

Name \_\_\_\_\_ Per \_\_\_\_\_

**LO:** I can solve problems that demonstrate my understanding of the Learning Objectives from the lessons in Unit 5: Exponential Functions.

**DO NOW** On the back of this packet

(1) **Linear vs Exponential Growth (5.6)**

Decide whether each of the following situations is linear, exponential, or neither. Define a function that represents each situation.

1. Ali reads at a rate of 25 pages per hour. (Let  $x$  be the number of hours and  $f(x)$  be the number of pages read.)

2. A bank account starting at \$100 gains 3% every year. (Let  $x$  be the number of years and  $f(x)$  be the value of the account.)

3. Avdeep runs 4 miles every hour. . (Let  $x$  be the number of hours and  $f(x)$  be the number of miles.)

4. Peter tosses a ball into the air and its height is modeled by the function  $h(t) = -16t^2 + 10t + 4$  . (Ok, the function is already given here.)

5. A new car worth \$20,000 loses 30% of its value every year. (Let  $x$  be the number of years and  $f(x)$  be the value of the car.)

6. Every time a 10 cm x 10 cm piece of paper is folded, it becomes half as big. (Let  $x$  be the number of folds and  $f(x)$  be the area of the folded paper.)

7. Connor starts with \$75 and spends \$15 every week. (Let  $x$  be the number of weeks and  $f(x)$  be the amount he has left.)

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 (2) **Interpreting Exponential Functions**

(1) The relationship between the elapsed time,  $t$  in years since the ice age began, and the total number of plant species,  $P(t)$ , is modeled by the following function:

$$P(t) = 30,000,000 \cdot \left(\frac{8}{9}\right)^t$$

(a) What is the meaning of 30,000 in the function?

(b) Is the number of plant species increasing or decreasing? How do you know?

(c) According to the model, how many plant species are there 12 years after the ice age began?

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 (3) **Interpreting Exponential Functions**

Elon sent a chain letter to his friends, asking them to forward the letter to more friends. The relationship between the elapsed time,  $t$ , in days since Elon sent the email, and the total number of people who receive the email,  $P(t)$ , is modeled by the following function:

$$P(t) = 4 \cdot 3^t$$

(a) How many emails did Elon send?

(b) How many emails did each of Elon's friends send?

(c) How many people will have received the email by the end of the 5<sup>th</sup> day?

(4) **Writing Exponential Equations**

(1) A bank account balance earns interest each year. Write an equation to represent the situation if the account starts with \$100 and has an annual rate of 4%. You may want to start by figuring out the multiplier.

(2) You bought a car for \$18,000 in 2010. The value of the car depreciates by 19% each year. Write an exponential model for the situation. You may want to start by figuring out the multiplier.

 (5) **Exponential Functions from tables**

Determine whether the table is linear or exponential. Circle linear or exponential. Write a function equation for the relationship

8.

$x$	0	1	2	3	4	5	6	7
$y$	10	5	2.5	1.25	0.625	0.3125	0.15625	0.078125

Linear or exponential?

 $f(x) =$ 

9.

$x$	0	1	2	3	4	5	6	7
$y$	2	5	8	11	14	17	20	23

Linear or exponential?

 $f(x) =$ 

10.

$x$	0	1	2	3	4	5	6	7
$y$	0.4	0.6	0.9	1.35	2.025	3.0375	4.55625	6.834375

Linear or exponential?

 $f(x) =$ 
 (6) **You should also be able to graph an exponential relationship using the graphing calculator**