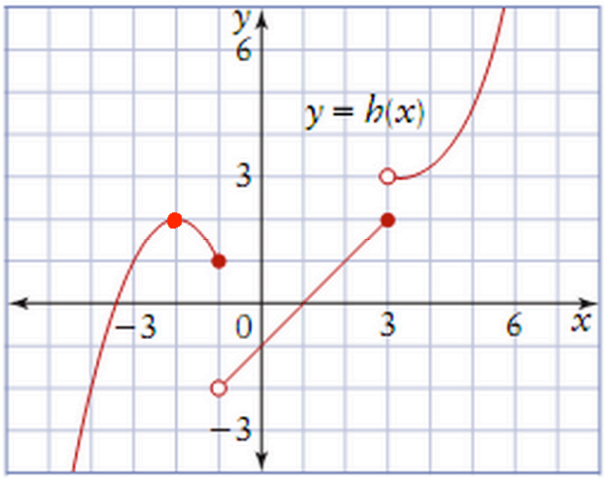
Name_____ Date_____ Period_____

AP Calculus TEST: 1.1-1.5 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 $h(x)$, shown below right, to answer questions 1-3.



_____ **1**. The largest value of $w \in \mathbf{R}$ such that $h(x)$ is continuous on $(-3, w]$ is

(A) 0 (B) -1 (C) -2 (D) -1.1 (E) No such value exists

_____ **2**. On the interval $-0.5 \le x \le 2.5$, the IVT guarantees a value $-0.5 < j < 2.5$ such that $h(j) = 1$. What is j?

(A) 0 (B) 1 (C) 2 (D) 3 (E) the IVT does not apply

_____ **3**. $\lim\limits_{x \to -1^+} h(h(x)) =$

(A) 0 (B) 1 (C) 2 (D) 3 (E) No such value exists

_____ 4. The line $y = -7$ is a horizontal asymptote to the graph of which of the following functions?

(A) $y = -\dfrac{\sin(7x)}{x}$ (B) $y = \dfrac{-7x^2 + 2x - 1}{\sqrt{x^2 + 50}}$ (C) $y = \dfrac{1}{x+7}$ (D) $y = \dfrac{21x^3 - 2x^2 - 7}{7 + 9x - 3x^3}$ (E) $y = \dfrac{-7x}{1-x}$

_____ 5. $\lim\limits_{x \to 6} \dfrac{1 - \sqrt{x-5}}{x(x-6)} =$ (A) $-\dfrac{1}{2}$ (B) $-\dfrac{1}{12}$ (C) $\dfrac{1}{2}$ (D) $\dfrac{1}{12}$ (E) $-\dfrac{1}{6}$

_____ 6. $\lim_{x\to 4} \dfrac{x-4}{\dfrac{4}{x}-\dfrac{3}{x-1}} =$ (A) 12 (B) -12 (C) $-\dfrac{1}{12}$ (D) $\dfrac{1}{12}$ (E) DNE

_____ 7. Evaluate $\lim_{x\to 0^-}\left(\dfrac{5\cot 2x}{2\csc 5x}-\dfrac{|3x|}{4x}+\dfrac{x^3+1}{x+1}\right)=$ (A) DNE (B) $\dfrac{13}{2}$ (C) 8 (D) $\dfrac{5}{4}$ (E) $\dfrac{11}{4}$

$$f(x)=\begin{cases}\dfrac{(3x+1)(x-3)}{2x-6}, & x\neq 3\\ k, & x=3\end{cases}$$

_____ 8. Let f be the function defined above. For what value of k is f continuous at $x=3$?
(A) 0 (B) 1 (C) 2 (D) 3 (E) 5

_____ 9. The function f is continuous on $[-10,10]$ and has values given in the table below. If the equation $f(x)=-1$ has at least 2 solutions in the interval $(-10,10)$ if $p=$

x	-10	0	10
$f(x)$	-4	p	-3

(A) $-\dfrac{3}{2}$ (B) $-\dfrac{1}{2}$ (C) -1 (D) -2 (E) -5

Part II: Free Response: Answer all questions in the space provided.. **Show all steps on part (e), and all parts, use proper notation, notation, notation. No Notation, No-No point!!**

10. Let $f(x)$ be the totally awesome piece wise function given below.

$$f(x)=\begin{cases}\dfrac{3x^5+7x^3-2x+1}{\sqrt{4x^{10}+2x^4+11}}, & x\le -3\\ ax^2+2b, & -3<x<-1\\ 5, & x=-1\\ 3bx-a, & -1<x<-\dfrac{1}{2}\\ \dfrac{3x^2}{\sin(3x)\tan(5x)}, & -\dfrac{1}{2}\le x<1\\ \dfrac{2x+1}{x-2}, & x\ge 1\end{cases}$$

(a) Find $\lim_{x\to -\infty} f(x)=$

(b) Find $\lim_{x\to 0} f(x)=$

(c) Find $\lim_{x\to 2^+} f(x)=$

(d) Does the IVT apply to $f(x)$ on $[1,3]$? Why or why not? Be specific.

(e) If a and b are constants that make $f(x)$ continuous at $x=-1$, **what is the value of** a?