Data Analytics Tutorial: Transaction Analysis Using Excel Pivot Tables and Charts

City of Somerville, MA dataset

Welcome to the data analytics tutorial covering transaction analysis using pivot tables and charts in Excel.

City of Somerville, MA dataset

- Using real-life checkbook data from City of Somerville, MA, for 2013 – 2016
- In this tutorial, we are using a small, 22-record data set
- For the actual activity, you will be using the full data set so answers will be different but the process will be similar

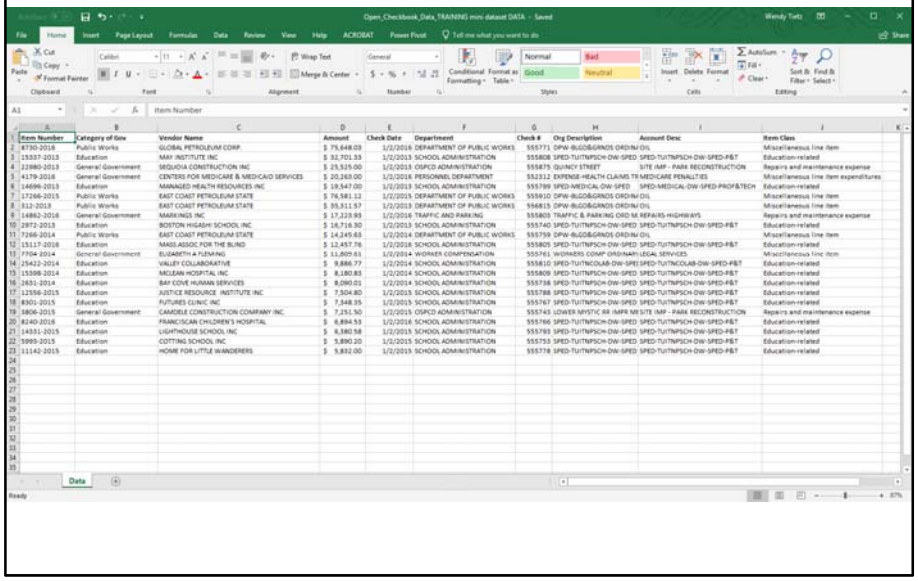
In this activity, we are using the real-life checkbook data from the City of Somerville, Massachusetts, for 2013 – 2016. For this tutorial only, we are using a small, 22-record data set. For the actual activity, you will be using the full data set so your answers for the activity requirements will be different – but the process will be similar.

Pivot tables and pivot charts

- Using Office 365 Excel in Windows in this tutorial
- Other versions of Excel may be slightly different
- May be many ways of accomplishing the same thing – just presenting one way here

For this tutorial on pivot tables and pivot charts, we will be demonstrating using Office 365 Excel for Windows. Other versions of Excel may be slightly different. Also note that there may be many ways of accomplishing the same thing – we are just presenting one way here.

Start by opening Excel workbook



Start this activity by opening the Excel workbook containing the data set.

General instructions

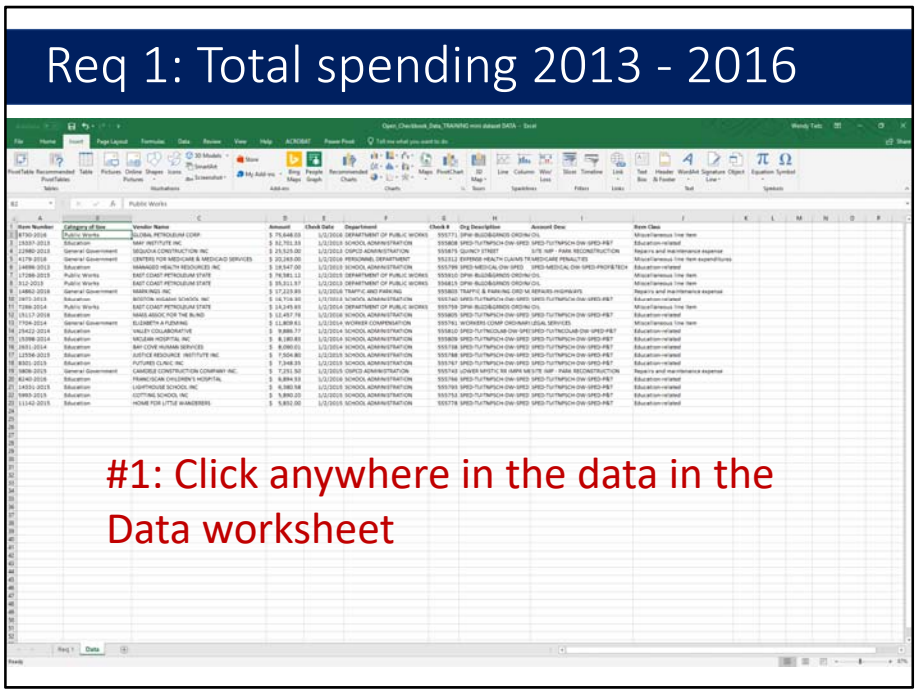
For each of the requirements, create a new pivot table in a new worksheet. Name each new worksheet as “Req 1,” “Req 2,” etc. Format the dollar amounts in each pivot table or pivot chart using the accounting format with zero decimal places. Format non-currency numbers in each pivot table or pivot chart using the number format with zero decimal places.

In general, for each of the requirements in this activity, create a new pivot table in a new worksheet. Name each new worksheet as “Req 1,” “Req 2,” etc. Format the dollar amounts in each pivot table or pivot chart using the accounting format with zero decimal places. Format non-currency numbers in each pivot table or pivot chart using the number format with zero decimal places.

Requirement 1

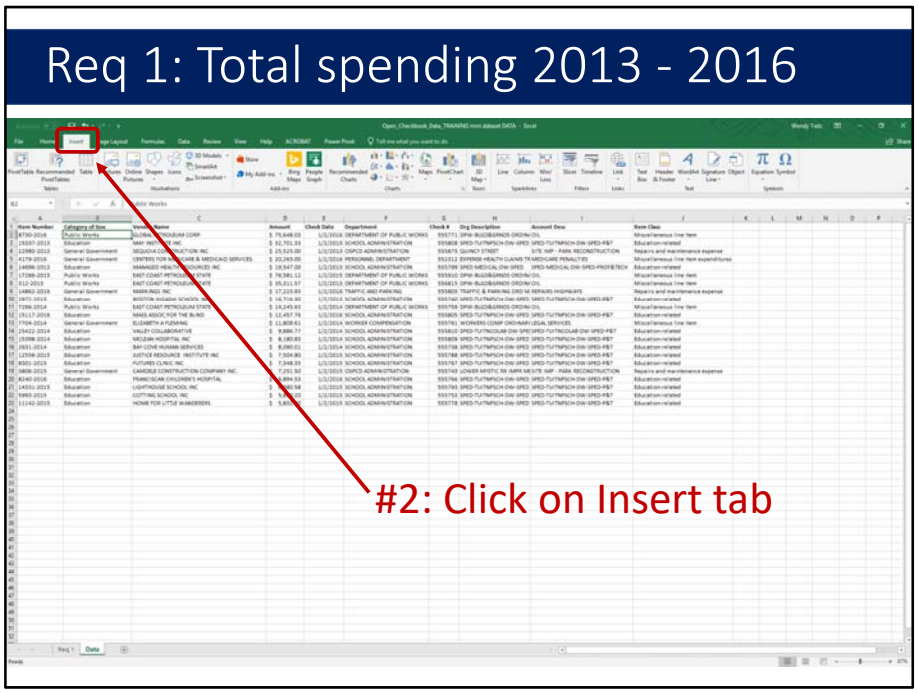
From 2013 – 2016, what was the total spending in each of the four calendar years?

Requirement 1 asks “From 2013 – 2016, what was the total spending in each of the four calendar years?”

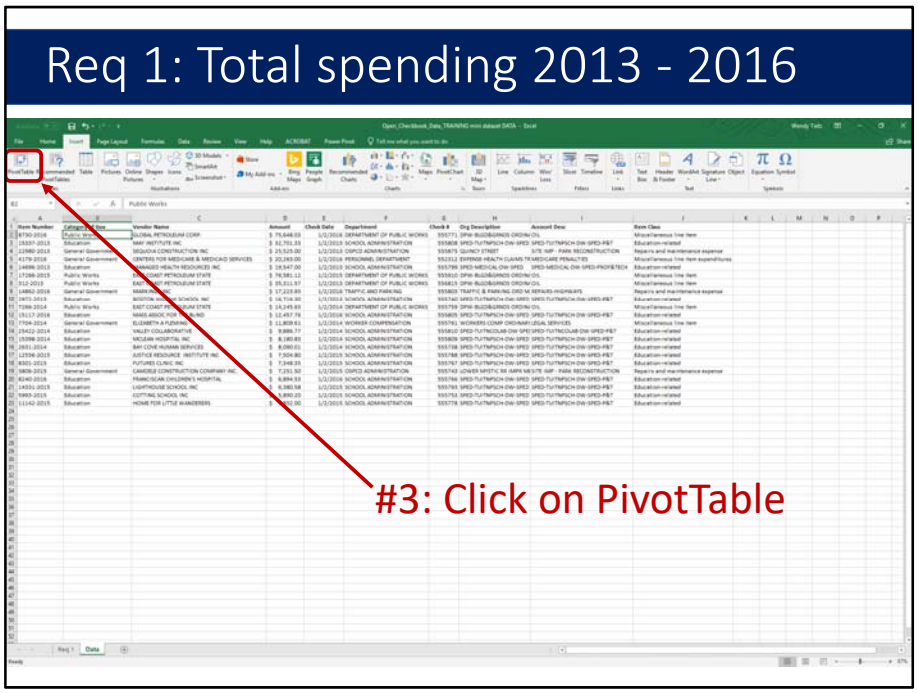


The first step is to click anywhere in the data in the Data worksheet.

Req 1: Total spending 2013 - 2016

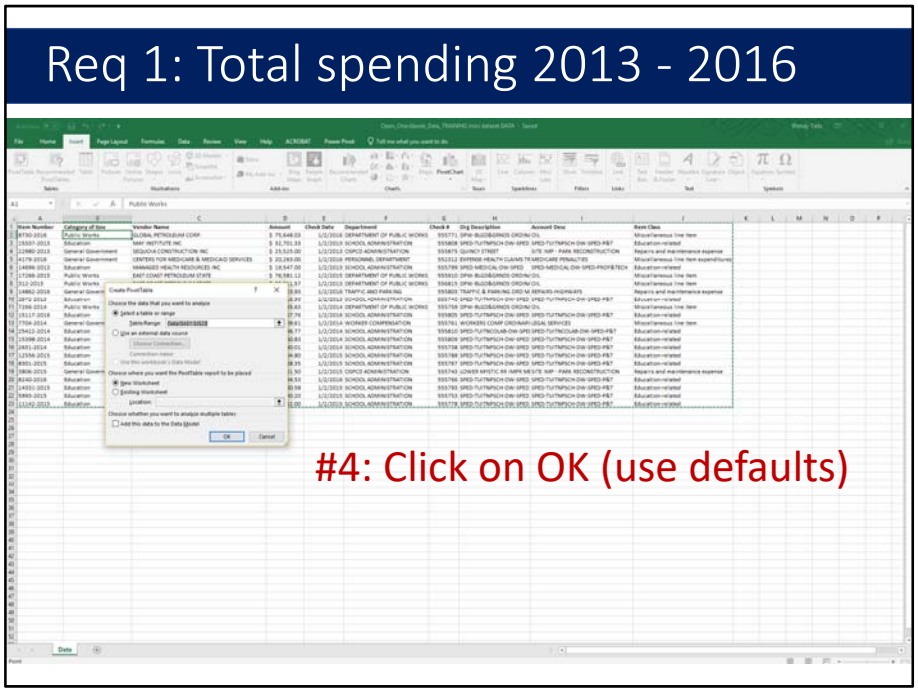


Step 2 is to click on the Insert tab in the ribbon.

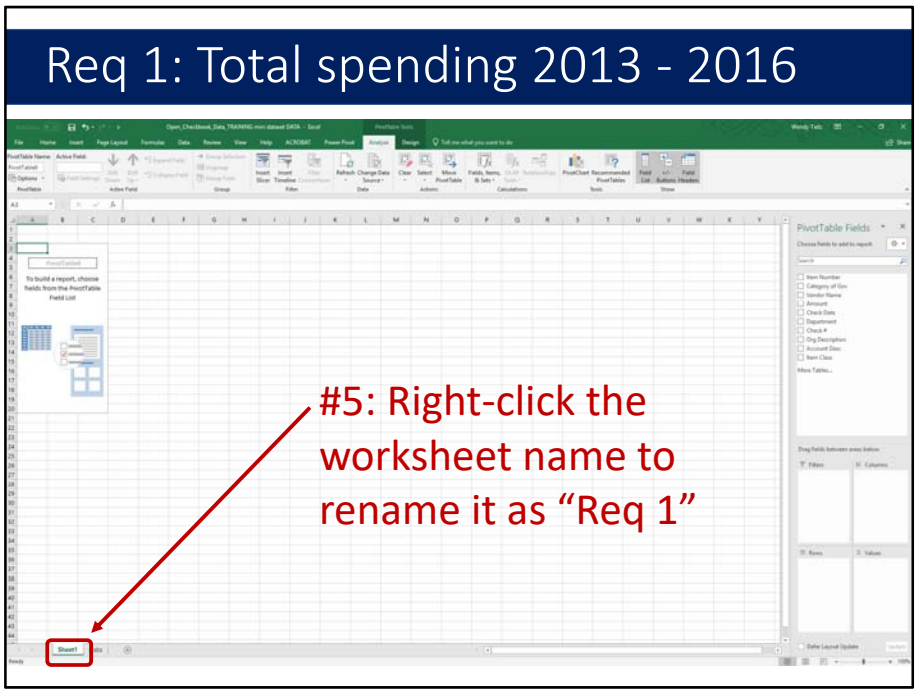


Step 3 is to click on PivotTable in the ribbon to insert a PivotTable.

Req 1: Total spending 2013 - 2016

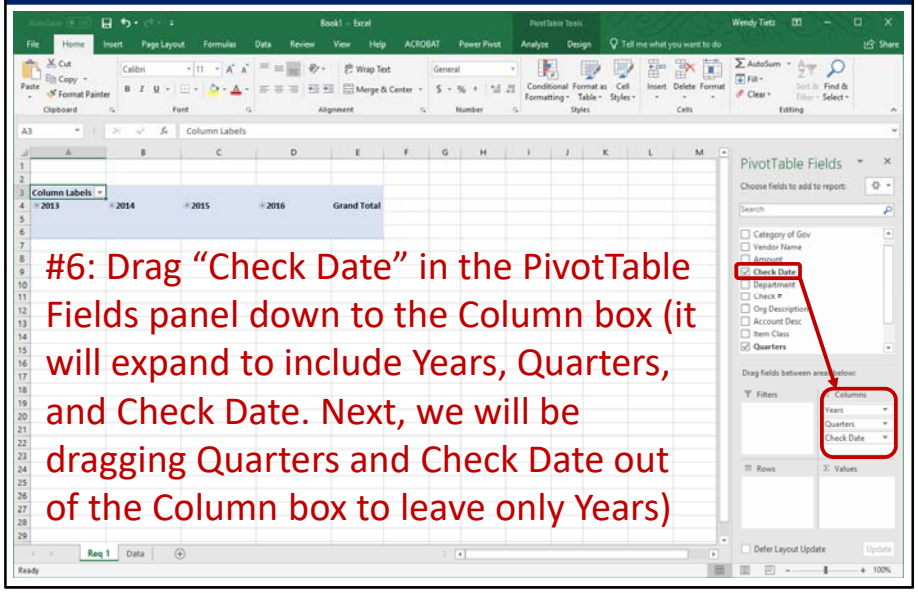


Excel will present you with a box containing pivot table options. Accept the defaults and click on OK.

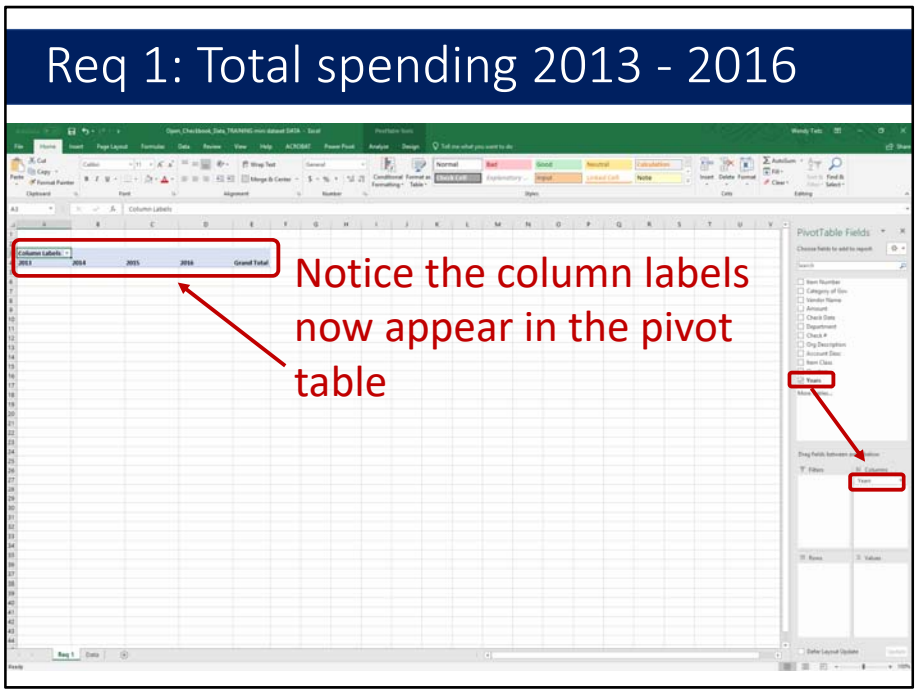


Before we go any further, for Step 5, right-click the worksheet name tab and rename it “Req 1.” That will just help to keep track of our pivot tables.

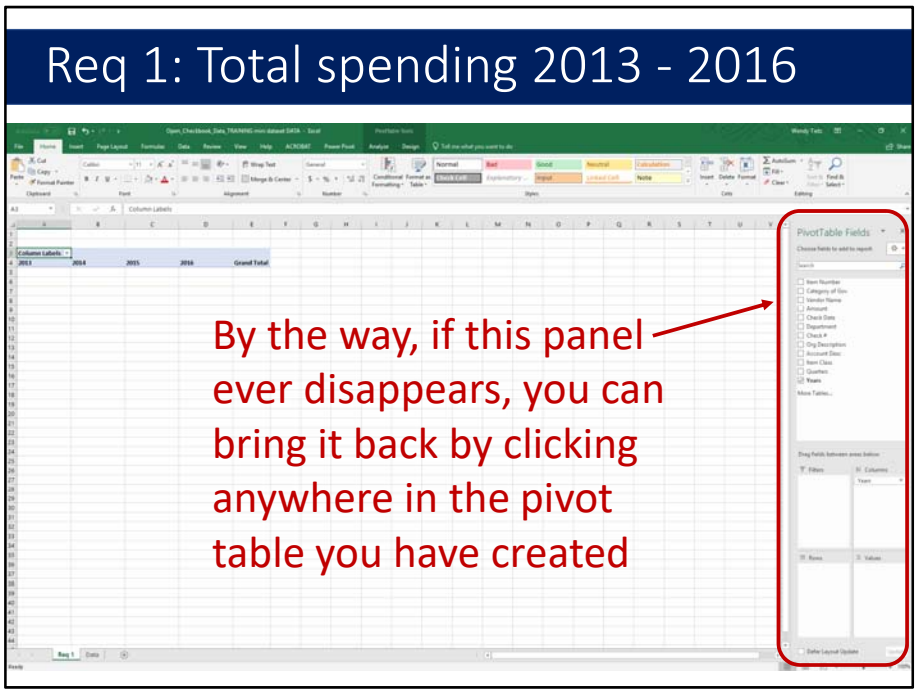
Req 1: Total spending 2013 - 2016



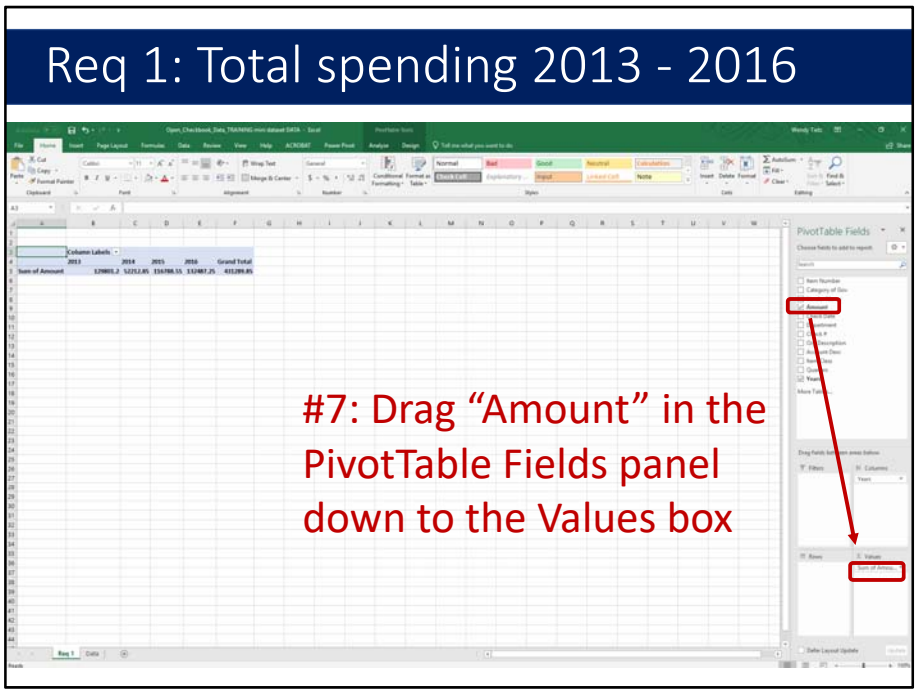
For Step 6, drag “Check Date” in the PivotTable Fields panel down to the Column box (it will expand to include Years, Quarters, and Check Date. Once I did this, I dragged Quarters and Check Date out of the Column box to leave only Years. I still have Quarters and Check Date displayed on this slide, but drag each of them up to the Field box to remove them from the Columns box – those two fields will be gone on the next slide.)



Notice that the column labels for the years 2013 through 2016 now appear in the pivot table – and that Quarters and Check Date are no longer in the Column box because we dragged them up the field box.

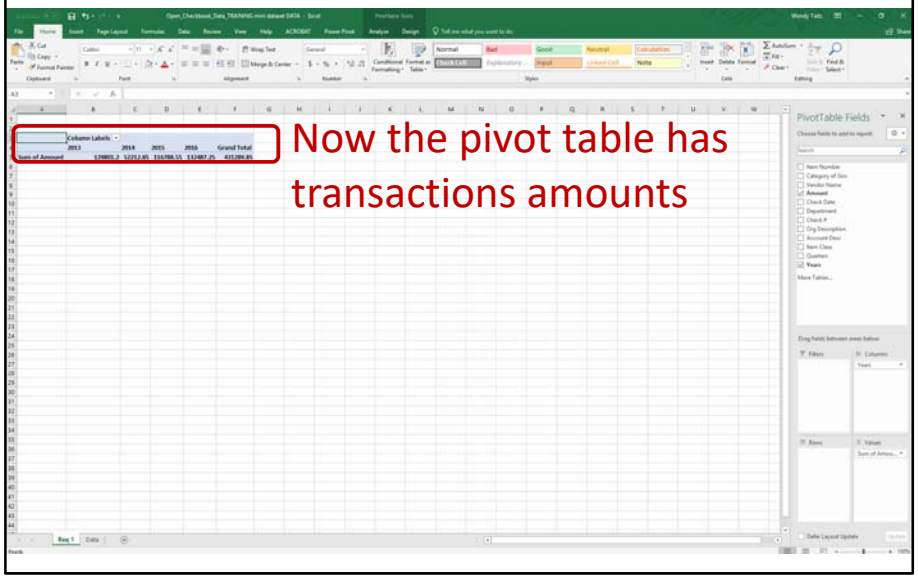


By the way, if the PivotTable Fields panel ever disappears, you can bring it back by clicking anywhere in the pivot table you have created.

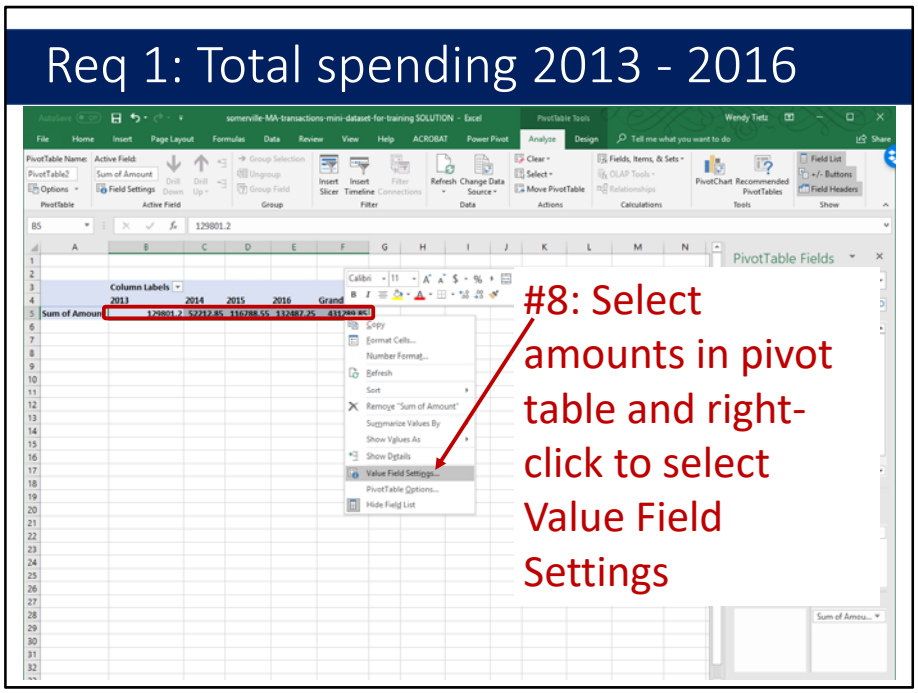


For Step 7, drag the “Amount” field from the PivotTable Fields panel down to the Values box.

Req 1: Total spending 2013 - 2016

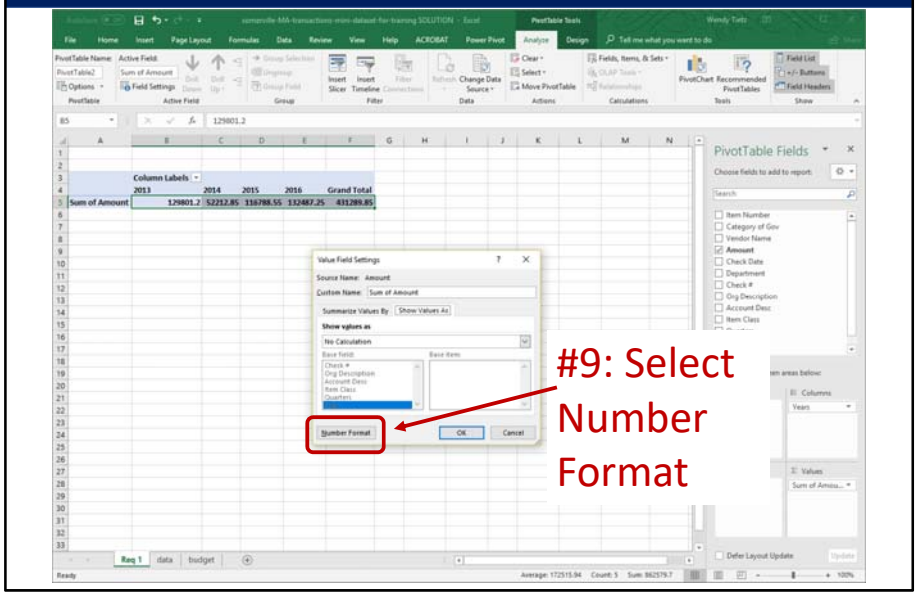


Now the pivot table has the sums of the transaction dollar amounts.



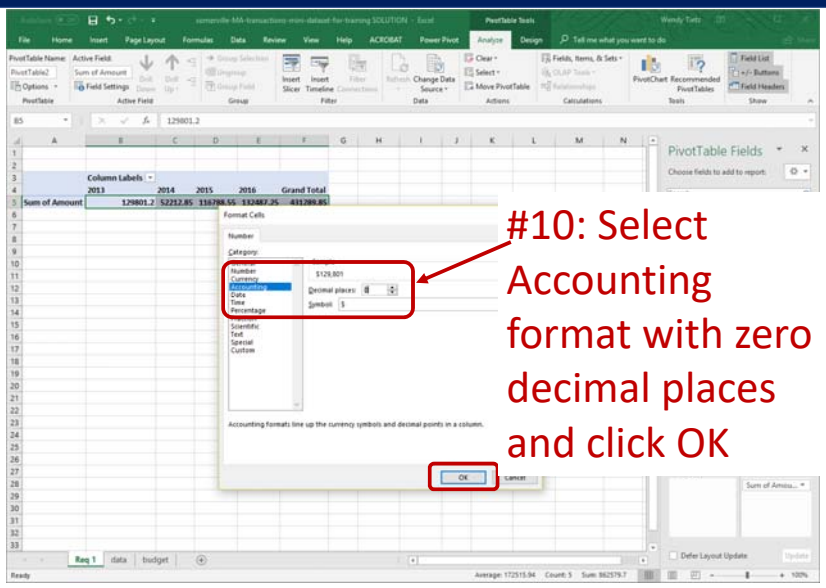
In Step 8, we are going to format the data. Select the amounts in the pivot table and right-click to select Value Field Settings.

Req 1: Total spending 2013 - 2016

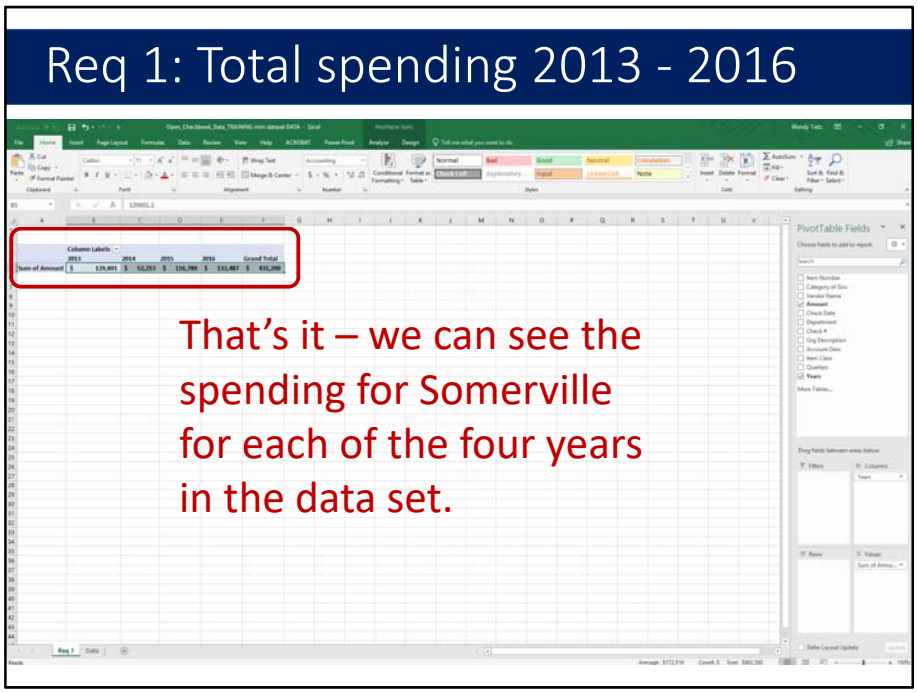


In Step 9, click on Number Format.

Req 1: Total spending 2013 - 2016



In Step 10, select the accounting format with zero decimal places and click OK.



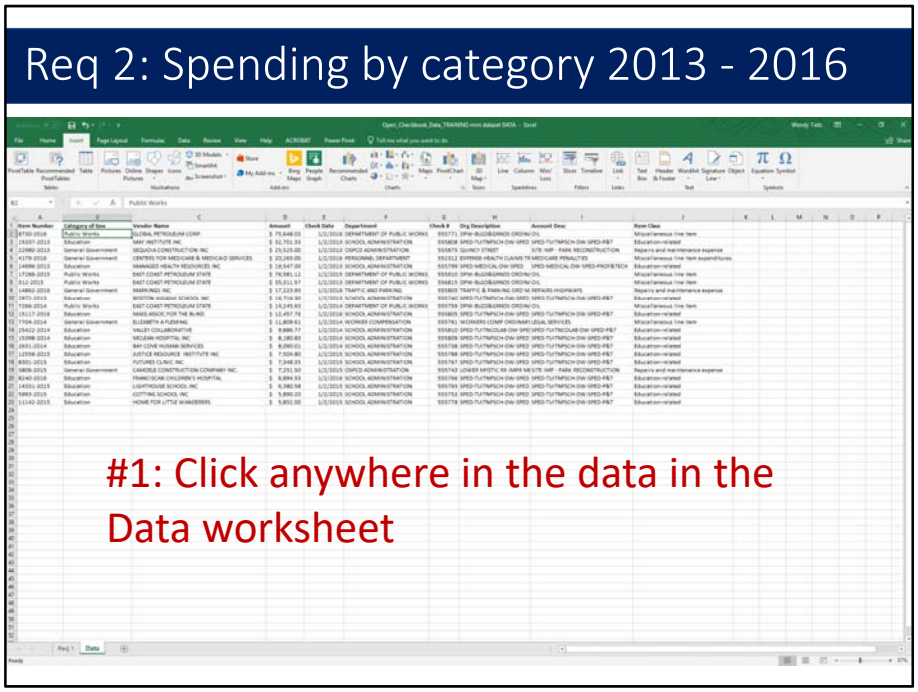
That's it for requirement 1 – we can see the spending for Somerville for each of the four years in the data set.

Requirement 2

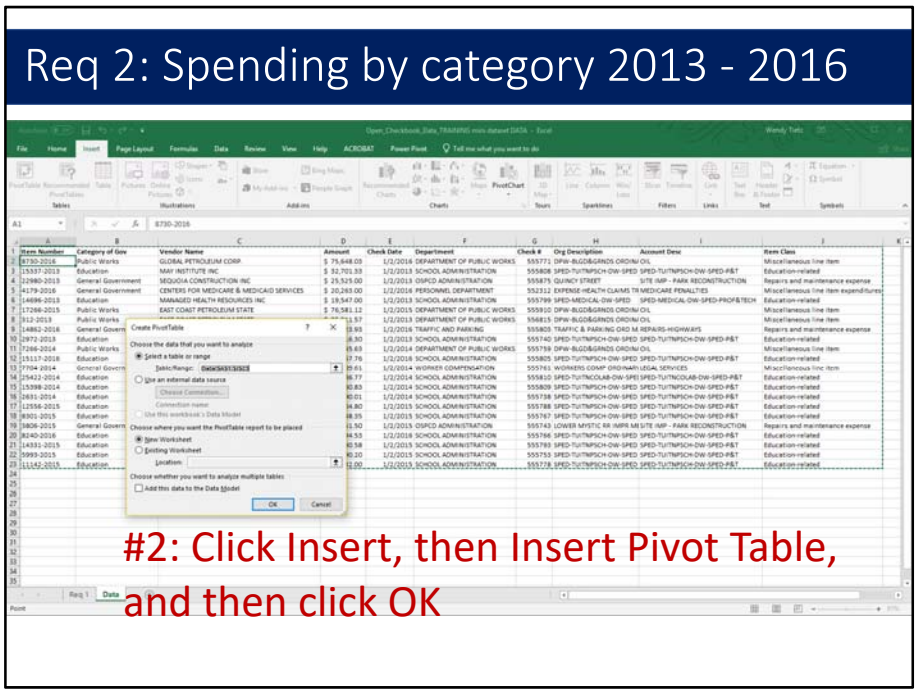
In each of the years 2013 - 2016, how much was spent in each of the three categories of government (Education, General Government, and Public Works)?

Requirement 2 asks the question “In each of the years 2013 - 2016, how much was spent in each of the three categories of government (Education, General Government, and Public Works)?”

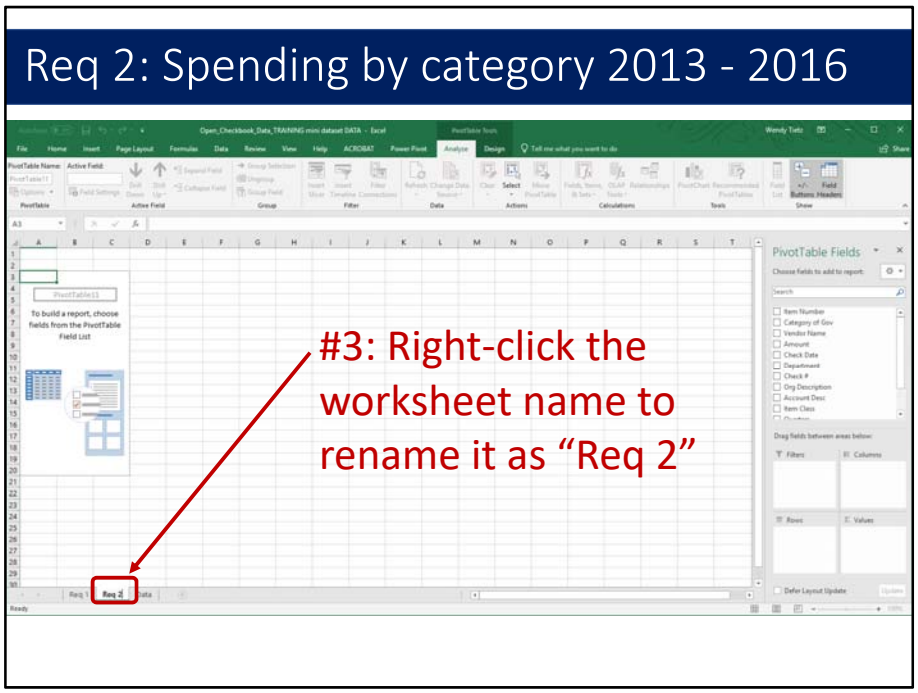
Req 2: Spending by category 2013 - 2016



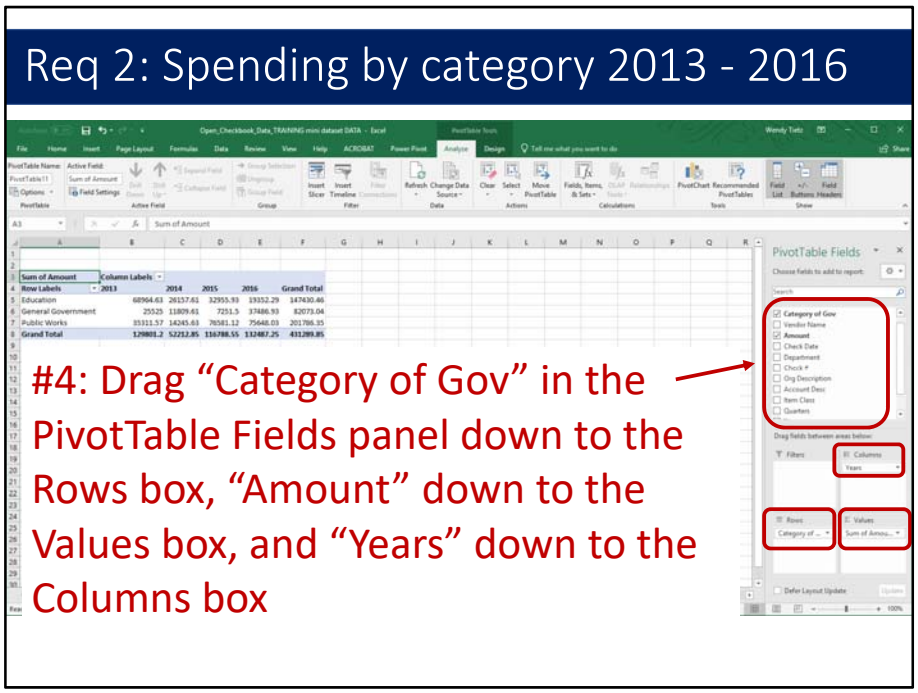
The first step is to click anywhere in the data in the Data worksheet.



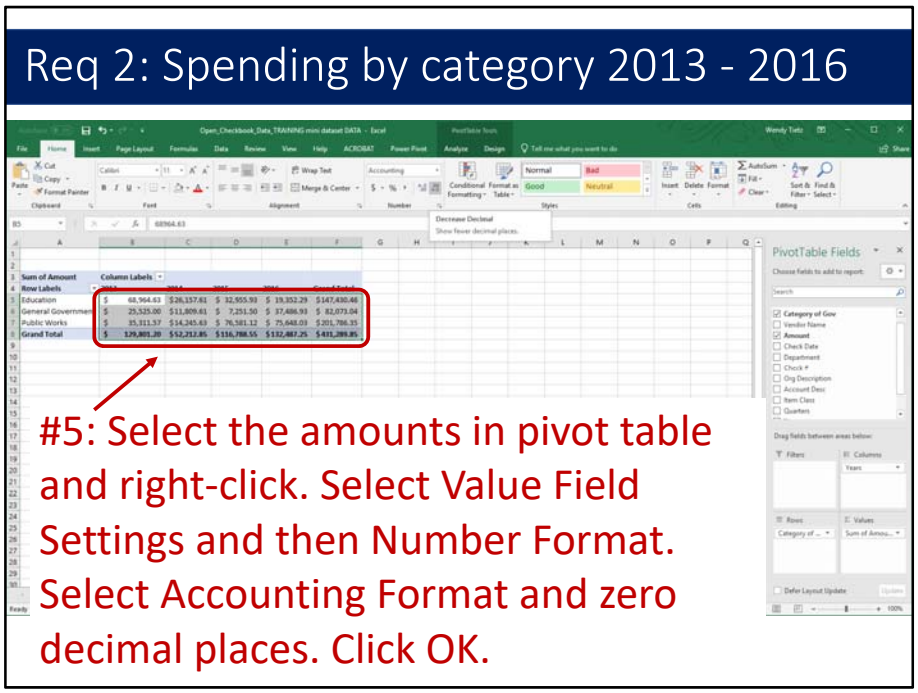
For Step #2, to insert a pivot table, click Insert, then Insert Pivot Table, and then click OK.



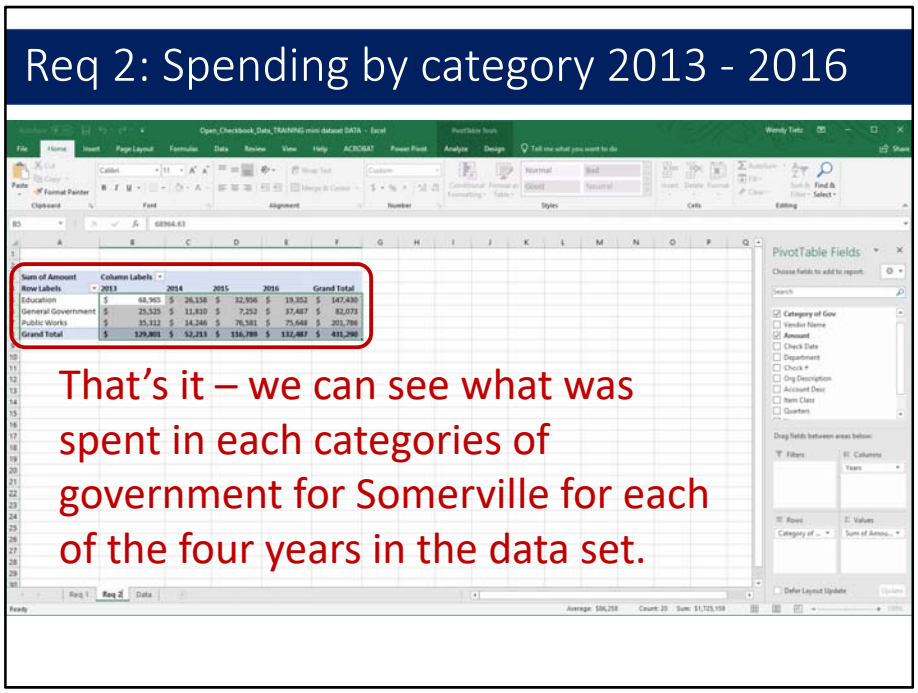
For Step #3, right-click the worksheet name to rename it as “Req 2.”



In Step 4, drag “Category of Gov” in the PivotTable Fields panel down to the Rows box, “Amount” down to the Values box, and “Years” down to the Columns box.



For Step 5, select the amounts in pivot table and format as the accounting format with zero decimal places.



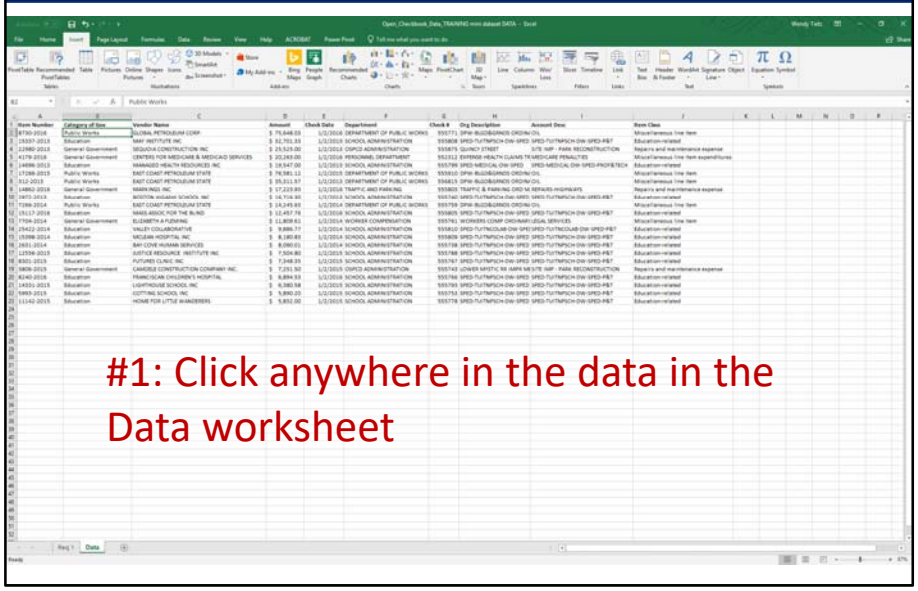
That's it – we can see what was spent in each category of government for Somerville for each of the four years in the data set.

Requirement 3

In 2016, which account (use the field “Account Desc” for this answer) was the largest in the General Government category?

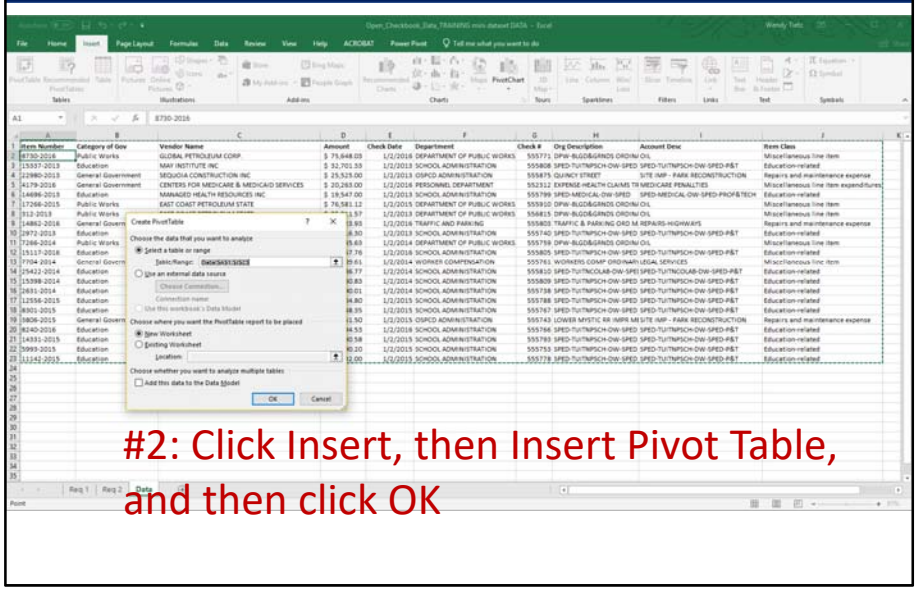
Requirement 3 reads “In 2016, which account (use the field “Account Desc” for this answer) was the largest in the General Government category?”

Req 3: In 2016, largest account for General Government category



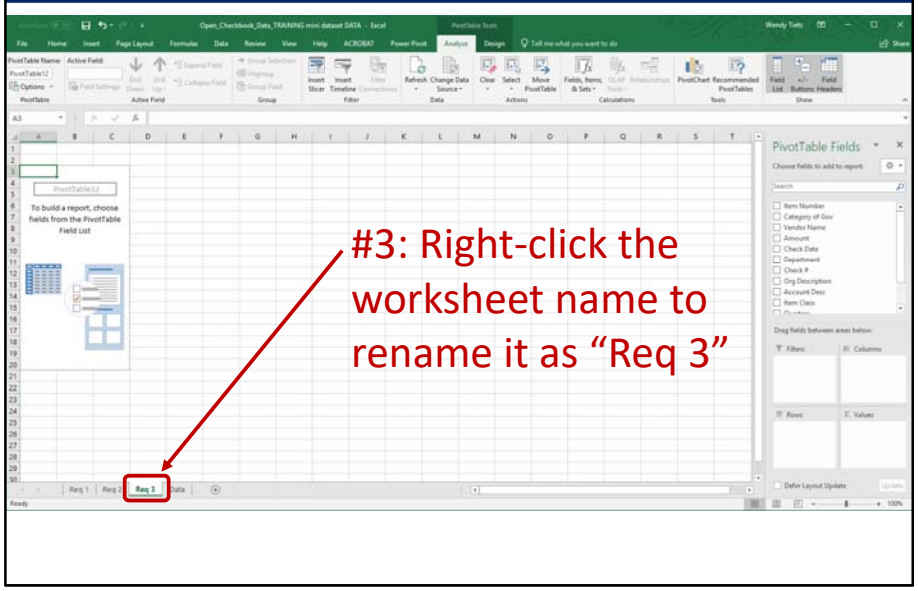
The first step is to click anywhere in the data in the Data worksheet.

Req 3: In 2016, largest account for General Government category



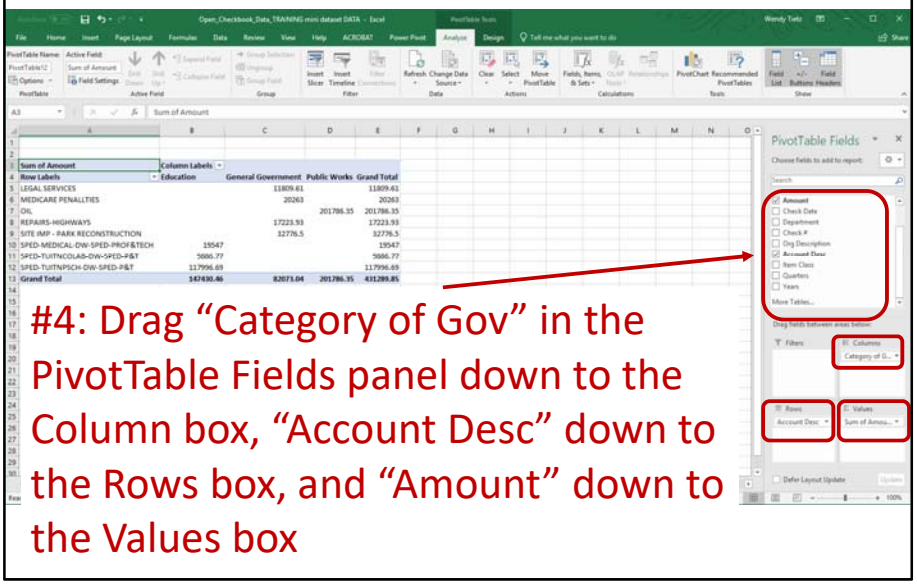
For Step #2, to insert a pivot table, click Insert, then Insert Pivot Table, and then click OK.

Req 3: In 2016, largest account for General Government category



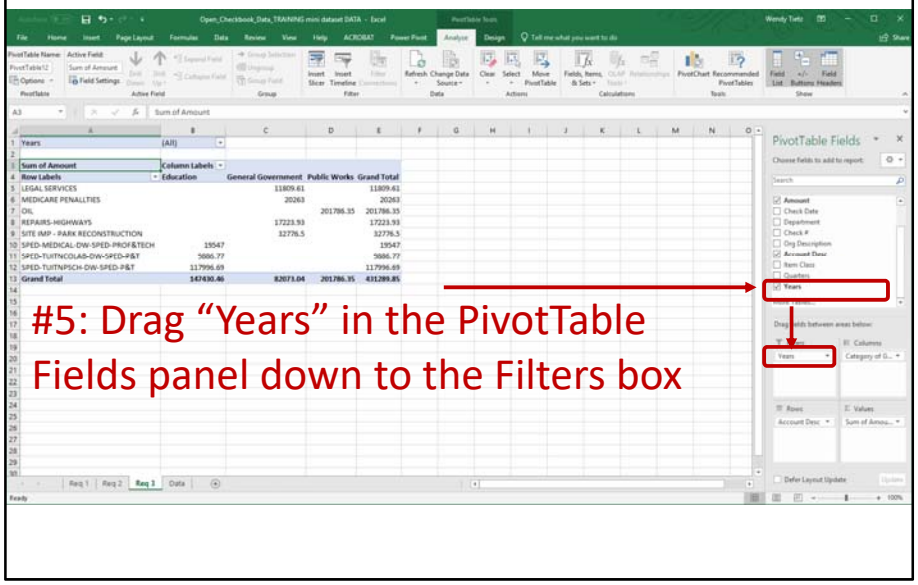
For Step #3, right-click the worksheet name to rename it as “Req 3.”

Req 3: In 2016, largest account for General Government category



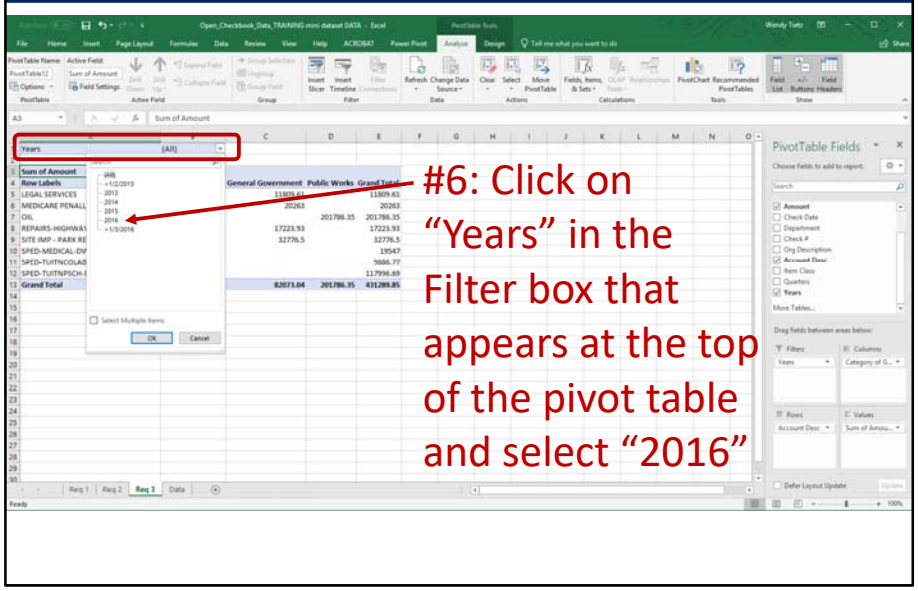
For Step 4, drag “Category of Gov” in the PivotTable Fields panel down to the Column box, “Account Desc” down to the Rows box, and “Amount” down to the Values box.

Req 3: In 2016, largest account for General Government category



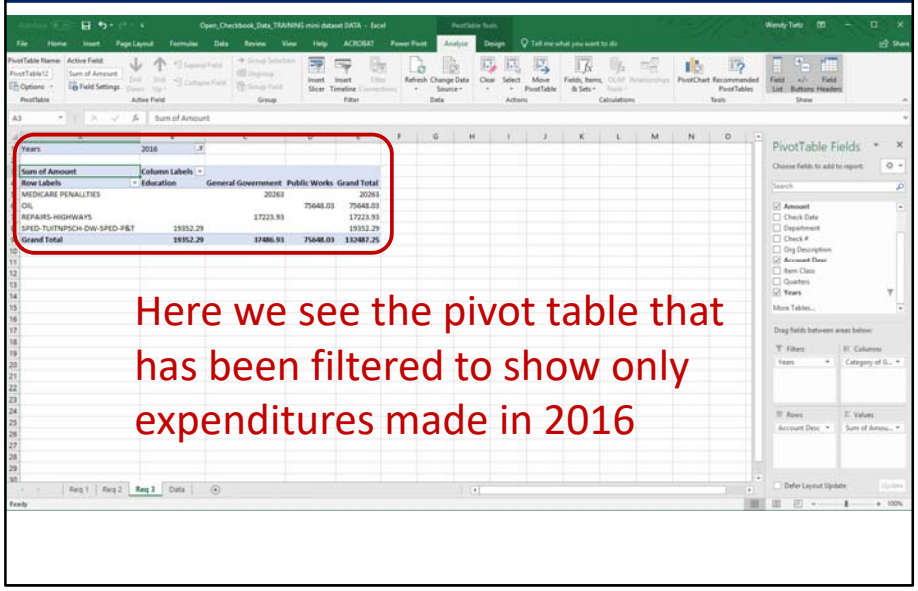
Now we are going to add a filter box to the pivot table. For Step 5, drag “Years” in the PivotTable Fields panel down to the Filters box.

Req 3: In 2016, largest account for General Government category



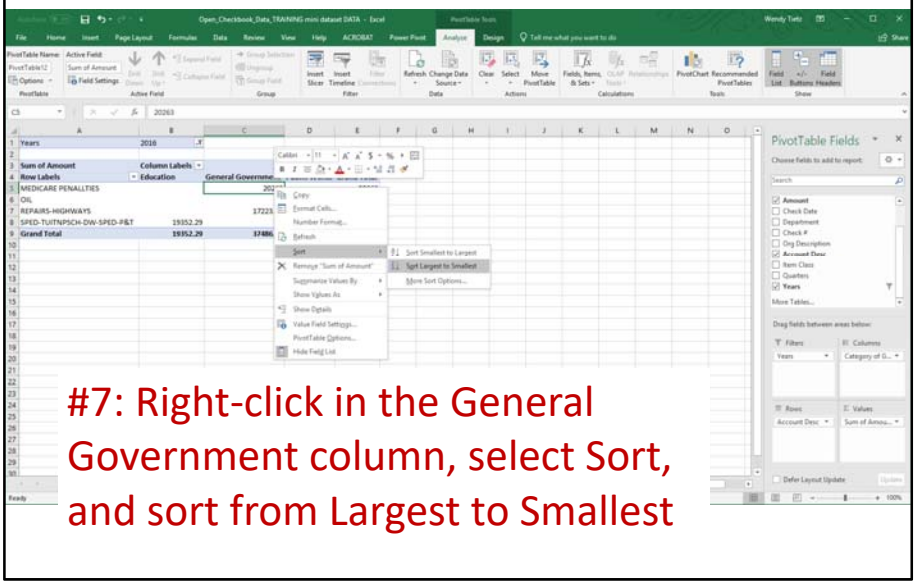
Now we are going to filter the pivot table to show only amounts from expenditures made in 2016. Click on "Years" in the Filter box that appears at the top of the pivot table and select "2016."

Req 3: In 2016, largest account for General Government category



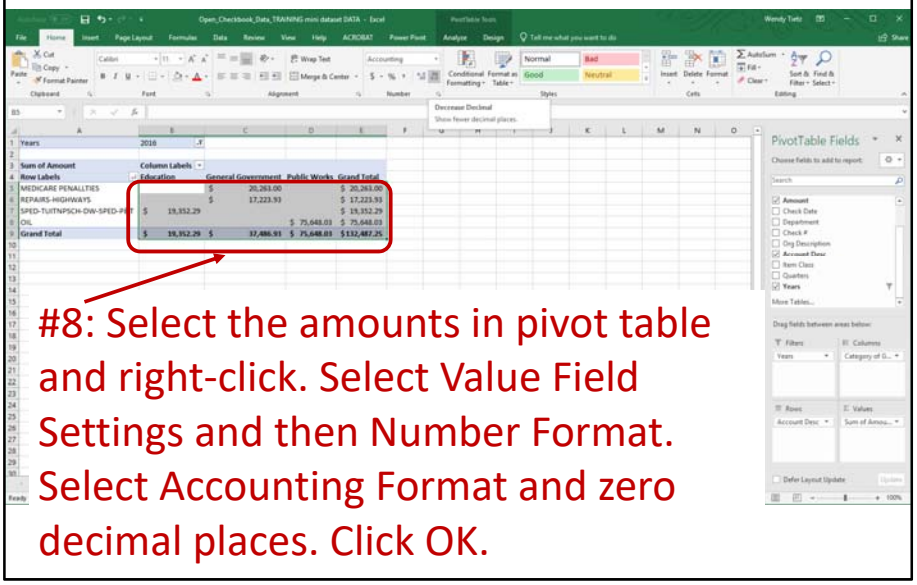
Here we see that the pivot table has been filtered to show only expenditures made in 2016.

Req 3: In 2016, largest account for General Government category



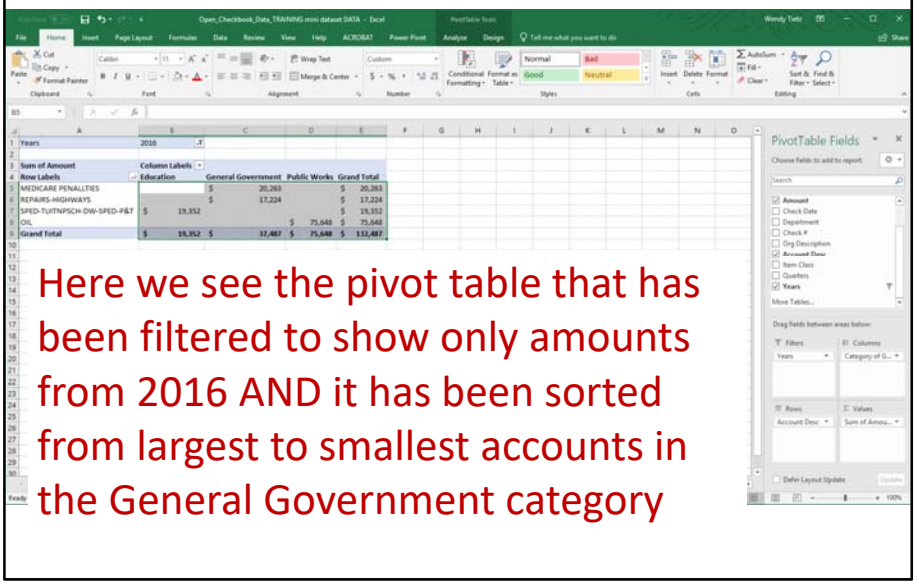
Now let's sort the pivot table by the expense category in the General Government column to find the largest category of spending. For Step 7, right-click in the General Government column, select Sort, and sort from Largest to Smallest.

Req 3: In 2016, largest account for General Government category



In Step 8, we will format the amounts in the pivot table. Select the amounts in pivot table and format as the accounting format with zero decimal places.

Req 3: In 2016, largest account for General Government category



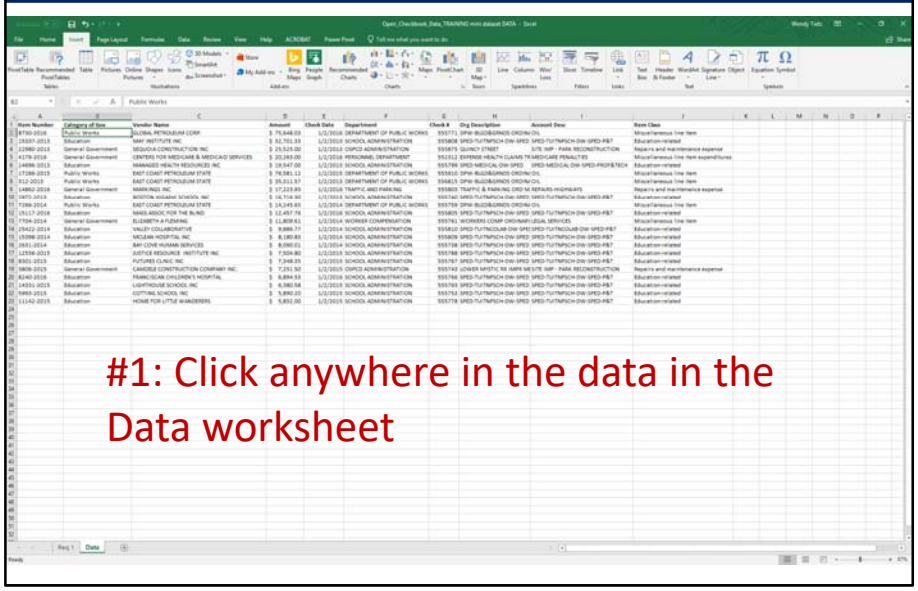
Here we see the pivot table that has been filtered to show only amounts from 2016 AND it has been sorted from largest to smallest accounts in the General Government category.

Requirement 4

In 2016, who was Somerville's largest vendor as measured by total dollars spent? How many separate payments did the city make to this vendor? What was the average amount of each payment to this vendor? Why did the city pay this vendor?

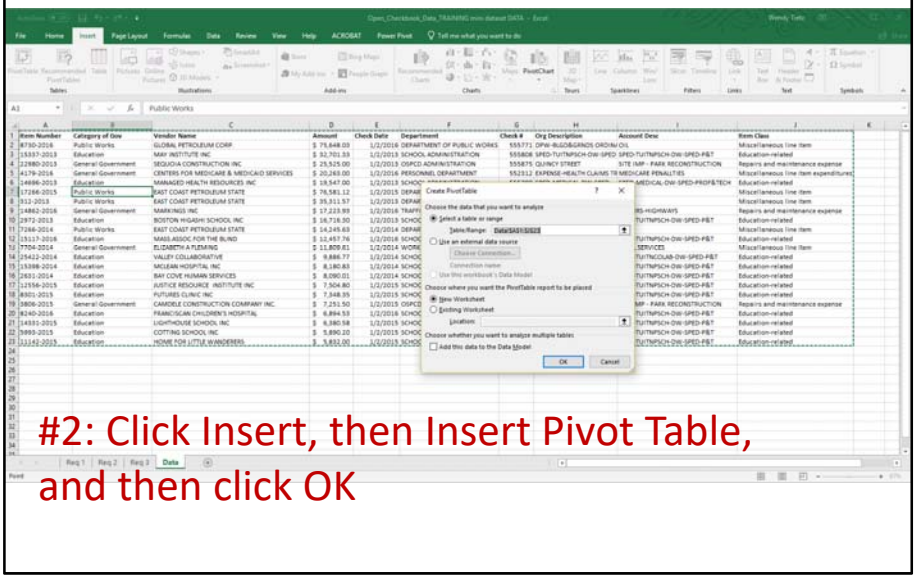
Requirement 4 reads "In 2016, who was Somerville's largest vendor as measured by total dollars spent? How many separate payments did the city make to this vendor? What was the average amount of each payment to this vendor? Why did the city pay this vendor?"

Req 4: In 2016, largest account for General Government category



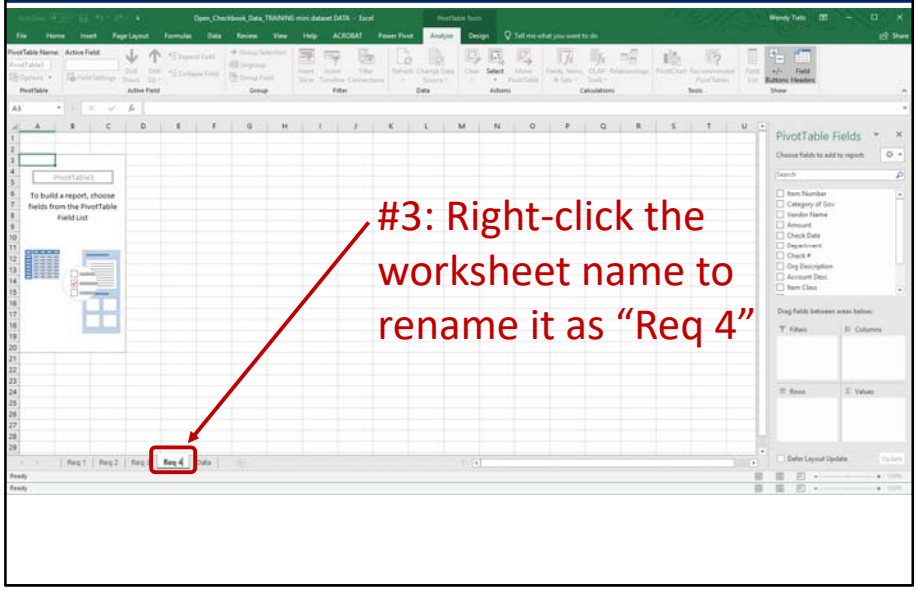
The first step is to click anywhere in the data in the Data worksheet.

Req 4: In 2016, largest account for General Government category



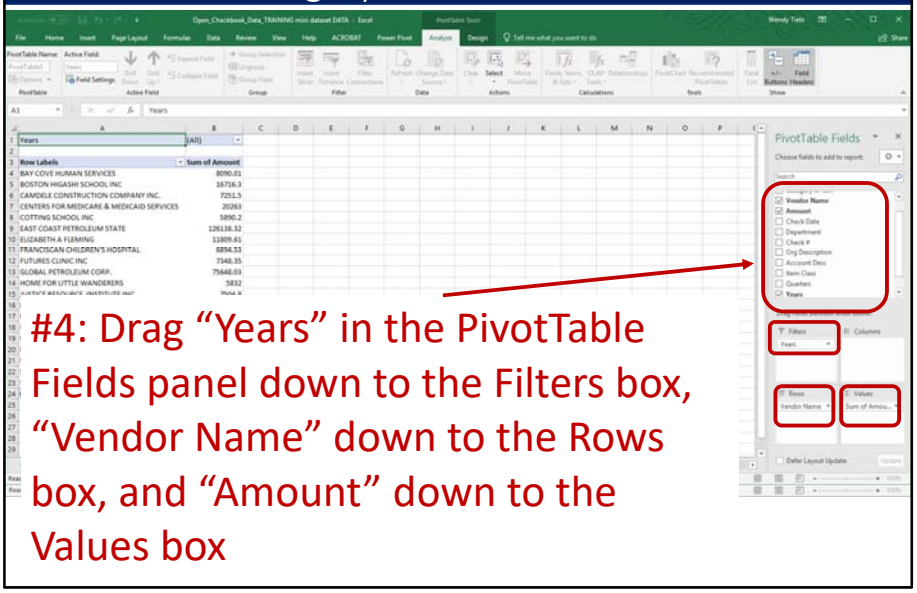
For Step #2, to insert a pivot table, click Insert, then Insert Pivot Table, and then click OK.

Req 4: In 2016, largest account for General Government category



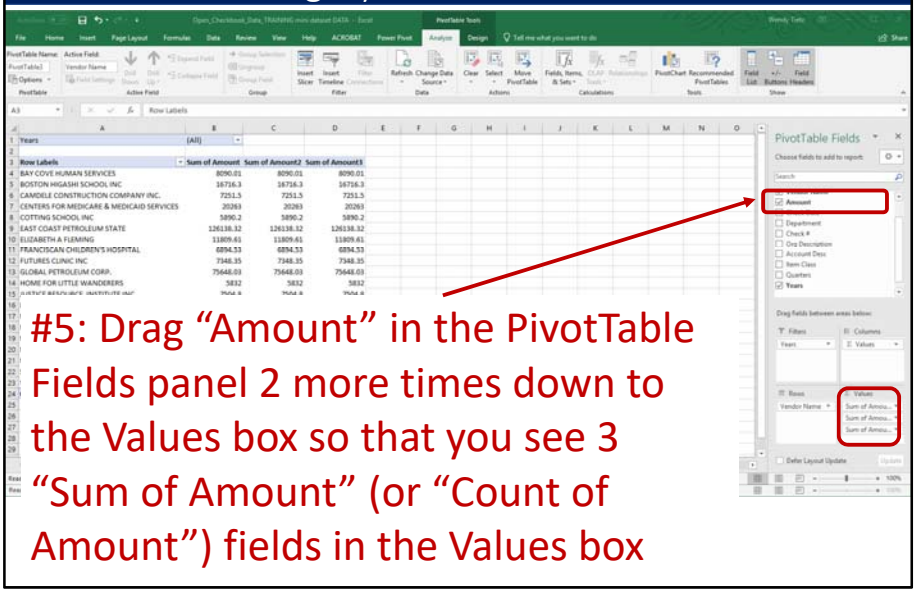
For Step #3, right-click the worksheet name to rename it as “Req 4.”

Req 4: In 2016, largest account for General Government category



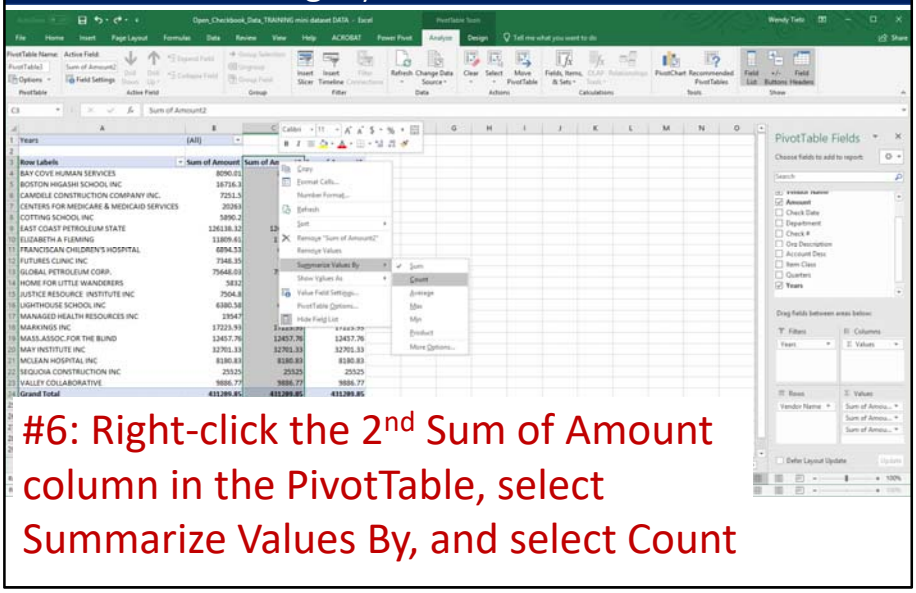
In Step 4, Drag “Years” in the PivotTable Fields panel down to the Filters box, “Vendor Name” down to the Rows box, and “Amount” down to the Values box.

Req 4: In 2016, largest account for General Government category



For Step 5, drag “Amount” in the PivotTable Fields panel 2 more times down to the Values box so that you see 3 “Sum of Amount” (or “Count of Amount”) fields in the Values box.

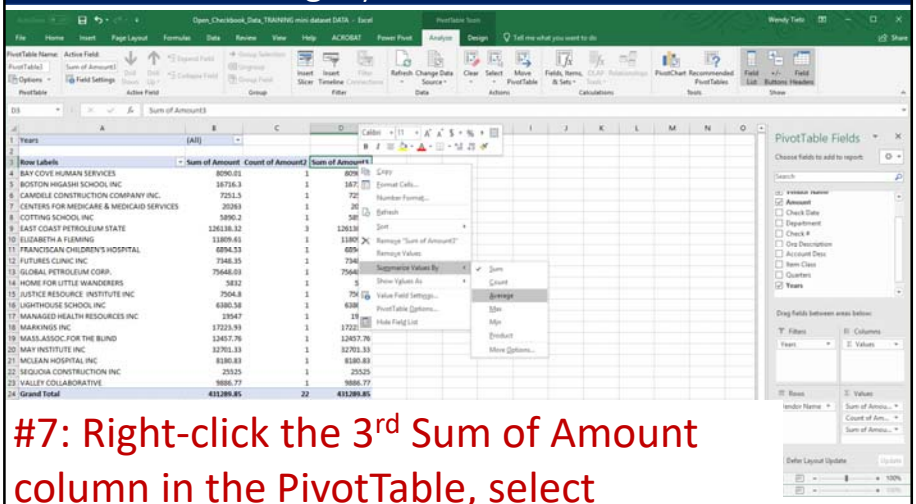
Req 4: In 2016, largest account for General Government category



#6: Right-click the 2nd Sum of Amount column in the PivotTable, select Summarize Values By, and select Count

For Step 6, right-click the 2nd Sum of Amount column in the PivotTable, select Summarize Values By, and select Count.

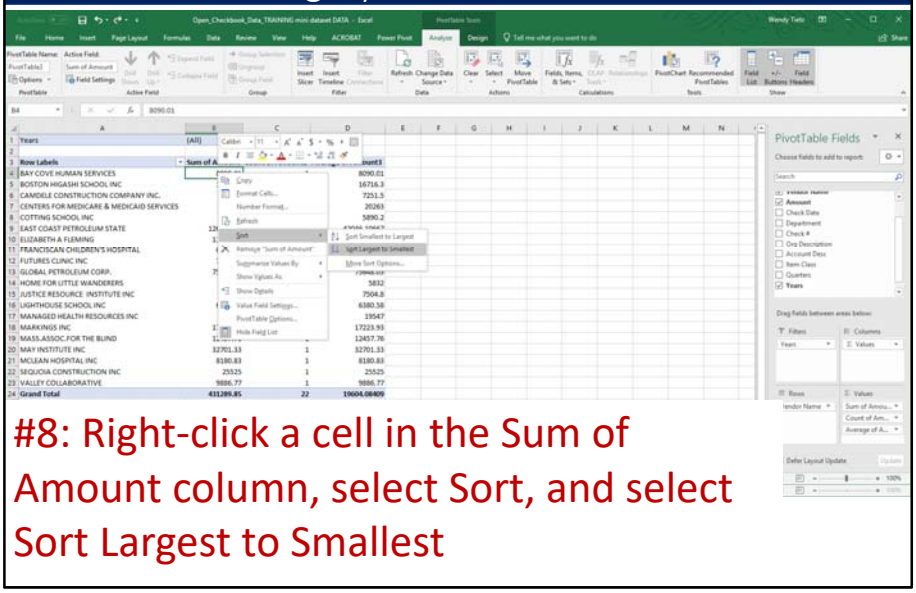
Req 4: In 2016, largest account for General Government category



#7: Right-click the 3rd Sum of Amount column in the PivotTable, select Summarize Values By, and select Average

In Step 7, right-click the 3rd Sum of Amount column in the PivotTable, select Summarize Values By, and select Average.

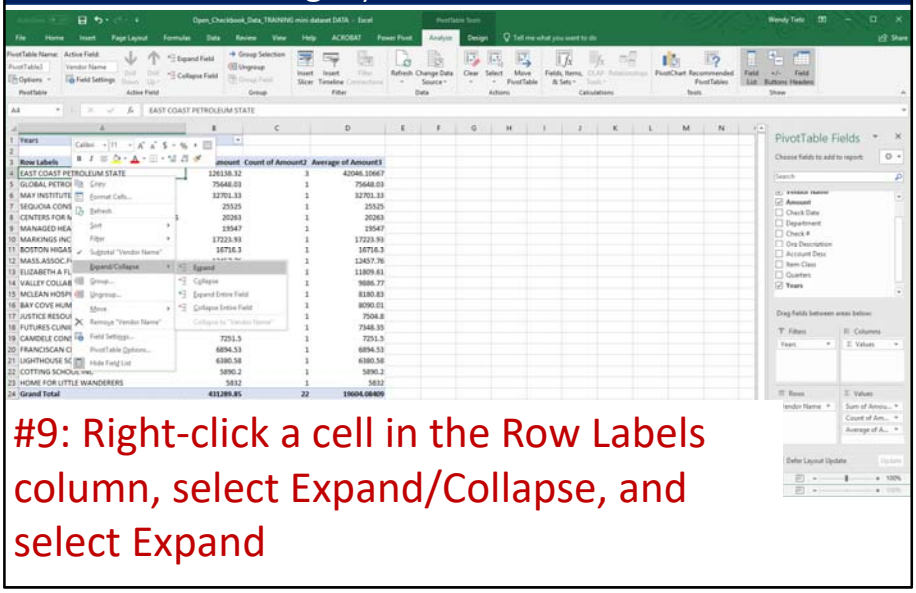
Req 4: In 2016, largest account for General Government category



#8: Right-click a cell in the Sum of Amount column, select Sort, and select Sort Largest to Smallest

In Step 8, right-click a cell in the Sum of Amount column, select Sort, and select Sort Largest to Smallest.

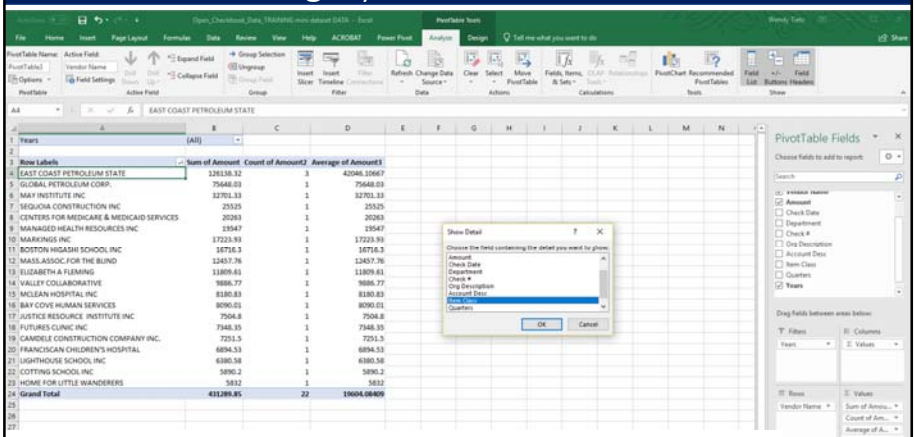
Req 4: In 2016, largest account for General Government category



#9: Right-click a cell in the Row Labels column, select Expand/Collapse, and select Expand

In Step 9, right-click a cell in the Sum of Amount column, select Expand/Collapse, and select Expand.

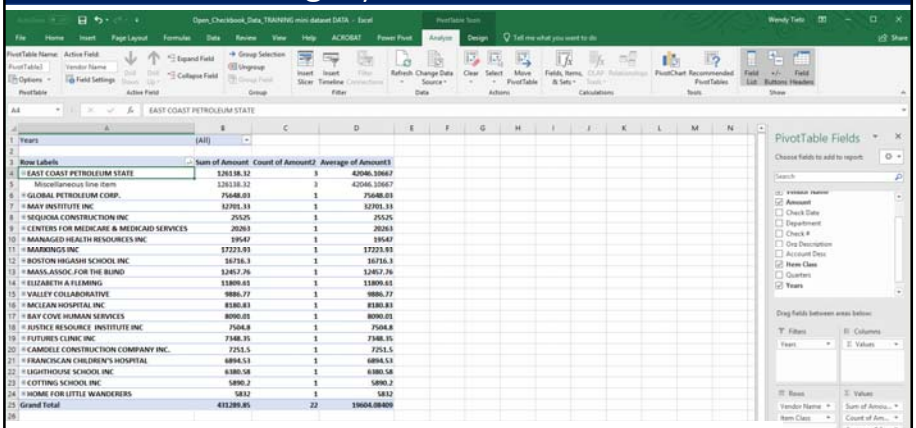
Req 4: In 2016, largest account for General Government category



#10: Select “Item Class” as the item for which to show additional detail

In Step 10, select “Item Class” as the item for which to show additional detail.

Req 4: In 2016, largest account for General Government category

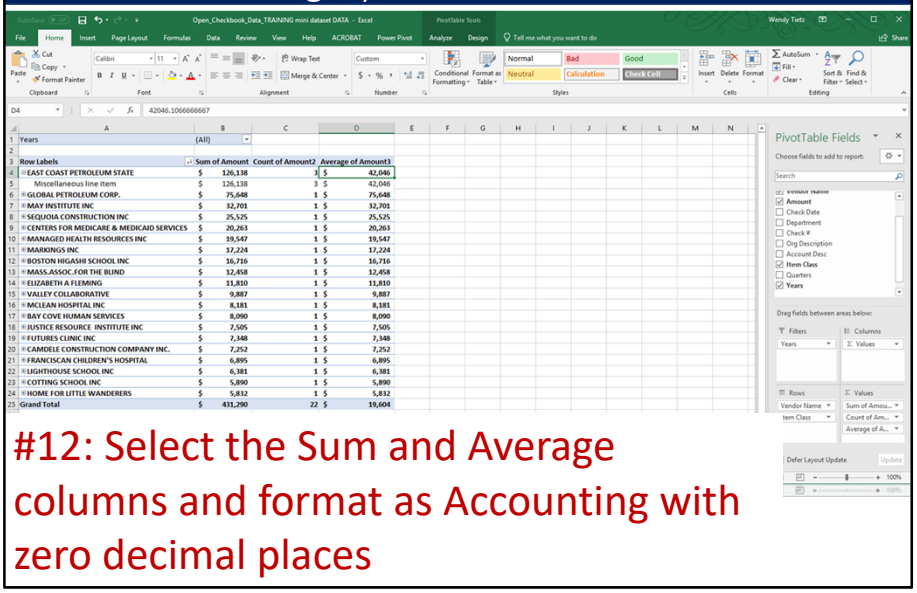


Years	(All)		
Row Labels	Sum of Amount	Count of Amount2	Average of Amount1
EAST COAST PETROLEUM STATE	126138.32	3	42046.10667
Miscellaneous line item	126138.32	3	42046.10667
GLOBAL PETROLEUM CORP.	75648.03	1	75648.03
MAY INSTITUTE INC	32701.33	1	32701.33
SEQUOIA CONSTRUCTION INC	25525	1	25525
CENTERS FOR MEDICARE & MEDICAID SERVICES	20263	1	20263
MANAGED HEALTH RESOURCES INC	19547	1	19547
MARKINGS INC	17223.93	1	17223.93
BOSTON HIGASHI SCHOOL INC	16716.3	1	16716.3
MASS.ASSOC.FOR THE BLIND	12457.76	1	12457.76
ELIZABETH A FLEMING	11809.61	1	11809.61
VALLEY COLLABORATIVE	9886.77	1	9886.77
MCLEAN HOSPITAL INC	8180.83	1	8180.83
BAY COVE HUMAN SERVICES	8090.01	1	8090.01
JUSTICE RESOURCE INSTITUTE INC	7504.8	1	7504.8
FUTURES CLINIC INC	7348.35	1	7348.35
CAMDELE CONSTRUCTION COMPANY INC.	7251.5	1	7251.5
FRANCISCAN CHILDREN'S HOSPITAL	6894.53	1	6894.53
LIGHTHOUSE SCHOOL INC	6180.58	1	6180.58
COTTING SCHOOL INC	5890.2	1	5890.2
HOME FOR LITTLE WANDERERS	5832	1	5832
Grand Total	431289.85	22	19604.08409

#11: Click the “+” or “–” symbol to the right of each Vendor Name to see the Item Class(es) for each vendor

For Step 11, click the “+” or “–” symbol to the right of each Vendor Name to see the Item Class(es) for each vendor.

Req 4: In 2016, largest account for General Government category

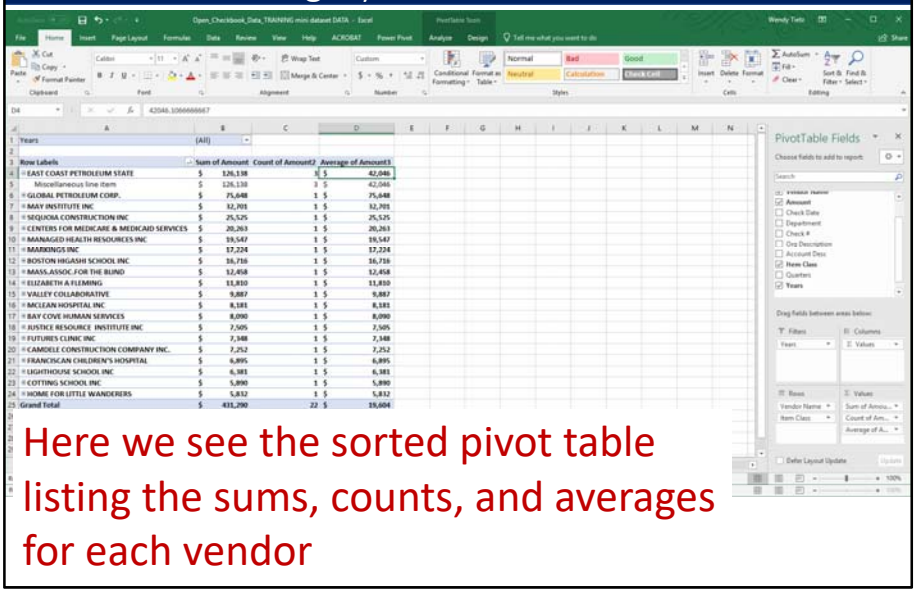


Years	(All)		
Row Labels	Sum of Amount	Count of Amount2	Average of Amount3
EAST COAST PETROLEUM STATE	$ 126,138	3	$ 42,046
Miscellaneous line item	$ 126,138	3	$ 42,046
GLOBAL PETROLEUM CORP.	$ 75,648	1	$ 75,648
MAY INSTITUTE INC	$ 32,701	1	$ 32,701
SEQUOIA CONSTRUCTION INC	$ 25,525	1	$ 25,525
CENTERS FOR MEDICARE & MEDICAID SERVICES	$ 20,263	1	$ 20,263
MANAGED HEALTH RESOURCES INC	$ 19,547	1	$ 19,547
MARKINGS INC	$ 17,224	1	$ 17,224
BOSTON HIGASHI SCHOOL INC	$ 16,716	1	$ 16,716
MASS.ASSOC.FOR THE BLIND	$ 12,458	1	$ 12,458
ELIZABETH A FLEMING	$ 11,810	1	$ 11,810
VALLEY COLLABORATIVE	$ 9,887	1	$ 9,887
MCLEAN HOSPITAL INC	$ 8,181	1	$ 8,181
BAY COVE HUMAN SERVICES	$ 8,090	1	$ 8,090
JUSTICE RESOURCE INSTITUTE INC	$ 7,505	1	$ 7,505
FUTURES CLINIC INC	$ 7,348	1	$ 7,348
CAMDELE CONSTRUCTION COMPANY INC.	$ 7,252	1	$ 7,252
FRANCISCAN CHILDREN'S HOSPITAL	$ 6,895	1	$ 6,895
LIGHTHOUSE SCHOOL INC	$ 6,381	1	$ 6,381
COTTING SCHOOL INC	$ 5,890	1	$ 5,890
HOME FOR LITTLE WANDERERS	$ 5,832	1	$ 5,832
Grand Total	$ 431,290	22	$ 19,604

#12: Select the Sum and Average columns and format as Accounting with zero decimal places

For Step 12, select the Sum and Average columns and format as Accounting with zero decimal places. (Right-click the numbers, select Value Field Settings, Number Format, Accounting format with zero decimal places, and then click OK.)

Req 4: In 2016, largest account for General Government category



Years	(All)		
Row Labels	Sum of Amount	Count of Amount2	Average of Amount3
EAST COAST PETROLEUM STATE	$ 126,138	3	$ 42,046
Miscellaneous line item	$ 126,138	3	$ 42,046
GLOBAL PETROLEUM CORP.	$ 75,648	1	$ 75,648
MAY INSTITUTE INC	$ 32,701	1	$ 32,701
SEQUOIA CONSTRUCTION INC	$ 25,525	1	$ 25,525
CENTERS FOR MEDICARE & MEDICAID SERVICES	$ 20,263	1	$ 20,263
MANAGED HEALTH RESOURCES INC	$ 19,547	1	$ 19,547
MARRINGS INC	$ 17,224	1	$ 17,224
BOSTON HIGASHI SCHOOL INC	$ 16,716	1	$ 16,716
MASS.ASSOC.FOR THE BLIND	$ 12,458	1	$ 12,458
ELIZABETH A FLEMING	$ 11,810	1	$ 11,810
VALLEY COLLABORATIVE	$ 9,887	1	$ 9,887
MCLEAN HOSPITAL INC	$ 8,181	1	$ 8,181
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JUSTICE RESOURCE INSTITUTE INC	$ 7,505	1	$ 7,505
FUTURES CLINIC INC	$ 7,348	1	$ 7,348
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FRANCISCAN CHILDREN'S HOSPITAL	$ 6,895	1	$ 6,895
LIGHTHOUSE SCHOOL INC	$ 6,381	1	$ 6,381
COTTING SCHOOL INC	$ 5,890	1	$ 5,890
HOME FOR LITTLE WANDERERS	$ 5,832	1	$ 5,832
Grand Total	$ 431,290	22	$ 19,604

Here we see the sorted pivot table listing the sums, counts, and averages for each vendor

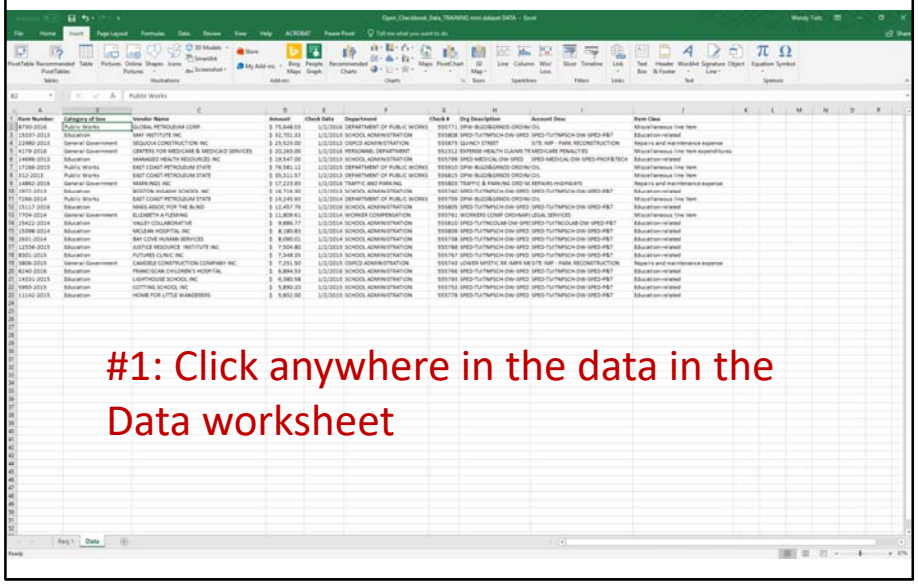
Here now we see the sorted pivot table listing the sums, counts, and averages for each vendor.

Requirement 5

How much in expenditures did Somerville have related to Property, Plant and Equipment (use the field “Item Class” for this answer) in the General Government category in each of the years 2013 – 2016? How much in expenditures in each of those years were related to repairs and maintenance?

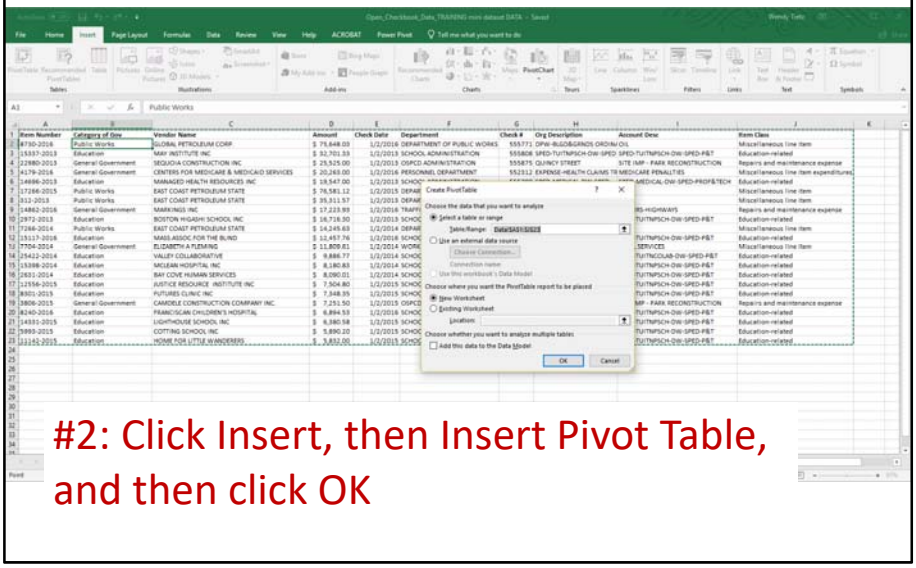
Requirement 5 reads “How much in expenditures did Somerville have related to Property, Plant and Equipment (use the field “Item Class” for this answer) in the General Government category in each of the years 2013 – 2016? How much in expenditures in each of those years were related to repairs and maintenance?”

Req 5: How much was spent related to Property, Plant & Equipment in 2013 – 2016?



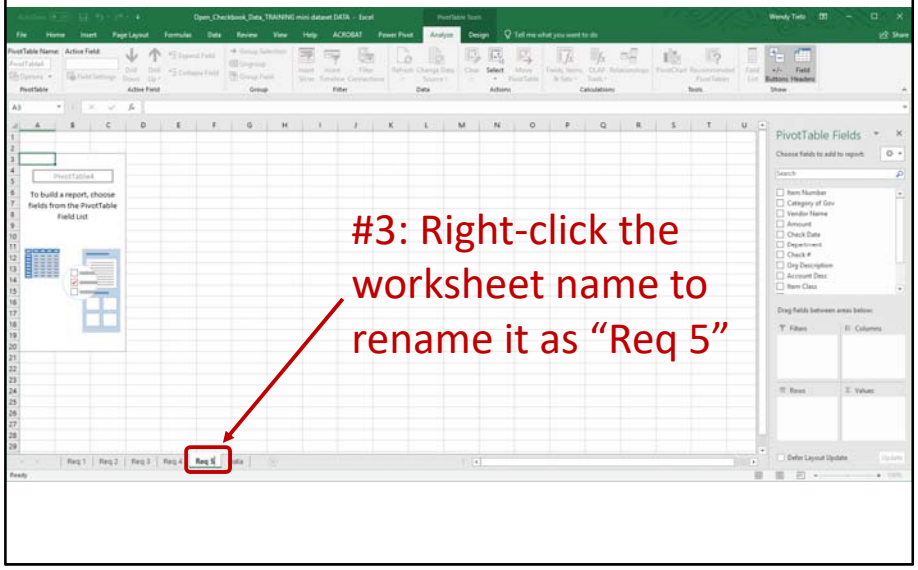
The first step is to click anywhere in the data in the Data worksheet.

Req 5: How much was spent related to Property, Plant & Equipment in 2013 – 2016?



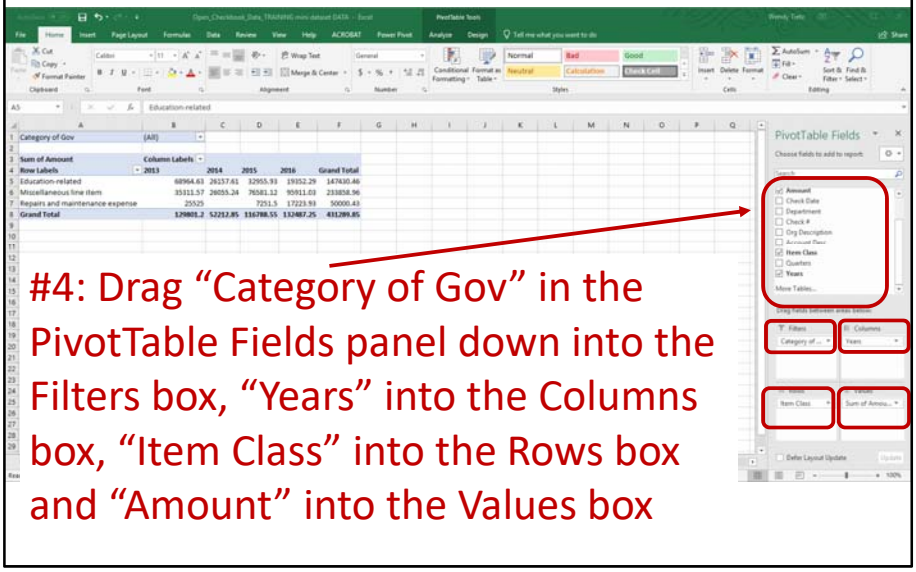
For Step #2, to insert a pivot table, click Insert, then Insert Pivot Table, and then click OK.

Req 5: How much was spent related to Property, Plant & Equipment in 2013 – 2016?



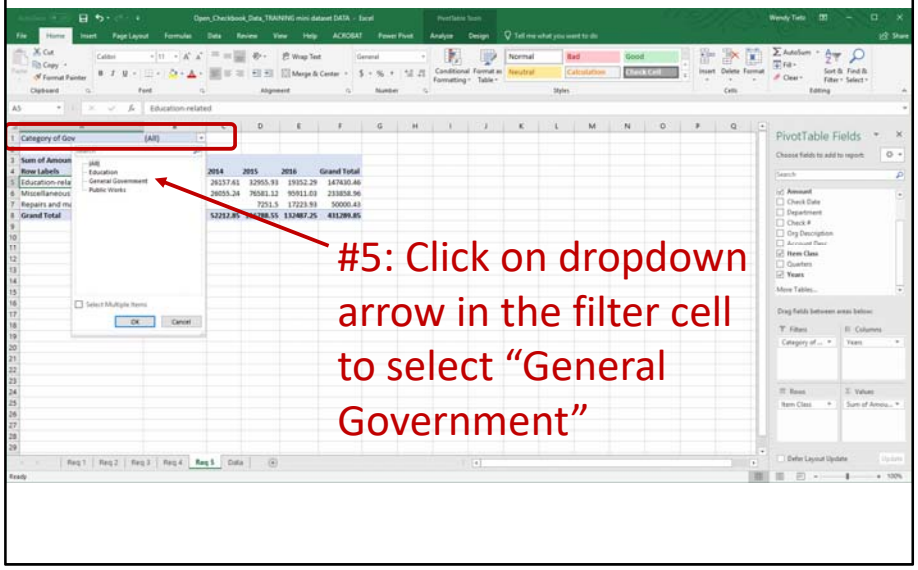
For Step #3, right-click the worksheet name to rename it as “Req 5.”

Req 5: How much was spent related to Property, Plant & Equipment in 2013 – 2016?



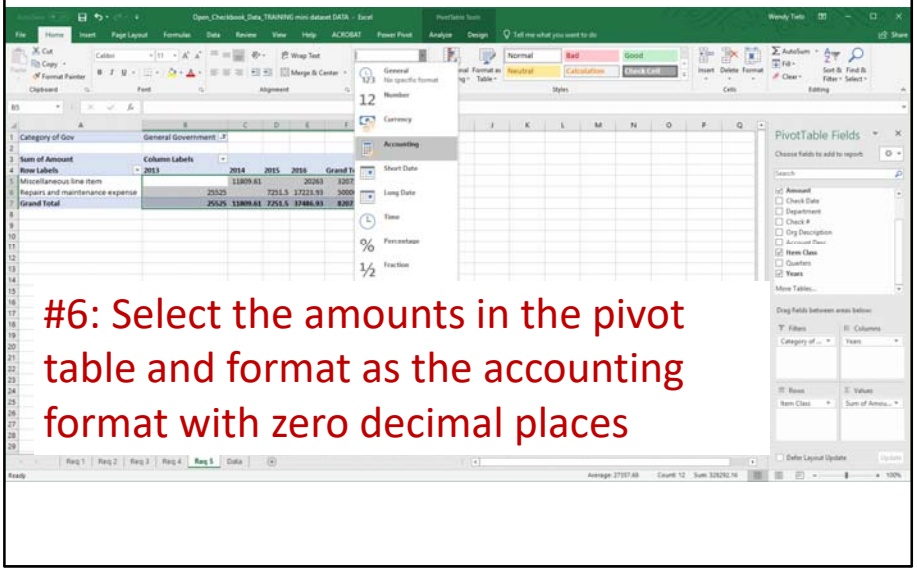
For Step 4, drag “Category of Gov” in the PivotTable Fields panel down into the Filters box, “Years” into the Columns box, “Item Class” into the Rows box and “Amount” into the Values box.

Req 5: How much was spent related to Property, Plant & Equipment in 2013 – 2016?



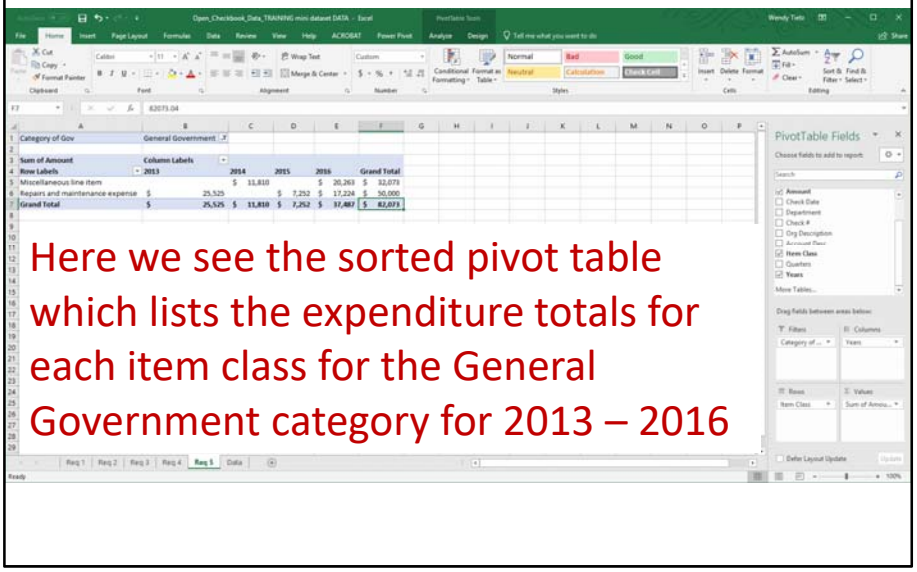
For Step 5, click on dropdown arrow in the filter cell to select “General Government”.

Req 5: How much was spent related to Property, Plant & Equipment in 2013 – 2016?



For Step 6, select the amounts in the pivot table and format as the accounting format with zero decimal places.

Req 5: How much was spent related to Property, Plant & Equipment in 2013 – 2016?



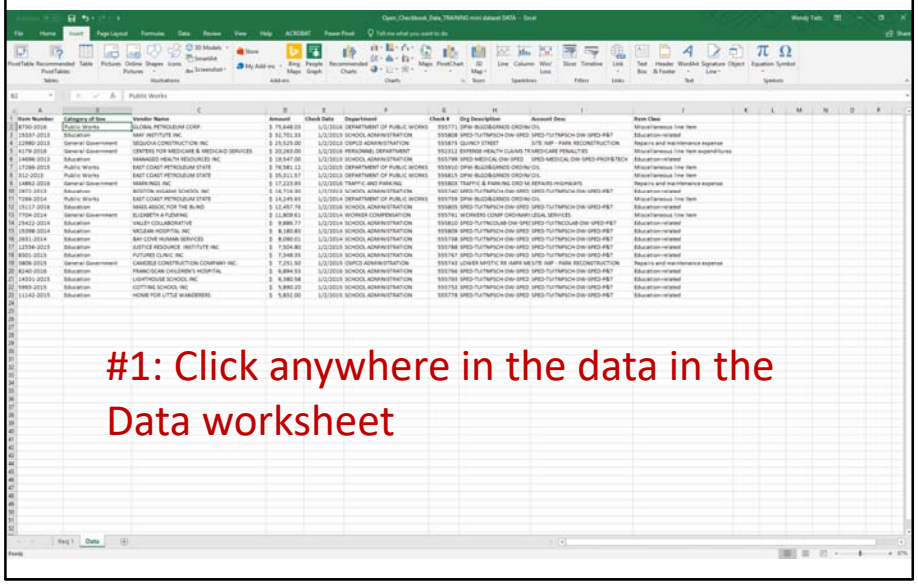
Here we see the sorted pivot table which lists the expenditure totals for each item class for the General Government category for 2013 – 2016.

Requirement 6

Prepare a pivot table that shows a line chart of Somerville's expenditures in each of the three categories of government (Education, General Government, and Public Works) for the years 2013 – 2016. Prepare a pivot chart using the line chart type of this information on the same worksheet. Analyze the pivot chart and summarize the trends.

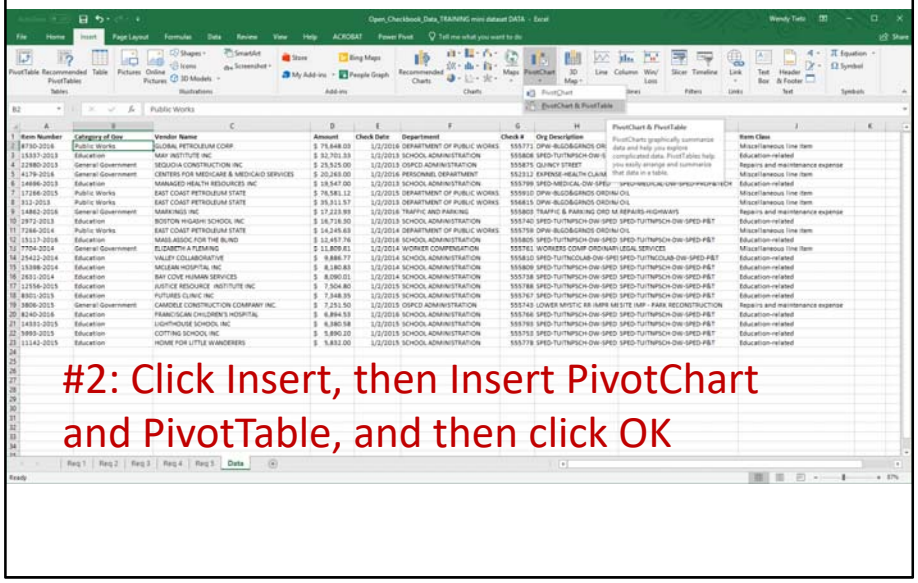
Requirement 6 reads "Prepare a pivot table that shows a line chart of Somerville's expenditures in each of the three categories of government (Education, General Government, and Public Works) for the years 2013 – 2016. Prepare a pivot chart using the line chart type of this information on the same worksheet. Analyze the pivot chart and summarize the trends."

Req 6: Use a PivotChart to analyze expenditures by category of government.



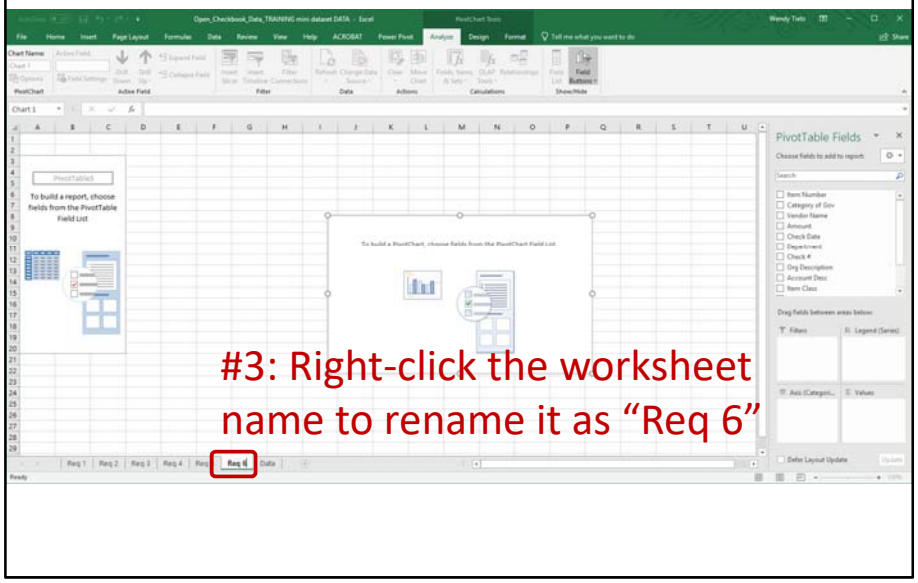
The first step is to click anywhere in the data in the Data worksheet.

Req 6: Use a PivotChart to analyze expenditures by category of government.



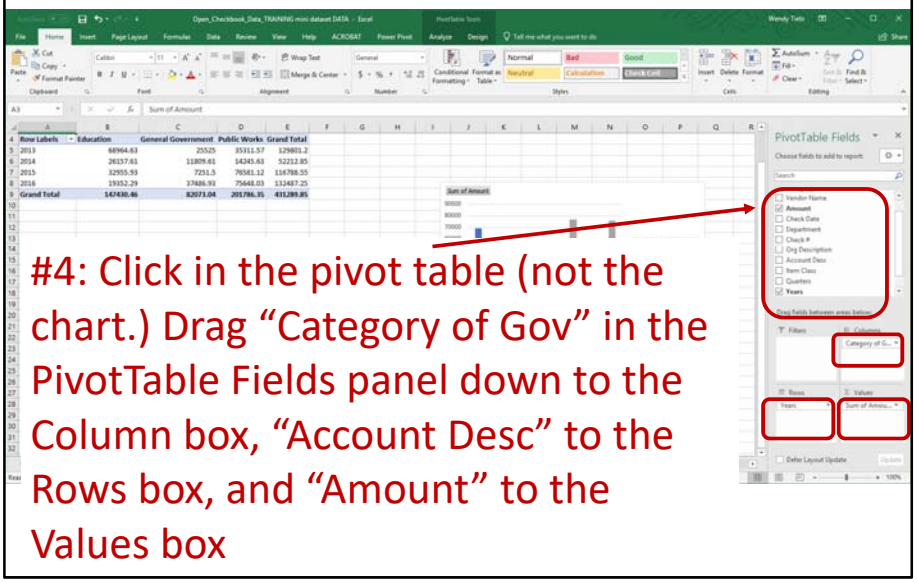
For Step #2, to insert a pivot table, click Insert, then Insert PivotChart and PivotTable, and then click OK.

Req 6: Use a PivotChart to analyze expenditures by category of government.



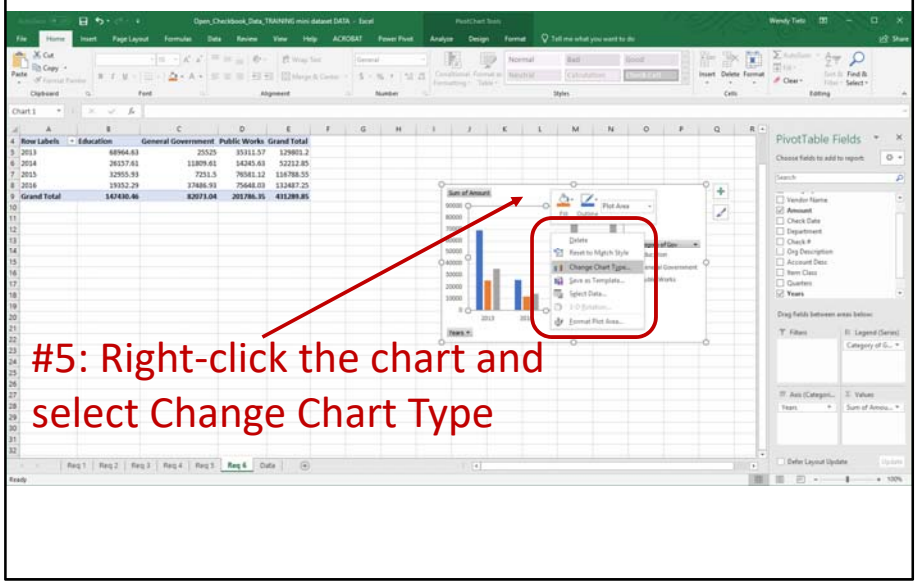
For Step #3, right-click the worksheet name to rename it as “Req 6.”

Req 6: Use a PivotChart to analyze expenditures by category of government.



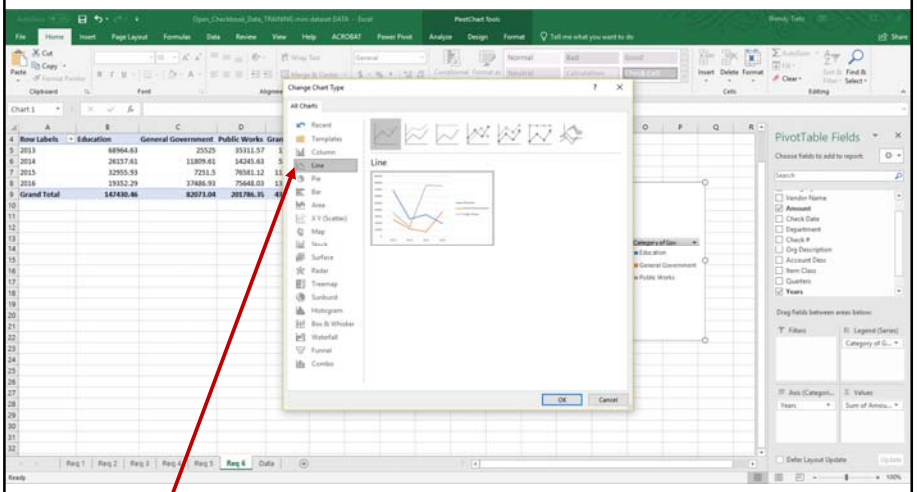
For Step 4, first click in the pivot table. Make sure you are not clicked in the pivot chart. The right side panel should say “PivotTable Fields.” Drag “Category of Gov” in the PivotTable Fields panel down to the Column box, “Account Desc” down to the Rows box, and “Amount” down to the Values box.

Req 6: Use a PivotChart to analyze expenditures by category of government.



For Step 5, change the chart type by right-clicking the chart and selecting Change Chart Type.

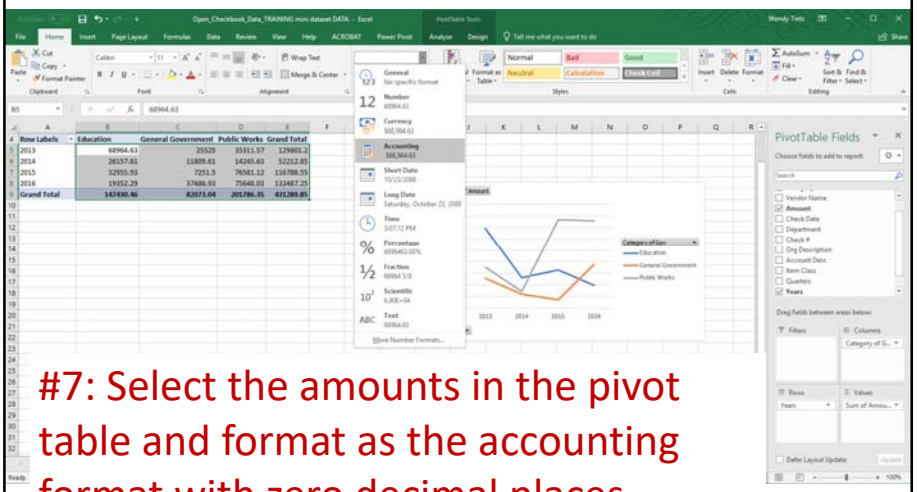
Req 6: Use a PivotChart to analyze expenditures by category of government.



Change the chart type to “Line”

Once you have right-clicked the chart and selected Change Chart Type, select “Line.”

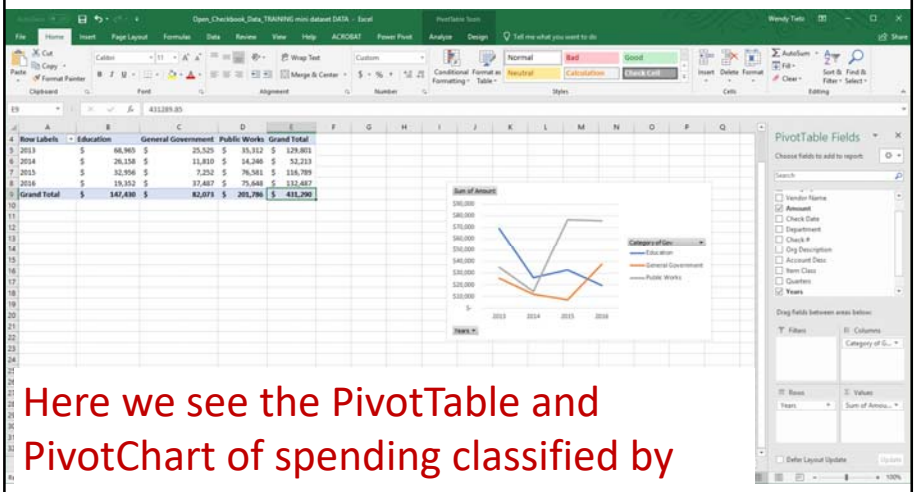
Req 6: Use a PivotChart to analyze expenditures by category of government.



#7: Select the amounts in the pivot table and format as the accounting format with zero decimal places

For Step 7, select the amounts in the pivot table and format as the accounting format with zero decimal places.

Req 6: Use a PivotChart to analyze expenditures by category of government.



Here we see the PivotTable and PivotChart of spending classified by government category for 2013 – 2016.



Prepared by:
Wendy M. Tietz, PhD, CPA, CMA, CSCA

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That concludes this data analytics tutorial covering transaction analysis using pivot tables and charts in Excel. Thanks for watching!