



Excel Intermediate: Complex Formulas and Charts

Overview: Expand your current Excel knowledge to include more complex formulas (including Year-to-Date formulas with cells from across spreadsheets), charts, naming worksheets and printing headers.

Student Skill Level: Intermediate

Requirements: **Excel Basic class or familiarity with the program.** Good mouse skills (ability to move the mouse on the computer screen and click or double click as required with minimal assistance).

Objectives

- The student will be able to use an existing Excel workbook for the following:
 - Look at a collection tool and set up a workbook
 - Create Year-to-Date formulas across spreadsheets
 - Insert a chart based on data from a spreadsheet



Getting Information into the Spreadsheet: Practice Setting Up the Workbook

The following is a simple form that could be used to collect responses regarding workshops. How would you “translate” this paper into the Excel format? It’s important to get all the data into the spreadsheet so that we can see how many workshops were done, dates, locations, etc. All of this information would be tallied so that a monthly report could be made. How would you do it?

Location Name: _____ Date: _____

Workshop Title: _____

Trainer’s Name: _____

How did you advertise this class? (For example, Flyer, Newspaper, Web Site, Other?)

Please comment on the following **benefits** of hosting this workshop (check the box):

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Attendees report satisfaction					
Computer training frees time					
Staff members asked questions					
Trainer discussed future classes					
Interested in future classes					

Please rate your **satisfaction** with the following (check the box):

	Very Unsatisfied	Unsatisfied	Neutral	Satisfied	Very Satisfied
Interaction with Trainer					
Easy to Book					
Mobile Training Web Site Content					
Materials & Handouts					
Overall Satisfaction					

Please include additional comments about this program and/or how it may have made a difference to your patrons:

Once you have the questions in the sheet, you may use **Alt+Enter** to place a “hard return” in the cells (to make them take up less horizontal space).

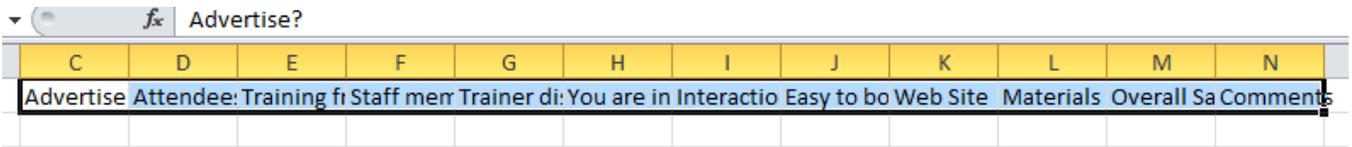
Where to start: What data doesn't change?

Every piece of paper is a person – and every person corresponds to a row in Excel. So, we'll put the “unchanging” data across Row 1. Please USE THE **TAB** key to move from cell to cell. We'll wrap the text so it looks right **either before** or **after** we've entered it. **START IN CELL A1** with “Location,” to **B1** with “Date,” etc.

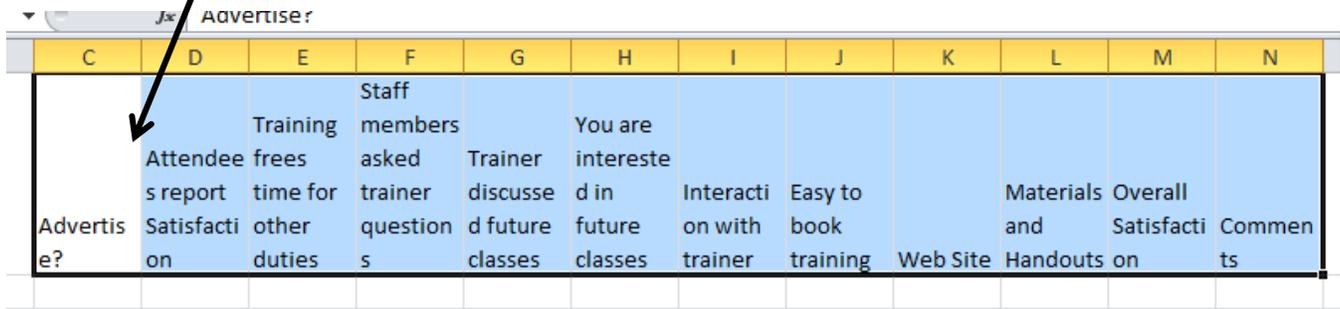
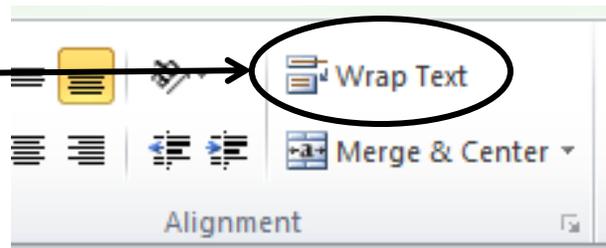
C	D	E	F	G	H	I	J	K	L	M	N
Advertise	Attendee:	Training fr	Staff mem	Trainer di:	You are in	Interactio	Easy to bo	Web Site	Materials	Overall Sa	Comments

It looks messy here, but we'll use **Wrap Text** to make it look better.

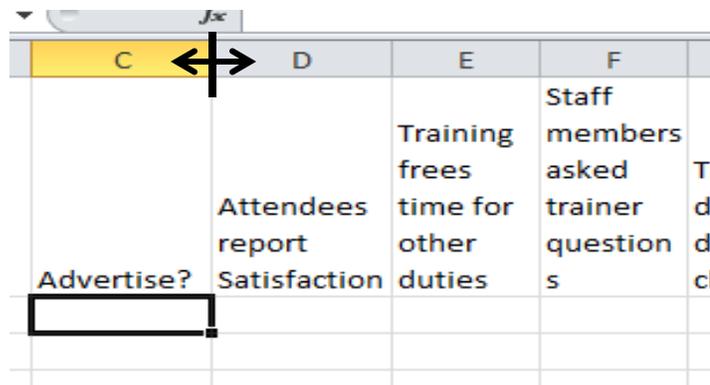
Select cells **A1 to N1** only.



Click on **Wrap Text** in the Alignment group on the Home tab, and this is what you'll see:



Click on any blank cell on the spreadsheet to get rid of the selection (in blue). Change the column width to accommodate the words.



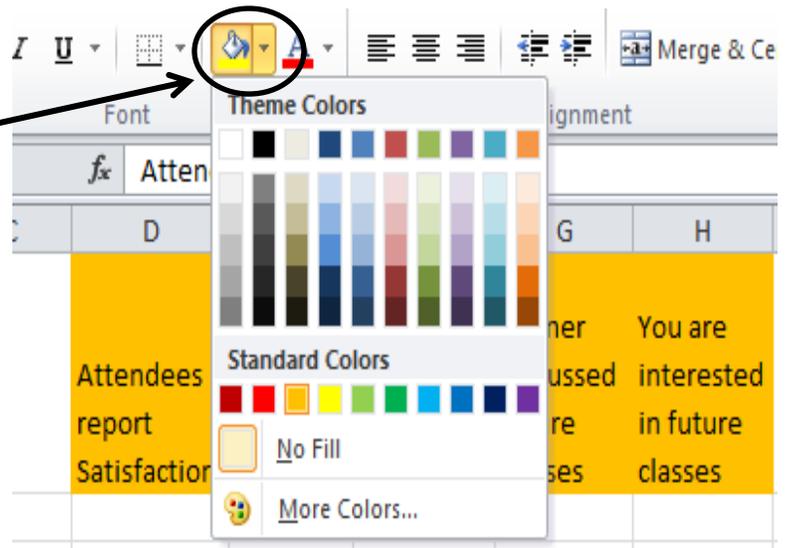
C	D	E	F	G	H	I	J	K	L	M	N
Advertise?	Attendees report Satisfaction	Training frees time for other duties	Staff members asked trainers questions	Trainer discussed future classes	You are interested in future classes	Interaction with trainer	Easy to book training	Web Site	Materials and Handouts	Overall Satisfaction	Comme

This is an example of how you may set up a spreadsheet to capture data. Next thing I would do is color-code the three separate areas of interest: **Benefits**, **Satisfaction**, and **Overall Satisfaction**.

Select the questions under **Benefits**

D	E	F	G	H
Attendees report Satisfaction	Training frees time for other duties	Staff members asked trainers questions	Trainer discussed future classes	You are interested in future classes

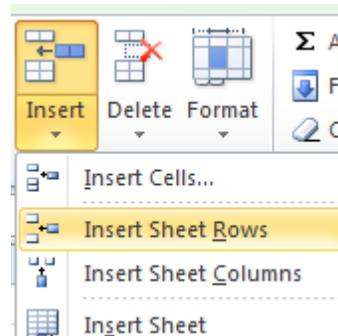
Click on the **Fill Color** command and choose a color (I go for lighter colors because they're easier to read). Repeat this for **Satisfaction** and **Overall Satisfaction** cells.



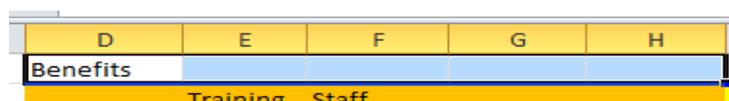
D	E	F	G	H	I	J	K	L	M
Attendees report Satisfaction	Training frees time for other duties	Staff members asked trainers questions	Trainer discussed future classes	You are interested in future classes	Interaction with trainer	Easy to book training	Web Site	Materials and Handouts	Overall Satisfaction

** Prove It Test: Since we have two main sections, let's add a row, label them, and use the **Merge and Center** option. We will also **Freeze** the top row.

Insert a new row one by **clicking on cell A1** and clicking on the **Home Tab > Cells group > Insert > Insert Sheet Rows**



Type "Benefits" in cell D1 and press Enter

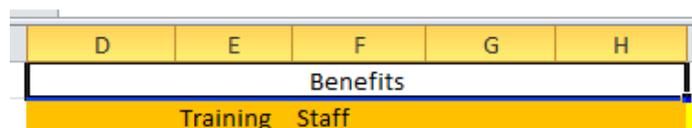


Highlight D1 to H1

To merge and center the item, click the **Home Tab > Alignment Group > Merge and Center**

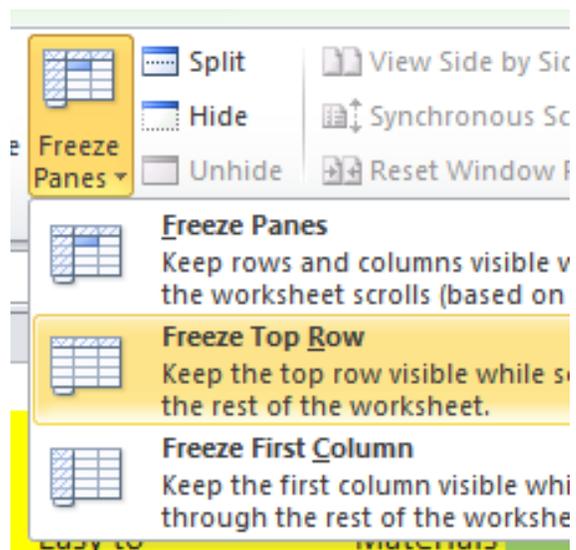


Do the same for cells I1 to L1, "Satisfaction."



To freeze this row so it can be seen at all times, go to the **View Tab > Window Group > Freeze Top Row.**

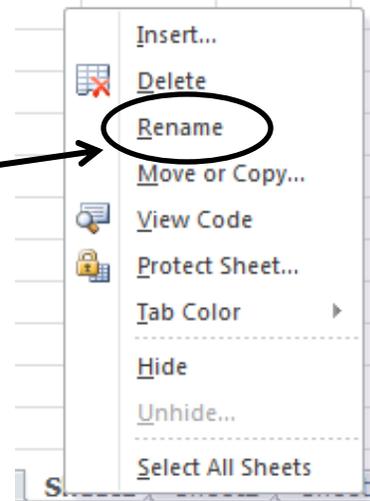
This makes the top row visible no matter how far down you scroll.



Rename and Copy Spreadsheet

Once you get a spreadsheet set up, you don't want to keep having to set it up month after month. You may **rename** it then **copy** it.

Right-click the tab (labeled **Sheet 1** here) and click on the **Rename** command. (Alternately, you may **double click** the sheet name and type over it.)



Sheet 1 will be selected (in black)

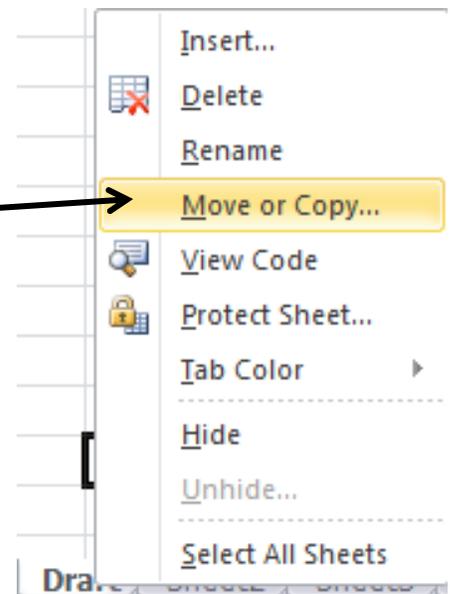


Type in **Draft** for the sheet name (or "Template" or whatever name makes sense to you). This will be the generic sheet we will copy for the rest of the months.



Press your Enter key or click once on the sheet to make the new name permanent.

Right-click on the sheet name. This time choose the **Move or Copy** command.



We will put in two formulas: a **count formula** in column **A** and an **average formula** in column **M**.

COLUMN A FORMULA:

It's easiest to create the formulas in the following manner:

= every formula begins with an equal sign

COUNTA this is the proper formula to use when you are counting text items in cells

(open parenthesis

Now, use your mouse to select the cells you want to include in the formula (click and hold your mouse and drag over the cells you want).

) close parenthesis

2		
3	Word Basic	
4	BDOL	1/4/20...
5	BDOL	1/4/20...
6	BDOL	1/4/20...
7	BDOL	1/4/20...
8	BDOL	1/4/20...
9	BDOL	1/4/20...
10	BDOL	1/4/20...
11	=COUNTA(A4:A10)	

=COUNTA(A4:A10)

When you do this correctly, press the **Enter key** on the keyboard. You should now see a number for your attendance for this particular class.

Repeat this pattern to get attendance numbers for the classes in January.

3	Word Basic	
4	BDOL	
5	BDOL	
6	BDOL	
7	BDOL	
8	BDOL	
9	BDOL	
10	BDOL	
11		7

COLUMN M FORMULA:

= every formula begins with an equal sign

AVERAGE this is the proper formula to use when you are averaging numbers in cells

(open parenthesis

Now, use your mouse to select the cells you want to include in the formula (click and hold your mouse and drag over the cells you want).

) close parenthesis

Press **Enter**

5	5	
5	5	
4	4	
3	3	
5	5	
4	4	
4	5	
=AVERAGE(M4:M10)		
		4.42857143

Once the numbers are in, we have to summarize the entire month. Below is a way to do that.

Column **O** will contain our labels, and column **P** will have our formulas. These formulas will summarize our entire month.

O	P
Classes	5
Attendance	
Average	

Here's the **attendance** formula.
Type a comma between cells to select multiple, non-continuous cells.

Classes	5
Attendance	=sum(A11,A19,A28,A41,A50)
Average	

Here's the Overall Satisfaction **average** for the month of January

Attendance	
Average	=average(M11,M19,M28,M41,M50)

Here's the final outcome

Classes	5
Attendance	34
Average	3.97905

Remember, all your monthly sheets will look like this.

Year-to-Date Formulas

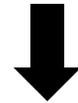
There are several ways to create YTD formulas. First, we'll get our sheet to automatically update monthly attendance totals. Then, we'll look at making a single formula that covers multiple spreadsheets. Here we see that the number of classes in January is simply counted "by hand" and typed in.

To get our monthly totals to automatically populate the YTD sheet, we can simply set up the sheet (as seen here) then add simple formulas.

1			
2		Classes	Attendance
3	January	5	
4	February	4	
5	March	5	
6	April	6	
7	May	6	
8	June	5	
9	YTD Total	31	

The attendance in **cell C3** is actually a **partial formula**, but with only one cell from one spreadsheet.

	Classes	Attendance
January	5	34



So, we're not using a full formula:

Just type in an equal sign
Click the sheet you need
Click the cell you wish to "copy and paste."
Press Enter and you're back to the YTD sheet.

`=Jan!P4`

The same thing can be done to tally the **monthly averages**.

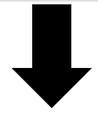
For the YTD totals, just use a sum formula for attendance **=SUM(C3:C8)**

9	YTD Total	31	288	4.126339
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You may also create a “double check” formula that creates an overall total for the 6 months represented in our spreadsheet. Here are the steps to follow:

- Click in cell **C11**
- Type in **=SUM(**
- Click on the **January** spreadsheet
- Click cell **P4**
- Type in a comma
- Click on **February**
- Click cell **P4**
- Type in a comma

```
fx =SUM(Jan!P4, Feb!P4, Mar!P4, Apr!P4, May!P4, Jun!P4)
```



11	Double Check:	288
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Continue this pattern for each month.

- Close parenthesis (Shift +0)
- Press **Enter**

Insert a Chart

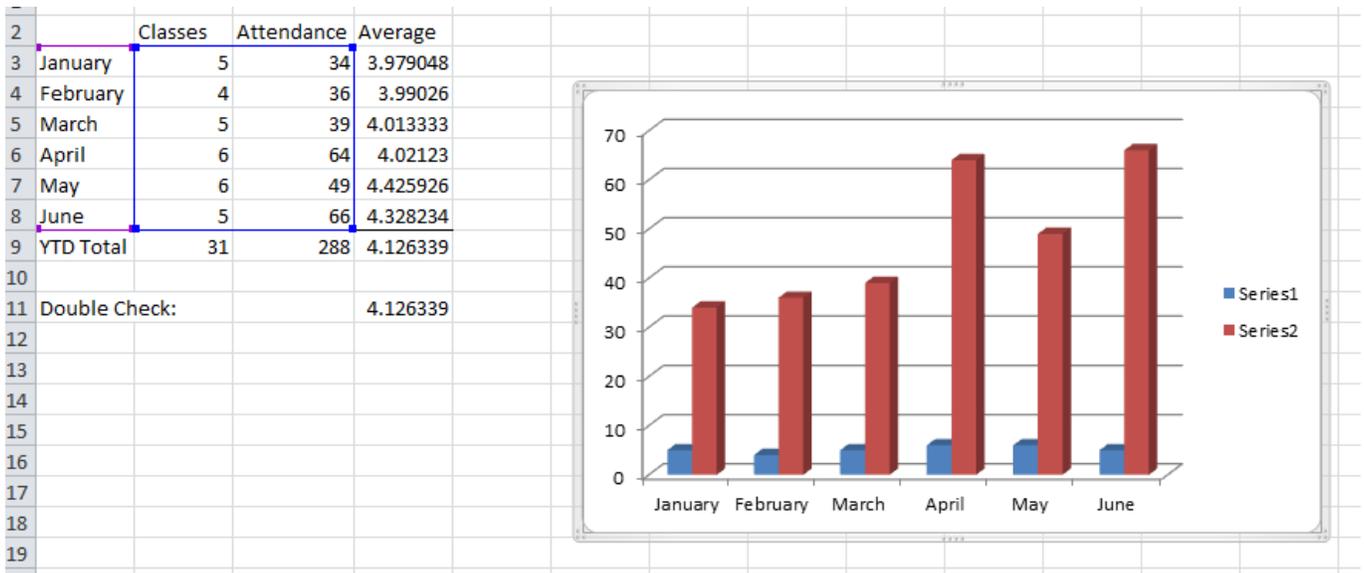
Let’s say we want to compare the total number of classes and attendance for these 6 months. We’ll select our data and use the Insert tab to choose a chart type.

This is a fairly simple chart: **choose A3 to C8** for our chart information.

2		Classes	Attendance
3	January	5	34
4	February	4	36
5	March	5	39
6	April	6	64
7	May	6	49
8	June	5	66
9	YTD Total	31	288

On the **Insert** tab, choose the Recommended Charts button. Click on the **Clustered Column** chart.

As seen below, the chart automatically inserts on the spreadsheet.

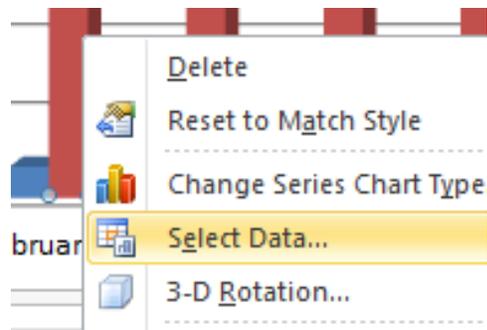


Prove It Test: to change a chart style, **click on the chart and then click the **Design tab** at the top. Choose the chart style from the gallery.

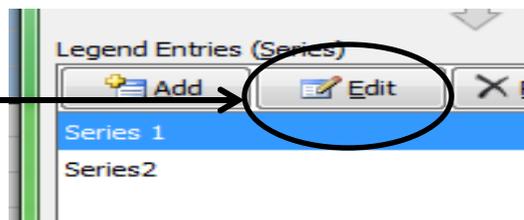


If you need to change the legend on it, here's what you do:

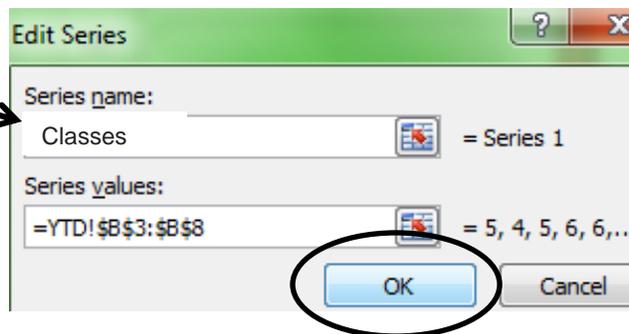
Right-click once on a taller column and choose **Select Data** from the submenu.



Click on **Series 1** and **Edit**



Type the name **Classes** and click OK. Do the same for attendance.



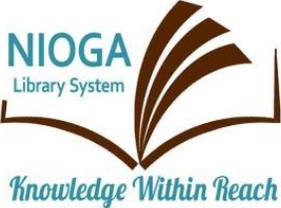
Resources

These items are available in the NIOGA Library System!

Contact your local library for assistance!

Author	Title
Bluttman, K	Excel Formulas and Functions
Harvey, G	Excel 2019 for Dummies
Harvey, G	Excel 2016 for Dummies
McFedries, P and Harvey, G	Microsoft Excel Workbook

Edited 2023



Computer Training Program is provided by:

NIOGA LIBRARY SYSTEM

6575 Wheeler Road - Lockport, NY 14094
Phone - (716) 434-6167 Fax - (716) 434-8231



.....Additional Prove It Test Items.....

To Center a selected worksheet both horizontally and vertically for printing: Page Layout > Page Setup > **Breakout arrow** > Margins > “Center on page” Horizontally and Vertically. Click OK.



To get each worksheet to print on one page: Page Layout > Page Setup > Breakout Arrow > Page > Scaling.... **Fit to 1 page wide by 1 page tall.**



Microsoft®
Excel 2021 Intermediate
 Quick Reference Guide



Chart Elements

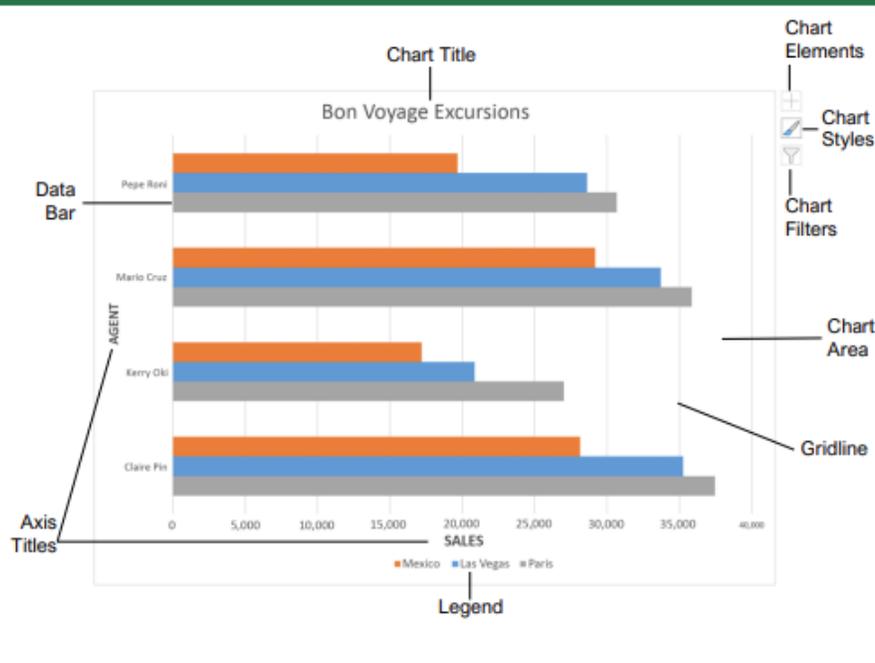


Chart Options

Chart Types

-  **Column:** Used to compare different values vertically side-by-side. Each value is represented in the chart by a vertical bar.
-  **Line:** Used to illustrate trends over time (days, months, years). Each value is plotted as a point on the chart and values are connected by a line.
-  **Pie:** Useful for showing values as a percentage of a whole when all the values add up to 100%. The values for each item are represented by different colors.
-  **Bar:** Similar to column charts, except they display information in horizontal bars rather than in vertical columns.
-  **Area:** Similar to line charts, except the areas beneath the lines are filled with color.
-  **XY (Scatter):** Used to plot clusters of values using single points. Multiple items can be plotted by using different colored points or different point symbols.
-  **Stock:** Effective for reporting the fluctuation of stock prices, such as the high, low, and closing points for a certain day.
-  **Surface:** Useful for finding optimum combinations between two sets of data. Colors and patterns indicate values that are in the same range.

Charts

Create a Chart: Select the cell range that contains the data you want to chart. Click the **Insert** tab on the ribbon. Click a chart type button in the Charts group and select the chart you want to insert.

Move or Resize a Chart: Select the chart. Place the cursor over the chart's border and, with the 4-headed arrow  showing, click and drag to move it. Or, click and drag a sizing handle  to resize it.

Change the Chart Type: Select the chart and click the **Design** tab. Click the **Change Chart Type**  button and select a different chart.

Filter a Chart: With the chart you want to filter selected, click the **Filter**  button next to it. Deselect the items you want to hide from the chart view and click the **Apply** button.

Position a Chart's Legend: Select the chart, click the **Chart Elements**  button, click the **Legend** button, and select a position for the legend.

Show or Hide Chart Elements: Select the chart and click the **Chart Elements**  button. Then, use the check boxes to show or hide each element.

Insert a Trendline: Select the chart where you want to add a trendline. Click the **Design** tab on the ribbon and click the **Add Chart Element**  button. Select **Trendline** from the menu.

Charts

Insert a Sparkline: Select the cells you want to summarize. Click the **Insert** tab and select the sparkline you want to insert. In the Location Range field, enter the cell or cell range to place the sparkline and click **OK**.

Create a Dual Axis Chart: Select the cell range you want to chart, click the **Insert** tab, click the **Combo**  button, and select a combo chart type.

Print and Distribute

Set the Page Size: Click the **Page Layout** tab. Click the **Size**  button and select a page size.

Set the Print Area: Select the cell range you want to print. Click the **Page Layout** tab, click the **Print Area**  button, and select **Set Print Area**.

Print Titles, Gridlines, and Headings: Click the **Page Layout** tab. Click the **Print Titles**  button and set which items you wish to print.

Add a Header or Footer: Click the **Insert** tab and click the **Header & Footer**  button. Complete the header and footer fields.

Adjust Margins and Orientation: Click the **Page Layout** tab. Click the **Margins**  button to select from a list of common page margins. Click the **Orientation**  button to choose Portrait or Landscape orientation.

Additional Chart Elements

Data Labels: Display values from the cells of the worksheet on the plot area of the chart.

Data Table: A table added next to the chart that shows the worksheet data the chart is illustrating.

Error Bars: Help you quickly identify standard deviations and error margins.

Trendline: Identifies the trend of the current data, not actual values. Can also identify forecasts for future data.

Intermediate Formulas

Absolute References: Absolute references always refer to the same cell, even if the formula is moved. In the formula bar, add dollar signs (\$) to the reference you want to remain absolute (for example, **\$A\$1** makes the column and row remain constant).

Name a Cell or Range: Select the cell(s), click the Name box in the Formula bar, type a name for the cell or range, and press **Enter**. Names can be used in formulas instead of cell addresses, for example: **=B4*Rate**.

Reference Other Worksheets: To reference another worksheet in a formula, add an exclamation point '!' after the sheet name in the formula, for example:
=FebruarySales!B4.

Reference Other Workbooks: To reference another workbook in a formula, add brackets '[']' around the file name in the formula, for example:
=[FebruarySales.xlsx]Sheet1!\$B\$4.

Order of Operations: When calculating a formula, Excel performs operations in the following order: Parentheses, Exponents, Multiplication and Division, and finally Addition and Subtraction (as they appear left to right). Use this mnemonic device to remember them:

Please	Parentheses
Excuse	Exponents
My	Multiplication
Dear	Division
Aunt	Addition
Sally	Subtraction

Concatenate Text: Use the CONCAT function **=CONCAT(text1,text2,...)** to join the text from multiple cells into a single cell. Use the arguments within the function to define the text you want to combine as well as any spaces or punctuation.

Payment Function: Use the PMT function **=PMT(rate,nper,pv,...)** to calculate a loan amount. Use the arguments within the function to define the loan rate, number of periods, and present value and Excel calculates the payment amount.

Date Functions: Date functions are used to add a specific date to a cell. Some common date functions in Excel include:

Date	=DATE(year,month,day)
Today	=TODAY()
Now	=NOW()

Display Worksheet Formulas: Click the **Formulas** tab on the ribbon and then click the **Show Formulas**  button. Click the **Show Formulas**  button again to turn off the formula view.

Manage Data

Export Data: Click the **File** tab. At the left, select **Export** and click **Change File Type**. Select the file type you want to export the data to and click **Save As**.

Import Data: Click the **Data** tab on the ribbon and click the **Get Data** button. Select the category and data type, and then the file you want to import. Click **Import**, verify the preview, and then click the **Load** button.

Use the Quick Analysis Tools: Select the cell range you want to summarize. Click the **Quick Analysis**  button that appears. Select the analysis tool you want to use. Choose from formatting, charts, totals, tables, or sparklines.

Outline and Subtotal: Click the **Data** tab on the ribbon and click the **Subtotal**  button. Use the dialog box to define which column you want to subtotal and the calculation you want to use. Click **OK**.

Use Flash Fill: Click in the cell to the right of the cell(s) where you want to extract or combine data. Start typing the data in the column. When a pattern is recognized, Excel predicts the remaining values for the column. Press **Enter** to accept the Flash Fill values.

Create a Data Validation Rule: Select the cells you want to validate. Click the **Data** tab and click the **Data Validation**  button. Click the **Allow** list arrow and select the data you want to allow. Set additional validation criteria options and click **OK**.

Tables

Format a Cell Range as a Table: Select the cells you want to apply table formatting to. Click the **Format as Table**  button in the Styles group of the Home tab and select a table format from the gallery.

	A	B	C	D
1	Excursion	Jan	Feb	Mar
2	Beijing	6,010	7,010	6,520
3	Las Vegas	35,250	28,125	37,455
4	México DF	20,850	17,200	27,010
5	Paris	33,710	29,175	35,840
6	Tokyo	12,510	14,750	11,490
7	Total	108,330	96,260	118,315

Sort Data: Select a cell in the column you want to sort. Click the **Sort & Filter**  button on the Home tab. Select a sort order or select **Custom Sort** to define specific sort criteria.

Filter Data: Click the filter arrow  for the column you want to filter. Uncheck the boxes for any data you want to hide. Click **OK**.

Add Table Rows or Columns: Select a cell in the row or column next to where you want to add blank cells. Click the **Insert**  button list arrow on the Home tab. Select either **Insert Table Rows Above** or **Insert Table Columns to the Left**.

Tables

Remove Duplicate Values: Click any cell in the table and click the **Data** tab on the ribbon. Click the **Remove Duplicates**  button. Select which columns you want to check for duplicates and click **OK**.

Insert a Slicer: With any cell in the table selected, click the **Design** tab on the ribbon. Click the **Insert Slicer**  button. Select the columns you want to use as slicers and click **OK**.

Table Style Options: Click any cell in the table. Click the **Design** tab on the ribbon and select an option in the Table Style Options group.

Intermediate Formatting

Apply Conditional Formatting: Select the cells you want to format. On the **Home** tab, click the **Conditional Formatting**  button. Select a conditional formatting category and then the rule you want to use. Specify the format to apply and click **OK**.

Apply Cell Styles: Select the cell(s) you want to format. On the Home tab, click the **Cell Styles**  button and select a style from the menu. You can also select **New Cell Style** to define a custom style.

Apply a Workbook Theme: Click the **Page Layout** tab on the ribbon. Click the **Themes**  button and select a theme from the menu.

Collaborate with Excel

Add a Cell Comment: Click the cell where you want to add a comment. Click the **Review** tab on the ribbon and click the **New Comment**  button. Type your comment and then click outside of it to save the text.

Invite People to Collaborate: Click the **Share**  button on the ribbon. Enter the email addresses of people you want to share the workbook with. Click the permissions button, select a permission level, and click **Apply**. Type a short message and click **Send**.

Co-author Workbooks: When another user opens the workbook, click the user's picture or initials on the ribbon, to see what they are editing. Cells being edited by others appear with a colored border or shading.

Protect a Worksheet: Before protecting a worksheet, you need to unlock any cells you want to remain editable after the protection is applied. Then, click the **Review** tab on the ribbon and click the **Protect Sheet**  button. Select what you want to remain editable after the sheet is protected.

Add a Workbook Password: Click the **File** tab and select **Save As**. Click **Browse** to select a save location. Click the **Tools** button in the dialog box and select **General Options**. Set a password to open and/or modify the workbook. Click **OK**.