



## 6-5 Additional Practice

### Properties of Logarithms

Use the properties of logarithms to expand each expression.

1.  $\ln(a^4b^7)$

2.  $\ln(x^4)$

3.  $\log_7(a^2b^3c)$

4.  $\log\left(\frac{7}{8}\right)^x$

5.  $\log_5\left(\frac{x}{7y}\right)$

6.  $\log\left(\frac{a}{b^2}\right)$

Use the properties of logarithms to write each expression as a single logarithm.

7.  $3 \log 4 - 2 \log 7$

8.  $2 \ln 4 + 2 \ln 5$

9.  $2 \log_4 a + 5 \log_4 b$

10.  $\log 4 + \log 5 + \log 7$

11.  $2 \log 2 + 5 \log(2x)$

12.  $4 \log_6 a - 7 \log_6 b$

13. Use the formula  $\text{pH} = \log\left(\frac{1}{[H^+]}\right)$  to write an expression for the concentration of hydrogen ions in a liter of a sports drink that has a pH level of 2.5. What is the concentration of hydrogen ions?

Use the Change of Base Formula to evaluate each logarithm. Round to the nearest thousandth, if necessary.

14.  $\log_2 10$

15.  $\log_5 7$

16.  $\ln e$

17.  $\log_7 9$

18.  $\log_5 13$

19.  $\log_3 9$

Use the Change of Base Formula to solve each equation for  $x$ . Give an exact solution as a logarithm and an approximate solution rounded to the nearest thousandth.

20.  $5^x = 7$

21.  $4^x = 20$

22.  $7^x = 42$

23.  $4^x = 77$

24.  $8^x = 50$

25.  $3^x = 16$

26. Explain why  $\frac{2}{3} \neq \frac{\ln 2}{\ln 3}$ .