6-5 Additional Practice
Properties of Logarithms

Use the properties of logarithms to expand each expression.

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

2. $\ln (x^4)$

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

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 $pH = \log \left(\frac{1}{[H^+]}\right)$ 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 $\frac{2}{3} \neq \frac{\ln 2}{\ln 3}$.