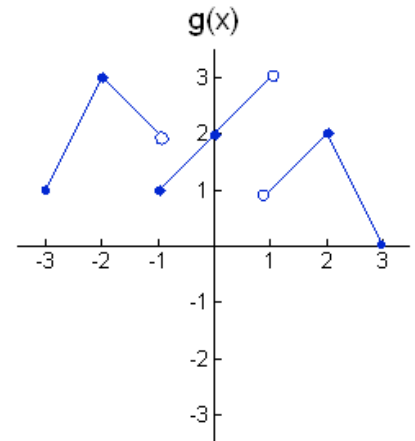


AP Calculus TEST: 1.1-1.4

No Calculator

Part I: Multiple Choice—write the CAPITAL LETTER in the blank to the left of the problem number.

Use the graph of the function $g(x)$ shown at right to answer question 1.



_____ 1. $\lim_{x \rightarrow -3^+} g(g(x)) + \lim_{x \rightarrow -1^-} \sqrt{3g(x)} + \lim_{x \rightarrow -1^-} g^2(x) =$
 (A) 6 (B) 7 (C) 8 (D) DNE

_____ 2. $\lim_{x \rightarrow 7} \frac{2x^2 - 13x - 7}{x - 7} =$
 (A) ∞ (B) 0 (C) 2 (D) 15

_____ 3. If $\csc\left(\frac{7\pi}{x}\right) \leq P(x) \leq \ln\left(\frac{12}{x} - 1\right) - \sqrt{x-2}$, for all x in an interval containing $x = 6$, then $\lim_{x \rightarrow 6} P(x) =$
 (A) -1 (B) -2 (C) $\frac{-2\sqrt{3}}{3}$ (D) not enough information is given

_____ 4. $\lim_{x \rightarrow -\infty} \frac{-3x^5 + 9x^4 + 1}{\sqrt{9x^{10} + x^8 + 4}} =$
 (A) -1 (B) 1 (C) $-\frac{1}{3}$ (D) $\frac{1}{3}$

_____ 5. $\lim_{x \rightarrow 6^+} \frac{(x+5)(7-x)}{(x-5)(6-x)} =$
(A) $-\infty$ (B) ∞ (D) 1 (E) -1

_____ 6. If $f(x) = \begin{cases} ax^2 + 2b, & x < 1 \\ 2, & x = 1 \\ 3ax - 5b, & x > 1 \end{cases}$ is continuous at $x = 1$ for particular values of real numbers a and b , what is

the value of $\frac{a}{b}$?

(A) $\frac{2}{7}$ (B) $\frac{7}{2}$ (C) $\frac{4}{11}$ (D) no such values of a and b exist

_____ 7. If $f(x)$ is continuous for all x in the interval $[a, b]$, then at any point $c \in (a, b)$, which of the following must be true?

(A) $\lim_{x \rightarrow c} f(x) = f(c)$ (B) $f(c) = 0$ (C) $f(c) = f(b) - f(a)$ (D) $f(a) \leq f(c) \leq f(b)$

_____ 8. Evaluate $\lim_{x \rightarrow 4^-} \frac{\sqrt{x+5} - 3}{x-4} =$

(A) 1 (B) $\frac{1}{6}$ (C) $-\frac{1}{6}$ (D) -6

Part II: Free Response: Answer all questions in the rectangle provided for each problem. **Show all steps, use proper notation, and write legibly.**

$$f(x) = \begin{cases} \frac{x^3 - 2x^2 + 3}{3x^2 + 4x - 1}, & x < -3 \\ \frac{x^2 + 3x - 1}{x - 1}, & -3 \leq x < -2 \\ \frac{-2}{x}, & -2 \leq x < 2 \\ 1 - 3x, & 2 < x \leq 4 \\ \frac{5 + 2^{-x}}{3 - 2^{-x}}, & x > 4 \end{cases}$$

9. For the function given above, find the following.

(a) $\lim_{x \rightarrow 3} f(x) =$

(b) $\lim_{x \rightarrow 0^-} f(x) =$

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

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

(e) Using the 3-step definition of continuity, discuss the continuity of $f(x)$ at $x = -2$.

(f) Using the 3-step definition of continuity, discuss the continuity of $f(x)$ at $x = 2$.