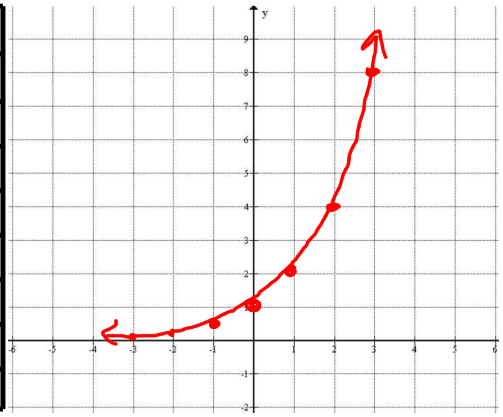
3.4a Exponential Relations

Complete the table of values and graph each

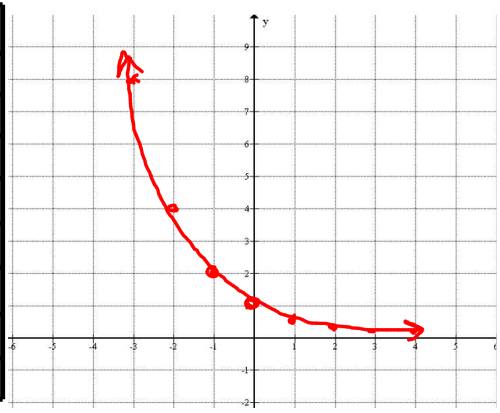
$y = 2^x$

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



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

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



What similarities do you notice between the two graphs?

Both:

- are exponential
- never touch the x axis
- have a y int of 1 (ie x=0 anything to the 0 is 1

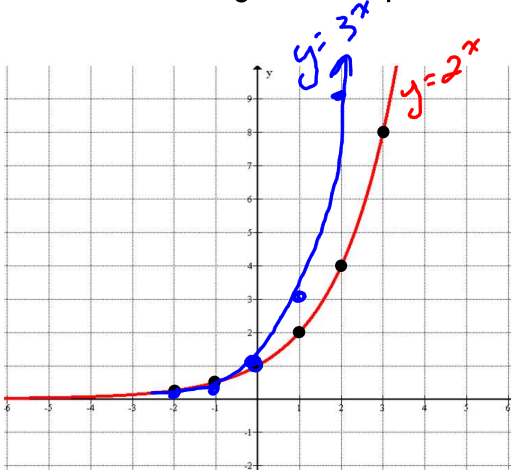
What differences do you notice between the two graphs?

- one is exponential growth (increases slowly then quickly)
- the other is exponential decay (decreases quickly then slowly)
- they are reflections about the y axis of each other

The graph of $y = 2^x$ is shown to the right. Complete the table and graph $y=3^x$ on the grid.

$y=3^x$

x	y
-3	$\frac{1}{27}$
-2	$\frac{1}{9}$
-1	$\frac{1}{3}$
0	1
1	3
2	9
3	27
4	81



Look at the value of y when x=1. What do you notice?

What are the similarities between the graph of $y=2^x$ and $y=3^x$?

- Both are exp. growth
- Both have a y int. of 1

What are the differences between the graph of $y=2^x$ and $y=3^x$

For $y=3^x$:

increases more slowly at first when x is neg then increases more quickly when x>0

Apr 27-9:55 AM

Explore on Desmos and note how the exponential function changes, as the base changes.

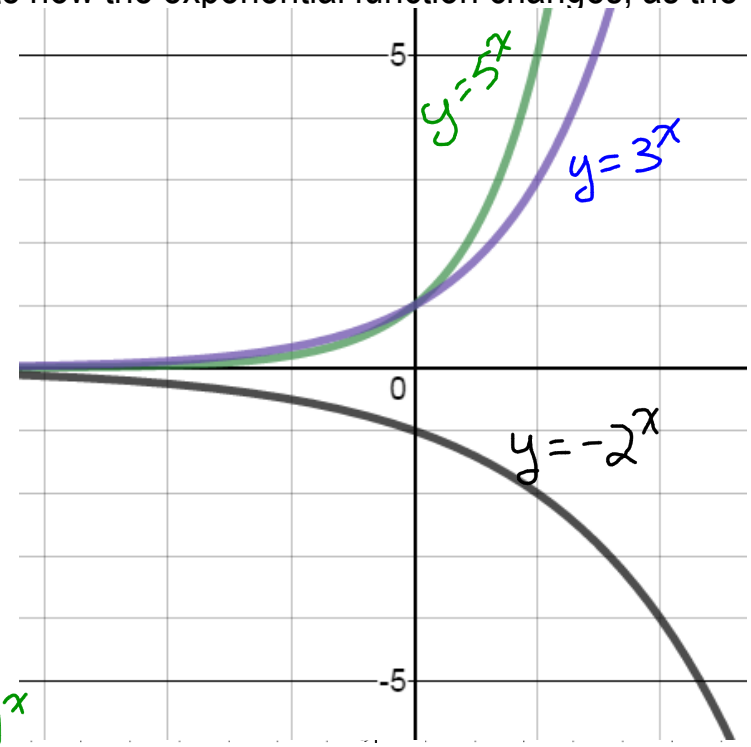
Graph the following:

$y = 3^x$

$y = 5^x$

$y = -2^x$

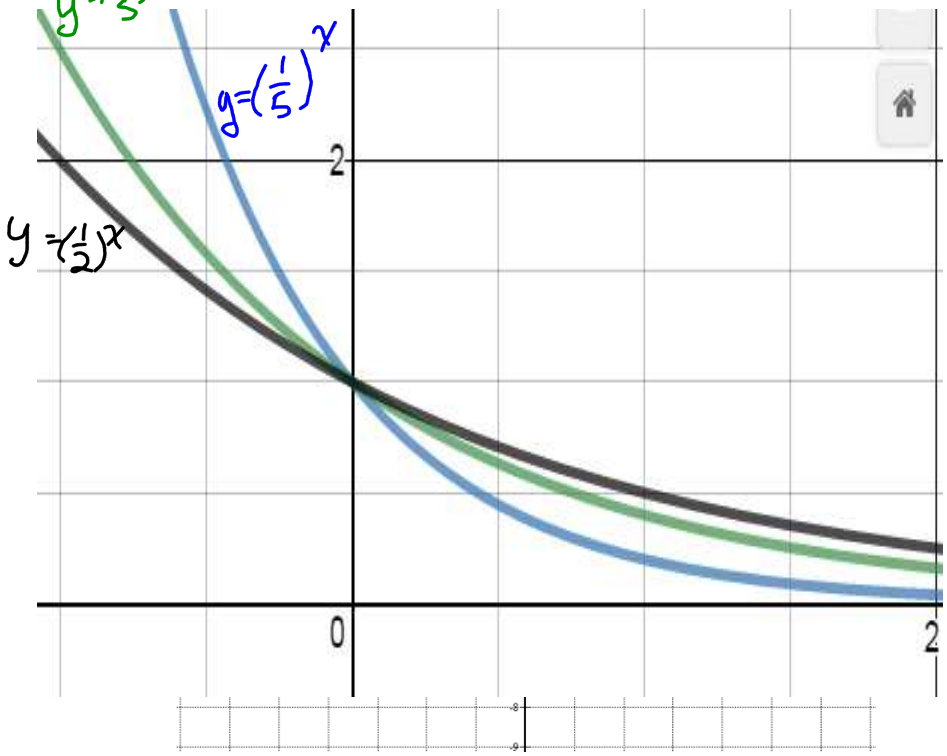
Notice the negative is not in brackets



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

$y = \left(\frac{2}{5}\right)^x$

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



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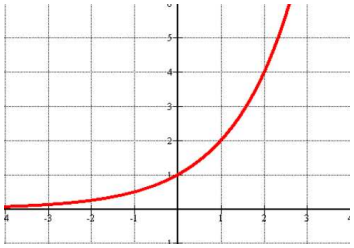
$y = b^x$ Summary

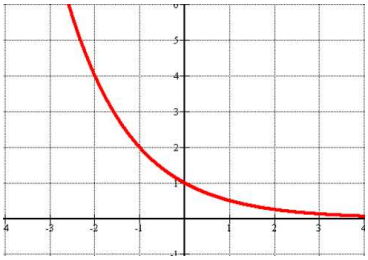
- $y = b^x$ is an exponential function note $b>0$ and $b \neq 1$

Description of the graph

- you can determine the value of b (the base) by looking at the value of y when x = 1



- When b >1, (from left to right) increases slowly for negative x values, increases rapidly for positive x values = exponential growth



- When 0 < b < 1,(from left to right) decreases rapidly for negative x values, decreases slowly for positive x values = exponential decay
- for $y = b^x$ the y-intercept is 1 ie when x = 0
- there are no x-intercepts

Apr 27-2:07 PM

Practice
pg 390 - 391
#1, 2, 3a(i,iii)b
4ab 5ab

Nov 30-4:57 PM