

### Working Example 3: Approximate Solutions to Radical Equations

- a) Solve  $4 + \sqrt{x + 4} = x - 4$  graphically.  
 b) Verify the solution algebraically.

#### Solution

- a) There are two methods to solving a radical equation graphically.

##### Method 1: Use a Single Function and Find the $x$ -Intercept(s)

Begin by stating the restrictions:  $x \geq$  \_\_\_\_\_.

Then, equate the function to 0.

$$4 + \sqrt{x + 4} = x - 4$$

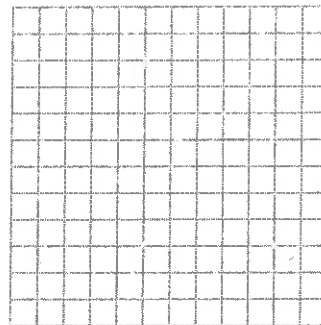
$$\text{_____} - \text{_____} + 4 + \sqrt{x + 4} = x - 4 + \text{_____} - \text{_____}$$

$$\text{_____} - \text{_____} + \sqrt{x + 4} = 0$$

Enter the left-hand side of the equation into a graphing calculator. Then determine the \_\_\_\_\_.

Sketch the resulting graph on the grid.

The solution to the equation  $4 + \sqrt{x + 4} = x - 4$  is \_\_\_\_\_.



##### Method 2: Use a System of Two Functions and Find the Point of Intersection

Enter the left-hand side of the equation,  $4 + \sqrt{x + 4}$ , into your graphing calculator. Then, enter the right-hand side of the equation,  $x - 4$ . Graph the equations on the same

axes and determine the \_\_\_\_\_. Sketch your graph on the grid.

The  $x$ -value of the \_\_\_\_\_ is  $x =$  \_\_\_\_\_.

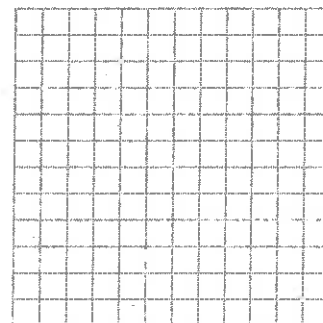
- b) Check the solution algebraically by substituting it into the original equation:

$$4 + \sqrt{\text{_____}} + 4 = \text{_____} - 4$$

$$4 + \sqrt{\text{_____}} = \text{_____}$$

$$4 + \text{_____} = \text{_____}$$

The solution,  $x =$  \_\_\_\_\_, is correct.



 To see a similar question, refer to Example 3 on pages 93–94 in *Pre-Calculus 12*.