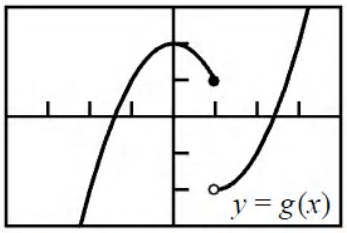
Finding Limits Graphically Name: _____

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]

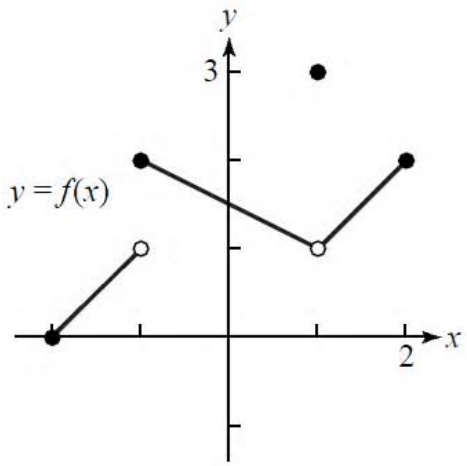
(a) $\lim_{x\to 1^-} g(x)$ 1

(b) $\lim_{x\to 1^+} g(x)$ −2

(c) $\lim_{x\to 1} g(x)$ D.N.E. $\lim_{x\to 1^-} g(x) \neq \lim_{x\to 1^+} g(x)$

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

b. $\lim_{x\to -1^+} f(x)$ 2

c. $f(-1)$ 2

d. $\lim_{x\to -1} f(x)$ D.N.E. $\lim_{x\to -1^-} f(x) \neq \lim_{x\to -1^+} f(x)$

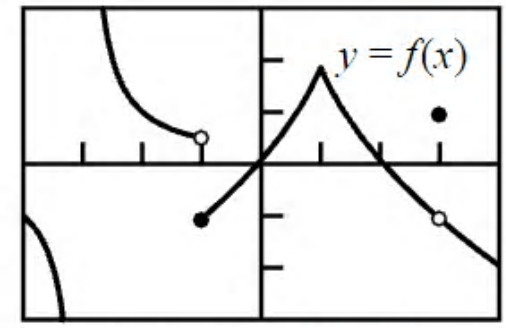
e. $\lim_{x\to 1^-} f(x)$ 1

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

g. $f(1)$ 3

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

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



[–4, 4] by [–3, 3]

a. $\lim_{x\to -1^-} f(x)$ .5

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

c. $f(-1)$ -1

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

e. $\lim_{x\to 1^-} f(x)$ 2

f. $\lim_{x\to 1^+} f(x)$ 2

g. $f(1)$ 2

h. $\lim_{x\to 1} f(x)$ 2

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

i. $\lim_{x\to 3^-} f(x) = -1$

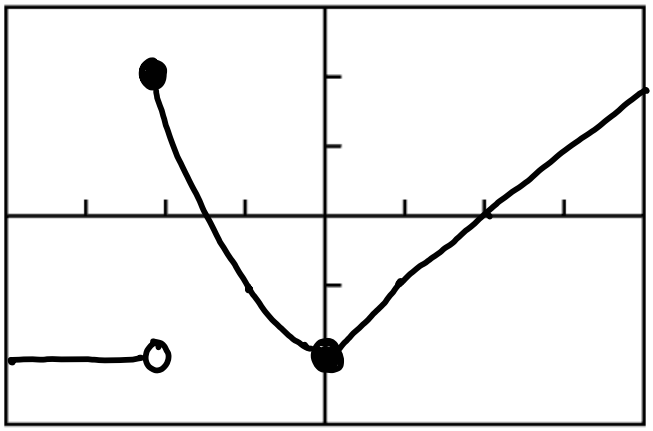
j. $\lim_{x\to 3^+} f(x) = -1$

k. $f(3) = 1$

l. $\lim_{x\to 3} f(x) = -1$

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.

$$f(x) = \begin{cases} -2, & x < -2 \\ x^2 - 2, & -2 \le x < 0 \\ x - 2, & x \ge 0 \end{cases}$$



[–4, 4] by [–3, 3]

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

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

c. $f(-2)$ 2

d. $\lim_{x \to -2} f(x)$ D.N.E. $\lim_{x \to -2^-} f(x) \neq \lim_{x \to -2^+} f(x)$

e. $\lim_{x \to 0^-} f(x)$ -2

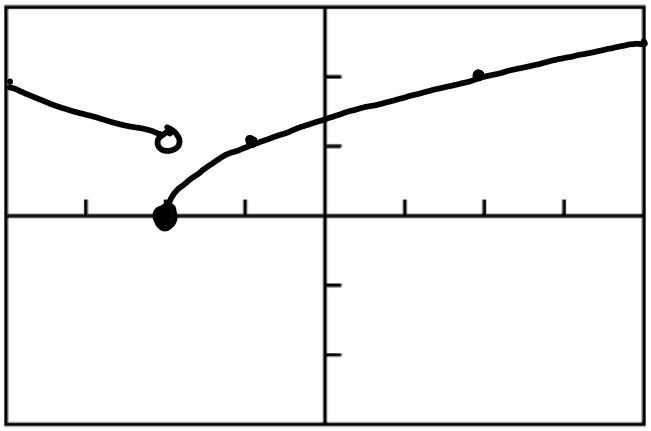
f. $\lim_{x \to 0^+} f(x)$ -2

g. $f(0)$ -2

h. $\lim_{x \to 0} f(x)$ -2

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. $\lim_{x \to -2^-} f(x)$ 1

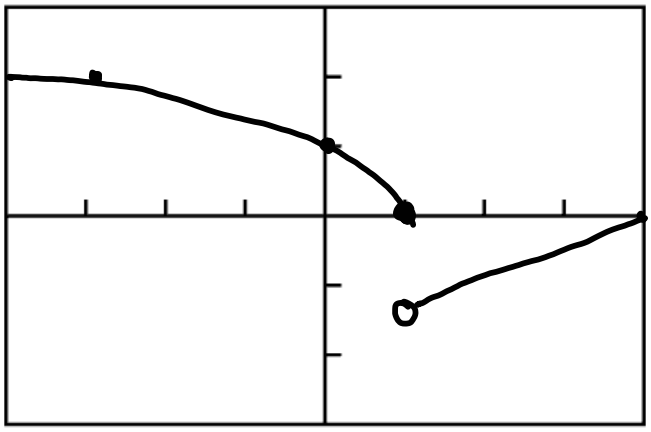
j. $\lim_{x \to -2^+} f(x)$ 0

k. $f(-2)$ 0

l. $\lim_{x \to -2} f(x)$ D.N.E. $\lim_{x \to -2^-} f(x) \neq \lim_{x \to -2^+} f(x)$

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.

$$\text{Let } f(x) = \begin{cases} \sqrt{1-x}, & x \le 1 \\ 0.5x - 2, & x > 1 \end{cases}$$



[–4, 4] by [–3, 3]

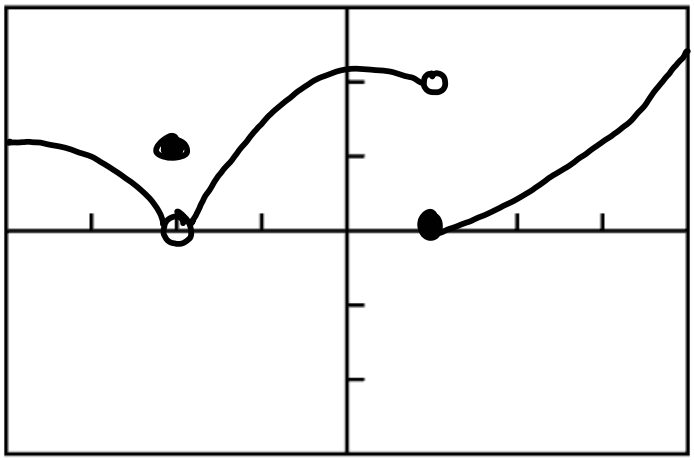
a. $\lim_{x \to 1^-} f(x)$ 0

b. $\lim_{x \to 1^+} f(x)$ -1.5

c. $f(1)$ 0

d. $\lim_{x \to 1} f(x)$ D.N.E. $\lim_{x \to 1^-} f(x) \neq \lim_{x \to 1^+} f(x)$

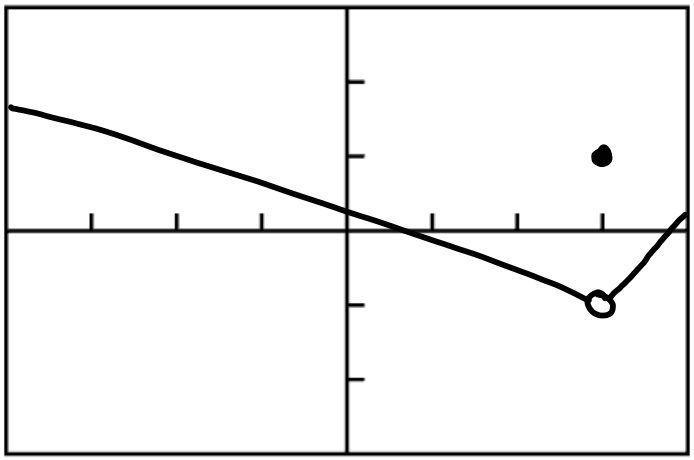
7. Sketch a possible graph for a function f that has the stated properties. $f(-2)$ exists, $\lim_{x \to -2} f(x)$ exists, f is not continuous at $x = -2$, and $\lim_{x \to 1} f(x)$ does not exist.



[–4, 4] by [–3, 3]

more than one correct answer

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



[–4, 4] by [–3, 3]

more than one correct answer