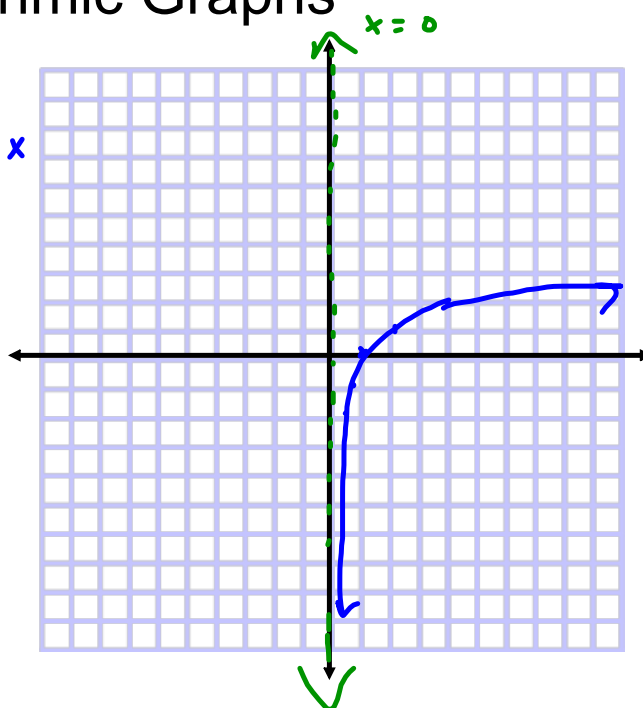


# Warm Up

# Logarithmic Graphs

x	y
1/4	-2
1/2	-1
1	0
2	1
4	2

$y = \log_2 x$   
 Asymptote:  $2^y = x$   
 $x = 0$   
 x-intercept:  $(1, 0)$



Parent Function  $y = \log_2 x$

Domain  $(0, +\infty)$

Range  $(-\infty, +\infty)$

Warm Up  $y = \log_{10} x$   $10^y = x$

x	y
$\frac{1}{100}$	-2
$\frac{1}{10}$	-1
1	0
10	1
100	2

Asymptote:  $x = 0$

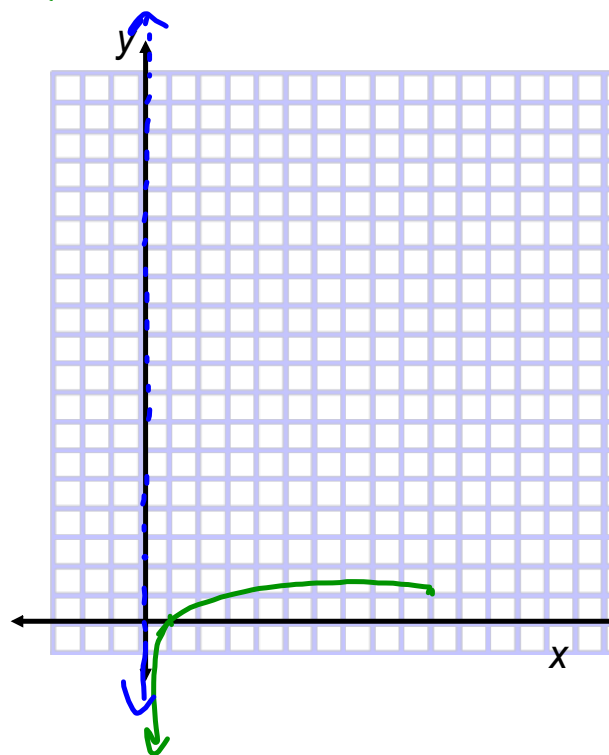
x-intercept:  $(1, 0)$

Parent Function

$$y = \log_2 x$$

Domain  $(0, +\infty)$

Range  $(-\infty, +\infty)$

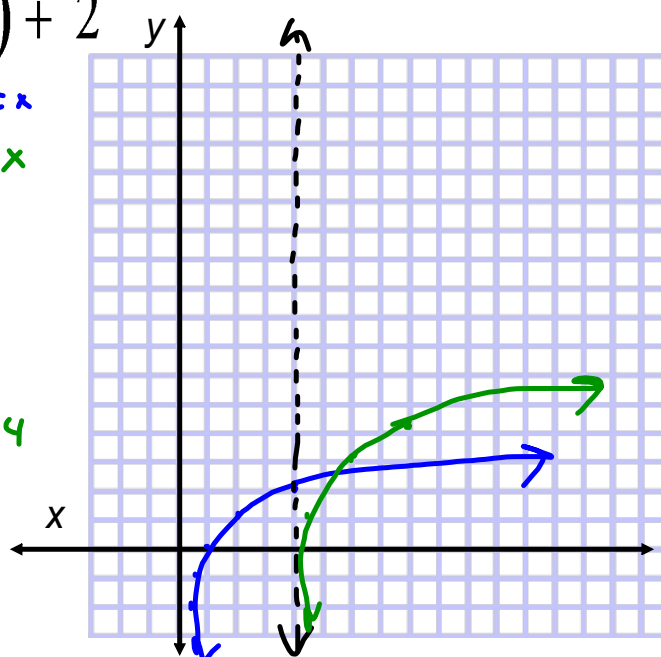


# Partner Paper

x	y
1/4	-2
1/2	-1
1	0
2	1
4	2

$$y = \log_2(x - 4) + 2$$

- Parent Function  $2^y = x$
- Asymptote  $x = 4$   $y = \log_2 x$
- Domain  $(4, +\infty)$
- Range  $(-\infty, +\infty)$
- Horizontal Shift Right 4
- Vertical Shift Up 2



### Partner Paper

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

$$y = \log_3(x + 2) - 4$$

Parent Function  $y = \log_3 x$

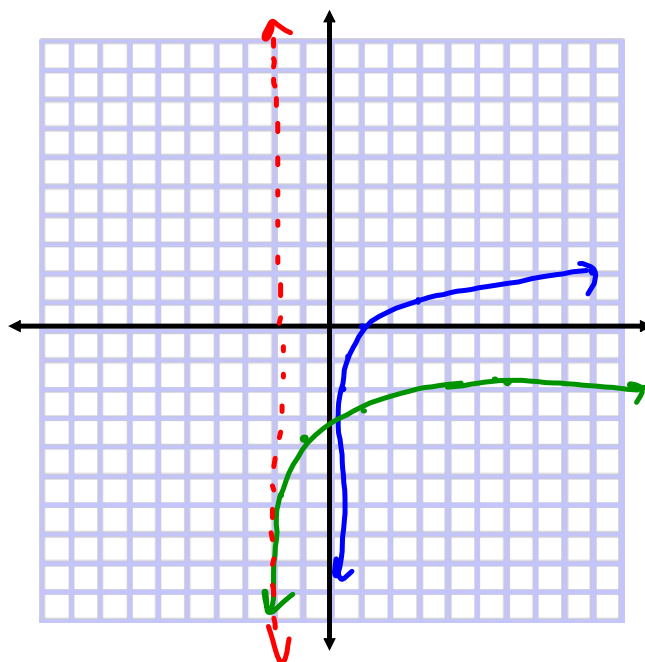
Asymptote  $x = -2$

Domain  $(-2, +\infty)$

Range  $(-\infty, +\infty)$

Horizontal Shift  $(+ f + 2)$

Vertical Shift  $\text{Down } 4$



## Partner Paper

$x$	$y$
	-2
	-1
	0
	1
	2

$$y = \log(x + 5) - 1$$

Parent Function  $y = \log x$

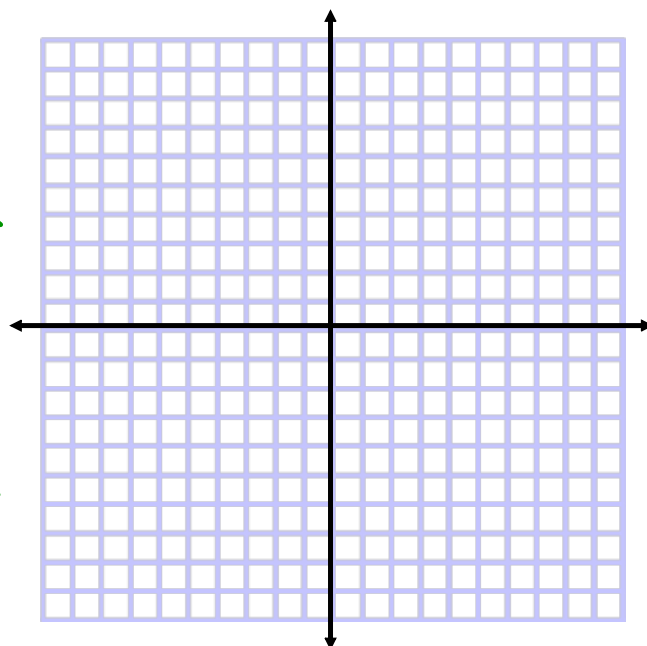
Asymptote  $x = -5$

Domain  $(-5, +\infty)$

Range  $(-\infty, +\infty)$

Horizontal Shift  $Left 5$

Vertical Shift  $Down 1$



## Partner Paper

$x$	$y$
	-2
	-1
	0
	1
	2

$$y = \log(x - 1) + 5$$

Parent Function

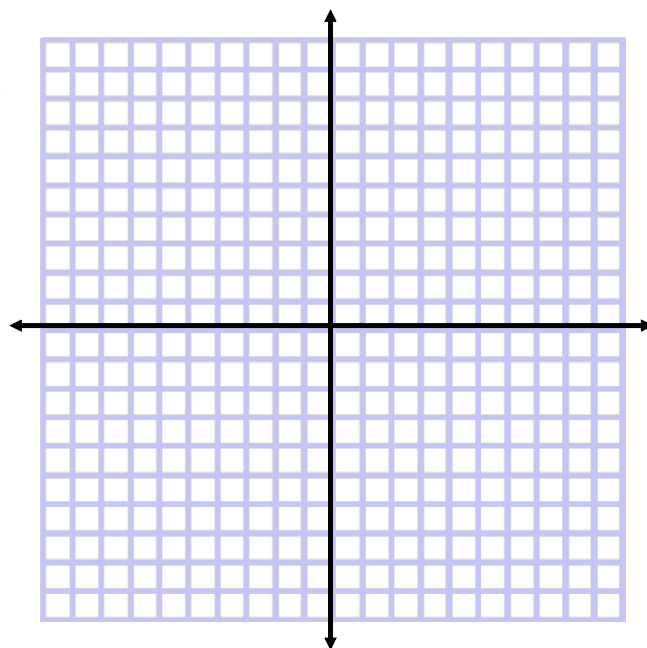
Asymptote

Domain

Range

Horizontal Shift

Vertical Shift



Without Graphing Describe each of the following.

$$f(x) = \log_2(x - 5) + 9$$

$$f(x) = \log_3(x + 6) - 8$$

Parent Function

Asymptote

Domain

Range

Horizontal Shift

Vertical Shift

