NAME _____ DATE _____ PERIOD _____

7-6 Practice
Common Logarithms

Use a calculator to evaluate each expression to the nearest ten-thousandth.

1. log 101 **2.** log 2.2 **3.** log 0.05

Use the formula pH = –log [*H*+] to find the pH of each substance given its concentration of hydrogen ions. Round to the nearest tenth.

4. milk: [*H*+] = 2.51×10^{-7} mole per liter

5. acid rain: [*H*+] = 2.51×10^{-6} mole per liter

6. black coffee: [*H*+] = 1.0×10^{-5} mole per liter

7. milk of magnesia: [*H*+] = 3.16×10^{-11} mole per liter

Solve each equation or inequality. Round to the nearest ten-thousandth.

8. $2^x < 25$ **9.** $5^a = 120$ **10.** $6^z = 45.6$

11. $9^m \geq 100$ **12.** $3.5^x = 47.9$ **13.** $8.2^y = 64.5$

14. $2^{b+1} \leq 7.31$ **15.** $4^{2x} = 27$ **16.** $2^{a-4} = 82.1$

17. $9^{z-2} > 38$ **18.** $5^{w+3} = 17$ **19.** $30^{x^2} = 50$

20. $5^{x^2-3} = 72$ **21.** $4^{2x} = 9^{x+1}$ **22.** $2^{n+1} = 5^{2n-1}$

Express each logarithm in terms of common logarithms. Then approximate its value to the nearest ten-thousandth.

23. $\log_5 12$ **24.** $\log_8 32$ **25.** $\log_{11} 9$

26. $\log_2 18$ **27.** $\log_9 6$ **28.** $\log_7 \sqrt{8}$

29. HORTICULTURE Siberian irises flourish when the concentration of hydrogen ions [*H*+] in the soil is not less than 1.58×10^{-8} mole per liter. What is the pH of the soil in which these irises will flourish?

30. ACIDITY The pH of vinegar is 2.9 and the pH of milk is 6.6. Approximately how many times greater is the hydrogen ion concentration of vinegar than of milk?

31. BIOLOGY There are initially 1000 bacteria in a culture. The number of bacteria doubles each hour. The number of bacteria *N* present after *t* hours is $N = 1000(2)^t$. How long will it take the culture to increase to 50,000 bacteria?

32. SOUND An equation for loudness *L* in decibels is given by $L = 10 \log R$, where *R* is the sound's relative intensity. An air-raid siren can reach 150 decibels and jet engine noise can reach 120 decibels. How many times greater is the relative intensity of the air-raid siren than that of the jet engine noise?