Working with Two-Variable Data on the TI-83(82)

This paper will discuss using the TI-83 to display and analyze data. First we will look at the mechanics of using the calculator to get a plot. Then we will discuss some methods of fitting a curve to the data and measuring the quality of the fit.

Editing Data

To edit data use the STAT key. Then select <EDIT> from the menu. There are six lists L₁, L₂, … L₆ that can be used to store data. Use the cursor keys to move from list to list and up and down in a list.

Erasing Data

In the first picture on the right there is data in L₁ and L₂.

To erase this data, move the cursor over the name of the list at the top of the screen (see first picture).

Then press CLEAR ENTER.

Do the same for each list. The result is the second picture.
Entering New Data

To enter data, move the cursor to the place in the list you want the value, type the value and press \[\text{ENTER}\]. Note that the value is not put in the list until after the \[\text{ENTER}\] key is pressed. You can change values by typing over them. To delete a value use the \[\text{DEL}\] key. To insert a value use \[\text{2nd}\ \text{INS}\] to get into the insert mode.

In the example to the right \(L_1\) is the year and \(L_2\) is the VCC enrollment. (0 means 1970, 5 is 1975, etc.) It is always a good idea to restate year data using smaller numbers as we did in this example.
Graphing Data

The TI-83 has several types of plots that can be made from data. In general the plot type must be selected and then the viewing window set.

Selecting the Plot Type

To set the plot type press \[2^{nd}\] [STAT PLOT] and you see the top picture menu on the right. The calculator can do three stat plots. This screen shows the current settings and allows you to select the one you want to set. Choose Plot 1 and you see the second screen.

The next screen shows the options that can be set for a plot. To choose an option move the cursor over it and press \[\text{ENTER}\]. To make a scatterplot using \(L_1\) as \(x\) and \(L_2\) as \(y\) set the options as shown. If \(L_1\) and \(L_2\) are not on your screen, \(L_1\) can be found on top of the 1 key, \(L_2\) on top of the 2 key and so on.

Set the Viewing Window and \[\text{GRAPH}\]

The viewing window is the same as used in function graphing. The window shown here is used for the enrollment data given on the previous page.

The plot of the data is shown. If you have unexplained lines on the screen, make sure that there are no functions in the \(Y=\) list.

Note: Use \[2^{nd}\] [STAT PLOTS] <4 PlotsOff> to turn off all statistical plots.
The Regression Command

Before finding the regression equation you must go to the catalog and turn the “Diagnostics On”. You only have to do this once and then never again. This will you to see the value of the correlation coefficient, r. The catalog is on top of the 0 button. Scroll down using the arrow buttons until you see DiagnosticOn. Make sure the arrow is next to DiagnosticOn, then press enter, and enter again. It should just say Done. Again, this is a one time only process.

The regression line can be calculated on the TI-83 under STAT [Calc] menu. Next, you specify which lists the x and y data are in. L1 can be found on top of the 1 key, L2 on top of the 2 key and so on. See figures 9, 10, 11 below.

To graph the regression line we can manually enter the equation into Y1 or add one more argument to the linear regression command. Start the same as before: STAT [Calc] menu, and then L1, L2. Next enter a comma and Y1, found under VARS [Y-Vars] [Function]. This will automatically store the regression equation in Y1.

Notice that there are other regression types built into the TI-83.

- **QuadReg** fits a quadratic function \( f(x) = ax^2 + bx + c \)
- **CubicReg** fits a cubic function \( f(x) = ax^3 + bx^2 + cx + d \)
- **QuartReg** fits a quartic function \( f(x) = ax^4 + bx^3 + cx^2 + dx + e \)
- **LnReg** fits a logarithmic function \( f(x) = a + b\ln(x) \)
- **ExpReg** fits a exponential function \( f(x) = a(b^x) \)
- **PwrReg** fits a power function \( f(x) = ax^b \)