Determining Rates in Exponential Functions Class Work

❧ **Objective:** *You will be able to manipulate exponential functions to determine various rates.*

★ **Example 1:** An online company that sells music provided incentives for customers who attended charity events run by the company. Over the course of one year, the amount of people attending the events increased exponentially by 38%. Determine the monthly rate of increase, expressed as a percent to the nearest hundredth.

🖉 **Now You Try!:** Be sure to show all work, and check for reasonableness and correctness.

1. Due to advertisement of an opportunity to help others, the number of volunteers at a local food bank increased exponentially by 27% over the course of one year. Determine the monthly rate of increase, expressed as a percent to the nearest tenth.

★ **Example 2:** A bank offers a certain type of savings account that compounds 1.2% interest, compounded quarterly.

a. Write an expression to model the situation for any principle amount, P.

b. Rewrite your expression so that it accurately reflects the annual interest rate.

c. Rewrite your expression so that it accurately reflects the monthly interest rate.

2. A bank offers a certain type of savings account that compounds 1.9% interest, compounded semi-annually.

a. Write an expression to model the situation for any principle amount, P.

b. Rewrite your expression so that it accurately reflects the annual interest rate.

c. Rewrite your expression so that it accurately reflects the weekly interest rate. (assume 52 weeks in one year)

3. The half-life of a certain isotope is two days. Assume a sample contains 8.23 grams of this isotope.

a. Write a function L(t) to model the mass of the isotope after t days, using a fractional exponent.

b. Rewrite your model without a fractional exponent.

c. Complete the blank: The base of the exponential equation in part b can be interpreted to signify that _____ percent of the element remains from one day to the next.

d. By approximately what percent does the mass of the element decrease by daily?

_____

<u>Exit Slip:</u>

During one year, the population of a certain type of plant grew according to the model $P = P_0(1.23)^t$, where P is the total population, P_0 is the initial population, and t is the time in years. Rewrite this equation in such a way that it can be used to model the approximate weekly growth rate.
(Round to at least 5 decimal places)