Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Period \_\_\_\_\_\_\_\_\_\_\_\_ Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Advanced Functions and Modeling**

**Compound Interest**

1. If interest is compounded annually, find the compound amount of $1000 invested for 5 years at 9.5% interest.

2. If interest is compounded semiannually, find the compound amount of $2500 invested for 3 years at 10% per year.

3. If interest is compounded semiannually, find the compound amount of $1200 invested for four and a half years at 12%.

4. If $100 is invested at 7% continuously compounded for 15 years, what is the amount at the end of that time?

5. If $350 is invested at 14.5% continuously compounded for 50 years, what is that amount at the end of that time?

6. Suppose you invest $3000 at 15% annual interest. Calculate the amount you would have after one year if interest is compounded (a) quarterly, (b) monthly, and (c) continuously.

7. One hundred dollars is deposited in a bank which compounds interest quarterly yields $115 at the end of a year. What is the annual rate of interest?

8. Mr. Hammond invests a sum of money at 8% interest compounded continuously. If he made his investment on January 1, 1981, and had $10,000 in his account by January 1, 2000, what was his original investment?

9. At what rate of interest compounded quarterly will $200 triple in 25 years?

**Growth and Decay**

10. The half-life of a certain radioactive substance is 14 days. There are 6.6 grams present initially. How much is let after 3 days?

11. Refer to question 10. After how much time will only 2 grams be left?

12. The half-life of a certain radioactive substance is 65 days. There are 3.5 grams present initially. When will there be less than 1 gram remaining?

13. The amount *C* in grams of carbon-14 present in a certain substance after *t* years is given by $C=20e^{-0.0001216t}$.

 a. What was the initial amount of carbon-14 present?

 b. How much is left after 10,400 years?

 c. When will the amount left be 10 grams?

 d. Estimate the half-life carbon-14.