Algebra II Warm Up   **2-2-15**

Allowance

Would you like to get a $25 allowance each week or get paid 2 cent the first day of the month, 4 cents the second day, 8 cents the third day, doubling each day of the month? Which would your parents agree to?

Sun	M	T	W	TH	F	Sat
1 .02	2 .04	3 .08	4 .16	5 .32	6 .64	7 1.28
8 2.56	9 5.12	10 10.24	11 20.48	12 40.96	13 81.92	14 163.84
15 327.68	16 655.36	17	18	19	20	21
22	23	24	25	26	27	28 .02²⁸ 268,435,456

What is happening with the pattern?

$$y = 2^x$$

x	y
1	2
2	4
0	1
-1	.5

What would the graph look like?
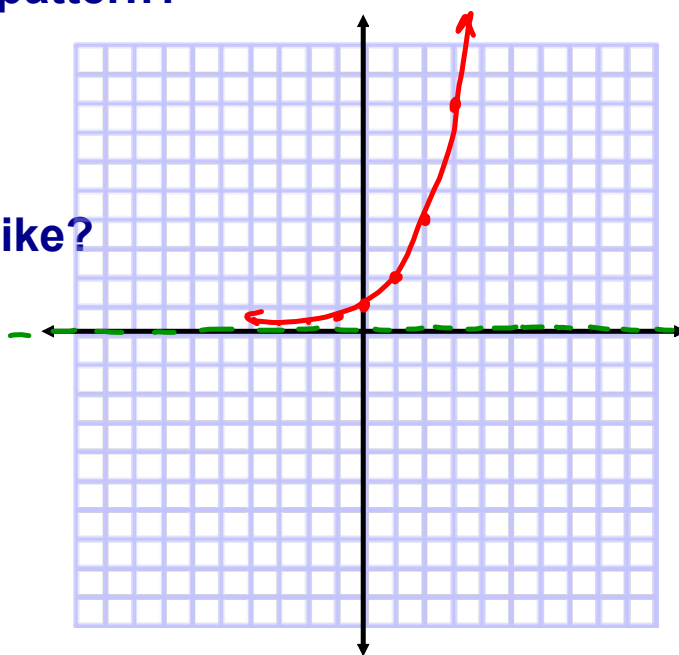
x-int: none

y-int : (0,1)

Domain: $(-\infty, \infty)$

Range: $(0, \infty)$

Asymptote: $y = 0$

Now let's graph

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

Decay

X	y
-2	4
-1	2
0	1
1	½
2	¼

What is happening?

x-int: none

y-int : (0, 1)

Domain: (-∞, ∞)

Range: (0, ∞)

Asymptote: y = 0
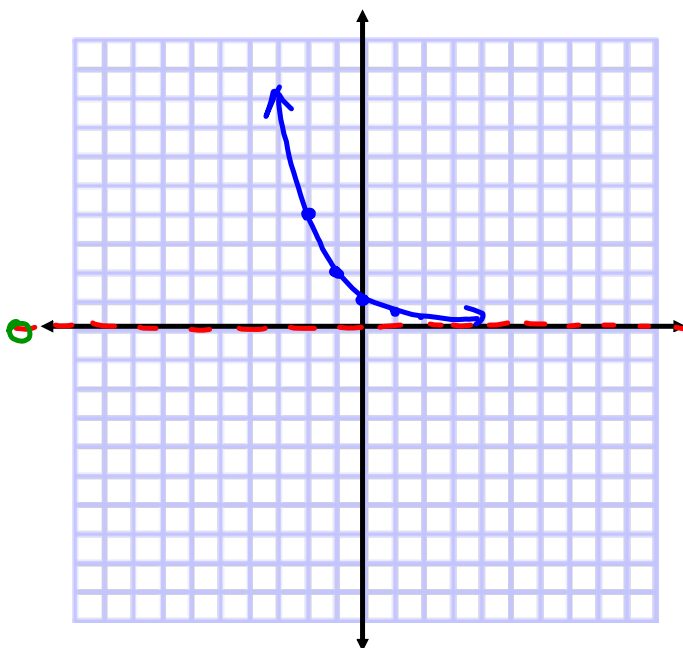
$$y = 2^x$$ **It is a Growth** $b > 1$

What causes growth or decay?

$$y = \left(\frac{1}{2}\right)^x$$ **It is a Decay**

$0 < b < 1$

An exponential equation is written as

$$y = ab^x$$

Jan 27-7:04 PM

$$y = ab^x$$

The a value is the initial value. It does not cause growth or decay.

The b value is the growth or decay value.

If b > 1, then it is a growth.

If 0<b<1, then it is a decay.

Jan 27-7:09 PM

Tell whether each is an example of exponential growth or exponential decay.

1. $y = 10(4)^x$

Growth

2. $y = (0.8)^x$

Decay

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

Growth

4. $y = 0.5\left(\dfrac{5}{8}\right)^x$

Decay

5. $y = 100\left(\dfrac{4}{5}\right)^{-x}$

$\dfrac{5}{4}$

Growth

6. $y = (7)^{-x}$

$\dfrac{1}{7}$

Decay

Graph the following.

$$y = 3^x$$

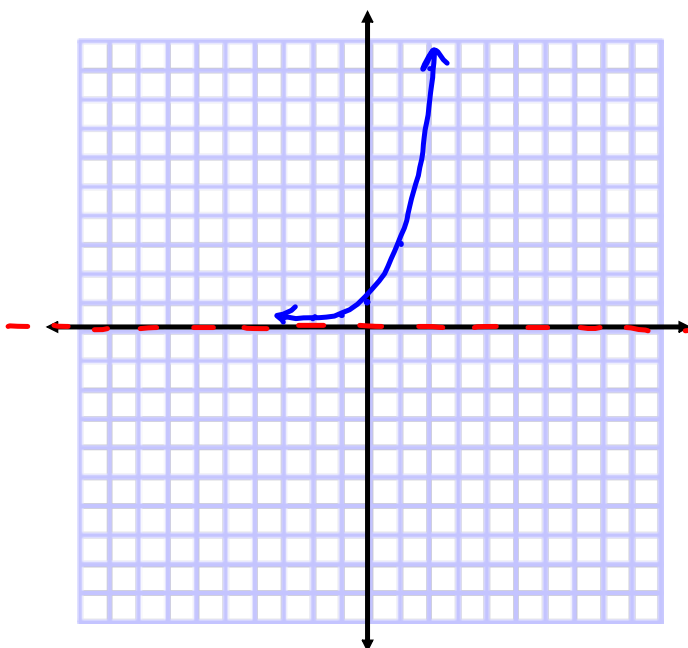| x	y
-2	1/9
-1	1/3
0	1
1	3
2	9

x-int: none

y-int : (0, 1)

Domain: (-∞, ∞)

Range: (0, ∞)

Asymptote: y = 0

Jan 27-7:20 PM

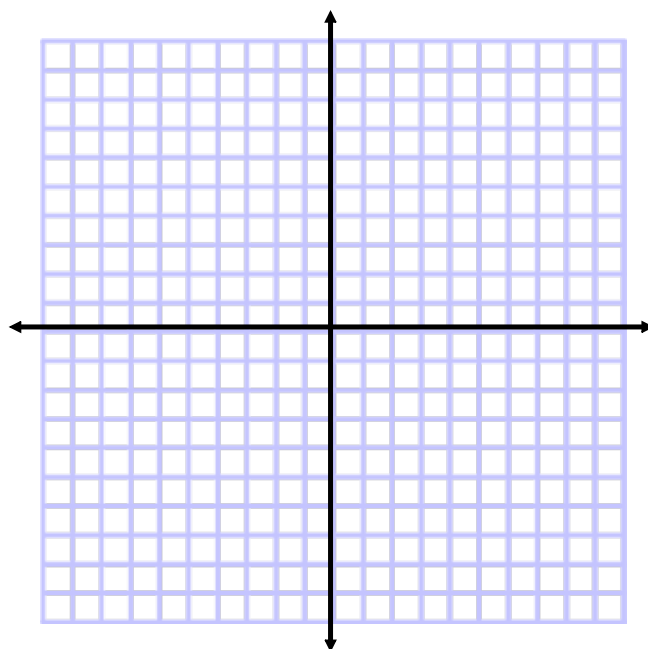**Graph the following.**

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

x-int: _____

y-int :_____

Domain:_____

Range:_____

Asymptote:____

Graph $y = 2(3)^x - 4$

x	y
-2	-3.7
-1	-3.3
0	-2
1	2
2	14

x-int: (0.6, 0)

y-int : (0, -2)

Domain: $(-\infty, \infty)$

Range: $(-4, \infty)$

Asymptote: $y = -4$

zero
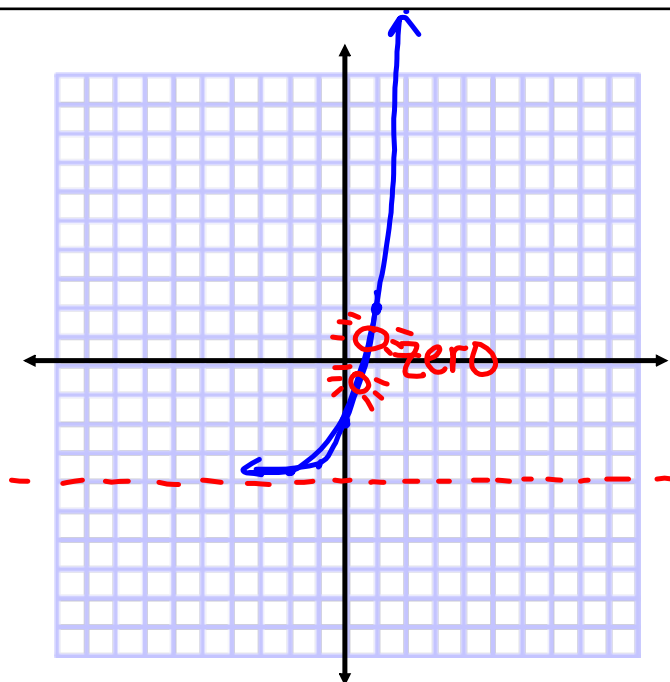
Conclusion

1. What value tells you if the equation is a growth or decay? $y = ab^x$ b

2. How do you know it is an exponential growth? $b > 1$

3. What do we need to do to graph an exponential equation?

x	y
-2	
-1	
0	
1	
2	

4. Questions??????????????

Jan 27-7:23 PM

Exponential Growth and Decay

Worksheet