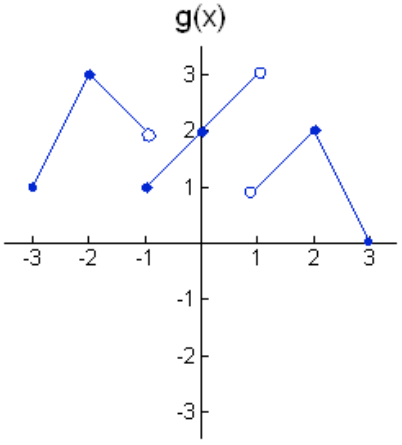
Name KEY 17 checks total Date Period

AP Calculus AB 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.

C 1. $\lim_{x\to 1^-} g(g(x)) + \lim_{x\to -2^+} \sqrt{g(x)+6} + g(-1) =$ 0 + 3 + 1

(A) 6 (B) 5 (C) 4 (D) 3 (E) DNE

E 2. $\lim_{x\to 3^+} \dfrac{x^3-9x}{x^2-x-6} =$ $\dfrac{x(x-3)(x+3)}{(x-3)(x+2)} = \dfrac{3(6)}{5}$

(A) DNE (B) 0 (C) $-\dfrac{3}{14}$ (D) $-\dfrac{18}{5}$ (E) $\dfrac{18}{5}$

D 3. If $2^{3x-1} \le P(x) \le x^3+2x+1$, for all x in an interval containing $x=1$, then $\lim_{x\to 1} P(x) =$

(A) DNE (B) 0 (C) 2 (D) 4 (E) not enough information is given

C 4. $\lim_{x\to -\infty} \dfrac{-2x^7+7x^2-3x+1}{\sqrt{4x^{14}+x^{12}+2x^2+3x+4}} =$

(A) $-\infty$ (B) $-\dfrac{1}{2}$ (C) 1 (D) -1 (E) $\dfrac{1}{2}$

A 5. $\lim_{x\to -4^-} \dfrac{x^2+1}{x+4} =$ $-\infty$

(A) $-\infty$ (B) ∞ (C) $\dfrac{17}{8}$ (D) 1 (E) $\dfrac{1}{4}$

D 6. If $f(x) = \begin{cases} \cos x, & x \neq \dfrac{7\pi}{6} \\ \dfrac{1}{2}, & x = \dfrac{7\pi}{6} \end{cases}$ Evaluate $\lim_{x\to \frac{7\pi}{6}} f(x) =$

(A) $\dfrac{1}{2}$ (B) $-\dfrac{1}{2}$ (C) $\dfrac{\sqrt{3}}{2}$ (D) $-\dfrac{\sqrt{3}}{2}$ (E) DNE

D 7. If $\lim_{x\to 0} f(x) = 5$, which of the following must be true?

I. $\lim_{x\to 0^-} f(x) = 5$ **II.** $\lim_{x\to 0^+} f(x) = 5$ **III.** $f(0) = 5$

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

C 8. Evaluate $\lim_{x\to 1^-} \dfrac{x^3+1}{x+1} =$ 1

(A) DNE (B) 0 (C) 1 (D) -1 (E) 3

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

9. For $f(x)=\begin{cases}\ln|x+2|, & x<-3\\ \dfrac{x+3}{x-1}, & -3\le x<-1\\ \dfrac{-2}{x}, & -1\le x<1\\ 1-3x, & 1<x\le 4\\ \dfrac{1}{x}\sin\left(\dfrac{\pi}{2}x\right), & x>4\end{cases}$, find the following.

(a) $\lim_{x\to 0^-} f(x)=$ DNE or ∞ ✓

(b) $\lim_{x\to -1} f(x)=$ DNE ✓ $\lim_{x\to -1^-} f(x)=-1$, $\lim_{x\to -1^+} f(x)=2$

(c) $\lim_{x\to\infty} f(x)=$ 0 ✓

(d) $\lim_{x\to -\infty} f(x)=$ DNE or ∞ ✓

(e) Using the 3-step definition of continuity, discuss the continuity of $f(x)$ at $x=1$.

$\lim_{x\to 1^-} f(x)=-2$

$\lim_{x\to 1^+} f(x)=-2$

$f(1)=$ DNE

f(x) is not continuous at x=1 ✓

since f(1) = DNE ✓

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

$\lim_{x\to -3^-} f(x)=0$

$\lim_{x\to -3^+} f(x)=0$ ✓

$f(-3)=0$

f(x) is continuous at x=-3 ✓

since 0=0=0 ✓

9 checks