Exponential Functions, Worksheet 2
Classwork

Objective:

The main purpose of this activity is to apply your knowledge of exponential functions to model situations in the real world. By the time you complete the activity, you should be able to write a formula for an exponential function to fit the situation and solve equations in order to answer questions about the situation.

Vocabulary:

Exponential growth refers to something which increases by a constant ratio over regular intervals. **Exponential decay** refers to something which decreases by a constant ratio over regular intervals.

1) A car's book value is an estimate of a car's resale value. In 2005, Tom bought a used car for $7000, its book value at that time. Three years later, the car's book value was $3584. Suppose the book value decreases exponentially.

   a) Find an equation to model the car's book value over time. It will work best if you use fractions rather than decimals to compute the ratio.

   b) What is the book value of the car in 2011?

   c) Tom's car was a 2002 model. What was the car's value when new?

2) Here is something I pulled out of textbook on bacteriology:

   "The time interval required for a bacterial cell to divide or for a population of bacterial cells to double is called the generation time. Generation times for bacterial species growing in nature may be as short as 15 minutes or as long as several days."

   So let's say you are in medical school and you start out with a sample of bacteria that has 5000 little critters in it. Your particular species has a generation rate of 30 minutes. How long will it take for you to have over a million bacteria?

3) How many bacteria will there be after a week? How about 30 days?

4) Do you think that exponential growth is a reasonable type of model to use for something like bacteria? Discuss this with your group.

By the way, your homework one day next week is going to be to look for some real-world data on something that you think might be exponential. It should be something you are interested in. So you might start thinking now about what type of thing you would like to gather data on. For example, is the popularity of Twitter growing exponentially?

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