6-5 Additional Practice

Properties of Logarithms

Use the properties of logarithms to expand each expression.

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

2. In
$$(x^4)$$

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.

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

10.
$$\log 4 + \log 5 + \log 7$$
 11. $2 \log 2 + 5 \log(2x)$ **12.** $4 \log_6 a - 7 \log_6 b$

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.

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 $\frac{2}{3} \neq \frac{\ln 2}{\ln 3}$.