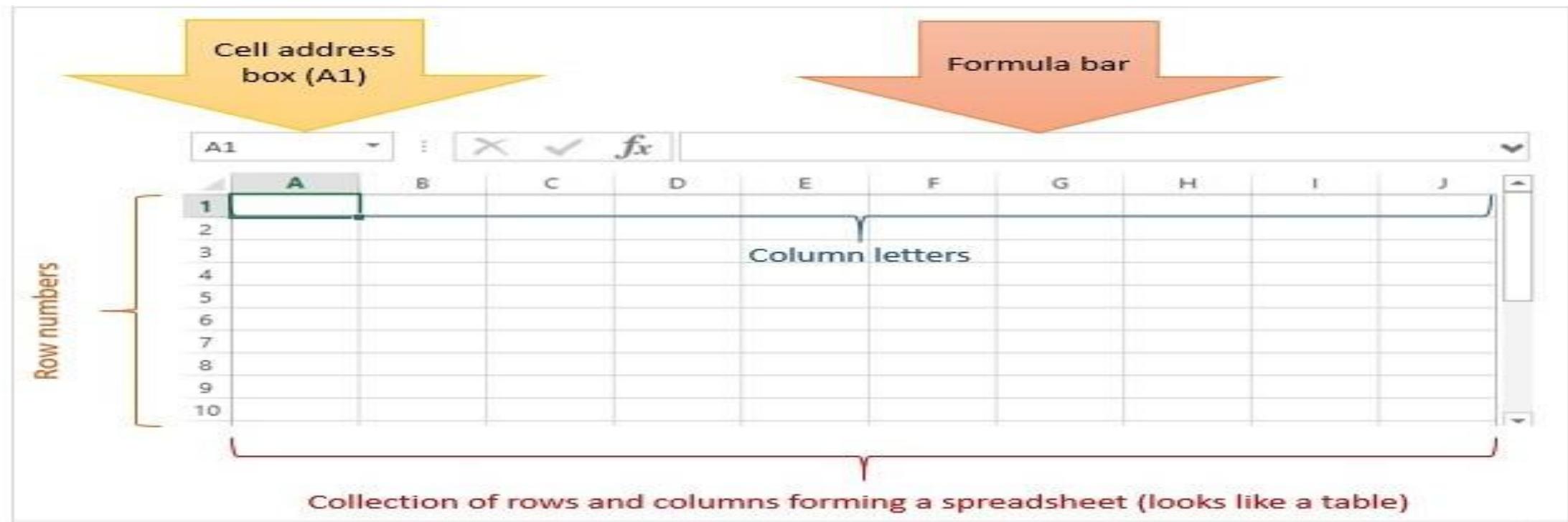


BUSINESS ANALYTICS WITH EXCEL

What is Microsoft Excel?

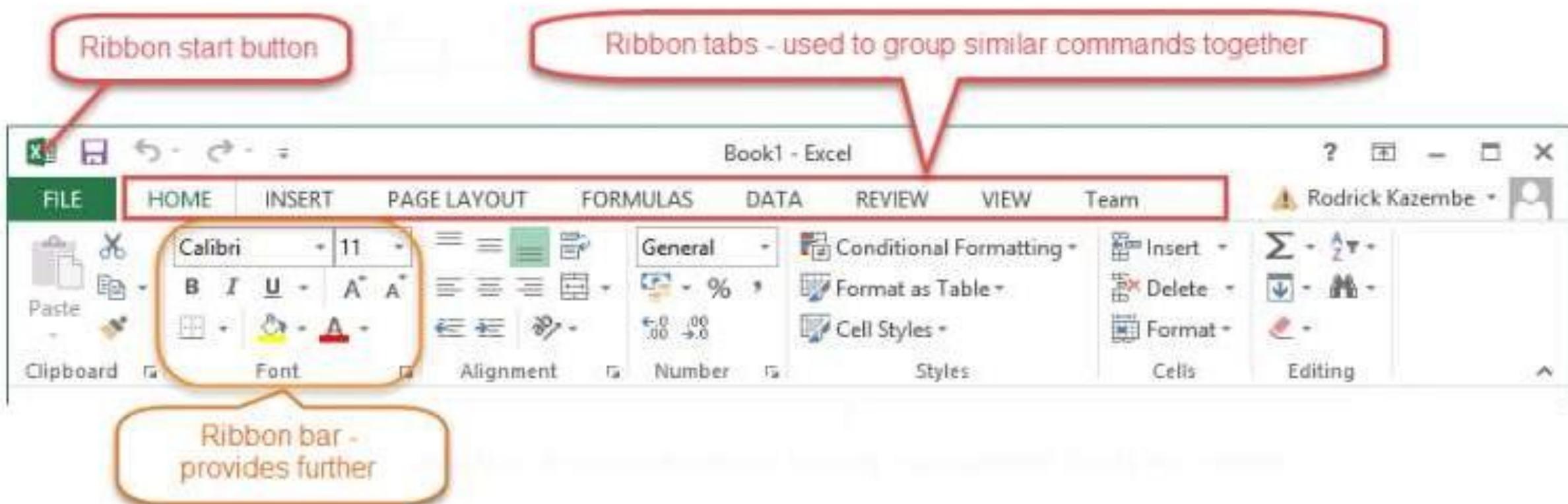
Microsoft Excel is a spreadsheet program that is used to record and analyse numerical data.

- Think of a spreadsheet as a collection of columns and rows that form a table. Alphabetical letters are usually assigned to columns and numbers are usually assigned to rows.
- The point where a column and a row meet is called a cell.
- The address of a cell is given by the letter representing the column and the number representing a row.



Understanding the Ribbon

The ribbon provides shortcuts to commands in Excel. A command is an action that the user performs. An example of a command is creating a new document, printing a document, etc. The image below shows the ribbon used in Excel 2013.



Understanding the Worksheet

A **worksheet** is a collection of rows and columns. When a row and a column meet, they form a cell. Cells are used to record data. Each cell is uniquely identified using a cell address. Columns are usually labelled with letters while rows are usually numbers.

A **workbook** is a collection of worksheets. By default, a workbook has three cells in Excel. You can delete or add more sheets to suit your requirements. By default, the sheets are named Sheet1, Sheet2 and so on and so forth. You can rename the sheet names to more meaningful names i.e. Daily Expenses, Monthly Budget, etc.



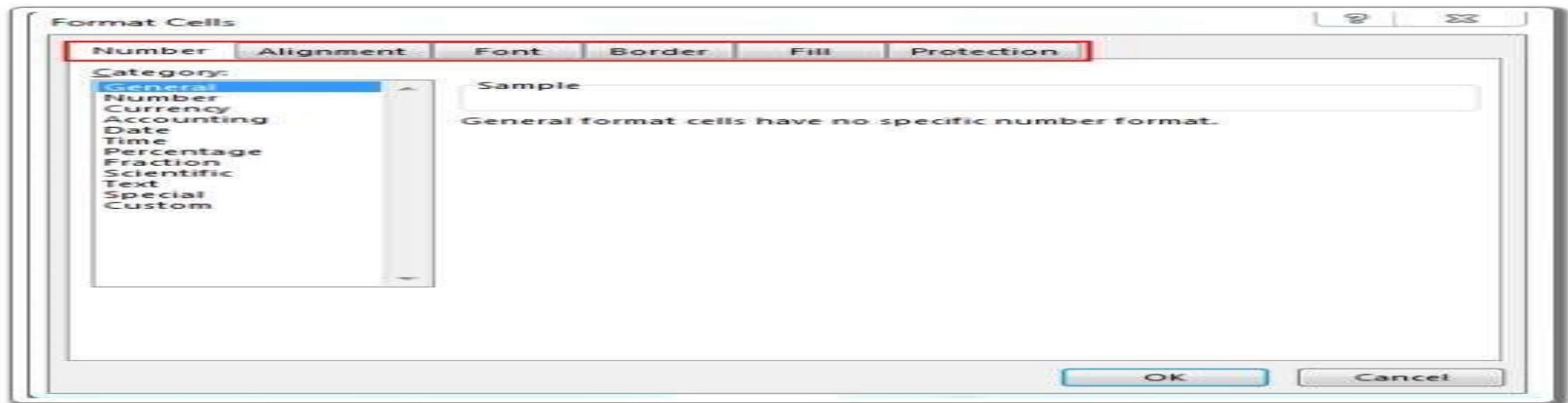
Data Types in Excel:

A better definition of a data type is a data storage format that can contain a specific type or range of values

Data type in Excel	Description
Whole Number	Numbers that have no decimal places. Integers can be positive or negative numbers, but must be whole numbers between -9,223,372,036,854,775,808 (-2^63) and 9,223,372,036,854,775,807 (2^63-1).
Decimal Number	Real numbers are numbers that can have decimal places. Real numbers cover a wide range of values:
	Negative values from -1.79E +308 through -2.23E -308
	Zero
	Positive values from 2.23E -308 through 1.79E + 308
	However, the number of significant digits is limited to 15 decimal digits.
BOOLEAN	Either a True or False value.
Text	A Unicode character data string. Can be strings, numbers or dates represented in a text format.
	Maximum string length is 268,435,456 Unicode characters (256 mega characters) or 536,870,912 bytes.
Date	Dates and times in an accepted date-time representation.
	Valid dates are all dates after January 1, 1900.
Currency	Currency data type allows values between -922,337,203,685,477.5808 to 922,337,203,685,477.5807 with four decimal digits of fixed precision.
N/A	A blank is a data type in DAX that represents and replaces SQL nulls. You can create a blank by using the BLANK function, and test for blanks by using the logical function, ISBLANK.
%	Depicts the data in Percentage

Format Cells:

- Excel cell format option is used for changing the appearance of number without any changes in number.
- To formatting the cells there are five tabs in Format Cells. By using this, we can change the date style, time style, Alignments, insert the border with different style, protect the cells, etc.
- We can find this option with right click of the mouse. After right-clicking, pop-up will appear, and then we need to click on Format Cells or we can use shortcut key Ctrl+1 on our keyboard.



Number Tab:

- Excel number format used for changing the formatting of number cells in decimals, providing the desired format, in terms of number, dates, converting into percentage, fractions, etc.
- Basis the requirement, any data type can be formatted accordingly in the number tab.

To change the font:

By default, the font of each new workbook is set to Calibri. However, Excel provides many other fonts you can use to customize your cell text. In the example below, we'll format our title cell to help distinguish it from the rest of the worksheet

1. Select the cell(s) you want to modify.

	A	B
1	Webinar Training Log	
2	Email Address	Last Name
3	heidi.lee@vestainsurance.com	Lee
4	josie.gates@vestainsurance.com	Gates

2. Click the drop-down arrow next to the Font command on the Home tab. The Font drop-down menu will appear.
3. Select the desired font. A live preview of the new font will appear as you hover the mouse over different options. In our example, we'll choose Georgia.



4. The text will change to the selected font.

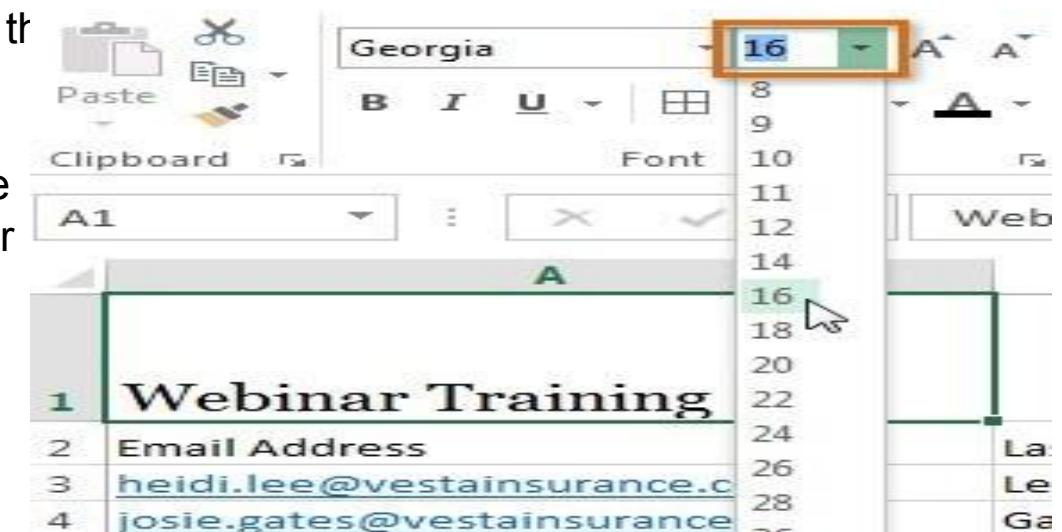
To change the font size:

1. Select the cell(s) you want to modify

	A	B
1	Webinar Training Log	
2	Email Address	Last Name
3	heidi.lee@vestainsurance.com	Lee
4	josie.gates@vestainsurance.com	Gates

2. Click the drop-down arrow next to the Font Size command on the Home tab. The Font Size drop-down menu will appear.

3. Select the desired font size. A live preview of the new font size will appear as you hover the mouse over different options. In our example, we will choose 16 to make the text larger.



4. The text will change to the selected font size.

	A	B
1	Webinar Training Log	
2	Email Address	Last Name
3	<u>heidi.lee@vestainsurance.com</u>	Lee
4	<u>josie.gates@vestainsurance.com</u>	Gates

You can also use the Increase Font Size and Decrease Font Size commands or enter a custom font size using your keyboard.



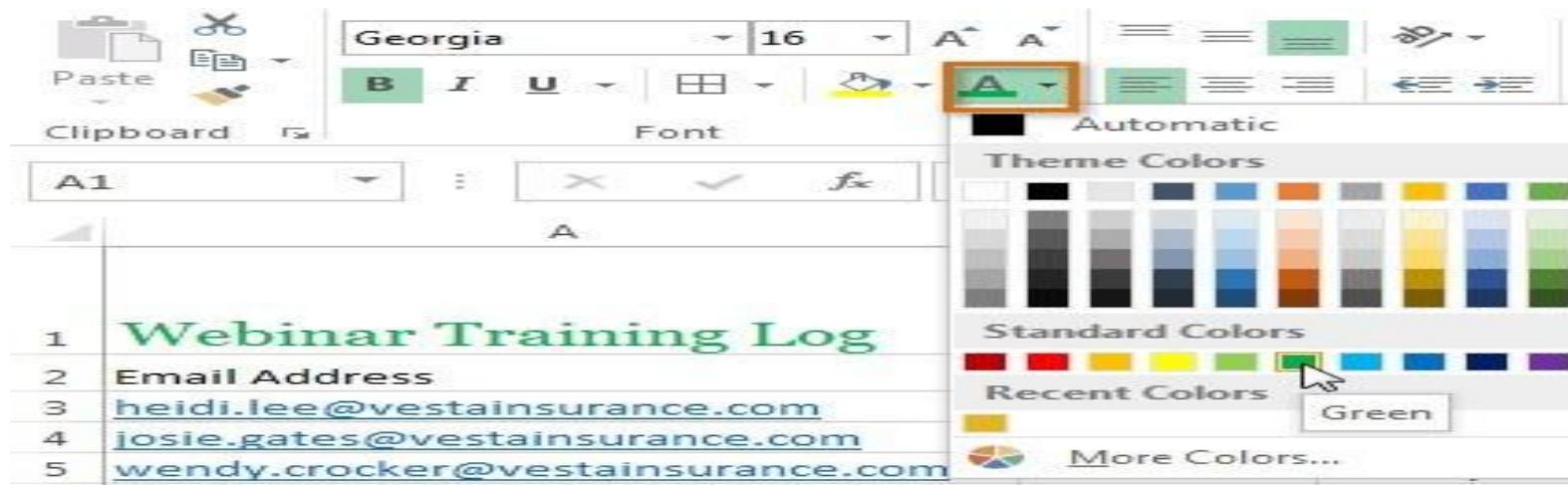
To change the font colour:

1. Select the cell(s) you want to modify.

1	Webinar Training Log	+	
2	Email Address	Last Name	
3	heidi.lee@vestainsurance.com	Lee	
4	josie.gates@vestainsurance.com	Gates	

2. Click the drop-down arrow next to the Font Color command on the Home tab. The Color menu will appear.

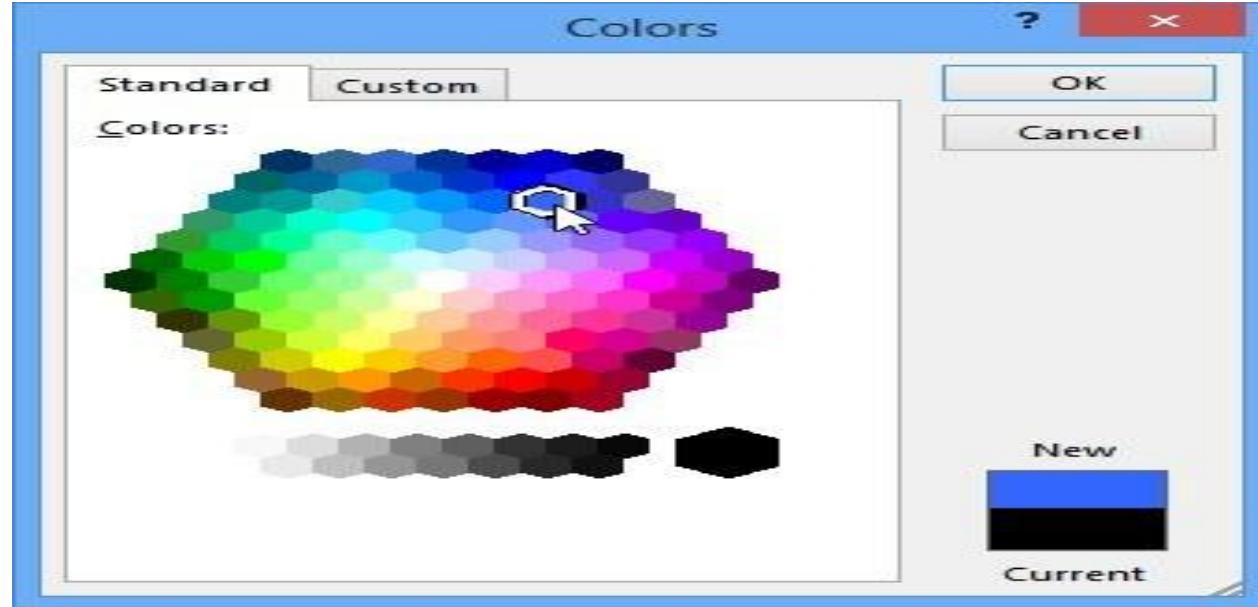
3. Select the desired font color. A live preview of the new font color will appear as you hover the mouse over different options. In our example, we'll choose Green.



4. The text will change to the selected font color.

	A	B
1	Webinar Training Log	
2	Email Address	
3	heidi.lee@vestainsurance.com	Last Name
4	josie.gates@vestainsurance.com	Lee
		Gates

Select More Colors at the bottom of the menu to access additional color options.

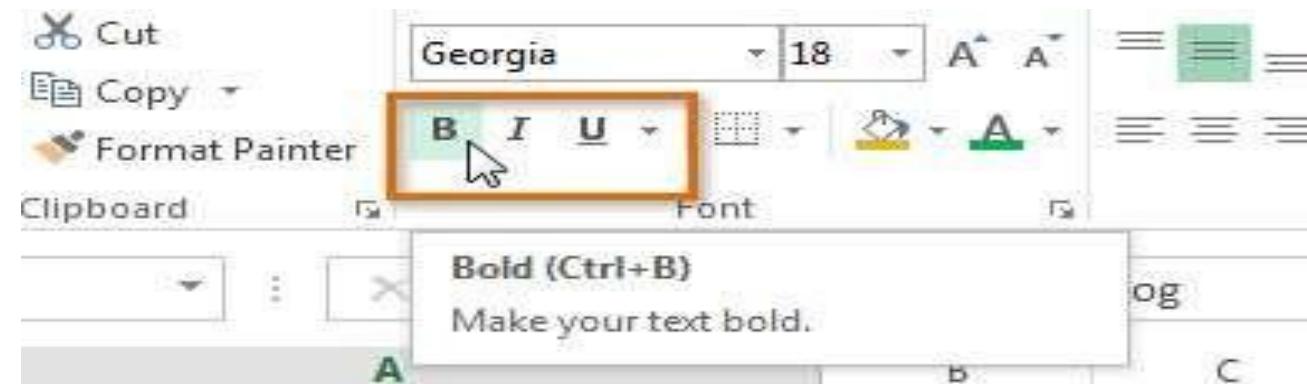


To use the Bold, Italic, and Underline commands:

1. Select the cell(s) you want to modify.

	A	B
1	Webinar Training Log	
2	Email Address	Last Name
3	<u>heidi.lee@vestainsurance.com</u>	Lee
4	<u>josie.gates@vestainsurance.com</u>	Gates

2. on the Home tab. In our example, we'll make the selected cells bold. Click the Bold (B), Italic (I), or Underline (U) command



3. The selected style will be applied to the text.

	A	B
1	Webinar Training Log	
2	Email Address	Last Name
3	<u>heidi.lee@vestainsurance.com</u>	Lee
4	<u>josie.gates@vestainsurance.com</u>	Gates

You can also press Ctrl+B on your keyboard to make selected text bold, Ctrl+I to apply italics, and Ctrl+U to apply an underline.

Text alignment

By default, any text entered into your worksheet will be aligned to the bottom-left of a cell, while any numbers will be aligned to the bottom-right. Changing the alignment of your cell content allows you to choose how the content is displayed in any cell, which can make your cell content easier to read.

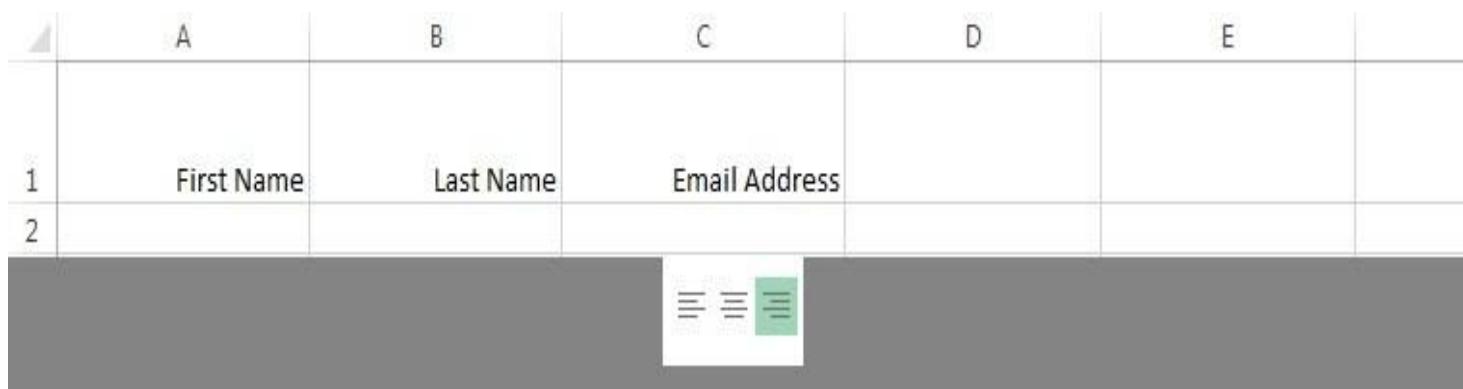
	A	B	C	D	E
1	First Name	Last Name	Email Address		
2					

Left align: Aligns content to the left border of the cell



	A	B	C	D	E
1	First Name	Last Name	Email Address		
2					

Centre align: Aligns content an equal distance from the left and right borders of the cell



	A	B	C	D	E
1	First Name	Last Name	Email Address		
2					

Right Align: Aligns content to the right border of the cell

To change horizontal text alignment:

In our example below, we'll modify the alignment of our title cell to create a more polished look and further distinguish it from the rest of the worksheet.

1. Select the cell(s) you want to modify.

3	Webinar Training Log	+
4	Email Address	Last Name
5	heidi.lee@vestainsurance.com	Lee
6	josie.gates@vestainsurance.com	Gates

2. Select one of the three horizontal alignment commands on the Home tab. In our example, we'll choose Centre Align.



3. The text will realign.

	Webinar Training Log	
3		
4	Email Address	Last Name
5	<u>heidi.lee@vestainsurance.com</u>	Lee
6	<u>josie.gates@vestainsurance.com</u>	Gates

To change vertical text alignment:

1. Select the cell(s) you want to modify.

3	Webinar Training Log +	
4	Email Address	Last Name
5	<u>heidi.lee@vestainsurance.com</u>	Lee
6	<u>josie.gates@vestainsurance.com</u>	Gates

2. Select one of the three vertical alignment commands on the Home tab. In our example, we'll choose Middle Align.



3. The text will realign.

Webinar Training Log	
3	
4	Email Address
5	<u>heidi.lee@vestainsurance.com</u>
6	<u>josie.gates@vestainsurance.com</u>
	Last Name
	Lee
	Gates

You can apply both vertical and horizontal alignment settings to any cell.

Cell borders and fill colors

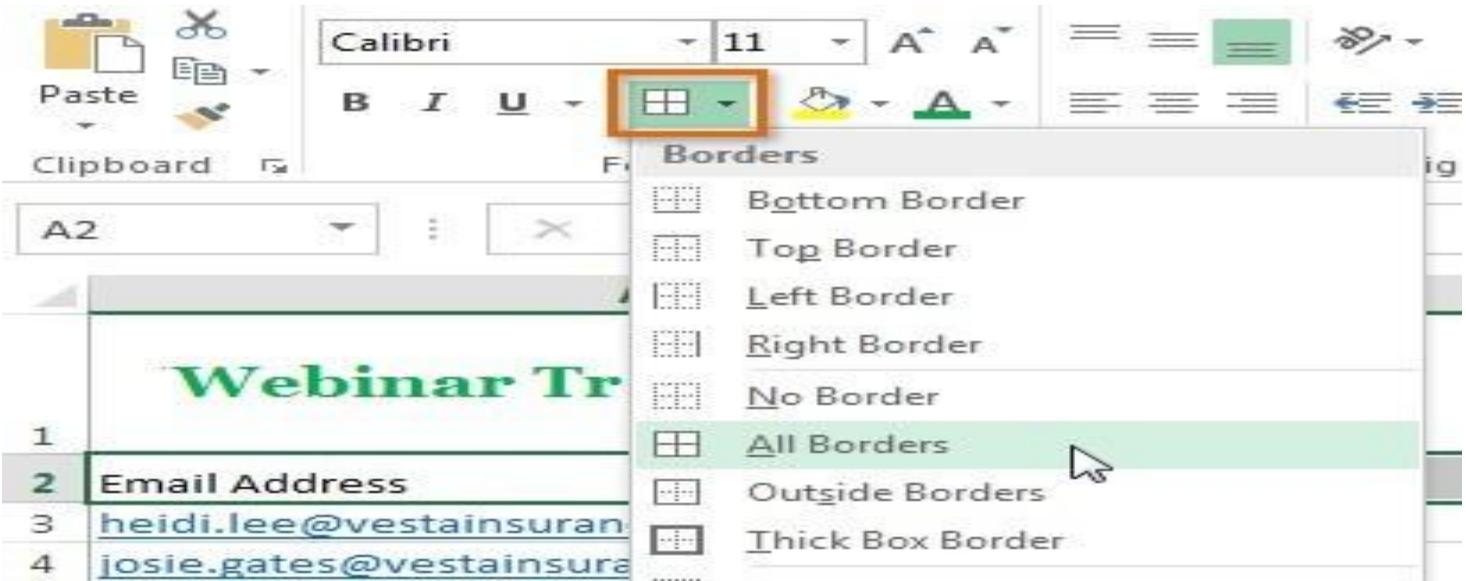
Cell borders and fill colors allow you to create clear and defined boundaries for different sections of your worksheet. Below, we'll add cell borders and fill color to our header cells to help distinguish them from the rest of the worksheet.

To add a border:

1. Select the cell(s) you want to modify.

Webinar Training Log		
3	Email Address	Last Name
4	First Name	
5	heidi.lee@vestainsurance.com	Lee
6	iosie.gates@vestainsurance.com	Gates
	Heidi	Josie

2. Click the drop-down arrow next to the Borders command on the Home tab. The Borders drop-down menu will appear.
3. Select the border style you want to use. In our example, we will choose to display All Borders



4. The selected border style will appear.

Webinar Training Log			
3	4 Email Address	Last Name	First Name
5	heidi.lee@vestainsurance.com	Lee	Heidi
6	josie.gates@vestainsurance.com	Gates	Josie

You can draw borders and change the line style and colour of borders with the Draw Borders tools at the bottom of the Borders drop-down menu.

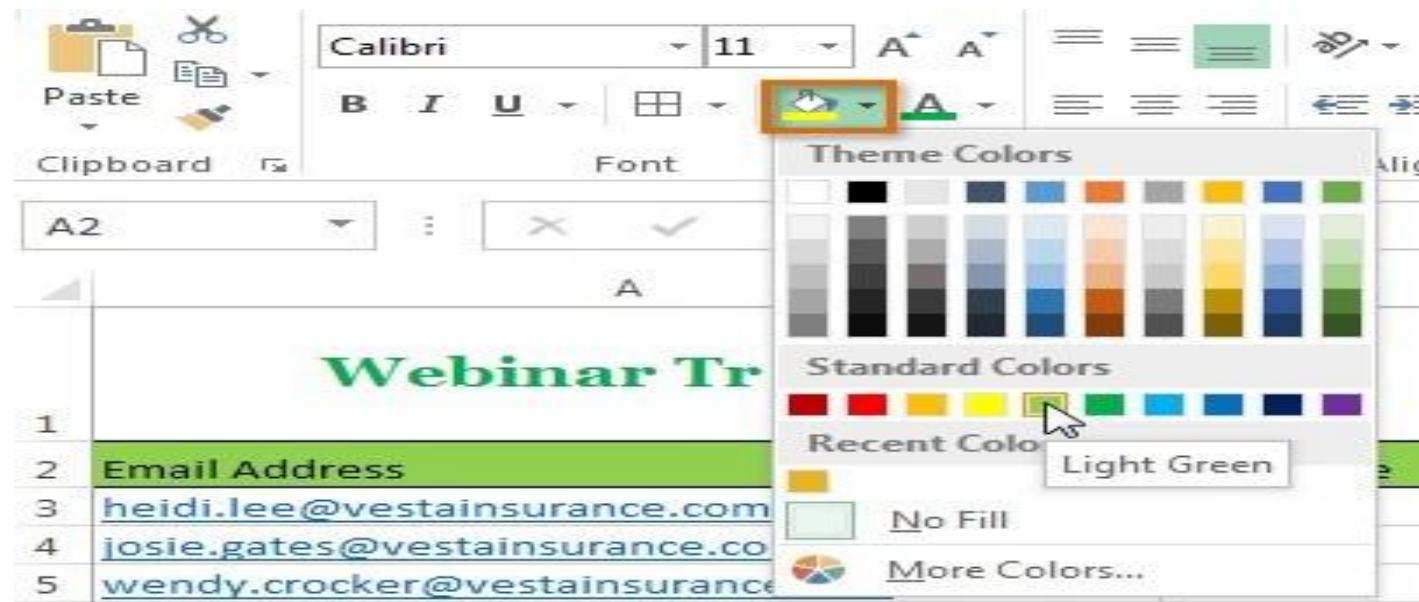


To add a fill color:

1. Select the cell(s) you want to modify.

Webinar Training Log			
3	Email Address	Last Name	First Name
4	heidi.lee@vestainsurance.com	Lee	Heidi
5	josie.gates@vestainsurance.com	Gates	Josie
6			

2. Click the drop-down arrow next to the Fill Colour command on the Home tab. The Fill Colour menu will appear.
3. Select the fill colour you want to use. A live preview of the new fill colour will appear as you hover the mouse over different options. In our example, we'll choose Light Green.

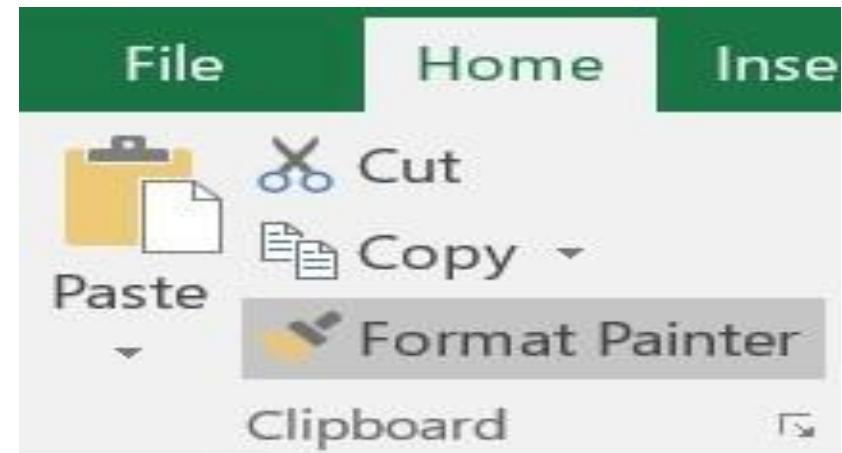


4. The selected fill colour will appear in the selected cells.

Webinar Training Log			
3			
4	Email Address	Last Name	First Name
5	heidi.lee@vestainsurance.com	Lee	Heidi
6	josie.gates@vestainsurance.com	Gates	Josie

Format Painter

If you want to copy formatting from one cell to another, you can use the Format Painter command on the Home tab. When you click the Format Painter, it will copy all of the formatting from the selected cell. You can then click and drag over any cells you want to paste the formatting to.



Formatting text and numbers

One of the most powerful tools in Excel is the ability to apply specific formatting for text and numbers. Instead of displaying all cell content in exactly the same way, you can use formatting to change the appearance of dates, times, decimals, percentages (%), currency (\$), and much more.

To apply number formatting:

In our example, we'll change the number format for several cells to modify the way dates are displayed.

1. Select the cells(s) you want to modify.

3/1/2013	3/8/2013	3/15/2013	3/22/2013	3/29/2013
X	X			

2. Click the drop-down arrow next to the Number Format command on the Home tab. The Number Formatting drop-down menu will appear

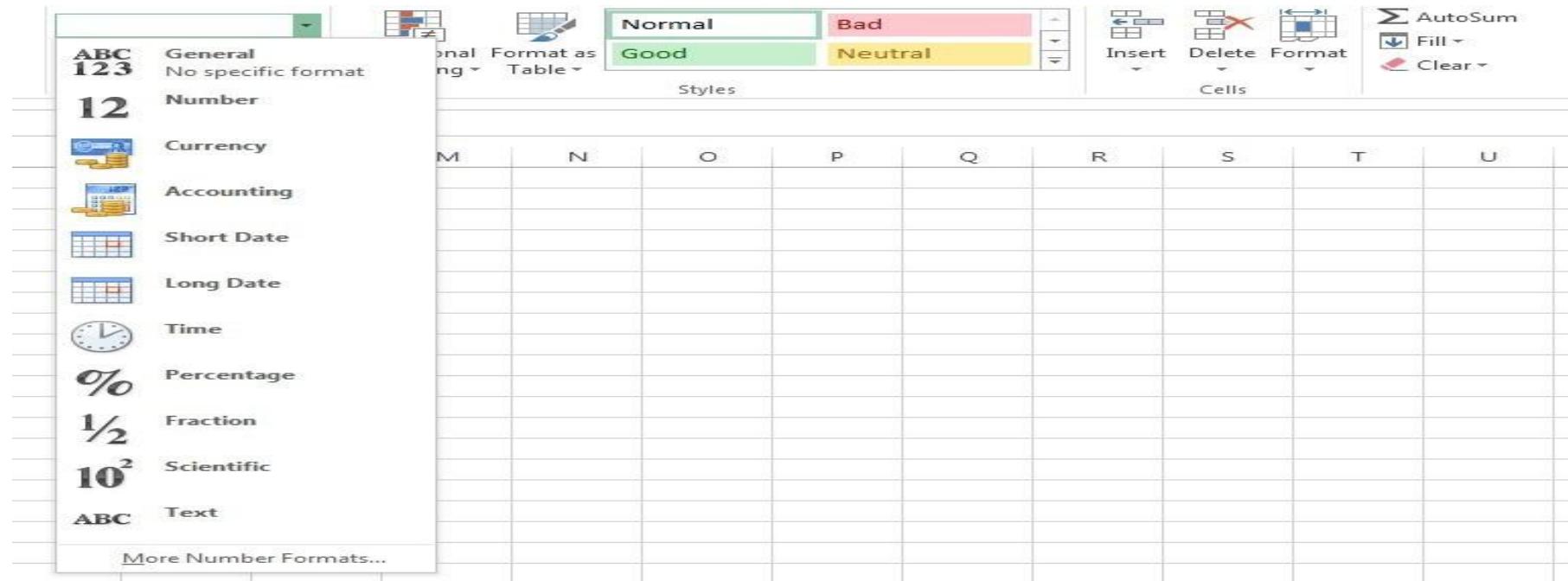
3. Select the desired formatting option. In our example, we will change the formatting to Long Date.

4. The selected cells will change to the new formatting style. For some number formats, you can then use the Increase Decimal and Decrease Decimal commands (below the Number Format command) to change the number of decimal places that are displayed.



Friday, March 01, 2013 Friday, March 08, 2013 Friday, March 15, 2013 Friday, March 22, 2013 Friday, March 29, 2013

X X



General

General is the default format for any cell. When you enter a number into the cell, Excel will guess the number format that is most appropriate. For example, if you enter **1-5**, the cell will display the number as a Short Date, **1/5/2010**.

Number

Number formats numbers with **decimal places**. For example, if you enter **4** into the cell, the cell will display the number as **4.00**.

Currency

Currency formats numbers as currency with a **currency symbol**. For example, if you enter **4** into the cell, the cell will display the number as **\$4.00**.

Accounting

Accounting formats numbers as monetary values like the Currency format, but it also **aligns** currency symbols and decimal places within columns. This format makes it easier to read long lists of currency figures.

Short Date

Short Date formats numbers as **M/D/YYYY**. For example, **August 8, 2013**, would be **8/8/2013**.

Long Date

Long Date formats numbers as **Weekday, Month DD, YYYY**. For example, the date would appear as **Monday, August 14, 2013**.

Time

Time formats numbers as **HH/MM/SS** and notes **AM** or **PM**. For example, time would appear as **10:25:00 AM**.

Percentage

Percentage formats numbers with **decimal places** and the **percent sign**. For example, if you enter **0.75** into the cell, the cell will display the number as **75.00%**.

Fraction

Fraction formats numbers as fractions separated by the **forward slash**. For example, if you enter **1/4** into the cell, the cell will display the number as **1/4**. If you enter **1/4** into a cell that is formatted as General, the cell will display the number as a date, **4-Jan**.

Scientific

Text

Scientific formats numbers in **scientific notation**. For example, if you enter **140000** into the cell, then the cell will display the number as **1.40E+05**. Note: By default, Excel will format the cell in scientific notation if it contains a large integer. If you do not want Excel to format large integers with scientific notation, use the **Number** format.

Text formats numbers as text, meaning what you enter into the cell will appear exactly as it was entered. Excel defaults to this setting if a cell contains both text and numbers.

Cell references

Cell references in Excel are very important. Understand the difference between relative, absolute and mixed reference.

Relative Reference

By default, Excel uses relative references. See the formula in cell D2 below. Cell D2 references (points to) cell B2 and cell C2. Both references are relative.

COUNTIF				
	A	B	C	D
1	Product	Quantity	Price	Amount
2	bread	2	1.5	=B2*C2
3	butter	1	1.2	
4	cheese	3	2	
5	ham	3	1.8	
6				

1. Select cell D2, click on the lower right corner of cell D2 and drag it down to cell D5.

COUNTIF				
	A	B	C	D
1	Product	Quantity	Price	Amount
2	bread	2	1.5	3
3	butter	1	1.2	1.2
4	cheese	3	2	6
5	ham	3	1.8	=B5*C5
6				

Cell D3 references cell B3 and cell C3. Cell D4 references cell B4 and cell C4. Cell D5 references cell B5 and other words: each cell references its two neighbours on the left.

C5. In

Absolute Reference

See the formula in cell E3 below.

1. To create an absolute reference to cell H3, place a \$ symbol in front of the column letter and row number (\$H\$3) in the formula of cell E3.

	COUNTIF	⋮	X	✓	f _x	=B3*\$H\$3		
1		A	B	C	D	E	F	G
2		Length (cm)	Width (cm)					
3		1	10			=B3*\$H\$3		
4		5	10					
5		4	8					
6		2	10					
7								

2. Now we can quickly drag this formula to the other cells.

The screenshot shows a Microsoft Excel spreadsheet with data in rows 1 through 7 and columns A through I. The data includes dimensions in centimeters and their equivalents in inches, along with a conversion rate. The formula bar at the top shows the formula $=C6*\$H\3 . The cell F6 contains the formula $=C6*\$H\3 , which is highlighted with a green border. The cell F7 is being filled with the same formula, indicated by a blue border around the formula bar and the cell itself. The conversion rate cell H3 is highlighted with a red border. The data table is as follows:

	A	B	C	D	E	F	G	H	I
1									
2	Length (cm)	Width (cm)		Length (inch)	Width (inch)	Conversion rate			
3		1	10	0.3937008	3.937008	0.3937008			
4		5	10	1.968504	3.937008				
5		4	8	1.5748032	3.1496064				
6		2	10	0.7874016	=C6*\\$H\\$3				
7									

The reference to cell H3 is fixed (when we drag the formula down and across). As a result, the correct lengths and widths in inches are calculated.

Mixed Reference

Sometimes we need a combination of relative and absolute reference (mixed reference).

1. See the formula in cell F2 below.

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

	A	B	C	D	E	F	G	H
1	Product	Price			Prices / Month	Jan	Feb	Mar
2	Jeans	80			Jeans	=B2*(1-B6)		
3	Shirts	30			Shirts			
4								
5	Month	Jan	Feb	Mar				
6	Reduction	20%	40%	80%				
7								

The formula bar at the top shows the formula `=B2*(1-B6)`. The cell F2 contains the formula `=B2*(1-B6)`, which is highlighted with a green border. The cell B6 contains the value 20%, which is highlighted with a red border. The formula bar also shows the function name `COUNTIF`.

2. We want to copy this formula to the other cells quickly. Drag cell F2 across one cell, and look at the formula in cell G2.

COUNTIF : X ✓ fx =C2*(1-C6)

	A	B	C	D	E	F	G	H
1	Product	Price			Prices / Month	Jan	Feb	Mar
2	Jeans	80			Jeans		64	=C2*(1-C6)
3	Shirts	30			Shirts			
4								
5	Month	Jan	Feb	Mar				
6	Reduction	20%	40%	80%				
7								

Do you see what happens?

The reference to the price should be a fixed reference to column B. Solution: place a \$ symbol in front of the column letter (\$B2) in the formula of cell F2. In a similar way, when we drag cell F2 down, the reference to the reduction should be a fixed reference to row 6. Solution: place a \$ symbol in front of the row number (B\$6) in the formula of cell F2.

COUNTIF : X ✓ fx =\$B2*(1-B\$6)

	A	B	C	D	E	F	G	H
1	Product	Price			Prices / Month	Jan	Feb	Mar
2	Jeans	80			Jeans	=\$B2*(1-B\$6)		
3	Shirts	30			Shirts			
4								
5	Month	Jan	Feb	Mar				
6	Reduction	20%	40%	80%				
7								

Note: we don't place a \$ symbol in front of the row number of \$B2 (this way we allow the reference to change from \$B2 (Jeans) to \$B3 (Shirts) when we drag the formula down). In a similar way, we don't place a \$ symbol in front of the column letter of B\$6 (this way we allow the reference to change from B\$6 (Jan) to C\$6 (Feb) and D\$6 (Mar) when we drag the formula across).

3. Now we can quickly drag this formula to the other cells. The references to column B and row 6 are fixed.

		COUNTIF							
1	Product	B	C	D	E	F	G	H	
2	Jeans	80			Jeans	64	48	16	
3	Shirts	30			Shirts	24	18	=B3*(1-D\$6)	
4									
5	Month	Jan	Feb	Mar					
6	Reduction	20%	40%	80%					
7									

Navigations using Excel:

Enter moves the cursor down. **Shift+ Enter** moves the cursor up. **Tab** moves the cursor to the right.

Shift + Tab moves it back to the left.

PageUp and **PageDown** move up or down one full screen.

Alt+ PageDown moves one full screen to the right

Alt+ PageUp moves one full screen to the left.

The **Home** key moves the cursor to the beginning of the current row in column A.

Ctrl+ Home moves the cursor to the Home position (A1).

Ctrl + Shift + Arrow Key selects the data till the last cell in which data is there, in the direction of Arrow key

Ctrl + Arrow Key Moves the active cell to the last cell with data in appropriate direction

Shift + Arrow Key Selects the cells in appropriate direction

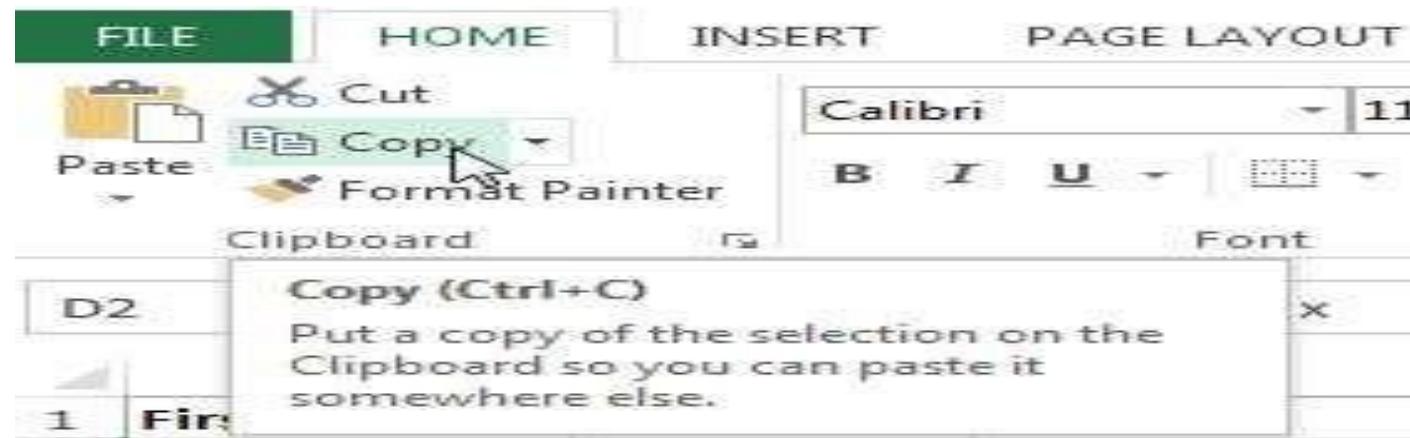
To copy and paste cell content:

Excel allows you to copy content that is already entered into your spreadsheet and paste that content to other cells, which can save you time and effort.

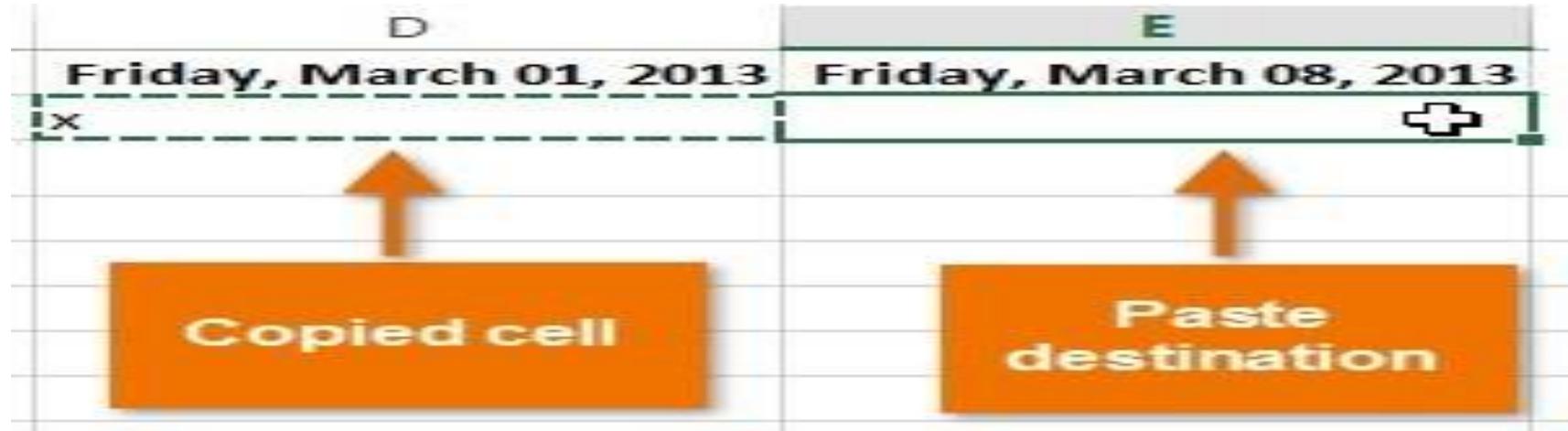
1. Select the cell(s) you want to copy.



2. Click the Copy command on the Home tab, or press Ctrl+C on your keyboard.



3. Select the cell(s) where you want to paste the content. The copied cells will now have a dashed box around them.



4. Click the Paste command on the Home tab, or press Ctrl+V on your keyboard.



5. The content will be pasted into the selected cells.

D	E
Friday, March 01, 2013	Friday, March 08, 2013
X	X

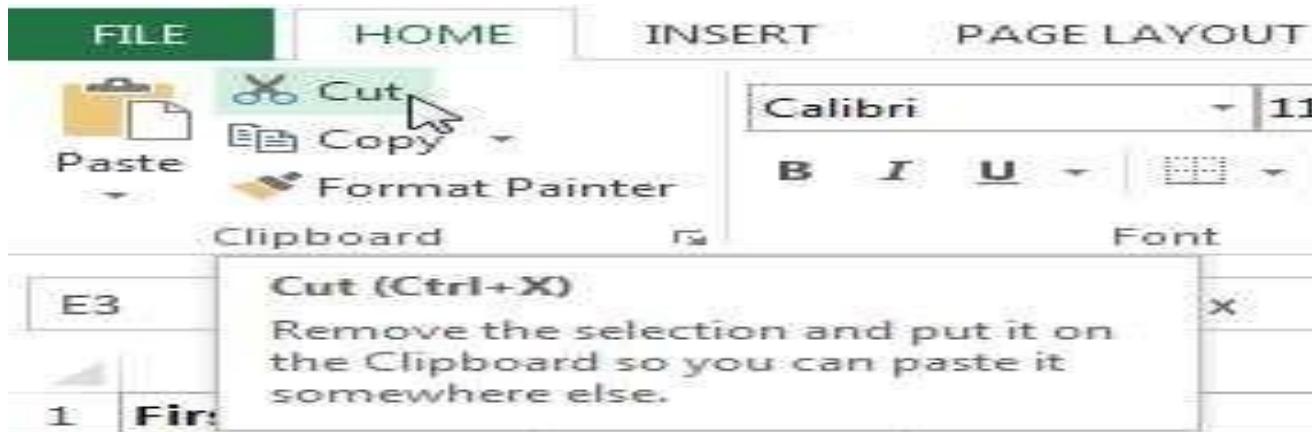
To cut and paste cell content:

Unlike copying and pasting, which duplicates cell content, cutting allows you to move content between cells.

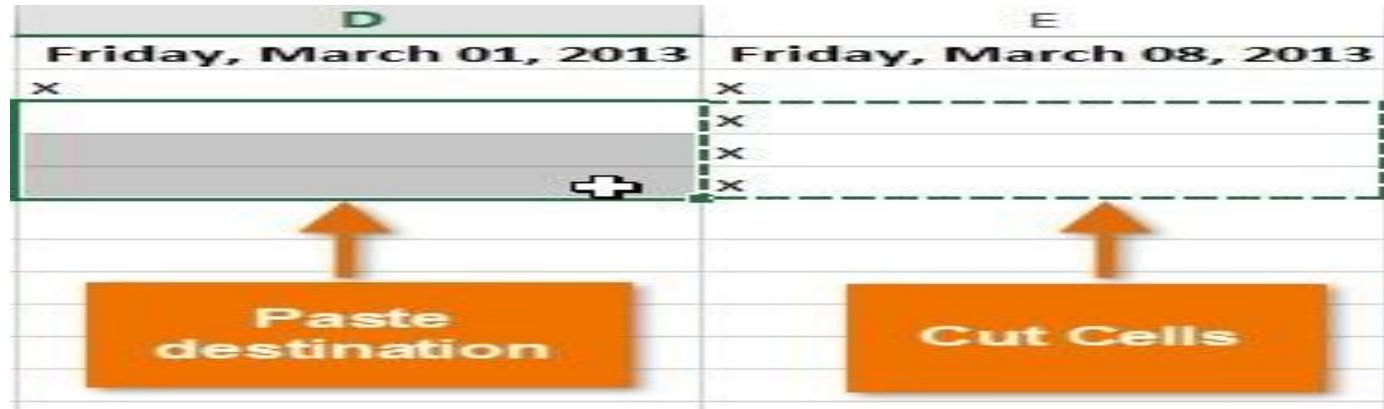
1. Select the cell(s) you want to cut.

D	E
Friday, March 01, 2013	Friday, March 08, 2013
x	x
	x
	x
	x
	+

2. Click the Cut command on the Home tab, or press Ctrl+X on your keyboard.



3. Select the cells where you want to paste the content. The cut cells will now have a dashed box around them.



4. Click the Paste command on the Home tab, or press Ctrl+V on your keyboard.



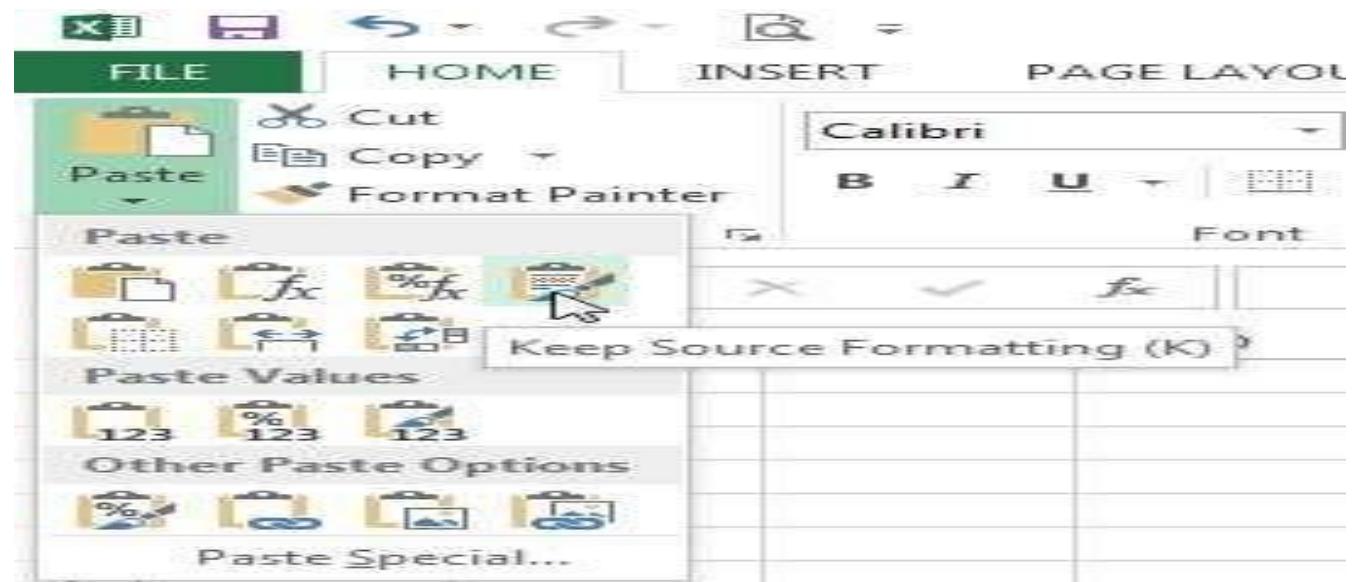
5. The cut content will be removed from the original cells and pasted into the selected cells.

D	E
Friday, March 01, 2013	Friday, March 08, 2013
x	x
x	
x	
x	

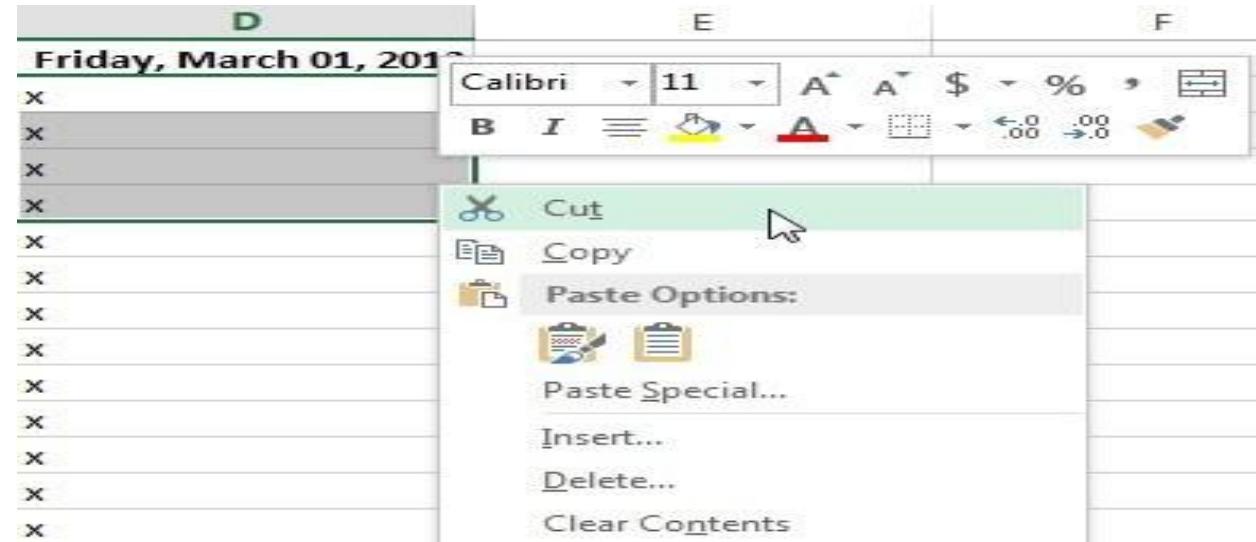
To access more paste options:

You can also access additional paste options, which are especially convenient when working with cells that contain formulas or formatting.

- To access more paste options, click the drop-down arrow on the Paste command.



Rather than choose commands from the Ribbon, you can access commands quickly by right-clicking. Simply select the cell(s) you want to format, then right-click the mouse. A drop-down menu will appear, where you'll find several commands that are also located on the Ribbon.



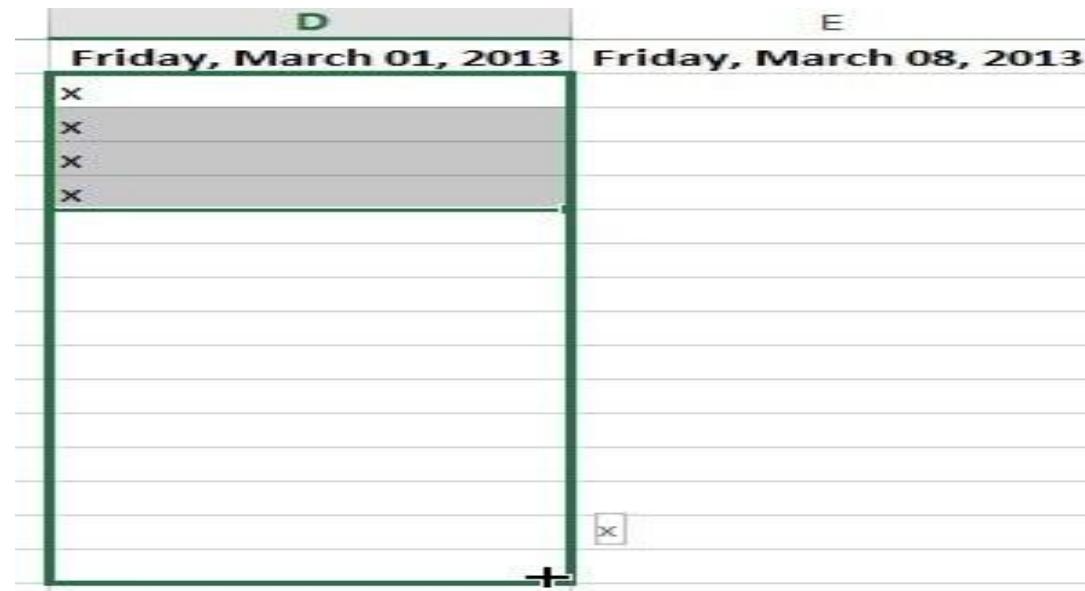
Here is the list of the **shortcuts** for Paste Special

1. To Paste Values only – Alt+E+S+V + Enter.
2. To Paste Formatting only – Alt+E+S+T + Enter.
3. To Paste Comments only – Alt+E+S+C + Enter.
4. To set column width same as that of the copied cells – Alt+E+S+W + Enter.
5. To copy but in a transposed manner – Alt+E+S+*+E+ Enter (striking that extra 'E' at the end checks the transpose option. The * indicates that you can use it with any of the above-mentioned shortcuts.

To use the fill handle:

There may be times when you need to copy the content of one cell to several other cells in your worksheet. You could copy and paste the content into each cell, but this method would be time consuming. Instead, you can use the fill handle to quickly copy and paste content to adjacent cells in the same row or column.

1. Select the cell(s) containing the content you want to use. The fill handle will appear as a small square in the bottom-right corner of the selected cell(s).
2. Click, hold, and drag the fill handle until all of the cells you want to fill are selected.



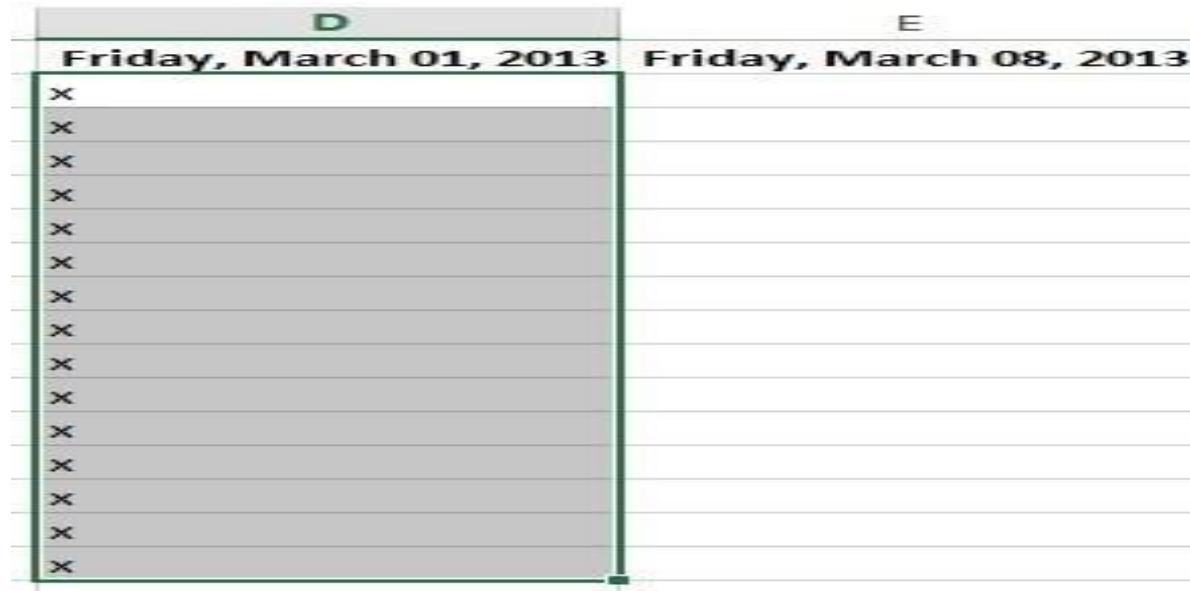
3. Release the mouse to fill the selected cells.

To continue a series with the fill handle:

The fill handle can also be used to continue a series.

Whenever the content of a row or column follows a sequential order, like numbers (1, 2, 3) or days (Monday, Tuesday, Wednesday), the fill handle can guess what should come next in the series. In many cases, you may need to select multiple cells before using the fill handle to help Excel determine the series order. In our example below, the fill handle is used to extend a series of dates in a column.

You can also double-click the fill handle instead of clicking and dragging. This can be useful with larger spreadsheets, where clicking and dragging may be awkward.



How to use Flash Fill

Usually Flash Fill starts automatically, and you only need to provide a pattern. Here's how:

1. Insert a new column adjacent to the column with your source data.
2. In the first cell of a newly added column, type the desired value.
3. Start typing in the next cell, and if Excel senses a pattern, it will show a preview of data to be auto-filled in the below cells.
4. Press the Enter key to accept the preview. Done!

In most situations, Flash Fill kicks in automatically as soon as Excel establishes a pattern in the data you are entering. If a preview does not show up, you can activate Flash Fill manually in this way:

1. Fill in the first cell and press Enter.

Click the Flash Fill button on the *Data* tab or press the Ctrl+C shortcut

The screenshot shows a Microsoft Excel interface. At the top, the ribbon is visible with the 'Data' tab selected. The 'Flash Fill' button, located under the 'Text to Columns' icon, is highlighted with a blue box and a large blue arrow pointing towards it from the bottom left. Below the ribbon, there are two tables. The first table (A) contains raw data with columns for 'Participants' and 'Country'. The second table (B) shows the results after Flash Fill has been applied, where the 'Country' column has been populated based on the pattern identified in the first cell. The 'Data Tools' section of the ribbon is also partially visible.

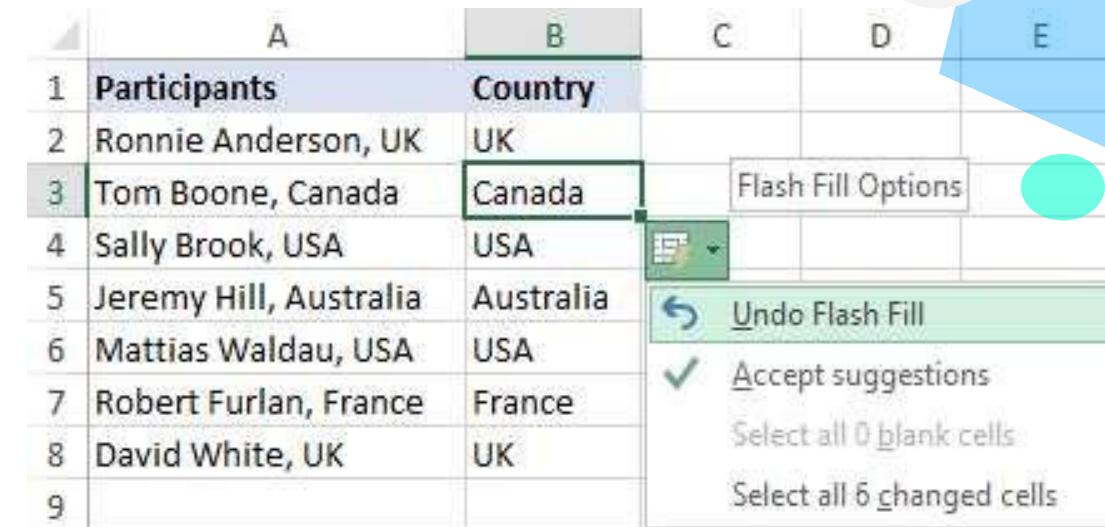
	A	B	C
1	Participants	Country	
2	Ronnie Anderson, UK	UK	
3	Tom Boone, Canada	Canada	
4	Sally Brook, USA	USA	
5	Jeremy Hill, Australia	Australia	
6	Mattias Waldau, USA	USA	
7	Robert Furlan, France	France	
8	David White, UK	UK	

	B	C	D
B	Participants	Country	
1	Ronnie Anderson, UK	UK	
2	Tom Boone, Canada	Canada	
3	Sally Brook, USA	USA	
4	Jeremy Hill, Australia	Australia	
5	Mattias Waldau, USA	USA	
6	Robert Furlan, France	France	
7	David White, UK	UK	

Flash Fill options

When using Flash Fill in Excel to automate data entry, the Flash Fill Options button appears near the auto-filled cells. Clicking this button opens the menu that lets you do the following:

- Undo the Flash Fill results.
- Select blank cells that Excel has failed to populate.
- Select the changed cells, for example, to format them all at once.



The screenshot shows a portion of an Excel spreadsheet with columns A, B, C, D, and E. Column A contains participant names and numbers, and column B contains their countries. Row 3, where the name is 'Tom Boone, Canada' and the country is 'Canada', has a green selection bar. A context menu is open at this cell, titled 'Flash Fill Options'. The menu includes the following items:

- Undo Flash Fill (highlighted with a green background)
- Accept suggestions
- Select all 0 blank cells
- Select all 6 changed cells

A small green circle highlights the 'Flash Fill Options' button in the top right corner of the menu.

A	B	C	D	E
1 Participants	Country			
2 Ronnie Anderson, UK	UK			
3 Tom Boone, Canada	Canada			Flash Fill Options
4 Sally Brook, USA	USA			
5 Jeremy Hill, Australia	Australia			
6 Mattias Waldau, USA	USA			
7 Robert Furlan, France	France			
8 David White, UK	UK			
9				

Sorting Data

Let's say you had the spreadsheet above and wanted to sort by price. This process is fairly simple. You can either highlight the whole column or even click on the first cell in the column to get started. Then you will:

- Right click to open the menu
- Go down to the Sort option – when hovering over Sort the sub-menu will appear
- Click on Largest to Smallest
- Select Expand the selection
- Click OK

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Font Alignment Number Styles Cells Editing

D2 100

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
1	Order Number	Product	Salesperson	Price	Date	Customer													
2	333222	ABC	John Smith	\$100.00	2/3/2016	Eastern Company													
3	333221	DEF	Rachel Adams	\$200.00	2/2/2016	Western Company													
4	333223	ABC	John Smith	\$100.00	2/4/2016	Eastern Company													
5	333220	XYZ	Cheryl Myers	\$800.00	2/1/2016	Southern Company													
6	333119	GHI	Rachel Adams	\$300.00	1/31/2016	Northern Company													
7	333224	JKL	Michael Brent	\$400.00	2/5/2016	Northern Company													
8	333118	DEF	Cheryl Myers	\$200.00	1/30/2016	Western Company													
9	333225	MNO	Dylan Rogers	\$500.00	2/6/2016	Eastern Company													
10	333117	PQR	Michael Brent	\$600.00	1/29/2016	Southern Company													
11	333226	STU	Cheryl Myers	\$700.00	2/7/2016	Northern Company													
12	333116	ABC	Rachel Adams	\$100.00	1/28/2016	Western Company													
13	333227	MNO	John Smith	\$500.00	2/3/2016	Eastern Company													
14	333228	PQR	Rachel Adams	\$600.00	2/2/2016	Western Company													
15	333229	ABC	John Smith	\$100.00	2/4/2016	Eastern Company													
16	333230	XYZ	Cheryl Myers	\$800.00	2/1/2016	Southern Company													
17	333231	DEF	Rachel Adams	\$200.00	1/31/2016	Northern Company													
18	333232	STU	Michael Brent	\$700.00	2/5/2016	Northern Company													
19	333233	GHI	Cheryl Myers	\$300.00	1/30/2016	Western Company													
20	333234	DEF	Dylan Rogers	\$200.00	2/6/2016	Eastern Company													
21	333235	ABC	Michael Brent	\$100.00	2/3/2016	Southern Company													
22																			
23																			

Filtering Data

The filter feature applies a drop-down menu to each column heading, allowing you to select specific choices to narrow a table.

Using the above example, let's say you wanted to filter your table by Company and Salesperson. Specifically, you want to find the number of sales Dylan Rogers made to Eastern Company.

To do this using the filter you would:

- Go to the Data tab on Excel ribbon
- Select the Filter tool
- Select Eastern Company from the dropdown menu
- Select Dylan Rogers from the Salesperson dropdown menu

Excel Sorting & Filtering Data.xlsx - Excel

Kevin Erdman

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Font: Calibri 11pt, Bold, Italic, Underline, Alignment: Merge & Center, Number: General, Conditional Formatting, Format as Table, Cell Styles, Insert, Delete, Format, Cells, Editing: AutoSum, Fill, Sort & Filter, Clear.

A1 Order Number

Order Number	Product	Salesperson	Price	Date	Customer
333222	ABC	John Smith	\$100.00	2/3/2016	Eastern Company
333221	DEF	Rachel Adams	\$200.00	2/2/2016	Western Company
333223	ABC	John Smith	\$100.00	2/4/2016	Eastern Company
333220	XYZ	Cheryl Myers	\$800.00	2/1/2016	Southern Company
333119	GHI	Rachel Adams	\$300.00	1/31/2016	Northern Company
333224	JKL	Michael Brent	\$400.00	2/5/2016	Northern Company
333118	DEF	Cheryl Myers	\$200.00	1/30/2016	Western Company
333225	MNO	Dylan Rogers	\$500.00	2/6/2016	Eastern Company
333117	PQR	Michael Brent	\$600.00	1/29/2016	Southern Company
333226	STU	Cheryl Myers	\$700.00	2/7/2016	Northern Company
333116	ABC	Rachel Adams	\$100.00	1/28/2016	Western Company
333227	MNO	John Smith	\$500.00	2/3/2016	Eastern Company
333228	PQR	Rachel Adams	\$600.00	2/2/2016	Western Company
333229	ABC	John Smith	\$100.00	2/4/2016	Eastern Company
333230	XYZ	Cheryl Myers	\$800.00	2/1/2016	Southern Company
333231	DEF	Rachel Adams	\$200.00	1/31/2016	Northern Company
333232	STU	Michael Brent	\$700.00	2/5/2016	Northern Company
333233	GHI	Cheryl Myers	\$300.00	1/30/2016	Western Company
333234	DEF	Dylan Rogers	\$200.00	2/6/2016	Eastern Company

The Sort & Filter Tool

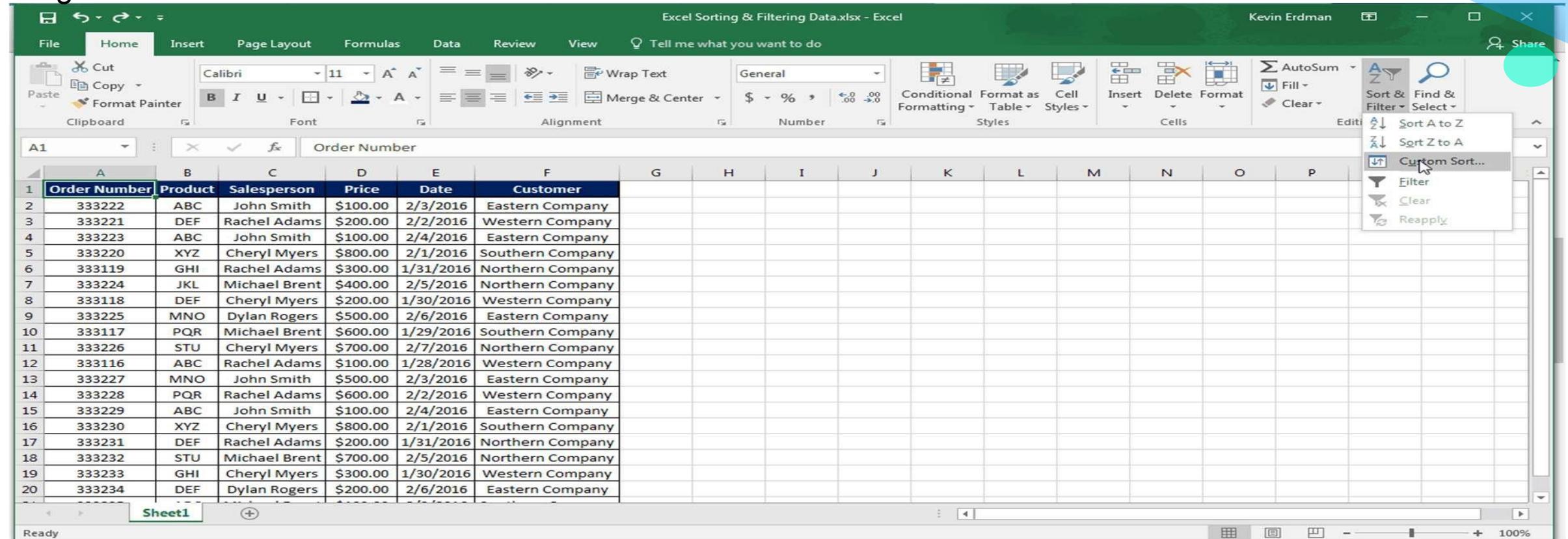
In addition to the right-click menu sorting option and the Filter tool on the Data ribbon, Excel has a Sort & Filter tool that allows for custom sorting.

In the following GIF, we can see how the Custom Sorting tool can be used to sort date ranges or price ranges.

The screenshot shows a Microsoft Excel spreadsheet titled "Excel Sorting & Filtering Data.xlsx - Excel". The ribbon is visible at the top with the "Home" tab selected. The main area contains a data table with 20 rows and 6 columns, starting from A1. The columns are labeled: Order Number, Product, Salesperson, Price, Date, and Customer. The data includes various order numbers, products (ABC, DEF, XYZ, GHI, MNO, PQR, STU), salespeople (John Smith, Rachel Adams, Cheryl Myers, Michael Brent, Dylan Rogers), prices (\$100.00 to \$800.00), dates (from 2/3/2016 to 2/6/2016), and customers (Eastern Company, Western Company, Southern Company, Northern Company). The "Editing" button in the ribbon is highlighted with a blue arrow. The status bar at the bottom indicates "Ready" and "100%".

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
1	Order Number	Product	Salesperson	Price	Date	Customer	G	H	I	J	K	L	M	N	O	P	Q	R
2	333222	ABC	John Smith	\$100.00	2/3/2016	Eastern Company												
3	333221	DEF	Rachel Adams	\$200.00	2/2/2016	Western Company												
4	333223	ABC	John Smith	\$100.00	2/4/2016	Eastern Company												
5	333220	XYZ	Cheryl Myers	\$800.00	2/1/2016	Southern Company												
6	333119	GHI	Rachel Adams	\$300.00	1/31/2016	Northern Company												
7	333224	JKL	Michael Brent	\$400.00	2/5/2016	Northern Company												
8	333118	DEF	Cheryl Myers	\$200.00	1/30/2016	Western Company												
9	333225	MNO	Dylan Rogers	\$500.00	2/6/2016	Eastern Company												
10	333117	PQR	Michael Brent	\$600.00	1/29/2016	Southern Company												
11	333226	STU	Cheryl Myers	\$700.00	2/7/2016	Northern Company												
12	333116	ABC	Rachel Adams	\$100.00	1/28/2016	Western Company												
13	333227	MNO	John Smith	\$500.00	2/3/2016	Eastern Company												
14	333228	PQR	Rachel Adams	\$600.00	2/2/2016	Western Company												
15	333229	ABC	John Smith	\$100.00	2/4/2016	Eastern Company												
16	333230	XYZ	Cheryl Myers	\$800.00	2/1/2016	Southern Company												
17	333231	DEF	Rachel Adams	\$200.00	1/31/2016	Northern Company												
18	333232	STU	Michael Brent	\$700.00	2/5/2016	Northern Company												
19	333233	GHI	Cheryl Myers	\$300.00	1/30/2016	Western Company												
20	333234	DEF	Dylan Rogers	\$200.00	2/6/2016	Eastern Company												

But notice how this example is either/or. What if you wanted to sort by date and by price? This where the Custom Sort option really comes in handy. After selecting your first sorting conditions, you can add a new level to get even more accurate data:



The screenshot shows a Microsoft Excel window titled "Excel Sorting & Filtering Data.xlsx - Excel". The ribbon is visible at the top, with the "Home" tab selected. In the "Cells" group of the ribbon, the "Sort & Filter" button is highlighted with a green circle. A dropdown menu is open from this button, showing options like "Sort A to Z", "Sort Z to A", "Custom Sort...", "Filter", "Clear", and "Reapply". The "Custom Sort..." option is highlighted with a blue rectangle. The main area of the screen displays a table with 20 rows of data, spanning columns A through P. The columns are labeled: Order Number, Product, Salesperson, Price, Date, and Customer. The data includes various product codes, names, prices, dates, and company names. The first row contains the column headers.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	Order Number	Product	Salesperson	Price	Date	Customer										
2	333222	ABC	John Smith	\$100.00	2/3/2016	Eastern Company										
3	333221	DEF	Rachel Adams	\$200.00	2/2/2016	Western Company										
4	333223	ABC	John Smith	\$100.00	2/4/2016	Eastern Company										
5	333220	XYZ	Cheryl Myers	\$800.00	2/1/2016	Southern Company										
6	333119	GHI	Rachel Adams	\$300.00	1/31/2016	Northern Company										
7	333224	JKL	Michael Brent	\$400.00	2/5/2016	Northern Company										
8	333118	DEF	Cheryl Myers	\$200.00	1/30/2016	Western Company										
9	333225	MNO	Dylan Rogers	\$500.00	2/6/2016	Eastern Company										
10	333117	PQR	Michael Brent	\$600.00	1/29/2016	Southern Company										
11	333226	STU	Cheryl Myers	\$700.00	2/7/2016	Northern Company										
12	333116	ABC	Rachel Adams	\$100.00	1/28/2016	Western Company										
13	333227	MNO	John Smith	\$500.00	2/3/2016	Eastern Company										
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15	333229	ABC	John Smith	\$100.00	2/4/2016	Eastern Company										
16	333230	XYZ	Cheryl Myers	\$800.00	2/1/2016	Southern Company										
17	333231	DEF	Rachel Adams	\$200.00	1/31/2016	Northern Company										
18	333232	STU	Michael Brent	\$700.00	2/5/2016	Northern Company										
19	333233	GHI	Cheryl Myers	\$300.00	1/30/2016	Western Company										
20	333234	DEF	Dylan Rogers	\$200.00	2/6/2016	Eastern Company										

As you can see, Excel offers a variety of sorting and filtering tools to help you refine your data and keep it organized

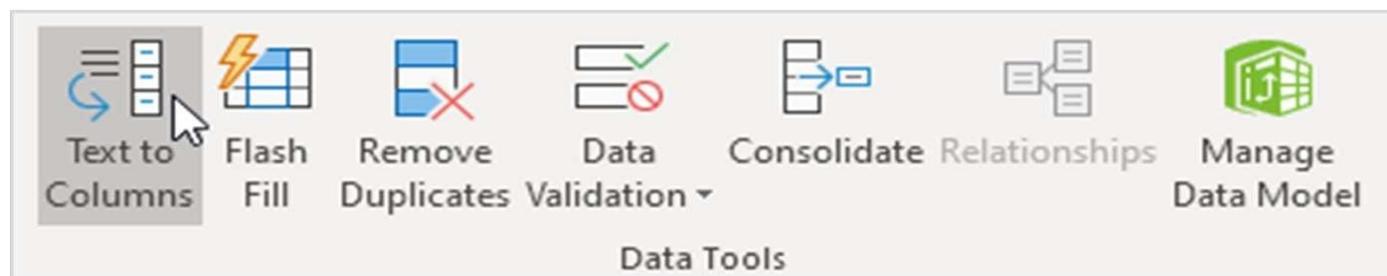
Text to Columns

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

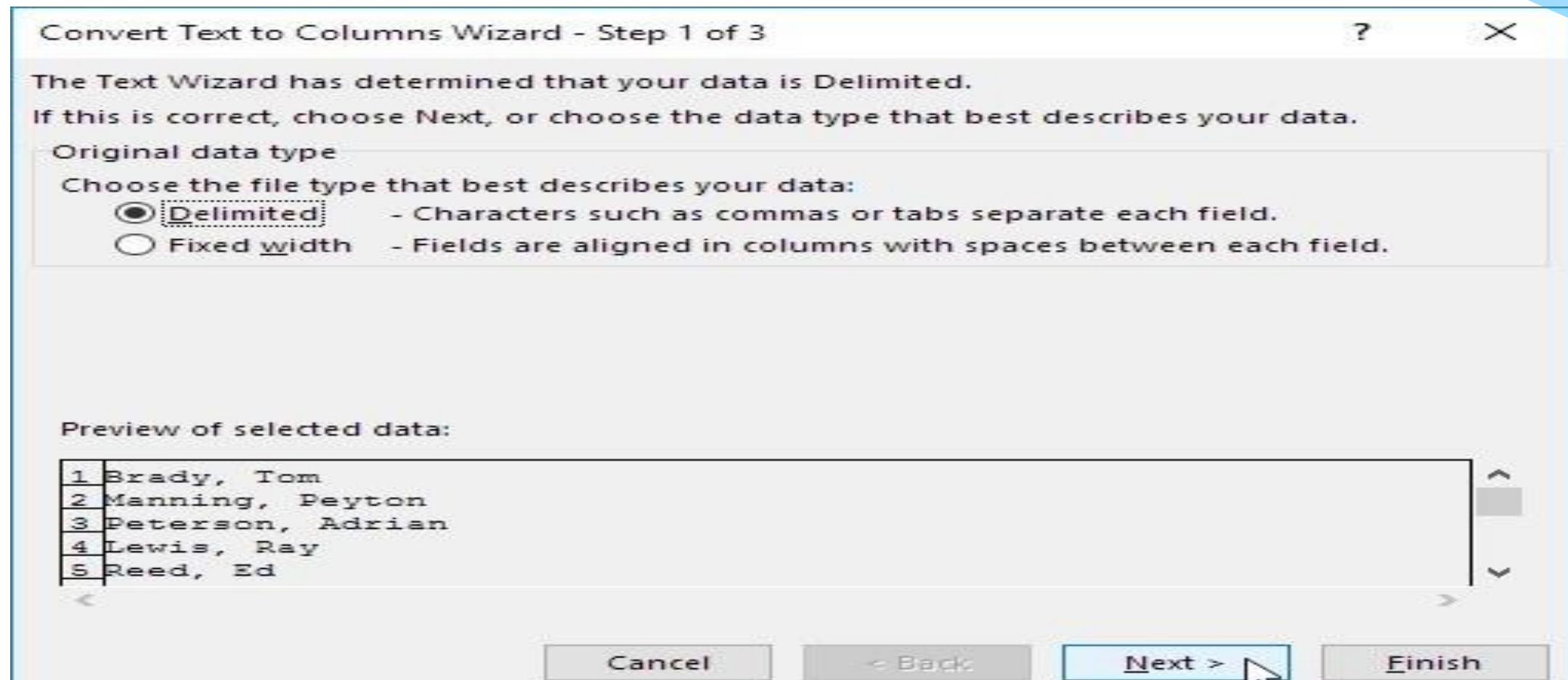
	A	B	C	D	E	F	G	H
1	Brady, Tom							
2	Manning, Peyton							
3	Peterson, Adrian							
4	Lewis, Ray							
5	Reed, Ed							
6	Polamalu, Troy							
7	Johnson, Andre							
8	Revis, Darrelle							
9	Brees, Drew							
10	Peppers, Julius							
11								

2. On the Data tab, in the Data Tools group, click Text to Columns.



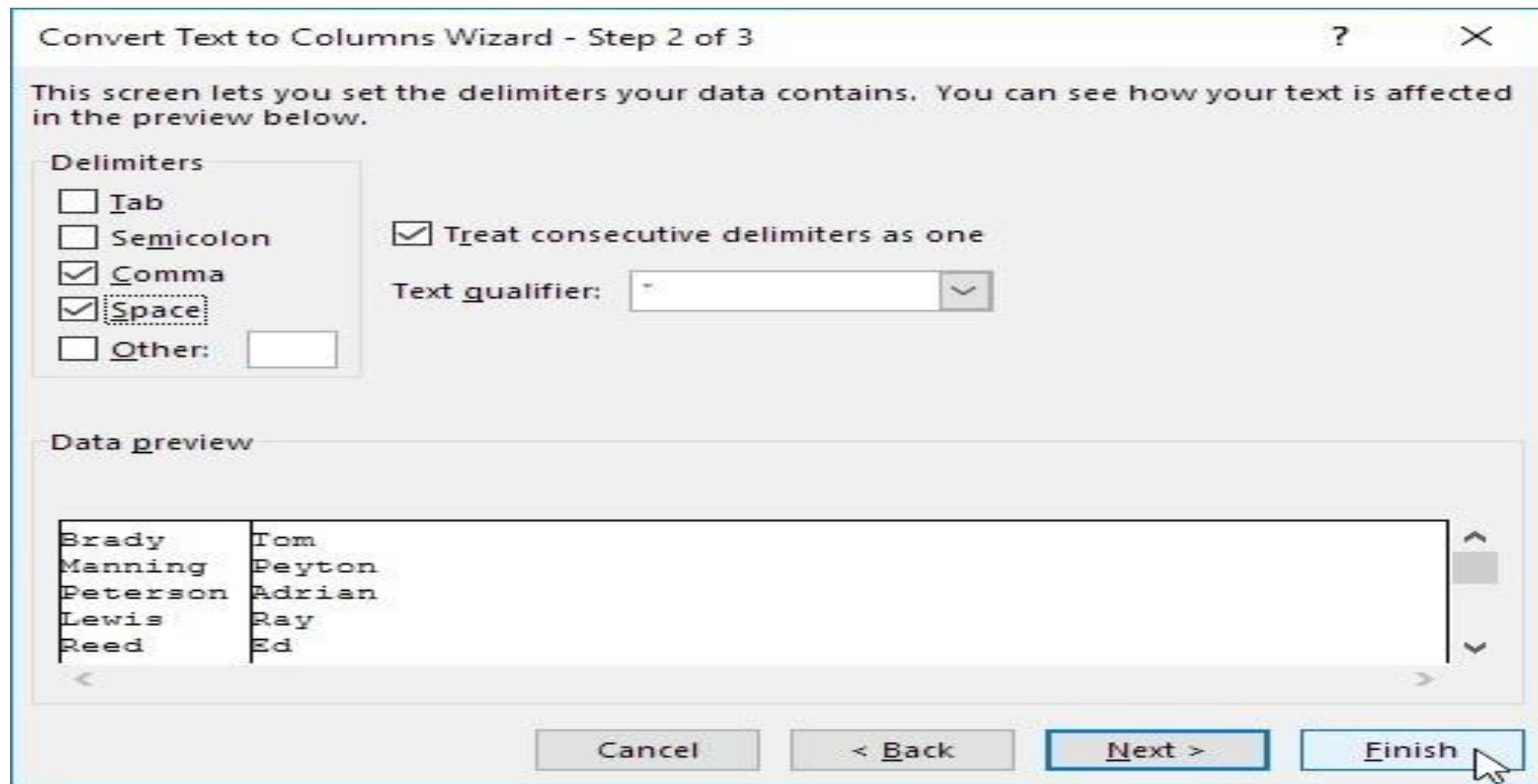
The following dialog box appears.

3. Choose Delimited and click Next.



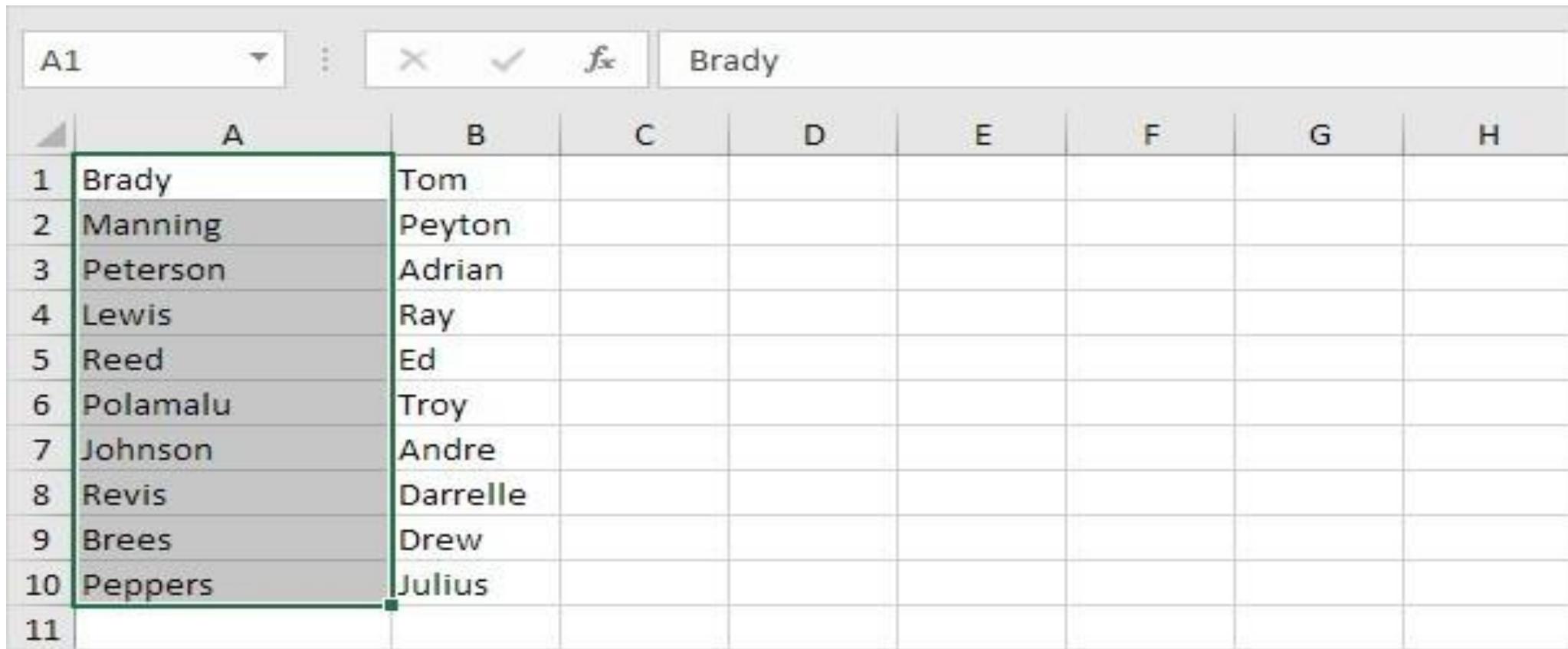
4. Clear all the checkboxes under Delimiters except for the Comma and Space check box.

5. Click Finish.



Note: This example has commas and spaces as delimiters. You may have other delimiters in your data. Experiment by checking and unchecking the different check boxes. You get a live preview of how your data will be separated.

Result:



	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								

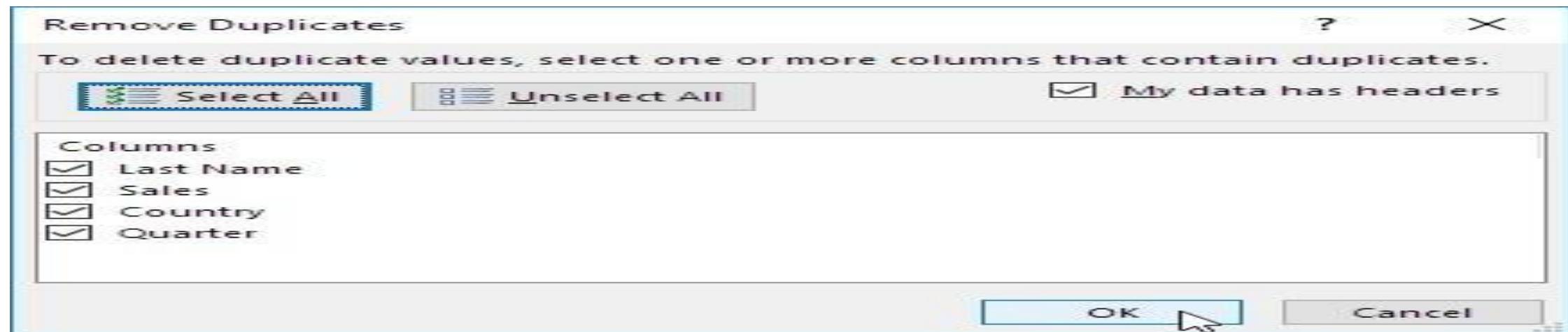
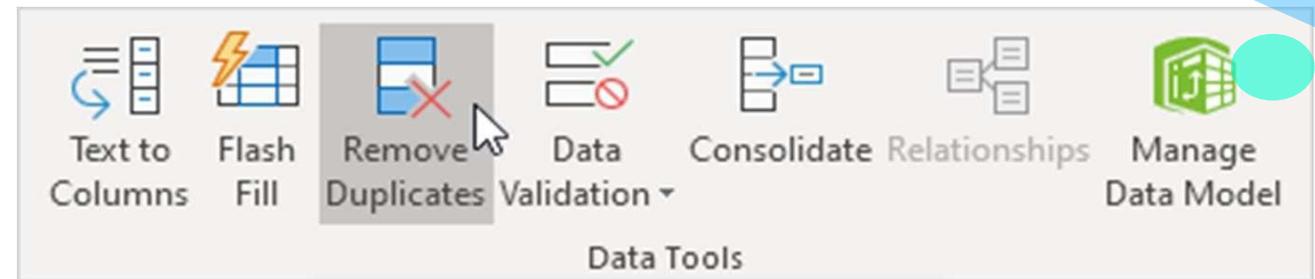
Remove Duplicates

This example teaches you how to remove duplicates in Excel.

1. Click any single cell inside the data set.
2. On the Data tab, in the Data Tools group, click Remove Duplicates.

The following dialog box appears.

3. Leave all checkboxes checked and click OK.



Result. Excel removes all identical rows (blue) except for the first identical row found (yellow).

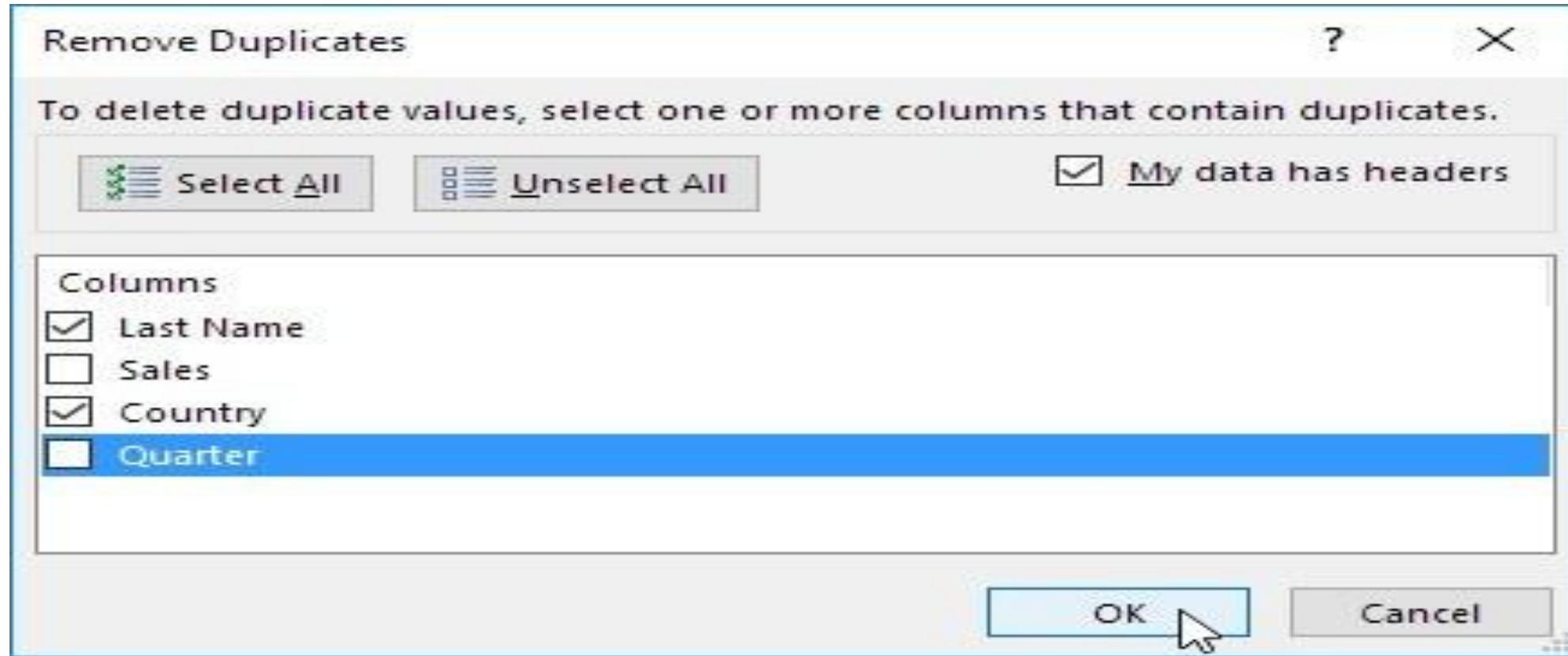
	A	B	C	D
1	Last Name	Sales	Country	Quarter
2	Smith	\$16,753.00	UK	Qtr 3
3	Johnson	\$14,808.00	USA	Qtr 4
4	Williams	\$10,644.00	UK	Qtr 2
5	Jones	\$1,390.00	USA	Qtr 3
6	Brown	\$4,865.00	USA	Qtr 4
7	Smith	\$16,753.00	UK	Qtr 3
8	Williams	\$12,438.00	UK	Qtr 1
9	Johnson	\$9,339.00	UK	Qtr 2
10	Smith	\$18,919.00	USA	Qtr 3
11	Jones	\$9,213.00	USA	Qtr 4
12	Jones	\$7,433.00	UK	Qtr 1
13	Smith	\$16,753.00	UK	Qtr 3
14	Brown	\$3,255.00	USA	Qtr 2
15	Williams	\$14,867.00	USA	Qtr 3
16	Williams	\$19,302.00	UK	Qtr 4
17	Smith	\$9,698.00	USA	Qtr 1
18				

	A	B	C	D
1	Last Name	Sales	Country	Quarter
2	Smith	\$16,753.00	UK	Qtr 3
3	Johnson	\$14,808.00	USA	Qtr 4
4	Williams	\$10,644.00	UK	Qtr 2
5	Jones	\$1,390.00	USA	Qtr 3
6	Brown	\$4,865.00	USA	Qtr 4
7	Williams	\$12,438.00	UK	Qtr 1
8	Johnson	\$9,339.00	UK	Qtr 2
9	Smith	\$18,919.00	USA	Qtr 3
10	Jones	\$9,213.00	USA	Qtr 4
11	Jones	\$7,433.00	UK	Qtr 1
12	Brown	\$3,255.00	USA	Qtr 2
13	Williams	\$14,867.00	USA	Qtr 3
14	Williams	\$19,302.00	UK	Qtr 4
15	Smith	\$9,698.00	USA	Qtr 1
16				
17				
18				

To remove rows with the same values in certain columns, execute the following steps.

4. For example, remove rows with the same Last Name and Country.

5. Check Last Name and Country and click OK.



Result. Excel removes all rows with the same Last Name and Country (blue) except for the first instances found (yellow).

	A	B	C	D
1	Last Name	Sales	Country	Quarter
2	Smith	\$16,753.00	UK	Qtr 3
3	Johnson	\$14,808.00	USA	Qtr 4
4	Williams	\$10,644.00	UK	Qtr 2
5	Jones	\$1,390.00	USA	Qtr 3
6	Brown	\$4,865.00	USA	Qtr 4
7	Williams	\$12,438.00	UK	Qtr 1
8	Johnson	\$9,339.00	UK	Qtr 2
9	Smith	\$18,919.00	USA	Qtr 3
10	Jones	\$9,213.00	USA	Qtr 4
11	Jones	\$7,433.00	UK	Qtr 1
12	Brown	\$3,255.00	USA	Qtr 2
13	Williams	\$14,867.00	USA	Qtr 3
14	Williams	\$19,302.00	UK	Qtr 4
15	Smith	\$9,698.00	USA	Qtr 1
16				
17				
18				

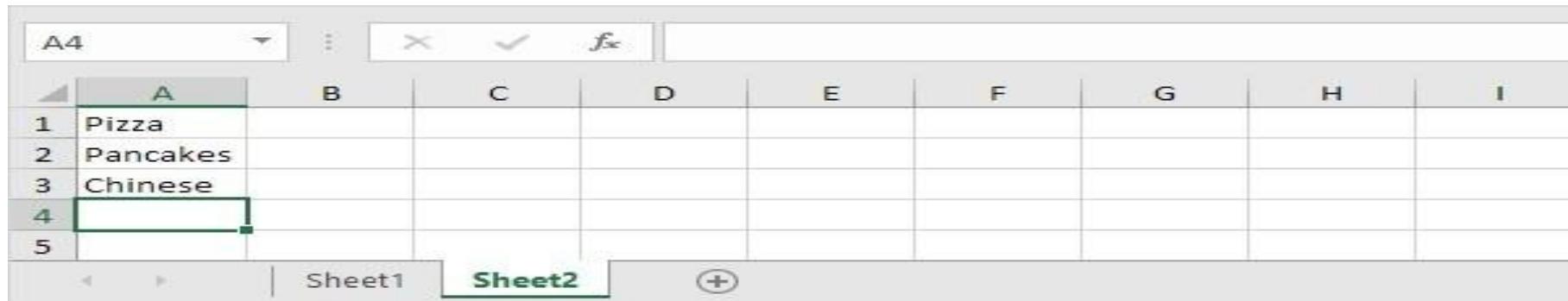
	A	B	C	D
1	Last Name	Sales	Country	Quarter
2	Smith	\$16,753.00	UK	Qtr 3
3	Johnson	\$14,808.00	USA	Qtr 4
4	Williams	\$10,644.00	UK	Qtr 2
5	Jones	\$1,390.00	USA	Qtr 3
6	Brown	\$4,865.00	USA	Qtr 4
7	Johnson	\$9,339.00	UK	Qtr 2
8	Smith	\$18,919.00	USA	Qtr 3
9	Jones	\$7,433.00	UK	Qtr 1
10	Williams	\$14,867.00	USA	Qtr 3
11				
12				
13				
14				
15				
16				
17				
18				

Data Validation – LISTS

Create a Drop-down List

To create a drop-down list in Excel, execute the following steps.

1. On the second sheet, type the items you want to appear in the drop-down list.

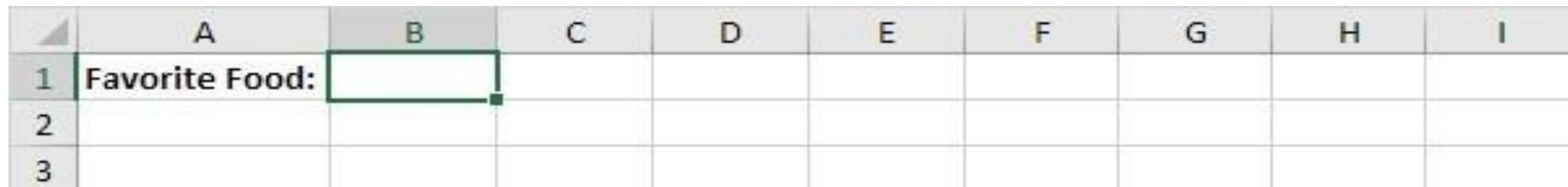


A screenshot of an Excel spreadsheet titled "Sheet2". The A column contains the following data:

	A
1	Pizza
2	Pancakes
3	Chinese
4	
5	

Note: if you don't want users to access the items on Sheet2, you can hide Sheet2. To achieve this, right click on the sheet tab of Sheet2 and click on Hide.

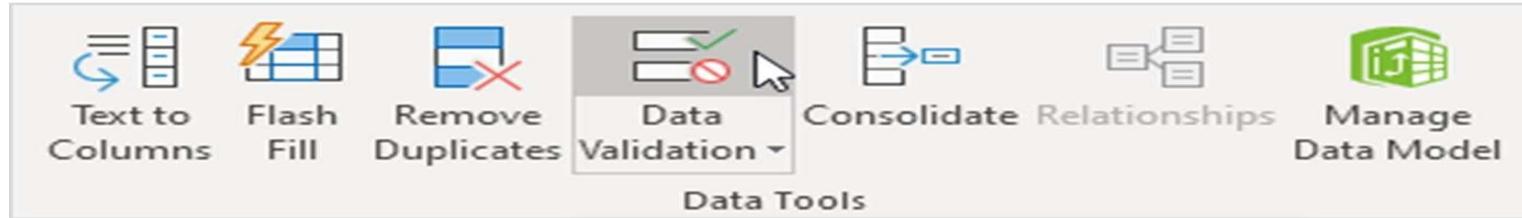
2. On the first sheet, select cell B1.



A screenshot of an Excel spreadsheet titled "Sheet1". Cell B1 contains the text "Favorite Food:" followed by a dropdown arrow. The A column contains the following data:

	A
1	Favorite Food:
2	
3	

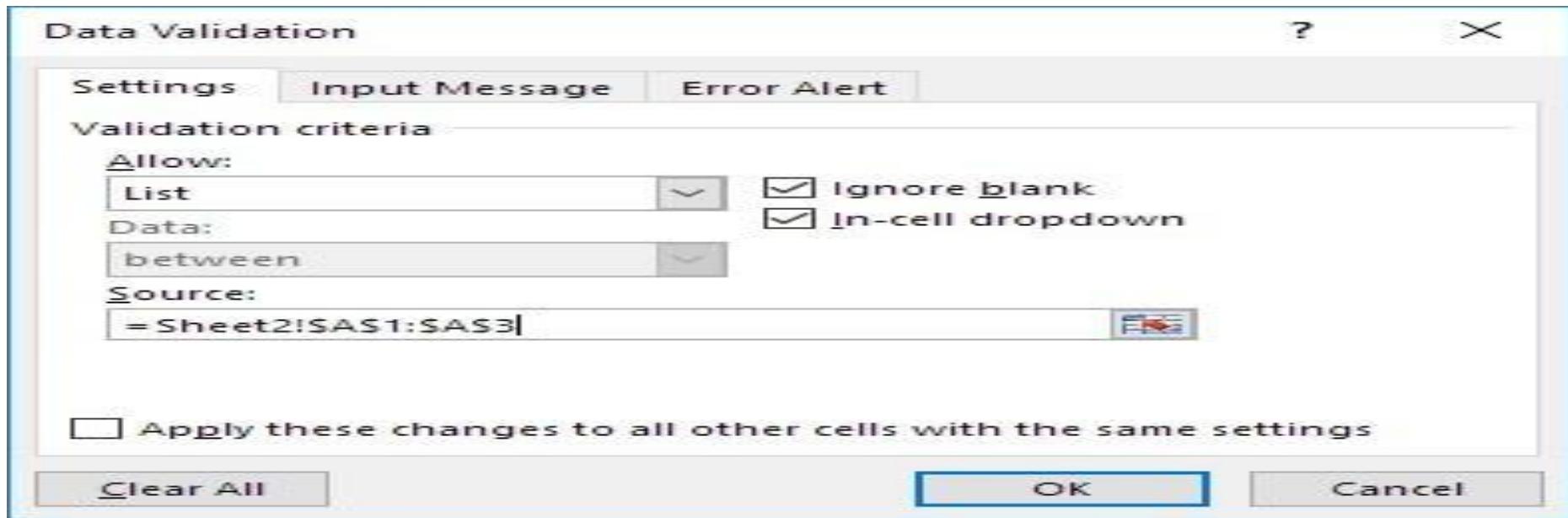
3. On the Data tab, in the Data Tools group, click Data Validation.



The 'Data Validation' dialog box appears.

4. In the Allow box, click List.

5. Click in the Source box and select the range A1:A3 on Sheet2.



6. Click OK.

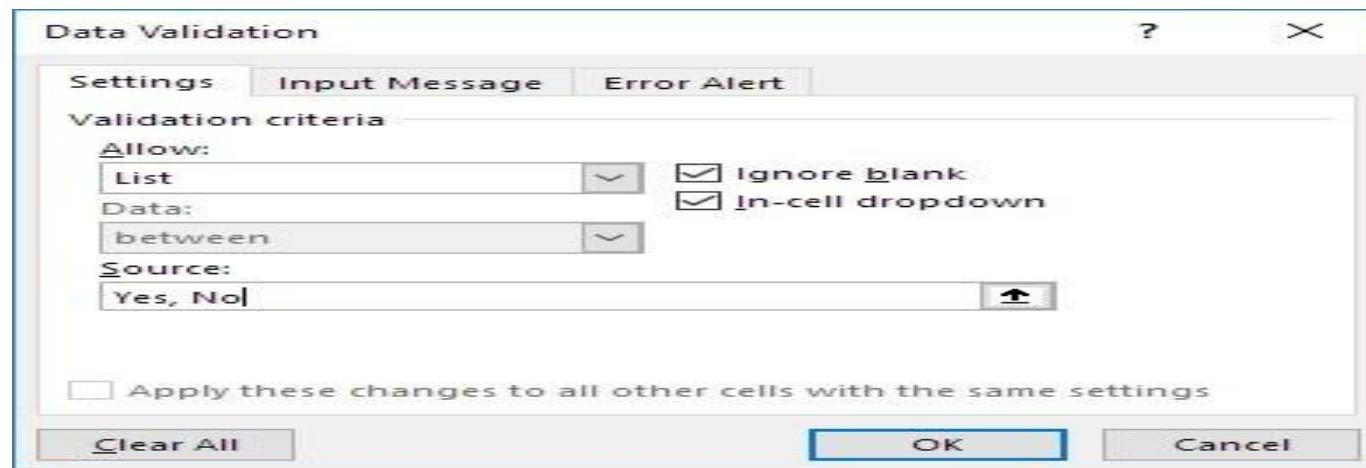
Result:

	A	B	C	D	E	F	G	H
1	Favorite Food:	Pizza						
2		Pancakes						
3		Chinese						
4								

Note: to copy/paste a drop-down list, select the cell with the drop-down list and press CTRL + c, select another cell and press CTRL + v.

7. You can also type the items directly into the Source box, instead of using a range reference.

Note: this makes your drop-down list case sensitive. For example, if a user types yes, an error alert will be displayed.



Conditional Formatting

Conditional formatting in Excel enables you to highlight cells with a certain colour, depending on the cell's value.

A	1	14
2		6
3		39
4		43
5		2
6		95
7		5
8		11
9		86
10		57
11		

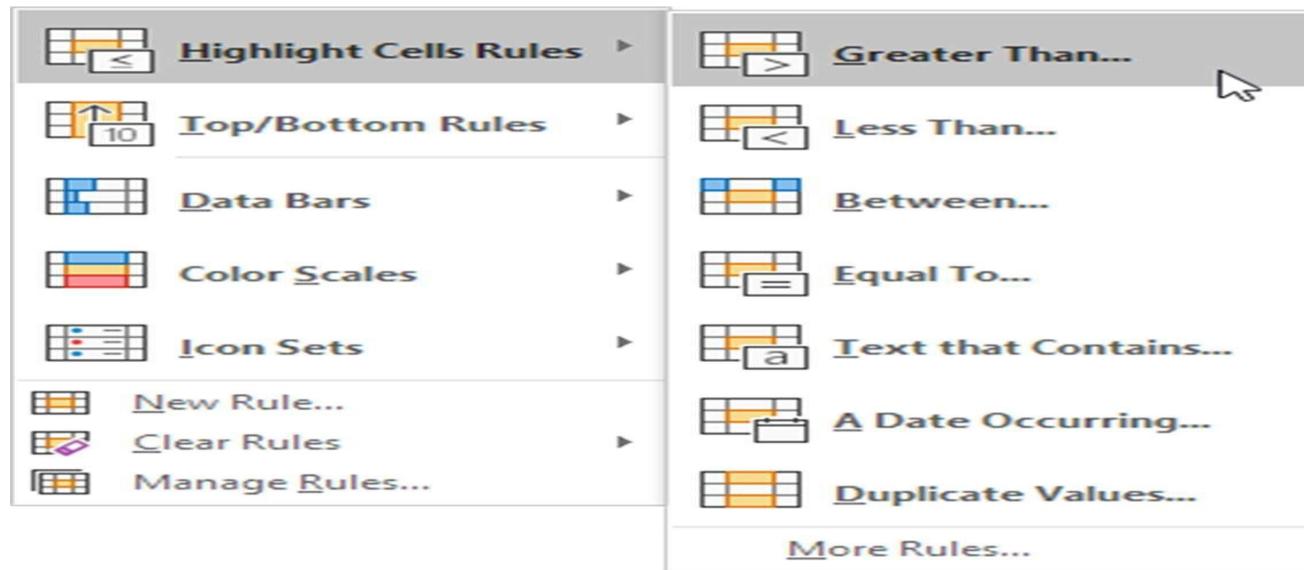
Highlight Cells Rules

To highlight cells that are greater than a value, execute the following steps.

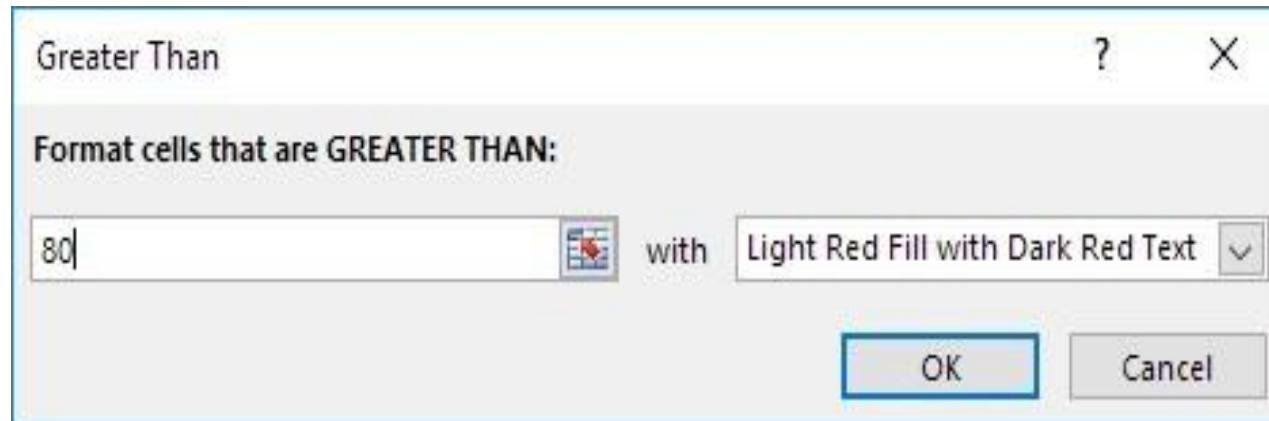
1. Select the range A1:A10.
2. On the Home tab, in the Styles group, click Conditional Formatting.



3. Click Highlight Cells Rules, Greater Than.



4. Enter the value 80 and select a formatting style.



5. Click OK.

Result. Excel highlights the cells that are greater than 80.

6. Change the value of cell A1 to 81.

Result. Excel changes the format of cell A1 automatically.

Note: you can also use this category (see step 3) to highlight cells that are less than a value, between two values, equal to a value, cells that contain specific text, dates (today, last week, next month, etc.), duplicates or unique values.

	A	B
1	14	
2	6	
3	39	
4	43	
5	2	
6	95	
7	5	
8	11	
9	86	
10	57	
11		

	A	B
1	81	
2	6	
3	39	
4	43	
5	2	
6	95	
7	5	
8	11	
9	86	
10	57	
11		

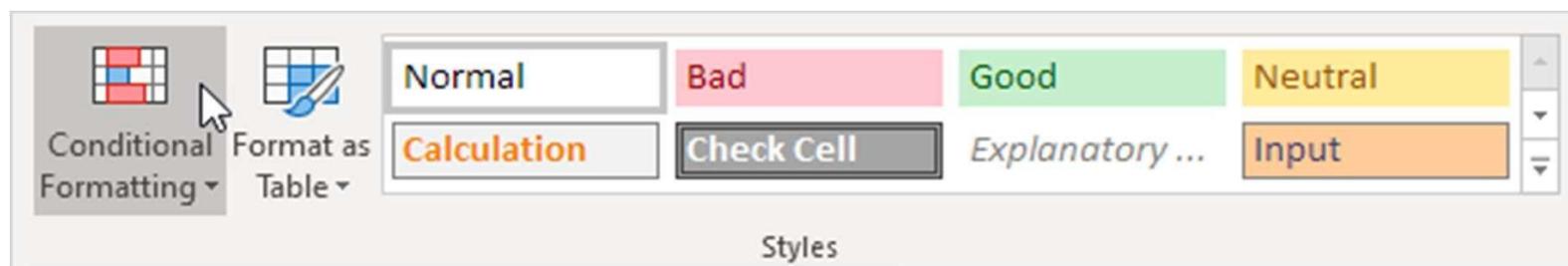
Clear Rules

To clear a conditional formatting rule, execute the following steps.

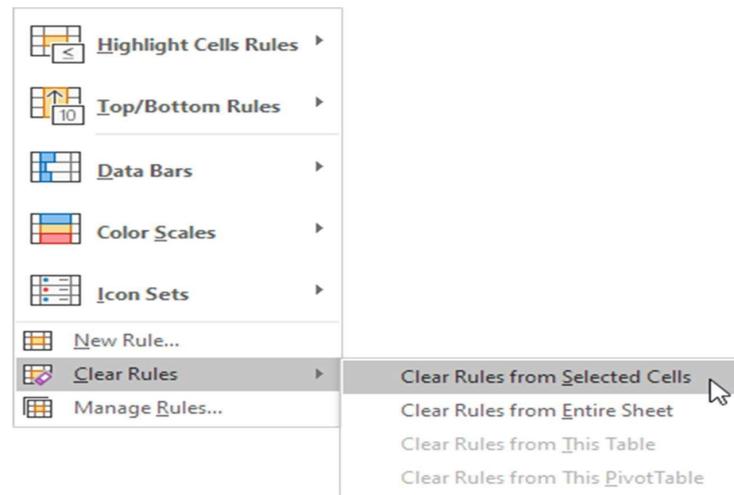
1. Select the range A1:A10.

A	B
1	81
2	6
3	39
4	43
5	2
6	95
7	5
8	11
9	86
10	57
11	

2. On the Home tab, in the Styles group, click Conditional Formatting.



3. Click Clear Rules, Clear Rules from Selected Cells.



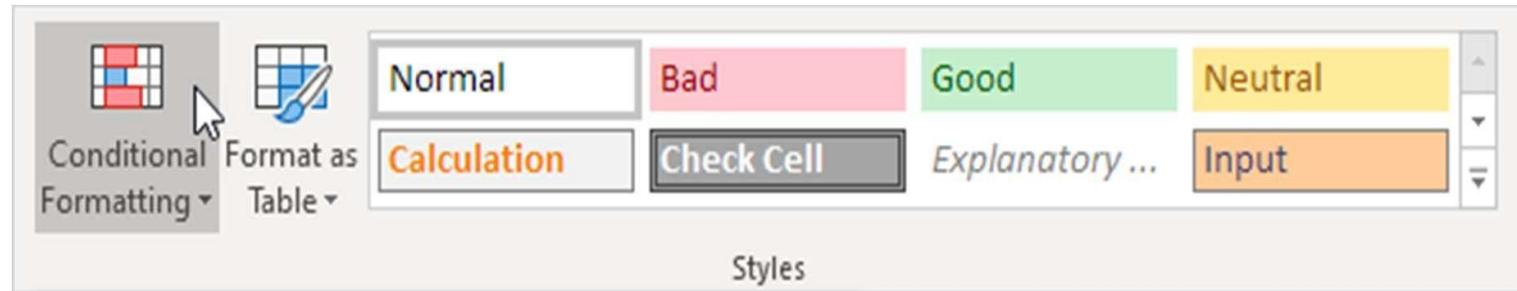
Top/Bottom Rules

To highlight cells that are above average, execute the following steps.

1. Select the range A1:A10.

	A	B
1	81	
2	6	
3	39	
4	43	
5	2	
6	95	
7	5	
8	11	
9	86	
10	57	
11		

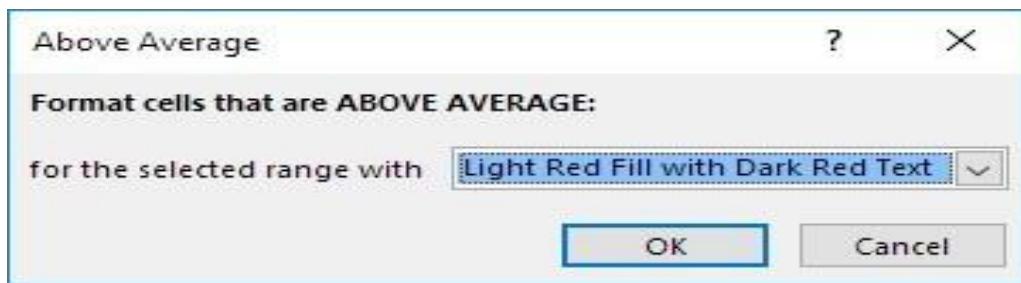
2. On the Home tab, in the Styles group, click Conditional Formatting.



3. Click Top/Bottom Rules, Above Average.



4. Select a formatting style.



5. Click OK.

Result. Excel calculates the average (42.5) and formats the cells that are above this average.

Note: you can also use this category (see step 3) to highlight the top n items, the top n percent, the bottom n items, the bottom n percent or cells that are below average.

	A	B
1	81	
2	6	
3	39	
4	43	
5	2	
6	95	
7	5	
8	11	
9	86	
10	57	
11		

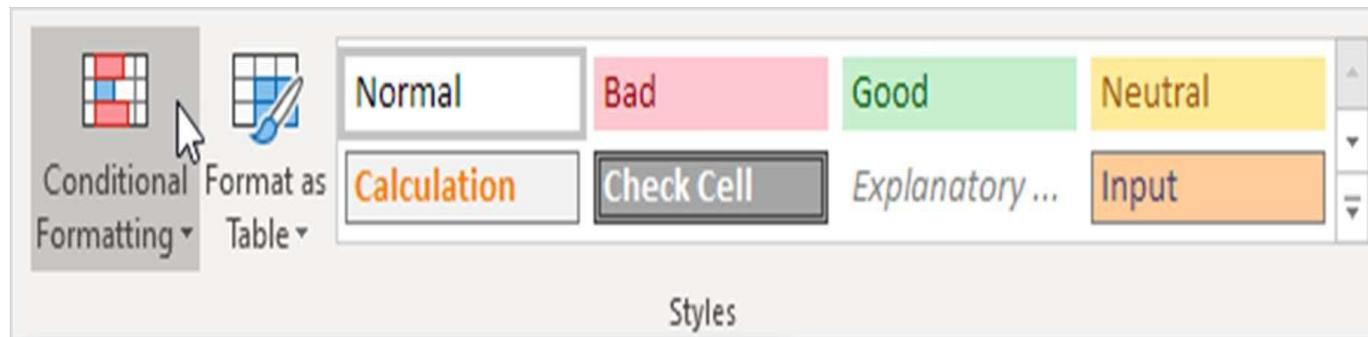
Conditional Formatting with Formulas

Take your Excel skills to the next level and use a formula to determine which cells to format. Formulas that apply conditional formatting must evaluate to TRUE or FALSE.

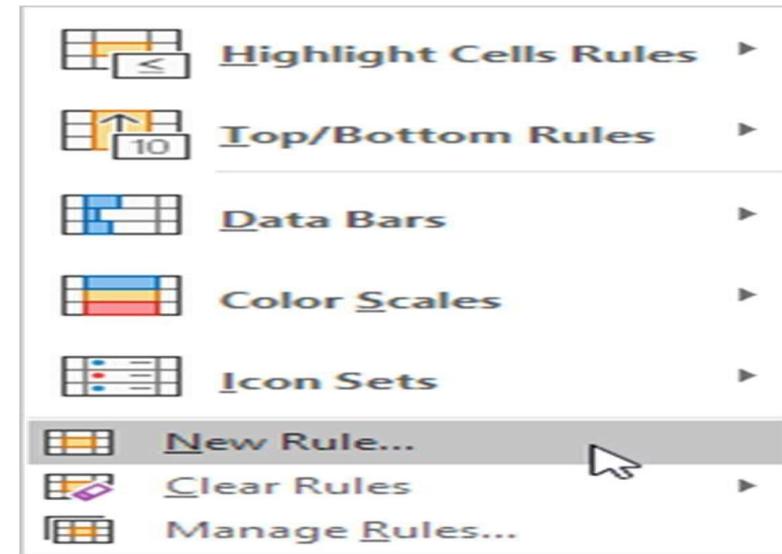
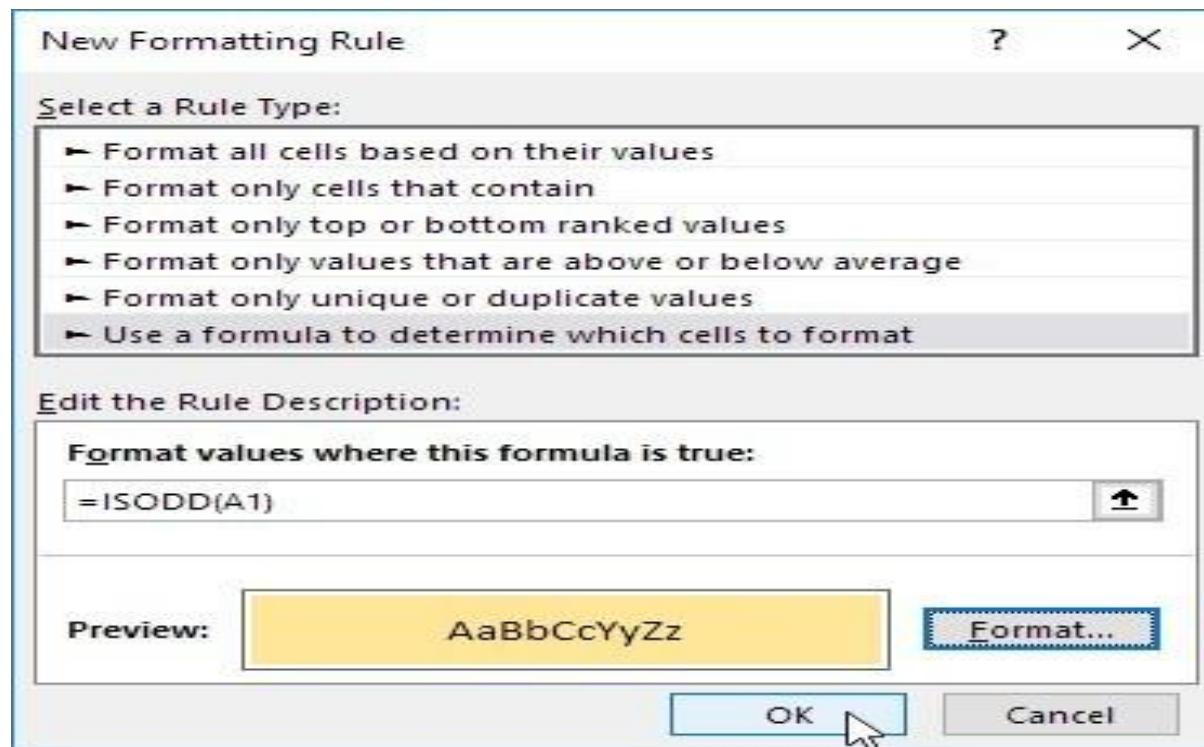
1. Select the range A1:E5.

	A	B	C	D	E	F
1	90	77	33	20	96	
2	59	66	20	61	44	
3	94	99	97	41	52	
4	36	43	70	13	54	
5	15	6	28	28	15	
6						

2. On the Home tab, in the Styles group, click Conditional Formatting.



3. Click New Rule.
4. Select 'Use a formula to determine which cells to format'.
5. Enter the formula =ISODD(A1)
6. Select a formatting style and click OK.



Result. Excel highlights all odd numbers.

	A	B	C	D	E	F
1	90	77	33	20	96	
2	59	66	20	61	44	
3	94	99	97	41	52	
4	36	43	70	13	54	
5	15	6	28	28	15	
6						

Explanation: always write the formula for the upper-left cell in the selected range. Excel automatically copies the formula to the other cells. Thus, cell A2 contains the formula
=ISODD(A2), cell A3 contains the formula =ISODD(A3), etc.

Here's another example.

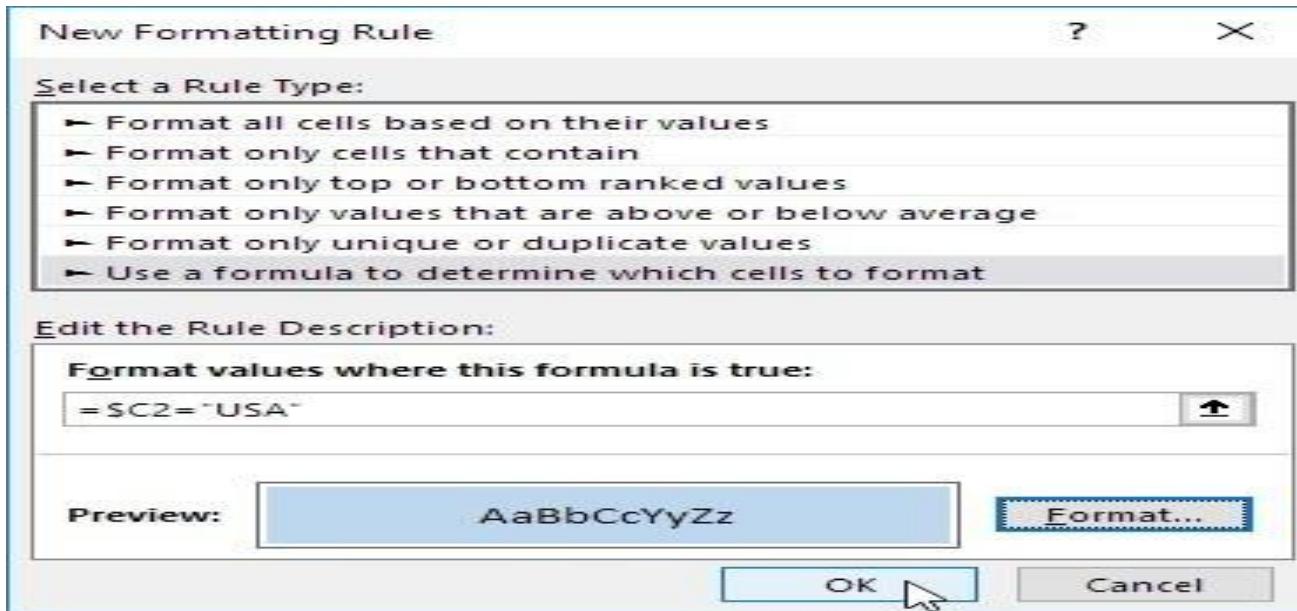
7. Select the range A2:D7.

8. Repeat steps 2-4 above.

9. Enter the formula =\$C2="USA"

	A	B	C	D	E
1	Last Name	Sales	Country	Quarter	
2	Smith	\$16,753.00	UK	Qtr 3	
3	Johnson	\$14,808.00	USA	Qtr 4	
4	Williams	\$10,644.00	UK	Qtr 2	
5	Jones	\$1,390.00	USA	Qtr 3	
6	Brown	\$4,865.00	USA	Qtr 4	
7	Williams	\$12,438.00	UK	Qtr 1	
8					

10. Select a formatting style and click OK.



Result. Excel highlights all USA orders.

Explanation: we fixed the reference to column C by placing a \$ symbol in front of the column letter (\$C2). As a result, cell B2, C2 and cell D2 also contain the formula `=$C2="USA"`, cell A3, B3, C3 and D3 contain the formula `=$C3="USA"`, etc.

	A	B	C	D	E
1	Last Name	Sales	Country	Quarter	
2	Smith	\$16,753.00	UK	Qtr 3	
3	Johnson	\$14,808.00	USA	Qtr 4	
4	Williams	\$10,644.00	UK	Qtr 2	
5	Jones	\$1,390.00	USA	Qtr 3	
6	Brown	\$4,865.00	USA	Qtr 4	
7	Williams	\$12,438.00	UK	Qtr 1	
8					

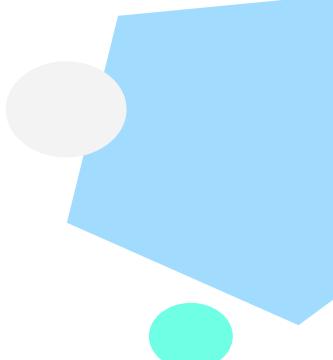
Functions and Formula:

Formula - A formula is an expression which calculates the value of a cell. Functions are predefined formulas and are already available in Excel.

Functions - Every function has the same structure. For example, SUM(A1:A4). The name of this function is SUM. The part between the brackets (arguments) means we give Excel the range A1:A4 as input. This function adds the values in cells A1, A2, A3 and A4.

To Decode a function use ALT + T + U + F to see the output in every step and validate everything.

SUM



	A	B	C	D	E	F	G	H
1	SUM function							
2	SUM (number1, number2, ...)							
3	Item	Quantity	Cost					
4	Apples	5	\$1.50					
5	Oranges	4	\$1.00					
6	Bananas	7	\$1.05					
7	Peaches	5	\$2.50					
8	Kiwis	3	\$3.00					
9	Total		\$9.05					
10								
11								
12								
13								

Min

	A	B	C	D	E	F	G	H	I
1	MIN(number1,[number2],...)								
2									
3	First	Last	Score						
4	Sue	Brown	66						
5	Sarah	Duncan	84						
6	Justin	Gatt	69						
7	Manfred	Hollis	77						
8	Troy	Johnson	69						
9	Aubrey	Sinclair	88						
10	Gen	Tanaka	86						
11	Renee	Zwick	74						

Max 88
Min 66

MAX:

	A	B	C	D	E	F	G	H	I
1	MAX(number1,[number2],...)								
2									
3									
4	First	Last	Score						
5	Sue	Brown	66						
6	Sarah	Duncan	84						
7	Justin	Gatt	69						
8	Manfred	Hollis	77						
9	Troy	Johnson	69						
10	Aubrey	Sinclair	88						
11	Gen	Tanaka	86						
	Renee	Zwick	74						

COUNT:

	A	B	C	D	E	F	G	H	
1	COUNT (value1, value2 ,...)								
2									
3									
4	Value								
5	puppy								
6	apple								
7		100							
8	1								
9	2	20%							
10	3		0.5						
11	4	28-Oct-2019							
12				Count	4				

COUNTA:

The screenshot shows a Microsoft Excel spreadsheet with the formula `=COUNTA(B5:B11)` entered into cell E6. The range B5:B11 contains the following data:

Value
puppy
apple
20%
-3
0.5

The cell E6 displays the result "5", indicating that there are 5 non-empty cells in the range B5:B11.

AVG:

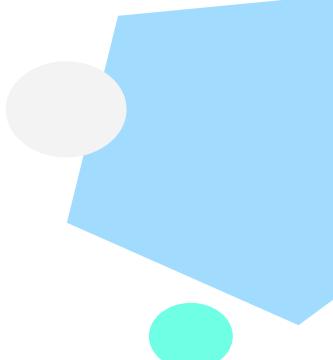
	A	B	C	D	E	F	G	H
1	AVERAGE function							
2	Calculate the average of supplied numbers							
4	Test 1	Test 2	Test 3	Average				
5	8	7	9	8				
6	9	9		9				
7	7	6	8	7				
8	8	8	8	8				
9	10	10	10	10				
10								
11								

CONDITIONALS:

IF:

	A	B	C	D	E	F	G	
1	IF function							
2	Run a test. Return one result if TRUE, another if FALSE.							
4	Name	Score	Result					
5	Anderson	92	Pass					
6	Bautista	85	Pass					
7	Block	65	Fail					
8	Burrows	79	Pass					
9	Chandler	69	Fail					
10	Colby	95	Pass					
11	Crosby	90	Pass					
12	Dove	70	Pass					
13	Frantz	96	Pass					
14	Gonzalez	93	Pass					
15	Humphy	75	Pass					
16								
Passing score: 70								

IF with OR:



	A	B	C	D	E	F
1						
2	Color	Price	New price			
3	Red	\$10.00	\$11.00			
4	Blue	\$10.00	\$10.00			
5	Green	\$10.00	\$11.00			
6	Silver	\$10.00	\$10.00			
7	Red	\$10.00	\$11.00			
8						
9						

IF with AND:



	A	B	C	D	E	F	G	H
1								
2	If this AND that							
3	Do something when two or more conditions are TRUE							
4								
5								
6	Color	Size	Flag	x				
7	red	small						
8	green	large						
9	red	medium						
10	blue	large						
11	red	small	x					
12	blue	medium						

A simple nested IF

A nested IF is just two more IF statements in a formula, where one IF statement appears inside the other.

To illustrate, below I've extended the original pass/fail formula above to handle "incomplete" results by adding an IF function, and nesting one IF inside the other:

	D3	f _x	=IF(C3="", "Incomplete", IF(C3>=65, "Pass", "Fail"))				
1	A	B	C	D	E	F	G
2	Name	Score	Result				
3	Anderson	92	Pass				
4	Bautista	85	Pass				
5	Block	64	Fail				
6	Burrows	79	Pass				
7	Chandler	82	Pass				
8	Colby		Incomplete				
9	Crosby	90	Pass				

The screenshot shows an Excel spreadsheet with data in columns A, B, C, and D. Column A contains row numbers 1 through 9. Column B contains names: Anderson, Bautista, Block, Burrows, Chandler, Colby, and Crosby. Column C contains scores: 92, 85, 64, 79, 82, blank, and 90. Column D contains the calculated results: Pass, Pass, Fail, Pass, Pass, Incomplete, and Pass. The formula in cell D3 is =IF(C3="", "Incomplete", IF(C3>=65, "Pass", "Fail")). To the right of the main table is a smaller table showing the logic for the nested IF statement:

Score	Result
65 +	Pass
< 65	Fail

IFERROR:

	A	B	C	D	E	F
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						

IFERROR(value, value_if_error)
Trap error and display a more friendly result

Sales	Units	Average price	Comments
300	62	4.84	
14	0	0.00	< Would display #DIV/0
200	11	18.18	
120	7	17.14	
634	80	7.93	

SUMIF:

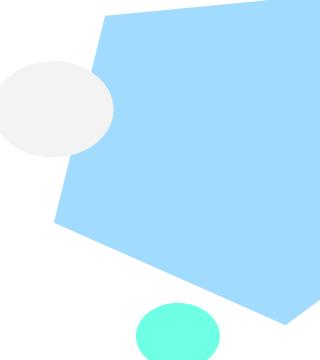
	A	B	C	D	E	F	G	H
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								

SUMIF function
SUMIF (range, criteria, sum_range)

Rep	State	Sales
Jim	MN	\$100
Sarah	CA	\$125
Jane	GA	\$200
Steve	CA	\$50
Joan	WA	\$150

Criteria	Total
Sales > \$100	\$475
Rep = Jim	\$100
State = CA	\$175

SUMIFS:



I6	A	B	C	D	E	F	G	H	I
									=SUMIFS(F5:F11,C5:C11,"red",D5:D11,"TX")
1									
2	SUMIFS function								
3									
4	Date	Color	State	Qty	Total		Criteria	Result	
5	9-Jan	Red	TX	1	\$18.00		Red	\$107.00	
6	23-Jan	Blue	CO	2	\$34.00		Red and TX	\$54.00	
7	3-Feb	Red	NM	2	\$36.00				
8	18-Feb	Blue	TX	1	\$17.00				
9	2-Mar	Blue	AZ	3	\$51.00				
10	15-Mar	Red	AZ	1	\$17.00				
11	25-Mar	Red	TX	2	\$36.00				
12									

COUNTIF:

G5	X	✓	fx	=COUNTIF(D5:D12,>100")	F	G
1	A	B	C	D	E	
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						

COUNTIF (range, criteria)

Name	State	Sales
Jim	MN	\$100.00
Sarah	CA	\$125.00
Jane	GA	\$200.00
Steve	CA	\$50.00
Jim	WY	\$75.00
Joan	WA	\$150.00
Jane	GA	\$200.00
Jim	WY	\$50.00

Example	Result
Sales over \$100	4
Sales by Jim	3
Sales in California	2

COUNTIFS:

I5	X	✓	fx	=COUNTIFS(C5:C14,"red",D5:D14,"TX")	I					
1	A	B	C	D	E	F	G	H	I	J
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										

COUNTIFS function

Date	Color	State	Qty	Total
9-Jan	Red	TX	1	\$18.00
23-Jan	Blue	CO	2	\$34.00
3-Feb	Red	NM	2	\$36.00
18-Feb	Blue	TX	1	\$17.00
2-Mar	Blue	AZ	3	\$51.00
15-Mar	Red	AZ	1	\$17.00
25-Mar	Red	TX	2	\$36.00
2-Apr	Red	CO	4	\$72.00
12-Apr	Blue	AZ	2	\$34.00

Red and TX 3

AVERAGEIF:

	A	B	C	D	E	F	G	H	I
3									
4									
5	Address	Price	Beds	Baths					
6	3007 Arthur Ave	\$0	2	1					
7	2479 North Rd	\$109,900	1	1					
8	4318 D Street	\$112,000	2	1					
9	4883 Hartland Ave	\$129,900	1	1					
10	4150 Richland Ave	\$149,900	2	1					
11	2659 Crestview Ln	\$189,000	3	2					
12	1233 Green Ave	\$189,900	3	2					
13	1448 Cheno Dr	\$229,900	4	2					

Criteria	Average
> \$0	\$359,867
> 200k	\$501,933
2+ beds	\$368,443

Name	Range
prices	=\$C\$6:\$C\$21
beds	=\$D\$6:\$D\$22

AVERAGEIFS:

	A	B	C	D	E	F	G	H	I
1									
2									
3									
4									
5	Address	Price	Beds	Baths					
6	3007 Arthur Ave	\$0	2	1					
7	2479 North Rd	\$109,900	1	1					
8	4318 D Street	\$112,000	2	1					
9	4883 Hartland Ave	\$129,900	1	1					
10	4150 Richland Ave	\$149,900	2	1					
11	1233 Green Ave	\$189,900	3	2					
12	1448 Cheno Dr	\$229,900	4	2					
13	966 Trainer Rd	\$439,900	3	2					

Criteria	Average
> \$0 and < \$500k	\$194,486
2+ beds and >1 baths	\$397,900
> \$0	\$276,800

prices = C6:C15

beds = D6:D15

baths = E6:E15

DATE AND TIME FUNCTIONS

Date Function:

	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			

Today Function:

	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.

NOW function

NOW() function returns the current date and time.

DateValue Function:

	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

TEXT Function:

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

Day Function:

MONTH function

A	B	C	D
1	Date	Formula	Result
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

YEAR Function:

	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.

EOMONTH function

EOMONTH(start_date, months) function returns the last day of the month a given number of months from the start date.

	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					

WEEKDAY

	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. The week begins on Sunday.
4		=WEEKDAY(A2, 2)	4	The day of the week corresponding to date in A2. The week begins on Monday.
6		=WEEKDAY(TODAY())	5	The day of the week of the current date. The week begins on Sunday.
7				

DATEDIF function:

	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.
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.

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.

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)

WORKDAY.INTL function

WORKDAY.INTL(start_date, days, [weekend], [holidays]) 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")

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)
```

NETWORKDAYS.INTL function

NETWORKDAYS.INTL(start_date, end_date, [weekend], [holidays]) 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.

Lookup Functions - Vlookup:

VLOOKUP is an Excel function to lookup and retrieve data from a specific column in table. VLOOKUP supports approximate and exact matching, and wildcards (* ?) for partial matches. The "V" stands for "vertical". Lookup values must appear in the first column of the table, with lookup columns to the right.

The screenshot shows a Microsoft Excel spreadsheet demonstrating the VLOOKUP function. The formula in cell E4 is =VLOOKUP(D4,B8:F17,4, FALSE). The table below contains 17 rows of data with columns labeled 1 through 5. Row 4 is highlighted in yellow and contains the formula. An orange arrow points from the text 'Lookup value' to the value 622 in cell D4. Another orange arrow points from the text 'Lookup column' to the column header 'ID'. The result, 'j.adder@ace.com', is shown in cell E4, with an orange arrow pointing from the text 'Result' to it. The table data is as follows:

	A	B	C	D	E	F
1						
2						
3						
4						
5						
6	1	2	3	4	5	
7	ID	First	Last	Email	Department	
8	610	Janet	Farley	j.farley@ace.com	Fulfillment	
9	798	Steven	Batista	s.batista@ace.com	Sales	
10	841	Evelyn	Monet	e.monet@ace.com	Fulfillment	
11	886	Marilyn	Bradley	m.bradley@ace.com	Fulfillment	
12	622	Jonathan	Adder	j.adder@ace.com	Marketing	
13	601	Adrian	Birt	a.birt@ace.com	Engineering	
14	869	Julie	Irons	j.irons@ace.com	Marketing	
15	867	Erica	Tan	e.tan@ace.com	Fulfillment	
16	785	Harold	Clayton	h.clayton@ace.com	Fulfillment	
17	648	Sharyn	Castor	s.castor@ace.com	Support	
18						
19						
20						
21						

Hlookup:

HLOOKUP is an Excel function to lookup and retrieve data from a specific row in table. The "H" in HLOOKUP stands for "horizontal", where lookup values appear in the first row of the table, moving horizontally to the right. HLOOKUP supports approximate and exact matching, and wildcards (* ?) for finding partial matches.

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

- Cell D8:** Contains the formula `=HLOOKUP(C8,C4:H5,2,1)`.
- Table Structure:** A table is defined by rows 4 through 11 and columns C through H. Row 4 contains headers: Sales, Comm %, Sales, Comm %, Sales, Comm %, Sales, Comm %. Row 5 contains data: \$ 50,000, 3%, \$ 75,000, 4%, \$ 100,000, 5%, \$ 125,000, 6%, \$ 175,000, 8%, \$ 200,000, 9%. Rows 7 through 11 contain data for individuals: Name, Sales, Comm %, Comm \$. The data for Applebee is highlighted with a yellow background.
- Row 8:** Contains the data for Applebee: Name (Applebee), Sales (\$ 171,900), Comm % (6%), and Comm \$ (\$10,314). The cell containing 6% is selected.
- Row 9:** Contains the data for Bueller: Name (Bueller), Sales (\$ 93,500), Comm % (4%), and Comm \$ (\$3,740).
- Row 10:** Contains the data for Chung: Name (Chung), Sales (\$ 151,200), Comm % (6%), and Comm \$ (\$9,072).
- Row 11:** Contains the data for Crawford: Name (Crawford), Sales (\$ 119,850), Comm % (5%), and Comm \$ (\$5,993).

INDEX and MATCH

Use INDEX and MATCH in Excel instead of using VLOOKUP and HLOOKUP. To perform advanced lookups, you'll need INDEX and MATCH.

Match

The MATCH function returns the position of a value in a given range. For example, the MATCH function below looks up the value 53 in the range B3:B9.

COUNTIF		:	X	✓	f _x	=MATCH(H2,B3:B9,0)	I	J	
A	B	C	D	E	F	G	H	I	J
1									
2	ID	First Name	Last Name	Salary		ID	53		
3	72	Emily	Smith	\$64,901		Salary	5		
4	66	James	Anderson	\$70,855					
5	14	Mia	Clark	\$188,657					
6	30	John	Lewis	\$97,566					
7	53	Jessica	Walker	\$58,339					
8	56	Mark	Reed	\$125,180					
9	79	Richard	Lopez	\$91,632					
10									

Explanation: 53 (first argument) found at position 5 in the range B3:B9 (second argument). In this example, we use the MATCH function to return an exact match so we set the third argument to 0.

Index

The INDEX function below returns a specific value in a one-dimensional range.

The screenshot shows a Microsoft Excel spreadsheet with a data table and a formula bar. The formula bar displays the formula `=INDEX(E3:E9,5)`. The data table has columns labeled A through J. Rows 1 and 2 serve as headers. Rows 3 through 10 contain data for ten employees. The 'Salary' column (E) is highlighted with a blue border. The cell containing the value '\$58,339' (E7) is also highlighted with a green border. A yellow arrow points from the formula bar to the value '\$58,339' in the table. The formula bar also shows the dropdown menu for the COUNTIF function.

	COUNTIF	⋮	X	✓	f _x	=INDEX(E3:E9,5)
1						
2	ID	First Name	Last Name	Salary	ID	
3	72	Emily	Smith	\$64,901	Salary	\$58,339
4	66	James	Anderson	\$70,855		
5	14	Mia	Clark	\$188,657		
6	30	John	Lewis	\$97,566		
7	53	Jessica	Walker	\$58,339		
8	56	Mark	Reed	\$125,180		
9	79	Richard	Lopez	\$91,632		
10						

Explanation: the INDEX function returns the 5th value (second argument) in the range E3:E9 (first argument).

Index and Match

Replace the value 5 in the INDEX function (see previous example) with the MATCH function (see first example) to lookup the salary of ID 53.

	A	B	C	D	E	F	G	H	I	J
1										
2	ID	First Name	Last Name	Salary	ID			53		
3	72	Emily	Smith	\$64,901	Salary			\$58,339		
4	66	James	Anderson	\$70,855						
5	14	Mia	Clark	\$188,657						
6	30	John	Lewis	\$97,566						
7	53	Jessica	Walker	\$58,339						
8	56	Mark	Reed	\$125,180						
9	79	Richard	Lopez	\$91,632						
10										

Explanation: the MATCH function returns position 5. The INDEX function needs position 5. It's a perfect combination. If you like, you can also use the VLOOKUP function. It's up to you. However, you'll need INDEX and MATCH to perform advanced lookups, as we will see next.

Two-way Lookup

The INDEX function can also return a specific value in a two-dimensional range. For example, use the INDEX and the MATCH function in Excel to perform a two-way-lookup

		=INDEX(B2:D13,MATCH(G2,A2:A13,0),MATCH(G3,B1:D1,0))							
1	A	B	C	D	E	F	G	H	I
2	Jan	Chocolate	Strawberry	Vanilla		Month	Feb		
3	Feb		544	639	189	Flavour	Chocolate		
4	Mar		217	719	679				
5	Apr		810	178	810	Sales	217		
6	May		567	926	929				
7	Jun		745	230	364				
8	Jul		298	820	947				
9	Aug		457	522	832				
10	Sep		495	500	239				
11	Oct		871	391	529				
12	Nov		585	225	791				
13	Dec		478	262	540				
14			741	883	809				

Case-sensitive Lookup

By default, the VLOOKUP function performs a case-insensitive lookup. However, you can use the INDEX, MATCH and the EXACT function in Excel to perform a case-sensitive lookup.

The screenshot shows a Microsoft Excel spreadsheet with two main sections. On the left, there is a table of employee data from row 2 to 9. On the right, there is a formula bar and a result cell G3.

Table Data:

	A	B	C	D	E	F	G	H	I
1									
2		First Name	Last Name	Salary		First Name	MIA		
3		Emily	Smith	\$64,901		Salary	\$125,180		
4		James	Anderson	\$70,855					
5		Mia	Clark	\$188,657					
6		John	Lewis	\$97,566					
7		Jessica	Walker	\$58,339					
8	✓	MIA	Reed	\$125,180					
9		Richard	Lopez	\$91,632					
10									

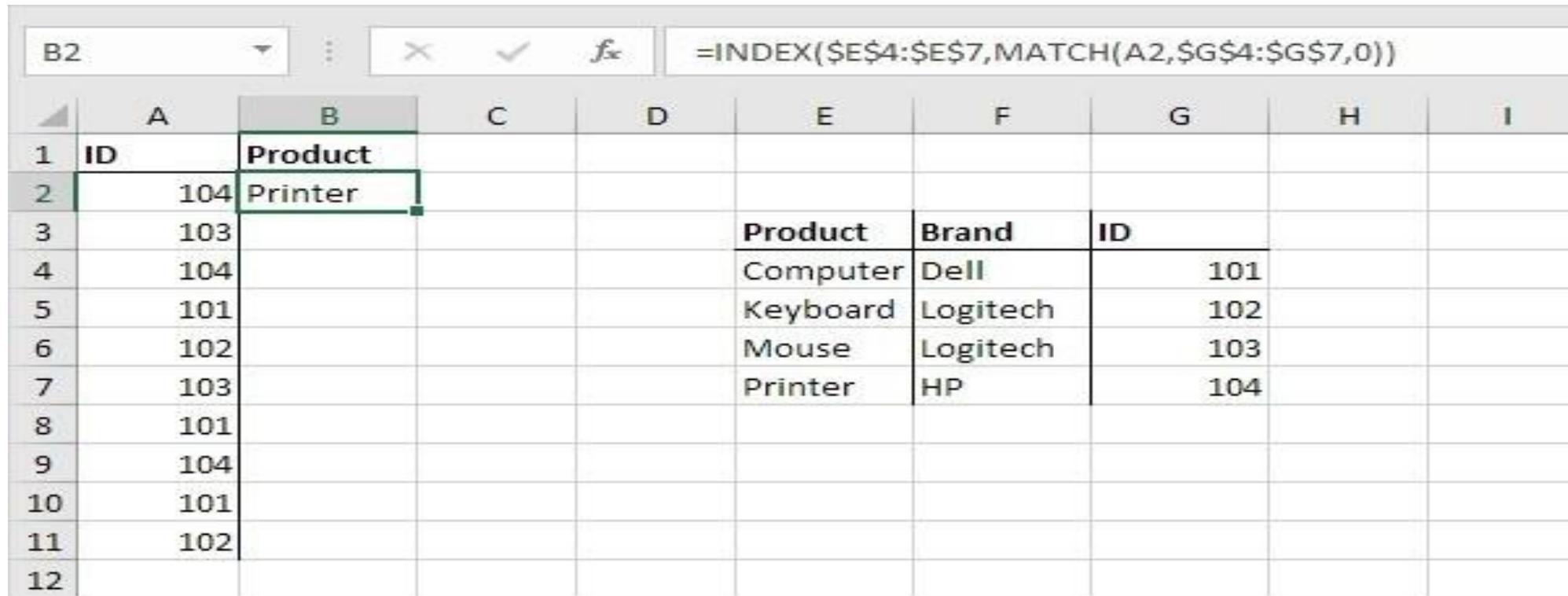
Formula Bar: The formula bar shows the formula `{=INDEX(D3:D9,MATCH(TRUE,EXACT(G2,B3:B9),0))}`.

Result Cell: The cell G3 contains the value `$125,180`, which corresponds to the salary of the employee named "MIA".

Note: the formula correctly looks up the salary of MIA Reed, not Mia Clark.

Left Lookup

The VLOOKUP function only looks to the right. No worries, you can use the INDEX and the MATCH function in Excel to perform a left lookup.



The screenshot shows an Excel spreadsheet with two main data sets. On the left, there is a list of product IDs and names. On the right, there is a smaller table mapping products to brands and IDs. The formula in cell B2 is =INDEX(\$E\$4:\$E\$7,MATCH(A2,\$G\$4:\$G\$7,0)).

	A	B	C	D	E	F	G	H	I
1	ID	Product							
2	104	Printer							
3	103								
4	104								
5	101								
6	102								
7	103								
8	101								
9	104								
10	101								
11	102								
12									

	Product	Brand	ID
	Computer	Dell	101
	Keyboard	Logitech	102
	Mouse	Logitech	103
	Printer	HP	104

Note: when we drag this formula down, the absolute references (\$E\$4:\$E\$7 and \$G\$4:\$G\$7) stay the same, while the relative reference (A2) changes to A3, A4, A5, etc.

Two-column Lookup

Do you want to lookup a value based on multiple criteria? Use the INDEX and the MATCH function in Excel to perform a two-column lookup.

The screenshot shows a Microsoft Excel spreadsheet with data in rows 2 through 10. The columns are labeled A through I. Row 1 contains column headers. Row 2 contains the labels "First Name", "Last Name", and "Salary". Rows 3 through 10 contain data points. Row 4 is highlighted in green. The formula bar at the top shows the formula: `{=INDEX(D3:D9,MATCH(G2&G3,B3:B9&C3:C9,0))}`. The cell G4 contains the result of the formula, which is \$188,657. The cell G4 is also highlighted with a green border.

	A	B	C	D	E	F	G	H	I
1									
2	First Name	Last Name	Salary		First Name	James			
3	James	Smith	\$64,901		Last Name	Clark			
4	James	Anderson	\$70,855		Salary	\$188,657			
5	James	Clark	\$188,657						
6	John	Lewis	\$97,566						
7	John	Walker	\$58,339						
8	Mark	Reed	\$125,180						
9	Richard	Lopez	\$91,632						
10									

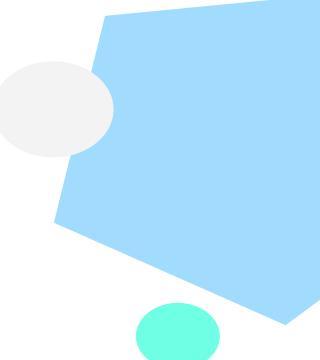
Note: the array formula above looks up the salary of James Clark, not James Smith, not James Anderson.

Closest Match

To find the closest match to a target value in a data column, use the INDEX, MATCH, ABS and the MIN function in Excel.

		:=INDEX(B3:B9,MATCH(MIN(ABS(C3:C9-F2)),ABS(C3:C9-F2),0))								
	A	B	C	D	E	F	G	H	I	J
1										
2	Name	Data		Target	720					
3	Emily	681		Match	James					
4	James	734								
5	Mia	683								
6	John	704								
7	Jessica	698								
8	Mark	736								
9	Richard	703								
10										

TEXT Functions: Concatenate:

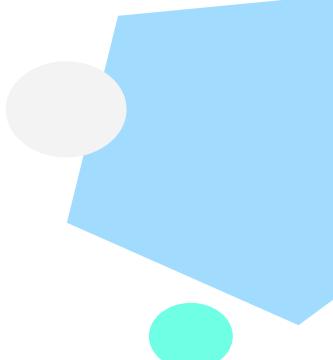


D5				=CONCATENATE(B5," and ",C5)
A	B	C	D	E
1				
2		CONCATENATE (text1, text2,...)		
3				
4	Text1	Text2	Result	Formula
5	Apples	Pears	Apples and Pears	=CONCATENATE(B5," and ",C5)
6	Beer	Wine	Beer or Wine	=CONCATENATE(B6," or ",C6)
7	Month:	7/1/2019	Month: July	=CONCATENATE(B7,TEXT(C7,"mmmm"))
8				
9				

LEFT:

C5				=LEFT(B5,3)
A	B	C	D	E
1				
2		LEFT (text)		
3				
4	Text	Result	Comment	
5	New York City	New	Left 3 characters of "New York"	
6	New York City	New York	Left 8 characters of "New York"	
7	84111-0001	84111	Standard 5 digits of a zip code	
8	303-512-4271	303	Area code of a phone number	
9				
10				

RIGHT:



Screenshot of an Excel spreadsheet demonstrating the RIGHT function.

The formula in cell E4 is: =RIGHT(B4,4)

Text

New York City
Moab, UT
FUNCTION
303-512-4271
google.com

Examples

Right 4 characters of "New York City"	City
State abbreviation from city, state	UT
Number of characters not specified	N
Phone number without area code	512-4271
Extracting a 3 letter domain extension	com

MID



Screenshot of an Excel spreadsheet demonstrating the MID function.

The formula in cell E4 is: =MID(B4,C4,D4)

MID (text, start_num, num_chars)

Text	Start	Chars	Result	Notes
The cat in the hat	5	3	cat	Retrieving characters 5-7
The cat in the hat	16	3	hat	Retrieving characters 16-18
string_unwanted	1		string	Using FIND with MID to remove "_xxxx"
string_garbage	1		string	Same formula as above

TRIM:

	A	B	C	D
1	TRIM (text)			
2				
3	Input	Result	Notes	
4	many spaces	many spaces	Extra spaces are replaced with one space	
5	even more space	even more space	Leading and trailing spaces also removed	
6	extra spaces & line breaks	extra spaces & line breaks	TRIM with CLEAN to remove line breaks and spaces at the same time	

Replace:

	A	B	C	D	E	F	G	H	I
1	REPLACE(old_text,start_num,num_chars,new_text)								
2									
3	Input	Output							
4	XRT-2017-001	XRT-2018-001							
5	XRT-2017-002	XRT-2018-002							
6	XRT-2017-003	XRT-2018-003							
7	XRT-2017-004	XRT-2018-004							
8	XRT-2017-005	XRT-2018-005							
9	XRT-2017-006	XRT-2018-006							
10									
11									
12									
13									

LEN

	A	B	C	D	E	F	G
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							

LEN(text)

Text

Text	Length
Utah	4
Salt Lake City	14
UT	2
01-Jan-13	5
001	3
10.1	4
1,000	4

Examples

Description	Result
Length of "Utah"	4
Length of "Salt Lake City"	14
Length of "UT"	2
Length of a date (5-digit number)	5
Length of "001" (text)	3
Length of a number (10.00)	4
Length of a number (1000)	4

FIND:

	A	B	C	D	E	F
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						

FIND (find_text, within_text, [start_num])

Find	Within	Start	Result	Notes
A	Apple		1	Start number is optional and defaults to 1
p	Apple	1	2	Result based on first occurrence
le	Apple	1	4	Finding more than one character
the	The cat in the hat	1	12	Find IS case sensitive

ROUND:

	A	B	C	D	E	F
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						

ROUND (number, num_digits)

Number	Digits	Result	Notes
5.7845	1	5.8	Round to 1 decimal place
5.7845	2	5.78	Round to 2 decimal places
5.7845	3	5.785	Round to 3 decimal places
23542.5	0	23543	Round to nearest whole number
23542.5	-1	23540	Round to nearest 10
23542.5	-2	23500	Round to nearest 100
23542.5	-3	24000	Round to nearest 1000
23542.5	-4	20000	Round to nearest 10000

SUBTOTAL:

	A	B	C	D	E	F	G
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							

Items visible: 7 Subtotal: \$9.54

Item	Category	Quantity	Unit price	Total price
apples	Fruit	12	\$0.15	\$1.80
pears	Fruit	6	\$0.35	\$2.10
oranges	Fruit	10	\$0.22	\$2.20
plums	Fruit	4	\$0.26	\$1.04
banannas	Fruit	6	\$0.12	\$0.72
lemons	Fruit	3	\$0.16	\$0.48
limes	Fruit	6	\$0.20	\$1.20

Keys for other Aggregate operation:

Function	Include hidden
AVERAGE	1
COUNT	2
COUNTA	3
MAX	4
MIN	5
PRODUCT	6
STDEV	7
STDEVP	8
SUM	9
VAR	10
VARP	11

Charts

A simple chart in Excel can say more than a sheet full of numbers.

As you'll see, creating charts is very easy.

Create a Chart

To create a line chart, execute the following steps.

1. Select the range A1:D7.

	A	B	C	D	E
1	Month	Bears	Dolphins	Whales	
2	Jan	8	150	80	
3	Feb	54	77	54	
4	Mar	93	32	100	
5	Apr	116	11	76	
6	May	137	6	93	
7	Jun	184	1	72	
8					

Charts

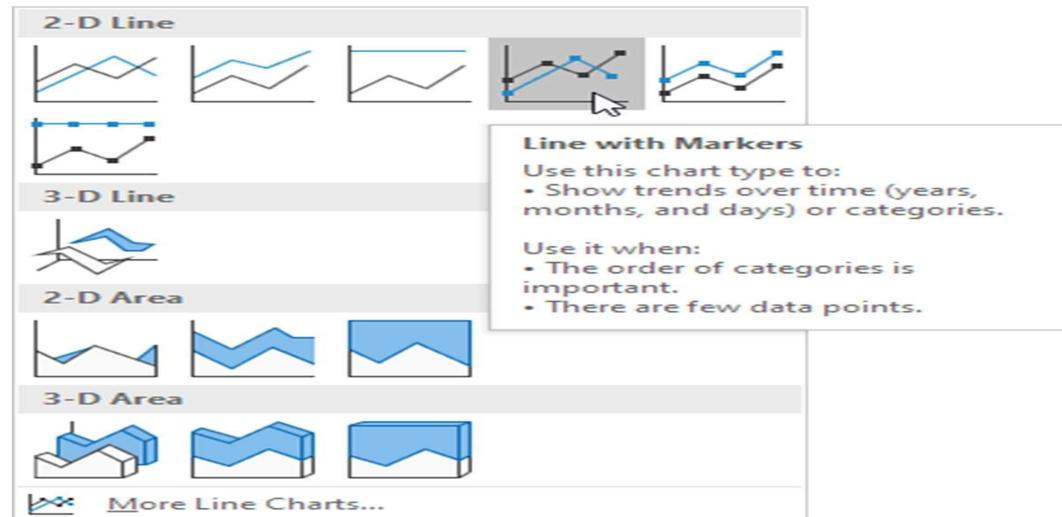
A simple chart in Excel can say more than a sheet full of numbers. As you'll see, creating charts is very easy.

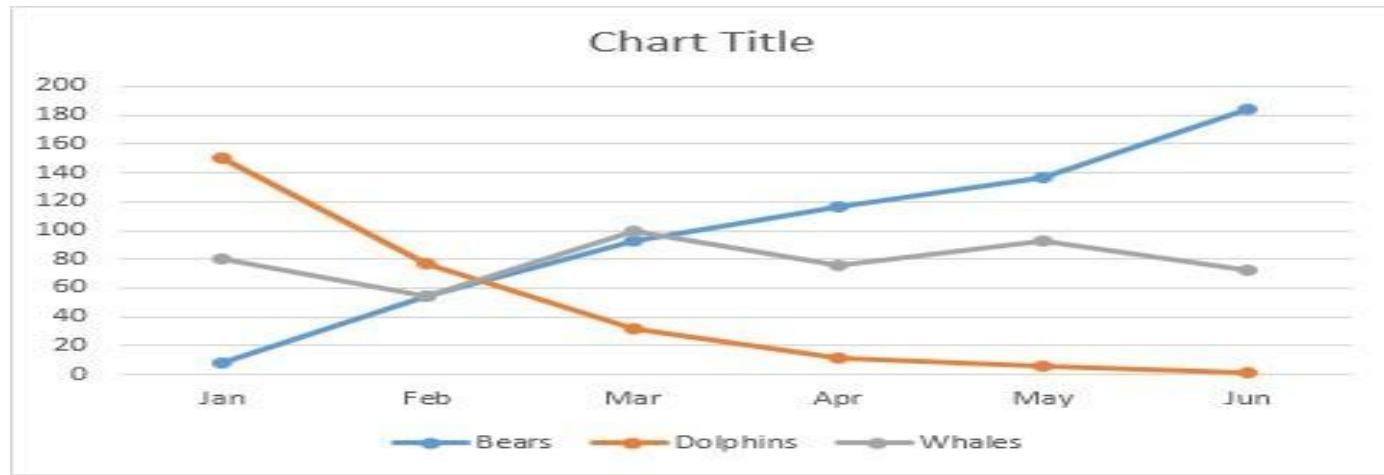
Create a Chart

To create a line chart, execute the following steps.

1. Select the range A1:D7.
2. On the Insert tab, in the Charts group, click the Line symbol.
3. Click Line with Markers.

Result:



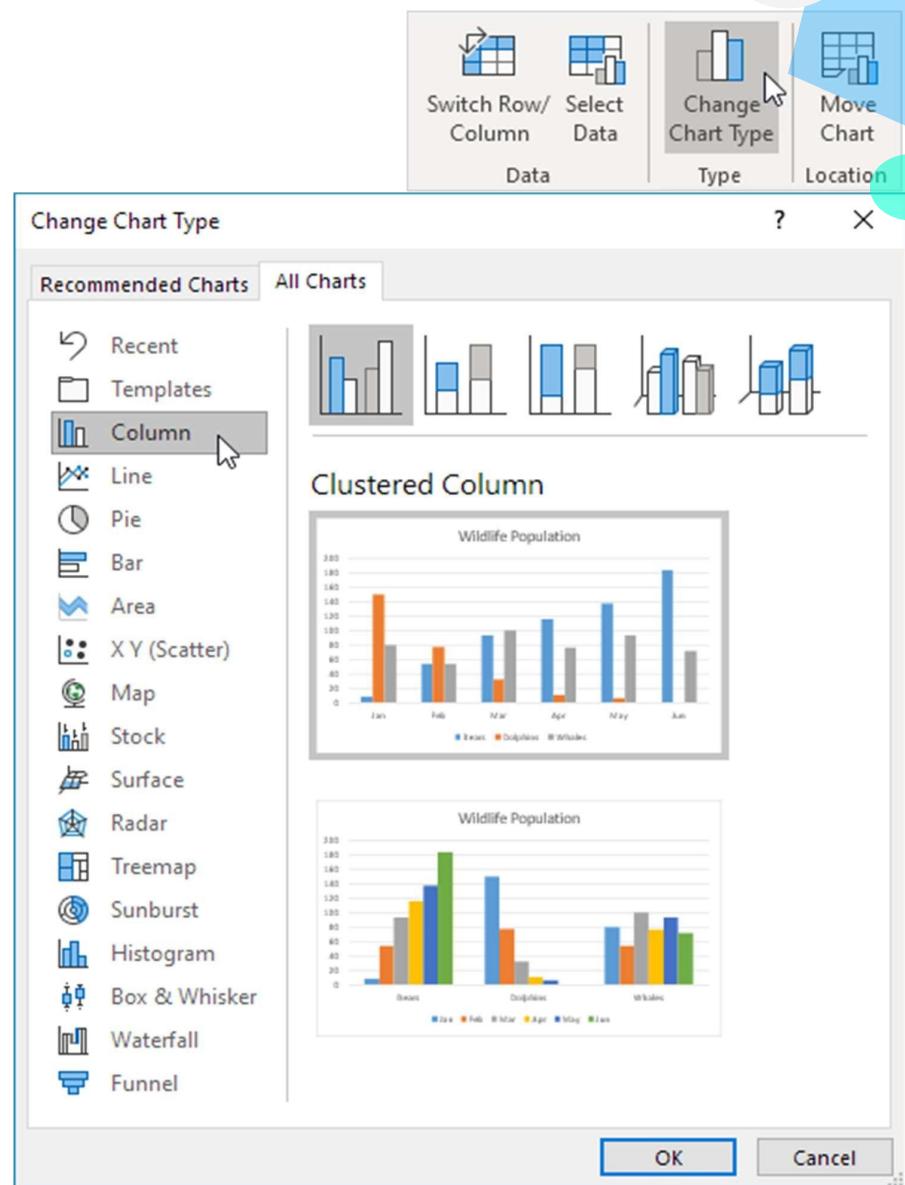


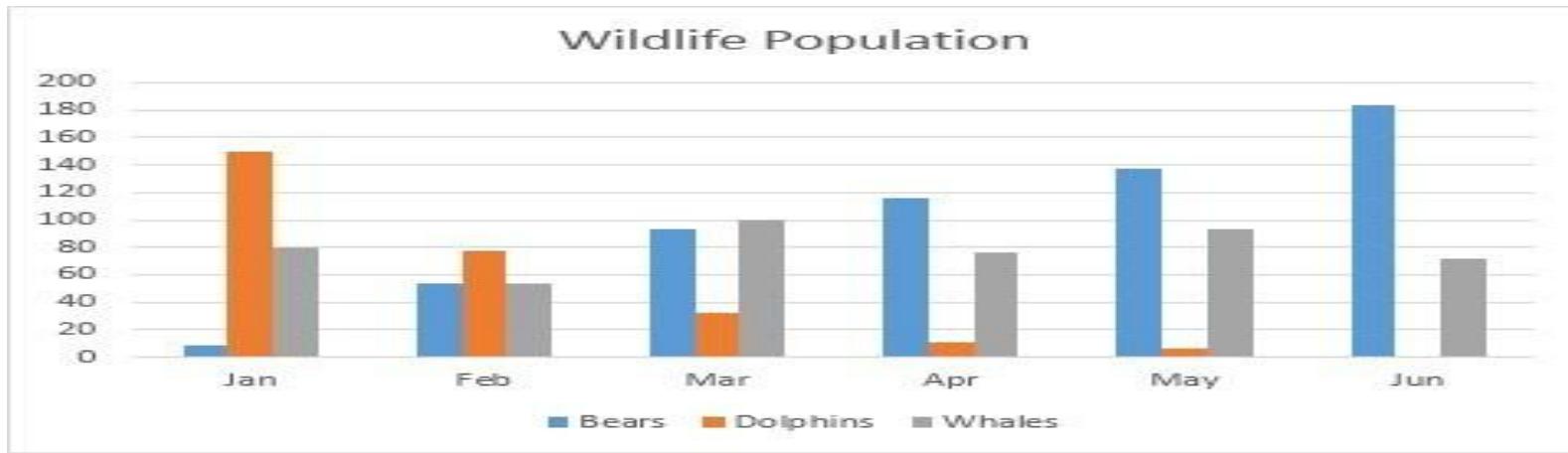
Note: enter a title by clicking on Chart Title. For example, Wildlife Population.

Change Chart Type

You can easily change to a different type of chart at any time.

1. Select the chart.
2. On the Design tab, in the Type group, click Change Chart Type.
3. On the left side, click Column.
4. Click OK.



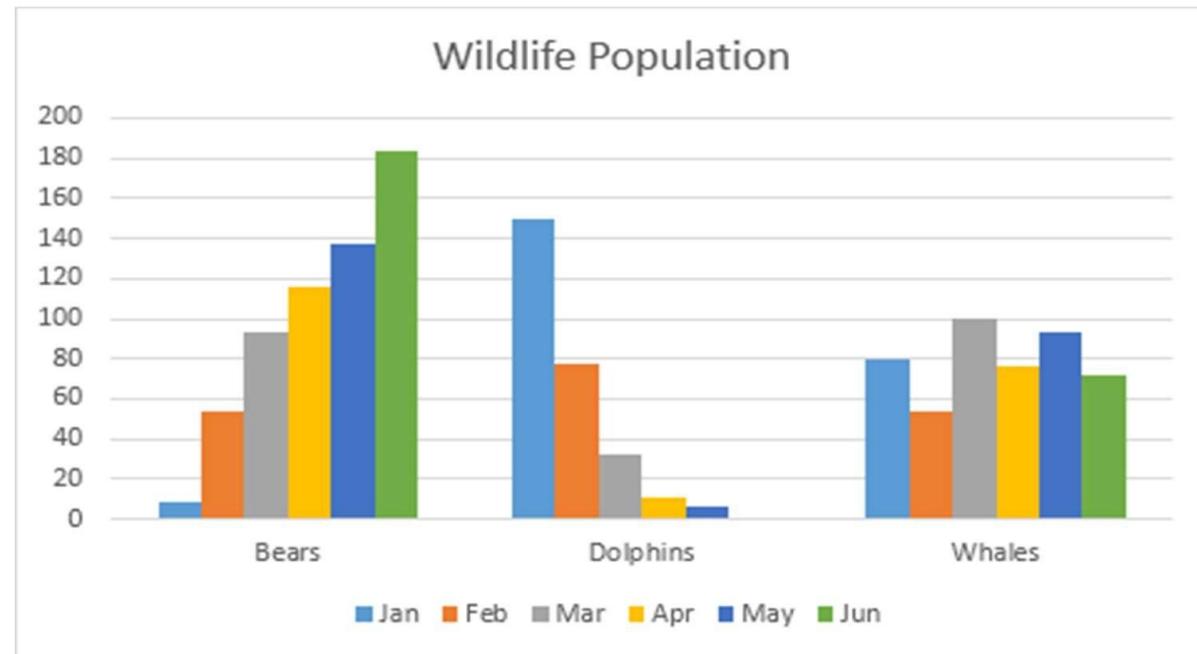


Switch Row/Column

If you want to display the animals (instead of the months) on the horizontal axis, execute the following steps.

1. Select the chart.
2. On the Design tab, in the Data group, click Switch Row/Column.

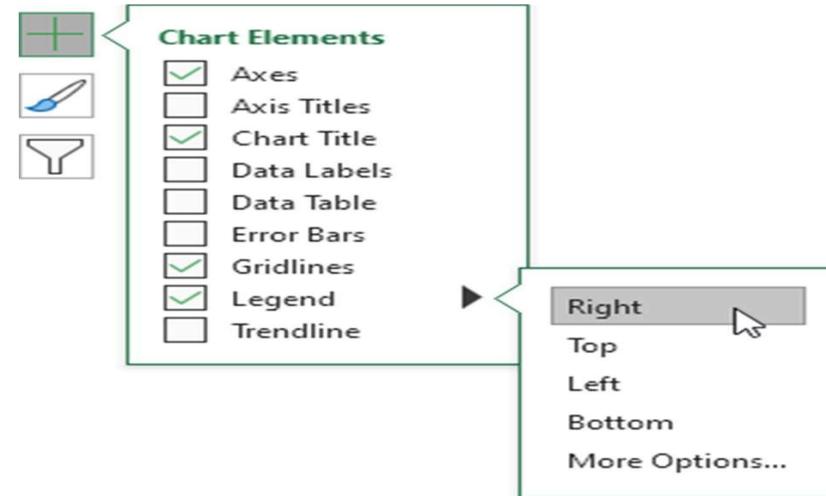
Result:



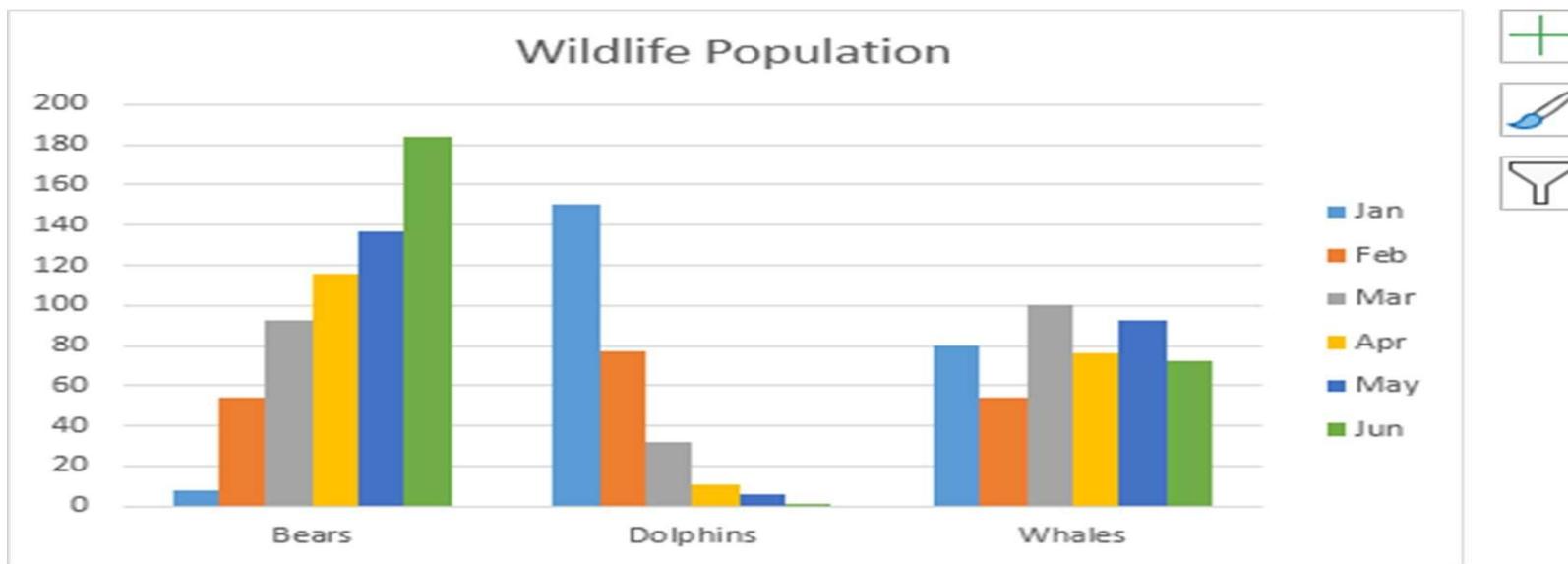
Legend Position

To move the legend to the right side of the chart, execute the following steps.

1. Select the chart.
2. Click the + button on the right side of the chart, click the arrow next to Legend and click Right.



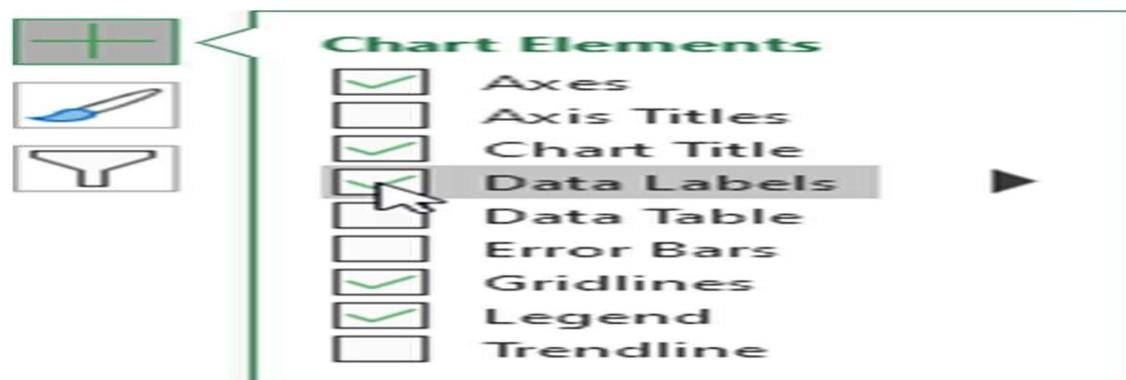
Result:



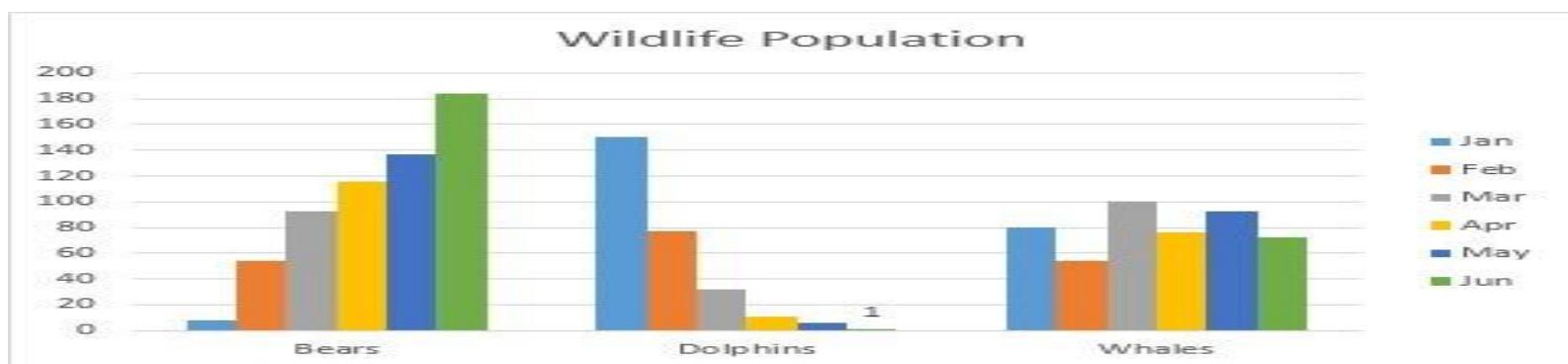
Data Labels

You can use data labels to focus your readers' attention on a single data series or data point.

1. Select the chart.
2. Click a green bar to select the Jun data series.
3. Hold down CTRL and use your arrow keys to select the population of Dolphins in June (tiny green bar).
4. Click the + button on the right side of the chart and click the check box next to Data Labels.



Result:



Pivot Tables

Pivot tables are one of Excel's most powerful features. A pivot table allows you to extract the significance from a large, detailed data set.

Our data set consists of 213 records and 6 fields. Order ID, Product, Category, Amount, Date and Country.

	A	B	C	D	E	F	G	H
1	Order ID	Product	Category	Amount	Date	Country		
2	1	Carrots	Vegetables	\$4,270	1/6/2016	United States		
3	2	Broccoli	Vegetables	\$8,239	1/7/2016	United Kingdom		
4	3	Banana	Fruit	\$617	1/8/2016	United States		
5	4	Banana	Fruit	\$8,384	1/10/2016	Canada		
6	5	Beans	Vegetables	\$2,626	1/10/2016	Germany		
7	6	Orange	Fruit	\$3,610	1/11/2016	United States		
8	7	Broccoli	Vegetables	\$9,062	1/11/2016	Australia		
9	8	Banana	Fruit	\$6,906	1/16/2016	New Zealand		
10	9	Apple	Fruit	\$2,417	1/16/2016	France		
11	10	Apple	Fruit	\$7,121	1/16/2016	Canada		

Insert a Pivot Table

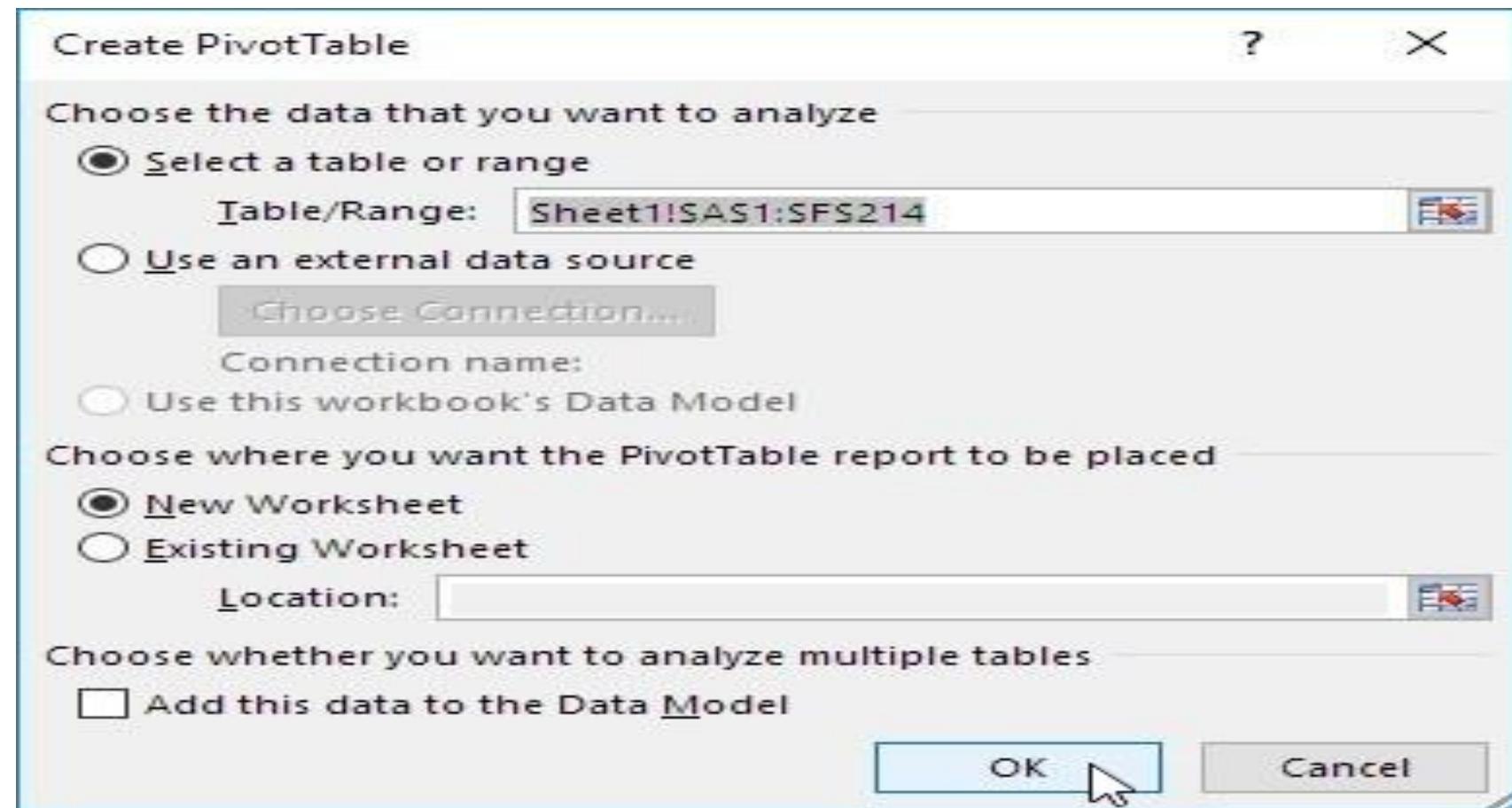
To insert a pivot table, execute the following steps.

1. Click any single cell inside the data set.
2. On the Insert tab, in the Tables group, click PivotTable.



The following dialog box appears. Excel automatically selects the data for you. The default location for a new pivot table is New Worksheet.

3. Click OK.



Drag fields

The PivotTable Fields pane appears. To get the total amount exported of each product, drag the following fields to the different areas.

1. Product field to the Rows area.
2. Amount field to the Values area.
3. Country field to the Filters area.

The screenshot shows the 'PivotTable Fields' pane with the following settings:

- Choose fields to add to report:** Contains checkboxes for Order ID, Product, Category, Amount, Date, and Country. Product, Amount, and Country are checked.
- Drag fields between areas below:**
 - Filters:** Contains a dropdown menu set to 'Country'.
 - Columns:** Empty.
 - Rows:** Contains a dropdown menu set to 'Product'.
 - Values:** Contains a dropdown menu set to 'Sum of Amount'.
- Defer Layout Update:** An unchecked checkbox.
- Update:** A button.

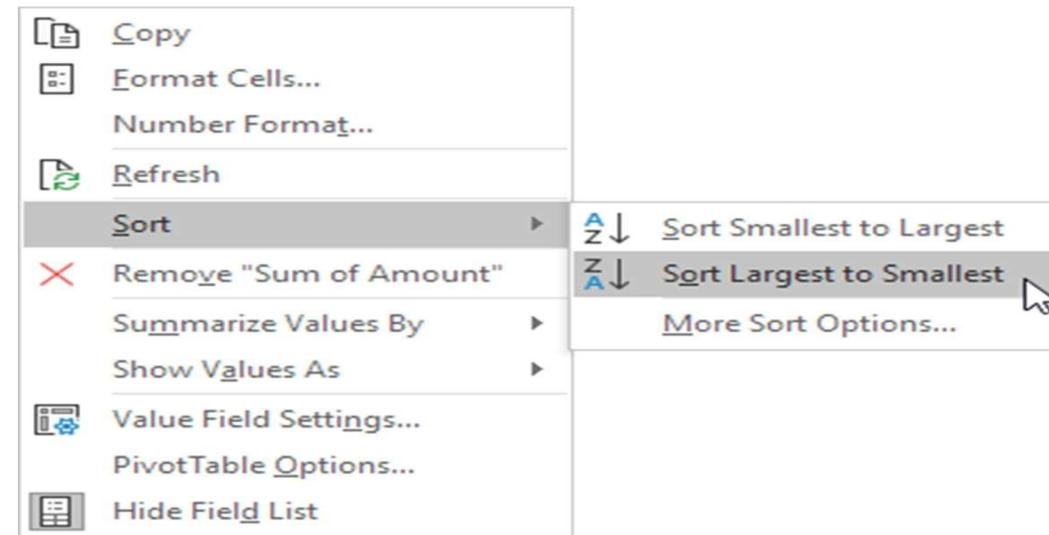
Below you can find the pivot table. Bananas are our main export product. That's how easy pivot tables can be!

	A	B	C
1	Country	(All)	
2			
3	Row Labels	Sum of Amount	
4	Apple	191257	
5	Banana	340295	
6	Beans	57281	
7	Broccoli	142439	
8	Carrots	136945	
9	Mango	57079	
10	Orange	104438	
11	Grand Total	1029734	
12			

Sort

To get Banana at the top of the list, sort the pivot table.

1. Click any cell inside the Sum of Amount column.
2. Right click and click on Sort, Sort Largest to Smallest.



Filter

Because we added the Country field to the Filters area, we can filter this pivot table by Country. For example, which products do we export the most to France?

1. Click the filter drop-down and select France. Result. Apples are our main export product to France.

	A	B	C
1	Country	(All)	
2			
3	Row Labels	Sum of Amount	
4	Banana	340295	
5	Apple	191257	
6	Broccoli	142439	
7	Carrots	136945	
8	Orange	104438	
9	Beans	57281	
10	Mango	57079	
11	Grand Total	1029734	
12			

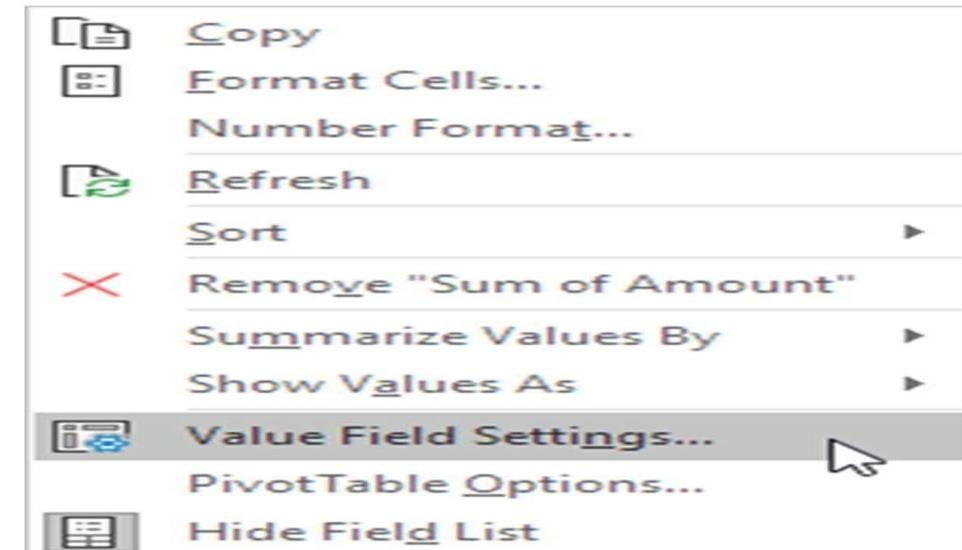
Note: you can use the standard filter (triangle next to Row Labels) to only show the amounts of specific products.

Change Summary Calculation

By default, Excel summarizes your data by either summing or counting the items. To change the type of calculation that you want to use, execute the following steps.

1. Click any cell inside the Sum of Amount column.
2. Right click and click on Value Field Settings.
3. Choose the type of calculation you want to use. For example, click Count.

	A	B
1	Country	France
2		
3	Row Labels	Sum of Amount
4	Apple	80193
5	Banana	36094
6	Carrots	9104
7	Mango	7388
8	Broccoli	5341
9	Orange	2256
10	Beans	680
11	Grand Total	141056
12		



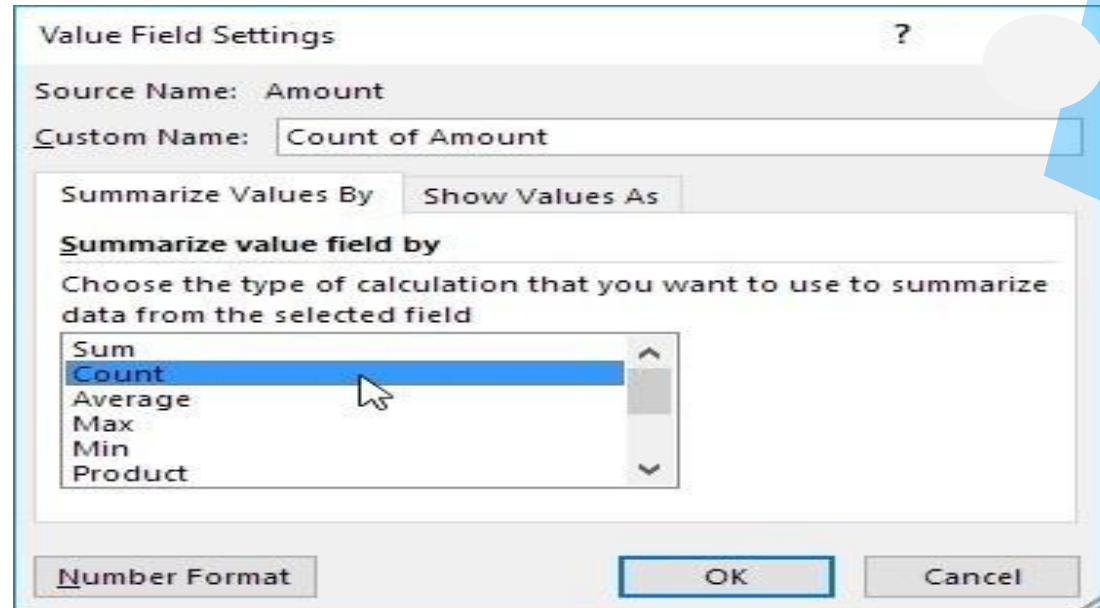
4. Click OK.

Result. 16 out of the 28 orders to France were 'Apple' orders.

Two-dimensional Pivot Table

If you drag a field to the Rows area and Columns area, you can create a two-dimensional pivot table. First, insert a pivot table. Next, to get the total amount exported to each country, of each product, drag the following fields to the different areas.

1. Country field to the Rows area.
2. Product field to the Columns area.
3. Amount field to the Values area.
4. Category field to the Filters area.



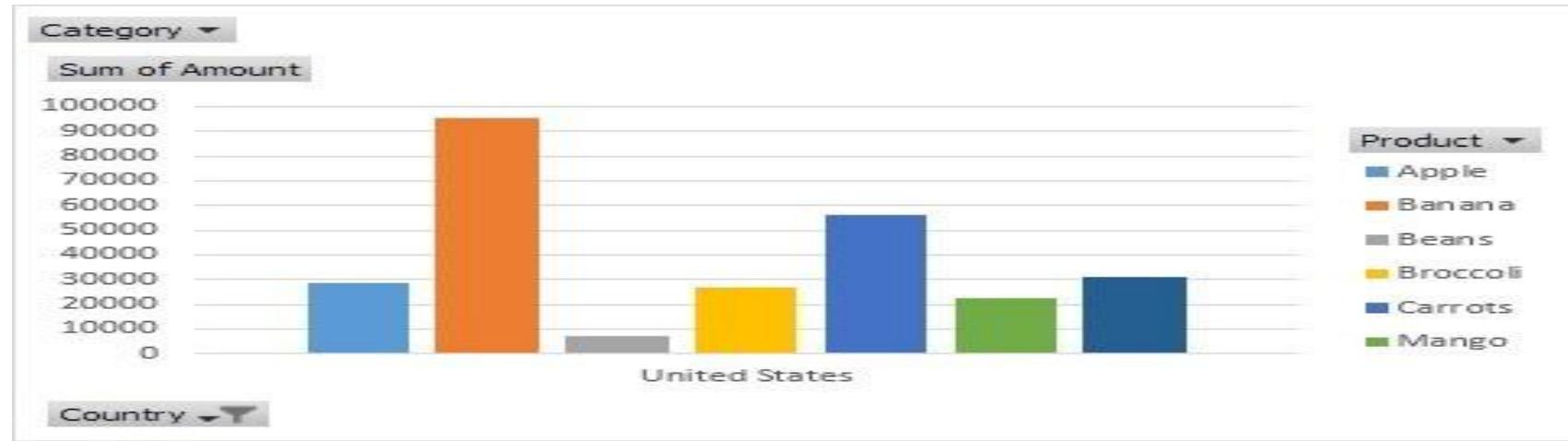
	A	B	C
1	Country	France	▼
2			
3	Row Labels	Count of Amount	
4	Apple	16	
5	Banana	7	
6	Carrots	1	
7	Mango	1	
8	Orange	1	
9	Beans	1	
10	Broccoli	1	
11	Grand Total	28	
12			

Below you can find the two-dimensional pivot table.

To easily compare these numbers, create a pivot chart and apply a filter. Maybe this is one step too far for you at this stage, but it shows you one of the many other powerful pivot table features Excel has to offer.



	A	B	C	D	E	F	G	H	I	J
1	Category	(All)								
2										
3	Sum of Amount	Column								
4	Row Labels	▼ Apple	Banana	Beans	Broccoli	Carrots	Mango	Orange	Grand Total	
5	Australia	20634	52721	14433	17953	8106	9186	8680	131713	
6	Canada	24867	33775		12407		3767	19929	94745	
7	France	80193	36094	680	5341	9104	7388	2256	141056	
8	Germany	9082	39686	29905	37197	21636	8775	8887	155168	
9	New Zealand	10332	40050		4390			12010	66782	
10	United Kingdom	17534	42908	5100	38436	41815	5600	21744	173137	
11	United States	28615	95061	7163	26715	56284	22363	30932	267133	
12	Grand Total	191257	340295	57281	142439	136945	57079	104438	1029734	
13										



Slicers

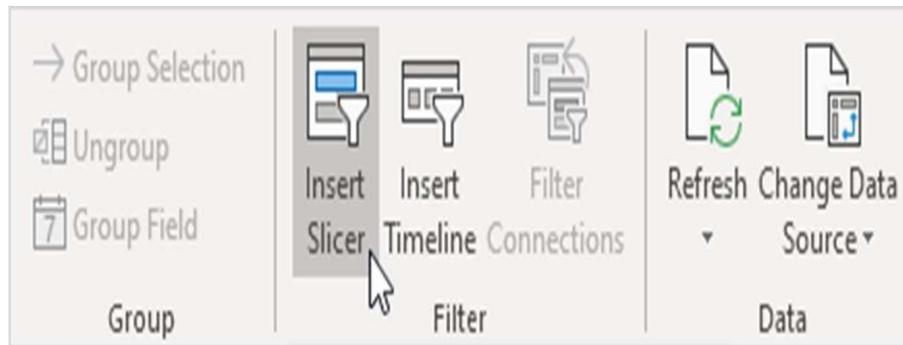
You can insert slicers in Excel to quickly and easily filter pivot tables. However, using the report filter gives the exact same result.

Below you can find a two-dimensional pivot table.

	A	B	C	D	E	F	G	H	I	J
1	Category	(All)								
2										
3	Sum of Amount	Column								
4	Row Labels	▼	Apple	Banana	Beans	Broccoli	Carrots	Mango	Orange	Grand Total
5	Australia		20634	52721	14433	17953	8106	9186	8680	131713
6	Canada		24867	33775		12407		3767	19929	94745
7	France		80193	36094	680	5341	9104	7388	2256	141056
8	Germany		9082	39686	29905	37197	21636	8775	8887	155168
9	New Zealand		10332	40050		4390			12010	66782
10	United Kingdom		17534	42908	5100	38436	41815	5600	21744	173137
11	United States		28615	95061	7163	26715	56284	22363	30932	267133
12	Grand Total		191257	340295	57281	142439	136945	57079	104438	1029734
13										

To insert a slicer, execute the following steps.

1. Click any cell inside the pivot table.
2. On the Analysis tab, in the Filter group, click Insert Slicer.
3. Check Category and click OK.



4. For example, click Fruit to only show the fruit exported to each country.

Note: the report filter (cell B1) changes to Fruit. Hold down CTRL to include fruit and vegetables.

	A	B	C	D	E	F	G	H	I
1	Category	Fruit							
2									
3	Sum of Amount	Column							
4	Row Labels	Apple	Banana	Mango	Orange	Grand Total			
5	Australia	20634	52721	9186	8680	91221			
6	Canada	24867	33775	3767	19929	82338			
7	France	80193	36094	7388	2256	125931			
8	Germany	9082	39686	8775	8887	66430			
9	New Zealand	10332	40050		12010	62392			
10	United Kingdom	17534	42908	5600	21744	87786			
11	United States	28615	95061	22363	30932	176971			
12	Grand Total	191257	340295	57079	104438	693069			
13									
14									

Category

Fruit

Vegetables

Pivot Chart

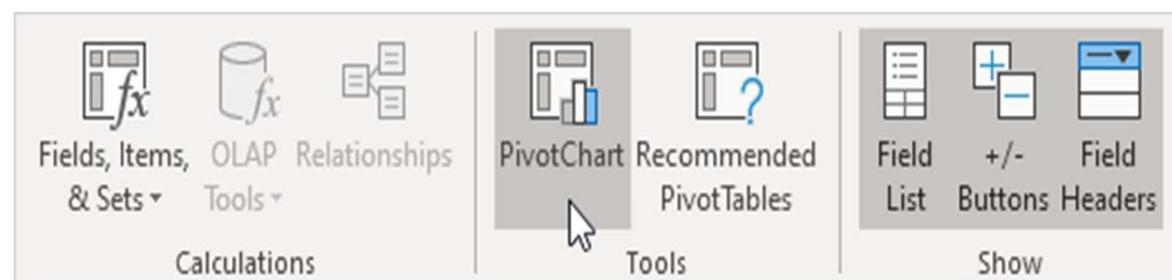
A pivot chart is the visual representation of a pivot table in Excel. Pivot charts and pivot tables are connected with each other.

	A	B	C	D	E	F	G	H	I	J
1	Category	(All)								
2										
3	Sum of Amount	Column								
4	Row Labels	Apple	Banana	Beans	Broccoli	Carrots	Mango	Orange	Grand Total	
5	Australia	20634	52721	14433	17953	8106	9186	8680	131713	
6	Canada	24867	33775		12407		3767	19929	94745	
7	France	80193	36094	680	5341	9104	7388	2256	141056	
8	Germany	9082	39686	29905	37197	21636	8775	8887	155168	
9	New Zealand	10332	40050		4390			12010	66782	
10	United Kingdom	17534	42908	5100	38436	41815	5600	21744	173137	
11	United States	28615	95061	7163	26715	56284	22363	30932	267133	
12	Grand Total	191257	340295	57281	142439	136945	57079	104438	1029734	
13										

Insert Pivot Chart

To insert a pivot chart, execute the following steps.

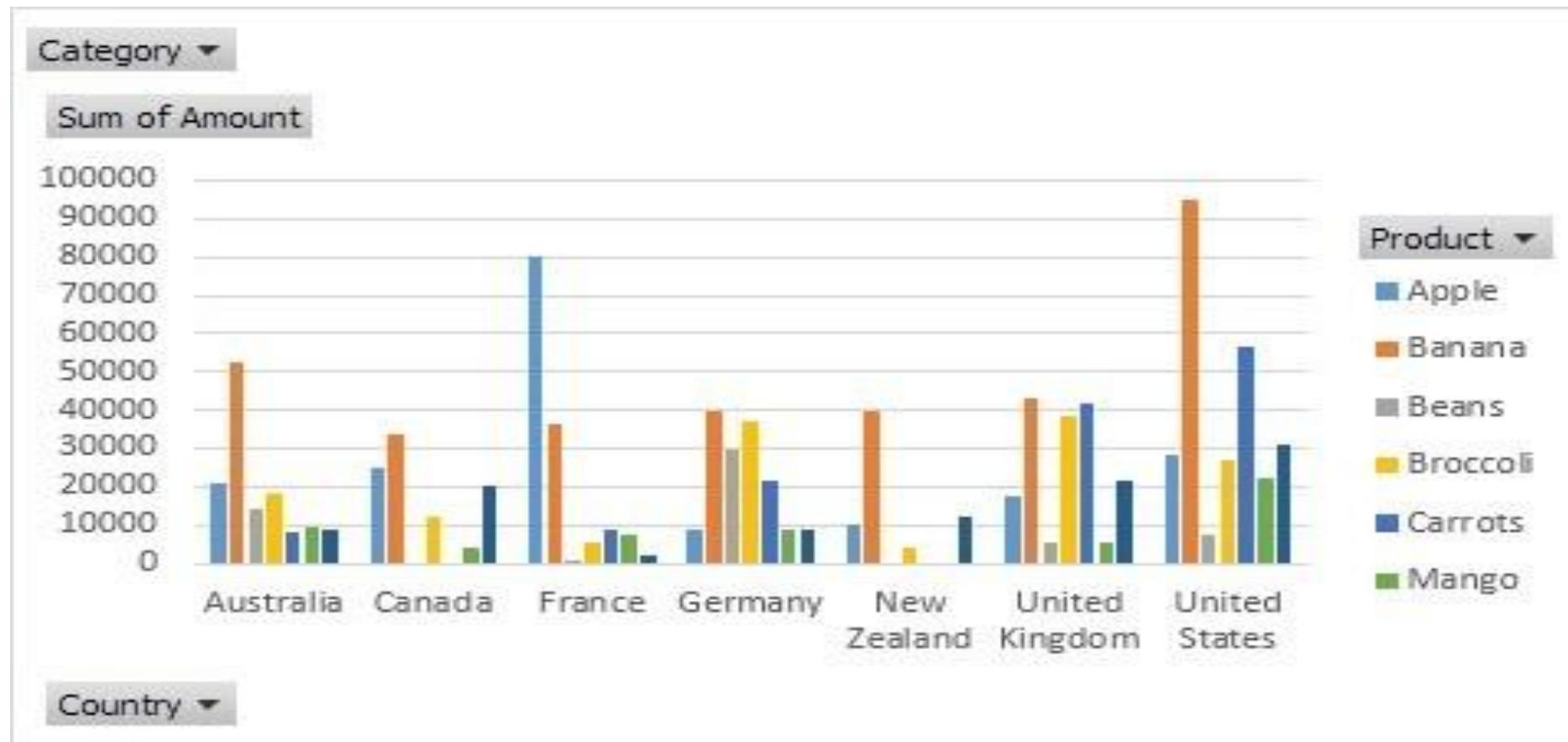
1. Click any cell inside the pivot table.
2. On the Analyze tab, in the Tools group, click PivotChart.

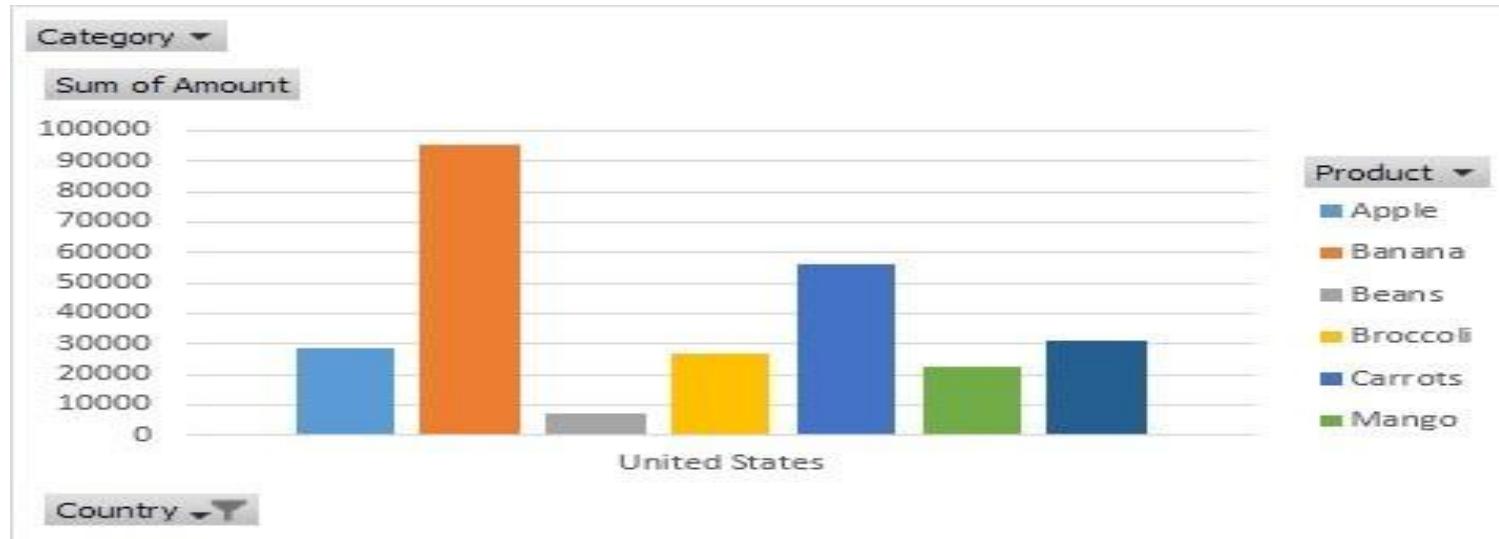


The Insert Chart dialog box appears.

3. Click OK.

Below you can find the pivot chart.





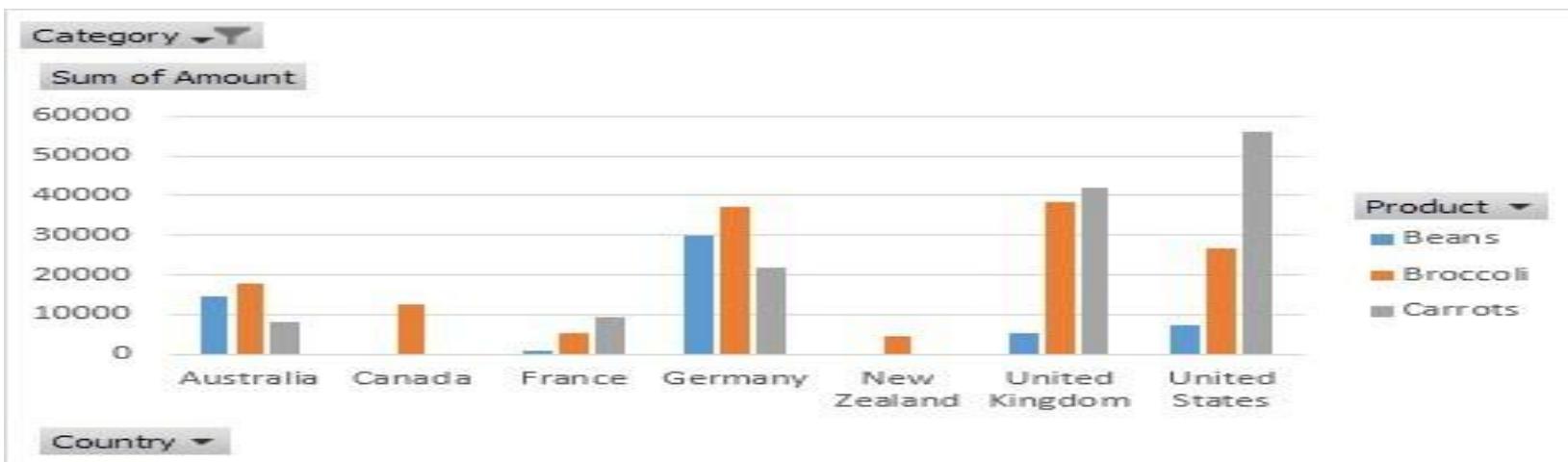
Filter Pivot Chart

To filter this pivot chart, execute the following steps.

1. Use the standard filters (triangles next to Product and Country). For example, use the Country filter to only show the total amount of each product exported to the United States.

2. Remove the Country filter.

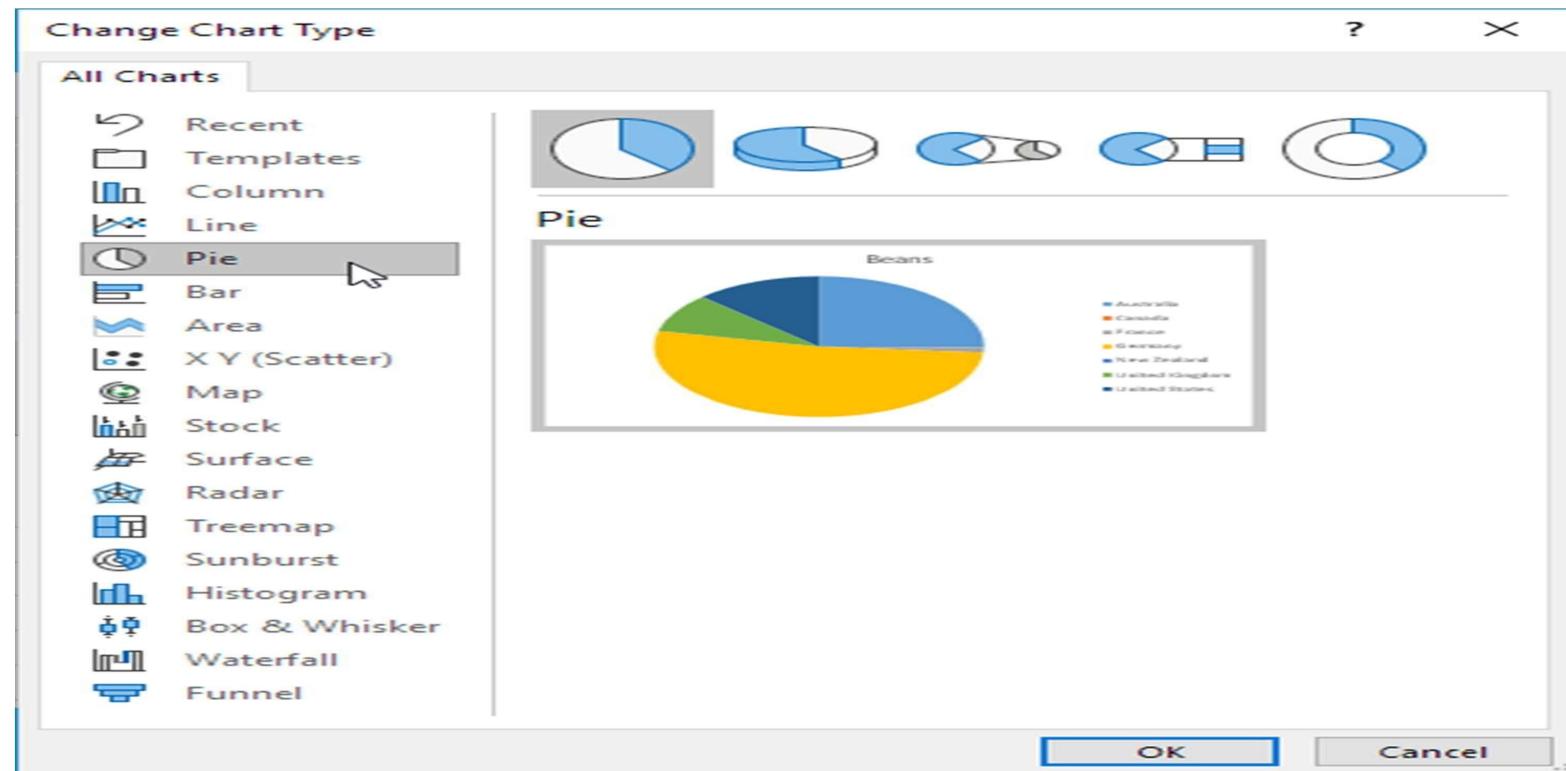
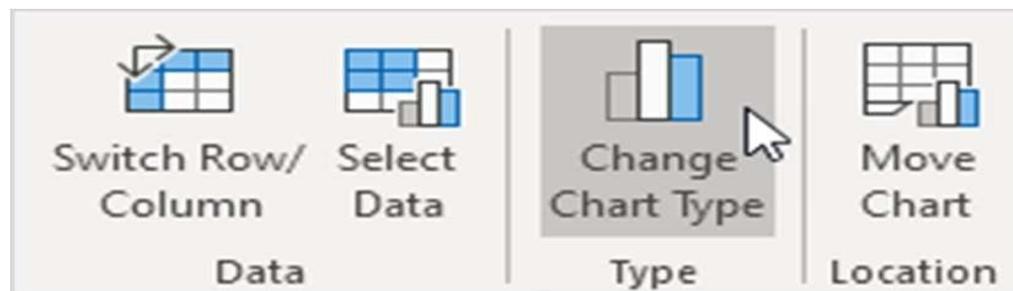
3. Because we added the Category field to the Filters area, we can filter this pivot chart (and pivot table) by Category. For example, use the Category filter to only show the vegetables exported to each country.



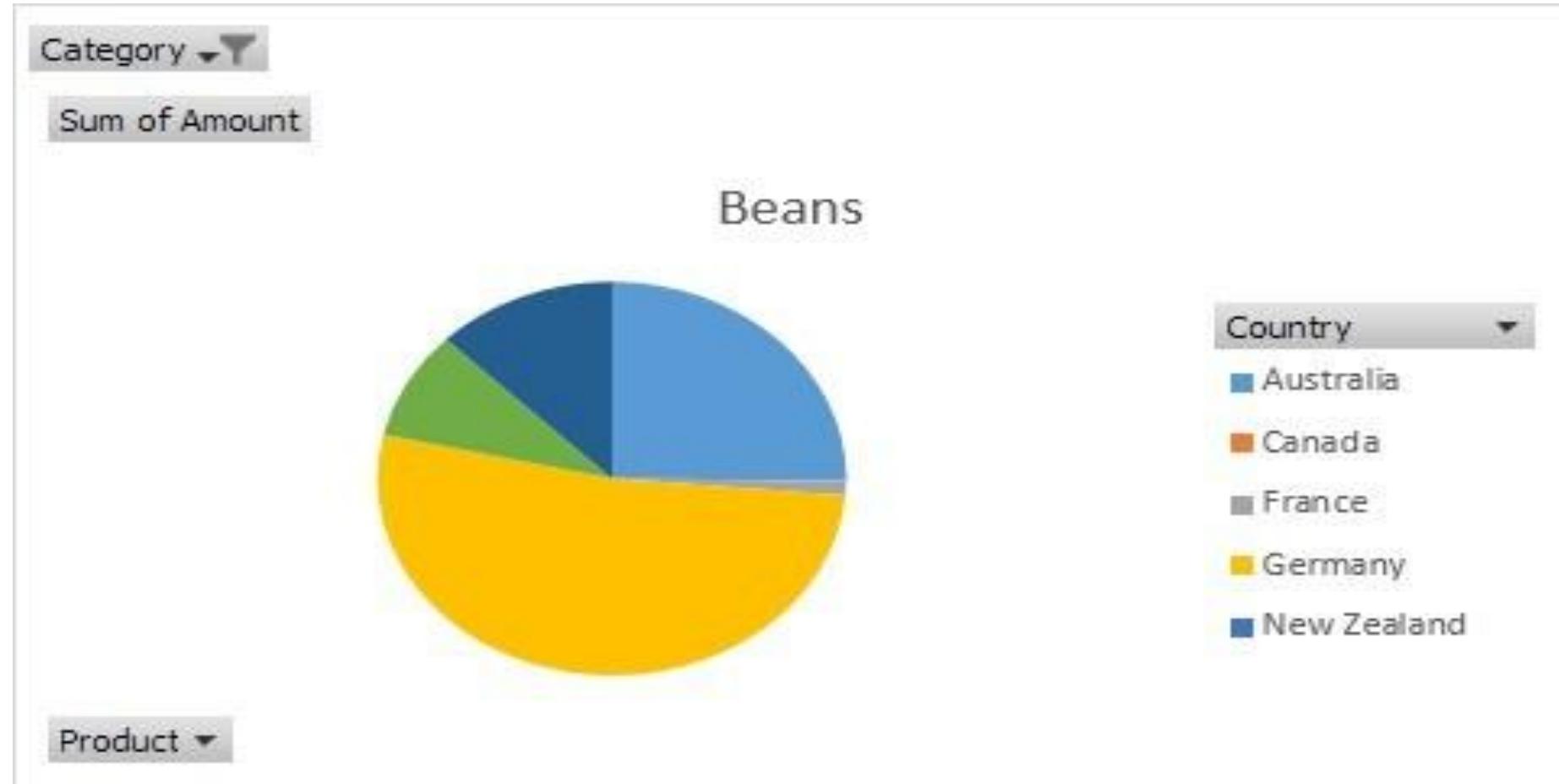
Change Pivot Chart Type

You can change to a different type of pivot chart at any time.

1. Select the chart.
2. On the Design tab, in the Type group, click Change Chart Type.
3. Choose Pie.
4. Click OK.



Result:



Note: pie charts always use one data series (in this case, Beans). To get a pivot chart of a country, swap the data over the axis. First, select the chart. Next, on the Design tab, in the Data group, click Switch Row/Column.

Dashboarding:

An Excel dashboard is one pager (mostly, but not always necessary) that helps managers and business leaders in tracking key KPIs or metrics and take a decision based on it. It contains charts/tables/views that are backed by data. A dashboard is often called a report, however, not all reports are dashboards.

