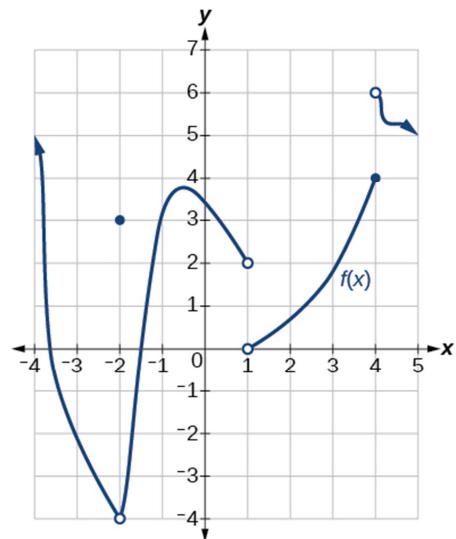


AP Calculus TEST 1.1-1.4, No Calculator

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 (for this problem only), 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.  $\lim_{x \rightarrow 2^-} \frac{x-5}{x-2} =$

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

\_\_\_\_\_ 3.  $\lim_{x \rightarrow -1} \frac{\sqrt{x+5}-2}{x+1} =$

- (A) 1      (B)  $\frac{1}{4}$       (C)  $-\frac{1}{4}$       (D) -1      (E) DNE

\_\_\_\_\_ 4.  $\lim_{x \rightarrow 5} \frac{\frac{x-5}{3} - \frac{x-5}{3}}{\frac{x-1}{4} - 4} =$

- (A)  $-\frac{4}{3}$       (B)  $\frac{4}{3}$       (C) DNE      (D)  $-\frac{16}{3}$       (E)  $\frac{16}{3}$

\_\_\_\_\_ 5.  $\lim_{x \rightarrow 0} \frac{\sin^2 2x}{\tan^2 5x} =$

- (A)  $\infty$       (B)  $\frac{2}{5}$       (C)  $-\infty$       (D)  $\frac{4}{25}$       (E) 0

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

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

\_\_\_\_\_ 7.  $\lim_{m \rightarrow 0} \frac{2(x+m) - x^2 + (x+m)^2 - 2x}{m} =$

- (A)  $2+x$       (B) 2      (C)  $1+2x$       (D) DNE      (E)  $2+2x$

\_\_\_\_\_ 8. 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

\_\_\_\_\_ 9. 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

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

Let a piecewise function be defined below.

$$f(x) = \begin{cases} \frac{2+e^x}{3-e^x}, & x < -8 \\ \frac{2x^3+10x^2}{|3x+15|}, & -8 \leq x \leq -2 \\ x^2+3x-2, & -2 < x < 0 \\ -2, & x = 0 \\ 2^x+1, & 0 < x < 1 \\ \sec x, & 1 \leq x < \frac{3\pi}{2} \\ \arctan x, & x \geq \frac{3\pi}{2} \end{cases}$$

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

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

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

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

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