Graphing Calculator Basics

Introduction

This document is designed to help students and teachers who are not familiar with the TI-83/84 graphing calculator perform some of the more fundamental functions that might be useful in a high school introductory algebra or science course:

- Graphing functions
- Creating lists and scatter plots
- Performing data regressions

Please remember that the steps provided are the basics. Many of the topics discussed can be greatly enhanced with a little more information, much of which can be found in the calculator's manual or TI's education website – http://education.ti.com. Feel free to email any questions to me as well at kevind@wcs.edu. Any suggestions to make this more helpful to students or teachers are also greatly appreciated.

Basic Troubleshooting

The real trick to learning the graphing calculator is by playing around with it. As far as I know, it is impossible to tear up a calculator by doing so. However, as with any piece of technology, things can get quirky. If this happens, you can try one of the following:

- Reset the default settings of the calculator:
  - **[2nd], [+], [7], [2],** and **[2]**
- Reset the memory (all programs will be lost):
  - **[2nd], [+], [7], [>], [>], [1],** and **[2]**

Every now and then, a calculator will completely lock up, not turn on at all, or start acting very bizarre even after trying to reset the memory. Try the following, in order:

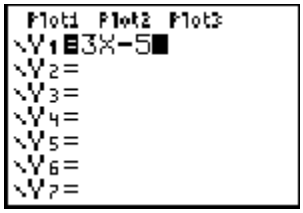
- Replace the 1 lithium and 4 AAA batteries
- Restore the factory settings:
  - Remove all five batteries for at least 10 minutes, then replace.
- Reset the calculator completely (you will need to reinstall the operating system, see below):
  - Remove 1 AAA battery.
  - Press and hold [DEL].
  - While holding [DEL], replace the battery and press [ON].
- Contact TI

To update or reinstall the calculator's operating system, you will need a fresh set of AAA batteries (installation can take a while and you don't want your batteries dying during the process) and a connection to a computer through TI-Connect. To locate the newest OS and installation instructions, visit the TI website.

Graphing Functions

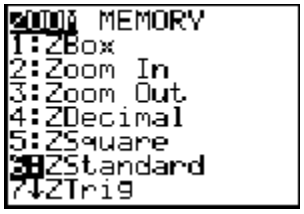
Suppose you want to graph the linear function $y = 3x - 5$:

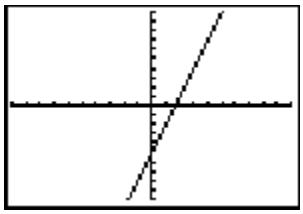
1. Press **[Y=]**. Clear any entries that might be there, and deactivate any of the plots if they are highlighted at the top by moving the cursor and pressing **[ENTER]**.



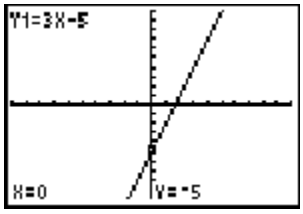
2. Move the cursor to **Y1**. Enter the expression **3X–5**.

3. To get the standard window, press **[ZOOM]** and select **6:ZStandard**. You should see the linear function in the window. If you prefer a different viewing window, you can press **[WINDOW]** and alter the settings.

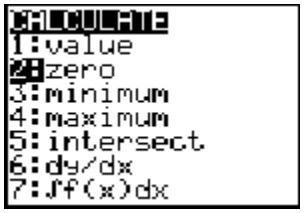


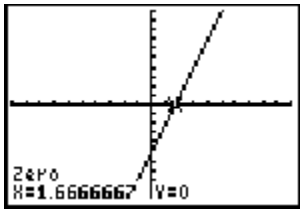


4. Press **[TRACE]** to view points along the line. You can either move the cursor using the arrow keys, or you can type in a specific x value. For example, you can press **[TRACE]**, **[0]**, and **[ENTER]** to find the y-intercept.



5. Press **[2nd]** and **[TRACE]** for the **CALC** menu. To find the x-intercept, choose **2:zero**. Move the cursor to the *left* of the x-intercept and press **[ENTER]**. Then move the cursor to the *right* of the x-intercept and press **[ENTER]**. Press **[ENTER]** once more and the x-intercept is displayed at the bottom.





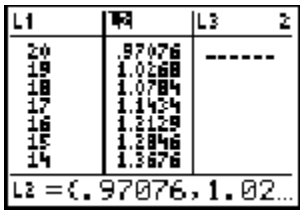
Creating Lists and Scatter Plots

1. Reset the lists by pressing **[STAT]**, choosing **5:SetUpEditor**, and pressing **[ENTER]**.

2. To get to the List Editor, press **[STAT]** and choose **1:Edit…**.

3. If there are numbers in the first two lists, move the cursor to the very top and press **[CLEAR]** and press down.

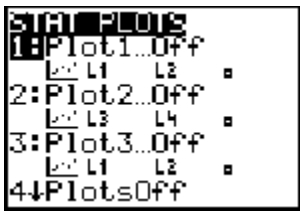
4. Enter the domain numbers into the first list, $\mathbf{L_1}$, and the range numbers into the second list, $\mathbf{L_2}$.

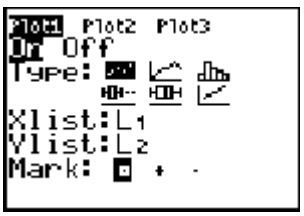


5. When finished, press **[2nd]** and **[MODE]** to **QUIT**.

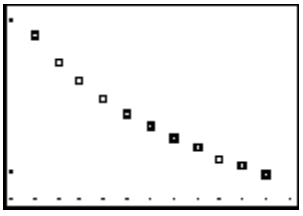
6. Press **[Y=]** and clear any entries that might be entered as graphs. Then press **[2nd]** and **[Y=]** to go to the Stat Plot window. Select **1:Plot1**.

7. Select On, **Type:Scatter Plot** (the first icon), **Xlist: $\mathbf{L_1}$**, **Ylist: $\mathbf{L_2}$**. You need to type **[2nd]** and **[1]** for $\mathbf{L_1}$ and **[2nd]** and **[2]** for $\mathbf{L_2}$.





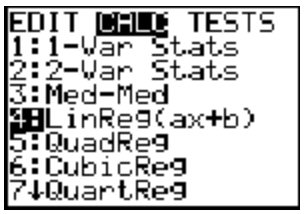
8. Press **[ZOOM]** and select **9:ZoomStat**. You should see the scatter plot.



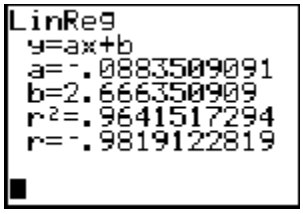
Performing a Linear Regression

1. If you wish to calculate the correlation coefficient, you must press **[2nd]** and **[0]** for the **CATALOG**. Find and **select DiagnosticOn**, then press **[ENTER]**.

2. Enter the data into the List Editor as described above. Make sure you enter the domain values into $\mathbf{L_1}$ and the range values into $\mathbf{L_2}$.

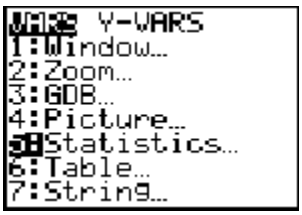


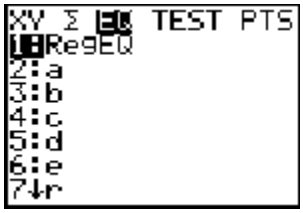
3. From the Home screen, press **[STAT]** and go to the **CALC** menu. Select **4:LinReg(ax+b)**.

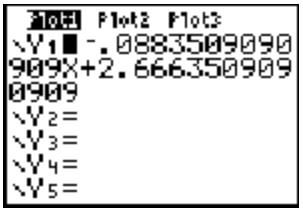


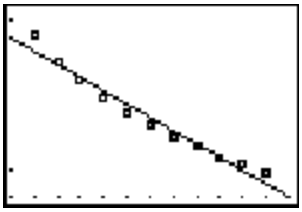
4. Press **[ENTER]** and the regression is calculated. The **a** value represents the slope and the **b** value represents the *y*-intercept. ***r*** is the correlation coefficient.

5. You can graph the scatter plot of data and its regression simultaneously. Start by performing the regression, turn on the scatter plot (see above), and then enter **RegEQ** into **Y1**. To enter the **RegEQ** command, press **[VARS]**, select **5:Statistics…**, go to the **EQ** menu, and select **1:RegEQ**.









Note: Notice how in this example the linear regression's equation doesn't model the scatter plot very well. You might consider trying a different type of equation, like quadratic (**5:QuadReg**) or power (**A:PwrReg**), to find a better fit.