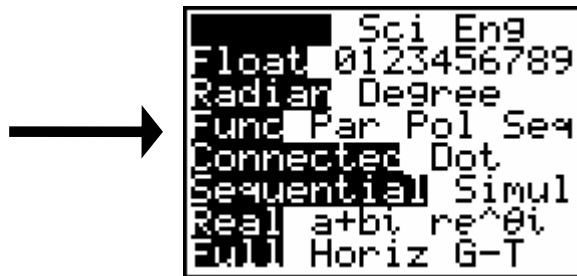


TI-83 Graphing Calculator
Graphing Tutorial
By
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Polk Community College

This tutorial assumes that you have some familiarity with entering expressions on the TI-83 and that you understand the order of operations.

MODE - Before beginning, you should make sure that the calculator's MODE is properly set. Press the MODE key.

Set the "Func Par Pol Seq" mode to Func (function) mode. Set the "Connected Dot" mode to Connected.



ENTERING FUNCTIONS - In order to graph a function you will first

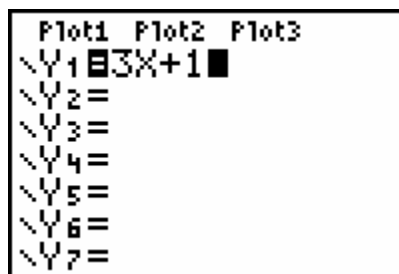
enter the function in the "Y=" screen. Press the Y= key.

You may have some functions entered in Y1, Y2, etc. To delete a function, use the down arrow key to move the cursor to the line

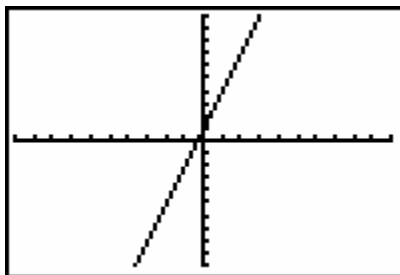
containing the function and press the CLEAR key. Repeat this

process to delete all functions in the Y= screen. Now move the cursor to the first line and enter Y1. We will enter Y1=3X+1.

The X is entered using the X,T,θ,n key. Your screen should appear as the screen below.

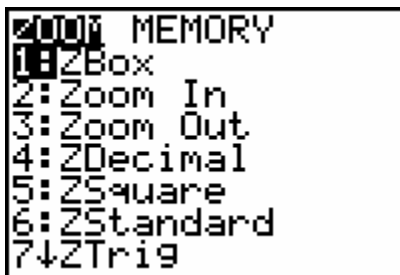


Now press the **GRAPH** key to display the graph.



Your graph may appear as the one above. If it does not, the use of the "ZOOM" feature or other features will change its appearance so that our graphs are the same.

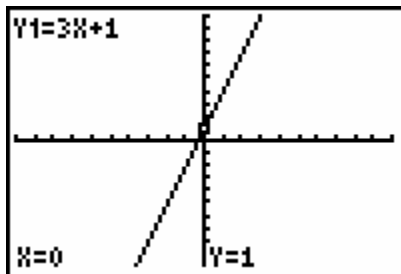
ZOOM STANDARD - The graph window may be changed using either the WINDOW settings or the various ZOOMs. Many graphs can be properly displayed using the ZOOM STANDARD. Press **ZOOM** .



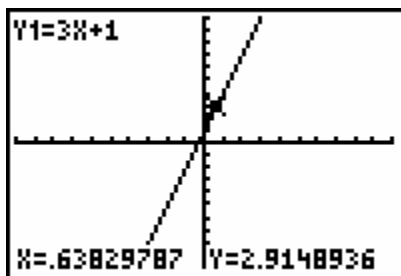
Your calculator display should appear as the screen above. ZOOM STANDARD is on the 6th line and may be activated by moving the cursor down to "6:ZStandard" with the arrow keys then pressing ENTER or by simply pressing the 6 key.

Press **6** and your graph should appear as above.

TRACE - Press the **TRACE** key. Your screen should appear as the screen below. Notice that the function $Y1=3X+1$ appears at the upper left of the screen, that a blinking dot (cursor) appears at the point $(0,1)$ and that $X=0$ $Y=1$ appears at the bottom of the screen.



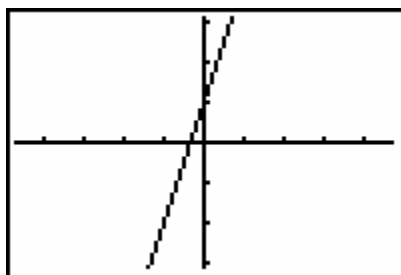
Now press the right arrow 3 times. You should notice that the cursor moves each time you press the right arrow and that the X and Y values change at the bottom of the screen. The screen below indicates that if $Y1=3X+1$ and, if $X=.63829787$, then $Y=2.9148936$.



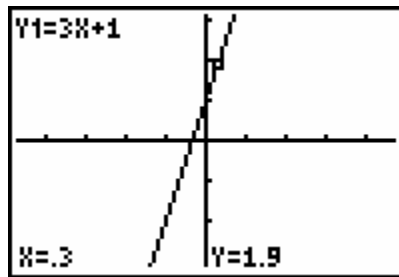
Try moving the cursor right and left while observing the changes in X and Y.

ZOOM DECIMAL - You have noticed that the values for X and Y in the example above are not "nice" numbers. We can ensure that our X values are more friendly by using ZOOM DECIMAL.

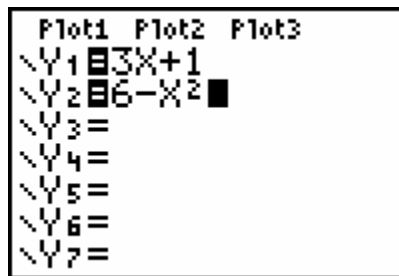
Press **ZOOM** **4**. Your screen should change as below.



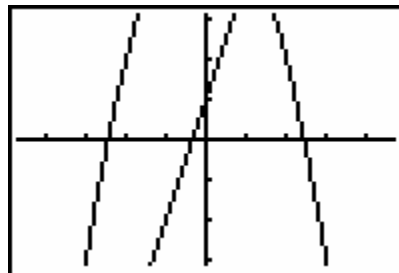
Now press **TRACE**, move the cursor 3 times with the right arrow and notice that the values for X and Y are given in tenths. You may find this ZOOM more convenient.



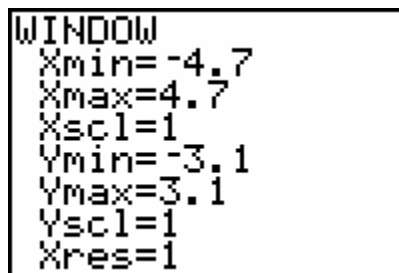
WINDOW - Press the **Y=** key and enter the function $6-X^2$ for Y2. Your screen should appear as the one below.



Now press the **GRAPH** key and your screen should appear as the one below. It appears that our graph is incomplete, and that is indeed the case.



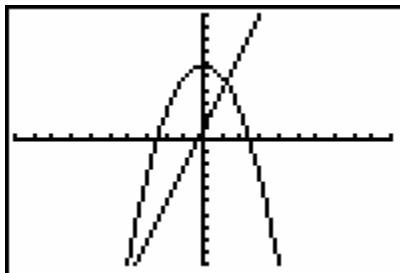
We must change our WINDOW. Press the **WINDOW** key. The screen below indicates that the minimum value of X on the screen is -4.7, the maximum value of X is 4.7, the X-scale is 1 (tick marks on the X-axis are 1 unit apart), the minimum value of Y is -3.1, the maximum value of Y is 3.1, and the Y-scale is 1.



Change the Xmin to -10, the Xmax to 10, the Ymin to -10 and the Ymax to 10 by using the arrow keys to position your cursor on the lines for Xmin, etc., typing the numbers and then moving the cursor to the next value to be changed. Make sure that you use the negative sign and not the subtraction sign. Your screen should appear as the one below.

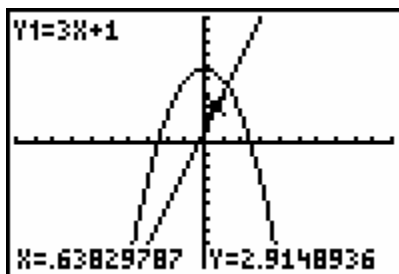
```
WINDOW
Xmin=-10
Xmax=10
Xscl=1
Ymin=-10
Ymax=10
Yscl=1
Xres=1
```

Now press **GRAPH** and you should get the complete graph for the two functions as shown below.

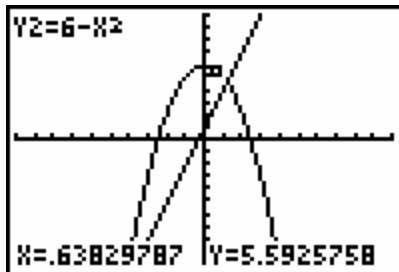


TRACE WITH MORE THAN ONE FUNCTION - Press the **TRACE** key.

You should have a screen which indicates that for, $Y1=3X+1$, when $X=0$ then $Y=1$. Press the right arrow 3 times and observe that the cursor moves along the graph of $Y1$ to the position indicated by the screen below.

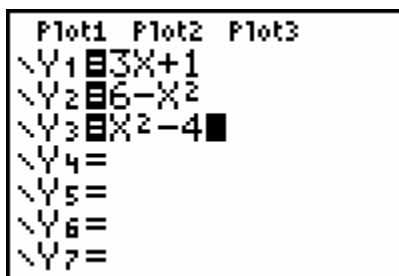


To TRACE along the function in Y2, press the down arrow (or up arrow) and you should see a screen indicating that you are now tracing along the graph of Y2. If you use the right or left arrow key, you will see the cursor move along the graph of Y2.

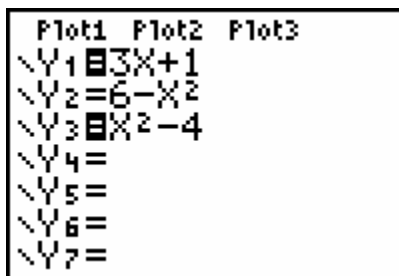


SELECTING GRAPHS - When you have several functions in the Y= screen, you may not wish to work with all of them at the present time but you do not wish to delete them. The calculator has the ability to SELECT some of the graphs to work with.

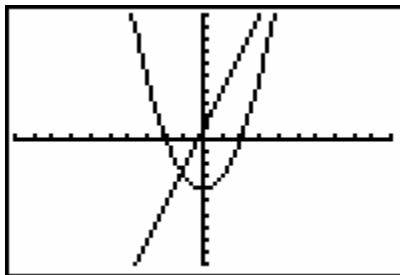
Enter the function X^2-4 in Y3. Assume that we wish to work with Y1 and Y3 but not Y2. We must DESELECT Y2.



Use your arrow keys to move the blinking cursor over the = sign to the right of Y2. Now press and you will notice that the = sign for Y2 now appears without a dark border. It has been deselected.

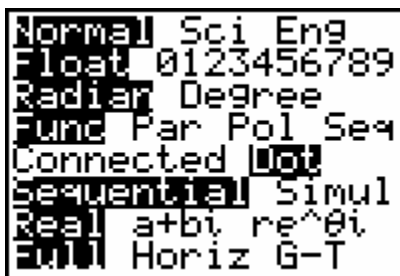


If you now graph the functions, you will observe that Y1 and Y3 are graphed, but Y2 is not graphed.

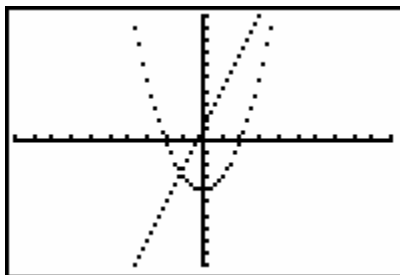


CONNECTED/DOT - Your calculator uses "connected" as the default setting for graphs. This means that it basically plots points and connects these points to produce a graph. There are occasions when we will not wish to connect the points and the "dot" mode must be used.

Press the key, move the cursor over "Dot" in the "Connected Dot" line and press .



If you now graph the functions, you should see that the graph is formed by a series of unconnected dots.

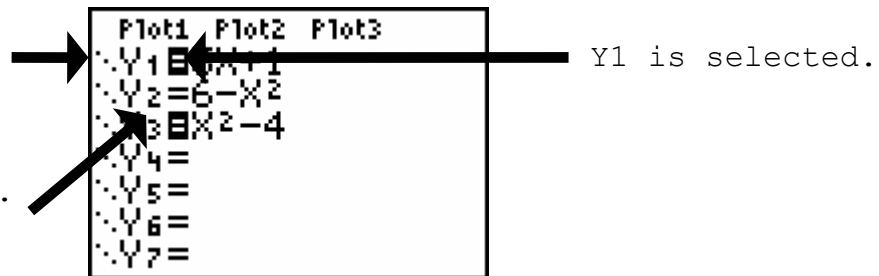


GRAPH STYLES - We have graphed in connected mode and in dot mode. The TI-83 has the ability to graph in other styles. We will investigate one other.

If you look at your Y= screen now, it should appear as the screen below. It indicates that:

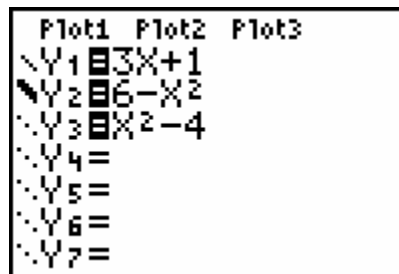
Each graph is in dot mode.

Y2 is deselected.
Y3 is selected.

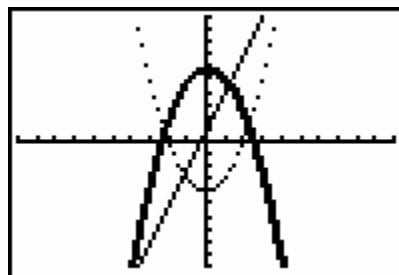


Move your cursor over the = sign for Y2 and press ENTER to select Y2 again. We will change the graph style for Y1 and Y2.

Move the cursor to the left of Y1 where you see the 3 dots. You will be pressing the ENTER key several times. Observe what happens to the 3 dots as you do. Press ENTER once. You should see the 3 dots change to a line. Use the down arrow to move the cursor to the left of Y2. Press ENTER twice. You should see the 3 dots change to a line then a heavy line.

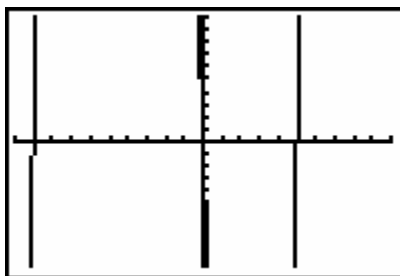


Finally, GRAPH the 3 functions. You should see Y1 graphed in the usual connected mode, Y2 graphed with a heavy line and Y3 graphed in dot mode.

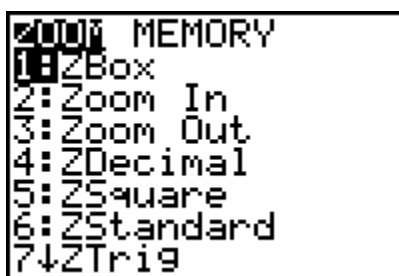


ZOOM FIT - You may occasionally have difficulty deciding what window to use with some function with which you are unfamiliar. The ZOOM FIT feature should allow you to get a complete graph within the window.

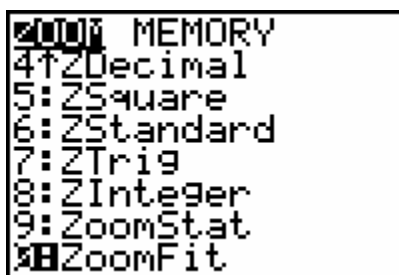
Set your MODE to Connected. Delete the 3 functions we have entered in the Y= screen and enter $Y1=X^3+4X^2-45X$. (Recall that the X^3 is entered as X^3 .) If you GRAPH now, you may suspect that the graph below is not complete, i.e. it does not show all the important features of the function. This is indeed the case.



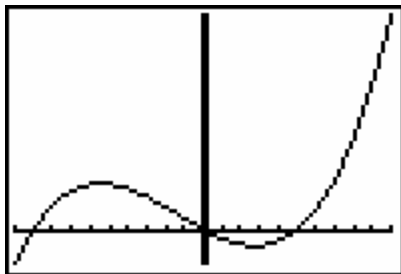
Press the ZOOM key. Notice the down arrow by the 7. This indicates that there are more options.



Press the down arrow 9 times.



Observe ZoomFit in the 0 position. Since your cursor is at this position, you can press ENTER to activate ZOOM FIT or you could have pressed the 0 key without using the DOWN ARROW. Press ENTER or 0 now.



The ZOOM functions automatically draw the graph with the modified window. After the ZOOM FIT, your screen should appear as the one below. You may now wish to check the WINDOW to see the settings.

QUIT - In general, you change between the various screens (GRAPH, MODE, etc.) by simply pressing the key for the desired screen. If you wish to return to the HOME screen, i.e. the primary screen where most basic operations are performed, press 2nd MODE.

This returns you to the HOME screen from any other screen.