

2nd Edition  
updated for  
Excel® 2016

# Microsoft® Excel®

## Pivot Tables & Introduction to Dashboards

### The Step-By-Step Guide

MONTH-YR		Jun-2017		Jul-2017		Aug-2017		Sep-2017	
REGIONS	TTL	+/-	TTL	+/-	TTL	+/-	TTL	+/-	
Central	993		993	0.0%	992	-0.1%	1,000	0.8%	
East	972		972	0.0%	947	-2.6%	971	2.5%	
West	911		950	4.3%	905	-4.7%	948	4.8%	
<b>TOTAL</b>	<b>2,876</b>		<b>2,915</b>	<b>1.4%</b>	<b>2,844</b>	<b>-2.4%</b>	<b>2,919</b>	<b>2.6%</b>	

TOP 10 PARTS SOLD		CATEGORY	QTY SOLD	%
Fire Protection	POWER	630	12.0%	
Auxiliary Structure	WING	563	10.7%	
Engine Struts	WING	534	10.1%	
Digital Fuel Flow System	FUEL	524	10.0%	
Fuel Dump Fuel Hose	FUEL	511	9.7%	
Wing Webs	WING	510	9.7%	
Boost Pumps	FUEL	505	9.6%	
Keel Beam	STRUCTURAL	501	9.5%	
Engine Lubrication System	FUEL	501	9.5%	
Fuel Pressure Indicating	FUEL	487	9.2%	
<b>TOTAL</b>		<b>5,266</b>	<b>100.0%</b>	



QUANTITY	CATEGORY					TOTAL
	REGIONS	FUEL	POWER	STRUCTURAL	WING	
Central	1,646	1,654	407	1,965	5,672	
East	1,582	1,668	413	1,893	5,556	
West	1,475	1,675	497	1,724	5,371	
<b>TOTAL</b>	<b>4,703</b>	<b>4,997</b>	<b>1,317</b>	<b>5,582</b>	<b>16,599</b>	

C.J. Benton

# **Excel® Pivot Tables & Introduction To Dashboards**

## **The Step-By-Step Guide**

**C.J. Benton**

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2. The Step-By-Step Guide To The **25 Most Common** Microsoft® Excel® Formulas & Features
3. The Step-By-Step Guide To **Pivot Tables & Introduction To Dashboards**  
*(version 2013)*
4. The Step-By-Step Guide To The **VLOOKUP** formula in Microsoft® Excel®
5. The Microsoft® Excel® Step-By-Step Training Guide **Book Bundle**
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## A MESSAGE FROM THE AUTHOR

# CHAPTER 1

## How To Use This Book

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This book can be used as a tutorial or quick reference guide. It is intended for users who are comfortable with the basics of Microsoft® Excel® and are now ready to build upon this skill by learning Pivot Tables and Dashboards.

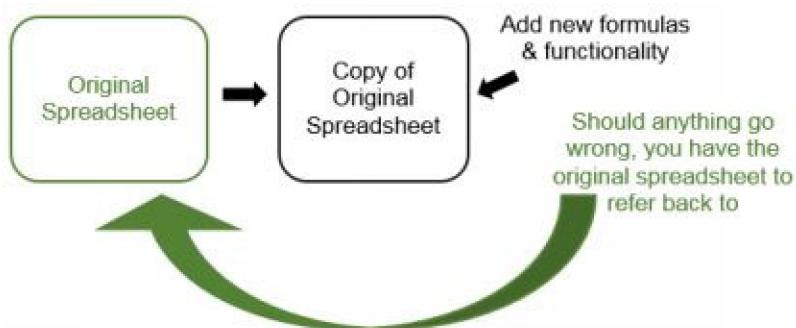
This book assumes you already know how to create, open, save, and modify an Excel® workbook and have a general familiarity with the Excel® toolbar (Ribbon).

All of the examples in this book use **Microsoft® Excel® 2016**, however most of the functionality and formulas can be applied with Microsoft® Excel® version 2013. All screenshots use **Microsoft® Excel® 2016**, functionality and display will be slightly different if using **Excel® 2013**.

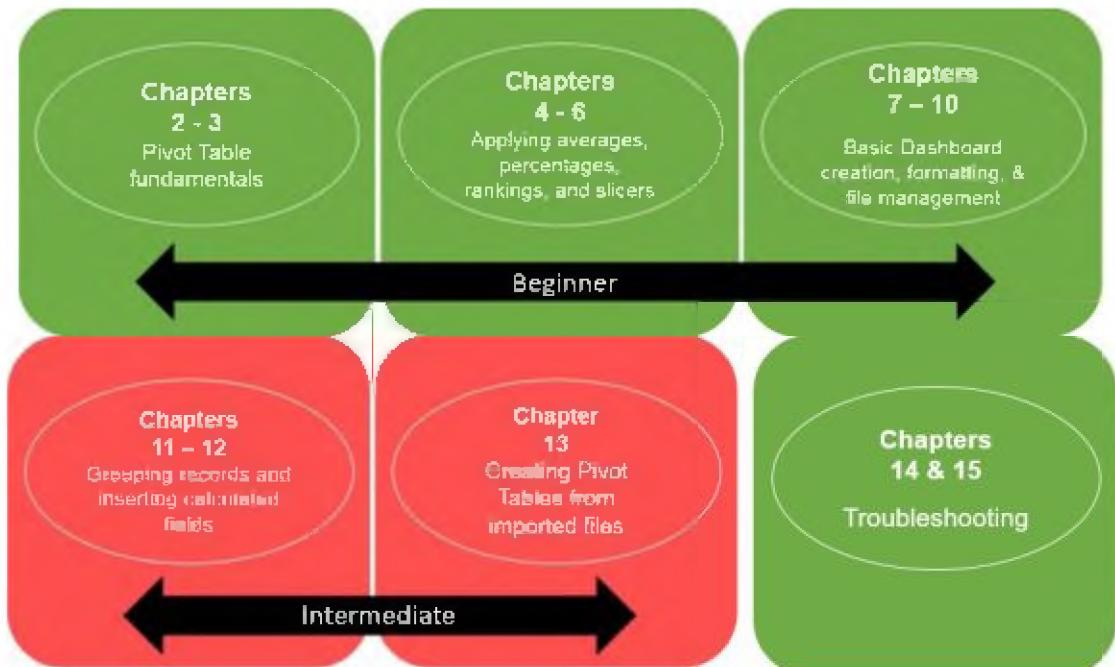
While this book provides several basic and intermediate Pivot Table examples, the book does not cover ALL available Microsoft® Excel® Pivot Table features, formulas, and functionality.

Please always **back-up your work and save often**. A good best practice when attempting any new functionality is to **create a copy of the original spreadsheet** and implement your changes on the copied spreadsheet. Should anything go wrong, you then have the original spreadsheet to fall back on. Please see the diagram below.

*Diagram 1:*



This book is structured to build on each previous chapter's teaching.



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## FILES FOR EXERCISES

The exercise files are available for download at the following website:

<http://bentonexcelbooks.my-free.website/excel-2016>

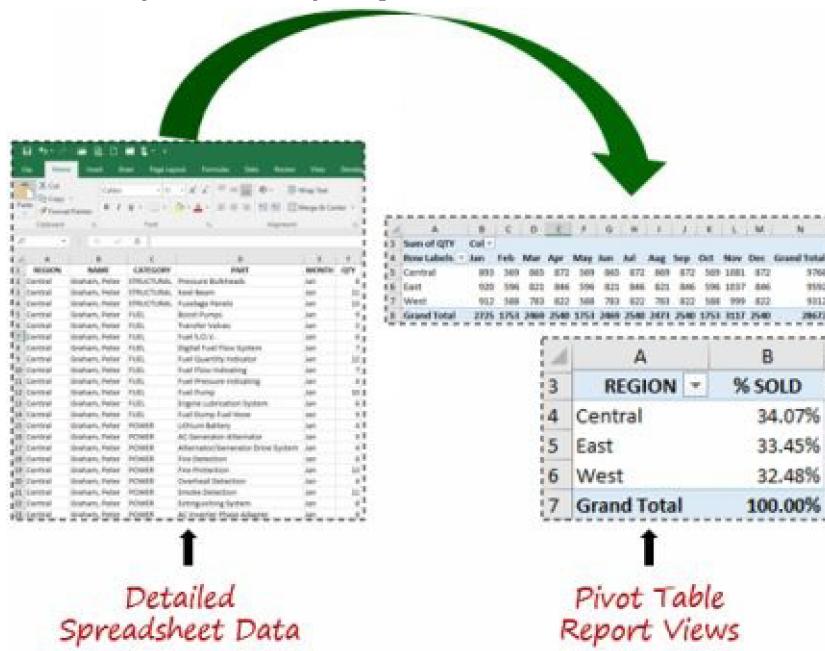
# CHAPTER 2

## Introduction To Pivot Tables

### What Are Pivot Tables?

Pivot Tables are a feature within Microsoft® Excel® that takes individual cells or pieces of data and lets you arrange them into numerous types of calculated views. These snapshots of summarized data require minimal effort to create and can be changed by simply clicking or dragging which fields are included in your report.

By using built-in functions and filters, Pivot Tables allow you to quickly organize and summarize large amounts of data. You can filter and drill-down for more detailed examination of your numbers and various types of analysis can be completed without the need to manually enter formulas into the spreadsheet you're analyzing.



For example, the below Pivot Table is based on a detailed spreadsheet of 3,888 individual records containing information about airplane parts. In less than 1 minute, I was able to produce the following report for the quantity of parts sold by region:

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1														
2														
3		Sum of QTY_SOLD	Column Labels											
4	Row Labels	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Grand Total
5	Central	893	569	865	872	569	865	872	869	872	569	1081	872	9768
6	East	920	596	821	846	596	821	846	846	821	846	999	1037	9592
7	West	912	588	783	822	588	783	822	781	822	588	999	822	9312
8	Grand Total	2725	1753	2469	2540	1753	2469	2540	2473	2540	1753	3117	2540	28672

This quick summary can also be formatted to improve readability. However, formatting

does require a little more time to complete.

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
3	QTY SOLD	MONTH												
4	REGIONS	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	TOTAL
5	Central	893	569	165	872	569	865	872	869	872	569	1,081	871	9,768
6	East	920	596	821	846	596	821	846	821	846	596	1,037	846	9,592
7	West	912	588	783	822	588	783	822	783	822	588	999	822	9,312
8	TOTAL	2,725	1,753	2,469	2,540	1,753	2,469	2,540	2,473	2,540	1,753	3,117	2,540	28,672

In today's world where massive amounts of information is available, you may be tasked with analyzing significant portions of this data, perhaps consisting of several thousand or hundreds of thousands of records. You may have to reconcile numbers from many different sources and formats, such as assimilating material from:

1. Reports generated by another application, such as a legacy system
2. Data imported into Excel® via a query from a database or other application
3. Data copied or cut, and pasted into Excel® from the web or other types of screen scraping activities
4. Analyzing test or research results from multiple subjects

One of the easiest ways to perform various levels analysis on this type of information and more is to use Pivot Tables.

## What Are The Main Parts Of A Pivot Table?

Before we begin our first exercise, let's review the three main components of a Pivot Table:

1. **Rows:** The rows section typically represents how you would like to categorize or group your data. Some examples include: employee name, region, department, part number etc.
2. **Columns:** The columns show the level or levels in which you're displaying your calculations. Often a *time period* such as month, quarter, or year, but can also be categories, product lines, etc.
3. **Values:** Values are the calculation portion of the report, these figures can be sums, percentages, counts, averages, rankings or custom computations.

The diagram shows a Pivot Table with annotations. A red arrow labeled "Level of Calculation" points to the column headers "QUARTER". A green arrow labeled "Categorize or Group" points to the row header "REGION". A blue arrow labeled "Calculation" points to the numerical values in the body of the table.

REGION	Qtr1	Qtr2	Qtr3	Qtr4	Total
Central	2,327	2,306	2,613	2,522	9,768
East	2,337	2,263	2,513	2,479	9,592
West	2,283	2,193	2,427	2,409	9,312
Total	6,947	6,762	7,553	7,410	28,672

# CHAPTER 3

## Building A Basic Pivot Table & Chart

In this chapter we will review the fundamental steps of creating and modifying a Pivot Table. Here we will take a basic spreadsheet containing fruit sale information and:

1. Determine the total sales by region and quarter
2. Create a chart that displays the sales by region and quarter
3. Display the individual fruit sales by region and quarter

### WEB ADDRESS & FILE NAME FOR EXERCISE:

<http://bentonexcelbooks.my-free.website/excel-2016>

FruitSales.xlsx

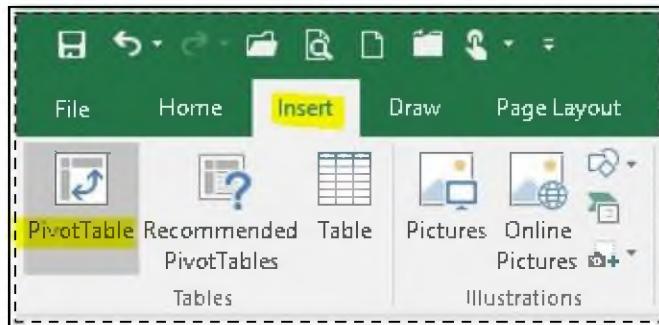
### Summarizing Numbers

Sample data for chapters 3 - 5, due to space limitations **the entire data set is not displayed.**

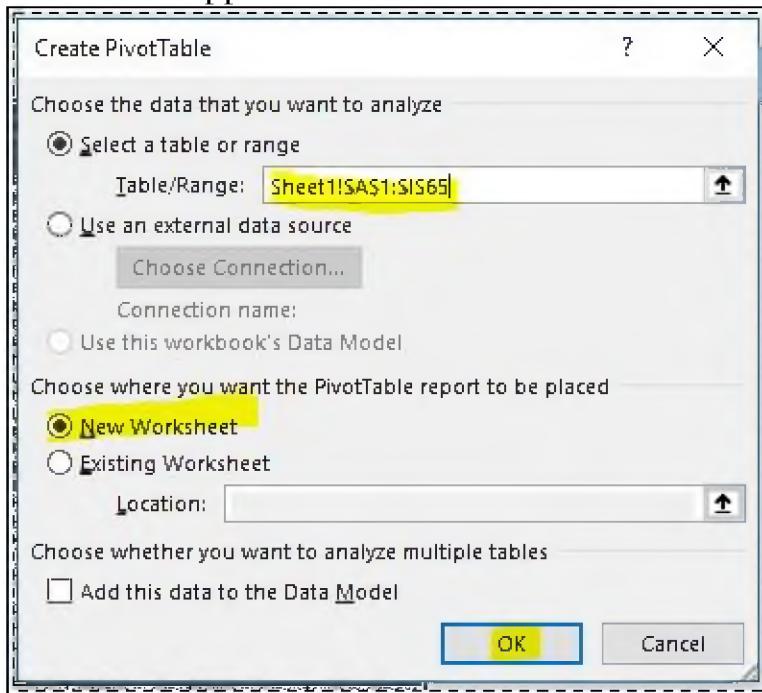
	A	B	C	D	E	F	G	H	I
1	REGION	SALES PERSON FIRST NAME	SALES PERSON LAST NAME	SALES PERSON ID	QUARTER	APPLES	ORANGES	MANGES	TOTAL
2	Central	Bob	Taylor	1174	1	1,810	2,039	1,771	5,620
3	Central	Helen	Smith	833	1	102	354	59	515
4	Central	Jill	Johnson	200	1	93	322	54	469
5	Central	Sally	Morton	500	1	595	824	556	1,975
6	Central	Sam	Becker	800	1	863	1,092	824	2,779
7	East	Abbey	Williams	690	1	346	237	260	843
8	East	John	Dower	255	1	260	178	195	633
9	East	John	Wilson	300	1	186	196	215	696
10	East	Mary	Nelson	600	1	315	215	236	766
11	East	Sarah	Taylor	900	1	381	261	285	927
12	West	Alex	Steller	1000	1	163	212	127	502
13	West	Billy	Winchester	1156	1	179	234	140	553
14	West	Helen	Simpson	817	1	148	193	116	457
15	West	Jack	Smith	100	1	111	145	87	343
16	West	Joe	Tanner	400	1	122	160	96	377
17	West	Peter	Graham	700	1	134	175	105	415
18	Central	Bob	Taylor	1174	2	113	390	65	567
19	Central	Helen	Smith	833	2	1,006	1,393	940	3,339
64	West	Joe	Tanner	400	4	2,833	2,886	2,796	8,516
65	West	Peter	Graham	700	4	4,392	4,473	4,334	13,199

First we will determine the ‘total sales by region’ and then we will build upon this by adding the ‘quarterly sales by region’:

1. Open the FruitSales.xlsx spreadsheet and highlight cells A1:I65
2. From the Ribbon select **INSERT : PivotTable**

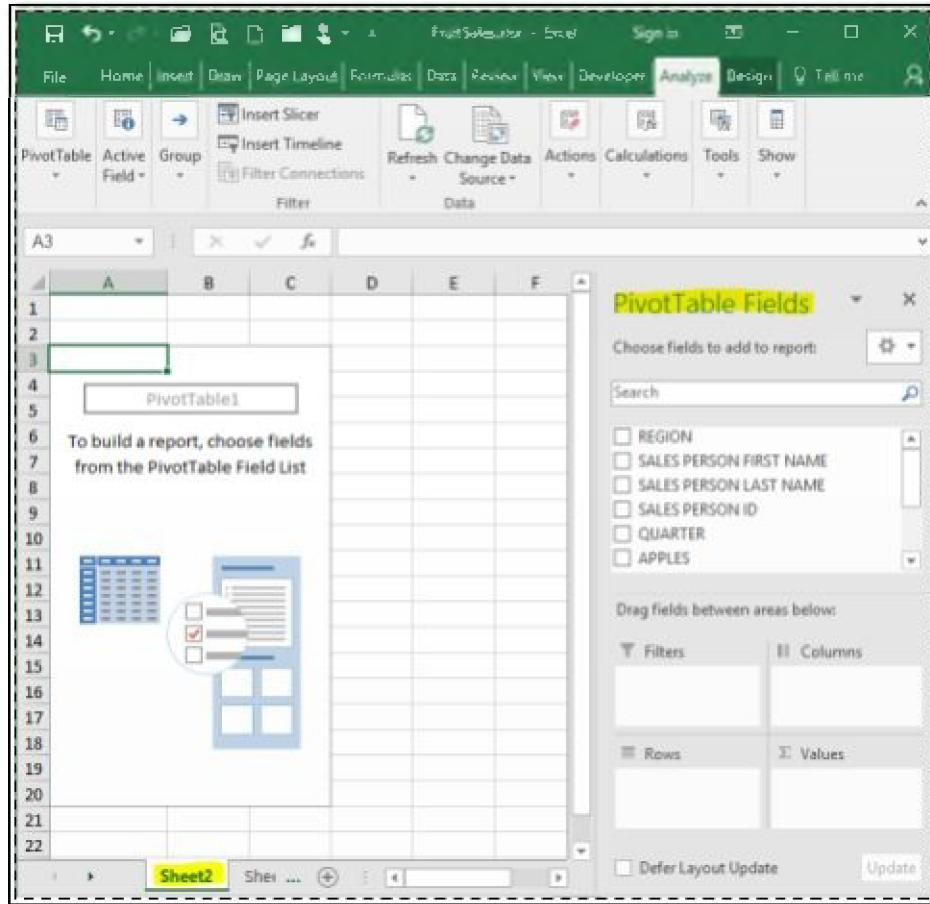


The following dialogue box should appear:



3. When prompted, verify the '**New Worksheet**' radio button is selected
4. Click the '**OK**' button

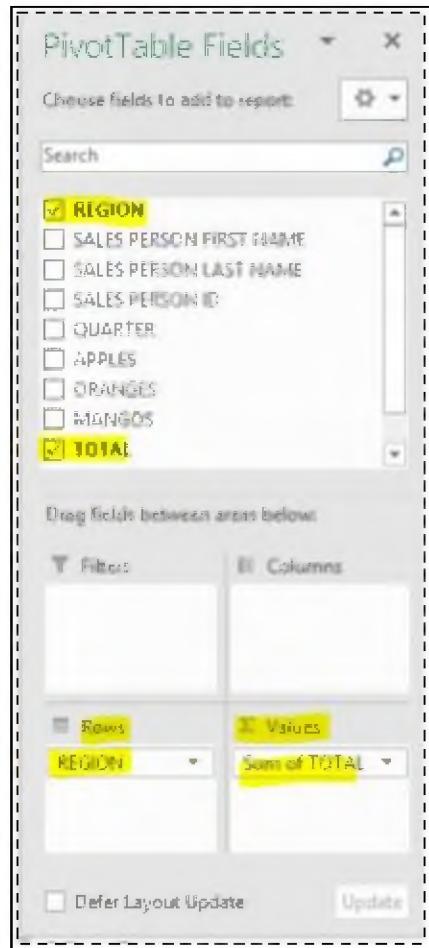
A new tab will be created and appear similar to the following. *Note: the 'PivotTable Fields' pane on the right side of the new worksheet.*



Next, we'll "categorize" our report and select a calculation value.

5. Inside the *PivotTable Fields pane* click the '**REGION**' box or drag this field to '**Rows**' section.
6. Inside the *PivotTable Fields pane* click the '**TOTAL**' box or drag this field to ' **$\Sigma$  Values**' section.

*Please see image below, for an illustration of steps #5 & #6*



The following should be displayed on the left side of your screen *Note: the format is not very easy to read.*

A	B
1	
2	
3 Row Labels ▾	Sum of TOTAL
4 Central	138571.3795
5 East	145587.9689
6 West	196786.7115
7 Grand Total	480946.0598

7. We can change the column labels and format of the numbers. In the below example:
  1. Select cell 'A3' and change the text from 'Row Labels' to 'REGION'
  2. Select cell 'B3' and change the text from 'Sum of TOTAL' to 'TOTAL SALES'
  3. You may also change the currency format in cells 'B4:B7'. In the below example, the format was changed to U.S. dollars with zero decimal places

*Below is the formatted example:*

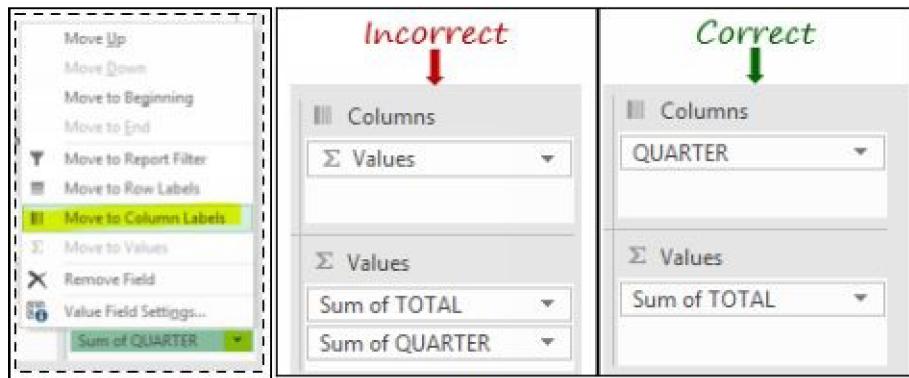
A	B
1	
2	
3 REGION	TOTAL SALES
4 Central	\$ 138,571
5 East	\$ 145,588
6 West	\$ 196,787
7 Grand Total	\$ 480,946

To enhance the report we're going to add *Quarter columns*. This "level" dimension will provide greater detail of the total fruit sales.

- Inside the *PivotTable Fields pane* **drag** the 'QUARTER' field to the 'Columns' section.

*Note: Excel® is reading the Quarter value as numeric, therefore if you click, instead of dragging the field to the 'Columns' section Excel® will apply a calculation.*

*If this happens click the drop-down-box of 'Sum of QUARTER' in the 'Σ Values' section and select the option 'Move to Column Labels'*



We now have 'QUARTER' added to the summary

- Select cell 'B3' and change the text from 'Column Labels' to 'BY QUARTER'
- The labels for cells 'B4', 'C4', 'D4', & 'E4' were changed by adding the abbreviation text 'QTR' in front of each quarter number

*Before formatting:*

A	B	C	D	E	F
1					
2					
3 TOTAL SALES	Column Labels				
4 REGION		1	2	3	4 Grand Total
5 Central	\$ 11,359	\$ 19,352	\$ 34,097	\$ 73,763	\$ 138,571
6 East	\$ 3,865	\$ 19,343	\$ 38,811	\$ 83,569	\$ 145,588
7 West	\$ 2,646	\$ 23,586	\$ 42,590	\$ 127,964	\$ 196,787
8 Grand Total	\$ 17,870	\$ 62,281	\$ 115,499	\$ 285,296	\$ 480,946

*After formatting:*

Total Sales By Quarter						
Region		QTR 1	QTR 2	QTR 3	QTR 4	Grand Total
Central	\$	11,359	\$ 19,352	\$ 34,097	\$ 73,763	\$ 138,571
East	\$	3,865	\$ 19,343	\$ 38,811	\$ 83,569	\$ 145,588
West	\$	2,646	\$ 23,586	\$ 42,590	\$ 127,964	\$ 196,787
Grand Total	\$	17,870	\$ 62,281	\$ 115,499	\$ 285,296	\$ 480,946

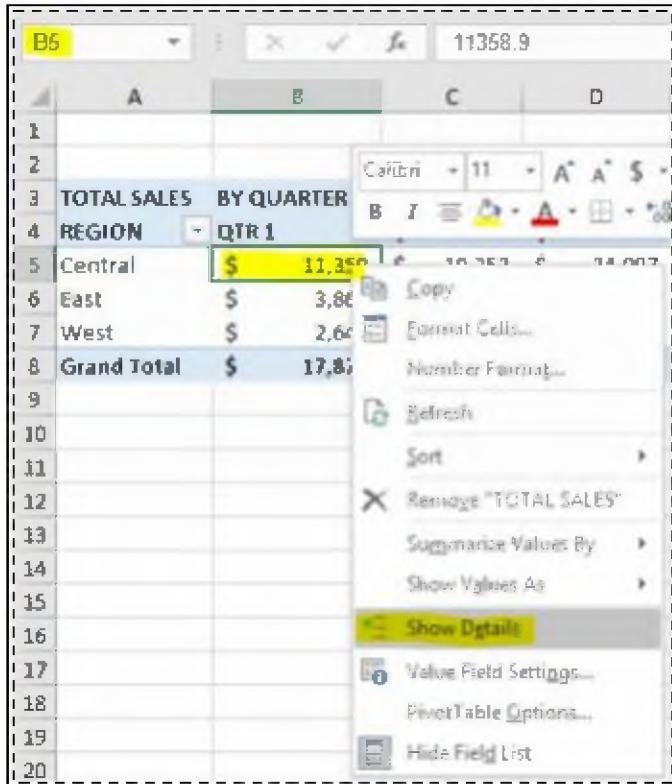
## How To Drill-Down Pivot Table Data

Before we continue with our Pivot Table report examples, let's say you wanted to investigate further why the Central region's Q1 results are so much higher than the other two regions.

Pivot Tables allow you to ***double-click*** on any calculated value to see the detail of that cell. You may also ***right-click*** on the calculated value and select ‘Show Details’. This will create a new worksheet containing a table with the details of the calculated value.

*Please see images below.*

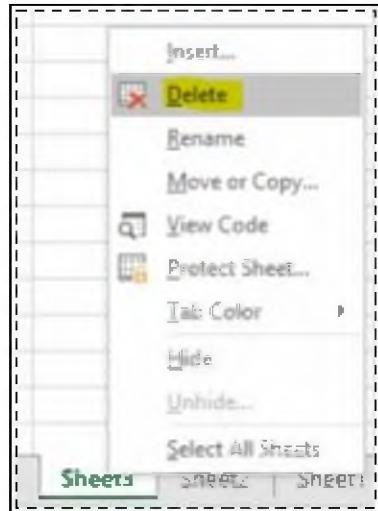
- #### 1. Right-click on cell ‘B5’ and select ‘Show Details’



A new worksheet containing a table with the details of the calculated value in cell ‘B5’:

Region	Sales Person First Name	Sales Person Last Name	Sales Person ID	Quarter	Apples	Bananas	Mangoes	Total
Central	Bob	Taylor	1129	3	1110	2035	1771	3626
Central	Melen	Smyth	933	1	1021	1543	394	3158
Central	Alli	Aphrodisian	200	1	91	342	54	489
Central	Sally	Morton	520	1	115	824	596	1535
Central	Sam	Becker	800	1	861	1092	221	2174

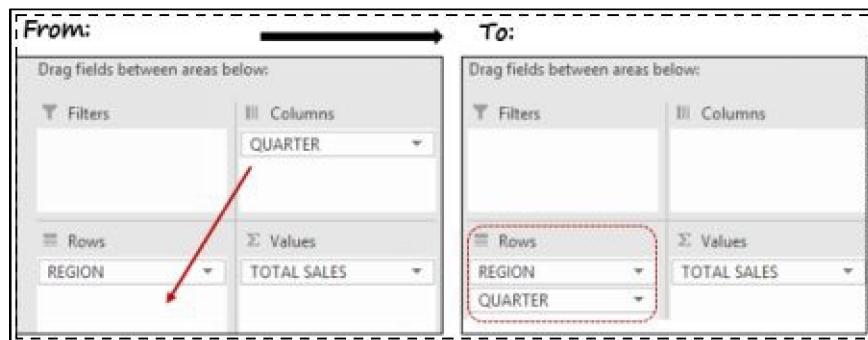
2. To delete the table, right-click on ‘Sheet3’ and select ‘Delete’



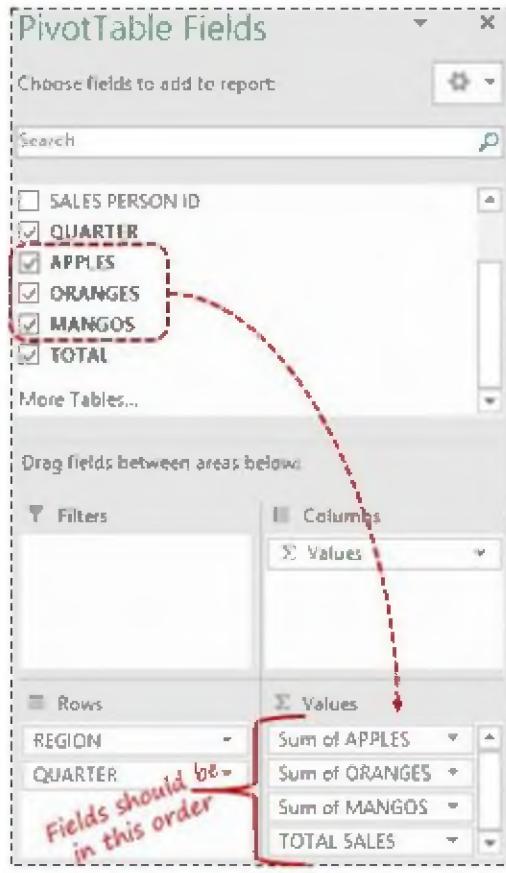
## Adding Additional Rows (categories) To Your Pivot Table

From our original Pivot Table report, we'll extend our analysis by adding the individual fruit sales to our summary.

1. Drag the 'QUARTER' field from the 'COLUMNS' section to the 'ROWS' section.



2. Drag the fields 'APPLES', 'ORANGES', & 'MANGOS' to the 'VALUES' section of the **PivotTable Fields** pane, place the fruit fields *before* the 'TOTAL SALES' value



The results should look similar to the following:

REGION		Sum of APPLES	Sum of ORANGES	Sum of MANGOS	TOTAL SALES
Central	\$	43,481	\$ 53,278	\$ 41,812	\$ 138,571
QTR 1	\$	3,463	\$ 4,631	\$ 3,264	\$ 11,359
QTR 2	\$	5,992	\$ 7,652	\$ 5,709	\$ 19,352
QTR 3	\$	10,634	\$ 13,280	\$ 10,183	\$ 34,097
QTR 4	\$	23,392	\$ 27,715	\$ 22,656	\$ 73,763
East	\$	50,626	\$ 47,117	\$ 47,845	\$ 145,588
QTR 1	\$	1,587	\$ 1,087	\$ 1,190	\$ 3,865
QTR 2	\$	6,891	\$ 6,149	\$ 6,303	\$ 19,343
QTR 3	\$	13,583	\$ 12,502	\$ 12,726	\$ 38,811
QTR 4	\$	28,564	\$ 27,380	\$ 27,625	\$ 83,569
West	\$	69,750	\$ 65,259	\$ 61,778	\$ 196,787
QTR 1	\$	856	\$ 1,119	\$ 671	\$ 2,646
QTR 2	\$	7,819	\$ 8,253	\$ 7,513	\$ 23,586
QTR 3	\$	15,335	\$ 14,074	\$ 13,182	\$ 42,590
QTR 4	\$	45,739	\$ 41,813	\$ 40,411	\$ 127,964
Grand Total	\$	163,857	\$ 165,655	\$ 151,435	\$ 480,946

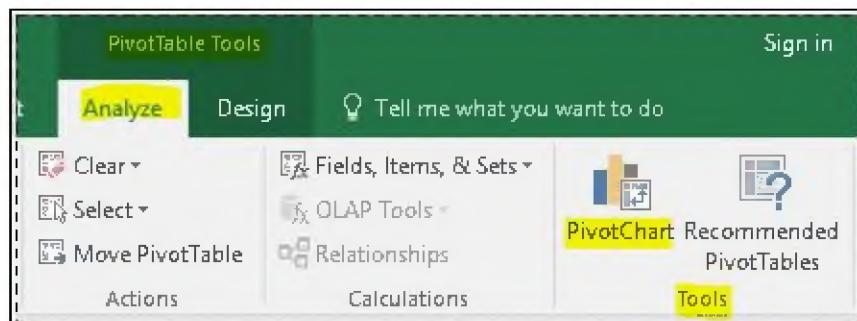
## Charts - How To Create A Basic Pivot Table Chart

In our last example of this chapter, we'll review how to create and format a basic Pivot Table chart:

1. From the **PivotTable Fields** pane uncheck the '**TOTAL SALES**' field

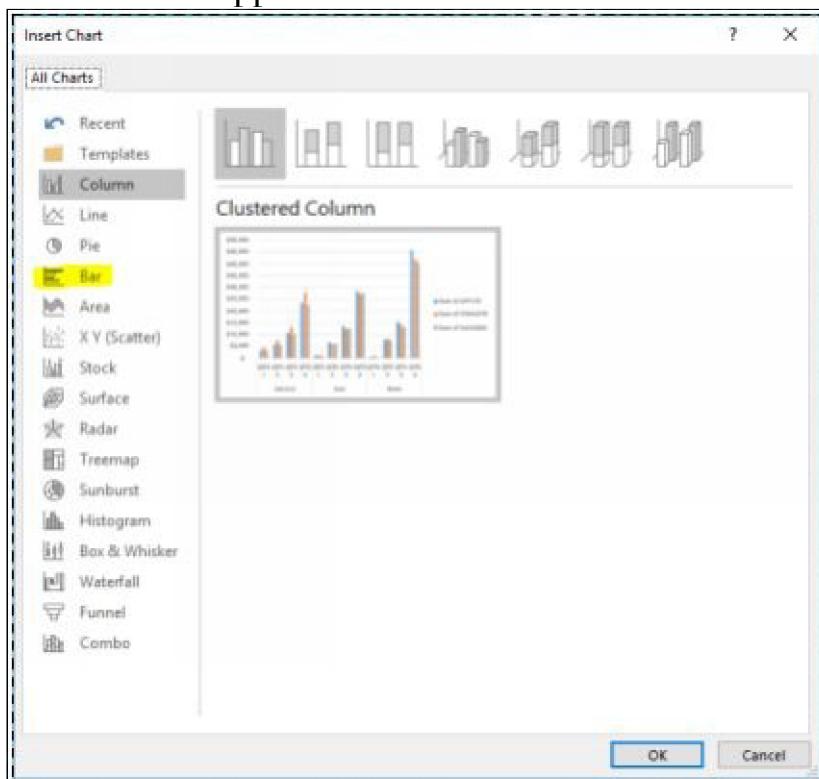


- From the **PivotTable Tools** Ribbon select the tab **Analyze : PivotChart**



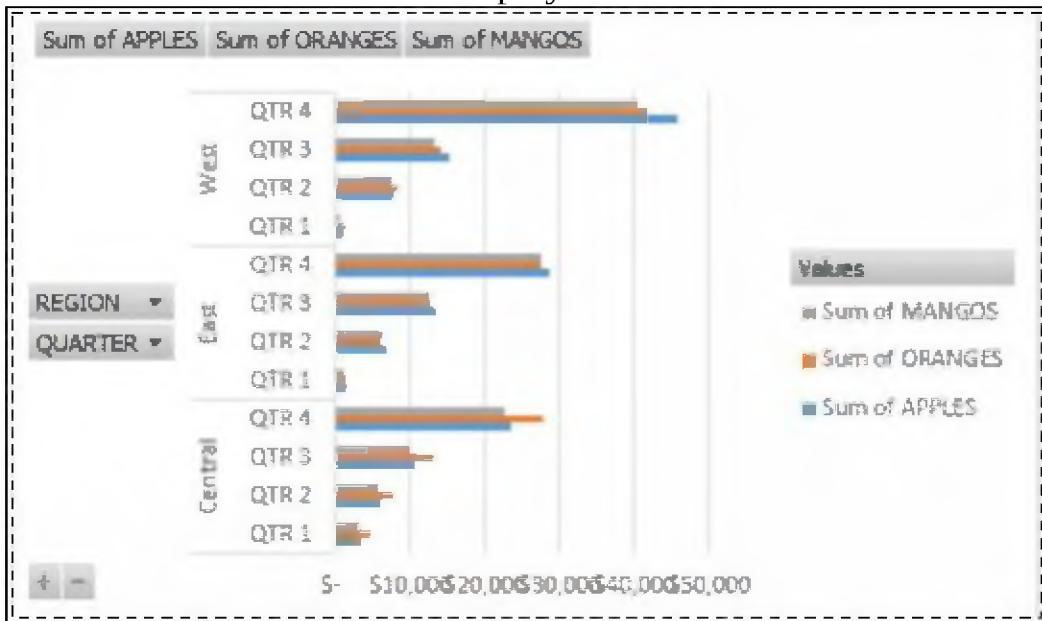
**Note:** If you do not see the **PivotTable Tools** option on your Ribbon, click any PivotTable cell. This toolbar option only appears when a PivotTable field is active.

The following dialogue box should appear:

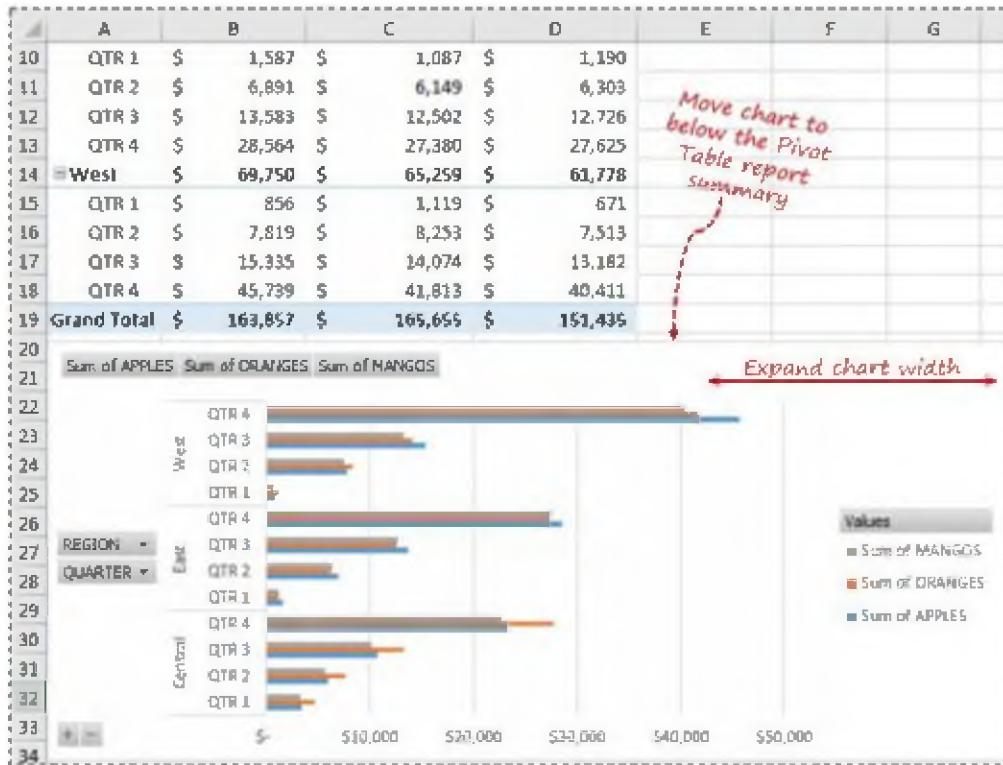


3. Select the ‘Bar’ option
4. Click the ‘OK’ button

A chart similar to the below should now be displayed:



5. Drag the chart below the Pivot Table report summary and expand the width to allow for easier viewing



6. From the **PivotChart Tools** Ribbon select the tab **Design** and under ‘Chart Styles’ select a new style



7. Edit the Chart Title by clicking inside the field, change text to “**Fruit Sales By Region & Quarter 2016**”
8. Optional step: hide the Field buttons, **right-click** over any Field button and select the appropriate hide option



# CHAPTER 4

## Displaying Percentages

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Another great benefit of using Pivot Tables is the ability to display numbers in various descriptive formats. In this chapter we'll describe how to use percentages to determine:

- The percentage of Individual Fruit Sales by Quarter
  - The percentage of Total Sales for each Region
- 

### WEB ADDRESS & FILE NAME FOR EXERCISE:

<http://bentonexcelbooks.my-free.website/excel-2016>

FruitSales.xlsx

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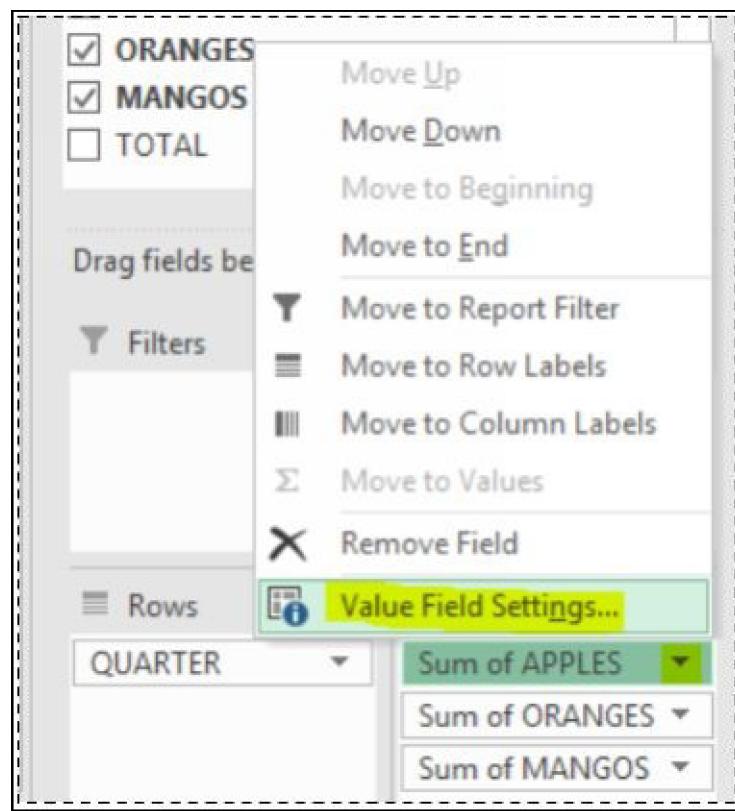
Create a new Pivot Table report, to see screenshot illustrations of steps #1 - #4, please see [chapter 3 ‘Summarizing Numbers’](#):

1. Open the **FruitSales.xlsx** spreadsheet and highlight **cells A1:I65**
  2. From the Ribbon select **INSERT : PivotTable**
  3. When prompted, verify the ‘**New Worksheet**’ radio button is selected
  4. Click the ‘**OK**’ button
- A new tab will be created and the ‘*PivotTable Fields*’ pane should appear on the left side of your screen.
5. Click the following fields:
    1. Quarter (*Rows section*)
    2. Apples, Oranges, Mangos (*Values section*)

A report *similar* to the following should be displayed:

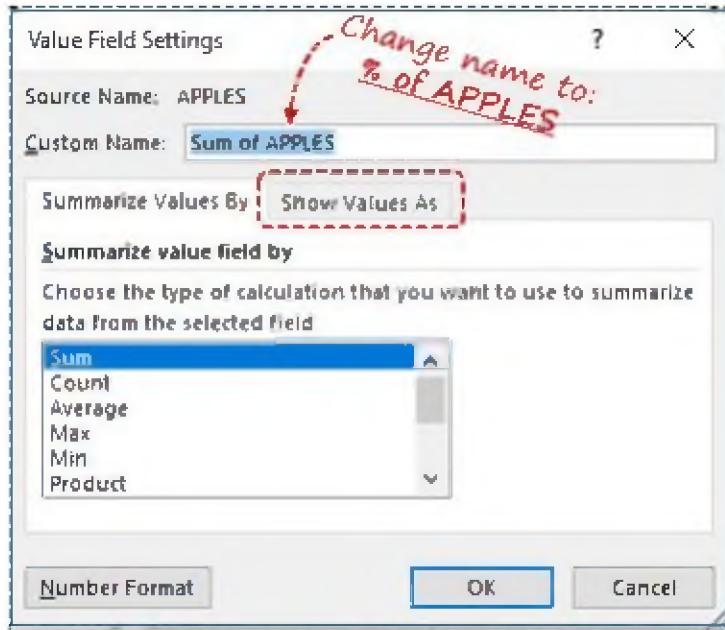
	A	B	C	D	E
1					
2					
3	Row Labels	Sum of APPLES	Sum of ORANGES	Sum of MANGOS	
4	1	5907.05871	6836.67125	5126.15257	
5	2	20701.86859	22054.28941	19525.17237	
6	3	39551.92925	39855.70125	36090.90225	
7	4	97695.89153	96908.13503	90692.28762	
8	Grand Total	163856.7481	165654.7969	151434.5148	
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					

6. Click on the ‘Sum of APPLES’ drop-down box and select ‘Value Field Settings...’

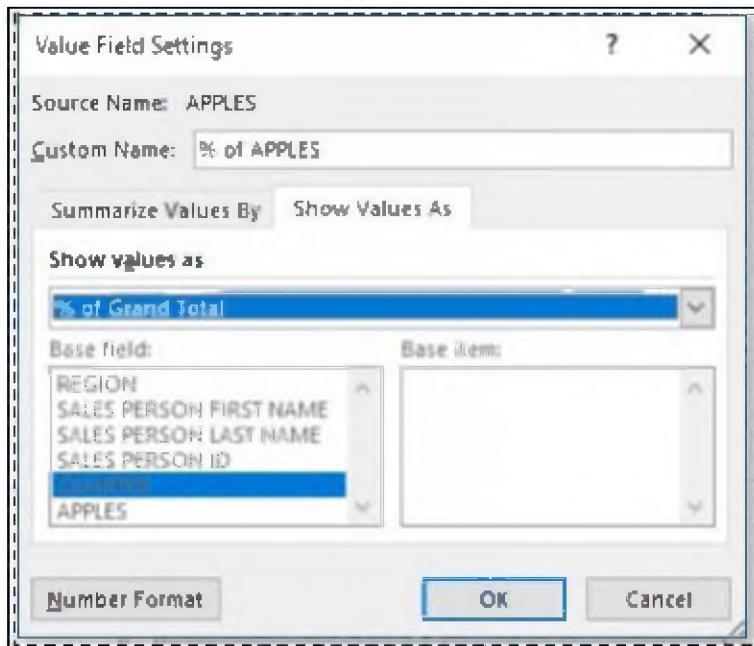


The following dialogue box should appear:

7. In the field ‘Custom Name:’ change to % of APPLES
8. Select the tab ‘Show Values As’



9. From the 'Show values as' drop-down list select '**% of Grand Total**'
10. Click the '**OK**' button



11. Repeat steps #6 - #10 for '**Sum of ORANGES**' and '**Sum of MANGOS**'

The totals by fruit have been changed to a percentage.

QUARTER	% of APPLES	% of ORANGES	% of MANGOS
1	3.61%	4.13%	3.39%
2	12.63%	13.31%	12.89%
3	24.14%	24.06%	23.83%
4	59.62%	58.50%	59.89%
<b>Grand Total</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>

**Please note:** In Excel®, often the percentages when summed together may exceed or not equal 100%, this is due to Excel® rounding the percentages either up or down.

We've now answered the question, what are the percentage of Individual Fruit Sales by Quarter.

To determine the percentage of Total Sales for each Region

12. Remove (uncheck) all the fields ‘APPLES,’ ‘ORANGES,’ ‘MANGOS,’ and ‘QUARTER’
13. Click the following fields:
  1. REGION (Rows section)
  2. TOTAL (Values section)
14. **Right-click over ‘Sum of TOTAL’, (cell ‘B3’)** from the pop-up menu select ‘Show Values As’ and then ‘% of Grand Total’

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

REGION	Sum of TOTAL
Central	138571.
East	145587.
West	196786.
<b>Grand Total</b>	<b>480946.</b>

A context menu is open over the 'Sum of TOTAL' cell (B3). The menu options include:

- Copy
- Format Cells...
- Number Format...
- Refresh
- Sort
- Remove 'Sum of TOTAL'
- Summarize Values By  No Calculation  % of Grand Total
- Show Values As  % of Column Total  % of Row Total  % Of...  % of Parent Row Total  % of Parent Column Total  % of Parent Total...  Difference From...  % Difference From...
- Value Field Settings...
- PivotTable Options...
- Hide Field List

On the right side of the screen, the PivotTable Fields pane is visible, showing the following fields:

- SALES PERSON ID
- QUARTER
- APPLES
- ORANGES
- MANGOS
- TOTAL** (with a checked checkbox)

Below the fields pane, there are sections for Filters and Columns. Under Rows, 'REGION' is selected. Under Values, 'Sum of TOTAL' is selected.

We've now determined the percentage of Total Sales for each Region.

A	B
1	
2	
3 REGION	Sum of TOTAL
4 Central	28.81%
5 East	30.27%
6 West	40.92%
7 Grand Total	100.00%

You may want to change the column heading from ‘**Sum of TOTAL**’ to something more descriptive.

B3	% OF SALES BY REGION		
A	B		
1			
2			
3 REGION	% OF SALES BY REGION		
4 Central	28.81%		
5 East	30.27%		
6 West	40.92%		
7 Grand Total	100.00%		

# CHAPTER 5

## ***Ranking Results & Displaying Averages***

---

In the previous examples we focused on *summary level* types of analysis, Pivot Tables also give us the capability to analyze individual results for comparisons and ranking information. This can quickly be accomplished without the need to manually sort or add additional calculated columns to our original data source. In this chapter we'll demonstrate how to:

- Rank each Sales Person by their individual *Total & Average Sales*
- 

### **WEB ADDRESS & FILE NAME FOR EXERCISE:**

<http://bentonexcelbooks.my-free.website/excel-2016>

FruitSales.xlsx

---

Create a new Pivot Table report, to see screenshot illustrations of steps #1 - #4, please see [chapter 3 ‘Summarizing Numbers’](#):

1. Open the FruitSales.xlsx spreadsheet and highlight **cells A1:I65**
2. From the Ribbon select **INSERT : PivotTable**
3. Verify the '**New Worksheet**' radio button is selected
4. Click the '**OK**' button

A new tab will be created and the '*PivotTable Fields*' pane should appear on the left side of your screen.

5. Click the following fields:
  1. SALES PERSON ID (*Rows section*)
  2. Drag TOTAL **three** times (*Values section*)

A report similar to the following should be displayed. ***Note: all three of the ‘Sum of TOTAL’ columns are currently the same. We will be changing them in the following steps.***

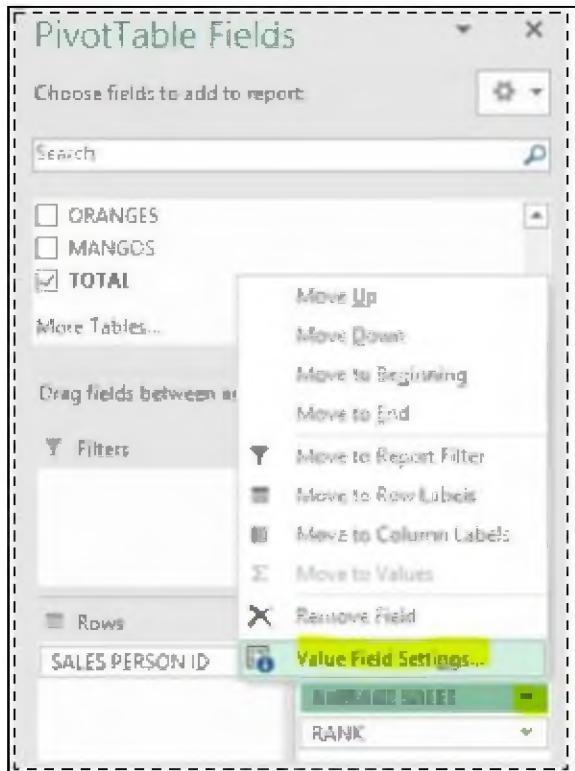
	A	B	C	D	E
1					
2					
3	Row Labels	Sum of TOTAL	Sum of TOTAL2	Sum of TOTAL3	
4	100	10339	10339	10339	
5	200	30217.4275	30217.4275	30217.4275	
6	255	11499	11499	11499	
7	300	16856.7	16856.7	16856.7	
8	400	15276.2	15276.2	15276.2	
9	500	20332.2129	20332.2129	20332.2129	
10	600	24898.65	24898.65	24898.65	
11	690	37013.424	37013.424	37013.424	
12	700	22708.425	22708.425	22708.425	
13	800	17755.0365	17755.0365	17755.0365	
14	817	33931.63025	33931.63025	33931.63025	
15	833	45671.45013	45671.45013	45671.45013	
16	900	55320.19485	55320.19485	55320.19485	
17	1000	50925.33004	50925.33004	50925.33004	
18	1156	63606.12616	63606.12616	63606.12616	
19	1174	24595.2525	24595.2525	24595.2525	
20	Grand Total	480946.0598	480946.0598	480946.0598	

6. Change the label for cell ‘A3’ to ‘SALES PERSON ID’
7. Change the label for cell ‘B3’ to ‘TOTAL SALES’
8. Change the label for cell ‘C3’ to ‘AVERAGE SALES’
9. Change the label for cell ‘D3’ to ‘RANK’
10. Change the formatting for columns ‘B’ & ‘C’ to a currency of your choice with zero decimal places. In this example I will use the British Pound.

	A	B	C	D
1				
2				
3	SALES PERSON ID	TOTAL SALES	AVERAGE SALES	RANK
4	100	£ 10,339	£ 10,339	10339
5	200	£ 30,217	£ 30,217	30217.4275
6	255	£ 11,499	£ 11,499	11499
7	300	£ 16,856	£ 16,856	16856.7
8	400	£ 15,276	£ 15,276	15276.2
9	500	£ 20,332	£ 20,332	20332.2129
10	600	£ 24,898	£ 24,898	24898.65
11	690	£ 37,013	£ 37,013	37013.424
12	700	£ 22,708	£ 22,708	22708.425
13	800	£ 17,755	£ 17,755	17755.0365
14	817	£ 33,931	£ 33,931	33931.63025
15	833	£ 45,671	£ 45,671	45671.45013
16	900	£ 55,320	£ 55,320	55320.19485
17	1000	£ 50,925	£ 50,925	50925.33004
18	1156	£ 63,606	£ 63,606	63606.12616
19	1174	£ 24,595	£ 24,595	24595.2525
20	Grand Total	£ 480,946	£ 480,946	480946.0598

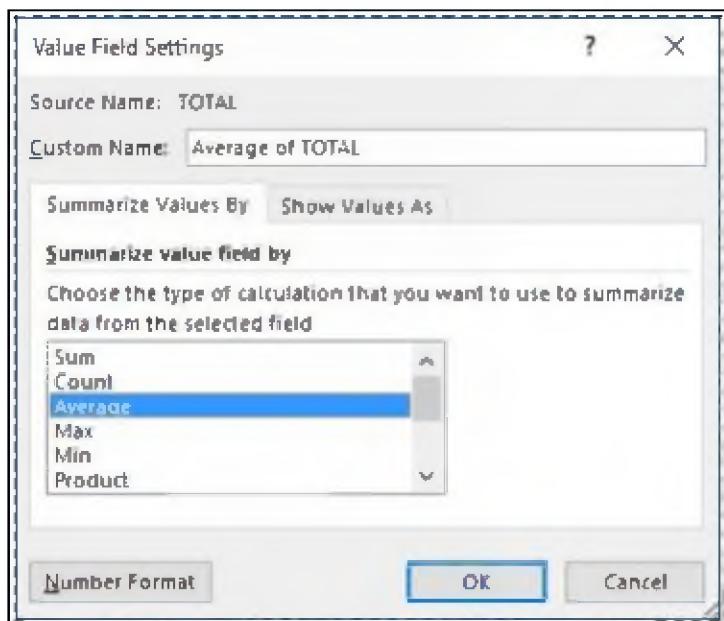
## Displaying Averages

11. In the *PivotTable Fields* pane, in the ‘VALUES’ section, click the drop-down box for ‘AVERAGE SALES’
12. From the menu select the ‘Value Field Settings...’ option



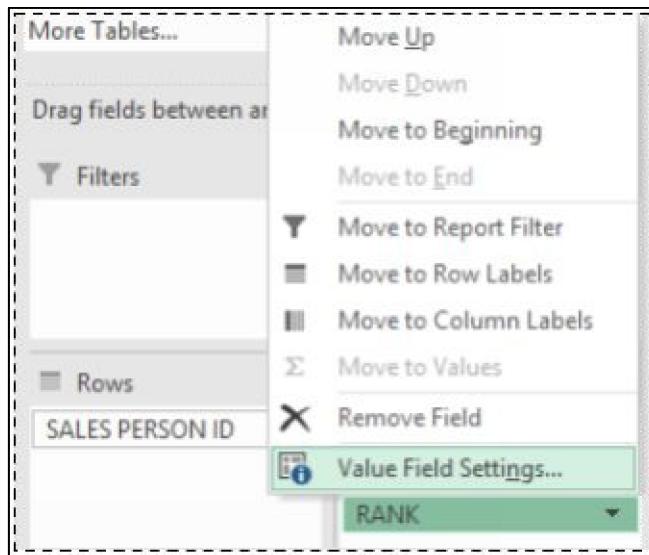
The following dialogue box should appear.

13. From the ‘Summarize value field by’ list select ‘Average’. *Note: this will change the ‘Custom Name:’ to ‘Average of TOTAL’, change back to ‘AVERAGE SALES’*
14. Click the ‘OK’ button



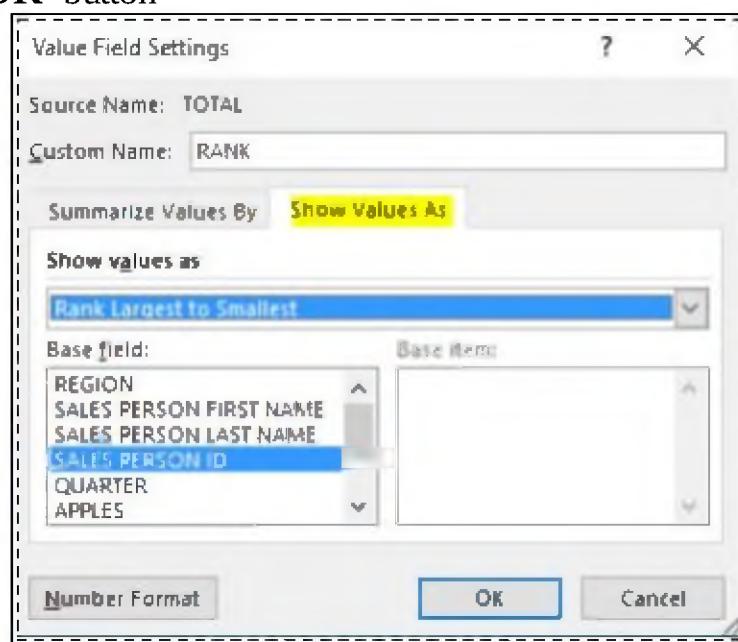
## Ranking Data

15. In the *PivotTable Fields*’ pane, in the ‘VALUES’ section, click the drop-down box for ‘RANK’
16. From the menu select the ‘Value Field Settings...’ option



The following dialogue box should appear

17. Select the tab '**Show Values As**'
18. From the '**Show values as**' drop-down list select '**Rank Largest to Smallest**'
19. For the '**Base field:**' box select '**SALES PERSON ID**'
20. Click the '**OK**' button



*The results should look similar to the following:*

A	B	C	D
1			
2			
3	<b>SALES PERSON</b>	<b>TOTAL SALES</b>	<b>AVERAGE SALES</b>
4	100	£10,339	£2,585
5	200	£30,217	£7,554
6	255	£11,499	£2,875
7	300	£16,857	£4,214
8	400	£15,276	£3,819
9	500	£20,332	£5,083
10	600	£24,899	£6,225
11	690	£37,013	£9,253
12	700	£22,708	£5,677
13	800	£17,755	£4,439
14	817	£33,932	£8,483
15	833	£45,671	£11,418
16	900	£55,320	£13,830
17	1000	£50,925	£12,731
18	1156	£63,606	£15,902
19	1174	£24,595	£6,149
20	<b>Grand Total</b>	<b>£480,946</b>	<b>£7,515</b>

Let's improve the readability:

21. With your cursor in cell 'A3' from the **PivotTable Tools** Ribbon select the tab **Design**
22. Check the box '**Banded Rows**'



23. Place your cursor in cell 'A3' and click the drop-down arrow
24. Select the option called '**More Sort Options...**'

SALES PERSON ID	TOTAL SALES	AVERAGE SALES	RANK
100	£2,585	16	
200	£7,554	7	
255	£2,875	15	
300	£4,214	13	
400	£3,819	14	
500	£5,083	11	
600	£6,225	8	
690	£9,253	5	
700	£5,677	10	
700	£4,439	12	
700	£8,483	6	
700	£11,418	4	
700	£13,830	2	
700	£12,731	3	
700	£15,902	1	
700	£6,149	9	
700	£7,515		

The following dialogue box will appear.

25. Select the '**Descending (Z to A) by:**' radio button
26. Select '**RANK**' from the drop-down box
27. Click the '**OK**' button

We now have a nicely formatted report that shows us each Sales Person's *sales rank* and their Total and Average Sales.

3	SALES PERSON	TOTAL SALES	AVERAGE SALES	RANK
4	1156	£63,606	£15,902	1
5	900	£55,320	£13,830	2
6	1000	£50,925	£12,731	3
7	833	£45,671	£11,418	4
8	690	£37,013	£9,253	5
9	817	£33,932	£8,483	6
10	200	£30,217	£7,554	7
11	600	£24,899	£6,225	8
12	1174	£24,595	£6,149	9
13	700	£22,708	£5,677	10
14	500	£20,332	£5,083	11
15	800	£17,755	£4,439	12
16	300	£16,857	£4,214	13
17	400	£15,276	£3,819	14
18	255	£11,499	£2,875	15
19	100	£10,339	£2,585	16
20	Grand Total	£480,946	£7,515	

# CHAPTER 6

## *Slicers (interactive analysis) & Advanced Filtering*

---

An additional tool within the Pivot Tables feature set are ‘Slicers’. Slicers are *graphical filters*, ideal for analysts or customers who like to examine data from many different perspectives. While filtering has always been a component of Pivot Tables, the introduction of the ‘Timeline Slicer’ has been a welcome enhancement as it allows the user to quickly categorize *individual date values* into months, quarters, or years. There are two types of slicers **1 ) Timeline Slicers** available in *Excel® versions 2013 & 2016* and **2) Slicers** available in *Excel® versions 2010, 2013, & 2016*.

For example, let’s say you’re a Financial Analyst that supports a manufacturing company of aerospace parts. You’ve been asked to attend an impromptu sales meeting for regional managers. The agenda *has not* been determined, instead you’ve been asked to prepare the sales data for the last 12 months and answer questions as they arise. Since you’re unsure of what the managers will ask, you decide to create a Pivot Table report with the slicers Category & Date.

---

### **WEB ADDRESS & FILE NAME FOR EXERCISE:**

<http://bentonexcelbooks.my-free.website/excel-2016>

AirlineParts.xlsx

---

### **EXCEL® 2013 USERS - PLEASE NOTE**

Excel® 2013 users will need to follow slightly different steps for the Timeline Slicer exercise, these instructions are outlined in that specific section.

Sample data for this chapter, due to space limitations **the entire data set is not displayed**. *Note: Column ‘E’ is a date value.*

	A	B	C	D	E	F
1	REGION	NAME	CATEGORY	PART	EOM_DATE	QTY
2	Central	Graham, Peter	STRUCTURAL	Pressure Bulkheads	31 January 2017	8
3	Central	Graham, Peter	STRUCTURAL	Keel Beam	31 January 2017	11
4	Central	Graham, Peter	STRUCTURAL	Fuselage Panels	31 January 2017	13
5	Central	Graham, Peter	FUEL	Boost Pumps	31 January 2017	9
6	Central	Graham, Peter	FUEL	Transfer Valves	31 January 2017	5
7	Central	Graham, Peter	FUEL	Fuel S.O.V.	31 January 2017	6
8	Central	Graham, Peter	FUEL	Digital Fuel Flow System	31 January 2017	7
9	Central	Graham, Peter	FUEL	Fuel Quantity Indicator	31 January 2017	12
10	Central	Graham, Peter	FUEL	Fuel Flow Indicating	31 January 2017	7
11	Central	Graham, Peter	FUEL	Fuel Pressure Indicating	31 January 2017	4
12	Central	Graham, Peter	FUEL	Fuel Pump	31 January 2017	10
13	Central	Graham, Peter	FUEL	Engine Lubrication System	31 January 2017	6
14	Central	Graham, Peter	FUEL	Fuel Dump Fuel Hose	31 January 2017	9
15	Central	Graham, Peter	POWER	Lithium Battery	31 January 2017	4
16	Central	Graham, Peter	POWER	AC Generator-Alternator	31 January 2017	9
17	Central	Graham, Peter	POWER	Alternator/Generator Drive System	31 January 2017	4
18	Central	Graham, Peter	POWER	Fire Detection	31 January 2017	8
19	Central	Graham, Peter	POWER	Fire Protection	31 January 2017	13
20	Central	Graham, Peter	POWER	Overheat Detection	31 January 2017	4
21	Central	Graham, Peter	POWER	Smoke Detection	31 January 2017	11
22	Central	Graham, Peter	POWER	Extinguishing System	31 January 2017	8
23	Central	Graham, Peter	POWER	AC Inverter Phase Adapter	31 January 2017	8
24	Central	Graham, Peter	POWER	Fire Bottle-Fixed	31 January 2017	6
25	Central	Graham, Peter	POWER	AC Regulator	31 January 2017	7
3888	West	Winchester, Charles	WING	Engine Struts	31 December 2016	8
3889	West	Winchester, Charles	WING	Engine Mounts	31 December 2016	11

## Timeline Slicer

Create a basic Pivot Table report, to see screenshot illustrations of steps #1 - #4, please see [chapter 3 ‘Summarizing Numbers’](#):

1. Open the **AirlineParts.xlsx** spreadsheet and highlight **cells A1:F3889**
2. From the Ribbon select **INSERT : PivotTable**
3. Verify the ‘**New Worksheet**’ radio button is selected
4. Click the ‘**OK**’ button
5. Click the following fields:
  1. Region (*Rows section*)
  2. Category (*Rows section*)
  3. QTY (*Values section*)

In order for a Timeline Slicer to work *all* the data for that field must be **formatted as a date**. In this example, once we click the date field. ‘**EOM\_DATE**’ in **Excel® 2016** will create addition calendar options **Quarters & Years**.

- Click the field 'EOM\_DATE' as you can see, **Excel® 2016** has created fields for **Quarters & Years\***

\*Excel 2013 users please [click here to see step #6](#)

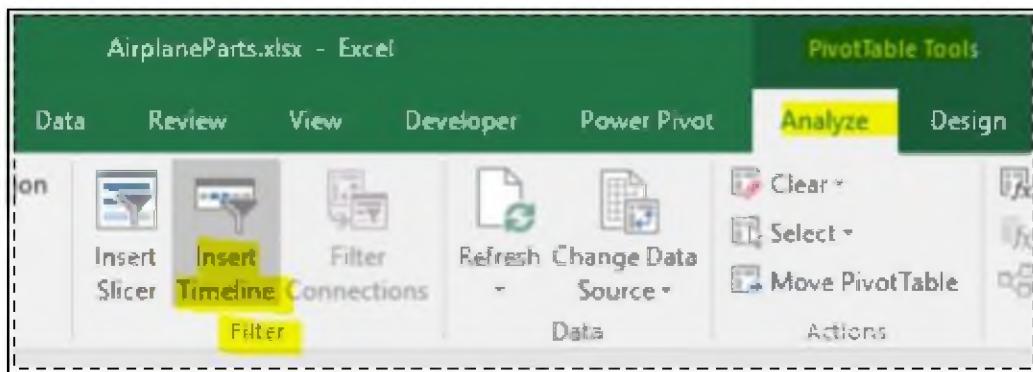
However, this type of display isn't very helpful. The Financial Analyst won't be able to quickly answer very many questions. Before adding our additional slicer, let's re-arrange the Pivot Table report to be more user friendly.

- Uncheck fields **Years & Quarters**
- Drag the field 'EOM\_DATE' to the 'Columns' area. *Note: how 'EOM\_DATE' is*

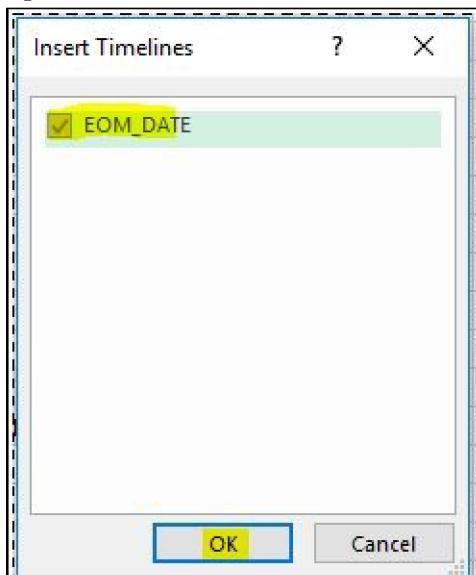
*now displaying as a month*

		Column labels											
	Row Labels	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	Sum of QTY												
2	Region												
3	Central	863	569	865	872	569	865	872	869	872	569	1081	872
4	FUEL	248	156	267	248	158	267	248	267	248	158	327	248
5	POWER	270	171	278	230	171	278	230	278	230	171	344	230
6	STRUCTURAL	81	54	57	54	54	57	57	61	57	54	75	57
7	WING	294	186	269	337	126	263	337	263	337	186	339	337
8	East	920	594	821	846	996	821	846	823	946	996	1017	846
9	FUEL	254	164	237	236	164	237	236	237	236	164	257	236
10	POWER	273	174	251	254	174	251	254	251	254	174	312	254
11	STRUCTURAL	81	54	54	51	54	54	54	61	54	54	72	51
12	WING	312	204	275	291	204	275	291	279	291	204	351	291
13	West	817	568	781	822	588	783	822	783	822	588	944	822
14	FUEL	242	152	218	236	152	219	236	219	236	152	279	236
15	POWER	279	180	225	278	162	225	276	225	276	160	291	276
16	STRUCTURAL	83	62	78	72	62	78	72	72	72	62	96	72
17	WING	322	214	261	281	234	261	243	261	248	214	333	248
18	Grand Total	2725	1753	2468	2548	1753	2469	2548	2473	2540	1753	3115	2548

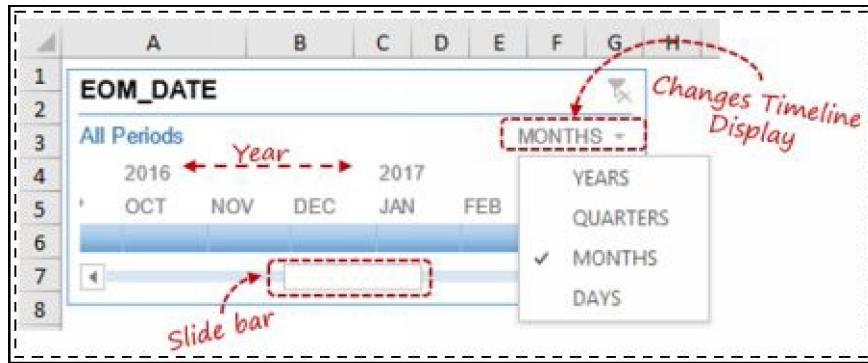
9. Insert 8 blank rows above row 3
10. **With your cursor located inside the Pivot Table**, from the **PivotTable Tools Ribbon** select the tab **Analyze : Insert Timeline**



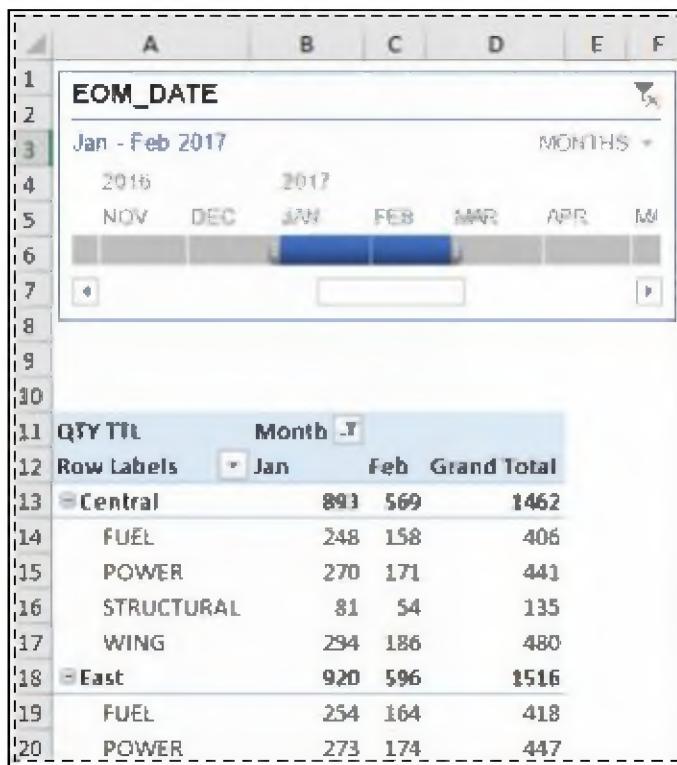
You'll receive the following prompt:



11. Click the '**EOM\_DATE**' checkbox
12. Click the '**OK**' button
13. The following **Timeline slicer** should now appear, drag to the area near cell '**A1**'



You may click individual months to view how the counts change. For example, you may click Jan 2017 or Jan and Feb 2017 to see totals change.



#### 14. Change the Timeline Display from Months to Quarters

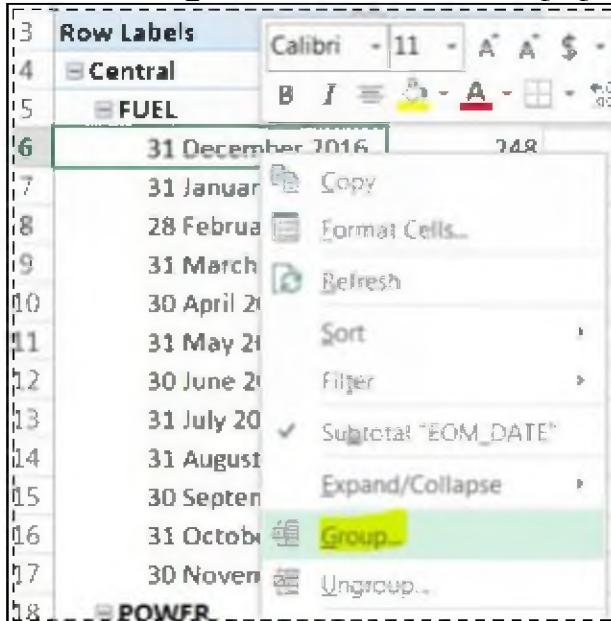
The screenshot shows a Power BI report interface. At the top, there is a 'EOM\_DATE' calendar filter with a red dashed box around the '2017' section. Below it is a red arrow pointing from the filter to a pivot table below. The pivot table has 'QTY TTL' as the value field and 'Month' as the column header. It includes a 'Row Labels' section with categories like 'Central' and 'East', and detailed items like 'FUEL', 'POWER', and 'STRUCTURAL'. The data is summarized by month (Jul, Aug, Sep) and includes a 'Grand Total' row.

	QTY TTL	Month		
Row Labels		Jul	Aug	Sep
Central		872	869	872
FUEL		248	267	248
POWER		230	278	230
STRUCTURAL		57	61	57
WING		337	263	337
East		846	821	846
FUEL		236	237	236
POWER		258	251	258
STRUCTURAL		57	54	57
				171
				Grand Total

### Excel 2013 users (step #6)

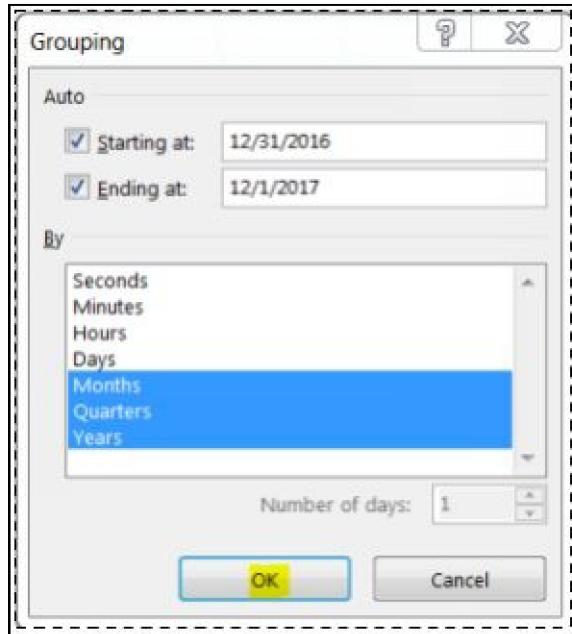
Users of Excel 2013 must complete a few additional steps:

**Step 6a:** Select cell 'A6', right-click, and from the pop-up menu select 'Group...'



**Step 6b:** When the following prompt appears, press your 'CTRL' button on your keyboard and select 'Months', 'Quarters', & 'Years'

**Step 6c:** Click the 'OK' button



### Step 6d: Return to [Step #7](#) above

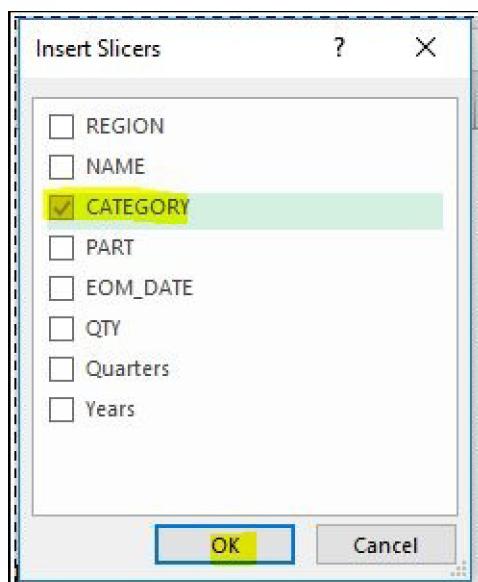
## Slicer

Next, we'll review the Slicer functionality.

- With your cursor located inside the Pivot Table, from the **PivotTable Tools** Ribbon select the tab **Analyze : Insert Slicer**

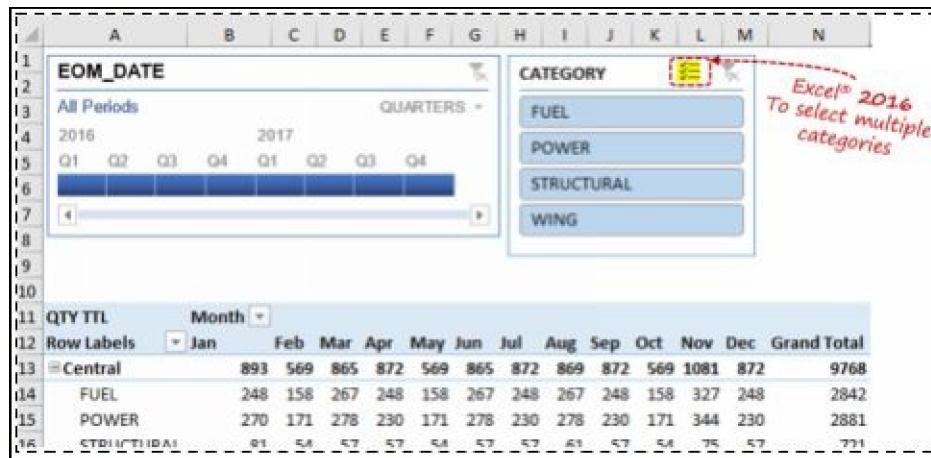


You'll receive the following prompt:



- Click the 'CATEGORY' checkbox

3. Click the ‘OK’ button
4. The following slicer should now appear, drag to the area near cell ‘H1’



The Financial Analyst may now answer all types of questions, with just a few clicks and without having to manually re-sort or add/remove formulas. Here are some examples:

- What are the total *Fuel* sales for **Feb 2017**?
- What are the **combined** sales for the *Structural & Wing* categories only?
- Provide the **Q4** sales for *Power*

#### **ADDITIONAL INFORMATION:**

While having the date fields *Month*, *Quarter*, & *Year* automatically be added to our Pivot Table fields list is helpful, there still may be times when you want to have the **individual dates** included in your report. To see the individual date values in our current example:

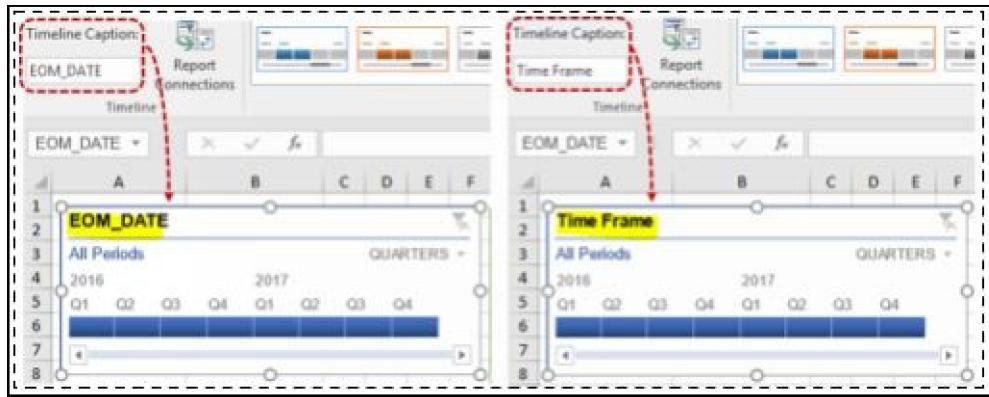
1. From the ‘PivotTable Fields’ pane unchecked fields ‘REGION’ & ‘CATEGORY’
2. Drag ‘EOM\_DATE’ from Columns to Rows
3. From the Pivot Table **right-click** over any of the month values
4. From the pop-up menu, select ‘Ungroup...’

The individual dates should now be displayed:

	Row Labels	Sum of QTY
11		
12	31 December 2016	2540
13	31 January 2017	2725
14	28 February 2017	1753
15	31 March 2017	2469
16	30 April 2017	2540
17	31 May 2017	1753
18	30 June 2017	2469
19	31 July 2017	2540
20	31 August 2017	2473
21	30 September 2017	2540
22	31 October 2017	1753
23	30 November 2017	3117
24	Grand Total	28672

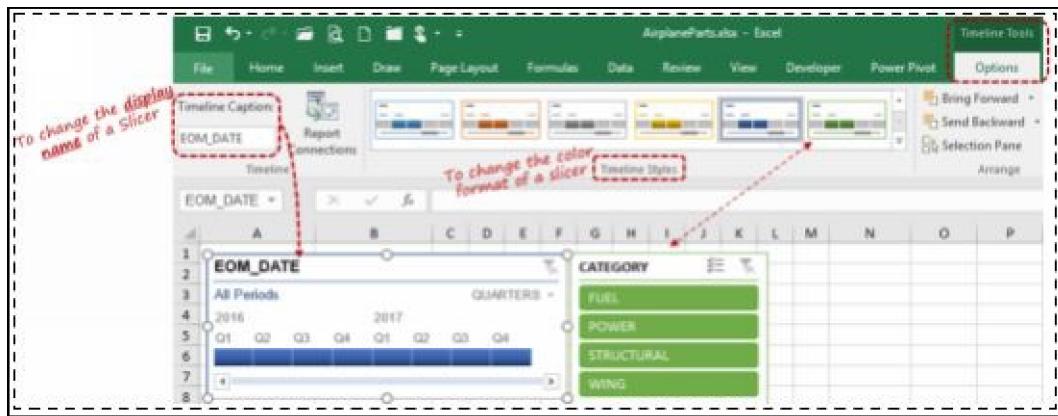
To change the *display name* of a Slicer:

1. Select the Slicer
2. From the **Timeline** or **Slicer Tools** Ribbon under ‘Options’ go to ‘Caption’ or ‘Timeline Caption’ and enter a new name



To change the **color format** of a Slicer:

1. Select the Slicer
2. From the **Timeline** or **Slicer Tools** Ribbon under ‘Options’ go to ‘Timeline Styles’ or ‘Slicer Styles’ and select a new color scheme



## Advanced Filtering

In the first part of this chapter we reviewed how Slicers may be used for quick filtering. In this section we'll demonstrate how to employ additional Pivot Table features which allow us to extend our analysis by *specifying conditions*. For example, in the airplane parts spreadsheet, if we wanted to know:

1. The *top 10* airplane parts sold by category?
2. The *bottom 10* airplane parts sold by category?
3. The *top 10* airplane parts sold by Quarter?
4. How many parts sold more than 800 in quantity?

If you're familiar with Excel's conditional formatting capabilities, this is very similar in Pivot Tables.

Let's walk through another example to show how this functionality may be utilized.

To see screenshot illustrations of steps #1 - #4, please see [chapter 3 ‘Summarizing Numbers’](#):

1. Open the **AirlineParts.xlsx** spreadsheet and highlight **cells A1:F3889**
2. From the Ribbon select **INSERT : PivotTable**
3. Verify the '**New Worksheet**' radio button is selected
4. Click the '**OK**' button

**(1)** A new tab will be created and the '*PivotTable Fields*' pane should appear on the left side of your screen.

5. Click the following fields:
  1. Part (*Rows section*)
  2. Category (*Columns section*)
  3. QTY (*Values section*)

6. Click the drop-down arrow of '**Row Labels**' cell ('A4')
7. From the menu select '**Value Filters**' then '**Top 10**'

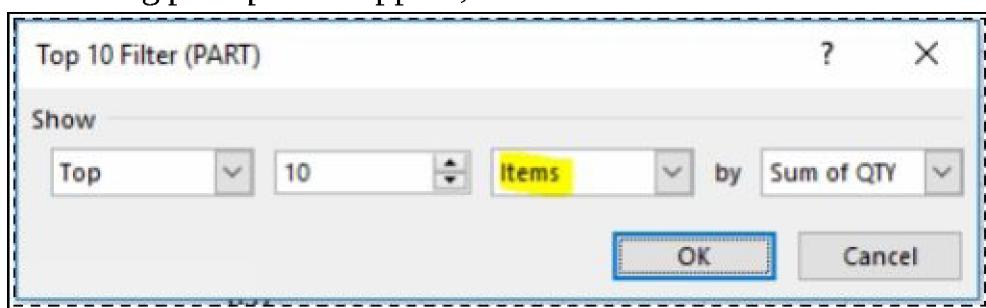
The screenshot shows the PivotTable Fields pane with the following configuration:

- Rows:** PART
- Columns:** FUEL, POWER, STRUCTURAL
- Values:** Sum of QTY

The 'Value Filters' dialog is open, showing a list of parts and filter options. The 'Top 10...' option is highlighted in the dropdown menu.

PART	Sum of QTY
FUEL	653
POWER	741
STRUCTURAL	777
	805

8. The following prompt will appear, click the '**OK**' button

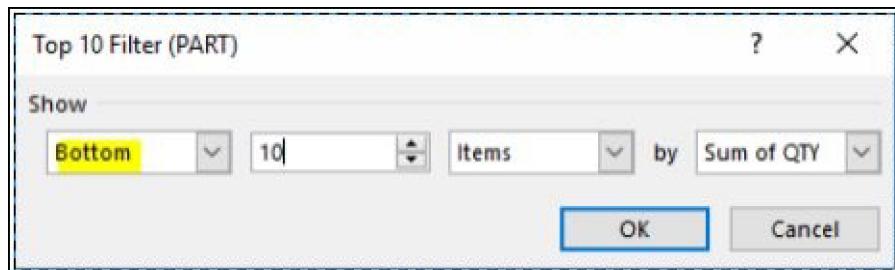


The following will be the result, you may *change the quantity* from 10 to any number you would like to see.

Sum of QTY	Color	FUEL	POWER	STRUCTURAL	WING	Grand Total
Row Labels						
Auxilliary Structure					949	949
Boost Pumps		841				841
Digital Fuel Flow System		841				841
Engine Lubrication System		849				849
Engine Struts				901		901
Fire Detection			837			837
Fire Protection			1065			1065
Fuel Dump Fuel Hose		881				881
Keel Beam				857		857
Wing Webs					849	849
<b>Grand Total</b>		3412	1902	857	2699	8870

Similarly we may change to show the bottom 10.

9. Click the drop-down arrow of ‘Row Labels’
10. From the menu select ‘Value Filters’ then ‘Top 10’
11. The following prompt will appear, click the drop-down box that says ‘Top’, change to ‘Bottom’
12. Click the ‘OK’ button



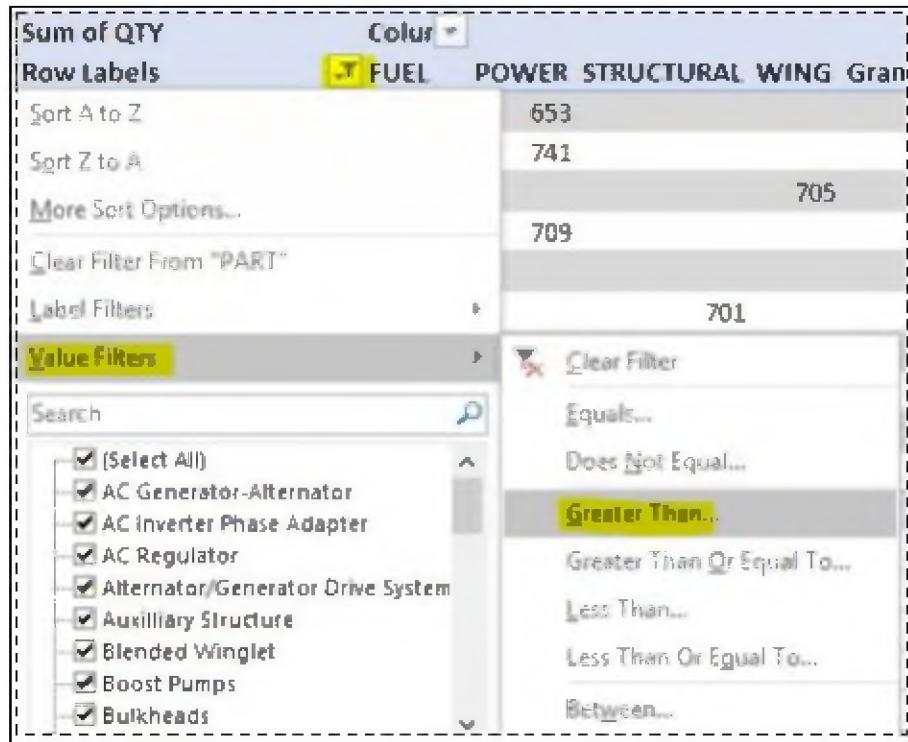
The following will be the result, you may *change the quantity from 10 to any number you would like to see.*

Sum of QTY	Color	FUEL	POWER	STRUCTURAL	WING	Grand Total
Row Labels						
AC Generator-Alternator			653			653
AC Inverter Phase Adapter			741			741
Engine Mounts				705		705
Extinguishing System			709			709
Fuel Flow Indicating		741				741
Fuselage Panels				701		701
NAC/Pylon Wing Fitting					729	729
Overheat Detection			721			721
Smoke Detection			701			701
Transfer Valves		709				709
<b>Grand Total</b>		1450	3525	701	1434	7110

You may add a [Timeline Slicer](#) to quickly see the *top or bottom 10 by quarter* or other time frames.

Lastly, to show how many parts sold more than 800 in quantity:

1. Click the drop-down arrow of ‘Row Labels’
2. From the menu select ‘Value Filters’ then ‘Greater Than...’



3. The following prompt will appear, enter the number ‘800’ in the field after the drop-down box ‘is greater than’
4. Click the ‘OK’ button

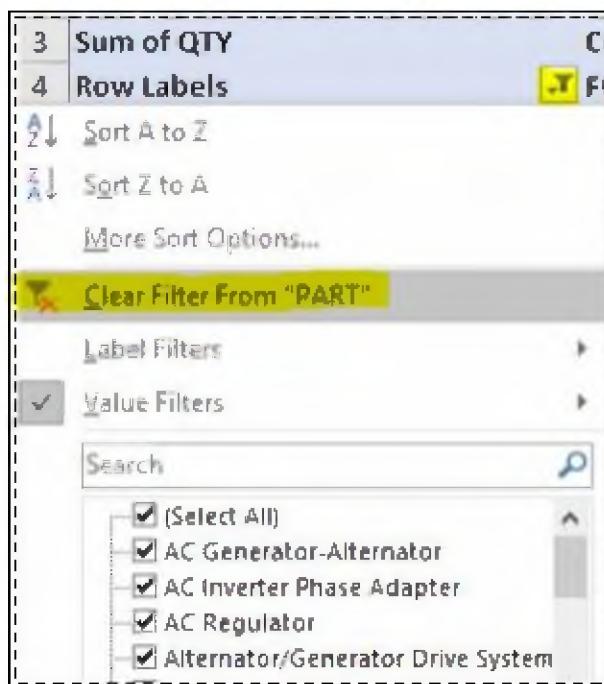


The following will be the result:

Sum of QTY	Color	FUEL	POWER	STRUCTURAL	WING	Grand Total
Row Labels						
Alternator/Generator Drive System			805			805
Auxiliary Structure					949	949
Boost Pumps		841				841
Bulkheads					801	801
Digital Fuel Flow System		841				841
Engine Lubrication System		849				849
Enging Struts					901	901
Fire Detection			837			837
Fire Protection			1065			1065
Fuel Dump Fuel Hose		881				881
Fuel Pressure Indicating		817				817
Fuel S.O.V.		821				821
Keel Beam				857		857
Lithium Battery			801			801
Longeron/Stringers					809	809
Panels					805	805
Spars					817	817
Wing Webs					849	849
<b>Grand Total</b>		5050	3508	857	5931	15346

To remove a filter:

1. Click the drop-down arrow of ‘Row Labels’
2. From the menu select **Clear Filter From “...”**



# CHAPTER 7

## ***Introduction To Dashboards***

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In the previous examples, we added one Pivot Table per worksheet, in this chapter we will demonstrate how to add more than one Pivot Table to a single worksheet, including how to create and format a basic Dashboard.

In [chapter 9](#), we will illustrate how to update (Refresh) data once you have a Pivot Table or Dashboard formatted in a preferred layout.

A few things to remember when designing a new Dashboard:

1. How will your audience view the Dashboard, in paper form, on a website, mobile device? You'll want to be mindful of *spacing* and *the use of colors* if your audience reads the Dashboard on paper printed in black and white ink or limit the amount information displayed if viewing on a mobile device.
2. Does your audience require separate views of the data? Perhaps a manager is interested in only his or her own geographic area? You can add slicers to assist in filtering rather than creating separate reports for each locale.
3. What are the data sources for your Dashboard and will the data be available on the *same frequency* if you were to publish a daily or weekly basis?
4. How will you maintain your Dashboard? Will it require manual updating or will your design allow the data to be refreshed when customers open the file? *This may also depend on required permissions to access the data source.*

It's been my experience to start small when creating a Dashboard, once your customers start using the information, they almost always ask for more and request changes to the layout. You'll want to manage expectations. What seems like a simple fix to your customer may require a lot of data preparation behind the scenes. It is important to balance the amount of time you spend creating and maintaining the Dashboard with the benefits it provides.

---

### **Example:**

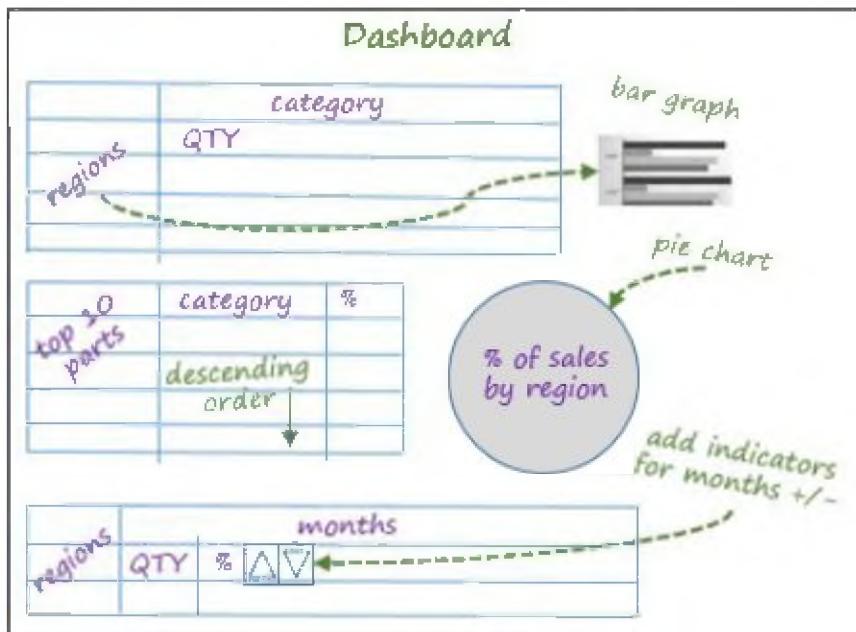
You've been asked to create a monthly sales Dashboard to provide the following information:

1. Quantity of parts sold by region and category, including a bar graph
2. Top 10 parts sold, combined quantity and percent of total
3. A pie chart with the percent of total sales by region
4. Quantity of parts sold by region and month
  1. Include a column that shows if the total sales were *above*, *below*, or *even* with the previous month

The data is generated from a database query. You'll receive a new report at the start of every

month for the prior month's sales. Users will access this report online as well as in printed form. The report will not be viewed on mobile devices.

The customer has included a whiteboard photo of how they would like to see the layout:



### WEB ADDRESS & FILE NAME FOR EXERCISE:

<http://bentonexcelbooks.my-free.website/excel-2016>

DashboardData.xlsx

---

You've reviewed the customer's requirements and while they didn't initially ask for the ability to *filter by time period or region*, you anticipate this is something they will want and therefore decide to design accordingly. In order to build this Dashboard you will need to:

- Create 4 Pivot Tables
  - Accommodate up-to 12 months of data
  - Insert 2 graphs
  - Add 2 slicers
  - Size to fit or be “*shrunk down*” to display on one legal size (8 ½ x 14 inch) piece of paper
  - Use colors on graphs and indicators sparingly, as you don't know if the paper form will be printed in color or in black and white ink
- 

### Adding Multiple Pivot Tables To A Worksheet

#### Pivot Table #1

#### Quantity of parts sold by region and category

Create a new Pivot Table report, to see screenshot illustrations of steps #1 - #4, please see [chapter 3 ‘Summarizing Numbers’](#):

1. Open the DashboardData.xlsx spreadsheet and highlight **columns A:F** (select columns, not cells)
2. From the Ribbon select **INSERT : PivotTable**
3. Select the '**New Worksheet**' radio button
4. Click the '**OK**' button

A new tab will be created and the '*PivotTable Fields*' pane should appear on the left side of your screen.

5. Rename the tab from '**Sheet1**' to '**Dashboard**'

**From:**



**To:**



6. In the '*PivotTable Fields*' pane select the following fields:
  1. REGION (Rows section)
  2. CATEGORY (Columns section)
  3. QTY (Values section) **Please note: when adding the QTY fields, it will default to 'Count of OTY', change to 'Sum'**

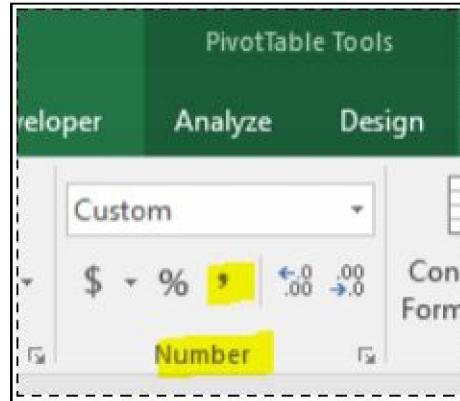
The screenshot shows a PivotTable report in the foreground and the 'PivotTable Fields' pane in the background. The PivotTable report displays data for FUEL categories across three regions: Central, East, and West. The 'PivotTable Fields' pane shows the selected fields: REGION, CATEGORY, and QTY. The QTY field is set to 'Sum' in the Values area.

	FUEL	POWER	STRUCTURAL	WING	(blank)	Grand Total
Central	2622	2693	690	3065		9070
East	2541	2700	696	3051		8988
West	2394	2637	836	2915		8782
(blank)						
Grand Total	7557	8030	2222	9031		26840

7. Change the label names:
  1. Change cell '**A3**' to **QUANTITY**
  2. Change cell '**A4**' to **REGIONS**
  3. Change cell '**B3**' to **CATEGORY**
  4. Change cell '**A9**' to **TOTAL** (this will also change cell '**G9**')

	A	B	C	D	E	F	G
1							
2							
3	QUANTITY	CATEGORY					
4	REGIONS	FUEL	POWER	STRUCTURAL	WING	(blank)	TOTAL
5	Central		2,622	2,693	690	3,065	9,070
6	East		2,541	2,700	696	3,051	8,988
7	West		2,394	2,637	836	2,915	8,782
8	(blank)						
9	<b>TOTAL</b>		<b>7,557</b>	<b>8,030</b>	<b>2,222</b>	<b>9,031</b>	<b>26,840</b>

8. Change the number format for the ‘QTY’ to include a comma (zero decimal places)



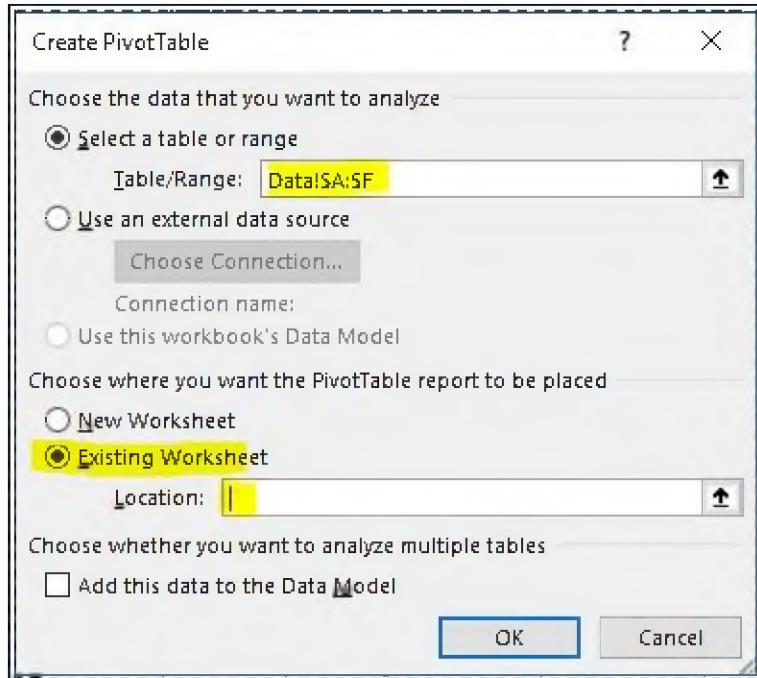
We'll add the bar chart in the [last part](#) of this chapter.

---

## Pivot Table #2

### Top 10 parts sold, combined quantity and percent of total

1. Return to the ‘Data’ tab and highlight **columns A:F**
2. From the Ribbon select **INSERT : PivotTable**
3. When you receive the **Create PivotTable** prompt, **select the ‘Existing Worksheet’ radio button**
4. Place your cursor inside the ‘**Location:**’ box



- With your cursor still inside the 'Location:' box click the 'Dashboard' tab and then cell 'A11'

The 'Create PivotTable' dialog box is open over a spreadsheet. The 'Location' field contains 'Dashboard!\$A\$11'. The 'OK' button is highlighted.

- Click the 'OK' button

Your screen should look similar to the following:

A screenshot of Microsoft Excel showing a PivotTable Fields pane. The pane lists fields: REGION, NAME, CATEGORY, PART, EOM\_DATE, and QTY. The QTY field is checked. The pane also shows sections for Filters, Columns, Rows, and Values. A note at the bottom says "To build a report, choose fields from the PivotTable Field List".

7. In the 'PivotTable Fields' pane select the following fields:

1. PART (Rows section)
2. CATEGORY (Rows section)
3. QTY two times (Values section) **Please note: when adding the QTY fields, it will default to 'Count of QTY', change to 'Sum'**

A screenshot of Microsoft Excel showing a PivotTable Fields pane with 'QTY' checked. A red annotation points to the 'QTY' checkbox with the text 'Add QTY twice'. Another red annotation points to the 'Values' dropdown with the text 'Will default to "Count of QTY", change to Sum'. A third red annotation points to the 'PART' and 'CATEGORY' dropdowns with the text 'Fields should be in this order'.

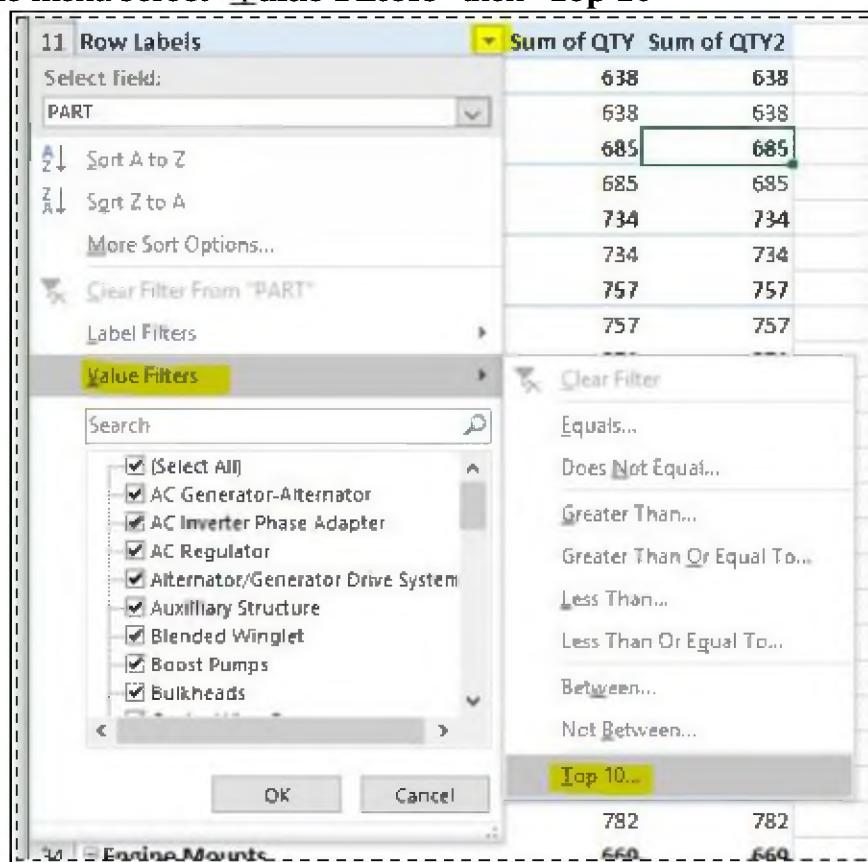
## Why are the ' $\Sigma$ Values' fields defaulting to Count instead of Sum?

When Pivot Table source data contains blank rows,

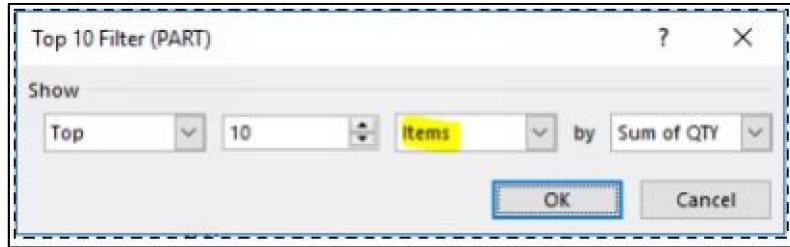
in this case because we're selecting columns (Data!\$A:\$F) instead of a specific cell range (Data!\$A\$1:\$F\$3889) our source data contains blank rows. For some reason when this occurs Microsoft® has decided to default fields going into the ‘ $\Sigma$  Values’ section to count. In order to prepare our Dashboard to receive new data, the best practice is to use columns instead of a specific cell range.

If you search the web, users have applied workarounds such as changing the blank rows to contain values of zero. For data quality and troubleshooting purposes, I do not modify source data unless required for ETL (Extract Transform Load) processes.

8. Click the drop-down arrow of ‘Row Labels’ (cell ‘A11’)
9. From the menu select ‘Value Filters’ then ‘Top 10’



10. The following prompt will appear, click the ‘OK’ button



Next, we'll change the display so the 'Category' field appears as a column

11. With your cursor in cell 'A11' from the **PivotTable Tools** Ribbon select the tab **DESIGN**
12. Click the drop-down box 'Report Layout' then 'Show in Tabular Form'

We also need to hide the 'PART' subtotals

13. With your cursor in cell 'A11' from the **PivotTable Tools** Ribbon select the tab **DESIGN**
14. Click the drop-down box 'Subtotals' then 'Do Not Show Subtotals'

*To hide 'Part' subtotal rows*

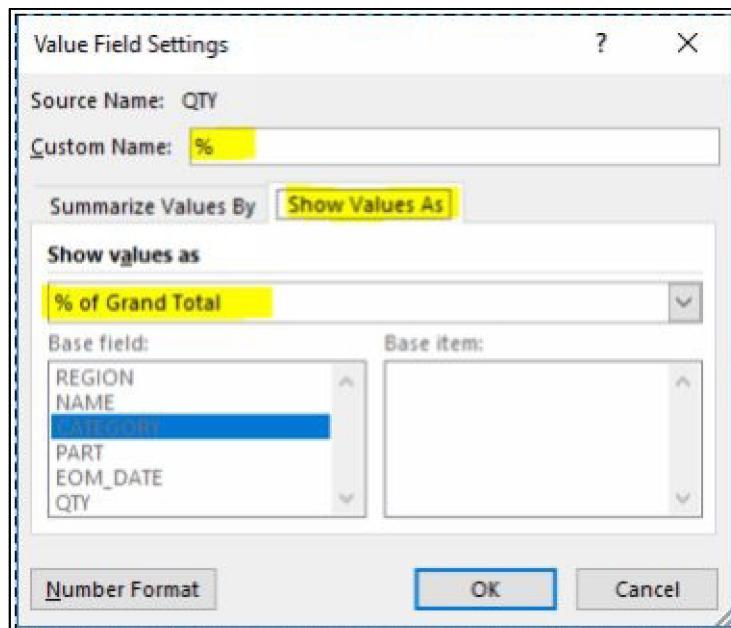
15. Click the second ‘Sum of QTY’ drop-down box and select ‘Value Field Settings...’

The following dialogue box should appear:

16. In the field ‘Custom Name:’ change to %

17. From the ‘Show values as’ drop-down list select ‘% of Grand Total’

18. Click the ‘OK’ button



	PART	CATEGORY	Sum of QTY	%
11	Auxiliary Structure	WING	871	10.60%
12	Boost Pumps	FUEL	789	9.61%
13	Digital Fuel Flow System	FUEL	783	9.53%
14	Engine Lubrication System	FUEL	782	9.52%
15	Engine Struts	WING	825	10.04%
16	Fire Protection	POWER	967	11.77%
17	Fuel Dump Fuel Hose	FUEL	822	10.01%
18	Keel Beam	STRUCTURAL	812	9.89%
19	Spars	WING	772	9.40%
20	Wing Webs	WING	791	9.63%
21	Grand Total		8214	100.00%

19. Change the label names:

1. Change cell ‘A11’ to **TOP 10 PARTS SOLD**
2. Change cell ‘C11’ to **QTY SOLD**
3. Change cell ‘A22’ to **TOTAL**

	A	B	C	D	
10					
11	TOP 10 PARTS SOLD	▼	CATEGORY ▼	QTY SOLD	%
12	Auxillary Structure	WING		871	10.6%
13	Boost Pumps	FUEL		789	9.6%
14	Digital Fuel Flow System	FUEL		783	9.5%
15	Engine Lubrication System	FUEL		782	9.5%
16	Engine Struts	WING		825	10.0%
17	Fire Protection	POWER		967	11.8%
18	Fuel Dump Fuel Hose	FUEL		822	10.0%
19	Keel Beam	STRUCTURAL		812	9.9%
20	Spars	WING		772	9.4%
21	Wing Webs	WING		791	9.6%
22	TOTAL			8,214	100.0%

20. Change the number format for the ‘QTY SOLD’ to include a comma (zero decimal places)

### Pivot Table #3

#### Quantity of parts sold by region and month

1. Return to the ‘Data’ tab and highlight **columns A:F**
2. From the Ribbon select **INSERT : PivotTable**
3. When you receive the **Create PivotTable** prompt, **select the ‘Existing Worksheet’ radio button**
4. Place your cursor inside the ‘**Location:**’ box
5. With your cursor still inside the ‘**Location:**’ box click the ‘**Dashboard**’ tab and then cell ‘**A26**’

The ‘**Location:**’ box should now have **Dashboard!\$A\$26** entered

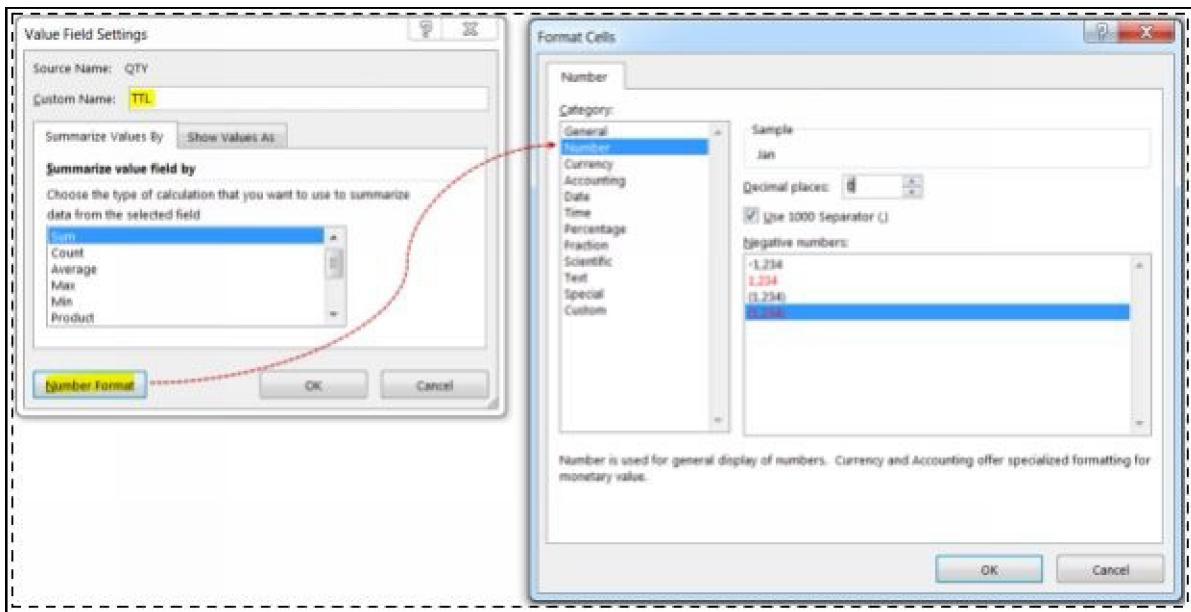
	A	B	C	D	E	F	G
1							
2							
3	QUANTITY	CATEGORY					
4	REGIONS	FUEL	POWER	STRUCTURE	WING (blank)	TOTAL	
5	Central	2,622	2,693	690	3,065	9,070	
6	East	2,541	2,700	696	3,051	8,988	
7	West	2,394	2,637	836	2,915	8,782	
8	(blank)						
9	<b>TOTAL</b>	<b>7,557</b>	<b>8,030</b>	<b>2,222</b>	<b>9,031</b>	<b>26,840</b>	
10							
11	TOP 10 PARTS SOLD	CATEGORY	QTY SOLD	%			
12	Auxiliary Structure						
13	Boost Pumps						
14	Digital Fuel Flow System						
15	Engine Lubrication System						
16	Engine Struts						
17	Fire Protection						
18	Fuel Dump Fuel Hose						
19	Keel Beam						
20	Spars						
21	Wing Webs						
22	<b>TOTAL</b>						
23							
24							
25							
26							
27							
28							
29							

In the ‘PivotTable Fields’ pane select the following fields:

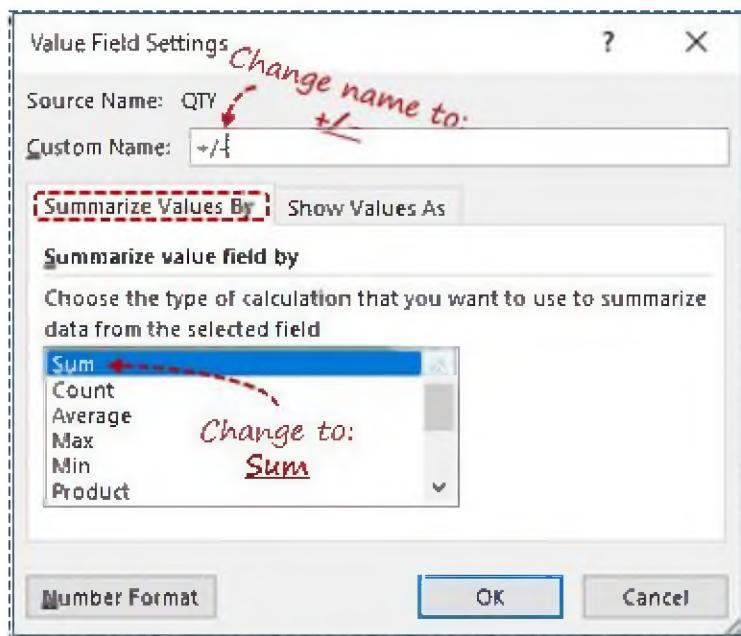
1. REGION (Rows section)
  2. EOM\_DATE (Columns section)
  3. QTY **two** times (Values section) **Please note: when adding the QTY fields, it will default to ‘Count of OTY’**
6. Click the ‘Count of QTY’ drop-down box and select ‘Value Field Settings...’



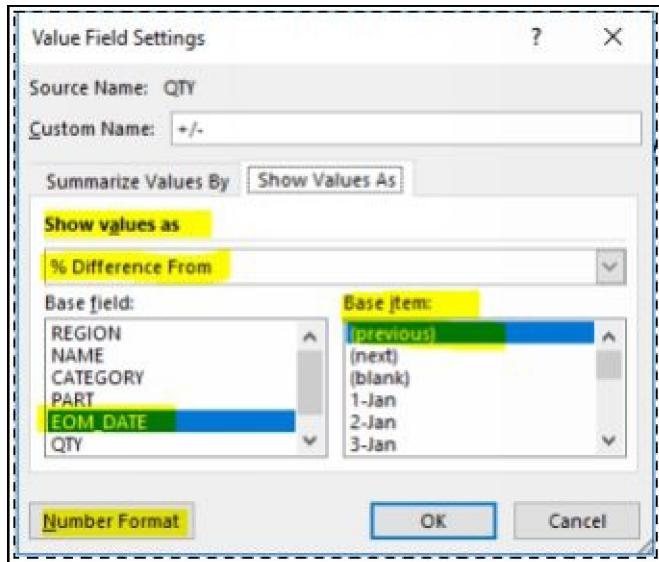
7. In the box ‘Summarize value field by’ select ‘Sum’
8. In the field ‘Custom Name:’ change to TTL
9. Change the number format for ‘TTL’ columns to include a comma (zero decimal places)



10. Click the ‘Count of QTY2’ drop-down box and select ‘Value Field Settings...’
11. In the box ‘Summarize value field by’ select ‘Sum’
12. In the field ‘Custom Name:’ change to +/-



13. Select the tab ‘Show Values As’



14. From the 'Show values as' drop-down list select '% Difference From'
15. Select Base field: EOM\_DATE & Base item: (previous)
16. Optionally, change the number format percent to one decimal place
17. Click the 'OK' button
18. Change the label names:
  1. Change cell 'A28' to REGIONS
  2. Change cell 'B26' to MONTH-YR
  3. Change cell 'B28' to TTL
  4. Change cell 'A33' to TOTAL

(blank) columns will appear at  
the end on the months column  
for Excel® 2013 → users

A	B	C	D	E	F	G
25						
26	MONTH - YR					
27	(blank)					
28	REGIONS	TTL	+/-	TTL	+/-	TTL
29	Central			1,015		695 -31.5%
30	East			1,048		720 -31.3%
31	West			1,037		715 -31.1%
32	(blank)			#NULL!		#NULL!
33	TOTAL			3,100		2,130 -31.3%

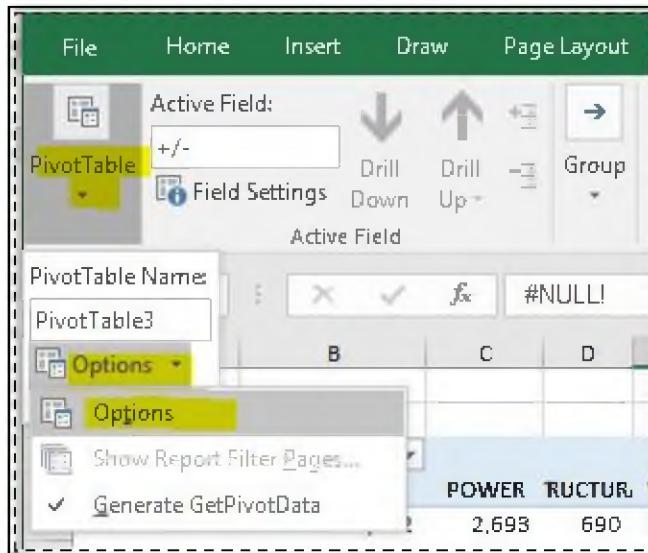
## Formatting The Dashboard

We've added 3 of the 4 Pivot Tables for this Dashboard, before going further, let's format the tables to improve readability.

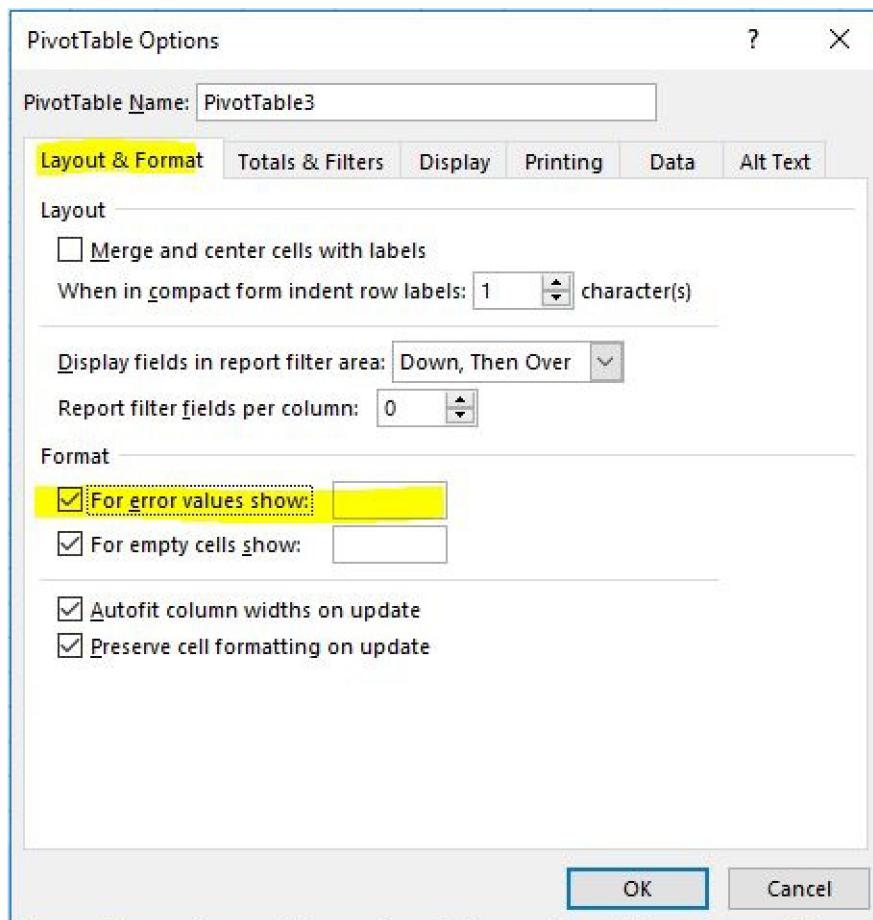
*Due to page size limitations, the image of the entire Dashboard is not displayed:*

	A	B	C	D	E	F	G	H
1								
2								
3	QUANTITY	CATEGORY						
4	REGIONS	FUEL	POWER	STRUCTUR	WING	(blank)	TOTAL	
5	Central	2,622	2,693	690	3,065		9,070	
6	East	2,541	2,700	696	3,051		8,988	
7	West	2,394	2,637	836	2,915		8,782	
8	(blank)							
9	<b>TOTAL</b>	7,557	8,030	2,222	9,031		<b>26,840</b>	
10								
11	TOP 10 PARTS	CATEGORY	QTY SOLD	%				
12	Auxiliary Strt	WING	871	10.6%				
13	Boost Pumps	FUEL	789	9.6%				
14	Digital Fuel Fl	FUEL	783	9.5%				
15	Engine Lubric	FUEL	782	9.5%				
16	Engine Struts	WING	825	10.0%				
17	Fire Protectic	POWER	967	11.8%				
18	Fuel Dump F	FUEL	822	10.0%				
19	Keel Beam	STRUCTURAL	812	9.9%				
20	Spars	WING	772	9.4%				
21	Wing Webs	WING	791	9.6%				
22	<b>TOTAL</b>		8,214	100.0%				
23								
24								
25								
26	MONTH - YR							
27	(blank)		31-Jan		28-Feb		31-Mar	
28	REGIONS	TTL	+/-	TTL	+/-	TTL	+/-	TTL
29	Central			1,015		695	-31.5%	991
30	East			1,048		720	-31.3%	945
31	West			1,037		715	-31.1%	945
32	(blank)			#NULL!		#NULL!	#NULL!	#N
33	<b>TOTAL</b>			3,100		2,130	-31.3%	2,881

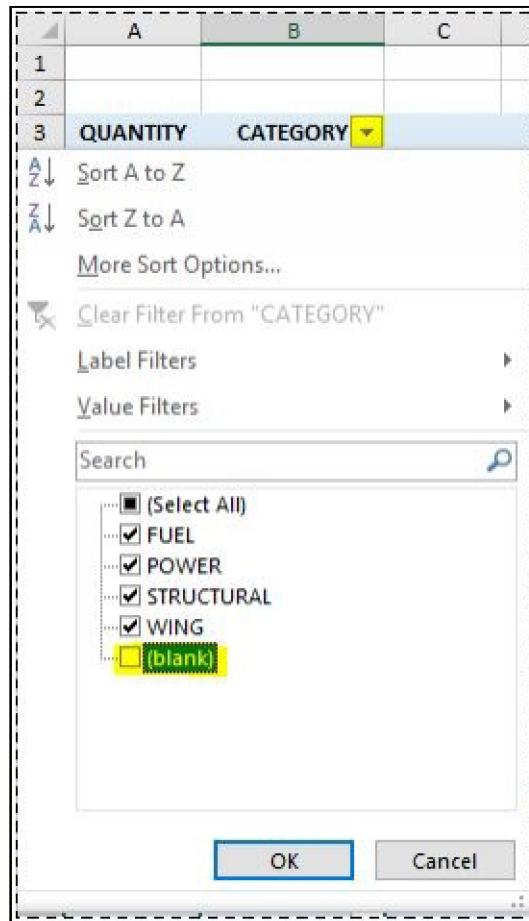
- To change the display of formula error messages (such as #NULL!, #DIV/0!), select cell ‘E32’
- From the **PivotTable Tools** Ribbon select the tab **Analyze**
- Select the PivotTable drop-down box, then the ‘**Options**’ drop-down box, then ‘**Options**’



4. Under the ‘Layout & Format’ tab, check the box ‘For error values show:’
5. Click the ‘OK’ button



6. To filter out the (blank) columns and rows, select cell ‘B3’ click the drop-down arrow and uncheck the (blank) field

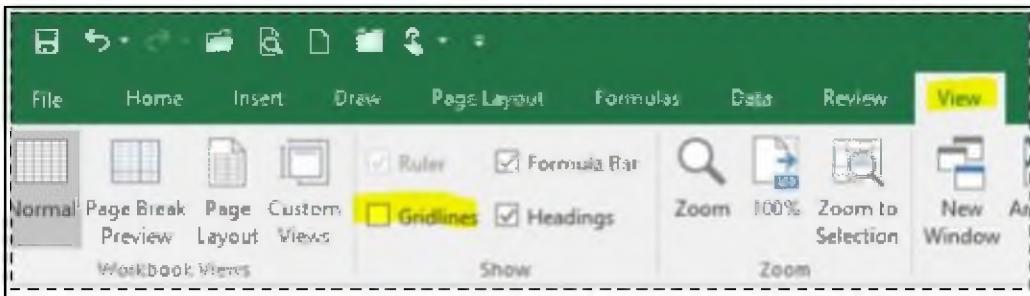


7. Click the 'OK' button
8. Repeat steps #6 & #7 for cell 'B11' (***DO NOT REPEAT FOR CELL 'B26'***)
9. Select cell 'X27' (Total TTL), right-click and select 'Remove Grand Total'

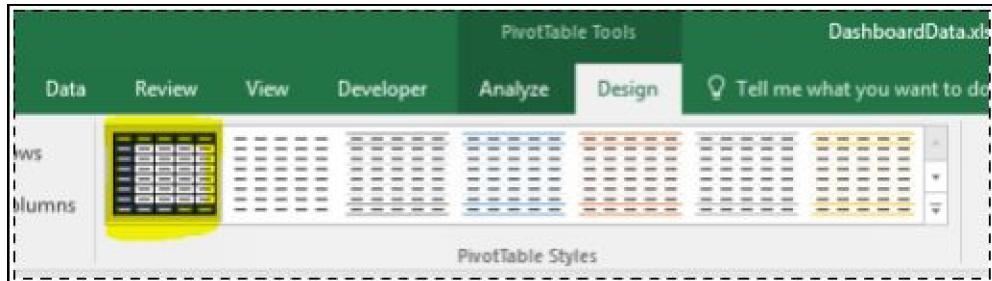
O	P	Q	R	S	T	U	V	Total TTL	Total +/-
25									
26									
27	31-Aug		30-Sep		31-Oct			Total TTL	Total +/-
28	+/-	TTL	+/-	TTL	+/-	TTL	+/-		
29	0.0%	992	-0.1%	1,000	0.8%	697	-30.3%	9,070	
30	0.0%	947	-2.6%	971	2.5%	719	-26.0%	8,988	
31	4.3%	905	-4.7%	948	4.8%	714	-24.7%	8,782	
32	1.4%	2,844	-2.4%	2,919	2.6%	2,130	-27.0%	26,840	
33									
34									
35									
36									
37									
38									
39									
40									

A context menu is open over cell V27. The menu items are: Copy, Format Cells..., Number Format..., Refresh, Remove Grand Total, Summarize Values By, Value Field Settings..., PivotTable Options..., and Hide Field List. The 'Remove Grand Total' option is highlighted.

10. From the Ribbon select the 'VIEW' tab and *uncheck* the 'Gridlines' box



11. Click cell 'A3', and then from the **PivotTable Tools** Ribbon select the tab **DESIGN** : **PivotTable Styles**

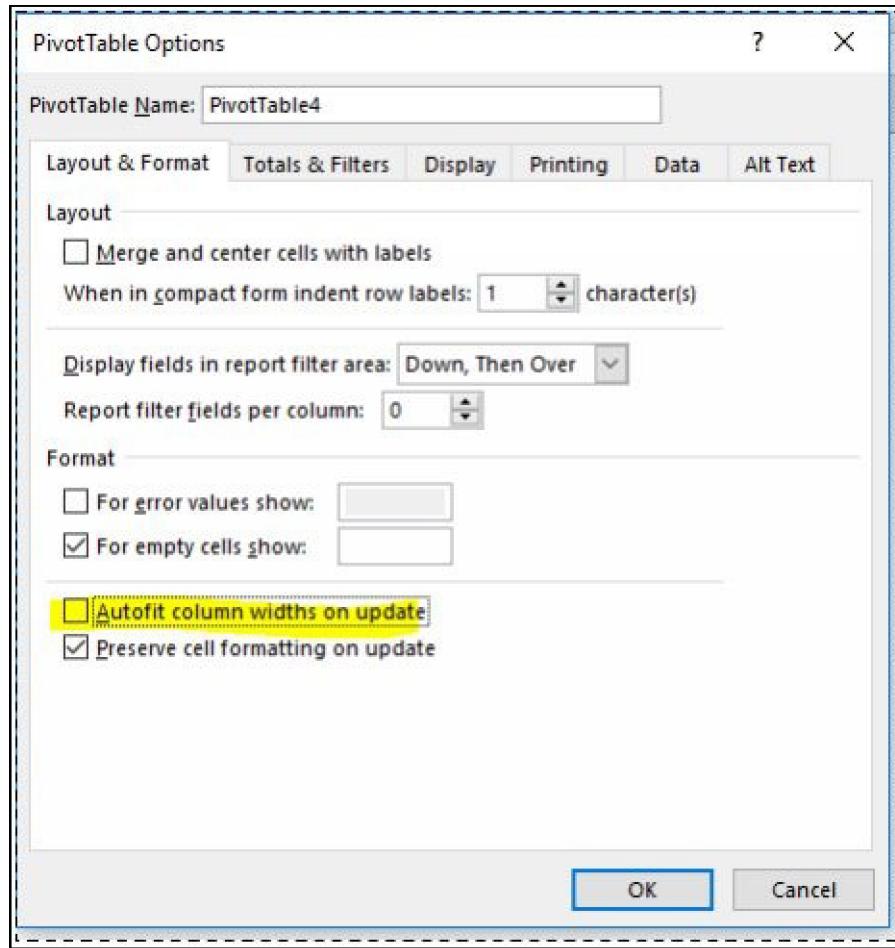


12. From the **PivotTable Styles** drop-down, select a format style you like
13. Repeat steps #11 & #12 for PivotTables in cells 'A11' & 'A26'
14. In cell 'A1' enter the text '**Monthly Dashboard**'
15. In cell 'B1' enter the text '**Airplane Parts by Region**'
16. Increase the font size of '**A1**' & '**B1**' to 18 and bold, *optionally you may change the font type to 'Consolas' and color of your choice*
17. **Right-click** on cell 'A3' and from the pop-up menu select '**PivotTable Options**'

The screenshot shows a Microsoft Excel spreadsheet with a PivotTable. The PivotTable has columns labeled 'POV', 'STRUCT', 'WING', and 'Grand Total'. Row 11, containing the value 'Sum %', is selected. A context menu is open over this cell, showing options like 'Copy', 'Format Cells...', 'Number Format...', 'Refresh', 'Sort', 'Remove "Sum of QTY"', 'Summarize Values By', 'Show Values As', 'Value Field Settings...', 'PivotTable Options...', and 'Hide Field List'. The 'Layout & Format' tab is active. A red annotation with a dashed arrow points from the text 'To prevent the columns from auto-adjusting' to the 'Autofit column widths on update' checkbox in the menu.

	A	B	C	D	E	F
1	Mo	Calibri	11	A A \$ % ,		
2	Ai	B I				on
3	Sum of QTY	Column Labels				
4	Row	Copy	POV	STRUCT	WING	Grand Total
5	Cent	Format Cells...	##	690	##	9970
6	East	Number Format...	##	696	##	8988
7	West	Refresh	##	836	##	8782
8	Grand	Sort	##	2222	##	26840
9		Remove "Sum of QTY"				
10	PART	Summarize Values By	Sun %			
11	■ Aut	##	#####			
12	■ Bo	##	1.61%			
13	■ Di	##	1.53%			
14	■ En	##	1.52%			
15	■ En	PivotTable Options...	##	#####		
16	■ Fire Protect	Hide Field List	##	#####		
17	■ Fuel Dump	F FUEL	##	#####		
18	■ Keel Beam	STRUCTURAL	##	1.89%		
19	■ Spars	WING	##	1.40%		
20	■ Wing Webs	WING	##	1.63%		
21	Grand Total		##	#####		
22						

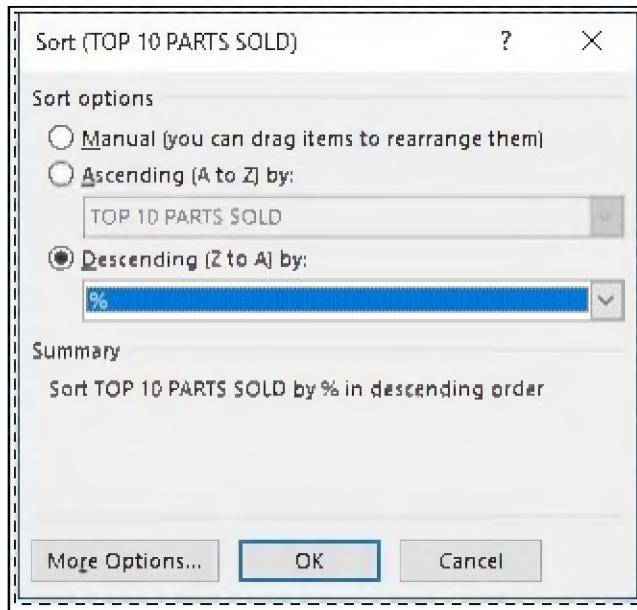
18. Under the ‘Layout & Format’ tab, uncheck the box ‘Autofit column widths on update’
19. Click the ‘OK’ button
20. Repeat steps #17 - #19 for cells ‘A11’ & ‘A26’
21. Then expand columns widths, so no # symbols display



To change the sort order for the '**TOP 10 PARTS SOLD**' to descending

22. Click the drop-down box for cell '**A11**' and then '**More Sort Options...**'

23. Select the '**Descending (Z to A) by:**' radio button
  24. Click the drop-down box and the '**%**' option
  25. Click the '**OK**' button



We're almost done! However, one of the trickiest (*and most frustrating*) aspects about formatting Pivot Tables is keeping the desired format **when new data is added**, especially when working with date values, in this case when new months are included. You'll learn more about adding data in [chapter 9](#).

Meanwhile, in order to prepare our Dashboard to keep the formatting for all new data. Sometimes, we have to perform **redundant and non-intuitive steps**. Our preferred formatting for the monthly Pivot Table is as follows:

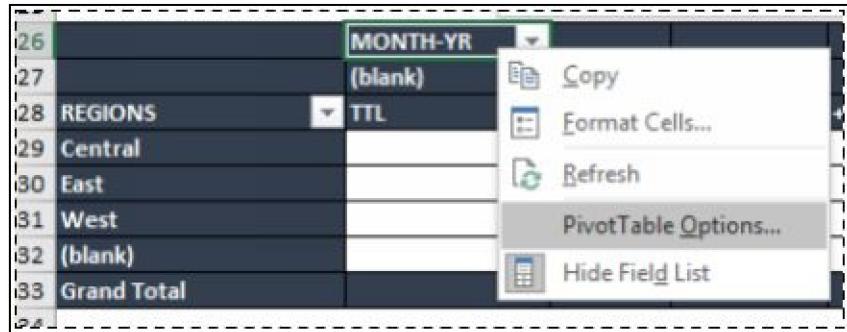
- Date displayed as MMM-YYYY (i.e. Jan-2017)
- The month and year centered over the columns 'TTL' and '+/-'
- Hide the (blank) rows and columns

*Because date Columns are dynamic, they require additional steps to keep formatting*

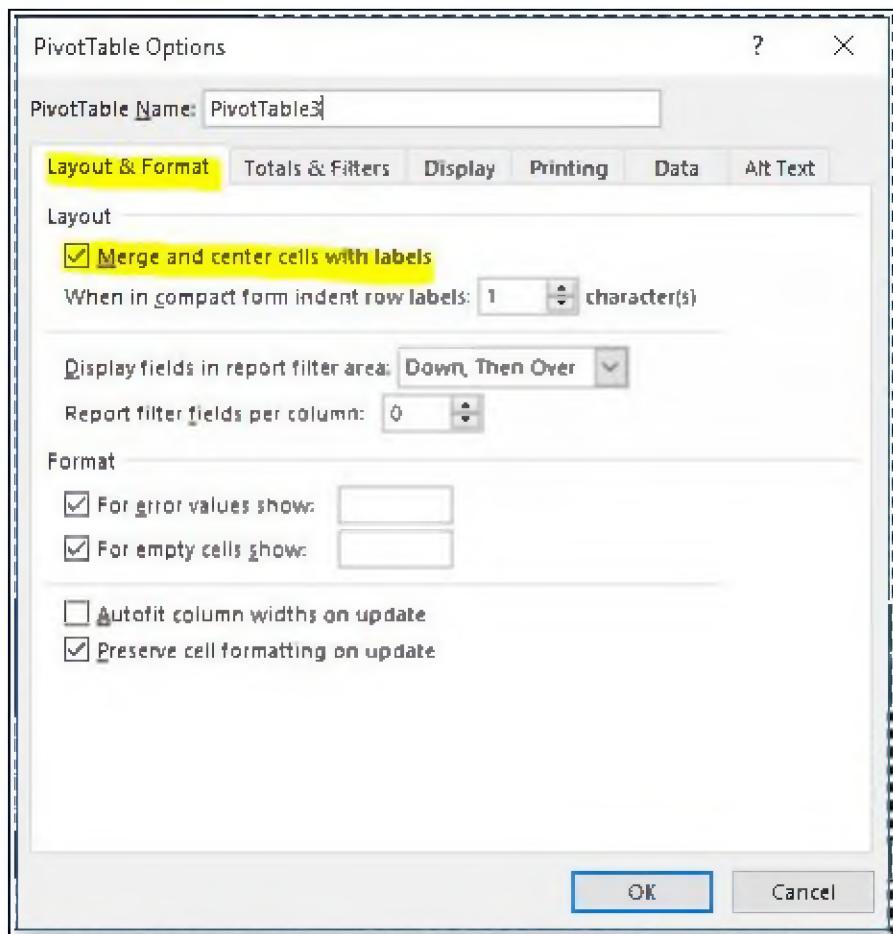
REGIONS	MONTH-YR	Jan-2017		Feb-2017	
		TTL	+/-	TTL	+/-
Central		1015		695	-31.5%
East		1048		720	-31.3%
West		1037		715	-31.1%
Grand Total		3100		2130	-31.3%

*When new months are added we want to keep this date format centered over both columns*

26. Right-click cell 'B26'
27. From the pop-up menu, select '**PivotTable Options**'



28. Under the ‘Layout & Format’ tab, check the box ‘Merge and center cells with labels’
29. Click the ‘OK’ button



To apply the date format we need to ungroup the field

**Excel 2013 users may skip step #30**

30. Right-click cell ‘B27’, from the pop-up menu, select ‘Ungroup’

7	West	2,394	2,637	836
8	<b>TOTAL</b>	<b>7,557</b>		
9				
10				
11	<b>TOP 10 PARTS SOLD</b>	<b>CATEGORY</b>		
12	• Fire Protection	POWER		
13	• Auxiliary Structure	WING		
14	• Engine Struts	WING		
15	• Fuel Dump Fuel Hose	FUEL		
16	• Keel Beam	STRUCTURAL		
17	• Wing Webs	WING		
18	• Boost Pumps	FUEL		
19	• Digital Fuel Flow System	FUEL		
20	• Engine Lubrication Syste	FUEL		
21	• Spars	WING		
22	<b>TOTAL</b>			
23				
24				
25				
26		MONTH-YR		
27	(blank)			
28	REGIONS	TTL		

You'll notice when we did this our '**+/-%**' column reverted back to the sum of quantity (Excel® 2016 only). I assume Excel® did this because we ungrouped the field. Yet, it is still perplexing as to why it did not keep our '**Show values as**' commands. Therefore, we must re-apply steps [#13 - #17](#) from above to apply the '**+/-%**' column.

I deliberated about structuring this lesson differently to avoid having to perform these redundant steps. However, I considered this to be a good example of some of the challenges you may experience when building Dashboards. Formatting glitches occur frequently. Don't be surprised if you find yourself spending a sizable amount of time addressing them.

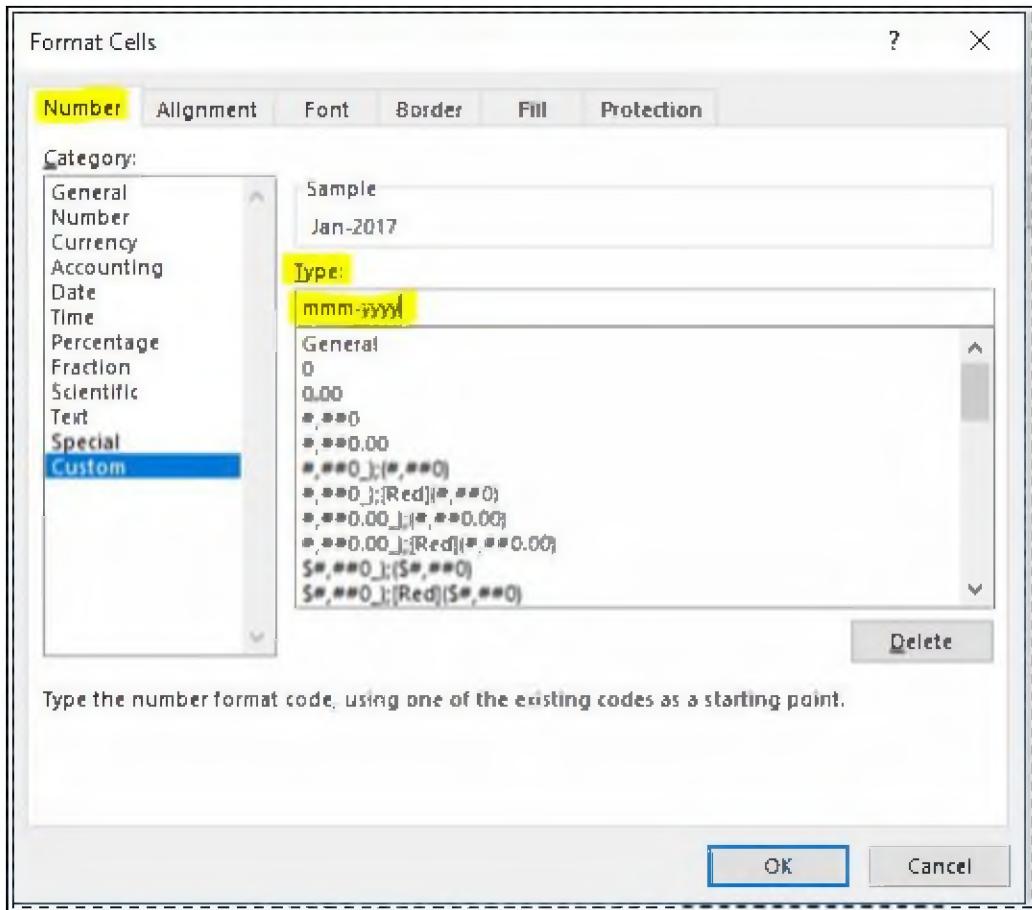
	MONTH-YR	<b>+/-</b>	
	1/31/2017		
REGIONS		TTL	+/-
Central		1,015	1015
East		1,048	1048
West		1,037	1037
{blank}			
<b>TOTAL</b>		<b>3,100</b>	<b>3100</b>

After changing the '**+/-%**' column back to display the '**% Difference From**' the previous month

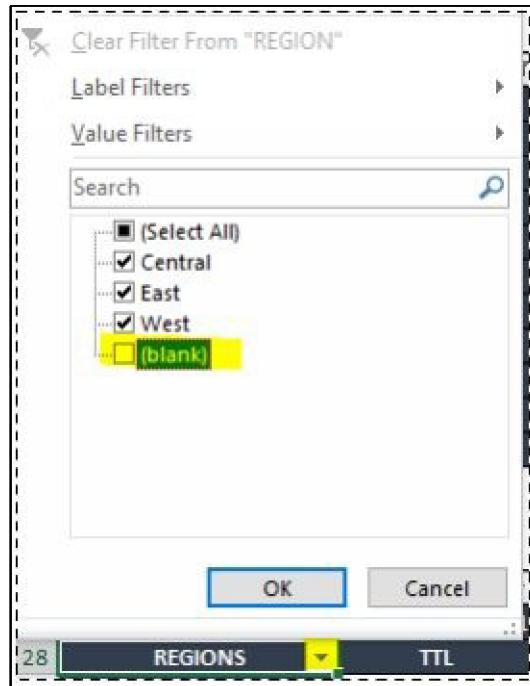
31. Highlight cells 'B27:W27' and **right-click** cell 'W27', from the pop-up menu, select '**Format Cells...**'

	A	B	C	D	E	F	G	
22	TOTAL		8,234	100.0%				
23								
24								
25								
26		MONTH-YR						
27		JAN	1/31/2017	2/28/2017	3/31/2017			
28	REGIONS		TTL	+/-	TTL	+/-	TTL	
29	Central		1,015		695	-31.5%	991	42.6%
30	West		1,048		720	-31.9%	945	31.5%

32. Under the ‘Number’ tab select ‘Custom’
33. In the ‘Type:’ field enter ‘mmm-yyyy’
34. Click the ‘OK’ button



35. To filter out the (blank) columns and rows, select cell ‘A28’ click the drop-down arrow and uncheck the (blank) field



36. Click the 'OK' button

I know these formatting steps may have seemed onerous at times, but they have prepared our Dashboard to receive new data and keep our existing formatting.

*Due to page size limitations, some columns have been hidden:*

Monthly Dashboard						
Airplane Parts by Region						
QUANTITY	CATEGORY	QTY	POWER	STRUCTURAL	WING	TOTAL
REGIONS	FUEL	2,622	2,693	690	3,063	9,070
Central						
East						
West						
TOTAL		7,357	8,036	2,222	9,031	26,840

TOP 10 PARTS SOLD				CATEGORY	QTY SOLD	%
■ Fire Protection	POWER	900			12.5%	
■ Auxiliary Structure	WING	893			12.2%	
■ Engine Struts	WING	825			10.0%	
■ Fuel Dump Fuel Hose	FUEL	822			10.0%	
■ Keel Beam	STRUCTURAL	812			9.8%	
■ Wing Web	WING	801			9.2%	
■ Boost Pumps	FUEL	789			9.0%	
■ Digital Fuel Flow System (DFL)	FUEL	783			9.0%	
■ Engine Lubrication System (ELS)	FUEL	782			9.0%	
■ Spars	WING	772			9.4%	
TOTAL		8,214			100.0%	

REGIONS	MONTH-YR		Jan-2017		Feb-2017		Mar-2017		Oct-2017	
	TTL	+/-	TTL	+/-	TTL	+/-	TTL	+/-	TTL	+/-
Central	1,015		695	-31.5%	991	42.6%	697	-30.3%		
East	1,048		720	-31.3%	945	31.3%	719	-26.0%		
West	1,057		715	-31.1%	945	32.2%	714	-24.7%		
TOTAL	3,100		2,130	-31.3%	2,881	35.3%	2,130	-27.0%		

## Adding Charts To The Dashboard

### Pie chart with the percent of total sales by region

To add our first chart we'll need to add another Pivot Table, however the customer has requested *only the pie chart and not the table displaying the percent of sales by region*. Therefore, we'll

create the Pivot Table on a separate tab to save space and place only the pie chart on the Dashboard.

1. Return to the ‘Data’ tab and highlight **columns A:F**
2. From the Ribbon select **INSERT : PivotTable**
3. Select the ‘New Worksheet’ radio button
4. Click the ‘OK’ button

A new tab will be created and the ‘PivotTable Fields’ pane should appear on the left side of your screen.

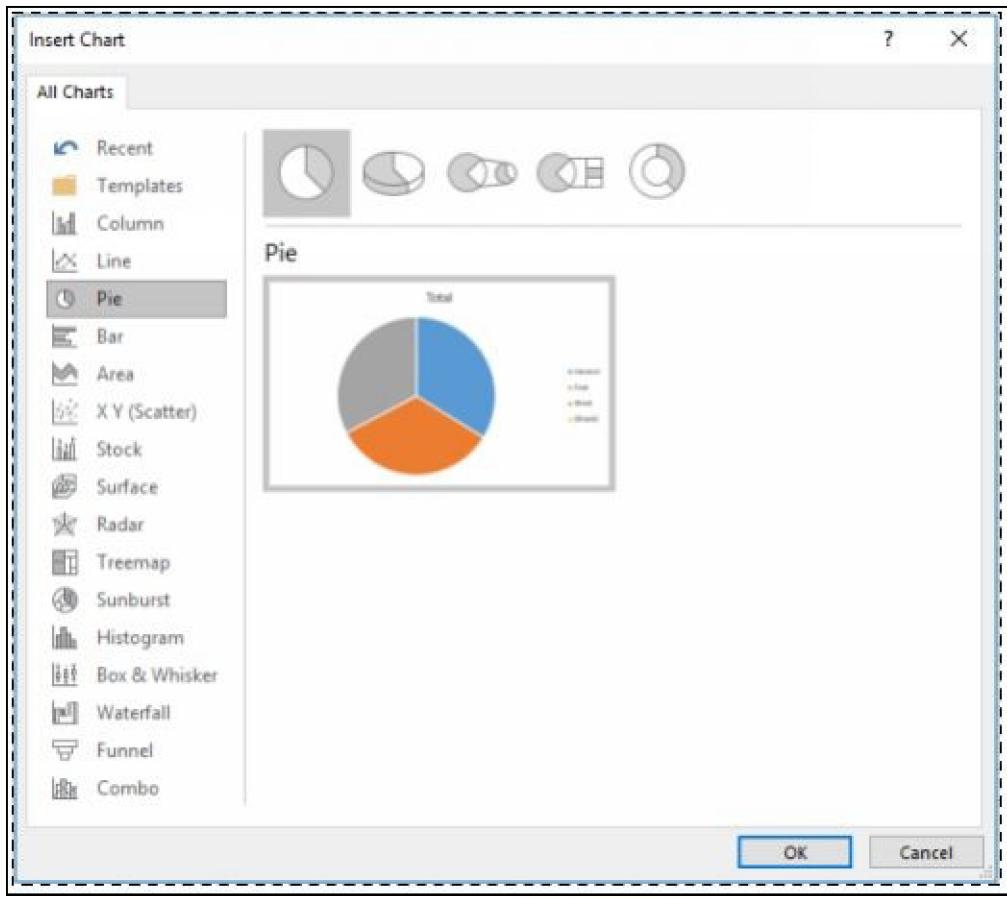
5. Rename the tab from ‘Sheet2’ (*you may be a different sheet#*) to ‘PieChart’
6. In the ‘PivotTable Fields’ pane select the following fields:
  1. REGION (Rows section)
  2. QTY (Values section) **Please note: when adding the QTY fields, it will default to ‘Count of OTY’, change to ‘Sum’**
7. Rename PivotTable to ‘PieChart’

	A	B
1		
2		
3	Row Labels - Sum of QTY	
4	Central	9070
5	East	8988
6	West	8782
7	{blank}	
8	Grand Total	26840

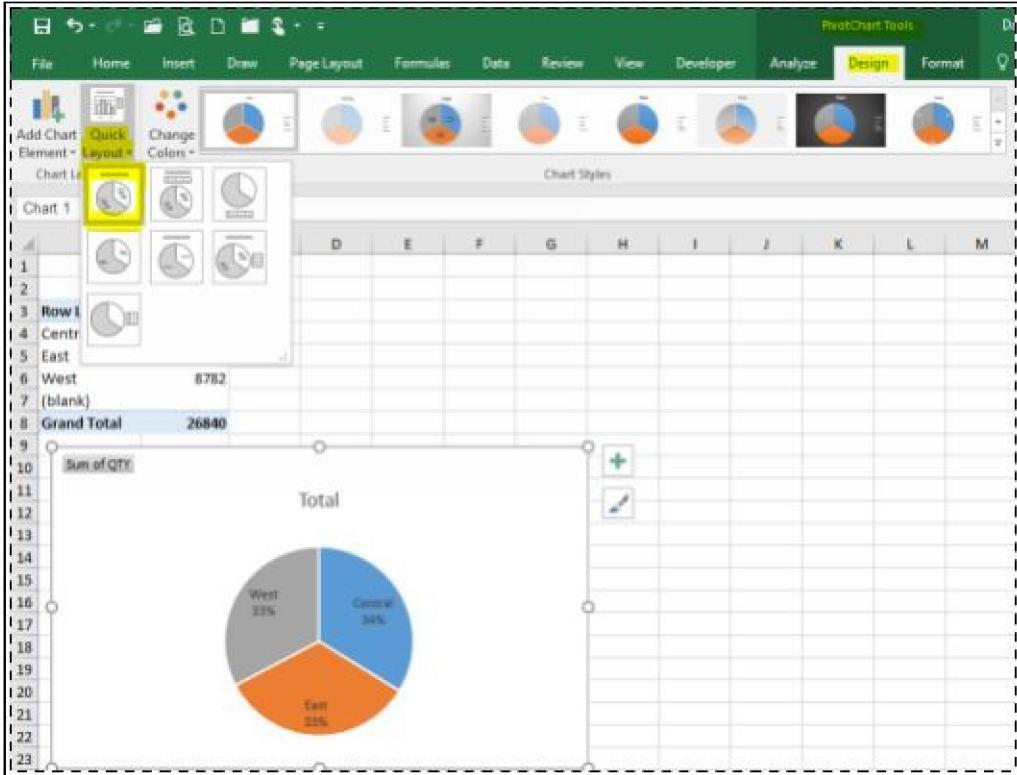
8. From the **PivotTable Tools** Ribbon select the tab **Analyze : PivotChart**



9. The following prompt should be displayed, select the ‘Pie’ option
10. Click the ‘OK’ button

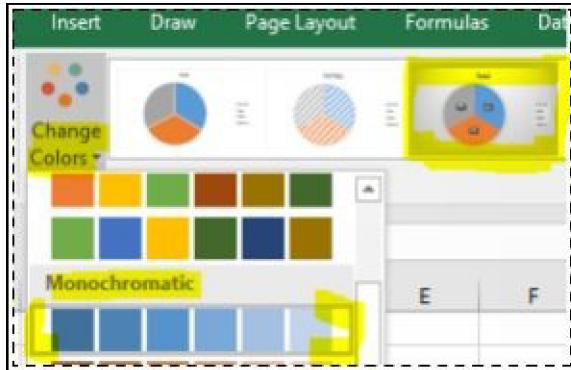


11. Click on the Pie chart and from the **PivotChart Tools** Ribbon select the tab **Design**
12. Click the drop-down for ‘Quick Layout’ and then ‘Layout 1’

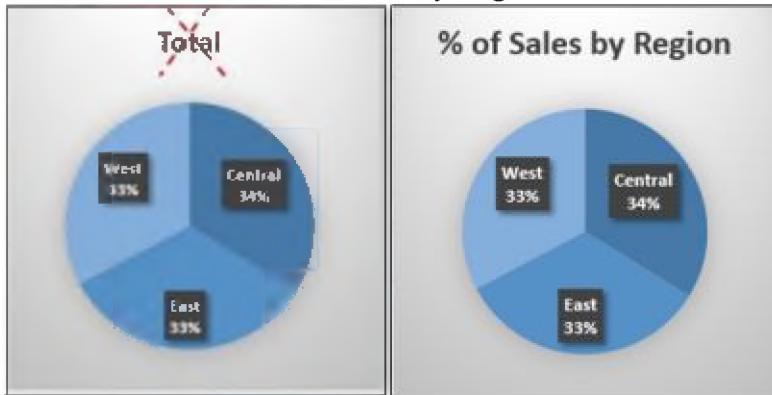


**Optional steps:** hide the Field buttons, **right-click** over any Field button and select the appropriate hide option. Remove the legend, by selecting the legend and pressing the delete key on your keyboard.

You may also change the color scheme, in this example I have chosen the first blue Monochromatic option

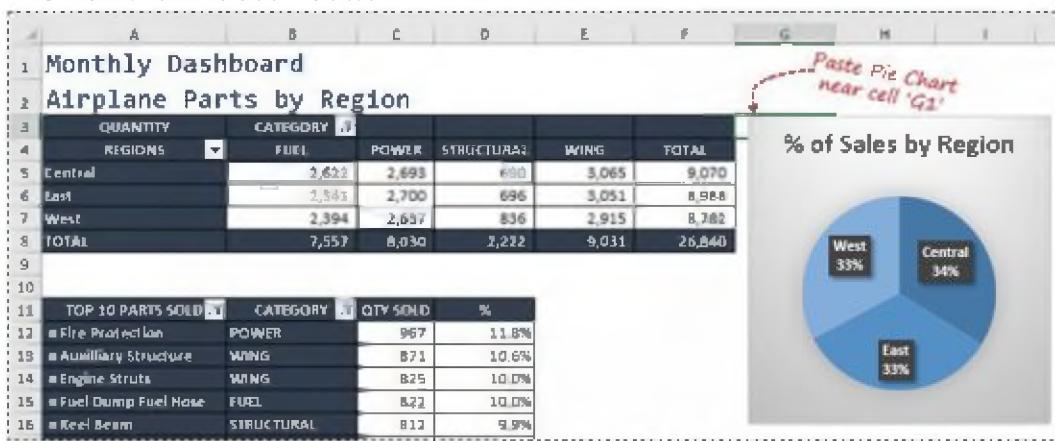


13. Change the chart title from 'Total' to '% of Sales by Region'



We'll now move the Pie chart to the Dashboard, by simply cutting and pasting.

14. Click on the Pie chart and press **(CTRL+X)** on your keyboard or:
  - From the Ribbon select the '**HOME**' tab
  - Click the '**Scissors**' icon
15. Click the '**Dashboard**' tab
16. Place your cursor in cell '**G3**' and press **(CTRL+V)** on your keyboard or:
  - From the Ribbon select the '**HOME**' tab
  - Click the '**Paste**' button

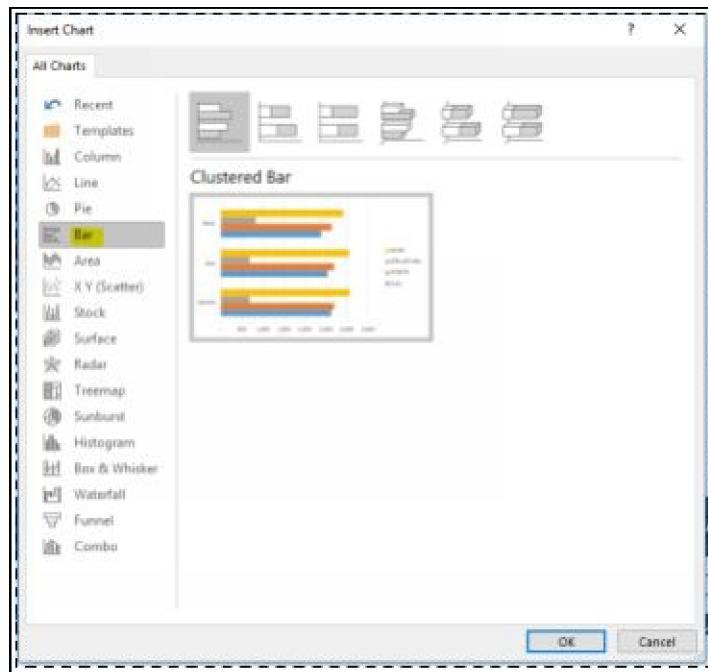


Lastly, we'll add the bar chart for 'quantity of parts sold by region and category':

17. On the '**Dashboard**' tab, click cell '**A3**'
18. From the **PivotTable Tools** Ribbon select the tab **Analyze : PivotChart**

19. The following prompt should be displayed, select the ‘Bar’ option

20. Click the ‘OK’ button



21. Drag the chart near cell ‘L3’



22. Rename Chart Name to ‘BarChart’ (*see step #7 above*)

23. Click on the Bar chart and from the **PivotChart Tools** Ribbon select the tab **Design**

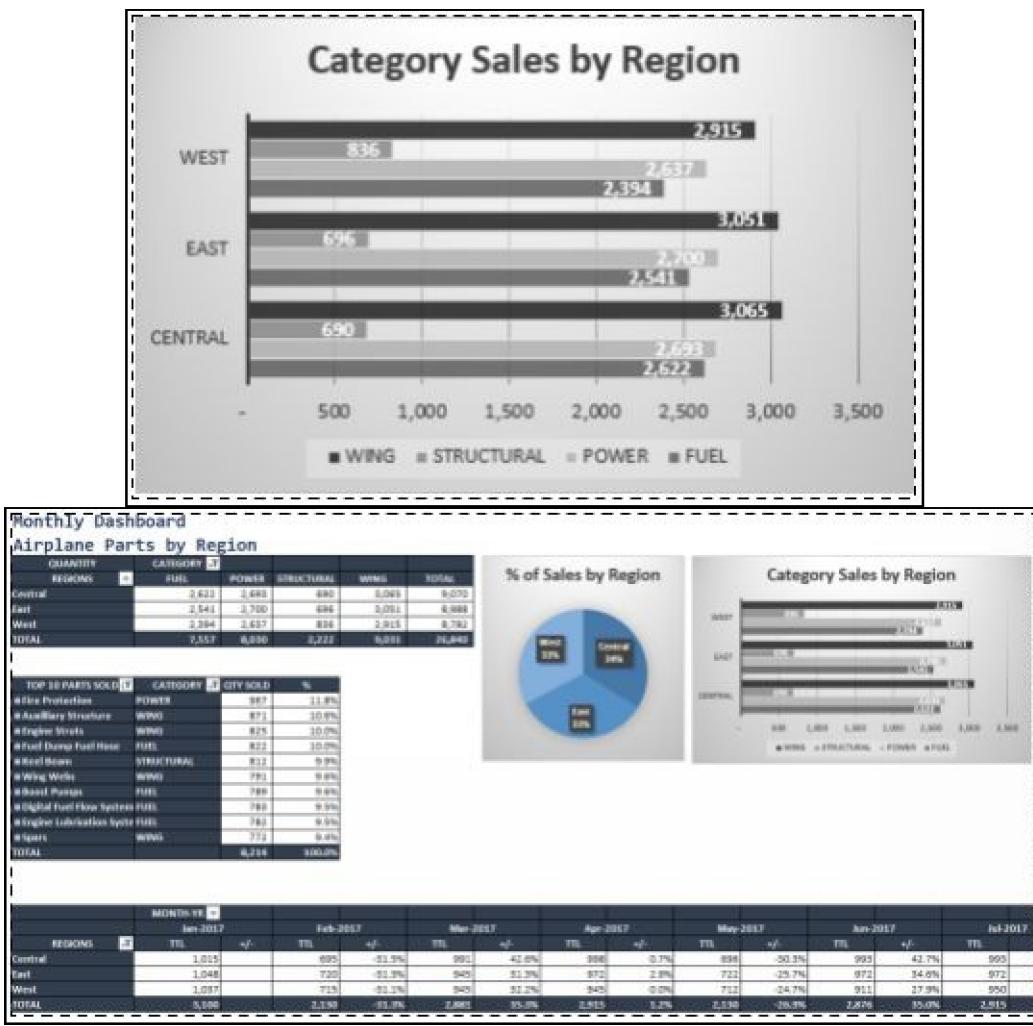
24. Click the drop-down for ‘Quick Layout’ and then ‘Layout 3’ (*see step #12 above*)

**Optional steps:** hide the Field buttons, **right-click** over any Field button and select the appropriate hide option

You may also change the color scheme, in this example I have chosen the black Monochromatic option

25. Change the chart title from ‘Chart Title’ to ‘Category Sales by Region’

26. **Save** your Dashboard, you may keep the same filename or name to something different



We've now fulfilled the customer requirements for delivering the Dashboard. To add additional functionality with **slicers & performance symbols**, please continue to [chapter 8](#).

To learn about refreshing Pivot Table data see [chapter 9](#) and to protect your Dashboard, please see [chapter 10](#).

# CHAPTER 8

## ***Adding Slicers and Performance Symbols To Your Dashboard***

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In this chapter we explore two ways to enhance your Dashboard by using slicers and performance symbols. Building on the Dashboard we created in [chapter 7](#) we will add:

1. A Timeline slicer
2. A Region slicer
3. Performance symbols (up / down arrows) to the sales by month Pivot Table 

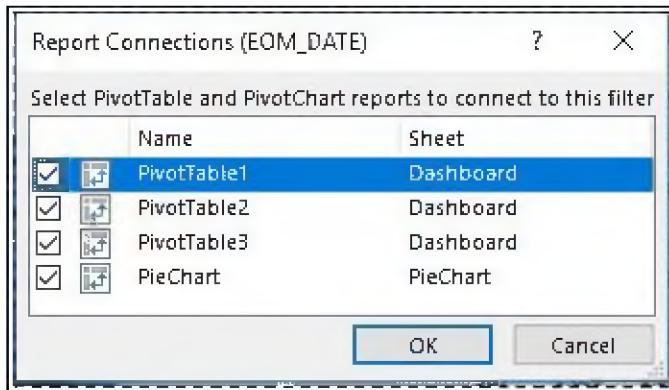
These enhancements will provide users with electronic or online access to the Dashboard the ability to examine the data by different time segments and regions. In addition to this, by adding symbols to indicate if sales were above or below the previous month, customers can quickly glance at the data and know how performance is trending, without the need to study the detail of the Pivot Table report.

---

### Slicers

1. Open the **Dashboard** spreadsheet you created in [chapter 7](#) and select **rows 3:6**
2. **Right-click** and from the pop-up menu select '**Insert**' (*4 blank rows, should now be added between the title and first Pivot Table*)
3. Click on cell '**A7**' and from the **PivotTable Tools** Ribbon select the tab **Analyze : Insert Timeline** (*for detailed instructions on how to insert a Timeline slicer please see [chapter 6](#)*)
4. When prompted click the '**EOM\_DATE**' checkbox
5. Click the '**OK**' button
6. A **Timeline slicer** should now appear, drag to the area near cell '**D1**'
7. **Right-click** on the newly added Timeline slicer and from the pop-up menu select '**Report Connections...**'

8. When prompted, select all checkboxes



9. Click the 'OK' button
10. From the **Timeline Tools** Ribbon under '**Options**' go to '**Caption**' and enter the new name of '**Time Frame**' (*for detailed instructions on how to change captions please see [chapter 6](#)*)
11. Click on cell '**A7**' and from the **PivotTable Tools** Ribbon select the tab **Analyze : Insert Slicer**
12. At the prompt click the '**REGION**' checkbox
13. Click the 'OK' button
14. A new **slicer** should now appear, drag next to the Timeline slicer
15. **Right-click** on the newly added REGION slicer and from the pop-up menu select '**Slicer Settings...**'

The screenshot shows a Microsoft Power BI dashboard titled "Monthly Dashboard" with a subtitle "Airplane Parts by Region". At the top left is a "Time Frame" slicer with "All Periods" set to "2017" and "MONTHS" set to "JUL, AUG, SEP, OCT, NOV, DEC". Below it is a table with columns "QUANTITY", "CATEGORIES", and "REGIONS". The table data is as follows:

REGIONS	FUEL	POWER	STRUCTURAL	WING	TOTAL
Central	2,622	2,693	690	3,065	9,070
East	2,541	2,700	696	3,051	8,988
West	2,394	2,637	836	2,915	8,782
<b>TOTAL</b>	<b>7,557</b>	<b>8,030</b>	<b>2,222</b>	<b>9,031</b>	<b>26,840</b>

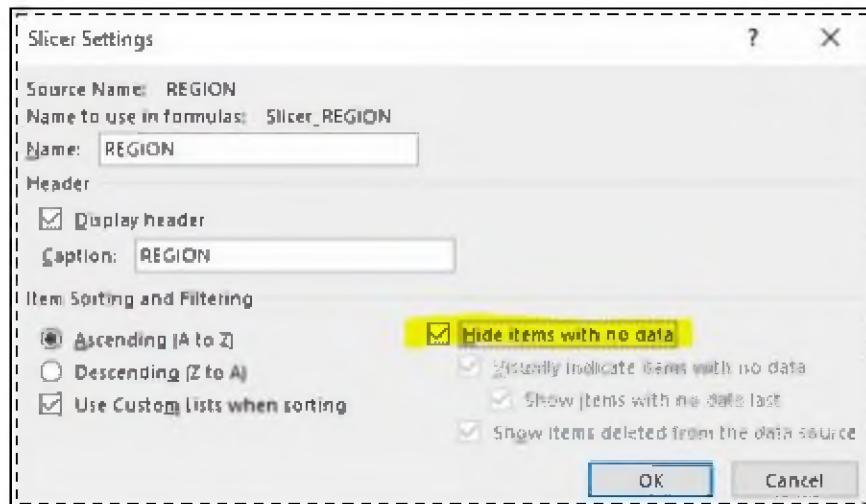
Below the table is another table titled "TOP 10 PARTS SOLD" with columns "CATEGORY" and "%". The data is as follows:

CATEGORY	%
Fire Protection	9.8%
Auxiliary Structure	8.71%
Engine Struts	8.25%
Fuel Dump Fuel Hose	8.22%
Keel Beam	8.12%
Wing Web	7.91%
Boost Pumps	7.89%

To the right of the dashboard is a pie chart titled "% of Sales by Reg" showing the percentage of sales for each region: West (33%), Central (34%), and East (33%). A context menu is open over the pie chart, with the "Slice Settings..." option highlighted.

16. When prompted, check the box '**Hide items with no data**'

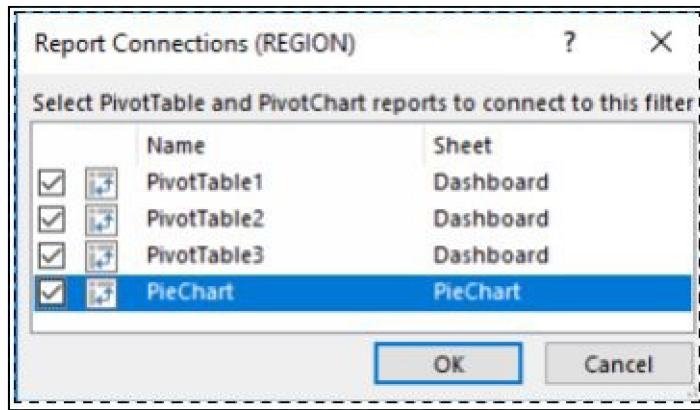
17. Click the '**OK**' button



18. Right-click on the newly added region slicer and from the pop-up menu select '**Report Connections...**'

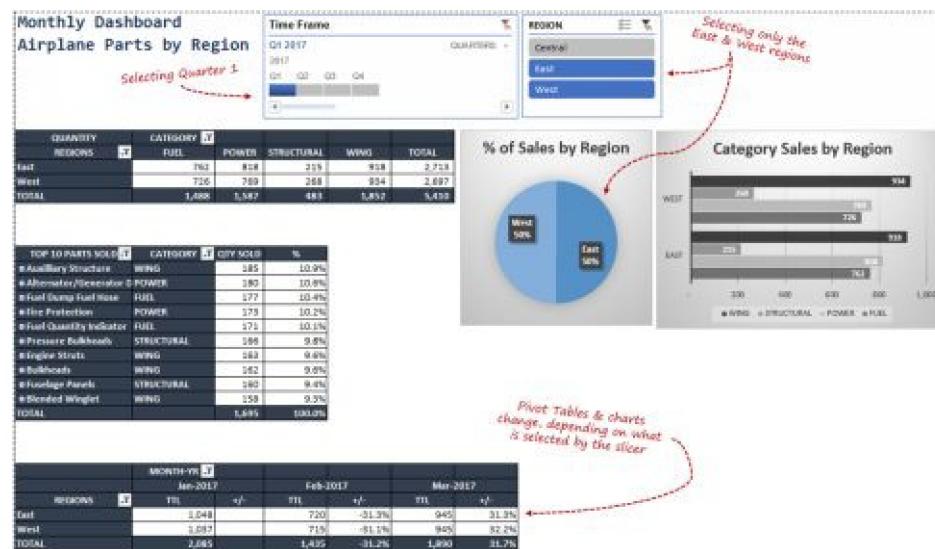
The screenshot shows the same Power BI dashboard as the previous one, but with a context menu open over the region slicer. The "Report Connections..." option is highlighted in yellow.

19. When prompted, select all checkboxes



20. Click the 'OK' button

Test the slicers by clicking on different combinations, you should see the Pivot Tables and charts expand and contract as you click.



### PLEASE NOTE!

Slicers are filters, when the 'Clear filter' button is selected any previous filters used, including those we applied to hide (blank) columns & rows will be displayed.

	MONTH-YR	Jan-2017	Feb-2017	[blank]		
REGIONS	TOTAL	+/	TOTAL	+/	TOTAL	+/
Central	1,015		695	-31.5%		
East	1,048		720	-31.3%		
West	1,037		715	-31.1%		
[blank]						
TOTAL	3,100		2,130	-31.3%		

### Performance Symbols (up/down arrows and other indicators)

1. Open the **Dashboard** spreadsheet you created in [chapter 7](#) and **select all +/- columns**

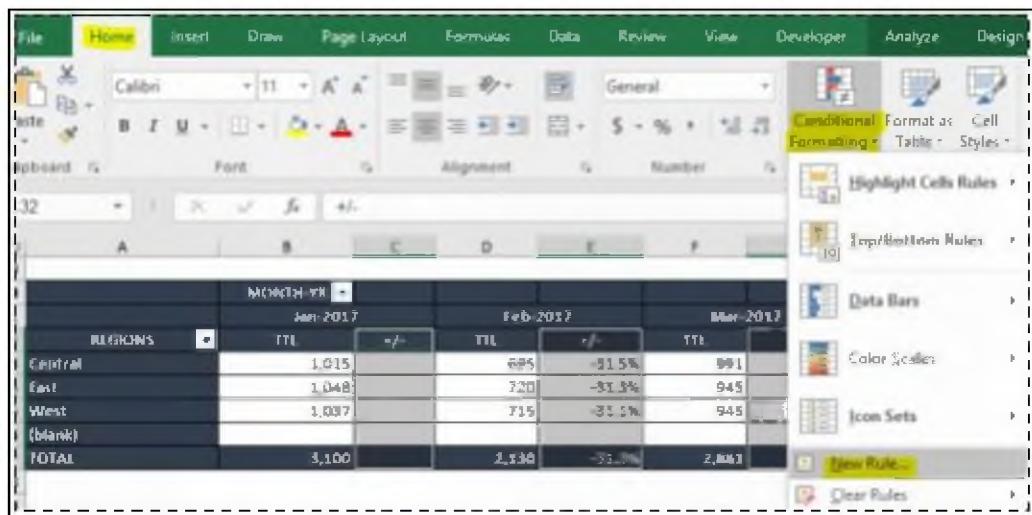
in the ‘Quantity of parts sold by region and month’ Pivot Table.

An easy way to accomplish this is by hovering your cursor near the line ‘C32’, **wait for the black down arrow** to appear and click so all +/- columns are now selected. (See image below)

The screenshot shows a Pivot Table with columns labeled 'MONTH-YR' (containing 'Jan-2017', 'Feb-2017', and 'Mar-2017'), 'REGIONS' (containing 'Central', 'East', 'West', '(blank)', and 'TOTAL'), and 'TTL' (Total). A red arrow points from the text 'Hover your cursor near line 'C32'', to the line above the 'TTL' column header. Another red arrow points from the text 'click to select all +/- columns' to the black downward-pointing arrow icon located at the top of the 'TTL' column header. Red annotations also highlight the 'TTL' column headers and the 'TTL' cell in row 37. A dashed red box encloses the entire table area. Handwritten red text at the top right says 'All +/- columns are now selected'.

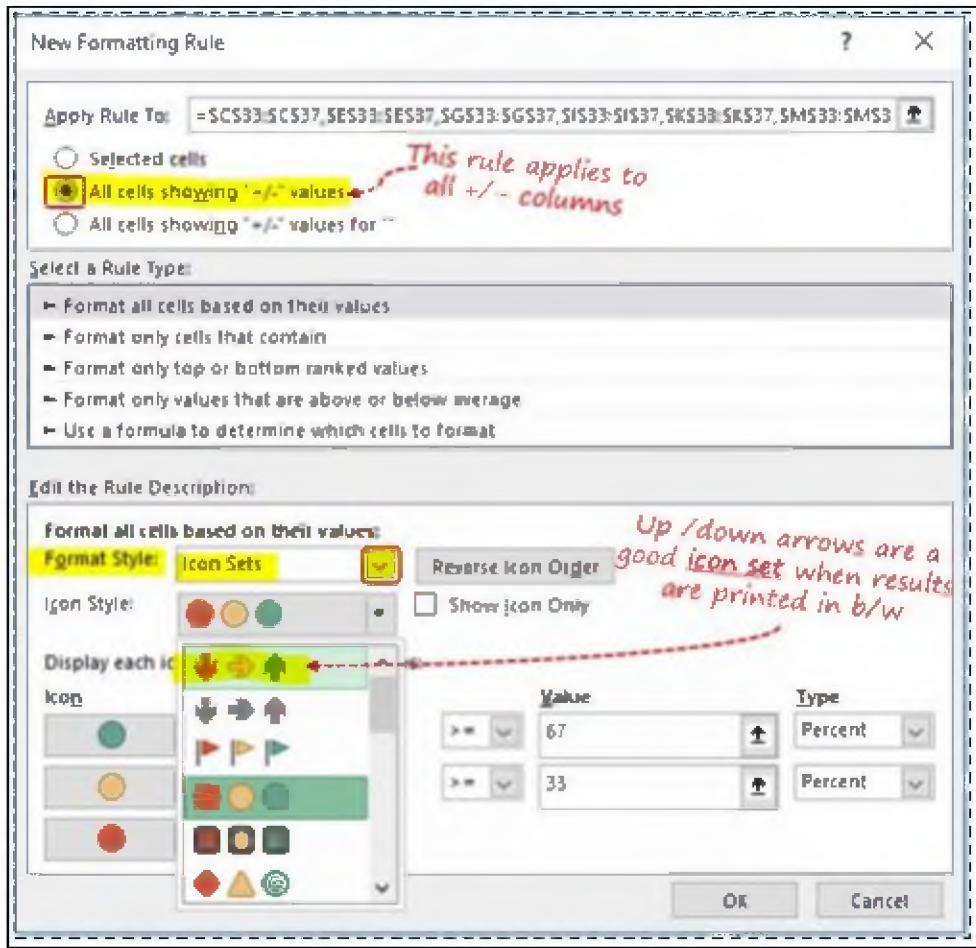
	A	B	C	D	E	F	G
29							
30		MONTH-YR	Jan-2017	Feb-2017	Mar-2017		
31	REGIONS	TTL	Jan-2017	Feb-2017	Mar-2017		
32	Central	1,015	+/-	+/-	+/-		
33	East	1,048		695	-31.5%	991	42.6%
34	West	1,037		720	-31.3%	945	31.3%
35	(blank)			715	-31.1%	945	32.2%
36	TOTAL	3,100		2,130	-31.3%	2,881	35.3%
37							

2. With all +/- columns selected, from the Ribbon select **HOME : Conditional Formatting** drop-down box
3. Select ‘New Rule...’

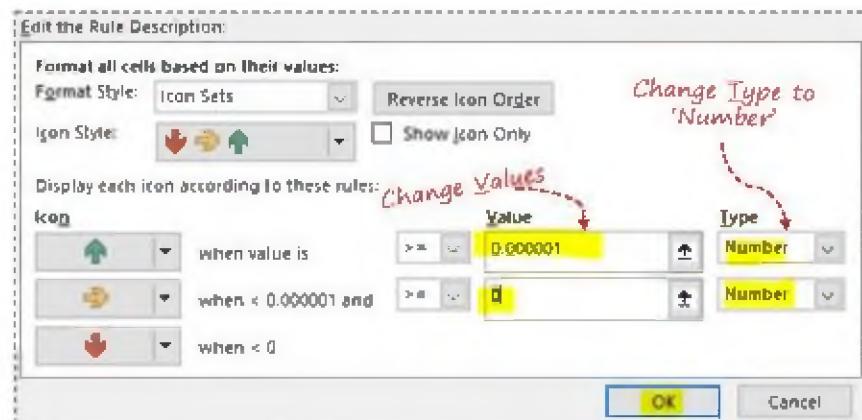


4. The following prompt will appear, select the radio button ‘All cells showing “+/-” values’
5. Click the drop-down box for **Format Style:** and select ‘Icon Sets’
6. Click the drop-down box for **Icon Style:** and scroll-up to select the up/down arrows





7. Click the drop-down box for **Type** and select '**Number**'
8. For the '**Values**' section enter:
  1. **0.000001** for '**when value is**'
  2. **0** for '**when < 0.000001 and**'
9. Click the '**OK**' button



10. **Save** your Dashboard file

We now have performance symbols added to our Dashboard

	MONTH-YR									
REGIONS	Jan-2017		Feb-2017		Mar-2017		Apr-2017			
	TTL	+/-	TTL	+/-	TTL	+/-	TTL	+/-		
Central	1,015		695	-31.5%	991	+2.6%	998	0.7%		
East	1,048		720	-31.3%	945	+31.3%	972	2.9%		
West	1,037		715	-31.1%	945	+32.2%	945	0.0%		
(blank)										
<b>TOTAL</b>	<b>3,100</b>		<b>2,130</b>	<b>-31.3%</b>	<b>2,881</b>	<b>+35.3%</b>	<b>2,915</b>	<b>1.2%</b>		

Due to page size limitations, the image of the entire Dashboard is not displayed:



We've now enhanced our Dashboard by using slicers and performance symbols.

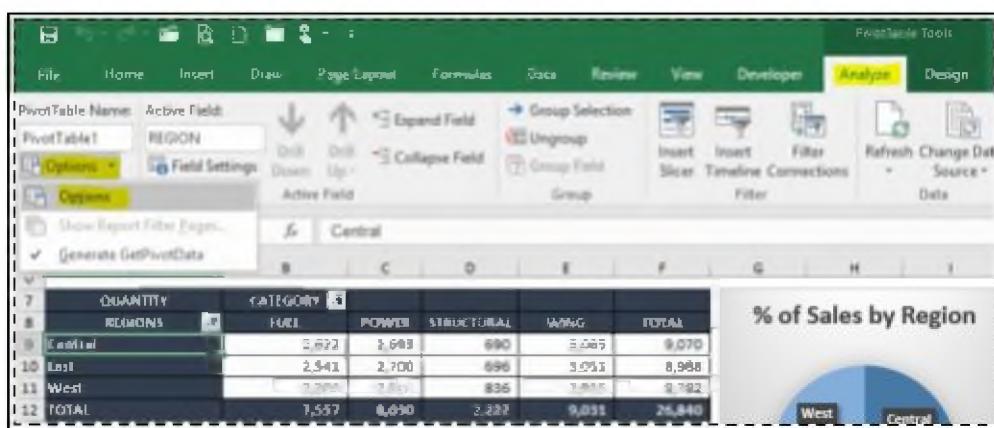
To learn about refreshing Pivot Table data see [chapter 9](#) and to protect your Dashboard, please see [chapter 10](#).

# CHAPTER 9

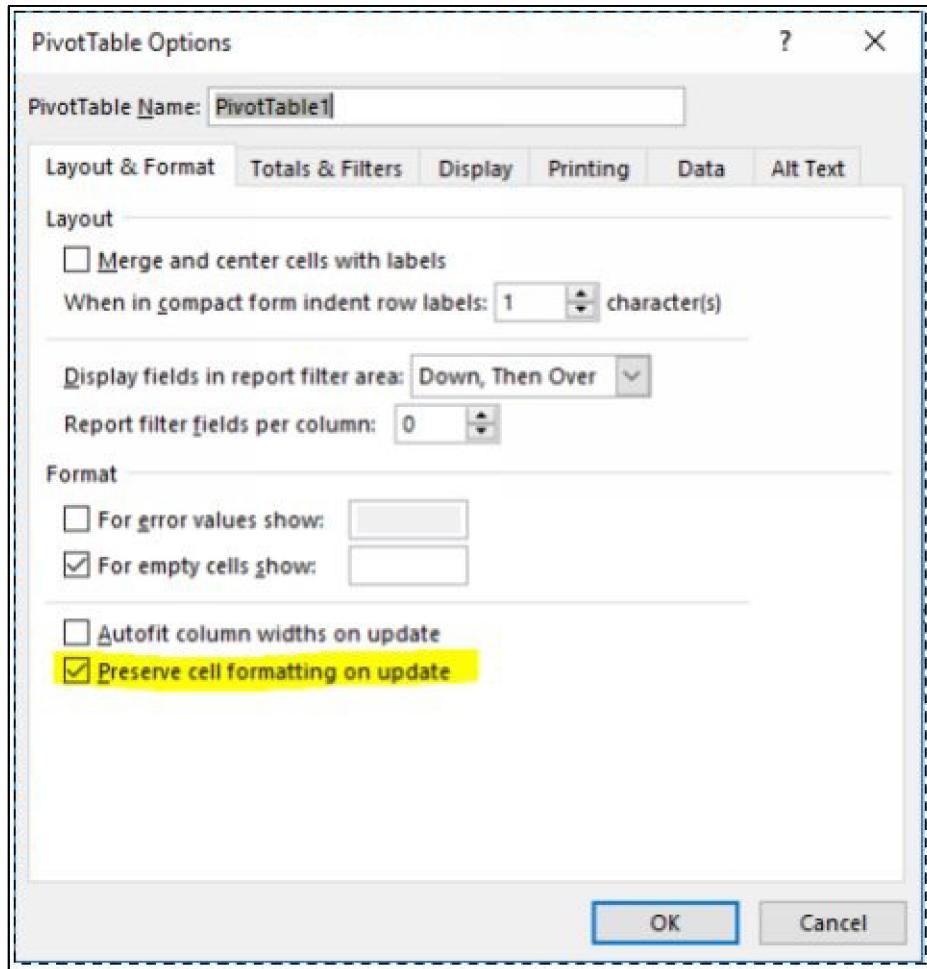
## Refreshing Pivot Table and Dashboard Data

Once you have created a Pivot Table or Dashboard where the layout and format is to your liking and you receive new data, this new information may be added to your existing Pivot Table(s) by using the **Refresh** feature. By refreshing your data, you may keep your current formatting and calculations. Just remember in your initial design to allow for additional rows and columns that may be created when you're incorporating new data. Let's walk through an example.

1. Open the **Dashboard** spreadsheet you created in [chapter 7](#)
2. [Click on any cell inside your first Pivot Table](#)
3. From the **PivotTable Tools** Ribbon select the tab **Analyze**
4. Under '**PivotTable Name**' click the '**Options**' drop-down box and select '**Options**'



5. The following dialogue box will appear, select the '**Layout & Format**' tab
6. Verify the check box '**Preserve cell formatting on update**' is selected
7. Click the '**OK**' button



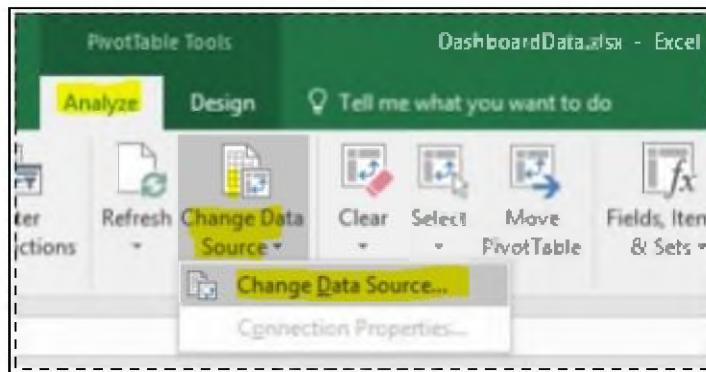
Optionally, you may also click the check box ‘Autofit column widths on update’. I chose not to, I manually adjusted the columns to be the same width for each month. This is simply a design preference to give the Dashboard a more uniform look.

## 8. Repeat steps #4 - #7 for each Pivot Table you've created

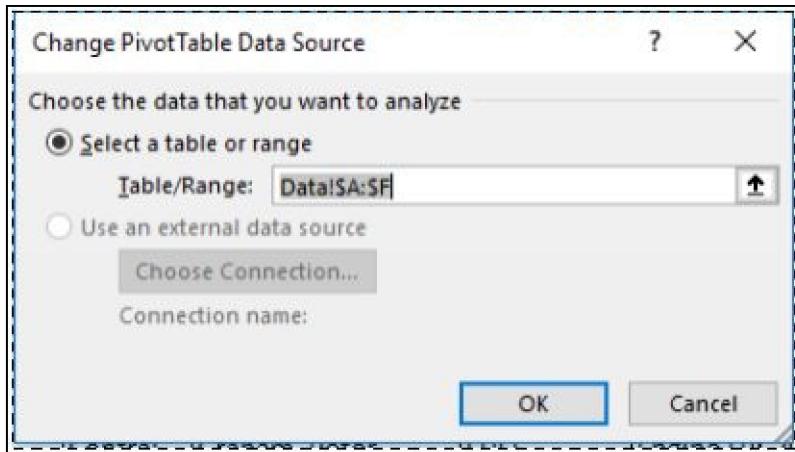
Verify your data source is correct

9. Select a cell in each PivotTable, from the **PivotTable Tools** Ribbon select the tab **Analyze**

10. Click the drop-down box ‘Change Data Source’ and select ‘Change Data Source...’



11. The following dialogue box will appear, verify the Table/Range is correct. In this case, since we'll be appending the data, selecting entire column is appropriate.



**Note:** you will not receive an error message if the **Range** is incorrect, however, the new data WILL NOT APPEAR in your Pivot Table / Dashboard.

12. Click the 'OK' button

Next, we will add new data to the Dashboard

13. Click the ‘**Data**’ tab
  14. Select and **copy** cells ‘**H2:M649**’ by pressing **(CTRL+C)** on your keyboard or:
    - From the Ribbon select the ‘**HOME**’ tab
    - Click the ‘**Copy**’ icon

A	B	C	D	E	F	G	H	I	J	K	L	M
1	REGION	NAME	CATEGORY	PART	EDDM_DATE	QTY	Data to add for Pivot Table refresh testing					
2	Central	Graham, Peter	STRUCTURAL	Pressure Bulkheads	31 January 2017	10	Central	Graham, Peter	STRUCTURAL	Pressure	30 November 2017	16
3	Central	Graham, Peter	STRUCTURAL	Keel Beam	31 January 2017	12	Central	Graham, Peter	STRUCTURAL	Keel Beam	30 November 2017	9
4	Central	Graham, Peter	STRUCTURAL	Portage Panels	31 January 2017	18	Central	Graham, Peter	STRUCTURAL	Portage	30 November 2017	9
5	Central	Graham, Peter	FUEL	Boost Pumps	31 January 2017	7	Central	Graham, Peter	FUEL	Boost Pump	30 November 2017	18
6	Central	Graham, Peter	FUEL	Transfer Valves	31 January 2017	7	Central	Graham, Peter	FUEL	Transfer Val.	30 November 2017	9
7	Central	Graham, Peter	FUEL	Fuel S.O.V.	31 January 2017	7	Central	Graham, Peter	FUEL	Fuel S.O.V.	30 November 2017	14
8	Central	Graham, Peter	FUEL	Digital Fuel Flow System	31 January 2017	10	Central	Graham, Peter	FUEL	Digital FFS	30 November 2017	16
9	Central	Graham, Peter	FUEL	Fuel Quantity Indicator	31 January 2017	10	Central	Graham, Peter	FUEL	Fuel Quant	30 November 2017	7
10	Central	Graham, Peter	FUEL	Fuel Flow Indicating	31 January 2017	9	Central	Graham, Peter	FUEL	Fuel Flow	30 November 2017	10
11	Central	Graham, Peter	FUEL	Fuel Pressure Indicating	31 January 2017	5	Central	Graham, Peter	FUEL	Fuel Press	30 November 2017	15
12	Central	Graham, Peter	FUEL	Fuel Pump	31 January 2017	15	Central	Graham, Peter	FUEL	Fuel Pump	30 November 2017	15
13	Central	Graham, Peter	FUEL	Engine Lubrication System	31 January 2017	4	Central	Graham, Peter	FUEL	Engin Lub	30 November 2017	4
14	Central	Graham, Peter	FUEL	Fuel Dump Fuel Hose	31 January 2017	12	Central	Graham, Peter	FUEL	Fuel Dump	30 November 2017	4
15	Central	Graham, Peter	POWER	Lithium Battery	31 January 2017	5	Central	Graham, Peter	POWER	Lithium	30 November 2017	18
16	Central	Graham, Peter	POWER	AC Generator/Alternator	31 January 2017	13	Central	Graham, Peter	POWER	AC Genera	30 November 2017	6
17	Central	Graham, Peter	POWER	Alternator/Generator Drive System	31 January 2017	2	Central	Graham, Peter	POWER	Alternator	30 November 2017	7
18	Central	Graham, Peter	POWER	Fire Detection / Notification	31 January 2017	10	Central	Graham, Peter	POWER	Fire Protec	30 November 2017	16
19	Central	Graham, Peter	POWER	Fire Protection	31 January 2017	14	Central	Graham, Peter	POWER	Fire Prote	30 November 2017	15
20	Central	Graham, Peter	POWER	Overheat Detection	31 January 2017	7	Central	Graham, Peter	POWER	Overheat	30 November 2017	15
21	Central	Graham, Peter	POWER	Smoke Detection	31 January 2017	19	Central	Graham, Peter	POWER	Smoke Det.	30 November 2017	13

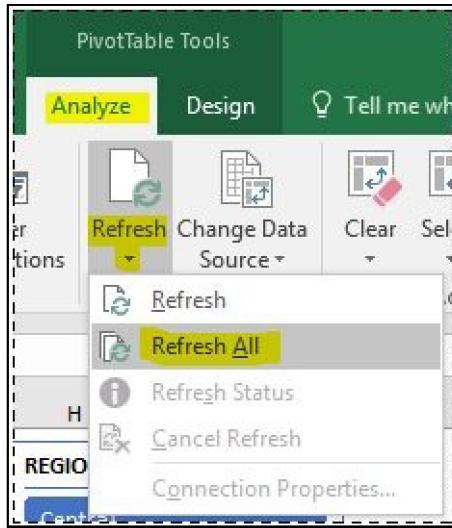
15. Place your cursor in cell ‘A3242’ and press **(CTRL+V)** on your keyboard or:

  - From the Ribbon select the ‘**HOME**’ tab
  - Click the ‘**Paste**’ button

A	B	C	D	E	F
3239	West	Winchester, Charles	WING	Wing Attach Fitting	31 October 2017
3240	West	Winchester, Charles	WING	Engine Struts	31 October 2017
3241	West	Winchester, Charles	WING	Engine Mounts	31 October 2017
3242	Central	Graham, Peter	STRUCTURAL	Pressure Bulkheads	30 November 2017
3243	Central	Graham, Peter	STRUCTURAL	Keel Beam	30 November 2017
3244	Central	Graham, Peter	STRUCTURAL	Fuselage Panels	30 November 2017
3245	Central	Graham, Peter	FUEL	Boost Pumps	30 November 2017
3246	Central	Graham, Peter	FUEL	Transfer Valves	30 November 2017
3247	Central	Graham, Peter	FUEL	Fuel S.O.V.	30 November 2017
3248	Central	Graham, Peter	FUEL	Digital Fuel Flow System	30 November 2017

16. Return to the ‘**Dashboard**’ tab and click on any cell inside your first Pivot Table
  17. From the **PivotTable Tools** Ribbon select the tab **Analyze**

18. Click the drop-down box ‘Refresh’ and select ‘Refresh All’



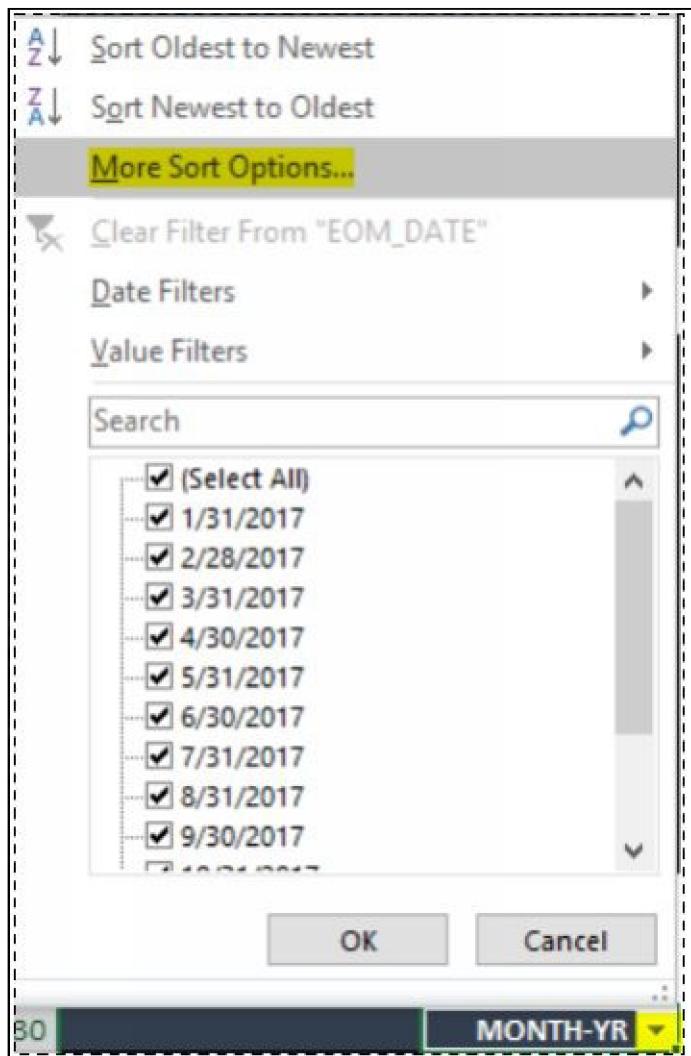
### Refresh vs. Refresh All

Selecting the ‘Refresh’ option would only update the **active** Pivot Table, by selecting ‘Refresh All’ we’re updating all of the Pivot Tables in the Dashboard.

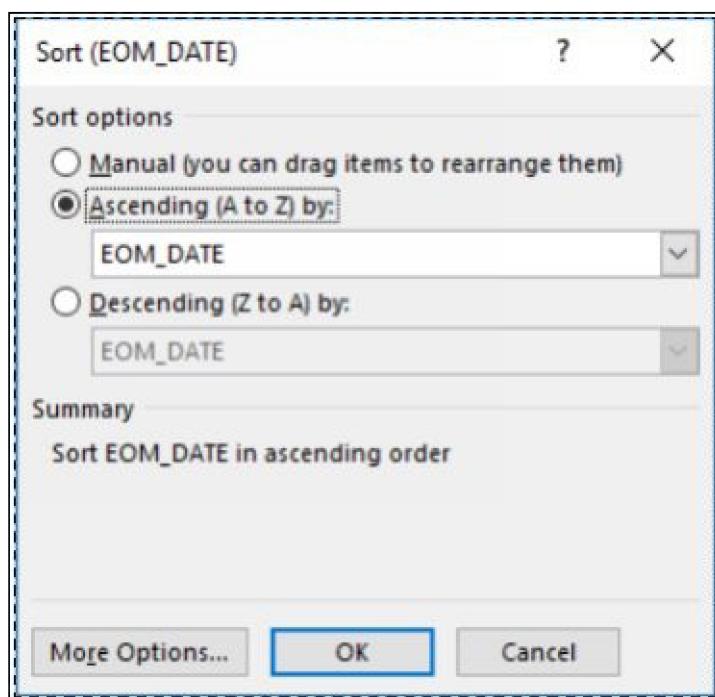
We now have new data added to the Dashboard

Oct-2017		{blank}		Nov-2017		Dec-2017	
TTL	+/-	TTL	+/-	TTL	+/-	TTL	+/-
697	⬇️ -30.3%			1,081		1,296	⬆️ 19.9%
719	⬇️ -26.0%			1,037		1,272	⬆️ 22.7%
714	⬇️ -24.7%			999		1,252	⬆️ 25.3%
2,130	⬇️ -27.0%			3,117		3,820	⬆️ 22.6%

19. To address the **(blank)** column in our display, click on the drop-down box for ‘MONTH-YR’ and select ‘More Sort Options...’

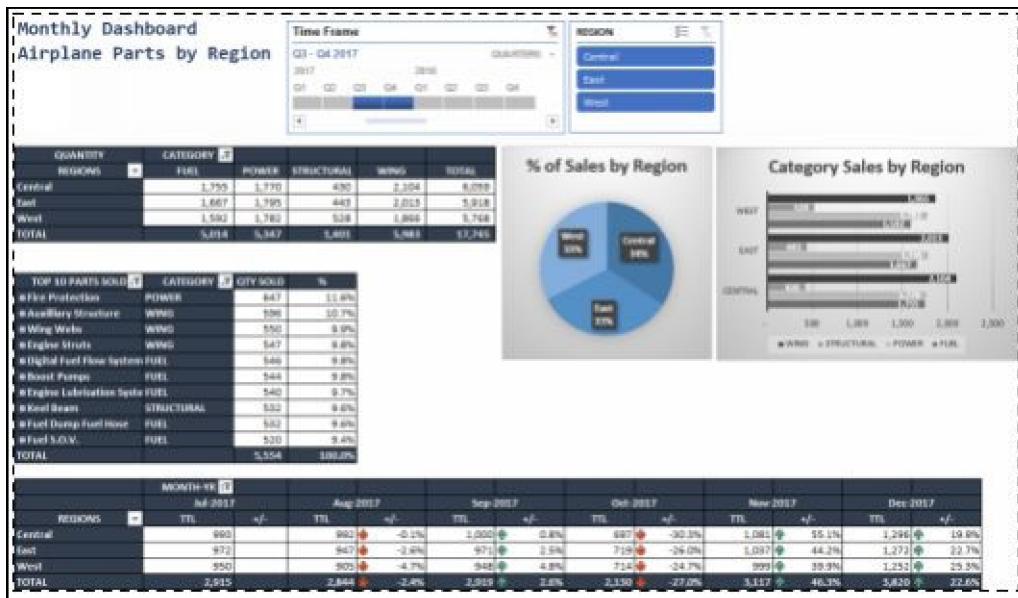


20. The following prompt will be displayed, select the ‘Ascending (A to Z) by:’ radio button. From the drop-down box select ‘EOM\_DATE’
21. Click the ‘OK’ button



## Our completed Dashboard:

*Due to page size limitations, the image of the entire Dashboard is not displayed:*



# CHAPTER 10

## Protecting Your Dashboard

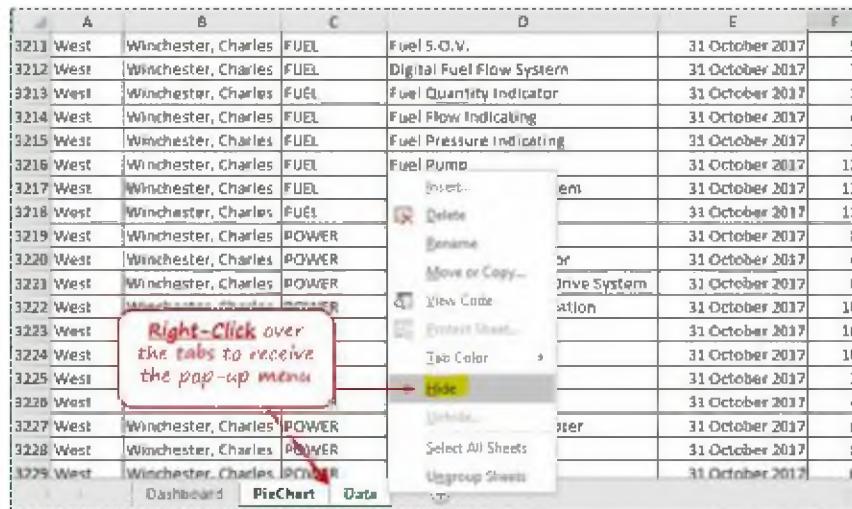
Depending on your audience, you may want to consider *protecting* your Dashboard to prevent unauthorized users from modifying it. As well as, *hide* any data source tabs, allowing your customers to see only the Dashboard itself.

### PLEASE NOTE!

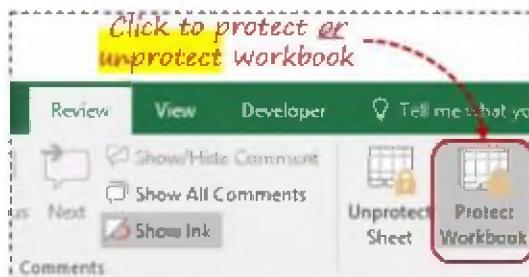
Protecting **disables** the use of slicers and prevents users from manually refreshing the data.

### Hiding Your Pivot Table Source Data

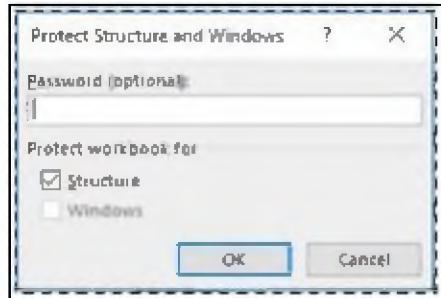
1. Open the Dashboard spreadsheet you created in [chapter 7](#)
2. To **hide** the ‘PieChart’ & ‘Data’ tabs, right click over the tabs and select ‘**Hide**’ from the pop-up menu
3. To **unhide** right click over any tab and select ‘**Unhide**’ (the unhide option will become active once a tab is hidden)



4. From the Ribbon select Review : Protect Workbook



The following dialogue box will appear:



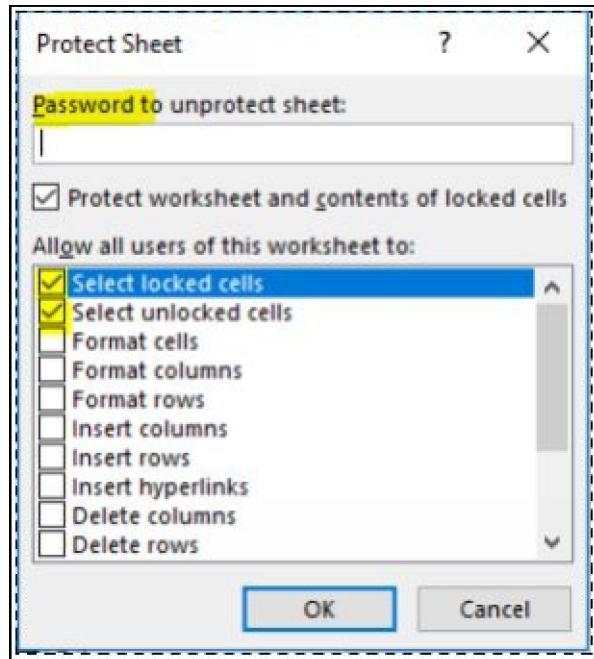
5. Optionally, enter a **Password** or leave blank
6. Click the '**OK**' button

## Protecting The Dashboard Or Any Other Worksheet

1. From the Ribbon select **Review : Protect Sheet**

The screenshot shows an Excel spreadsheet titled "Monthly Dashboard Airplane Parts by Region". The ribbon is set to the "Review" tab, with the "Protect Sheet" button highlighted. The spreadsheet contains several data tables and charts. One table shows regional sales data for Fuel, Power, Structural, and Wing categories. Another table lists the top 10 parts sold. A pie chart and a bar chart also provide regional sales information.

The following dialogue box will appear:



2. You may enter a password or leave blank
3. A good best practice is to leave the first two check boxes selected (*these will allow your customers to click on cells and scroll, but not change any content*):
  1. Select locked cells
  2. Select unlocked cells
4. Click the 'OK' button

If a user tries to modify the sheet, they will receive the following message:



5. To **unprotect**, the sheet from the Ribbon select **Review : Unprotect Sheet**



# CHAPTER 11

## Grouping Pivot Table Data

---

In chapters 3 & 4 we reviewed different summary level types of analysis you can complete with Pivot Tables, however when you have a lot of detailed individual records such as customer demographics, sales, or location data. Sometimes more insight can be gained when you can cluster this data into categories or ranges. The ‘**Grouping**’ feature allows you to complete this type of segmented analysis.

For example, let’s say you received a large amount of *detailed* customer records and need to:

1. Group the number of customers by how much they spent
  2. Include their groups percentage to the overall sales total for each segment
- 

### WEB ADDRESS & FILE NAME FOR EXERCISE:

<http://bentonexcelbooks.my-free.website/excel-2016>

CustomerSales.xlsx

---

Sample data for this chapter, due to space limitations **the entire data set is not displayed**.

	A	B
1	CUSTOMER ID	AMOUNT PURCHASED
2	111	\$ 142
3	222	\$ 153
4	333	\$ 442
5	444	\$ 409
6	555	\$ 136
7	666	\$ 147
8	777	\$ 436
9	888	\$ 403
10	999	\$ 1,500
31	3330	\$ 752

### Grouping Records

Create a basic Pivot Table report, to see screenshot illustrations of steps #1 - #4, please see [chapter 3 ‘Summarizing Numbers’](#):

1. Open the CustomerSales.xlsx spreadsheet and highlight **cells A1:B31** (*Select cells not columns*)
2. From the Ribbon select **INSERT : PivotTable**
3. Verify the ‘**New Worksheet**’ radio button is selected
4. Click the ‘**OK**’ button

A new tab will be created and the ‘*PivotTable Fields*’ pane should appear on the left side of your screen.

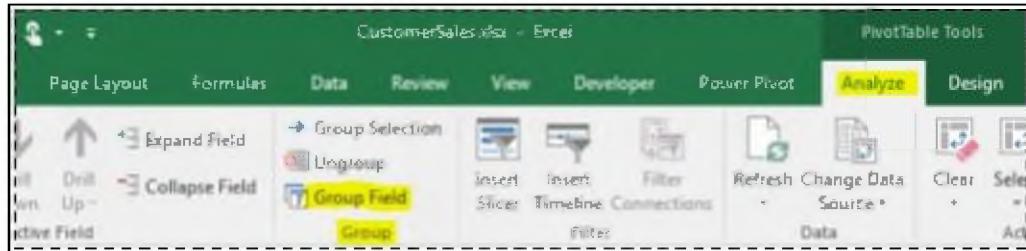
5. Click the following fields:

1. AMOUNT PURCHASE (Rows section)
2. CUSTOMER ID **twice** (Values section)

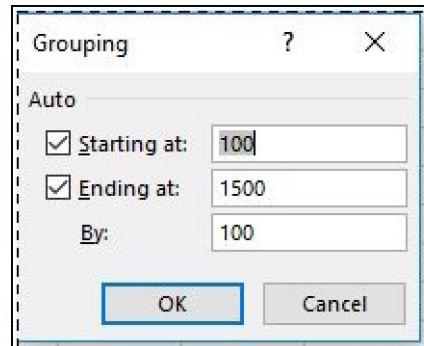
The screenshot shows a Microsoft Excel spreadsheet titled 'CustomerSales.xlsx'. A PivotTable is being created in the range A1:D28. The PivotTable Fields pane on the right indicates that 'CUSTOMER ID' is selected for both 'Row Labels' and 'Values' (Sum of CUSTOMER ID). 'AMOUNT PURCHASED' is also selected for 'Values' (Sum of AMOUNT PURCHASED). The main grid displays a list of customer IDs (e.g., 100, 106, 136, etc.) in the first column, and their corresponding purchase amounts (e.g., 5106, 1110, 555, etc.) in the second column.

6. Click cell 'A4'

7. From the **PivotTable Tools** Ribbon select the tab **Analyze : Group Field**



The following dialogue box will appear:



8. Verify both the 'Starting at:' and 'Ending at:' check boxes are selected

- o 'Starting at:' will default to 100 (this is the *lowest value* in the dataset)
- o 'Ending at:' will default to 1500 (this is the *highest value* in the dataset)

9. Enter 100 in the 'By:' field (*this is the amount between group segments*)

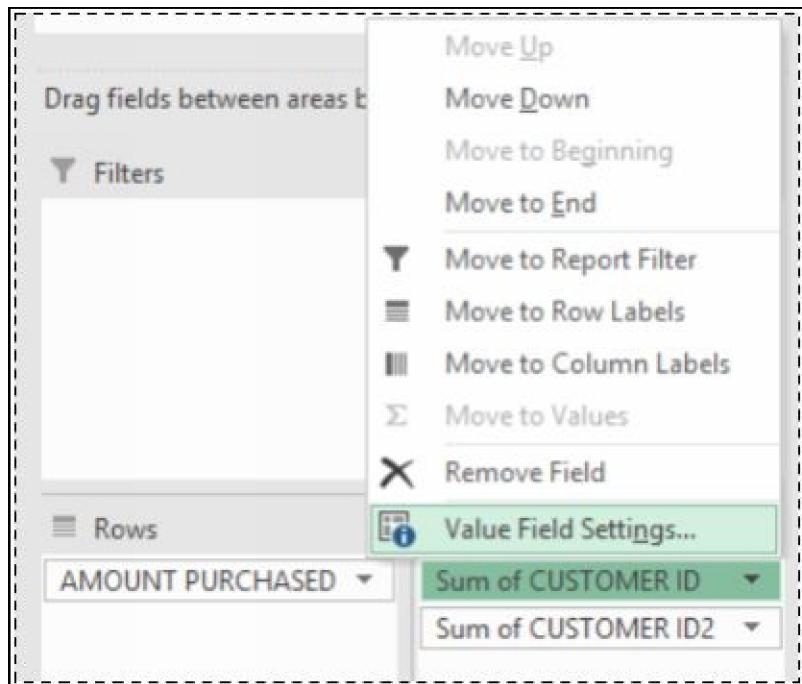
10. Click the 'OK' button

We've now grouped customer purchase amounts into segments, with each bracket differential representing approximately 100:

However, this table is not providing meaningful information, because it is incorrectly summing 'CUSTOMER ID', to fix this:

Row Labels	Sum of CUSTOMER ID	Sum of CUSTOMER ID2
100-199	7770	7770
200-299	2442	2442
300-399	5106	5106
400-499	8325	8325
500-599	2664	2664
600-699	3108	3108
700-799	7215	7215
800-899	2997	2997
900-999	3219	3219
1000-1099	4329	4329
1100-1199	3441	3441
1400-1500	999	999
Grand Total	51615	51615

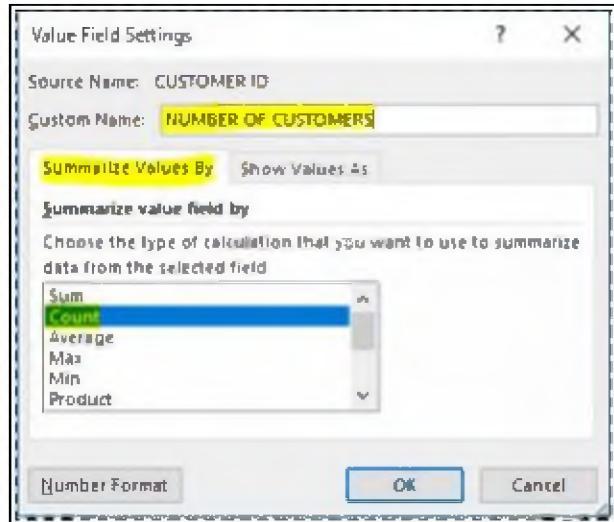
11. In the PivotTable Fields list, in the 'VALUES' section, click the drop-down box for 'Sum of CUSTOMER ID'
12. Select the 'Value Field Settings...' option



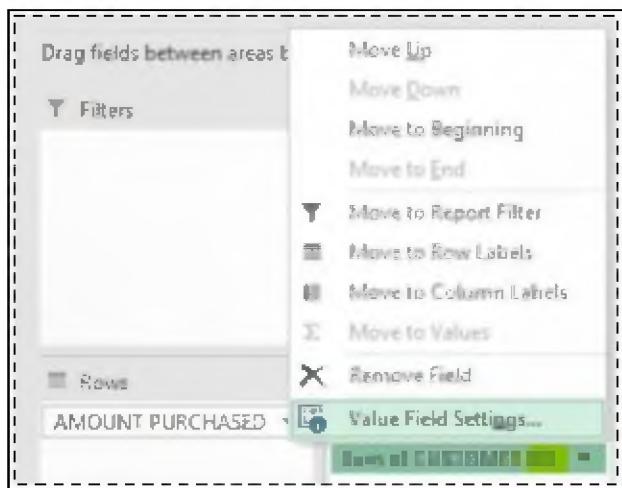
## Count Function

The following dialogue box will appear:

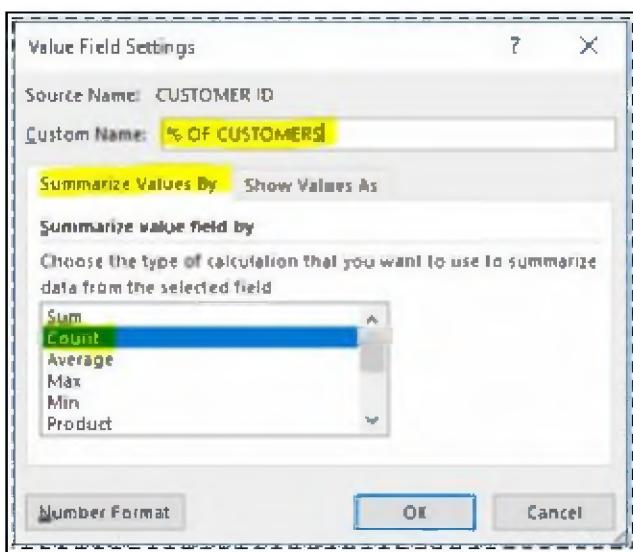
13. In the 'Summarize value field by' list box select 'Count'
14. In the 'Custom Name:' field change to 'NUMBER OF CUSTOMERS'
15. Click the 'OK' button



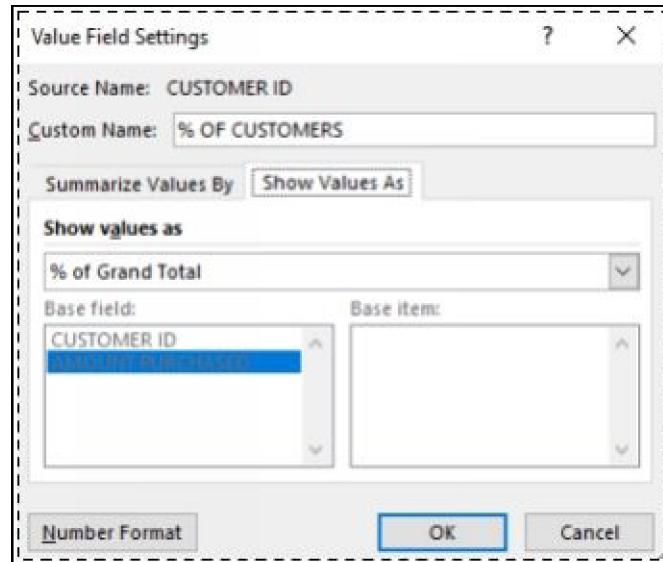
16. In the **PivotTable Fields** list, in the ‘VALUES’ section, click the drop-down box ‘Sum of CUSTOMER ID2’
17. Select the ‘Value Field Settings...’option



18. In the ‘Summarize value field by’ list select ‘Count’
19. In the ‘Custom Name:’ field change to ‘% OF CUSTOMERS’



20. Click the ‘Show Values As’ tab



21. Click the 'Show values as' drop-down box and select '% of Grand Total'
22. Click the 'OK' button
23. Change the text in cell 'A3' from "Row Labels" to 'AMOUNT PURCHASED'

We now have a report that groups the number of customers by how much they spent and the segment's percentage to the overall sales total.

	AMOUNT PURCHASED	NUMBER OF CUSTOMERS	% OF CUSTOMERS
3	100-199	7	23.33%
4	200-299	1	3.33%
5	300-399	3	10.00%
6	400-499	6	20.00%
7	500-599	1	3.33%
8	600-699	1	3.33%
9	700-799	3	10.00%
10	800-899	2	6.67%
11	900-999	1	3.33%
12	1000-1099	2	6.67%
13	1100-1199	2	6.67%
14	1400-1500	1	3.33%
15	Grand Total	30	100.00%

# CHAPTER 12

## Calculated Fields In Pivot Tables

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As demonstrated in previous chapters, Pivot Tables have many powerful analysis features already built-in, however the type of work you perform may require more complex or technical types of calculations than those included in the standard set of Pivot Table ‘Value Field Settings.’ This is when the ability to insert your own ‘Calculated Fields’ is particularly helpful.

For example, let’s say you’re responsible for analyzing your company’s sales location plan vs. actual. In addition to this you also determine if a store is eligible for a bonus and *if* they earned a bonus what the bonus amount is to be paid.

You perform this type of analysis on a regular basis and it is the type of business, where some stores *may close and others open from month-to-month*. You need to report:

1. The monthly sales dollar variance -/+ plan vs. actual by location
  2. The monthly percent variance -/+ plan vs. actual by location
  3. If the store is eligible for a bonus, based on actual sales greater than 1.5% over planned sales
  4. If the store earned a bonus, the dollar amount owed to each location, which is 2% of that store’s actual sales
- 

### WEB ADDRESS & FILE NAME FOR EXERCISE:

<http://bentonexcelbooks.my-free.website/excel-2016>

StoresSales.xlsx

Sample data for this chapter:

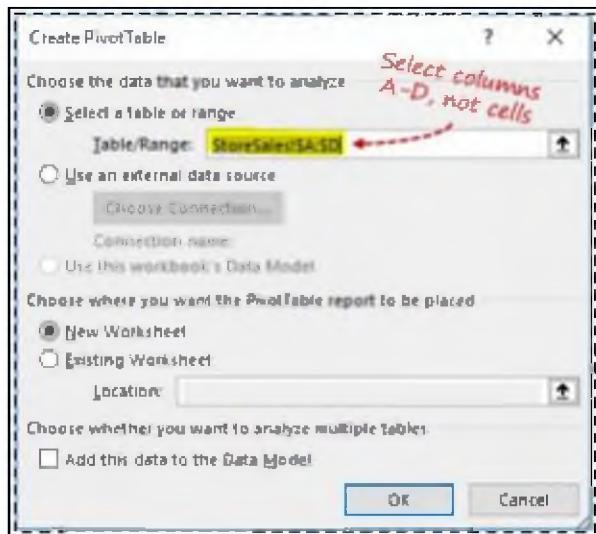
	A	B	C	D	E	F	G	H	I
1	Location	Month	Planned Sales	Actual Sales					
2	AAA	Jan	406	414					
3	BBB	Jan	332	329					
4	CCC	Jan	496	526					
5	DDD	Jan	152	156					
6	EEE	Jan	178	173					
7	AAA	Feb	415	427					
8	BBB	Feb	346	342					
9	CCC	Feb	551	595					
10	DDD	Feb	175	184					
11	EEE	Feb	173	183					
12	AAA	Mar	424	416					
13	BBB	Mar	360	363					
14	CCC	Mar	612	648					
15	DDD	Mar	202	207					
16	EEE	Mar	168	163					

### Adding A Basic Calculated Field

Create a basic Pivot Table report, to see screenshot illustrations of steps #1 - #4, please see

## chapter 3 ‘Summarizing Numbers’:

1. Open the **StoreSales.xlsx** spreadsheet and highlight **columns A:D**
2. From the Ribbon select **INSERT : PivotTable**
3. Select the ‘**New Worksheet**’ radio button
4. Click the ‘**OK**’ button



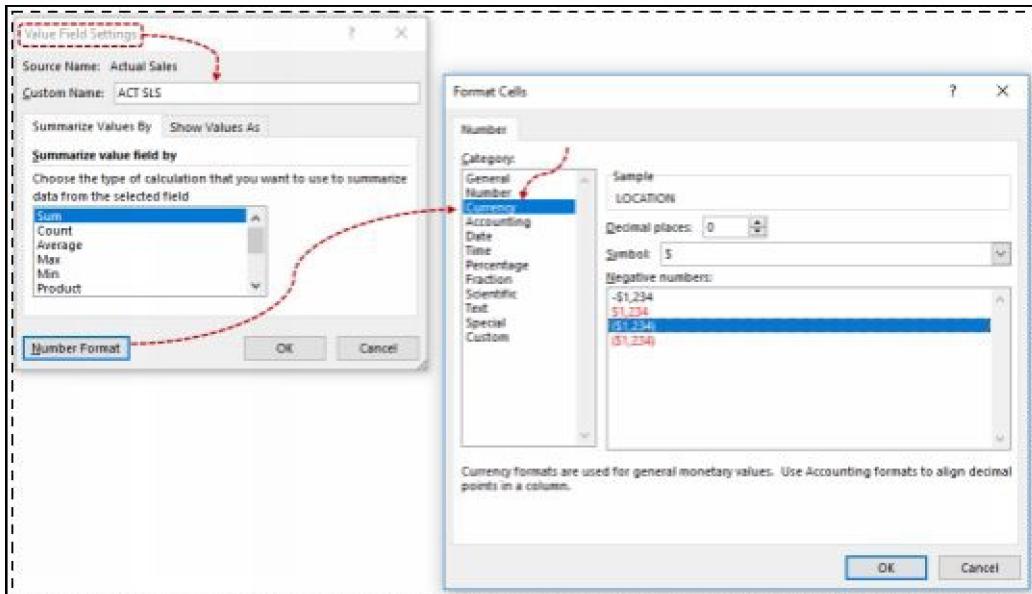
A new tab will be created and the ‘PivotTable Fields’ pane should appear on the left side of your screen.

5. Select the following fields:
  1. Location (*Columns section*)
  2. Month (*Rows section*)
  3. Planned Sales and Actual Sales (*Values section*) **Please note: when adding the QTY fields, it will default to ‘Count of OTY’, change to ‘Sum’**
  4.  $\Sigma$  Value (*Rows section*) – drag this field to the rows section

The screenshot shows a PivotTable in an Excel spreadsheet. The PivotTable Fields pane is open on the right, showing 'Location', 'Month', 'Planned Sales', and 'Actual Sales' under 'Values'. A handwritten note 'Make sure the "Σ Values" field is after the "Month" field' points to the 'Σ Values' field in the pane. The PivotTable itself shows sales data by month and location.

	AAA	BBB	CCC	DDD	EEE	(blank)	Grand Total
Jan							
Sum of Planned Sales	406	332	496	152	178		1564
Sum of Actual Sales	414	329	526	156	173		1598
Feb							
Sum of Planned Sales	415	348	551	175	179		1660
Sum of Actual Sales	417	342	595	184	183		1731
Mar							
Sum of Planned Sales	624	360	612	202	188		1794
Sum of Actual Sales	616	369	648	207	163		1797
(blank)							
Sum of Planned Sales							
Sum of Actual Sales							
Total Sum of Planned Sales	1245	1038	1650	520	516		4900
Total Sum of Actual Sales	1257	1034	1769	547	519		5124

6. Change the text in cell ‘A4’ to ‘MONTH’
7. Change the text in cell ‘B3’ to ‘LOCATION’
8. For ‘Sum of Planned Sales’ under ‘Value Field Settings’
  - Change the name to ‘PLN SLS’
  - The ‘Number Format’ to a currency of your choice
9. For ‘Sum of Actual Sales’ under ‘Value Field Settings’
  - Change the name to ‘ACT SLS’
  - The ‘Number Format’ to a currency of your choice



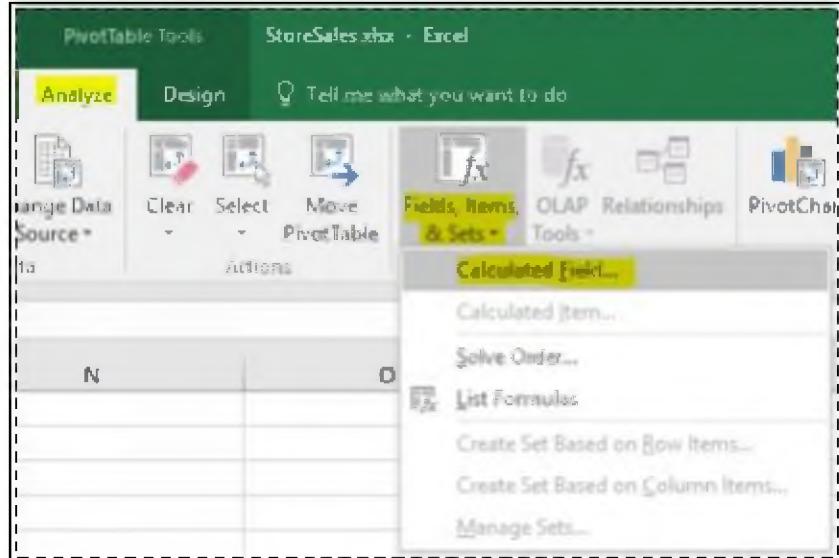
The Pivot Table should look *similar* to the following:

	LOCATION	AAA	BBB	CCC	DDD	EEE	(blank)	Grand Total
MONTH								
Jan								
	PLN SLS	\$406	\$332	\$496	\$152	\$178		\$1,564
	ACT SLS	\$414	\$329	\$526	\$156	\$173		\$1,598
Feb								
	PLN SLS	\$415	\$346	\$551	\$175	\$173		\$1,660
	ACT SLS	\$427	\$342	\$595	\$184	\$183		\$1,731
Mar								
	PLN SLS	\$424	\$360	\$612	\$202	\$168		\$1,766
	ACT SLS	\$416	\$363	\$648	\$207	\$163		\$1,797
	(blank)							
	PLN SLS							
	ACT SLS							
	Total PLN SLS	\$1,245	\$1,038	\$1,659	\$529	\$519		\$4,990
	Total ACT SLS	\$1,257	\$1,034	\$1,769	\$547	\$519		\$5,126

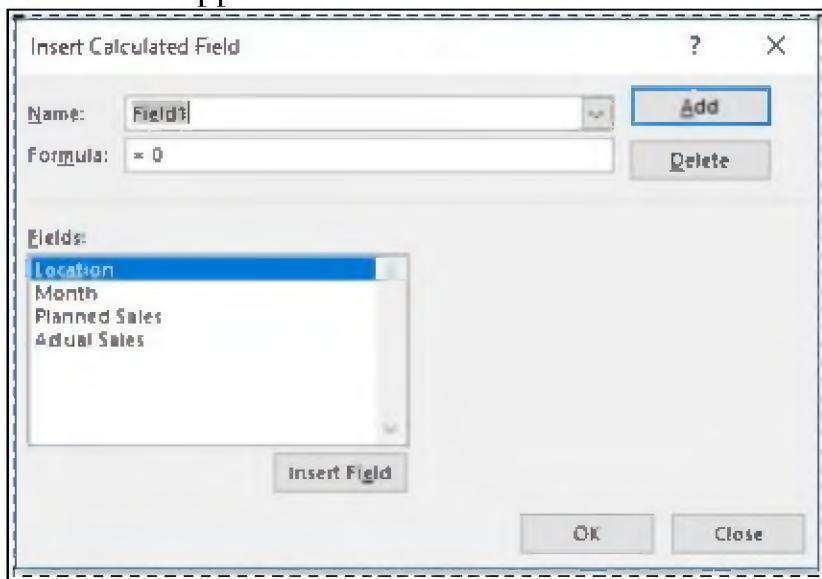
We'll hide the (blank) fields in a later step

To add our first calculated field showing the sales dollar variance -/+ plan vs. actual.

10. From the **PivotTable Tools** Ribbon select the tab **Analyze**
11. Click the '**Fields, Items & Sets**' drop-down box
12. Select '**Calculated Field...**'



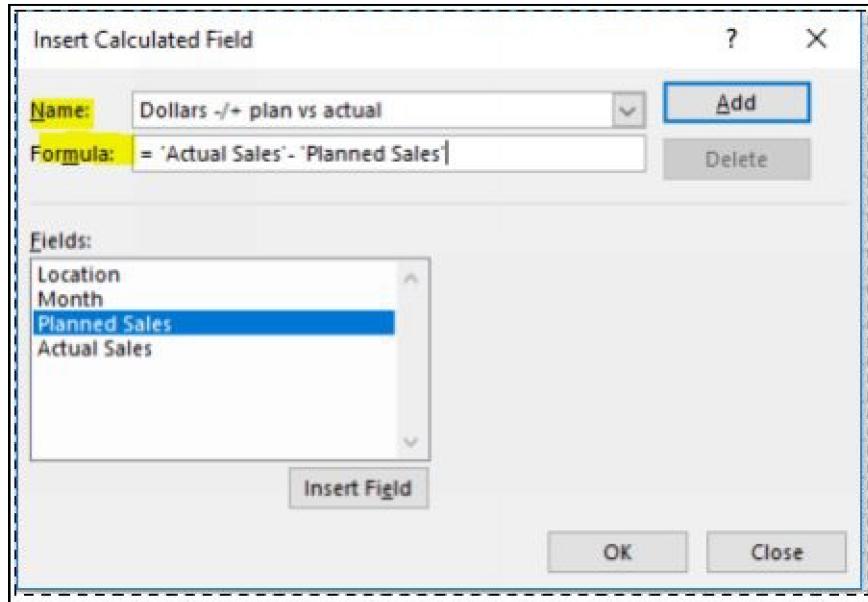
The following dialogue box will appear:



13. In the **Name:** field enter '**Dollars -/+ plan vs actual**'
14. In the **Formula:** field delete the zero '0', but leave the equal '=' sign
15. Select '**Actual Sales**' from the '**Fields**' list and click the '**Insert Field**' button
16. Add the minus '-' symbol in the **Formula:** field after '**Actual Sales**'
17. Select '**Planned Sales**' from the '**Fields**' list and click the '**Insert Field**' button

The following formula should now be in the '**Formula:**' field

**= 'ACTUAL SALES' - 'PLAN SALES'**



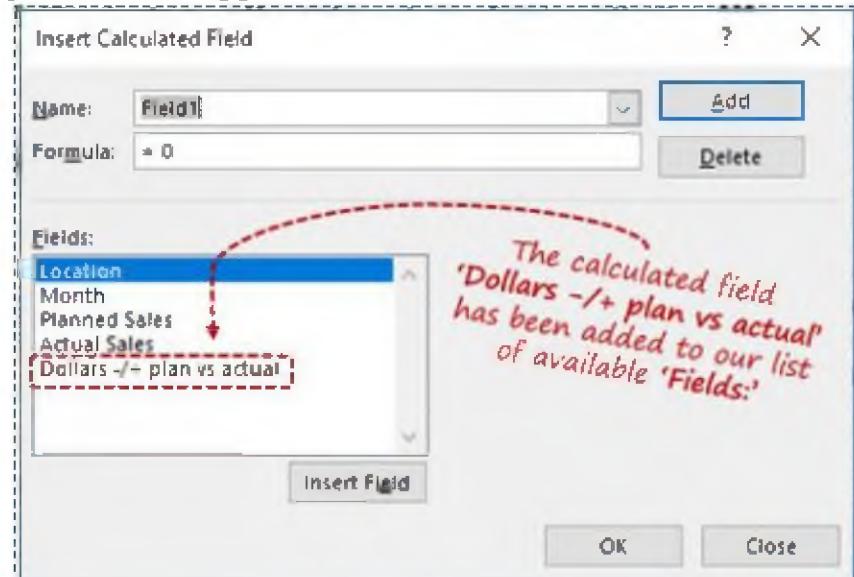
18. Click the ‘OK’ button

The following field was added to our PivotTable results:

Next, we'll add the calculated field for the percent variance  $-/+$  plan vs. actual

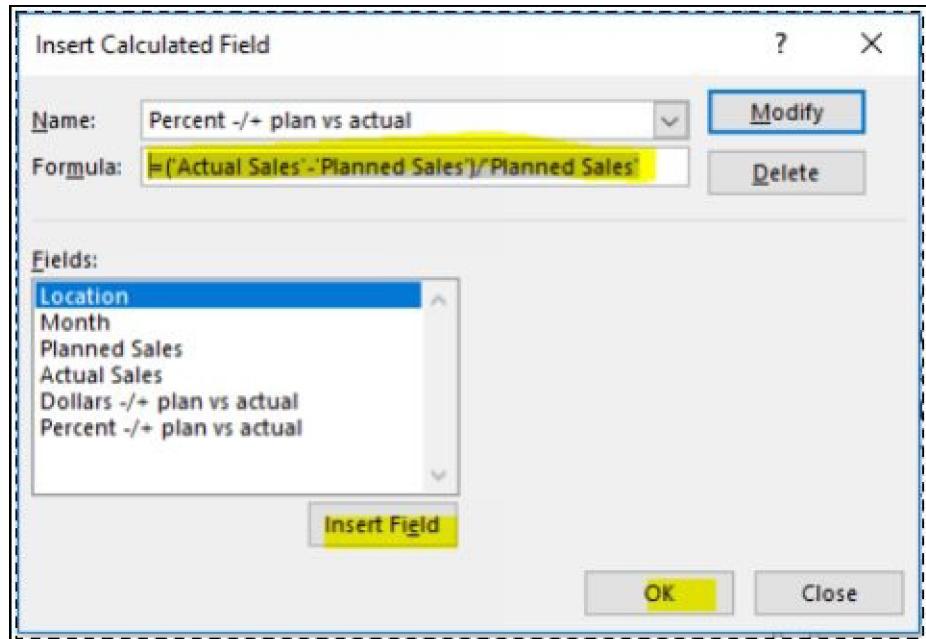
19. Repeat steps# 10 – 12 from above

The following dialogue box will appear:



20. In the **Name:** field enter '**Percent -/+ plan vs actual**'
21. In the **Formula:** field delete the zero '0', but leave the equal '=' sign
22. Add the below formula to the **Formula:** field  

$$= ('Actual Sales' - 'Planned Sales') / 'Planned Sales'$$
23. Click the '**OK**' button



The following field was added to our PivotTable results:

	MONTH	AAA	BBB	CCC	DDD	EEE	(blank)	Grand T
Jan								
PLN SLS		\$406	\$332	\$496	\$152	\$178		\$1,
ACT SLS		\$414	\$329	\$526	\$156	\$173		\$1,
Sum of Dollars -/+ plan vs actual		\$8	(\$3)	\$30	\$4	(\$5)	\$0	
Sum of Percent -/+ plan vs actual		\$0	(\$0)	\$0	\$0	(\$0)	#DIV/0!	
Feb								
PLN SLS		\$413	\$346	\$531	\$175	\$173		\$1,
ACT SLS		\$427	\$342	\$595	\$184	\$183		\$1,
Sum of Dollars -/+ plan vs actual		\$12	(\$4)	\$44	\$9	\$20	\$0	
Sum of Percent -/+ plan vs actual		\$0	(\$0)	\$0	\$0	(\$0)	#DIV/0!	
Mar								
PLN SLS		\$424	\$360	\$612	\$202	\$168		\$1,
ACT SLS		\$436	\$363	\$648	\$207	\$163		\$1,
Sum of Dollars -/+ plan vs actual		(\$12)	\$3	\$36	\$5	(\$5)	\$0	
Sum of Percent -/+ plan vs actual		(\$0)	\$0	\$0	\$0	(\$0)	#DIV/0!	
(Blank)								
PLN SLS								
ACT SLS								
Sum of Dollars -/+ plan vs actual		\$0	\$0	\$0	\$0	\$0	\$0	
Sum of Percent -/+ plan vs actual		#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	
Total PLN SLS		\$1,245	\$1,038	\$1,659	\$529	\$529		\$4,
Total ACT SLS		\$1,257	\$1,034	\$1,789	\$547	\$529		\$5,
Total Sum of Dollars -/+ plan vs actual		\$12	(\$4)	\$110	\$18	\$0	\$0	\$
Total Sum of Percent -/+ plan vs actual		\$0	(\$0)	\$0	\$0	(\$0)	#DIV/0!	

Choose from items in report...

Search:

Location  
 Month  
 Planned Sales  
 Actual Sales  
 Dollars -/+ plan vs actual  
 Percent -/+ plan vs actual

More Tables...

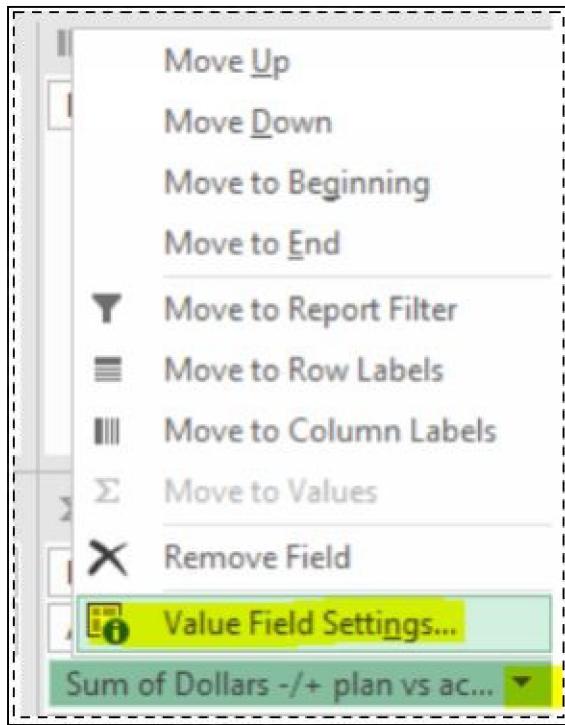
Drag fields between areas below:

F Filters	Columns
	Location

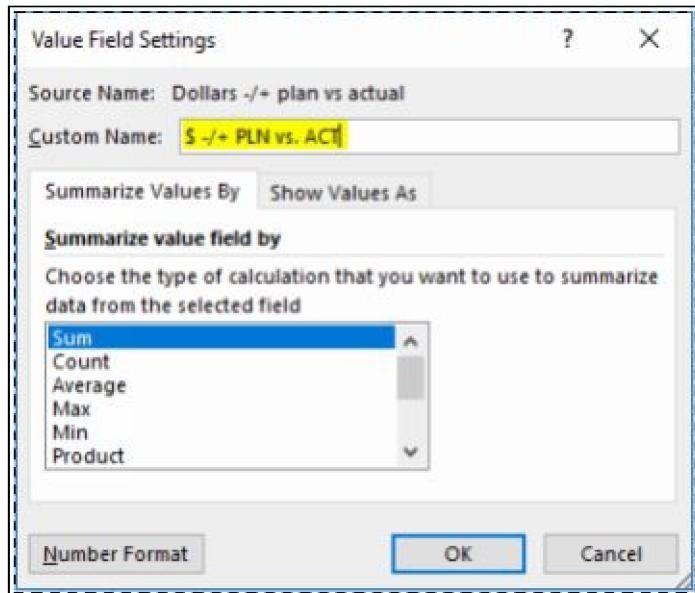
R Rows	V Values
Month	PLN SLS
Value	ACT SLS
	Sum of Dollars -/+ plan vs ac...
	Sum of Percent -/+ plan vs a...

Let's now format our report to improve readability

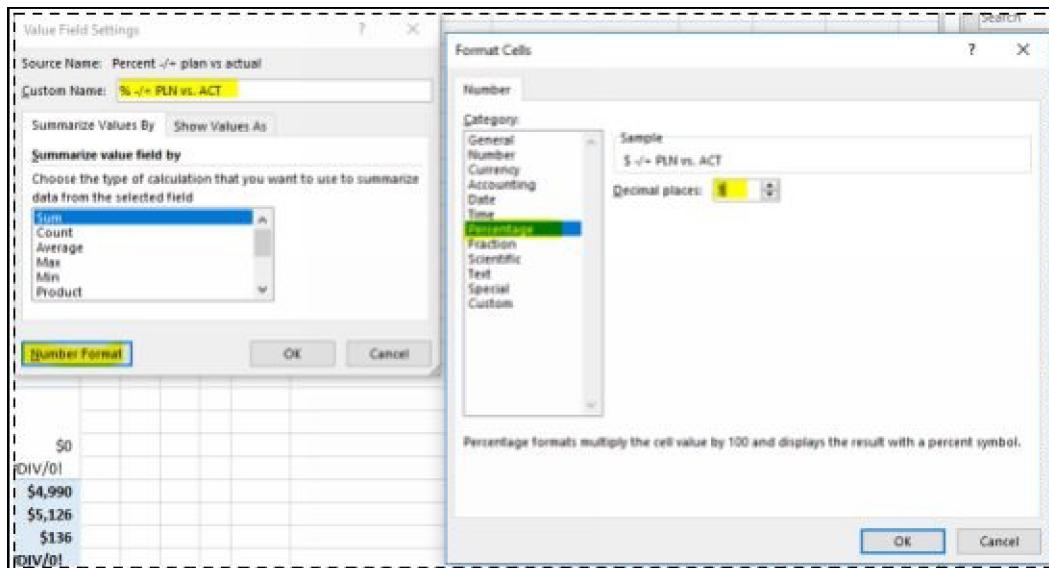
1. In the PivotTable Fields list, in the '**VALUES**' section, click the drop-down box for '**Sum of Dollars -/+ plan vs actual**'
2. Select the '**Value Field Settings...**'



3. Change the '**Custom Name:**' to '**\$ -/+ PLN vs. ACT**'
4. Click the '**OK**' button



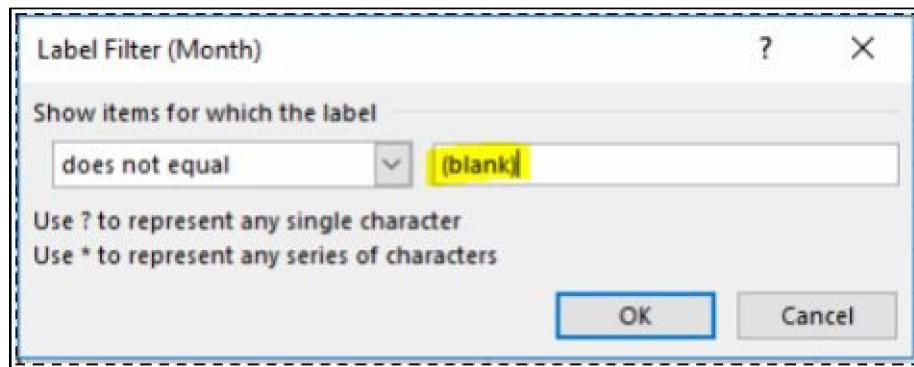
5. In the PivotTable Fields list, in the '**VALUES**' section, click the drop-down box for '**Sum of Percent -/+ plan vs actual**'
6. Select the '**Value Field Settings...**'
7. Change the '**Custom Name:**' to '**% -/+ PLN vs. ACT**'
8. Click the '**Number Format**' to change the format to a percentage with 1 decimal place



9. Click the 'OK' button for each dialogue box
10. Click the drop-down box for 'MONTH' and select 'Label Filters' then 'Does Not Equal...'.

	LOCATION	BBB	CCC	DDD	EEE
AAA	332	496	152		
	329	526	156		
	-3	30	4		
	-0.9%	6.0%	2.6%	-2	

11. When prompted enter (blank), this method will ensure when we refresh the data, the blank rows & columns will not appear, but our new locations will.



12. From the **PivotTable Tools** Ribbon select the tab **Design**
13. Select '**PivotTable Style**' of your choice
14. Click the checkbox '**Banded Columns**'

The screenshot shows a Microsoft Excel spreadsheet with a PivotTable. The PivotTable is organized by Month (Jan, Feb, Mar) and Location (AAA, CCC, DDD). The data includes actual sales figures and percentage changes from plan. The PivotTable has a 'Banded Columns' style applied, where each location group has a distinct color: AAA is light blue, CCC is light green, and DDD is light orange. Sub-totals are present for each month and a grand total at the bottom.

	A	B	C	D	E	F	G
3	MONTH	LOCATION	AAA	CCC	DDD	EEE	FFF
4	Jan						
5	PLN SLS	\$406	\$102	\$496	\$152	\$172	\$1,564
6	ACT SLS	\$414	\$109	\$526	\$166	\$171	\$1,596
7	\$-/- plan vs actual	\$8	(3)	\$20	\$4	(5)	\$34
8	% -/- plan vs actual	2.0%	-0.5%	6.0%	2.3%	-2.3%	2.2%
9	Feb						
10	PLN SLS	\$415	\$146	\$551	\$172	\$179	\$1,640
11	ACT SLS	\$427	\$142	\$586	\$194	\$183	\$1,711
12	\$-/- plan vs actual	\$12	(6)	\$44	\$9	\$10	\$73
13	% -/- plan vs actual	2.9%	-1.2%	6.0%	5.1%	5.5%	4.1%
14	Mar						
15	PLN SLS	\$424	\$166	\$612	\$200	\$188	\$1,746
16	ACT SLS	\$416	\$162	\$644	\$207	\$193	\$1,757
17	\$-/- plan vs actual	(18)	\$3	\$34	\$5	(5)	\$66
18	% -/- plan vs actual	-1.9%	0.8%	5.9%	2.3%	-3.0%	1.0%
19	Total PLN SLS	\$1,245	\$3,607	\$3,699	\$529	\$519	\$4,900
20	Total ACT SLS	\$1,267	\$3,694	\$3,798	\$547	\$529	\$5,038
21	Total \$-/- plan vs actual	\$22	(9)	\$99	\$18	(18)	\$161
22	Total % -/- plan vs actual	1.6%	-0.4%	6.6%	3.4%	-3.0%	2.7%
23	Total % -/- plan vs actual	3.0%	-0.4%	6.6%	3.4%	-3.0%	2.7%

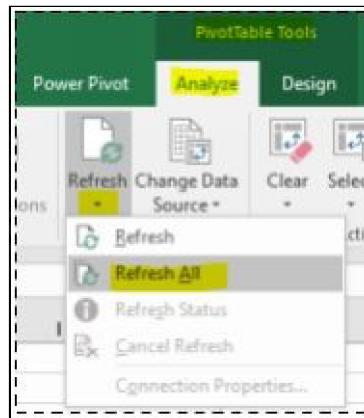
Now let's examine how our results change when we *add* or *remove* locations.

1. Return to the '**StoreSales**' tab
2. Copy cells '**F2:I7**' and paste into in cell '**A17**'

The screenshot shows a Microsoft Excel spreadsheet with two tables. The first table (A1:D22) has columns for Location, Month, Planned Sales, and Actual Sales. The second table (E1:I17) has columns for Location, Month, and two numerical columns. A dashed red arrow points from the bottom of the first table to the second table, indicating a data transfer. A handwritten note in red says: "Copy cells 'F2:I7' and paste in cell 'A17'".

	A	B	C	D	E	F	G	H	I
1	Location	Month	Planned Sales	Actual Sales					
2	AAA	Jan	406	414					
3	BBB	Jan	332	329					
4	CCC	Jan	496	526					
5	DDD	Jan	152	156					
6	EEE	Jan	178	173					
7	AAA	Feb	415	427					
8	BBB	Feb	346	342					
9	CCC	Feb	551	595					
10	DDD	Feb	175	184					
11	EEE	Feb	173	183					
12	AAA	Mar	424	416					
13	BBB	Mar	360	363					
14	CCC	Mar	612	648					
15	DDD	Mar	202	207					
16	EEE	Mar	168	163					
17	AAA	Apr	432	450					
18	BBB	Apr	338	329					
19	CCC	Apr	509	526					
20	DDD	Apr	155	150					
21	FFF	Apr	191	170					
22	GGG	Apr	181	170					

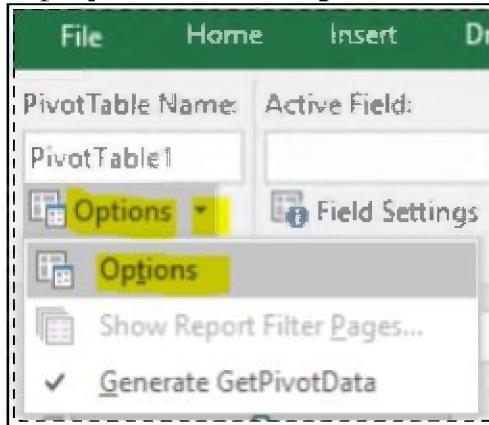
3. Return to the **Pivot Tables** tab, from the **PivotTable Tools** Ribbon select the tab **Analyze**
4. Click '**Refresh : Refresh All**'



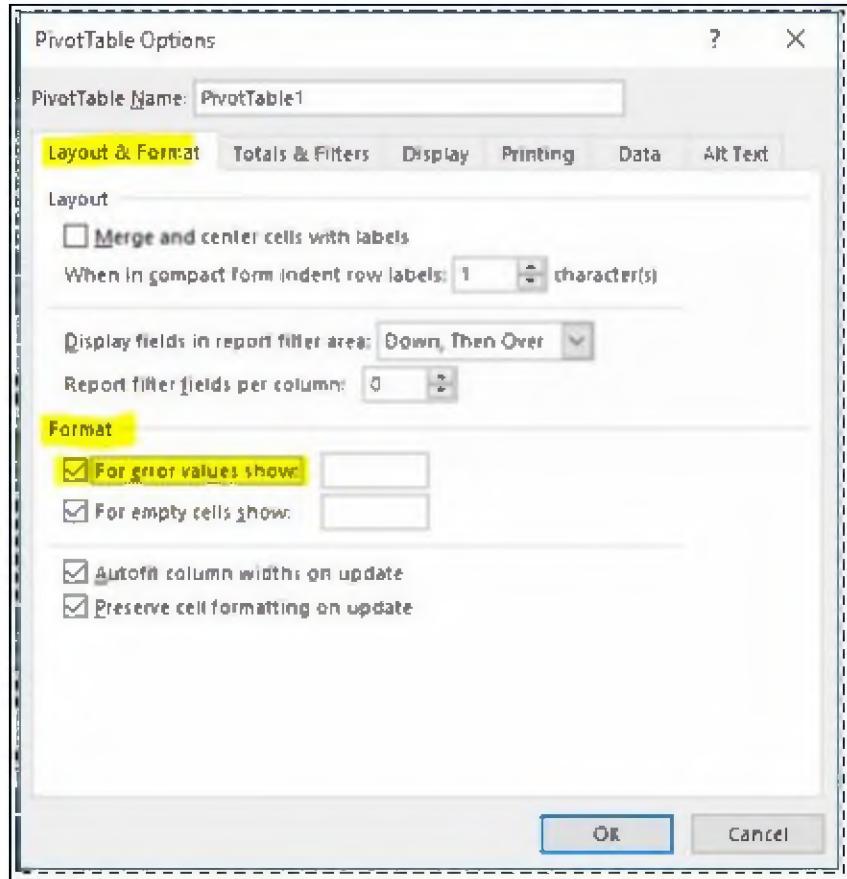
Changing The Display Of Formula Error Messages  
A report similar to the following should now appear:

	A	B	C	D	E	F	G	H	I
3		LOCATION ▾							
4	MONTH	AAA	BBB	CCC	DDD	EEE	FFF	GGG	TTL
5	Jan								
6	PLN SLS	\$406	\$332	\$496	\$152	\$178			\$1,564
7	ACT SLS	\$414	\$329	\$526	\$156	\$173			\$1,598
8	\$ -/+ plan vs actual	\$8	(\$3)	\$30	\$4	(\$5)	\$0	\$0	\$34
9	% -/+ plan vs actual	2.0%	-0.9%	6.0%	2.6%	-2.8%	#DIV/0!	#DIV/0!	2.2%
10	Feb								
11	PLN SLS	\$415	\$346	\$551	\$175	\$173			\$1,660
12	ACT SLS	\$427	\$342	\$595	\$184	\$183			\$1,731
13	\$ -/+ plan vs actual	\$12	(\$4)	\$44	\$9	\$10	\$0	\$0	\$71
14	% -/+ plan vs actual	2.9%	-1.2%	8.0%	5.1%	5.8%	#DIV/0!	#DIV/0!	4.3%
15	Mar								
16	PLN SLS	\$424	\$360	\$612	\$202	\$168			\$1,766
17	ACT SLS	\$416	\$363	\$648	\$207	\$163			\$1,797
18	\$ -/+ plan vs actual	(\$8)	\$3	\$36	\$5	(\$5)	\$0	\$0	\$31
19	% -/+ plan vs actual	-1.9%	0.8%	5.9%	2.5%	-3.0%	#DIV/0!	#DIV/0!	1.8%
20	Apr								
21	PLN SLS	\$432	\$338	\$509	\$155		\$191	\$181	\$1,806
22	ACT SLS	\$450	\$329	\$526	\$150		\$170	\$170	\$1,795
23	\$ -/+ plan vs actual	\$18	(\$9)	\$17	(\$5)	\$0	(\$21)	(\$11)	(\$11)
24	% -/+ plan vs actual	4.2%	-2.7%	3.3%	-3.2%	#DIV/0!	-11.0%	-6.1%	-0.6%
25	Total PLN SLS	\$1,677	\$1,376	\$2,168	\$684	\$519	\$191	\$181	\$6,796
26	Total ACT SLS	\$1,707	\$1,363	\$2,295	\$697	\$519	\$170	\$170	\$6,921
27	Total \$ -/+ plan vs actual	\$30	(\$13)	\$127	\$13	\$0	(\$33)	(\$11)	\$125
28	Total % -/+ plan vs actual	1.8%	-0.9%	5.9%	1.9%	0.0%	-11.0%	-6.1%	1.8%

5. To remove the #DIV/0! display, select the ‘Options’ drop-down box, then ‘Options’



6. Under the ‘Layout & Format’ tab, check the box ‘For error values show:’  
 7. Click the ‘OK’ button



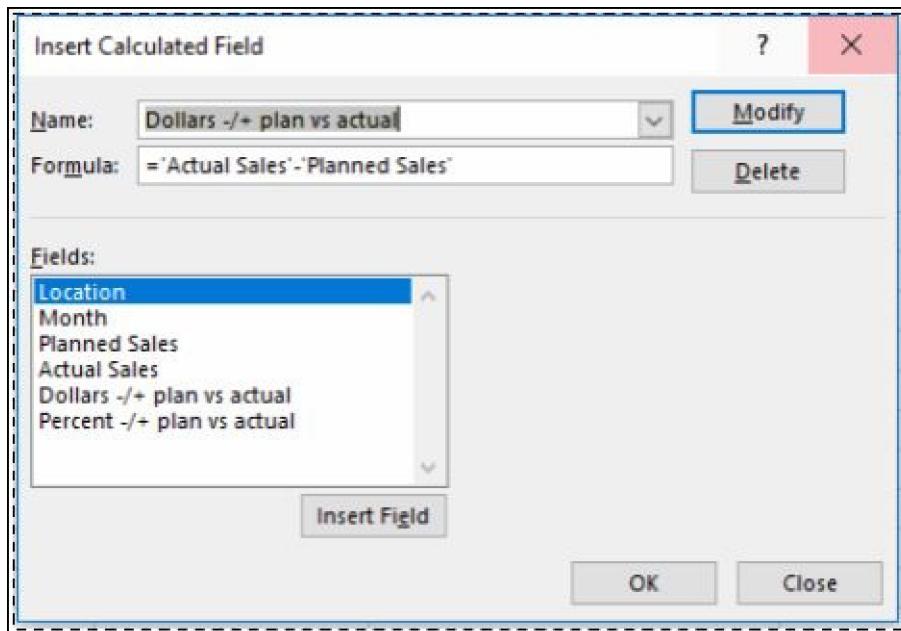
## Removing Or Changing Calculated Fields

To remove or change a calculated field:

1. From the **PivotTable Tools** Ribbon select the tab **Analyze**
2. Click the '**Fields, Items & Sets**' drop-down box
3. Select '**Calculated Field...**'

The following dialogue box will appear:

4. In the '**Name:**' drop-down box select the calculated field you would like to change or remove
5. Click appropriate button, either '**Modify**' or '**Delete**'



## Inserting Logic Fields (*if...then*)

We'll need to add two additional calculated fields, in order to answer the following questions:

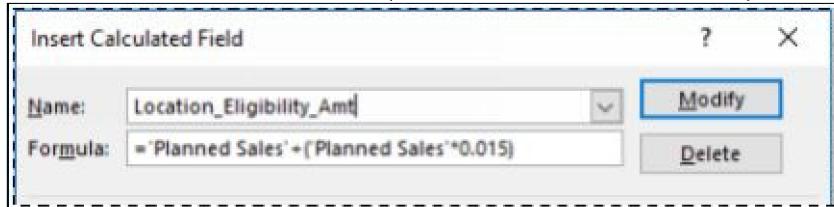
- Is the store eligible for a bonus based on actual sales greater than 1.5% over planned sales?
- If the store earned a bonus, what is the dollar amount owed to that location? *This is calculated as 2% of that store's actual sales.*

The two calculated fields needed:

1. Location Eligibility Amount to calculate what is 1.5% over the planned sales for each location?
2. Bonus Award the dollar amount owed, *if* they earned the bonus, what is 2% of actual sales for that location?

**Location\_Eligibility\_Amt** formula:

=**'Planned Sales'+('Planned Sales'\*0.015)**



**Bonus\_Award** formula:

=**IF('Actual Sales'>Location\_Eligibility\_Amt,('Actual Sales'\*0.02),0)**

Printed Fields										
Month	Location	AAA	BBB	CCC	DDO	EII	FFF	GGG	TT	Choose Fields to Add to Report
Jan	PLN SLS	\$406	\$332	\$496	\$152	\$170		\$1,564		
	ACT SLS	\$424	\$329	\$506	\$156	\$170		\$1,596		
	\$/-> plan vs actual	\$4	\$(-1)	\$0	\$4	\$(-1)		\$24		
	%/-> plan vs actual	-2.0%	-3.9%	6.0%	2.6%	-2.6%		2.2%		
	Balance \$ Amount	\$0	\$0	\$11	\$1	\$0		\$0	\$0	
Feb	PLN SLS	\$411	\$346	\$604	\$212	\$217		\$1,660		
	ACT SLS	\$437	\$341	\$515	\$184	\$184		\$1,711		
	\$/-> plan vs actual	\$5	\$(-1)	\$14	\$4	\$(-1)		\$51		
	%/-> plan vs actual	-1.3%	-1.3%	4.0%	3.1%	-3.0%		3.1%		
	Balance \$ Amount	\$0	\$0	\$12	\$4	\$0		\$0	\$0	
Mar	PLN SLS	\$424	\$400	\$412	\$260	\$260		\$1,766		
	ACT SLS	\$441	\$400	\$400	\$261	\$261		\$1,797		
	\$/-> plan vs actual	\$17	\$(-1)	\$1	\$1	\$0		\$0	\$0	
	%/-> plan vs actual	-1.9%	-0.1%	0.3%	2.5%	-1.0%		1.4%		
	Balance \$ Amount	\$0	\$0	\$21	\$4	\$0		\$0	\$0	
Apr	PLN SLS	\$433	\$418	\$409	\$325	\$310		\$1,871		
	ACT SLS	\$450	\$416	\$424	\$310	\$310		\$1,913		
	\$/-> plan vs actual	\$17	\$(-1)	\$17	\$17	\$(-1)		\$42		
	%/-> plan vs actual	-4.2%	-2.7%	2.3%	-3.0%	-1.0%		-0.6%		
	Balance \$ Amount	\$0	\$0	\$21	\$0	\$0		\$0	\$0	
Total PLN SLS		\$1,619	\$1,436	\$1,535	\$470	\$470		\$1,619		
Total ACT SLS		\$1,619	\$1,436	\$1,535	\$470	\$470		\$1,619		
Total \$/-> plan vs actual		\$0	\$0	\$0	\$0	\$0		\$0	\$0	
Total %/-> plan vs actual		0.0%	0.0%	0.0%	0.0%	0.0%		0.0%		
Total Balance \$ Amount		\$0	\$0	\$0	\$0	\$0		\$0	\$0	



# CHAPTER 13

## ***Creating Pivot Tables From Imported Files – using the Data Model***

---

Like with many tasks in Excel®, file importing and parsing can be accomplished in multiple ways. The following example describes how to read and parse a.CSV (comma separated value) file using Excel’s® Data Model technique. Then applying the parsed data to create a Pivot Table report.

The Excel® Data Model is a feature in which different data sources can be brought together into a single workbook. Once this information is in the workbook, you’re able to create more robust Pivot Tables, Pivot Charts, or Power View reports.

This type of reporting can also be achieved by using macros (Visual Basic for Applications) or Power Pivot. Deciding which method to use depends a on variety of factors, such as:

- The amount of data your analyzing
- The complexity and time it takes to complete your analysis
- Your audience’s requirements
- Your experience with Excel®

In the following example, the reporting is straightforward, we’ll be reporting on less than 100 records. Our Excel® Data Model will contain only one data source.

In this example, you’re a Business Analyst and a request has been made to change a monthly employee sales report. Management would now like to see:

1. A regional summary
2. Employee sales grouped and subtotalized by region

Employee sales are captured in a legacy system. This older system produces a monthly .CSV file and saves it to a company server location. To save time formatting the same report each month you create Pivot Tables to parse the .CSV file and format the data into a Excel® report.

---

### **WEB ADDRESS & FILE NAMES FOR EXERCISE:**

<http://bentonexcelbooks.my-free.website/excel-2016>

EmployeeSales.csv

### **ADDITIONAL STEP FOR THIS CHAPTER**

Save the **EmployeeSales.csv** file to a location on your computer you can easily access such as a temporary folder or your desktop.

## EXAMPLE:

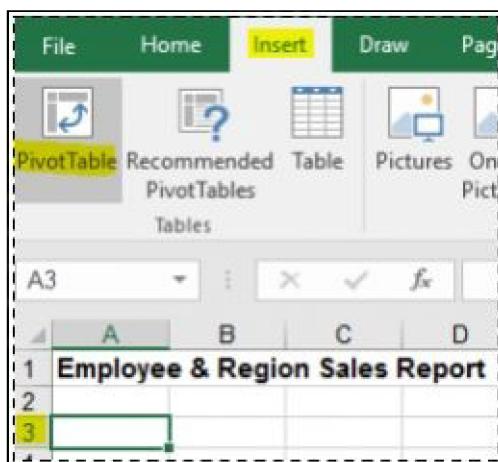
From:

	A	B	C	D	E	F	G
1	REGION	SALES_PEF	SALES PER MONTH	PEF	MARCH	SALES	
2	West	Jack	Smith	105	March	4787	
3	West	Joe	Tanner	119	March	4520	
4	West	Peter	Graham	130	March	4456	
5	West	Abbey	Williams	179	March	3124	
6	East	Sarah	Taylor	183	March	3752	
7	East	John	Wilson	136	March	3029	
8	East	Mary	Nelson	106	March	3117	
9	East	John	Dower	135	March	3871	
10	South	Jeanne	Campbell	114	March	4285	
11	South	Sheldon	Bates	187	March	3834	
12	South	Carson	Lewis	109	March	4805	

To:

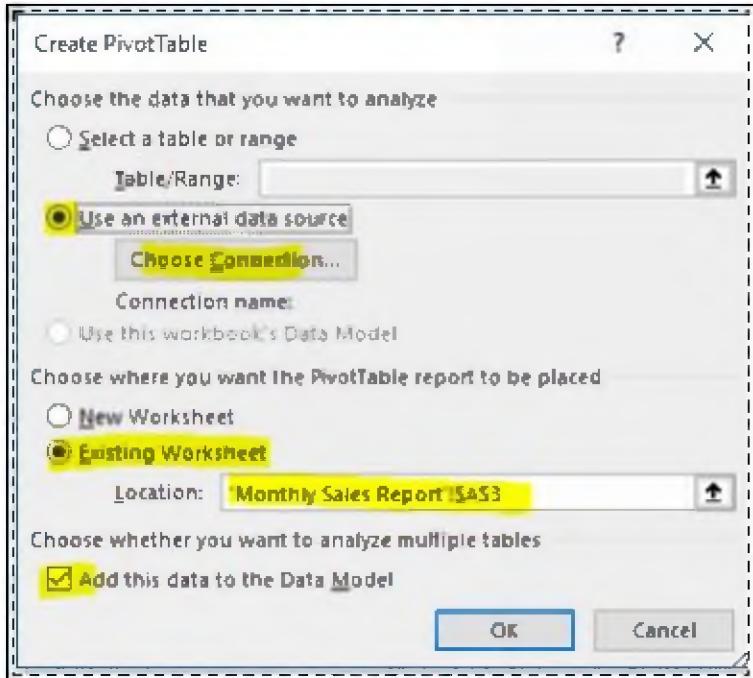
	A	B	C	D	E	F
1	Employee & Region Sales Report					
2						
3	EMPLOYEE & REGION	MONTH		REGION	MONTH	
4	SALES	March		SALES	March	
5	Central	19,054		Central	19,054	
6	Becker	4,647		East	13,769	
7	Johnson	4,386		South	20,979	
8	Morton	3,425		West	16,887	
9	Smith	3,370		TOTAL	70,689	
10	Taylor	3,226				
11	East	13,769				
12	Dower	3,871				
13	Nelson	3,117				
14	Taylor	3,752				
15	Wilson	3,029				
16	South	20,979				
17	Bates	3,834				
18	Blatchford	4,350				
19	Campbell	4,285				
20	Lewis	4,805				
21	Tansae	3,705				
22	West	16,887				
23	Graham	4,456				
24	Smith	4,787				
25	Tanner	4,520				
26	Williams	3,124				
27	TOTAL	70,689				

1. Create a new blank Excel® spreadsheet (**CTRL + N**)
2. Rename ‘Sheet1’ to ‘Monthly Sales Report’
3. Select cell ‘A1’ and enter the text ‘Employee & Region Sales Report’
4. Select cell ‘A3’
5. From the Ribbon select **INSERT : PivotTable**

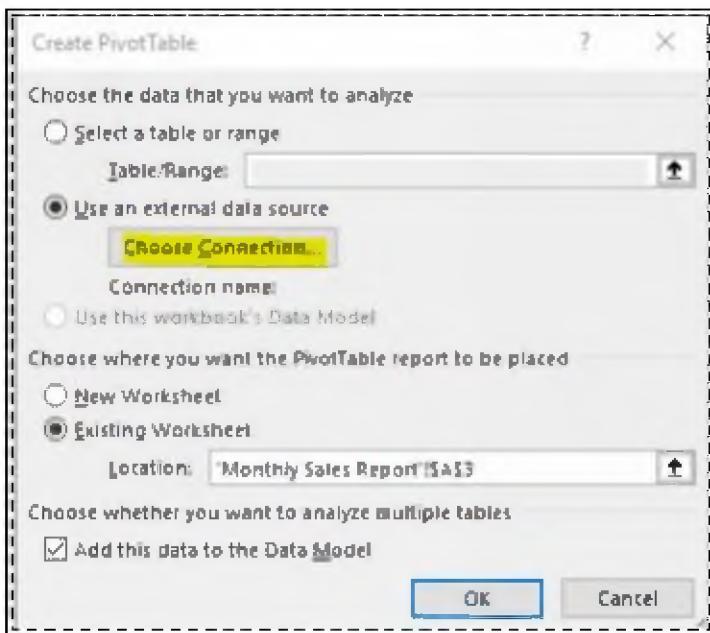


The following dialogue box will appear:

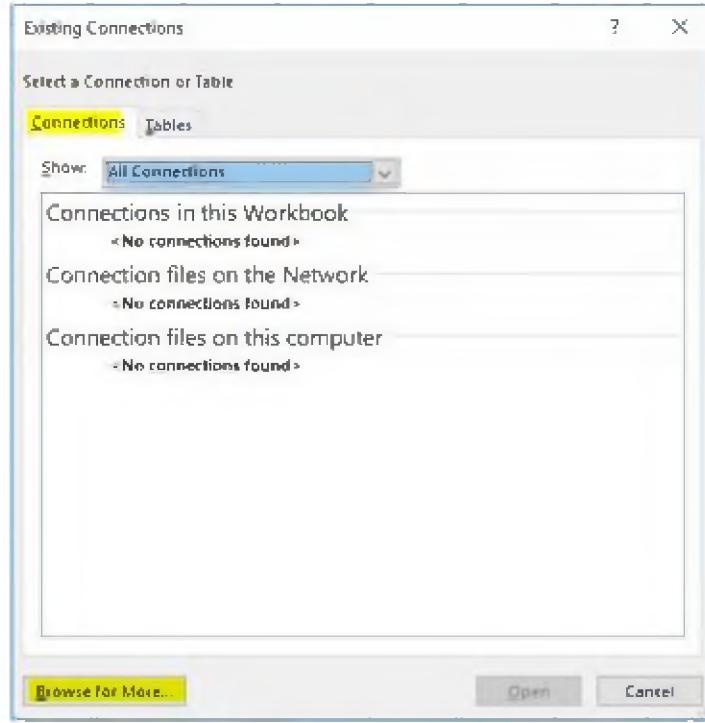
6. Select the ‘Use an external data source’ radio button
7. Click the ‘Add this data to the Data Model’ checkbox



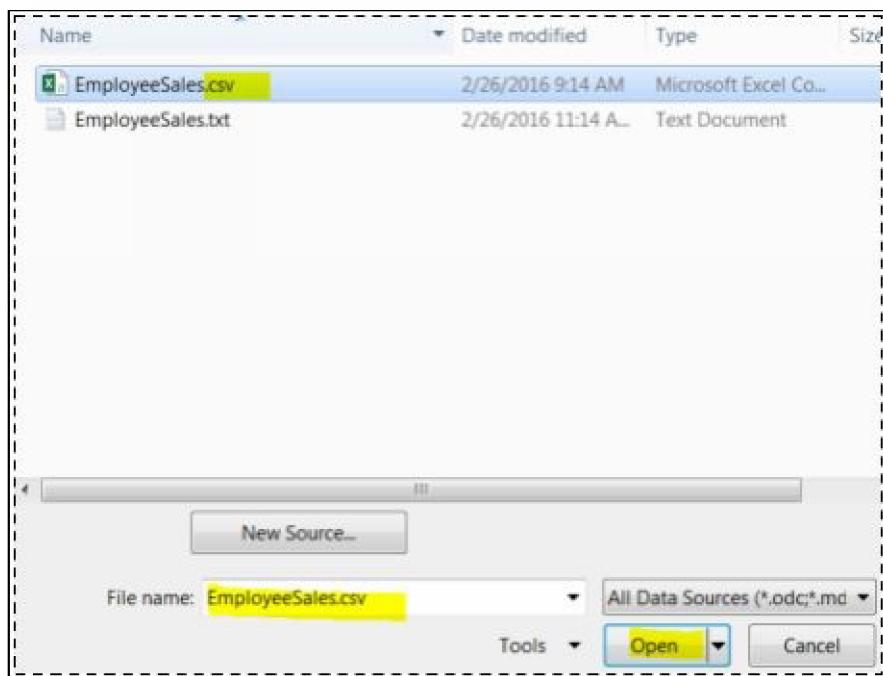
8. Click the 'Choose Connection...' button



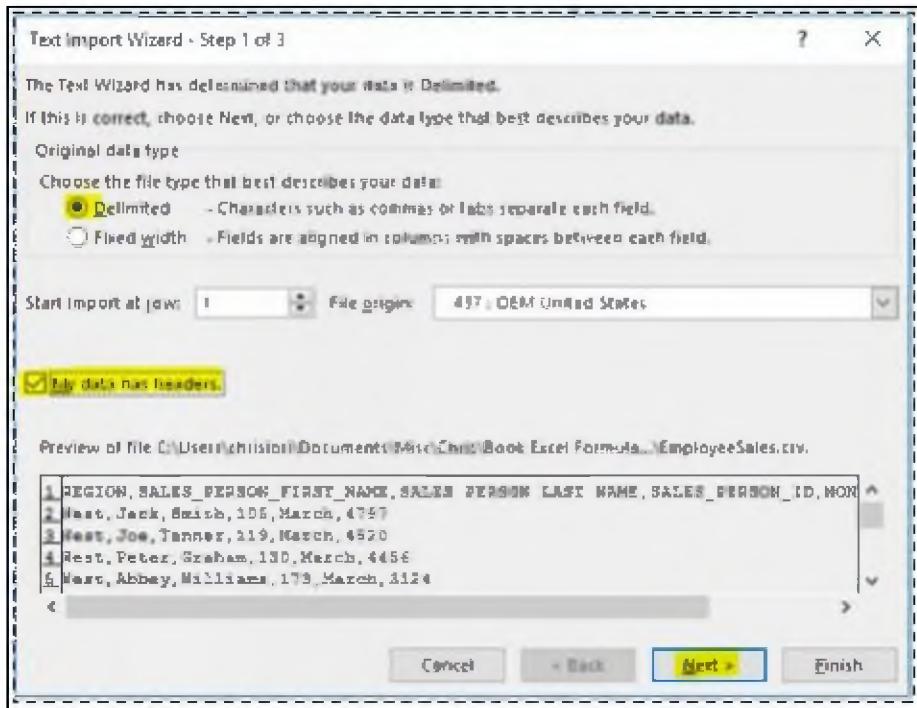
A prompt *similar* to the following should appear:



9. Click the '**Browse for More...**' button
10. When prompted select the file path where the file '**EmployeeSales.csv**' is located
11. Click the '**Open**' button

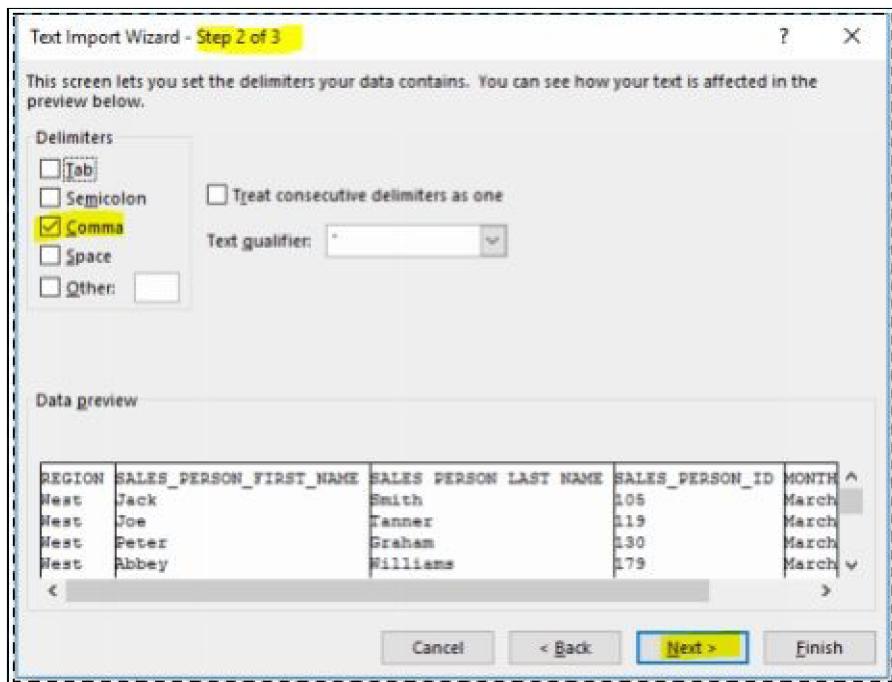


The following **Text Import Wizard** will be displayed:



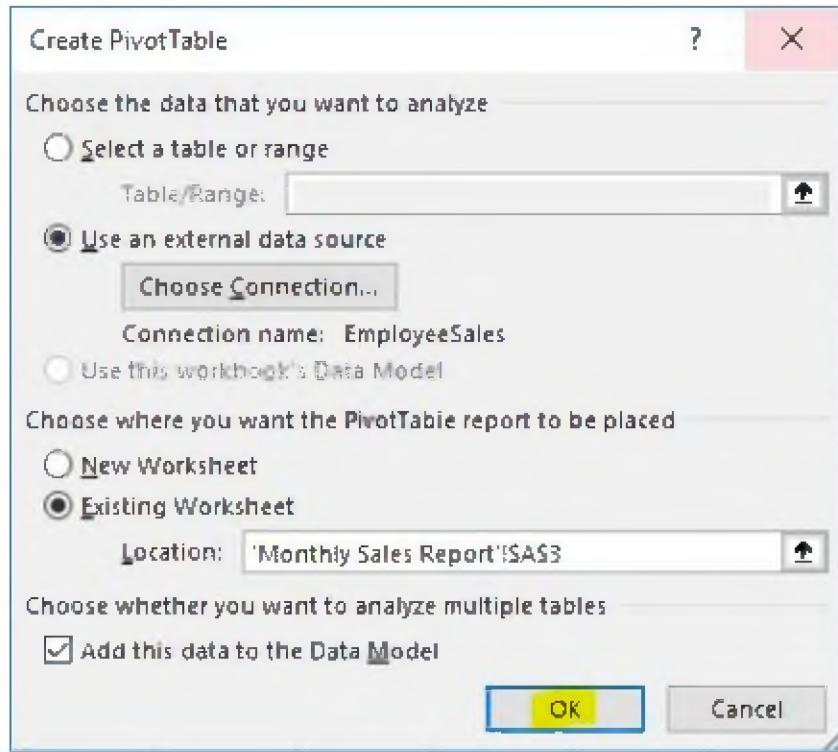
12. Select the '**Delimited**' radio button and '**My data has headers**' check box
13. Click the '**Next>**' button

Step 2 of the **Text Import Wizard** will be displayed:



14. For the Delimiters, select the '**Comma**' check box
15. Click the '**Finish**' button

The following prompt will appear:



16. Click the 'OK' button

A prompt similar to the following should appear (*it may take moment to load*):



17. In the 'PivotTable Fields' pane select the following fields:

- REGION & SALES PERSON LAST NAME (Rows section)
- MONTH (Columns section)
- SALES (Values section)

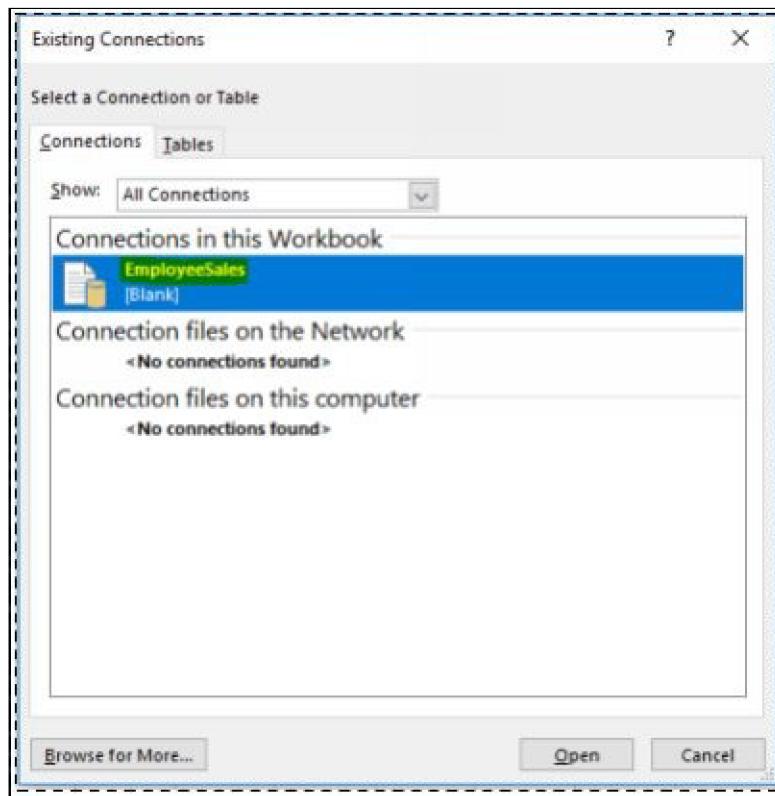
Employee & Region Sales Report			
		Sum of SALES	Column Labels
	Row Labels	March	Grand Total
5	- Central	19054	19054
6	Becker	4647	4647
7	Johnson	4386	4386
8	Moran	3425	3425
9	Smith	3370	3370
10	Taylor	3226	3226
11	- East	13769	13769
12	Davies	3871	3871
13	Nelson	3117	3117
14	Taylor	3752	3752
15	Wilson	3029	3029
16	- South	20979	20979
17	Bates	3834	3834
18	Batchford	4350	4350
19	Campbell	4285	4285
20	Lewis	4805	4805
21	Tucker	3705	3705
22	- West	16887	16887
23	Graham	4456	4456
24	Smith	4787	4787
25	Tanner	4520	4520
26	Williams	3124	3124
27	Grand Total	70629	70629

18. Place your cursor in cell 'E3'

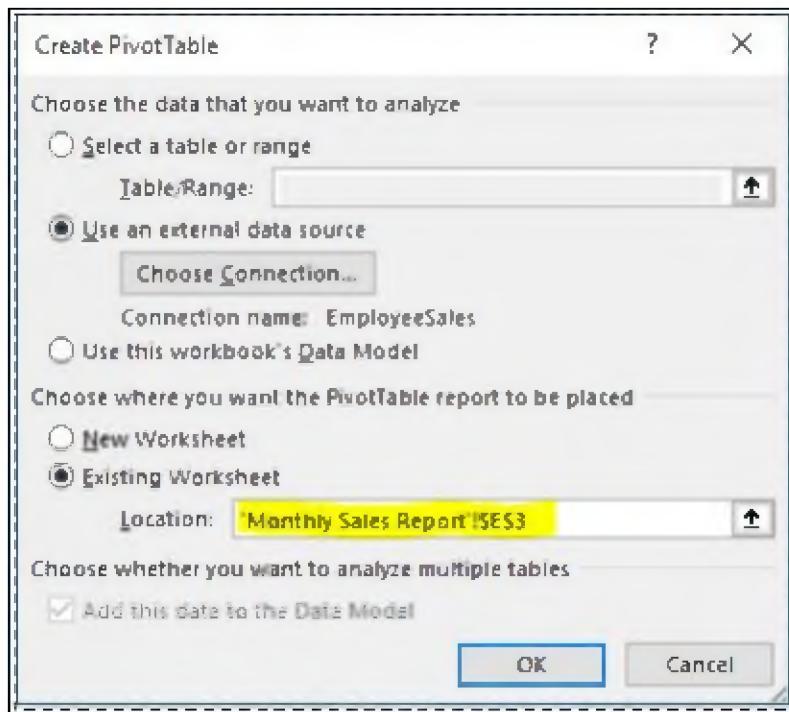
19. Repeat steps 5 – 8 from above

A prompt similar to the following should appear:

20. Select ‘EmployeeSales’ and click the ‘Open’ button



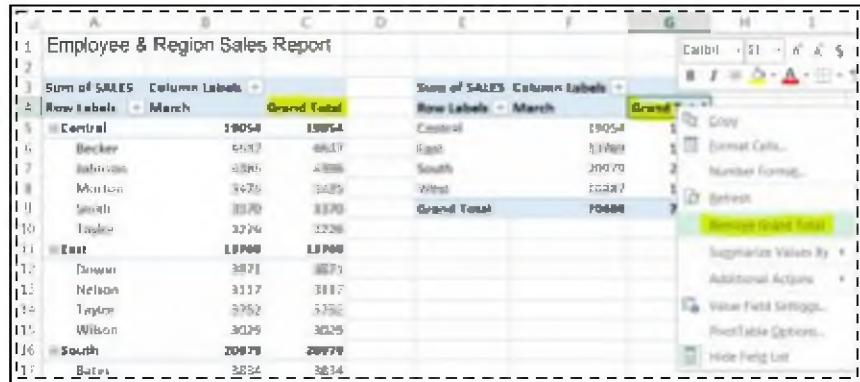
21. Click the ‘OK’ button



22. In the ‘PivotTable Fields’ pane select the following fields:

- REGION (*Rows section*)
- MONTH (*Columns section*)
- SALES (*Values section*)

23. Right-click over *both* ‘Grand Total’ fields and select ‘Remove Grand Total’



A screenshot of a Microsoft Power BI report titled "Employee & Region Sales Report". The report displays sales data for four regions: Central, East, South, and West. The columns represent Employee names and their March sales. Two 'Grand Total' fields are present in the report. A context menu is open over the first 'Grand Total' field, with the option 'Remove Grand Total' highlighted.

	Sum of SALES	Column Labels	Grand Total	Sum of SALES	Column Labels	Grand Total
	Row Labels	Month		Row Labels	Month	
1	Central	19054	19054	Central	19054	19054
2	Becker	4,647	4,647	East	13,769	13,769
3	Johnson	4,386	4,386	South	20,979	20,979
4	Morton	3,425	3,425	West	16,887	16,887
5	Smith	3,370	3,370	Grand Total	70,689	70,689
6	Taylor	3,226	3,226			
7	East	13,769	13,769			
8	Dower	3,521	3,521			
9	Nelson	3,317	3,317			
10	Taylor	3,752	3,752			
11	Wilson	3,029	3,029			
12	South	20,979	20,979			
13	Bates	3,834	3,834			
14	Ulatchford	4,350	4,350			
15	Campbell	4,285	4,285			
16	Lewis	4,805	4,805			
17	Tansae	3,705	3,705			
18	West	16,887	16,887			
19	Graham	4,456	4,456			
20	Smith	4,787	4,787			
21	Tanner	4,520	4,520			
22	Williams	3,124	3,124			
23	TOTAL	\$ 70,689	\$ 70,689			

24. Re-label and format column headings, change currency to your preference



A screenshot of a Microsoft Power BI report titled "Employee & Region Sales Report". The report has been modified from the previous screenshot. The column headings have been changed to "EMPLOYEE & REGION" and "MONTH". The "Month" column now contains "SALES" and "March". The "Region" column now contains "SALES" and "Month". The "Month" column under "Region" also contains "March". The data remains the same as the previous screenshot, with sales figures for each employee across four regions.

	EMPLOYEE & REGION	MONTH	REGION	MONTH
	SALES	March	SALES	March
1	Central	\$ 19,054	Central	\$ 19,054
2	Becker	\$ 4,647	East	\$ 13,769
3	Johnson	\$ 4,386	South	\$ 20,979
4	Morton	\$ 3,425	West	\$ 16,887
5	Smith	\$ 3,370	TOTAL	\$ 70,689
6	Taylor	\$ 3,226		
7	East	\$ 13,769		
8	Dower	\$ 3,521		
9	Nelson	\$ 3,317		
10	Taylor	\$ 3,752		
11	Wilson	\$ 3,029		
12	South	\$ 20,979		
13	Bates	\$ 3,834		
14	Ulatchford	\$ 4,350		
15	Campbell	\$ 4,285		
16	Lewis	\$ 4,805		
17	Tansae	\$ 3,705		
18	West	\$ 16,887		
19	Graham	\$ 4,456		
20	Smith	\$ 4,787		
21	Tanner	\$ 4,520		
22	Williams	\$ 3,124		
23	TOTAL	\$ 70,689		

# CHAPTER 14

## Troubleshooting: Pivot Tables Displaying Duplicate Values

---

Sometimes the data we're analyzing is not in a format conducive for Pivot Tables. Cell values may contain extra spaces between and after words. This can cause Pivot Table reports to display incorrect results, below are two examples of this issue and how to resolve them.

---

### WEB ADDRESS & FILE NAME FOR EXERCISE:

<http://bentonexcelbooks.my-free.website/excel-2016>

FormulasLenAndTrim.xlsx

---

### Example:

You've been given a report that was created by a Data Base Administrator (DBA). The DBA created the file by running a query in a database, exporting the results into a .CSV file, and then opened and re-saved the report as an Excel® file.

As the Business Analyst, you're attempting to reconcile the data using a Pivot Table. In your analysis, you've discovered cell values that "look" to be the same, but are being returned as two separate records in your results.

You decide to use the **LEN function** to troubleshoot why you're getting two separate records in your results for what appear to be the same value.

Below is an illustration of the Pivot Table report showing the incorrect values.

A	B
1	
2	
3 Row Labels	Sum of FRUIT SALES
4 Apples	100
5 Apples	500
6 Kiwi	600
7 Oranges	600
8 Grand Total	1800
9	
10	

### Formula - LEN

**Definition:** The LEN formula counts the number characters in a cell

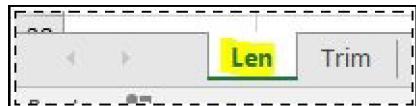
---

Formula Syntax:

LEN(text)

text is required

1. Open the **FormulasLenAndTrim.xlsx** spreadsheet
2. Select the tab named '**Len**'



3. Sorting the results by 'Fruit Name' in Ascending order

*Sort Column 'A' in  
Ascending order*

	A	B
1	FRUIT NAME	FRUIT SALES
2	Apples	100
3	Kiwi	100
4	Oranges	100
5	Apples	200
6	Kiwi	200
7	Oranges	200
8	Apples	300
9	Kiwi	300
10	Oranges	300
11		

4. Select cell 'C1' and label it "**LEN FUNCTION**"
5. Click cell 'C2'

	A	B	C
1	FRUIT NAME	FRUIT SALES	LEN FUNCTION
2	Apples	100	
3	Apples	200	
4	Apples	300	
5	Kiwi	100	
6	Kiwi	200	
7	Kiwi	300	
8	Oranges	100	
9	Oranges	200	
10	Oranges	300	
11			

6. From the Ribbon select **Formulas : Text : LEN**

The screenshot shows the Microsoft Excel ribbon with the 'Formulas' tab selected. In the 'Text' section of the ribbon, the 'LEN' function is highlighted. Below the ribbon, a table is displayed with columns for 'FRUIT NAME', 'FRUIT SALES', and 'LEN FUNCTION'. The 'LEN FUNCTION' column contains the formula =LEN(A2) in cell C2. A dropdown menu is open over the formula, listing various text functions like BAHTTEXT, CHAR, CLEAN, CODE, CONCAT, DOLLAR, EXACT, FIND, FIXED, LEFT, LOWER, and MID.

The following dialogue box will appear:

7. Click on cell 'A2' or enter 'A2' in the Text field
8. Click the 'OK' button

The screenshot shows the 'Function Arguments' dialog box for the LEN function. The 'Text' input field is set to 'A2', which corresponds to the cell containing 'Apples'. The dialog box also displays the function's purpose: 'Returns the number of characters in a text string.' and its formula result: 'Formula result = 6'. The 'OK' button is visible at the bottom right of the dialog.

9. Copy the LEN formula down to cells 'C3' thru 'C10'

There appears to be an extra space in cells 'A3' & 'A4' after the fruit name 'Apple'

	A	B	C
1	FRUIT NAME	FRUIT SALES	LEN FUNCTION
2	Apples	100	6
3	Apples	200	7
4	Apples	300	7
5	Kiwi	100	4
6	Kiwi	200	4
7	Kiwi	300	4
8	Oranges	100	7
9	Oranges	200	7
10	Oranges	300	7

10. Remove the extra space in cells ‘A3 & A4’ for the fruit name ‘Apple’
11. Save your changes
12. You would now be able to re-run your Pivot Table report and results should appear correctly

3	Row Labels	Sum of FRUIT SALES
4	Apples	600
5	Kiwi	600
6	Oranges	600
7	Grand Total	1800

### Example:

You've been given a Excel® report generated by another application. Upon review you see the content in the cells contains extra spaces between and after the words. In order to make the report usable for analysis and presentation you need to remove the extraneous spaces. You decide to use the **TRIM function** to remove the spaces.

Below is an example of the report showing that must be corrected in order to create a Pivot Table report.

FRUIT NAME
Apples, Bananas, Mangos
Apples, Bananas, Mangos
Kiwi, Oranges, Strawberries
Kiwi, Oranges, Strawberries
Blueberries, Raspberries, Blackberries
Blueberries, Raspberries, Blackberries

*Extra spaces*

## Formula - TRIM

**Definition:** Removes all extraneous spaces from a cell, except for single spaces between words.

Formula Syntax:

TRIM(text)

text is required

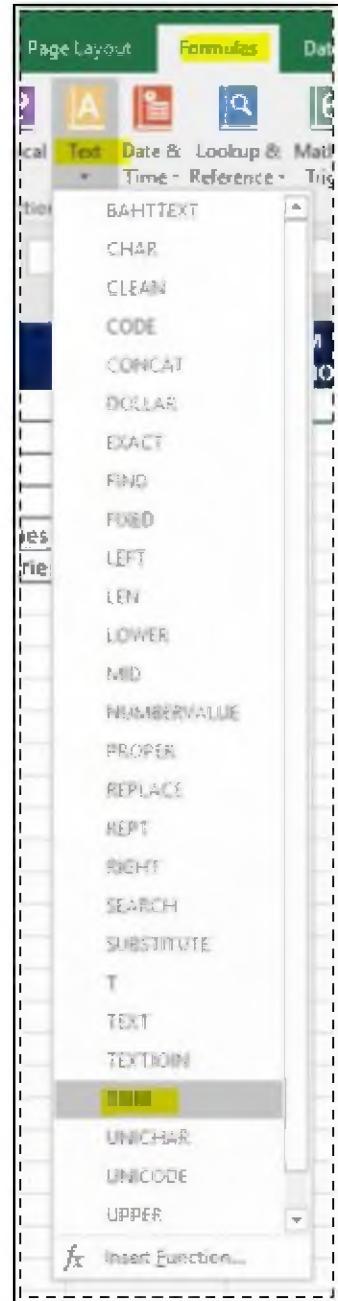
1. Open the **FormulasLenAndTrim.xlsx** spreadsheet
2. Select the tab named '**Trim**'



3. Click cell '**C2**'

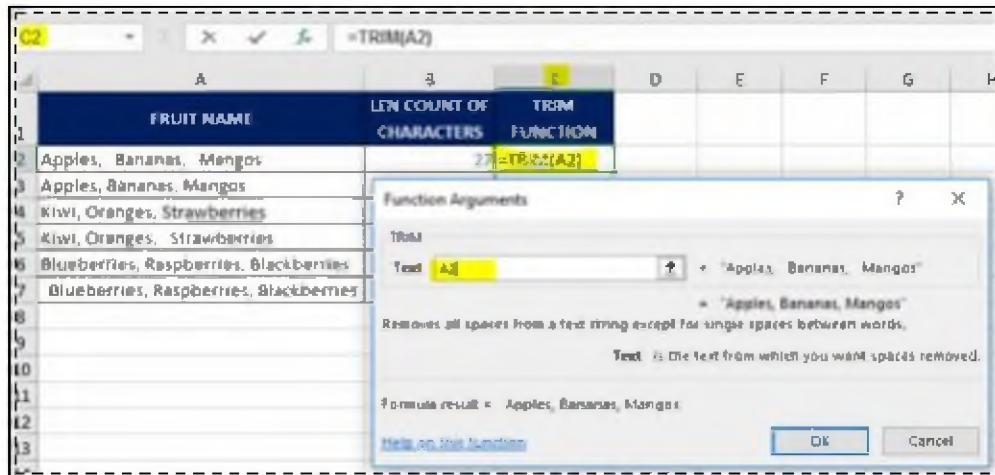
	A	B	C
1	FRUIT NAME	LEN COUNT OF CHARACTERS	TRIM FUNCTION
2	Apples, Bananas, Mangos	27	
3	Apples, Banana\$ Mangos	23	
4	Kiwi, Oranges, Strawberries	27	
5	Kiwi, Oranges, Strawberries	29	
6	Blueberries, Raspberries, Blackberries	38	
7	Blueberries, Raspberries, Blackberries	40	

4. From the Ribbon select **Formulas : Text : TRIM**



The following dialogue box will appear:

5. Click cell 'A2' or enter 'A2' in the **Text** field
6. Click the '**OK**' button



7. Copy the **TRIM** formula down cells ‘C3’ thru ‘C7’
8. The extra spaces have been removed

	A	B	C	D
1	FRUIT NAME	LEN COUNT OF CHARACTERS	TRIM FUNCTION	LEN COUNT OF CHARACTERS
2	Apples, Bananas, Mangos	27	Apples, Bananas, Mangos	23
3	Apples, Bananas, Mangos	23	Apples, Bananas, Mangos	23
4	Kiwi, Oranges, Strawberries	27	Kiwi, Oranges, Strawberries	27
5	Kiwi, Oranges, Strawberries	29	Kiwi, Oranges, Strawberries	27
6	Blueberries, Raspberries, Blackberries	38	Blueberries, Raspberries, Blackberries	38
7	Blueberries, Raspberries, Blackberries	40	Blueberries, Raspberries, Blackberries	38

Next we'll copy and **paste as values** the contents of column C and remove the columns (B & C) used for troubleshooting.

9. Select cells ‘C2’ thru ‘C7’
10. Click the ‘Copy’ button or press **CTRL+C** from your keyboard
11. Select cell ‘A2’
12. Right-click and select ‘Paste Special...’
13. Select the ‘Values’ radio button
14. Click the ‘OK’ button

	A	B	C
1	FRUIT NAME	LEN COUNT OF CHARACTERS	TRIM FUNCTION
2	Apples, Bananas, Mangos	27	Apples, Bananas, Mangos
3	Apples, Bananas, Mangos	27	Apples, Bananas, Mangos
4	Kiwi, Oranges, Strawberries	26	Kiwi, Oranges, Strawberries
5	Kiwi, Oranges, Strawberries	26	Kiwi, Oranges, Strawberries
6	Blueberries, Raspberries, Blackberries	31	Blueberries, Raspberries, Blackberries
7	Blueberries, Raspberries, Blackberries	41	Blueberries, Raspberries, Blackberries

15. Select columns ‘B’ & ‘C’

16. Right-click and select ‘Delete’, the troubleshooting columns ‘B’ & ‘C’ should now be removed

We have successfully removed all extraneous spaces from the records contained in column ‘A’. Further analysis and reporting can be completed without error.

	A	B
1	FRUIT NAME	
2	Apples, Bananas, Mangos	
3	Apples, Bananas, Mangos	
4	Kiwi, Oranges, Strawberries	
5	Kiwi, Oranges, Strawberries	
6	Blueberries, Raspberries, Blackberries	
7	Blueberries, Raspberries, Blackberries	

# CHAPTER 15

## Troubleshooting: How To Resolve Common Pivot Table Errors

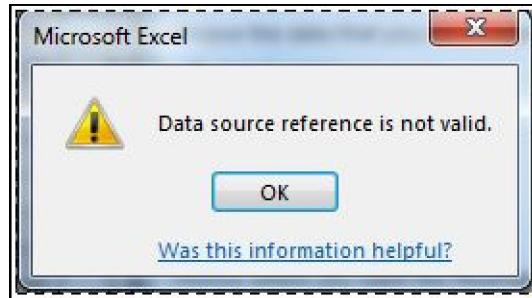
---

Below are the two most common Pivot Table error messages with instructions on how to resolve them.

**Please Note:** *The following is not a comprehensive list of all Pivot Table error messages, just a few of the more common ones.*

---

### **Error message:**



‘Data source reference is not valid.’

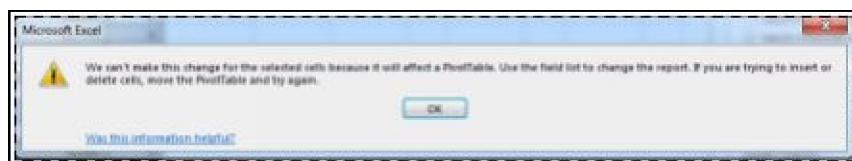
Typically appears when you attempt to create a Pivot Table, with a **blank header row**.

A	B	C	D	E	F	G	H	I
1	REGION	SALES PERSON	SALES PERSON	SALES PERSON	QUARTER	APPLES	ORANGES	MANGOES
2				ID				TOTAL
3								

To resolve, delete the blank row (in this case row 1) or make sure you select the correct header rows and supporting data before clicking **Insert : Pivot Table** from the Ribbon.

---

### **Error message:**



‘We can’t make this change for the selected cells because it will affect a PivotTable. Use the field list to change the report. If you are trying to insert or delete cells, move the PivotTable and try again.’

This message will appear when you attempt to change the column order, by cutting & pasting. For example, you want to move the ‘**Total**’ column to be last the last.

Attempting to move  
a Column by Cutting  
& Pasting

A	B	C	D	E
1				
2				
3 Row Labels	Sum of TOTAL	Sum of APPLES	Sum of ORANGES	Sum of MANGOS
4 Central	€ 138,571	€ 43,481	€ 53,278	€ 41,812
5 East	€ 145,588	€ 50,626	€ 47,117	€ 47,845
6 West	€ 196,787	€ 69,750	€ 65,259	€ 61,778
7 Grand Total	€ 480,946	€ 163,857	€ 165,655	€ 151,435

To change the column order in a Pivot Table, change the order in the PivotTables Fields pane:

Change the order in the  
PivotTables Fields pane

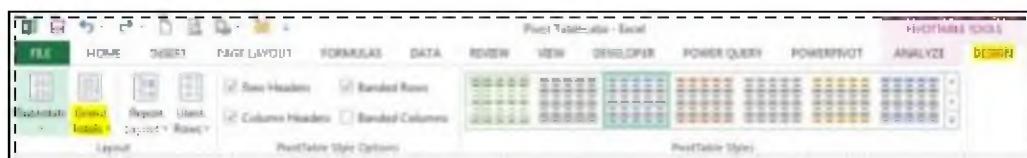
Row Labels	Sum of APPLES	Sum of ORANGES	Sum of MANGOS	Sum of TOTAL
Central	€ 43,481	€ 53,278	€ 41,812	€ 138,571
East	€ 50,626	€ 47,117	€ 47,845	€ 145,588
West	€ 69,750	€ 65,259	€ 61,778	€ 196,787
Grand Total	€ 163,857	€ 165,655	€ 151,435	€ 480,946

This message will also appear when you attempt to delete a calculated field, row, or column. For example, you no longer want to see the row '**Grand Total**', unfortunately, you can't simply delete this row, you'll receive the above error message.

19	100	\$	10,339	\$	2,585	16
20	<b>Grand Total</b>	\$	<b>480,946</b>	\$	<b>7,515</b>	

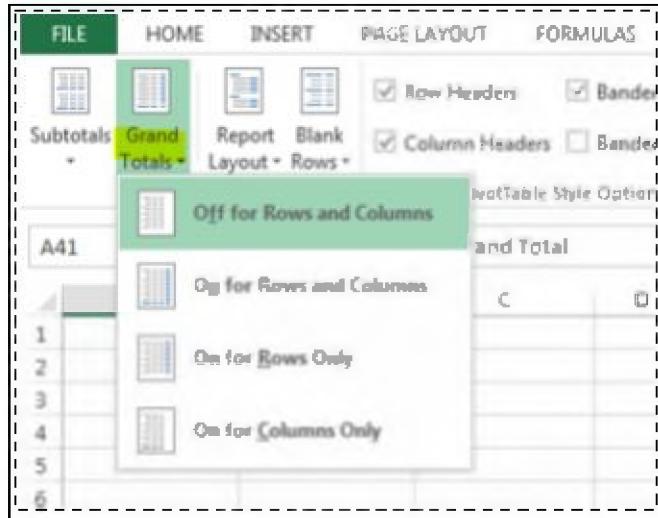
To remove '**Grand Total**' rows and columns we need to change the Pivot Table design.

1. Click the cell you would like to remove and then from the toolbar select **PIVOTTABLE TOOLS** and the tab **DESIGN**



2. Click the drop-down box for '**Grand Totals**' and select your preferred option:
  1. Off for Rows and Columns
  2. On for Rows and Columns
  3. On for Rows Only
  4. On for Columns Only

For this example, we will select '**Off for Rows and Columns**'



The ‘Grand Total’ row has now been removed.

19	100	\$ 10,339	\$ 2,585	16
20				

## A MESSAGE FROM THE AUTHOR

# Thank you!

Thank you for purchasing and reading this book! **Your feedback is valued and appreciated.** Please take a few minutes and leave a review.

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