

SAMPLE EXAM Problems on Exponential Growth  
(For first quarter or first semester calculus exams.)

**Question 1** A deposit of \$2000 is made into a fund with annual interest rate of 5%. If the interest is compounded continuously, then the time it takes to triple the deposited amount is

- a)  $\frac{\ln(3)}{\ln(0.05)}$
- b)  $\frac{\ln(3)}{0.05}$
- c)  $\frac{-\ln(3)}{\ln(0.05)}$
- d)  $\frac{-\ln(3)}{0.05}$
- e) None of the above

**Question 2** A radioactive substance has a half-life of 1000 years. How long does it take for 25% of it to decay? Simplify your answer as much as possible without using a calculator.

**Question 3** The remains of an old campfire are unearthed and it is found that there is only 80% as much radioactive carbon-14 in the charcoal samples from the campfire as there is in modern living trees. If the half-life of carbon-14 is 5730 years, how long ago did the campfire burn? You do not need to simplify your answer.

**Question 4** Babbette needs 1 gram of radioactive Kryptonite to perform an important experiment. Unfortunately, she doesn't have the lab set up for her experiment yet and her Kryptonite is decaying. Yesterday there were 15 grams of Kryptonite left and today there are only 12 grams left. How long does she have before she doesn't have enough Kryptonite left to do her experiment?