Graphing Piecewise Functions on TI-83/84

Summary: You can graph piecewise functions on your TI-83/84 by using the TEST menu. To show the method, we'll graph the function

$$f(x)=\begin{cases} x^2+11, & x<0 \\ 11-4x, & 0\le x\le 2 \\ x^2-3x+5, & x>2 \end{cases}$$

which is read "f of x equals x^2+11 for x<0, 11–4x for x between 0 and 2 inclusive, and x^2-3x+5 for x>2." This particular function, as you'll see, doesn't have any gaps in it, but exactly the same technique works for piecewise functions that do have gaps.

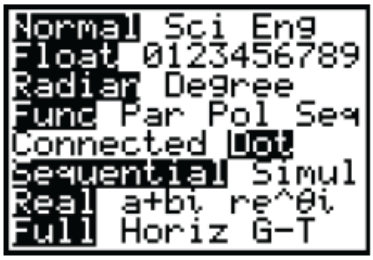
See also: Graphing Functions on TI-83/84

Set-up: Dot Mode

The TI-83/84 likes to connect dots with continuous lines or curves where it can. But a piecewise function could have gaps legitimately, and therefore you want to select dot mode.

The TI-83 and TI-84 MODE screens are slightly different, but the settings are the same.

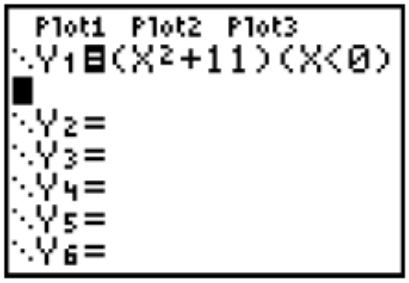
[MODE] [▼ 4 times] [▶] [ENTER]

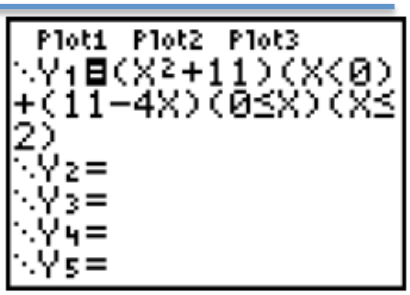
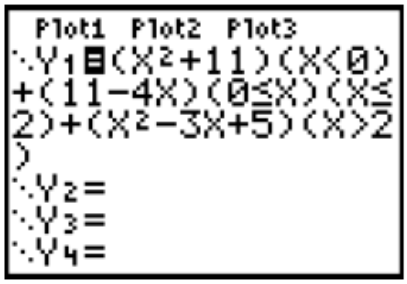


(You may need to switch between dot mode and connected mode, depending on the functions you're graphing, because a function with a steeply sloping graph will be hard to see in dot mode.)

Enter the Function

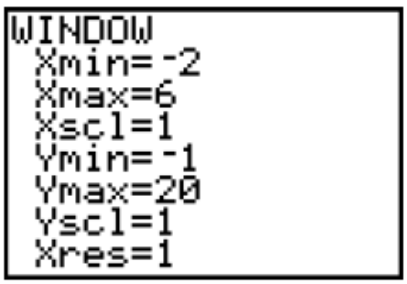
Clear any previous plots. (Review this on the general graphing page if you need to.)	[Y=] and deactivate anything that's highlighted.
Enter the first branch of the function definition, (x^2+11).	On the Y= screen, cursor to one of the Y= lines. Press [CLEAR] if necessary, and enter the first piece in parentheses: [(] [X,T,θ,n] [x²] [+] 11 [)]
Enter the test, (x<0).	Press [(] [X,T,θ,n] [2nd MATH *makes* TEST] [5] 0 [)]

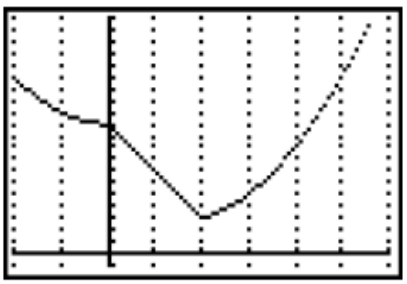


Enter the second branch of the function definition, (11–4x).	[+] [(] 11 [–] 4 [x,T,θ,n] [)]
Enter the second test, (0 ≤ x ≤ 2). You can code this either as the product of two tests, (0≤x)(x≤2), or with an *and* condition, (0≤x and x≤2). The first way saves a couple of keystrokes, so that's what I'll do.	[(] 0 [2nd MATH *makes* TEST] [6] [x,T,θ,n] [)] [(] [x,T,θ,n] [2nd MATH *makes* TEST] [6] 2 [)] 
Enter a plus sign and the last branch of the function, (x²–3x+5).	[+] [(] [x,T,θ,n] [x²] [–] 3 [x,T,θ,n] [+] 5 [)]
Enter the last test, (x>2).	[(] [x,T,θ,n] [2nd MATH *makes* TEST] [3] 2 [)] 

Display the Graph

It's often helpful to start with [ZOOM] [6], standard zoom, and then adjust the window. This particular function, I think, is a little easier to visualize with the window parameters shown.





You can zoom, trace, and find values and intercepts just as you would do for any other function.

See the general graphing page for common problems.

One particular problem with piecewise functions is that the TI-83/84 may try to connect the pieces. Make sure you are in dot mode, not connected mode: look on the Y= screen for three dots to the left of your equation.