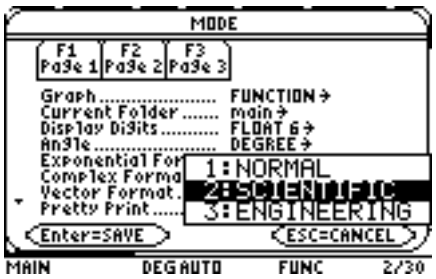
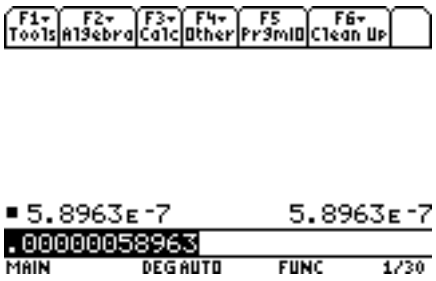
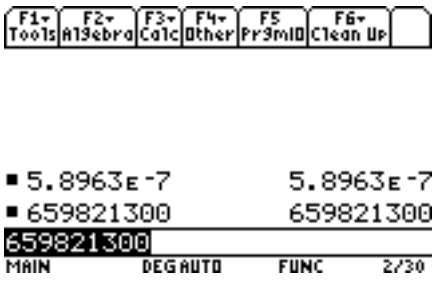
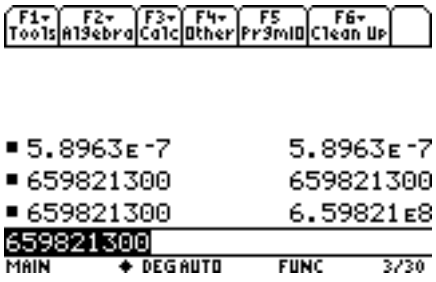
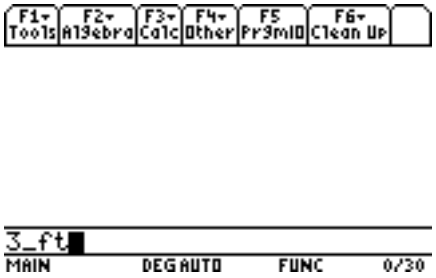
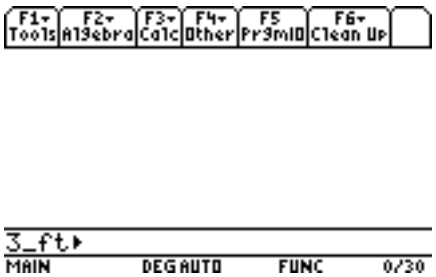
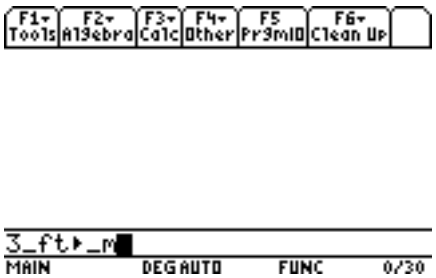
SI Physics

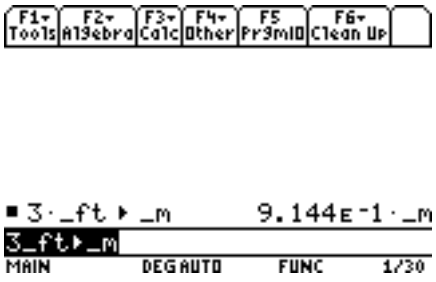
Tutorial for the TI-89 Titanium Calculator

Using Scientific Notation on a TI-89 Titanium calculator

From **Home**, press the **Mode** button, then scroll down to **Exponential Format**. Select **Scientific**. Press **Enter** to save your selection.	
If you type in a number less than one and then press **Enter**, the number will now be automatically converted to scientific notation. Note that the format your calculator uses to display scientific notation is really not the correct format. The "E" stands for "x10^", so using the example to the right, you would *write* your answer as follows: 5.8963×10^{-7}	
If you type in a number greater than 1, the calculator does not automatically display it in scientific notation. How, then, do you get the calculator to display the number in scientific notation?	
Easy. Simply press the green diamond button and then **Enter** again and the number will be converted. Again, when you write the number down, use the correct format rather than the calculator's format, ie. 6.59821×10^{8}. Also, if this is a final answer, be sure you express your answer to the correct number of significant digits.	

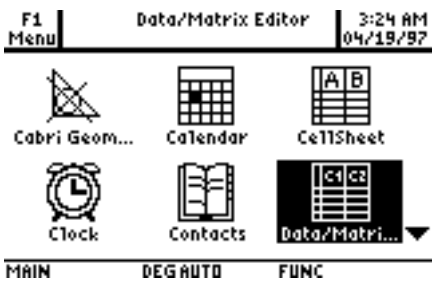
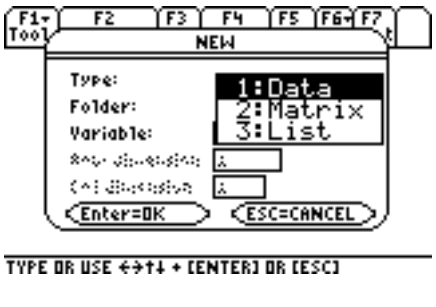
Converting units using the TI-89 Titanium calculator

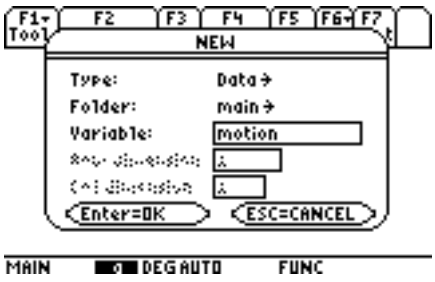
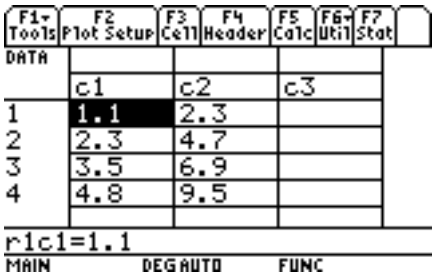
Type in the number you wish to convert, then press the **blue 2nd** key followed by the blue **Units** key (the #**3** on your keypad). A list will pop up. Scroll down to select the category for your unit, then use the right arrow key and the down/up keys to make your selection. Here we wish to convert 3 ft to meters. This is a unit of length, so the **Length** category has been selected, and **_ft** has been chosen for our original unit. (Note, you may also type in the unit if you know the abbreviation, as shown below).	
Once the unit has been chosen, press **Enter** and the number and unit will be displayed.	
To convert the units, press the **2nd** key again and then the **convert** key (the **blue triangle** pointing to the right, above the **Mode** key). This tells the calculator that you want to convert the original units to something else.	
Next, indicate the unit you want your original value to be converted to. You may do this either by using the same method described above to select the unit from a list, or you may type the unit in directly by pressing the **green diamond** key followed by the **underscore** button (**Mode**). In this case, we have chosen to type in the unit for meters.	

Once the desired units are selected, press **Enter** to see the conversion. Here we find that 3 ft equals 0.9144 meters.	

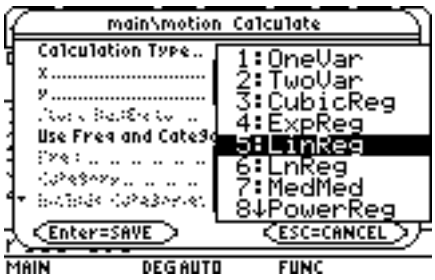
How to construct a data table and create a graph on a TI-89 Titanium calculator

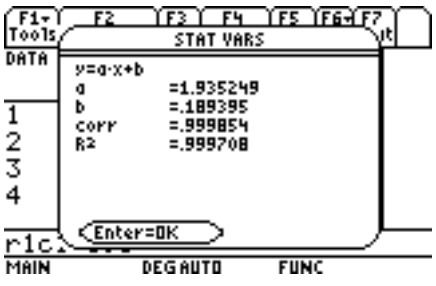
Step1: Construct a data table.

Press the **Apps** button and select the **Data/Matrix Editor.**	
Create a new data table.	
Select **Data** for the type of table you will be creating.	

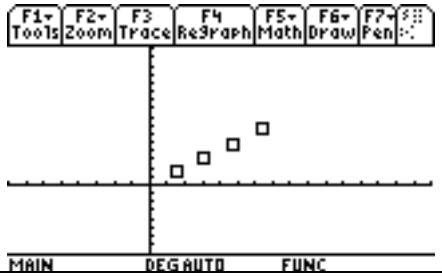
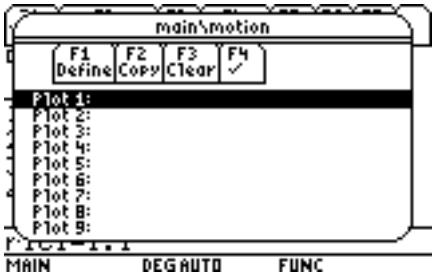
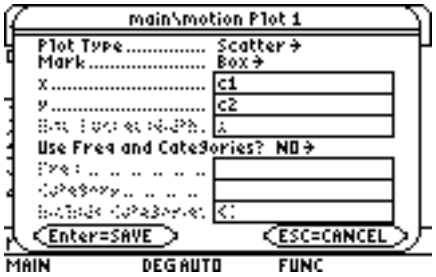
For **Variable**, give your data table a unique name. Here, for example, the name of the data table will be "motion". Then press **Enter** to go to the empty data table.	
The data table will appear empty. Enter your data, usually with the independent variable in column 1 (**c1**) and the dependent variable in column 2 (**c2**).	

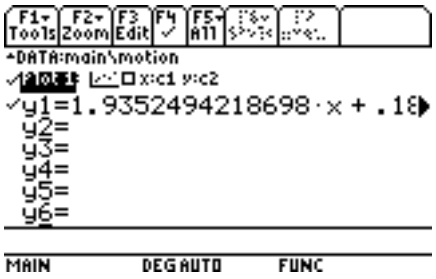
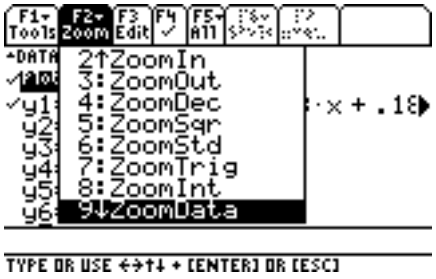
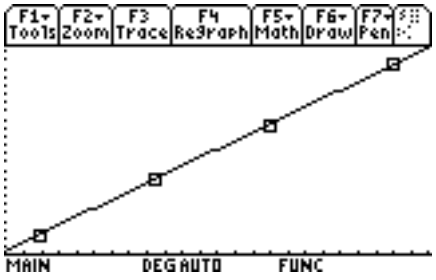
Step 2: Perform a statistical analysis of the data

In our case, we would like to perform a linear regression to see how well the data fit a line. Begin by pressing the **F5** key. For **Calculation Type**, select **LinReg**. (Obviously, if you wanted to perform a power regression, select **PowerReg**, etc.). Press **Enter** to save your selection.	
Identify which column has the x and which has the y variable. Then instruct the calculator to store the regression equation (**RegEQ**). Here, **y1(x)** is the location where we have chosen to store the equation.	

Press **Enter** to save. A window with the equation information will appear. In this case, the general equation for a line is given in the upper left corner, and the values for the slope (a) and y-intercept (b) are provided. In addition, the correlation coefficient is given, along with the R^2 value (a better descriptor of the goodness of fit).	

Step 3: Graph the data and a best-fit line:

To view a graph of your data, press the **green diamond** and **F3** buttons from the **Data/Matrix Editor** window.	
From the graph we have just created, it appears that the x and y variables share a linear relationship. Therefore, we should find the equation of a best-fit line, evaluate the goodness of fit between the line and the data, and create a graph of the line and data together. To do this, return to the window with your data table (the **Data/Matrix Editor**), press **F2** for **Plot Setup**. Select **Plot 1**.	
Press **F1** to define how your graph will be constructed. You will want to select **Scatter** for they type of graph (this is usually the default) and select the type of marks you want to use to show the data (here, **Box** is selected). Then define which column will be the x and which will be the y variable. Press **Enter** to save these setting.	

A screen like this will appear, with a shorthand description of your graphing selections. Press **Enter** to take you back to the **Data/Matrix Editor**.	
Select the **Y=** (green diamond button, then **F1**). The name of your data table will show on the top line, then below that will be a description of your graph selections, and beneath that will be the statistical data you stored in **y1(x)**.	
To create a graph, select **F2**, then option **9** (**ZoomData**) to create a graph that zooms in on your data (rather than the whole line in the equation). Press **Enter** (or **9**).	
A graph will be created that shows your data points as they appear in relation to the best-fit line.	
If you want to label the axes, select **F7** and then **Text** (**7**). Use the arrow keys to move around and then type in your text where you want it.