Practice 8-8

Exponential Growth and Decay

Write an exponential function to model each situation. Find each amount after the specified time.

1. Suppose one of your ancestors invested $500 in 1800 in an account paying 4% interest compounded annually. Find the account balance in each of the following years.

   a. 1850　　　　**b.** 1900　　　　**c.** 2000　　　　**d.** 2100

2. Suppose you invest $1500 in an account paying 4.75% annual interest. Find the account balance after 25 yr with the interest compounded the following ways.

   a. annually　　**b.** semiannually　　**c.** quarterly　　**d.** monthly

3. The starting salary for a new employee is $25,000. The salary for this employee increases by 8% per year. What is the salary after each of the following?

   a. 1 yr　　　　**b.** 3 yr　　　　**c.** 5 yr　　　　**d.** 15 yr

4. Carbon-14 has a half-life of 5,700 years. Scientists use this fact to determine the age of things made of organic material. Suppose the average page of a book containing approximately 0.5 mg of carbon-14 is put into a time capsule. How much carbon-14 will each page contain after each of the following numbers of years?

   a. 5700　　　　**b.** 11,400　　　**c.** 22,800　　　**d.** 34,200

5. The tax revenue that a small city receives increases by 3.5% per year. In 1990, the city received $250,000 in tax revenue. Determine the tax revenue in each of the following years.

   a. 1995　　　　**b.** 1998　　　　**c.** 2000　　　　**d.** 2006

6. Suppose the acreage of forest is decreasing by 2% per year because of development. If there are currently 4,500,000 acres of forest, determine the amount of forest land after each of the following.

   a. 3 yr　　　　**b.** 5 yr　　　　**c.** 10 yr　　　　**d.** 20 yr

7. A $10,500 investment has a 15% loss each year. Determine the value of the investment after each of the following.

   a. 1 yr　　　　**b.** 2 yr　　　　**c.** 4 yr　　　　**d.** 10 yr

8. A city of 2,950,000 people has a 2.5% annual decrease in population. Determine the city's population after each of the following.

   a. 1 yr　　　　**b.** 5 yr　　　　**c.** 15 yr　　　　**d.** 25 yr

9. A $25,000 purchase decreases 12% in value per year. Determine the value of the purchase after each of the following.

   a. 1 yr　　　　**b.** 3 yr　　　　**c.** 5 yr　　　　**d.** 7 yr