

## Property of Logs &amp; Solving Practice

Date \_\_\_\_\_ Period \_\_\_\_\_

**Use a calculator to approximate each to the nearest thousandth.**

1)  $\log_7 2.4$

2)  $\log_2 5.3$

3)  $\log_6 19$

4)  $\log_3 40$

5)  $\log_2 18$

6)  $\log_2 33$

**Condense each expression to a single logarithm.**

7)  $24\log_9 x - 4\log_9 y$

8)  $\log_9 12 + \log_9 11 + 3\log_9 5$

9)  $3\log_9 a + 6\log_9 b$

10)  $\log_9 z + \frac{\log_9 x}{2} + \frac{\log_9 y}{2}$

11)  $\log_3 u + \log_3 v + 6\log_3 w$

12)  $3\log_4 x + 3\log_4 y$

**Solve each equation.**

13)  $\log_9 (n - 4) = \log_9 (2n + 6)$

14)  $\log_{11} 12 = \log_{11} (-x - 1)$

15)  $\log_3 (5a + 4) = \log_3 (-4a - 2)$

16)  $\log_{11} -3p = \log_{11} (9 - 2p)$

17)  $\log_2 -a = \log_2 (-4a - 9)$

18)  $\log_{17} (-4x - 6) = \log_{17} -2x$

19)  $\log_4 (x^2 - 9) - \log_4 7 = 2$

20)  $\log_8 3 + \log_8 (x + 3) = 1$

21)  $\log_7 (x^2 + 6) - \log_7 5 = \log_7 3$

22)  $\log_9 10 - \log_9 (x - 1) = 2$

23)  $\ln x - \ln (x - 3) = 5$

24)  $\log (x + 8) + \log x = \log 33$

**Evaluate each expression.**

25)  $\log_2 \frac{1}{8}$

26)  $\log_6 36$

27)  $\log_5 25$

28)  $\log_5 125$

29)  $\log_7 \frac{1}{49}$

30)  $\log_3 9$

**Expand each logarithm.**

31)  $\log_9 \frac{7^3}{12^2}$

32)  $\log_7 \left( \frac{x^4}{y} \right)^6$

33)  $\ln \left( \frac{u^4}{v} \right)^3$

34)  $\log_6 (ab^3)^2$

35)  $\log_9 (8 \cdot 11 \cdot 7^3)$

36)  $\log_3 (7\sqrt{6 \cdot 5})$

37)  $\log_6 \frac{x^6}{y^5}$

38)  $\log_3 (7^4 \sqrt[3]{11})$

39)  $\log_6 (a^3 b^2)$

40)  $\log_4 (2 \cdot 5^3)^2$

41)  $\log_4 (11 \cdot 6 \cdot 5^2)$

42)  $\log_8 (z\sqrt{x \cdot y})$

**Rewrite each equation in exponential form.**

43)  $\log_{169} 13 = \frac{1}{2}$

44)  $\log_{\frac{1}{17}} \frac{1}{289} = 2$

45)  $\log_{225} 15 = \frac{1}{2}$

46)  $\log_7 \frac{1}{343} = -3$

47)  $\log_6 36 = 2$

48)  $\log_6 \frac{1}{216} = -3$

## Property of Logs &amp; Solving Practice

Date \_\_\_\_\_ Period \_\_\_\_\_

**Use a calculator to approximate each to the nearest thousandth.**

1)  $\log_7 2.4$

0.45

2)  $\log_2 5.3$

2.406

3)  $\log_6 19$

1.643

4)  $\log_3 40$

3.358

5)  $\log_2 18$

4.17

6)  $\log_2 33$

5.044

**Condense each expression to a single logarithm.**

7)  $24\log_9 x - 4\log_9 y$

$$\log_9 \frac{x^{24}}{y^4}$$

8)  $\log_9 12 + \log_9 11 + 3\log_9 5$

$$\log_9 (132 \cdot 5^3)$$

9)  $3\log_9 a + 6\log_9 b$

$$\log_9 (b^6 a^3)$$

10)  $\log_9 z + \frac{\log_9 x}{2} + \frac{\log_9 y}{2}$

$$\log_9 (z\sqrt{yx})$$

11)  $\log_3 u + \log_3 v + 6\log_3 w$

$$\log_3 (vuw^6)$$

12)  $3\log_4 x + 3\log_4 y$

$$\log_4 (y^3 x^3)$$

**Solve each equation.**

13)  $\log_9 (n - 4) = \log_9 (2n + 6)$

No solution.

14)  $\log_{11} 12 = \log_{11} (-x - 1)$

 $\{-13\}$ 

15)  $\log_3 (5a + 4) = \log_3 (-4a - 2)$

$$\left\{ -\frac{2}{3} \right\}$$

16)  $\log_{11} -3p = \log_{11} (9 - 2p)$

 $\{-9\}$

$$17) \log_2 -a = \log_2 (-4a - 9)$$

$$\{-3\}$$

$$18) \log_{17} (-4x - 6) = \log_{17} -2x$$

$$\{-3\}$$

$$19) \log_4 (x^2 - 9) - \log_4 7 = 2$$

$$\{11, -11\}$$

$$20) \log_8 3 + \log_8 (x + 3) = 1$$

$$\left\{-\frac{1}{3}\right\}$$

$$21) \log_7 (x^2 + 6) - \log_7 5 = \log_7 3$$

$$\{3, -3\}$$

$$22) \log_9 10 - \log_9 (x - 1) = 2$$

$$\left\{\frac{91}{81}\right\}$$

$$23) \ln x - \ln (x - 3) = 5$$

$$\left\{-\frac{3e^5}{1 - e^5}\right\}$$

$$24) \log (x + 8) + \log x = \log 33$$

$$\{3\}$$

**Evaluate each expression.**

$$25) \log_2 \frac{1}{8}$$

$$-3$$

$$26) \log_6 36$$

$$2$$

$$27) \log_5 25$$

$$2$$

$$28) \log_5 125$$

$$3$$

$$29) \log_7 \frac{1}{49}$$

$$-2$$

$$30) \log_3 9$$

$$2$$

**Expand each logarithm.**

$$31) \log_9 \frac{7^3}{12^2}$$

$$3 \log_9 7 - 2 \log_9 12$$

$$32) \log_7 \left(\frac{x^4}{y}\right)^6$$

$$24 \log_7 x - 6 \log_7 y$$

$$33) \ln \left( \frac{u^4}{v} \right)^3$$

$$12 \ln u - 3 \ln v$$

$$35) \log_9 (8 \cdot 11 \cdot 7^3)$$

$$\log_9 8 + \log_9 11 + 3 \log_9 7$$

$$37) \log_6 \frac{x^6}{y^5}$$

$$6 \log_6 x - 5 \log_6 y$$

$$39) \log_6 (a^3 b^2)$$

$$3 \log_6 a + 2 \log_6 b$$

$$41) \log_4 (11 \cdot 6 \cdot 5^2)$$

$$\log_4 11 + \log_4 6 + 2 \log_4 5$$

$$34) \log_6 (ab^3)^2$$

$$2 \log_6 a + 6 \log_6 b$$

$$36) \log_3 (7\sqrt{6 \cdot 5})$$

$$\log_3 7 + \frac{\log_3 6}{2} + \frac{\log_3 5}{2}$$

$$38) \log_3 (7^4 \sqrt[3]{11})$$

$$4 \log_3 7 + \frac{\log_3 11}{3}$$

$$40) \log_4 (2 \cdot 5^3)^2$$

$$2 \log_4 2 + 6 \log_4 5$$

$$42) \log_8 (z\sqrt{x \cdot y})$$

$$\log_8 z + \frac{\log_8 x}{2} + \frac{\log_8 y}{2}$$

**Rewrite each equation in exponential form.**

$$43) \log_{169} 13 = \frac{1}{2}$$

$$169^{\frac{1}{2}} = 13$$

$$44) \log_{\frac{1}{17}} \frac{1}{289} = 2$$

$$\left( \frac{1}{17} \right)^2 = \frac{1}{289}$$

$$45) \log_{225} 15 = \frac{1}{2}$$

$$225^{\frac{1}{2}} = 15$$

$$46) \log_7 \frac{1}{343} = -3$$

$$7^{-3} = \frac{1}{343}$$

$$47) \log_6 36 = 2$$

$$6^2 = 36$$

$$48) \log_6 \frac{1}{216} = -3$$

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