Name: ____ Date:________________

Unit 1-HW 4 AP Calculus BC

1.) Given that $f(x)$ is continuous on [0, 5] and some values of f are shown below,

x	0	3	5
$f(x)$	-4	b	-4

If $f(x)=-2$ has no solutions on [0, 5], then b could be?

(A) 3 (B) 1 (C) 0 (D) -2 (E) -5

2.) Given that $f(x)$ is continuous for all real numbers,

x	0	1	2
$f(x)$	1	?	1

which of the following possible values of $f(1)$ would guarantee two solutions for $f(x) = ½$ on the domain $0 \leq x \leq 2$?

(A) ½ (B) 1 (C) 2 (D) 0 (E) $f(1)$ could be any value

3.) Given that $f(x)$ is continuous for all real numbers,

x	0	1	2	3	4
$f(x)$	1	-1	3	5	2

which of the following statements is necessarily true?

(A) There is some c in the interval (0, 2) such that $f(c) = 4$.

(B) There is some c in the interval (1, 2) such that $f(c) = -5$.

(C) There is some c in the interval (2, 4) such that $f(c) = 6$.

(D) There is some c in the interval (0, 3) such that $f(c) = 2$.

(E) There is some c in the interval (0, 4) such that $f(c) = -3$.

4.) If a function f is discontinuous at $x = 4$, which of the following must be true?

i. $\lim_{x\to 4} f(x)$ does not exist

ii. $\lim_{x\to 4^-} f(x) \neq \lim_{x\to 4^+} f(x)$

iii. $f(4)$ does not exist

iv. $\lim_{x\to 4} f(x) \neq f(4)$

(A) i only (B) ii only (C) iii only (D) iv only (E) ii and iv only

5.) Find a value of k, on $[0, 2\pi]$, that makes $f(x) = \begin{cases} x^2 & , x \le 1 \\ \sin(kx) & , x > 1 \end{cases}$ continuous at $x = 1$.

6.) Let f be a continuous function on the closed interval [-2, 7]. If $f(-2) = 5$ and $f(7) = -3$, then the intermediate value theorem guarantees that

(A) $f(0) = 0$

(B) $f'(c) = 0$ for at least one c between -3 and 5

(C) $f'(c) = 0$ for at least one c between -2 and 7

(D) $f(c) = 0$ for at least one c between -2 and 7

(E) $f(c) = 0$ for at least one c between -3 and 5

7.) For $f(x) = \begin{cases} x^2 & , x < 2 \\ 2x - 1 & , x \ge 2 \end{cases}$ algebraically determine the following:

a. $\lim_{x\to 2^-} f(x)$

b. $\lim_{x\to 2^+} f(x)$

c. $\lim_{x\to 2} f(x)$

d. Is $f(x)$ continuous at $x = 2$? Justify your answer.