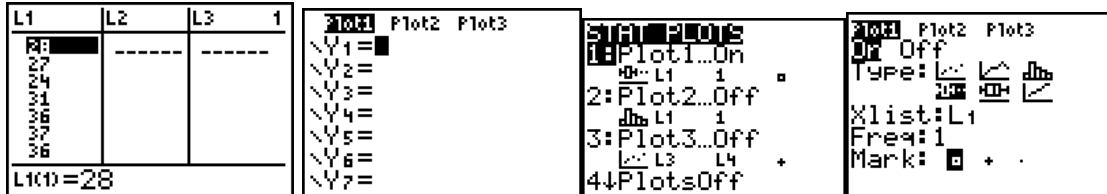


Getting your TI-83 to do your Statistics III

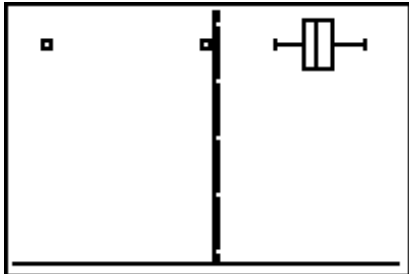
Muhammad Zafrullah

5. Box plots and normality testing

Turn your calculator on and get to the Edit screen. Now let us bring the data that we started with in L1. If you did not stash it away as I suggested then go back to the first tutorial and punch it in. Check to see if the [Y=.] screen is clear (press [Y=.] and see, and if necessary clear the screen you know how.) Now get to the STAT PLOT screen ([2nd], [Y=.]). Turn Plot 1 on. Your important screens should look like the following:

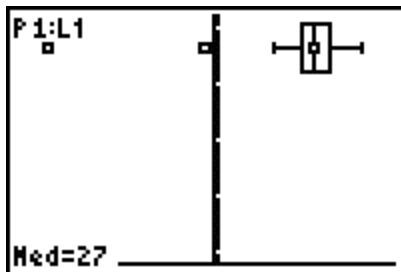


These are your **Edit**, “Y=.”, “STAT PLOT” and **Plot 1** screens. You have turned the **Plot 1** on, taken the cursor to Type: and you have taken the cursor to the fourth picture by pressing the right arrow key and you have pressed ENTER to fix. This fourth picture by the way looks like a box plot with two dots on its side. (This is a box plot with outliers.) Finally, my screen had L1 in front of the Xlist. If yours had something else (L2 or L3 etc) take the cursor to the Xlist and when its is blinking on top of the line number punch in L1 (you know how). Now with this scenario we are set to make a box plot by pressing ZOOM and then punching [9]. My calculator shows the following picture:



My box plot shows two “low” outliers, quite understandable as I am working with the same data that I started with.

Of course there is no point in making such a nice picture from some data if it does not tell us some things about the data. To get some info from this picture press the TRACE key. You see the following picture with the “tracer” blinking at the median:



At the bottom of the screen you can see Med = 27 that tells you that 27 is the median of the data.

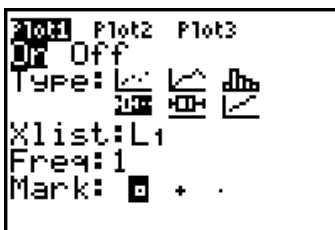
Press the left arrow once you would see the tracers blinking on Q1 and the bottom of the screen telling you that Q1 = 24.

Press the left arrow again the tracer would be blinking at $X=16$ (this is the minimum if you cast out the outliers.).

Press the left arrow again you get to the other outlier -44 , that happens to be the actual minimum of the data. Pressing the right arrow a sufficient number of times you would get to see the Q_3 and the Max of the data.

The idea behind using the calculator to make a box plot with outliers is that it indicates the outliers without us making the calculation. (I suggest that you make a box plot, using this set up, of data that you suspect has high outliers.)

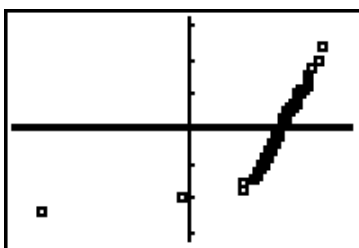
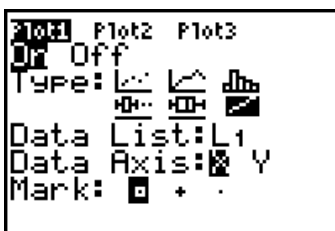
Now the next picture in front of types is that of a box plot without outliers. This is something that you can do by hand as soon as you have found the five number summary from 1-Variable Statistics. So, I will skip it, and move onto normality testing. For this let us get back to the Plot 1 screen with your cursor blinking on one of the pictures in front of "Type:". By now you should know how that could be done. The screen I want you to



get to is the following with the cursor blinking on the scatter plot picture:

Now, press the right arrow key five times so that the blinking cursor is on the last picture in front of "Type:." Press ENTER to fix. The screen should now look like:

A lot of books and software like to put data on X-axis but your book puts it on the Y-axis. An approximately normally distributed data would produce a plot that is approximately a straight line in both cases though the orientation would change slightly. We would first do it by taking the data axis to be the X-axis and then we would do it by taking the Y-axis as the data axis. Before we do that let me tell you about the "Mark" It gives you three choices of the point markers. We will use the square brick for now and will change it for



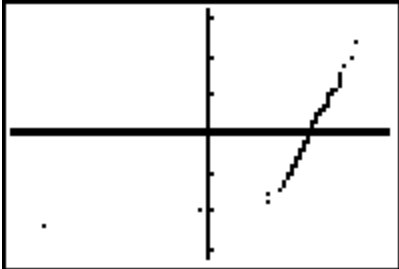
the next. Now to draw the normality plot do ZOOM, [9]:

You see that apart from the pesky outliers the remaining data gives the impression of a straight line, but the markers are kind of too big. So, who knows they are hiding

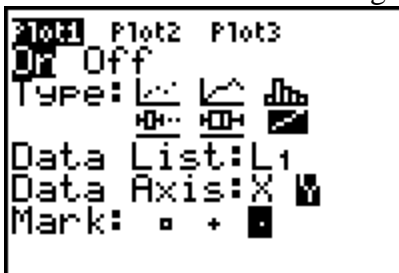


something. Let us go change the marker. (Get to the Plot 1 screen, take the blinking cursor down to “Mark:” and move it to the right twice, it would be blinking on the almost invisible dot and press ENTER.):

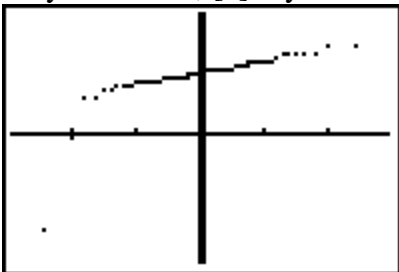
Now do the ZOOM, Stat (ZOOM, [9]) to see.



Yeah right, but it still looks like a straight line except for the two outliers. So we decide that the distribution of the data is almost normal provided we choose to ignore the outliers. Good. But this picture does not look like the one in your book right? That can be easily cured. Go back to the Plot 1 screen, take the blinking cursor down to “Data Axis:” and move the cursor to the right to Y and hit ENTER. The Plot 1 screen should look like:

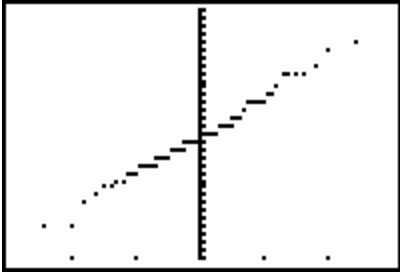


As you ZOOM, [9] it you would get:



So, it is the same story told slightly differently. The normality plot is almost a straight line except for the two outliers.

You have already seen how to delete the outliers. Once you do that and ZOOM, [9] you would see:



This indeed gives you a clearer picture.