

6-2 Skills Practice**Solving Logarithmic Equations and Inequalities**

Solve each equation.

1. $3x = \log_6 216$

1

2. $x - 4 = \log_3 243$

9

3. $\log_4 (4x - 20) = 5$

261

4. $\log_9 (3 - x) = \log_9 (5x - 15)$

no solution

5. $\log_{81} (x + 20) = \log_{81} (6x)$

4

6. $\log_9 (3x^2) = \log_9 (2x + 1)$

 $-\frac{1}{3}$ or 1

Solve each inequality.

7. $\log_5 (-3x) < 1$

 $-\frac{5}{3} < x < 0$

8. $\log_6 x > \log_6 (4 - x)$

 $2 < x < 4$

9. $\log_{10} (x - 3) < 2$

 $3 < x < 103$

10. $\log_2 (x - 5) > \log_2 (3)$

 $x > 8$

11. $\log_7 (8x + 5) > \log_7 (6x - 18)$

 $x > 3$

12. $\log_9 (3x - 3) < 1.5$

 $1 < x < 10$

13. $\log_{10} (2x - 2) < \log_{10} (7 - x)$

 $1 < x < 3$

14. $\log_3 (7 - x) \leq \log_3 (x + 19)$

 $-6 \leq x \leq 7$

6-2 Practice

Solving Logarithmic Equations and Inequalities

Solve each equation.

1. $x + 5 = \log_4 256$

$$x = -1$$

3. $\log_3 (4x - 17) = 5$

$$x = 65$$

5. $\log_{13} (x^2 - 4) = \log_{13} 3x$

$$x = 4$$

2. $3x - 5 = \log_2 1024$

$$x = 5$$

4. $\log_5 (3 - x) = 5$

$$x = -3122$$

6. $\log_3 (x - 5) = \log_3 (3x - 25)$

$$x = 10$$

Solve each inequality.

7. $\log_8 (-6x) < 1$

$$-\frac{4}{3} < x < 0$$

9. $\log_{11} (x + 7) < 1$

$$-7 < x < 4$$

8. $\log_9 (x + 2) > \log_9 (6 - 3x)$

$$1 < x < 2$$

10. $\log_{81} x \leq 0.75$

$$0 < x \leq 27$$

11. $\log_2 (x + 6) < \log_2 17$

$$-6 < x < 11$$

12. $\log_{12} (2x - 1) > \log_{12} (5x - 16)$

$$3\frac{1}{5} < x < 5$$

13. $\log_9 (2x - 1) < 0.5$

$$\frac{1}{2} < x < 2$$

14. $\log_{10} (x - 5) > \log_{10} 2x$

no solution

15. $\log_3 (x + 12) > \log_3 2x$

$$0 < x < 12$$

16. $\log_3 (0.3x + 5) > \log_3 (x - 2)$

$$2 < x < 10$$

17. $\log_2 (x + 3) < \log_2 (1 - 3x)$

$$-3 < x < -\frac{1}{2}$$

18. $\log_6 (3 - x) \leq \log_6 (x - 1)$

$$2 \leq x < 3$$