Please show **all** your work! Answers without supporting work will not be given credit.
Write answers in spaces provided.

Name:

1. **[5 pts]** The radioactive isotope ^{226}Ra has a half-life of 1,599 years. If there are 10 grams of ^{226}Ra initially, how much is there are 1,000 years.

   (Round your answer to 4 decimal places)

$$y(1,000) = \underline{\hspace{4cm}}$$

2. **[5 pts]** The rate of change of the population $N(t)$ of a sample of bacteria is directly proportional to the number of bacteria present, so
$$N'(t) = kN$$
   where time t is measured in hours. Initially, there are 200 bacteria present. If the number of bacteria after 3 hours is 400, find the growth rate k in terms of hours.

   (Round your answer to 3 decimal places)

$$k = \underline{\hspace{4cm}}$$