

## Making Graphs with a TI-82 or TI-83

1. First clear out some space in the calculator's data table:
  - a. Turn the calculator ON. Hit the STAT key, then ENTER. A data table appears on the screen. There are six columns, labelled L1, L2, ... L6. (The letter "L" stands for "List".)
  - b. Notice that you can move the cursor around in the data table by using the four arrow keys.
  - c. To erase old data from a column, move the cursor to the column header, such as L1. Then hit CLEAR, and ENTER. If necessary, do that for each of the six columns.
2. Let's put some data into the table:
  - a. To avoid confusion later, it's a good idea to write the full column headings on paper first. For example, you might write something like this:  
L1 = Force (in newtons) and L2 = Acceleration (in m/s<sup>2</sup>)  
(Notice that the controlled variable goes in the L1 column, and the dependent variable goes in L2.)
  - b. Move the cursor to the space just below "L1".
  - c. Type the first force value and hit ENTER.
  - d. Enter the rest of the forces in similar fashion.
  - e. Put the accelerations into the second column in similar fashion, so that the data table looks like the one at the right, but with different numbers and more rows filled in.

	L1	L2
	2.5	0.71
	5.0	1.43
	7.5	2.09
	10.0	2.45
3. Let's see if there is any pattern in your set of data. The TI-82 can make graphs of three sets of data simultaneously, called PLOT 1, PLOT 2, and PLOT 3. For now we just want one graph on the screen, so we'll switch all three off and then switch on PLOT 1 by following these steps:
  - a. Hit the blue 2ND button, and then the Y= button right above it to make the "STATPLOT" menu appear.
  - b. Enter the numeral 4 to switch all plots off. Then hit ENTER. If you see a bunch of stuff on the screen then use the CLEAR button to make it go away.
  - c. Repeat the steps in 3a to bring back the "statplot" menu. Choice number 1 is already highlighted so you can just hit ENTER to get into the Plot 1 menu. Hit ENTER again to turn plot 1 on.
  - d. Use the down-arrow key to move the cursor to the next line, where you can choose the type of graph that you want. The first choice just gives you data points, the second gives you data points with a zig-zag line connecting them. Use the arrow key to put the cursor on the first choice and hit ENTER.
  - e. Move the cursor down to the "X-list" line. Since we want a graph of acceleration vs force, we want the "x-axis" of our graph to be "L1", as in 2a. Move the cursor to that choice and hit ENTER.
  - f. Move the cursor down to the "Y-list" line and select "L2". Hit ENTER again.
4. The TI-82 can also be used to display graphs of equations. To see if the calculator now contains any equations waiting to be graphed, hit the "Y=" key. If you see any equations, DELETE them.
5. Now you are ready to see a graph of the data which we left in the data table:

If you hit the GRAPH key, you will see a graph of your data with a poor choice of scale.

  - a. To choose scales so that the graph is not squashed and doesn't go beyond the edges of the screen, hit the ZOOM key in the top row, select choice 9 for automatic scaling, and then hit ENTER.
  - b. Unfortunately, that cuts off the origin. To remedy that, hit WINDOW.
  - c. Move down to XMIN, hit 0, and then ENTER. Do the same for YMIN. Then hit GRAPH.
6. Guess an equation that might fit the data and enter it into the Y= screen. (For example, try  $Y = X$ .) Then hit GRAPH to see how well it fits. You will need to adjust the proportionality constant in your equation to make the line go close to the data points. (For example, try  $Y = 0.3 * X$ , and notice what that does to the slope of the line.) Keep trying until you have two equations that give two lines from the origin with slightly different slopes, both fitting the data as well as you could hope for. Then you can write your conclusion with the proportionality constant expressed in range form.