

$$y = ab^x$$

**Exponential Growth/Decay Applications**

Homework

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

Write an equation for each of the following problems and solve.

1. A town's population grows at a rate of 5.2% per year. If the town currently has 17,450 people, how many people will there be in 6 years? 18 years?

$a = 17450$   
 $b = 1 + .052 = 1.052$   
 $x = 6, x = 18$   
 $y = 17450(1.052)^6$   
 $y = 23653$   
 $y = 17450(1.052)^{18}$   
 $y = 26,177$   
 OR  $y = 17,450(1.052)^x \rightarrow y = 2^{2.2} + 64$

2. A rabbit population doubles every year. If there are two rabbits to start with, how many rabbits will there be in 5 years?

$a = 2$   
 $b = 2$   
 $x = 5$   
 $y = 2(2)^5$   
 $y = 64$  rabbits



3. A car is purchased for \$22,800. The value of the car depreciates 18% per year. What is the value of the car after 5 years?

$a = 22,800$   
 $b = 1 - .18 = .82$   
 $x = 5$   
 $y = 22,800(.82)^5$   
 $y = 8452.87$   
 $\approx \$8452.87$

4. The number of people who ride skateboards is growing at a rate of 20% per year. If 400 people ride skateboards now, how many will ride skateboards in 3 years?

$a = 400$   
 $b = 1 + .2 = 1.2$   
 $x = 3$   
 $y = 400(1.2)^3$   
 $y = 691.2$   
 $\approx 691$  people

5. Suppose a radioactive substance loses half of its remaining mass each day. How much of a 36 gram sample will remain after 6 days?

$a = 36$   
 $b = \frac{1}{2}$   
 $x = 6$   
 $y = 36(\frac{1}{2})^6$   
 $y = .5625$   
 $.5625$  grams

6. Identify each equation as linear, quadratic, exponential, or inverse..

- |                                      |                                       |  |
|--------------------------------------|---------------------------------------|--|
| a. $y = x$ Linear (direct variation) | b. $y = \frac{8}{x}$ inverse          | c. $y = x^2 - x + 1$ Quadratic               |
| d. $y = -0.25x^2$ Quadratic          | e. $y = \frac{1}{2}(5)^x$ exponential | f. $y = -3(0.5)^x$ Linear (direct variation) |
| g. $y = 7x + 2$ Linear               | h. $y = 2$ Linear                     | i. $y = -100(0.25)^x$ exponential            |