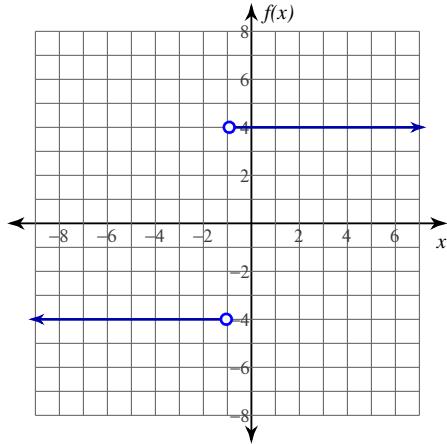


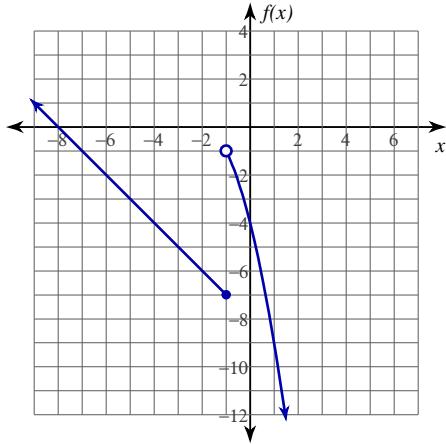
Evaluating Limits

Evaluate each limit.

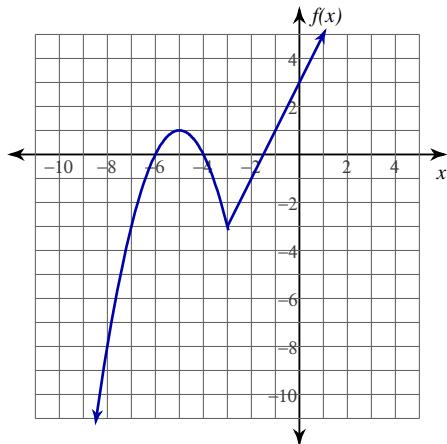
1) $\lim_{x \rightarrow -1^+} \frac{4x + 4}{|x + 1|}$



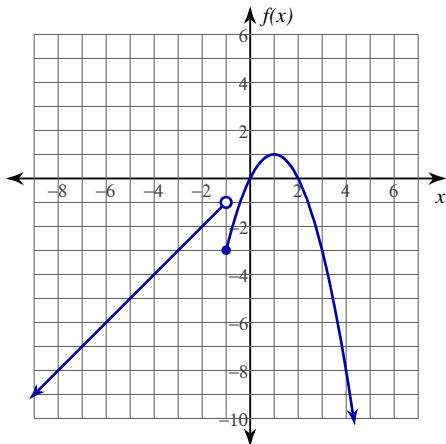
2) $\lim_{x \rightarrow -1^-} f(x), f(x) = \begin{cases} -x - 8, & x \leq -1 \\ -x^2 - 4x - 4, & x > -1 \end{cases}$



3) $\lim_{x \rightarrow -3} f(x), f(x) = \begin{cases} -x^2 - 10x - 24, & x \leq -3 \\ 2x + 3, & x > -3 \end{cases}$

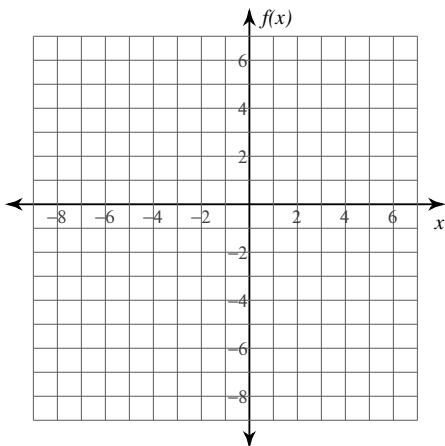


4) $\lim_{x \rightarrow -1} f(x), f(x) = \begin{cases} x, & x < -1 \\ -x^2 + 2x, & x \geq -1 \end{cases}$

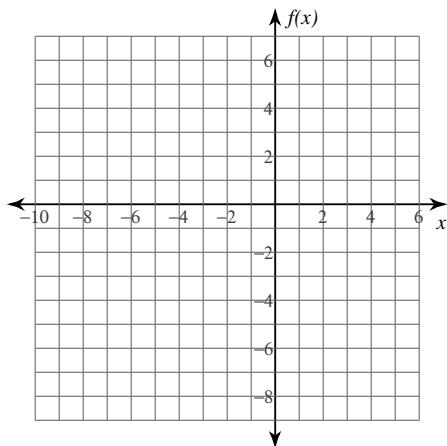


Evaluate each limit. You may use the provided graph to sketch the function.

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



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



Evaluate each limit.

7) $\lim_{x \rightarrow 0^+} f(x), f(x) = \begin{cases} 1, & x \leq 0 \\ -x^2 + 4x - 3, & x > 0 \end{cases}$

8) $\lim_{x \rightarrow 0^-} \frac{|x|}{x}$

9) $\lim_{x \rightarrow 0^+} \lfloor -2x + 1 \rfloor$

10) $\lim_{x \rightarrow 1} f(x), f(x) = \begin{cases} \frac{x}{2} + \frac{9}{2}, & x < 1 \\ x^2 - 6x + 10, & x \geq 1 \end{cases}$

11) $\lim_{x \rightarrow -1} \frac{3|x+1|}{x+1}$

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

Critical thinking questions:

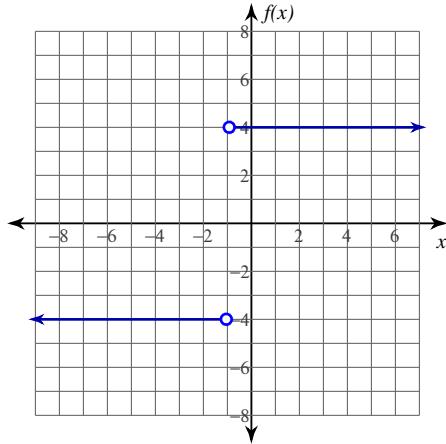
- 13) Give an example of a two-sided limit of a piecewise function where the limit does not exist.

- 14) Given an example of a two-sided limit of a function with an absolute value where the limit does not exist.

Evaluating Limits

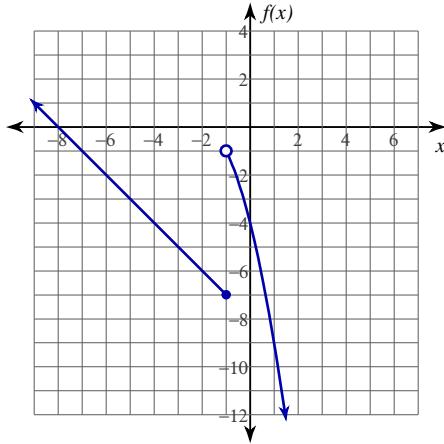
Evaluate each limit.

1) $\lim_{x \rightarrow -1^+} \frac{4x + 4}{|x + 1|}$



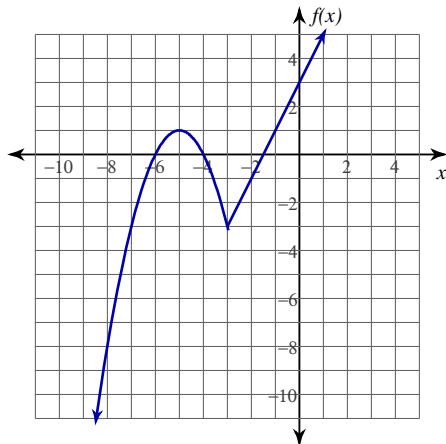
4

2) $\lim_{x \rightarrow -1^-} f(x), f(x) = \begin{cases} -x - 8, & x \leq -1 \\ -x^2 - 4x - 4, & x > -1 \end{cases}$



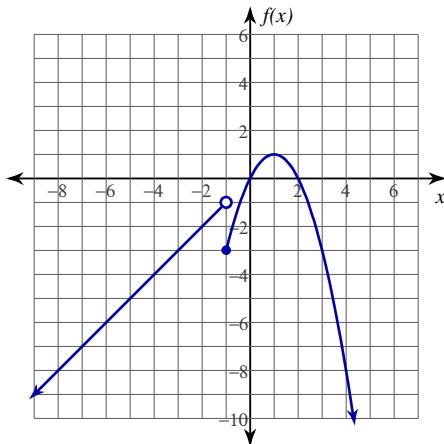
-7

3) $\lim_{x \rightarrow -3} f(x), f(x) = \begin{cases} -x^2 - 10x - 24, & x \leq -3 \\ 2x + 3, & x > -3 \end{cases}$



-3

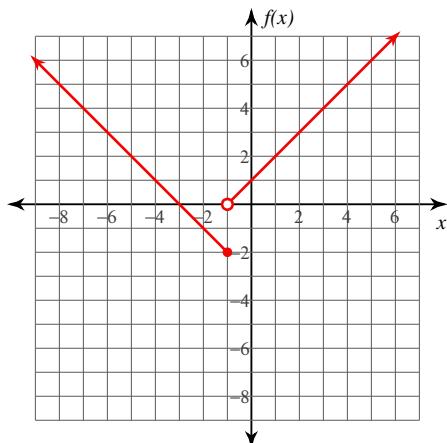
4) $\lim_{x \rightarrow -1} f(x), f(x) = \begin{cases} x, & x < -1 \\ -x^2 + 2x, & x \geq -1 \end{cases}$



Does not exist.

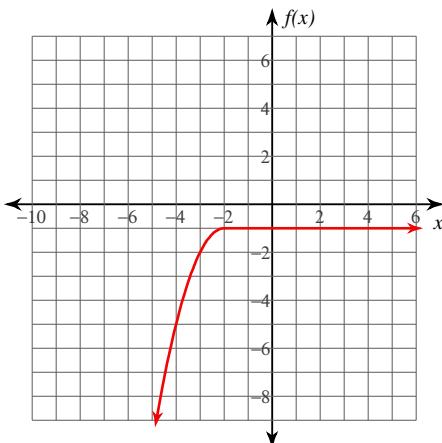
Evaluate each limit. You may use the provided graph to sketch the function.

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



-2

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



-1

Evaluate each limit.

7) $\lim_{x \rightarrow 0^+} f(x), f(x) = \begin{cases} 1, & x \leq 0 \\ -x^2 + 4x - 3, & x > 0 \end{cases}$

-3

8) $\lim_{x \rightarrow 0^-} \frac{|x|}{x}$

-1

9) $\lim_{x \rightarrow 0^+} \lfloor -2x + 1 \rfloor$
0

10) $\lim_{x \rightarrow 1} f(x), f(x) = \begin{cases} \frac{x}{2} + \frac{9}{2}, & x < 1 \\ x^2 - 6x + 10, & x \geq 1 \end{cases}$

5

11) $\lim_{x \rightarrow -1} \frac{3|x+1|}{x+1}$

Does not exist.

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

4

Critical thinking questions:

- 13) Give an example of a two-sided limit of a piecewise function where the limit does not exist.

Many answers. Ex: $\lim_{x \rightarrow 1} f(x), f(x) = \begin{cases} 0, & x < 1 \\ x, & x \geq 1 \end{cases}$

- 14) Given an example of a two-sided limit of a function with an absolute value where the limit does not exist.

Many answers. Ex: $\lim_{x \rightarrow 0} \frac{|x|}{x}$