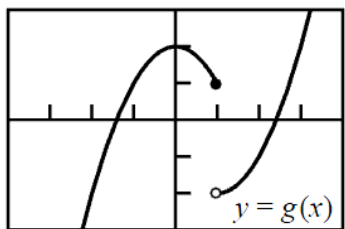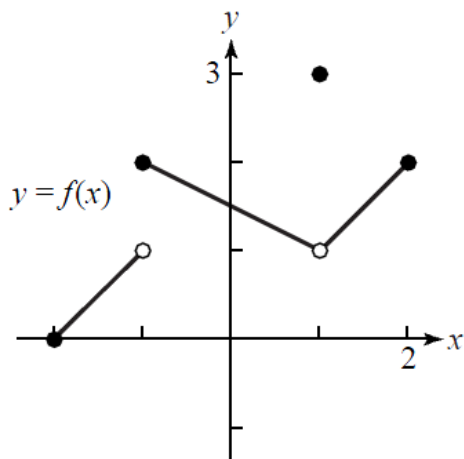1. Use the graph to estimate the limits and value of the function, or explain why the limits do not exist.

[−4, 4] by [−3, 3]

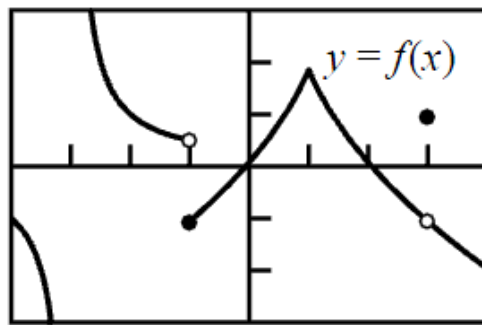(a) $\lim\limits_{x\to 1^-} g(x)$

(b) $\lim\limits_{x\to 1^+} g(x)$

(c) $\lim\limits_{x\to 1} g(x)$

(d) $g(1)$

2. Use the graph of $f(x)$ below to find the following values and limits. If a limit does not exist, briefly explain why.

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

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

c. $f(-1)$

d. $\lim_{x\to-1} f(x)$

e. $\lim_{x\to1^-} f(x)$

f. $\lim_{x\to1^+} f(x)$

g. $f(1)$

h. $\lim_{x\to1} f(x)$

3.   Use the graph of $f(x)$ below to find the following values and limits. If a limit does not exist, briefly explain why.
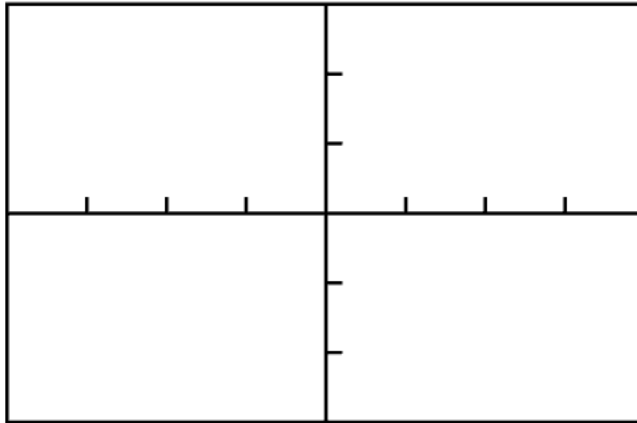

$y = f(x)$

$[-4, 4]$ by $[-3, 3]$

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

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

c. $f(-1)$

d. $\lim_{x \to -1} f(x)$

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

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

g. $f(1)$

h. $\lim_{x \to 1} f(x)$

4.   Graph the function below on the coordinate plane provided, then use the graph to determine the following limits and values. If a limit does not exist, briefly explain why.

$$f(x) = \begin{cases} -2, & x < -2 \\ x^2 - 2, & -2 \leq x < 0 \\ x - 2, & x \geq 0 \end{cases}$$
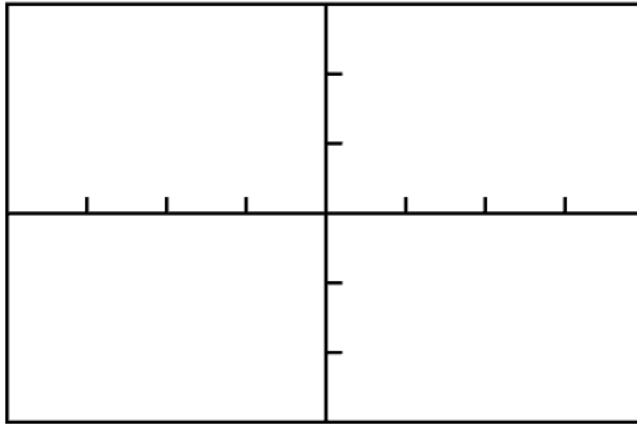
[–4, 4] by [–3, 3]

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

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

c. $f(-2)$

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

e. $\lim_{x \to 0^-} f(x)$

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

g. $f(0)$

h. $\lim_{x \to 0} f(x)$

5.   Graph the function below on the coordinate plane provided, then use the graph to determine the following limits and values. If a limit does not exist, briefly explain why.

$$\text{Let } f(x) = \begin{cases} -0.5x, & x < -2 \\ \sqrt{x+2}, & x \geq -2 \end{cases} .$$
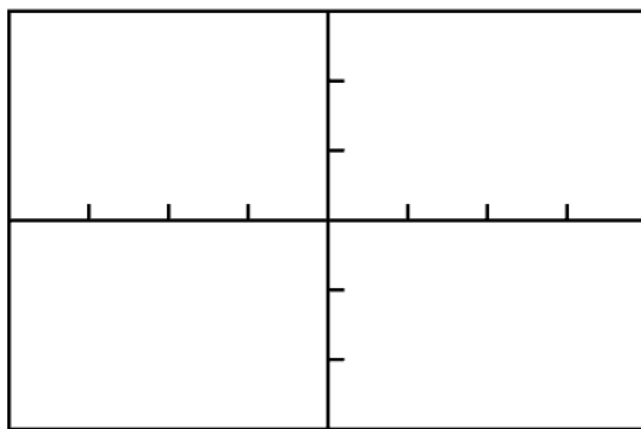

[−4, 4] by [−3, 3]

i. $\lim_{x \to -2^-} f(x)$

j. $\lim_{x \to -2^+} f(x)$

k. $f(-2)$

l. $\lim_{x \to -2} f(x)$

6.   Graph the function below on the coordinate plane provided, then use the graph to determine the following limits and values. If a limit does not exist, briefly explain why.

$$\text{Let } f(x) = \begin{cases} \sqrt{1-x}, & x \leq 1 \\ 0.5x - 2, & x > 1 \end{cases}$$
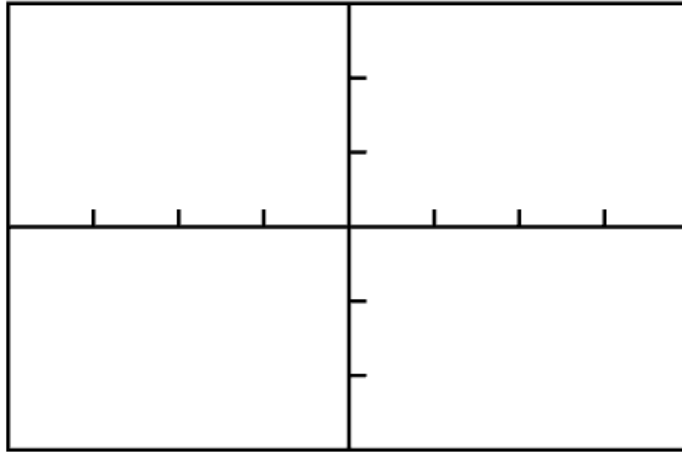
$[-4, 4]$ by $[-3, 3]$

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

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

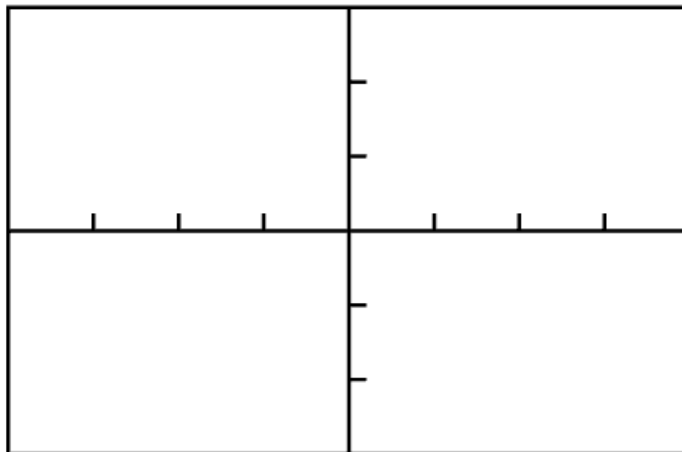c. $f(1)$

d. $\lim_{x \to 1} f(x)$

7.

Sketch a possible graph for a function f that has the stated properties. $f(-2)$ exists, $\lim\limits_{x \to -2} f(x)$ exists, f is not continuous at $x = -2$, and $\lim\limits_{x \to 1} f(x)$ does not exist.

[−4, 4] by [−3, 3]

8.

Sketch a possible graph for a function f, where $\lim\limits_{x \to 3} f(x)$ exists, $f(3) = 1$, and f is not continuous at $x = 3$.

[−4, 4] by [−3, 3]