

## 9-1 CLASSWORK

## Exponential Growth

Occurs when a quantity \_\_\_\_\_ by the same rate over time.

$$y = a(1 + r)^t$$

$$a = \underline{\hspace{10em}}$$

$$r = \underline{\hspace{10em}}$$

$$t = \underline{\hspace{10em}}$$

## Examples:

1. The original value of an investment is \$1400, and the value increases by 9% each year. Write an exponential growth function to model this situation. Then, find the value of the investment after 25 years.

$$y = 1400(1.09)^x$$

2. The cost of tuition at a college is \$12,000 and is increasing at a rate of 6% each year. Write an exponential growth function to model this situation. Then, find the tuition cost after 4 years.

$$y = 12000(1.06)^x$$

3. The number of student athletes at a local high school is 300 and is increasing at a rate of 8% per year. Write an exponential growth function to model this situation. Then, find the number of student athletes after 5 years.

$$y = 300(1.08)^x$$

4. Annual sales for a company are \$149,999 and are increasing at a rate of 6% per year. Write an exponential growth function to model this situation. Then, find the annual sales after 7 years.

$$y = 149999(1.06)^x$$

5. The population of a small town is 1600 and is increasing at a rate of 3% per year. Write an exponential function to model this situation. Then, find the population of the town after 10 years.

$$y = 1600(1.03)^x$$

6. In 1985, there were 285 cell phone subscribers in Mayville. The number of subscribers increased by 75% per year after 1985. How many subscribers were in Mayville in 2008?

$$y = 285(1.75)^x$$

# Exponential Decay

Occurs when a quantity \_\_\_\_\_ by the same rate over time.

$$y = a(1 - r)^t$$

$$a = \underline{\hspace{10em}}$$

$$r = \underline{\hspace{10em}}$$

$$t = \underline{\hspace{10em}}$$

## Examples:

7. The population of a town is decreasing at a rate of 1% per year. In 2000 there were 1300 people. Write an exponential decay function to model this situation. Then, find the population in 2008.

$$y = 1300(0.99)^x$$

8. The value of a car is \$18,000 and depreciating at a rate of 12% per year. Write an exponential decay function to model this situation. Then, find the value of the car after 10 years.

$$y = 18000(0.88)^x$$

9. A farmer buys a tractor for \$50,000. If the tractor depreciates 10% per year, write an exponential decay function to find the value of the tractor in 7 years.

$$y = 50000(0.90)^x$$

10. An investment of \$8200 loses value at a rate of 2% per year. Write an exponential decay function to find the value of the investment after 9 years.

$$y = 8200(0.98)^x$$

11. The value of a book is \$58 and decreases at a rate of 7% per year. Write an exponential decay function to find the value of the book after 8 years.

$$y = 58(0.93)^x$$

12. The population in Haywardsville is decreasing at a rate of 2.5% per year. If the population in 2000 was 28,000, what will be the expected population in 2015 if this rate of decrease continues?

$$y = 28000(0.975)^x$$