

## Warm Up #6

Evaluate the expression.

1.  $64^{\frac{2}{3}}$

**ANSWER** 16

2.  $(-32)^{\frac{3}{5}}$

**ANSWER** -8

3. Expand  $(x - 5)^2$

$$(x - 5)(x - 5)$$

$$x^2 - 10x + 25$$

Solve the equation.

4.  $x^2 + 6x + 9 = x + 45$

$$x^2 + 5x - 36 = 0$$

$$(x + 9)(x - 4) = 0$$

$$x + 9 = 0 \text{ or } x - 4 = 0$$

$$x = -9 \quad x = 4$$

**Ch.6 Section 6**

Objective: Solve Radical Equations.

**KEY CONCEPT****Solving Radical Equations**

To solve a radical equation, follow these steps:

- STEP 1** **Isolate** the radical on one side of the equation, if necessary.
- STEP 2** **Raise** each side of the equation to the same power to eliminate the radical and obtain a linear, quadratic, or other polynomial equation.
- STEP 3** **Solve** the polynomial equation using techniques you learned in previous chapters. Check your solution.

Solve. Check your solution.

1.  $\sqrt[3]{2x+7} = 3$

$$2x + 7 = 27$$

$$2x = 20$$

$$x = 10$$

2.  $\sqrt[3]{x} - 9 = -1$

$$\sqrt[3]{x} = 8$$

$$x = 512$$

3.  $\sqrt{x+25} = 4$

4.  $2\sqrt[3]{x-3} = 4$

$$5. \quad \frac{3x^{3/2} = 375}{3}$$

$$x^{3/2} = 125$$

$$x = \sqrt[3]{125^2} = 25$$

$$7. \quad (x+3)^{5/2} = 32$$

$$x+3 = \sqrt[5]{32^2}$$

$$x+3 = 4$$

$$x = 1$$

$$6. \quad \left(\frac{-3}{2}\right)^{\frac{1}{2}} \cdot \frac{-2}{3} x^{1/5} = -\frac{2}{1} \left(\frac{-3}{2}\right)^{\frac{1}{5}}$$

$$x^{1/5} = 3$$

$$x = 243$$

$$8. \quad (x-5)^{4/3} = 81$$

$$x-5 = 81^{3/4}$$

$$x-5 = 27$$

$$x = 32$$

9.  $(x+2)^{3/4} - 1 = 7$

10.  $(x+2)^{2/3} + 3 = 7$

11.  $\sqrt{2x+5}^2 = \sqrt{x+7}^2$

$$2x+5 = x+7$$

$$x=2$$

12.  $\sqrt{10x+9}^2 = (x+3)^2$

$$10x+9 = (x+3)(x+3)$$

$$10x+9 = x^2+6x+9$$

$$0 = x^2-4x$$

$$0 = x(x-4)$$

$$x-4=0$$

$$x=0$$

$$x=4$$

$$13. (x+1)^2 = \sqrt{7x+15}^2$$

$$x^2 + 2x + 1 = 7x + 15$$

$$x^2 - 5x - 14 = 0$$

$$(x-7)(x+2) = 0$$

$$x=7 \quad x=-2$$

$$15. (\sqrt{x+6}-2)^2 = \sqrt{x-2}^2$$

$$x+6 - 4\sqrt{x+6} + 4 = x-2$$

$$\cancel{10} - 4\sqrt{x+6} = \cancel{-2} - 16$$

$$-4\sqrt{x+6} = -12$$

$$\sqrt{x+6}^2 = 3^2$$

$$x+6 = 9$$

$$x=3$$

$$14. \left(x - \frac{1}{2}\right)^2 = \sqrt{\frac{1}{4}x}^2$$

$$4\left(x^2 - x + \frac{1}{4}\right) = \frac{1}{4}x$$

$$4x^2 - 4x + 1 = x$$

$$4x^2 - 5x + 1 = 0$$

$$(4x-1)(x-1) = 0$$

$$16. (\sqrt{x+2}+1)^2 = \sqrt{3-x}^2 \quad x = \frac{1}{4}, 1$$

$$\sqrt{1+\frac{1}{2}} = 2\sqrt{\quad} \quad x+2 + 2\sqrt{x+2} + 1 = 3-x$$

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

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

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

$$x+2 = x^2$$

$$0 = x^2 - x - 2$$

$$(x-2)(x+1) = 0$$

$$x = \cancel{2}, -1$$

**Homework:**

Section 6.6 (3-51 threes)