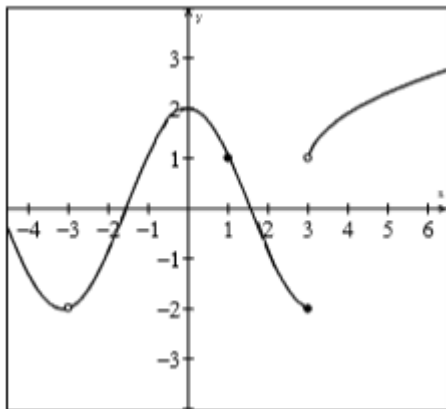


Check In: Determining the Existence of Limits in Piecewise Functions

Answer all questions in the spaces provided.

1. Given the graph of $f(x)$, find the following limits:



a. $\lim_{x \rightarrow -3^-} f(x)$

b. $\lim_{x \rightarrow -3^+} f(x)$

c. $\lim_{x \rightarrow -3} f(x)$

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

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

f. $\lim_{x \rightarrow 1} f(x)$

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

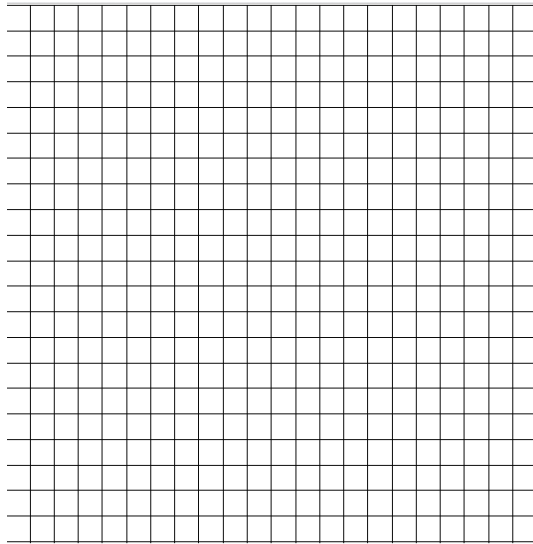
h. $\lim_{x \rightarrow 3^+} f(x)$

i. $\lim_{x \rightarrow 3} f(x)$

2. Sketch each piecewise function below and find the limit at the indicated point. If the limit does not exist, provide an explanation.

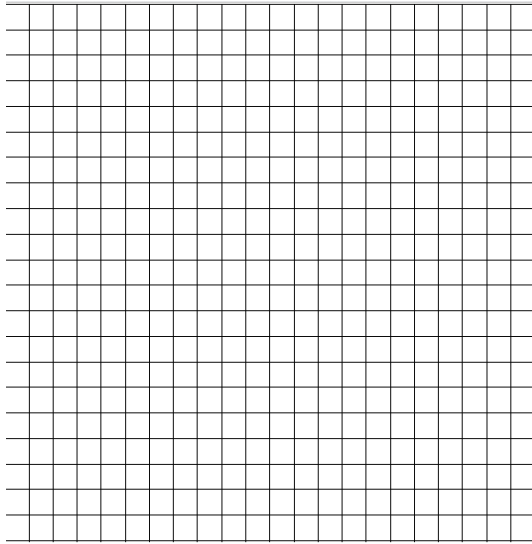
$$\text{a. } f(x) = \begin{cases} 2, & x < 1 \\ 3, & x = 1 \\ x + 1, & x > 1 \end{cases}$$

Find $\lim_{x \rightarrow 1} f(x)$



$$\text{b. } f(x) = \begin{cases} 4 - x^2, & -2 < x \leq 2 \\ x - 2, & x > 2 \end{cases}$$

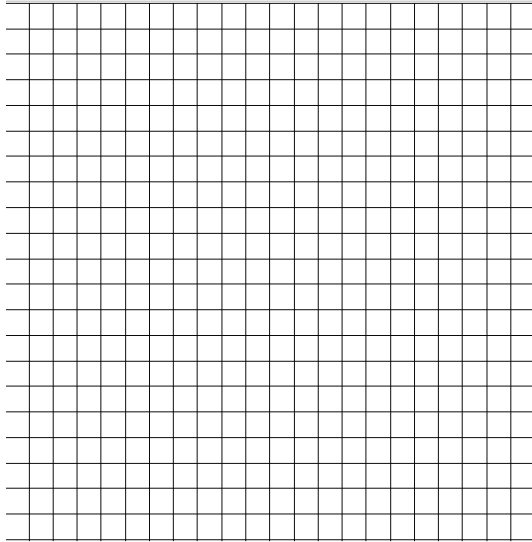
Find $\lim_{x \rightarrow 2} f(x)$



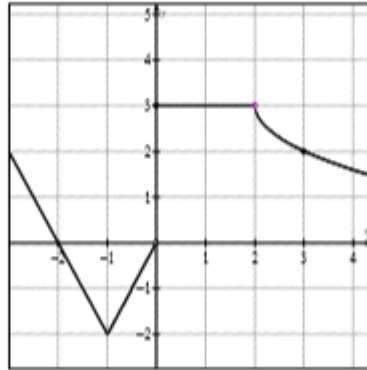
Pre-Calculus B 120

$$c \ f(x) = \begin{cases} |x + 2| + 1, & x < -1 \\ -x + 1, & -1 \leq x \leq 1 \\ x^2 - 2x + 2, & x > 1 \end{cases}$$

Find $\lim_{x \rightarrow 1} f(x)$



3. Answer the following questions about this graph:



a. Does the limit exist at $x = 0$?

b. Does the limit exist at $x = 2$?

c. Explain your answers in a. and b.

4. For each of the following piecewise functions, find the requested limits:

$$\text{a. } f(x) = \begin{cases} x^2 - 4x + 6, & x < 2 \\ -x^2 + 4x + 2, & x \geq 2 \end{cases}$$

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

ii. $\lim_{x \rightarrow 2^+} f(x)$

iii. $\lim_{x \rightarrow 2} f(x)$

$$\text{b. } f(x) = \begin{cases} x^2 + 1, & x < 1 \\ x + 1, & x \geq 1 \end{cases}$$

i. $\lim_{x \rightarrow 1^-} f(x)$

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

iii. $\lim_{x \rightarrow 1} f(x)$