

Finding real solutions for equations with the TI-85/TI-86

Method of x-intercepts:

Starting from the Home screen(command line).

1. Enter graphics mode.
Press **GRAPH**.
2. Enter function editor.
Press **F1:y(x)**.
3. Erase or unselect any existing functions.
If any other functions are entered:
Either press **F4:DELf** repeatedly until they are all erased,
or for each function, put the cursor on the function and if the "=" is reversed(white on black),
press **F5:SELCT** so that the function won't graph but is still in the calculator.
4. By hand, move all the terms to one side of the equation.(set it equal to 0)
5. Enter the side of the equation that's not 0.
If no other functions are entered, set y1 equal to the non-zero side of the equation.
But if there are already functions entered that you want to keep, move the cursor down until you get a
blank function. Type in the non-zero side of the equation. Take note of the function's number.
6. Return to the graph screen with a standard viewing window if no window information is given. IF you are
given a window or interval in which to find the solution, skip to step 8.
Press **EXIT F3:ZOOM F4:ZSTD**.
7. Make sure at least one x-intercept is showing.
If not, zoom out until one is seen.
Press **F3:ZOOM F3:ZOUT ENTER**.
Wait for the graph to redraw.
If you still don't see an x-intercept, press **ENTER** again until one is show.
Press **EXIT EXIT**.
8. Enter the math submenu.
Press **MORE F1:MATH**.
9. Enter x-intercept mode.
TI-85 | Press **F3:ROOT**.
TI-86 | Press **F1:ROOT**.
10. Verify the number in the top right corner is the function's number (i.e. 1 if you're using y1.)
If not, press either (**cursor up**) or (**cursor down**) until it is the function's number.
11. TI-86 only | Set the bounds for the intersection.
| Move the cursor to the left of the desired x-intercept.
| Press **ENTER**.
| Move the cursor to the right of the desired x-intercept.
| Press **ENTER**.
12. Set the guess for the x-intercept.
Move the cursor close to an x-intercept.
Press **ENTER**.
Wait for the calculator to find the x-intercept.
13. When done a solution to the equation will appear at the bottom of the screen as the value of x.
14. Press **EXIT** to bring back the menu.
15. If there are other solutions to find,
TI-85 | go back to step 9.
TI-86 | press **F1:MATH** and go back to step 9.

You may have to zoom out again to find other x-intercepts.

How do you know you have all the solutions?

Classify the equation as radical, rational, linear, quadratic, cubic, etc.

Answer the following questions.

Have you found the expected number of solutions for that type of equation? (one for a linear equation,
two for a quadratic equation, etc.)

If not, is this a situation I would get a different number of solutions than expected?