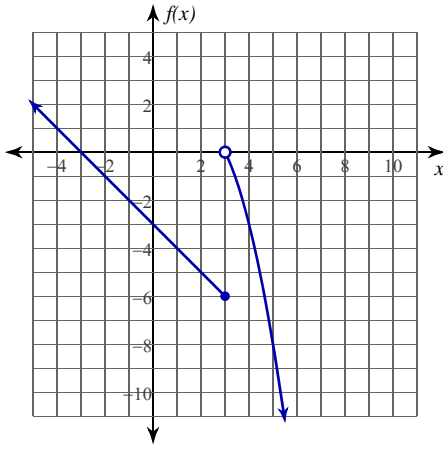


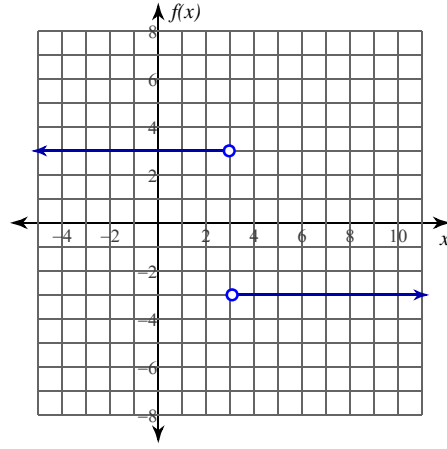
## Evaluating Limits

Evaluate each limit.

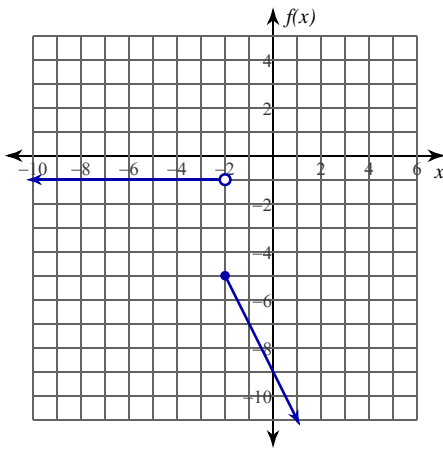
$$1) \lim_{x \rightarrow 3^+} f(x), f(x) = \begin{cases} -x - 3, & x \leq 3 \\ -x^2 + 4x - 3, & x > 3 \end{cases}$$



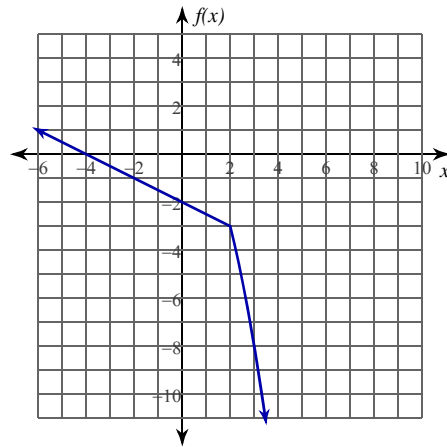
$$2) \lim_{x \rightarrow 3^-} \frac{3|-x+3|}{-x+3}$$



$$3) \lim_{x \rightarrow -2} f(x), f(x) = \begin{cases} -1, & x < -2 \\ -2x - 9, & x \geq -2 \end{cases}$$

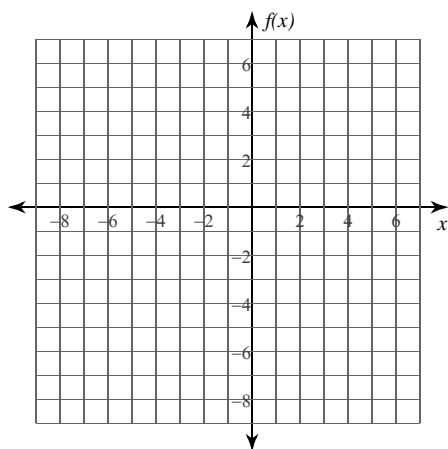


$$4) \lim_{x \rightarrow 2} f(x), f(x) = \begin{cases} -\frac{x}{2} - 2, & x \leq 2 \\ -x^2 + 1, & x > 2 \end{cases}$$

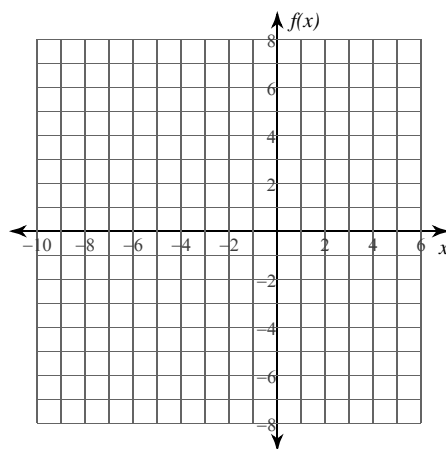


Evaluate each limit. You may use the provided graph to sketch the function.

$$5) \lim_{x \rightarrow -1^-} f(x), f(x) = \begin{cases} x + 2, & x \leq -1 \\ -\frac{x}{2} - 4, & x > -1 \end{cases}$$



$$6) \lim_{x \rightarrow -2} f(x), f(x) = \begin{cases} x^2 + 6x + 8, & x < -2 \\ -\frac{x}{2} - 1, & x \geq -2 \end{cases}$$



Evaluate each limit.

$$7) \lim_{x \rightarrow 4^-} f(x), f(x) = \begin{cases} 2x - 5, & x < 4 \\ -2x + 7, & x \geq 4 \end{cases}$$

$$8) \lim_{x \rightarrow 3^-} f(x), f(x) = \begin{cases} -x^2 + 4x - 3, & x < 3 \\ \frac{x}{2} - 3, & x \geq 3 \end{cases}$$

$$9) \lim_{x \rightarrow 1^+} f(x), f(x) = \begin{cases} 2x - 5, & x < 1 \\ x - 4, & x \geq 1 \end{cases}$$

$$10) \lim_{x \rightarrow -3^-} f(x), f(x) = \begin{cases} -x^2 - 4x - 4, & x < -3 \\ -1, & x \geq -3 \end{cases}$$

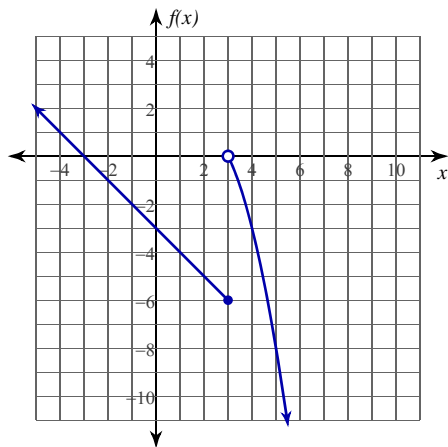
**Critical thinking question:**

11) Write a piecewise function where  $\lim_{x \rightarrow 2^-} f(x) = 1$ ,  $\lim_{x \rightarrow 2^+} f(x) = 3$ , and  $f(2) = 2$ .

# Evaluating Limits

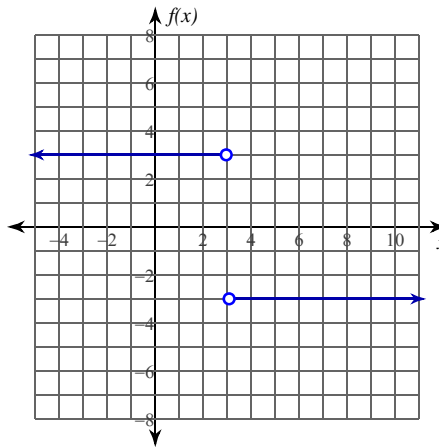
Evaluate each limit.

1)  $\lim_{x \rightarrow 3^+} f(x), f(x) = \begin{cases} -x - 3, & x \leq 3 \\ -x^2 + 4x - 3, & x > 3 \end{cases}$



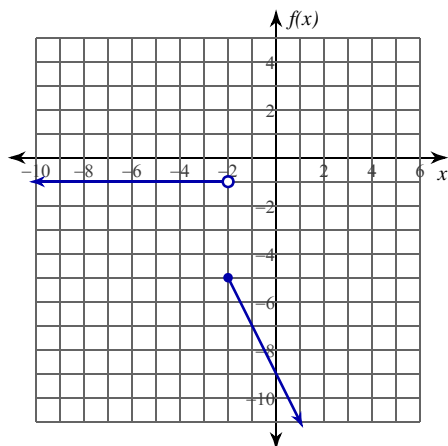
0

2)  $\lim_{x \rightarrow 3^-} \frac{3|-x+3|}{-x+3}$



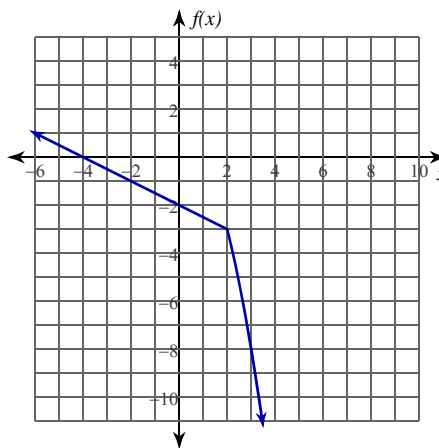
3

3)  $\lim_{x \rightarrow -2} f(x), f(x) = \begin{cases} -1, & x < -2 \\ -2x - 9, & x \geq -2 \end{cases}$



Does not exist.

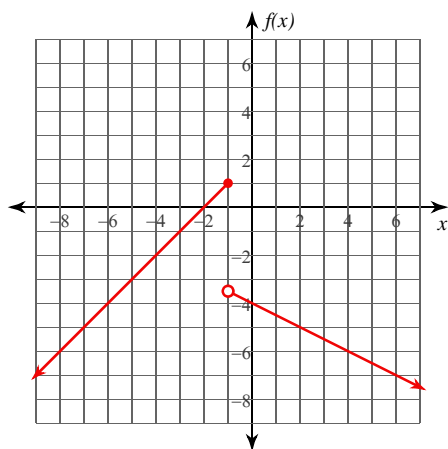
4)  $\lim_{x \rightarrow 2} f(x), f(x) = \begin{cases} -\frac{x}{2} - 2, & x \leq 2 \\ -x^2 + 1, & x > 2 \end{cases}$



-3

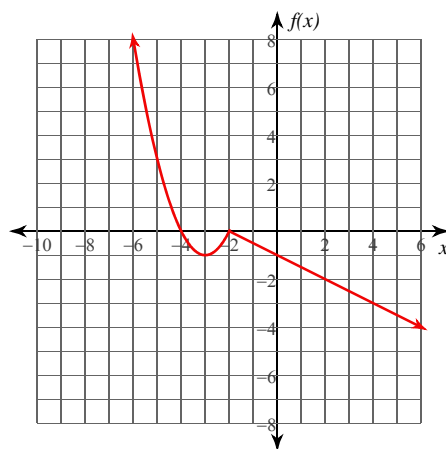
Evaluate each limit. You may use the provided graph to sketch the function.

$$5) \lim_{x \rightarrow -1^-} f(x), f(x) = \begin{cases} x + 2, & x \leq -1 \\ -\frac{x}{2} - 4, & x > -1 \end{cases}$$



1

$$6) \lim_{x \rightarrow -2} f(x), f(x) = \begin{cases} x^2 + 6x + 8, & x < -2 \\ -\frac{x}{2} - 1, & x \geq -2 \end{cases}$$



0

Evaluate each limit.

$$7) \lim_{x \rightarrow 4^-} f(x), f(x) = \begin{cases} 2x - 5, & x < 4 \\ -2x + 7, & x \geq 4 \end{cases}$$

3

$$8) \lim_{x \rightarrow 3^-} f(x), f(x) = \begin{cases} -x^2 + 4x - 3, & x < 3 \\ \frac{x}{2} - 3, & x \geq 3 \end{cases}$$

0

$$9) \lim_{x \rightarrow 1^+} f(x), f(x) = \begin{cases} 2x - 5, & x < 1 \\ x - 4, & x \geq 1 \end{cases}$$

-3

$$10) \lim_{x \rightarrow -3^-} f(x), f(x) = \begin{cases} -x^2 - 4x - 4, & x < -3 \\ -1, & x \geq -3 \end{cases}$$

-1

**Critical thinking question:**

11) Write a piecewise function where  $\lim_{x \rightarrow 2^-} f(x) = 1$ ,  $\lim_{x \rightarrow 2^+} f(x) = 3$ , and  $f(2) = 2$ .

Many answers. Ex:  $f(x) = \begin{cases} x - 1, & x < 2 \\ x, & x = 2 \\ x + 1, & x > 2 \end{cases}$