

Working Example 1: Relate Roots and x-Intercepts

Consider $2\sqrt{x-4} - 3 = 0$.

- Determine the roots algebraically.
- Graph the corresponding function and determine the x-intercepts.
- Compare the roots of the equation to the x-intercepts of the graph of the corresponding function.

Solution

- a) Begin by stating the restrictions for the variable.

You cannot take the square root of a negative number, so in the equation $2\sqrt{x-4} - 3 = 0$,
() ≥ 0 . Therefore, $x \geq$ _____

$$2\sqrt{x-4} - 3 = 0$$

$$2\sqrt{x-4} - 3 + \text{_____} = \text{_____}$$

$$2\sqrt{x-4} = \text{_____}$$

Isolate the radical.

$$4(\text{_____}) = 3^2$$

Square both sides.

$$\text{_____} - \text{_____} = 9$$

$$4x = 9 + \text{_____}$$

Solve.

$$x = \frac{\boxed{}}{\boxed{}}$$

The solution is $x =$ _____

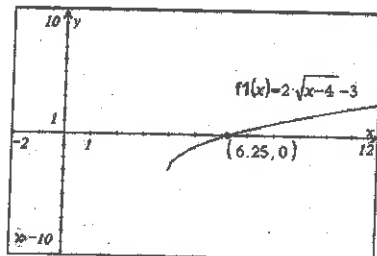
How can you check your solution?

- b) Rewrite the equation as $y = 2\sqrt{x-4} - 3$.

Then, enter the equation into your graphing calculator.

Graph the function and determine the root, or _____

The function has a single x-intercept at $x =$ _____



- c) The root that was determined algebraically is equal to the _____ of the graph of the function $y = 2\sqrt{x-4} - 3$.



To see a similar question, refer to Example 1 on page 91 in *Pre-Calculus 12*.