NAME _____ DATE _____

Practice 21

FOR USE WITH SECTION 4.2

Write each equation in logarithmic form.

1. $2^5 = 32$ **2.** $9^2 = 81$ **3.** $3^5 = 243$ **4.** $4^{-1/2} = \frac{1}{2}$

5. $7^0 = 1$ **6.** $4^{-3} = \frac{1}{64}$ **7.** $(0.5)^3 = 0.125$ **8.** $1000^{-1/3} = \frac{1}{10}$

Write each equation in exponential form.

9. $\log_3 81 = 4$ **10.** $\log_{1/2} 32 = -5$ **11.** $\log_5 \frac{1}{5} = -1$ **12.** $\log_2 64 = 6$

13. $\log_8 16 = \frac{4}{3}$ **14.** $\log_3 1 = 0$ **15.** $\log_{0.09} 0.3 = \frac{1}{2}$ **16.** $\log_{1/25} 125 = -\frac{3}{2}$

Evaluate each logarithm.

17. $\log_6 36$ **18.** $\log_{27} 3$ **19.** $\log 0.0001$ **20.** $\ln e^4$

21. $\log_2 \frac{1}{64}$ **22.** $\log_4 1$ **23.** $\log_{1.5} 2.25$ **24.** $\log_{81} \frac{1}{3}$

25. The atmospheric pressure (in lb/in.^{2}) at altitude x (in miles) above sea level is given by the equation

$$y = 14.7e^{-0.198x}.$$

a. Find the inverse of the given function.

b. Predict the altitude at which the atmospheric pressure is 5 lb/in.^{2}.

c. Find the altitude at which the atmospheric pressure is $\frac{1}{2}$ of what it is at sea level.

26. Writing Evaluate several pairs of logarithms like $\log_3 27$ and $\log_{27} 3$, or $\log_4 8$ and $\log_8 4$. Describe any pattern that you notice. Make a conjecture about the relationship between $\log_a b$ and $\log_b a$, where a and b are positive numbers and neither is equal to 1.