The goal of this assignment is to create a scatter plot of a set of data. You could do this with any two columns of data, but for demonstration purposes we'll work with the data in the table below. The first column of the table is aligned to years after 2000 and corresponds to the years 2000, 2001, …, 2006. The second column contains the student to teacher ratios for US public primary and secondary schools in the corresponding years. For this demonstration we'll graph the Years after 2000 on the horizontal axis and the corresponding US Student to Teacher Ratios on the vertical axis. Thus each row in the table will be graphed as an ordered pair like (0, 16.048), (1, 15.893), …, (6, 15.540).

Years after 2000	US Student to Teacher Ratio
0	16.048
1	15.893
2	15.900
3	15.900
4	15.800
5	15.657
6	15.540

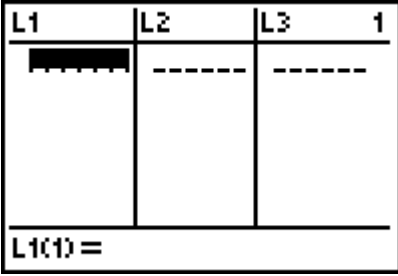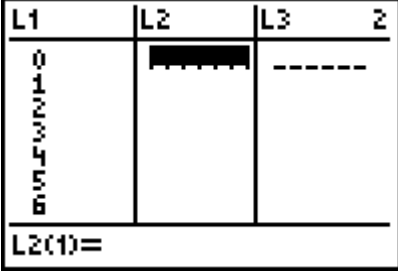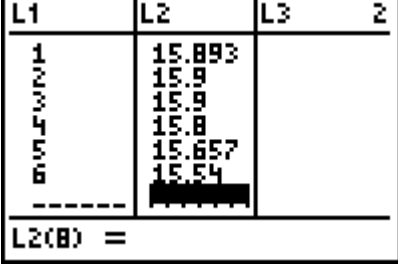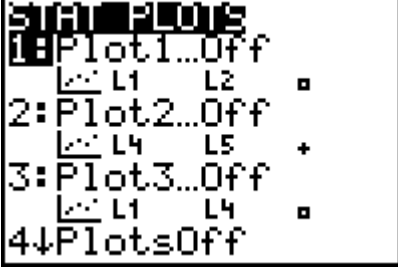The first row of data indicates that in 2000, there were 16.048 students per teacher in US public primary and secondary schools.
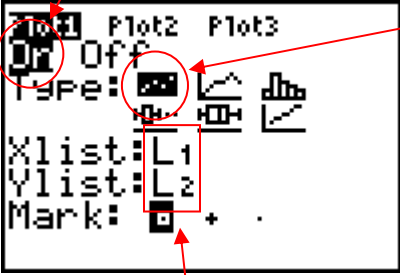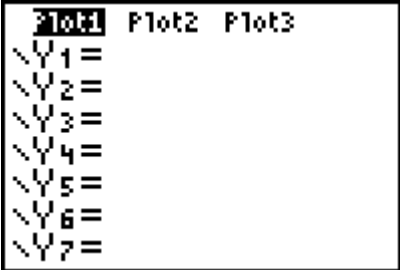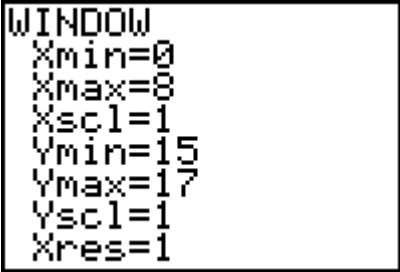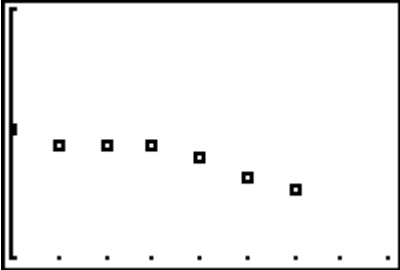
Graph the Data on a TI-84

1. Turn on your calculator by pressing [ON].

2. Press [STAT] to access the statistics menu.


```
EDIT CALC TESTS
1:Edit…
2:SortA(
3:SortD(
4:ClrList
5:SetUpEditor
```

3. To enter the data into the calculator, select `1:Edit...` by pressing `1`. You may also press `ENTER` since the selection is already highlighted. If you see any data in the columns L1 or L2, you can clear the data by pressing `STAT` `4` `2nd` `1` `,` `2nd` `2` `ENTER`. After clearing the data you'll need to press `STAT` `1` to enter the statistics editor again.

L1	L2	L3	1
▬▬▬	------	------	

L1(1)=

4. In the column headed by L1, enter the data from the first column above. After each number, press `ENTER` or `▼` to go to the next row.

5. After you have finished typing the numbers in the first column, press `▶` to go to the first row of the column headed by L2.

L1	L2	L3	2
0	▬▬▬	------	
1			
2			
3			
4			
5			
6			

L2(1)=

6. Enter the numbers from above into the column headed by L2. After each number, press `ENTER` or `▼` to go to the next row.

L1	L2	L3	2
1	15.893		
2	15.9		
3	15.9		
4	15.8		
5	15.657		
6	15.54		
------	▬▬▬		

L2(8) =

7. Now that the data has been into the statistics editor, you need to turn the scatter plot on for the data. Press `2nd` `Y=` to access the STAT PLOT menu.

8. The menu shown to the right indicates that all scatter plots on the calculator are turned off. In the next step we'll need to turn on Plot 1.

```
STAT PLOTS
1:Plot1…Off
   ⌐ L1    L2    ▫
2:Plot2…Off
   ⌐ L4    L5    +
3:Plot3…Off
   ⌐ L1    L4    ▫
4↓PlotsOff
```

Turn plot ON

Scatter plot

9. Press $\boxed{1}$ or $\boxed{\text{ENTER}}$ to access the settings for Plot 1.

10. Use the $\boxed{\blacktriangleleft},\boxed{\blacktriangle},\boxed{\blacktriangleright},\boxed{\blacktriangledown}$ buttons to highlight On and the type shown to the right. To highlight an option, press $\boxed{\text{ENTER}}$. The first type is a scatter plot.

11. Xlist and Ylist tell the calculator where the data is located. If the Xlist does not indicate L_1, move the cursor to that line and press $\boxed{\text{2nd}}\boxed{1}$. If the Ylist does not indicate L_2, move the cursor to that line and press $\boxed{\text{2nd}}\boxed{2}$.

12. Highlight one of the marks and press $\boxed{\text{ENTER}}$.

Location of the data to be plotted horizontally and vertically

13. Press $\boxed{\text{Y=}}$ to open the equation editor menu. If there are any equations in Y_1 through Y_7, highlight them with the $\boxed{\blacktriangleleft},\boxed{\blacktriangle},\boxed{\blacktriangleright},\boxed{\blacktriangledown}$ buttons and press $\boxed{\text{DEL}}$. We want to plot the data only so no equations should appear here. Alternatively, we could highlight the = sign on any equation and press $\boxed{\text{ENTER}}$ to turn off the corresponding equation. At this point it is easiest to simply delete the equations.

14. Press $\boxed{\text{WINDOW}}$ to adjust the graphing window. Use the $\boxed{\blacktriangleleft},\boxed{\blacktriangle},\boxed{\blacktriangleright},\boxed{\blacktriangledown}$ buttons to change the values for Xmin, Xmax to match the horizontal extent of the graphing window for your data. Change the values for Ymin, Ymax to match the vertical extent of the graphing window for your data. The window shown to the right is appropriate for the data in the table above.

15. Press $\boxed{\text{GRAPH}}$ to see the scatter plot.

16. Keep in mind that different windows can lead to graphs that look very different. The window shown to the right leads to the scatter plot below it. In this case, a larger vertical window shifts the data point up and makes them look less curved. Experiment with values for the graphing window to see how the scatter plot changes.

```
WINDOW
 Xmin=0
 Xmax=8
 Xscl=1
 Ymin=0
 Ymax=17
 Yscl=5
 Xres=1■
```
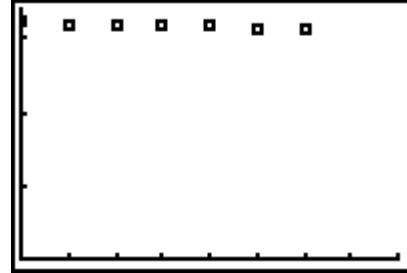
tabs

Graph the Data in Excel

Graphing data in Excel is exactly like graphing a function in Excel except you choose a different Chart type. Follow the steps below to create and modify a scatter plot of the data you have been assigned.

1. Start Excel/

2. Excel has many capabilities that allow it to do calculations and make different types of graphs. Along the top of the window are the tabs. As shown, the Home tab is selected. This tab contains many formatting options as well as the copy and paste buttons. Other tabs can be selected such as Insert, Page Layout, ect. Other tabs will appear as needed as you work in Excel.

3. The main part of Excel are the cells. The cells form a large table. For instance, the black box is currently in cell A1 meaning that it is in the column labeled A and the row labeled 1. You can click your mouse in other cells and see the location of the cell change in the label just above the cells.

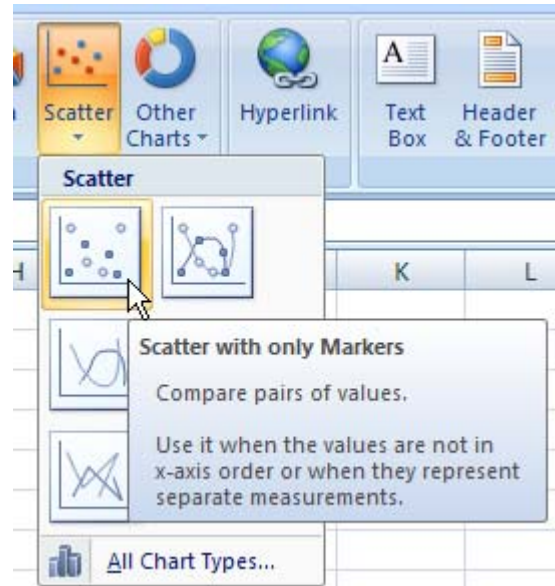4. Above the cells is the formula bar. This is where you will enter formulas you want Excel to calculate.
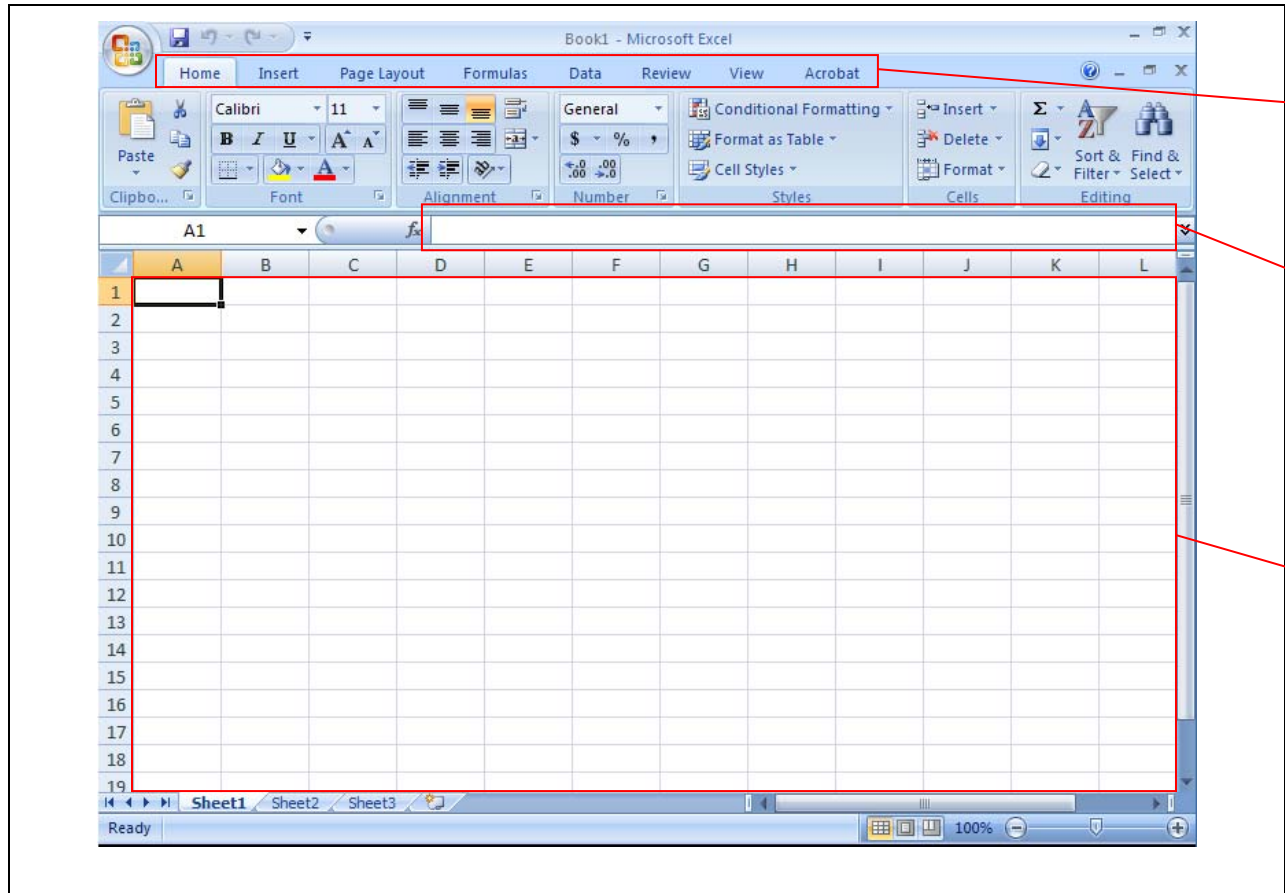
5. Enter the data from the first column of the table into column A. You can use the fill feature in Excel or simply type in the numbers.

6. Enter the data from the second column of the table into column B. Since there is no discernable pattern to the data, you need to type each data value in individually. This differs from graphing a formula where each y value comes from a formula.

	A	B
1	0	16.048
2	1	15.893
3	2	15.900
4	3	15.900
5	4	15.800
6	5	15.657
7	6	15.540
8		
9		

|	
7. Left mouse click on cell A1. While holding down the mouse button, drag the mouse to cell B7 so that a selection rectangle covers all of the data you want to graph.	7R x 2C ▼ <table><tr><td></td><td>A</td><td>B</td></tr><tr><td>1</td><td>0</td><td>16.048</td></tr><tr><td>2</td><td>1</td><td>15.893</td></tr><tr><td>3</td><td>2</td><td>15.900</td></tr><tr><td>4</td><td>3</td><td>15.900</td></tr><tr><td>5</td><td>4</td><td>15.800</td></tr><tr><td>6</td><td>5</td><td>15.657</td></tr><tr><td>7</td><td>6</td><td>15.⊕0</td></tr><tr><td>8</td><td></td><td></td></tr><tr><td>9</td><td></td><td></td></tr></table>
8. Click on the Insert tab at the top of the Excel window. 9. Under the Charts panel, select Scatter followed by Scatter with only Markers. This creates a scatter plot where the points are not connected by a line.	Scatter Other Hyperlink Text Header Charts ▾ Box & Footer Scatter Scatter with only Markers Compare pairs of values. Use it when the values are not in x-axis order or when they represent separate measurements. All Chart Types...

10. The scatter plot will appear in your Excel worksheet in an appropriate window.

11. Select the legend on the right of the graph and press Delete on your keyboard.

12. Select any grid lines on the scatter plot and press Delete on your keyboard. Your graph should be similar to the one below and not contain a legend or any gridlines.
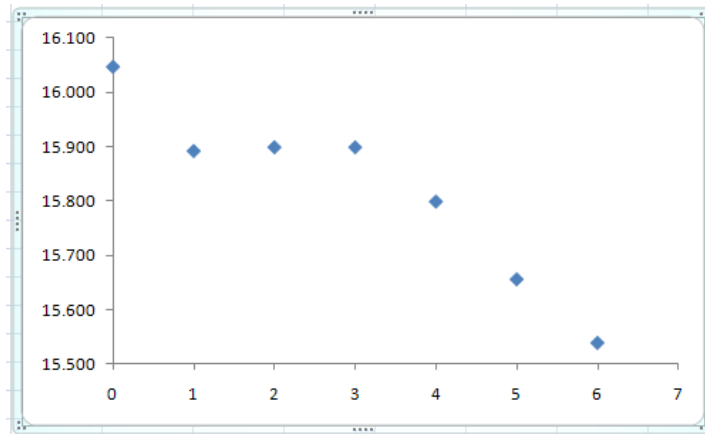
13. Use the mouse to left click on one of the data points in your graph. You'll notice that the points are selected and a tab called Chart Tools appears along the top of Excel.

14. Under the Design tab, try selecting different colors for the data points like the red points shown to the right. Many colors and sizes are available using the scroll bar on the Chart Styles panels.
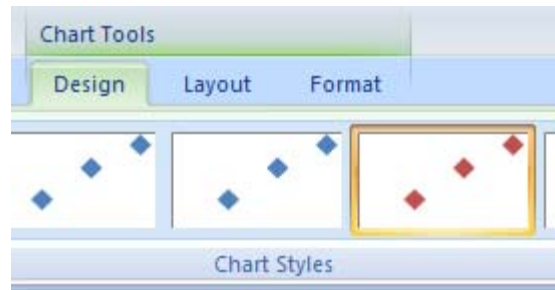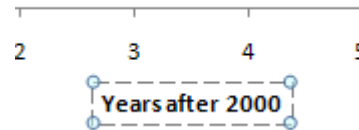

15. Click on the edge of your graph to select it. From Chart Tools, click on the Layout tab.
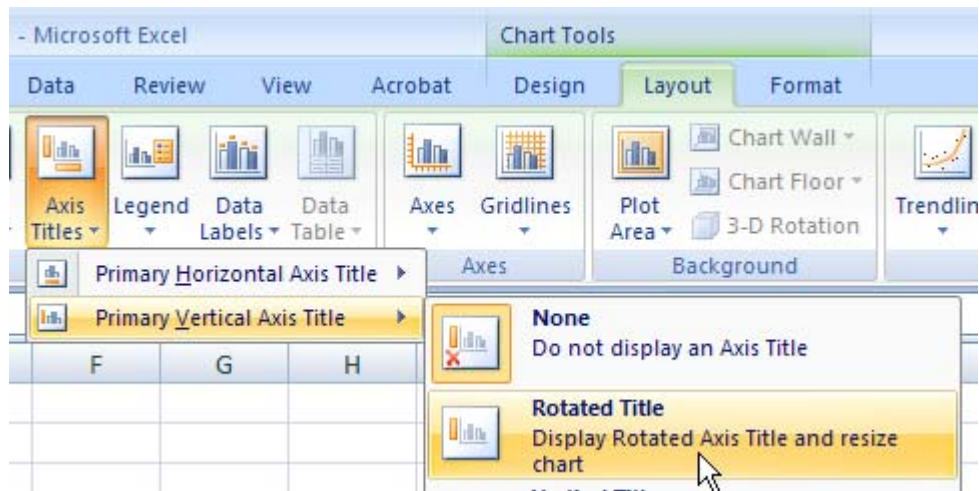
16. Under the Labels panel, select Axes Titles.

17. From the menu that appears, select Primary Horizontal Axis Title and finally left mouse click on Title Below Axis.
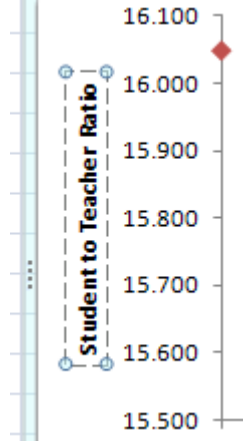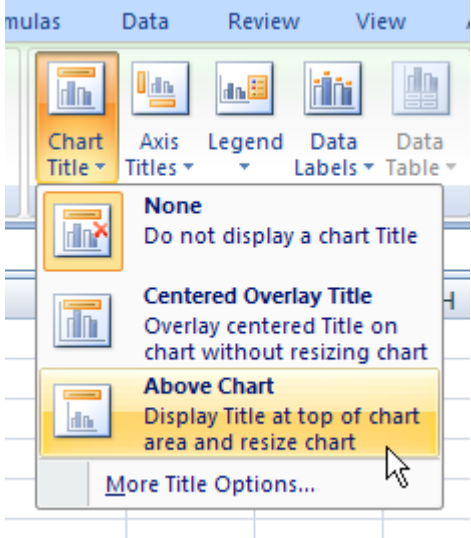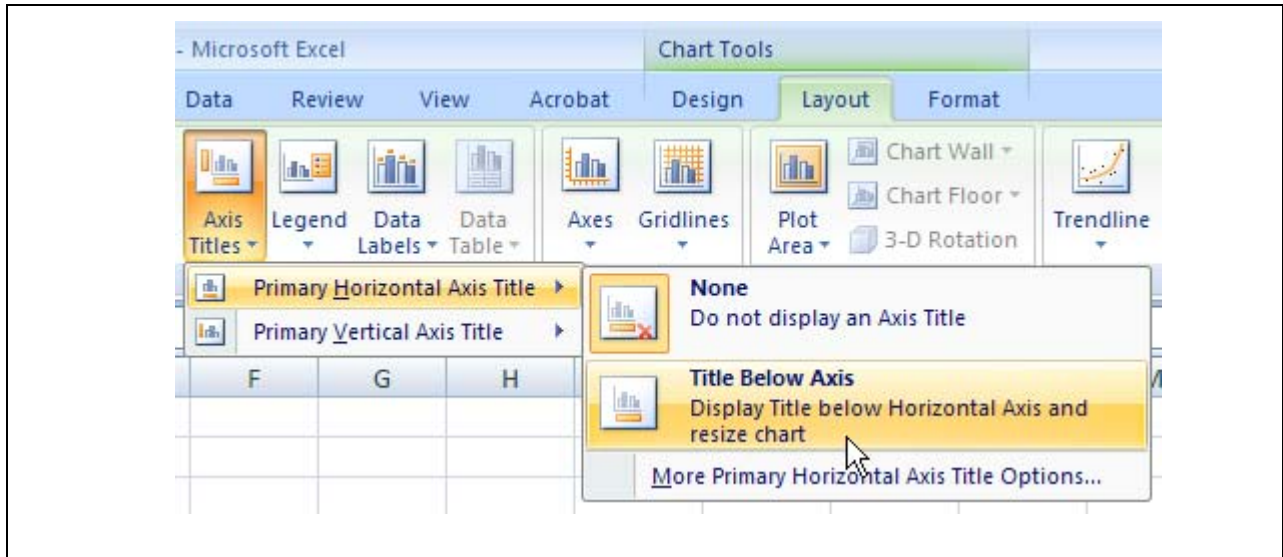
18. An axis title will appear below the horizontal axis. Double left mouse click on the axis title to select it and change it to an appropriate title for your graph.

19. Click on the edge of your graph to select it. From Chart Tools, click on the Layout tab.

20. Under the Labels panel, select Axes Titles.

21. From the menu that appears, select Primary Vertical Axis Title and finally left mouse click on Rotated Title.

22. An axis title will appear to the left of the vertical axis. Double left mouse click on the axis title to select it and change it to an appropriate title for your graph.	
23. The final addition to the graph you will make is a chart title. Click on the edge of your graph to select it. From Chart Tools, click on the Layout tab. 24. Under the Labels panel, select Chart Titles. 25. From the menu that appears, select Above Chart.	

26. A chart title will appear above the scatter plot. Double left mouse click on the chart title to select it and change it to an appropriate title for your graph.
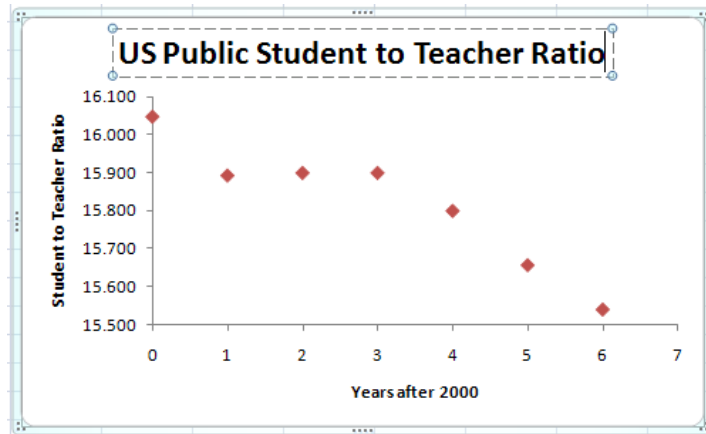
27. To finish this tech assignment, you need to copy your graph from Excel to word processing document in Word (or a similar program). Click on your graph to select it.

28. On the Home tab, left click on the Copy button to copy the graph to the clipboard.

29. Open Word (or another word processing program).

30. At the top of the document, type your name, class, and the date followed by a carriage return (Enter).

31. In Word, left click on the Home tab.

32. Select Paste to paste the graph into your Word document. Your document should look similar to the one shown to the right.
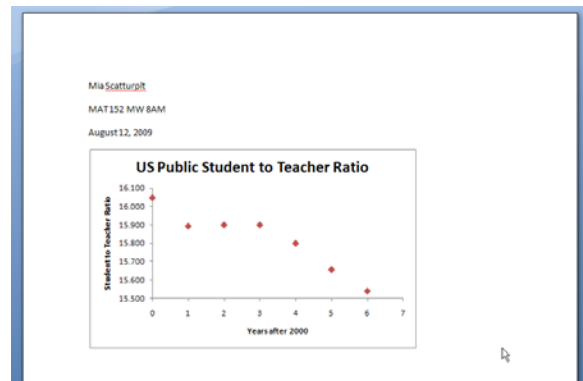
33. Finally, you need to save this document to a convenient location. In the upper left hand corner of Word, left click on the disk icon.

34. Give the document and appropriate name and location and select Save.

35. You can also select the Office button to the left of the disk icon. This is useful to save the document with a new file name. In this case you would select Save As... and

then give an appropriate name. If you are working on a document over several days, it is advisable to save the document with a slightly different name on each day based on the date. This allows you to recover earlier version of a document in case you need to refer to earlier work.	