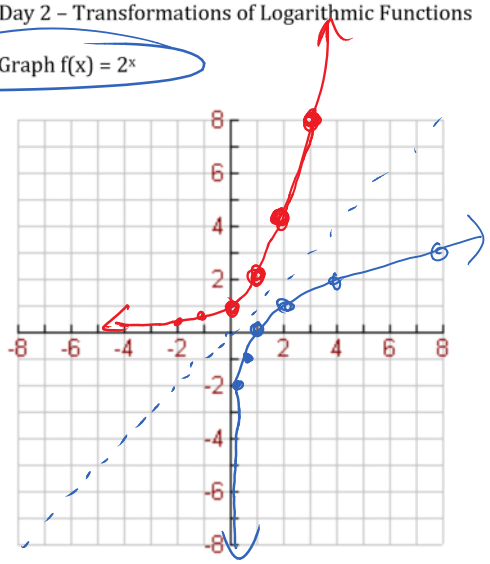
Graphing Logs

Friday, November 6, 2015 11:46 AM

Precalculus
3.3 Day 2 – Transformations of Logarithmic Functions

Name:
Period:

1. Graph $f(x) = 2^x$



x	f(x)
-2	1/4
-1	1/2
0	1
1	2
2	4

$x = 2^y$

$\log_2 x = y$

x	$f^{-1}(x)$
1/4	-2
1/2	-1
1	0
2	1
4	2

2. Now graph the inverse of $f(x) = 2^x$ on the grid above (flip the x's and the y's). Use a new color and label each graph.

3. Complete the table by using the graphs above:

	$f(x) = 2^x$	$f^{-1}(x) = \log_2 x$
Domain	$(-\infty, \infty)$	$(0, \infty)$
Range	$(0, \infty)$	$(-\infty, \infty)$
Equation of Asymptote	H.A. $y = 0$	V.A. $x = 0$

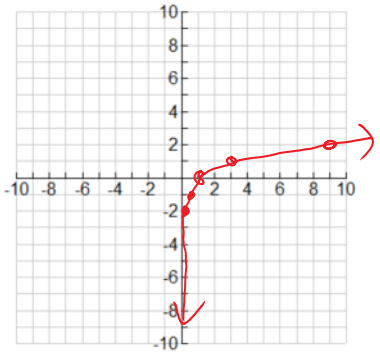
A QUICK SUMMARY OF LOGARITHMS:

- Logs and exponents are inverses ★ Helpful for graphing.
- $a^x = b \Leftrightarrow \log_a b = x$
- $\log$ "10" = Common log (log)
  $\log$ "e" = Natural log (ln)

Sketch the graph of the function $f(x) = \log_3(x)$. Graph four reasonably accurate points. *Hint*: graph the inverse function first.

$f^{-1}(x) = 3^x$

x	$f^{-1}(x)$
-2	$\frac{1}{9}$
-1	$\frac{1}{3}$
0	1
1	3
2	9



x	$f(x)$
$\frac{1}{9}$	-2
$\frac{1}{3}$	-1
1	0
3	1
9	2

Describe the how each function below transforms its parent function $f(x) = \log_3(x)$. Then, match the functions below with their corresponding graphs.

a. $k(x) = \log_3(-x)$ III

b. $g(x) = -\log_3(x) + 1$ II

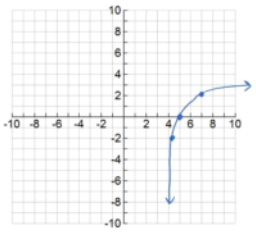
c. $h(x) = 2\log_3(x-4)$ I

d. $j(x) = \log_3(x+2) + 1$ IV

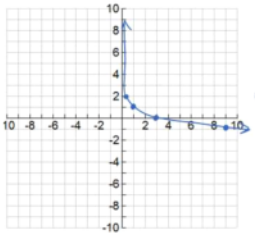
$y = 3^x$

$y = 3^x$

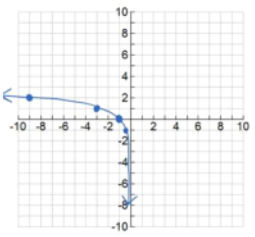
I.



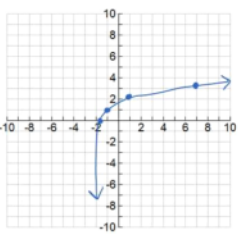
II.



III.



IV.



Think About It! What about the natural log function? How is it similar to the common log graph? How is it different?