

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*?

$$\frac{60 = 80(0.98)^{+}}{80 \cdot 80} = \frac{3}{80} = \frac{1}{80}$$

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?

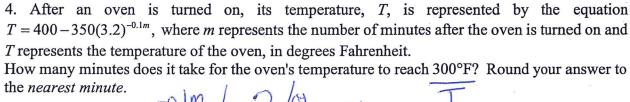
Juliette's money to double?

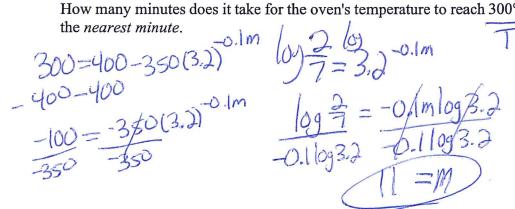
$$541=2(3000)=6000$$
 $\ln 2 = \ln e \cdot 042 + \ln 2 = 042$

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?

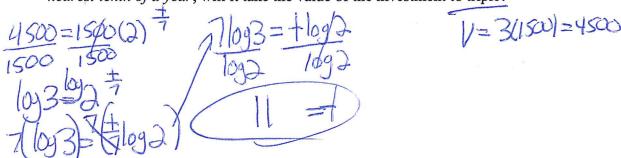
$$\frac{150 = 200(.094)^{2+}}{200 200} = \frac{109^{\frac{3}{4}} = 2 + \log.094}{2\log.094} = 2\log.094$$

$$09^{\frac{3}{4}} = \frac{\log.094}{2\log.094} = 2\log.094$$





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 $H(t) = 540(1.039)^{1.02t}$, 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?

$$\frac{100}{540} = \frac{540(1.039)}{540}$$

$$\frac{18}{540} = \frac{100}{540}$$

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