

Section 2.2 Definition of limits

1. Choose one answer below and explain

If $\lim_{x \rightarrow 2^-} h(x) = 5$, $\lim_{x \rightarrow 2^+} h(x) = 5$, and $h(2) = 6$, then

- a. $\lim_{x \rightarrow 2} h(x) = 5$
- b. $\lim_{x \rightarrow 2} h(x) = 6$
- c. $\lim_{x \rightarrow 2} h(x)$ does not exist

2. Choose one answer below and explain

If $\lim_{x \rightarrow 2} h(x) = 5$, then

- a. $h(2) = 5$
- b. $h(2)$ is undefined
- c. Not enough information to determine $h(2)$

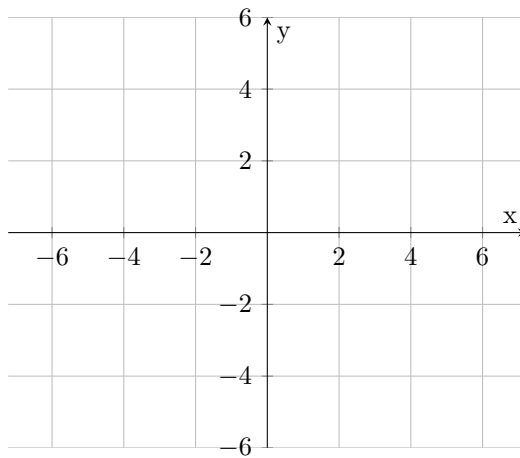
Choose one answer below and explain

If $\lim_{x \rightarrow 1^-} f(x) = 6$ and $\lim_{x \rightarrow 1^+} f(x) = 7$, then

- a. $\lim_{x \rightarrow 1} f(x) = 6$
- b. $\lim_{x \rightarrow 1} f(x) = 7$
- c. $\lim_{x \rightarrow 1} f(x)$ does not exist

4. Sketch a function with the following features.

$$f(1) = 0, f(2) = 4, f(3) = 6, \quad \lim_{x \rightarrow 2^-} f(x) = -3, \quad \text{and} \quad \lim_{x \rightarrow 2^+} f(x) = 5$$



5. Using the following information, find the limits below

$$\lim_{x \rightarrow 1} f(x) = 8 \quad \lim_{x \rightarrow 1} g(x) = 3 \quad \lim_{x \rightarrow 1} h(x) = 2$$

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

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

c. $\lim_{x \rightarrow 1} \frac{f(x)}{g(x) - h(x)}$

d. $\lim_{x \rightarrow 1} \frac{f(x)g(x)}{h(x)}$

6. Evaluate the following limits:

a. $\lim_{x \rightarrow 3} \frac{\sqrt{x-2}}{x-4}$

b. $\lim_{x \rightarrow 4} \frac{\sqrt{x-2}}{x-4}$

c. $\lim_{x \rightarrow 1} g(x)$ where $g(x) = \begin{cases} 3x - 4 & x \leq -1 \\ x^2 + 2x - 4 & x > -1 \end{cases}$

7. Determine if there is a value a such that the following limit exists. If it does exist, find the value of a and the value of the limit.

$$\lim_{x \rightarrow 2} \frac{2x - a}{x^2 + x - 2}$$

8. Evaluate the limit

$$\lim_{x \rightarrow 3} \left(\left(4x - \frac{2}{x-3} \right) (6 + x - x^2) \right)$$

9. Evaluate the limit for $a > 0$

$$\lim_{x \rightarrow a} \frac{x - a}{\sqrt{x} - \sqrt{a}}$$

10. Evaluate the limit

$$\lim_{x \rightarrow 0} \frac{\frac{1}{5+h} - \frac{1}{5}}{h}$$