

**7-4 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**

7.  $\log_4 (x - 1) = \log_4 (12)$

**13**

8.  $\log_7 (5 - x) = \log_7 (5)$

**0**

9.  $\log_x (5x) = 2$

**5**

Solve each inequality.

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

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

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

**$\{x \mid 2 < x < 4\}$**

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

**$\{x \mid 3 < x < 103\}$**

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

**$\{x \mid x > 8\}$**

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

**$\{x \mid x > 3\}$**

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

**$\{x \mid 1 < x < 10\}$**

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

**$\{x \mid 1 < x < 3\}$**

17.  $\log_9 (x - 1) > \log_9 (2x)$

**no solution**

18.  $\log_{16} x \geq 0.5$

**$\{x \mid x \geq 4\}$**

19.  $\log_3 \left( \frac{x - 3}{4} + 5 \right) > \log_3 (x + 2)$

**$\{x \mid -2 < x < 3\}$**

20.  $\log_5 (3x) < \log_5 (2x - 1)$

**no solution**

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

**$\{x \mid -6 \leq x \leq 7\}$**