

84
How Can The TI-84 Plus Graphing Calculator Help Us Solve Quadratic Equations?

Complete Quad

Example:
 Solve $x^2 + 2x = 3$

$x^2 + 2x - 3 = 0$
 $(x+3)(x-1) = 0$

| | |
|------------------|------------------|
| $x+3=0$ -3 -3 | $x-1=0$ +1 +1 |
| $x = -3$ | $x = 1$ |

Roots
 zeros
 solutions

$\{-3, 1\}$

Checks *must plug into the original*

| | |
|---|---|
| <p>chk#1 $x = -3$ $x^2 + 2x = 3$ $(-3)^2 + 2(-3) = 3$ $9 + 2(-3) = 3$ $9 - 6 = 3$ $3 = 3$</p> | <p>chk#2 $x = 1$ $x^2 + 2x = 3$ $(1)^2 + 2(1) = 3$ $1 + 2(1) = 3$ $1 + 2 = 3$ $3 = 3$</p> |
|---|---|

On the Graphing Calculator:

Another check

Other way to check
 $y =$ put equation in standard form
 press 2^{nd} Graph
 then look for where $y = 0$

1. Push the $y =$ button
2. Type in the quadratic equation you want to solve (you must type it in standard form) *ex: $x^2 + 2x - 3$*
3. Press the GRAPH button.
 You should see a parabola representing the graph of your quadratic equation

4. The points where the graph intersects the x-axis are the roots, or solutions or zeros

To find these points:

- Press the 2^{nd} button and the TRACE button.
- Push the 2 button. (zero)
- Using your \leftarrow or \rightarrow button, move the cursor slightly to the left of the first point where the graph intersects the x-axis.
 Press ENTER
- Next move your cursor slightly to the right of the first point where the graph intersects the x-axis.
 Press ENTER
- Press Enter again
- The value given for x is your first root.

5. Repeat Step 4 for the second point where the graph intersects the x-axis. This will give you your second root.

works great to figure out decimal roots

Extraq.

Work Backwards

$$x^2 - 4x - 21 = 0$$

$$x^2 + 3x - 7x - 21 = 0$$

$$(x-7)(x+3) = 0$$

$$x=7 \quad | \quad x=-3$$

$$\{-7, 3\}$$

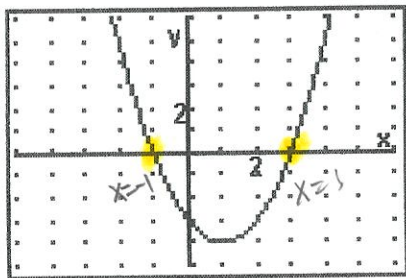
$$y = x^2 - 4x - 21$$

on

$$f(x) = x^2 - 4x - 21$$

Practice:

1)

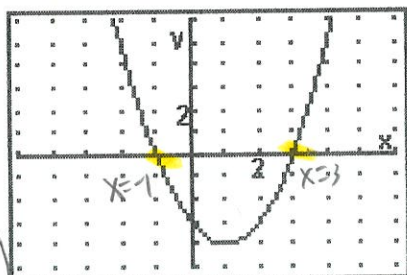


What are the roots of this parabola? Choose: where the parabola intersects the x-axis and y-value is 0.

- a) 3 and 1 where the
- b) 1 and 0 y-value
- c) 3 and -1 is 0.
- d) -4 and 0

2)

Work Backwards
What is the equation for the accompanying graph?



$$f(x) = x^2 - 2x - 3$$

OR

$$y = x^2 - 2x - 3$$

$$x^2 - 2x - 3 = 0$$

$$x^2 - 3x + 1x - 3 = 0$$

$$(x+1)(x-3) = 0$$

Work Backwards

start here $\rightarrow x = -1, x = 3$

4) Solve: $x^2 - 10 = 3x$

$$x^2 - 3x - 10 = 0$$

Complete Quadratic

$$x^2 - 3x - 10 = 0$$

$$(x-5)(x+2) = 0$$

$$x-5=0$$

$$+5 \quad +5$$

$$x+2=0$$

$$-2 \quad -2$$

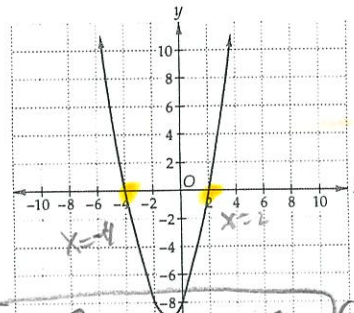
$$x=5$$

$$x=-2$$

{-2, 5}

3)

What is the equation for the accompanying graph?



$$y = f(x)$$

$$y = x^2 + 2x - 8$$

$$x^2 + 2x - 8 = 0$$

$$x^2 - 2x + 4x - 8 = 0$$

$$(x+4)(x-2) = 0$$

$$x = -4 \quad | \quad x = 2$$

Work Backwards

5) Solve: $w^2 - 18 = 0$

$$w^2 = 18$$

Incomplete Quadratic

$$\sqrt{w^2} = \sqrt{18}$$

$$\sqrt{9 \cdot 2}$$

$$w = \pm 3\sqrt{2}$$