Day4-MCR3U

Name:_____

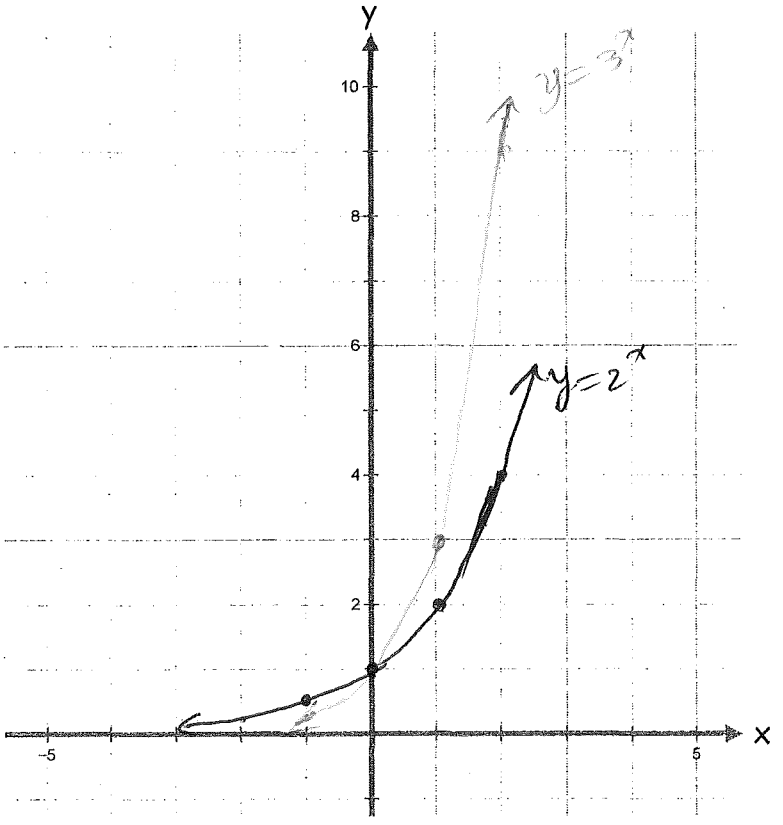
Date:_____

Graphing $y = b^x$, $b > 1$

Complete the following tables of values and use them to graph and label each function.

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

x	$y = 3^x$
-3	$\frac{1}{27}$
-2	$\frac{1}{9}$
-1	$\frac{1}{3}$
0	1
1	3
2	9
3	27



a) What are the y-intercepts for both graphs?

y-int is 1.

b) What are the domains and ranges for both graphs?

$D = \{x \in \mathbb{R}\}$ $R = \{y \in \mathbb{R} \mid y > 0\}$

c) What do you notice as the values of x get smaller?

y approaches 0 [horizontal asymptote].

↳ equation is $y = 0$.

Summary

If f is a function defined by $f(x) = b^x$, where $b > 1$:

f(x) is increasing, f(0) = 1, f(1) = b, and the equation of the horizontal asymptote is $y = 0$.

Day4-MCR3U

Name:_____

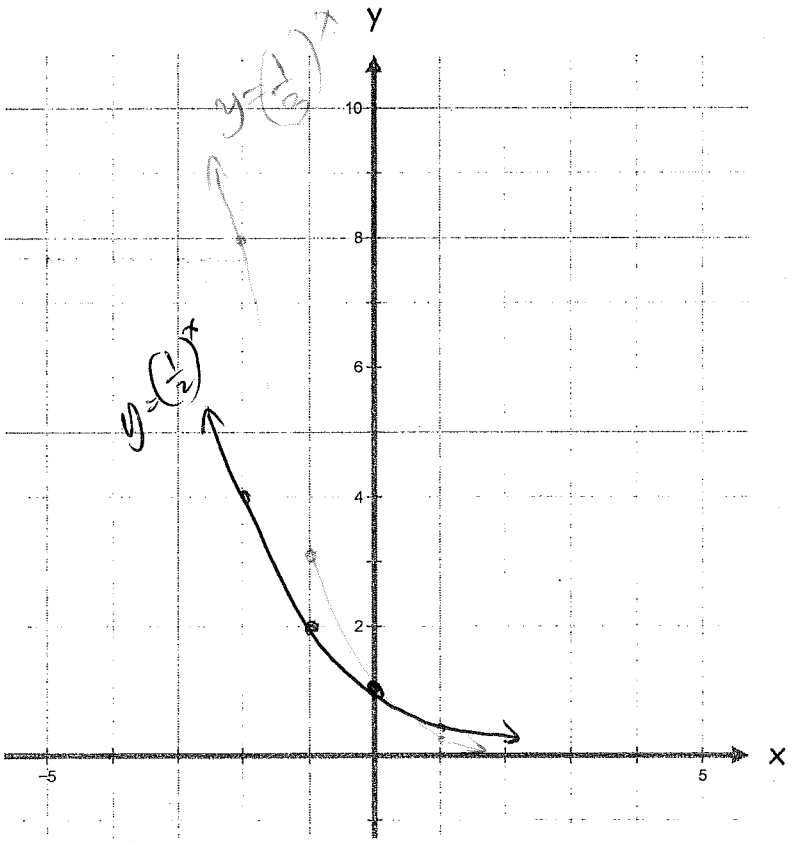
Date:_____

Graphing $y = b^x$, $0 < b < 1$

Complete the following tables of values and use them to graph and label each function.

x	$y = \left(\frac{1}{2}\right)^x$
-3	
-2	
-1	
0	
1	
2	
3	

x	$y = \left(\frac{1}{3}\right)^x$
-3	
-2	
-1	
0	
1	
2	
3	



a) What are the y-intercepts for both graphs?

y-int is 1

b) What are the domains and ranges for both graphs?

$D = \{x \in \mathbb{R}\}$ $R = \{y \in \mathbb{R} \mid y > 0\}$

c) What do you notice as the values of x get larger?

y approaches 0 [horizontal asymptote $y = 0$]

Summary

If f is a function defined by $f(x) = b^x$, where $0 < b < 1$:

f(x) is decreasing, f(0) = 1, f(1) = b, $f(-1) = \frac{1}{b}$ and the equation of the horizontal asymptote is y = 0.

Day4-MCR3U

Name:_____

Date:_____

Determining the Equation of an Exponential Function $y = b^x$

From Harcourt Mathematics 12

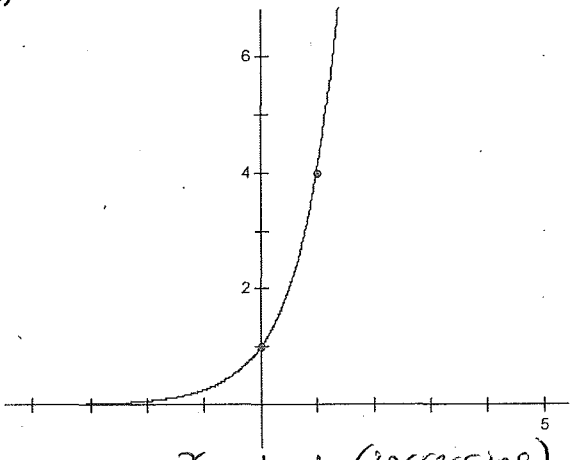
1. Determine the equation of the functions graphed below.

   Hints: They are all of the form $y = b^x$.

   Determine whether the graph is increasing or decreasing to determine whether $b > 1$ or $0 < b < 1$.

   Determine the value of y when $x = 1$ or $x = -1$.

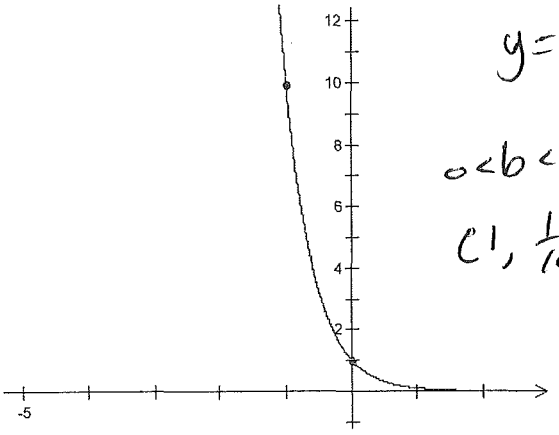
a)



$y = 4^x$ $b > 1$ (increasing)

$(1, 4)$ $(-1, \frac{1}{4})$

b)

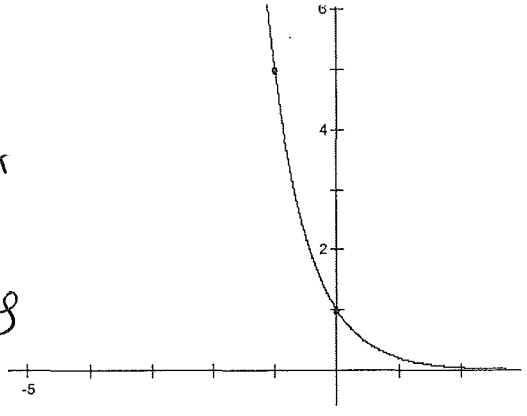


$y = \left(\frac{1}{10}\right)^x$

$0 < b < 1$ (decreasing)

$(1, \frac{1}{10})$ $(-1, 10)$

c)



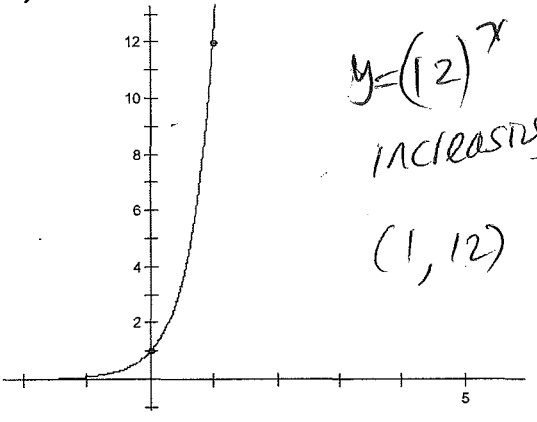
$y = \left(\frac{1}{5}\right)^x$

decreasing

$(1, \frac{1}{5})$

$(-1, 5)$

d)



$y = (12)^x$

increasing

$(1, 12)$ $(-1, \frac{1}{12})$

Homework: p. 243 #1,2 p. 239 #1f,5f,6d,7d,8,9f, 10f,11ab, 12a-d