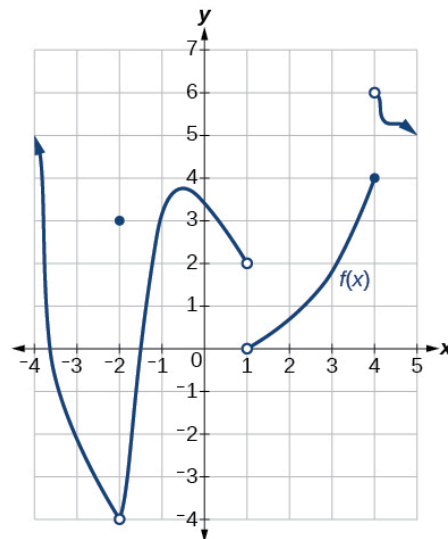


AP Calculus TEST 1.1-1.4, No Calculator, AB

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 (for this problem only), what is the value of $\lim_{x \rightarrow -1^-} f(x^2) + \lim_{x \rightarrow 4^-} \sqrt{f(x)} - \lim_{x \rightarrow -2} f(x)$
- (A) -2 (B) 0 (C) 2 (D) 7 (E) 8

- _____ 2. $\lim_{x \rightarrow 3^+} \frac{4-x}{(x-3)^2} =$
- (A) ∞ (B) $-\infty$ (C) $\frac{4}{3}$ (D) $\frac{4}{9}$ (E) $-\frac{1}{9}$

- _____ 3. $\lim_{x \rightarrow 7} \frac{3-\sqrt{x+2}}{7-x} =$
- (A) 1 (B) $\frac{1}{6}$ (C) $-\frac{1}{6}$ (D) -1 (E) DNE

- _____ 4. $\lim_{x \rightarrow 4} \frac{\frac{2}{x+1} - \frac{2}{x-4}}{x-4} =$
- (A) $-\frac{2}{25}$ (B) $\frac{2}{25}$ (C) DNE (D) $-\frac{25}{2}$ (E) $\frac{25}{2}$

- _____ 5. If $e^x + \cos x \leq B(x) \leq \frac{5x^2 - 2x - 1}{\sec x}$, what is $\lim_{x \rightarrow 0} B(x)$?
- (A) 2 (B) 1 (C) 5 (D) 3 (E) Not enough information

_____ 6. $\lim_{x \rightarrow -3} \frac{x^3 - 3x^2 - 10x + 24}{x^2 + 4x + 3} =$

- (A) ∞ (B) $\frac{-19}{2}$ (C) $\frac{1}{2}$ (D) $\frac{-35}{2}$ (E) $\frac{-17}{2}$

_____ 7. $\lim_{x \rightarrow -\infty} \frac{-4x^5 - 4x^3 - 5x^2 - 1}{\sqrt{4x^{12} + 5x^4 + 19}} =$

- (A) -1 (B) 1 (C) -2 (D) 2 (E) 0

_____ 8. $\lim_{x \rightarrow 0} \frac{(1+x)^2 - 3(1+x) + 2}{x} =$

- (A) 0 (B) 1 (C) -1 (D) DNE (E) 2

_____ 9. If $f(x) = \begin{cases} ax + b, & x < -2 \\ -3, & x = -2 \\ bx^2 + a, & x > -2 \end{cases}$ is continuous at $x = -2$, what is the value of $a + b$?

- (A) 1 (B) -1 (C) 0 (D) -2 (E) 2

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

Let a piecewise function be defined below.

$$f(x) = \begin{cases} \frac{1+7e^{-x}}{5-4e^{-x}}, & x < -8 \\ \frac{x+5}{x^2-25}, & -8 \leq x \leq -2 \\ 2x^2+4x-5, & -2 < x \leq 0 \\ \frac{x+5}{e^x + \ln(x+1)}, & 0 < x < 1 \\ \csc x, & 1 \leq x < 2\pi \\ (\arctan x)^3, & x \geq 2\pi \end{cases}$$

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

(b) $\lim_{x \rightarrow -5^-} f(x) =$

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

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

$$(e) \lim_{x \rightarrow \frac{5\pi}{4}} f(x) =$$