LESSON 3.5

Exercise Set A

MM1A3b Solve equations involving radicals such as $\sqrt{x} + b = c$, using algebraic techniques.

Tell whether the given value is a solution of the equation.

1. $4\sqrt{2x - 3} = 12; 2$
2. $2\sqrt{9x - 1} = 20; 7$
3. $\sqrt{4x + 8} = \sqrt{6 + 2x}; -1$
4. $\sqrt{7x - 2} = \sqrt{8 - 3x}; -1$
5. $x = \sqrt{4x - 3}; 3$
6. $\sqrt{4x - 3} = x - 2; 7$

***Describe* the steps you would use to solve the equation. Do not solve the equation.**

7. $\sqrt{7x + 3} - 5 = 2$
8. $6\sqrt{4 - x} - 3 = 1$
9. $\sqrt{12x - 7} = \sqrt{9x + 3}$
10. $10\sqrt{6 - x} = 2\sqrt{x + 4}$
11. $\sqrt{5x - 3} - \sqrt{10 - 4x} = 0$
12. $\sqrt{9x + 1} - 2 = x$

Solve the equation. Check for extraneous solutions.

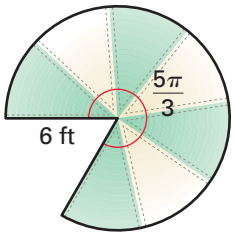
13. $8\sqrt{x} - 32 = 0$
14. $\sqrt{x} - 4 = 16$
15. $\sqrt{x + 3} + 8 = 15$
16. $\sqrt{x - 6} - 2 = 4$
17. $\sqrt{x} + 5 = 14$
18. $\sqrt{8 - 3x} + 5 = 6$
19. $\sqrt{5x + 4} - 12 = -6$
20. $3\sqrt{x + 5} - 3 = 6$
21. $4\sqrt{2x + 1} - 7 = 1$
22. $\sqrt{x} = \sqrt{5x - 1}$
23. $\sqrt{7x - 6} = \sqrt{x}$
24. $\sqrt{6x - 8} = \sqrt{4x - 10}$
25. $\sqrt{7x - 5} = \sqrt{3x + 19}$
26. $\sqrt{x - 15} - \sqrt{x - 7} = 0$
27. $\sqrt{10x - 3} - \sqrt{8x - 11} = 0$
28. $\sqrt{5x - 6} = x$
29. $x = \sqrt{2x + 24}$
30. $\sqrt{2x - 15} = x$

31. **Market Research** A marketing department determines that the price of a magazine subscription and the demand to subscribe are related by the function $P = 40 - \sqrt{0.0004x + 1}$ where P is the price per subscription and x is the number of subscriptions sold.
    - **a.** If the subscription price is set at \$25, how many subscriptions would be sold? Round your answer to the nearest whole subscription.
    - **b.** If the subscription price is set at \$30, how many more subscriptions are sold in part (a) than when the price is \$30? Round your answer to the nearest whole subscription.

32. **Awning** The area A of a portion of a circle bounded by two radii r and angle t of a sector of a circle are related by the function

$$r = \sqrt{\frac{2A}{t}}.$$

The length of a side (radius) of the top view of the awning shown at the right is 6 feet and the angle that is formed by the awning is $\frac{5\pi}{3}$. Find the area of the awning. Round your answer to the nearest hundredth.



LESSON 3.5

Exercise Set B

MM1A3b Solve equations involving radicals such as $\sqrt{x} + b = c$, using algebraic techniques.

Describe **how you would solve the equation. Do not solve the equation.**

1. $1 + \sqrt{x + 6} = 13$

2. $15 - \sqrt{2x + 2} = 13$

3. $4 - 2\sqrt{1 - 4x} = -6$

4. $6\sqrt{5x + 3} - 5 = 2$

5. $\sqrt{10 - 6x} = \sqrt{\frac{3}{2}x - 1}$

6. $\sqrt{3 - 2x} - \sqrt{2 + 4x} = 0$

7. $6\sqrt{5 - 2x} = 3\sqrt{5x - 2}$

8. $x + 1 = \sqrt{3 - 2x}$

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

Solve the equation. Check for extraneous solutions.

10. $\sqrt{x} + 4 = 9$

11. $7\sqrt{3x - 4} + 7 = 35$

12. $14 - 5\sqrt{8 - 3x} = 19$

13. $\sqrt{x} - 8 = 4$

14. $10 + 4\sqrt{3 - 2x} = 14$

15. $2\sqrt{5 - 2x} - 13 = -17$

16. $\sqrt{4x - 3} - \sqrt{6x - 11} = 0$

17. $\sqrt{\frac{1}{4}x - 5} - \sqrt{x - 9} = 0$

18. $\sqrt{8 - 6x} = 3x$

19. $2x = \sqrt{11x + 3}$

20. $\sqrt{3x + 6} = x - 4$

21. $x + 3 = \sqrt{2x + 21}$

22. $\sqrt{x} + 3 = \sqrt{x + 12}$

23. $4 - \sqrt{x - 3} = \sqrt{x + 5}$

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

25. Write a radical equation that has 3 and 4 as solutions.

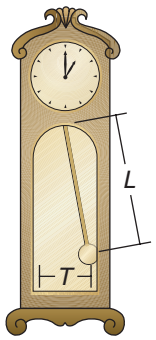
26. **Writing** A student solves the equation $\sqrt{x + 6} = x$ and finds that $x = 3$ or $x = -2$. Without checking by substituting into the equation, which is the extraneous solution, 3 or -2? How do you know?

27. **Speed of Sound** The speed of sound near Earth's surface depends on the temperature. The speed v (in meters per second) is given by the function $v = 20\sqrt{t + 273}$ where t is the temperature (in degrees Celsius).

a. A friend is throwing a tennis ball against a wall 200 meters from you. You hear the sound of the ball hitting the wall 0.6 second after seeing the ball hit the wall. What is the temperature? Round your answer to the nearest tenth.

b. The temperature $-273°C$ is called absolute zero. What is the speed of sound at this temperature?

28. **Pendulum** The period T (in seconds) of a pendulum is the time it takes for the pendulum to swing back and forth. The period is related to the length L (in inches) of the pendulum by the model $T = 2\pi\sqrt{\frac{L}{384}}$.



a. Find the length of a pendulum with a period of 2 seconds. Round your answer to the nearest tenth.

b. What is the length of a pendulum whose period is double the period of the pendulum in part (a)? Round your answer to the nearest tenth.

UNIT 3