

Solve for the unknown.

9. $\log_7 343 = n$

$$\log_7 343 = n$$

$$7^n = 343$$

$$7^n = 7^3$$

$$n = 3$$

10. $\log_{\frac{1}{4}} 64 = n$

11. $\log_n 1024 = 5$

12. $\log_n \left(\frac{1}{625}\right) = -4$

13. $\log_n (\sqrt[4]{8}) = \frac{3}{4}$

14. $\log n = 6$

15. $\log_4 16 = n$

16. $\log_{81} \left(\frac{1}{9}\right) = n$

LESSON 13.2 Skills Practice

Name _____ Date _____

Mad Props Properties of Logarithms

Problem Set

Rewrite each logarithmic expression in expanded form using the properties of logarithms.

1. $\log_3(5x)$

$\log_3(5x) = \log_3 5 + \log_3 x$

2. $\log_5\left(\frac{a}{b}\right)$

3. $\log_7(n^4)$

4. $\log\left(\frac{x}{7}\right)$

5. $\log_2(mn)$

6. $\log(p^a)$

7. $\ln(x^2)$

8. $\ln\left(\frac{c}{3}\right)$

9. $\log_3(7x^2)$

10. $\ln(2x^3y^2)$

11. $\log\left(\frac{xy}{5}\right)$

12. $\log_7\left(\frac{3x^4}{y}\right)$

13. $\ln\left(\frac{x}{7y}\right)$

14. $\log_5\left(\frac{7x^2}{y^3}\right)$

15. $\log(xyz)$

16. $\ln\left(\frac{x+1}{(y+3)^2}\right)$

Rewrite each logarithmic expression as a single logarithm.

17. $\log x - 2 \log y$

$$\log x - 2 \log y = \log \left(\frac{x}{y^2} \right)$$

18. $3 \log_4 x + \log_4 y - \log_4 z$

19. $6 \log_2 x - 2 \log_2 x$

20. $\log 3 + 2 \log 7 - \log 6$

21. $\log x + 3 \log y - \frac{1}{2} \log z$

22. $7 \log_3 x - (2 \log_3 x + 5 \log_3 y)$

23. $2 \ln (2x + 3) - 4 \ln (y - 2)$

24. $\ln (x - 7) - 2(\ln x + \ln y)$

Suppose $w = \log_b 2$, $x = \log_b 3$, $y = \log_b 7$, and $z = \log_b 11$. Write an algebraic expression for each logarithmic expression.

25. $\log_b 33$

$$\begin{aligned} \log_b 33 &= \log_b (3 \cdot 11) \\ &= \log_b 3 + \log_b 11 \\ &= x + z \end{aligned}$$

26. $\log_b 98$

27. $\log_b \left(\frac{2}{3} \right)$

28. $\log_b \left(\frac{7}{8} \right)$

29. $\log_b 1.5$

30. $\log_b 2.75$