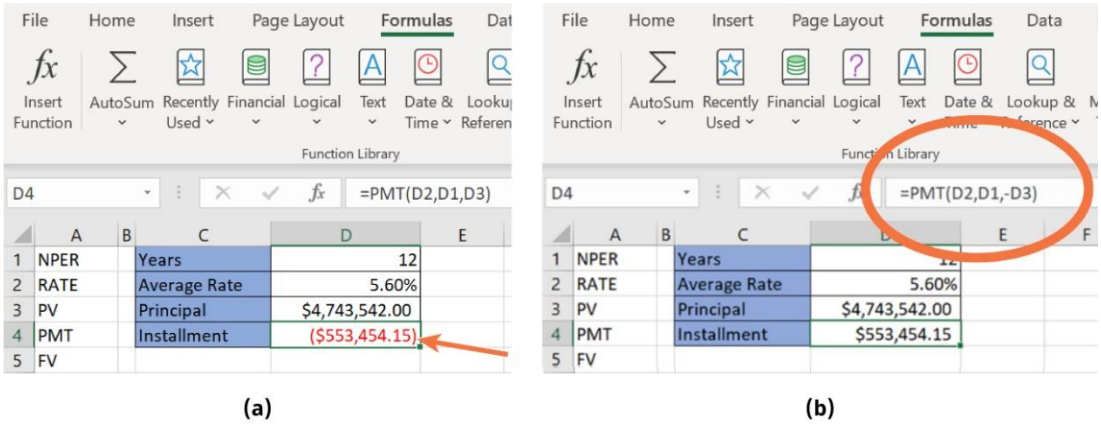


Figure Notice the final answer is negative (as indicated by "()" and red font. (b) The "-" in front of D3 changes the installment payment to a positive number.

b. RATE

The RATE function works in the same way as the PMT function. Again, you can find the RATE function in the financial functions library. For this example, WorldCorp wants to open another manufacturing plant for making headphones. The cost of the site and the machinery is $3,843,974, but they will use a down payment of $450,000. The loan they would need then would be $3,393,974 (total cost − $450,000). The bank loan will be over twelve years, with yearly payments of $427,308.08. You need to determine the interest rate. Figure shows the table of variables, but this time the interest rate is missing. You can then use the RATE function to determine the interest rate.

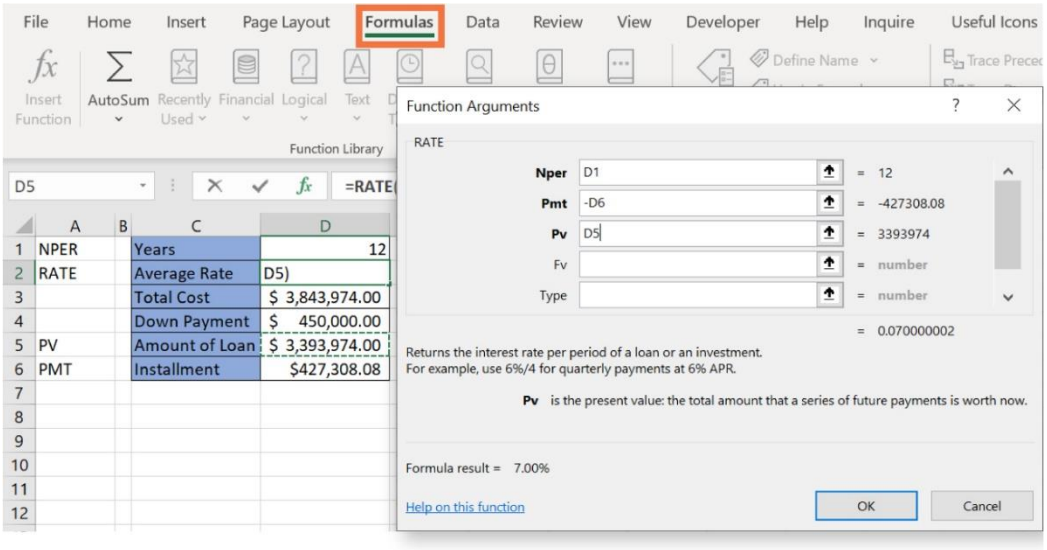


Figure: You can find the interest rate if you have the loan term, the loan amount, and the payment. Recall that you need at least three of the variables and be sure to enter a "-" in front of the PMT.

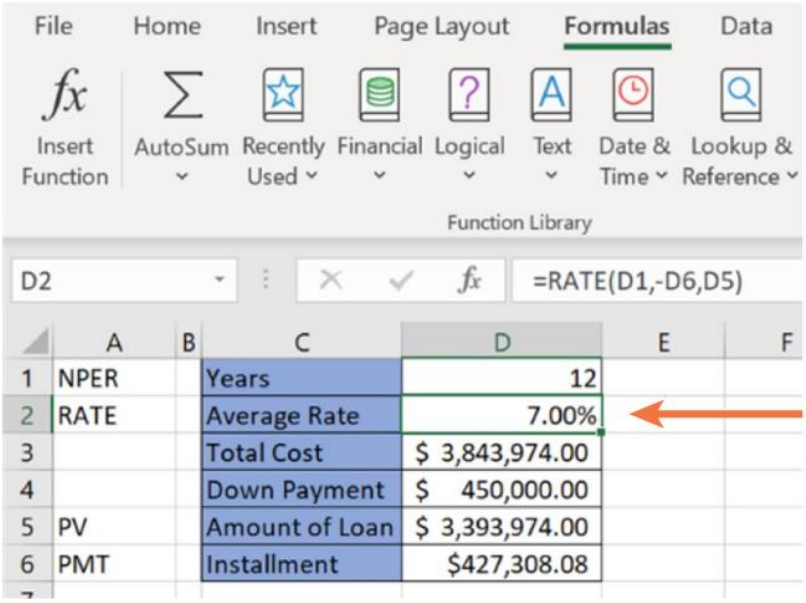


Figure: The function returns the interest rate based on the other variable values.

NPER

You can use the NPER function in Excel in the same way as the other time value of money functions to determine the amount of time required to repay the loan. For this example, WorldCorp has decided to change the look of their retail stores. They asked you, a financial analyst, to find the best bank loan terms—the one that costs the company the least amount in total payment.

The average cost of each store renovation is $64,757. Bank X offers an interest rate of 5.45 percent and Bank Y offers an interest rate of 6.55 percent.

Bank Y is your current bank, and you have a great working relationship with the employees. You want to keep banking there, but want to understand the long-term impact of the higher interest rate for this loan. You have budgeted $1,500 each month toward the loan for an annual payment of $18,000 ($1,500 × 12 months). You can use those values in the NPER function Figure to determine the repayment time period for each loan Figure, which you can then use to determine the total payment of the loan. You would multiply the PMT by the NPER you just found.

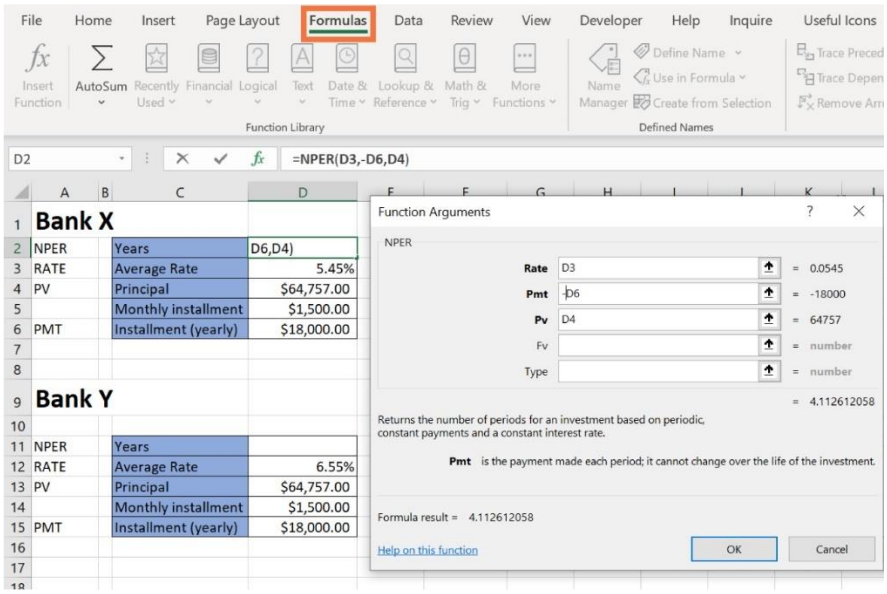


Figure: Bank X and Bank Y offer different interest rates. Use the NPER function to find the number of payment periods for Bank X.

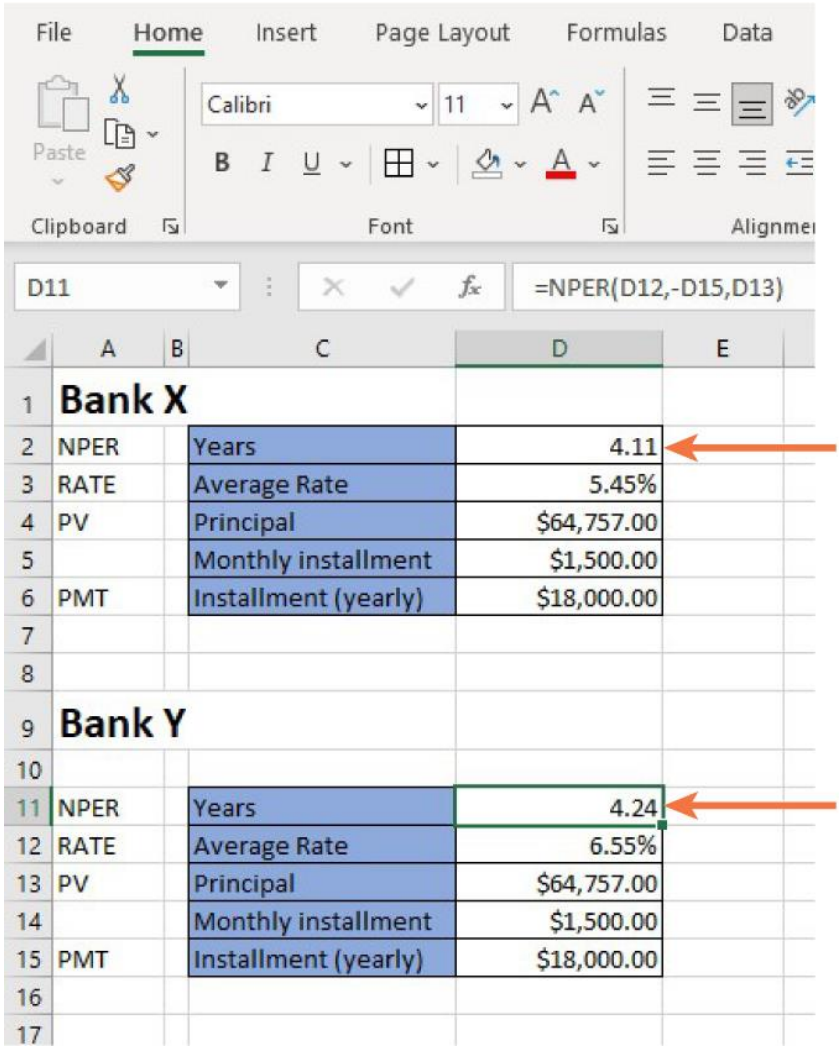


Figure: Repeat the NPER function for Bank Y.

The difference between the two options might not seem that significant**:** 4.11 years compared with 4.24 years. However, when you take that number and multiply it by the yearly installment, you can see the overall difference between the two loans. For Bank X, you will pay a total of $74,027.02 (= 4.11 × $1,800) and using the same process for Bank Y, the total cost is $76,239.91. It would save you more than $2,000 by going with Bank X. You will need to decide if that is enough savings to take the business away from your current bank. This example shows you that sometimes decisions are not always based on the numbers. Sometimes nonfinancial aspects must be considered when making decisions such as this.

c. PV

Excel's PV function allows you to calculate the principal of a loan. Suppose you are WorldCorp's new financial analyst, and your supervisor asked you to track down all of the company's outstanding bank loans and their original principals. The first loan you find has a monthly payment of $8,673.38, a period of eight years and an annual interest rate of 6.55 percent. As with other examples, the first step is to set up your table of information. However, the table you have been using has the term set up in years, but the term of this loan is in months. You will need to multiply 8 years by 12 months to get NPER, and you will need to divide your annual interest (RATE) by 12 months to get the monthly interest. Now that you have converted all of your figures to months, you can use the PV function from Excel to get the original principal of $646,743.00.

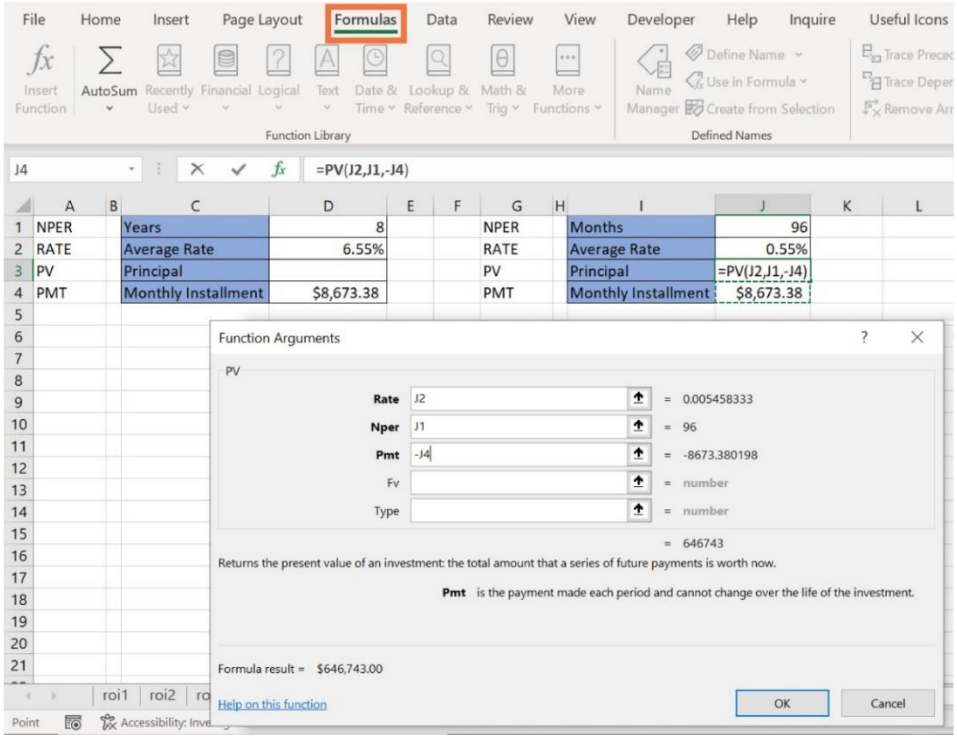
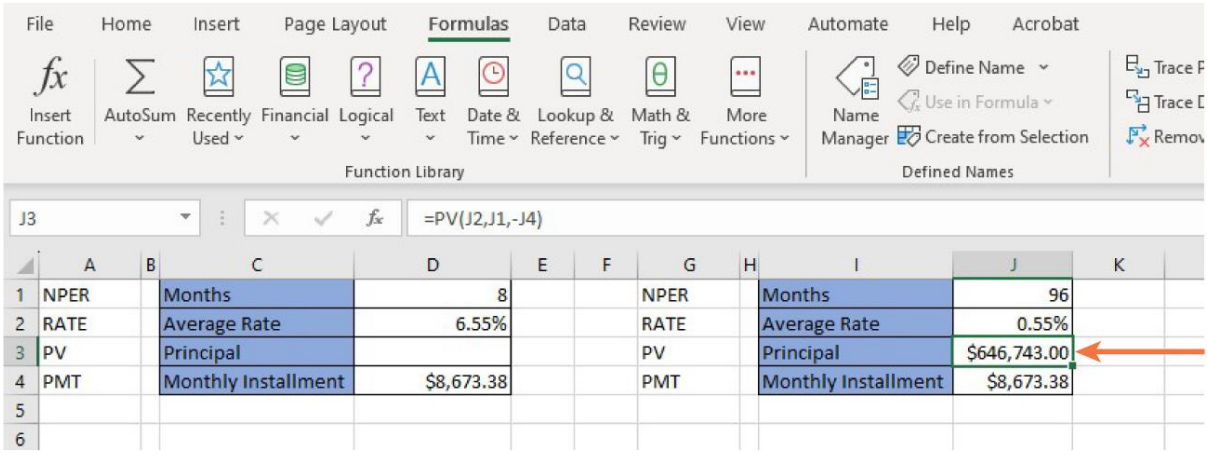


Figure: The financial functions in Excel are based on yearly information. The Excel function PV calculates the principal of a loan, but you need to convert yearly information to monthly information.



	A	C	D	G	I	J
1	NPER	Months	8	NPER	Months	96
2	RATE	Average Rate	6.55%	RATE	Average Rate	0.55%
3	PV	Principal		PV	Principal	$646,743.00
4	PMT	Monthly Installment	$8,673.38	PMT	Monthly Installment	$8,673.38
5						
6						

Figure: PV gives you the principal amount of the loan based on the interest rate and repayment period.

LINK TO LEARNING

An amortization schedule is a summary table of all the principal and interest payments made on a loan. This helps the borrower understand the impact of the interest rate and the timeline to pay back a loan such as one for a car or a home. Excel is a great tool for constructing such a table.

d. FV

The final time value of money function you will use is for the future value, which the previous examples have not used. For this example, you will analyze a stock investment. As a financial analyst at WorldCorp, you need to assess the value of investments in a savings account to determine whether it would be better for WorldCorp to use this cash for buying stock of other companies to get a greater return. The stocks they are considering will increase in market value in the future, so you will need to calculate the amount WorldCorp will gain when they sell it. They have $5,456,254.00 in their savings account now. They are considering investing that savings in other company stocks that increase in value on average 6.57 percent per year, and they would plan to hold on to the stock for nine years. You would use the FV function, as shown in Figure to determine this value. You can then compare that with what they would get if they just keep the funds in the savings account during that nine-year time period.

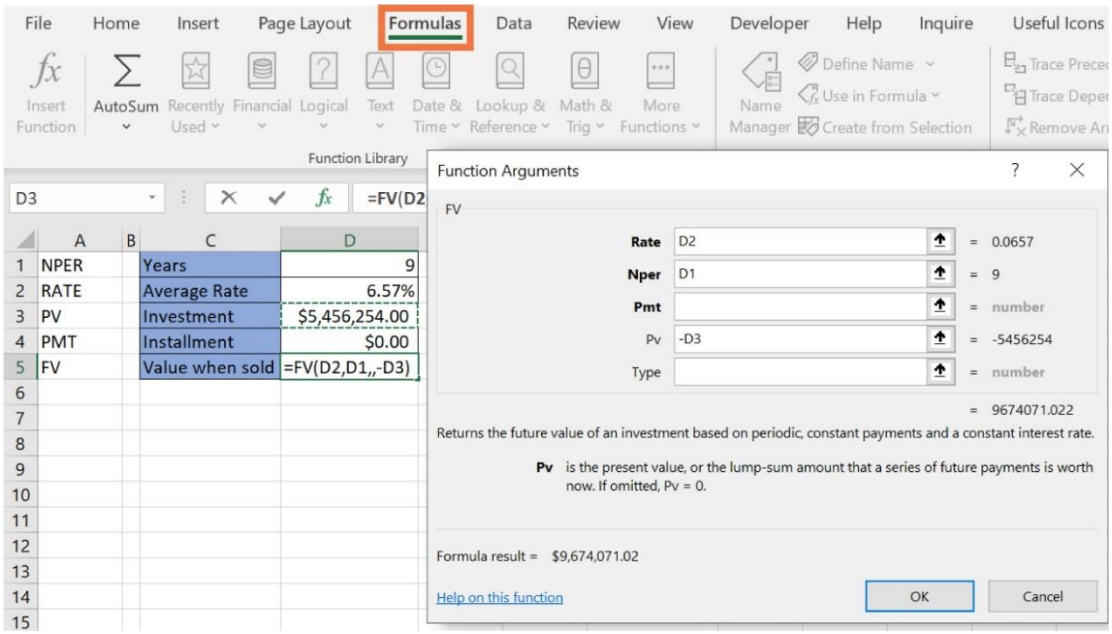


Figure: In this example, there is no annual payment you are making. Calculating the future value uses the FV function and three of the other four time value of money variables. Excel assumes PMT is "0" if no value is entered.

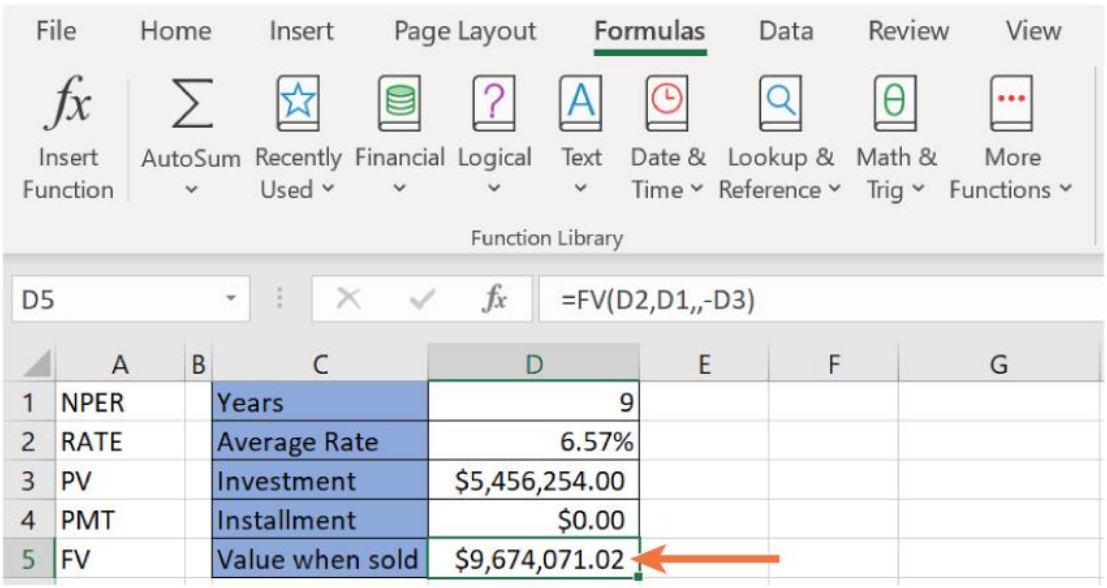


Figure: Again, like the other functions, the result will be negative if you do not add the "-" before the investment amount.

e. Depreciation

Depreciation is not one of the five variables used in time value of money theory, but it is an important function used in accounting. The steady decrease in value of an asset, such as a piece of equipment, over time is called **depreciation**. The IRS lets businesses calculate depreciation as an expenditure, which in turn reduces the total amount they are taxed each year. There are several different depreciation functions in Excel, but this section will focus on the DB (declining balance) function. This is one of the most used methods of depreciation in accounting. With this function, you are essentially reducing the total value of the asset over a period of time.

The formula for depreciation takes into account the original price, the current market value of the item (or the salvage value), the years of use (or useful life), and the period. The years of use is the average lifespan of the machine. The period is the time that has passed since the purchase. The other variable in the function is Month. This can be used if the machine was purchased in the middle of the year. Excel will assume a normal twelve-month year for the first year if you leave this value blank. The number you enter here is the number of months the business owned the asset during a partial year. For this example, you will use the values in Figure, which shows the DB function. Figure shows the depreciation of the asset. As shown, during period 2, the machine is $18,627.12 less than its original value, meaning that in year 2 the machine is worth $61,372.88 (or $80,000 − $18,627.12).

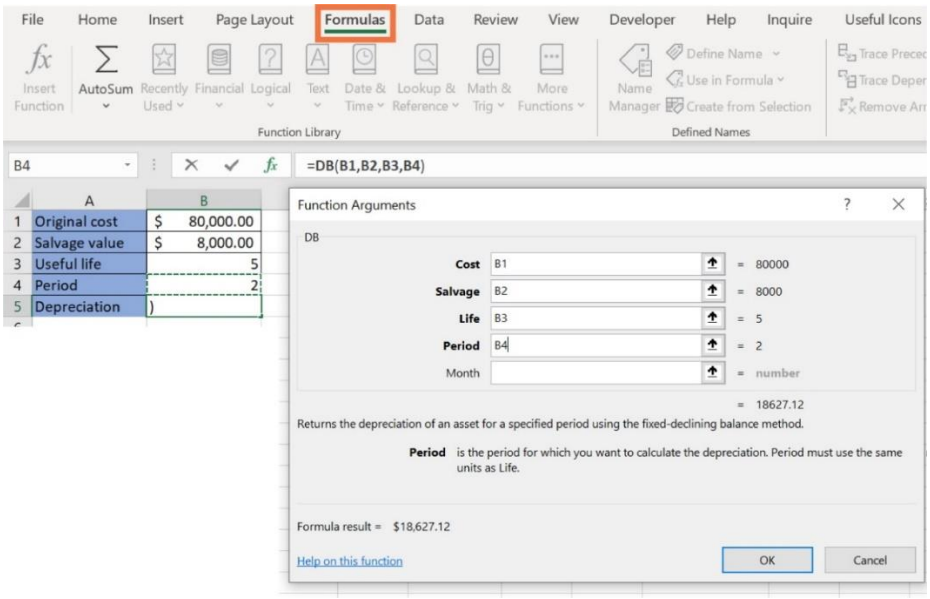


Figure: The salvage value is the worth of the asset if you were to sell it. The DB function calculates depreciation, which can reduce a company's taxes.

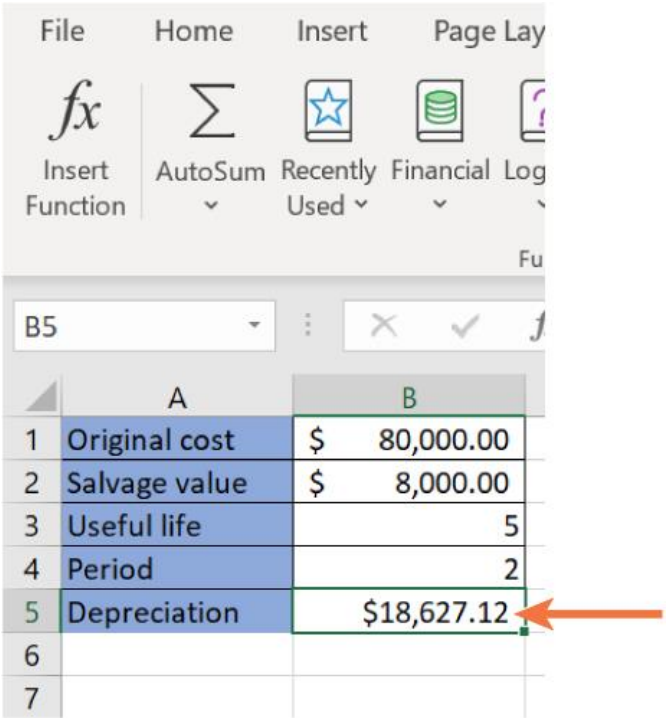
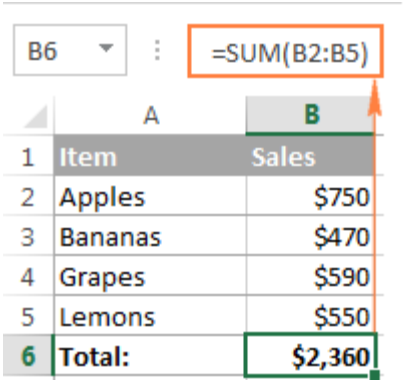


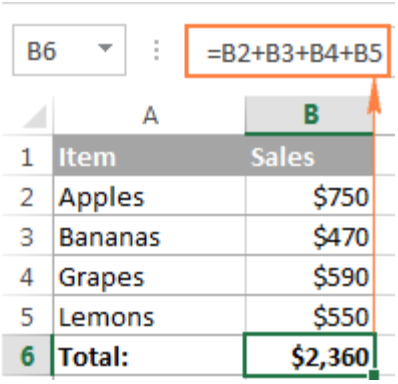
Figure: The resulting value is the annual depreciation of the asset to be deducted as an expense.

f. Math Functions

In MS Excel, formulas are equations that perform various calculations in your worksheets. Though Microsoft has introduced a handful of new functions over the years, the concept of Excel spreadsheet formulas is the same in all versions of Excel 2016, Excel 2013, Excel 2010, Excel 2007 and lower.

- All Excel formulas begin with an **equal sign** (=).
- After the equal symbol, you enter either a **calculation** or **function**. For example, to add up values in cells B1 through B5, you can either
    - Type the entire equation**: =B1+B2+B3+B4+B5**
    - Use the SUM function**: =SUM(B1:B5)**
- Press the Enter key to complete the formula. Done!





Elements of Microsoft Excel formulas

When you make a formula in Excel, you can use different elements to supply the source data to the formula and indicate what operators should be performed on those data. Depending on the formula type that you create, it can include any or all of the following parts**:**

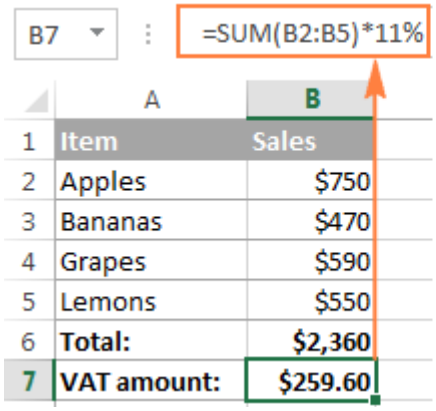
- Constants - numbers or text values that you enter directly in a formula, like =2*3.
- Cell references - reference to a cell containing the value you want to use in your Excel formula, e.g.

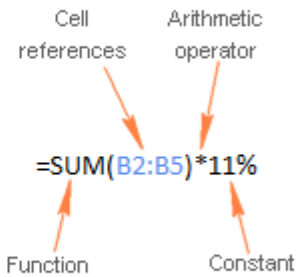
=SUM(A1, A2, B5).

To refer to data in two or more contiguous cells, use a **range reference** like A1**:**A5. For example, to sum values in all cell between A1 and A5, inclusive, use this formula

=SUM(A1:A5).

- Names - defined name for a cell range, constant, table, or function, for example **=SUM(my_name)**.
- Functions - predefined formulas in Excel that perform calculations using the values supplied in their arguments.
- Operators - special symbols that specify the type of operation or calculation to be performed.





Operators in Excel worksheet formulas

To tell Microsoft Excel what type of operation you want to perform in a formula, you use special symbols that are technically called **operators**. There exist 4 types of operators in Excel

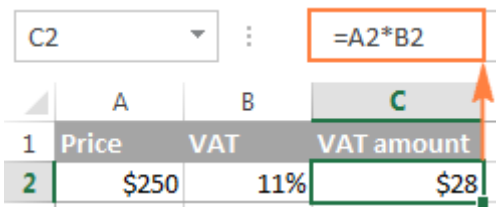
- Arithmetic - to perform basic mathematical operations.
- Comparison (logical) - to compare values.
- Concatenation - to join text values into a single string.
- Reference - to make ranges and separate arguments in Excel functions.

A. Using arithmetic operators in Excel formulas

These operators are used to perform basic mathematical operations such as addition, subtraction, multiplication, and division.

Operator	Meaning	Formula example
+ (plus sign)	Addition	**=A2+B2**
- (minus sign)	Subtraction Negation (reversing the sign)	**=A2-B2** **=-A2** (changes the sign of the value in A2)
* (asterisk)	Multiplication	**=A2*B2**
/ (forward slash)	Division	**=A2/B2**
% (percent sign)	Percentage	**=A2*10%** (returns 10% of the value in A2)
^ (caret)	Exponential (power of)	**=A2^3** (raises the number in A2 to the power of 3)

For example, if you have an item price in cell A2 and VAT in cell B2, you can calculate the VAT amount by using the following percentage formula**: =A2*B2**



B. Comparison operators in Excel formulas

In Microsoft Excel formulas, *comparison*, or *logical*, *operators* are used to compare two values. The result of the comparison is always a logical value of TRUE or FALSE. The following logical operators are available in Excel

Comparison operator	Meaning	Formula example
=	Equal to	**=A2=B2**
<>	Not equal to	**=A2<>B2**
>	Greater than	**=A2>B2**
<	Less than	**=A2<B2**
>=	Greater than or equal to	**=A2>=B2**
<=	Less than or equal to	**=A2<=B2**

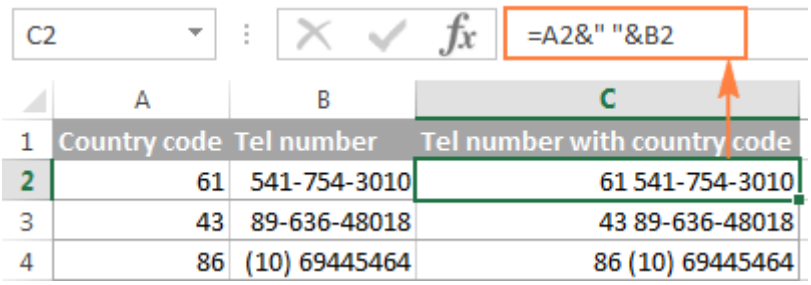
For example, formula =A1=B1 returns TRUE if cells A1 and B1 contain the same value (number, text or date), FALSE otherwise.

C. Text concatenation operator

Text concatenation operator in Excel is the ampersand symbol (**&**). You can use it to join two or more text strings in a single string.
For example, if you have country codes in column A and telephone numbers in column B, you can use the following formula to get the telephone numbers combined with the country codes

=A1&" "&B1

In the above formula, we concatenate a space " " in between to make the numbers better readable



D. Reference operators in Excel formulas and functions

To supply ranges to MS Excel formulas and separate arguments in Excel functions, the following operators are used.

Colon (:) - it is a **range** operator that allows you to make one reference for multiple cells located between 2 cells that you specify.

For example, range A1**:**A00 includes 100 cells from A1 through A100. To find an average of those 100 cells, you use the following formula

=AVERAGE(A1:A00)

You can also refer to the **entire column** (A**:**A) or the **entire row** (1**:**1). For example, the following formula finds the total of all numbers in column A**: =SUM(A:A)**.

Comma (,) - is used to separate arguments in Excel spreadsheet formulas. For example, the formula **=IF(A1>0, "good", "bad")** reads as follows**:** if A1 is greater than zero, return "good", otherwise "bad".

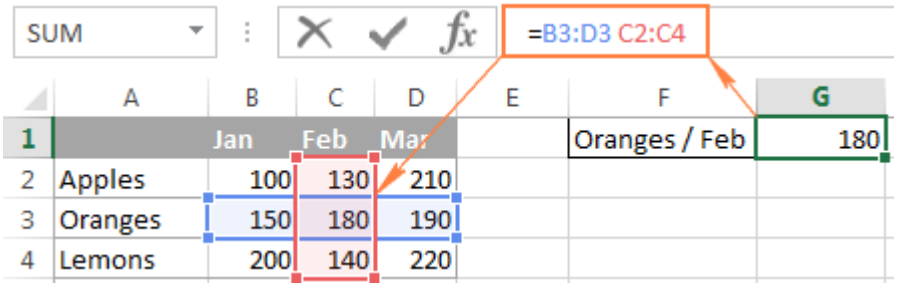
Note. Comma is the default *List Separator* in North America and some other countries. In European countries, comma is reserved as the *Decimal Symbol* and the *List Separator* is usually set to semicolon (;). In this case, you need to separate a function's arguments with semicolons, e.g.

=IF(A1>0; "good"; "bad")

So, if you are trying to make a formula in your worksheet, but Excel does not accept it and throws up an "invalid formula" error, go to your Regional Settings (*Control Panel > Region and Language > Additional Settings)* and check what symbol is set as **List Separator** there. It is that symbol that you need to use to separate arguments in your Excel formulas.

Space - it is an intersection operator that lets you get the cell(s) common to the two references that you specify. For example, if you a list of items in column A and some related data in other columns, you can get a value at the intersection of a given column and row by using a formula like this

=B3:D3 C2:C4



Excel formula types

Formulas that you create in your Excel spreadsheets can be simple or complex**:**

- **Simple** Excel formulas perform just one mathematical operation, for example **=10*5** or **=SUM(A1:A10)**
- **Complex** (advanced) Excel formulas include more than one calculation, for example **=10*5+20** or **=SUM(A1:A10)/2**

How to create formulas in Excel

As already mentioned, any Excel formula starts with the equal sign (=). So, whatever formula you are going to write, begin by typing = either in the destination cell or in the Excel formula bar. And now, let's have a closer look at how you can make different formulas in Excel.

How to create advanced formulas in Excel

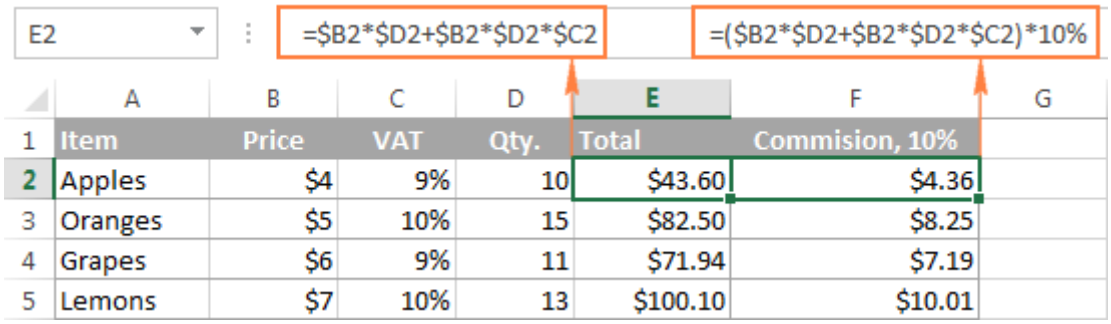
When you have some experience with simple Excel formulas, you may want to perform several calculations within a single formula. And the following examples show how you can do this.

Creating complex formulas with constants and mathematic operators

For a complex Excel formula to calculate correctly, certain operations must be performed before others. The default order of operations in Excel formulas is this

- Mathematical operations enclosed in parenthesis
- Power of (exponential calculations)
- Multiplication and division, whichever comes first in a formula
- Addition and subtraction, whichever comes first in a formula

For example, you can use the following formulas to calculate the total and commission



	A	B	C	D	E	F	G
1	Item	Price	VAT	Qty.	Total	Commision, 10%	
2	Apples	$4	9%	10	$43.60	$4.36	
3	Oranges	$5	10%	15	$82.50	$8.25	
4	Grapes	$6	9%	11	$71.94	$7.19	
5	Lemons	$7	10%	13	$100.10	$10.01	

And now, let's break down these formulas to see how Microsoft Excel calculates them**:**

Total formula**: =$B2*$D2+$B2*$D2*$C2**

- 1st multiplication**:** $B2*$D2 (price*qty. = amount)
- 2nd and 3rd multiplications**:** $B2*$D2*$C2 (price*qty.*VAT % = VAT amount)
- Addition**:** amount + VAT amount = total

Commission formula**: =($B2*$D2+$B2*$D2*$C2)*10%**

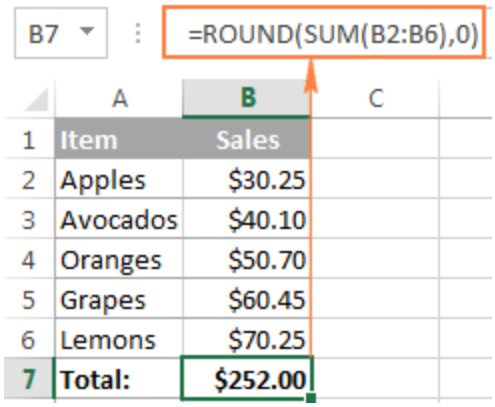
To calculate the 10% commission, you need to multiply the total by 10%, so you enclose the previous calculation in brackets, and got the result you want.

Of course, nothing prevents you from multiplying the total already calculated in column E by 10%, in this case the formula would reduce to a simple calculation **=E2*10%**. However, in large worksheets, it makes sense to write independently calculated formulas, so that removing a column with one formula wouldn't break the others.

Excel formulas with nested functions

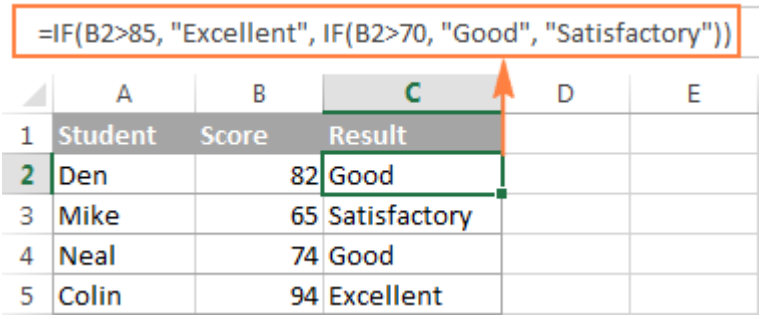
In Microsoft Excel formulas, **nesting** one function within another means using one function as an argument of another function. In modern versions of Excel 2016, 2013, 2010 and 2010, you can use up to 64 nested functions. In older versions of Excel 2003 and lower, only up to 7 levels of functions are allowed.

Here is a very simple example of a nested Excel formula that includes the SUM function to find the total, and ROUND function to round that number to the nearest integer (0 decimal places)



=ROUND(SUM(B2:B6),0)

Of all Excel functions, IF is nested more often than all others. As you probably know, the IF function is used to evaluate a specified condition and return one value when condition is met, and another value when the condition is not met. However, quote often you have to deal with situations where there are more than two possible outcomes. And if this case, you can write several IF functions and nest them into each other



Array formulas in Excel

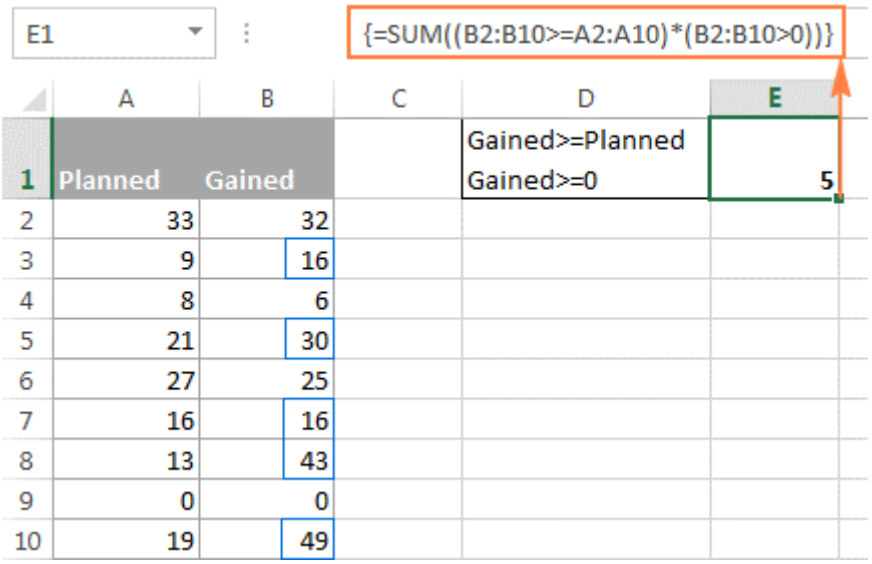
Array formulas in Excel are advanced aerobatics. A single Excel array formula can perform thousands of calculations and replace hundreds of usual formulas. Learning array formulas certainly requires some time and effort, but it's worth it.

Since this tutorial is purposed for beginners, I won't intimidate you by the definitions of array constants and complex multi-line formulas. I'll show just one very simple example of an Excel array formula that demonstrates what they are capable for.

Supposing you have 2 columns of numbers, column A and B. And you want to know how many times column B is greater than or equal to column A when a value in column B is greater than 0.

This task requires comparing two ranges and you can do this by using the following array formula**:**

=SUM((B2:B10>=A2:A10) * (B2:B10>0))



Note. To enter an Excel array formula correctly, you have to press Ctrl+Shift+Enter instead of conventional Enter stroke.

Excel user defined functions

Although Microsoft Excel has hundreds of built in functions, you still may find yourself faced with a challenge for which no predefined Excel function exists. In this case, you can create that function yourself...

Such custom functions are called **User Defined Functions** (UDFs), and they are especially useful for advanced mathematic or engineering calculations. Like macros, user defined functions are written in VBA (Visual Basic for Applications).

Absolute, relative and mixed cell references in Excel formulas

There exist 3 types of cell references in Excel**:** absolute (A1), relative (A1) and mixed ($A1 or A$1). All three of the above references refer to the same cell, and the dollar sign ($) is used only for one purpose - it tells Microsoft Excel whether to change or not to change cell references when the formula is moved or copied to other cells.

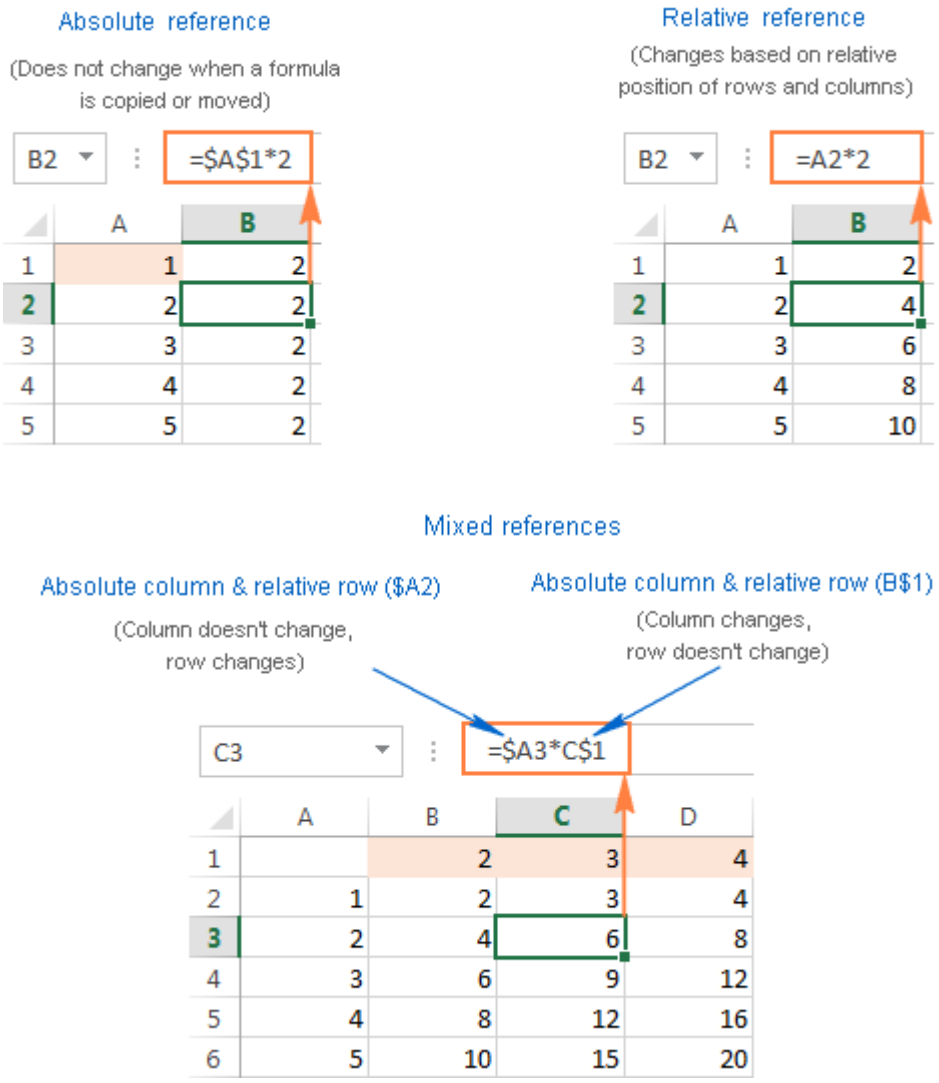
Absolute cell reference (A1) - the $ sign before the row and column coordinates makes a reference static, and lets you copy a formula **without changing references**.

Relative cell reference (A1) - a cell reference with no $ sign changes based on relative position of rows and columns in a spreadsheet.

Mixed cell reference - can be of 2 types

- *Absolute column and relative row* ($A1) - the $ sign in front of the column letter locks the reference to the specified column, so the column never changes. The relative row reference, without the dollar sign, changes depending on the row to which the formula is copied.
- *Relative column and absolute row* (A$1) - the row's reference locked by $ doesn't change, and the column's reference does.

The following image shows how different reference types work in practice.



iv. Information Function

A. CELL Function

The CELL function returns information about the formatting, location, or contents of a cell. For example, if you want to verify that a cell contains a numeric value instead of text before you perform a calculation on it, you can use the following formula

=IF(CELL("type",A1)="v",A1*2,0)

This formula calculates A1*2 only if cell A1 contains a numeric value, and returns 0 if A1 contains text or is blank.

Note: Formulas that use CELL have language-specific argument values and will return errors if calculated using a different language version of Excel. For example, if you create a formula containing CELL while using the Czech version of Excel, that formula will return an error if the workbook is opened using the French version. If it is important for others to open your workbook using different language versions of Excel, consider either using alternative functions or allowing others to save local copies in which they revise the CELL arguments to match their language.

Syntax**: CELL(info_type, [reference])**

The CELL function syntax has the following arguments

Argument	Description
info_type Required	A text value that specifies what type of cell information you want to return. The following list shows the possible values of the Info_type argument and the corresponding results.
reference Optional	The cell that you want information about. If omitted, the information specified in the info_type argument is returned for cell selected at the time of calculation. If the reference argument is a range of cells, the CELL function returns the information for active cell in the selected range. **Important:** Although technically reference is optional, including it in your formula is encouraged, unless you understand the effect its absence has on your formula result and want that effect in place. Omitting the reference argument does not reliably produce information about a specific cell, for the following reasons**:** ▪ In automatic calculation mode, when a cell is modified by a user the calculation may be triggered before or after the selection has progressed, depending on the platform you're using for Excel. For example, Excel for Windows currently triggers calculation before selection changes, but Excel for the web triggers it afterward.

Argument	Description
	▪ When Co-Authoring with another user who makes an edit, this function will report your active cell rather than the editor's. ▪ Any recalculation, for instance pressing F9, will cause the function to return a new result even though no cell edit has occurred.

info_type values

The following list describes the text values that can be used for the info_type argument. These values must be entered in the CELL function with quotes (" ").

info_type	Returns
"address"	Reference of the first cell in reference, as text.
"col"	Column number of the cell in reference.
"color"	The value 1 if the cell is formatted in color for negative values; otherwise returns 0 (zero). **Note:** This value is not supported in Excel for the web, Excel Mobile, and Excel Starter.
"contents"	Value of the upper-left cell in reference; not a formula.
"filename"	Filename (including full path) of the file that contains reference, as text. Returns empty text ("") if the worksheet that contains reference has not yet been saved. **Note:** This value is not supported in Excel for the web, Excel Mobile, and Excel Starter.
"format"	Text value corresponding to the number format of the cell. The text values for the various formats are shown in the following table. Returns "-" at the end of the text value if the cell is formatted in color for negative values. Returns "()" at the end of the text value if the cell is formatted with parentheses for positive or all values.

info_type	Returns
	Note: This value is not supported in Excel for the web, Excel Mobile, and Excel Starter.
"parentheses"	The value 1 if the cell is formatted with parentheses for positive or all values; otherwise returns 0. **Note:** This value is not supported in Excel for the web, Excel Mobile, and Excel Starter.
"prefix"	Text value corresponding to the "label prefix" of the cell. Returns single quotation mark (') if the cell contains left-aligned text, double quotation mark (") if the cell contains right-aligned text, caret (^) if the cell contains centered text, backslash (\) if the cell contains fill-aligned text, and empty text ("") if the cell contains anything else. **Note:** This value is not supported in Excel for the web, Excel Mobile, and Excel Starter.
"protect"	The value 0 if the cell is not locked; otherwise returns 1 if the cell is locked. **Note:** This value is not supported in Excel for the web, Excel Mobile, and Excel Starter.
"row"	Row number of the cell in reference.
"type"	Text value corresponding to the type of data in the cell. Returns "b" for blank if the cell is empty, "l" for label if the cell contains a text constant, and "v" for value if the cell contains anything else.
"width"	Returns an array with 2 items. The 1st item in the array is the column width of the cell, rounded off to an integer. Each unit of column width is equal to the width of one character in the default font size. The 2nd item in the array is a Boolean value, the value is TRUE if the column width is the default or FALSE if the width has been explicitly set by the user. **Note:** This value is not supported in Excel for the web, Excel Mobile, and Excel Starter.

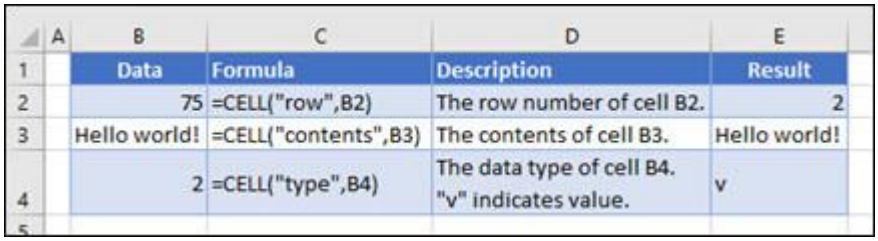
CELL format codes

The following list describes the text values that the CELL function returns when the Info_type argument is "format" and the reference argument is a cell that is formatted with a built-in number format.

If the Excel format is	The CELL function returns
General	"G"
0	"F0"
#,##0	",0"
0.00	"F2"
#,##0.00	",2"
$#,##0_);($#,##0)	"C0"
$#,##0_);[Red]($#,##0)	"C0-"
$#,##0.00_);($#,##0.00)	"C2"
$#,##0.00_);[Red]($#,##0.00)	"C2-"
0%	"P0"
0.00%	"P2"
0.00E+00	"S2"
# ?/? or # ??/??	"G"
m/d/yy or m/d/yy h:mm or mm/dd/yy	"D4"
d-mmm-yy or dd-mmm-yy	"D1"
d-mmm or dd-mmm	"D2"
mmm-yy	"D3"
mm/dd	"D5"
h:mm AM/PM	"D7"
h:mm:ss AM/PM	"D6"
h:mm	"D9"
h:mm:ss	"D8"

Note: If the info_type argument in the CELL function is "format" and you later apply a different format to the referenced cell, you must recalculate the worksheet (press **F9**) to update the results of the CELL function.

Examples



	A	B	C	D	E
1		Data	Formula	Description	Result
2		75	=CELL("row",B2)	The row number of cell B2.	2
3		Hello world!	=CELL("contents",B3)	The contents of cell B3.	Hello world!
4		2	=CELL("type",B4)	The data type of cell B4. "v" indicates value.	v

B. ERROR.TYPE function

Returns a number corresponding to one of the error values in Microsoft Excel or returns the #N/A error if no error exists. You can use ERROR.TYPE in an IF function to test for an error value and return a text string, such as a message, instead of the error value.

Syntax

ERROR.TYPE(error_val)

The ERROR.TYPE function syntax has the following arguments

- **Error_val** Required. The error value whose identifying number you want to find. Although error_val can be the actual error value, it will usually be a reference to a cell containing a formula that you want to test.

If error_val is	ERROR.TYPE returns
#NULL!	1
#DIV/0!	2
#VALUE!	3
#REF!	4
#NAME?	5
#NUM!	6
#N/A	7
#GETTING_DATA	8
Anything else	#N/A

Example

Copy the example data in the following table, and paste it in cell A1 of a new Excel worksheet. For formulas to show results, select them, press F2, and then press Enter. If you need to, you can adjust the column widths to see all the data.

Data		
#NULL!		
#DIV/0!		
Formula	**Description**	**Result**
=ERROR.TYPE(A2)	Number of the #NULL! Error(1).	1
=IF(ERROR.TYPE(A3)<3,CHOOSE(ERROR.TYPE(A3),"Ranges do not intersect","The divisor is zero"))	Checks cell A3 to see whether the cell contains either the #NULL! error value or the #DIV/0! error value. If it does, then the number for the error value is used in the	The divisor is zero

Data		
		CHOOSE worksheet function to display one of two messages; otherwise, the #N/A error value is returned.

C. INFO function

Returns information about the current operating environment.

Syntax

INFO(type_text)
The INFO function syntax has the following arguments**:**

- **Type_text** Required. Text that specifies what type of information you want returned.

Type_text	Returns
"directory"	Path of the current directory or folder specified in the Excel option, **At startup, open all files in** (Select **File** > **Options** > **Advanced** > **General**).
"numfile"	Number of worksheets in the open workbooks.
"origin"	Returns the absolute cell reference of the top and leftmost cell visible in the window, based on the current

Type_text	Returns
	scrolling position, as text prepended with "$A:". This value is intended for for Lotus 1-2-3 release 3.x compatibility. The actual value returned depends on the current reference style setting. Using D9 as an example, the return value would be: ▪ **A1 reference style** "$A:$D$9". ▪ **R1C1 reference style** "$A:R9C4"
"osversion"	Current operating system version, as text.
"recalc"	Current recalculation mode; returns "Automatic" or "Manual".
"release"	Version of Microsoft Excel, as text.
"system"	Name of the operating environment: Macintosh = "mac" Windows = "pcdos"

Important: In previous versions of Microsoft Excel, the "memavail", "memused", and "totmem" type_text values, returned memory information. These type_text values are no longer supported and now return a #N/A error value.

Example

Copy the example formulas in the following table, and paste them in a new Excel worksheet.

Formula	Description	Result
=INFO("numfile")	Number of worksheets in open workbooks	a number indicating how many sheets are in the currently open workbooks
=INFO("recalc")	Recalculation mode for the workbook.	"Automatic" or "Manual" depending on the current state of your calculation options.

D. IS functions

Each of these functions, referred to collectively as the **IS** functions, checks the specified value and returns TRUE or FALSE depending on the outcome. For

example, the **ISBLANK** function returns the logical value TRUE if the value argument is a reference to an empty cell; otherwise it returns FALSE.

You can use an **IS** function to get information about a value before performing a calculation or other action with it. For example, you can use the **ISERROR** function in conjunction with the **IF** function to perform a different action if an error occurs

= IF(ISERROR(A1), "An error occurred.", A1 * 2)

This formula checks to see if an error condition exists in A1. If so, the **IF** function returns the message "An error occurred." If no error exists, the **IF** function performs the calculation A1*2.

Syntax

ISBLANK(value)
ISERR(value)
ISERROR(value)
ISLOGICAL(value)
ISNA(value)
ISNONTEXT(value)
ISNUMBER(value)
ISREF(value)
ISTEXT(value)

The **IS** function syntax has the following argument**:**

- **value** Required. The value that you want tested. The value argument can be a blank (empty cell), error, logical value, text, number, or reference value, or a name referring to any of these.

Function	Returns TRUE if
ISBLANK	Value refers to an empty cell.
ISERR	Value refers to any error value except #N/A.
ISERROR	Value refers to any error value (#N/A, #VALUE!, #REF!, #DIV/0!, #NUM!, #NAME?, or #NULL!).
ISLOGICAL	Value refers to a logical value.
ISNA	Value refers to the #N/A (value not available) error value.
ISNONTEXT	Value refers to any item that is not text. (Note that this function returns TRUE if the value refers to a blank cell.)

Function	Returns TRUE if
ISNUMBER	Value refers to a number.
ISREF	Value refers to a reference.
ISTEXT	Value refers to text.

Remarks

- The value arguments of the **IS** functions are not converted. Any numeric values that are enclosed in double quotation marks are treated as text. For example, in most other functions where a number is required, the text value "19" is converted to the number 19. However, in the formula **ISNUMBER("19")**, "19" is not converted from a text value to a number value, and the **ISNUMBER** function returns FALSE.
- The **IS** functions are useful in formulas for testing the outcome of a calculation. When combined with the **IF** function, these functions provide a method for locating errors in formulas (see the following examples).

Examples

Example 1

Copy the example data in the following table, and paste it in cell A1 of a new Excel worksheet. For formulas to show results, select them, press F2, and then press Enter. If you need to, you can adjust the column widths to see all the data.

Formula	Description	Result
=ISLOGICAL(TRUE)	Checks whether TRUE is a logical value	TRUE
=ISLOGICAL("TRUE")	Checks whether "TRUE" is a logical value	FALSE
=ISNUMBER(4)	Checks whether 4 is a number	TRUE
=ISREF(G8)	Checks whether G8 is a valid reference	TRUE

Formula	Description	Result
=ISREF(XYZ1)	Checks whether XYZ1 is a valid reference	FALSE

Example 2

Copy the example data in the following table, and paste it in cell A1 of a new Excel worksheet. For formulas to show results, select them, press F2, and then press Enter. If you need to, you can adjust the column widths to see all the data.

Data		
Gold		
Region1		
#REF!		
330.92		
#N/A		
Formula	**Description**	**Result**
=ISBLANK(A2)	Checks whether cell A2 is blank.	FALSE
=ISERROR(A4)	Checks whether the value in cell A4, #REF!, is an error.	TRUE
=ISNA(A4)	Checks whether the value in cell A4, #REF!, is the #N/A error.	FALSE
=ISNA(A6)	Checks whether the value in cell A6, #N/A, is the #N/A error.	TRUE
=ISERR(A6)	Checks whether the value in cell A6, #N/A, is an error.	FALSE
=ISNUMBER(A5)	Checks whether the value in cell A5, 330.92, is a number.	TRUE
=ISTEXT(A3)	Checks whether the value in cell A3, Region1, is text.	TRUE

E. Lookup Functions

The LOOKUP function in Excel is used to search for a value in a one-row or one-column range and return a value from the same position in another row or

column. It's a simple way to perform lookups when you don't need an exact match, but rather a "rough match" or an approximate match.

While doing financial analysis, if we wish to compare two rows or columns, we can use the LOOKUP function. It is designed to handle the simplest cases of vertical and horizontal lookup.

The more advanced versions of the LOOKUP function are HLOOKUP and VLOOKUP.

Formula (Vector)

There are two forms of Lookup**:** Vector and Array.

The vector form of the LOOKUP function will search one row or one column of data for a specified value and then get the data from the same position in another row or column.
The formula for the function is as follows**:**
=LOOKUP(lookup_value, lookup_vector, [result_vector])

It uses the following arguments

1. **Lookup_value** (required function) – This is the value that we will be searching. It can be a logical value of TRUE or FALSE, reference to a cell, number, or text.
2. **Lookup_vector** (required function) – This is the one-dimensional data that we wish to search. Remember, we need to sort it in ascending order.
3. **Result_vector** – An optional one-dimensional list of data from which we want to return a value. If supplied, the [result_vector] must be the same length as the lookup_vector. If the [result_vector] is omitted, the result is returned from the lookup_vector.

The array form of LOOKUP looks in the first row or column of an array for the specified value and returns a value from the same position in the last row or column of the array. We need to use this form of LOOKUP when the values that we want to match are in the first row or column of the array.

Formula (Array) LOOKUP Function
= LOOKUP(lookup_value, array)

The arguments are as follows**:**

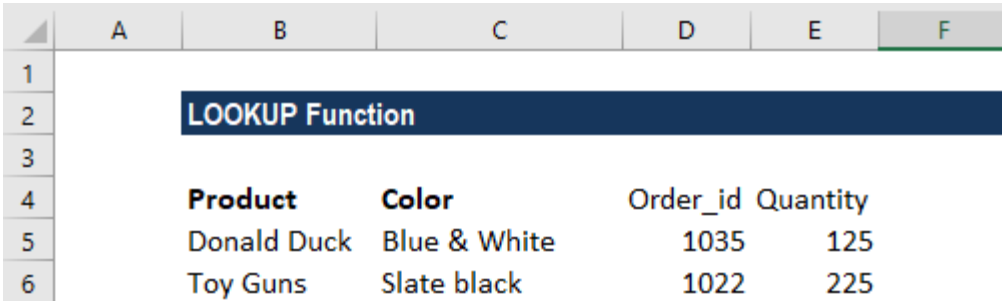
1. **Lookup_value** (required argument) – This is a value that we are searching for.
2. **Array** (required argument) – A range of cells that contains text, numbers, or logical values that we want to compare with the lookup_value.

How to use the LOOKUP Function in Excel?

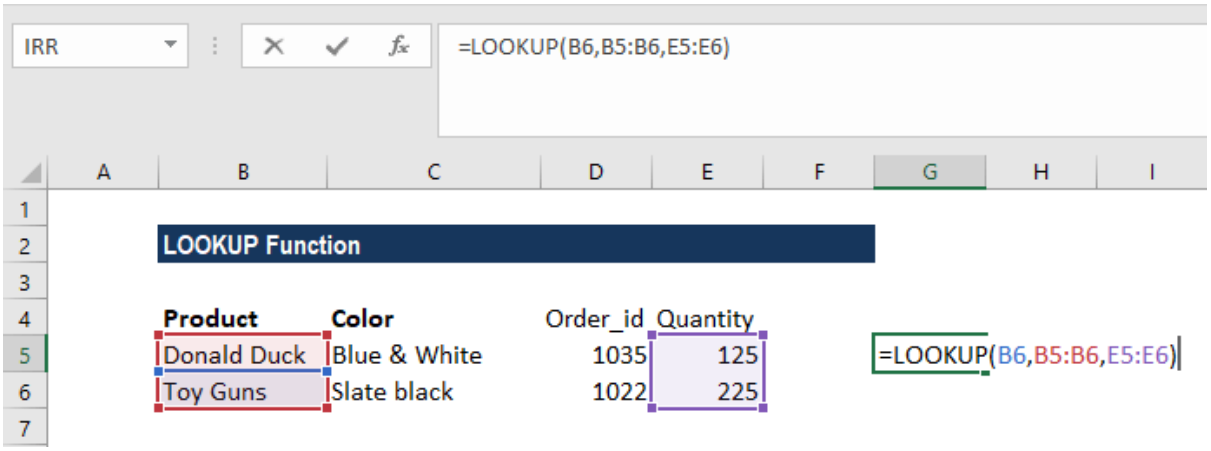
As a worksheet function, the LOOKUP Function can be entered as part of a formula in a cell of a worksheet. To understand the uses of this function, let us consider a few examples**:**

Example 1

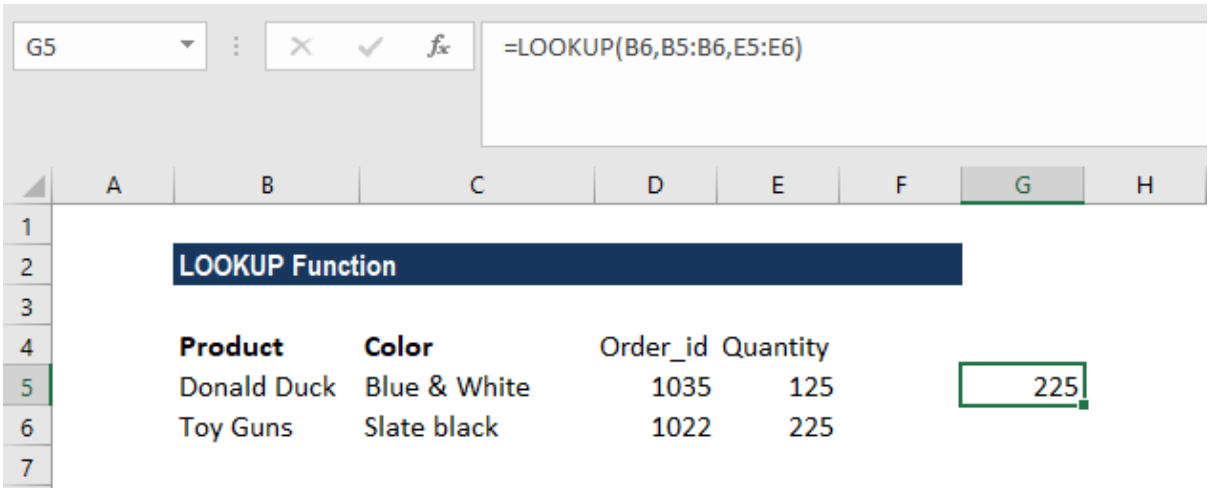
Assume we are given a list of products, color, order_id, and quantity. We want a dashboard where we put the product and then we instantly get the quantity.



The formula to use will be

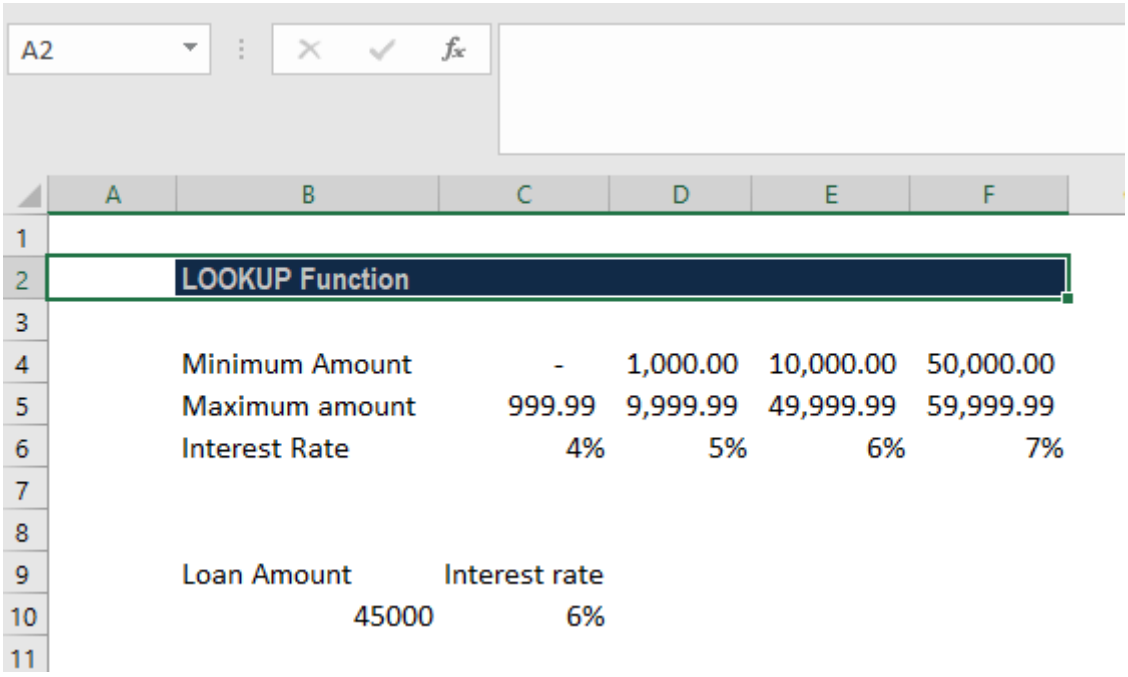


The result we get is

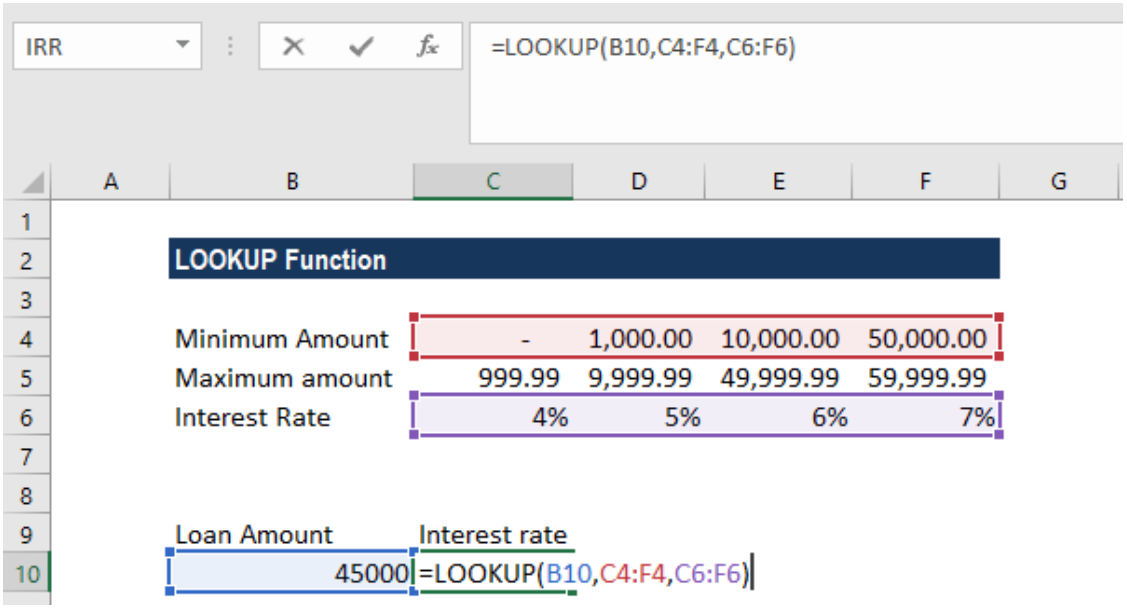


Example 2

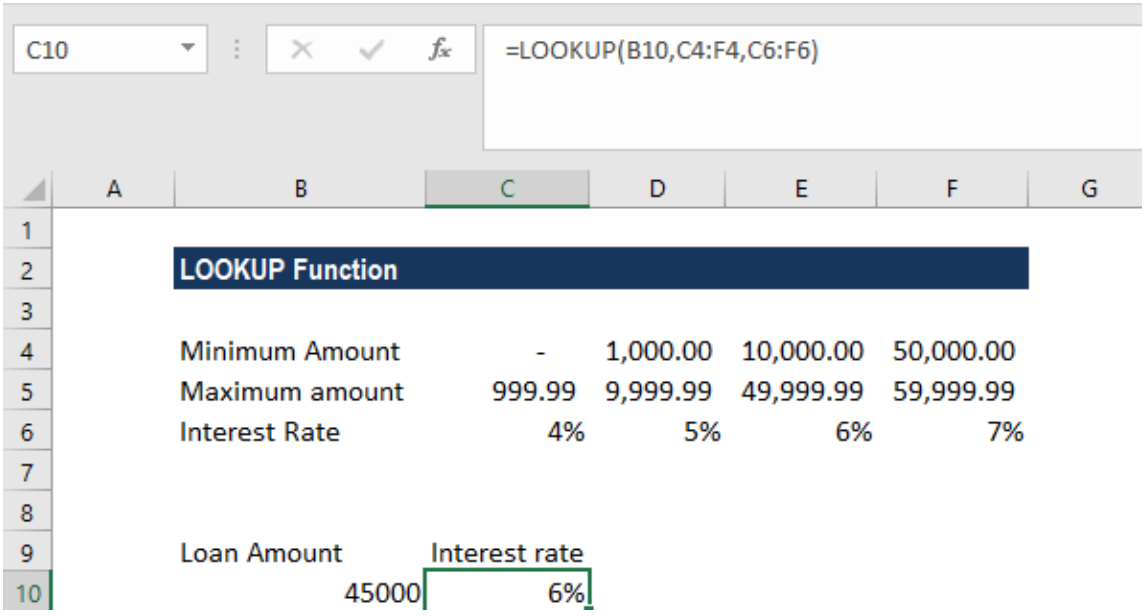
Suppose we are in the business of giving loans and we offer different interest rates based on the amount borrowed. We are given the data below



The formula to use will be



We will get the following result



Things to remember about the LOOKUP Function

1. #N/A error – Occurs when the Lookup function fails to find the closest match to the supplied lookup_value. This can occur if either**:**
    1. The smallest value in the lookup_vector (or first column/row of the array) is greater than the lookup_value provided; or

2. The lookup_vector (or first column/row of the array) is not in ascending order.

2. #REF! error – Occurs if the formula is attempting to reference cells that are non-existent. This can be caused by either**:**
    1. Cells being deleted after the Lookup function has been entered.
    2. Relative references in the Lookup function that have become invalid when the functions have been copied to other cells.

F. Date and Time Functions

a. Excel DATE function

DATE(year, month, day) returns a serial number of a date based on the year, month and day values that you specify.

When it comes to working with dates in Excel, DATE is the most essential function to understand. The point is that other Excel date functions not always can recognize dates entered in the text format. So, when performing date calculations in Excel, you'd better supply dates using the DATE function to ensure the correct results.

Here are a few Excel DATE formula examples**:**
=DATE(2015, 5, 20) - returns a serial number corresponding to 20-May-2015.
=DATE(YEAR(TODAY()), MONTH(TODAY()), 1) - returns the first day of the current year and month.
=DATE(2015, 5, 20)-5 - subtracts 5 days from May 20, 2015.

	A	B	C
1	Formula	Result	Explanation
2	=DATE(2015, 5, 20)	05/20/2015	Returns 20-May-2015
3			
4	=DATE(YEAR(TODAY()), MONTH(TODAY()), 1)	05/01/2015	Returns the 1st day of the current year and month
5			
6	=DATE(2015, 5, 20)-5	05/15/2015	Subtracts 5 days from May 20, 2015
7			

b. Excel TODAY function

The **TODAY()** function returns today's date, exactly as its name suggests.

TODAY is arguably one of the easiest Excel functions to use because it has no arguments at all. Whenever you need to get today's date in Excel, enter the following formula is a cell**:**

=TODAY()

Apart from this obvious use, the Excel TODAY function can be part of more complex formulas and calculations based on today's date. For example, to add 7 days to the current date, enter the following formula in a cell**:**

=TODAY()+7

To add 30 weekdays to today's date excluding weekend days, use this one**:**
=WORKDAY(TODAY(), 30)

	A	B	C
1	Formula	Result	Explanation
2	=TODAY()	21-May-15	Returns the current date.
3			
4	=TODAY()+7	28-May-15	Adds 7 days to today's date.
5			
6	=WORKDAY(TODAY(), 30)	2-Jul-15	Adds 30 workdays to today's date.

c. Excel NOW function

NOW() function returns the current date and time. As well as TODAY, it does not have any arguments. If you wish to display today's date and current time in your worksheet, simply put the following formula in a cell

=NOW()

Note. As well as TODAY, Excel NOW is a volatile function that refreshes the returned value every time the worksheet is recalculated. Please note, the cell with the NOW() formula does not auto update in real-time, only when the workbook is reopened or the worksheet is recalculated. To force the spreadsheet to recalculate, and consequently get your NOW formula to update its value, press either Shift+F9 to

recalculate only the active worksheet or F9 to recalculate all open workbooks.

d. Excel DATEVALUE function

DATEVALUE(date_text) converts a date in the text format to a serial number that represents a date.

The DATEVALUE function understands plenty of date formats as well as references to cells that contain "text dates". DATEVALUE comes in really handy to calculate, filter or sort dates stored as text and convert such "text dates" to the Date format.

A few simple DATEVALUE formula examples follow below

=DATEVALUE("20-may-2015")
=DATEVALUE("5/20/2015")
=DATEVALUE("may 20, 2015")

	A	B
1	Formula	Result
2	=DATEVALUE("20-may-2015")	42144
3		
4	=DATEVALUE("5/20/2015")	42144
5		
6	=DATEVALUE("May 20, 2015")	42144

e. Excel TEXT function

In the pure sense, the TEXT function cannot be classified as one of Excel date functions because it can convert any numeric value, not only dates, to a text string.
With the TEXT(value, format_text) function, you can change the dates to text strings in a variety of formats, as demonstrated in the following screenshot.

	A	B	C
1	Date	Formula	Result
2	5/20/2015	=TEXT(A2,"d-mmm-yy")	20-May-15
3			
4		=TEXT(A2,"dd mmmm, yyyy")	20 May, 2015
5			
6		=TEXT(A2,"dddd, mmmm d, yyyy")	Wednesday, May 20, 2015

f. Excel DAY function

DAY(serial_number) function returns a day of the month as an integer from 1 to 31.
Serial_number is the date corresponding to the day you are trying to get. It can be a cell reference, a date entered by using the DATE function, or returned by other formulas.

Here are a few formula examples

=DAY(A2) - returns the day of the month from a date in A2
=DAY(DATE(2015,1,1)) - returns the day of 1-Jan-2015
=DAY(TODAY()) - returns the day of today's date

	A	B	C	D
1	Date	Formula	Result	Explanation
2	1-Jan-15	=DAY(A2)	1	Returns the day of the date in A2
3				
4		=DAY(DATE(2015,1,1))	1	Returns the day of 1-Jan-2015
5				
6		=DAY(TODAY())	20	Returns the day of today's date

g. Excel MONTH function

MONTH(serial_number) function in Excel returns the month of a specified date as an integer ranging from 1 (January) to 12 (December).
For example**:**
=MONTH(A2) - returns the month of a date in cell A2.
=MONTH(TODAY()) - returns the current month.

For the detail explanation of the MONTH function's syntax and plenty more formula examples, please check out the following tutorial**:** Using the MONTH function in Excel.

h. Excel YEAR function

YEAR(serial_number) returns a year corresponding to a given date, as a number from 1900 to 9999.
The Excel YEAR function is very straightforward and you will hardly run into any difficulties when using it in your date calculations**:**
=YEAR(A2) - returns the year of a date in cell A2.
=YEAR("20-May-2015") - returns the year of the specified date.
=YEAR(DATE(2015,5,20)) - a more reliable method to get the year of a given date.
=YEAR(TODAY()) - returns the current year.

	A	B	C	D
1	Date	Formula	Result	Explanation
2	20-May-15	=YEAR(A2)	2015	Returns the year of a date in cell A2.
3				
4		=YEAR("20-May-2015")	2015	Return the year of a specified date (20-May-2015).
5				
6		=YEAR(DATE(2015,5,20))	2015	
7				
8		=YEAR(TODAY())	2015	Return the current year.

i. Excel EOMONTH function

EOMONTH(start_date, months) function returns the last day of the month a given number of months from the start date.
Like most of Excel date functions, EOMONTH can operate on dates input as cell references, entered by using the DATE function, or results of other formulas.

A **positive value** in the **months** argument adds the corresponding number of months to the start date, for example**:**
=EOMONTH(A2, 3) - returns the last day of the month, 3 months **after** the date in cell A2.
A **negative value** in the *months* argument subtracts the corresponding number of months from the start date**:**
=EOMONTH(A2, -3) - returns the last day of the month, 3 months **before** the date in cell A2.
A **zero** in the *months* argument forces the EOMONTH function to return the last day of the start date's month**:**

=EOMONTH(DATE(2015,4,15), 0) - returns the last day in April, 2015.

To get the **last day of the current month**, enter the TODAY function in the *start_date* argument and 0 in *months*:

=EOMONTH(TODAY(), 0)

	A	B	C	D	E
1	Date	Formula	Result	Date	Explanation
2	1-Jan-15	=EOMONTH(A2, 3)	42124	30-Apr-15	The last day of the month, 3 months **after** the date in A2.
3					
4		=EOMONTH(A2, -3)	41943	31-Oct-14	The last day of the month, 3 months **before** the date in A2.
5					
6		=EOMONTH(DATE(2015,4,15), 0)	42124	30-Apr-15	The last day in April, 2015.
7					
8		=EOMONTH(TODAY(), 0)	42155	31-May-15	The last day of the current month.
9					

j. Excel WEEKDAY function

WEEKDAY(serial_number,[return_type]) function returns the day of the week corresponding to a date, as a number from 1 (Sunday) to 7 (Saturday).

- **Serial_number** can be a date, a reference to a cell containing a date, or a date returned by some other Excel function.
- **Return_type** (optional) - is a number that determines which day of the week shall be considered the first day.

And here are a few WEEKEND formula examples

=WEEKDAY(A2) - returns the day of the week corresponding to a date in cell A2; the 1st day of the week is Sunday (default).

=WEEKDAY(A2, 2) - returns the day of the week corresponding to a date in cell A2; the week begins on Monday.

=WEEKDAY(TODAY()) - returns a number corresponding to today's day of the week; the week begins on Sunday.

	A	B	C	D
1	Date	Formula	Result	Explanation
2	Thu, 01-Jan-2015	=WEEKDAY(A2)	5	The day of the week corresponding to date in A2.
3				The week begins on Sunday.
4		=WEEKDAY(A2, 2)	4	The day of the week corresponding to date in A2.
5				The week begins on Monday.
6		=WEEKDAY(TODAY())	5	The day of the week of the current date.
7				The week begins on Sunday.

k. Excel DATEDIF function

DATEDIF(start_date, end_date, unit) function is specially designed to calculate the difference between two dates in days, months or years.
Which time interval to use for calculating the date difference depends on the letter you enter in the last argument**:**
=DATEDIF(A2, TODAY(), "d") - calculates the number of **days** between the date in A2 and today's date.
=DATEDIF(A2, A5, "m") - returns the number of **complete months** between the dates in A2 and B2.
=DATEDIF(A2, A5, "y") - returns the number of **complete years** between the dates in A2 and B2.

	A	B	C	D
1	Start date	Formula	Result	Explanation
2	1-Jan-13	=DATEDIF(A2, B5, "m")	28	Complete months between dates in A2 and B2.
3				
4	End date	=DATEDIF(A2, B5, "y")	2	Complete years between dates in A2 and B2.
5	20-May-15			
6		=DATEDIF(A2, TODAY(), "d")	870	Days between the date in A2 and today's date.

l. Excel WEEKNUM function

WEEKNUM(serial_number, [return_type]) - returns the week number of a specific date as an integer from 1 to 53.
For example, the below formula returns 1 because the week containing January 1 is the first week in the year.

=WEEKNUM("1-Jan-2015")

Excel EDATE function

EDATE(start_date, months) function returns the serial number of the date that is the specified number of months before or after the start date. For example**:**

=EDATE(A2, 5) - adds 5 months to the date in cell A2.
=EDATE(TODAY(), -5) - subtracts 5 months from today's date.

m. Excel YEARFRAC function

YEARFRAC(start_date, end_date, [basis]) function calculates the proportion of the year between 2 dates.

n. Excel WORKDAY function

WORKDAY(start_date, days, [holidays]) function returns a date N workdays before or after the start date. It automatically excludes weekend days from calculations as well as any holidays that you specify. This function is very helpful for calculating milestones and other important events based on the standard working calendar.
For example, the following formula adds 45 weekdays to the start date in cell A2, ignoring holidays in cells B2**:**B8**:**

=WORKDAY(A2, 45, B2:B85)

o. Excel WORKDAY.INTL function

WORKDAY.INTL(start_date, days, [weekend], [holidays]) is a more powerful variation of the WORKDAY function introduced in Excel 2010.
WORKDAY.INTL allows calculating a date N number of workdays in the future or in the past with custom weekend parameters.
For example, to get a date 20 workdays after the start date in cell A2, with Monday and Sunday counted as weekend days, you can use either of the following formulas

=WORKDAY.INTL(A2, 20, 2, 7)
or
=WORKDAY.INTL(A2, 20, "1000001")

Of course, it might be difficult to grasp the essence from this short explanation, but more formula examples illustrated with screenshots will make things really easy**:**
WORKDAY.INTL - calculating workdays with custom weekends
Excel NETWORKDAYS function
NETWORKDAYS(start_date, end_date, [holidays]) function returns the number of weekdays between two dates that you specify. It automatically excludes weekend days and, optionally, the holidays.

For example, the following formula calculates the number of whole workdays between the start date in A2 and end date in B2, ignoring Saturdays and Sundays and excluding holidays in cells C2**:**C5**:=NETWORKDAYS(A2, B2, C2:C5)**

p. Excel NETWORKDAYS.INTL function

NETWORKDAYS.INTL(start_date, end_date, [weekend], [holidays]) is a more
powerful modification of the NETWORKDAYS function available in Excel 2010 and later. It also returns the number of weekdays between two dates, but lets you specify which days should be counted as weekends.

Here is a basic NETWORKDAYS formula**: =NETWORKDAYS(A2, B2, 2, C2:C5)**

The formula calculates the number of workdays between the date in A2 (start_date) and the date in B2 (end_date), excluding the weekend days Sunday and Monday (number 2 in the weekend parameter), and ignoring holidays in cells C2**:**C5.

Self-Check Sheet - 2: Use Formulas and functions

1. Identify the category that is NOT a type of Excel function:

a) Basic (SUM, AVERAGE, COUNT, MAX, MIN)
b) Statistical (functions to analyze data distribution)
c) Text (functions to manipulate text data)
d) Image

2. What information does the "Arguments" section of a function provide?

a) The function name itself
b) The values or cell references used for calculations
c) The format of the output (e.g., currency, percentage)
d) A comment explaining the function's purpose

3. How do Excel functions benefit users compared to manual calculations?

a) They increase complexity.
b) They automate tasks and reduce errors.
c) They can only handle small datasets.
d) They make sharing formulas difficult.

4. Which logical function returns TRUE if exactly one of its arguments is TRUE?

a) AND (requires all arguments to be TRUE)
b) OR
c) XOR (requires an odd number of TRUE arguments)
d) NOT (inverts the logical value of a single argument)

5. How can you display a number as a currency value using the TEXT function?

a) There is no TEXT function for currency formatting.
b) Use the format code "$0.00" within the TEXT function.
c) Apply currency formatting directly to the cell.
d) Both B and C are correct.

6. What is the key difference between the IF and AND functions?

a) IF allows multiple conditions, while AND requires a single condition.
b) AND formats cells, while IF performs calculations.
c) IF returns different outputs based on the test, while AND always returns TRUE or FALSE.
d) There is no difference; they perform the same function.

Answer Key - 2: Use Formulas and functions

d) Image

b) The values or cell references used for calculations

b) They automate tasks and reduce errors.

b) OR

d) Both B and C are correct. (TEXT function with "$0.00" format or direct formatting)

c) IF can return different outputs based on the test result, while AND always returns TRUE or FALSE.

Job Sheet-2: Create a worksheet using Logical, Text and Financial Function

Instructions:

1. **Create a New Workbook:** Open Microsoft Excel and create a new workbook.
2. **Sample Data:** For each section, you will need sample data in your worksheet. This could be a list of sales figures, customer information, inventory details, or any data relevant to the practiced functions.

Section A: Logical Functions

- **Task 1:** Create a formula using the **IF** function to determine if a product sold more than 100 units. Display "High Sales" if true, and "Low Sales" if false.
- **Task 2:** Combine multiple conditions using the **AND** and/or **OR** functions. For example, identify customers who live in California (CA) and have spent more than $500.
- **Task 3 (Bonus):** Explore the **COUNTIF** and **SUMIF** functions. Count the number of items with a specific value (e.g., "Out of Stock") or calculate the total sales amount for a particular product category.

Section B: Text Functions

- **Task 1:** Extract specific text from a cell using the **LEFT** and/or **RIGHT** functions. For example, extract the first five characters of a product code.
- **Task 2:** Combine text from different cells using the **CONCATENATE** function. For example, create a full customer name from separate first and last name columns.
- **Task 3 (Bonus):** Explore the **UPPER** and **LOWER** functions to convert text to uppercase or lowercase. You can also try the **CLEAN** function to remove unwanted characters from text data.

Section C: Financial Functions

- **Task 1:** Calculate loan payments using the **PMT** function. Specify the loan amount, interest rate, and term (number of payments) to determine the monthly payment amount.
- **Task 2:** Calculate the future value of an investment using the **FV** function. Specify the initial investment amount, interest rate, and number of periods to determine the future value.
- **Task 3 (Bonus):** Explore the **IRR** and **NPV** functions. The **IRR** function calculates the internal rate of return for an investment, while the **NPV** function determines the net present value of a series of cash flows.

Deliverable:

- A completed Excel workbook with three separate worksheets demonstrating the use of Logical, Text, and Financial functions.
- Each task should be clearly labeled within the corresponding worksheet.

Specification Sheet-2: Create a worksheet using Logical, Text and Financial Function

Necessary Tools

Sl. No	Name of Tools	Specification	Unit	Quantity
2				

Necessary Equipment

Sl. No	Name of Equipment	Specification	Unit	Quantity
3.	Computer	As Need	No.	01
4.	Spreadsheet Software	As Need	No.	01

Learning Outcome 3: Making Charts

Assessment Criteria	1. Data can be accessed. 2. The type of chart can be selected. 3. A chart can be created 4. The chart can be formatted 5. The chart can be presented
Conditions and Resources	1. Real or simulated workplace 2. CBLM 3. Handouts 4. Laptop 5. Multimedia Projector 6. Paper, Pen, Pencil, Eraser 7. Internet facilities 8. White board and marker 9. Audio Video Device
Contents	1. Data Access o Chart Type o Pie Chart o Bar Chart o Line Chart o Area Chart o X Y Chart 2. Chart Creation 3. Chart Formatting 4. Chart Presentation
Activities/job/Task	1. Create a worksheet using Charts
Training Methods	1. Discussion 2. Presentation 3. Demonstration 4. Guided Practice 5. Individual Practice 6. Project Work 7. Problem Solving 8. Brainstorming
Assessment Methods	Assessment methods may include but not limited to 1. Written Test 2. Demonstration 3. Oral Questioning 4. Portfolio

Learning Experience 3: Make Charts

In order to achieve the objectives stated in this learning guide, you must perform the learning steps below. Beside each step are the resources or special instructions you will use to accomplish the corresponding activity.

Learning Activities	Recourses/Special Instructions
1. Trainee will ask the instructor about about the learning materials	1. Instructor will provide the learning materials 'Perform Making Charts'
2. Read the Information sheet and complete the Self Checks & Check answer sheets on "Make Charts"	2. Read Information sheet 3**:** Perform Making Chart 3. Answer Self-check 3**:** Perform Making Chart 4. Check your answer with Answer key 3**:** Perform Making Chart
3. Read the Job/Task Sheet and Specification Sheet and perform job/Task	5. Job/Task Sheet and Specification Sheet Job Sheet-3**:** Create a worksheet using Charts

Information Sheet 3: Making Charts

Learning Objective:

After completion of this information sheet, the learners will be able to explain, define and interpret the following contents**:**

3.1. Data can be accessed.
3.2. The type of chart can be selected.
3.3. A chart can be created
3.4. The chart can be formatted
3.5. The chart can be presented

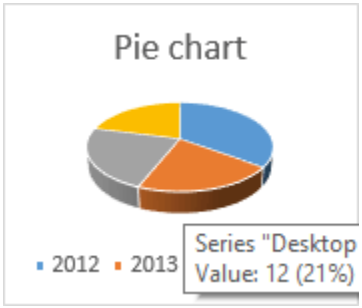
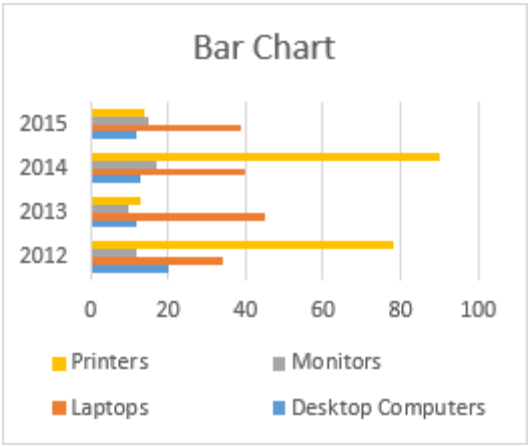
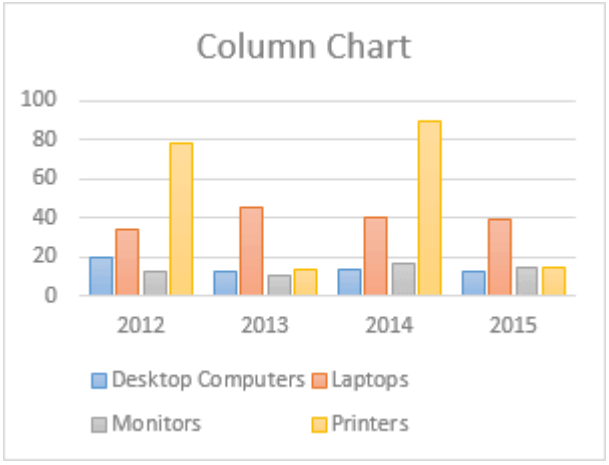
3.1, 3.2, 3.3: Data access, Type of of chart select and create

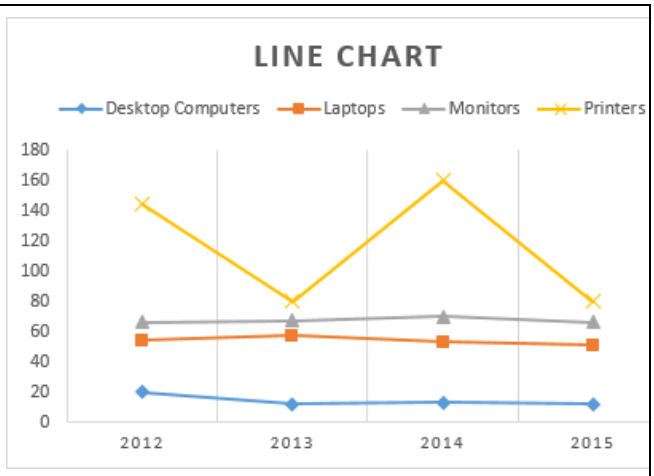
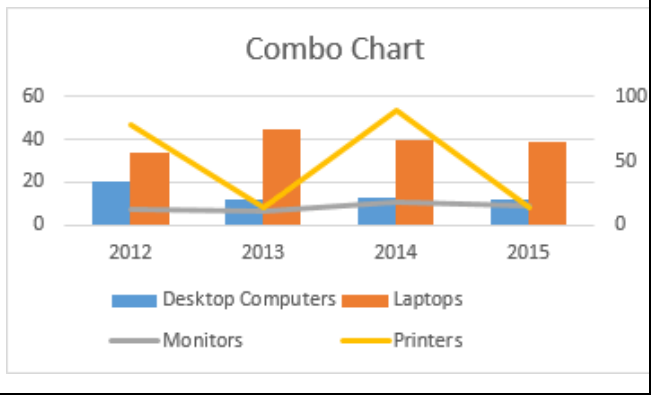
When you create a chart in an Excel worksheet, a Word document, or a PowerPoint presentation, you have a lot of options. Whether you'll use a chart that's recommended for your data, one that you'll pick from the list of all charts, or one from our selection of chart templates, it might help to know a little more about each type of chart.

Types of Charts in MS Excel

Different scenarios require different types of charts. Towards this end, Excel provides a number of chart types that you can work with. **The type of chart that you choose depends on the type of data that you want to visualize**. To help simplify things for the users, Excel 2013 and above has an option that analyses your data and makes a recommendation of the chart type that you should use.

The following table shows some of the most commonly used Excel charts and when you should consider using them.

S/N	CHART TYPE	WHEN SHOULD I USE IT?	EXAMPLE
1	Pie Chart	When you want to quantify items and show them as percentages.	
2	Bar Chart	When you want to compare values across a few categories. The values run horizontally	
3	Column chart	When you want to compare values across a few categories. The values run vertically	

4	Line chart	When you want to visualize trends over a period of time i.e. months, days, years, etc.	
5	Combo Chart	When you want to highlight different types of informatio n	

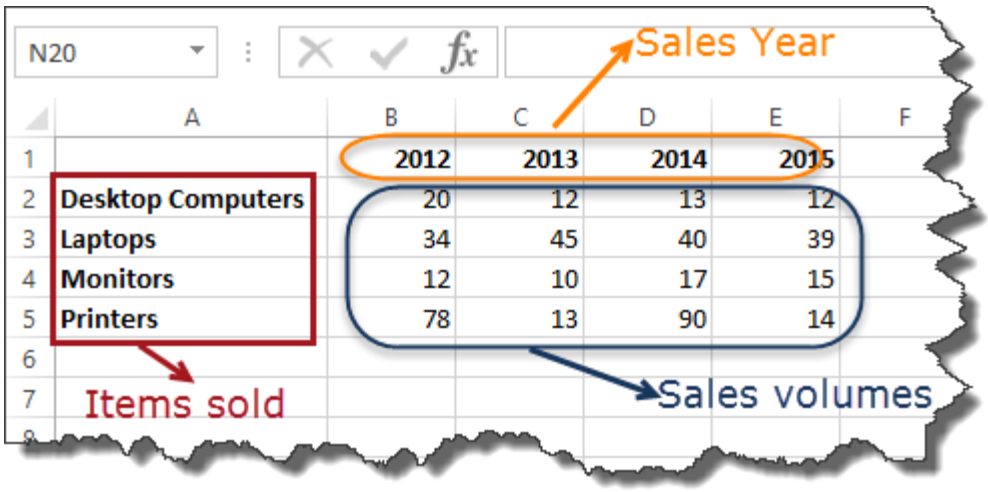
The importance of charts

- Allows you to visualize data graphically
- It's easier to analyse trends and patterns using charts in MS Excel
- Easy to interpret compared to data in cells

Step by step example of creating charts in Excel

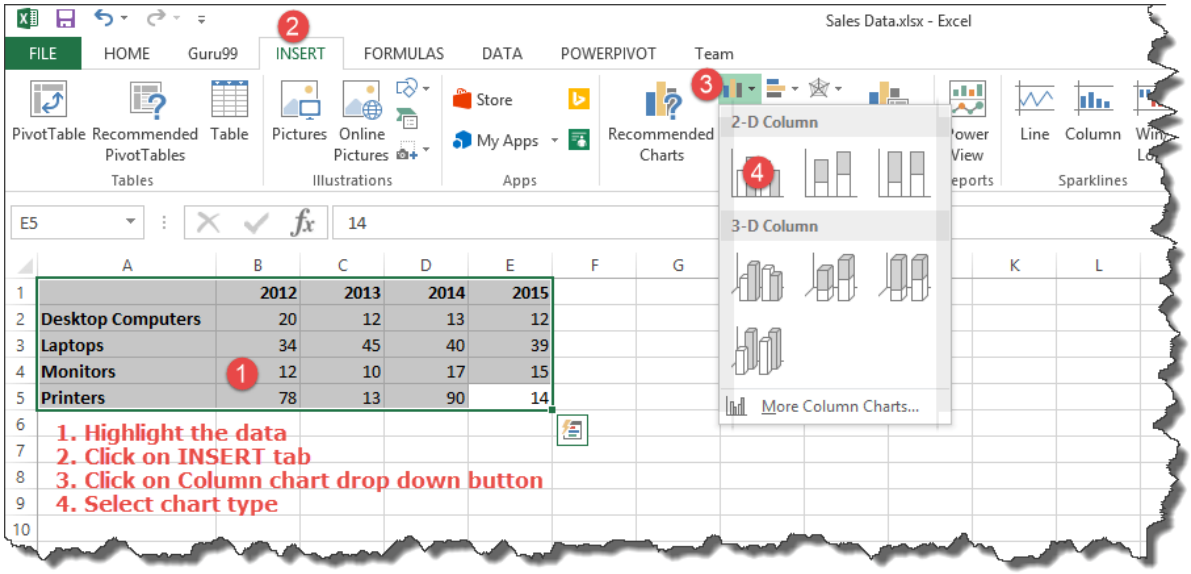
In this tutorial, we are going to plot a simple column chart in Excel that will display the sold quantities against the sales year. Below are the steps to create chart in MS Excel**:**

- Open Excel
- Enter the data from the sample data table above
- Your workbook should now look as follows

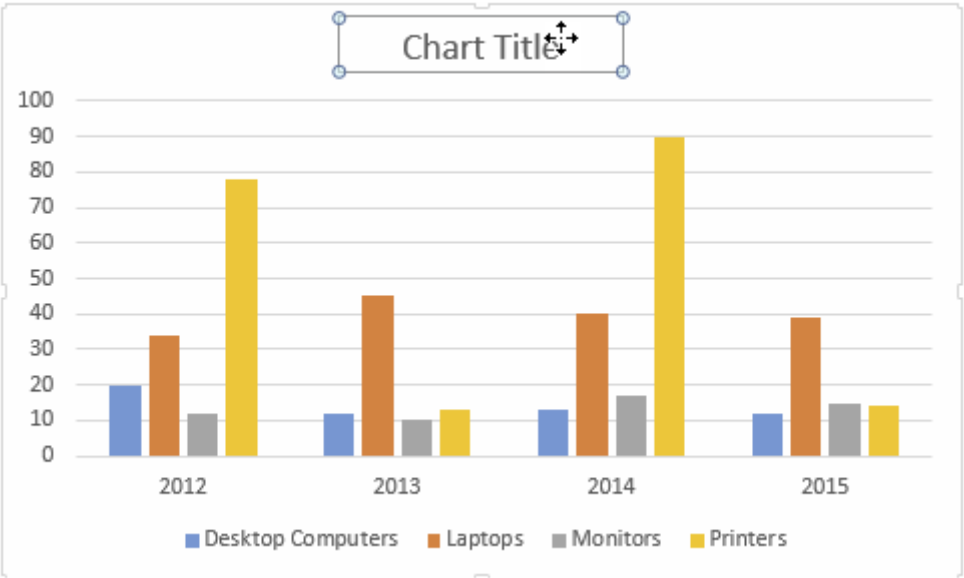


	A	B	C	D	E
1		2012	2013	2014	2015
2	Desktop Computers	20	12	13	12
3	Laptops	34	45	40	39
4	Monitors	12	10	17	15
5	Printers	78	13	90	14

To get the desired chart you have to follow the following steps



- Select the data you want to represent in graph
- Click on INSERT tab from the ribbon
- Click on the Column chart drop down button
- Select the chart type you want



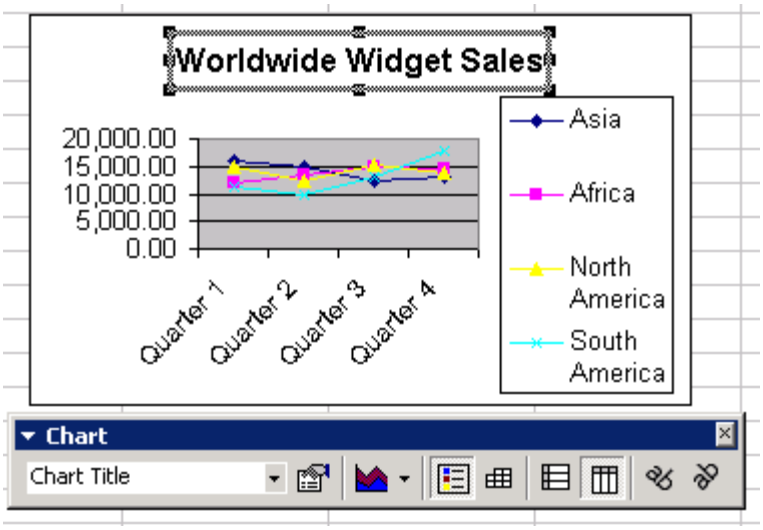
3.4 and 3.5: format the chart and present

A. Formatting the chart title

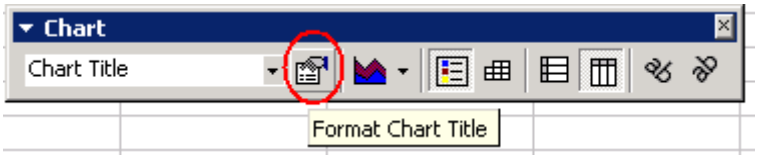
The **chart title** can be formatted to change color, pattern, typeface, size, and alignment using the **Format Chart Title** dialog box.

To format the chart title

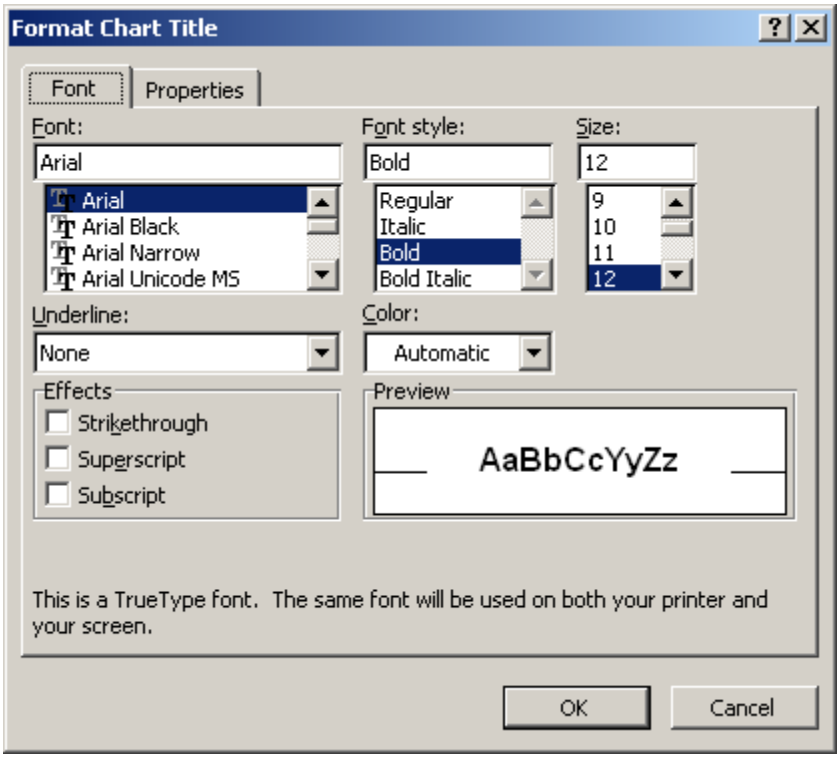
Select the **chart title**.



Click **Format** on the **Chart toolbar**, or double-click the chart title.



- The **Format Chart Title** dialog box contains three tabs—Patterns, Font, and Alignment—that can be used to format the chart title.
- The Patterns tab lets you define borders and fill colors.
- The Font tab lets you define font, font style, size, and color.
- The Alignment tab lets you define horizontal and vertical cell placement, as well as text orientation.



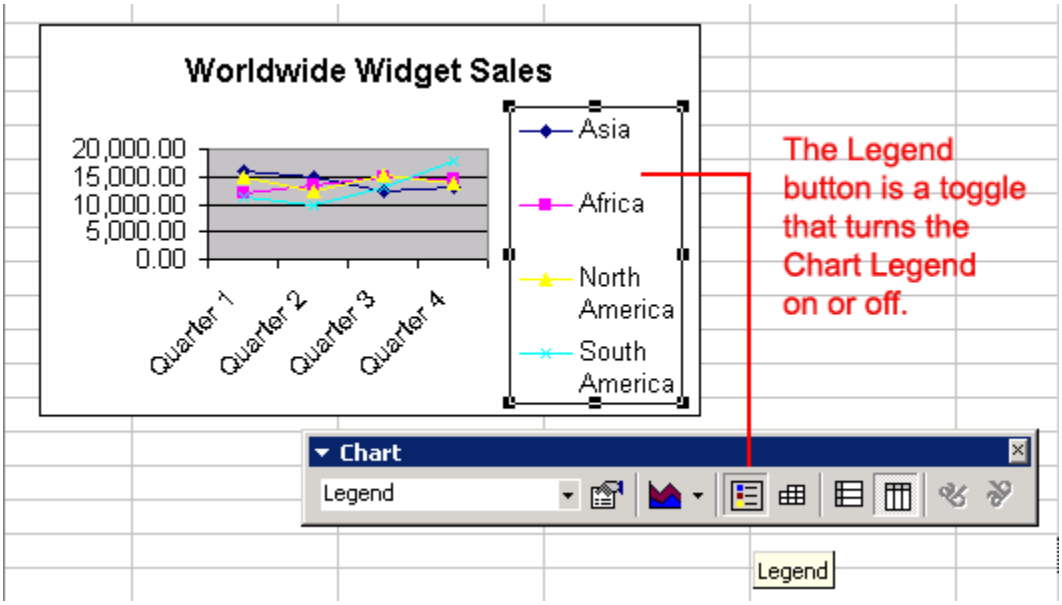
- Click **OK** to accept the chart title format changes.

B. Formatting the chart legend

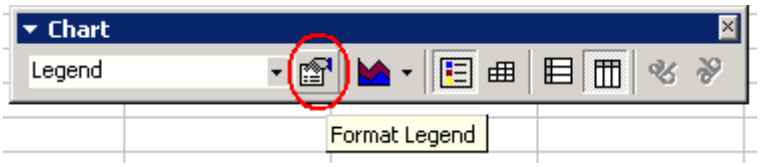
The **chart legend** displays useful information about the chart. Like a roadmap, the legend identifies what different colors or objects represent in the chart. The chart legend—like the chart title and category axis labels—can be formatted to your liking.

To format the chart legend

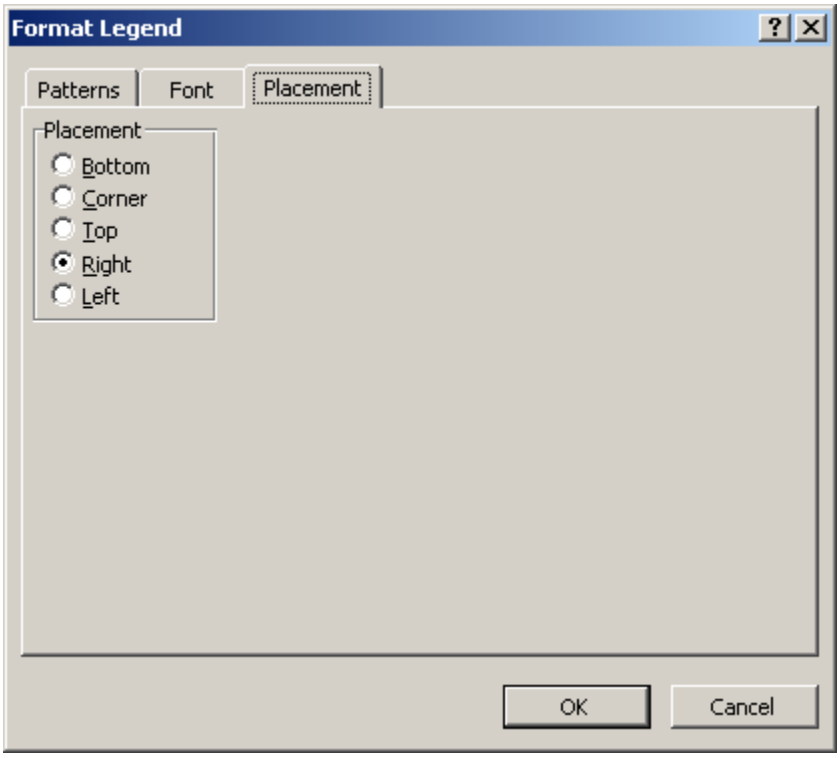
- Press the **show/hide legend** button on the **Chart toolbar** to turn on the legend display. (This button acts like a toggle by turning the display on or off.)



- Click to select the **chart legend**.
- Click **Format** on the **Chart toolbar**, or double-click the chart legend.



- The **Format Legend** dialog box contains three tabs—Patterns, Font, and Alignment—that can be used to format the chart title.
- The **Patterns** tab lets you define borders and fill colors.
- The **Font** tab lets you define font, font style, size, and color.
- The **Placement** tab lets you define the location where the legend will appear on the chart.



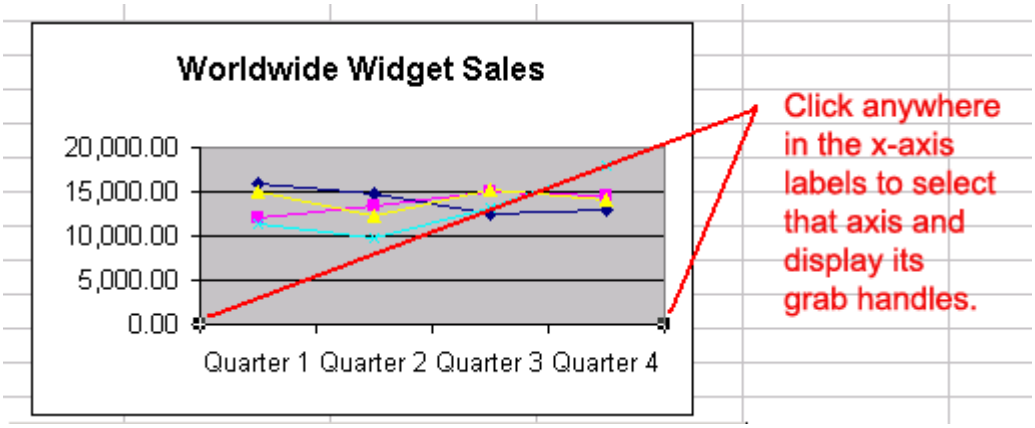
- Click **OK** to accept the chart legend format changes.

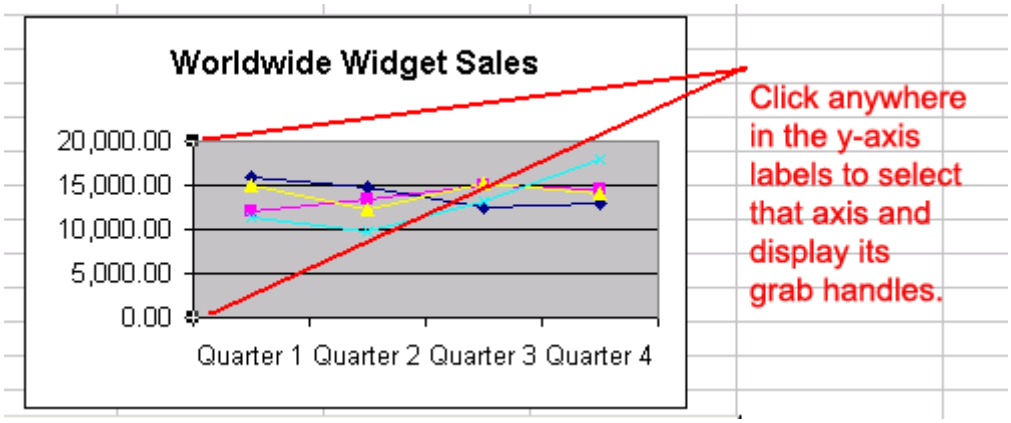
C. Formatting the axis labels

In Excel, a graph represents data in two dimensions. The number of items sold in January, for example, is data on two dimensions**:** number of items and month. The number of items might be plotted on the Y axis, while the month may be plotted on the X axis. The Y axis runs up and down on the graph, while the X axis runs left to right. When formatting the **axis** labels in your chart, you can adjust the numbers on the **scale** of the chart, as well as change font, color, and style.

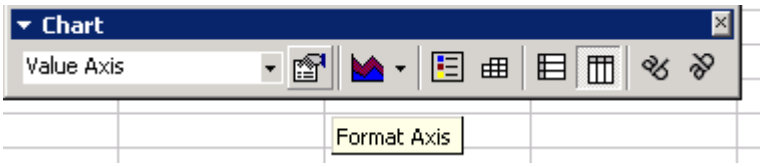
To format an axis

- Click anywhere in the axis label you want to edit

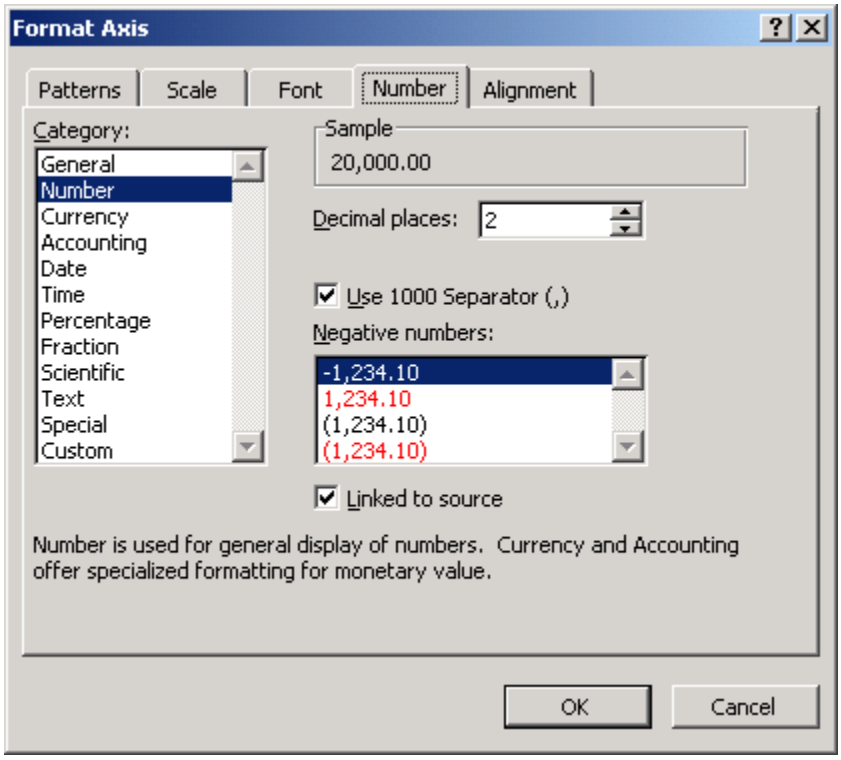




- Click **Format** on the **Chart toolbar**, or double-click the chart axis.



- The **Format Axis** dialog box contains three tabs—Patterns, Font, and Alignment—that can be used to format the chart title.
- The **Patterns** tab lets you define borders and tick marks.
- The **Scale** tab lets you define numeric intervals on the value (Y) axis scale.
- The **Font** tab lets you define font, font style, size, and color.
- The **Number** tab lets you define the format of numbers displayed in the axis.
- The **Alignment** tabs let you define text orientation.



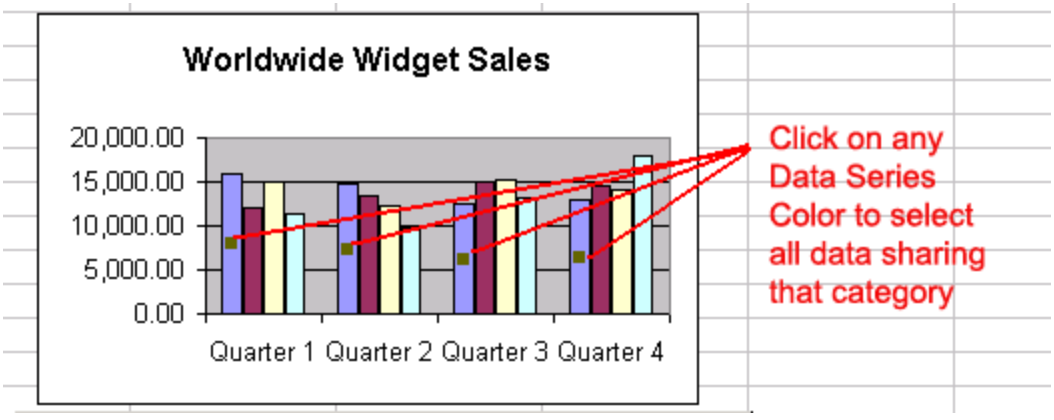
- Click **OK** to accept the axis format changes.

D. Changing the data series color

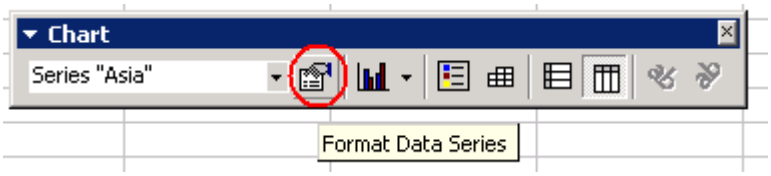
When a chart is created in Excel XP, you'll notice that color is automatically applied to the **data series**. You can keep this format or change it for each data series in the chart. Various aspects of each data series can be changed, but you'll probably change the color of bars, columns, pie slices, and areas most often.

To change the color of a data series

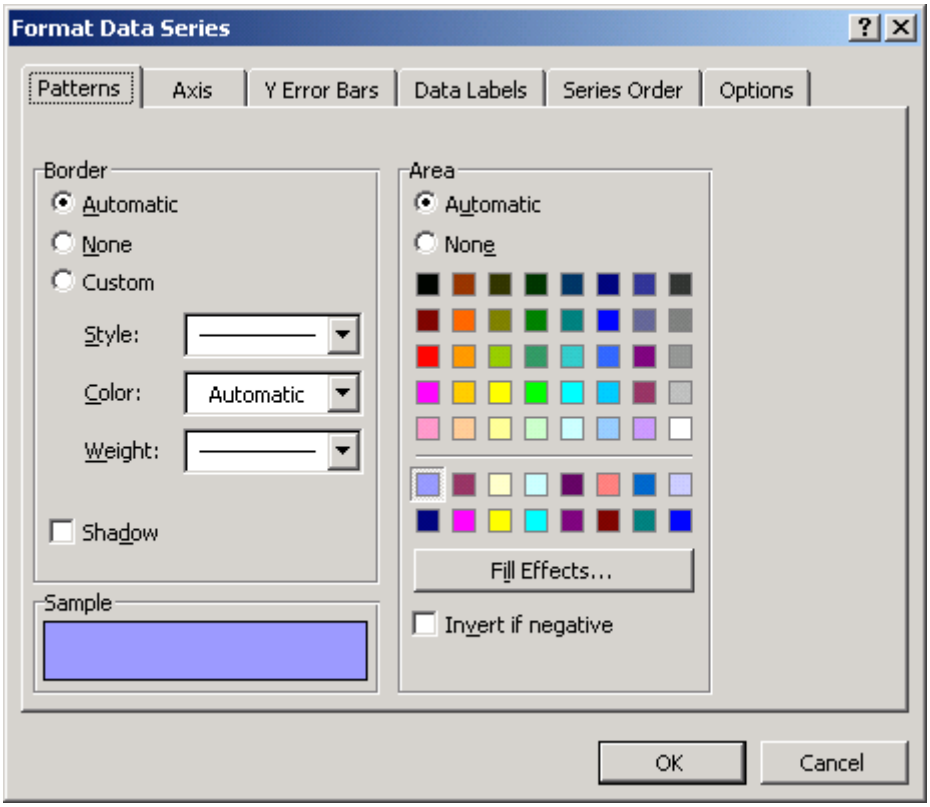
- Select the data series you want to edit.



- Click **Format** on the **Chart toolbar**, or double-click the data series.



- Use the **Format Data Series** dialog box to select a new color.



- Click **OK** to accept the data series color changes.

Self-Check Sheet - 3: Making Charts

1. Which of the following is NOT a step mentioned in creating a chart in Excel covered in the information sheet?

a) Selecting the data you want to represent

b) Highlighting the entire worksheet

c) Clicking on the Insert tab

d) Choosing the desired chart type

2. According to the passage, when is a pie chart most suitable for use?

a) To compare values across categories

b) To visualize trends over time

c) To show parts of a whole and their percentages

d) To highlight different data types in one chart

3. What can be formatted using the Font tab in the formatting options for charts in Excel?

a) Data values displayed on the chart

b) The chart borders

c) The background color of the chart area

d) Text elements like the title, legend, and axis labels

4. Which of the following is the main purpose of formatting a chart?

a) To change the underlying data in the worksheet

b) To improve the readability and visual appeal of the chart

c) To calculate statistical functions on the data

d) To insert additional data series into the chart

5. In the context of charts, what does the X-axis typically represent?

a) The chart title

b) The data labels for each data point

c) The categories or groups being compared

d) The values or quantities being measured

6. Based on the information sheet, which chart type would be best suited to show sales figures for each month of the year?

a) Pie Chart

b) Bar Chart

c) Column Chart

d) Line Chart

Answer Key - 3: Making Charts

1. Which of the following is NOT a step mentioned in creating a chart in Excel covered in the information sheet?

a) Selecting the data you want to represent

b) Highlighting the entire worksheet

c) Clicking on the Insert tab

d) Choosing the desired chart type

Answer: b) Highlighting the entire worksheet

2. According to the passage, when is a pie chart most suitable for use?

a) To compare values across categories

b) To visualize trends over time

c) To show parts of a whole and their percentages

d) To highlight different data types in one chart

Answer: c) To show parts of a whole and their percentages

3. What can be formatted using the Font tab in the formatting options for charts in Excel?

a) Data values displayed on the chart

b) The chart borders

c) The background color of the chart area

d) Text elements like the title, legend, and axis labels

Answer: d) Text elements like the title, legend, and axis labels

4. Which of the following is the main purpose of formatting a chart?

a) To change the underlying data in the worksheet

b) To improve the readability and visual appeal of the chart

c) To calculate statistical functions on the data

d) To insert additional data series into the chart

Answer: b) To improve the readability and visual appeal of the chart

5. In the context of charts, what does the X-axis typically represent?

a) The chart title
b) The data labels for each data point
c) The categories or groups being compared
d) The values or quantities being measured

Answer: c) The categories or groups being compared

6. Based on the information sheet, which chart type would be best suited to show sales figures for each month of the year?

a) Pie Chart
b) Bar Chart
c) Column Chart
d) Line Chart

Answer: d) Line Chart

Job Sheet-3: Create a worksheet using Charts

Working Procedure:

1. Data Source: Use the provided sample data table below.

Sample Data Table:

Month	Sales (Units)	Revenue	Website Visits	Average Rating
Jan	120	$1200	1000	4.2
Feb	80	$900	800	4.5
Mar	150	$1500	1200	4.8
Apr	90	$1080	900	4.3
May	100	$1100	1100	4.7

2. Chart Types: This section will explore various chart types to understand their strengths in data visualization.

2.1 Pie Chart:

- Create a pie chart to visualize the distribution of sales (units) across the months.
- Label each pie slice with the month and corresponding sales percentage.

2.2 Bar Chart:

- Create a stacked bar chart to compare sales (units) and revenue for each month.
- Label each data series clearly (sales and revenue) and the X-axis with months.

2.3 Line Chart:

- Create a line chart to track website visits over time (months).
- Label the X-axis with months and the Y-axis with website visits.
- Consider adding data points to the line for a clearer visual representation.

3. Chart Formatting:

- Customize the appearance of your charts:
    - Add a descriptive chart title for each chart.
    - Change color schemes for each chart (consider color-blind friendly options).
    - Format chart axes (labels, font size, gridlines, etc.).
    - Add data labels to display specific values within the charts (optional).

1. Identify key steps involved in the task revision and update process, aligning with the existing flowchart or established procedures.
2. Include clear and concise instructions for each step, using action verbs.
3. Consider incorporating optional steps based on specific project needs (e.g., seeking external approvals for major revisions).
4. Organize the checklist in a logical sequence, reflecting the natural flow of the revision and update process.
5. Utilize bullet points and checkboxes for easy completion tracking.
6. Group related steps under subheadings or sections for better readability.
7. Use straightforward language that is easy to understand by individuals with varying levels of project management experience.
8. Avoid technical jargon or overly complex sentence structures.
9. Ensure each checklist item is specific and actionable.
10. Design the checklist to be adaptable across different project types and complexities.
11. Consider including notes or comments sections for adding project-specific details.

Specification Sheet-3: Create a worksheet using Charts

Necessary Tools

Sl. No	Name of Tools	Specification	Unit	Quantity
3				

Necessary Equipment

Sl. No	Name of Equipment	Specification	Unit	Quantity
5.	Computer	As Need	No.	01
6.	Spreadsheet Software	As Need	No.	01

Learning Outcome 4: Create table and PIVOT

Assessment Criteria	1. Able to access data according to client requirements. 2. Able to format data into a table. 3. Able to design a pivot report according to requirements. 4. Able to submit the report to the client
Conditions and Resources	1. Real or simulated workplace 2. CBLM 3. Handouts 4. Laptop 5. Multimedia Projector 6. Paper, Pen, Pencil, Eraser 7. Internet facilities 8. White board and marker 9. Audio Video Device
Contents	1. Accessing data according to client requirements 2. Formatting data into a table 3. Designing a pivot report according to requirements 4. Submitting the report to the client
Activities/job/Task	1. Create a Sample PivotTable in Excel
Training Methods	1. Discussion 2. Presentation 3. Demonstration 4. Guided Practice 5. Individual Practice 6. Project Work 7. Problem Solving 8. Brainstorming
Assessment Methods	1. Written Test 2. Demonstration 3. Oral Questioning 4. Portfolio

Learning Experience 4: Create table and PIVOT

In order to achieve the objectives stated in this learning guide, you must perform the learning steps below. Beside each step are the resources or special instructions you will use to accomplish the corresponding activity.

Learning Activities	Recourses/Special Instructions
1. Trainee will ask the instructor about about the learning materials	1. Instructor will provide the learning materials 'Create table and PIVOT'
2. Read the Information sheet and complete the Self Checks & Check answer sheets on "Perform Tasks"	2. Read Information sheet 4**:** Create table and PIVOT 3. Answer Self-check 4**:** Create table and PIVOT 4. Check your answer with Answer key 4**:** Create table and PIVOT
3. Read the Job/Task Sheet and Specification Sheet and perform job/Task	5. Job/Task Sheet and Specification Sheet Job Sheet-4**:** Create a Sample PivotTable in Excel

Information Sheet 4: Create table and PIVOT

Learning Objective:

After completion of this information sheet, the learners will be able to explain, define and interpret the following contents**:**

4.1. Access Data
4.2. Format data into a table.
4.3. Design a pivot report according to requirements.
4.4. Submit the report to the client

4.1. Access data

You might be under the impression that the data in your worksheet is already in a table simply because it's organized in rows and columns. However, the data in a tabular format is not a true "table" unless you've specifically made it such.

Excel table is a special object that works as a whole and allows you to manage the table's contents independently from the rest of the worksheet data.

The screenshot below contrasts a regular range and the table format

Range

Region	Jan	Feb	Mar
East	$100	$150	$130
West	$200	$260	$150
South	$130	$160	$90
North	$270	$250	$180
Total	**$700**	**$820**	**$550**

Excel table

Region	Jan	Feb	Mar
East	$100	$150	$130
West	$200	$260	$150
South	$130	$160	$90
North	$270	$250	$180
Total	$700	$820	$550

The most obvious difference is that the table is styled. However, an Excel table is far more than a range of formatted data with headings. There are many powerful features inside

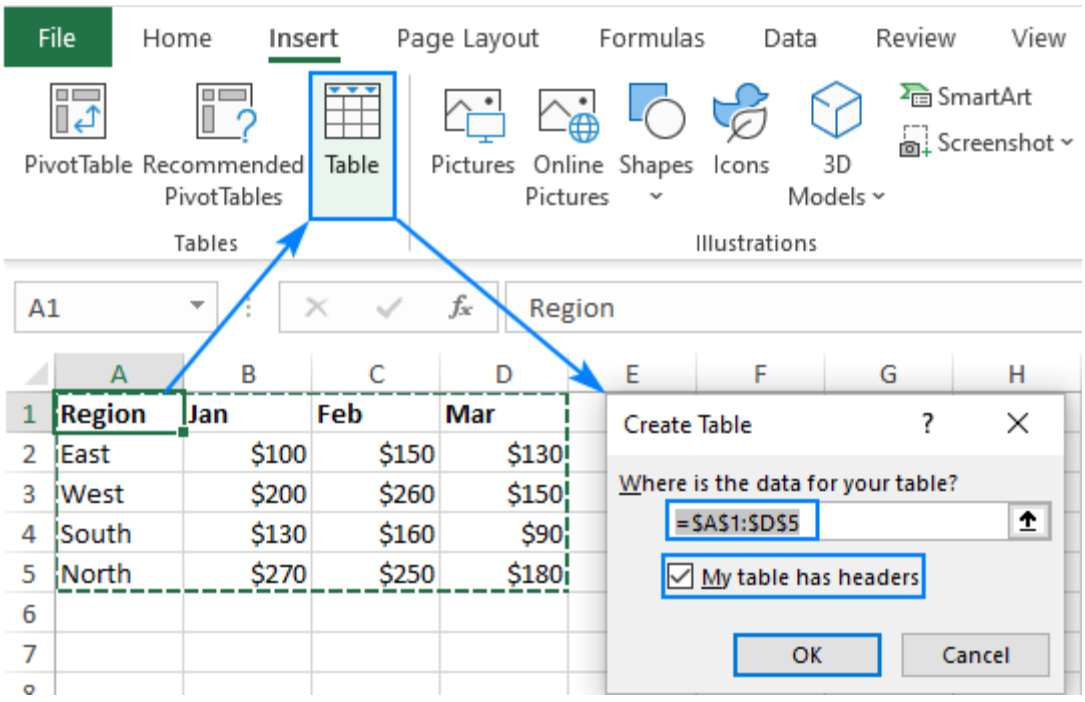
- Excel tables are **dynamic** by nature, meaning they expand and contract automatically as you add or remove rows and columns.
- Integrated **sort** and **filter** options; visual filtering with **slicers**.
- **Easy formatting** with inbuilt table styles.
- **Column headings** remain visible while scrolling.

- **Quick totals** allow you to sum and count data as well as find average, min or max value in a click.
- **Calculated columns** allow you to compute an entire column by entering a formula in one cell.
- **Easy-to-read formulas** due to a special syntax that uses table and column names rather than cell references.
- **Dynamic charts** adjust automatically as you add or remove data in a table.

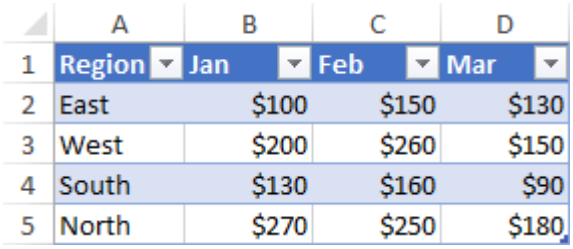
A. How to create a table in Excel

With the source data organized in rows and columns, carry out the below steps to covert a range of cells into a table

1. Select any cell within your data set.
2. On the *Insert* tab, in the *Tables* group, click the **Table** button or press the Ctrl + T shortcut.
3. The *Create Table* dialog box appears with all the data selected for you automatically; you can adjust the range if needed. If you want the first row of data to become the table headers, make sure the **My table has headers** box is selected.
4. Click *OK*.



As the result, Excel converts your range of data into a true table with the default style



	A	B	C	D
1	Region	Jan	Feb	Mar
2	East	$100	$150	$130
3	West	$200	$260	$150
4	South	$130	$160	$90
5	North	$270	$250	$180

Many wonderful features are now just a click away and, in a moment, you will learn how to use them. But first, we'll look at how to make a table with a specific style.

Tips and notes

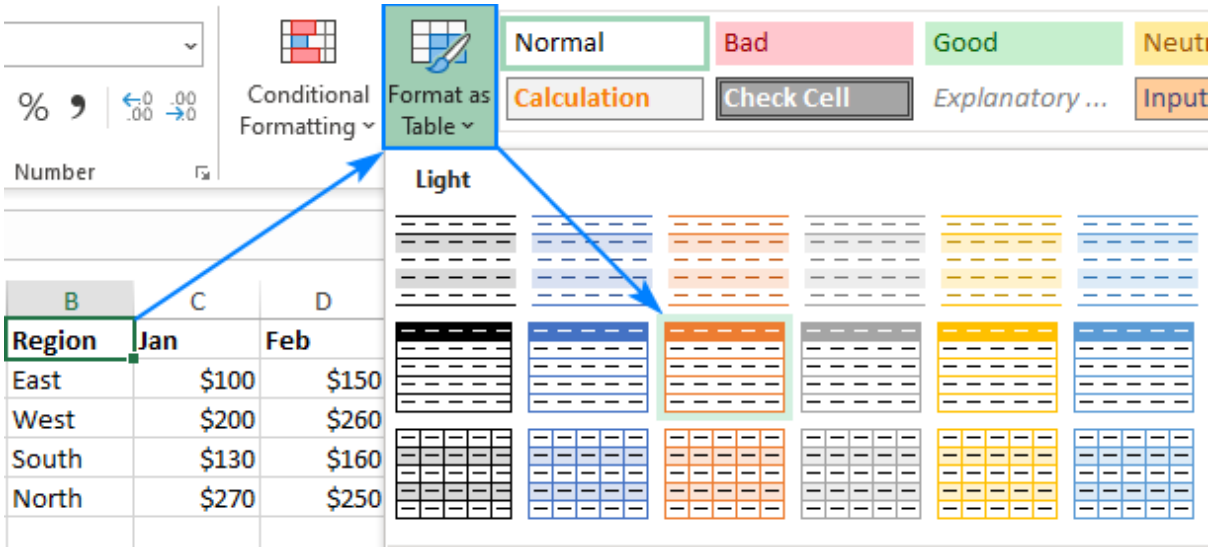
- Prepare and clean your data before creating a table**:** remove blank rows, give each column a unique meaningful name, and make sure each row contains information about one record.
- When a table is inserted, Excel retains all formatting that you currently have. For best results, you may want to remove some of the existing formatting, e.g. background colors, so it does not conflict with a table style.
- You are not limited to just one table per sheet, you can have as many as needed. For better readability, it stands to reason to insert at least one blank row and one blank column between a table and other data.

4.2. Format data into a table.

A. How to make a table with a selected style

The previous example showed the fastest way to create a table in Excel, but it always uses the default style. To draw a table with the style of your choosing, perform these steps

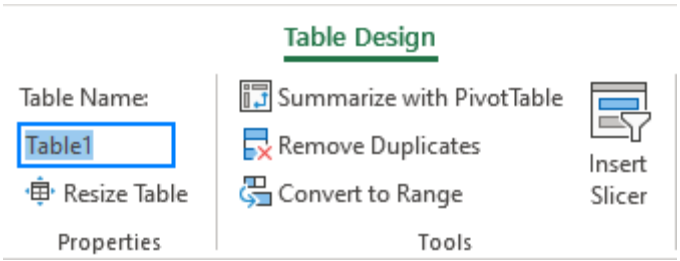
1. Select any cell in your data set.
2. On the *Home* tab, in the *Styles* group, click **Format as Table**.
3. In the gallery, click on the style you want to use.
4. In the *Create Table* dialog box, adjust the range if necessary, check the *My table has headers* box, and click *OK*.



B. How to name a table in Excel

Every time you make a table in Excel, it automatically gets a default name such as*Table1*, *Table2*, etc. When you deal with multiple tables, changing the default names to something more meaningful and descriptive can make your work a lot easier.
To rename a table, just do the following

1. Select any cell in the table.
2. On the *Table Design* tab, in the *Properties* group, select the existing name in the **Table Name** box, and overwrite it with a new one.



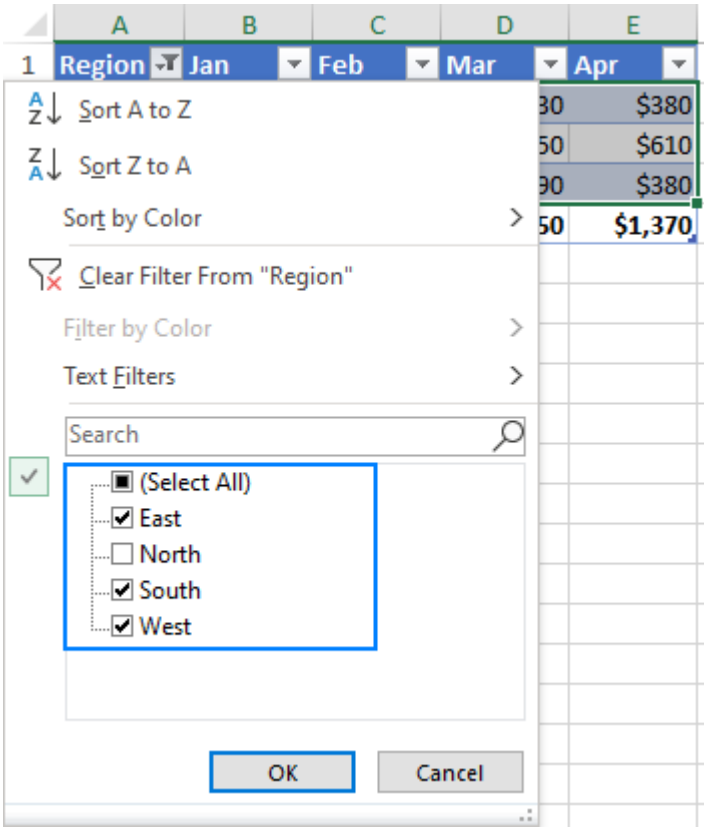
C. How to use tables in Excel

Excel tables have many awesome features that simply calculating, manipulating and updating data in your worksheets. Most of these features are intuitive and straightforward. Below you will find a quick overview of the most important ones.

D. How to filter a table in Excel

All tables get the auto-filter capabilities by default. To filter the table's data, this is what you need to do

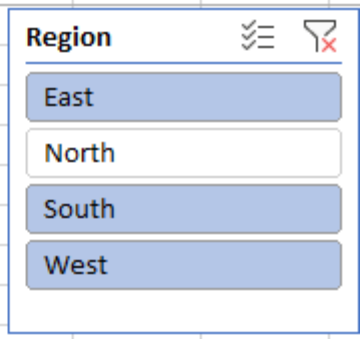
1. Click the drop-down arrow in the column header.
2. Uncheck the boxes next to the data you want to filter out. Or uncheck the *Select All* box to deselect all the data, and then check the boxes next to the data you want to show.
3. Optionally, you can use the Filter by Color and Text Filters options where appropriate.
4. Click *OK*.



If you don't need the auto-filter feature, you can **remove the arrows** by unchecking the *Filter Button* box on the *Design* tab, in the *Table Style Options* group. Or you can toggle the filter buttons on and off with the Ctrl + Shift + L shortcut.

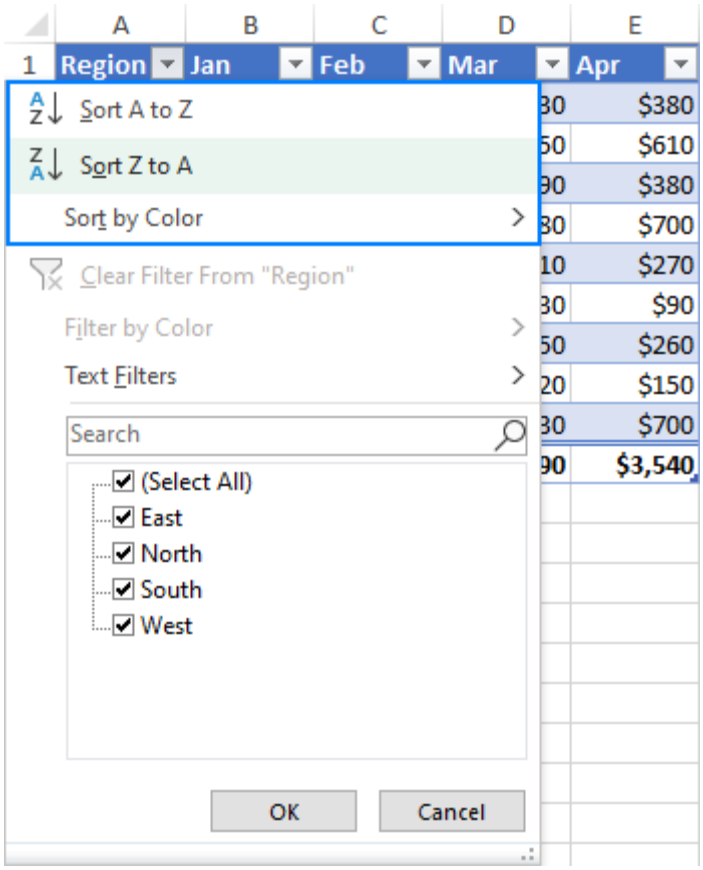
Additionally, you can create a visual filter for your table by adding a slicer. For this, click *Insert Slicer* on the *Table Design* tab, in the *Tools* group.

	A	B	C	D	E
1	Region	Jan	Feb	Mar	Apr
2	East	$100	$150	$130	$380
3	West	$200	$260	$150	$610
4	South	$130	$160	$90	$380
6	East	$150	$150	$610	$270
7	West	$100	$380	$130	$90
8	South	$200	$380	$250	$260
9	West	$120	$380	$220	$150
11	**Total**	**$1,000**	**$1,860**	**$1,580**	**$2,140**



E. How to sort a table in Excel

To sort a table by a specific column, just click the drop-down arrow in the heading cell, and pick the required sorting option

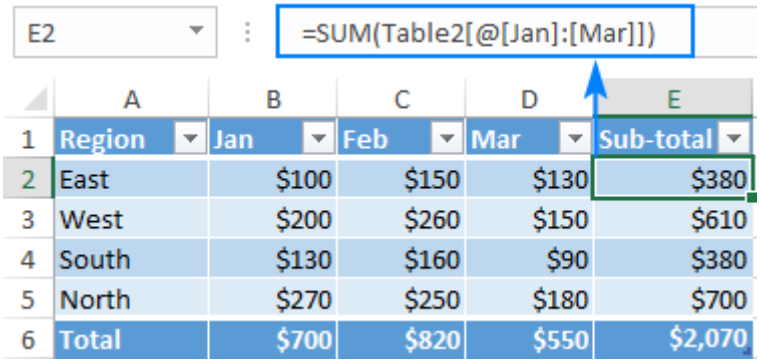


F. Excel table formulas

For calculating the table data, Excel uses a special formula syntax called structured references. Compared to regular formulas, they have a number of advantages

- **Easy-to-create**. Simply select the table's data when making a formula, and Excel will build a structured reference for you automatically.
- **Easy-to-read**. Structured references refer to the table parts by name, which makes formulas easier to understand.
- **Auto-filled**. To perform the same calculation in each row, enter a formula in any single cell, and it will be immediately copied throughout the column.
- **Changed automatically**. When you modify a formula anywhere in a column, the other formulas in the same column will change accordingly.
- **Updated automatically.** Every time the table is resized or the columns renamed, structured references update dynamically.

The screenshot below shows an example of a structured reference that sums data in each row



Sum table columns

Another great feature of an Excel table is the ability to summarize data without formulas. This option is called **Total Row.**

To sum a table's data, this is what you need to do**:**

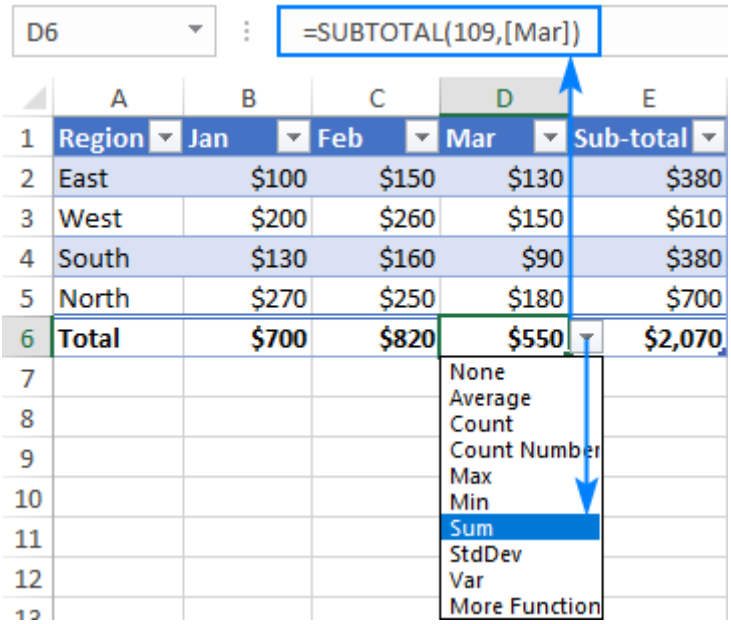
1. Select any cell in the table.
2. On the *Design* tab, in the *Table Style Options* group, put a tick mark in the *Total Row box*.

The *Total* row is inserted at the bottom of the table and shows the total in the last column**:**

Region	Jan	Feb	Mar	Sub-total
East	$100	$150	$130	$380
West	$200	$260	$150	$610
South	$130	$160	$90	$380
North	$270	$250	$180	$700
Total				**$2,070**

To sum data in other columns, click in the *Total* cell, then click the drop-down arrow and choose the SUM function. To calculate data in a different way, e.g. count or average, select the corresponding function.

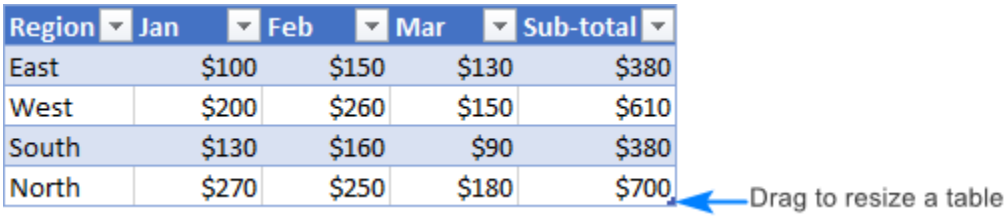
Whatever operation you choose, Excel would use the SUBTOTAL function that calculates data only in **visible rows**



How to extend a table in Excel

When you type anything in an adjacent cell, an Excel table **expands automatically** to include the new data. Combined with structured references, this creates a dynamic range for your formulas without any effort from your side. If you don't mean the new data to be part of the table, press Ctrl + Z. This will undo the table expansion but keep the data that you typed.

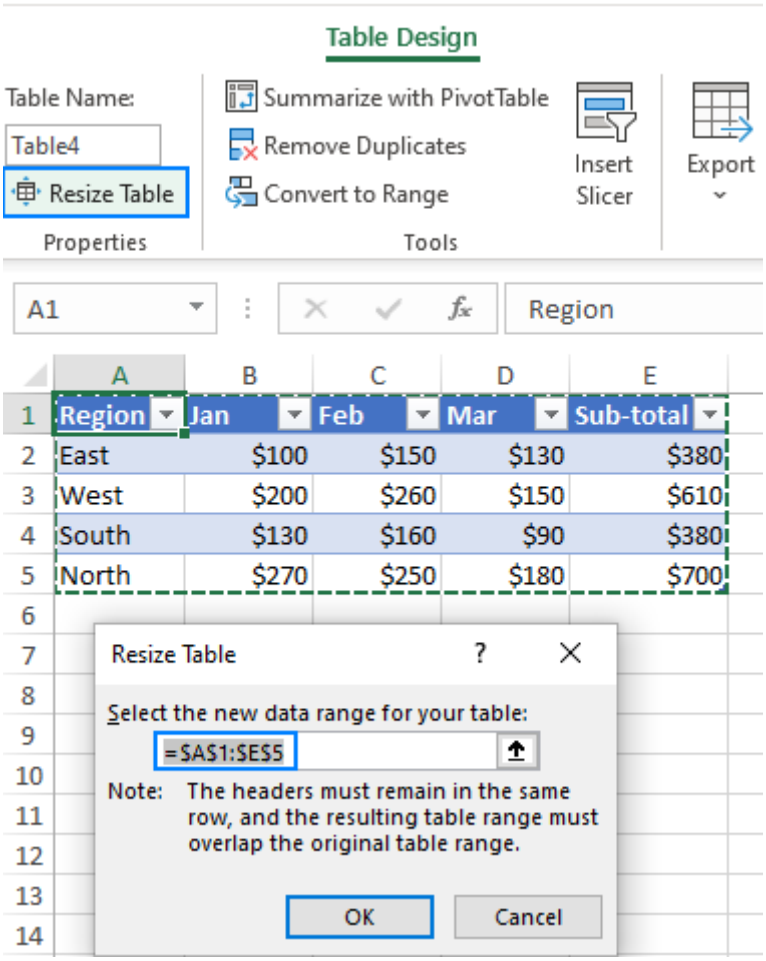
You can also **extend a table** manually by dragging a little handle at the bottom-right corner.



You can also add and remove columns and rows by using the **Resize Table** command. Here's how

1. Click anywhere in your table.
2. On the *Design* tab, in the *Properties* group, click **Resize Table**.
3. When the dialog box appears, select the range to be included in the table.

4. Click *OK*.



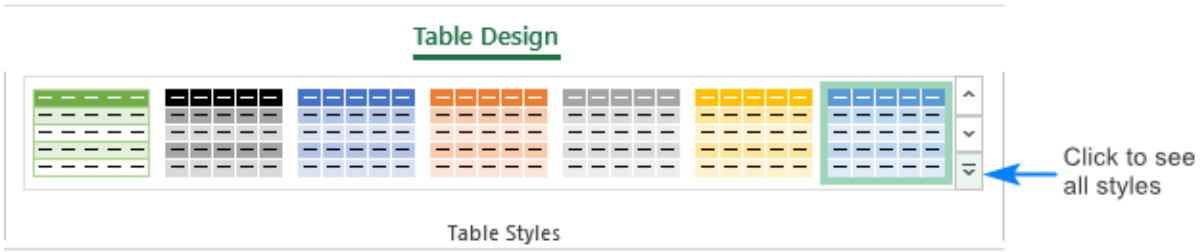
Excel table styles

Tables are very easily formatted due to a predefined gallery of styles. Additionally, you can create a custom style with your own formatting.

How to change table style

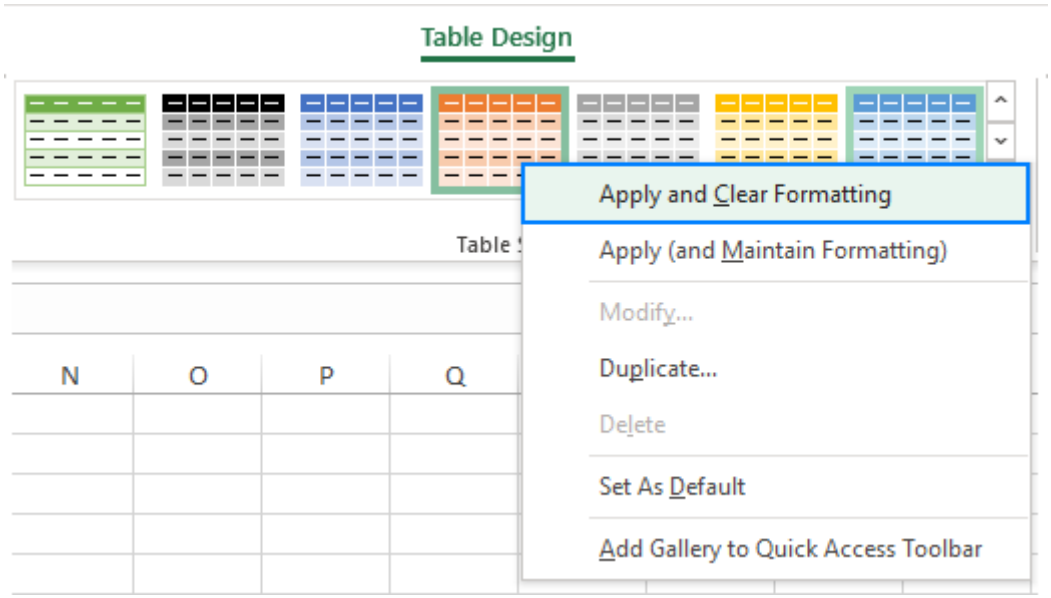
When you insert a table in Excel, the default style is automatically applied to it. To change a table style, do the following

1. Select any cell in the table.
2. On the *Design* tab, in the *Table Styles* group, click on the style you want to apply. To see all the styles, click the *More* button in the down-right corner.



Apply a table style and remove existing formatting

When you format a table with any predefined style, Excel preserves the formatting you already have. To remove any existing formatting, right-click the style and choose **Apply and Clear formatting**



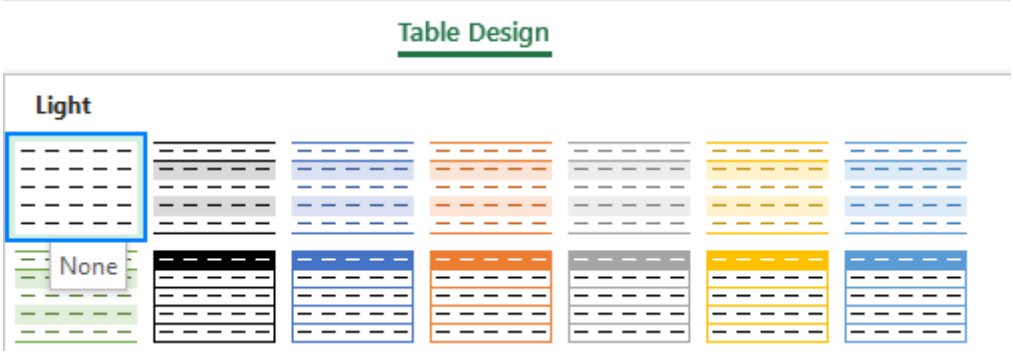
Manage banded rows and columns

To add or remove banded rows and columns as well as apply special formatting for the first or last column, simply tick or untick the corresponding checkbox on the *Design* tab in the *Table Style Options* group

How to remove table formatting

If you'd like to have all the functionality of an Excel table but do not want any formatting such as banded rows, table borders and the like, you can remove formatting in this way

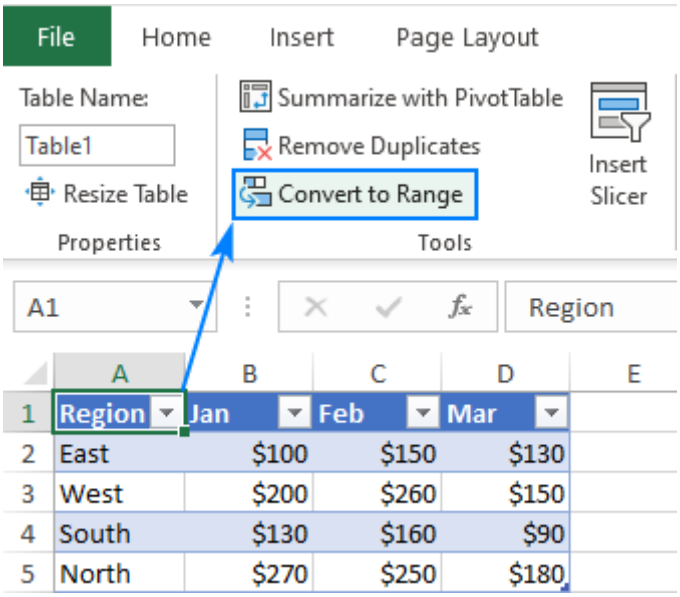
1. Select any cell within your table.
2. On the *Design tab*, in the *Table Styles* group, click the *More* button in the bottom-right corner, and then click **Clear** underneath the table style templates. Or pick the first style under *Light*, which is called **None**.



How to remove table in Excel

Removing a table is as easy as inserting it. To convert a table back to a range, just do the following**:**

1. Right-click any cell in your table, and then click *Table> Convert to Range*. Or click the **Convert to Range** button on the *Design* tab, in the *Tools* group.
2. In the dialog box that appear, click *Yes*



This will remove the table but retain all the data and formatting. To keep only the data, remove table formatting before converting your table to a range.

4.3. 4.3 and 4.4 Create PIVOT Table and Format for Reporting

What is a Pivot Table in Excel?

An Excel *Pivot Table* is a tool to explore and summarize large amounts of data, analyze related totals and present summary reports designed to

- Present large amounts of data in a user-friendly way.
- Summarize data by categories and subcategories.
- Filter, group, sort and conditionally format different subsets of data so that you can focus on the most relevant information.
- Rotate rows to columns or columns to rows (which is called "pivoting") to view different summaries of the source data.
- Subtotal and aggregate numeric data in the spreadsheet.
- Expand or collapse the levels of data and drill down to see the details behind any total.
- Present concise and attractive online of your data or printed reports.

For example, you may have hundreds of entries in your worksheet with sales figures of local resellers

	A	B	C	D
1	Product	Reseller	Month	Sales
2	Cherries	John	Oct	$250
3	Bananas	Mike	Nov	$200
4	Apples	Pete	Oct	$180
5	Oranges	Mike	Nov	$400
6	Bananas	Sally	Oct	$250
7	Apples	Mike	Oct	$120
8	Cherries	Sally	Sep	$330
9	Apples	Pete	Oct	$110
10	Cherries	Mike	Sep	$250

One possible way to sum this long list of numbers by one or several conditions is to use formulas as demonstrated in SUMIF and SUMIFS tutorials. However, if you want to compare several facts about each figure, using a Pivot Table is a far more efficient way. In just a few mouse clicks, you can get a resilient and

easily customizable summary table that totals the numbers by any field you want.

Pivot Table 1

Sales				
	Sep	Oct	Nov	Total
Apples	**250**	**590**		**840**
John		180		180
Mike		120		120
Pete		290		290
Sally	250			250
Bananas		**430**	**600**	**1030**
John			400	400
Mike			200	200
Pete		180		180
Sally		250		250
Cherries	**580**	**910**		**1490**
John		250		250
Mike	250	330		580
Pete		330		330
Sally	330			330
Oranges		**120**	**720**	**840**
John			120	120
Mike			400	400
Pete		120		120
Sally			200	200
Total	**830**	**2050**	**1320**	**4200**

Pivot Table 2

Month	(All)				
Sales	Product				
Reseller	Apples	Bananas	Cherries	Oranges	Total
John	$180	$400	$250	$120	$950
Mike	$120	$200	$580	$400	$1,300
Pete	$290	$180	$330	$120	$920
Sally	$250	$250	$330	$200	$1,030
Total	**$840**	**$1,030**	**$1,490**	**$840**	**$4,200**

Pivot Table 3

Product	(All)			
Sales	Month			
Reseller	Sep	Oct	Nov	Total
John		$430	$520	$950
Mike	$250	$450	$600	$1,300
Pete		$920		$920
Sally	$580	$250	$200	$1,030
Total	**$830**	**$2,050**	**$1,320**	**$4,200**

The screenshots above demonstrate just a few of many possible layouts. And the steps below show how you can quickly create your own Pivot Table in all versions of Excel.

How to make a Pivot Table in Excel

Many people think that creating a Pivot Table is burdensome and time-consuming. But this is not true! Microsoft has been refining the technology for many years, and in the modern versions of Excel, the summary reports are user-friendly are incredibly fast. In fact, you can build your own summary table in just a couple of minutes. And here's how**:**

1. Organize your source data

Before creating a summary report, organize your data into rows and columns, and then convert your data range in to an Excel Table. To do this, select all of the data, go to the *Insert* tab and click **Table**.

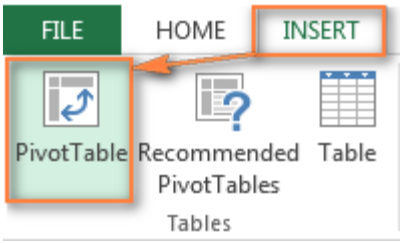
Using an Excel Table for the source data gives you a very nice benefit - your data range becomes "dynamic". In this context, a dynamic range means that your table will automatically expand and shrink as you add or remove entries, so won't have to worry that your Pivot Table is missing the latest data.

Useful tips

- Add unique, meaningful headings to your columns, they will turn into the field names later.
- Make sure your source table contains no blank rows or columns, and no subtotals.
- To make it easier to maintain your table, you can name your source table by switching to the *Design* tab and typing the name in the **Table Name** box the upper right corner of your worksheet.

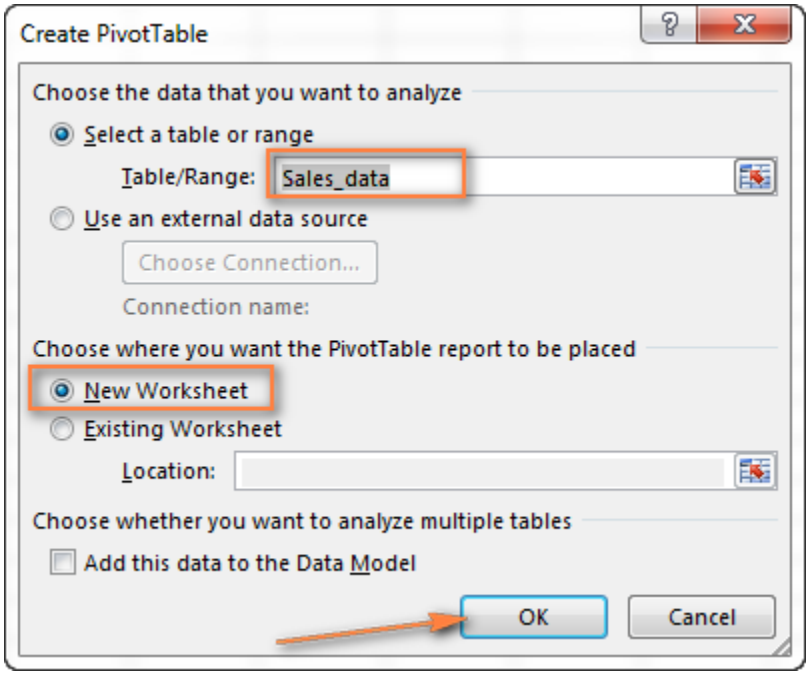
Create a Pivot Table

Select any cell in the source data table, and then go to the *Insert* tab > *Tables* group > *PivotTable*.

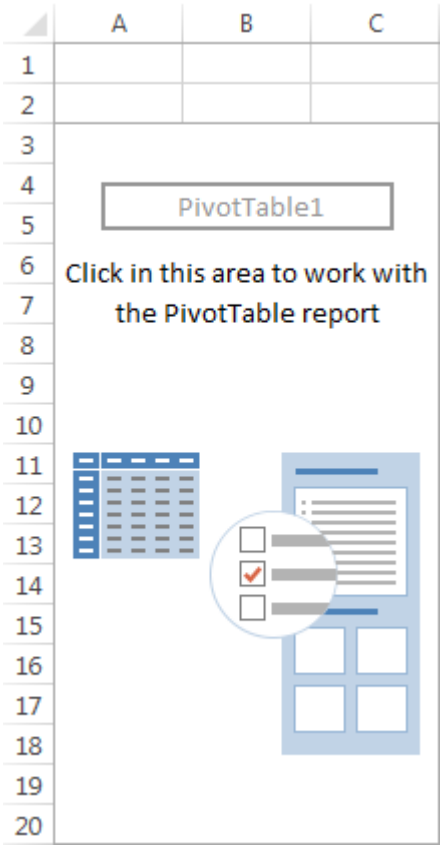


This will open the *Create PivotTable* window. Make sure the correct table or range of cells is highlighted in the *Table/Range* field. Then choose the target location for your Excel Pivot Table**:**

- Selecting **New Worksheet** will place a table in a new worksheet starting at cell A1.
- Selecting **Existing Worksheet** will place your table at the specified location in an existing worksheet. In the *Location* box, click the Collapse Dialog button to choose the first cell where you want to position your table.



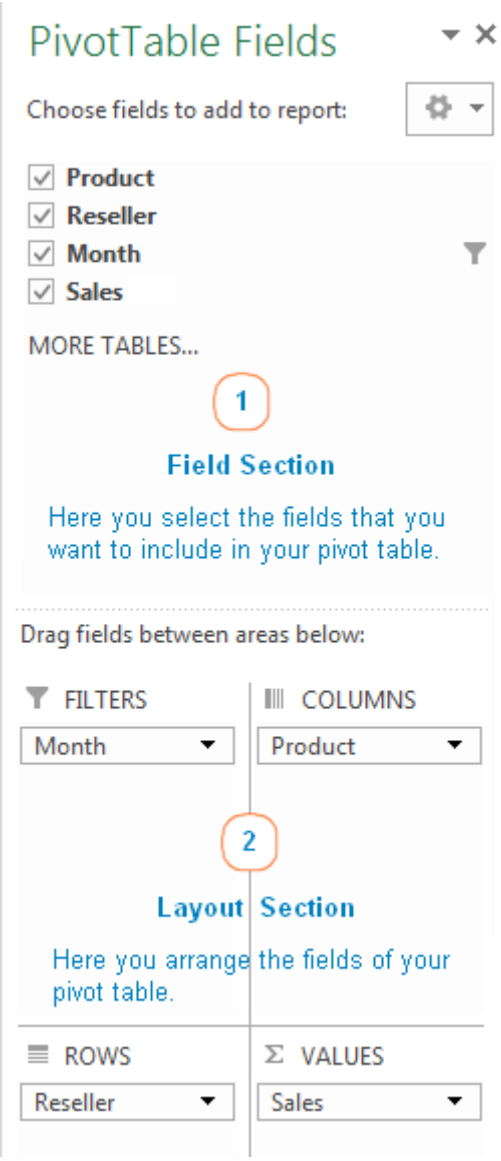
Clicking OK creates a blank Pivot Table in the target location, which will look similar to this



Arrange the layout of your Pivot Table report

The area where you work with the fields of your summary report is called **PivotTable Field List**. It is located in the right-hand part of the worksheet and divided into the header and body sections

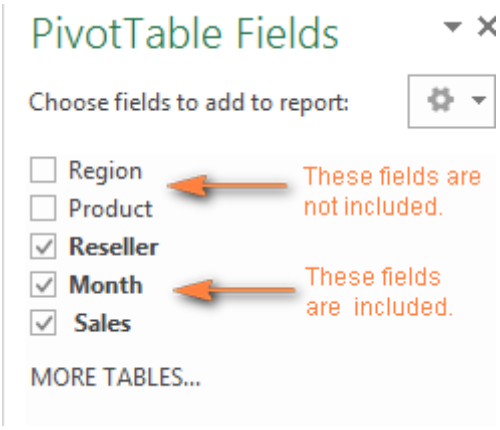
- The **Field Section** contains the names of the fields that you can add to your table. The filed names correspond to the column names of your source table.
- The **Layout Section** contains the *Report Filter* area, *Column* Labels, *Row Labels* area, and the *Values* area. Here you can arrange and re-arrange the fields of your table.



The changes that you make in the *PivotTable Field List* are immediately reflected to your table.

How to add a field to Pivot Table

To **add a field** to the *Layout* section, select the check box next to the field name in the *Field* section.



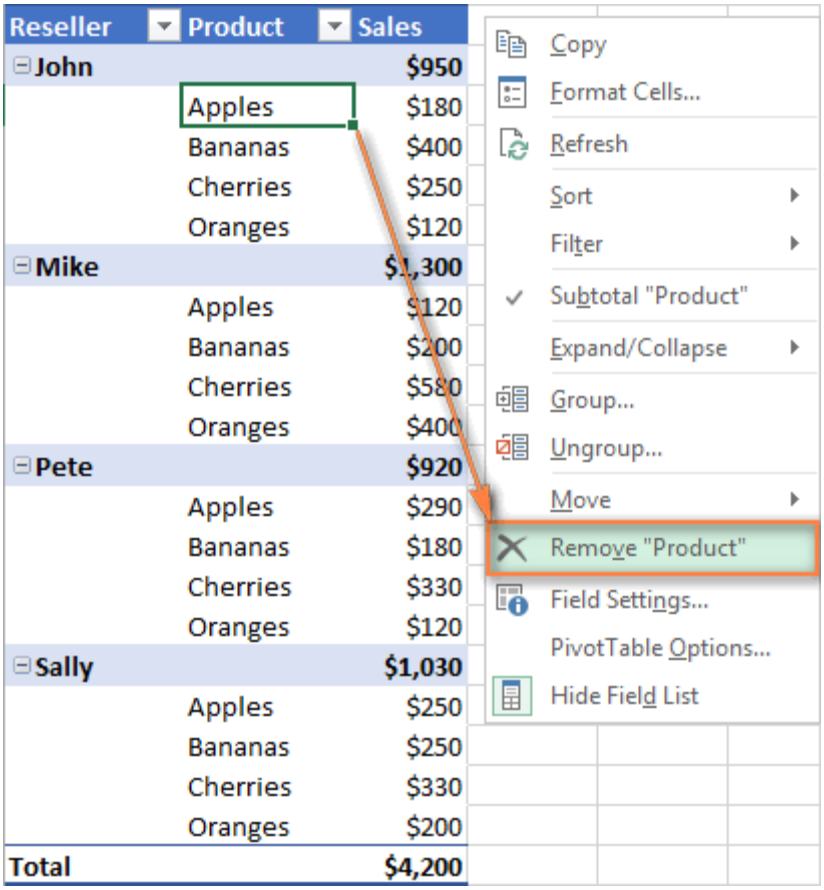
By default, Microsoft Excel adds the fields to the *Layout* section in the following way

- Non-numeric fields are added to the *Row Labels* area;
- Numeric fields are added to the *Values* area;
- Online Analytical Processing (OLAP) date and time hierarchies are added to the *Column Labels* area.

How to remove a field from a Pivot Table

To delete a certain field, you can either

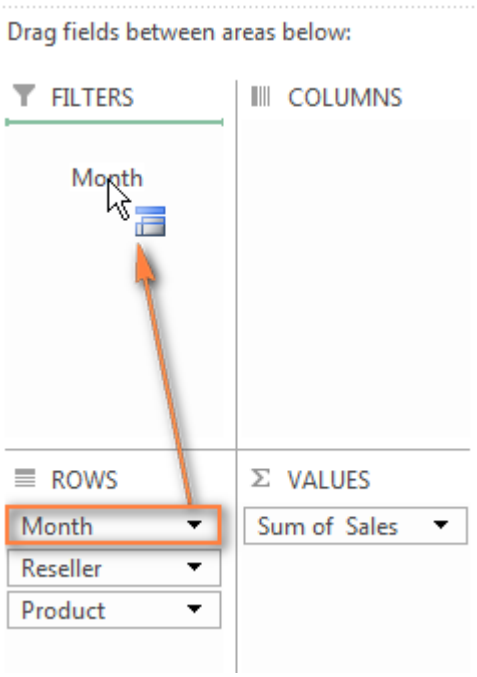
- Uncheck the box nest to the field's name in the *Field* section of the PivotTable pane.
- Right-click on the field in your Pivot Table, and then click "*Remove Field_Name*".



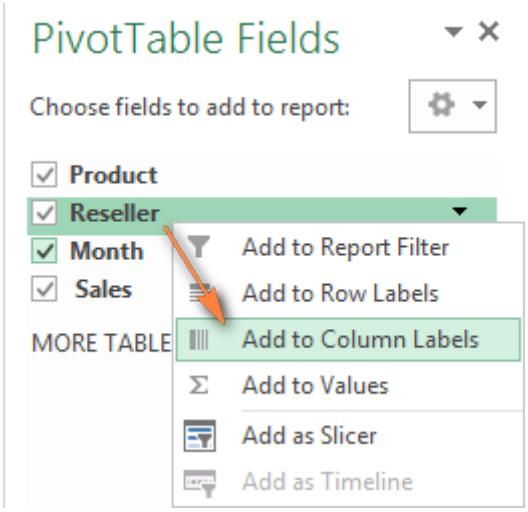
How to arrange Pivot Table fields

You can arrange the fields in the *Layout* section in three ways

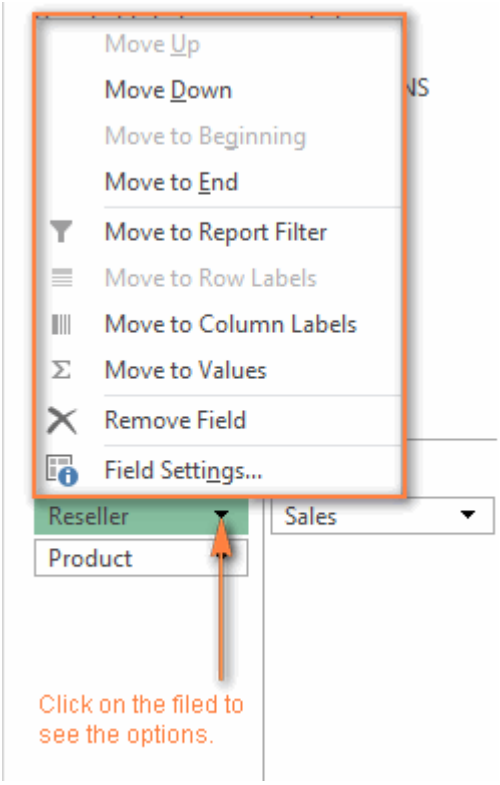
1. **Drag and drop fields** between the 4 areas of the *Layout* section using the mouse. Alternatively, click and hold the field name in the *Field* section, and then drag it to an area in the *Layout* section - this will remove the field from the current area in the *Layout* section and place it in the new area.



2. Right-click the field name in the **Field** section, and then select the area where you want to add it

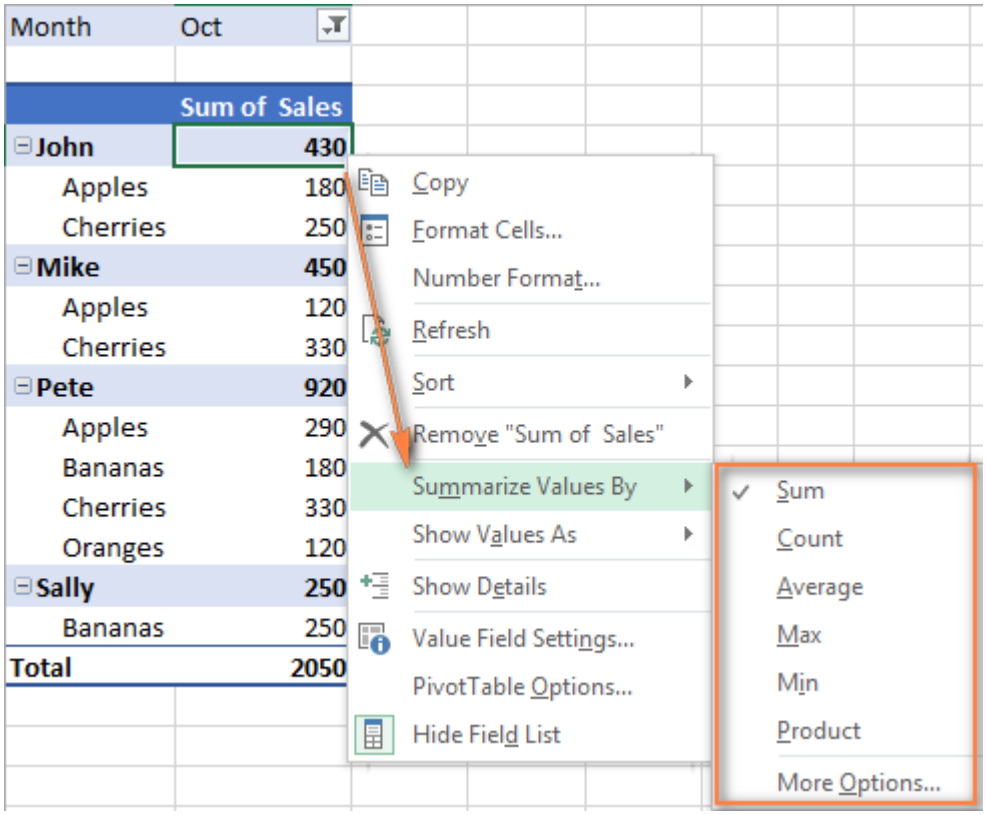


3. Click on the filed in the **Layout** section to select it. This will also display the options available for that particular field.



4. Choose summary function for Values (optional)

By default, Microsoft Excel applies the **Sum** function to numeric value fields placed in the *Values* area. Conversely, for non-numeric data (such as text, dates, or Boolean values), the **Count** function is automatically applied.
However, you are free to choose a different summary function according to your preference. For this, right-click on the value field you wish to modify, select *Summarize Values By*, and then choose the desired function from the options provided.
Below, you'll find an example of a Pivot Table utilizing the *Average*function



The functions' names are mostly self-explanatory

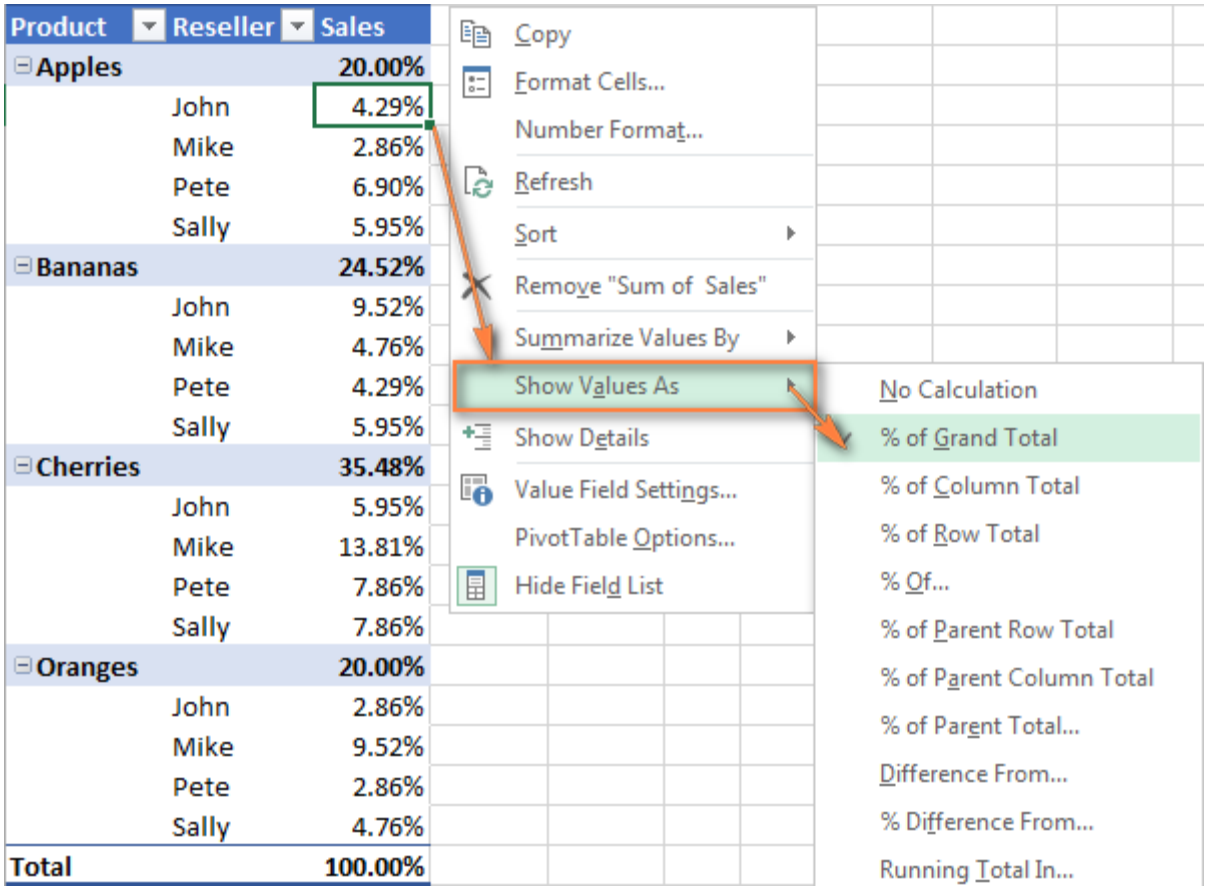
- Sum - calculates the sum of the values.
- Count - counts the number of non-empty values (works as the COUNTA function).
- Average - calculates the average of the values.
- Max - finds the largest value.
- Min - finds the smallest value.
- Product - calculates the product of the values.

To get more specific functions, click *Summarize Values By* > *More Options*….

Show different calculations in value fields (optional)

Excel Pivot Tables provide one more useful feature that enables you to present values in different ways, for example **show totals as percentage** or **rank values** from smallest to largest and vice versa.

This feature is called **Show Values As** and it's accessible by right-clicking the field in the table in Excel 2013 and higher. In Excel 2010 and lower, you can also find this option on the *Options* tab, in the *Calculations* group.

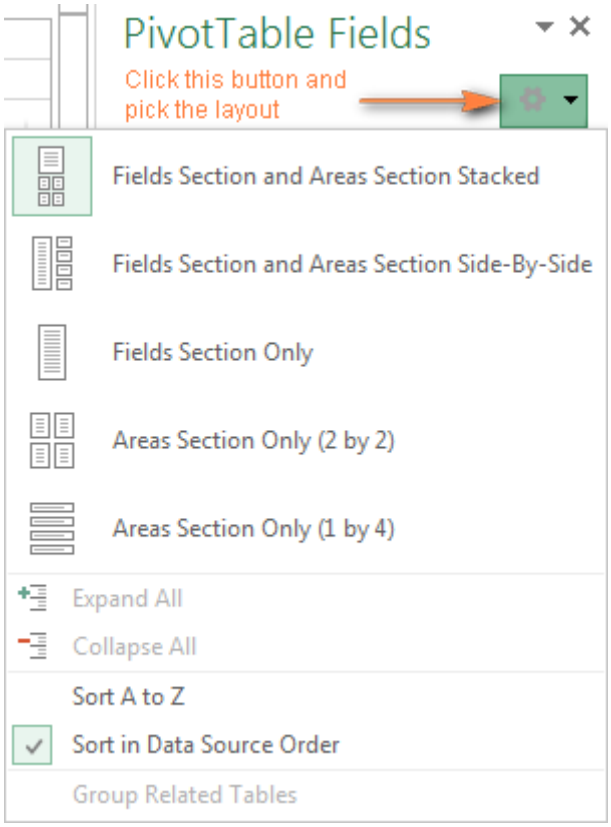


Working with PivotTable Field List

The Pivot Table pane, which is formally called **PivotTable Field List**, is the main tool that you use to arrange your summary table exactly the way you want. To make your work with the fields more comfortable, you may want to customize the pane to your liking.

Changing the Field List view

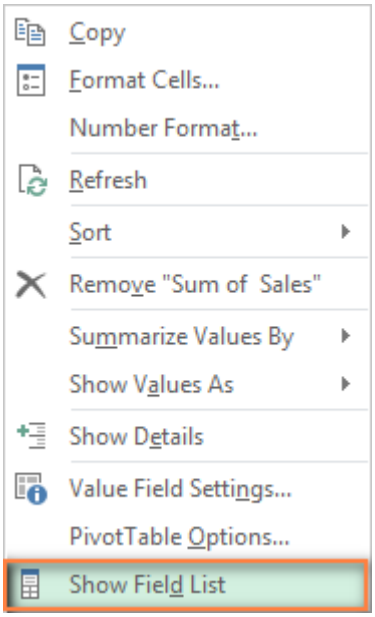
If you want to change how the sections are displayed in the *Field List*, click the **Tools** button, and choose your preferred layout.



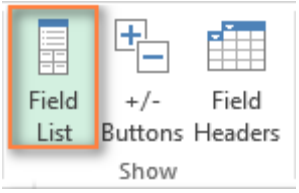
You can also **resize** the pane horizontally by dragging the bar (splitter) that separates the pane from the worksheet.

Closing and opening the PivotTable pane

Closing the *PivotTableField List* is as easy as clicking the **Close** button (X) in the top right corner of the pane.Making it to show up again is not so obvious **:)** To display the Field List again, right-click anywhere in the table, and then select **Show Field List** from the context menu.



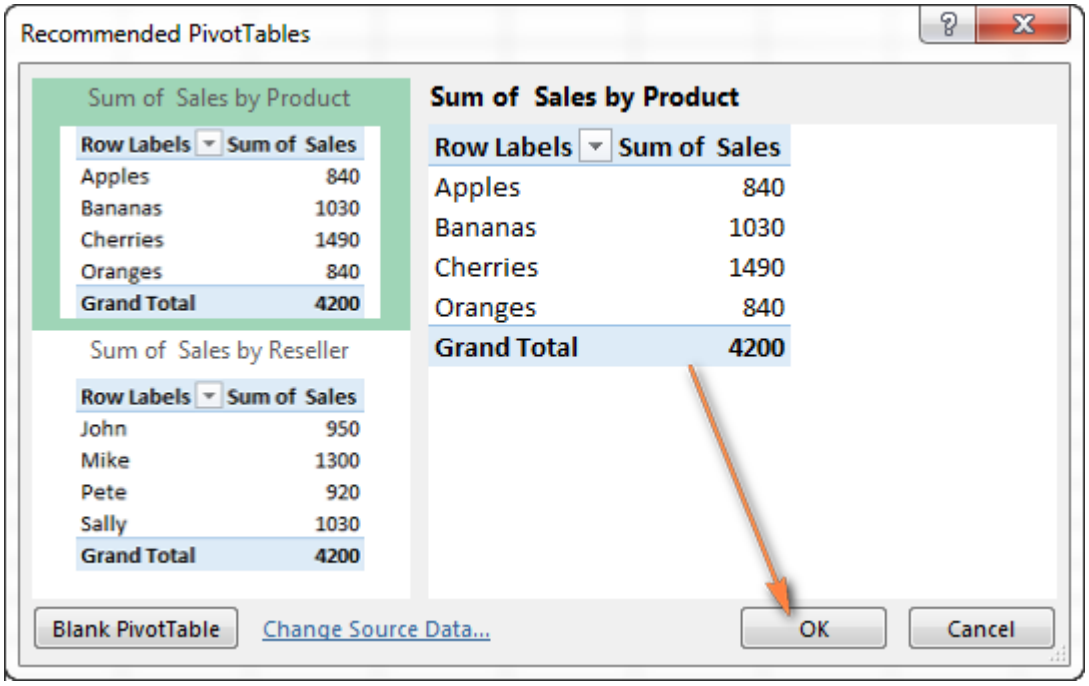
You can also click the **Field List** button on the Ribbon, which resides on the *Analyze / Options* tab, in the *Show* group.



Using Recommended PivotTables

As you have just seen, creating a Pivot Table in Excel is easy. However, the modern versions of Excel take even a step further and make it possible to automatically make a report most suited for your source data. All you have to do is 4 mouse clicks

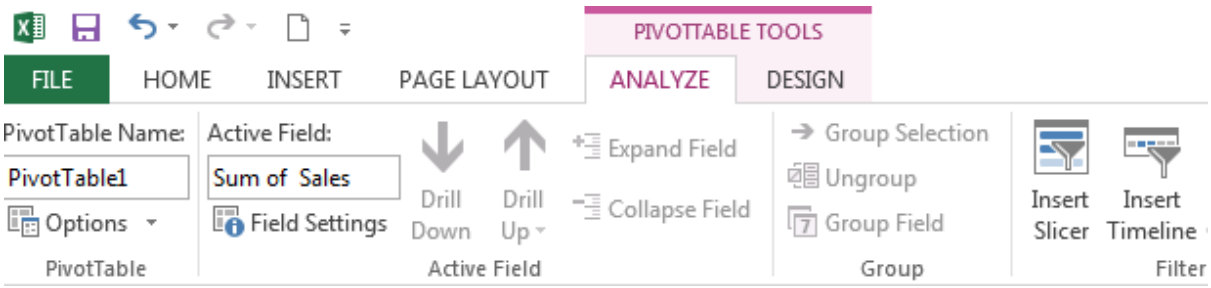
1. Click any cell in your source range of cells or table.
2. On the *Insert* tab, click **Recommended PivotTables**. Microsoft Excel will immediately display a few layouts, based on your data.
3. In the *Recommended PivotTables* dialog box, click a layout to see its preview.
4. If you are happy with the preview, click the OK button, and get a Pivot Table added to a new worksheet.



As you see in the screenshot above, Excel was able to suggest just a couple of basic layouts for my source data, which are far inferior to the Pivot Tables we created manually a moment ago. Of course, this is only my opinion and I am biased, you know **:**)
Overall, using the Recommended PivotTable is a quick way to get started, especially when you have a lot of data and are not sure where to start.

How to use Pivot Table in Excel

Now that you know the basics, you can navigate to the **Analyze** and **Design** tabs of the **PivotTable Tools** in Excel 2013 and higher, (**Options** and **Design** tabs in Excel 2010 and 2007) to explore the groups and options provided there. These tabs become available as soon as you click anywhere within your table.



You can also access options and features that are available for a specific element by right-clicking on it.

Self-Check Sheet 4: Create table and PIVOT

01. Which of the following statements about Excel tables is TRUE?

A. They can only be applied to numerical data.
B. They convert your data into a chart by default.
C. They dynamically adjust in size as you add or remove data.
D. They require a separate add-on to be installed.

02. When filtering data in an Excel table, what happens to the hidden rows?

A. They are permanently deleted from the table.
B. Their formulas are recalculated to exclude them.
C. They are visually hidden but still included in calculations.
D. They are moved to a separate sheet in the workbook.

03. Structured references in Excel tables offer which advantage over regular cell references?

A. They allow you to use complex mathematical symbols.
B. They are automatically updated when the table structure changes.
C. They require less typing for simple formulas.
D. They can only be used with specific functions.

04. What is the keyboard shortcut for converting a table back to a regular data range in Excel?

A. Ctrl + P
B. Ctrl + Shift + T
C. Alt + F8
D. There is no shortcut; it must be done through the menu.
E. Ctrl + T

05. Which of these is NOT a way to format an Excel table?

A. Applying a pre-defined table style
B. Manually changing font size and color
C. Using conditional formatting based on cell values
D. Inserting a slicer to filter data visually

Answer Key 4: Create table and PIVOT

01. Which of the following statements about Excel tables is TRUE?

A. They can only be applied to numerical data.
B. They convert your data into a chart by default.
C. They dynamically adjust in size as you add or remove data. ** (Answer) **
D. They require a separate add-on to be installed.

02. When filtering data in an Excel table, what happens to the hidden rows?
A. They are permanently deleted from the table.
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C. They are visually hidden but still included in calculations. ** (Answer) **
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E. Ctrl + T ** (Answer) **

05. Which of these is NOT a way to format an Excel table?
A. Applying a pre-defined table style
B. Manually changing font size and color
C. Using conditional formatting based on cell values
D. Inserting a slicer to filter data visually ** (Answer) **

Job Sheet-4: **Create a Sample PivotTable in Excel**

Working Procedure:

1. Sample Data:

- Use the provided sample data table below. (Replace this with your actual data table).

Sample Data Table:

Order ID	Product Name	Category	Price	Order Date	Country
1001	Shirt	Clothing	$20.00	2024-04-01	USA
1002	Hat	Accessories	$15.00	2024-04-05	Canada
1003	Jeans	Clothing	$35.00	2024-04-10	USA
1004	Phone Case	Accessories	$10.00	2024-04-12	UK
1005	Watch	Accessories	$50.00	2024-04-15	USA

2. Create a PivotTable:

- Select the entire data table, including headers.
- Go to the Insert tab on the Excel ribbon.
- Click the PivotTable button.
- In the Create PivotTable dialog box, ensure the correct table/range is selected and choose where you want to place the PivotTable (New Worksheet or Existing Worksheet). Click OK.

3. PivotTable Fields:

The PivotTable Fields pane will appear on the right side of your screen. This pane lists the fields available in your data table.

- Drag and drop fields to the following areas to customize your PivotTable:
    - Rows: This area displays categories or groupings for your data (e.g., Product Name, Category).
    - Columns: This area displays another way to categorize your data (e.g., Country).

    - Values: This area displays summarized data based on calculations (e.g., Sum of Price).

4. Sample PivotTable Analysis:

- Scenario 1: Analyze total sales per country.
    - Drag Country field to the Rows area.
    - Drag Price field to the Values area.
    - Choose the Sum function to calculate total sales.
    - This PivotTable will show the total sales amount for each country.
- Scenario 2: Analyze average price per product category.
    - Drag Category field to the Rows area.
    - Drag Price field to the Values area.
    - Choose the Average function to calculate the average price per category.
    - This PivotTable will show the average price for each product category.

5. Experimentation:

- Try different combinations of fields in rows, columns, and values to explore your data from various perspectives.
- Use filters within the PivotTable to focus on specific data sets (e.g., filter by a specific date range).

Deliverable:

- A completed Excel workbook with a sample data table and a PivotTable analyzing the data in two different scenarios.

Specification Sheet-4: Create a Sample PivotTable in Excel

Necessary Tools

Sl. No	Name of Tools	Specification	Unit	Quantity
4				

Necessary Equipment

Sl. No	Name of Equipment	Specification	Unit	Quantity
7.	Computer	As Need	No.	01
8.	Spreadsheet Software	As Need	No.	01

Learning Outcome 5: Using Tools

Assessment Criteria	1. Able to select tools according to requirements 2. Able to use tools according to requirements
Conditions and Resources	1. Real or simulated workplace 2. CBLM 3. Handouts 4. Laptop 5. Multimedia Projector 6. Paper, Pen, Pencil, Eraser 7. Internet facilities 8. White board and marker 9. Audio Video Device
Contents	1. Tools 2. Data Validation 3. Remove Duplicate Data 4. Data Sorting and Filtering 5. Text to Columns 6. Advanced Filtering 7. Data Consolidation 8. Hyperlink
Activities/job/Task	1. Create a Worksheet include data validation, Duplicate Removing, Data sorting and Filtering
Training Methods	1. Discussion 2. Presentation 3. Demonstration 4. Guided Practice 5. Individual Practice 6. Project Work 7. Problem Solving 8. Brainstorming
Assessment Methods	1. Written Test 2. Demonstration 3. Oral Questioning 4. Portfolio

Learning Experience 5: Use Tools

In order to achieve the objectives stated in this learning guide, you must perform the learning steps below. Beside each step are the resources or special instructions you will use to accomplish the corresponding activity.

Learning Activities	Recourses/Special Instructions
1. Trainee will ask the instructor about about the learning materials	1. Instructor will provide the learning materials 'Use Tools'
2. Read the Information sheet and complete the Self Checks & Check answer sheets on "Use Tools"	2. Read Information sheet 5**:** Use Tools 3. Answer Self-check 5**:** Use Tools 4. Check your answer with Answer key 5**:** Use Tools
3. Read the Job/Task Sheet and Specification Sheet and perform job/Task	5. Job/Task Sheet and Specification Sheet Job Sheet-5**:** Create Checklist - Task Revision and Update Process

Information Sheet 5: Use Tools

Learning Objective:

After completion of this information sheet, the learners will be able to explain, define and interpret the following contents**:**

5.1.Select tools according to requirements
5.2. Use tools according to requirements

5.1 and 5.2 Select and Use Excel Tools

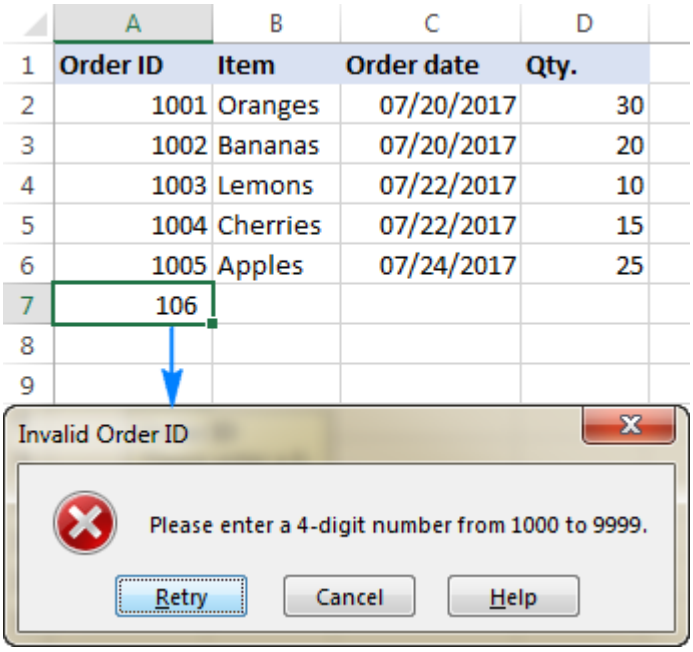
Data Validation

Excel Data Validation is a feature that restricts (validates) user input to a worksheet. Technically, you create a validation rule that controls what kind of data can be entered into a certain cell.

Here are just a few examples of what Excel's data validation can do**:**

- Allow only **numeric** or **text** values in a cell.
- Allow only numbers within a specified **range**.
- Allow data entries of a specific **length**.
- Restrict dates and times outside a given **range**.
- Restrict entries to a selection from a **drop-down list**.
- Validate an entry based on **another cell**.
- Show an **input message** when the user selects a cell.
- Show a **warning message** when incorrect data has been entered.
- Find **incorrect entries** in validated cells.

For instance, you can set up a rule that limits data entry to 4-digit numbers between 1000 and 9999. If the user types something different, Excel will show an error alert explaining what they have done wrong



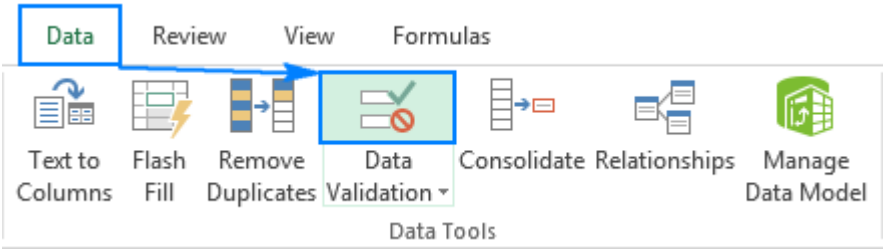
How to do data validation in Excel

To add data validation in Excel, perform the following steps.

1. Open the Data Validation dialog box

Select one or more cells to validate, go to the *Data* tab > *Data Tools* group, and click the **Data Validation** button.

You can also open the Data Validation dialog box by pressing Alt > D > L, with each key pressed separately.

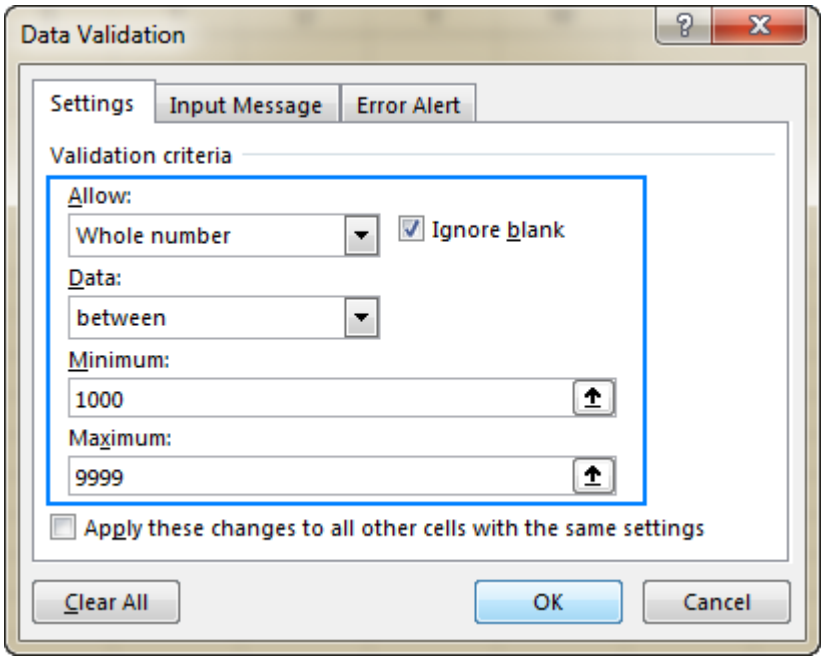


2. Create an Excel validation rule

On the **Settings** tab, define the validation criteria according to your needs. In the criteria, you can supply any of the following

- *Values* - type numbers in the criteria boxes like shown in the screenshot below.
- *Cell references* - make a rule based on a value or formula in another cell.
- *Formulas* - allow to express more complex conditions

As an example, let's make a rule that restricts users to entering a whole number between 1000 and 9999



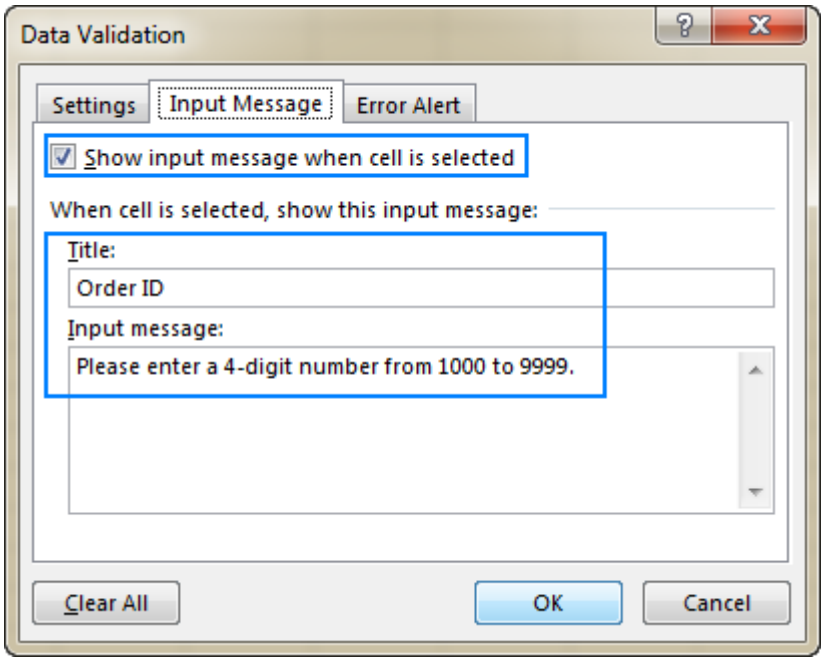
With the validation rule configured, either click *OK* to close the *Data Validation* window or switch to another tab to add an input message or/and error alert.

3. Add an input message (optional)

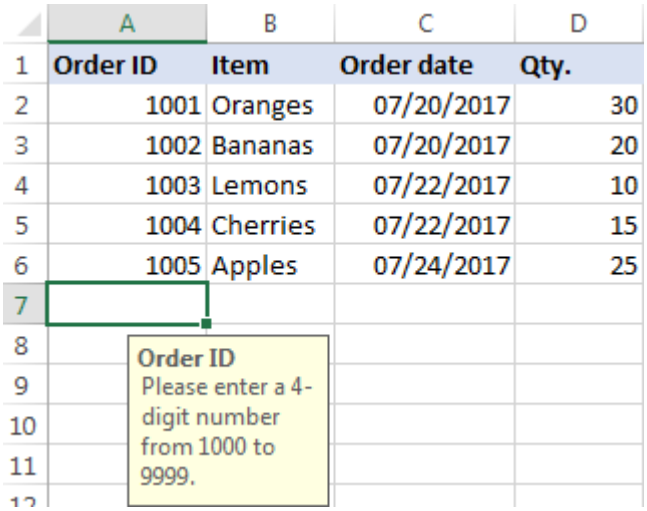
If you want to display a message that explains to the user what data is allowed in a given cell, open the *Input Message* tab and do the following

- Make sure the **Show input message when cell is selected** box is checked.
- Enter the title and text of your message into the corresponding fields.

- Click *OK* to close the dialog window.

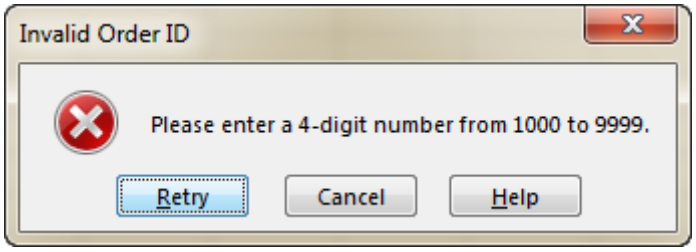
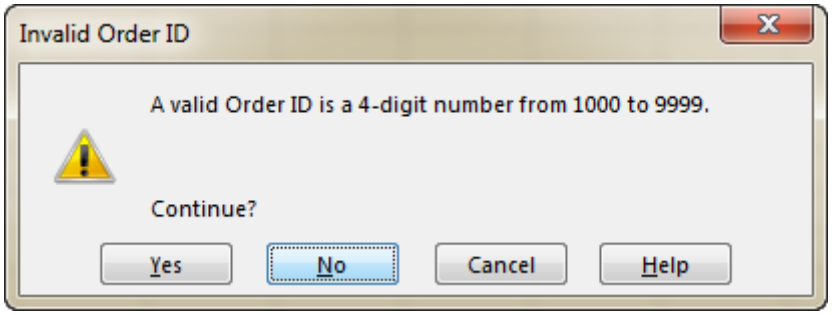
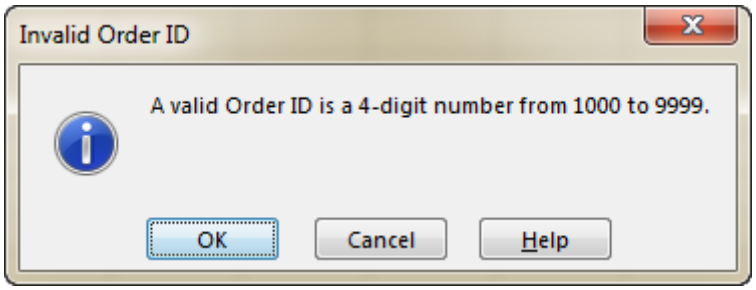


As soon as the user selects the validated cell, the following message will show up



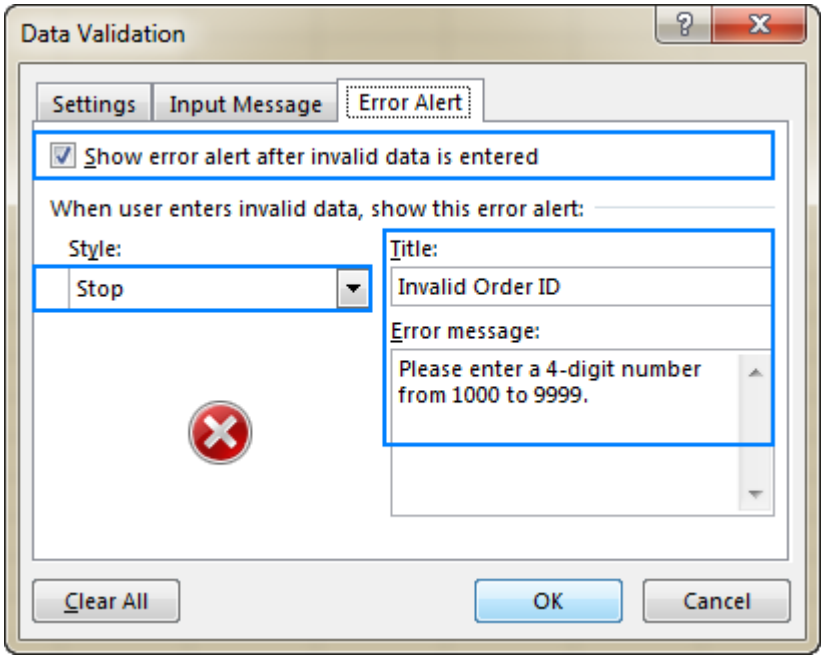
4. Display an error alert (optional)

In addition to the input message, you can show one of the following error alerts when invalid data is entered in a cell.

Alert type	Description
Stop (default)	 The strictest alert type that prevents users from entering invalid data. You click *Retry* to type a different value or *Cancel* to remove the entry.
Warning	 Warns users that the data is invalid, but does not prevent entering it. You click *Yes* to input the invalid entry, *No* to edit it, or *Cancel* to remove the entry.
Information	 The most permissive alert type that only informs users about an invalid data entry. You click *OK* to enter the invalid value or *Cancel* to remove it from the cell.

To configure a custom error message, go to the *Error Alert* tab and define the following parameters

- Check the **Show error alert after invalid data is entered** box (usually selected by default).
- In the *Style* box, select the desired alert type.
- Enter the title and text of the error message into the corresponding boxes.
- Click *OK*.



And now, if the user enters invalid data, Excel will display a special alert explaining the error (like shown in the beginning of this tutorial).

Note. If you do not type your own message, the **default Stop alert** with the following text will show up**:** *This value does not match the data validation restrictions defined for this cell*.

Excel data validation examples

When adding a data validation rule in Excel, you can choose one of the predefined settings or specify custom criteria based on your own validation formula. Below we will discuss each of the built-in options, and next week we will have a closer look at Excel data validation with custom formulas in a separate tutorial.

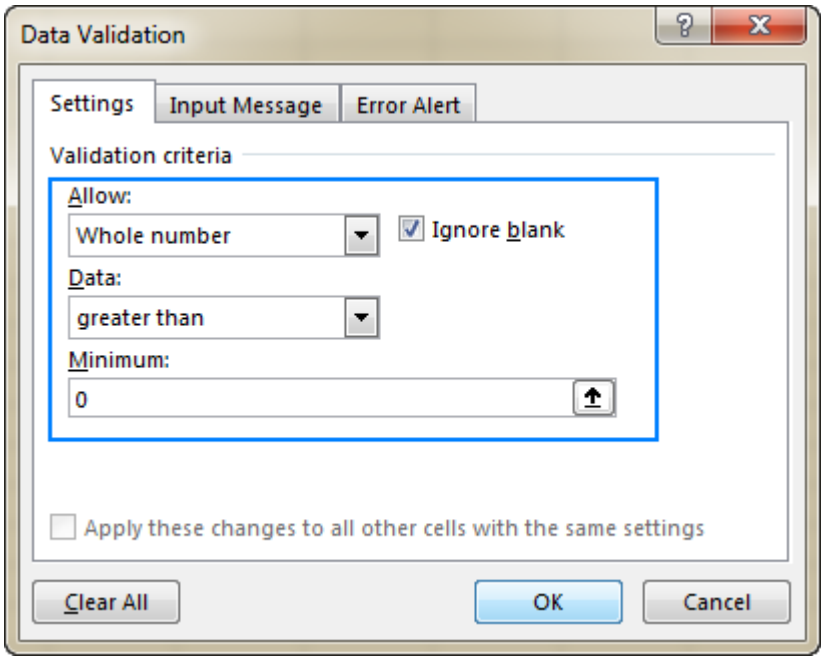
As you already know, the validation criteria are defined on the **Settings** tab of the *Data Validation* dialog box (*Data* tab > *Data Validation*).

Whole numbers and decimals

To restrict data entry to a **whole number** or **decimal**, select the corresponding item in the **Allow** box. And then, choose one of the following criteria in the **Data** box

- *Equal to* or *not equal to* the specified number
- *Greater than* or *less than* the specified number
- *Between* the two numbers or *not between* to exclude that range of numbers

For example, this is how you create an Excel validation rule that allows any whole number greater than 0**:**

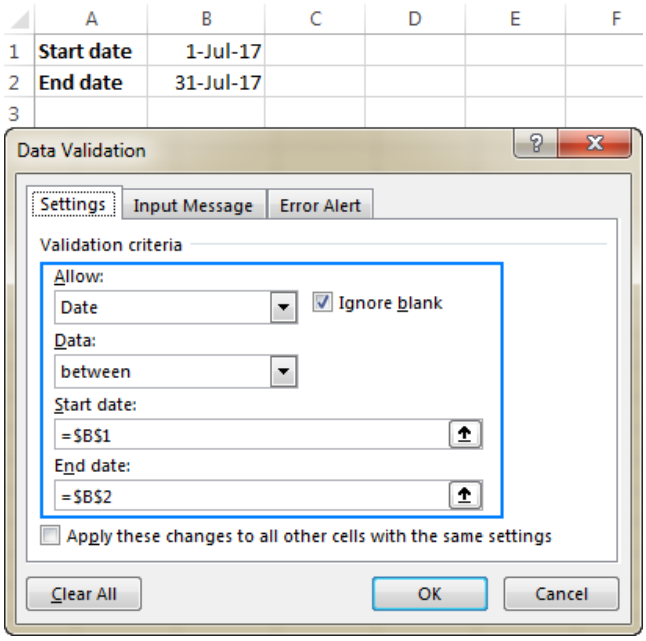


Date and time validation in Excel

To validate dates, select **Date** in the *Allow* box, and then pick an appropriate criteria in the **Data** box. There are quite a lot of predefined options to choose from**:** allow only dates between two dates, equal to, greater than or less than a specific date, and more.

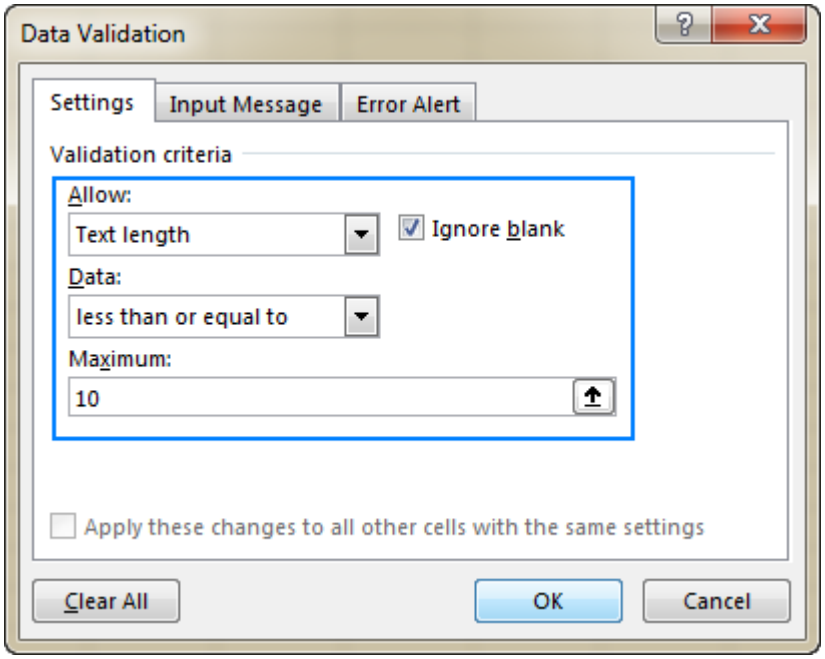
Similarly, to validate times, select **Time** in the *Allow* box, and then define the required criteria.

For example, to allow only dates between *Start date* in B1 and *End date* in B2, apply this Excel date validation rule



Text length

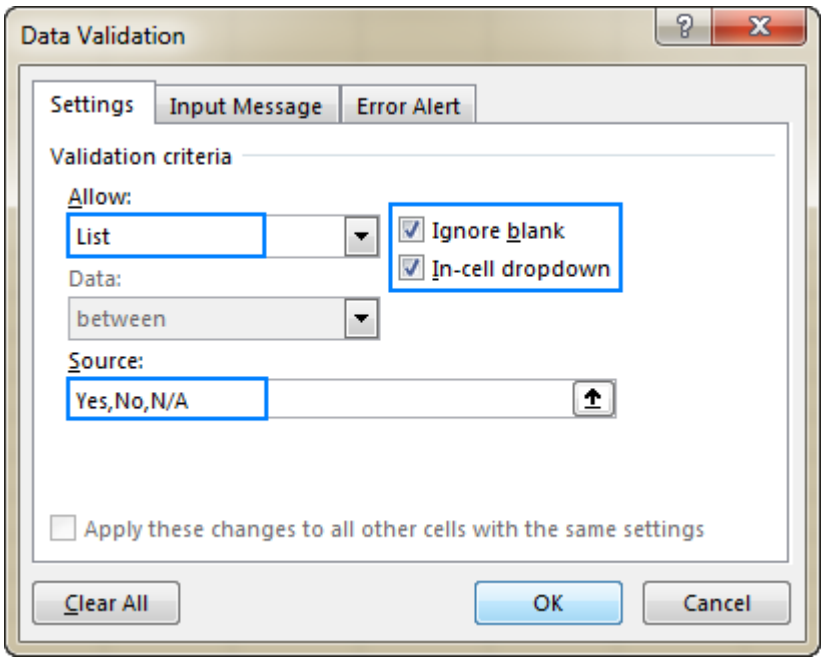
To allow data entry of a specific length, select **Text length** in the *Allow* box, and choose the validation criteria in accordance with your business logic. For example, to limit the input to 10 characters, create this rule



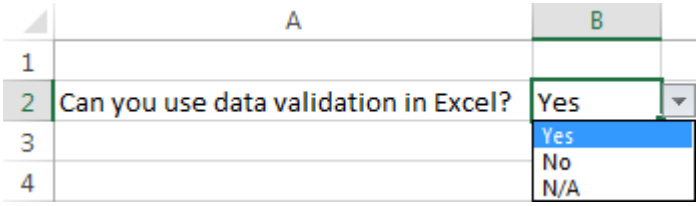
Excel data validation list (drop-down)

To add a drop-down list of items to a cell or a group of cells, select the target cells and do the following

1. Open the *Data Validation* dialog box (*Data* tab > *Data Validation*).
2. On the *Settings* tab, select **List** in the **Allow** box.
3. In the **Source** box, type the items of your Excel validation list, separated by commas. For example, to limit the user input to three choices, type *Yes, No, N/A*.
4. Make sure the **In-cell dropdown** box is selected in order for the drop-down arrow to appear next to the cell.
5. Click *OK*.



The resulting Excel data validation list will look similar to this



Note. Please be careful with the **Ignore blank** option, which is selected by default. If you are creating a drop-down list based on a named range that has at least one blank cell, selecting this check box allows entering any value in

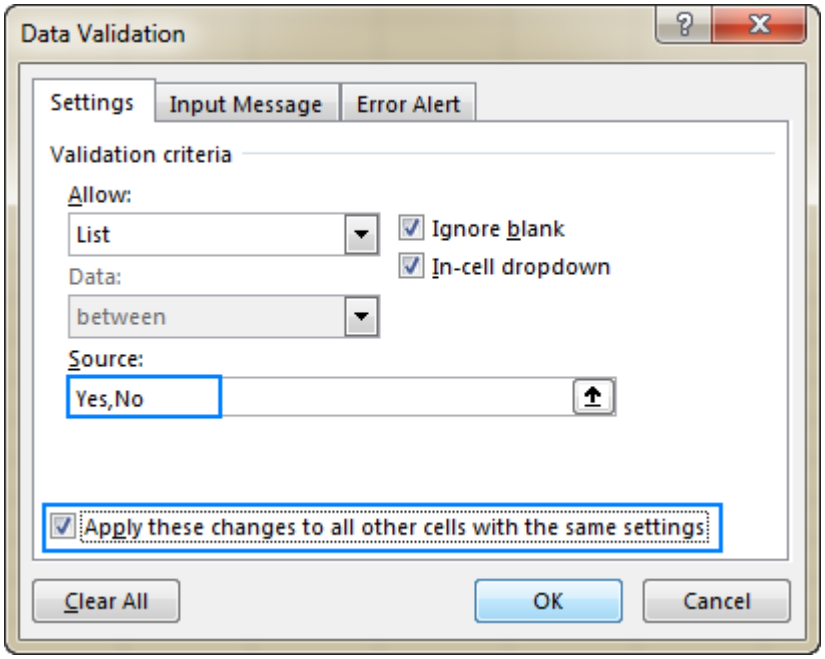
the validated cell. In many situations, it is also true for validation formulas**:** if a cell referenced in the formula is blank, any value will be allowed in the validated cell.

How to edit data validation in Excel

To change an Excel validation rule, perform these steps

1. Select any of the validated cells.
2. Open the *Data Validation* dialog box (*Data* tab > *Data Validation*).
3. Make the required changes.
4. Select the **Apply these changes to all other cells with the same settings** check box to copy the changes you've made to all other cells with the original validation criteria.
5. Click *OK* to save the changes.

For instance, you can edit your Excel data validation list by adding or removing items from the *Source* box, and have these changes applied to all other cells containing the same drop-down list



How to copy Excel data validation rule to other cells

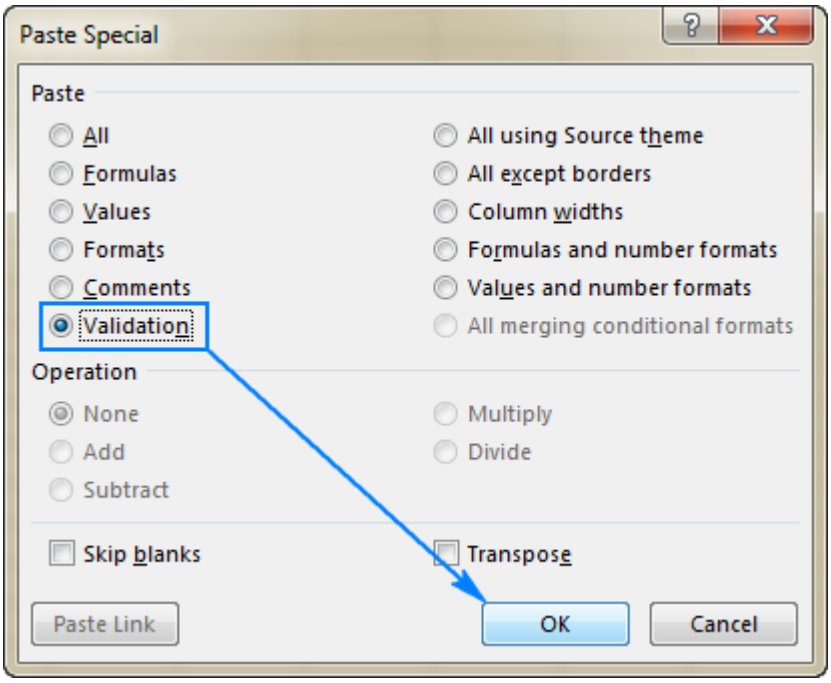
If you've configured data validation for one cell and wish to validate other cells with the same criteria, you don't have to re-create the rule from scratch.

To copy the validation rule in Excel, perform these 4 quick steps

1. Select the cell to which the validation rule applies and press Ctrl + C to copy it.
2. Select other cells you want to validate. To select non-adjacent cells, press and hold the Ctrl key while selecting the cells.
3. Right-click the selection, click **Paste Special**, and then select the **Validation** option.

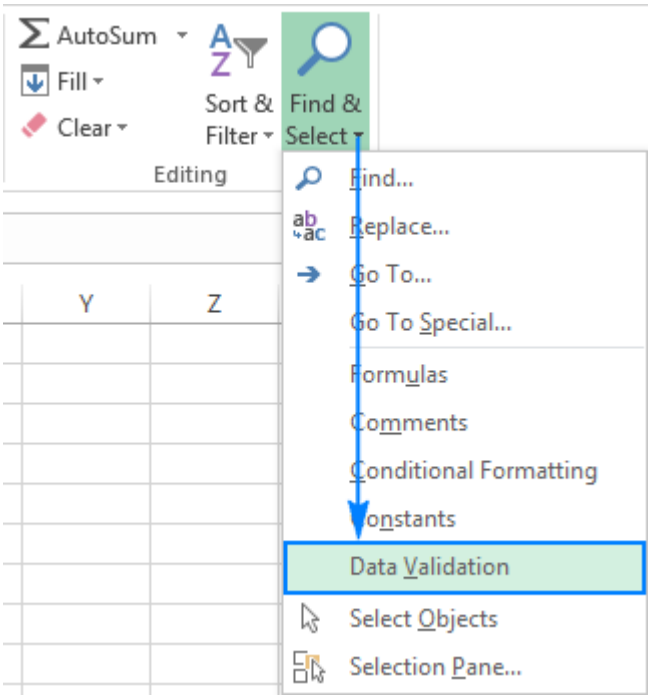
Alternatively, press the *Paste Special* > *Validation* shortcut**:** Ctrl + Alt + V, then N.

4. Click *OK*.



How to find cells with data validation in Excel

To quickly locate all validated cells in the current worksheet, go to the *Home* tab > *Editing* group, and click *Find & Select* > **Data Validation**



This will select all cells that have any data validation rules applied to them

Cells with data validation

	A	B	C	D
1	Order ID	Item	Order date	Qty.
2	1001	Oranges	07/20/2017	30
3	1002	Bananas	07/20/2017	20
4	1003	Lemons	07/22/2017	10
5	1004	Cherries	07/22/2017	15
6	1005	Apples	07/24/2017	25

How to remove data validation in Excel

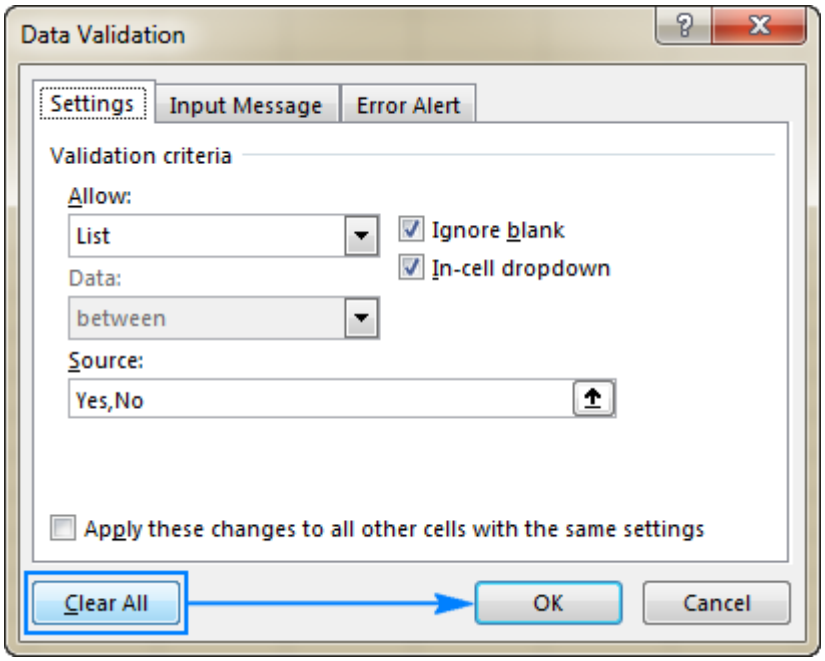
Overall, there are two ways to remove validation in Excel**:** the standard approach designed by Microsoft and the mouse-free technique devised by Excel geeks who would never take their hands off the keyboard unless absolutely necessary (e.g. to take a cup of coffee **:**)

Method 1: Regular way to remove data validation

Normally, to remove data validation in Excel worksheets, you proceed with these steps**:**

1. Select the cell(s) with data validation.
2. On the *Data* tab, click the *Data Validation* button.

3. On the *Settings* tab, click the **Clear All** button, and then click *OK*.



Method 2: Paste Special to delete data validation rules

De jure, Excel Paste Special is designed for pasting specific elements of copied cells. De facto, it can do many more useful things. Among others, it can quickly remove data validation rules in a worksheet. Here's how

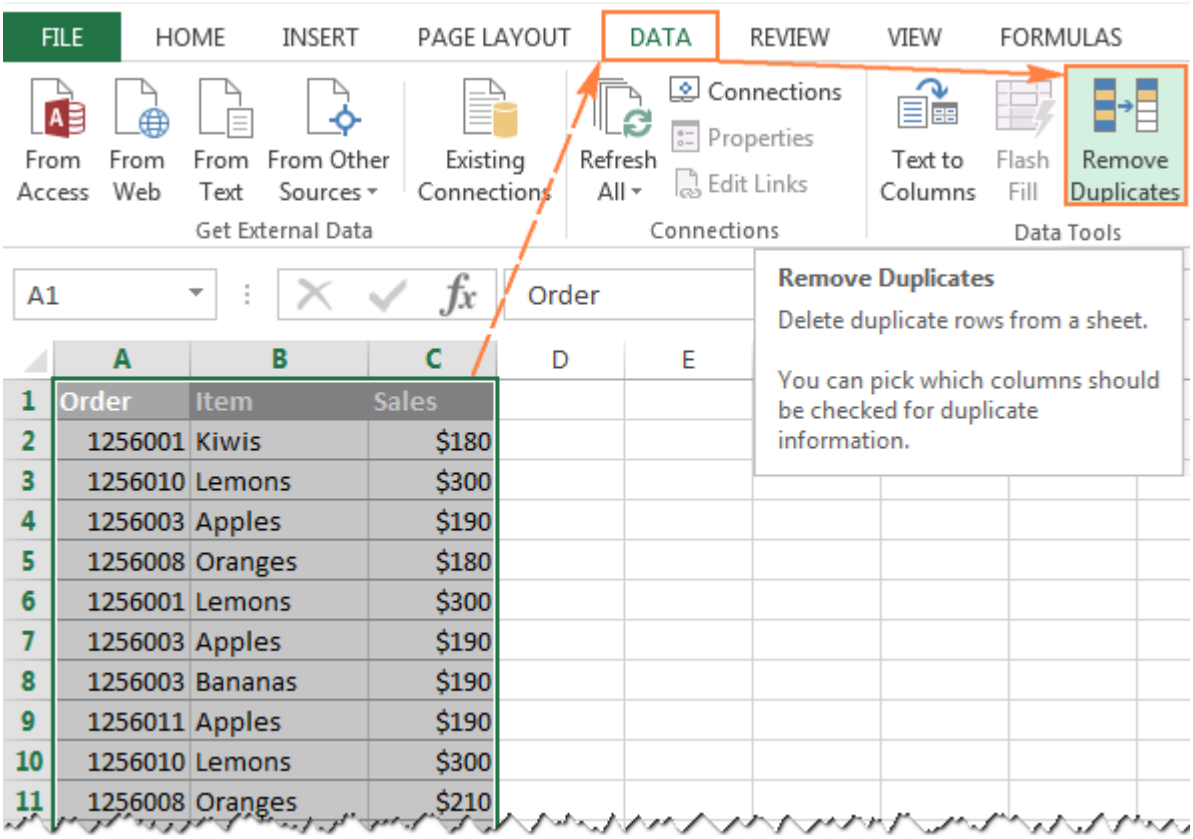
1. Select an empty cell without data validation, and press Ctrl + C to copy it.
2. Select the cells(s) from which you want to remove data validation.
3. Press Ctrl + Alt + V, then N, which is the shortcut for *Paste Special > Data Validation*.
4. Press Enter. Done!

Remove Duplicate Data

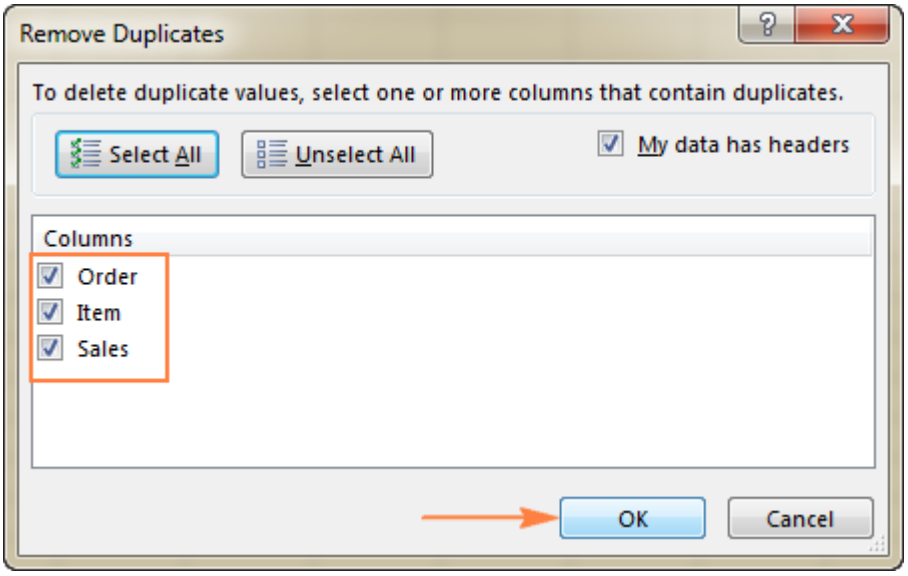
In all versions of Excel 365 - 2007, there is a built-in tool for removing duplicates called, not surprisingly, *Remove Duplicates*.

This tool allows you to find and remove **absolute duplicates** (cells or entire rows) as well as **partially matching records** (rows that have identical values in a specified column or columns). To perform this, follow the below steps.

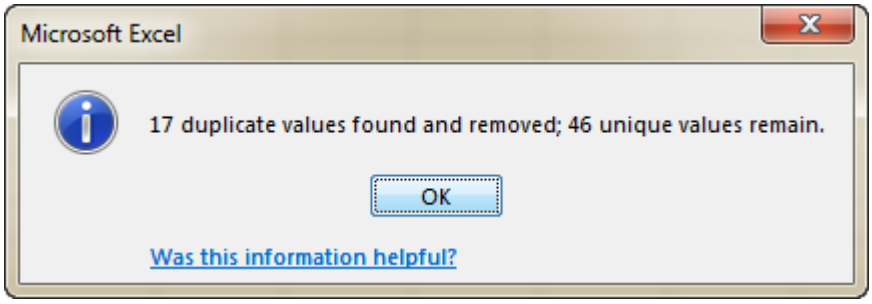
1. To begin with, select the range in which you want to ddelete dupes. To select the entire table, press Ctrl + A.
2. Go to the *Data tab* > *Data Tools* group, and click the **Remove Duplicates** button.



3. The *Remove Duplicates* dialog box will open, you select the columns to check for duplicates, and click *OK*.
    - To delete **duplicate rows** that have completely equal values in all columns, leave the check marks next to all columns, like in the screenshot below.
    - To remove **partial duplicates** based on one or more key columns, select only those columns. If your table has many columns, the fastest way is to click the *Unselect All* button, and then select the columns you want to check for dupes.
    - If your table does not have **headers**, clear the *My data has headers* box in the upper-right corner of the dialog window, which is usually selected by default.



Done! All duplicate rows in the selected range are deleted, and a message is displayed indicating how many duplicate entries have been removed and how many unique values remain.



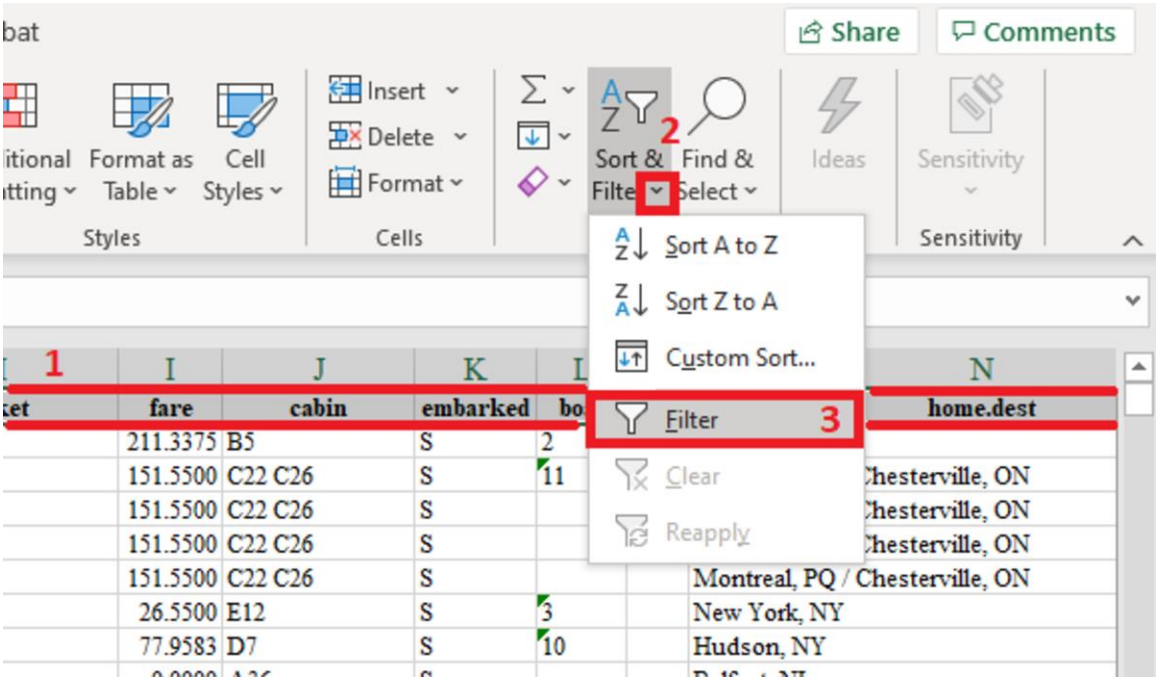
Data Sorting and Filtering

Enabling Sort & Filter for a Data Set

The first step to sorting and filtering data is enabling the capabilities of a dataset. Each of the steps needed to enable sort and filter in Excel is shown below

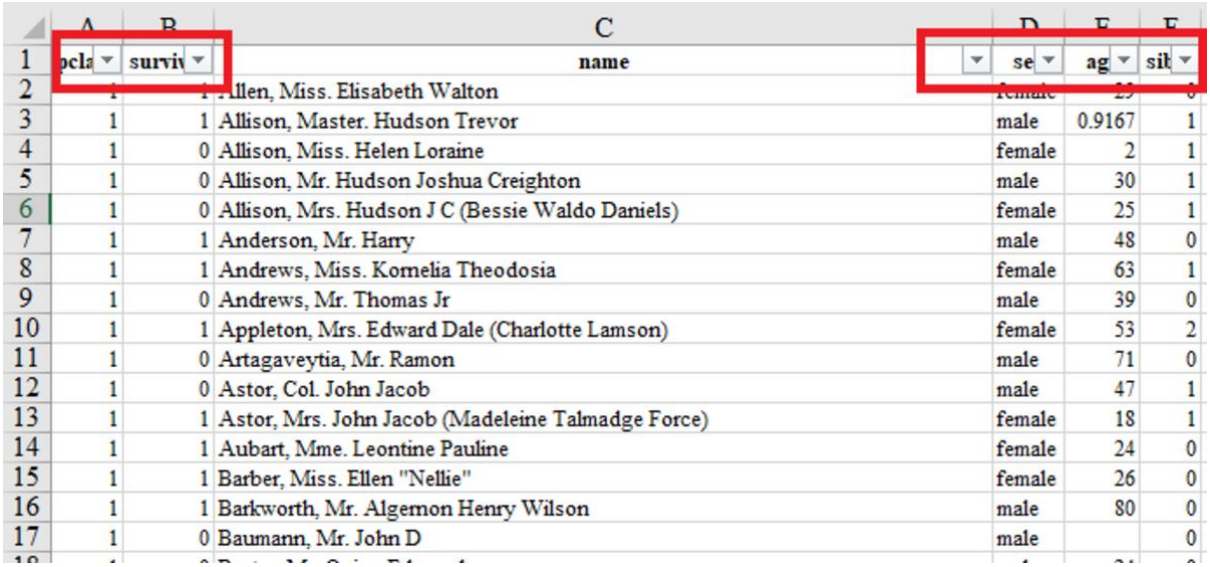
Step 1. Select the row of headers.
Step 2. While on the "Home" tab, click the sort and filter button in the editing section of the ribbon.
Step 3. Click on the filter option.

Enabling Sort & Filter



The sort and filter options are located under the home tab in the Excel ribbon.

Each column header will have an arrow in the cell that can be clicked to display a menu of sort and filter tools. These added arrows are highlighted in the illustration below.

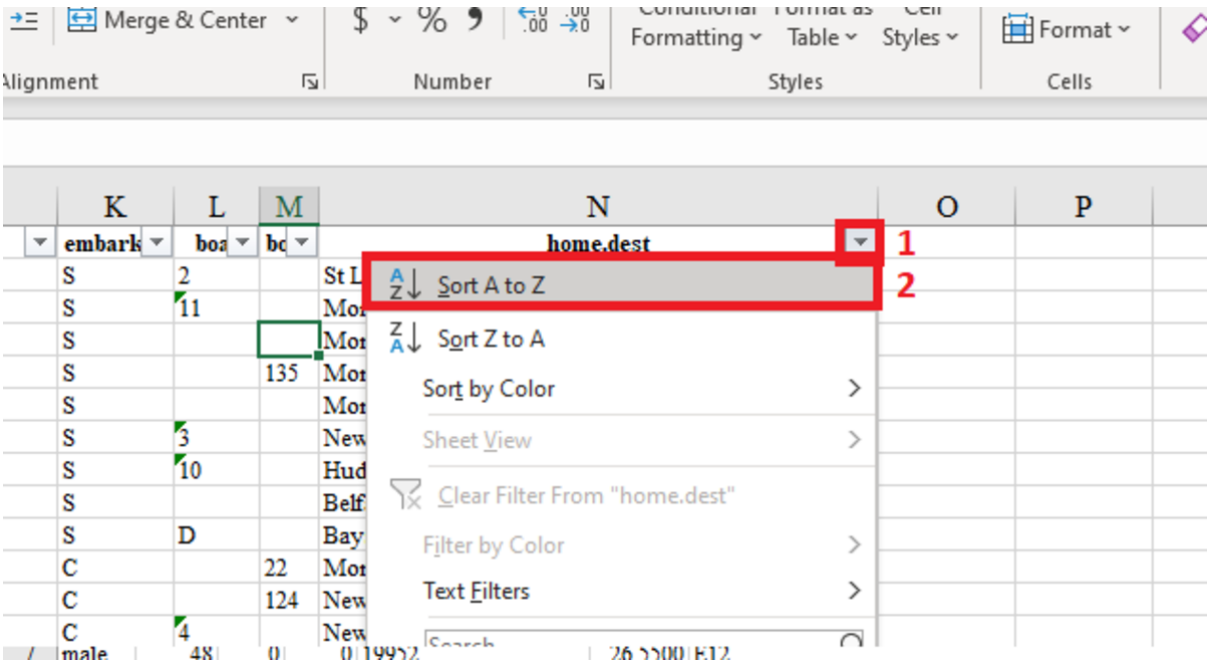


Sorting A to Z in Excel

Sorting from A to Z (or sorting from Z to A) can be accomplished in two steps. The

Step 1. Select the down arrow on the column.

Step 2. Select one of the first two sorting options.

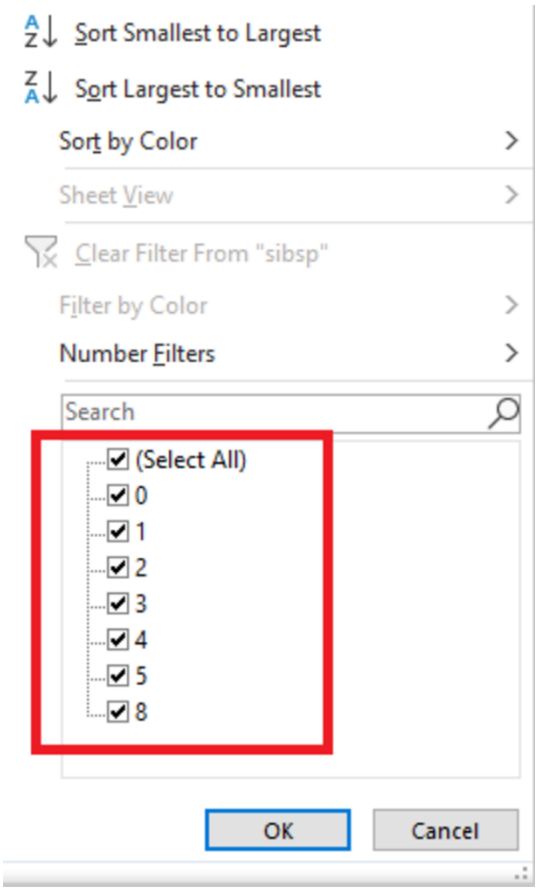


Excluding Data in Excel

Data can be excluded by clicking on the down arrow located on the header and making changes to the checkboxes in the menu. Unchecking a box will exclude it from the data set.

You may have outliers in the data that you would like to exclude temporarily. If you require only a few pieces of data, the select all check box can be unchecked giving you the opportunity to select what data is displayed by only checking the corresponding boxes.

Date Exclusion Option in Excel



This above illustration shows the filtering option where data can be excluded by unchecking boxes.

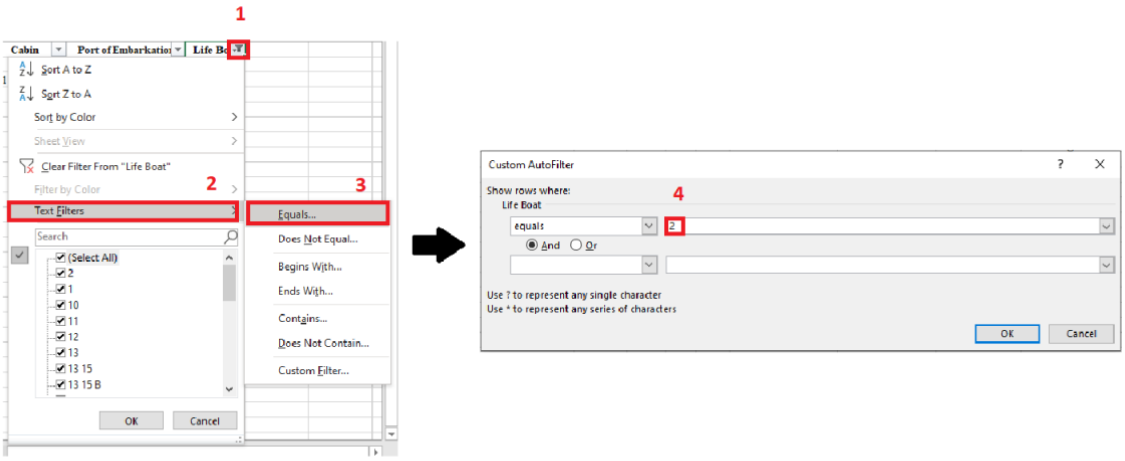
Using the Custom Auto Filter in Excel

Text filters can come in handy especially if you have data with a lot of attributes to analyze. With this tool you can filter by equals, does not equal, greater than, less than, begins with ends with, and contains.

For a text filter example, let us look at the equals filter. The equals filter will display the exact data that is specified. In the illustration below I walk through each step to use this tool to filter by 2.

1. Click the down arrow on the header
2. Select text filters and equals
3. Enter 2 into the field after equals

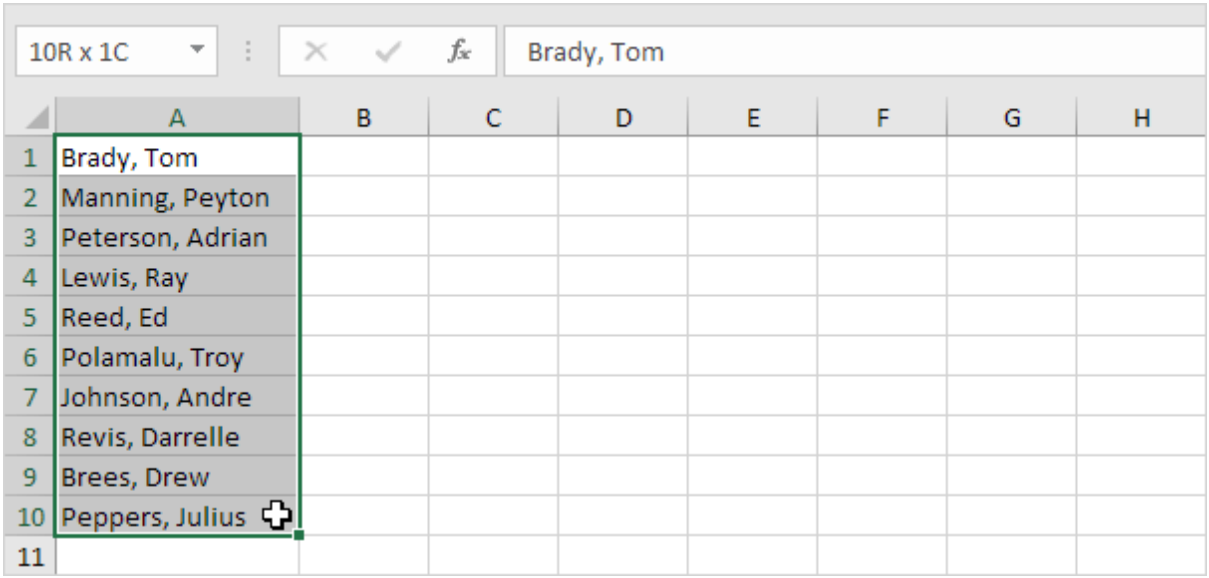
Note that you are not limited to just one filter. An additional filter like one that will show all numbers greater than 4 can be added as well.



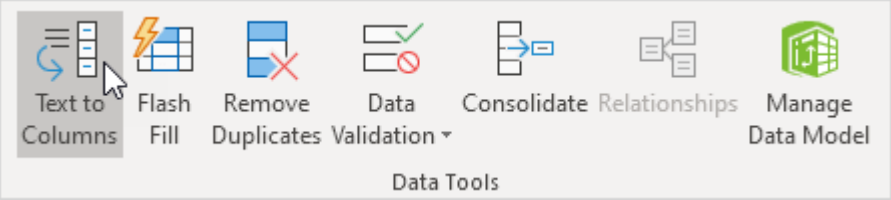
Text to Columns

To separate the contents of one Excel cell into separate columns, you can use the 'Convert Text to Columns Wizard'. For example, when you want to separate a list of full names into last and first names.

1. Select the range with full names.

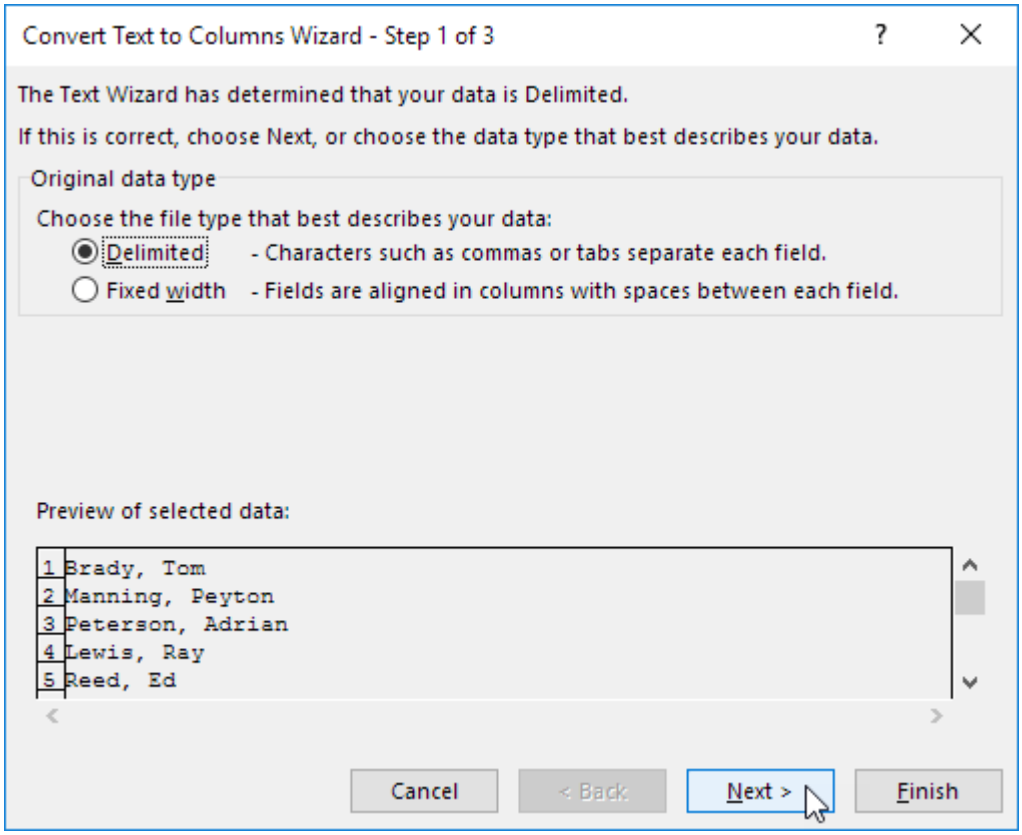


2. On the Data tab, in the Data Tools group, click Text to Columns.



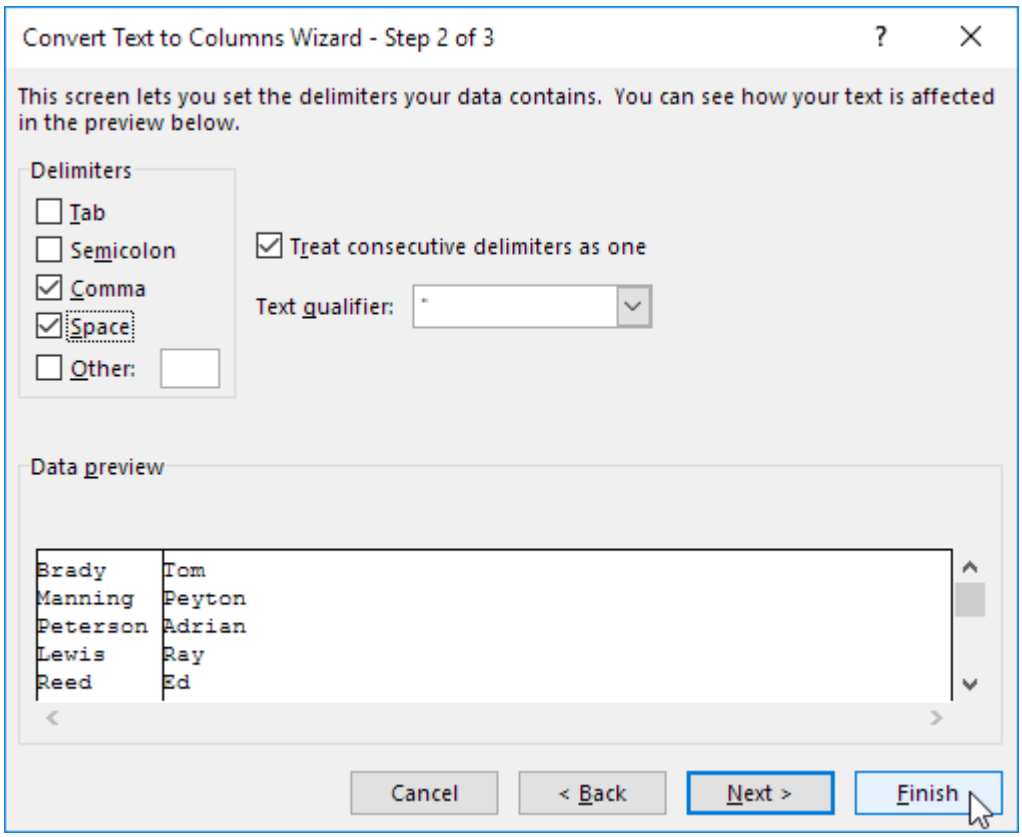
The following dialog box appears.

3. Choose Delimited and click Next.

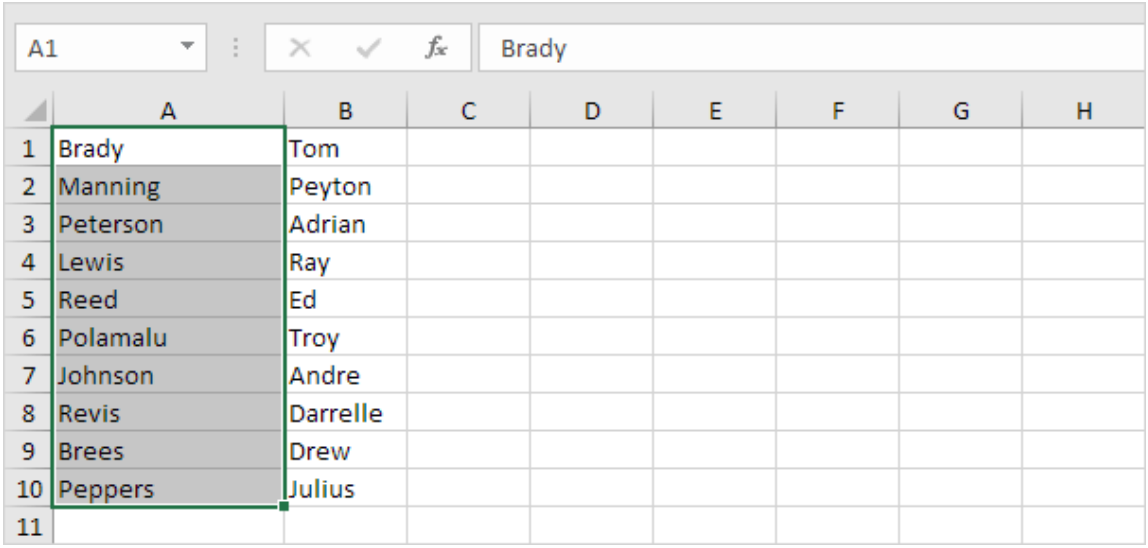


4. Clear all the check boxes under Delimiters except for the Comma and Space check box.

5. Click Finish.


Convert Text to Columns Wizard - Step 2 of 3
This screen lets you set the delimiters your data contains. You can see how your text is affected in the preview below.
Delimiters
Tab
Semicolon
Comma
Space
Other:
Treat consecutive delimiters as one
Text qualifier:
Data preview
Brady Tom
Manning Peyton
Peterson Adrian
Lewis Ray
Reed Ed
Cancel
< Back
Next >
Finish

Result


A1
Brady
A B C D E F G H
1 Brady Tom
2 Manning Peyton
3 Peterson Adrian
4 Lewis Ray
5 Reed Ed
6 Polamalu Troy
7 Johnson Andre
8 Revis Darrelle
9 Brees Drew
10 Peppers Julius
11

Advanced Filtering

Step 1: Prepare Your Data.

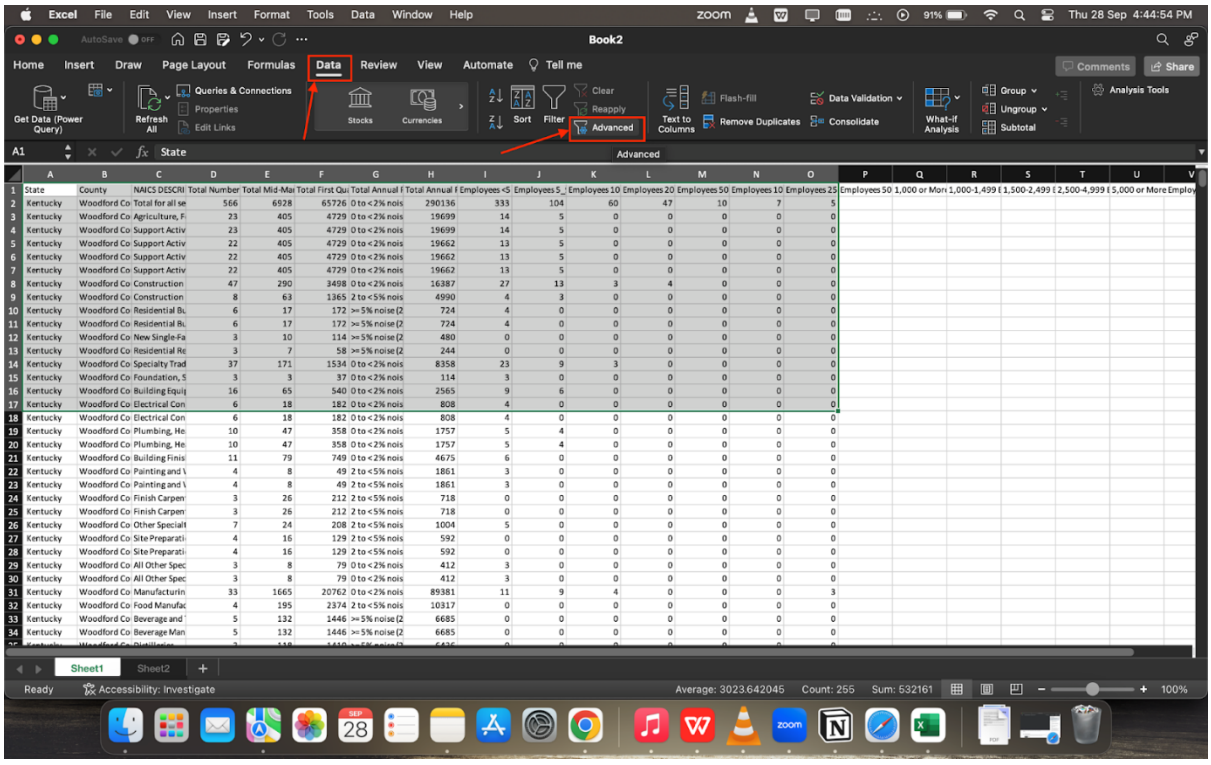
Make sure your data is well-organized with column headers, and you know the specific criteria you want to use for filtering.

Step 2: Select the Data Range.

Click anywhere within the dataset you want to filter. Excel will automatically detect the boundaries of your data. Or, you can manually select the data range by clicking and dragging over the cells.

Step 3: Access the Advanced Filter Dialog Box.

Go to the "Data" tab in the Excel ribbon. In the "Sort & Filter" group, click on "Advanced."



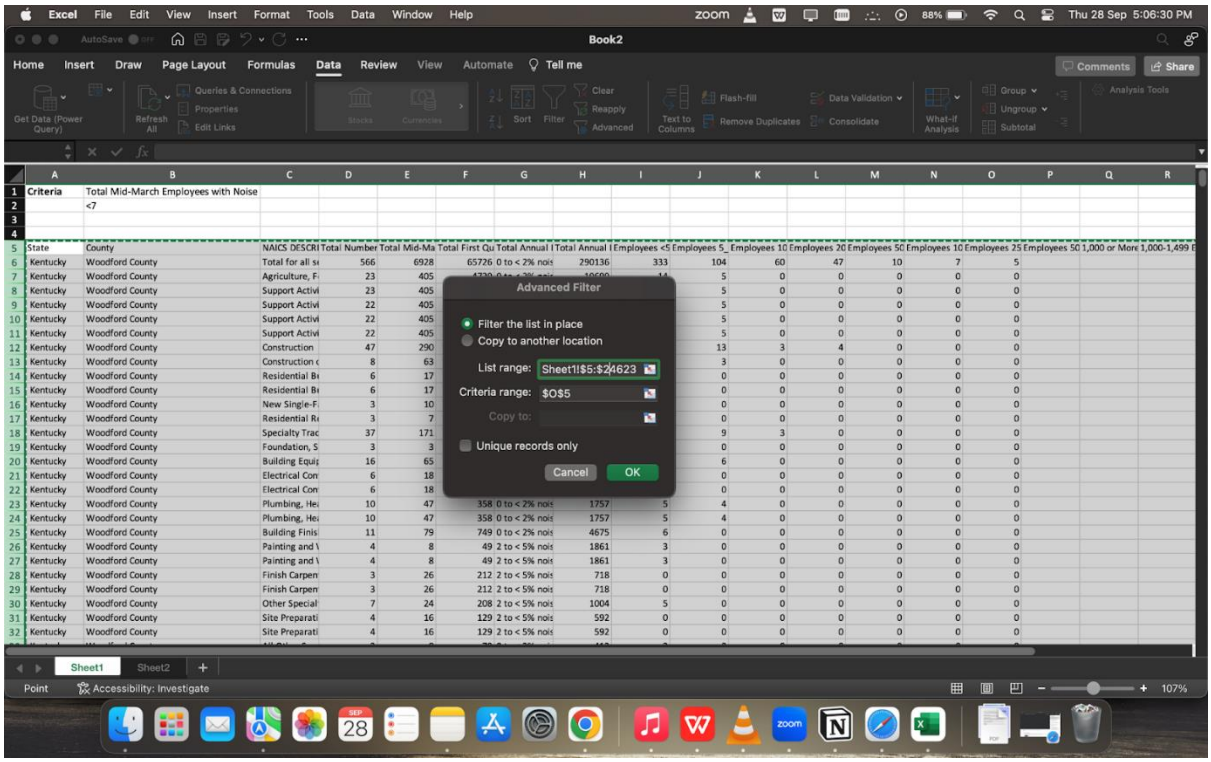
Step 4: Define the Criteria Range

In the Excel Advanced Filter dialog box that appears**:**

- Choose whether you want to filter the data in place (replace the original data with the filtered data) or copy it to another location. If you choose to

filter in place, make sure you have enough empty rows below your data to accommodate the filtered results.

- Specify the "List range," which is the range of cells containing your data.
- Specify the "Criteria range," which is a range of cells where you will define your filtering criteria.



Step 5: Define Filtering Criteria

In the criteria range you specified**:**

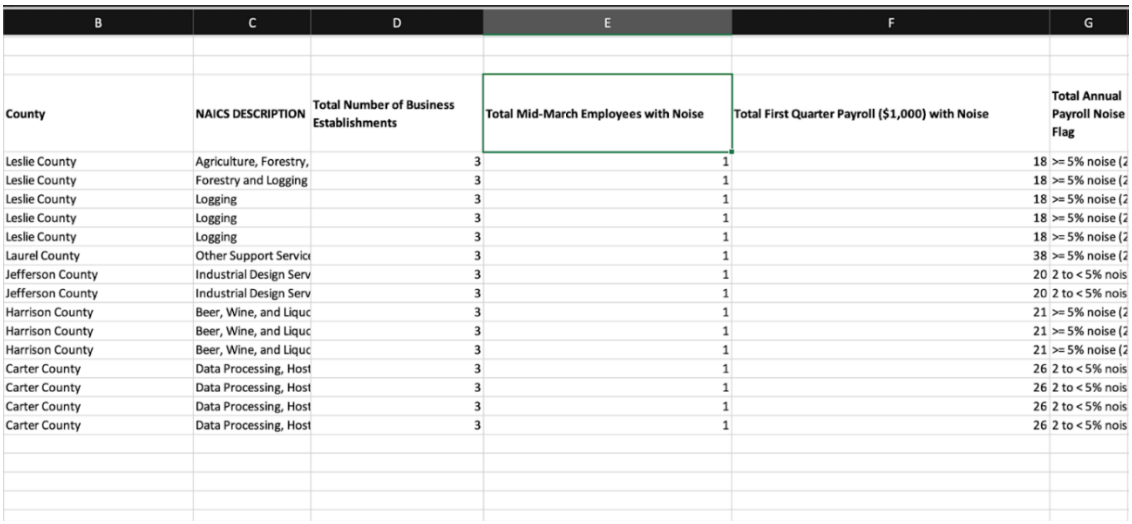
- Create column headers that match the headers in your data.
- Under each column header, specify the filtering criteria. You can use comparison operators like "=," "<>," "<, ",">," "<=," ">", "=" or logical operators like "AND" and "OR" to define complex criteria.
- Leave cells blank for columns where you don't want to apply any criteria.

	A	B	C	D	E
1		Total Mid-March Employees with Noise	Total First Quarter Payroll ($1,000) with Noise		
2		<=1	>=18		
3					

Step 6: View the Filtered Data

- Excel will apply the advanced filter based on your criteria.

- If you choose to filter in place, you'll see the filtered results in your original data range. If you choose to copy the data, it will appear in the specified location.



B	C	D	E	F	G
County	NAICS DESCRIPTION	Total Number of Business Establishments	Total Mid-March Employees with Noise	Total First Quarter Payroll ($1,000) with Noise	Total Annual Payroll Noise Flag
Leslie County	Agriculture, Forestry,	3	1	18	>= 5% noise (2
Leslie County	Forestry and Logging	3	1	18	>= 5% noise (2
Leslie County	Logging	3	1	18	>= 5% noise (2
Leslie County	Logging	3	1	18	>= 5% noise (2
Leslie County	Logging	3	1	18	>= 5% noise (2
Laurel County	Other Support Servic	3	1	38	>= 5% noise (2
Jefferson County	Industrial Design Serv	3	1	20	2 to < 5% nois
Jefferson County	Industrial Design Serv	3	1	20	2 to < 5% nois
Harrison County	Beer, Wine, and Liquc	3	1	21	>= 5% noise (2
Harrison County	Beer, Wine, and Liquc	3	1	21	>= 5% noise (2
Harrison County	Beer, Wine, and Liquc	3	1	21	>= 5% noise (2
Carter County	Data Processing, Host	3	1	26	2 to < 5% nois
Carter County	Data Processing, Host	3	1	26	2 to < 5% nois
Carter County	Data Processing, Host	3	1	26	2 to < 5% nois
Carter County	Data Processing, Host	3	1	26	2 to < 5% nois

Step 7: Clear the Filter (Optional)

- To remove the filter and restore your original data, go back to the "Data" tab, click on "Clear" in the "Sort & Filter" group, and select "Clear Filters."

Data Consolidation

Rows consolidation in Excel can be helpful when you have multiple rows with the same entries.

Let’s say you have a record of various orders placed on an e-commerce store containing columns for order ID, product SKU, and quantity.

January 2023 - Sales Details		
order_id	sku	quantity
ORD-01033	4587	2
ORD-01034	6523	3
ORD-01035	1425	4
ORD-01036	2013	5
ORD-01037	2468	1
ORD-01038	5688	2
ORD-01039	5986	8
ORD-01040	3146	6
ORD-01041	6523	11
ORD-01042	4587	3

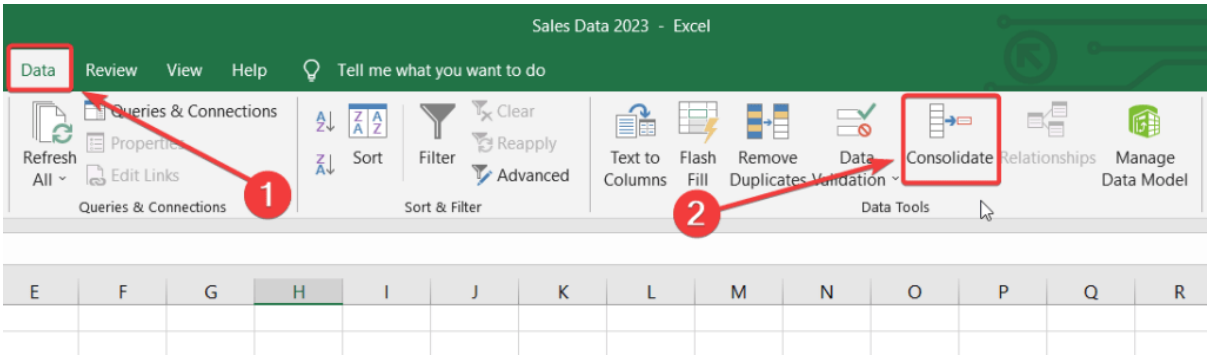
Here, you can use data consolidation to get the total quantity for each product by adding up quantities with similar SKUs.

You can follow these steps to consolidate data from rows**:**

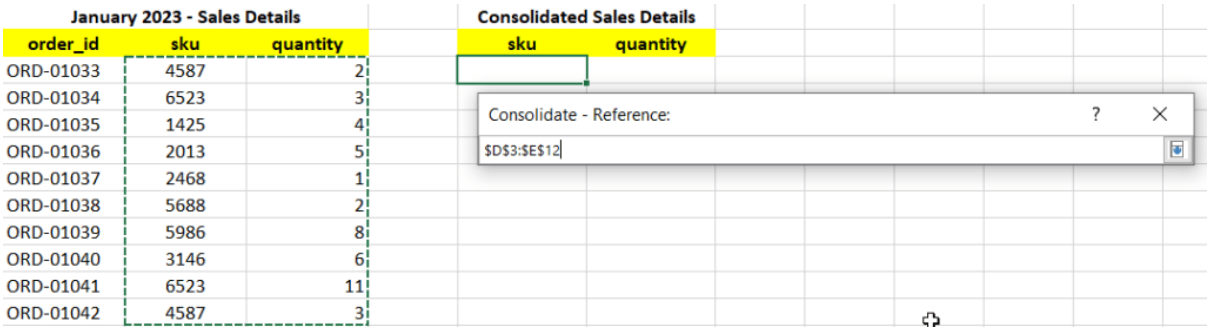
1. Open the Excel sheet and select the target cell where you want to place the consolidated rows.

January 2023 - Sales Details				Consolidated Sales Details	
order_id	sku	quantity		sku	quantity
ORD-01033	4587	2			
ORD-01034	6523	3			
ORD-01035	1425	4			
ORD-01036	2013	5			
ORD-01037	2468	1			
ORD-01038	5688	2			
ORD-01039	5986	8			
ORD-01040	3146	6			
ORD-01041	6523	11			
ORD-01042	4587	3			

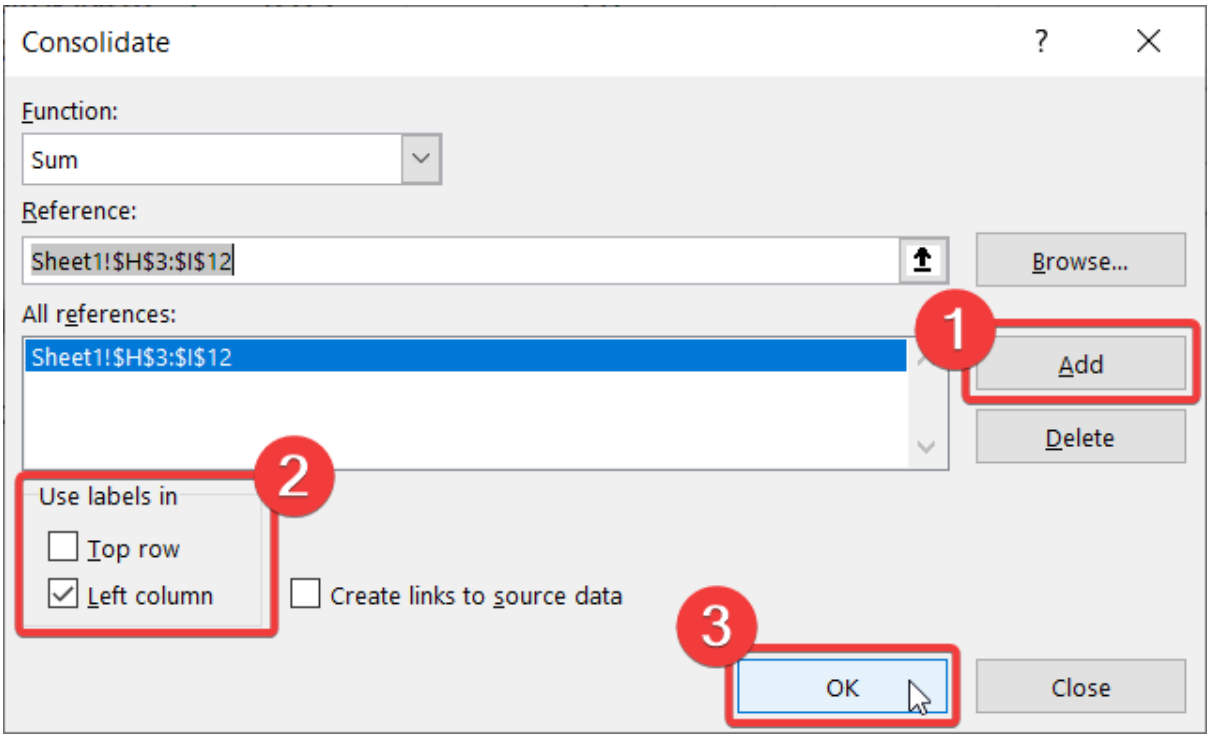
2. In the upper tab, select **Data**, and click on **Consolidate** in the '*Data Tools*' section.



3. The *'Consolidate'* window will appear on the screen. Select the appropriate function, click on the little upside arrow in the reference field, and select the reference ranges.



4. After selecting the range, click on **Add** button to add it as a reference. Check the appropriate option in the '*Use labels in*' section (It is 'Left column' in this example to add up product quantities with the same SKU), and click on **OK** to proceed.



5. Verify the results for a couple of rows manually to ensure that the rows have been accurately consolidated.

January 2023 - Sales Details				Consolidated Sales Details	
order_id	sku	quantity		sku	quantity
ORD-01033	4587	2		4587	5
ORD-01034	6523	3		6523	14
ORD-01035	1425	4		1425	4
ORD-01036	2013	5		2013	5
ORD-01037	2468	1		2468	1
ORD-01038	5688	2		5688	2
ORD-01039	5986	8		5986	8
ORD-01040	3146	6		3146	6
ORD-01041	6523	11			
ORD-01042	4587	3			

Hyperlink

An Excel hyperlink is a reference to a specific location, document or web-page that the user can jump to by clicking the link.

Microsoft Excel enables you to create hyperlinks for many different purposes including**:**

- Going to a certain location within the current workbook
- Opening another document or getting to a specific place in that document, e.g. a sheet in an Excel file or bookmark in a Word document.
- Navigating to a web-page on the Internet or Intranet
- Creating a new Excel file
- Sending an email to a specified address

Hyperlinks in Excel are easily recognizable - generally this is text highlighted in underlined blue like shown in the screenshot below.

Hyperlinks in Excel	
Ablebits.com	Opens www.ablebits.com
Sheet2	Jumps to Sheet2 in the current workbook
Word doc	Opens a Word document
My web-site	Navigates to a specified web-site

Absolute and relative hyperlinks in Excel

Microsoft Excel supports two types of links**:** absolute and relative, depending on whether you specify a full or partial address.

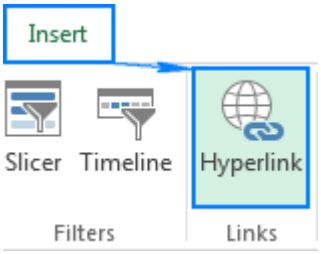
An **absolute hyperlink** contains a full address, including the protocol and domain name for URLs, and the entire path and file name for documents. For example**:**
Absolute URL**: https://www.ablebits.com/excel-lookup-tables/index.php**
Absolute link to an Excel file**: C:\Excel files\Source Data\Book1.xlsx**
A **relative hyperlink** contains a partial address. For example**:**
Relative URL**: excel-lookup-tables/index.php**
Relative link to an Excel file**: Source data\Book3.xlsx**

On the web, it's a common practice to use relative URLs. In your Excel hyperlinks, you should always supply **full URLs for web-pages**. Though, Microsoft Excel can understand URLs without a protocol. For example, if you type "www.ablebits.com" in a cell, Excel will automatically add the default "http" protocol and convert it into a hyperlink you can follow.
When creating **links to Excel files** or other documents stored on your computer, you can use either absolute or relative addresses. In a relative hyperlink, a missing part of the file path is relative to the location of the active workbook. The main advantage of this approach is that you don't have to edit the link address when the files are moved to another location. For example, if your active workbook and target workbook reside on drive C, and then you move them to drive D, relative hyperlinks will continue working as long as the relative path to the target file remains unchanged. In case of an absolute hyperlink, the path should be updated every time the file is moved to another place.

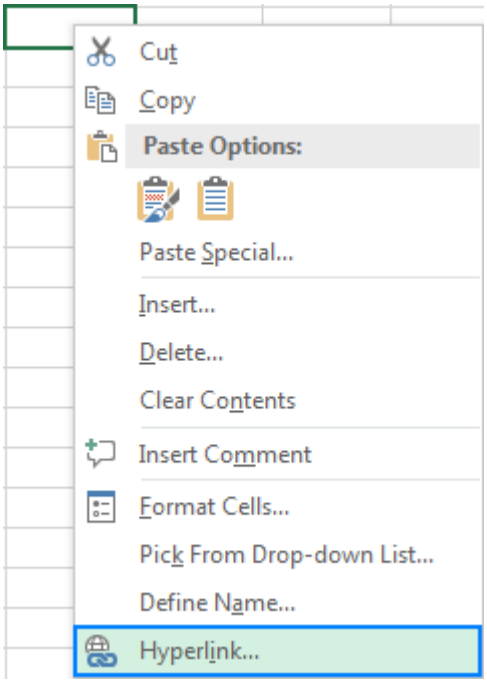
How to create a hyperlink in Excel

The most common way to put a hyperlink directly into a cell is by using the **Insert Hyperlink** dialog, which can be accessed in 3 different ways. Just select the cell where you want to insert a link and do one of the following

- On the *Insert* tab, in the *Links* group, click the **Hyperlink** or **Link** button, depending on your Excel version.



- Right click the cell, and select **Hyperlink…** (**Link** in recent versions) from the context menu.



- Press the Ctrl + K shortcut.

Self-Check Sheet 5: Use Tools

1. Which of the following is NOT a type of data validation allowed in Excel?

a) Restricting data to a specific range of numbers
b) Allowing only text entries
c) Limiting the length of the data entered
d) Matching data to a specific format (e.g., Social Security Number)

2. How can you remove duplicate rows in an Excel dataset?

a) Manually select and delete duplicate rows.
b) Use the "Sort" function to group duplicates.
c) Use the "Remove Duplicates" tool.
d) Use a custom formula to identify duplicates.

3. When sorting data in Excel from A to Z, which option do you select from the dropdown menu in the column header?

a) "Filter"
b) "Sort Ascending"
c) "Sort Descending"
d) "Custom Sort"

4. How can you filter data in Excel to show only entries containing the word "apple"?

a) Use the "Sort" function.
b) Use the "Find" function.
c) Use a custom formula.
d) Use the text filter with the "contains" option.

5. What is the purpose of using the "Text to Columns" feature in Excel?

a) To convert numbers to text format.
b) To separate text within a single cell into multiple columns.
c) To combine data from multiple cells into one cell.
d) To add borders around cells.

Answer Key 5: Use Tools

1. Which of the following is NOT a type of data validation allowed in Excel?

a) Restricting data to a specific range of numbers
b) Allowing only text entries
c) Limiting the length of the data entered
d) Matching data to a specific format (e.g., Social Security Number)

Answer: d) Matching data to a specific format (e.g., Social Security Number)

2. How can you remove duplicate rows in an Excel dataset?

a) Manually select and delete duplicate rows.
b) Use the "Sort" function to group duplicates.
c) Use the "Remove Duplicates" tool.
d) Use a custom formula to identify duplicates.

Answer: c) Use the "Remove Duplicates" tool.

3. When sorting data in Excel from A to Z, which option do you select from the dropdown menu in the column header?

a) "Filter"
b) "Sort Ascending"
c) "Sort Descending"
d) "Custom Sort"

Answer: b) "Sort Ascending"

4. How can you filter data in Excel to show only entries containing the word "apple"?

a) Use the "Sort" function.
b) Use the "Find" function.
c) Use a custom formula.
d) Use the text filter with the "contains" option.

Answer: d) Use the text filter with the "contains" option.

5. What is the purpose of using the "Text to Columns" feature in Excel?

a) To convert numbers to text format.
b) To separate text within a single cell into multiple columns.
c) To combine data from multiple cells into one cell.
d) To add borders around cells.

Answer: b) To separate text within a single cell into multiple columns.

Job Sheet-5: Create a Worksheet include data validation, Duplicate Removing, Data sorting and Filtering

Working Procedure:

1. Sample Data:

- Use the provided sample data table below.

Sample Data Table:

Product ID	Product Name (may contain typos)	Unit Price (may contain inconsistencies)	Category
101	Shirt (duplicate)	$19.99	Clothing
102	Hat	$14.50	Accessories
103	Jeans	$34.95	Clothing (misspelled)
101	Shirt (duplicate)	$19.75	Clothing
104	Phone Case	$9.99	Accessories

2. Data Validation:

- Scenario 1: Ensure product IDs are unique.
    - Select the column containing product IDs.
    - Go to the Data tab on the Excel ribbon.
    - Click on Data Validation.
    - In the Settings tab, choose Allow as Unique.
    - Click OK.
    - Now, trying to enter a duplicate ID will display an error message.
- Scenario 2: Limit unit price entries to a specific range (e.g., $5 to $50).
    - Select the column containing unit prices.
    - Follow steps for Data Validation (Data tab -> Data Validation).
    - In the Settings tab, choose Allow as Decimal and set minimum and maximum values.
    - Click OK.

3. Remove Duplicate Data:

- Select the entire data table.
- Go to the Data tab on the Excel ribbon.
- Click on Remove Duplicates.
- In the Remove Duplicates dialog box, choose the columns where duplicates should be removed (e.g., Product ID).
- Click OK.
- This will remove duplicate rows based on the selected criteria.

4. Data Sorting and Filtering:

- Sorting: Sort the data table by product name (ascending) and then by unit price (descending).
    - Select the entire data table.
    - Go to the Data tab on the Excel ribbon.
    - Click on Sort.
    - Choose Sort by the desired columns (Product Name, Unit Price) and their sort order (ascending/descending).
    - Click OK.
- Filtering: Filter the data table to show only products in the "Clothing" category.
    - Select the entire data table.
    - Click the down arrow in the header row of the "Category" column.
    - Choose the checkbox next to "Clothing" and uncheck others.
    - Only rows with "Clothing" in the category will be displayed.

Specification Sheet-5: Create a Worksheet include data validation, Duplicate Removing, Data sorting and Filtering

Necessary Tools

Sl. No	Name of Tools	Specification	Unit	Quantity
5				

Necessary Equipment

Sl. No	Name of Equipment	Specification	Unit	Quantity
9.	Computer	As Need	No.	01
10.	Spreadsheet Software	As Need	No.	01

Learning Outcome 6: Develop Real Life Project

Assessment Criteria	1. Able to determine Project type 2. Able to Design Structure of project 3. Able to develop Project as per design
Conditions and Resources	1. Real or simulated workplace 2. CBLM 3. Handouts 4. Laptop 5. Multimedia Projector 6. Paper, Pen, Pencil, Eraser 7. Internet facilities 8. White board and marker 9. Audio Video Device
Contents	1. Project Types o Accounting System o Inventory System o Payroll System 2. Determining Project Type 3. Designing Project Structure
Activities/job/Task	1. Create a Basic Accounting System (Grocery Shop) using Excel
Training Methods	1. Discussion 2. Presentation 3. Demonstration 4. Guided Practice 5. Individual Practice 6. Project Work 7. Problem Solving 8. Brainstorming
Assessment Methods	1. Written Test 2. Demonstration 3. Oral Questioning 4. Portfolio

Learning Experience 6: **Develop Real Life Project**

In order to achieve the objectives stated in this learning guide, you must perform the learning steps below. Beside each step are the resources or special instructions you will use to accomplish the corresponding activity.

Learning Activities	**Recourses/Special Instructions**
1. Trainee will ask the instructor about about the learning materials	1. Instructor will provide the learning materials 'Use Tools'
2. Read the Information sheet and complete the Self Checks & Check answer sheets on "Use Tools"	2. Read Information sheet 5**:** Use Tools 3. Answer Self-check 5**:** Use Tools 4. Check your answer with Answer key 5**:** Use Tools
3. Read the Job/Task Sheet and Specification Sheet and perform job/Task	5. Job/Task Sheet and Specification Sheet Job Sheet-6: Create a Basic Accounting System (Grocery Shop) using Excel

Information Sheet 6: Develop Real Life Project

Learning Objective:

After completion of this information sheet, the learners will be able to explain, define and interpret the following contents**:**

6.1. Project Types
6.2. Determining Project Type
6.3. Designing Project Structure

6.1. Project Types

In the context of freelancing accounting, spreadsheets can be used to manage and organize various types of projects. Below are examples of common project types that freelancers might deal with:

a. Accounting System
An accounting system is essential for tracking income, expenses, and profits. Spreadsheets are often used for this purpose because they can provide an organized structure for financial records.

Example: Income Statement: A simple spreadsheet template can be used to record revenue (invoices, payments received) and expenses (supplies, software subscriptions).

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Date	Description	Income	Expense	Balance
2025-01-01	Payment from Client A	500		500
2025-01-05	Purchase of Software		100	400

This spreadsheet will allow freelancers to track their financial performance over time.

b. Inventory System

Freelancers may need an inventory system to manage items related to their business, such as office supplies, merchandise for reselling, or other physical goods used in projects.

Example: Inventory Tracking: A spreadsheet can help track the items in stock, their quantity, and cost, making it easier to manage resources.

Item	Quantity	Unit Cost	Total Cost
Printer Ink	10	20	200
Laptop Stand	5	30	150

c. Payroll System

If the freelancer is employing others, managing payroll might also be necessary. Spreadsheets can calculate wages, taxes, and deductions based on hours worked or salary.

Example:Employee Payroll: A payroll spreadsheet will show employee details, hours worked, pay rate, and the total amount due.

Employee Name	Hours Worked	Hourly Rate	Gross Pay	Taxes (10%)	Net Pay
John Doe	40	25	1000	100	900
Jane Smith	35	30	1050	105	945

6.2. Determining Project Type

Before starting a project, it's important to assess the nature of the project to choose the most appropriate project type. In freelancing accounting, some key factors to consider when determining project type include:

1. **Project Scope**: What is the primary goal of the project? Is it focused on managing income and expenses (Accounting System), tracking inventory (Inventory System), or calculating wages for employees (Payroll System)?

2. **Complexity**: If the project requires a lot of data, such as multiple employees or complex inventory, it might warrant an advanced spreadsheet structure with formulas and functions.
3. **Time Frame**: How long will the project last? A short-term project might need a simpler accounting system, while a long-term project could involve more detailed tracking.
4. **Volume of Data**: Larger projects might require the use of pivot tables, data validation, or charts in spreadsheets to effectively organize and analyze information.

6.3. Designing Project Structure

Designing an effective project structure in a spreadsheet ensures that data is organized, easy to access, and can be used for analysis. Here are steps for designing a project structure:

a. Create Separate Sheets for Each Function

For complex projects, creating multiple sheets for each section of the project can help maintain clarity. For example:

- **Sheet 1**: Income and Expenses
- **Sheet 2**: Inventory Tracking
- **Sheet 3**: Payroll Information

b. Use Tables and Headers

Each sheet should have clear headers to define the data being collected (e.g., Date, Description, Amount). Using tables can help organize data and make it easier to filter and sort.

c. Incorporate Basic Formulas and Functions

Incorporating functions like SUM, AVERAGE, and IF statements allows for automatic calculations. For example, the balance in an accounting system can be calculated with a formula:

- =SUM(C2:C10) - SUM(D2:D10) for calculating the balance after expenses.

d. Incorporate Data Validation

Data validation ensures that only valid data is entered in the spreadsheet. For example, a cell can be restricted to accept only dates or numbers, ensuring no invalid entries.

e. **Visualize Data with Charts**
   Using charts to visualize income, expenses, or inventory changes can provide insights at a glance. A bar chart for monthly income vs. expenses, or a pie chart for expense distribution, is an effective way to present data visually.

Example of Structure Design for Accounting System:

Sheet 1: Income and Expenses

Date	Description	Income	Expense	Balance
2025-01-01	Client A	500		500
2025-01-05	Software		100	400

Sheet 2: Inventory Tracking

Item	Quantity	Unit Cost	Total Cost
Printer Ink	10	20	200

Sheet 3: Payroll

Employee Name	Hours Worked	Hourly Rate	Gross Pay	Taxes (10%)	Net Pay
Mahmud	40	25	1000	100	900

Self-Check Sheet 6: Develop Real Life Project

1. What is an Accounting System used for in freelancing?
   Ans:

2. What does an Inventory System help manage?
   Ans:

3. What does a Payroll System calculate?
   Ans:

4. What is the importance of determining project type before starting a project?
   Ans:

5. Why is data validation important in spreadsheet design?
   Ans:

Answer Key 6: Develop Real Life Project

1. What is an Accounting System used for in freelancing?
   Ans: An Accounting System tracks income, expenses, and profits for a freelancer.

2. What does an Inventory System help manage?
   Ans: An Inventory System helps manage items like office supplies and merchandise for resale.

3. What does a Payroll System calculate?
   Ans: A Payroll System calculates wages, taxes, and deductions for employees.

4. What is the importance of determining project type before starting a project?
   Ans: It ensures that the right system (accounting, inventory, or payroll) is chosen based on the project's scope and complexity.

5. Why is data validation important in spreadsheet design?
   Ans: Data validation ensures only valid data is entered, reducing errors and maintaining data integrity.

Job Sheet-6: Create a Basic Accounting System (Grocery Shop) using Excel

Working Procedure:

1. **Create an Excel Workbook Structure**
    - Open Excel and create a new workbook.
    - Create separate sheets for different categories:
        - **Sales Tracking**: Record daily sales transactions.
        - **Purchase Tracking**: Record purchases of inventory.
        - **Inventory Management**: Track stock levels of goods.
        - **Expense Tracking**: Record expenses (e.g., rent, utilities).
        - **Income Statement**: Summarize income and expenses.
2. **Sales Tracking Sheet**
    - Columns: Date, Item Name, Quantity Sold, Unit Price, Total Sales (Quantity x Unit Price).
    - Example:

Date	Item Name	Quantity Sold	Unit Price	Total Sales
2025-01-01	Apples	10	2.00	20.00
2025-01-01	Rice	5	5.00	25.00

3. **Purchase Tracking Sheet**
    - Columns: Date, Item Name, Quantity Purchased, Unit Price, Total Purchase (Quantity x Unit Price).
    - Example:

Date	Item Name	Quantity Purchased	Unit Price	Total Purchase
2025-01-01	Apples	50	1.80	90.00
2025-01-02	Rice	30	4.50	135.00

4. **Inventory Management Sheet**
    - Columns: Item Name, Starting Stock, Purchases, Sales, Ending Stock.
    - Example:

Item Name	Starting Stock	Purchases	Sales	Ending Stock
Apples	0	50	10	40
Rice	0	30	5	25

5. **Expense Tracking Sheet**
    - Columns: Date, Expense Category (e.g., rent, utilities), Description, Amount.
    - Example:

Date	Expense Category	Description	Amount
2025-01-01	Rent	Monthly Rent	500.00
2025-01-02	Utilities	Electricity Bill	100.00

6. **Income Statement Sheet**
    - Create a summary sheet that includes total income (from sales), total expenses, and net profit.
    - Use formulas to calculate totals and the difference between income and expenses.

Specification Sheet-6: Create a Basic Accounting System (Grocery Shop) using Excel

Necessary Equipment

Sl. No	Name of Equipment	Specification	Unit	Quantity
1.	Computer	As Need	No.	01
2.	Spreadsheet Software	As Need	No.	01

Reference

1. **"Excel for Accounting"** by Lita Epstein (2010) – A practical guide for managing financial records and reports using Excel.
2. **"Excel for Finance and Accounting"** by Michael Rees (2007) – Focuses on using Excel for financial analysis, budgeting, and reporting.
3. **"Financial Modeling in Excel For Dummies"** by Danielle Stein Fairhurst (2018) – Covers financial modeling, forecasting, and analysis with Excel.
4. **"Excel Accounting: A Guide for Small Business Owners"** by D. R. (Bob) Woolf (2002) – A guide for small business owners on managing finances with Excel.
5. **"Accounting and Financial Analysis Using Excel"** by R. L. (Ray) Anderson (2006) – Teaches using Excel for accounting and financial data analysis.

Review of Competency

Below is yourself assessment rating for module “Use Spreadsheets”

Assessment of performance Criteria	Yes	No
Sheet is prepared	☐	☐
Sheet is formatted as per requirement	☐	☐
Layout is made as required	☐	☐
Functions are used as per requirements	☐	☐
Functions are selected as required	☐	☐
Data is accessed as per client's requirements	☐	☐
Chart type is selected as per client's requirements	☐	☐
Chart is created as required	☐	☐
Chart is formatted as required	☐	☐
Chart is presented as required	☐	☐
Data is accessed as per client's requirements	☐	☐
Data is formatted as Table	☐	☐
Report is designed in Pivot as requirement	☐	☐
Report is submitted to client	☐	☐
Tools are selected	☐	☐
Tools are learned	☐	☐
Project type is determined	☐	☐
Structure of project is designed	☐	☐
Project is developed as per design	☐	☐

I now feel ready to undertake my formal competency assessment.

Signed**:**

Date**:**

Development of CBLM

The Competency based Learning Material (CBLM) of ‘Using Spreadsheets (Occupation: Accounting for Freelancing) for National Skills Certificate is developed by NSDA with the assistance of SAMAHAR Consultants Ltd.in the month of June, 2024 under the contract number of package SD-9C dated 15th January 2024.

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