TI-83/TI-83+/TI-84 Graphing Video Notes

These notes are provided so that students watching the TI-83/TI-84 Graphing Video will not have to take notes while watching the video, but can instead concentrate on using the calculator. The video was made with the TI-83; however, the TI-83 and the TI-84 are practically identical. All the material covered on this video, and in these notes, is the same for the TI-83 and the TI-84.

Entering functions

Press the **Y=** key, which is the far left key in the top row of the keyboard.
The variable **X** has a special key that can be accessed easily – next to the green ALPHA key. It looks like **X,T,θ,*n***. The other characters on the X key will be exhibited when the MODE is in a mode other than the Function mode.

Graphing functions

After a function has been entered at **Y=**, press the **GRAPH** key, located at the upper right of the keyboard.
The procedures to graph several unique functions are described below.

- **Rational functions** are entered with parentheses around the entire numerator and another set of parentheses around the entire denominator. For example, y = $\frac{x+3}{x-2}$ is entered as Y1 = (X+3) **/** (X-2).
- **Absolute value functions** are entered using the **abs**, found in **MATH** and then **NUM**. For example, y = |x+1| is entered as Y1 = abs(x+1).
- **Greatest integer functions** are entered using the **int**, found in **MATH** and then **NUM**. For example, y = [[x]] is entered as Y1 = int(x).
- **Piecewise functions** are entered in pieces, each piece being a separate function with its own restriction. For example,

  y = $\begin{cases} x+3, & x \le -1 \\ 4, & -1 < x \le 2 \end{cases}$ is entered as Y1 = (x+3)(x≤ -1) Y2 = (4)(x>-1)(x≤ 2).

  Find the $\le$ and $\ge$ symbols in the TEST menu, above the MATH key.

  Note that **dot MODE** should be used for piecewise functions.

Tracing functions

To see the coordinates of an ordered pair at a point on the graph, press **TRACE**, which is the key to the left of GRAPH. Use the ***left*** and ***right*** **arrow keys** to move the cursor to the *left* or *right* on the graph. See the coordinates at the bottom of the screen. The *up* and *down* arrows will not move the cursor up and down on a particular graph. The up and down arrows are used to toggle between the graphs of several different functions.

Clearing a function

Place the cursor directly to the right of the equal sign of the function in Y=. Press the **CLEAR** key.

Turning functions off and on

At **Y=**, position the cursor *on* the **equals sign**. Press **ENTER**. The function is now turned off and will not graph when the GRAPH key is pressed. To turn a function *on* again, repeat these steps. When the equal sign is in a black box, the function is on.

Dimensions of the graphing screen and using ZOOM

- The *dimensions* of the graphing screen can be changed *manually* by pressing **WINDOW**, the key to the right of Y=. Enter the desired values for the minimum and maximum values of x and y.
- The *dimensions* can be changed *automatically* by pressing **ZOOM**, the middle key at the top of the keyboard. Access one of the options. Some of the ZOOM options are explained below.
  - **ZStandard** automatically changes the dimensions to $-10 \le x \le 10$ and $-10 \le y \le 10$ with the space between the tick marks equal to 1. A quick check of the WINDOW will verify that this is so.

- **ZDecimal** automatically changes the dimensions to "nicer" X-values. A quick check of the WINDOW will show that the dimensions have changed. Pressing TRACE and moving left and right will exhibit the "nicer" x-values.
- **Zoom Out** moves out.
- **Zoom In** moves in closer.
- **ZBox** makes it possible to draw a box around a portion of the graph and zoom in to it. Follow these steps: Use TRACE to place the cursor at the point to be investigated. Access ZBox in the ZOOM menu. Use the arrow keys to move the cursor to a point that will form the upper left corner of a box that will surround the point of interest. When the cursor is set where you want it, press ENTER. Now use the arrow keys to move the cursor to a point that will form the lower right corner of your box. The box will form as the cursor is moved. When the box has the position you want, press ENTER.
- **ZTrig** automatically changes the graph window to fit trig functions nicely. In radian mode the new window will have x-axis increments of $\pi/2$ and will encompass $-2\pi<X<2\pi$. In degree mode the new window will have x-axis increments of 90° and will encompass $-360°<X<360°$. Y values range from -4 to +4 in both radian mode and degree mode.

Thick, thin, and dotted lines
Press the **Y=** key. Move the cursor to the *left* of Y1. Press **ENTER** while watching the symbol to the left of Y1. Press ENTER as many times as necessary. Stop with the desired choice. Press GRAPH to see the change in the graph.

Finding the intersection of two graphs
Graph the two functions, using Y= and GRAPH.
Access the **CALC** menu, above TRACE.
Pick **intersect** from the CALC menu.
Notice that **First curve?** is written at the bottom of the screen. **Move the cursor** close to the intersection point you are interested in, with the left and right arrows. Press ENTER.
Notice that **Second curve?** is now written at the bottom of the screen. Press ENTER again.
Now notice that **Guess?** is written at the bottom of the screen. Press ENTER.
The x and y-values of the **Intersection** are written at the bottom of the screen.

Finding x-intercepts
Graph a function. Access the **CALC** menu. Pick **zero**, which means x-intercept, from the CALC menu.
Left Bound? is written at the bottom of the screen. There are two choices to answer this left bound question: Either **move the cursor** to the left of the point in question, *or* **type a number** value that is to the left of (smaller than) the x-value at the point. Press ENTER.
Right Bound? is now written at the bottom of the screen. Again, there are two choices to answer this question: Either move the cursor to the right of the point in question, or type a number value that is to the right of (larger than) the x-value at the point. Press ENTER.
Guess? is now written at the bottom of the screen. Press ENTER.
Zero is written at the bottom of the screen with the ordered pair. Note the ordered pair. You might see the y-coordinate as something like 1E-13. This means 1×10^{-13}, or .0000000000001, which is essentially zero.

Finding the maximum of a parabola
Graph a parabola that opens down. Access the **CALC** menu. Pick **maximum** from the menu.
Left Bound? is written at the bottom of the screen. There are two choices to answer this question: Either **move the cursor** to the left of the maximum point, *or* **type a number** value that is smaller than the x-value at the maximum. Press ENTER.
Right Bound? is written at the bottom of the screen. There are two choices to answer this question: Either move the cursor to the right of the maximum point, or type a number value that is larger than the x-value at the maximum. Press ENTER.
Guess? is written at the bottom of the screen. Press ENTER.
Maximum is written at the bottom of the screen with the ordered pair.

Finding the linear regression equation, and plotting the data with the line

For example, consider the ordered pairs (1,2), (3,7), (-1,1).

- **Enter ordered pairs**:
  Press the STAT key and choose EDIT. Enter the *x* values of the ordered pairs into one list, such as L1. Enter the *y* values into a different list, such as L2.
- **Plot the ordered pairs**:
  Choose STATPLOT, above the Y= key. Turn on Plot1. Type: Choose the first option, which is a scatterplot. If the *x*-values and *y*-values were entered into L1 and L2, the Xlist and Ylist should now indicate that. If Xlist and Ylist changes need to be made, choose the appropriate *list* names from above the number keys, 1 through 6. To graph, press ZOOM and ZoomStat.
  The ordered pairs can be seen if you press TRACE, and use the left and right arrows.
- **Find the linear regression equation**:
  Press the STAT key and then choose CALC. Choose **LinReg(ax+b)**. Make the screen of the calculator look like this:
  LinReg(ax+b) L1, L2, Y1 Note: Y1 can be found with : VARS $\rightarrow$ Y-VARS $\rightarrow$ Function $\rightarrow$ Y1
- **Plot the data and the linear regression equation together**:
  Press the GRAPH key.

NOTE: It would be wise to turn off the Stat Plot now, to prevent a conflict when graphing other functions in the future. One method to turn off Plot1 is to press the Y= key and move the cursor up to Plot1. Press ENTER.

Libby Corriston, JCCC, 09/2011