

# 5.4

## In-class Activity or Homework

Name \_\_\_\_\_ Date \_\_\_\_\_

In Exercises 1–6, solve the equation. Check your solution.

1.  $(\sqrt[3]{x-14})^3 = (-2)^3$

$$\begin{aligned} x-14 &= -8 \\ +14 & \quad +14 \\ \hline x &= 6 \end{aligned}$$

2.  $-5\sqrt{16x} + 17 = -8$

$$\begin{aligned} -5\sqrt{16x} &= -25 \\ \frac{-5}{-5} \sqrt{16x} &= \frac{-25}{-5} \\ (\sqrt{16x}) &= 5 \\ \frac{16x}{16} &= \frac{25}{16} \\ x &= 25/16 \end{aligned}$$

3.  $\frac{1}{4}\sqrt[3]{2x} + 8 = 6$

$$\begin{aligned} \frac{1}{4}\sqrt[3]{2x} &= -2 \\ \sqrt[3]{2x} &= -8 \\ \frac{2x}{2} &= \frac{-512}{2} \\ x &= -256 \end{aligned}$$

4.  $\sqrt{3x} - \frac{3}{4} = 0$

$$\begin{aligned} (\sqrt{3x}) &= \left(\frac{3}{4}\right) \\ \frac{3x}{3} &= \frac{9}{16} \\ x &= \frac{9}{16} \cdot \frac{1}{3} = \frac{3}{16} \end{aligned}$$

5.  $3\sqrt[5]{x} + 9 = 15$

$$\begin{aligned} 3\sqrt[5]{x} &= 6 \\ \sqrt[5]{x} &= 2 \\ x &= 32 \end{aligned}$$

6.  $\sqrt[4]{8x} - 16 = -12$

$$\begin{aligned} \sqrt[4]{8x} &= 4 \\ 8x &= 256 \\ x &= 32 \end{aligned}$$

In Exercises 7–12, solve the equation. Check your solution(s).

7.  $\sqrt{10x+24} = x+12$

$$\begin{aligned} (\sqrt{10x+24})^2 &= (x+12)^2 \\ 10x+24 &= x^2+24x+144 \\ -10x-24 & \quad -10x-24 \\ \hline x^2+14x+120 &= 0 \\ -14 \pm \sqrt{196-4(1)(120)} & \\ \hline 2(1) & \end{aligned}$$

Set = 0

$$\begin{aligned} (x+12)(x+12) \\ x^2+12x+12x+144 \end{aligned}$$

120 · 1  
60 · 2  
40 · 3  
30 · 4  
24 · 5  
20 · 6  
15 · 8  
12 · 10

8.  $x+3 = \sqrt{\frac{22}{3}x+9}$

$$\begin{aligned} (x+3)^2 &= \left(\sqrt{\frac{22}{3}x+9}\right)^2 \\ x^2+6x+9 &= \frac{22}{3}x+9 \\ -\frac{22}{3}x-9 & \quad -\frac{22}{3}x-9 \\ \hline x^2-\frac{4}{3}x &= 0 \\ x(x-\frac{4}{3}) &= 0 \end{aligned}$$

$$\frac{6x}{1} - \frac{22}{3}x$$

$$\frac{18}{3}x - \frac{22}{3}x$$

$$-\frac{4}{3}x$$

$$x=0 \quad x-\frac{4}{3}=0$$

$$x=0 \text{ ; } \frac{4}{3}$$

$$9. \sqrt[4]{2-25x^2} = 5x$$

$$\left[ \sqrt[4]{2-25x^2} \right]^4 = \left[ 5x \right]^4$$

$$2-25x^2 = 625x^4$$

$$625x^4 + 25x^2 - 2 = 0$$

$$10. \sqrt{4x-4} - \sqrt{x+8} = 0$$

$$\left[ \sqrt{4x-4} \right]^2 = \left[ \sqrt{x+8} \right]^2$$

$$4x-4 = x+8$$

$$\begin{array}{r} -x+4 \\ -x+4 \end{array}$$

$$\frac{3x}{3} = \frac{12}{3} \quad \boxed{X=4}$$

$$11. \sqrt[3]{4x-1} = \sqrt[3]{6x+5}$$

$$\left[ \sqrt[3]{4x-1} \right]^3 = \left[ \sqrt[3]{6x+5} \right]^3$$

$$4x-1 = 6x+5$$

$$\begin{array}{r} -4x \\ -4x \end{array}$$

$$-1 = 2x+5$$

$$\begin{array}{r} -5 \\ -5 \end{array}$$

$$-6 = 2x$$

$$\boxed{X=-3}$$

$$12. \sqrt{4x-10} = \sqrt{2x-13} + 1$$

In Exercises 13–15, solve the equation. Check your solution(s).

$$13. 3x^{2/3} - 30 = 18$$

$$\frac{3x^{2/3}}{3} = \frac{48}{3}$$

$$x^{2/3} = 16$$

$$\left[ x^{2/3} \right]^{3/2} = \left[ 16 \right]^{3/2}$$

$$x = 16^{3/2} \rightarrow \sqrt[2]{16^3}$$

$$x = (4)^3 \text{ or } (-4)^3$$

$$\boxed{X=64 \text{ or } -64}$$

$$14. (6x+8)^{1/2} - 3x = 0$$

$$(6x+8)^{1/2} = 3x$$

$$\left[ (6x+8)^{1/2} \right]^2 = \left[ 3x \right]^2$$

$$6x+8 = 9x^2$$

$$9x^2 - 6x - 8 = 0$$

$$\left( \frac{9x^2 - 12x}{3x} \right) \left( \frac{6x + 8}{+2} \right) = 0$$

$$3x(3x-4) + 2(3x+4) = 0$$

$$(3x+2)(3x-4) = 0$$

$$3x+2=0 \quad 3x-4=0$$

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

$$15. (2x^2+8)^{1/4} = x$$

$$\left[ (2x^2+8)^{1/4} \right]^4 = \left[ x \right]^4$$

$$2x^2+8 = x^4$$

$$x^4 - 2x^2 - 8 = 0$$

$$(x^2 - 4)(x^2 + 2) = 0$$

$$x^2 - 4 = 0 \quad x^2 + 2 = 0$$

$$x^2 = 4 \quad x^2 = -2$$

$$x = 2 \text{ or } -2 \quad \text{NO SOL}$$