

Name: Key Hour: \_\_\_\_\_ Date: \_\_\_\_\_

## NOTES: Section 8.3 – Graphs of Exponential Functions

Goals: #1 - I can graph an exponential function.



Homework: Section 8.3 Worksheet

Warm Up:

Simplify the expression.

1.  $(-3x^4)^3(2x^3)^5$   
 $(-3)^3 x^{12} 2^5 x^{15}$   
 $-27x^{12} 32x^{15}$   
 $-864x^{27}$

2.  $(\frac{1}{3})^{-3}$   
 $\frac{1^{-3}}{3^{-3}}$   
 $\frac{3^3}{1^3}$   $27$

3.  $\frac{2}{(-3y)^{-4}}$   
 $\frac{2}{(-3)^{-4} y^{-4}}$   
 $2(-3)^4 y^4$   
 $2(81) y^4$   
 $162y^4$

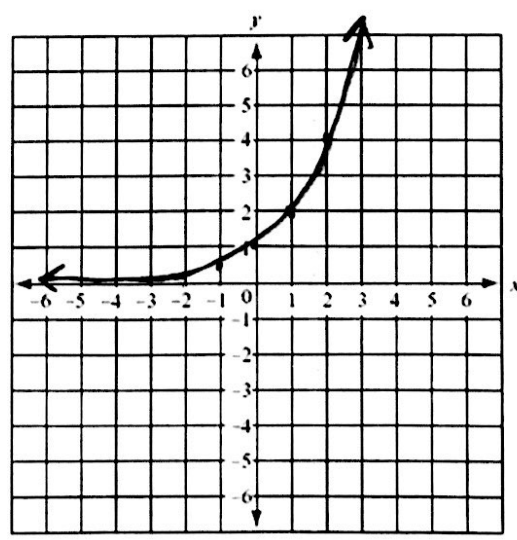
4.  $4^9 \cdot (\frac{1}{4})^4$   
 $4^9 \cdot \frac{1^4}{4^4}$   
 $\frac{4^9}{4^4}$   $4^5$   $1024$

Exploration #1: Work with a partner and answer the following questions.

1. Complete the table of values to graph the following function.

$y = 2^x$

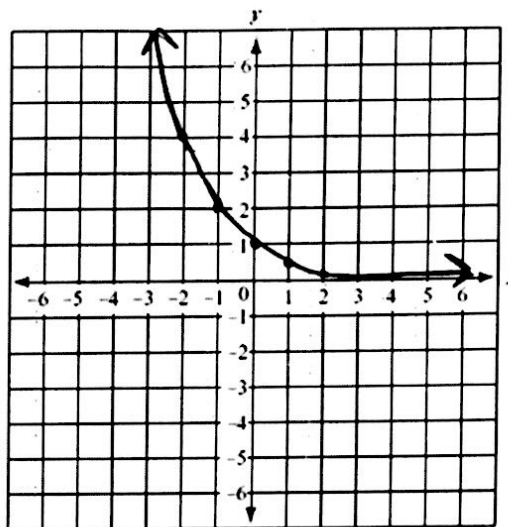
x	y
-2	$\frac{1}{4}$
-1	$\frac{1}{2}$
0	1
1	2
2	4



2. Complete the table of values to graph the following function.

$$y = \left(\frac{1}{2}\right)^x$$

x	y
-2	4
-1	2
0	1
1	$\frac{1}{2}$
2	$\frac{1}{4}$



Notes:

A function in the form  $y = a \cdot b^x$  is an exponential function

When  $b > 1$ , the graph represents exponential growth

When  $b < 1$ , the graph represents exponential decay

Example #1: Tell whether the function represents *exponential growth* or *exponential decay*.

1.  $y = 3^x$   
 $3 > 1$   
 exponential growth

2.  $y = (0.8)^x$   
 $0.8 < 1$   
 exponential decay

3.  $y = (1.5)^x$   
 $1.5 > 1$   
 exponential growth

**Example #2:** Identify the decay or growth factor and the y-intercept of each exponential function.

1.  $y = 4\left(\frac{4}{9}\right)^x$

2.  $y = 2(6)^x$

3.  $y = \left(\frac{5}{2}\right)^x$

Decay/Growth Factor:  $\frac{4}{9}$   
 y-intercept:  $(0, 4)$

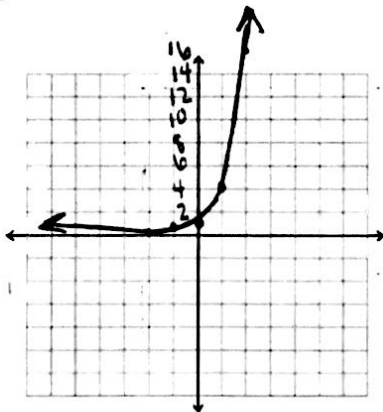
Decay/Growth Factor: 6  
 y-intercept:  $(0, 2)$

Decay/Growth Factor:  $\frac{5}{2}$   
 y-intercept:  $(0, 1)$

**Example #3:** Graph the exponential function.

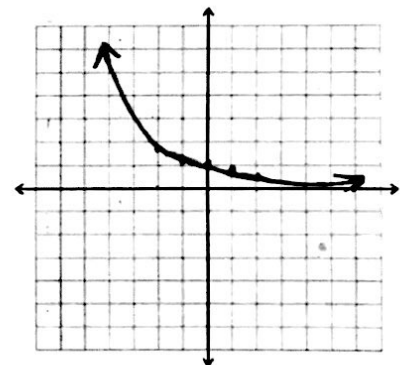
1.  $y = 4^x$

x	y
-2	$\frac{1}{16}$
-1	$\frac{1}{4}$
0	1
1	4
2	16



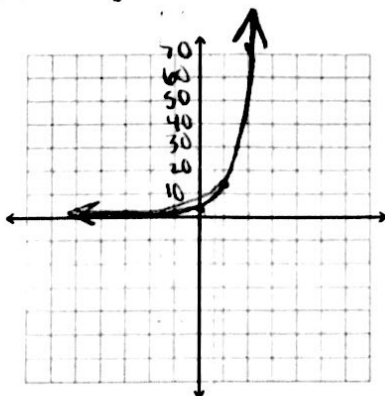
2.  $y = \left(\frac{3}{4}\right)^x$

x	y
-2	1.8
-1	1.3
0	1
1	0.8
2	0.6



3.  $y = 3(5)^x$

x	y
-2	0.1
-1	0.6
0	3
1	15
2	75



4.  $y = 2\left(\frac{1}{7}\right)^x$

x	y
-2	98
-1	14
0	2
1	0.3
2	0.04

