

Solving Logarithmic Equations

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Solve each equation.

1) $\log_4 (v + 8) = \log_4 (-4v - 2)$

2) $\log_{17} (9 - n) = \log_{17} -4n$

3) $\log_7 (-2b + 10) = \log_7 3b$

4) $\log_{19} (-5x - 6) = \log_{19} (2 - 3x)$

5) $\log_7 x - \log_7 (x - 1) = 1$

6) $\log_6 5 - \log_6 (x - 7) = 1$

7) $\log_7 4 - \log_7 (x - 4) = \log_7 41$

8) $\log_6 5 + \log_6 5x = \log_6 17$

9) $\log_9 4 + \log_9 -3x = 2$

10) $\log_6 (x + 8) + \log_6 7 = 2$

11) $\log_2 3x - \log_2 7 = 3$

12) $\log_5 9 - \log_5 (x - 5) = \log_5 45$

13) $\log_3 4 + \log_3 2x = \log_3 56$

14) $\log_9 3x + \log_9 2 = 2$

15) $\log_3 8 + \log_3 -5x = 3$

16) $\log_8 5 - \log_8 (x - 6) = 1$

17) $\log_3 x - \log_3 (x - 1) = 2$

18) $\log_7 (x - 3) - \log_7 x = 3$

19) $\log_7 9 - \log_7 -3x = 2$

20) $\log_4 5 - \log_4 -4x = 1$

21) $\log_6 x - \log_6 (x - 6) = 1$

22) $\log_6 x - \log_6 (x + 6) = 1$

23) $\log_4 8 - \log_4 (x + 6) = 1$

24) $\log_3 x - \log_3 (x + 5) = 3$

Review: Simplify. Your answer should contain only positive exponents.

25) $\frac{2y^2 \cdot (2x^4 y^4)^4}{x^2 y^4}$

26) $\frac{(2n^{-4})^3 \cdot (2m^2 n^4)^2}{(2m^4 n^4)^4}$

Review: Condense each expression to a single logarithm.

27) $\frac{\log_7 x}{3} + \frac{\log_7 y}{3} + \frac{\log_7 z}{3}$

28) $3 \log_7 a + 15 \log_7 b$

Review: Expand each logarithm.

29) $\log_5 (ab^5)^5$

30) $\log_6 \frac{u^4}{v^2}$

Review: Solve each equation.

31) $5^{2p} = 5^{3p+1}$

32) $6^{-3x} = \frac{1}{216}$

33) $-3 \cdot 2^{5r} = -37$

34) $-8 \cdot 5^{m+1} = -81$

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Solve each equation.

1) $\log_4 (v + 8) = \log_4 (-4v - 2) \{-2\}$

2) $\log_{17} (9 - n) = \log_{17} -4n \{-3\}$

3) $\log_7 (-2b + 10) = \log_7 3b \{2\}$

4) $\log_{19} (-5x - 6) = \log_{19} (2 - 3x) \{-4\}$

5) $\log_7 x - \log_7 (x - 1) = 1 \left\{ \frac{7}{6} \right\}$

6) $\log_6 5 - \log_6 (x - 7) = 1 \left\{ \frac{47}{6} \right\}$

7) $\log_7 4 - \log_7 (x - 4) = \log_7 41 \left\{ \frac{168}{41} \right\}$

8) $\log_6 5 + \log_6 5x = \log_6 17 \left\{ \frac{17}{25} \right\}$

9) $\log_9 4 + \log_9 -3x = 2 \left\{ -\frac{27}{4} \right\}$

10) $\log_6 (x + 8) + \log_6 7 = 2 \left\{ -\frac{20}{7} \right\}$

11) $\log_2 3x - \log_2 7 = 3 \left\{ \frac{56}{3} \right\}$

12) $\log_5 9 - \log_5 (x - 5) = \log_5 45 \left\{ \frac{26}{5} \right\}$

13) $\log_3 4 + \log_3 2x = \log_3 56 \{7\}$

14) $\log_9 3x + \log_9 2 = 2 \left\{ \frac{27}{2} \right\}$

15) $\log_3 8 + \log_3 -5x = 3 \left\{ -\frac{27}{40} \right\}$

16) $\log_8 5 - \log_8 (x - 6) = 1 \left\{ \frac{53}{8} \right\}$

17) $\log_3 x - \log_3 (x - 1) = 2 \left\{ \frac{9}{8} \right\}$

18) $\log_7 (x - 3) - \log_7 x = 3$ No solution.

19) $\log_7 9 - \log_7 -3x = 2 \left\{ -\frac{3}{49} \right\}$

20) $\log_4 5 - \log_4 -4x = 1 \left\{ -\frac{5}{16} \right\}$

21) $\log_6 x - \log_6 (x - 6) = 1 \left\{ \frac{36}{5} \right\}$

22) $\log_6 x - \log_6 (x + 6) = 1$ No solution.

23) $\log_4 8 - \log_4 (x + 6) = 1 \{-4\}$

24) $\log_3 x - \log_3 (x + 5) = 3$ No solution.

Review: Simplify. Your answer should contain only positive exponents.

25) $\frac{2y^2 \cdot (2x^4 y^4)^4}{x^2 y^4} 32y^{14}x^{14}$

26) $\frac{(2n^{-4})^3 \cdot (2m^2 n^4)^2}{(2m^4 n^4)^4} \frac{2}{n^{20} m^{12}}$

Review: Condense each expression to a single logarithm.

27) $\frac{\log_7 x}{3} + \frac{\log_7 y}{3} + \frac{\log_7 z}{3} \log_7 \sqrt[3]{zyx}$

28) $3 \log_7 a + 15 \log_7 b \log_7 (b^{15} a^3)$

Review: Expand each logarithm.

29) $\log_5 (ab^5)^5 5 \log_5 a + 25 \log_5 b$

30) $\log_6 \frac{u^4}{v^2} 4 \log_6 u - 2 \log_6 v$

Review: Solve each equation.

31) $5^{2p} = 5^{3p+1} \{-1\}$

32) $6^{-3x} = \frac{1}{216} \{1\}$

33) $-3 \cdot 2^{5r} = -37 \frac{\log_2 \frac{37}{3}}{5}$

34) $-8 \cdot 5^{m+1} = -81 \log_5 \frac{81}{8} - 1$