April 15 Park

$y = 2(2^x)$

y-intercept is 2

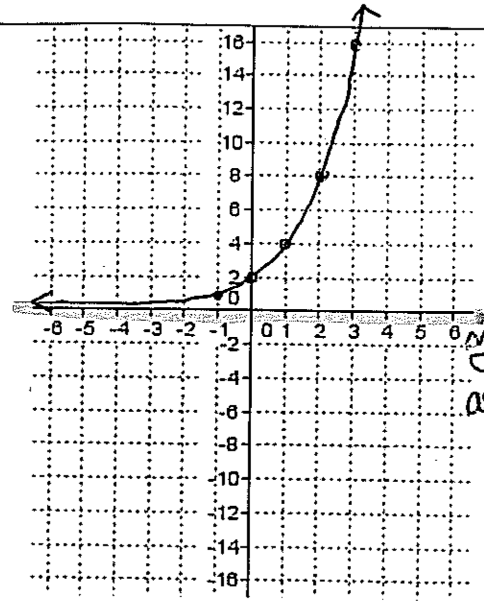
a = 2

b = 2

increasing, decreasing, neither (circle one)

Domain = $\{x \in \mathbb{R}\}$

Range = $\{y \in \mathbb{R},\ y > 0\}$



x	y
-1	1
0	2
1	4
2	8
3	16
4	32

Δy	Ratio
1	1
2	1
4	1
8	1
16	1

increasing by b

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

y-intercept is

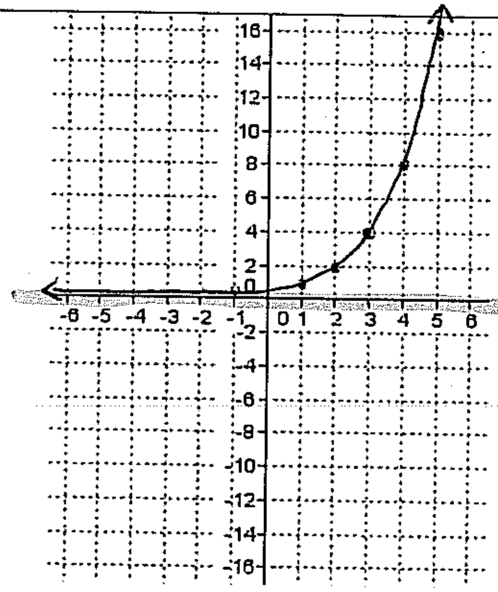
a = $\frac{1}{2}$

b = 2

increasing, decreasing, neither (circle one)

Domain = $\{x \in \mathbb{R}\}$

Range = $\{y \in \mathbb{R},\ y > 0\}$



x	y
-4	$\frac{1}{32}$
-3	$\frac{1}{16}$
-2	$\frac{1}{8}$
-1	$\frac{1}{4}$
0	$\frac{1}{2}$
1	1

Δy	Ratio
$\frac{1}{32}$	1
$\frac{1}{16}$	1
$\frac{1}{8}$	1
$\frac{1}{4}$	1
$\frac{1}{2}$	1

increasing by b

$y = 2(2^x)$ flipped on x axis

$y = -2(2^x)$

y-intercept is -2

a = -2

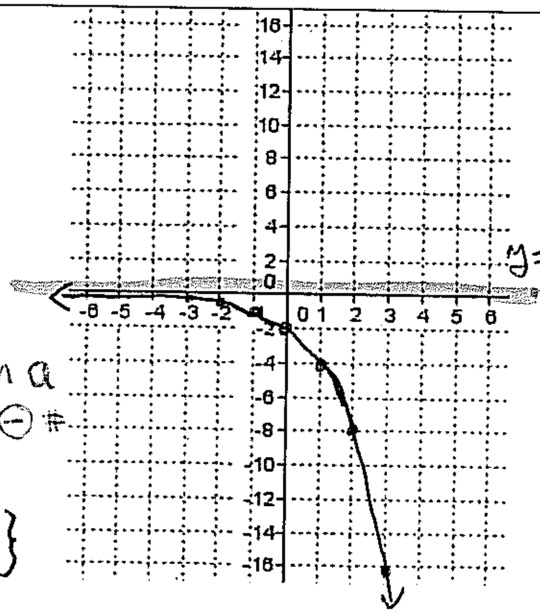
b = 2

increasing, decreasing, neither (circle one)

when a is $\ominus$ #

Domain = $\{x \in \mathbb{R}\}$

Range = $\{y \in \mathbb{R},\ y < 0\}$



$\frac{2}{3}$ $\frac{2}{4}$ (4,8)

x	y
-3	$-\frac{1}{4}$
-2	$-\frac{1}{2}$
-1	-1
0	-2
1	-4
2	-8
3	-16

Δy	Ratio
$-\frac{1}{4}$	1
$-\frac{1}{2}$	1
-1	1
-2	1
-4	1

increasing by b

* youtube : "Graphing Exponential functions" by Patrick JMT

Consolidation:

1. Make a chart listing the equations that have graphs that are increasing, decreasing and neither increasing nor decreasing.

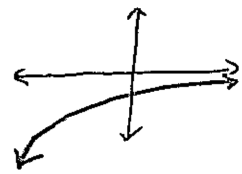
$y = \frac{1}{2}(2^x)$

Increasing	Decreasing	Neither
$y = 2^x$	$y = (\frac{1}{2})^x$	$y = 1^x$
$y = 3^x$	$y = (\frac{1}{3})^x$	
$y = 4^x$	$y = -2(2^x)$	
$y = 2(2^x)$		

What characteristic does an exponential equation have if its graph $y = ab^x$

a) Increases? ① $a > 0$ and $b > 1$

② $a < 0$ and $0 < b < 1$



b) Decreases? ① $a > 0$ and $0 < b < 1$

② $a < 0$ and $b > 1$

2. Describe how the value of the base, b, of an exponential function determines the shape of the graph.

vertically stretched

① If $b > 1$, The higher the "b" value, the steeper the graph becomes.

② If $0 < b < 1$, then the higher the "b" value, the flatter the graph becomes.

horizontally stretched

3. What ordered pair do all the graphs have in common? $y = b^x \rightarrow (0, 1)$

4. If the equation was changed to $\boxed{y = ab^x}$ what would the y-intercept be?

$(0, a)$

5. The graph $y = \left(\frac{1}{2}\right)^x$ and the graph of $y = 2^{-x}$ are the same. Show algebraically that this is true.

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

Homework: Pg. 185 #C1, C2, 3, 7, 9, 11