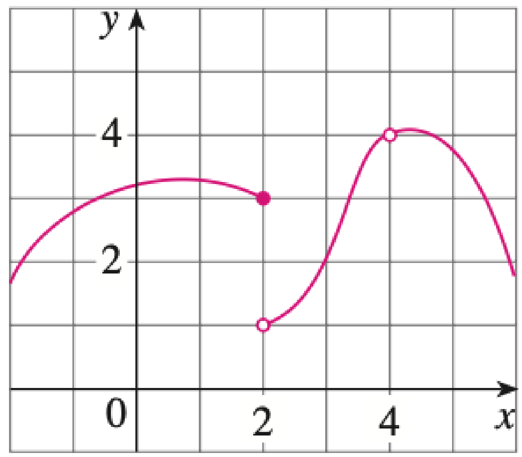
Reading Stewart §1.5 and §1.6.

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

   a) $\lim_{x\to 2^-} f(x)$ b) $\lim_{x\to 2^+} f(x)$

   c) $\lim_{x\to 2} f(x)$ d) $f(2)$

   e) $\lim_{x\to 4} f(x)$ f) f(4)

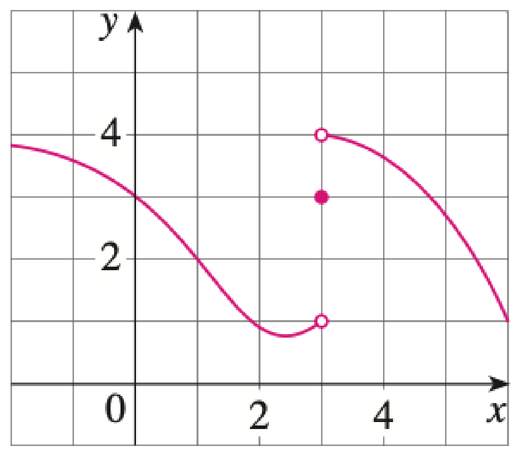


2. Use the given graph to state the value of each quantity, if it exists. If it does not exist, briefly explain why.

   a) $\lim_{x\to 1} f(x)$ b) $\lim_{x\to 3^-} f(x)$

   c) $\lim_{x\to 3^+} f(x)$ d) $\lim_{x\to 3} f(x)$

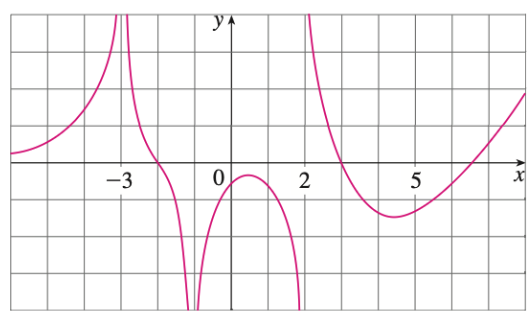
   e) $f(3)$



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

   a) $\lim_{x\to -3} A(x)$ b) $\lim_{x\to 2^-} A(x)$

   c) $\lim_{x\to 2^+} A(x)$ d) $\lim_{x\to -1} A(x)$



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

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

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

   (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 above the value of the limit $\lim_{x\to 3} f(x)$.

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

   a) $\displaystyle\lim_{x\to 3^-} \frac{x+2}{x-3}$ b) $\displaystyle\lim_{x\to -2^+} \frac{x-3}{x+2}$

7. Suppose that f and g are functions such that

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

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

   a) $\displaystyle\lim_{x\to 2}[2f(x) + 4g(x)]$ b) $\displaystyle\lim_{x\to 2} x^3[f(x)]^2$ c) $\displaystyle\lim_{x\to 2} \frac{f(x)}{g(x)}$

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

   a) $\displaystyle\lim_{x\to -1}(x^4 - 3x)(x^2 + 7x - 2)$ b) $\displaystyle\lim_{t\to 2} \frac{t^3 - 5t}{t^2 - 3t + 5}$