Precalc 11.4

Evaluate expressions involving logarithms
Solve equations and inequalities involving logarithms
Graph logarithmic functions and inequalities

inverse function

$10^2 = 100 \quad \log_{10} 100 = 2$

logarithm

logarithmic function

base

exponent

properties of exponents $x^2 * x^3$, etc.

Logarithmic Function	The logarithmic function $y = \log_a x$, where $a > 0$ and $a \neq 1$, is the inverse of the exponential function $y = a^x$. So, $y = \log_a x$ if and only if $x = a^y$.

exponent = $\log_{(base)}$ number

Example: $2 = \log_{10} 100$

6 Graph $y = \log_3 (x + 1)$.

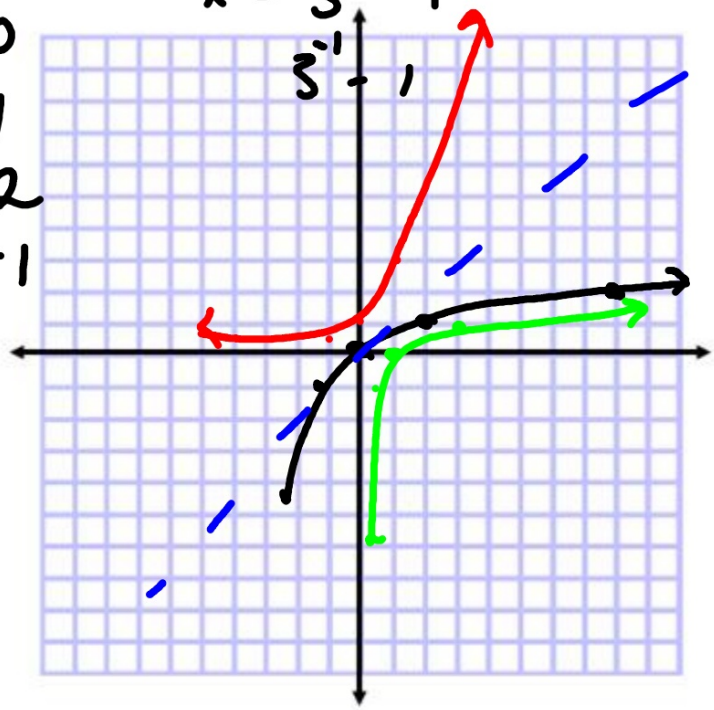
$3^y = x + 1$

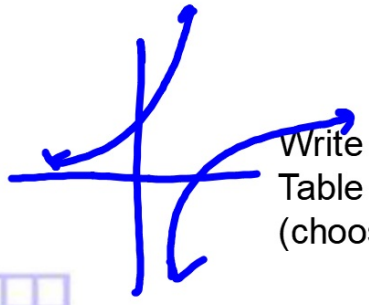
$3^{-1} \; y$

$x = 3^{-1} - 1$

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

$y = 3^x$





Write in exp form
Table of values
(choose y) …why?

$y =$

x	y

7 Graph $y \leq \log_5 x - 2$.

$y = 5^x$

$y + 2 = \log_5 x$

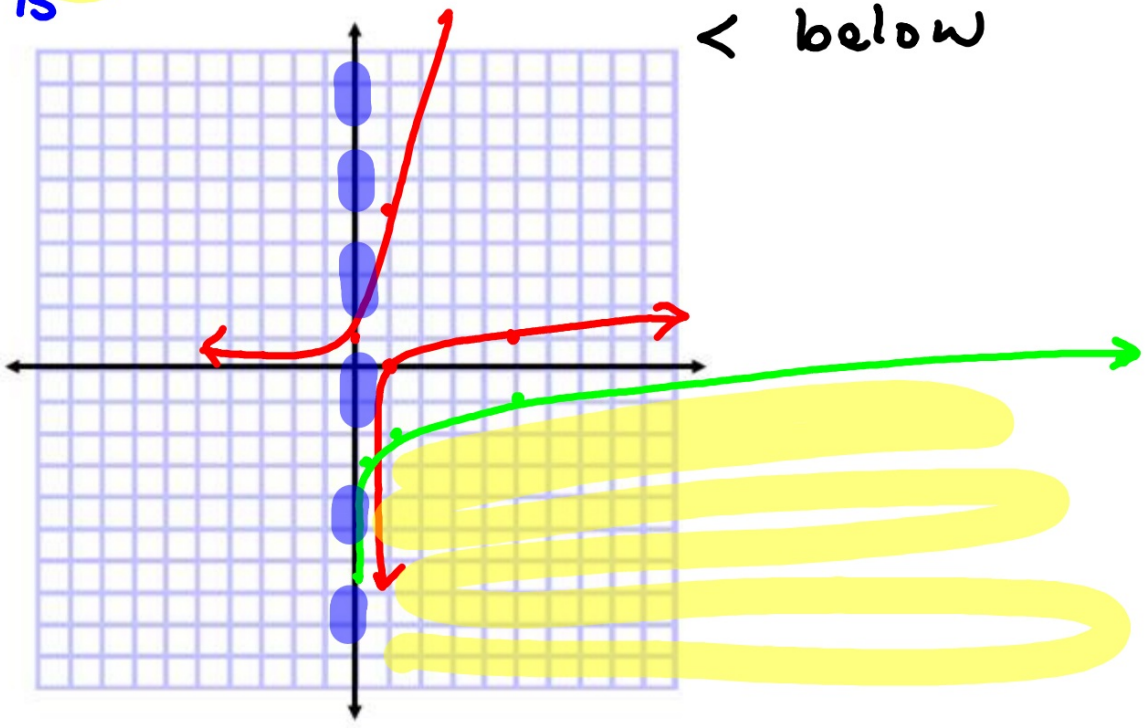
> above

< below

$y = x$

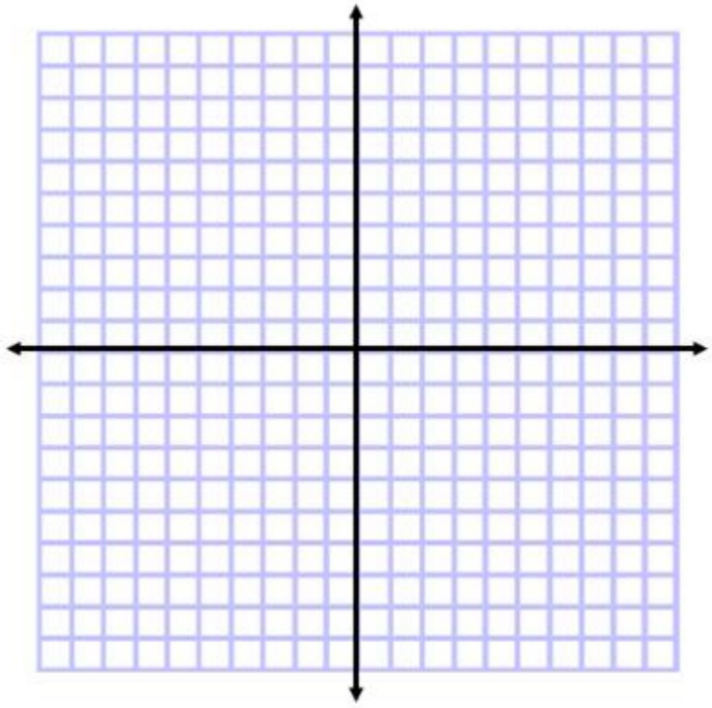
$5 = x$

25	0
5	-1
1	-2
$\frac{1}{5}$	-3

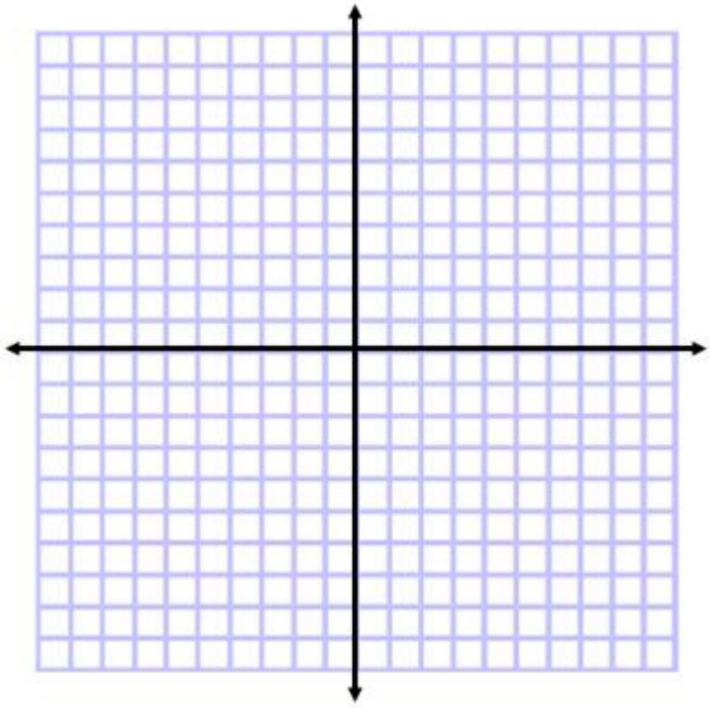


Graph each equation or inequality.

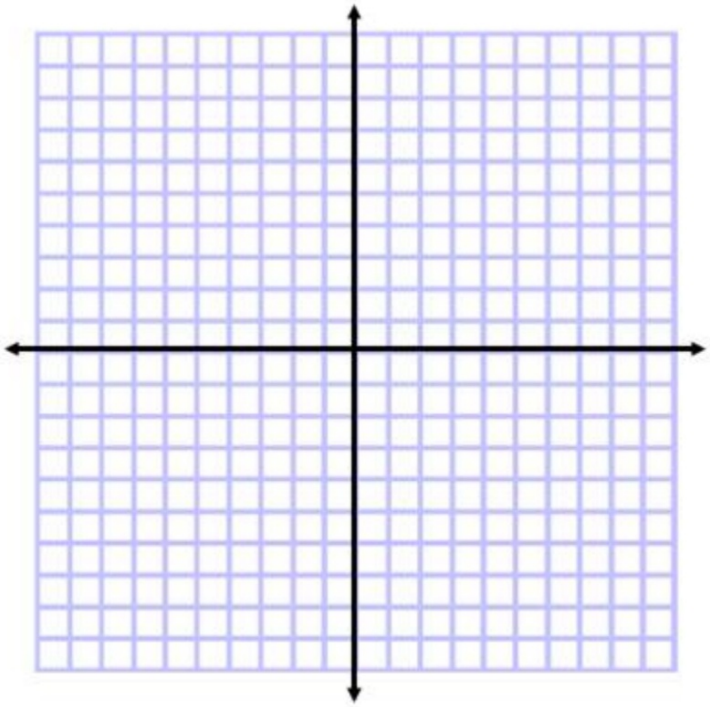
17. $y = \log_{\frac{1}{2}} x$



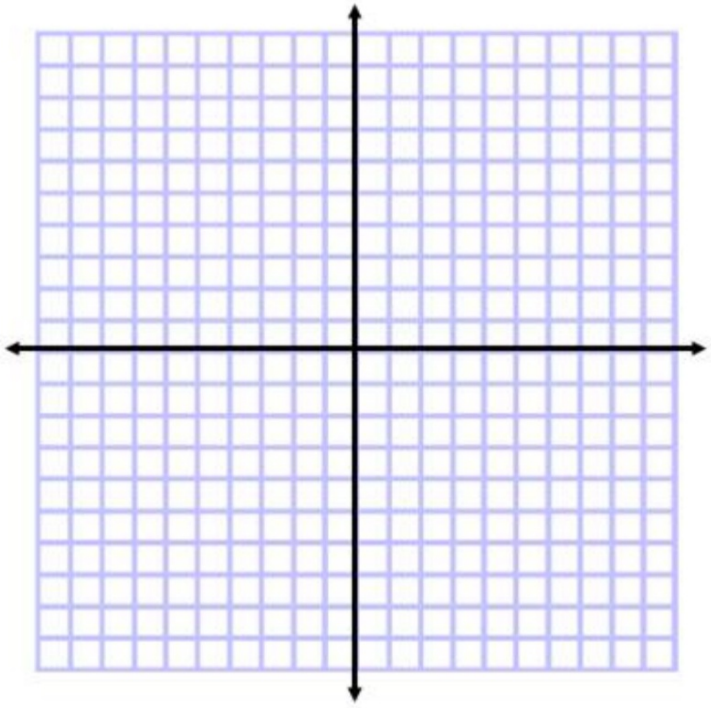
18. $y \geq \log_6 x$



55. $y = \log_5(x - 1)$



58. $y > \log_{10}(x + 1)$



$$\log_4(2x-1) = \log_4 16$$

$$2x-1 = 16$$

$$\log_4 0.25 = x$$

$$4^x = \frac{1}{4} \qquad 4^x = 4^{-1}$$

$$x = -1$$