

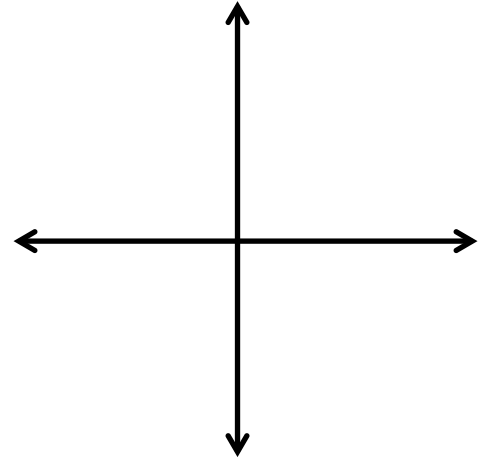
Directions: Use the following function to answer questions 1-5.

$$f(x) = \log(x - 2) + 2$$

1) x-intercept:

2) End Behavior:

3) Sketch and Label:



4) Vertical Asymptote:

5) Shifts:

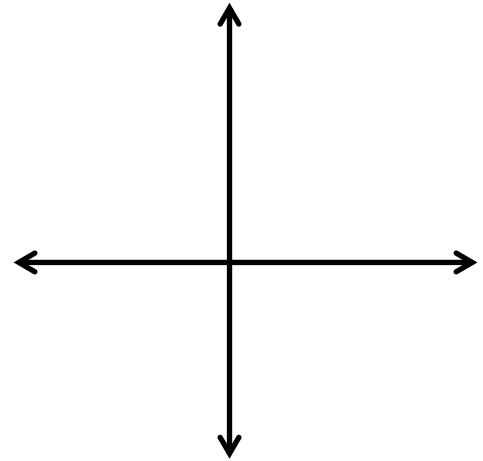
Directions: Use the following function to answer questions 6-10.

$$f(x) = \log_2(x + 4) - 3$$

6) x-intercept:

7) End Behavior:

8) Sketch and Label:



9) Vertical Asymptote:

10) Shifts:

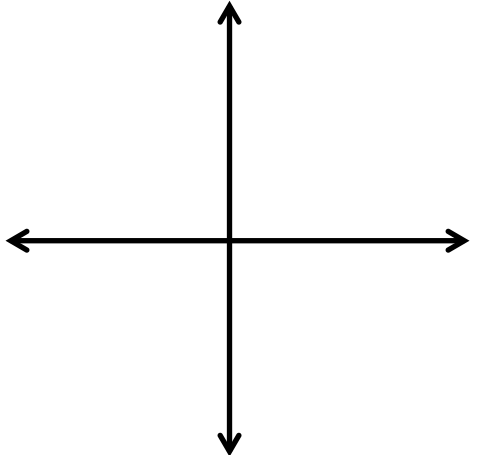
Directions: Use the following function to answer questions 11-15.

$$f(x) = \log_3(x - 3) + 1$$

11) x-intercept:

12) End Behavior:

13) Sketch and Label:



14) Vertical Asymptote:

15) Shifts:

Directions: Use the following function to answer questions 1-5.

$$f(x) = \log(x - 2) + 2$$

1) x-intercept:

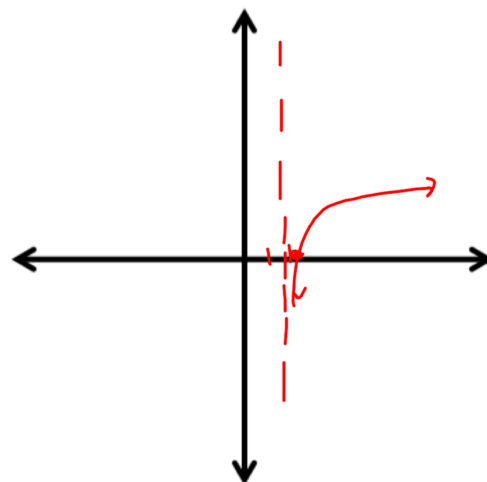
$$\begin{aligned} 0 &= \log(x-2) + 2 \\ -2 &= \log(x-2) \\ 10^{-2} &= x-2 \\ 10^{-2} + 2 &= x \\ 2.01 &= x \end{aligned} \quad (2.01, 0)$$

2) End Behavior:

$$x \rightarrow 2^+, f(x) \rightarrow -\infty$$

$$x \rightarrow \infty, f(x) \rightarrow \infty$$

3) Sketch and Label:



4) Vertical Asymptote:

$$\begin{aligned} x-2 &= 0 \\ x &= 2 \end{aligned}$$

5) Shifts:

Vertical shift up 2,  
horizontal shift right 2.

Directions: Use the following function to answer questions 6-10.

$$f(x) = \log_2(x + 4) - 3$$

6) x-intercept:

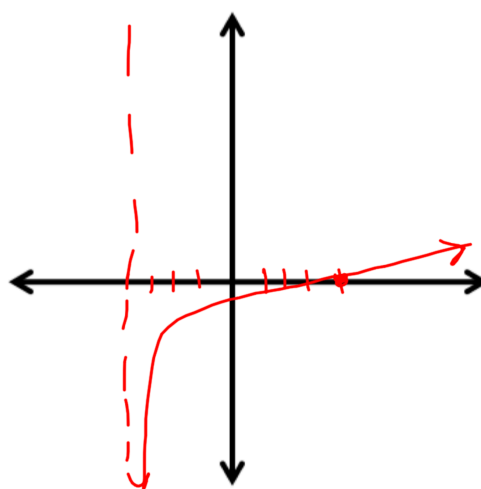
$$\begin{aligned} 0 &= \log_2(x+4) - 3 \\ 3 &= \log_2(x+4) \\ 2^3 &= x+4 \\ 8 - 4 &= x \\ 4 &= x \end{aligned} \quad (4, 0)$$

7) End Behavior:

$$x \rightarrow -4^+, f(x) \rightarrow -\infty$$

$$x \rightarrow \infty, f(x) \rightarrow \infty$$

8) Sketch and Label:



9) Vertical Asymptote:

$$\begin{aligned} x+4 &= 0 \\ x &= -4 \end{aligned}$$

10) Shifts:

Vertical shift down 3,  
Horizontal shift left 4.

Directions: Use the following function to answer questions 11-15.

$$f(x) = \log_3(x - 3) + 1$$

11) x-intercept:

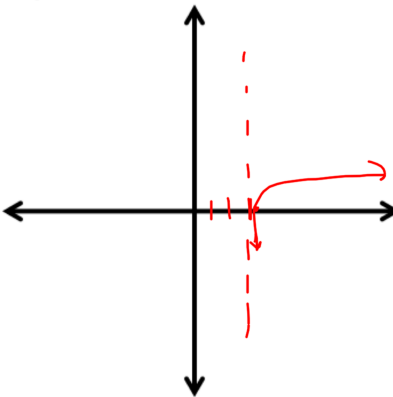
$$\begin{aligned} 0 &= \log_3(x-3) + 1 \\ -1 &= \log_3(x-3) \\ 3^{-1} &= x-3 \\ \frac{1}{3} + 3 &= x \\ 3\frac{1}{3} &= x \end{aligned} \quad (3\frac{1}{3}, 0)$$

12) End Behavior:

$$x \rightarrow 3^+, f(x) \rightarrow -\infty$$

$$x \rightarrow \infty, f(x) \rightarrow \infty$$

13) Sketch and Label:



14) Vertical Asymptote:

$$\begin{aligned} (x-3) &= 0 \\ x &= 3 \end{aligned}$$

15) Shifts:

Vertical shift up 1,  
horizontal shift right 3.