

Unit 1 Quiz 1 Prep Problems

Solve the following equations using reversing operations. Show ALL work. If the equation has no solutions explain why in a complete sentence. You may draw pictures of the graphs, if that helps your explanation.

$$1. \quad 11 - 3\sqrt{x-4} = -13$$

$$\begin{array}{r} -11 \qquad -11 \\ -3\sqrt{x-4} = -24 \\ \underline{-3 \quad -3} \\ \sqrt{x-4} = 8 \end{array}$$

$$\begin{array}{r} x-4 = 64 \\ \hline x = 68 \end{array}$$

$$2. \quad |3x+12| - 3 = -16$$

$$\begin{array}{r} +3 +3 \\ |3x+12| = -13 \end{array}$$

No solution (distance can't be negative)

$$3. \quad \left(\frac{x-1}{7} - 5 = \frac{x}{14}\right) \cdot 7$$

$$x-1-35 = \frac{7x}{14}$$

$$14 \cdot (x-36 = \frac{7x}{14}) \cdot 14$$

$$\begin{array}{r} 14x - 504 = 7x \\ \underline{-14x \quad -14x} \end{array}$$

$$\begin{array}{r} -504 = -7x \\ \underline{-7 \quad -7} \end{array}$$

$$72 = x$$

$$4. \quad -13(x+2)^2 - 4 = -17$$

$$\begin{array}{r} +4 +4 \\ -13(x+2)^2 = -13 \\ \underline{-13 \quad -13} \end{array}$$

$$(x+2)^2 = 1$$

$$\begin{array}{r} x+2 = 1 \\ \underline{-2 \quad -2} \end{array}$$

$$x = -1$$

$$\begin{array}{r} x+2 = -1 \\ \underline{-2 \quad -2} \end{array}$$

$$x = -3$$

$$5. \quad \left(\frac{x}{x-12} - 3 = \frac{14}{x-12}\right) \cdot (x-12)$$

$$x - 3(x-12) = 14$$

$$x - 3x + 36 = 14$$

$$\begin{array}{r} -2x + 36 = 14 \\ \underline{-36 \quad 36} \end{array}$$

$$\begin{array}{r} -2x = -22 \\ \underline{-2 \quad -2} \end{array}$$

$$x = 11$$

Word Problems: Remember you can use graphs or solving by reversing operations.

1. For her birthday, Beatrice received the Bam 3-Person Water Balloon Launcher. She immediately took it to the Cleveland football field to test it out. On the initial flight, the launched water balloon followed a path represented by the equation $y = -(x - 12)^2 + 100$, where x = the horizontal location of the water balloon in yards and y = the height of the balloon above the ground in feet.

- a. How far along the ground did the water balloon travel? Show how you found your answer.

Set $y = 0$

$$0 = -(x - 12)^2 + 100$$

$$-100 = -(x - 12)^2$$

$$100 = (x - 12)^2$$

$$10 = x - 12 \quad -10 = x - 12$$

$$22 = x \quad 2 = x$$

Traveled 20 yards

- b. What was the greatest height the balloon traveled? Explain how you know.

$$y = -(x - 12)^2 + 100$$

y - value of the vertex

100 feet high

2. During a recent tennis match, Will hit what he thought was the perfect lob (a lob is a high shot designed to go over your opponent). The path of the tennis ball can be represented by the quadratic equation $b(x) = -\frac{1}{10}(x - 10)^2 + 14.4$, where x is the distance in meters that the ball travels horizontally, and $b(x)$ is the height the tennis ball above the ground in feet.

- a. What is $b(0)$? What does it represent about the ball?

This means "plug in zero"

$$b(0) = -\frac{1}{10}(0 - 10)^2 + 14.4 = 4.4$$

The ball was 4.4 feet high when Will hit it.

- b. A standard tennis court is 23.8 meters long. If Will is standing right on the baseline when he hits the ball, does it land in the court? Show all of your work.

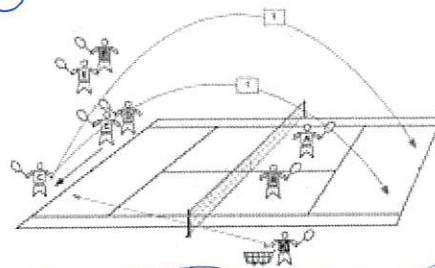
Land $\rightarrow y = 0$

$$0 = -\frac{1}{10}(x - 10)^2 + 14.4$$

$$-14.4 = -\frac{1}{10}(x - 10)^2$$

$$144 = (x - 10)^2$$

$$12 = x - 10 \quad -12 = x - 10$$

$$22 = x \quad 2 = x$$


Because it hits the ground at $x = 22$, & $22 < 23.8$, it lands in the court.