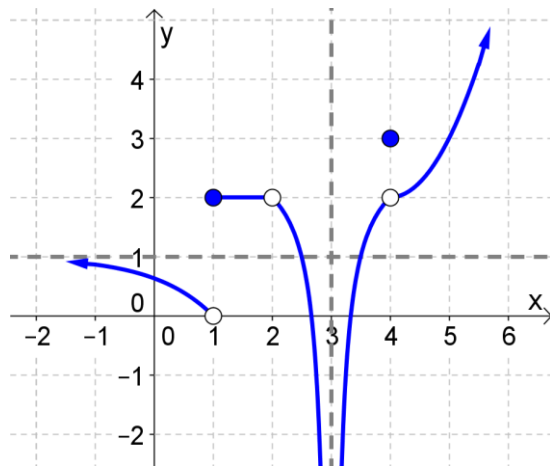


Due date: \_\_\_\_\_

Name: \_\_\_\_\_

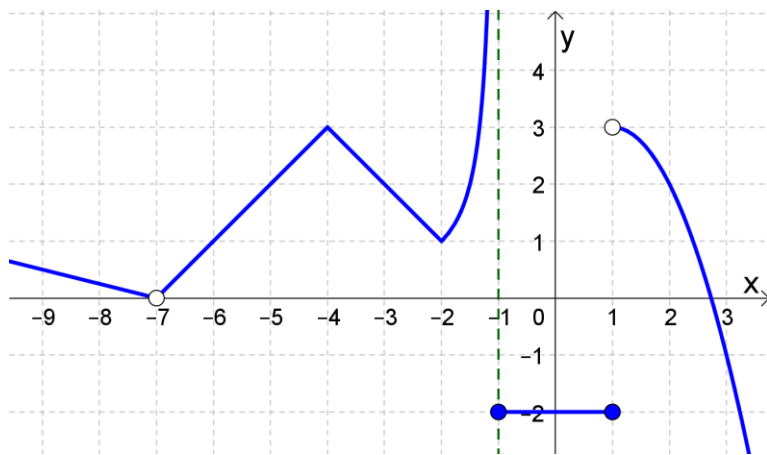
1.



Find the following, given the graph of  $f(x)$  to the left.

- |                                    |                                     |                               |
|------------------------------------|-------------------------------------|-------------------------------|
| $f(1)$                             | $f(2)$                              | $f(5)$                        |
| $\lim_{x \rightarrow 1^-} f(x)$    | $\lim_{x \rightarrow 1^+} f(x)$     | $\lim_{x \rightarrow 1} f(x)$ |
| $\lim_{x \rightarrow 2^-} f(x)$    | $\lim_{x \rightarrow 2^+} f(x)$     | $\lim_{x \rightarrow 2} f(x)$ |
| $\lim_{x \rightarrow 3^-} f(x)$    | $\lim_{x \rightarrow 3^+} f(x)$     | $\lim_{x \rightarrow 3} f(x)$ |
| $\lim_{x \rightarrow 4^-} f(x)$    | $\lim_{x \rightarrow 4^+} f(x)$     | $\lim_{x \rightarrow 4} f(x)$ |
| $\lim_{x \rightarrow \infty} f(x)$ | $\lim_{x \rightarrow -\infty} f(x)$ |                               |

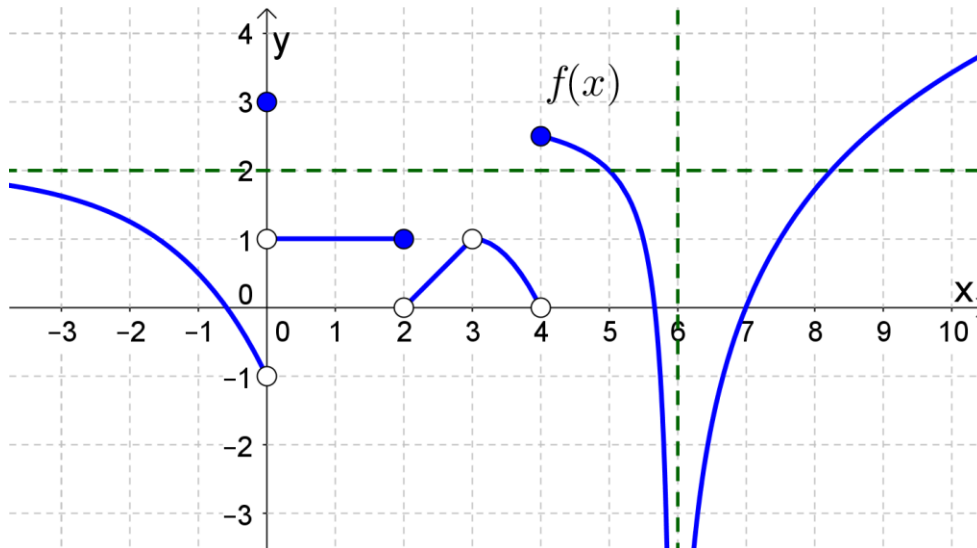
2.



Find the following, given the graph of  $f(x)$  above.

- |                                  |                                    |                                     |
|----------------------------------|------------------------------------|-------------------------------------|
| $f(-7)$                          | $f(-2)$                            | $f(-1)$                             |
| $\lim_{x \rightarrow -1^-} f(x)$ | $\lim_{x \rightarrow -1^+} f(x)$   | $\lim_{x \rightarrow -1} f(x)$      |
| $\lim_{x \rightarrow 1^-} f(x)$  | $\lim_{x \rightarrow 1^+} f(x)$    | $\lim_{x \rightarrow 1} f(x)$       |
| $\lim_{x \rightarrow -7} f(x)$   | $\lim_{x \rightarrow \infty} f(x)$ | $\lim_{x \rightarrow -\infty} f(x)$ |

3.



Find the following, given the graph of  $f(x)$  above.

$f(0)$

$f(3)$

$f(6)$

$\lim_{x \rightarrow 0^-} f(x)$

$\lim_{x \rightarrow 0^+} f(x)$

$\lim_{x \rightarrow 0} f(x)$

$\lim_{x \rightarrow 1^-} f(x)$

$\lim_{x \rightarrow 1^+} f(x)$

$\lim_{x \rightarrow 1} f(x)$

$\lim_{x \rightarrow 2^-} f(x)$

$\lim_{x \rightarrow 2^+} f(x)$

$\lim_{x \rightarrow 2} f(x)$

$\lim_{x \rightarrow 3^-} f(x)$

$\lim_{x \rightarrow 3^+} f(x)$

$\lim_{x \rightarrow 3} f(x)$

$\lim_{x \rightarrow 4^-} f(x)$

$\lim_{x \rightarrow 4} f(x)$

$\lim_{x \rightarrow 5} f(x)$

$\lim_{x \rightarrow 6^-} f(x)$

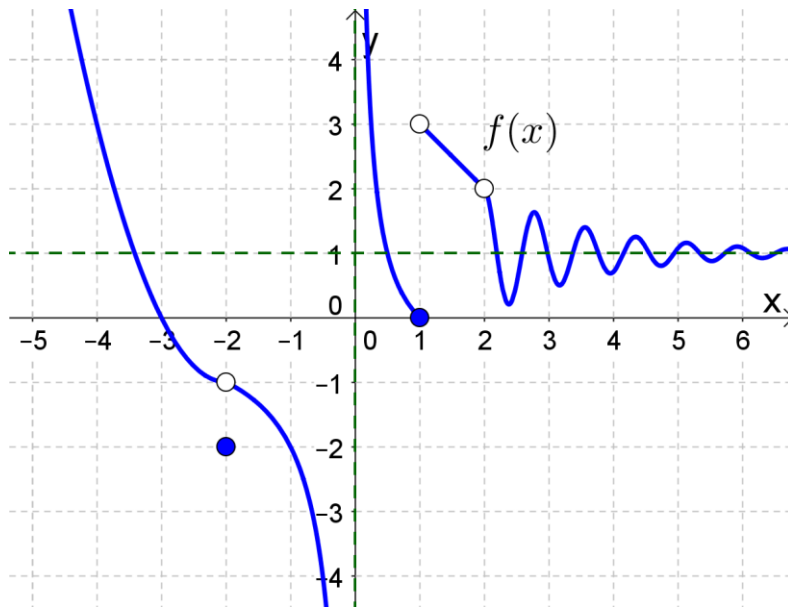
$\lim_{x \rightarrow 6^+} f(x)$

$\lim_{x \rightarrow 6} f(x)$

$\lim_{x \rightarrow -\infty} f(x)$

$\lim_{x \rightarrow \infty} f(x)$

4.



Find the following, given the graph of  $f(x)$  above.

$$f(-2)$$

$$f(0)$$

$$f(1)$$

$$\lim_{x \rightarrow -2^-} f(x)$$

$$\lim_{x \rightarrow -2^+} f(x)$$

$$\lim_{x \rightarrow -2} f(x)$$

$$\lim_{x \rightarrow -1^-} f(x)$$

$$\lim_{x \rightarrow -1^+} f(x)$$

$$\lim_{x \rightarrow -1} f(x)$$

$$\lim_{x \rightarrow 0^-} f(x)$$

$$\lim_{x \rightarrow 0^+} f(x)$$

$$\lim_{x \rightarrow 0} f(x)$$

$$\lim_{x \rightarrow 1^-} f(x)$$

$$\lim_{x \rightarrow 1^+} f(x)$$

$$\lim_{x \rightarrow 1} f(x)$$

$$\lim_{x \rightarrow 2^-} f(x)$$

$$\lim_{x \rightarrow 2^+} f(x)$$

$$\lim_{x \rightarrow 2} f(x)$$

$$\lim_{x \rightarrow -\infty} f(x)$$

$$\lim_{x \rightarrow \infty} f(x)$$

5. Find the following limits.

a)  $\lim_{x \rightarrow \pi/2^+} \tan x$

b)  $\lim_{x \rightarrow \pi/2} \cot x$

c)  $\lim_{x \rightarrow 0^+} \csc x$

d)  $\lim_{x \rightarrow \pi/2} \sec x$

e)  $\lim_{x \rightarrow \pi/2} \sin x$

f)  $\lim_{x \rightarrow \pi/2^+} \cos x$

6. Find the following limits.

a)  $\lim_{x \rightarrow -\infty} \frac{1}{x}$

b)  $\lim_{x \rightarrow \infty} \frac{1}{x}$

c)  $\lim_{x \rightarrow -\infty} \tan^{-1} x$

d)  $\lim_{x \rightarrow \infty} e^{-x}$

e)  $\lim_{x \rightarrow -\infty} e^{-x}$

7. Find the following limits.

a)  $\lim_{x \rightarrow 0^+} \ln x$

b)  $\lim_{x \rightarrow 1} \ln x$

8. Find the following limits.

a)  $\lim_{x \rightarrow -\infty} |x|$

b)  $\lim_{x \rightarrow \infty} 2 - |x + 1|$

c)  $\lim_{x \rightarrow -\infty} 2 - |x + 1|$

d)  $\lim_{x \rightarrow -1} 2 - |x + 1|$

e)  $\lim_{x \rightarrow \infty} 2^x$

f)  $\lim_{x \rightarrow -\infty} 2^x$

g)  $\lim_{x \rightarrow \infty} 1 - 2^{-x}$

h)  $\lim_{x \rightarrow -\infty} 1 - 2^{-x}$

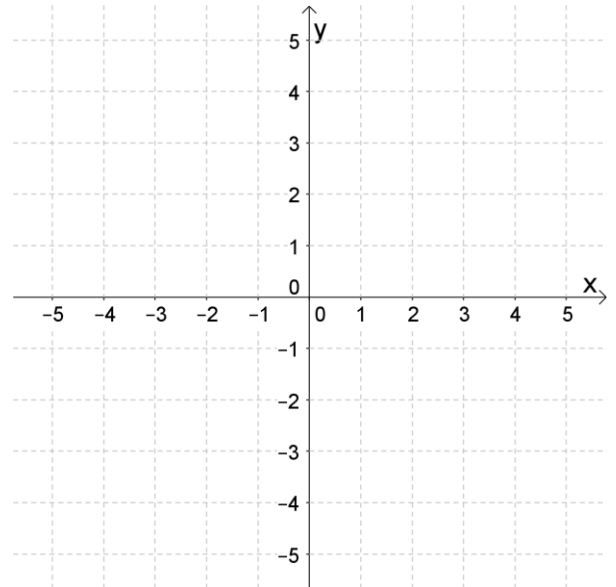
i)  $\lim_{x \rightarrow 0} 1 - 2^{-x}$

9. Suppose  $f(x) = \begin{cases} -1 & \text{if } x < -3 \\ -|x+2| & \text{if } -3 \leq x < 0 \\ x & \text{if } 0 < x < 2 \\ \sqrt{x} & \text{if } x \geq 2 \end{cases}$ . Graph  $f(x)$  and then find the following limits.

$$\lim_{x \rightarrow -3^-} f(x) \qquad \lim_{x \rightarrow -3^+} f(x) \qquad \lim_{x \rightarrow -3} f(x)$$

$$\lim_{x \rightarrow 0^-} f(x) \qquad \lim_{x \rightarrow 0^+} f(x) \qquad \lim_{x \rightarrow 0} f(x)$$

$$\lim_{x \rightarrow 2} f(x) \qquad \lim_{x \rightarrow \infty} f(x) \qquad \lim_{x \rightarrow -\infty} f(x)$$

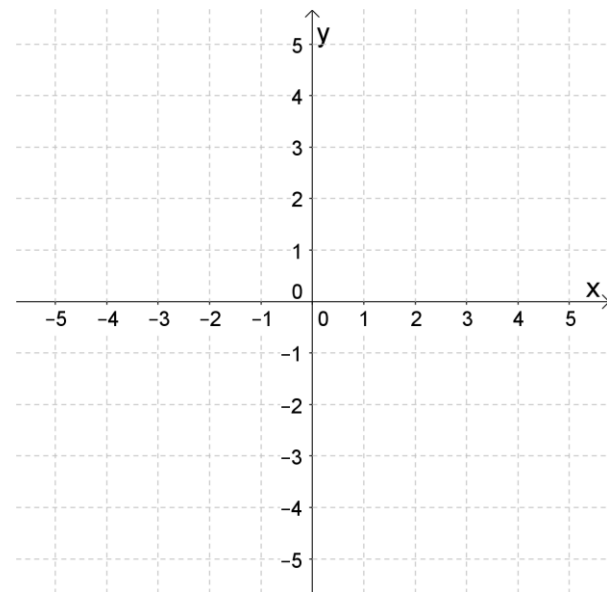


10. Suppose  $f(x) = \begin{cases} -2 & \text{if } x \leq -1 \\ \sqrt{x+1} & \text{if } -1 < x \leq 3 \\ -\ln(x-3) & \text{if } x > 3 \end{cases}$ . Graph  $f(x)$  and then find the following limits.

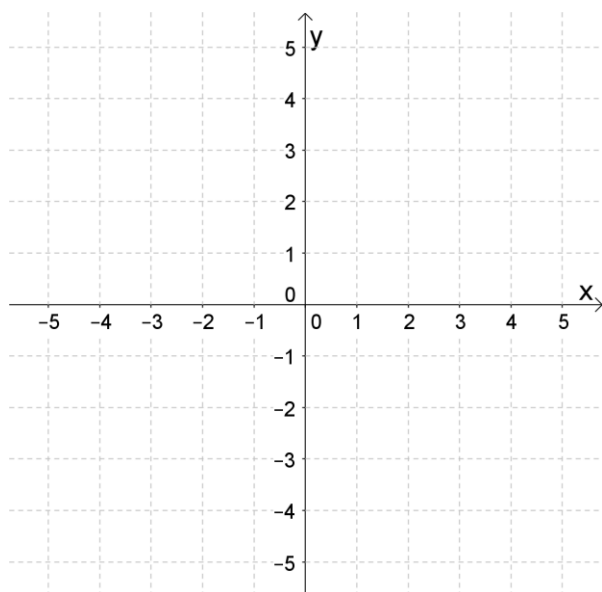
$$\lim_{x \rightarrow -1^-} f(x) \qquad \lim_{x \rightarrow -1^+} f(x) \qquad \lim_{x \rightarrow -1} f(x)$$

$$\lim_{x \rightarrow 3^-} f(x) \qquad \lim_{x \rightarrow 3^+} f(x) \qquad \lim_{x \rightarrow 3} f(x)$$

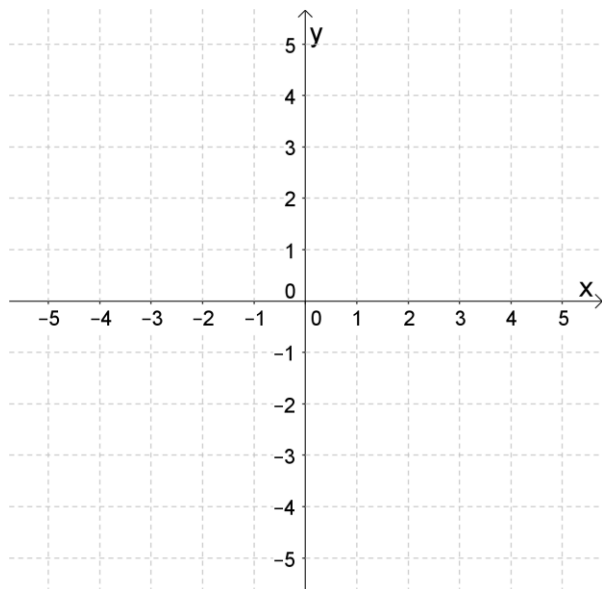
$$\lim_{x \rightarrow 1} f(x) \qquad \lim_{x \rightarrow \infty} f(x) \qquad \lim_{x \rightarrow -\infty} f(x)$$



11. Draw the graph of a function  $f(x)$ , where  $f(-1) = 3$ ,  $\lim_{x \rightarrow 1^-} f(x) = \infty$ ,  $\lim_{x \rightarrow 1^+} f(x) = -\infty$ ,  
 $\lim_{x \rightarrow 3} f(x) = 2$ ,  $f(3) = 1$ , and  $\lim_{x \rightarrow \infty} f(x) = 3$ .



12. Draw the graph of a function  $f(x)$ , where  $\lim_{x \rightarrow 0^-} f(x) = 2$ ,  $\lim_{x \rightarrow 0^+} f(x) = -1$ ,  $f(0) = -2$ ,  
 $\lim_{x \rightarrow 3} f(x) = -\infty$ ,  $\lim_{x \rightarrow 5} f(x) = -2$ ,  $f(5)$  is undefined,  $\lim_{x \rightarrow -\infty} f(x) = \infty$ , and  $\lim_{x \rightarrow \infty} f(x) = -\infty$ .



Optional exercises from the Stewart textbook if you'd like more practice:

2.2 (p.92) #5-9 odd, 15, 17

2.6 (p.137) #3-9 odd