

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

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

### Exponential Growth and Decay Word Problems

*Show all work when using equations.*

1. 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 an equation giving the cost  $C$  of tuition at the college  $t$  years after 1990.
  - b. What is the tuition in 2010?
  - c. What year was the tuition about \$20,000?
  
2. Ten grams of Carbon 14 is stored in a container. The amount  $C$  (in grams) of Carbon 14 present after  $t$  years can be modeled by  $C = 10(.99987)^t$ .
  - a. Identify the initial amount, the decay factor, and the decay rate.
  - b. How much Carbon 14 is present after 1000 years?
  
3. From 1991 through 1995, the number of computers per 100 people worldwide can be modeled by  $C = 25.2(1.15)^t$  where  $t$  is the number of years since 1991.
  - a. Identify the initial amount, the growth factor, and the growth rate.
  - b. What is the number of computers per 100 people worldwide in 2000?
  
4. You purchase a stereo system for \$830. The value of the stereo system decreases 13% each year.
  - a. Write an exponential decay equation for the value of the stereo system in terms of the number of years since the purchase.
  - b. What is the value of the system after 6 years?

5. The number of newly reported cases of tuberculosis  $T$  (in thousands) in the United States from 1991 to 1996 can be approximated by the equation  $T = 28.5(0.9567)^t$ , where  $t$  represents the number of years since 1990.
- Identify the initial amount, the decay factor, and the decay rate.
  - Find the number of newly reported cases in 2005.
  - In what year was the number of newly reported cases in the United States approximately 25,000?
6. A house was purchased for \$290,000 in 1995.
- If the value of the home increases by 5% per year, what is it worth in the year 2020?
8. You have bought a new car for \$26,500. The value  $y$  of the car decreases by 18% each year.
- Write an exponential decay equation for the value of the car.
  - Use the equation to find the value of the car after three years.
  - When will the car have a value of \$18,000?