Precalculus Unit 4 Homework—Evaluating Using Properties of Logs

In exercises 1-6, change to logarithmic form.

1. $4^3 = 64$

$\log_4 64 = 3$

2. $3^5 = 243$

$\log_3 243 = 5$

3. $3^x = 4 - t$

$\log_3 (4-t) = x$

4. $7^x = 100p$

$\log_7 (100p) = x$

5. $10^5 = 100{,}000$

$\log 100{,}000 = 5$

6. $e^4 = D$

$\ln D = 4$

In exercises 7-12, change to exponential form.

7. $\log_2 32 = 5$

$2^5 = 32$

8. $\log_3 81 = 4$

$3^4 = 81$

9. $\log_3 (x+2) = 5$

$3^5 = x+2$

10. $\log_6 (2x-1) = 3$

$6^3 = 2x-1$

11. $\log x = 50$

$10^{50} = x$

12. $\ln x = 0.1$

$e^{0.1} = x$

In exercises 13-24, evaluate each logarithm (if possible).

13. $\log_5 1$

0

14. $\log_3 3$

1

15. $\log_4 (-2)$

not possible

16. $\log_7 7^2$

2

17. $3^{\log_3 8}$

8

18. $\log_5 125$

3

19. $\log_5 0$

not possible

20. $\log_6 6^7$

7

21. $\log_4 \frac{1}{16}$

-2

22. $5^{\log_5 4}$

4

23. $\log_2 128$

7

24. $\log_3 243$

5

In exercises 25-28, write each expression in terms of a single logarithm with a coefficient of 1.

25. $\log_b m - \frac{1}{2}\log_b n$

$\log_b \frac{m}{\sqrt{n}}$

26. $\log_b w + \log_b x - \log_b y$

$\log_b \frac{wx}{y}$

27. $3\log_b x + 2\log_b y - \frac{1}{4}\log_b z$

$\log_b \frac{x^3 y^2}{\sqrt[4]{z}}$

28. $\frac{1}{3}\log_b w - 3\log_b x - 5\log_b y$

$\log_b \frac{\sqrt[3]{w}}{x^3 y^5}$

In exercises 29-36, use the properties of logarithms to write each expression as a sum, difference, and/or constant multiple of logarithms.

29. $\log 5x$

$\log 5 + \log x$

30. $\log_8 t^{-3}$

$-3\log_8 t$

31. $\ln abc$

$\ln a + \ln b + \ln c$

32. $\ln\left(\frac{x^2-1}{x^3}\right)$

$\ln(x^2-1) - 3\ln x$

33. $\ln\sqrt{\frac{x^2}{y^3}}$

$\ln x - \frac{3}{2}\ln y$

34. $\ln\frac{x^4\sqrt{y}}{z^5}$

$4\ln x + \frac{1}{2}\ln y - 5\ln z$

35. $\log_5 \frac{x^5}{y^2 z^3}$

$5\log_5 x - 2\log_5 y - 3\log_5 z$

36. $\ln z(z-1)^2$

$\ln z + 2\ln(z-1)$