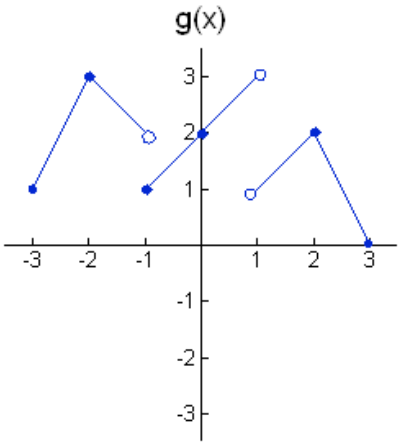
Name_____ Date_____ Period_____

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.

_____ 1. $\lim_{x\to 1^-} g\left(g\left(x\right)\right)+\lim_{x\to -2^+}\sqrt{g(x)+6}+g\left(-1\right)=$

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

_____ 2. $\lim_{x\to 3^+}\dfrac{x^3-9x}{x^2-x-6}=$

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

_____ 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

_____ 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) $\dfrac{1}{2}$

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

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

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

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

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

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

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

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

(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) $\lim_{x\to 0^-} f(x)=$
(b) $\lim_{x\to -1} f(x)=$
(c) $\lim_{x\to \infty} f(x)=$
(d) $\lim_{x\to -\infty} f(x)=$
(e) Using the 3-step definition of continuity, discuss the continuity of $f(x)$ at $x=1$.
(f) Using the 3-step definition of continuity, discuss the continuity of $f(x)$ at $x=-3$.