

## Section 6-7 Solving Radical Equations and Inequalities

Extraneous Solutions

### Steps to Solve Radical Equations

- 1.
- 2.
- 3.

Solve each equation.

1.  $5 = \sqrt{x-2} - 1$

$$6 = \sqrt{x-2} - 1$$

$$36 = x - 2$$

$$38 = x$$

2.  $\sqrt{x+15} = 5 + \sqrt{x}$

square both sides

$$x+15 = (5+\sqrt{x})^2$$

$$x+15 = (5+\sqrt{x})(5+\sqrt{x})$$

$$x+15 = 25 + 10\sqrt{x} + x$$

$$15 = 25 + 10\sqrt{x}$$

$$-10 = 10\sqrt{x}$$

$$-1 = \sqrt{x}$$

$$1 = x$$

3.  $2(3n+2)^{\frac{2}{3}} - 8 = 0$

$$2(3n+2)^{\frac{2}{3}} = 8$$

$$(3n+2)^{\frac{2}{3}} = 4$$

$$\left( (3n+2)^{\frac{2}{3}} \right)^{\frac{3}{2}} = (4)^{\frac{3}{2}}$$

$$3n+2 = 8$$

$$3n = 6$$

$$n = 2$$

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

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

$$x^2 - 8x + 16 = 2x$$

$$x^2 - 10x + 16 = 0$$

$$(x-8)(x-2) = 0$$

$$x = 8 \quad \cancel{x = 2}$$

5. Multiple Choice

What is the solution of

$$4(3x+6)^{\frac{1}{4}} - 12 = 0 ?$$

- A.  $x=7$
- B.  $x=25$
- C.  $x=29$
- D.  $x=37$

$$(3x+6)^{\frac{1}{4}} = 3$$

$$3x+6 = 81$$

$$3x = 75$$

6.  $\sqrt{3x+1} = \sqrt{x-5}$

$$3x+1 = x-5$$

$$2x = -6$$

$$x = -3$$

$$\sqrt{-9+1} = \sqrt{3-8}$$

No Solution

Solving Radical inequalities.

- 1.
- 2.
- 3.

1.  $\sqrt{3x-6} + 4 \leq 7$

$$\sqrt{3x-6} \leq 3$$

$$3x-6 \leq 9$$

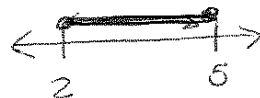
$$3x \leq 15$$

$$x \leq 5$$

$$3x-6 \geq 0$$

$$3x \geq 6$$

$$x \geq 2$$



$$\boxed{\{2 \leq x \leq 5\}}$$

2.  $\sqrt{2x+2} + 1 \geq 5$

$$\sqrt{2x+2} \geq 4$$

$$2x+2 \geq 16$$

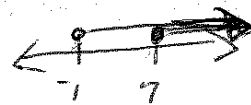
$$2x \geq 14$$

$$x \geq 7$$

$$2x+2 \geq 0$$

$$2x \geq -2$$

$$x \geq -1$$



~~$$\{ -1 < x \}$$~~

$$\boxed{\{x \mid x \geq 7\}}$$