

Graphing Exponential Functions

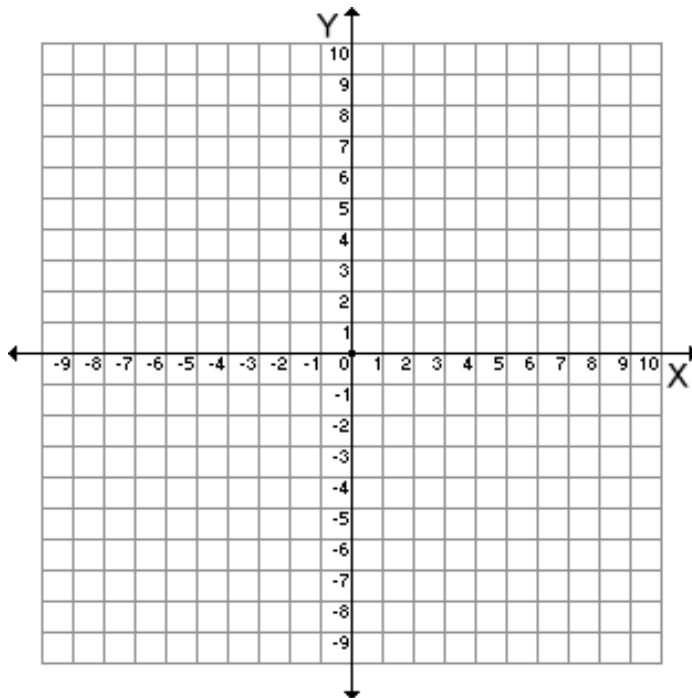
Name _____

Period # _____

Ex 1: The function $y = 3^x$ is called an _____ function because the exponent is a _____.

Now, let's look at how to graph the exponential function $y = 3^x$.

x	$y = 3^x$	y	(x, y)
-3	$y = 3^{(-3)} = \frac{1}{3^3} = \frac{1}{27}$		
-2			
-1			
0			
1			
2			
3			



Definition 1: Since the y values increase as the x values increase in the example above, this is what we call exponential _____. (The graph goes up the hill from left to right)

QUESTION: In the exponential function $y = 3^x$, the y -values can never equal or be less than _____.

Definition 2: Since the y -value can NEVER equal zero in this function, there is a horizontal _____ at $y = 0$.

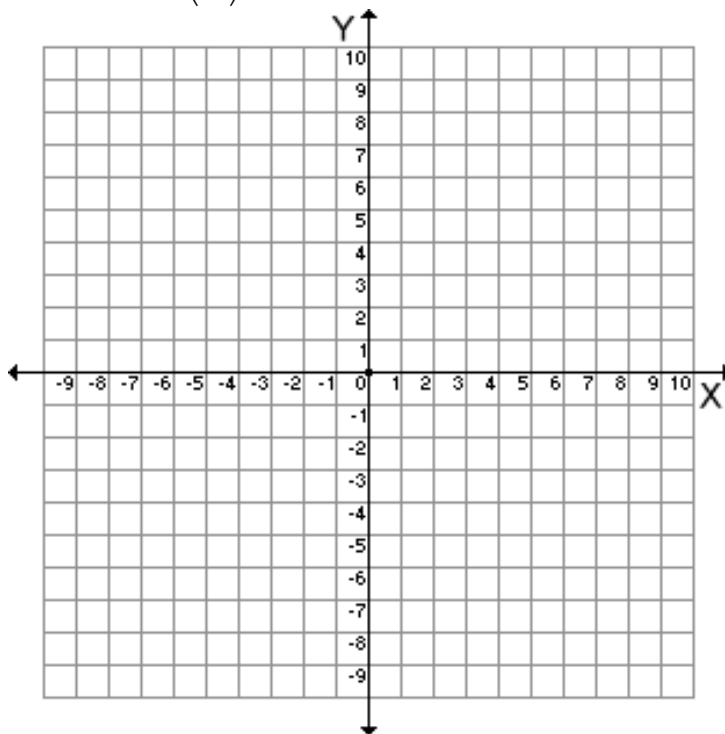
Ex 2: By looking at the graph above, list the domain and range of the function $y = 3^x$

DOMAIN:

RANGE:

Ex 3: Now, let's look at how to graph the exponential function $y = \left(\frac{1}{3}\right)^x$.

x	$y = \left(\frac{1}{3}\right)^x$	y	(x, y)
-3			
-2			
-1			
0			
1			
2			
3			



Definition 3: Since the y values decrease as the x values increase in the example above, this is what we call exponential decay. (The graph goes down the hill from left to right)

QUESTION: Is there an asymptote? If so, where is it?

Ex 4: By looking at the graph above, list the domain and range of the function $y = \left(\frac{1}{3}\right)^x$

DOMAIN:

RANGE:

Tell whether the functions below show exponential GROWTH or DECAY.

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

6) $y = 2^x$

7) $y = 1^x$

8) $y = 5^x$

9) $y = 0^x$

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

Graphing Exponential Functions Practice Worksheet

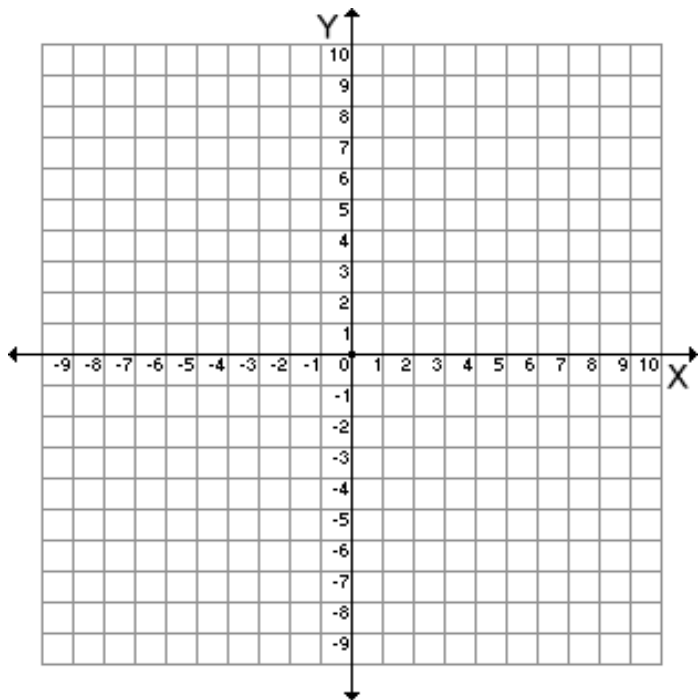
Name _____

Period # _____

Graph the following functions and tell whether they show exponential growth or decay.

1)

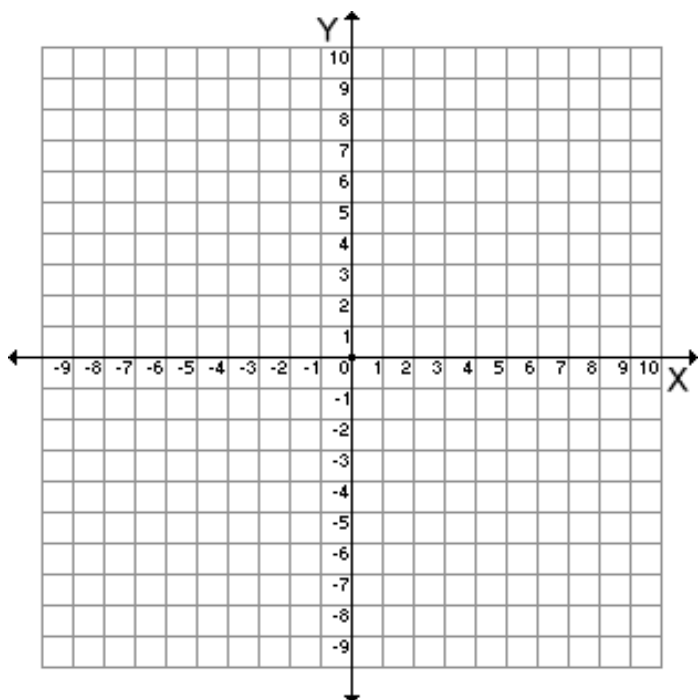
x	$y = 2^x$	y	(x, y)
-3			
-2			
-1			
0			
1			
2			
3			



Does the function above show exponential GROWTH or DECAY?

2)

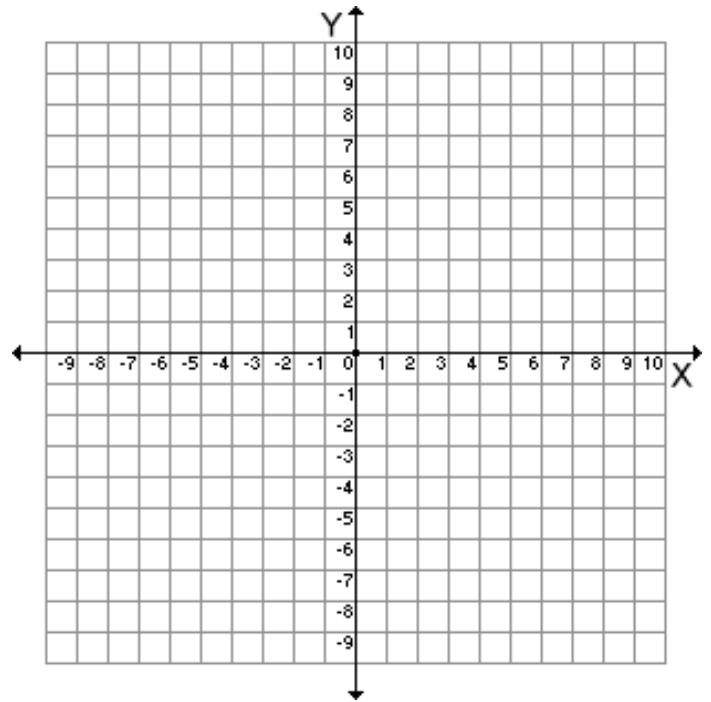
x	$y = \left(\frac{1}{2}\right)^x$	y	(x, y)
-3			
-2			
-1			
0			
1			
2			
3			



Does the function above show exponential GROWTH or DECAY?

3)

x	$y = 1^x$	y	(x, y)
-3			
-2			
-1			
0			
1			
2			
3			



Does the function above show exponential GROWTH or DECAY?

Tell whether the functions below show exponential GROWTH or DECAY.

4) $y = 9^x$

5) $y = \left(\frac{1}{5}\right)^x$

6) $y = 4^x$

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

8) $y = \left(\frac{5}{6}\right)^x$

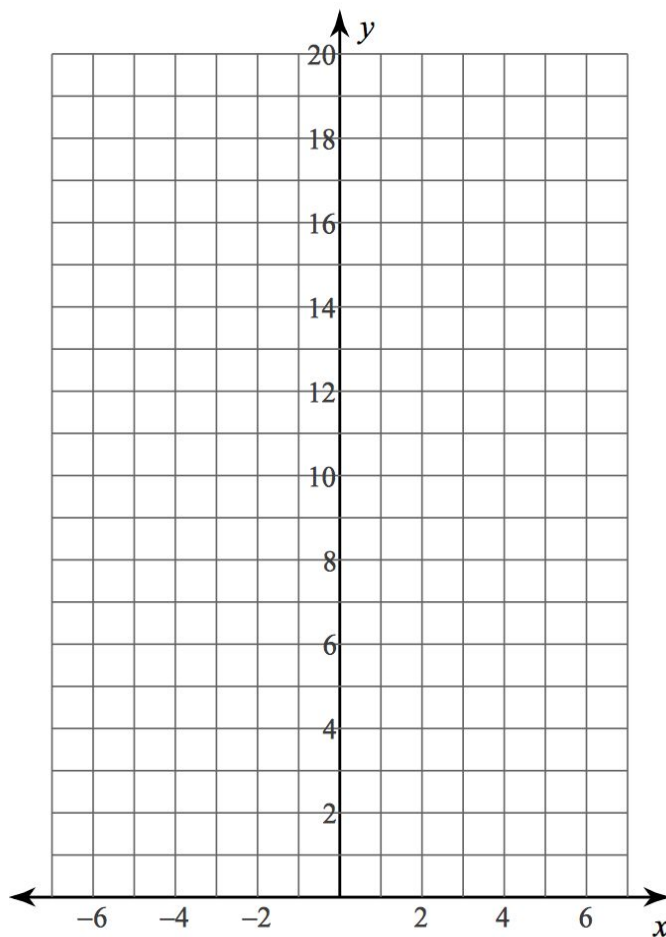
9) $y = 0^x$

Graphing Exponential Functions Worksheet #2
Directions: Answer all questions. Show all work!!!

Sketch the graph of each function. Then, state the Domain, Range, and Y-intercept, and change of Y-values of the function.

1. $y = 8 \cdot \left(\frac{1}{2}\right)^x$

X	Y
-1	
0	
1	
2	
3	
4	
5	
6	



Domain:

Range:

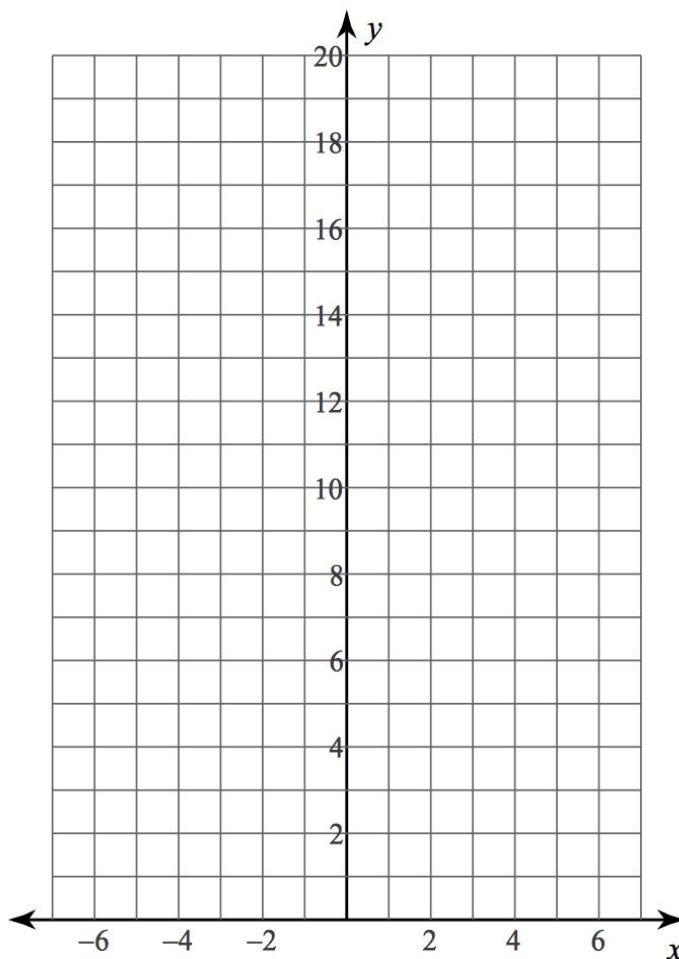
Y-Intercept: (,)

Change in Y-Values:

Growth or Decay? _____

2. $y = \frac{7}{2} \cdot 2^x$

X	Y
-4	
-3	
-2	
-1	
0	
1	
2	
3	
4	



Domain:

Range:

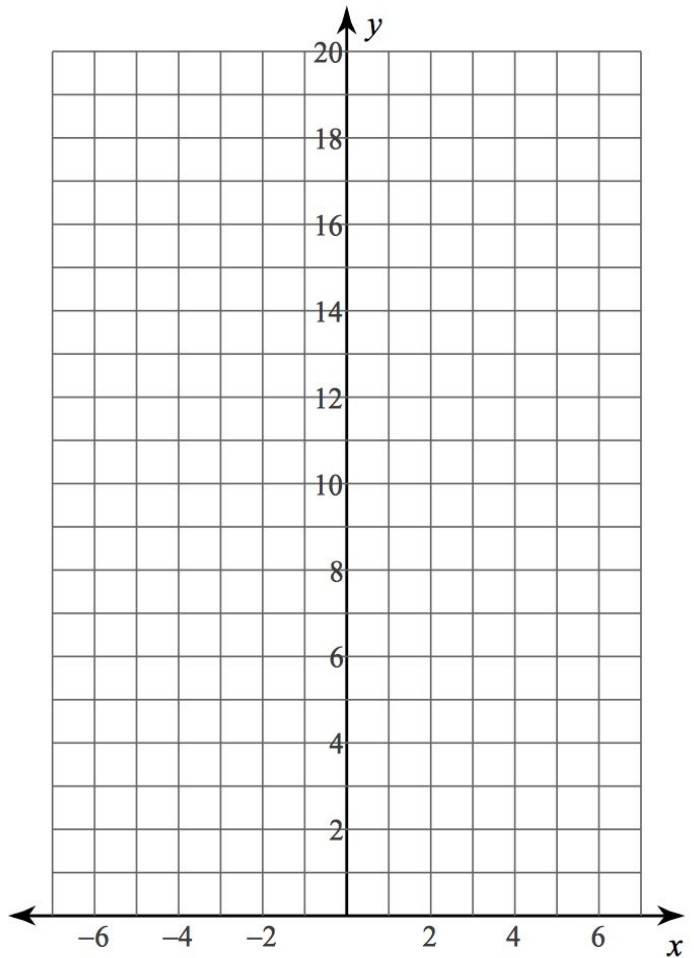
Y-Intercept: (,)

Change in Y-Values:

Growth or Decay? _____

3. $y = -6 \cdot \left(\frac{1}{2}\right)^x$

X	Y
-2	
-1	
0	
1	
2	
3	
4	
5	
6	
7	



Domain:

Range:

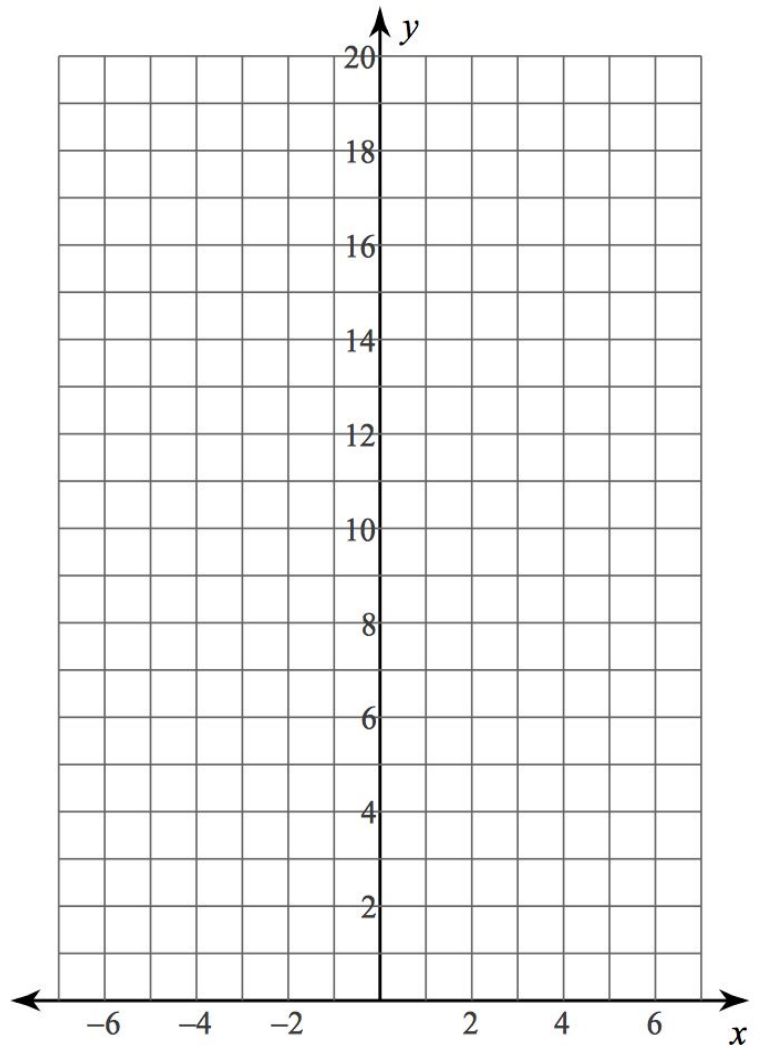
Y-Intercept: (,)

Change in Y-Values:

Growth or Decay? _____

4. $y = 0.5^x$

X	Y
-3	
-2	
-1	
0	
1	
2	
3	



Domain:

Range:

Y-Intercept: (,)

Change in Y-Values (*b*):

Growth or Decay? _____