Name: ______ Exponential & Logarithmic Functions Ch. 10 & 11 Review

Does the following represent exponential growth or decay. How can you tell? 1. $y = \frac{1}{3}(4)^{x}$ $y = 5(0.7)^{x}$ a) b)

2. Write an exponential function for the graph that will pass through (0, -2) and (3, -54)

Solve each of the equations. Show all work. $9^x = \frac{1}{81}$ b) $2^{6x} = 4^{5x+2}$ 3. c) $49^{3p+1} = 7^{2p-5}$ $9^{x} = \frac{1}{81}$ a)

d)
$$2e^x - 4 = 1$$
 e) $-4e^{2x} + 15 = 7$

The population of mice in a particular area is growing exponentially. On January 1, there were 4. 50 mice, and by June 1, there were 200 mice. Write an exponential function of the form $P(t) = ab^{t}$ that could be used to model the mouse population, P(t), of the area as a function of time, t, in months since January 1.

- 6.
- Write the following in logarithmic form. b) $5^{-2} = \frac{1}{25}$ c) $e^{x} = 6$ a)

7. Write the following in exponential form. $\log_8 2 = \frac{1}{3}$ $\log_4 64 = 3$ c) $\ln 7.4 = x$ b) a)

Evaluate each expression. 8. $4^{\log_4 9}$ $\log_7 7^{-5}$ a) b) $\log_{81} 3$ d) log₁₃ 169 c)

In chemistry the pH of a substance is given by the function $P(H) = -\log(H)$ where H is the 9. hydrogen ion concentration of the substance. How many times as great is the acidity of orange juice with a pH of 3 as battery acid with a pH of 0?

- **10.** Solve each equation.
- a) $\log_4 x = \frac{1}{2}$ b) $\log_{81} 729 = x$ c) $\log_8 (x^2 + x) = \log_8 12$

d)
$$\ln (x - 10) = 0.5$$
 e) $\ln x + \ln 4x = 10$

- 11. Condense the following into a single statement.
 a) log₅ (x + 4) + ¹/₂ log₅ x
 b) 2log₂ x log₂ (x + 3)
- c) $\log_6 3x^2 2\log_6 (x/y) + \log_6 y$
- **12.** Solve each equation. Round to 4 decimals where appropriate.
- a) $2^x = 53$ b) $2.3^x = 66.6$ c) $6^{3y} = 8^{y-1}$

13. Holly deposited \$500 into a bank account that pays an annual interest rate of 3% compounded quarterly. Use $A = P(1 + r/n)^{nt}$ to find how long it will take for Diane's money to double.