

For each problem you must write an equation and show your work. Remember to use correct units!

1. Find the accumulated value of an investment of \$10,000 for 5 years at an interest rate of 5.5% if the money is
 - a. Compounded semiannually:
 - b. Compounded quarterly:
 - c. Compounded monthly:
 - d. Compounded continuously:
2. Find the accumulated value of an investment of \$5000 for 10 years at an interest rate of 6.5% if the money is
 - a. Compounded semiannually:
 - b. Compounded quarterly:
 - c. Compounded monthly:
 - d. Compounded continuously:
3. Consider a situation where you have \$2000 to invest and you can choose between getting paid a flat rate of \$100 per year or receiving 4% interest per year (this would mean $n=1$). Create an equation for each option and use the table in your calculator to answer the following questions.
 - a. When is the option with the \$100 flat rate more lucrative?
 - b. When is the option with 4% interest more lucrative?
 - c. When would 4% interest be more lucrative than receiving a flat fee of \$1000 per year?
 - d. Is there any flat fee that would not eventually be surpassed by a yearly percentage rate?

4. In Bolivia, the population was 10.5 million people in the year 2010 and the country has 1.6% annual growth rate.
- A) Assuming population grows continuously write a function to model Bolivia's population with respect to t , the number of years after 2010.
- B) Use your model to predict what Bolivia's population will be in the year 2030.
5. A hospital gives you 120 mg of a drug. This drug has a half-life of 2 hours. Write an equation to represent the amount of drug left in your bloodstream after t hours. Use your equation to find out how much of the drug would remain after 11 hours.
6. 16 mg of Strontium is found in a rock sample. Strontium has a half-life of 14 years. Write an equation to represent the amount of Strontium left in the rock after t years. Then use the equation to find how much will remain after 26 years.
7. The population of Boston, Massachusetts is growing at a rate of 1.8%. The population in 2013 was approximately 636,500. What is the predicted population for 2025?
8. Suppose you have \$12,000 to invest. Which investment yields the greater return over 3 years: 7% compounded monthly or 6.85% compounded continuously?
9. Suppose you have \$6000 to invest. Which investment yields a greater return over 4 years: 8.25% compounded quarterly or 8.3% compounded semiannually?
10. In 1626, Peter Minuit convinced the Wappinger Indians to sell him Manhattan Island for \$24. If the Native Americans had put \$24 into a bank account paying 5% interest, how much would the investment have been worth in the year 2012 if the interest were compounded
- a. Monthly?
- b. Continuously?