

# Microsoft Excel 2016

*Advanced*

*Participants Guide*

# Contents

Text to Columns .....	4
Concatenate.....	6
The Concatenate Function.....	6
The Right Function with Concatenation .....	6
Absolute Cell References .....	7
Data Validation .....	8
Time and Date Calculations .....	10
Conditional Formatting.....	12
Exploring Styles and Clearing Formatting .....	12
Using Conditional Formatting to Hide Cells .....	13
Using the IF Function .....	14
Changing the “Value if false” Condition to Text.....	14
3D Formulas .....	15
Pivot Tables.....	16
Creating a Pivot Table .....	16
Specifying PivotTable Data .....	17
Changing a PivotTables Calculation.....	18
Filtering and Sorting a PivotTable .....	19
Creating a PivotChart .....	20
Grouping Items .....	21
Updating a PivotTable .....	22
Formatting a PivotTable .....	22
Using Slicers.....	23
Charts .....	24
Creating a Simple Chart.....	24
Chart Terminology .....	24
Charting Non-Adjacent Cells .....	24
Creating a Chart Using the Chart Wizard .....	25
Modifying Charts.....	25
Moving an Embedded Chart .....	25
Sizing an Embedded Chart.....	25
Changing the Chart Type .....	25
Chart Types.....	25
Changing the Way Data is Displayed .....	26
Moving the Legend .....	26
Formatting Charts.....	27
Adding Chart Items .....	27
Formatting All Text .....	28
Formatting and Aligning Numbers .....	28

Formatting the Plot Area .....	29
Formatting Data Markers .....	30
<b>Pie Charts .....</b>	<b>31</b>
Creating a Pie Chart .....	31
Moving the Pie Chart to its Own Sheet .....	31
Adding Data Labels .....	32
Exploding a Slice of a Pie Chart .....	32
Rotating and Changing the Elevation of a Pie Chart .....	33

## Text to Columns

Depending on the way your data is arranged, you can split the cell content based on a delimiter such as a space or a character (comma, a period, or a semicolon) or you can split it based on a specific column break location within your data.

1. Navigate to the **Text to Columns** worksheet.
2. Select column B and **Insert** a new column.  
**Note:** If you do not insert a new column, the text to columns wizard will replace any content in the adjoining cell.
3. Select column A.
4. Choose **Text to Columns** in the **Data** tab. The **Text to Columns** wizard will appear.

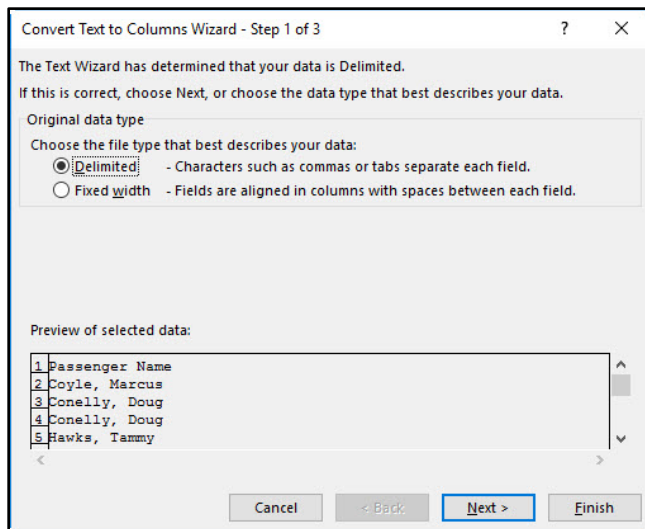


Figure 1

5. Select the **Delimited** radio button (already selected by default) and click **Next**.
6. Select **Comma** from the list of delimiters. The preview of selected data will show the text split.

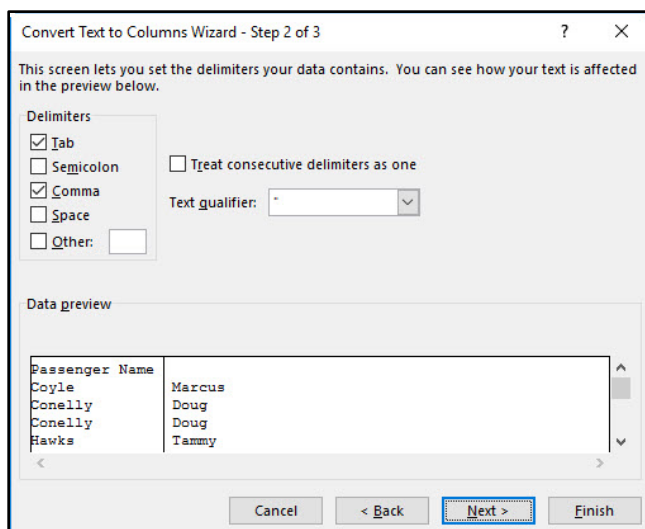


Figure 2

7. Click **Next**.
8. The final step of the wizard appears. This allows you to pre-format the column before it goes back into the Excel worksheet. In this example, we will leave the default as is.

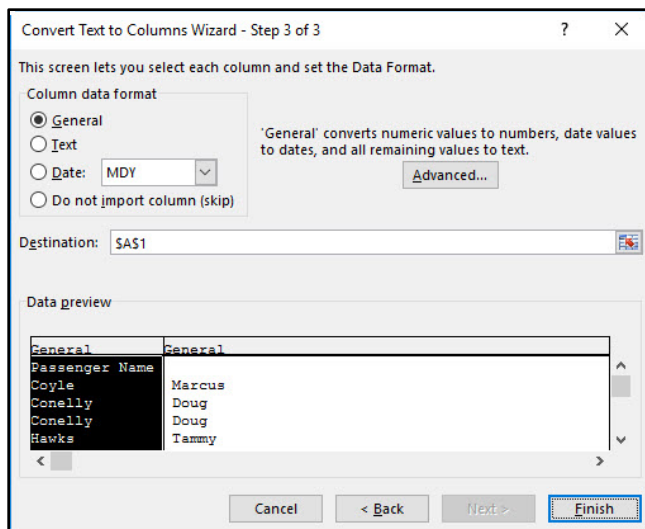


Figure 3

9. Click **Finish**. The Excel worksheet will show the columns split. You may have to go into specific cells and do further clean up. See cell B14 for example.

	A	B
1	<b>Passenger Name</b>	
2	Coyle	Marcus
3	Conelly	Doug
4	Conelly	Doug
5	Hawks	Tammy
6	Jernigan	Deborah
7	Drake	Deborah
8	Carrey	Pam
9	Couto	Terry
10	Glass	Helen
11	Hopson	Marie
12	Conelly	Doug
13	Conelly	Doug
14	Cox	William G

Figure 4

# Concatenate

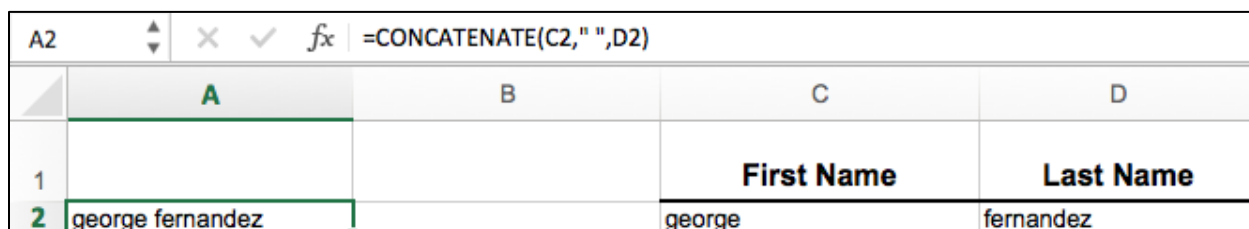
The concatenate function joins two or more text strings together into one string. For example, if you have the customer's first name in column A and the last name in column B, you could use “=concatenate (A3,“ ”,B3)” to produce a string containing first name and last name.

Concatenate text can also be achieved using the “&” symbol. Concatenation works best when combined with other functions like upper, proper, left, and right.

**Note:** When you join two strings, Excel does not insert a space or any punctuation between the two. You must do it by inserting “ ” between the two strings, as shown above, or by replacing that space with a hyphen or other punctuation. The quotation marks are required.

## The Concatenate Function

1. Navigate to the **Concatenate** sheet.
2. In cell **A2**, type: =concatenate(C2, “ ”,D2).
3. This will join the contents of two cells together and place a space in between them.



The screenshot shows an Excel spreadsheet with the following data:

	A	B	C	D
1			First Name	Last Name
2	george fernandez		george	fernandez

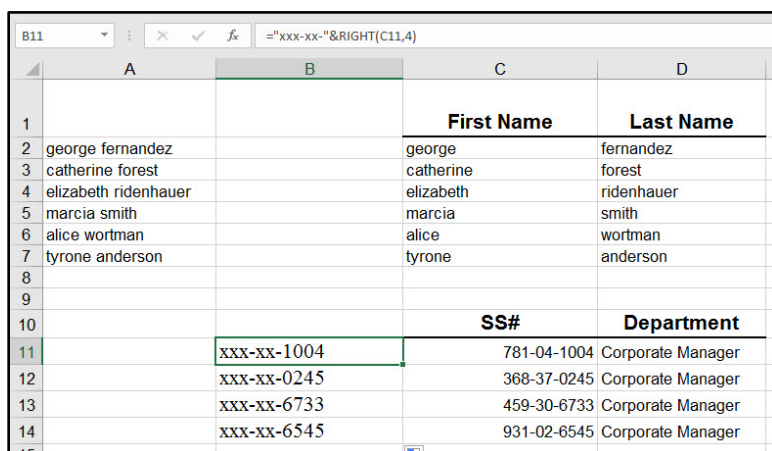
The formula bar at the top shows: `=CONCATENATE(C2," ",D2)`

Figure 5

## The Right Function with Concatenation

The right function with concatenation enables you to take sensitive data (credit card numbers, social security numbers, etc.) and replace a portion of it. If you are handling data with sensitive personal identification information, this process will give you the ability to protect that information.

1. In cell **B11**, type: ="xxx-xx-"&right(C11,4).
2. This will append the social security number leaving the last four characters.



The screenshot shows an Excel spreadsheet with the following data:

	A	B	C	D
1			First Name	Last Name
2	george fernandez		george	fernandez
3	catherine forest		catherine	forest
4	elizabeth ridenhauer		elizabeth	ridenhauer
5	marcia smith		marcia	smith
6	alice wortman		alice	wortman
7	tyrone anderson		tyrone	anderson
8				
9				
10			SS#	Department
11		xxx-xx-1004	781-04-1004	Corporate Manager
12		xxx-xx-0245	368-37-0245	Corporate Manager
13		xxx-xx-6733	459-30-6733	Corporate Manager
14		xxx-xx-6545	931-02-6545	Corporate Manager

The formula bar at the top shows: `= "xxx-xx-"&RIGHT(C11,4)`

Figure 6

## Absolute Cell References

When copying a formula, you may want one or more of the cell references to remain unchanged. Unlike a relative cell reference, which preserves the relationship to the formula location, absolute cell references preserve the exact cell address in a formula.

1. Navigate to the **Absolute** sheet.
2. Click in cell **F7**. We are going to find the total of each item including the tax.
3. Type **=D7\*E4+E7** and press **Enter**. This will add tax to the product then add shipping. No tax is added to the shipping cost.
4. Using the fill handle, drag the formula down to cell **F10**. Notice the odd looking results. This is because it is using relative cell references.
5. Click back in cell **F7**. Press **Delete** and type **=D7\*E4+E7**.
6. Highlight the E4 inside the formula and then press the **F4** function key on your keyboard. Notice the \$ signs around cell **E4**.
7. Press **Enter**.
8. Drag the formula down to **F10**.

	D	E	F
3	<b>Tax Rate:</b>	8.25%	
4	<b>Tax Multiplier</b>	1.0825	
5			
6	<b>Cost</b>	<b>Shipping</b>	<b>Total w/ Tax</b>
7	\$12.00	\$2.00	
8	\$15.00	\$3.00	
9	\$18.00	\$4.00	
10	\$25.00	\$5.00	

Figure 7

## Data Validation

Data validation is an Excel feature that you can use to define restrictions on what data can or should be entered in a cell. You can configure data validation to prevent users from entering data that is not valid.

1. Open the **Data Validation** sheet.
2. Select the range **C6:C12**.
3. From the **Data** tab, select **Data Validation**. The **Data Validation** menu will appear.

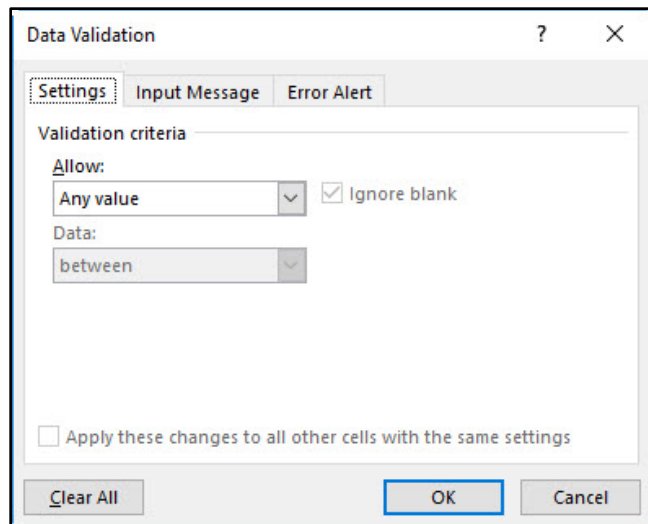


Figure 8

4. Select **List** from the **Allow** dropdown and choose **=G\$5:G\$305** as the source by clicking in the **Source** box and dragging down column G starting at cell G5.

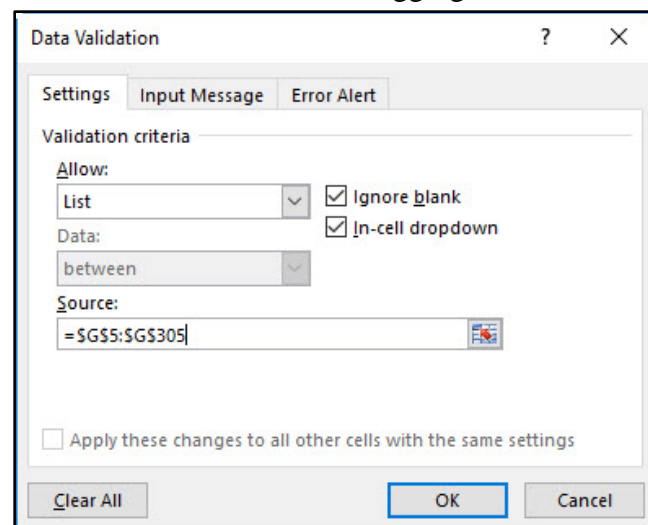


Figure 9

5. Click **OK** or press **Enter**.



6. In the **Input Message** tab, type: *Please select a time.*
7. In the **Input message** box, type: *Allowed time is from 7:00 AM through 12:00 PM.*

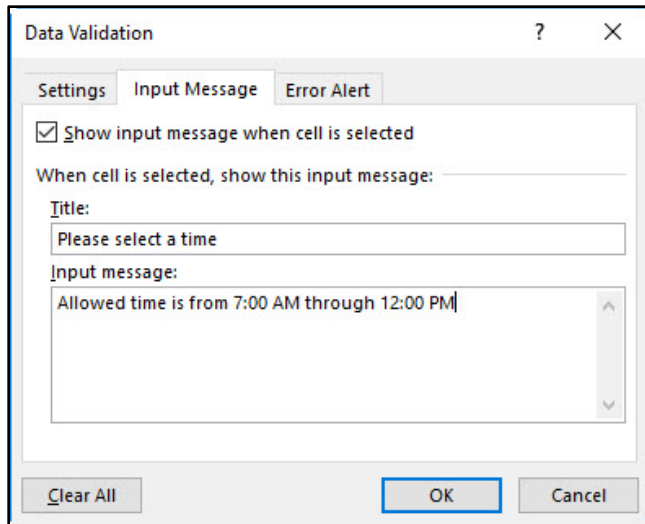


Figure 10

8. In the **Error Alert** tab, type: *Error: Incorrect Time Entered* in the **Title** box.
9. In the **Error message** box type: *Allowed time is from 7:00 AM through 12:00 PM.*

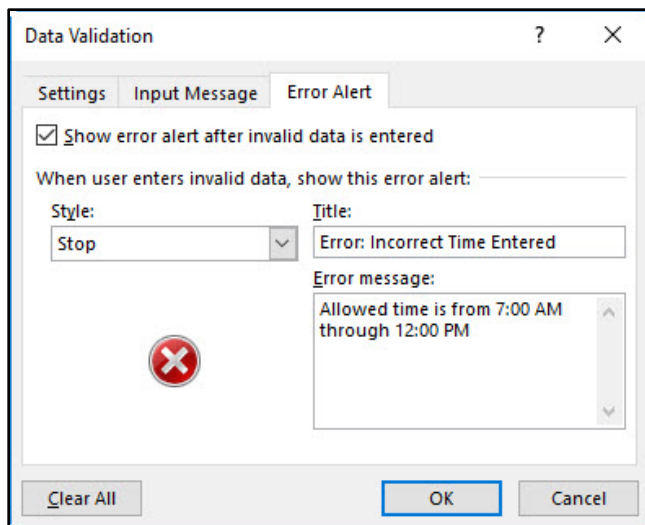


Figure 11

10. Click **OK**. Test the validation out by manually typing in **2 PM** in cell C7.

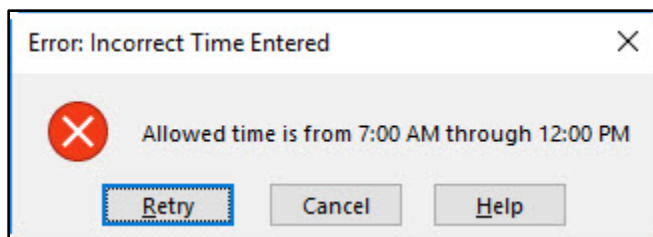


Figure 12

## Time and Date Calculations

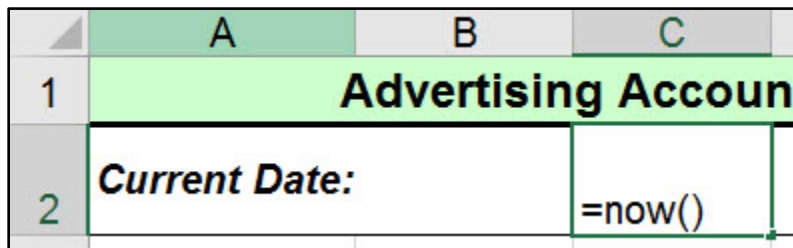
When you type a date into Excel, you may never see the underlying serial number, like 40519, but it is there nonetheless. This is a date serial number and it is used in calculating dates. Excel uses a numbering system with dates beginning with 1 Jan, 1900 as the serial date number of 1 then continued numbering until this day and beyond. For example, a serial number that is 40519 when converted to a date represents 7 Dec, 2010.

When you type a time into a cell in Excel, the underlying value is a fraction, but Excel interprets this as a time serial number and formats the cell accordingly. You can calculate this fraction for any time value during the day by taking the total number of seconds that have passed from midnight until your time value and dividing by 86,400 seconds in a day.

A time value of 6:00PM will show up in Excel as .75

When time and dates are combined, they show up as a serial number with a decimal point. For example: 42446.50 is noon on March 17, 2016.

1. Open the **Date and Time** sheet.
2. Enter the current date as a fixed date into cell **C2** using the **Ctrl+;** keyboard shortcut
3. Delete the cell contents and replace them with the current date formula **=now()**.



	A	B	C
1	<b>Advertising Account</b>		
2	<b>Current Date:</b>		=now()

Figure 13

4. In cell **D4**, use a formula to add 30 days to the invoice date. This will determine the **Invoice Due Date**. In this instance type: **=B4+30**. Autofill the contents down.

Amount	Invoice Due Date
577.82	3/4/2016
264.67	4/8/2016
810.21	2/24/2016
577.82	3/22/2016
86.50	2/26/2016
2595.00	4/5/2016

Figure 14

5. Next, calculate how old each invoice is by calculating between two dates. In cell **E4**, type **=C\$2-B4**. The dollar signs are absolute values which lock the cell C2 into the formula.
6. Autofill the formula down.

Invoice Due Date	Age
3/4/2016	47
4/8/2016	12
2/24/2016	56
3/22/2016	29
2/26/2016	54
4/5/2016	15

Figure 15

7. In cell **F4**, calculate the number of days an invoice is past the deadline. Type **=E4-30** and autofill down.

	A	B	C	D	E	F
1	<b>Advertising Accounts Receivable</b>					
2	<b>Current Date:</b>		11/8/2016			
3	<b>Invoice Number</b>	<b>Invoice Date</b>	<b>Amount</b>	<b>Invoice Due Date</b>	<b>Age</b>	<b>No. of Days Overdue</b>
4	92334	9/22/2016	577.82	10/22/2016	47	17
5	92356	10/27/2016	264.67	11/26/2016	12	-18
6	92362	9/13/2016	810.21	10/13/2016	56	26
7	92379	10/10/2016	577.82	11/9/2016	29	-1
8	92393	9/15/2016	86.50	10/15/2016	54	24
9	92407	10/24/2016	2595.00	11/23/2016	15	-15

Figure 16

## Conditional Formatting

Conditional formatting in Excel enables you to highlight cells with a certain color depending on the cell's value. Using this feature can make analyzing data easier by applying visual styles to the data.

1. Open the **Conditional Formatting** worksheet.
2. Select the cell range **D4:H13**.
3. On the **Home** tab, in the **Styles** group, click the arrow next to **Conditional Formatting** and choose **Color Scales**.
4. Hover over the color scale icons to see a preview of the data with conditional formatting applied. In a three-color scale, the top color represents higher values, the middle color represents medium values, and the bottom color represents lower values. This example uses the Red-Yellow-Green color scale.

	A	B	C	D	E	F	G	H	I
1	Average Rep/Quarter:		30771.525						
2									
3	Last Name	First Name	Region	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Total	Average Qtr
4	Arman	Simon	East	14815	13100	11580	0	39495	9873.75
5	Greenburg	Linda	East	15900	22700	17600	20000	76200	19050
6	Lundquist	Sam	North	25000	34000	21000	35000	115000	28750
7	McTague	Michael	Northwest	48206	31971	44531	24333	149041	37260.25
8	Quayle	Antonio	West	11983	31706	51143	64449	159281	39820.25
9	Rivena	Orlando	South	35682	63387	25780	72258	197107	49276.75
10	Stark	Oscar	Southwest	52733	41556	69323	72508	236120	59030
11	Unger	Maria	Southwest	23300	24600	21380	15937	85217	21304.25
12	Monder	Alana	Southwest	31200	23100	17700	29300	101300	25325
13	Simmonds	Leon	West	30900	24400	16800	0	72100	18025
14									
15			Quarter Totals:	289719	310520	296837	333785	1230861	
16									

Figure 17

## Exploring Styles and Clearing Formatting

On the **Home** tab, in the **Styles** group, click the arrow next to **Conditional Formatting** and then experiment with the available styles by completing the following:

1. Select cell range I4:I13 and apply a **3 Arrows** set in the **Icon Set** menu.
2. Select cell range D15:H15 and apply a **Solid Fill Blue Data Bar**.
3. Practice using the **Top/Bottom** and **Highlight Cells Rules** on the worksheet.
4. From the **Conditional Formatting** dropdown menu, hover over **Clear Rules**, then click **Clear Rules from Entire Sheet**.

## Using Conditional Formatting to Hide Cells

If you have cell contents and you do not want to be visible, you can use conditional formatting to hide them.

1. Select cells **G4** through **G13**.
2. Choose **Conditional Formatting** from the **Home** tab and select **New Rule** from the dropdown menu.
3. Select the **Format only cells that contain** option.
4. Choose **Cell Value is less than or equal to zero** as the criteria.

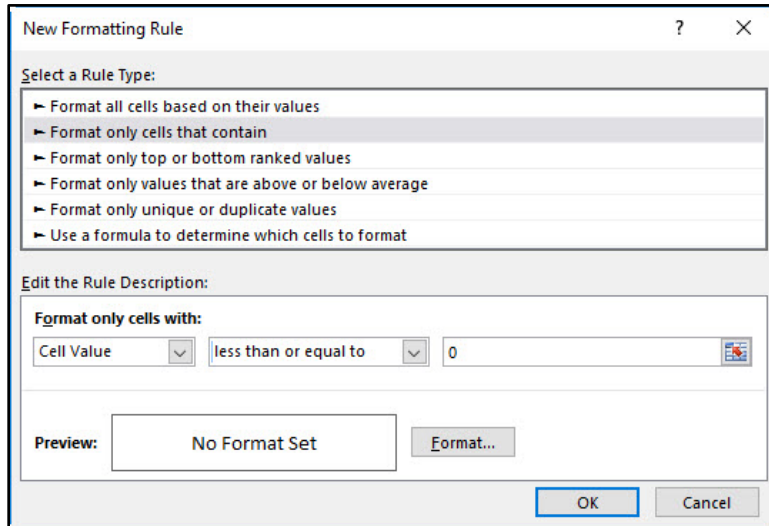


Figure 18

Click the **Format** button and change the font color to white. This will give the appearance that the cells that do not meet the criteria are hidden.

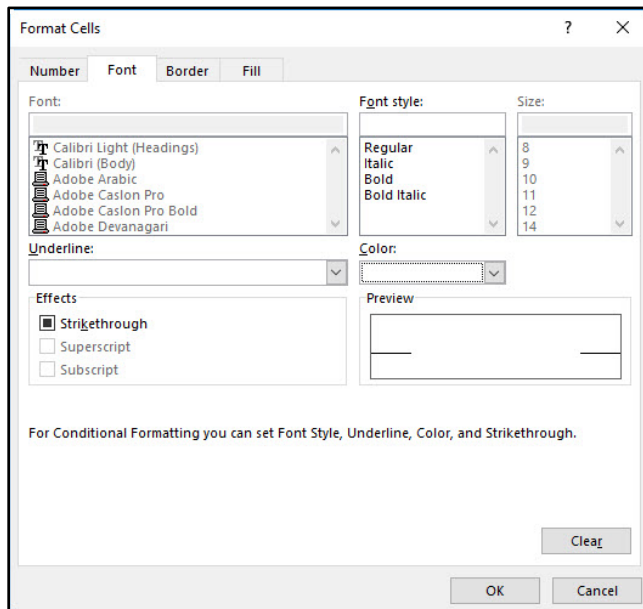


Figure 19

## The IF Function

The IF function is a logical function that is designed to return one value if a condition you specify evaluates to be TRUE and another value if it evaluates to be FALSE.

Basic Concept: =IF(logical\_test, value\_if\_true, value\_if\_false)

If the first quarter total is equal to or greater than the 1<sup>st</sup> quarter quota then the salesman will get the 2% bonus. If not, they get 0.

1. Click on the **Bonuses** sheet.
2. Select cell **G6**.
3. Click the **Formulas** tab on the ribbon.
4. Click the down arrow under **Logical**.
5. Choose **IF**.
6. Type what you see in the box below.

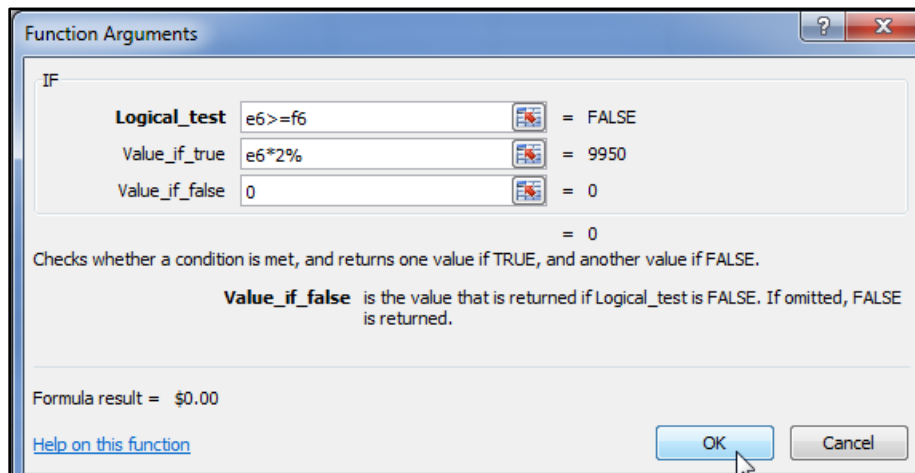


Figure 20

7. Using the fill handle, copy the formula down to cell **G11**.

## Changing the “Value if false” Condition to Text

1. Click in cell **G6** and click in the **Formula** bar.
2. Change the **0** to “**No Bonus**” (you must type the quotation marks).
3. Press **Enter** and copy the formula down using the fill handle.

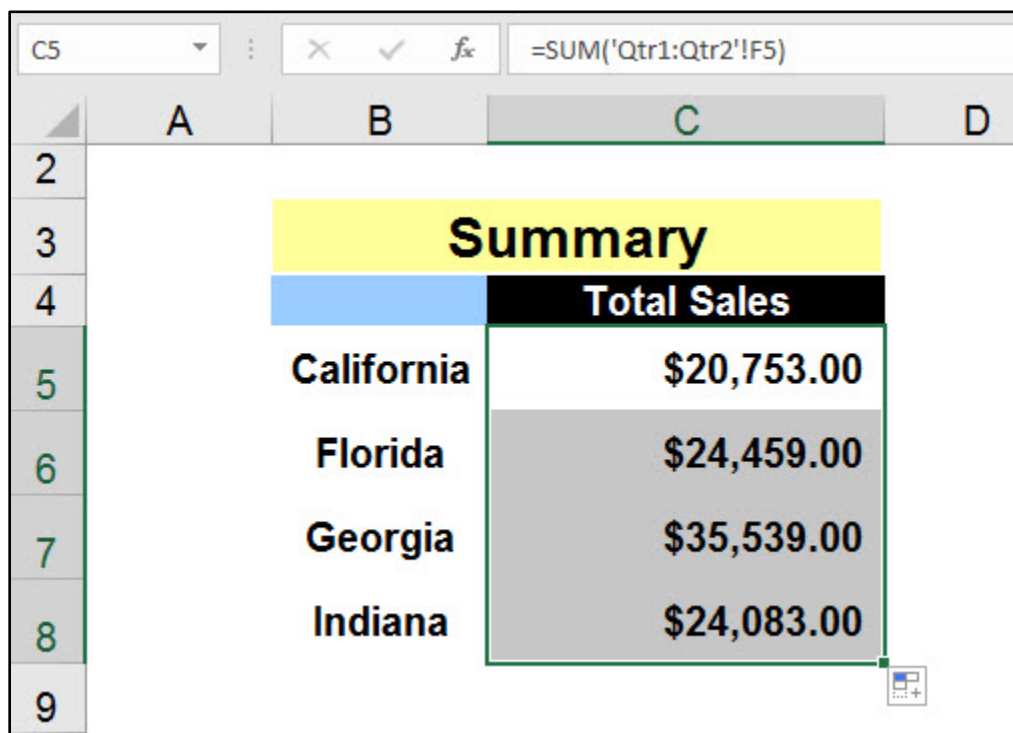
## 3D Formulas

3D formulas typically refer to specific cells across multiple worksheets. This formula is also sometimes called a “cubed formula”. It can, but does not need to, use a function to calculate across worksheets.

Basic Concept: =Sheet1Name!Cell1Name+ Sheet2Name!Cell2Name

Example1: =SUM('Qtr1:Qtr2'!F5)

1. Click the **Summary** worksheet.
2. Select cell **C5**.
3. Type =**SUM**(.
4. Click on the **QTR1** tab.
5. Hold down **Shift** and click on the **QTR2** tab.
6. Click in cell **F5**, then close the parenthesis in the formula.
7. Press **Enter**.
8. Drag the formula down.



Summary	
	Total Sales
California	\$20,753.00
Florida	\$24,459.00
Georgia	\$35,539.00
Indiana	\$24,083.00

Figure 21

## **Pivot Tables**

A pivot table is a special Excel tool that allows you to summarize and explore data interactively.

**Table** - A collection of data. It was first coined in MS Access. However, it is commonly used in Excel nowadays. A table in Excel has a header and there are no entirely blank rows or columns. (Example: Home > Format as Table)

**Pivot** - The ability to alter the perspective of retrieved data.

**Pivot Table** - The ability to create a brand new table based on existing data for the purpose of viewing, reporting and analyzing data.

### **Creating a Pivot Table**

1. Click on the **Performance Appraisals** worksheet.
2. Click in a cell within the data range.

**Note:** No entirely blank rows or columns can exist. There must be a header row for a PivotTable to work.

3. Click the **Insert** tab on the ribbon and click the **PivotTable** button in the **Tables** group.
4. Accept the defaults, click the **OK** button.

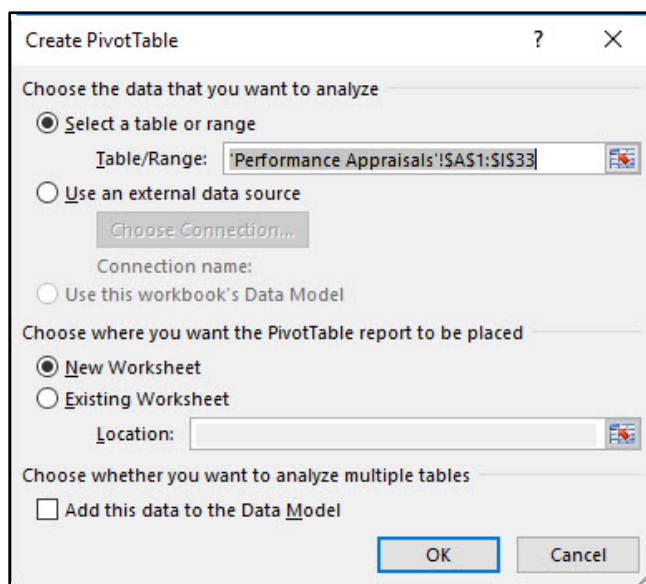


Figure 22



5. A PivotTable will open in a brand new sheet titled **Sheet1** and inserted to the left of the **Performance Appraisals** worksheet.

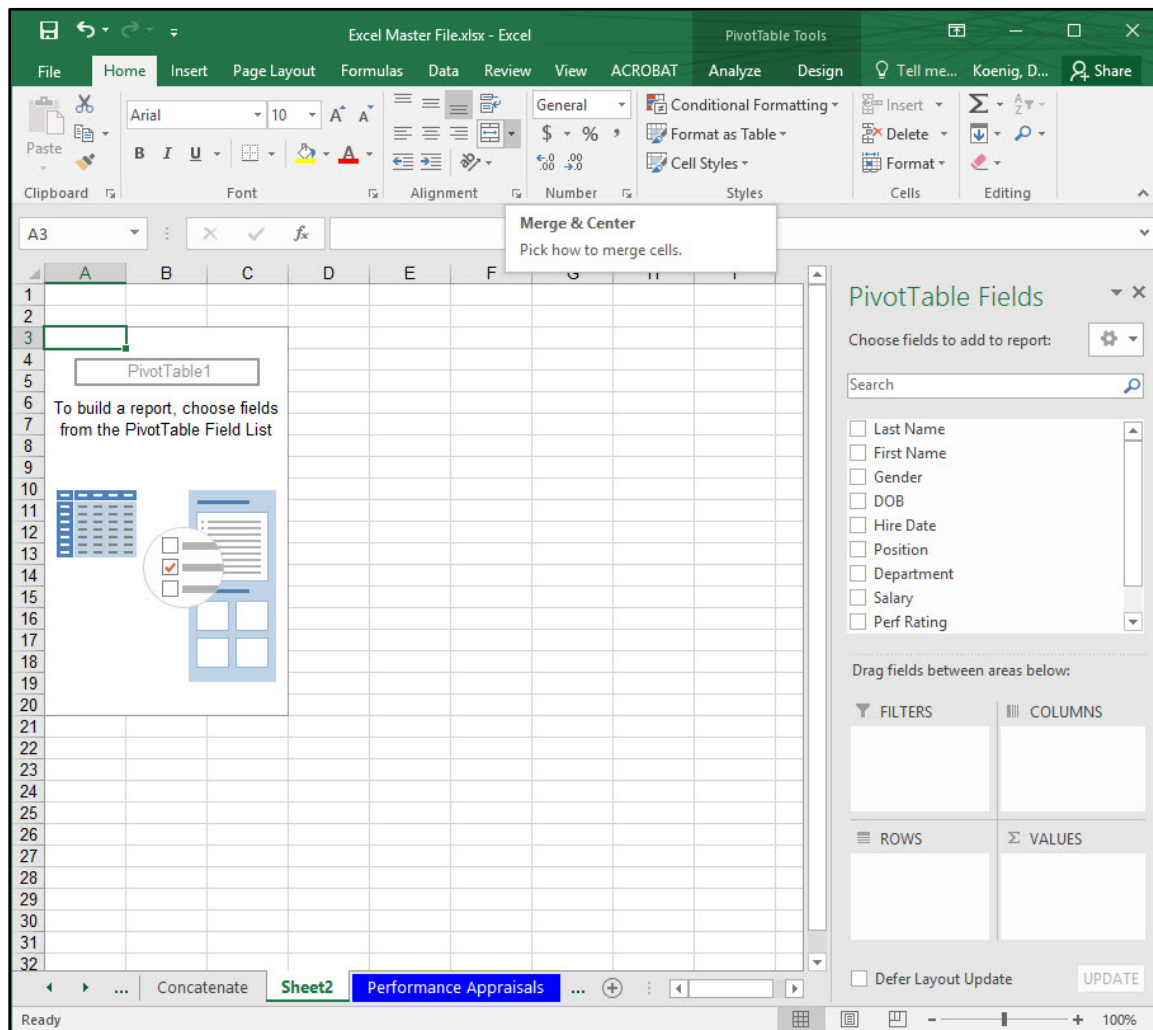


Figure 23

## Specifying PivotTable Data

Before creating a PivotTable you must know what you want to analyze. There are three questions you have to ask before proceeding:

- What do you want your column headers to be?
- What do you want your row headers to be?
- What data do you want to analyze?

By understanding the layout, you will have a better perspective on how to create a PivotTable.

1. Click back on the **Performance Appraisals** sheet and ask participants if it is possible to determine the average salary for each performance rating.
2. Expand to see if you can group that data by **Position** and **Department** as well.

- Click back on **Sheet1**.
- Drag the **Performance Rating** field down to the **Rows** area.
- Drag the **Salary** over to the **Values** area.
- A PivotTable will begin to show the results of the data analysis.
- Drag the **Performance Rating** field from the **Rows** area to the **Column** area.
- Drag down **Position** to the **Rows** area.
- Your PivotTable will now show the income for each position separated by **Performance Rating**.

	A	B	C	D	E	F	G	H
1								
2								
3	Sum of Salary	Column Labels						
4	Row Labels	1	2	3	4	5	Grand Total	
5	Accountant			47950			47950	
6	Administrator					38750	38750	
7	Asst Manager	55675					55675	
8	CFO			96825			96825	
9	Counselor	21960		22000	19500		63460	
10	Custodian			36300			36300	
11	Director			55000			55000	
12	Engineer	49220					49220	
13	Front Desk				40440		40440	
14	GM			95000			95000	
15	Groundskeeper	19200	22700	19355	23000		84255	
16	Housekeeper		32940				32940	
17	Kitchen Assistant			16650	18950		35600	
18	Maintenance		19000				19000	
19	Marketing			67550			67550	
20	Mktg Manager		85000				85000	
21	Payroll		67090				67090	
22	President				157000		157000	
23	Snr. Counselor		28950				28950	
24	Supervisor		49750				49750	
25	Trainer			35000			35000	
26	VP			89000			89000	
27	Grand Total	49220	96835	353380	532680	297640	1329755	
28								
29								

Figure 24

## Changing a PivotTables Calculation

- Click the dropdown arrow next to **Salary** in the PivotTable Fields list.
- Select **Value Field Settings**.
- Change the **Summarize value field by:** to **Average**.
- Click **OK**.
- Now, the totals will show the **Average** of each grouping.

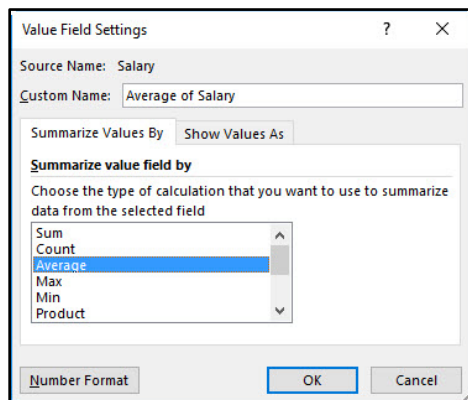


Figure 25

## Filtering and Sorting a PivotTable

1. Drag the **Department** field to the **Filters** area. This top-level filter allows filtering data by department only.
2. In cell **B1**, select **Administration** from the dropdown list.
3. Click **OK**.
4. The results are filtered to show just those positions that are part of **Administration**.
5. In cell **B1**, click the **Select Multiple Items** checkbox from the dropdown list.
6. Add **Executive** to the filter and click **OK**.
7. In cell **B1**, click the **All** checkbox from the dropdown list and click **OK**. All records are now displayed.
8. Drag **Department** from the **Filters** area to the **Rows** area. Position it so that it lies above the **Position** field.
9. The positions are now grouped by department.
10. In cell **A4**, select **Training** only from the dropdown list. Click the **OK** button. All other records are filtered.
11. Click cell **A4** and choose **Select All**. Click **OK**. All records are now returned to view.
12. Click cell **A4** and select **Sort A to Z** from the dropdown menu. The departments are now sorted alphabetically.
13. Click cell **B3** and choose **Sort Largest to Smallest**. The **Performance Ratings** now show the highest rating first.

	A	B	C	D	E	F	G	H
1								
2								
3	Sum of Salary	Column Labels						
4	Row Labels		5	4	3	2	1	Grand Total
5	Accounting		96825	115040			211865	
6	Accountant			47950			47950	
7	CFO		96825				96825	
8	Payroll			67090			67090	
9	Administration		79190	67550	134750	55675	337165	
10	Administrator		38750				38750	
11	Asst Manager				55675		55675	
12	Front Desk		40440				40440	
13	Marketing		67550				67550	

Figure 26

## Creating a PivotChart

1. Select **Sheet1** (the PivotTable created based on Performance Appraisals).
2. In the **Analyze** tab under the **PivotTable Tools** tab menu, select **PivotChart** in the **Tools** group.
3. Choose the default column chart.
4. Click **OK**.
5. A new chart is added on top of the data.
6. Remove **Position** from the **Rows** area.
7. The chart updates accordingly.
8. **Delete** the chart.
9. Click on a cell inside the PivotTable.
10. Press the **F11** key. This is another way to create a chart. This time a chart is added to a new sheet titled Chart1.
11. Drag **Department** from the **Rows** area (known as Axis Fields).
12. Drag **Performance Rating** from the **Legend Fields** (Column area) to the **Axis Fields** (Row area).
13. Change **Sum of Salary** to **Average**.
14. The chart updates.
15. Click back on the PivotTable.
16. Double-click on cell **B8** (the 1 rating).

**Note:** It is only one person listed and that is why the results may be skewed.

## Grouping Items

1. Click the **2006Donations** sheet.
2. Select a cell in the data range.
3. From the **Insert** tab on the ribbon, click **PivotTable**.
4. The **Create PivotTable** dialog window will appear. Click **OK** to accept the defaults.
5. A new PivotTable will be created on a new worksheet labeled **Sheet3**.
6. Drag **Date** to the **Rows** area.
7. Drag **Amount** to the **Values** area.
8. The PivotTable will summarize the amounts donated on a particular day.
9. Click on a cell in column A in the data range.

**Note:** It must be a cell in the data range and not a label (ie: A3).

10. Right-click and select **Group** from the pop-up menu.
11. **Months** will already be highlighted. Deselect **Days** and click **OK** to group by **Months**.

	A	B	C
1			
2			
3	Row Labels	Sum of Amount	
4	Jan	2107361	
5	Feb	2061339	
6	Mar	2095655	
7	Apr	2062809	
8	May	1983698	
9	Jun	1923150	
10	Jul	2027945	
11	Aug	2015056	
12	Sep	1943515	
13	Oct	2262072	
14	Nov	2189497	
15	Dec	2054068	
16	Grand Total	24726165	
17			
18			

Figure 27

12. Select **Ungroup** from the **Group** group in the **Analyze** tab on the ribbon. The data will be ungrouped by months and now show dates.

## Updating a PivotTable

PivotTables will not automatically update to reflect data changes. Either the Excel spreadsheet will need to close and re-open (thus forcing an update) or you can manually update the workbook using the refresh button.

1. Click the **2006Donations** worksheet.
2. Insert a row between row **6** and **7**.
3. Type the following:

6/5/2006	New	Property	87,000	Ohio	Mail
----------	-----	----------	--------	------	------

4. Save the file.
5. Click the **Sheet2** sheet.
6. Click the **Analyze** tab under the **PivotTable Tools** contextual menu.
7. Click **Refresh** in the **Data** group.
8. Scroll to **June 5, 2006** (cell B158).
9. Double-click cell **B158**. A new sheet will appear showing the results of donations made that day. The new \$87000 donation appears on the list.
10. Click back on **Sheet2**.

## Formatting a PivotTable

1. Select column **A**.
2. Select **Long Date** from the **Number** group on the **Home** tab.
3. Notice that all dates show the Day of the Week now.
4. Select column **B**.
5. Select **Accounting** format from the **Number** group on the **Home** tab.
6. Decrease decimals by two places so that just the whole numbers appear.
7. Select **Row 3**.
8. Increase the font size to **14 points**.

	A	B	C
1			
2			
3	<b>Row Labels</b>	<b>Sum of Amount</b>	
4	Saturday, May 12, 2007	\$ 56,272	
5	Saturday, March 31, 2007	\$ 180,997	
6	Saturday, October 27, 2007	\$ 114,595	
7	Monday, February 12, 2007	\$ 227,446	
8	Friday, February 23, 2007	\$ 243,893	
9	Saturday, April 28, 2007	\$ 199,800	

Figure 28

## Using Slicers

Slicers enable you to filter the data within a PivotTable. Inserted Slicers will appear as a set of buttons allowing for rapid filtering of data.

1. Click the **Payments by City** sheet.
2. Select a cell in the data range.
3. From the **Insert** tab on the ribbon, click **PivotTable**.
4. The **Create PivotTable** dialog window will appear. Click **OK** to accept the defaults.
5. A new PivotTable will be created on a new worksheet.
6. Drag **City** to the **Rows** area.
7. Drag **Payment Type** to the **Columns** area.
8. Drag **Amount** to the **Values** area.
9. Click the **Analyze** tab from the PivotTable tools contextual menu.
10. Select **Insert Slicer** from the **Filter** group.
11. Choose **City** and click **OK**.
12. Select **Insert Slicer** from the **Filter** group again.
13. Choose **Payment Type**.
14. Drag the slicers to a clear spot in your PivotTable.
15. Select **Baltimore** from the **City** slicer group.
16. Select **Visa** from the **Payment Type** slicer group.
17. You can now view a list of Visa Payments made for the City of Baltimore only.
18. Click the **Clear Filter** button in both slicers.
19. Experiment by holding the **Ctrl** key to select multiple slicers.
20. Select **Baltimore** and **Boston** in the **City** slicer group.
21. Select **Cash**, **Check** and **Money Order** in the **Payment Type** slicer group.

	A	B	C	D	E	F
1						
2						
3	Sum of Amount	Column Labels				
4	Row Labels	Cash	Check	Money Order	Grand Total	
5	Baltimore	10886	9257	10707	30850	
6	Boston	20187	10098	8564	38849	
7	Grand Total	31073	19355	19271	69699	
8						
9						

Figure 29

# Charts

Charts are a great way to visualize your data.

## Creating a Simple Chart

1. Navigate to the worksheet called **Charts**.
2. Select the range of **B2:E5**.
3. Press the **F11** key.

## Chart Terminology

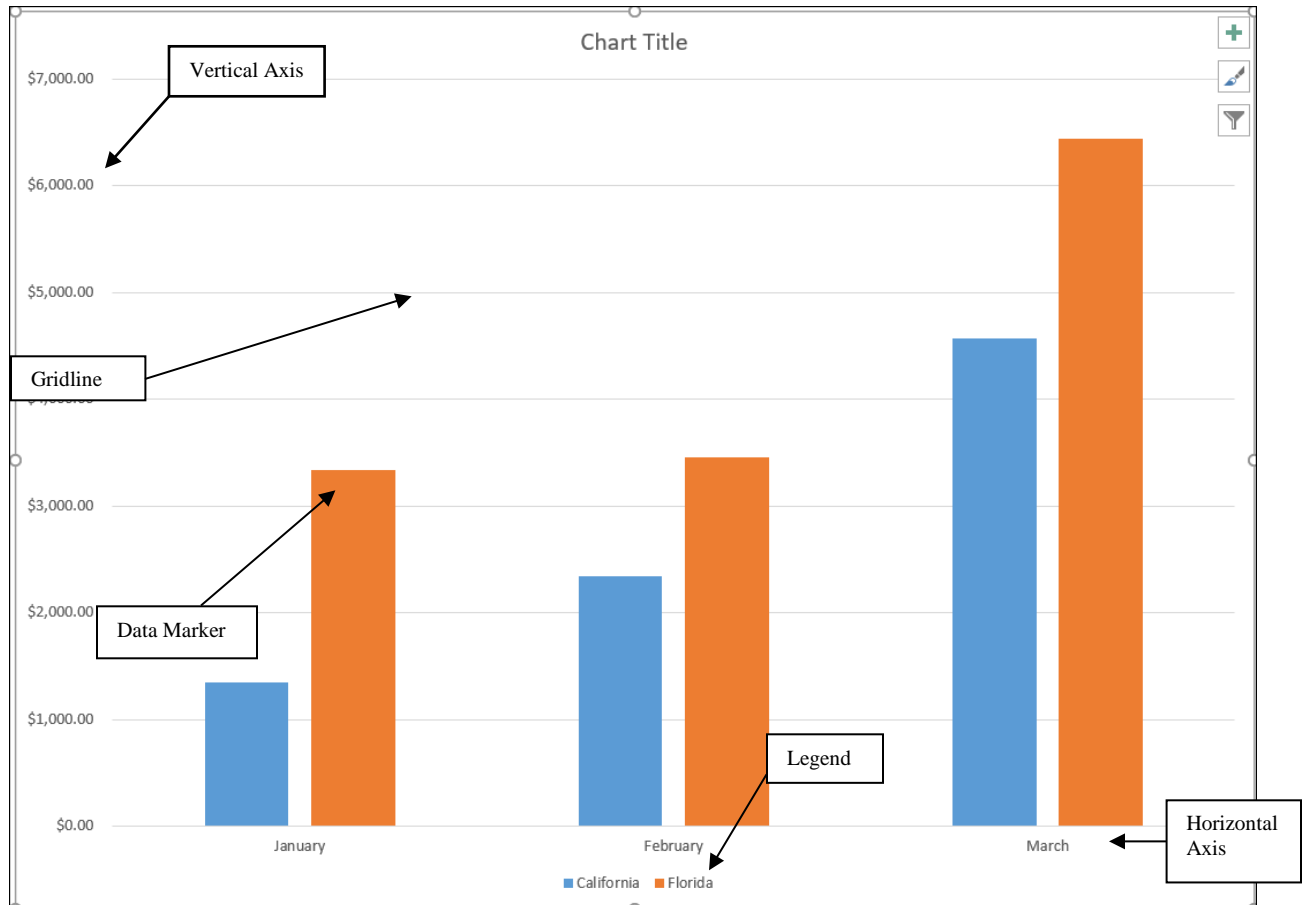


Figure 30

## Charting Non-Adjacent Cells

1. Click on the **Charts** sheet again. Select the range **B3:C5**. Hold down the **Ctrl** key and select the range **E3:E5** (must use the dragging technique when the **Ctrl** key is held down).
2. Press the **F11** key.



## Creating a Chart Using the Chart Wizard

1. Click on the **Charts** sheet again.
2. Select the range of **B2:E5**.
3. Select the **Insert** tab on the ribbon.
4. In the **Charts** group, click the **Recommended Charts** icon.
5. Click the **All Charts** tab in the **Insert Chart** window.
6. Choose **3-D Clustered Column** under the **Column** section.
7. Click **OK**.

*Point out the contextual tabs.*

## Modifying Charts

There are many different ways to modify your charts to best visualize your data.

### Moving an Embedded Chart

1. Place your mouse on the chart area of the chart. This is the white area within the perimeter.
2. Hold down the mouse button and drag the chart to cell **B7**.

### Sizing an Embedded Chart

1. Select the chart. You know the chart is selected because it has handles around the perimeter.
2. Place your mouse on one of the handles until your mouse turns into a **dual headed arrow**.
3. Hold down your left mouse button and drag until the chart becomes larger or smaller.
4. Drag the chart over to the **H** column and down to row **22**.

### Changing the Chart Type

1. Click on the chart to select it.
2. Click the **Design** contextual tab on the ribbon.
3. In the group named **Type**, click **Change Chart Type**.
4. Hover over the different chart types to see what they look like and look at the table above to get an idea on how to use the different chart types.
5. End with a **3-D Clustered Column** chart.

### *Chart Types*

<b>Chart Type</b>	<b>Used For</b>
Area	Displays values over a period of time. Emphasis on amount of change.
Bar	Displays values for comparison.
Column	Displays values for comparison.
Line	Shows trends over time.
Pie	Displays only one data series. Each piece of the pie is a percent of the whole.
Doughnut	Similar to a pie, except it can display more than one data series.
Radar	Displays changes of data relative to a center point and also to each other.
XY (Scatter)	Displays the relationship between numeric values in several data series.
Bubble	Plot and coordinate values.

## Changing the Way Data is Displayed

1. With the chart still selected, click the **Design** tab on the ribbon.
2. Click the **Switch Row/Column** button.

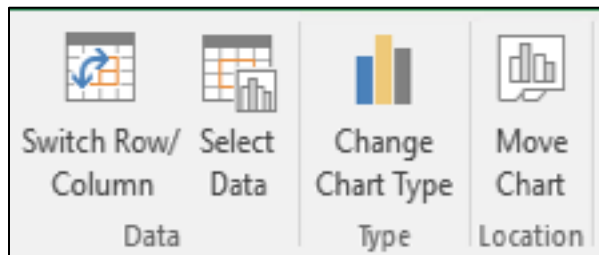


Figure 31

## Moving the Legend

1. Click once on the legend to select it.
2. From the **Chart Layouts** group in the **Design** tab, select the **Add Chart Element** dropdown.
3. Select the **Legend** group and choose **Right**.

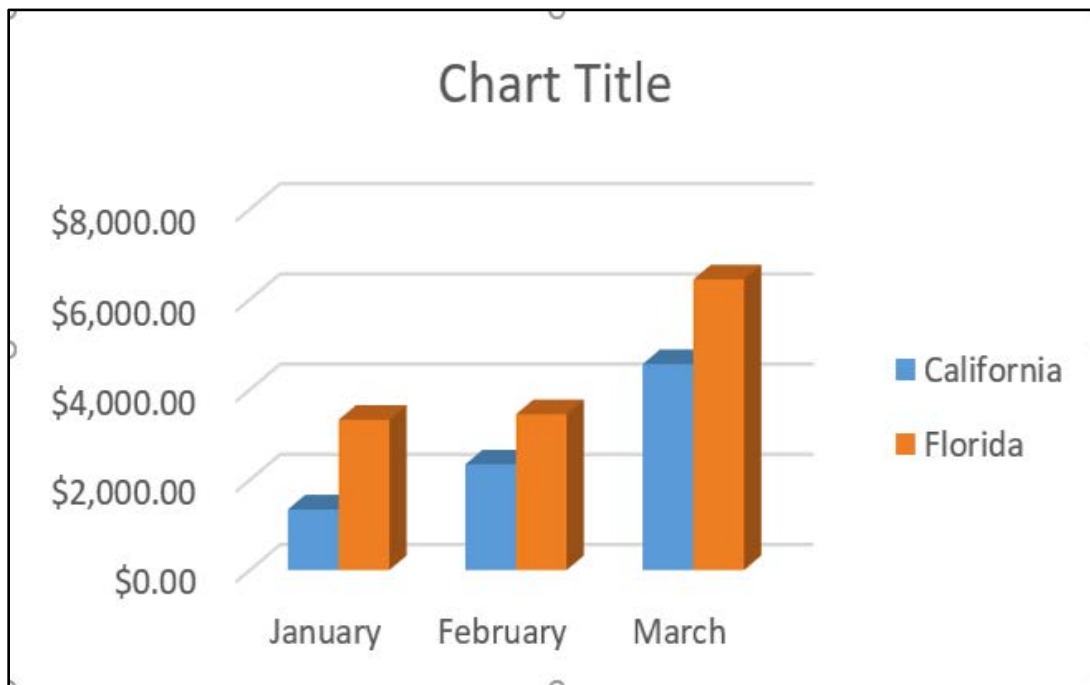


Figure 32

# Formatting Charts

## Adding Chart Items

1. Switch to the sheet entitled **Monthly Orders** in the **Excel Master File** spreadsheet.
2. Create a **Clustered Column Chart** from the data.
3. Click on the chart to select it.
4. Click the **Quick Layout** dropdown from the **Chart Layouts** group.
5. Select **Layout 2** from the list.
6. Click on **Add Chart Element** in the **Chart Layouts** group.
7. Click on the **Chart Title** option. The **Title Options** will appear.
8. Click the **Above Chart** option and type *Sandwich Sales*.
9. Press **Enter**.
10. Add the following **Axis Titles** from the **Add Chart Element** dropdown menu.

**Primary Horizontal Axis = *Month***

**Primary Vertical Axis = *Sales in (\$)***

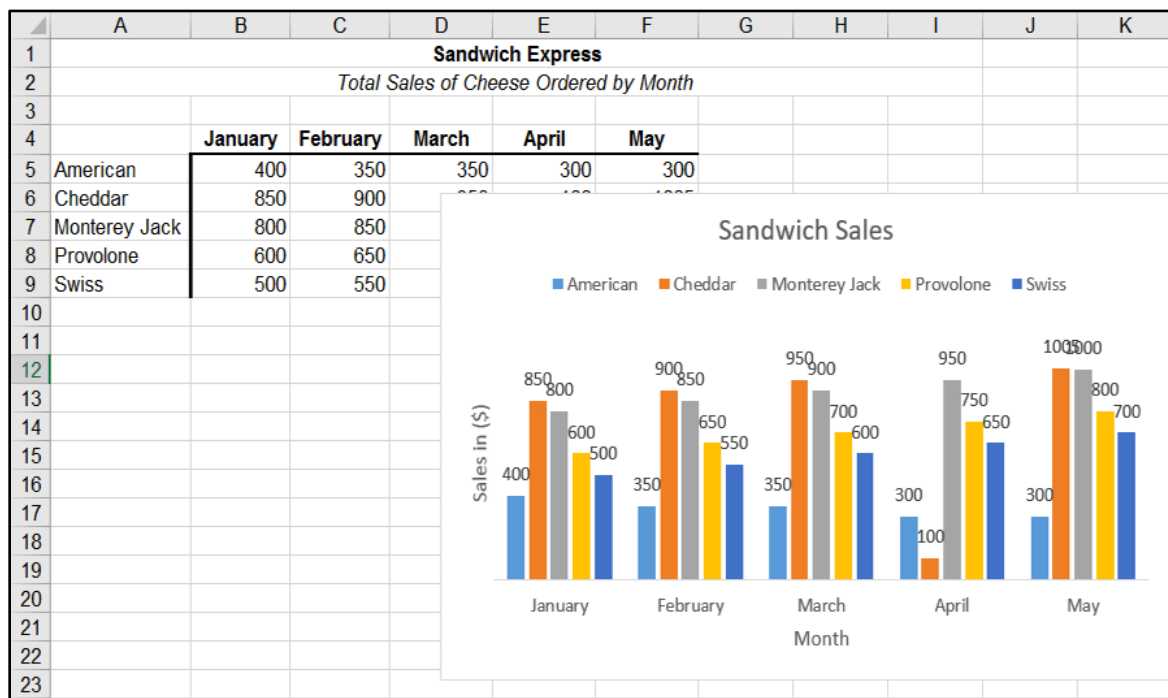


Figure 33

## Formatting All Text

1. Select the entire chart by clicking once in the white chart area.
2. Click on the **Format** contextual tab.
3. Apply the **Colored Outline, Black, Dark 1** theme from the **Shape Styles** group.
4. Apply the **Fill Black, Text 1, Shadow WordArt** style from the **WordArt Styles** group.

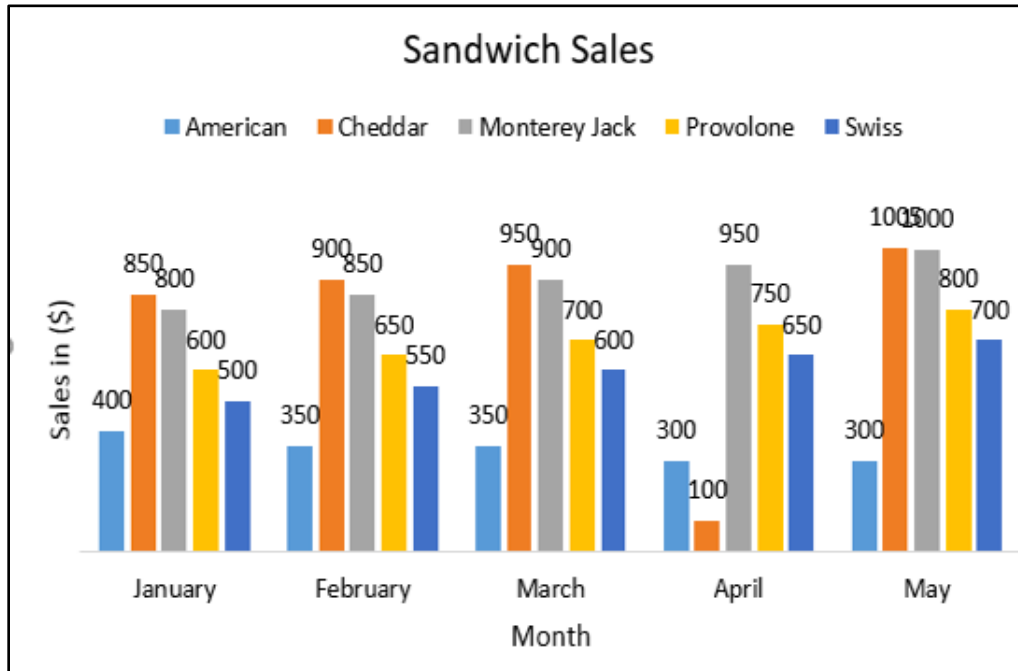


Figure 34

## Formatting and Aligning Numbers

1. Select **Add Chart Element** from the **Chart Layouts** group in the **Design** tab.
2. Select **Primary Vertical** from the **Axes** group to add the Y axis to the chart.
3. Double-click on the Y axis.
4. Select **Number** from the **Axis Options** tab.
5. Choose the format of **Currency** and **0 decimal places**.

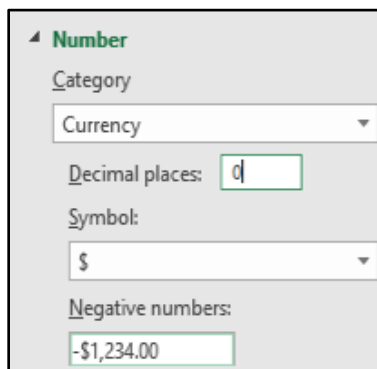


Figure 35

6. Click the **Size and Properties** tab.
7. In the **Custom Angle** field, type **-45** to place the text at a slanted angle.
8. Click **X** to close the panel.
9. Make the chart larger by dragging the bottom handle fill the screen.

## Formatting the Plot Area

1. Double-click on the white of the chart background.
2. Select the **Fill** toggle.
3. Click on **Picture or texture fill**.
4. Click the **Online** button and type *Cheese Pattern* in the **Bing Image Search** field.
5. Select the swiss cheese image and click **Insert**.

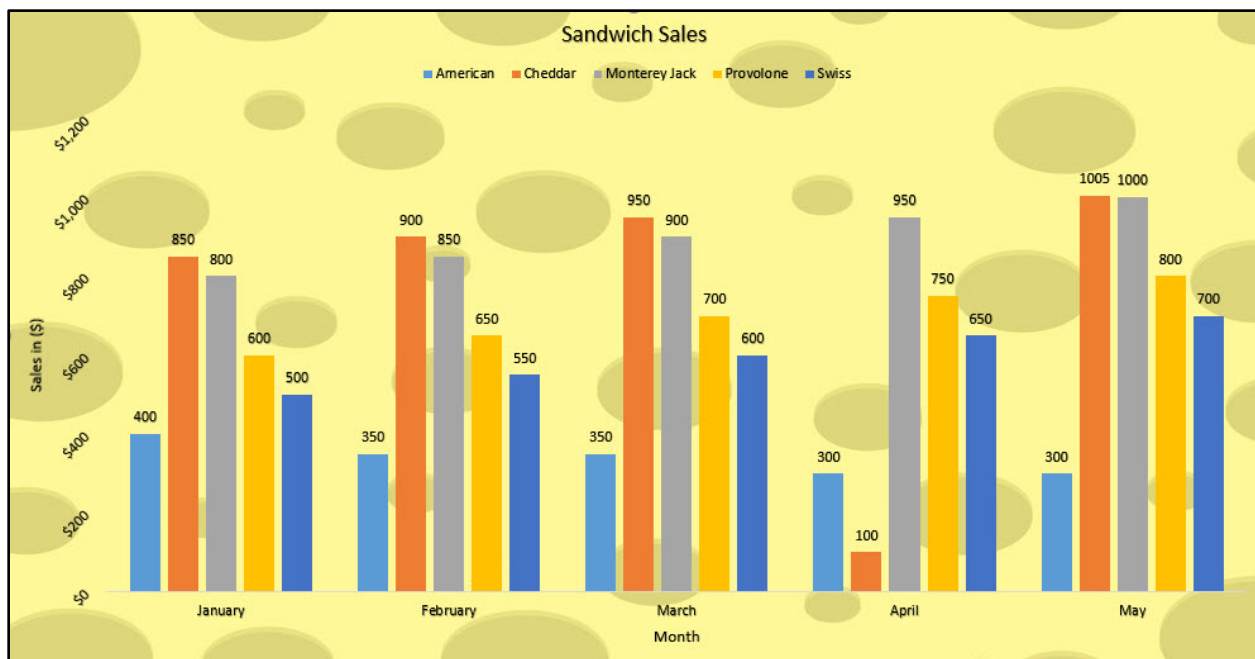


Figure 36

## Formatting Data Markers

1. Double-click on the **Swiss** data marker to select. Notice that all the Swiss data markers will become selected.
2. Select the **Fill** toggle.
3. Select **Picture or texture fill**.
4. Click the **Online** button and type *Swiss Cheese* in the **Bing Image Search** field.
5. Select the third swiss cheese image and click **Insert**.
6. Select the **Stack** radio button.
7. Click **X** to close the panel.

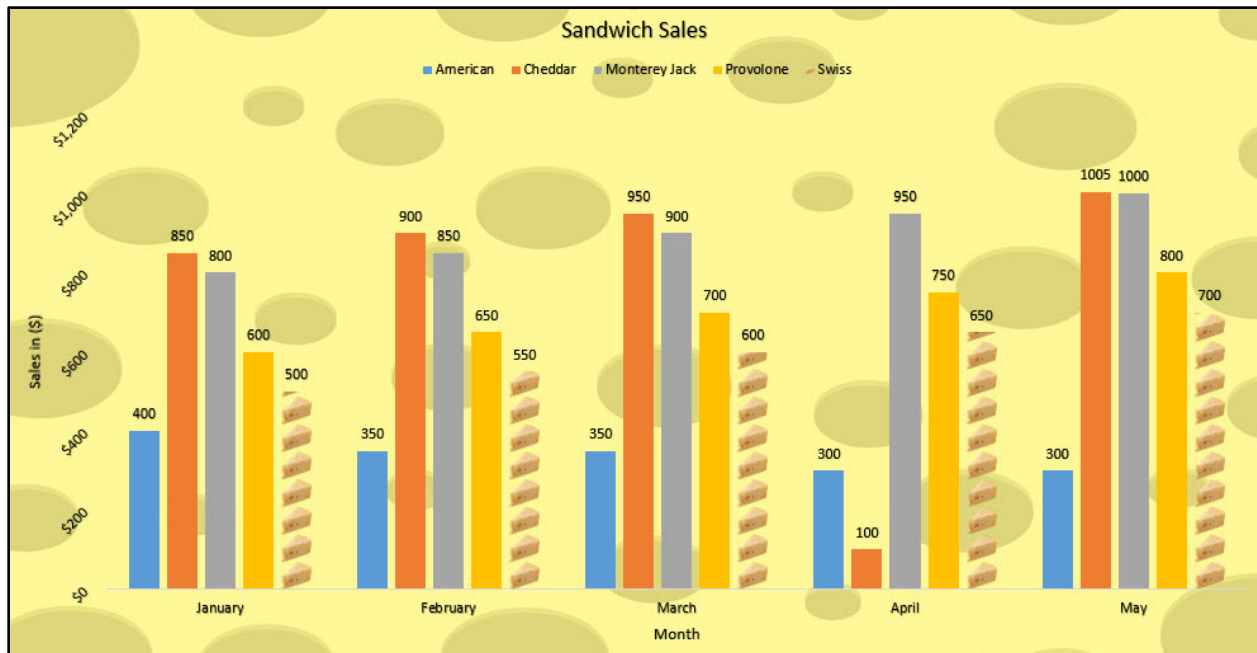


Figure 37

## Pie Charts

Pie charts can present the relationship of different classes of data in a visually simple way.

### Creating a Pie Chart

1. Click on the **Pastry Sales by State** sheet.
2. Select the range of **A4:B11**.
3. Click the **Insert** tab on the ribbon.
4. In the **Charts** group, click on the **Insert Pie or Doughnut Chart** icon.
5. Under the **3-D Pie**, click on **3-D Pie Chart**.

### Moving the Pie Chart to its Own Sheet

1. Click the pie chart to select it.
2. Click the **Design** contextual tab. Under the group **Location**, click **Move Chart**.
3. Click beside **New sheet** and type **Pastry Sales Pie Chart**.
4. Click **OK** or press **Enter**.

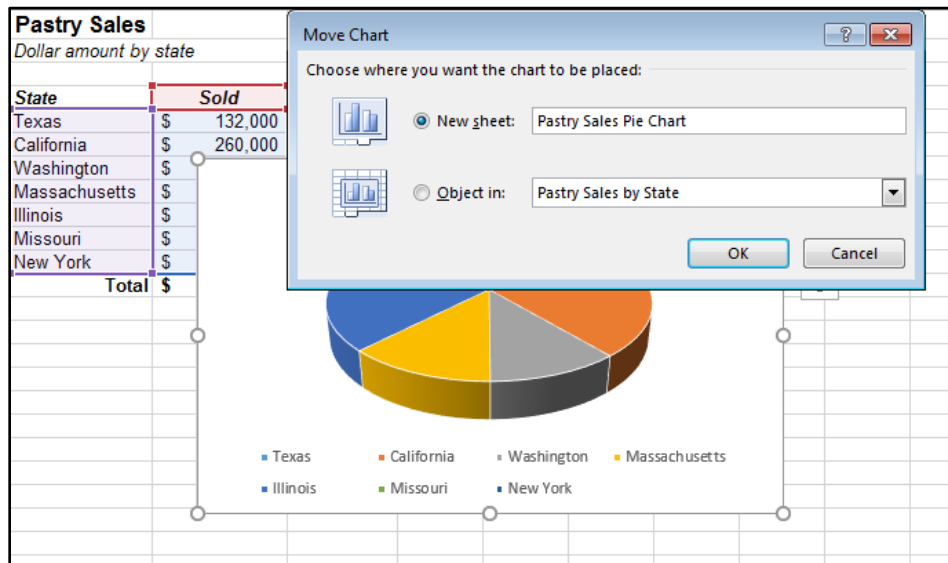


Figure 38

## Adding Data Labels

1. Click the **Design** contextual tab.
2. From the **Chart Layouts** group, select the **Add Chart Element** dropdown.
3. Select **Data Labels** and choose **Inside End**.

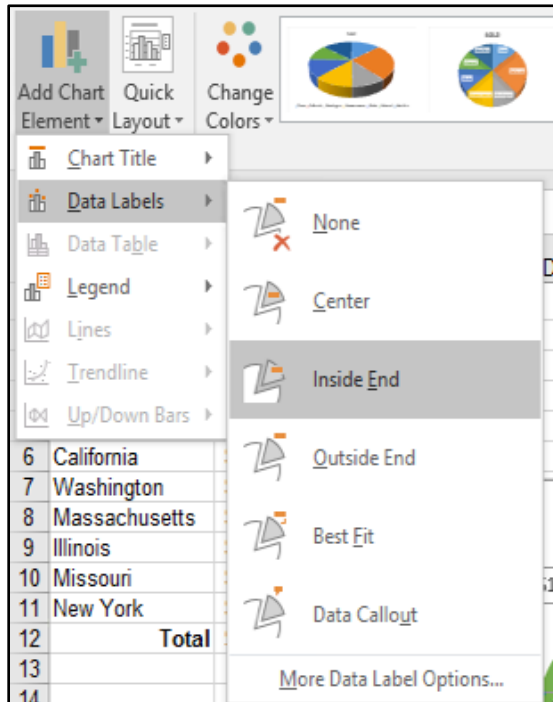


Figure 39

4. Click **Data Labels** again and choose **More Data Labels Options**.
5. Click **Percentage** to turn it on and click **Value** to turn it off.
6. Click **Category Name** to turn it on.

## Exploding a Slice of a Pie Chart

1. Click directly on top of the pie chart to select the entire chart.
2. Click again on the **California** slice to select only that slice of the pie.
3. Hold down your mouse button and drag the slice towards you.
4. Press **Esc** on your keyboard to deselect the pie.



## Rotating and Changing the Elevation of a Pie Chart

1. Right-click on the chart.
2. Click **3-D Rotation** from the contextual menu.
3. Beside **Perspective**, click the up and down arrows.
4. Change the **Rotation** by moving the **X Rotation** and **Y Rotation** input fields.

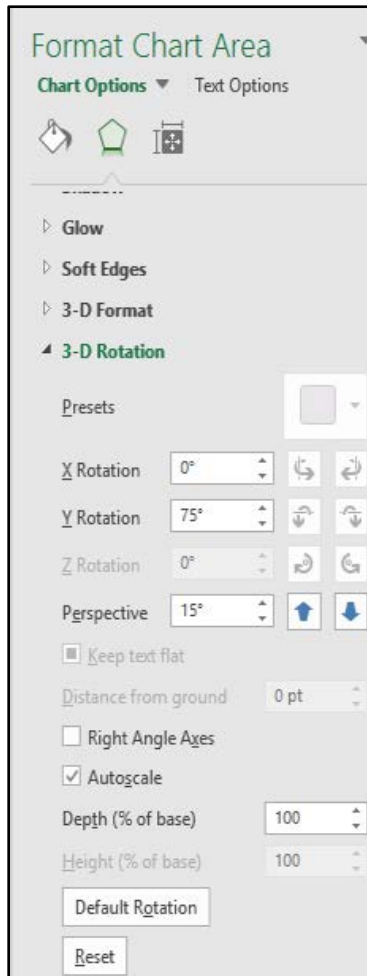


Figure 40