Solving Square Root Equations
Lesson 10.2

A **square root equation** is an equation that contains a square root with a variable in the radicand. To solve a square root equation, use properties of equality to isolate the square root by itself on one side of the equation, then use the following property.

🔑 *Key Idea*

Squaring Each Side of an Equation

Words If two expressions are equal, then their squares are also equal.

Algebra If $a = b$, then $a^2 = b^2$.

Examples: a. Solve $\sqrt{x} + 5 = 13$.   b. Solve $3 - \sqrt{x} = 0$.

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$$9 = x$$

Remember: $\left(\sqrt{n}\right)^2 = n$

On Your Own

Solve the equation. Check your solution.

1. $\sqrt{x} = 6$

$x = 36$

2. $\sqrt{x} - 7 = 3$

$x = 100$

3. $\sqrt{x} + 15 = 22$

$x = 49$

4. $1 - \sqrt{x} = -2$

$x = 9$

More Examples

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Identifying Extraneous Solutions

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$$x = 3 \quad or \quad x = -2$$

Check $\quad 3 \overset{?}{=} \sqrt{3 + 6} \qquad\qquad -2 \overset{?}{=} \sqrt{-2 + 6}$

$$3 \overset{?}{=} \sqrt{9} \qquad\qquad -2 \overset{?}{=} \sqrt{4}$$

$$\mathbf{3 = 3} \quad \checkmark \qquad\qquad -2 \neq 2 \quad ✗$$

5. $\sqrt{x+4} + 7 = 11$

$x = 12$

6. $8\sqrt{x-1} = 24$

$x = 10$

7. $\sqrt{3x+1} = \sqrt{4x-7}$

$x = 8$

8. $\sqrt{x-1} = x - 3$

$x = 5$