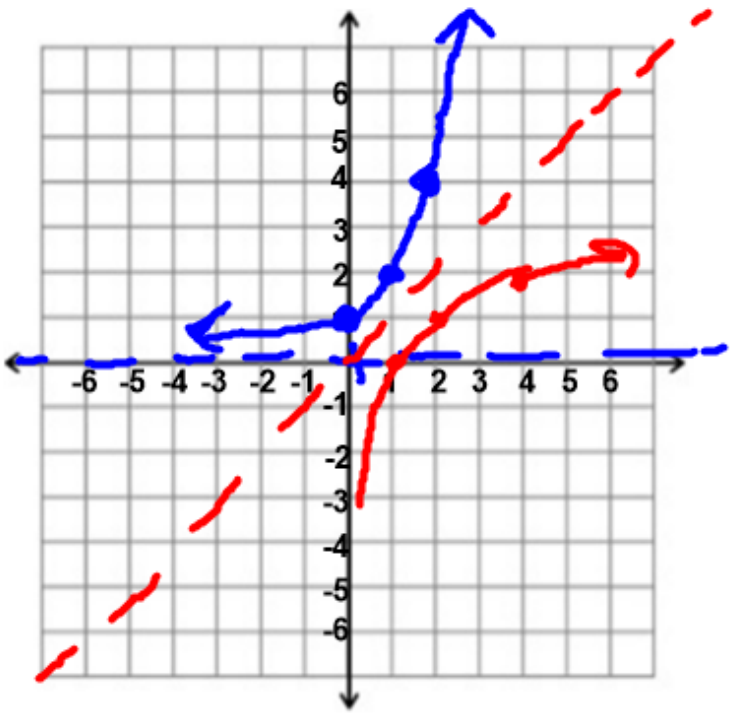
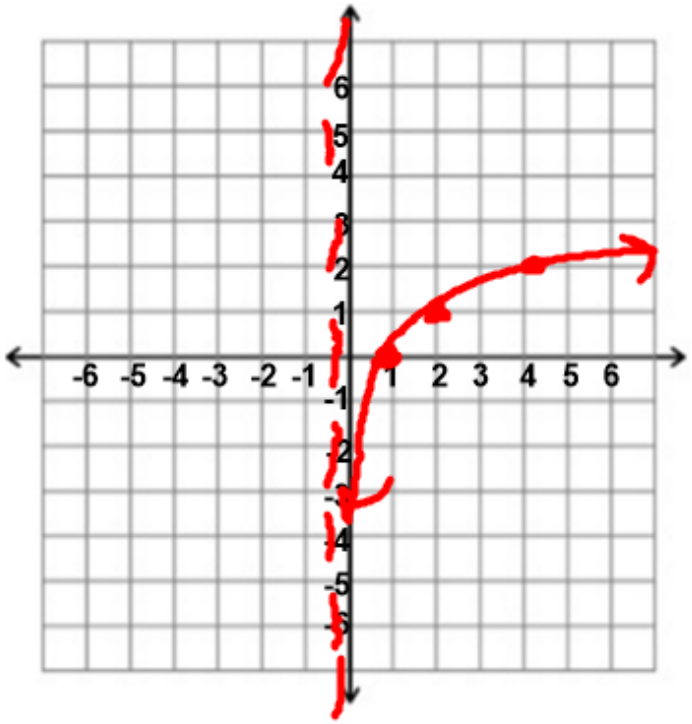
Lesson 9.3: Graphing Logarithms

Inverses

$y = 2^x$

$y = \log_2 x$





HA: $y = 0$

D: $\mathbb{R}$

R: $y > 0$

VA: $x = 0$

D: $x > 0$

R: $\mathbb{R}$

General Equation

$$y = a\log_b(x - h) + k$$

Vertical shift

y-distortion
multiply y's
by a.

$Vertical\ Asymptote: x = h$
(Horizontal Shift
Opposite direction)

Key Points: ★

$(1,0)\ and\ (b,1)$

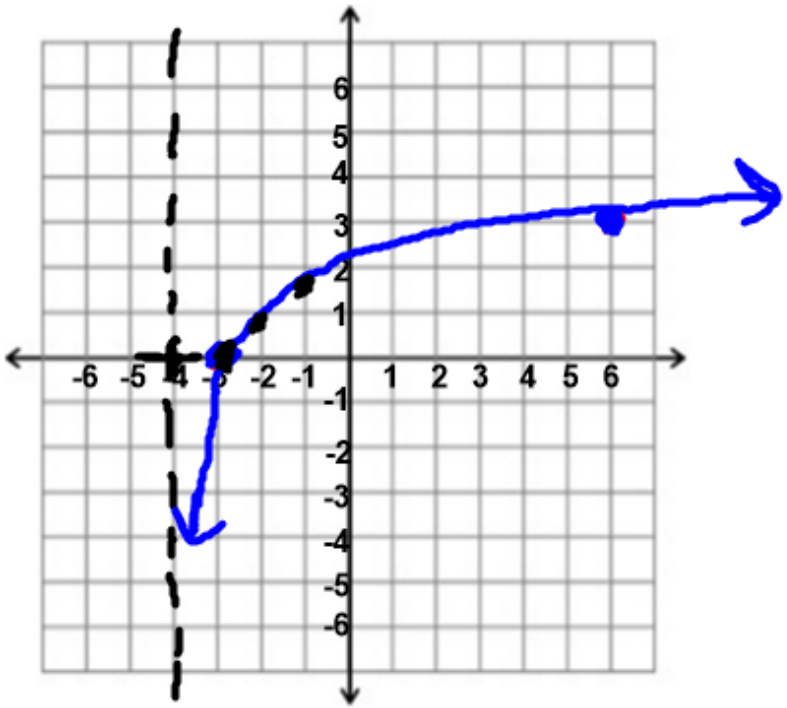
$$\log_b a = \frac{\log(a)}{\log(b)}$$

→ If you use Plug and Chug.

$y = 3\log(x + 4)$

y-dist

(2) 4



(1, 0) (6, 1)

(1, 0) (10, 1)

x3 x3

1, 0 10, 3

VA: $x = -4$

D: $x > -4$

R: $\mathbb{R}$

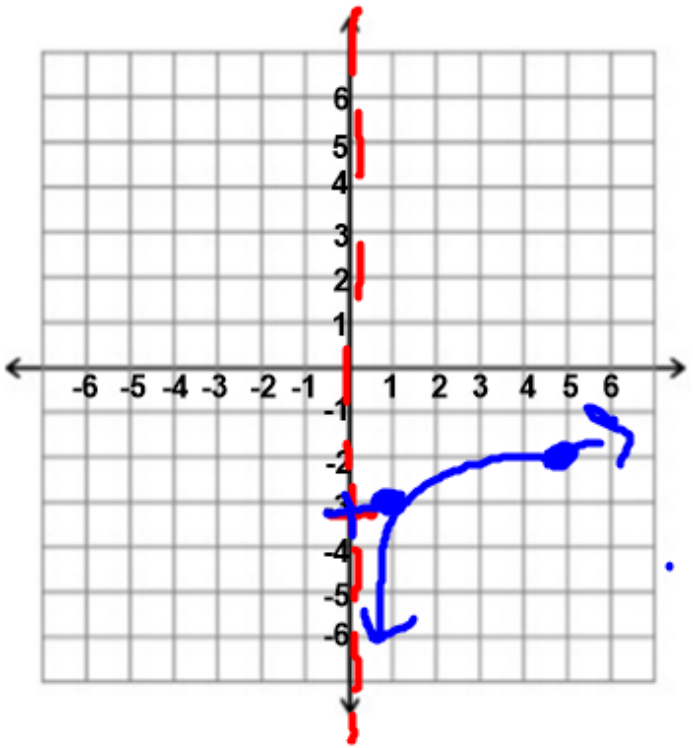
Plug and Chug Method

x	y
-3	0
-2	.9
-1	1.4

$y = \log_5 x - 3$

(1, 0) (5, 1)

Down 3



Plug and Chug Method

x	y
1	$\log_5(1) - 3 = -3$
2	$\log_5(2) - 3 =$
3	$\log_5(3) - 3 =$

$\log(1) \div \log(5) - 3$

Change of Base

VA: $x = 0$

D: $x > 0$

R: $\mathbb{R}$

$$y = \ln(x - 3) + 1$$

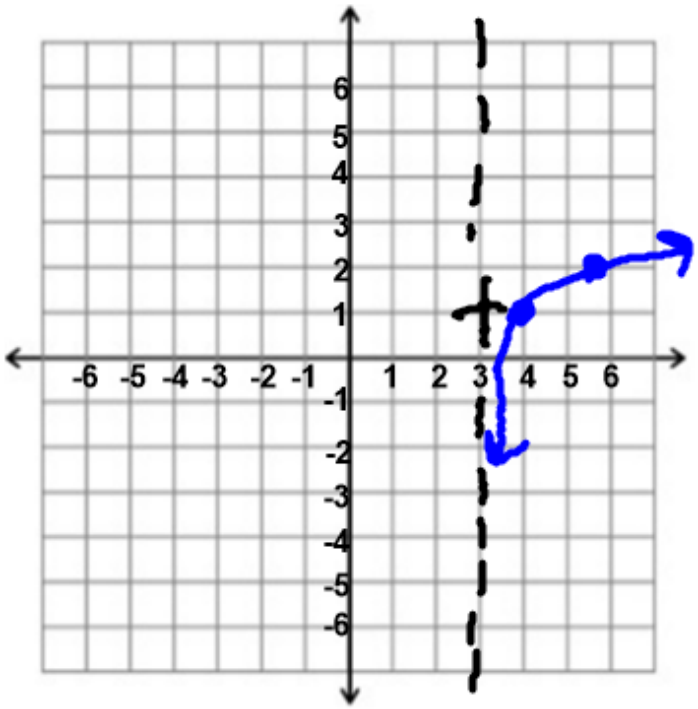
R 3 up 1

(1, 0)

(6, 1)

↓

(2.7, 1)



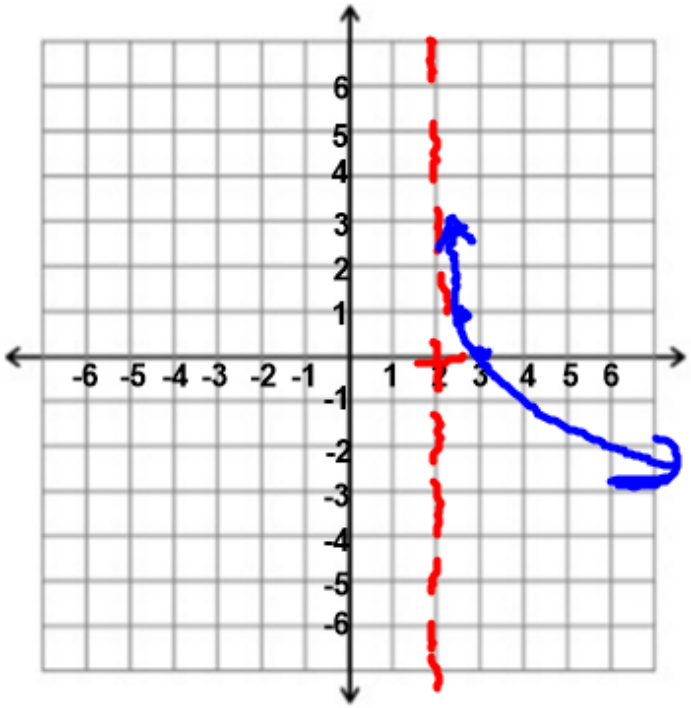
VA: $x = 3$

D: $x > 3$

R: $\mathbb{R}$

$y = \log_{1/4}(x - 2)$

(1, 0) (1/4, 1)

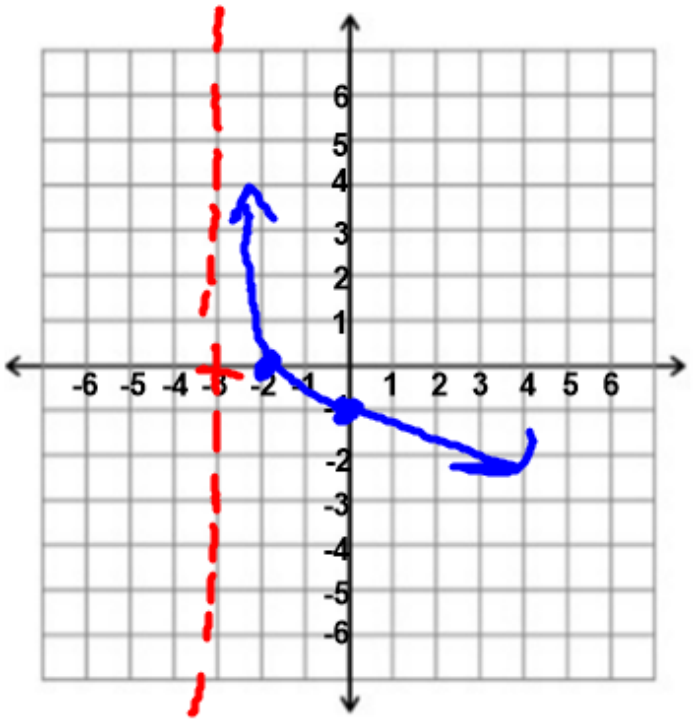


$y = -\log_3(x+3)$

y-dist.

(1, 0) → x · -1 → (1, 0)

(3, 1) → x · -1 → (3, -1)



VA: $x = -3$

D: $x > -3$

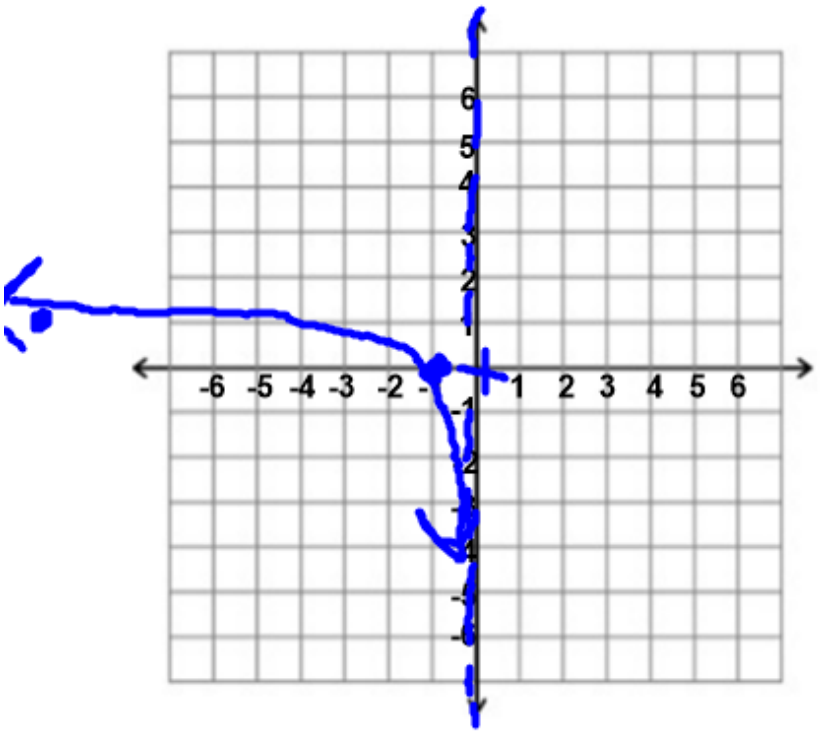
R: $\mathbb{R}$

$y = \log(-x)$

X-axis.

(1, 0) ÷ -1 → -1, 0

(10, 1) ÷ -1 → -10, 1



VA: $x = 0$

D: $x < 0$

R: $\mathbb{R}$