

## 7-1: Graphing Exponential Functions

**Objectives:** I can graph an exponential equation from an equation

**Vocab:**  $y = a \cdot b^x$   
 ↑ y-int initial value  
 ↑ rate of change  
 exponential's Multiply

Does the following table represent exponential behavior? Why or why not?

**No**

x	0	5	10	15	20	25
y	64	32	16	8	4	2

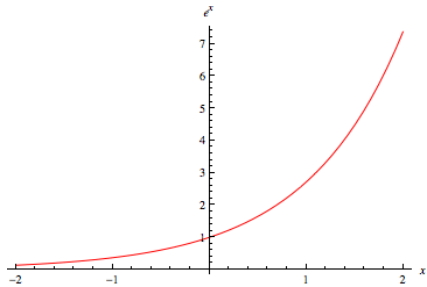
**Yes**

$\cdot \frac{1}{2} \quad \cdot \frac{1}{2} \quad \cdot \frac{1}{2} \quad \cdot \frac{1}{2}$

Review: Is it exponential growth or decay?

$$y = \frac{1}{2}(3)^x$$

growth



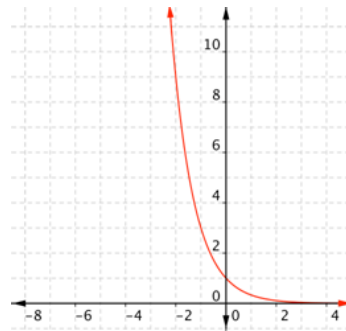
growth

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

decay

$b < 1$

$b > 1$



decay

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

growth

Evaluate the following functions using your calculator:

1.  $y = 2(3)^x$  for  $x = 2$

$$y = 2(3)^2$$
$$y = 18 \quad (2, 18)$$

2.  $y = 3(4)^x$  for  $x = 3$

$$y = 3(4)^3$$
$$y = 192 \quad (3, 192)$$

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

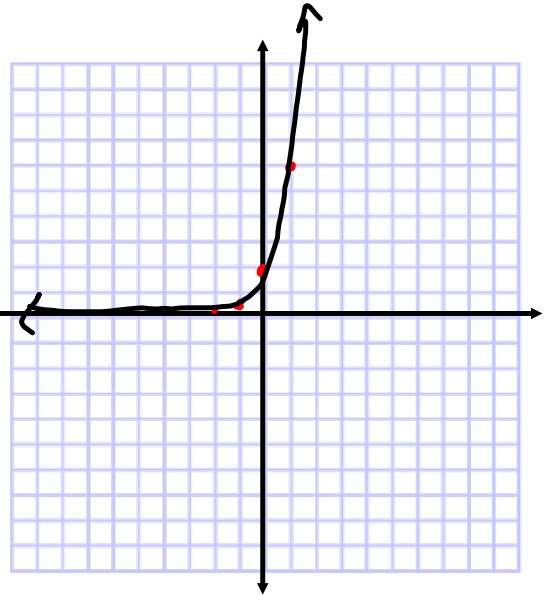
$$y = \left(\frac{1}{2}\right)^3$$
$$y = .125$$

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

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

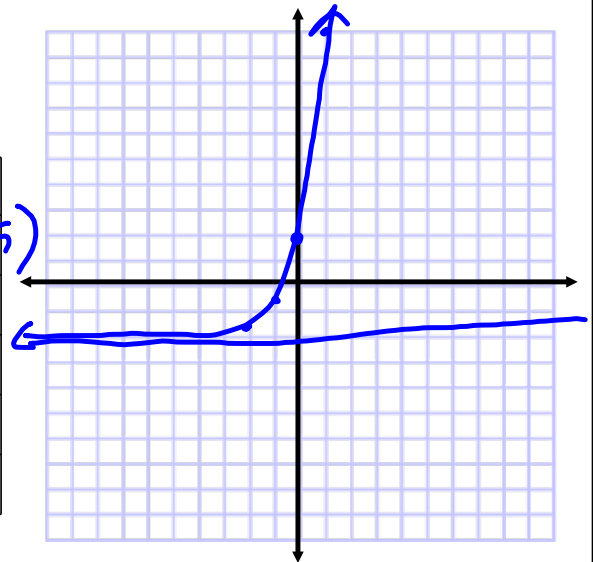
Graph  $y = \underline{\underline{2(3)^x}}$

x	y =	(x,y)
-2	$2(3)^{-2} = .77$	$(-2, .77)$
-1	$2(3)^{-1} = .666$	$(-1, .66)$
0	$2(3)^0 = 2$	$(0, 2)$
1	$2(3)^1 = 6$	$(1, 6)$
2	$2(3)^2 = 18$	$(2, 18)$



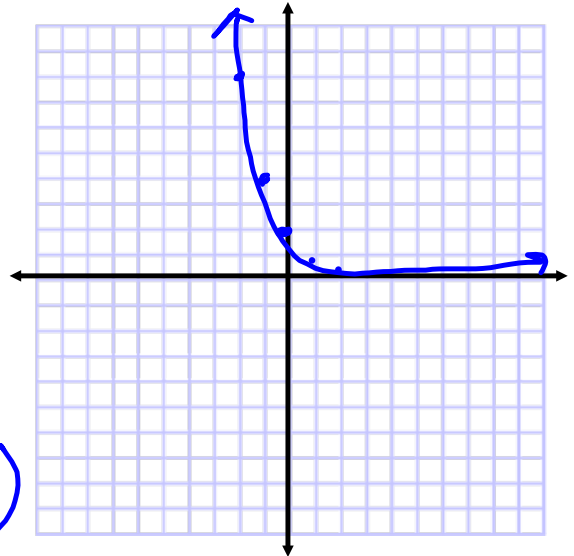
Graph  $y = \underline{4}(3)^x - 2$

x	y =	(x,y)
-2	$4(3)^{-2} - 2 = -1.5$	$(-2, -1.5)$
-1	$4(3)^{-1} - 2 = -.6$	$(-1, -.6)$
0	$4(3)^0 - 2 = 2$	$(0, 2)$
1	$4(3)^1 - 2 = 10$	$(1, 10)$
2	$4(3)^2 - 2 = 34$	$(2, 34)$



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

x	y =	(x,y)
-2	$y = 8$	$(-2, 8)$
-1		$(-1, 4)$
0	$y = 2$	$(0, 2)$
1	$y = 1$	$(1, 1)$
2	$.5$	$(2, .5)$



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

x	y =	(x,y)
-2		$(-2, 3)$
-1		$(-1, 1)$
0		$(0, 0)$
1		$(1, -1/2)$
2		$(2, -3/4)$

