

More Exponential Models...

Part 1: For each situation, make a table of several ordered pairs and write an exponential equation that models the information. Then use the model to answer the questions. You may need to solve the equation graphically.

1. The radioactive gas radon has a half-life of 3.8 days. How long would it take 1.0 grams of the gas to decay to .2 grams?
2. The population of a town is 625,000 and is increasing at a rate of 4.05% per year. What will the population be in 8 years? When will the population be 1.5 million?
3. The number of rabbits in a certain population doubles every month. If there are 20 rabbits initially, how many rabbits are present after 5 years.
4. In 1994, the population of the US was 260.8 million with an annual growth rate of .7%. At the same time, the population of Mexico was 91.8 million with an annual growth rate of 2.2%. If the growth rates remain the same, when will the population of Mexico overtake that of the United States?
5. The number of small pox cases has dropped exponentially at a rate of 10% every year. If there were 1,500,000 cases in 1910, how many cases were there in 1975?

Part 2: The following situations follow an exponential model...that is $y = ab^x$, where a and b are constants. For each of the following, use the information to find a and b , then answer the question posed.

6. If 14 grams of Einsteinium decays to 9.4 grams in 1100 years, what is its half-life?
7. The number of E Coli bacteria multiplies from 1.5 million to 3.7 million from 2 pm to 5 pm. How many will be present at 7:30 pm?
8. Crystal has been looking at old radio dials and she noticed that the numbers are not evenly spaced. She hypothesizes that there is an exponential relationship involved. The display on her digital radio is out. She turned on the radio at 88.7 FM. After six clicks of the tuning knob, she was listening to 92.9 FM.
 - a. Name two points that the function must fit. (Use zero clicks for 88.7)
 - b. Using the exponential model $y = ab^x$ and the above ordered pairs, write the equation for this situation.
 - c. Use the equation you have found to determine how many clicks she should turn to get from 88.7 FM to 106.3 FM.