

Characteristics of Logs

Parent Function: $y = a \log_b(x + h) + k$

*Domain: (h, ∞) $y = \log_b(-x)$ \curvearrowright $(-\infty, h)$

Range: \mathbb{R} or $(-\infty, \infty)$

x-intercept: $(x, 0)$ * Plug in zero for y; Solve the equation

y-intercept: $(0, y)$ * Plug in zero for x, Simplify

Asymptote: $x = h$ opposite of equation $(x+2)$ $x = -2$

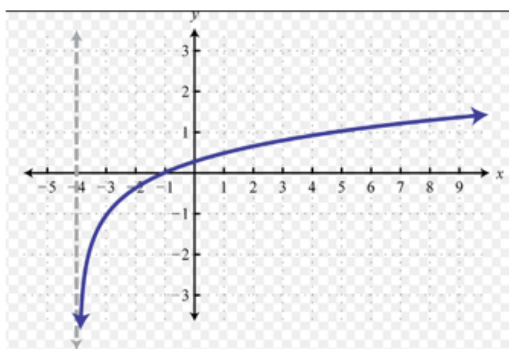
*Set inside = 0
 $(x+h) = 0$

End Behavior:

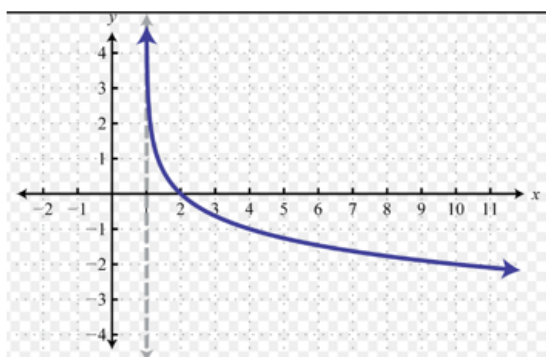
as $x \rightarrow h$, $f(x) \rightarrow \begin{matrix} \text{down } -\infty \\ \text{up } \infty \end{matrix}$

as $x \rightarrow \infty$ or $-\infty$, $f(x) \rightarrow \begin{matrix} \text{down } -\infty \\ \text{up } \infty \end{matrix}$

$x+2=0$



Domain	$(-4, \infty)$
Range	$(-\infty, \infty)$
Asymptote	$x = -4$
<u>x-int</u>	$(-1, 0)$
<u>y-int</u>	$(0, .25)$
End Behavior	$as\ x \rightarrow \underline{-4}, f(x) \rightarrow \underline{-\infty}$ $as\ x \rightarrow \underline{\infty}, f(x) \rightarrow \underline{\infty}$

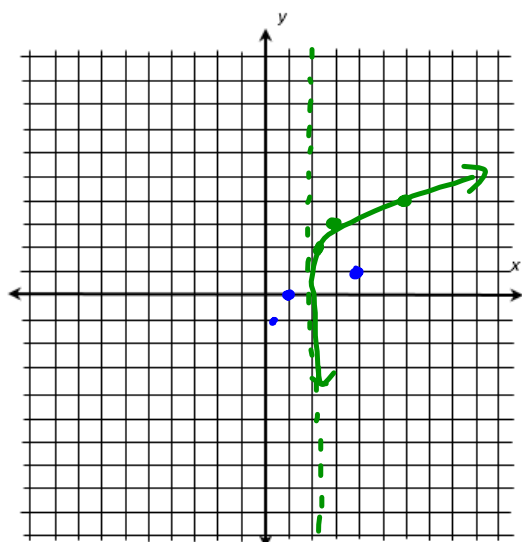


Domain	$(1, \infty)$
Range	$(-\infty, \infty)$
Asymptote	$x = 1$
x-int	$(2, 0)$
y-int	n/A
End Behavior	$as x \rightarrow 1, f(x) \rightarrow \infty$ $as x \rightarrow \infty, f(x) \rightarrow -\infty$

Graph the following and identify the given characteristics

$$y = \log_4(x - 2) + 3$$

Asymptote
 $x - 2 = 0$
 $x = 2$



Domain	$(2, \infty)$
Range	$(-\infty, \infty)$
Asymptote	$x = 2$
<u>x-int</u>	$(2.02, 0)$
<u>y-int</u>	N/A
End Behavior	$as x \rightarrow \underline{2}, f(x) \rightarrow \underline{-\infty}$ $as x \rightarrow \underline{\infty}, f(x) \rightarrow \underline{\infty}$

Practice Worksheet: Graphing Logarithmic Functions

Without a calculator, match each function with its graph.

D 1. $f(x) = \log_2 x$

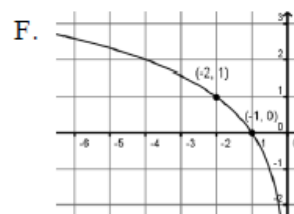
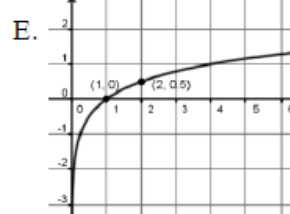
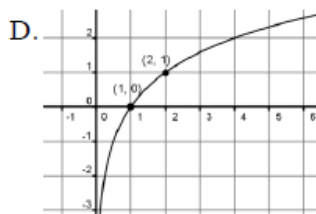
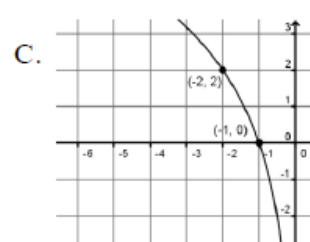
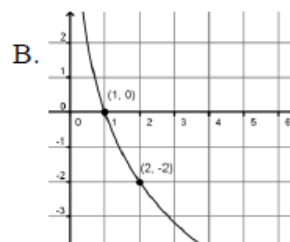
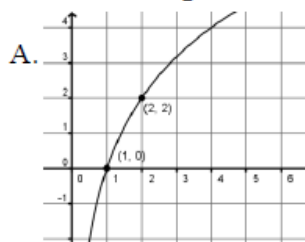
F 2. $f(x) = \log_2(-x)$

A 3. $f(x) = 2 \log_2 x$

E 4. $f(x) = \frac{1}{2} \log_2 x$

C 5. $f(x) = 2 \log_2(-x)$

B 6. $f(x) = -2 \log_2 x$



7. $f(x) = 3 \log_{\frac{1}{3}} x + 2$

$$a = 3 \quad b = \frac{1}{2} \quad c = \frac{1}{3} \quad h = 0 \quad k = 2$$
 Domain: $x > 0$

Asymptote: $x = 0$ Range: $y \in \mathbb{R}$

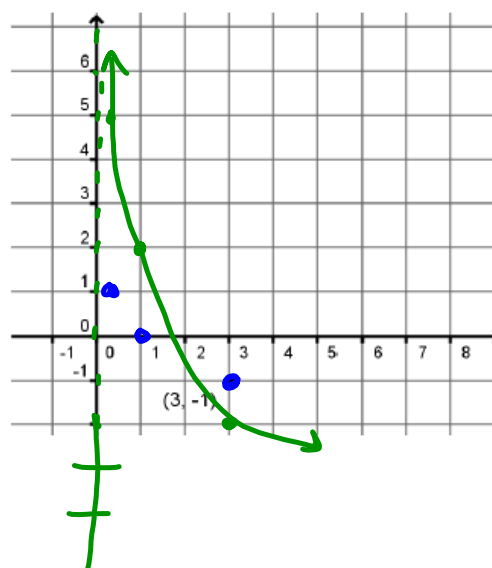
Transformations: Parent

$\frac{1}{3}$

$(3, -1)$
 $(1, 0)$
 $(\frac{1}{3}, 1)$

mult
y by 3

Coordinates of the two anchor points:

 $(\frac{1}{3}, 1)$ and $(3, -1)$ 

$$f(x) = \log_3(-x) + 1$$

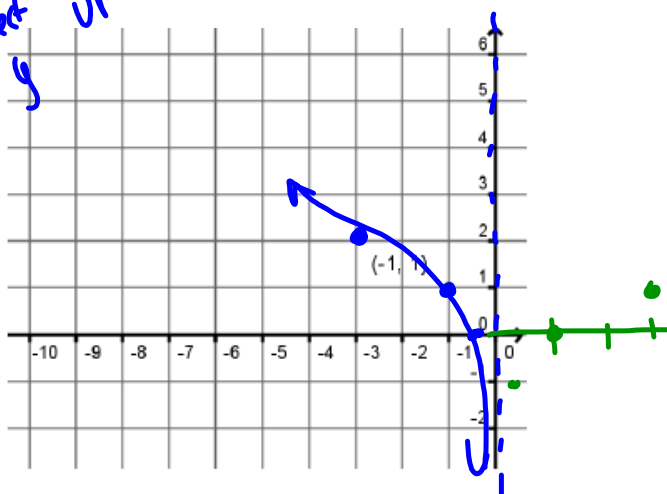
Reflect
over y
up 1

Domain:

Range:

$(\frac{1}{3}, -1)$
 $(1, 0)$
 $(3, 1)$

oints:



9. $f(x) = -2 \log_{\frac{1}{2}}(x - 3) - 3$ RT down

a = b = c = h = k = Domain:

Asymptote: Range:

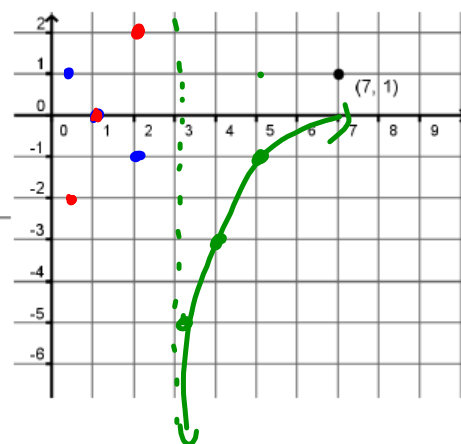
Transformations:	Parent
	$(2, -1)$
	$(1, 0)$
	$(\frac{1}{2}, 1)$

mult by 2
by 2

$(2, -2)$
 $(1, 0)$
 $(\frac{1}{2}, -2)$

Coordinates of the two anchor points:

() and ()

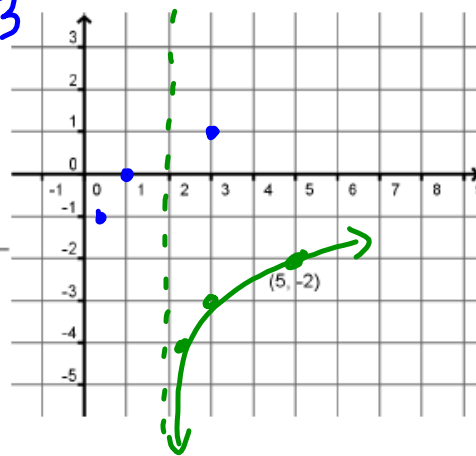


$$f(x) = \log_3(x-2) - 3$$

in:

e:

$(\frac{1}{3}, -1)$
 $(1, 0)$
 $(3, 1)$



- ① Find parent points
- ② Plot P.P.
- ③ Find out trans
- ④ Move points using trans
- ⑤ make graph
draw in asymptote

$f(x) = 2 \log_2(-x) + 5$

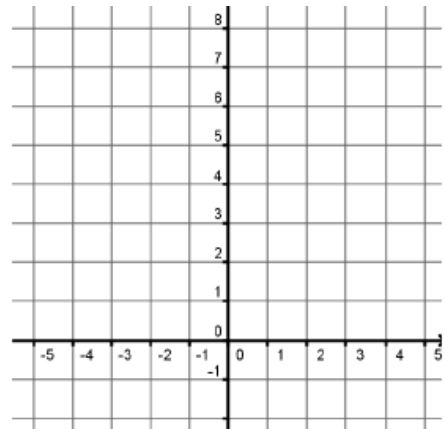
$a =$ $b =$ $c =$ $h =$ $k =$ Domain:

Asymptote: Range:

Transformations:	Parent			
	$(\quad, 0)$			
	$(\quad, 1)$			

Coordinates of the two anchor points:

(,) and (,)



main:

nge:

