Algebra 2/Trig

Key

SECT 9.1 - EXPONENTIAL FUNCTIONS
DAY 1

If $f(x) = 2^x$, find:

f(1)= 2 f(2)= 4 f(3)= 8 f(4)= 16

Let's make a t-table with this information:

x	y
1	2
2	4
3	8
4	16

(+1 between each x; ·2 between each y)

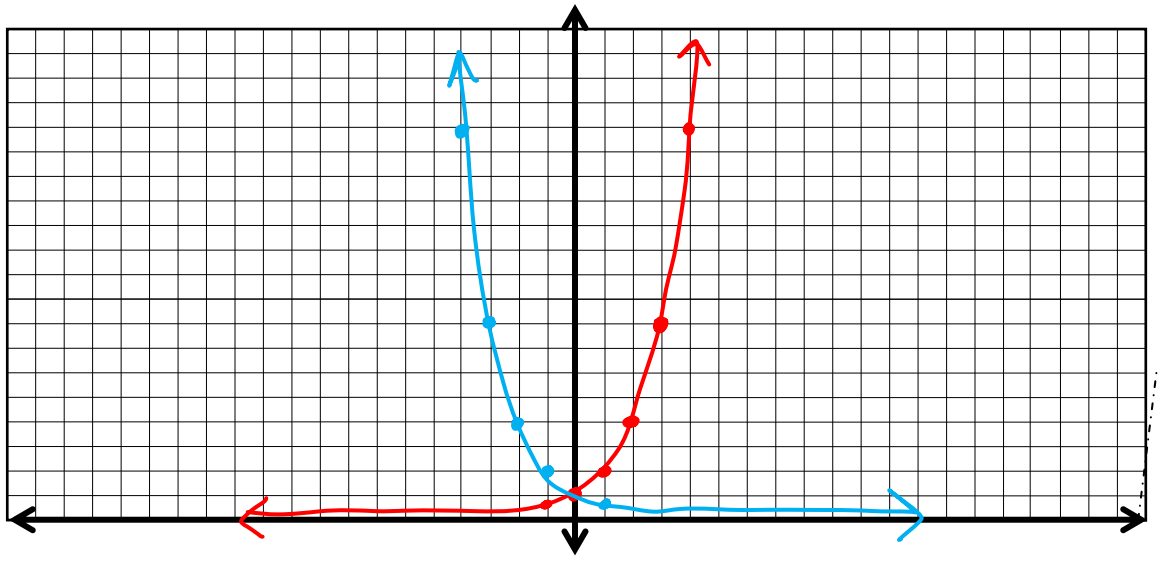
This is called the add multiply property

What is happening at each increment? add 1 to the x, then multiply the previous y by 2

What will happen at

f(5)? 32 f(0)? 1 f(-1) 1/2

Use the points you have developed to graph the exponential function.



There is also a Horizontal asymptote at y = 0

If $f(x) = \left(\frac{1}{2}\right)^x$, find:

f(1)= 1/2 f(2)= 1/4 f(3)= 1/8 f(4)= 1/16

What is happening at each increment? add 1 to the x, the multiply the previous y by 1/2

What will happen at

f(5)? 1/32 f(0)? 1 f(-1) 2

x	y
1	1/2
2	1/4
3	1/8
4	1/16

(+1 between each x; ·1/2 between each y)

EXPONENTIAL FUNCTION

An equation in the form of

$$y = a \bullet b^x \quad \text{where } a \neq 0,\ b > 0, \text{ and } b \neq 1.$$

a = y-int

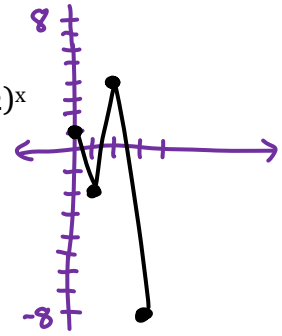
b = base

(x,y) = ordered pair

Why can't b ≤ 0?

Let's graph: $y = (-2)^x$

x	y
0	1
1	-2
2	4
3	-8
4	16



not an exponential function

Why can't b = 1?

Let's graph $y = 1^x$

x	y
0	1
1	1
2	1
3	1
4	1

not an exponential function

There are 2 types of exponential functions

Exponential Growth – when $b > 1$

Exponential Decay – when $0 < b < 1$

Circle the following functions that are exponential. Then categorize them as either growth or decay (G,D) AND write the y-intercept.

$y = 3(2)^x$ G, b = 2, a = 3

$y = .6(7)^x$ G, b = 7, a = .6

line: $y = 5 + 4x$

$y = 3 + 2^x$ G, b = 2, a = 1

line: $y = 7 - x$

parabola: $y = x^2 + 4x$

$y = 2(.7)^x$ D, b = .7, a = 2

line: $y = 9(.8)^2$

radical: $y = \sqrt{x^5}$

$y = .2(.2)^x$ D, b = .2, a = .2

$y = 3^{x+1}$ G, b = 3, a = 1

abs. value: $y = |3x^3|$

$y = 10(.4)^x$ D, b = .4, a = 10

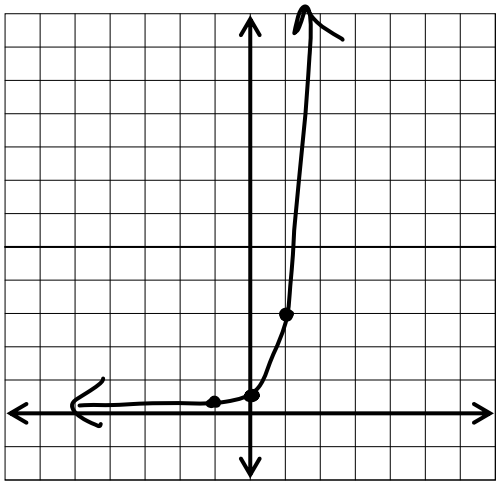
$y = 5 \bullet \left(\frac{1}{3}\right)^x$ D, $b = \frac{1}{3}$, a = 5

$y = \left(\frac{9}{4}\right)^x$ G, $b = \frac{9}{4}$, a = 1

Now it's your turn to graph:

Graph…and state the domain and range:

1. $y = \frac{1}{2}(6)^x$ Growth or Decay?

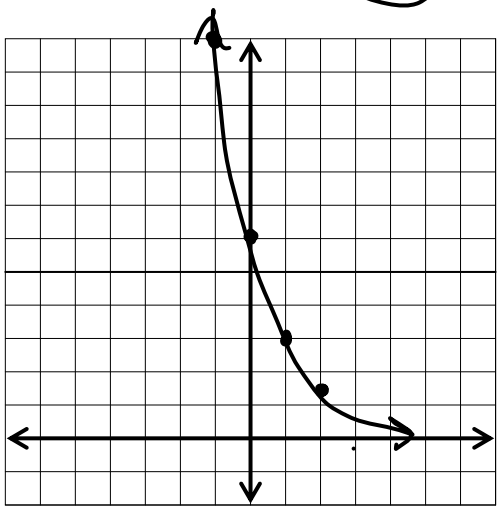


x	y
-2	1/12
-1	1/12
0	1/2
1	3
2	18

Doman $-\infty \leq x \leq \infty$

Range $y > 0$

2) $y = 6(\frac{1}{2})^x$ Growth or Decay?



x	y
-2	24
-1	12
0	6
1	3
2	3/2

Doman $-\infty \leq x \leq \infty$

Range $y > 0$