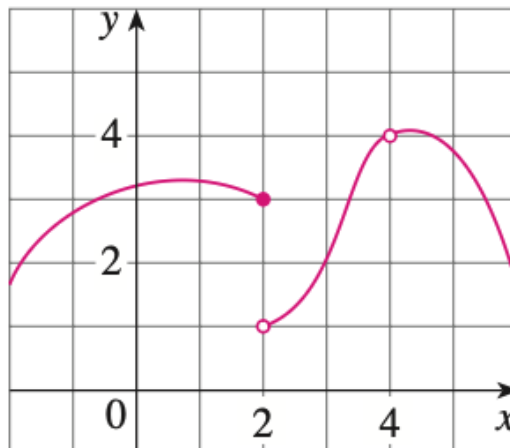


Reading Stewart §1.5 and §1.6.

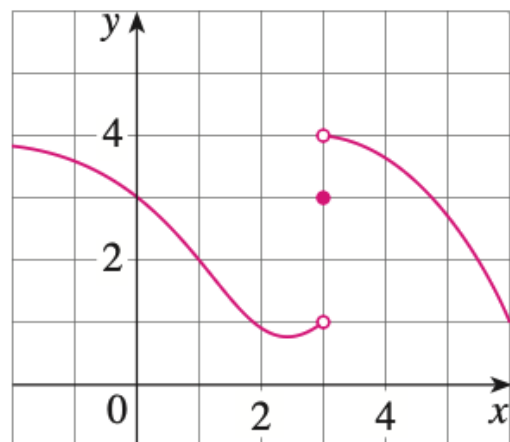
1. Use the given graph to state the value of each quantity, if it exists. If it does not exist, briefly explain why.

- a) $\lim_{x \rightarrow 2^-} f(x)$ b) $\lim_{x \rightarrow 2^+} f(x)$
 c) $\lim_{x \rightarrow 2} f(x)$ d) $f(2)$
 e) $\lim_{x \rightarrow 4} f(x)$ f) $f(4)$



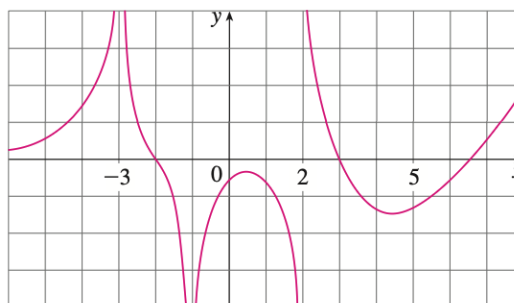
2. Use the given graph to state the value of each quantity, if it exists. If it does not exist, briefly explain why.

- a) $\lim_{x \rightarrow 1} f(x)$ b) $\lim_{x \rightarrow 3^-} f(x)$
 c) $\lim_{x \rightarrow 3^+} f(x)$ d) $\lim_{x \rightarrow 3} f(x)$
 e) $f(3)$



3. For the function A whose graph is shown, state the following.

- a) $\lim_{x \rightarrow -3} A(x)$ b) $\lim_{x \rightarrow 2^-} A(x)$
 c) $\lim_{x \rightarrow 2^+} A(x)$ d) $\lim_{x \rightarrow -1} A(x)$



4. Sketch the graph of a function f that satisfies the following properties:

$$\lim_{x \rightarrow 0} f(x) = 3, \quad \lim_{x \rightarrow 3^-} f(x) = 1, \quad \lim_{x \rightarrow 3^+} f(x) = -2, \quad f(0) = -1, \quad f(3) = 0$$

5. Let $f(x) = \frac{\sqrt{x+1} - 2}{x - 3}$.

- (a) Use a calculator to compute the values of f at $x = 3.1$, $x = 3.01$, $x = 3.001$.

- (b) Use a calculator to compute the values of f at $x = 2.9$, $x = 2.99$, $x = 2.999$.
(c) Having done parts (a) and (b), make a guess about the value of the limit $\lim_{x \rightarrow 3} f(x)$.

6. Determine the following infinite limits. Briefly explain your answers.

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

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

7. Suppose that f and g are functions such that

$$\lim_{x \rightarrow 2} f(x) = 5 \quad \text{and} \quad \lim_{x \rightarrow 2} g(x) = -3.$$

Use the Limit Laws to compute the following limits. As always, show and briefly explain your steps.

a) $\lim_{x \rightarrow 2} [2f(x) + 4g(x)]$

b) $\lim_{x \rightarrow 2} x^3 [f(x)]^2$

c) $\lim_{x \rightarrow 2} \frac{f(x)}{g(x)}$

8. Use the Direct Substitution Property to compute the following limits.

a) $\lim_{x \rightarrow -1} (x^4 - 3x)(x^2 + 7x - 2)$

b) $\lim_{t \rightarrow 2} \frac{t^3 - 5t}{t^2 - 3t + 5}$