Precalculus: Section 1.7
Scatter Plots and Linear Regression on the TI-83/TI-84 Calculator

The following is a reference sheet on graphing scatter plots and calculating linear regression on the TI-83 or TI-84 calculators. Keep this sheet, because we will come back to this process at the end of chapter 2 and chapter 3, and potentially other times during the year.

To Graph a Scatter Plot:

In order to graph a scatter plot, you first must input the desired data into your calculator. To do this, press the STAT button. You will get a list of options, the first one of which should say 1: Edit…

Press ENTER to select it. You will see the following table:

This is where you will enter the data to be plotted (into L1 and L2).

As an example for you to follow, I am going to use the following data.

Club-Head Speed (mph)	Distance (yards)
100	257
102	264
103	274
101	266
105	277
100	263
99	258
105	275

Enter the club-head speed data in list 1 (L1) and the distance in list 2 (L2). Your completed data entry screen should look like this.

*** If you there is data in your list that you need to clear out prior to entering the new data sets, move your cursor so that L1 or L2 is highlighted and press the <u>CLEAR</u> button (NOT DELETE). When you arrow back down into the list, the data will be cleared out. If you hit delete, you will completely lose L1. If this happens, let me know and I will show you how to get it back ☺.

Now, to actually plot the data, press STAT PLOT (2nd and the Y= key). and then ENTER to select the first item. Make sure that On is selected (it should be highlighted). For Type: you want to select the first (leftmost) option. Next you want to set Xlist to L1. Do this by scrolling down to Xlist and pressing L 1 (2nd and the 1 key). In the same manner, set Ylist to L2. Lastly, select the leftmost Mark. It should look like the screen below.

```
Plot1  Plot2  Plot3
On Off
Type:
Xlist:L1
Ylist:L2
Mark: □  +  .
```

Press Y= to return to the function definition screen. On this screen you should see Plot1 highlighted. Leave it highlighted or highlight it if for some reason it is not already highlighted. At this time, clear out any functions you have entered here.

Before actually graphing the data, we should stop and think about a good window to view it in. Press WINDOW to view the current x-value and y-value ranges. If we just graph it in the standard window ($-10 \leq x \leq 10; -10 \leq y \leq 10$) we won't be able to see any of the points, so we need to pick a better window. The optimal window will change from problem to problem depending on the data set. For our example, our *x*-values correspond to club-head speed. Those values go from 99 to 105, so we need to set the *x* window so that we can see them. Our *y*-values range from 257 to 277, so you need to adjust the window accordingly. Below is the window that I used.

```
WINDOW
 Xmin=95
 Xmax=110
 Xscl=1
 Ymin=250
 Ymax=280
 Yscl=1
 Xres=1
```

Finally, press GRAPH and you should see a picture of your scatter plot.
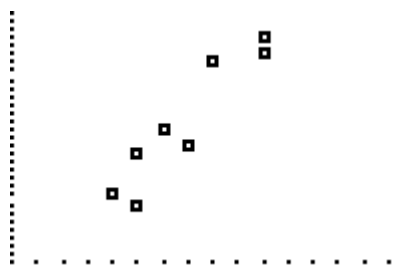
To Calculate a Regression Line:

Press STAT and arrow right to the CALC menu. There are a lot of options in this menu for different types of regression. Arrow to #4 LinReg (ax+b) and hit ENTER.

```
EDIT CALC TESTS
1:1-Var Stats
2:2-Var Stats
3:Med-Med
4:LinReg(ax+b)
5:QuadReg
6:CubicReg
7↓QuartReg
```

LinReg(ax+b) will now show up on your home screen. BEFORE you hit enter, you need to tell the calculator what lists it is using and where to store the regression equation to.

Since our data is in list1 and list2, press L1 (2nd 1), comma (the button above the 7), L2 (2nd 2).

To send your equation to Y1, so we can see it on our scatter plot, following L2 type, comma (the button above the 7), Y1 (VARS, → Y-VARS, #1 FUNCTION, #1 Y1). At this point, your screen should look like the one below.

```
LinReg(ax+b) L1,
L2,Y1
```

Press ENTER, and magically, your regression equation will appear on your screen. If everything has gone well to this point, you should see the same screen that I have below. If your screen does not have the r and r^2 values, ask me how to make them appear.

```
LinReg
 y=ax+b
 a=3.166101695
 b=-55.79661017
 r²=.8811498758
 r=.9386958377
```

Keep in mind that a is the slope (what we have called m) and b is the y-intercept, which thankfully, we have also called b. Thus our regression equation is $y = 3.166x - 55.797$. The correlation coefficient is $r = .94$.