

Algebra 1
Lesson 10.4
Solving Radical Equations

Goal: to solve equations involving radicals and checking solutions

How would we solve

$$\sqrt{x} - 5 = 3?$$

$$+5 \quad +5$$

$$(\sqrt{x})^2 = (8)^2$$

$$x = 64 \checkmark$$

To solve radical equations, you will get the radical by itself on one side and then square both sides of the equation and check.

Solve and check:

$$-2 = \sqrt{2x} - 8$$

$$+8 \quad +8$$

$$(\sqrt{2x})^2 = (6)^2$$

$$\frac{36 = 2x}{2} \quad x = 18 \checkmark$$

When you solve an equation by squaring both sides, you create a new equation. The new equation may have a solution that does not satisfy the original equation. These are extraneous solutions.

Ex: $x = 3 \quad x^2 = 9$ so $x = 3, -3$

Our original was $x = 3$, not both so -3 is extraneous. This is why you have to check your solutions.

$$x = 3 \quad (x)^2 = (3)^2$$

$$x^2 = 9$$

$$x = 3, -3$$

Solve and check

$$(\sqrt{3x+1})^2 = (7)^2$$

$$3x+1 = 49$$

$$\frac{3x}{3} = \frac{48}{3} \quad x = 16 \checkmark$$

$$\sqrt{4r} + 7 = 3$$

$$-7 \quad -7$$

$$(\sqrt{4r})^2 = (-4)^2$$

$$\frac{4r}{4} = \frac{16}{4} \quad r = 4 \text{ (extraneous)}$$

$$\sqrt{4r} = -4$$

Solve:

$$(\sqrt{7x-4})^2 = (\sqrt{5x+10})^2$$

$$7x-4 = 5x+10$$

$$-5x \quad +4 \quad -5x \quad +4$$

$$\frac{2x}{2} = \frac{14}{2} \quad x = 7 \checkmark$$

Solve and check:

$$x^2 = \sqrt{-x+6}^2$$

$$x^2 = -x+6$$

$$x^2 + x - 6 = 0$$

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

$$x-2=0 \quad x=-3$$

$$x=2$$

2, *

#34. Solve and check your answer.

$$(2y)^2 = \sqrt{5y+6}$$

$$4y^2 = 5y+6$$

$$-5y-6$$

$$4y^2 - 5y - 6$$

$$(4y+3)(y-2)$$

$$y = -\frac{3}{4} \quad y = 2$$

#47. Solve and check

$$\sqrt{y+12} = 3\sqrt{y}$$

$$y+12 = 9y$$

$$-y$$

$$\frac{12}{8} = \frac{8y}{8} \quad y = 1.5$$

1.5

Hwk: pg 636 - 637

#8 - 28 (4th), 38, 40

44 - 50 evens, 51