

## Unit 4-Exponential Functions

### Finding Exponential Models

#### Day 5 Notes and Class Work

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

Date: \_\_\_\_\_ Hour \_\_\_\_\_

**Example 1:** Write an exponential function  $y = ab^x$  for a graph that includes the given points.

(2, 4), (3, 16)

Step 1: Write the formula for an exponential function.

Step 2: Write the exponential function using the ordered pair with the larger "x".

Step 3: Write the exponential function using the other ordered pair.

Step 4: Divide the two equations and simplify to find "b".

Step 5: Pick one of the ordered pairs and the "b" value found in Step 4 to find "a".

Step 6: Write the exponential function using the "a" and "b" values.

**Example 2:** Write an exponential function  $y = ab^x$  for the data in the table.

x	0	1	2	3
f(x)	4	2	1	$\frac{1}{2}$

When there is a common ratio between the y values the function is exponential.

**Class Work:** Find the exponential model for each of the following.

1) (0, 2) and (3, 250)

2) (3, 2048) and (5, 131072)

3) (1, 72) and (4, 52488)

4) (3, 0.15625) and (4, 0.0390625)

5)

X	0	1	2	3	4
F(x)	5	15	45	135	405

6)

X	3	4	5	6	7
F(x)	13.5	20.25	30.375	45.5625	68.34375

## Unit 4-Exponential Functions

### Finding Exponential Models

#### Day 5 Worksheet

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

Date: \_\_\_\_\_ Hour \_\_\_\_\_

In exercises 1-6, write an exponential function  $y = ab^x$  for a graph that includes the given points.

1. (2, 122.5), (3, 857.5)

2. (-3, 24), (-2, 12)

3. 2, 16 , 4, 2.56

4. 4, 8 , 6, 32

5.

X	2	4	6	7	9
F(x)	96	1536	24576	98304	1572864

6. A pharmaceutical company is testing a new anesthetic. They injected 14 mg of the anesthetic into the bloodstream of a laboratory rat and then monitored the level of the drug every hour. The results are in the table below. (Hint: Round each of the ratios to two decimal places)

Time (hr)	0	1	2	3	4	5	6	7	8	9
Anesthetic (mg)	14.00	9.38	6.28	4.21	2.82	1.89	1.27	.85	.57	.38

7. **Multiple choice.** For which set of data below is an exponential model most appropriate? *Explain.*

a.

$x$	0	1	2	3	4	5	6
$y$	3	18	75	390	1800	10,000	50,000

b.

$x$	0	1	2	3	4	5	6
$y$	3	15	75	375	1875	9375	46875

c.

$x$	0	1	2	3	4	5	6
$y$	3	6	99	732	3075	9378	23331

8. Suppose  $(0, 4)$  and  $(2, 36)$  are on the graph of an exponential function.
- Use  $(0, 4)$  in the general form of an exponential function  $y = a \cdot b^x$  to find the value of the constant  $a$ .
  - Use your answer from part (a) along with  $(2, 36)$  to find the value of the constant  $b$ .
  - Write a rule for the function.
  - Evaluate the function for  $x = -2$  and  $x = 4$ .