

TTT4T: Tips, Techniques, and Tricks for TI's

You know the basics of how to use a graphing calculator by now, such as calculating values on the home screen, or entering a function on the [y=] screen. Today we will look at some helpful strategies.

#1: Pulling up a previous line

You just typed in the entire quadratic formula with values filled in, and hit enter. Then you want to run the same formula, just with the + changed to a -. Or, you just realized after you hit enter that you made a mistake. Don't re-type the entire thing. Press [2nd] [Enter] to pull up the previous entry, and you can edit.

#2: Using the last answer

You just did a big complicated calculation, and you have an obnoxiously long decimal result that you want to use in the next calculation. Don't write it down on a sheet of paper, or round it off. When you get to the point in the expression where the result goes, press [2nd] [(-)] which is the negative key. That inserts the previous answer ("ans").

#3: Entering fractions and mixed numbers

To use a fraction or mixed number, first consider if it is a terminating (not repeating) decimal that you already know, such as one-half or three-tenths. If so, go with that. If not, put the whole number plus the fraction in parentheses, like this: five and two-thirds will be $(5 + 2/3)$. Negative signs must go OUTSIDE the parentheses.

#4: Converting a decimal to a fraction

Yes, we all know that 0.5 is $1/2$. But what fraction is 0.428571...? If you have a ridiculous decimal, try using [MATH] and ►Frac. That will convert most decimals to a fraction. If it's repeating, there must be quite a bit of the repetition for it to "figure it out". If it's a mixed number, try subtracting the whole-number part off first (i.e. to find 9.125, first subtract 9 and then just convert the remaining 0.125).

#5: Calculating the slope, or a line of best fit

If you are given two or more ordered pairs (in point form, or on a table) and you want to find the slope, first put them into the lists using [STAT] [EDIT]. Then go back to the [STAT] menu, arrow to the right for [CALC], and select LinReg for a linear regression. The first value, "a", is the slope. The second, "b", is the y-intercept. Fill the values into $y = ax + b$ to write the linear function. (It's the same as $y = mx + b$.)

#6: Solving any one-variable equation!

Any single-variable equation can be solved by turning it into a system. Press [y=] and enter the left side of the equation as y_1 . Enter the right side of the equation as y_2 . Be sure to use "x" in place of the variable in your problem. Now, take a quick glance at the graph. You may or may not be able to see the lines, depending on the particular equation and how big the numbers are. If you can see an intersection, you are good to go. Press [2nd] [TRACE] on the top row, which is CALC. Then select "intersect". Press [ENTER] three times (first curve, second curve, guess). The default is fine, just hit enter all three times. The calculator will display "x=" and "y=" on the bottom; the "x=" is your answer!

If you cannot see the intersection, you *might* have to change the window. The calculator MUST have the answer within the given domain, or you will get an error ("ERR: NO SIGN CHNG"). If you see this message, then either the equation has no solution (less likely but certainly possible), or the answer is beyond the current domain (more likely). Change the window (it's on the top row under the screen) to a larger domain, such as Xmin = -100 and Xmax = 100, or even Xmin = -1000 and Xmax = 1000. (You don't have to worry about the y values, just the domain.) Then go get the intersection.

#7: Graphing the solution to a one-variable inequality

Many students struggle with solving inequalities, because they have trouble remembering when to flip the inequality symbol. Use this technique to check your work. Press [y=] and enter the ENTIRE inequality. To get the < or >, press [2^{nd}] [MATH], which is TEST. It's on the left side under ALPHA. What this does is perform a test for each value of x: if that value of x gives a true statement, then the result is 1. If it gives a false statement, then the result is 0. Doesn't sound all that useful, until you realize that graphing 1's will show up just above the x-axis and graphing 0's will be ON the x-axis and therefore not visible! When you finish entering the inequality, press [GRAPH] and the inequality will be drawn for you. The only catch here is that it's nearly impossible to tell about $0 \rightarrow$ (not included, no underline) vs $\bullet \rightarrow$ (included, underlined). You're on your own to figure that part out!

#8: Solving any system

Some systems can be solved faster by using elimination (such as when the equations are lined up with a matching coefficient) or by using substitution (such as when one variable is already isolated). However, a graphing calculator can be used to solve any system, as long as you can get y alone. Keep in mind that the calculator does not care if the equation is simplified or "cleaned up" – it only matters that y is isolated so that it can go in the [y=] screen. So, if you have an equation such as $3x - 8y = 15$, normally that's a challenge to isolate y. But all you have to do, really, is subtract 3x and then divide by -8. Write it like this: $y = (15-3x)/-8...$ and you are in business. No need to simplify or deal with the ugly fractions. Now, calculate the intersection of your two lines and you've got the solution to the system. NOTE: see #5 regarding possible error messages.

#9: Analyzing quadratics

Quadratic functions have interesting graphs – they are parabolas. You may need to know when the maximum or minimum occurs, or what the maximum or minimum is, or the zeroes (x-intercepts) of the function. Just put the function in [y=] and go to the graph. Once you are viewing the graph, adjusting the window as necessary, press [2^{nd}] [TRACE], which is CALC. Use "zero" to find x-intercepts, and "minimum" or "maximum" to find the vertex. You do have to provide some "guidance". It will ask for "left bound" or "lower bound" first, and you can use the arrow keys to move left of your target. Some models allow you to punch in the number instead. Then it asks for "right" or "upper", followed by "guess". You will then see the result on the bottom.

#10: Split screen

You can view both a graph and a table at the same time. First enter the function on [y=], then press [MODE], which is just to the right of [2^{nd}]. The last row offers a choice of "G-T". That's not gifted – talented; that's graph – table. Try it!