

coefficient  
out squaring both sides.

**Example 4** Solve  $3x = 2 + x\sqrt{5}$  without squaring both sides.

**Solution**

$$3x = 2 + x\sqrt{5}$$

$$3x - x\sqrt{5} = 2$$

$$(3 - \sqrt{5})x = 2$$

$$x = \frac{2}{3 - \sqrt{5}}$$

$$= \frac{2}{3 - \sqrt{5}} \cdot \frac{3 + \sqrt{5}}{3 + \sqrt{5}}$$

$$= \frac{2(3 + \sqrt{5})}{4} = \frac{3 + \sqrt{5}}{2}$$

$\therefore$  the solution set is  $\left\{\frac{3 + \sqrt{5}}{2}\right\}$ . *Answer*

## Oral Exercises

Solve. If an equation has no real solution, say so.

1.  $\sqrt{x} = 5$

4.  $\sqrt{x} - 7 = 0$

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

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

5.  $\sqrt{x} + 6 = 0$

8.  $\sqrt{x} + \sqrt{x+2} = 0$

3.  $\sqrt{x-1} = 3$

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

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

10. Tell whether each equation is a radical equation or a linear equation.

a.  $x\sqrt{2} = 3$

b.  $2\sqrt{x} = 3$

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



## Written Exercises

Solve. If an equation has no real solution, say so.

- A**
- |                            |                                    |   |
|----------------------------|------------------------------------|---|
| 1. $\sqrt{4x-3} = 5$       | 2. $\sqrt{3n+1} = 7$               | 3. $3\sqrt{t-5} = 13$                       |
| 4. $7 + 4\sqrt{a} = 3$     | 5. $\sqrt{2x^2-7} = 5$             | 6. $\sqrt{5y^2+1} = 9$                      |
| 7. $\sqrt[3]{3m+1} = 4$    | 8. $\sqrt[3]{2w-5} = 3$            | 9. $\sqrt[3]{2d+5} = 3$                     |
| 10. $7 - \sqrt[3]{9c} = 4$ | 11. $2\sqrt[3]{x} = \sqrt[3]{x^2}$ | 12. $\frac{\sqrt[3]{x}}{2} = \sqrt[3]{x-7}$ |
| 13. $\sqrt{x+2} = x$       | 14. $\sqrt{2n+3} = n$              | 15. $\sqrt{t-2} + t = 4$                    |
| 16. $5 + \sqrt{a+7} = a$   | 17. $\sqrt{2x+5} - 1 = x$          | 18. $\sqrt{3n+10} - 4 = n$                  |

In Exercises 19–24, a radical equation and a linear equation are given. Solve the radical equation by squaring both sides. Solve the linear equation without squaring both sides.

- |                            |                            |                             |
|----------------------------|----------------------------|-----------------------------|
| 19. a. $5\sqrt{x} = 10$    | 20. a. $3\sqrt{x} = 12$    | 21. a. $5 + 2\sqrt{x} = 7$  |
| b. $x\sqrt{5} = 10$        | b. $x\sqrt{3} = 12$        | b. $5 + x\sqrt{2} = 7$      |
| 22. a. $2 + 3\sqrt{x} = 8$ | 23. a. $x = 3 + 2\sqrt{x}$ | 24. a. $3x = 7\sqrt{x} - 2$ |
| b. $2 + x\sqrt{3} = 8$     | b. $x = 3 + x\sqrt{2}$     | b. $3x = x\sqrt{7} - 2$     |

Solve. If an equation has no real solution, say so.

- B**
- |  |  |
|--|--|
| 25. $\sqrt{y} + \sqrt{y+5} = 5$        | 26. $\sqrt{x-7} + \sqrt{x} = 7$        |
| 27. $\sqrt{2n-5} - \sqrt{3n+4} = 2$    | 28. $\sqrt{3a-2} - \sqrt{2a-3} = 1$    |
| 29. $\sqrt{3b-2} - \sqrt{2b+5} = 1$    | 30. $\sqrt{5y-1} - \sqrt{7y+9} = 2$    |
| 31. $\sqrt{x} + \sqrt{3} = \sqrt{x+3}$ | 32. $\sqrt{n+6} - \sqrt{n} = \sqrt{6}$ |

33. If you are near the top of a tall building on a clear day, how far can you see? If a building is  $h$  ft high, then the distance  $d$  (in miles) to the earth's horizon is approximately

$$d = \sqrt{\frac{3}{2}h}$$

- a. The observ...

