Name _____ Date _____

Mr. Schlansky Algebra II

Exponential Equations Word Problems

1. A population of wolves in a county is represented by the equation $P(t) = 80(0.98)^t$, where t is the number of years since 1998. After how many years will the population of wolves be 60 rounded to the *nearest year*?

2. Juliette deposits \$3000 into a bank account where the balance of the account $b(t)$ after t years can be represented by $b(t) = 3000e^{.042t}$. To the nearest tenth of a year, how long will it take for Juliette's money to double?

3. 200 grams of a radioactive substance decays according to the formula $a(t) = 200(.094)^{2t}$ where $a(t)$ is the amount of the radioactive substance remaining after t years. To the nearest hundredth of a year, how long will it take until there are 150 grams remaining?

4. After an oven is turned on, its temperature, T, is represented by the equation $T = 400 - 350(3.2)^{-0.1m}$, where m represents the number of minutes after the oven is turned on and T represents the temperature of the oven, in degrees Fahrenheit.
How many minutes does it take for the oven's temperature to reach 300°F? Round your answer to the *nearest minute*.

5. Drew's parents invested $1,500 in an account such that the value of the investment doubles every seven years. The value of the investment, V, is determined by the equation $V = 1500(2)^{\frac{t}{7}}$, where t represents the number of years since the money was deposited. How many years, to the *nearest tenth of a year*, will it take the value of the investment to triple?

6. The number of houses in Central Village, New York, grows every year according to the function $\mathrm{H}(t) = 540(1.039)^{1.02t}$, where H represents the number of houses, and t represents the number of years since January 1995. A civil engineering firm has suggested that a new, larger well must be built by the village to supply its water when the number of houses exceeds 1,000. During which year will this first happen?