### Lesson 7 Practice Problems

1. The half-life of carbon-14 is about 5,730 years. A fossil had 6 picograms of carbon-14 at one point in time. (A picogram is a trillionth of a gram or gram.) Which expression describes the amount of carbon-14, in picograms, years after it was measured to be 6 picograms.
2. The half-life of carbon-14 is about 5,730 years. A tree fossil was estimated to have about 4.2 picograms of carbon-14 when it died. (A picogram is a trillionth of a gram.) The fossil now has about 0.5 picogram of carbon-14. About how many years ago did the tree die? Show your reasoning.
3. Nickel-63 is a radioactive substance with a half-life of about 100 years. An artifact had 9.8 milligrams of nickel-63 when it was first measured. Write an equation to represent the mass of nickel-63, in milligrams, as a function of:
   1. , time in years
   2. , time in days
4. Tyler says that the function is exponential and so it grows by equal factors over equal intervals. He says that factor must be for an interval of because ten of those intervals makes an interval of length 1. Do you agree with Tyler? Explain your reasoning.

* (From Unit 4, Lesson 5.)

1. The population in a city is modeled by the equation , where is the number of decades since 1970.
   1. What do the 0.3 and 100,000 mean in this situation?
   2. Write an equation for the function to represent the population years after 1970. Show your reasoning.
   3. Write an equation for the function to represent the population centuries after 1970. Show your reasoning.

* (From Unit 4, Lesson 6.)

1. The function is exponential. Its graph contains the points and .
   1. Find . Explain your reasoning.
   2. Use the value of to find . Explain your reasoning.
   3. What is an equation that defines ?

* (From Unit 4, Lesson 6.)

1. Select **all** expressions that are equal to .
   1. 4

* (From Unit 3, Lesson 4.)



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