# Data Visualisation and Dashboard Making

- Charts - Column, Bar, Line, Pie, Combo

- Pivot Charts

- Conditional Formatting Data Validation

- Reporting & MIS Preparation

- Excel Interactive Dashboards

Data Visualization in Excel

Data visualization is the graphical representation of information and data. By using visual elements like charts, graphs, and maps, data visualization tools provide an accessible way to see and understand trends, outliers, and patterns in data.
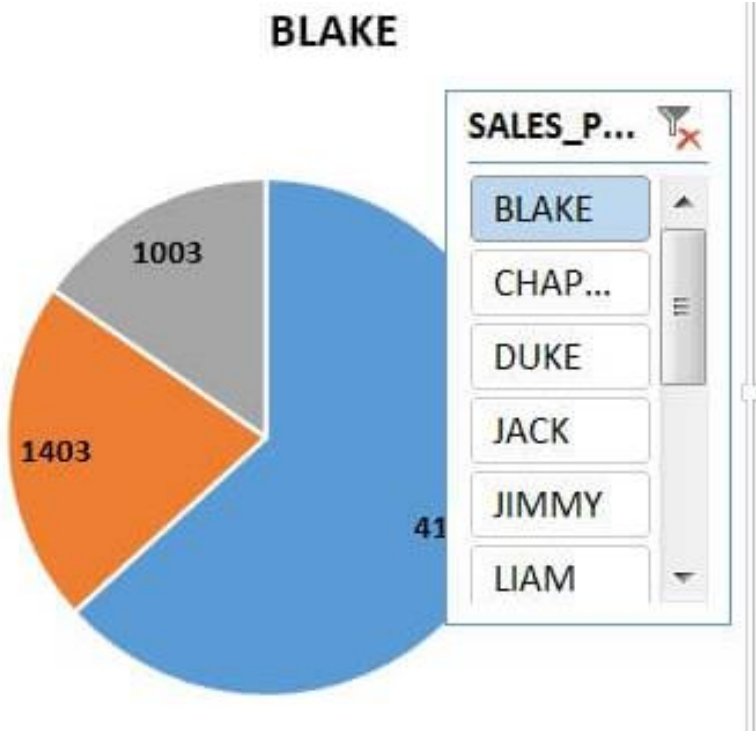
Additionally, it provides an excellent way for employees or business owners to present data to non-technical audiences without confusion.
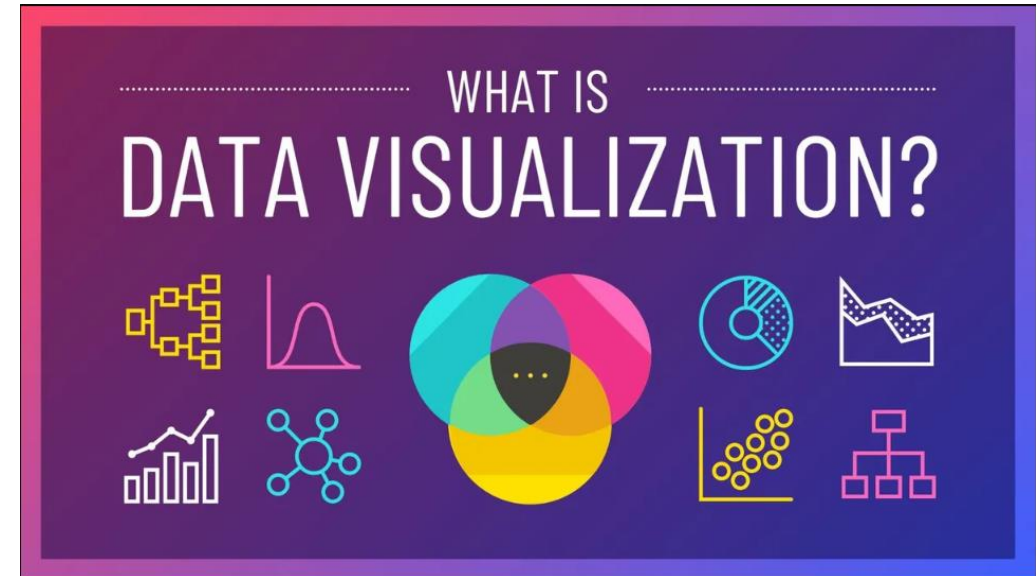
Graphs and Charts in Excel
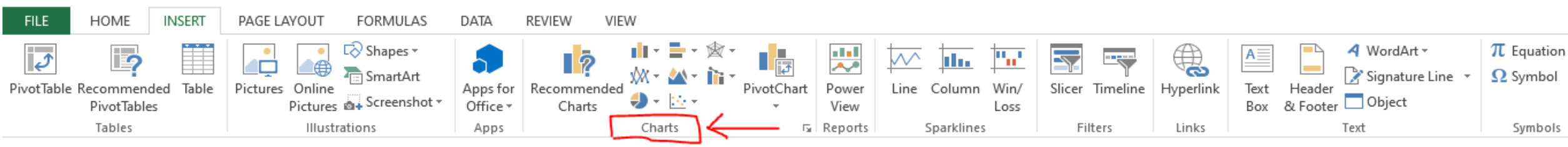
1. Select all cells, including header row.
2. Insert tab --> Charts

Graphs and Charts in Excel

5 Questions to Ask When Deciding Which Type of Chart to Use:

1. Do you want to compare values?

2. Do you want to show the composition of something?

3. Do you want to understand the distribution of your data?

4. Are you interested in analyzing trends in your data set?

5. Do you want to better understand the relationship between value sets?

Chart Types and their Purposes

1. Bar Graph:

- A bar graph should be used to avoid clutter when one data label is long or if you have more than 10 items to compare.

- Bar graphs can help you compare data between different groups or to track changes over time. Bar graphs are most useful when there are big changes or to show how one group compares against other groups.
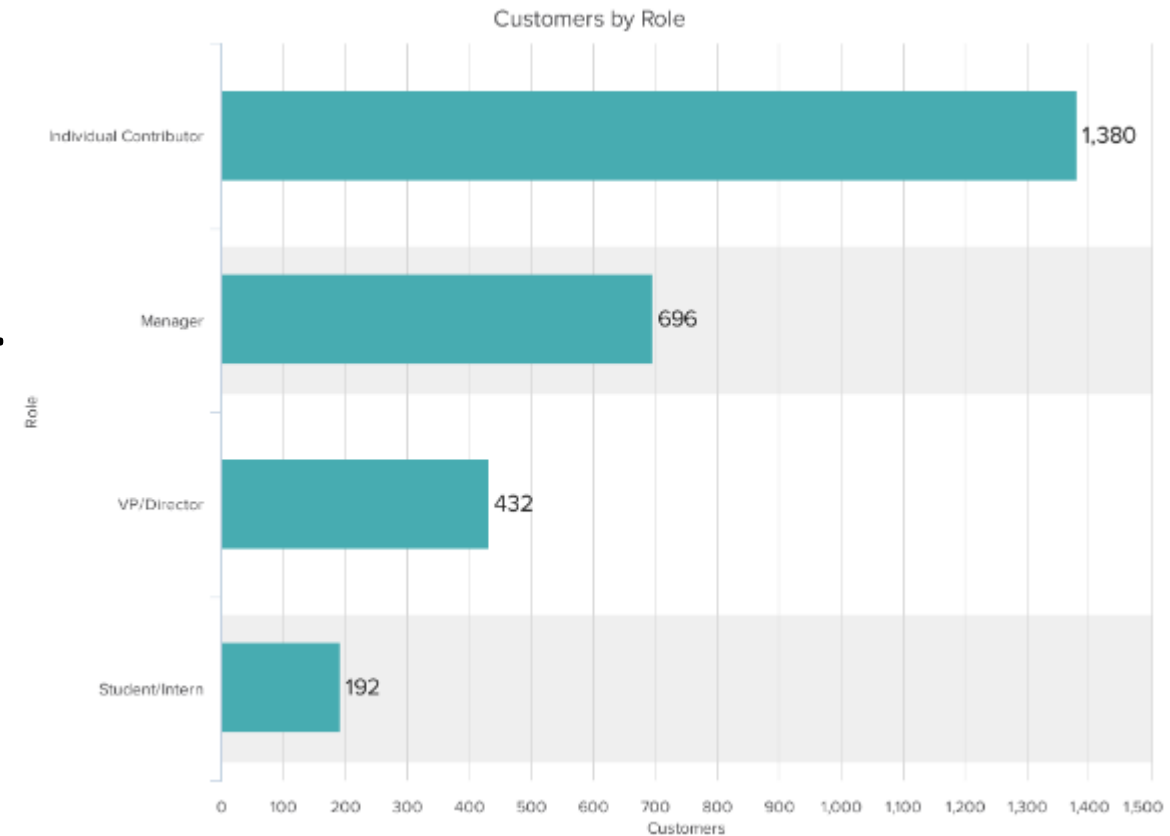
Customers by Role

Role	Customers
Individual Contributor	1,380
Manager	696
VP/Director	432
Student/Intern	192

Chart Types and their Purposes

Best Design Practices for Bar Graphs:

- Use consistent colors throughout the chart, selecting accent colors to highlight meaningful data points or changes over time.
- Use horizontal labels to improve readability.
- Start the y-axis at 0 to appropriately reflect the values in your graph.
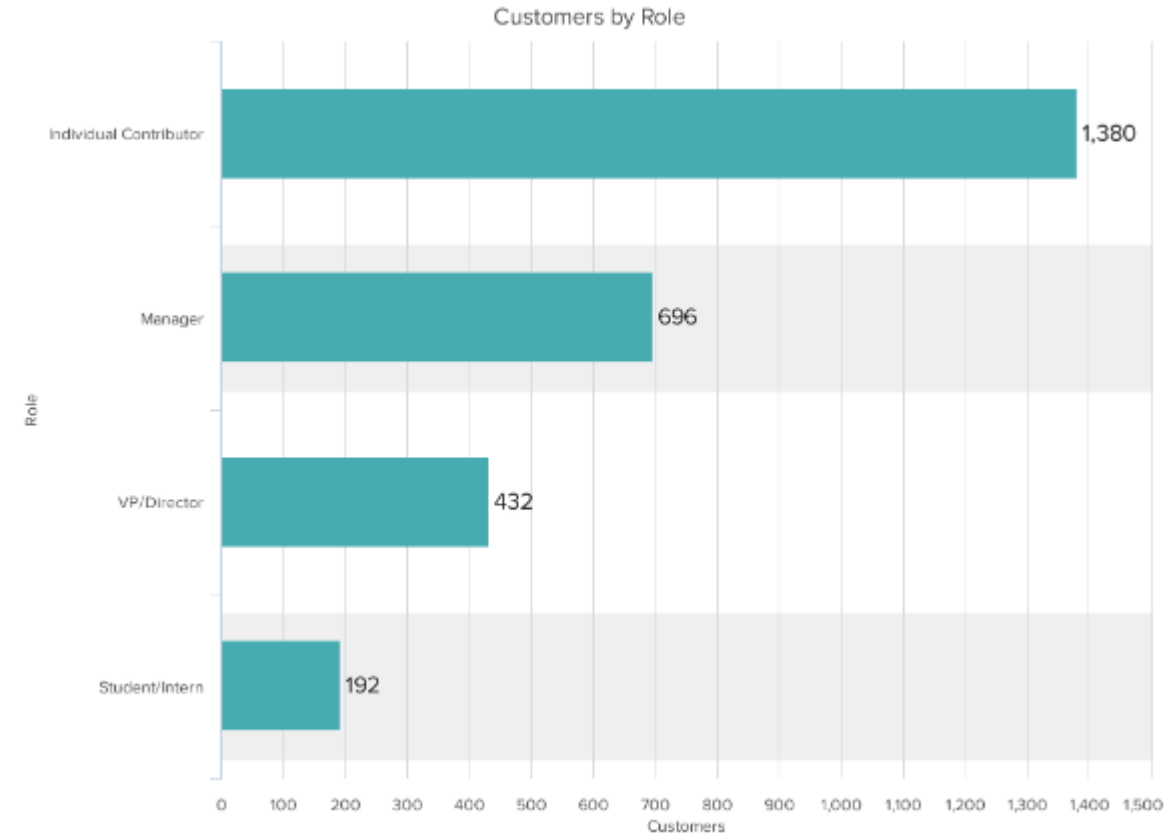
Chart Types and their Purposes

2. Column Graph:

- Use a column chart to show a comparison among different items, or to show a comparison of items over time. You could use this format to see the revenue per landing page or customers by close date.

- While column charts show information vertically, and bar graphs show data horizontally. While you can use both to display changes in data, column charts are best for negative data.

Customers by Close Date

Chart Types and their Purposes

Best Design Practices for Column Graphs:

- Use consistent colors throughout the chart, selecting accent colors to highlight meaningful data points or changes over time.
- Use horizontal labels to improve readability.
- Start the y-axis at 0 to appropriately reflect the values in your graph.

Customers by Close Date

Chart Types and their Purposes

3. Line Graph:

- A line graph reveals trends or progress over time, and you can use it to show many different categories of data. You should use it when you chart a continuous data set.

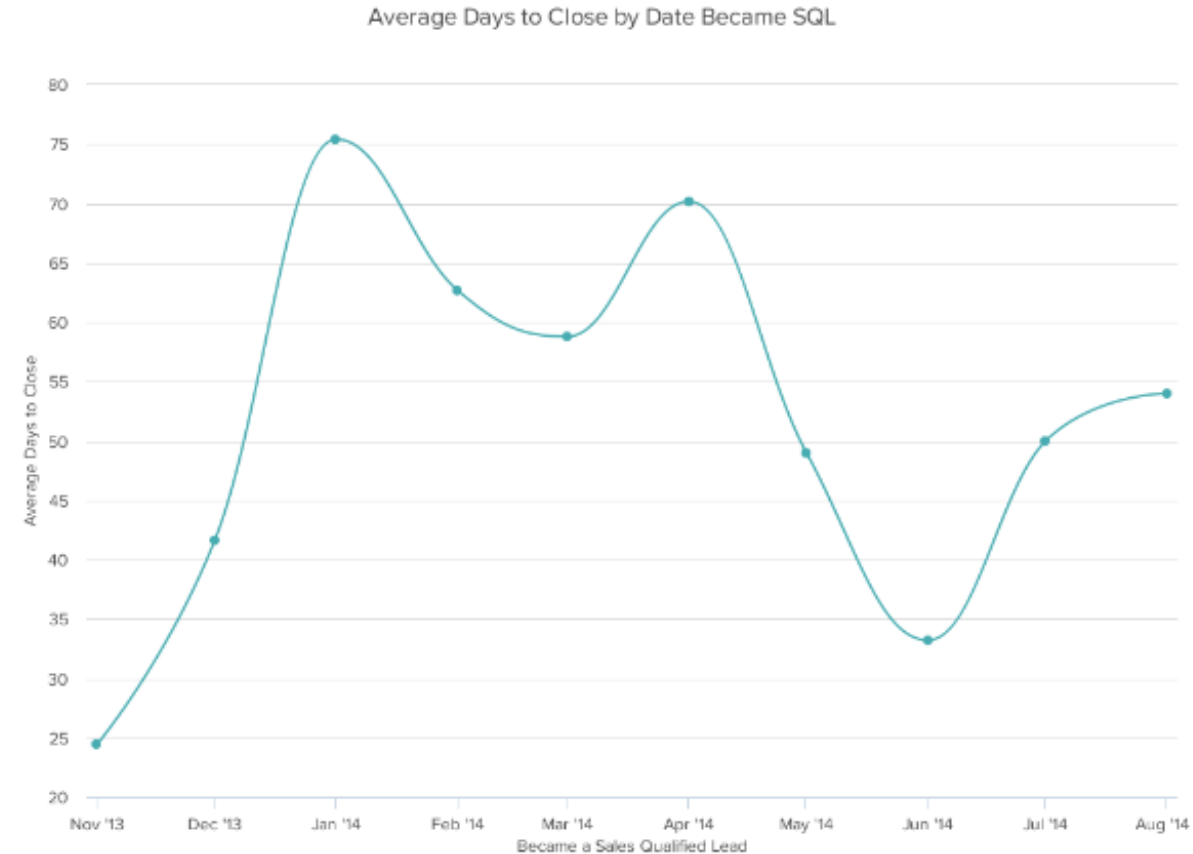- Line graphs can help you compare changes for more than one group over the same period.

Average Days to Close by Date Became SQL

Chart Types and their Purposes

Best Design Practices for Line Graphs:

- Use solid lines only.

- Don't plot more than four lines to avoid visual distractions.

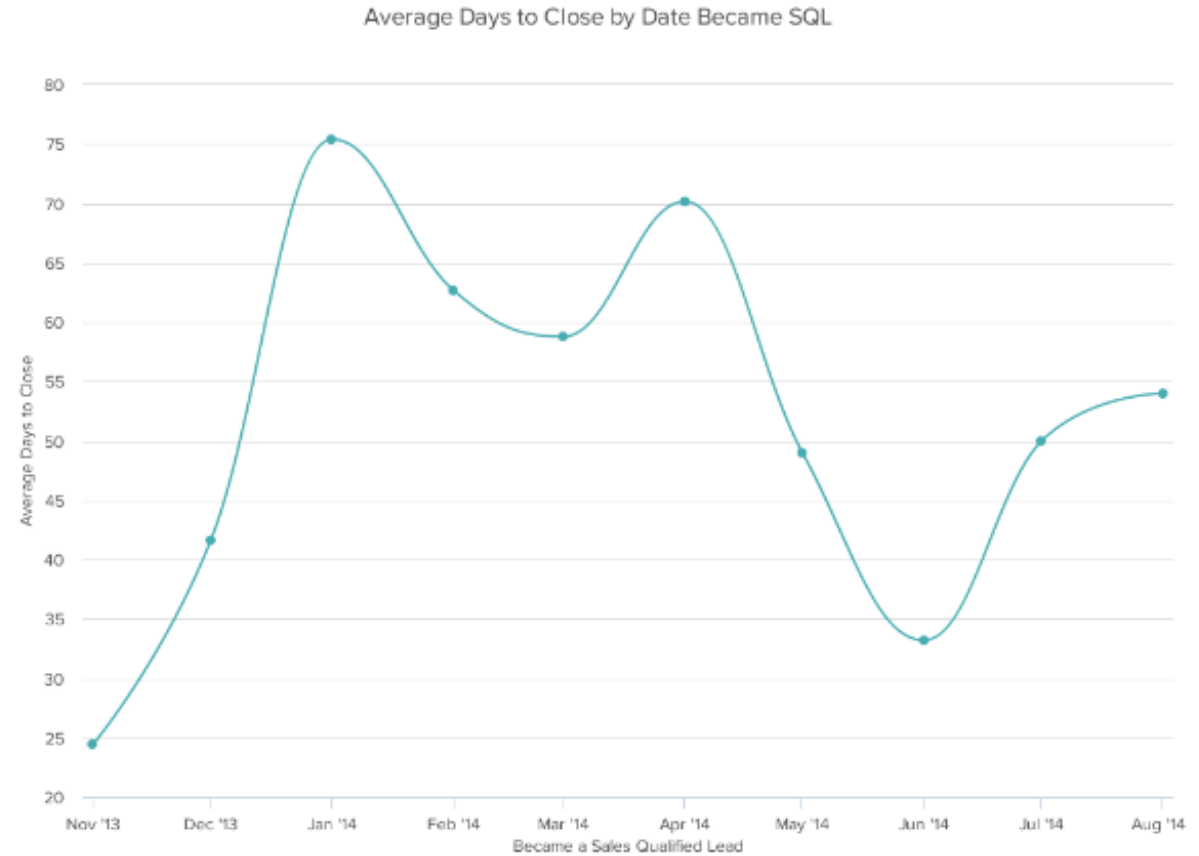- Use the right height so the lines take up roughly 2/3 of the y-axis' height.

Average Days to Close by Date Became SQL

Chart Types and their Purposes

4. Pie Chart:

- A pie chart shows a static number and how categories represent part of a whole — the composition of something. A pie chart represents numbers in percentages, and the total sum of all segments needs to equal 100%.

- Pie charts make it easy to see a section in relation to the whole
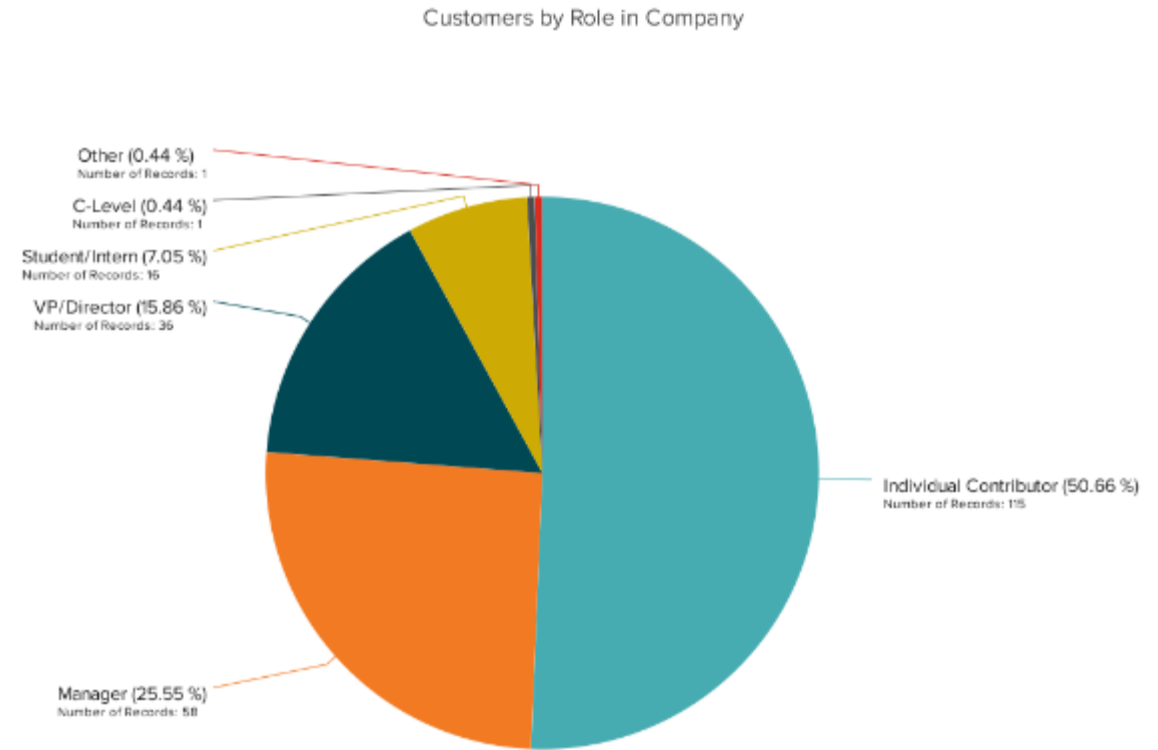
Customers by Role in Company

Other (0.44 %)
Number of Records: 1

C-Level (0.44 %)
Number of Records: 1

Student/Intern (7.05 %)
Number of Records: 16

VP/Director (15.86 %)
Number of Records: 36

Individual Contributor (50.66 %)
Number of Records: 115

Manager (25.55 %)
Number of Records: 58

Chart Types and their Purposes

Best Design Practices for Pie Graphs:

- Don't illustrate more than 6 categories to ensure differentiation between slices.

- Ensure that the slice values add up to 100%.
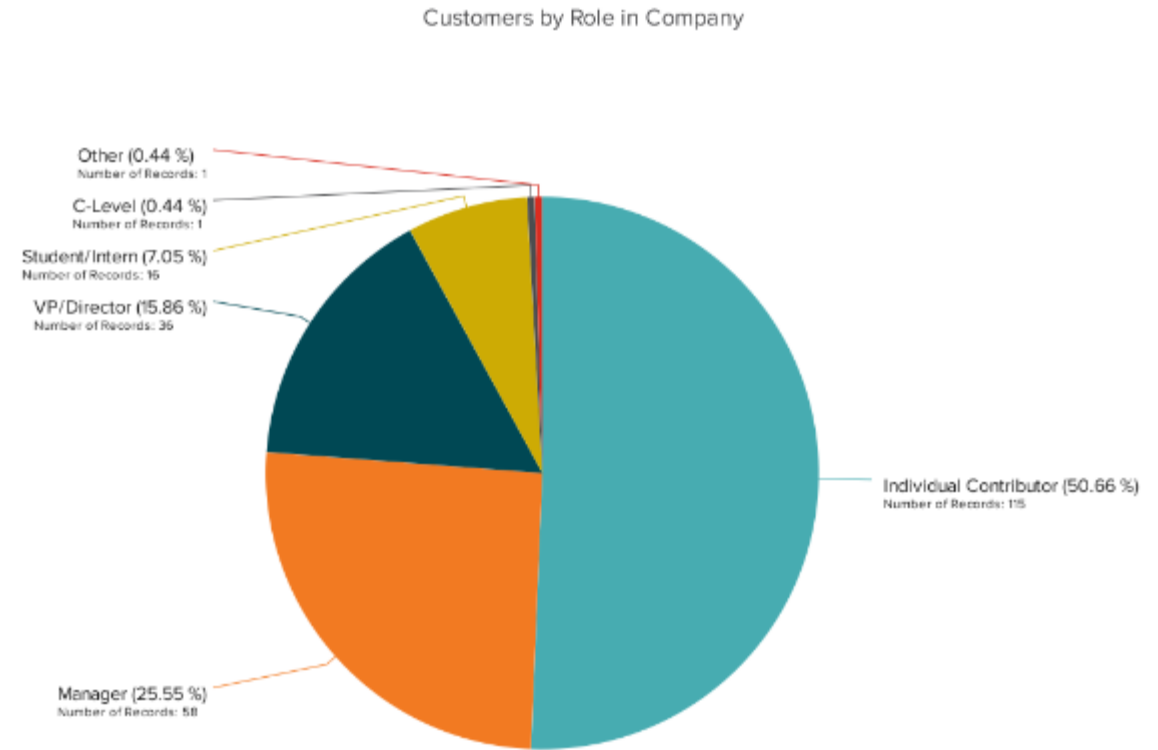
- Order slices according to their size.

Customers by Role in Company

Other (0.44 %)
Number of Records: 1

C-Level (0.44 %)
Number of Records: 1

Student/Intern (7.05 %)
Number of Records: 16

VP/Director (15.86 %)
Number of Records: 36

Individual Contributor (50.66 %)
Number of Records: 115

Manager (25.55 %)
Number of Records: 58

Chart Types and their Purposes

5. Dual Axis Chart (Combo):

- A dual-axis chart allows you to plot data using two y-axes and a shared x-axis. It has three data sets. One is a continuous set of data and the other is better suited to grouping by category. Use this chart to visualize a correlation or the lack thereof between these three data sets.

- A dual-axis chart makes it easy to see relationships between different data sets. They can also help with comparing trends.

Revenue by Number of New Customers by Date
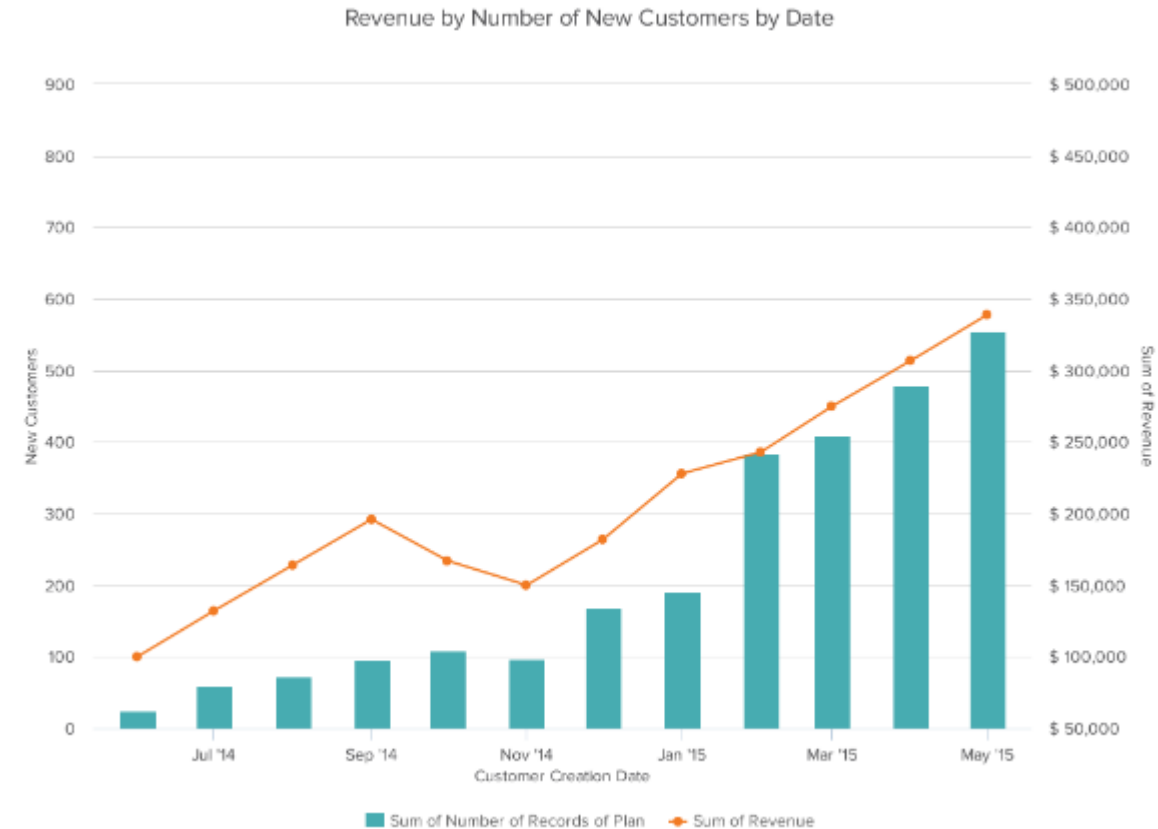
Chart Types and their Purposes

Best Design Practices for Combo Graphs:

- Use the y-axis on the left side for the primary variable because brains are naturally inclined to look left first.
- Use different graphing styles to illustrate the two data sets, as illustrated above.
- Choose contrasting colors for the two data sets.

Revenue by Number of New Customers by Date
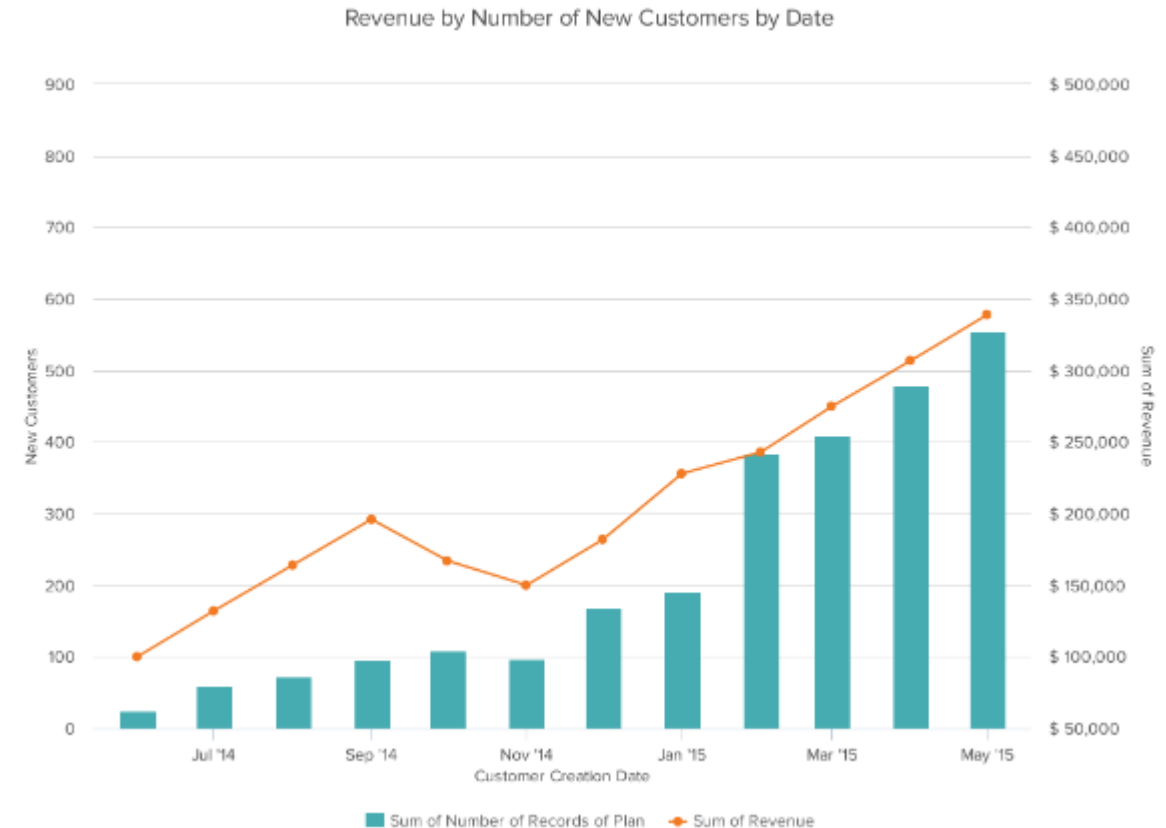
Chart Types and their Purposes

6. <u>Stacked Bar Chart</u>:

- Use this chart to compare many different items and show the composition of each item you're comparing.
- These graphs are helpful when a group starts in one column and moves to another over time.
- Stacked bar charts are also a smart option for planning or strategy meetings. This is because these charts can show a lot of information at once, but they also make it easy to focus on one stack at a time or move data as needed.
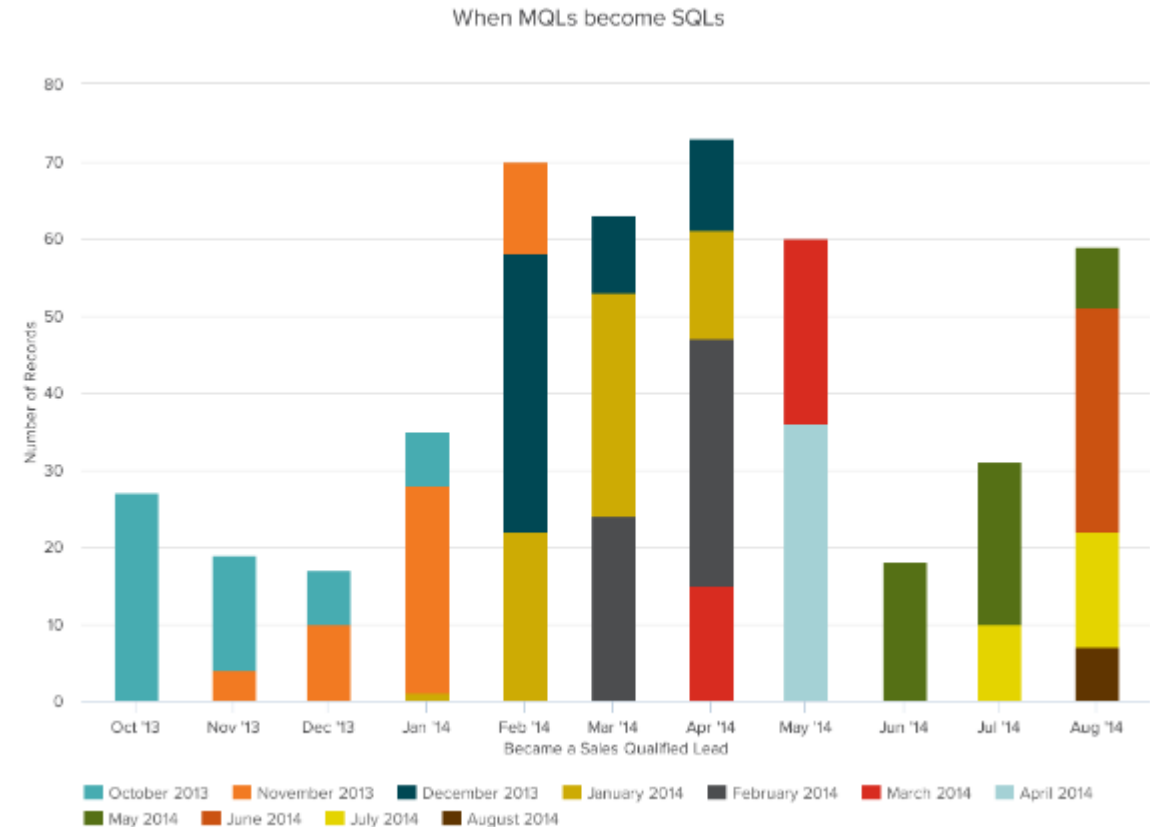
Chart Types and their Purposes

Best Design Practices for Stacked Bar Graphs:

- Best used to illustrate part-to-whole relationships.
- Use contrasting colors for greater clarity.
- Make the chart scale large enough to view group sizes in relation to one another.

When MQLs become SQLs
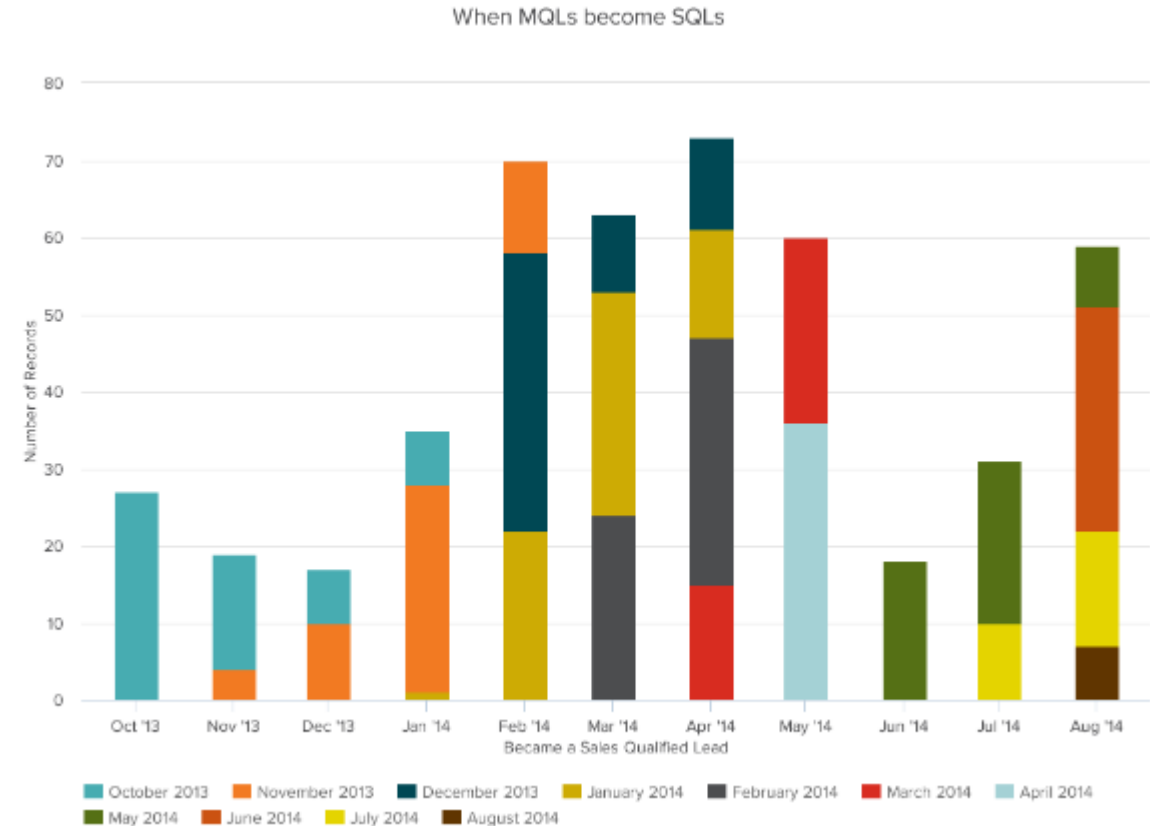
Chart Types and their Purposes

7. <u>100% Stacked Bar Chart</u>:

- A 100% stacked bar chart shows the relative percentage of multiple data series in stacked bars, where the total (cumulative) of each stacked bar always equals 100%.

- Like a pie chart, a 100% stacked bar chart shows a part-to-whole relationship. However, unlike a pie chart, a 100% stacked bar chart can show how proportions change over time.
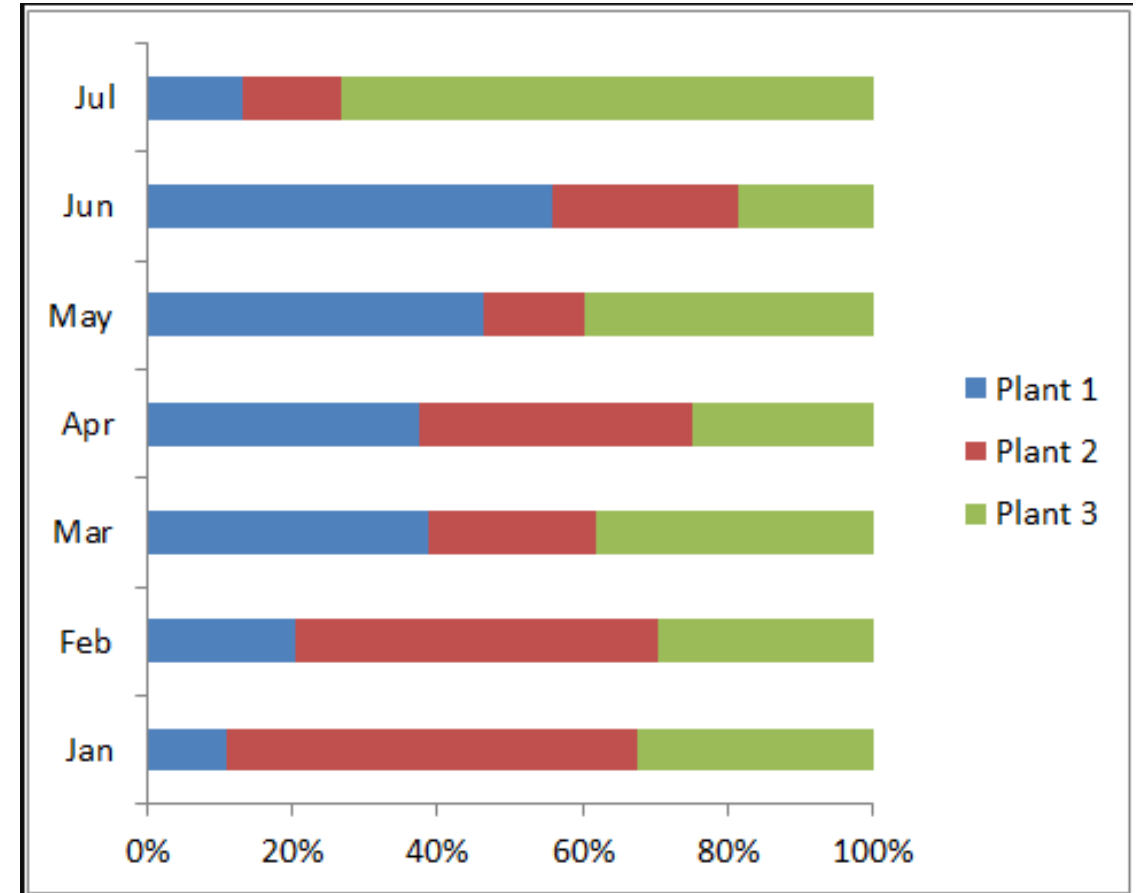
Chart Types and their Purposes

Best Design Practices for 100% Stacked Bar Graphs:

- Limit data series and categories

- Avoid all 3d variants
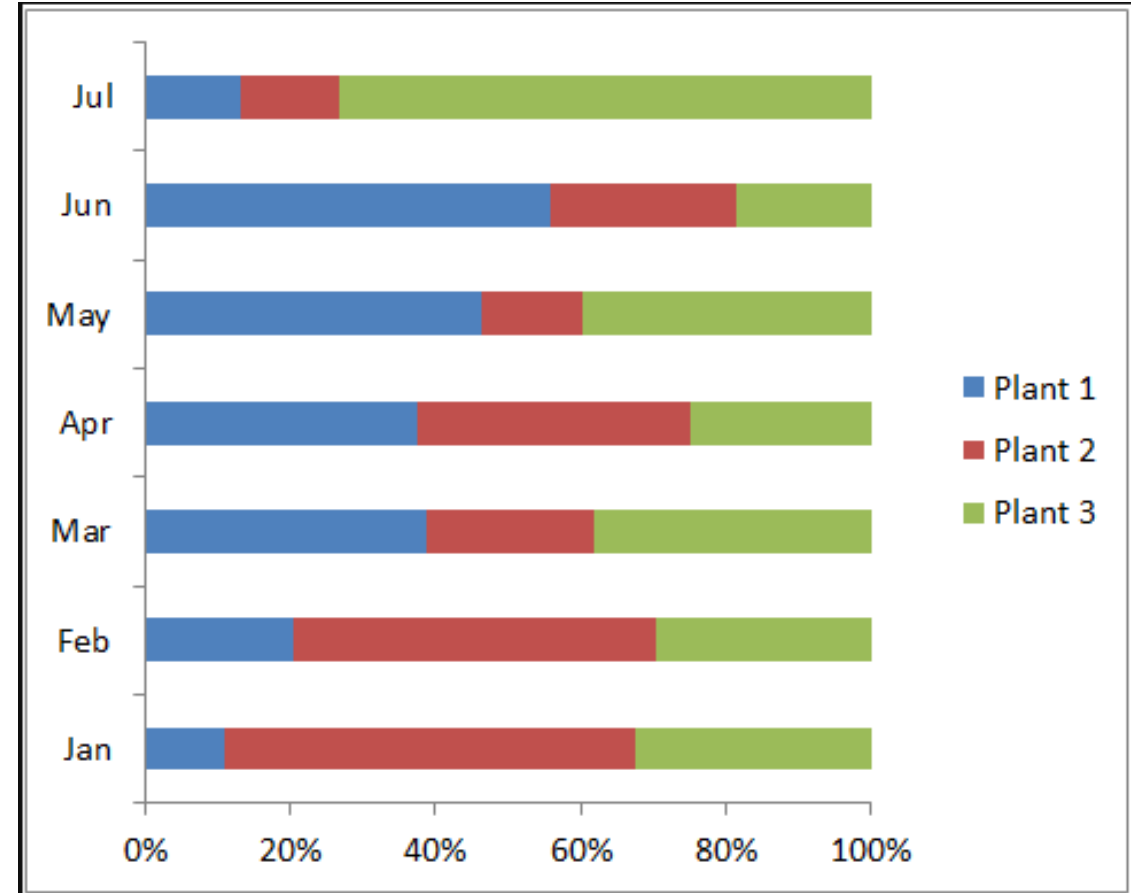
Chart Types and their Purposes (When to Use)

Chart Type	Purpose
column bar chart line chart	To compare many category values
column bar chart line chart	To show distribution
Line graph	To understand the relationship between value sets
line chart column bar chart	To show trends over time
pie chart stacked bar chart	To show composition: how individual parts make up the whole of something

Pivot Charts

Creating PivotChart

A PivotChart is a graphical representation of the data in a Pivot Table

- A PivotChart allows you to interactively add, remove, filter, and refresh data

- First u need to select an appropriate visualization for Pivot Charts
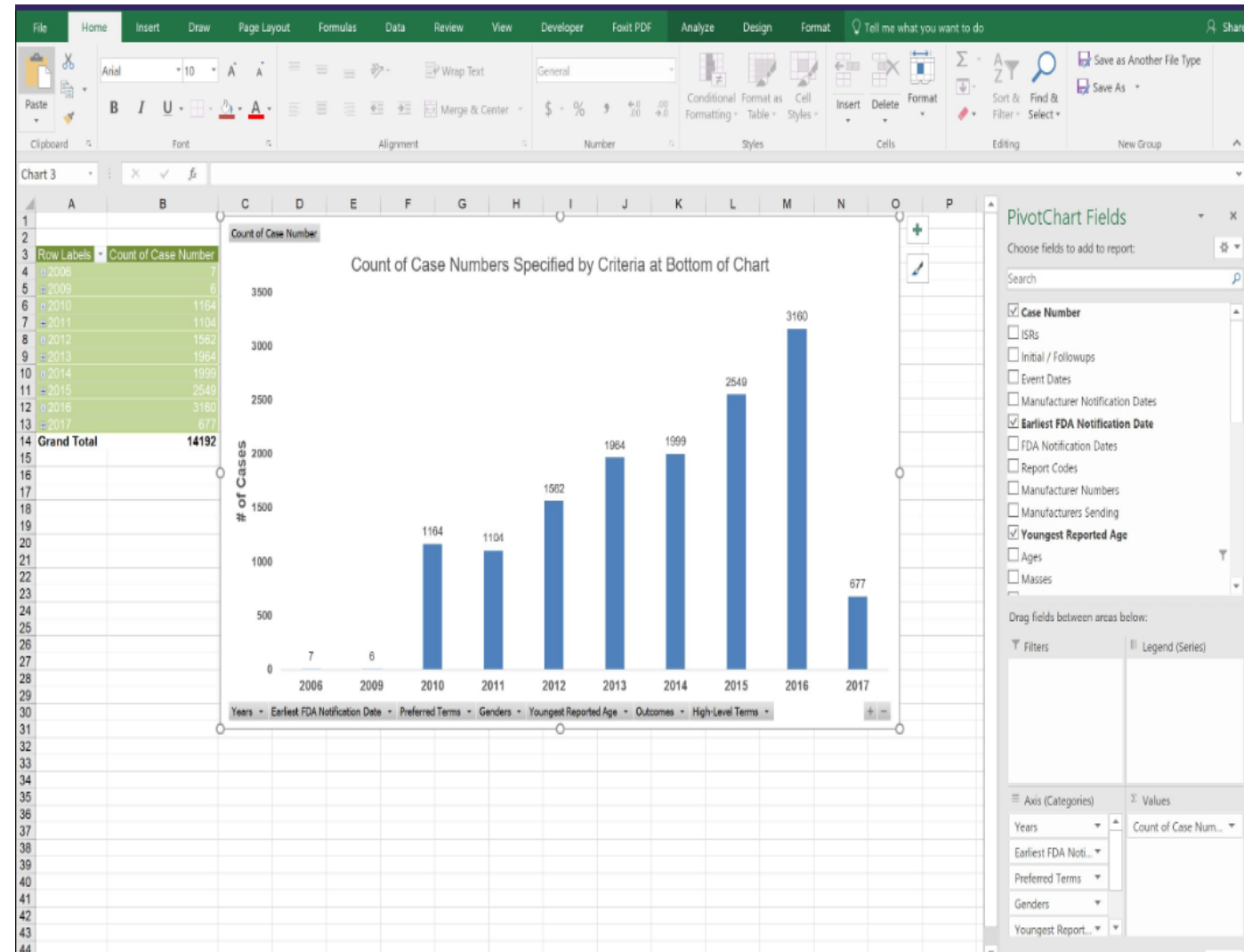
Creating PivotChart

Click any cell in the PivotTable
--> Tools group
--> Pivot chart
--> All Chart
--> select appropriate chart

Formatting Chart

You can format charts quickly using the Format pane. It is quite handy and provides advanced formatting options.

To Format any chart element:

Step 1 – Click on the chart.

Step 2 – Right-click chart element.

Step 3 – Click Format <Chart Element> from the drop-down list.
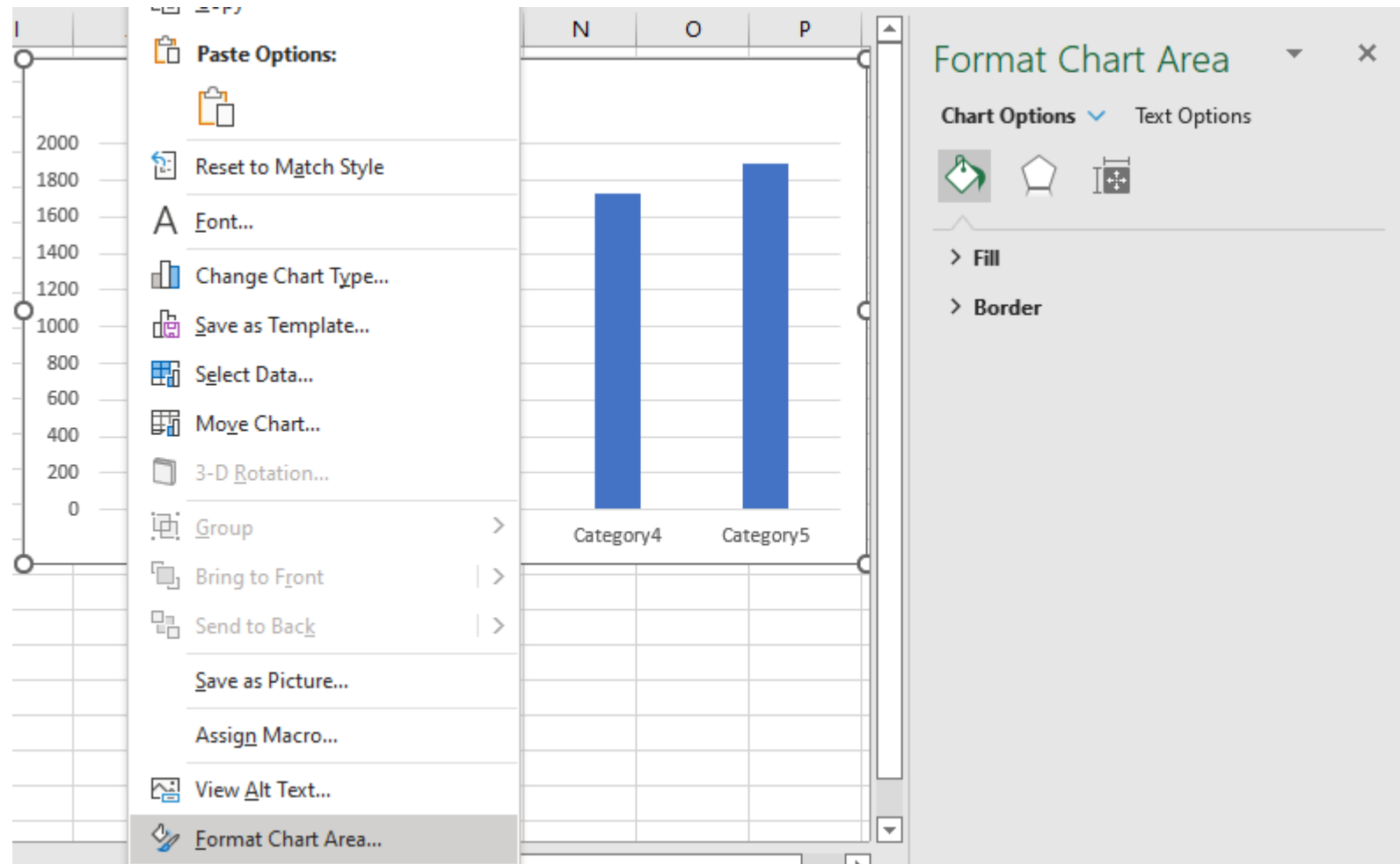
The Format pane appears with options that are tailored for the selected chart element.

Formatting Chart

Format Pane

The Format pane by default appears on the right-side of the chart.

Step 1 – Click on the chart.

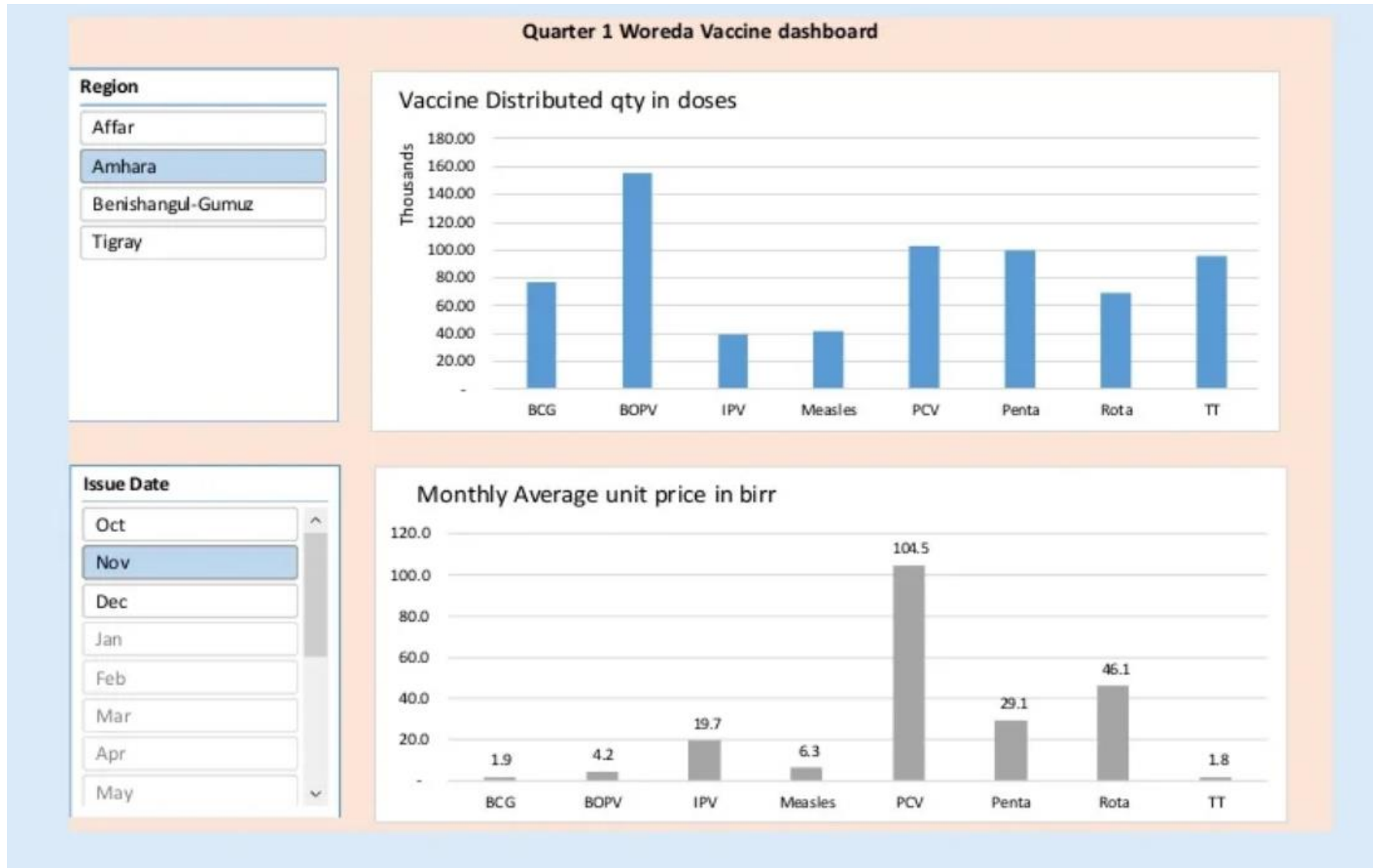Step 2 – Right-click the horizontal axis. A drop-down list appears.

Formatting Chart

You can also quickly customize the chart using the "+" icon
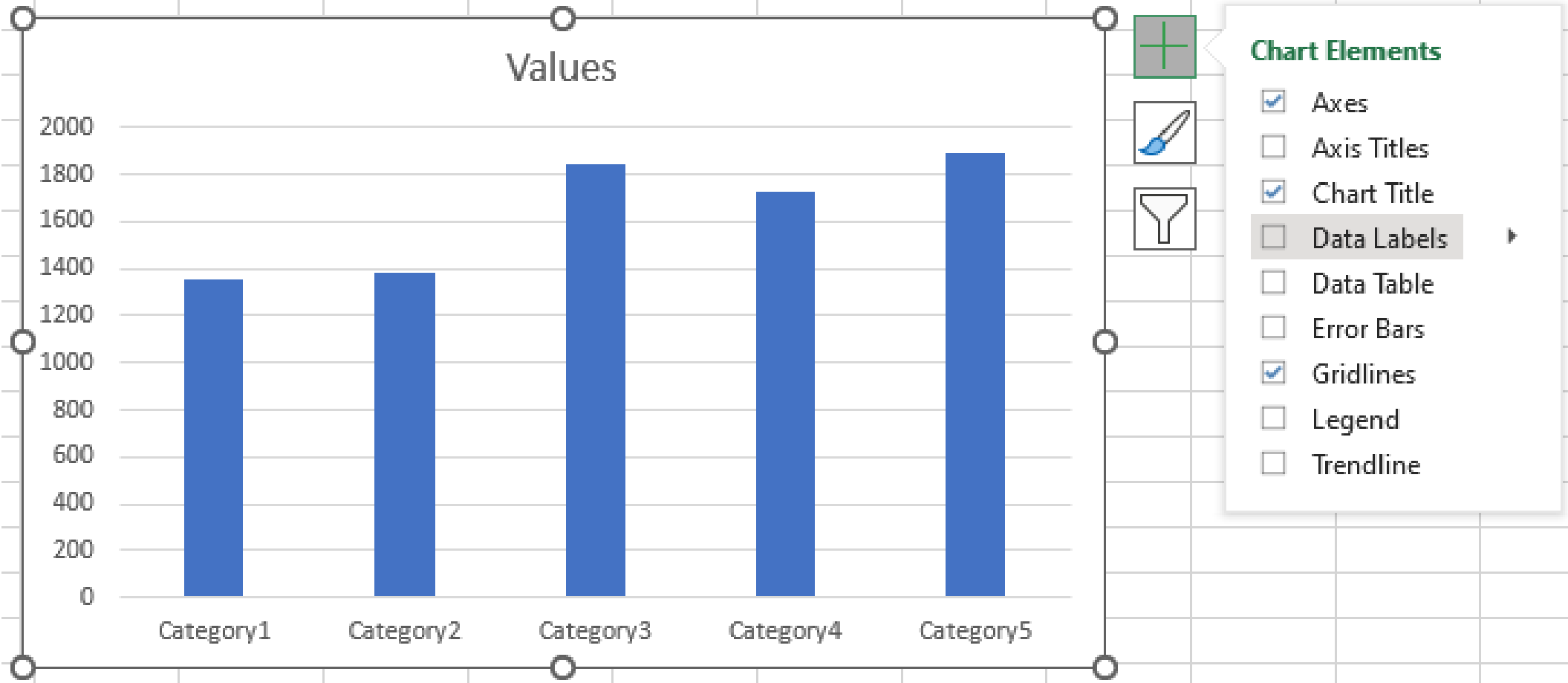
PivotChart Dashboard

Conditional Formatting

- Conditional formatting allows you to automatically apply formatting—such as **colors**, **icons**, and **data bars**—to one or more cells based on the **cell value and conditional formatting rule**.

- To do this, you'll need to create a **conditional formatting rule**.

- For example, a conditional formatting rule might be: **If the value is less than $2000, color the cell red and cell element to dark red**.

- By applying this rule, you'd be able to quickly see which cells contain values less than $2000.

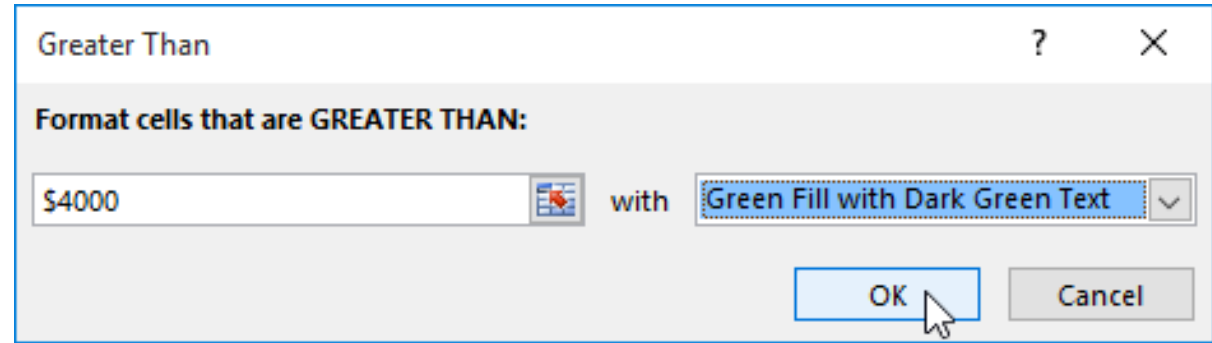|	A	B	C	D	E
2	Salesperson	May	June	July	August
3	Albertson, Kathy	$3,799.00	$557.00	$3,863.00	$1,117.00
4	Allenson, Carol	$18,930.00	$1,042.00	$9,355.00	$1,100.00
5	Altman, Zoey	$5,725.00	$3,072.00	$6,702.00	$2,116.00
6	Bittiman, William	$1,344.00	$3,755.00	$4,415.00	$1,089.00
7	Brennan, Michael	$8,296.00	$3,152.00	$11,601.00	$1,122.00
8	Carlson, David	$3,945.00	$4,056.00	$3,726.00	$1,135.00
9	Collman, Harry	$8,337.00	$4,906.00	$9,007.00	$2,113.00
10	Counts, Elizabeth	$3,742.00	$521.00	$4,505.00	$1,024.00
11	David, Chloe	$7,605.00	$3,428.00	$3,973.00	$1,716.00

Conditional Formatting (Steps)

1. Select the **desired cells** for the conditional formatting rule

2. From the **Home** tab, click the **Conditional Formatting** command.

3. A drop-down menu will appear.

4. Hover the mouse over the desired **conditional formatting type**, then select the **desired rule** from the menu that appears.
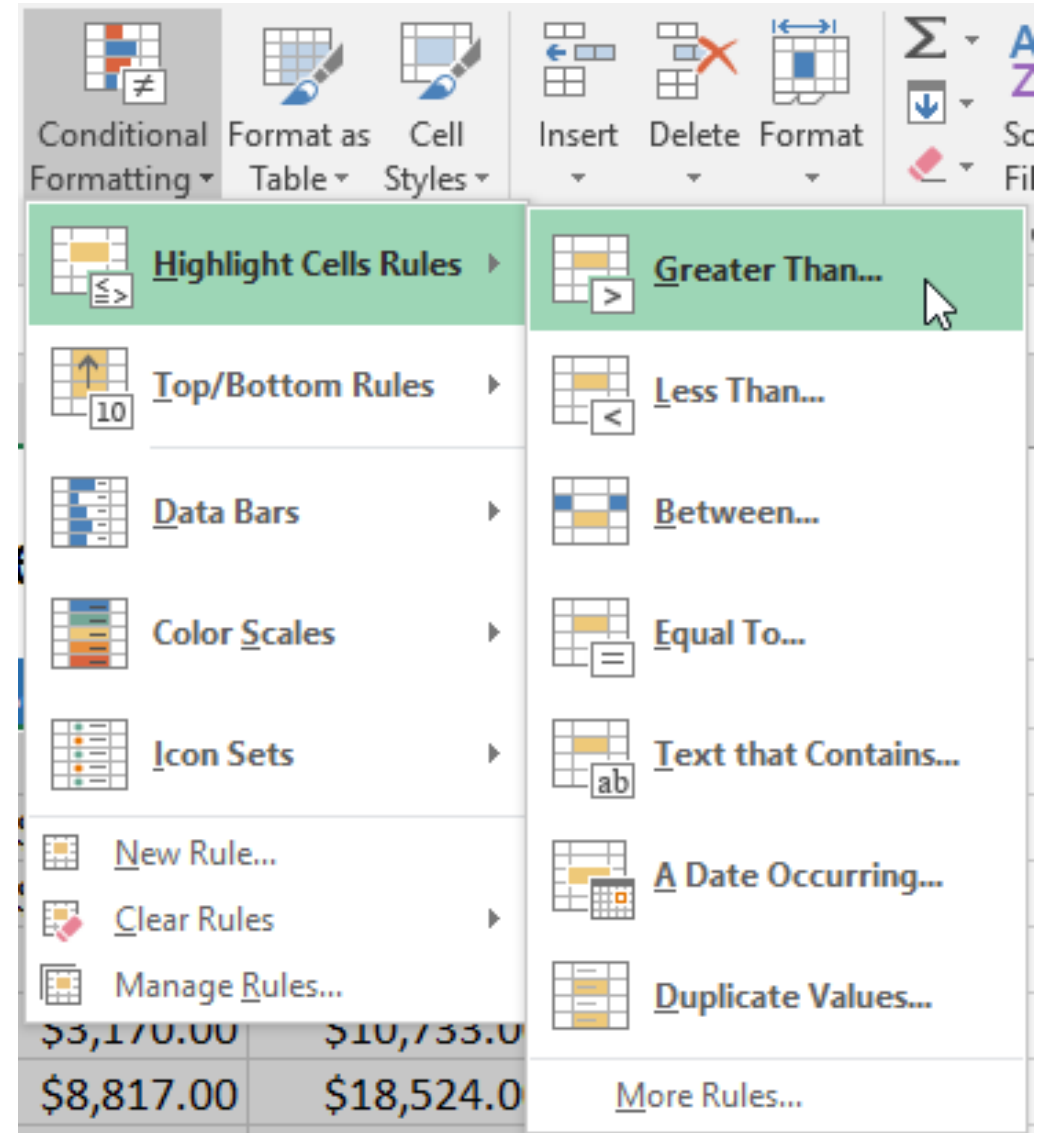
Conditional Formatting (Steps)

1. A dialog box will appear.

2. Enter the **desired value(s)** into the blank field.

3. Select a **formatting style** from the drop-down menu, then click **OK**.

4. The conditional formatting will be applied to the selected cells.

Greater Than   ?   ×

Format cells that are GREATER THAN:

$4000   with   Green Fill with Dark Green Text ˅

                                OK   Cancel

Westbrook Parker Sales Data

	Salesperson	May	June	July	August	September	October
3	Albertson, Kathy	$3,799.00	$557.00	$3,863.00	$1,117.00	$8,237.00	$8,690.00
4	Allenson, Carol	$18,930.00	$1,042.00	$9,355.00	$1,100.00	$10,185.00	$18,749.00
5	Altman, Zoey	$5,725.00	$3,072.00	$6,702.00	$2,116.00	$13,452.00	$8,046.00
6	Bittiman, William	$1,344.00	$3,755.00	$4,415.00	$1,089.00	$4,404.00	$20,114.00
7	Brennan, Michael	$8,296.00	$3,152.00	$11,601.00	$1,122.00	$3,170.00	$10,733.00
8	Carlson, David	$3,945.00	$4,056.00	$3,726.00	$1,135.00	$8,817.00	$18,524.00
9	Collman, Harry	$8,337.00	$4,906.00	$9,007.00	$2,113.00	$13,090.00	$13,953.00
10	Counts, Elizabeth	$3,742.00	$521.00	$4,505.00	$1,024.00	$3,528.00	$15,275.00
11	David, Chloe	$7,605.00	$3,428.00	$3,973.00	$1,716.00	$4,839.00	$13,085.00
12	Davis, William	$5,304.00	$1,562.00	$2,945.00	$1,176.00	$9,642.00	$13,714.00
13	Dumlao, Richard	$9,333.00	$2,779.00	$7,549.00	$1,101.00	$5,850.00	$15,065.00
14	Farmer, Kim	$1,103.00	$3,470.00	$3,862.00	$1,040.00	$10,024.00	$18,389.00
15	Ferguson, Elizabeth	$1,333.00	$1,913.00	$4,596.00	$1,126.00	$5,503.00	$10,686.00
16	Flores, Tia	$12,398.00	$2,883.00	$2,142.00	$2,014.00	$13,547.00	$21,983.00
17	Ford, Victor	$3,251.00	$4,931.00	$8,283.00	$1,054.00	$9,543.00	$11,967.00
18	Hodges, Melissa	$4,624.00	$4,798.00	$8,420.00	$1,389.00	$10,468.00	$12,677.00
19	Jameson, Robinson	$2,552.00	$4,459.00	$2,248.00	$1,058.00	$6,267.00	$14,982.00
20	Kellerman, Frances	$4,281.00	$4,172.00	$11,074.00	$1,282.00	$2,365.00	$9,380.00

Conditional Formatting (Pre-sets)

Excel has several predefined styles—or **presets**—you can use to quickly apply conditional formatting to your data. They are grouped into three categories:

▶ **Data Bars** are horizontal bars added to each cell, much like a **bar graph**.

$3,863.00	$1,117.00	$8,237.00	$8,690.00
$9,355.00	$1,100.00	$10,185.00	$18,749.00
$6,702.00	$2,116.00	$13,452.00	$8,046.00
$4,415.00	$1,089.00	$4,404.00	$20,114.00

▶ **Color Scales** change the color of each cell based on its value. Each color scale uses a **two- or three-color gradient**. For example, in the **Green-Yellow-Red** color scale, the **highest** values are green, the **average** values are yellow, and the **lowest** values are red.

$3,863.00	$1,117.00	$8,237.00	$8,690.00
$9,355.00	$1,100.00	$10,185.00	$18,749.00
$6,702.00	$2,116.00	$13,452.00	$8,046.00
$4,415.00	$1,089.00	$4,404.00	$20,114.00

▶ **Icon Sets** add a specific icon to each cell based on its value.

▼ $3,863.00	▼ $1,117.00	▬ $8,237.00	▬ $8,690.00
▬ $9,355.00	▼ $1,100.00	▬ $10,185.00	▲ $18,749.00
▼ $6,702.00	▼ $2,116.00	▬ $13,452.00	▬ $8,046.00
▼ $4,415.00	▼ $1,089.00	▼ $4,404.00	▲ $20,114.00

End to End Report in Excel

Annual growth rates by Country for Index (%)

Index of production excluding construction
Domestic output price index excluding construction
Index of production for construction
Construction costs index

	2004	2005	2006	2007	2008
EU-27	2.90	5.01	5.60	2.75	7.61
Euro area	2.31	4.06	5.08	2.68	6.05
Belgium	5.17	2.52	5.07	3.07	9.27
Bulgaria	5.44	7.28	8.68	8.00	13.23
Czech Republic	5.55	3.07	1.54	4.13	4.47
Denmark	3.79	9.15	7.90	1.60	13.16
Germany	1.65	4.37	5.38	1.31	5.44
Estonia	3.40	1.66	4.34	9.61	9.55
Ireland	0.54	2.24	1.84	1.61	5.34
Greece	3.58	5.88	7.33	4.13	10.01
Spain	3.43	4.73	5.39	3.60	6.55
France	2.04	3.11	3.82	2.77	5.60
Italy	2.72	4.01	5.23	3.33	5.81
Cyprus	4.43	4.95	5.29	3.56	11.72
Latvia	7.35	7.13	9.63	18.57	15.67
Lithuania	2.51	5.94	6.87	9.38	15.83
Luxembourg	9.08	3.56	12.80	4.35	15.09
Hungary	8.39	6.06	8.42	6.45	11.64
Malta	NA	NA	21.66	-4.87	17.49
Netherlands	2.43	6.96	8.58	5.25	8.87
Austria	1.96	3.35	2.09	4.14	4.80
Poland	7.56	2.16	3.44	4.00	5.39
Portugal	NA	NA	4.37	2.84	5.17
Romania	19.16	10.84	10.25	8.43	12.81
Slovenia	4.38	2.75	2.42	5.45	5.59
Slovakia	2.70	3.70	6.33	1.84	6.15
Finland	0.65	4.25	6.28	3.87	8.60
Sweden	1.79	3.87	6.08	3.60	6.06
United Kingdom	4.02	11.12	8.63	1.74	16.12
Croatia	3.53	2.71	2.73	3.46	8.29
Turkey	12.20	7.09	9.78	5.98	12.98
Norway	3.87	6.13	8.64	-0.62	15.17

Excel Shortcuts

- Shortcuts for Selection & Navigation

- Other Useful Shortcuts

Selection and Navigation Shortcuts

Selection Shortcuts	
Shortcut	**Purpose**
Ctrl + Shift + Down Arrow	Select Column Top To Down
Ctrl+Shift+Up Arrow	Select Column Down To Top
Ctrl + Shift + Right Arrow	Select Column Left To Right
Ctrl+Shift+ Left Arrow	Select Column Right To Left
Shift + Down Arrow	Select One Cell Down
Shift + Up Arrow	Select One Cell Up
Shift+Right Arrow	Select One Cell Right
Shift+ Left Arrow	Select One Cell Left

Location Shortcuts	
Shortcut	**Purpose**
Ctrl + Up Arrow	Go To Top Most Cell
Ctrl + Down Arrow	Go To Bottom Most Cell
Ctrl + Right Arrow	Go To Right Most Cell
Ctrl + Left Arrow	Go To Left Most Cell

TIME-SAVING EXCEL SHORTCUTS

Useful Shortcuts – (1/3)

Sr No	Button	Action
1	Ctrl + N	To create a new workbook.
2	Ctrl + O	To open a saved workbook.
3	Ctrl + S	To save a workbook.
4	Ctrl + A	To select all the contents in a workbook.
5	Ctrl + B	To turn highlighted cells bold.
6	Ctrl + C	To copy cells that are highlighted.
7	Ctrl + D	To fill the selected cell with the content of the cell right above.
8	Ctrl + F	To search for anything in a workbook.
9	Ctrl + G	To jump to a certain area with a single command.
10	Ctrl + H	To find and replace cell contents.
11	Ctrl + I	To italicise cell contents.
12	Ctrl + P	To print a workbook.
13	Ctrl + R	To fill the selected cell with the content of the cell on the left.
14	Ctrl + U	To underline highlighted cells.
15	Ctrl + V	To paste anything that was copied.
16	Ctrl + W	To close your current workbook.
17	Ctrl + Z	To undo the last action.
18	Ctrl + 1	To format the cell contents.
19	Ctrl + 5	To put a strikethrough in a cell.
20	Ctrl + 9	To hide a row.

Useful Shortcuts – (2/3)

21	Ctrl + 0	To hide a column.
22	Ctrl + Shift +	To Insert columns or rows.
23	Ctrl + -	To delete columns or rows.
24	Ctrl + Shift + ~	To switch between displaying Excel formulas or their values in cell.
25	Ctrl + Shift + %	To apply percentage formatting.
26	Ctrl + Spacebar	To select an entire column.
27	Ctrl + Shift + Spacebar	To select an entire workbook.
28	Ctrl + Home	To redirect to cell A1.
29	Ctrl + Drag	To drag and copy a cell or to a duplicate worksheet.
30	Ctrl + Shift + Drag	To drag and insert copy.
31	Ctrl + Up arrow	To go to the top most cell in a current column.
32	Ctrl + Down arrow	To jump to the last cell in a current column.
33	Ctrl + Right arrow	To go to the last cell in a selected row.
34	Ctrl + Left arrow	To jump back to the first cell in a selected row.
35	Ctrl + End	To go to the last cell in a workbook.
36	Alt + Page down	To move the screen towards the right.
37	Alt + Page Up	To move the screen towards the left.
38	Alt	To open the access keys.
39	Tab	Move to the next cell.
40	Alt + Down arrow	To activate filters for cells.

Useful Shortcuts – (3/3)

41	F2	To edit a cell.
42	Shift + F2	To add or edit a cell comment.
43	Alt + H + H	To select a fill colour.
44	Alt + H + B	To add a border.
45	Ctrl + 9	To hide the selected rows.
46	Ctrl + 0	To hide the selected columns.
47	Esc	To cancel an entry.
48	Enter	To complete the entry in a cell and move to the next one.
49	Shift + Right arrow	To extend the cell selection to the right.
50	Shift + Left arrow	To extend the cell selection to the left.
51	Shift + Space	To select the entire row.
52	Page up/ down	To move the screen up or down.
53	Alt + Enter	To start a new line in a current cell.
54	F9	To calculate workbooks.
55	Shift + F9	To calculate an active workbook.
56	Ctrl + Alt + F9	To force calculate all workbooks.

Errors Messages
And
Handling

- Error Messages

- Error Types and How to Handle them

Types of Errors

Error Name	When It Happens
#DIV/0!	When you divide by ZERO ***TIP:*** *Add an error handler like IFERROR()*
#N/A!	When a formula or a function inside a formula cannot find the referenced data. ***TIP:*** *Check the referenced data.*
#NAME?	When the text in a formula is not recognized. ***TIP:*** *Check the arguments in the function name.*
#REF!	When a reference is invalid. ***TIP:*** *Check to see if you have entered any formatted currency, dates, or special symbols. Then, make sure to remove those characters from the formula, only keeping the numbers themselves.*

Types of Errors

Error Name	When It Happens
#NUM!	When a formula has numeric data *TIP: Check if reference range is numerical values*
#VALUE!	When the wrong type of operand or function argument is used *TIP: Are you using Math operators (+, -, *, /, ^) with different data types? If so, try using a function instead*.
#######	When a column is not wide enough to display all the characters. *TIP: Try to auto-fit the cell.*

Other Useful Techniques

- Data Validation

- Text to Column

- Find and Select

- Trace Precedents/Dependents

- Evaluate Formula

Data Validation
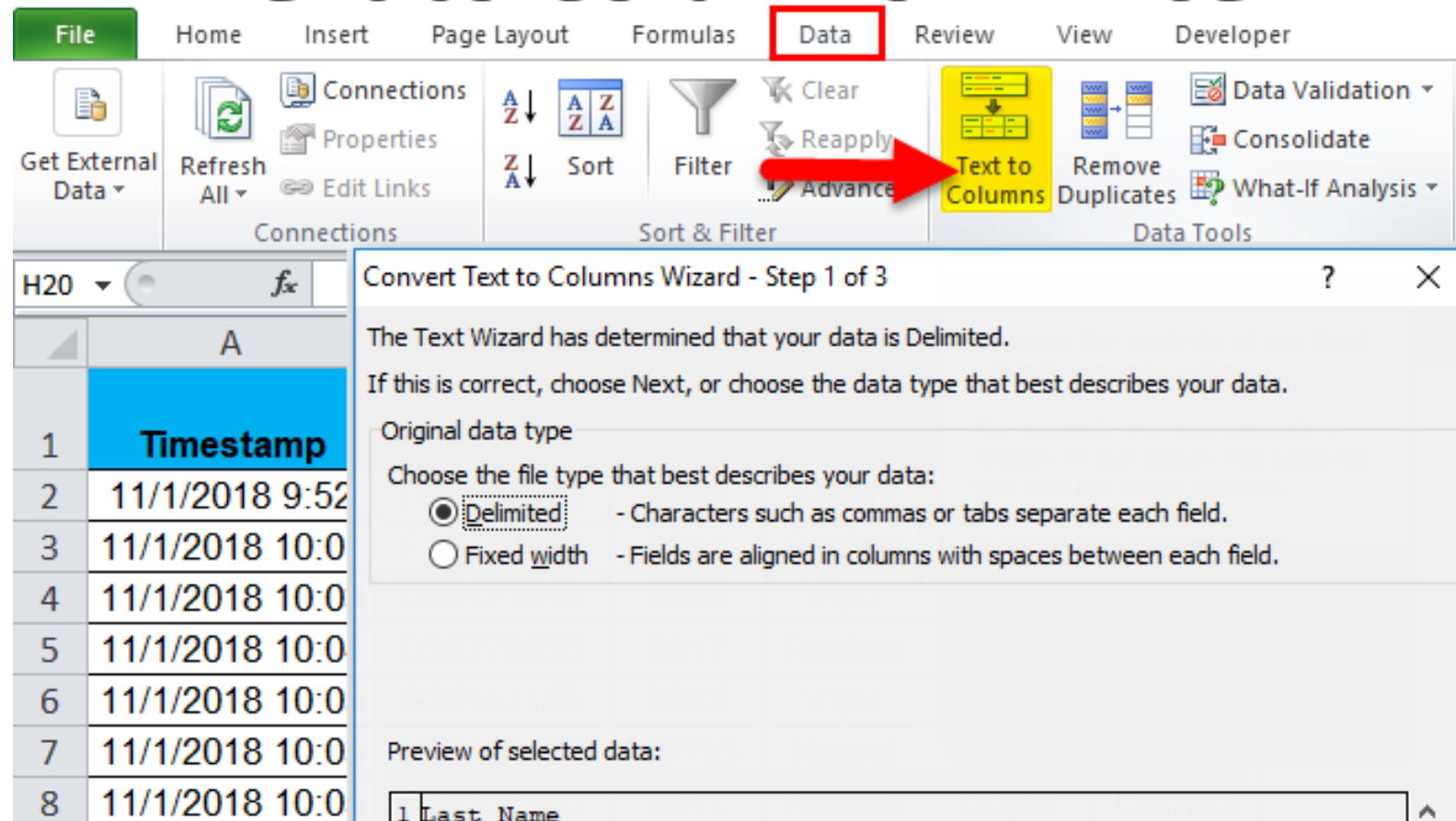
- Data Validation: Provide dropdown/options to input values only
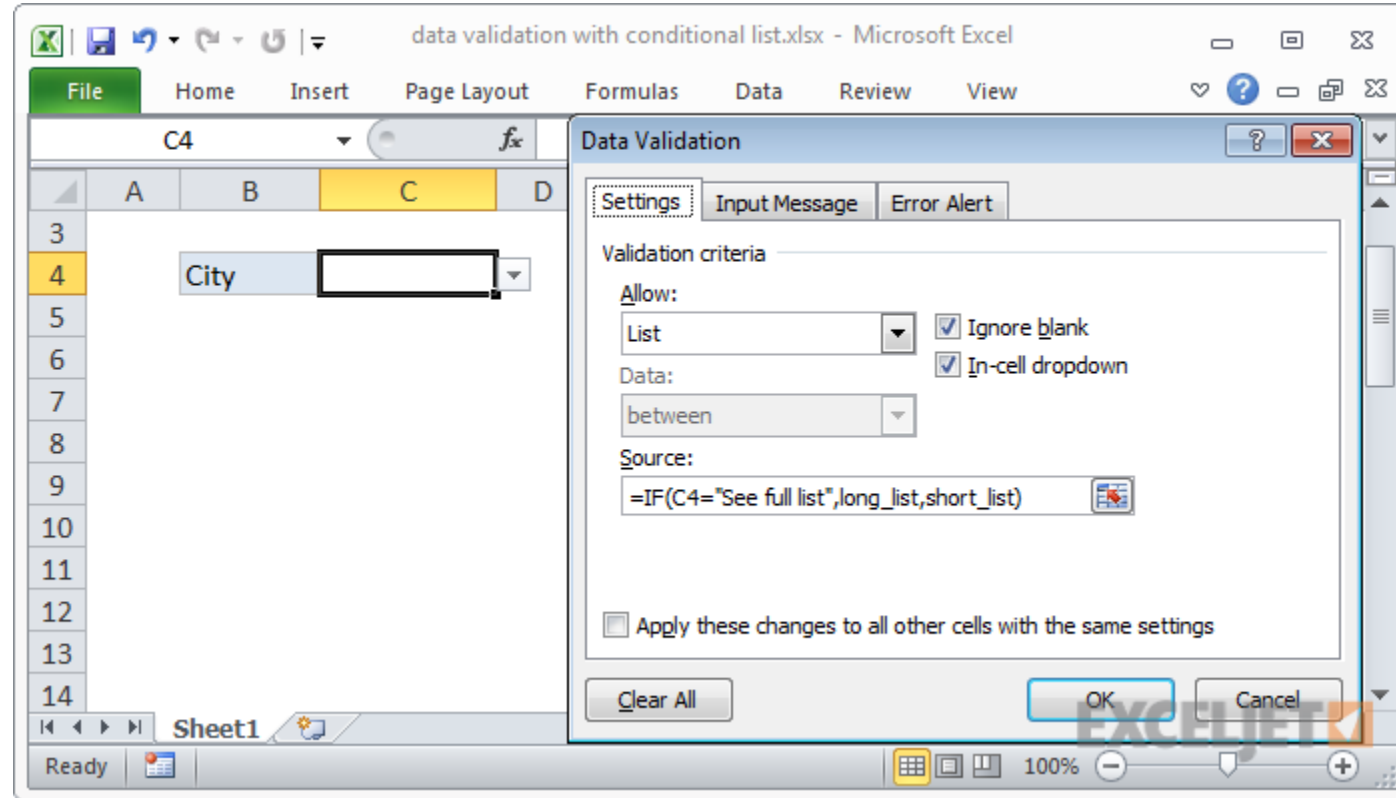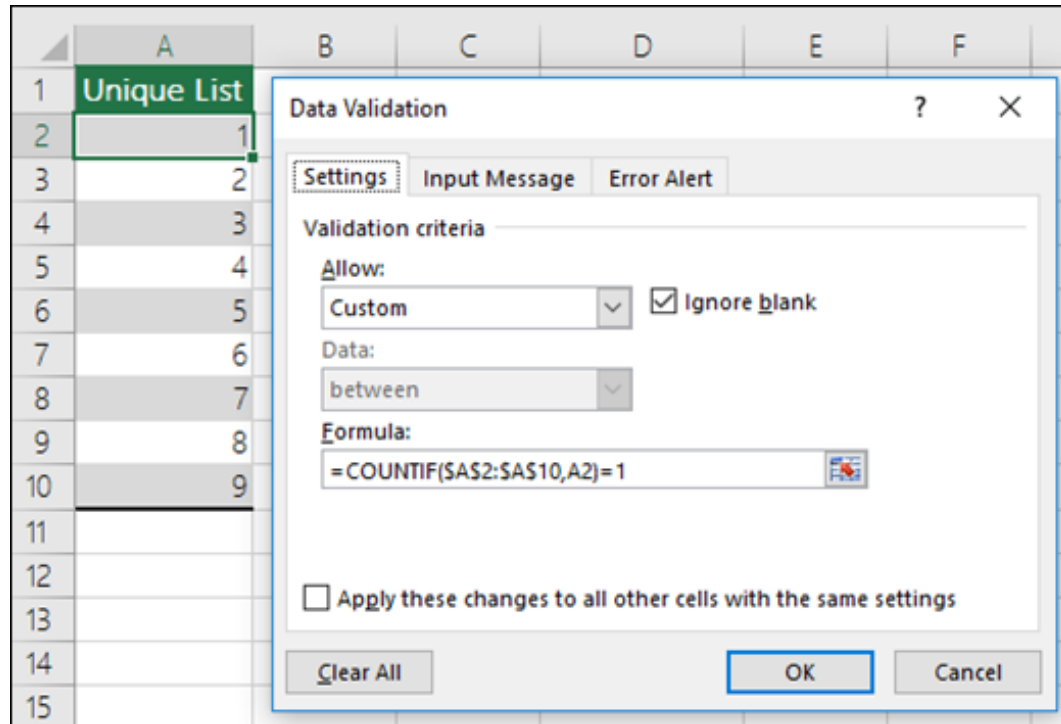
Text to Column

- To split text/numbers into multiple columns. Separated by comma, space, width or any other **Delimiter**

Find & Select

- Find & Select is found on the Home Tab

- Applications:
  - Find and replace
  - Find Formulas, Comments, etc.
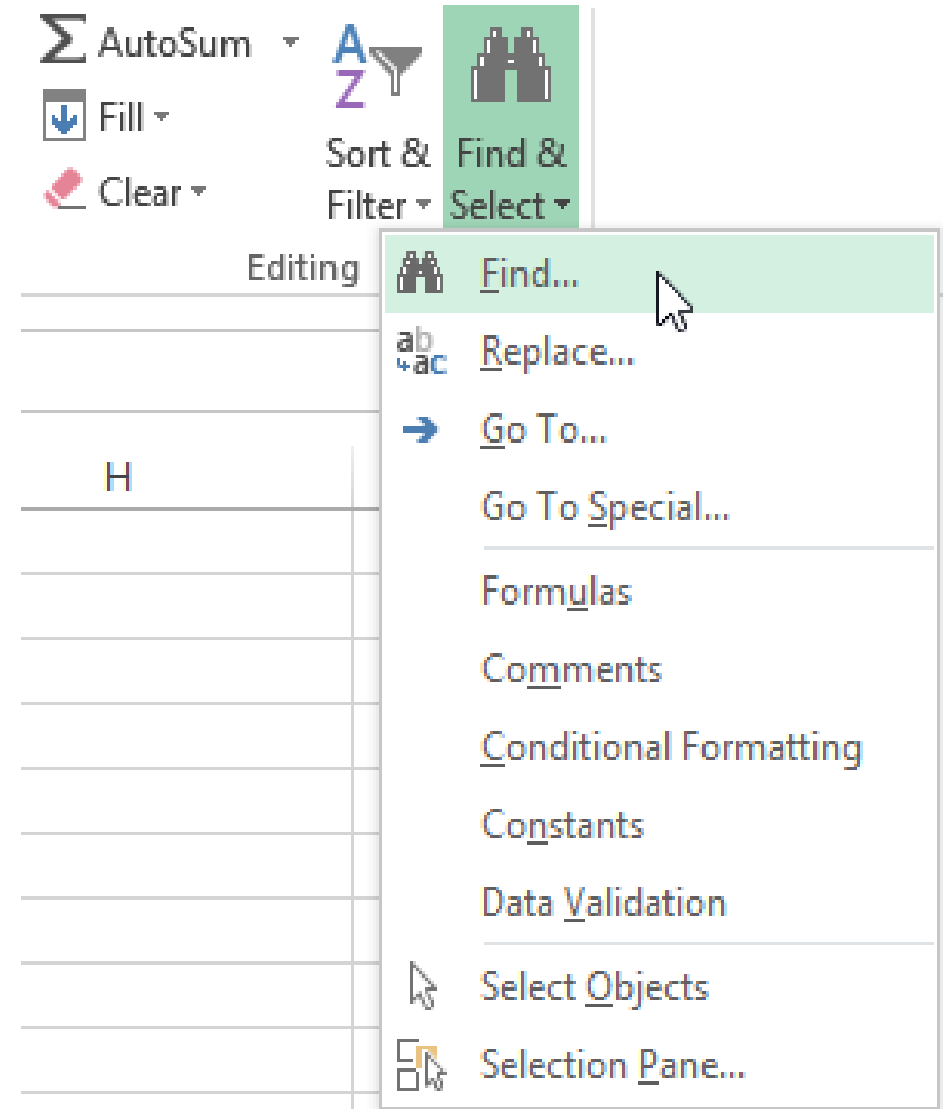
Trace Precedents/Dependents

- Dependent Traces formula to the dependent cell. Points to the cells that are dependent on the active cell

- Precedent traces cells provide data to a formula

Evaluate Formula

Click on "**fx**" symbol that is present right before formula bar.

Evaluate Formula

- Sometimes, understanding how a nested formula calculates the final result is difficult because there are several intermediate calculations and logical tests.

- However, by using the Evaluate Formula dialog box, you can see the different parts of a nested formula evaluated in the order the formula is calculated.

- For example, the formula =IF(AVERAGE(D2:D5)>50,SUM(E2:E5),0)is easier to understand when you can see the following intermediate results.