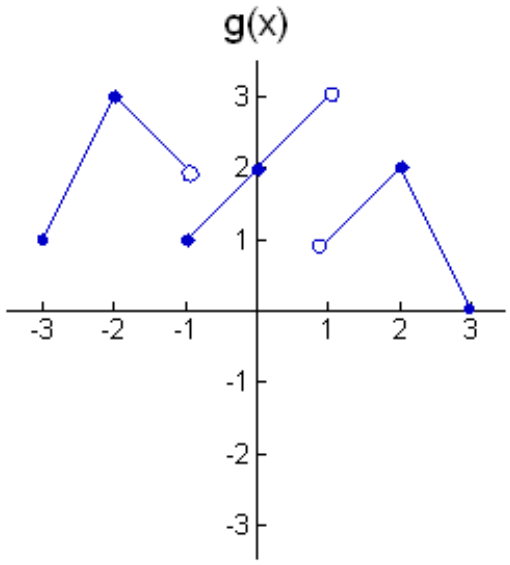
Name_____ Date_____ Period_____

AP Calculus TEST: 3.1-3.4
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 questions 1-2.



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

(A) 10 (B) 11 (C) 12 (D) 13 (E) DNE

_____ 2. $\lim_{x\to 3^-} g\left(g\left(x\right)\right) =$

(A) 0 (B) 3 (C) 2 (D) 1 (E) DNE

_____ 3. Evaluate $\lim_{x\to 0}\left(\dfrac{3\cot 6x}{2\csc 2x} + \dfrac{x}{x}\right)$

(A) DNE (B) 0 (C) $\dfrac{11}{2}$ (D) $\dfrac{3}{2}$ (E) 3

_____ 4. Evaluate $\lim_{x\to 0}\left(\dfrac{1-\cos 4x}{x+1}\right)$

(A) DNE (B) 0 (C) 1 (D) -1 (E) 4

_____ 5. If $f(x) = \begin{cases} 2x^2+1, & x<-1 \\ -\dfrac{3}{x}, & x\geq -1 \end{cases}$, which of the following is NOT true?

(A) $\lim_{x\to -1^+} f(x) = f(-1)$ (B) $f(x)$ is continuous at $x=-1$ (C) $\lim_{x\to\infty} f(x) = 0$

(D) $f(x)$ has a vertical asymptote at $x=0$ (E) $\lim_{x\to -1^-} f(x) = -1$ (F) Math Rocks Me Like A Hurricane

_____ 6. If $\sec x \leq M(x) \leq e^x$, for all x in an interval containing $x=0$, then $\lim_{x\to 0} M(x) =$

(A) DNE (B) 0 (C) 1 (D) -1 (E) Not enough information

Part II: Free Response: Answer all questions below the given line. **Show all steps, label parts, and write legibly.**

7. Evaluate 5 out of 6 of the following. Careful rewriting the "lim" each time it is needed!!! Show all work when necessary.

(a) $\lim_{x\to 0} \dfrac{\tan 2x + x}{5x}$

(b) $\lim_{x\to 2} \dfrac{x^3 - 5x + 2}{x^2 + 3x - 10}$

(c) $\lim_{x\to 5^+} \dfrac{x^4 + x^3 - 30x^2}{|5x - 25|}$

(d) $\lim_{x\to -\infty} \dfrac{4x^5 + 2x^2 - 3x + 1}{\sqrt{9x^{10} + 11x^9 + 12x^2 + 13x + 14}}$

(e) $\lim_{x\to 0} \dfrac{\sqrt{x^2 + 9} - 3}{x^2}$

(f) $\lim_{x\to -4} \dfrac{\frac{1}{4} + \frac{1}{x}}{4 + x}$