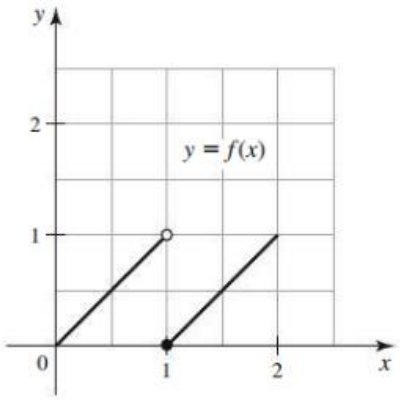
2.1-2.2 Group Activity Problems

15. Use the graph of f in the figure to find the following values or state that they do not exist. If a limit does not exist, explain why.

a. $f(1)$ **b.** $\lim_{x\to 1^-} f(x)$ **c.** $\lim_{x\to 1^+} f(x)$ **d.** $\lim_{x\to 1} f(x)$



2.2.15

a. $f(1) = 0$.

b. $\lim_{x\to 1^-} f(x) = 1$.

c. $\lim_{x\to 1^+} f(x) = 0$.

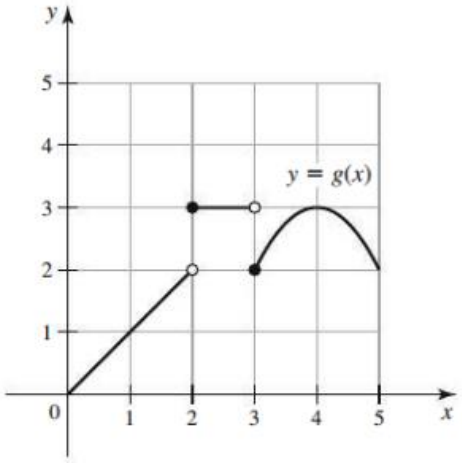
d. $\lim_{x\to 1} f(x)$ does not exist, since the two one-sided limits aren't equal.

18. One-sided and two-sided limits Use the graph of g in the figure to find the following values or state that they do not exist. If a limit does not exist, explain why.

a. $g(2)$ **b.** $\lim_{x\to 2^-} g(x)$ **c.** $\lim_{x\to 2^+} g(x)$

d. $\lim_{x\to 2} g(x)$ **e.** $g(3)$ **f.** $\lim_{x\to 3^-} g(x)$

g. $\lim_{x\to 3^+} g(x)$ **h.** $g(4)$ **i.** $\lim_{x\to 4} g(x)$



2.2.18

a. $g(2) = 3$.

b. $\lim_{x \to 2^-} g(x) = 2$.

c. $\lim_{x \to 2^+} g(x) = 3$.

d. $\lim_{x \to 2} g(x)$ does not exist.

e. $g(3) = 2$.

f. $\lim_{x \to 3^-} g(x) = 3$.

g. $\lim_{x \to 3^+} g(x) = 2$.

h. $g(4) = 3$.

i. $\lim_{x \to 4} g(x) = 3$.

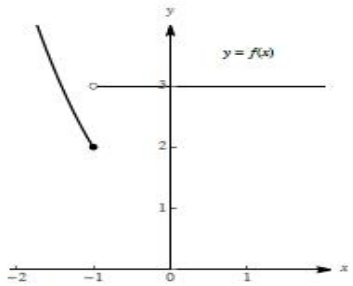
Practice Exercises

19–26. Evaluating limits graphically *Sketch a graph of f and use it to make a conjecture about the values of* $f(a)$, $\lim_{x \to a^-} f(x)$, $\lim_{x \to a^+} f(x)$, *and* $\lim_{x \to a} f(x)$ *or state that they do not exist.*

19. $f(x) = \begin{cases} x^2 + 1 & \text{if } x \le -1 \\ 3 & \text{if } x > -1 \end{cases}; a = -1$

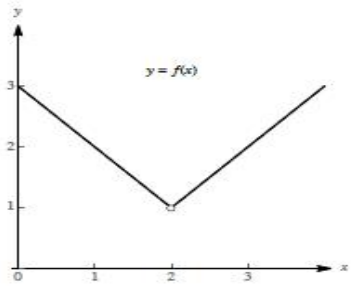
20. $f(x) = \begin{cases} 3 - x & \text{if } x < 2 \\ x - 1 & \text{if } x > 2 \end{cases}; a = 2$

2.2.19



$f(-1) = 2$, $\lim_{x \to -1^-} f(x) = 2$, $\lim_{x \to -1^+} f(x) = 3$, $\lim_{x \to -1} f(x)$ does not exist.

2.2.20



$f(2)$ is undefined. $\lim_{x \to 2^-} f(x) = 1$, $\lim_{x \to 2^+} f(x) = 1$, and $\lim_{x \to 2} f(x) = 1$.