$y = \log_b x \leftrightarrow b^y = x$

Graphing Logarithmic Functions – Intermediate Algebra

Fact: Logarithms and Exponential functions are inverses of each other.

Fact: The graphs of inverse functions are symmetric across the line $y = x$.

Examples: Graph each logarithmic function by first graphing its corresponding exponential function.

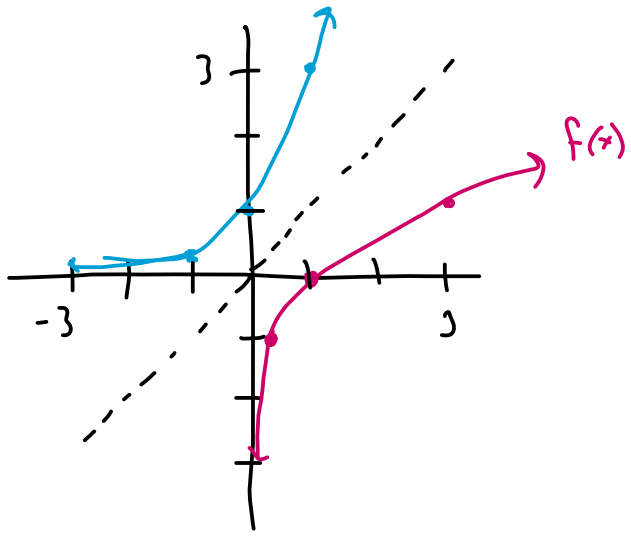
1. $f(x) = \log_3 x$

$y = 3^x$

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

switch x & y

x	y
$\frac{1}{3}$	-1
1	0
3	1



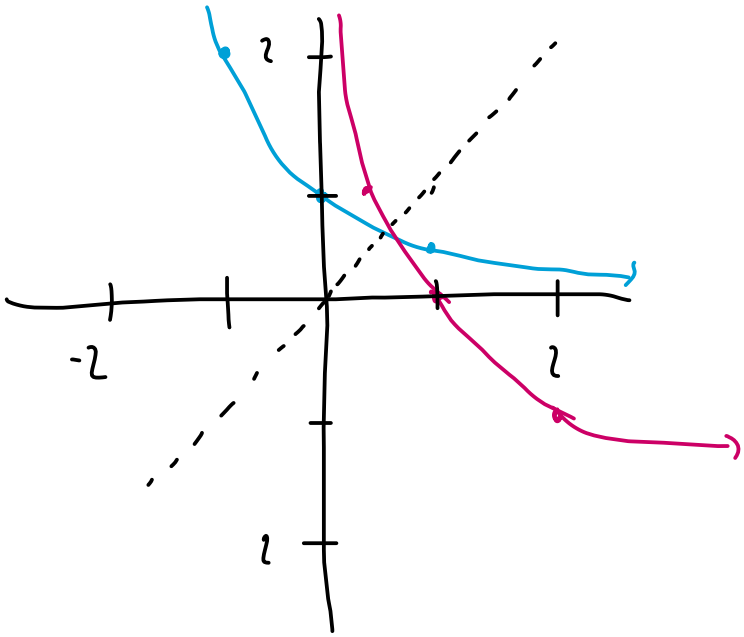
2. $g(x) = \log_{1/2} x$

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

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

$y = \log_{\frac{1}{2}} x$

x	y
2	-1
1	0
$\frac{1}{2}$	1



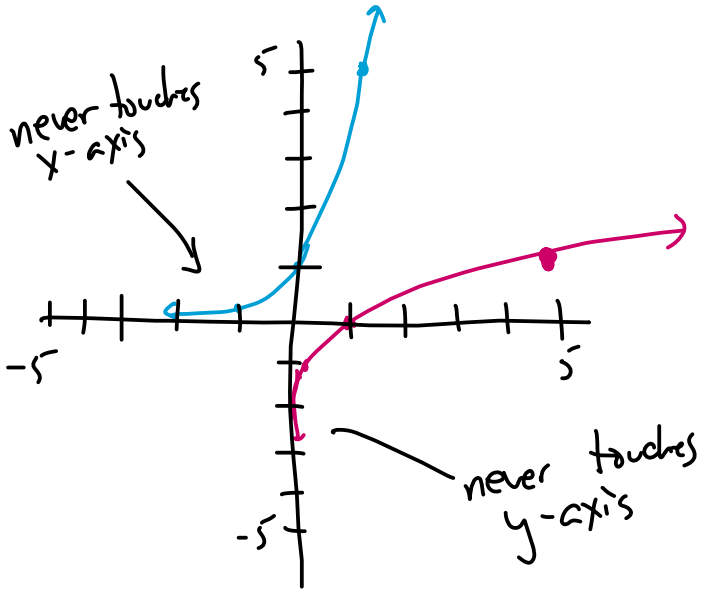
3. $h(x) = \log_5 x$

$y = 5^x$

x	y
-1	$\frac{1}{5}$
0	1
1	5

$y = \log_5 x$

x	y
$\frac{1}{5}$	-1
1	0
5	1



4. $f(x) = \log_{1/4} x$

$y = \left(\frac{1}{4}\right)^x$

x	y
-1	4
0	1
1	$\frac{1}{4}$

$y = \log_{\frac{1}{4}} x$

x	y
4	-1
1	0
$\frac{1}{4}$	1