

AP[®] Exam Practice Questions

See LarsonCalculus.com for worked-out solutions to these questions.

What You Need to Know

- The AP[®] Exam, especially the free-response section, stresses the major applications of calculus rather than the foundational limit concept.
- You are not required to use the formal epsilon-delta definition of a limit on the AP[®] Exam.
- The algebraic methods for evaluating limits (see Section 1.3) are not explicitly tested on the free-response section of the AP[®] Exam. They are, however, helpful on some multiple-choice questions.
- You should be able to apply the Intermediate Value Theorem, whether the function is presented as an equation or by a table.

Practice Questions

Section 1, Part A, Multiple Choice, No Technology

1. $\lim_{x \rightarrow \pi} \frac{\sin x}{x}$ is

- (A) 0. (B) 1.
(C) π . (D) nonexistent.

2. $\lim_{x \rightarrow -2} \frac{3x^2 + 5x + 7}{x - 4}$ is

- (A) $-\frac{5}{2}$. (B) $-\frac{3}{2}$.
(C) -1. (D) 3.

3. Consider the function

$$f(x) = \begin{cases} \sqrt{x-2}, & x > 3 \\ 6-2x, & x \leq 3 \end{cases}$$

Which of the following statements is true?

I. $\lim_{x \rightarrow 3} \sqrt{x-2} = 1$ II. $\lim_{x \rightarrow 3} (6-2x) = 0$

III. The limit $\lim_{x \rightarrow 3} f(x)$ does not exist.

- (A) None (B) I and II only
(C) III only (D) I, II, and III

4. Which of the following limits do not exist?

I. $\lim_{x \rightarrow 1} \frac{x^3 + 1}{x - 1}$ II. $\lim_{x \rightarrow 0} \frac{|x|}{x}$

III. $\lim_{x \rightarrow 2} f(x)$, where $f(x) = \begin{cases} 3, & x \leq 2 \\ 0, & x > 2 \end{cases}$

- (A) None (B) I and II only
(C) III only (D) I, II, and III

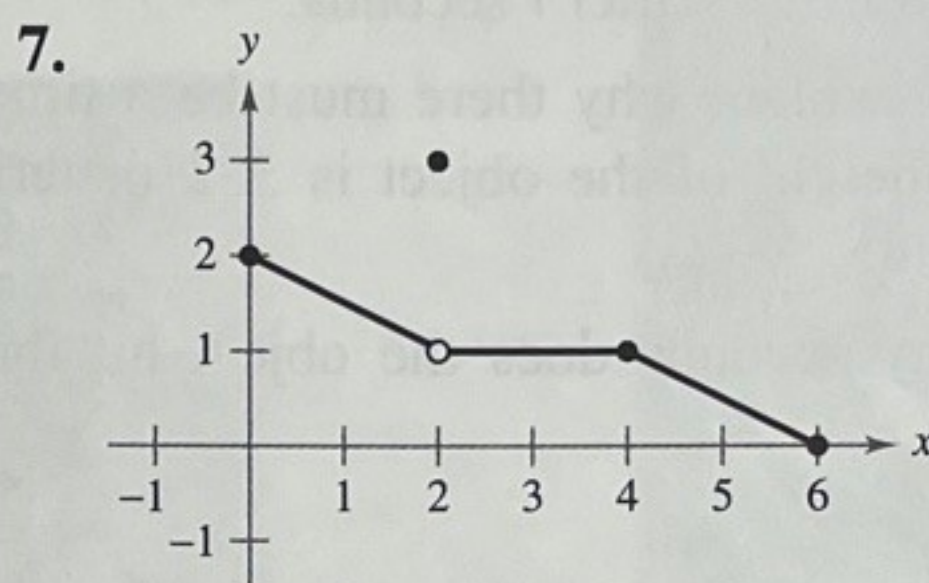
5. On which given interval is the graph of $f(x) = 2/\sqrt{x-1}$ not continuous?

- (A) $[2, \infty)$ (B) $(1, \infty)$
(C) $[1, \infty)$ (D) $(1, 2)$

6. Given $\lim_{x \rightarrow 5} f(x) = 10$ and $\lim_{x \rightarrow 5} g(x) = 1$, what is the limit of

$$\lim_{x \rightarrow 5} [5f(x) - g(x)]?$$

- (A) 9 (B) 15 (C) 45 (D) 49



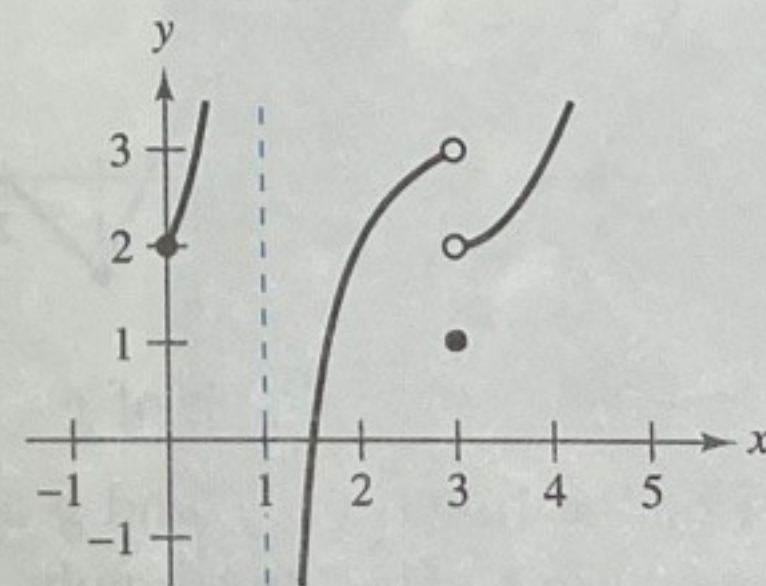
The graph of the function g is shown above. Which of the following is true?

I. $\lim_{x \rightarrow 2} g(x) = 1$ II. $\lim_{x \rightarrow 2} g(x) = g(2)$

III. g is continuous at $x = 3$.

- (A) I only (B) I and III only
(C) III only (D) I, II, and III

8. The graph of the function f is shown. The line $x = 1$ is a vertical asymptote.



Which of the following statements about f is true?

(A) $\lim_{x \rightarrow 1} f(x) = \infty$ (B) $\lim_{x \rightarrow 3^-} f(x) < \lim_{x \rightarrow 3^+} f(x)$

(C) $\lim_{x \rightarrow 3} f(x) = 1$ (D) $\lim_{x \rightarrow 0^+} f(x) = \lim_{x \rightarrow 3^+} f(x)$

9. The function $f(x) = 10/x^4$ is shown in the figure. What is $\lim_{x \rightarrow 0} f(x)$?

- (A) 0
(B) 1
(C) 10
(D) nonexistent

