NAME ______________________________ DATE __________

Practice A

For use with pages 493–499

Use the properties of logarithms to rewrite the expression in terms of log 2 and log 7. Then use log 2 ≈ 0.301 and log 7 ≈ 0.845 to approximate the expression.

1. $\log 4$
2. $\log 14$
3. $\log \left(\frac{7}{2}\right)$
4. $\log \left(\frac{2}{7}\right)$
5. $\log 7^{-3}$
6. $\log 49$

Expand the expression.

7. $\log_2(3x)$
8. $\log_3(9x)$
9. $\log\left(\frac{x}{5}\right)$
10. $\log_6\left(\frac{6}{x}\right)$
11. $\log_3 x^5$
12. $\ln x^{-3}$
13. $\log \sqrt[3]{x}$
14. $\log_2\sqrt{2x}$
15. $\log_3(27x)^2$

Condense the expression.

16. $\log 3 + \log 5$
17. $\log_2 x + \log_2 7$
18. $\log_3 14 + \log_3 y$
19. $\log 4 - \log x$
20. $\ln x - \ln 3$
21. $\log (x - 1) - \log 6$
22. $\ln 2 - \ln (x + 2)$
23. $\log_3 (x + 5) + \log_3 4$
24. $2 \log x + \log 8$

Use the change-of-base formula to rewrite the expression. Then use a calculator to evaluate the expression. Round your result to three decimal places.

25. $\log_2 5$
26. $\log_7 10$
27. $\log_3 17$
28. $\log_6 200$
29. $\log_5 \frac{1}{2}$
30. $\log_4 1235$

Investments **In Exercises 31 and 32, use the following information.**

You want to invest in a stock whose value has been increasing by approximately 5% each year. The time required for an initial investment of I_0 to grow to I can be modeled by

$$t = \frac{\ln\left(\frac{I}{I_0}\right)}{0.049},$$

where I_0 and I are measured in dollars and t is measured in years.

31. Expand the expression for t.

32. Assume that you have $1000 to invest. Complete the table to show how long your investment would take to double, triple, and quadruple.

I	2000	3000	4000
t			

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LESSON

8.5

NAME ______________________________ DATE __________

Practice B

For use with pages 493–499

Use the properties of logarithms to rewrite the expression in terms of log 3 and log 4. Then use log 3 ≈ 0.477 and log 4 ≈ 0.602 to approximate the expression.

1. $\log\left(\frac{3}{4}\right)$ **2.** $\log 12$ **3.** $\log 9$

4. $\log 16$ **5.** $\log \frac{1}{4}$ **6.** $\log\left(\frac{4}{27}\right)$

Expand the expression.

7. $\log_6 3x$ **8.** $\log_2 \frac{x}{5}$ **9.** $\log xy^2$

10. $\log_4 \frac{xy}{3}$ **11.** $\log_3 \sqrt{x}\, y\, z$ **12.** $\log_5 2\sqrt{x}$

13. $\log \frac{x^2}{4}$ **14.** $\log \frac{10}{\sqrt{x}}$ **15.** $\log_2 \frac{x^2y}{z}$

Condense the expression.

16. $\log_3 7 - \log_3 x$ **17.** $2\log_5 x + \log_5 3$

18. $\log_4 5 + \log_4 x + \log_4 y$ **19.** $\frac{1}{2}\log x - \log 4$

20. $\frac{2}{3}\log_2 x - 3\log_2 y$ **21.** $\log_3 4 + 2\log_3 x - \log_3 5$

Use the change-of-base formula to rewrite the expression. Then use a calculator to evaluate the expression. Round your result to three decimal places if necessary.

22. $\log_3 12$ **23.** $\log_6 2$ **24.** $\log_4 0.5$

25. $\log_{0.8} 12$ **26.** $\log_{1.5} 2.8$ **27.** $\log_{1/2} 6$

Henderson-Hasselbach Formula **In Exercises 28–32, use the following information.**

The pH of a patient's blood can be calculated using the Henderson-Hasselbach Formula, $pH = 6.1 + \log \frac{B}{C}$, where B is the concentration of bicarbonate and C is the concentration of carbonic acid. The normal pH of blood is approximately 7.4.

28. Expand the right side of the formula.

29. A patient has a bicarbonate concentration of 24 and a carbonic acid concentration of 1.9. Find the pH of the patient's blood.

30. Is the patient's pH in Exercise 29 below normal or above normal?

31. A patient has a bicarbonate concentration of 24. Graph the model.

32. Use the graph to approximate the concentration of carbonic acid required for the patient to have normal blood pH.

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