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Solve the problem.

1) In a chemical reaction, the rate at which the amount of a reactant changes with time is   1) _____

   proportional to the amount present, such that $\frac{dy}{dt} = -0.7y$, when t is measured in hours. If

   there are 61 g of reactant present when t = 0, how many grams will be left after 2 hours?
   Give your answer to the nearest tenth of a gram.

2) Find the half-life of the radioactive element radium, assuming that its decay constant is   2) _____
   $k = 4.332 \times 10^{-4}$, with time measured in years.

3) The amount of alcohol in the bloodstream, A, declines at a rate proportional to the amount,   3) _____

   that is, $\frac{dA}{dt} = -kA$. If k = 0.3 for a particular person, how long will it take for his alcohol

   concentration to decrease from 0.10% to 0.05%? Give your answer to the nearest tenth of
   an hour.

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Answers:

1) 15 g

2) 1600 years

3) 2.3 hr