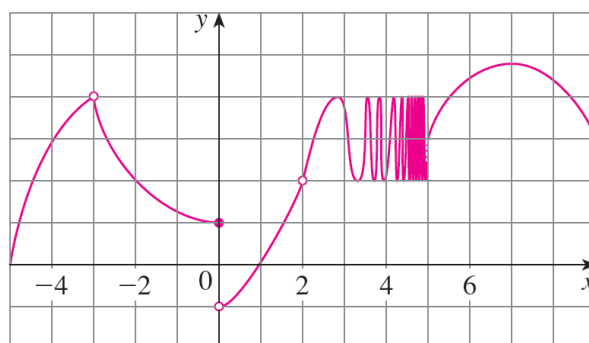


Exercise 6

For the function h whose graph is given, state the value of each quantity, if it exists. If it does not exist, explain why.

- | | | |
|--------------------------------------|--------------------------------------|-------------------------------------|
| (a) $\lim_{x \rightarrow -3^-} h(x)$ | (b) $\lim_{x \rightarrow -3^+} h(x)$ | (c) $\lim_{x \rightarrow -3} h(x)$ |
| (d) $h(-3)$ | (e) $\lim_{x \rightarrow 0^-} h(x)$ | (f) $\lim_{x \rightarrow 0^+} h(x)$ |
| (g) $\lim_{x \rightarrow 0} h(x)$ | (h) $h(0)$ | (i) $\lim_{x \rightarrow 2} h(x)$ |
| (j) $h(2)$ | (k) $\lim_{x \rightarrow 5^+} h(x)$ | (l) $\lim_{x \rightarrow 5^-} h(x)$ |



Solution

$$\lim_{x \rightarrow -3^-} h(x) = 4$$

$$\lim_{x \rightarrow -3^+} h(x) = 2$$

$$\lim_{x \rightarrow -3} h(x) \text{ does not exist because } \lim_{x \rightarrow -3^-} h(x) \neq \lim_{x \rightarrow -3^+} h(x)$$

$h(-3)$ does not exist because there's a hole in the curve at $x = -3$ and no solid dot.

$$\lim_{x \rightarrow 0^-} h(x) = 1$$

$$\lim_{x \rightarrow 0^+} h(x) = -1$$

$$\lim_{x \rightarrow 0} h(x) \text{ does not exist because } \lim_{x \rightarrow 0^-} h(x) \neq \lim_{x \rightarrow 0^+} h(x)$$

$$h(0) = 1$$

$$\lim_{x \rightarrow 2} h(x) = 2 \quad \lim_{x \rightarrow 5^+} h(x) = 3 \quad \lim_{x \rightarrow 5^-} h(x) = 3 \text{ (hard to see)}$$

$h(2)$ does not exist because there's a hole in the curve at $x = 2$ and no solid dot.