APPC Lesson 4.4 Homework

Name _____

1. Identify whether each scenario represents exponential growth, exponential decay, or neither. Give a reason for your answer.

   a. The volume of a cube as the side length grows

   b. The price of a shirt with a 40% off coupon

   c. The reselling value of a car based on its age in years

2. The number of students enrolled at a certain university increases by 3% each year. In 2010 , the university has $27,360$ students enrolled. Write an equation for a function n , where $n(t)$ models the number of enrollments per year and t is the time in years since 2010 .

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3. Determine if each equation represents exponential growth, exponential decay, or neither. Give a reason for your answer.

a. $y = 3 \cdot 4.25^x$

b. $y = 3x^4 - 5$

c. $y = -2\left(\frac{4}{3}\right)^x$

d. $y = 5(0.28)^x$

4. Selected values of an exponential function, f , are given in the table. Complete the rest of the table.

x	0	1	2	3	4	5
$f(x)$		24	36			

5. An exponential function of the form $y = ab^x$ passes through $(2, 40)$ and $(5, 5)$. Find the value of a and b .

6. A company emails its initial weekly newsletter to 65 people. Two weeks after this launch, the company emails the weekly newsletter to 75 people.

a. Assume that the number of people receiving the newsletter each week increases in a linear relationship. Write an equation for a function R, where function $R(t)$ is the number of people receiving the newsletter t weeks after the launch.

b. Assume that the number of people receiving the newsletter each week increases exponentially. Write an equation for a function N, where $N(t)$ is the approximate number of people receiving the newsletter t weeks after the launch.

c. Which model do you think is more accurate? Explain.

7. A new Ford Escape is valued at $\$26,010$, but depreciates by 8% each year. Write, but do not evaluate, an expression that gives the value of the Ford Escape after 7 years.

8. The amount of ibuprofen, in mg, remaining in an adult's bloodstream after taking one dose can be modeled by $P(t) = 400(0.71)^t$, where t is the time in hours since taking the ibuprofen.

a. How many mg of ibuprofen are in one adult dose? How do you know?

b. What percent of the ibuprofen is eliminated each hour? How do you know?

9. Duska drinks a 12 -ounce cup of coffee that has 142 milligrams of caffeine in it. After 1 hour she has approximately 126.4 mg of caffeine left in her body. The amount of caffeine in her blood stream changes by a constant factor each hour.

a. Does this situation model exponential growth or decay? Explain.

b. What percentage of the caffeine remains in her bloodstream each hour?

c. Write an equation for a function c , where $c(t)$ gives the approximate number of milligrams of caffeine in her body after t hours.