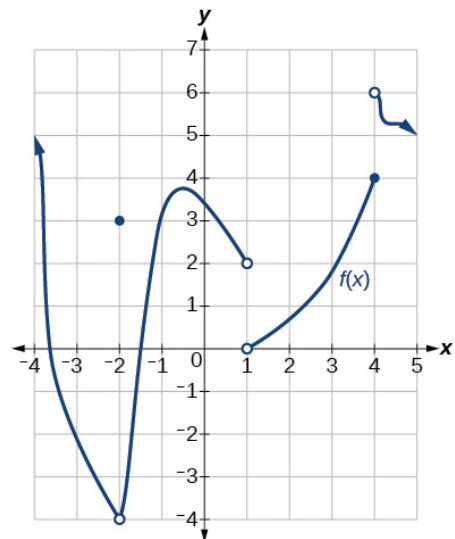


AP Calculus TEST 1.1-1.3, No Calculator

Part I—Multiple Choice: Put the correct CAPTIAL LETTER in the space provided next to each question number.



_____ 1. Using the graph of $f(x)$ on the right, what is the value of

$$\lim_{x \rightarrow 4^-} f(x-3) + \lim_{x \rightarrow -2} [f(x)]^2 - \lim_{x \rightarrow 4^+} f(x)$$

(A) 5 (B) 7 (C) 10 (D) 12 (E) 26

_____ 2. Using the graph of $f(x)$ on the right, on the open interval $-4 < x < 5$, how many discontinuities does the graph of $f(x)$ have?

- (A) 1 (B) 2 (C) 3 (D) 4 (E) 5

_____ 3. $\lim_{x \rightarrow \infty} \frac{4x + 2x^2 - 3x^3}{5x^3 + x^2 - 11} =$

- (A) $\frac{4}{5}$ (B) $-\frac{4}{5}$ (C) 0 (D) $\frac{3}{5}$ (E) $-\frac{3}{5}$

_____ 4. $\lim_{x \rightarrow -\infty} \frac{8x^3 + 2x^2 - 14}{\sqrt{16x^6 + 11x^4 + 9}} =$

- (A) $-\frac{1}{2}$ (B) $\frac{1}{2}$ (C) 0 (D) -2 (E) 2

_____ 5. $\lim_{x \rightarrow 2^-} \frac{x-5}{x-2} =$

- (A) 0 (B) 1 (C) $\frac{5}{2}$ (D) ∞ (E) $-\infty$

- _____ 6. If $f(x) = \begin{cases} ax+b, & x < -1 \\ -3, & x = -1 \\ 2ax^2+bx, & x > -1 \end{cases}$ is continuous at $x = -1$, what is the value of $a \cdot b$?
- (A) 54 (B) -15 (C) 3 (D) -9 (E) 28

- _____ 7. $\lim_{x \rightarrow 7} \frac{x^2 - 5x - 14}{x^2 - 10x + 21} =$
- (A) $\frac{9}{4}$ (B) $-\frac{2}{3}$ (C) $-\frac{5}{7}$ (D) 1 (E) DNE

- _____ 8. If $2^x + 5 \leq f(x) \leq x^3 + 4x - 7$, what is $\lim_{x \rightarrow 2} f(x)$?
- (A) 2 (B) 5 (C) 9 (D) 11 (E) Not enough information

- _____ 9. Which of the following is an equation of an asymptote to the function

$$f(x) = \frac{x^3 + 3x^2 - 10x - 30}{x^2 - x - 6}?$$

- I. $x = 3$
II. $x = -2$
III. $y = x + 3$
IV. $y = x + 4$
- (A) I and II only (B) I, II, and III only (C) I, II, and IV only (D) II and IV only (E) I and IV only

Part II—Free Response: Show all work in the space provided. Use proper notation.

Let a piecewise function be defined below.

$$f(x) = \begin{cases} \frac{2+e^x}{3-e^x}, & x < -8 \\ \sqrt{x+8}, & -8 \leq x \leq -4 \\ x^2 + 3x - 2, & -4 < x < 0 \\ -2, & x = 0 \\ 2^x + 1, & 0 < x < 1 \\ \sec x, & 1 \leq x < \frac{3\pi}{2} \\ \arctan x, & x > \frac{3\pi}{2} \end{cases}$$

(a) Using the 3-step definition of continuity at a point, determine if $f(x)$ is continuous at $x = -4$.

(b) Using the 3-step definition of continuity at a point, determine if $f(x)$ is continuous at $x = 0$.

$$(c) \lim_{x \rightarrow -\infty} f(x) =$$

$$(d) \lim_{x \rightarrow \infty} f(x) =$$

$$(e) \lim_{x \rightarrow \frac{\pi}{3}} f(x) =$$