

Name: \_\_\_\_\_ Period: \_\_\_\_\_

**1. Account Balance** You deposit \$5000 in an account that pays 7% annual interest compounded continuously. What is the balance after 2 years?

2. You buy a new car for \$24,000. The value  $y$  of the car decreases by 16% each year.

a. Write an exponential decay model for the value of the car. Use the model to estimate the value after 2 years.

3. You deposit \$1000 in an account that earns 2.5% annual interest. Find the balance after 3 years if this interest is compounded with the given frequency.

a. monthly

b. daily

c. hourly

4. You deposit \$1000 in an account that pays 8% annual interest compounded continuously. What is the balance after 1 year?

5. There are 40,000 homes in your city. Each year 10% of the homes are expected to disconnect from septic systems and connect to the sewer system.

a. Write an exponential decay model for the number of homes that still use septic systems.

b. Use the model to estimate the number of homes using septic systems after 5 years.

6. You purchase a stereo system for \$830. After a 3 month trial period, the value of the stereo system decreases 13% each year.

a. Write an exponential decay model for the value of the stereo system in terms of the number of years since the purchase.

b. What was the value of the system after 1 year?

7. A tool and die business purchases a piece of equipment for \$250,000. The value of the equipment depreciates at a rate of 12% each year.

- a. Write an exponential decay model for the value of the equipment.
- b. What is the value of the equipment after 5 years?
- c. Use the model to estimate when the equipment will have a value of \$70,000.

8. In January, 1993, there were about 1,313,000 Internet hosts. During the next five years, the number of hosts increased by about 100% per year.

- a. Write a model giving the number  $h$  (in millions) of hosts  $t$  years after 1993. About how many hosts were there in 1996?

9. You deposit \$1000 in an account that pays 8% annual interest. Find the balance after 1 year if the interest is compounded with the given frequency.

a. annually

b. quarterly

c. daily

10. In 1990, the tuition at a private college was \$15,000. During the next 9 years, tuition increased by about 7.2% each year.

- a. Write a model giving the cost  $C$  of tuition at the college  $t$  years after 1990.
- b. Estimate the year when the tuition was \$20,000.
- c. Estimate the tuition in 2010.

$$① \quad 5000 e^{0.07(2)}$$
$$\boxed{\$5751.37}$$

$$② \quad 2400 (1-0.16)^x$$
$$2400 (0.84)^2 = \boxed{1693.44}$$

$$③ \quad a) \quad 1000 \left(1 + \frac{0.025}{12}\right)^{12 \cdot 3} = \boxed{1077.80}$$

$$b) \quad 1000 \left(1 + \frac{0.025}{365}\right)^{365 \cdot 3} = \boxed{1077.88}$$

$$c) \quad 1000 \left(1 + \frac{0.025}{8760}\right)^{8760 \cdot 3} = \boxed{1077.88}$$

$$④ \quad A = 1000 e^{0.08 \cdot (1)} = \boxed{1083.29}$$

$$⑤ \quad a) \quad A = 40000 (1-0.1)^x$$

$$b) \quad A = 40,000 (0.9)^5 = \boxed{23,619.60}$$

$$⑥ \quad a) \quad 830 (1-0.13)^{x-0.25}$$

$$b) \quad 830 (1-0.13)^{4-0.25} = \boxed{747.68}$$

$$⑦ \quad a) \quad 250,000 (1-0.12)^x$$

$$b) \quad 250,000 (1-0.12)^5 = \boxed{131,932.98}$$

$$c) \quad 70000 = 250,000 (0.88)^x$$

$$0.28 = 0.88^x \quad \boxed{x \approx 10}$$

$$\textcircled{8} \text{ a.) } 1.313(1+1)^t$$
$$1.313(2)^3 = \boxed{10.504 \text{ million}}$$

$$\textcircled{9} \text{ a.) } 1000 \left(1 + \frac{0.08}{1}\right)^{1.1} = \boxed{1080}$$

$$\text{b.) } 1000 \left(1 + \frac{0.08}{4}\right)^{1.4} = \boxed{1082.43}$$

$$\text{c.) } 1000 \left(1 + \frac{0.08}{365}\right)^{365} = \boxed{1083.28}$$

$$\textcircled{10} \text{ a.) } 15000(1+0.072)^t$$

$$\text{b.) } 20000 = 15000(1.072)^t$$
$$\boxed{t \approx 4.14}$$

$$\text{c.) } 15000(1.072)^{20} = \boxed{60,254.15}$$