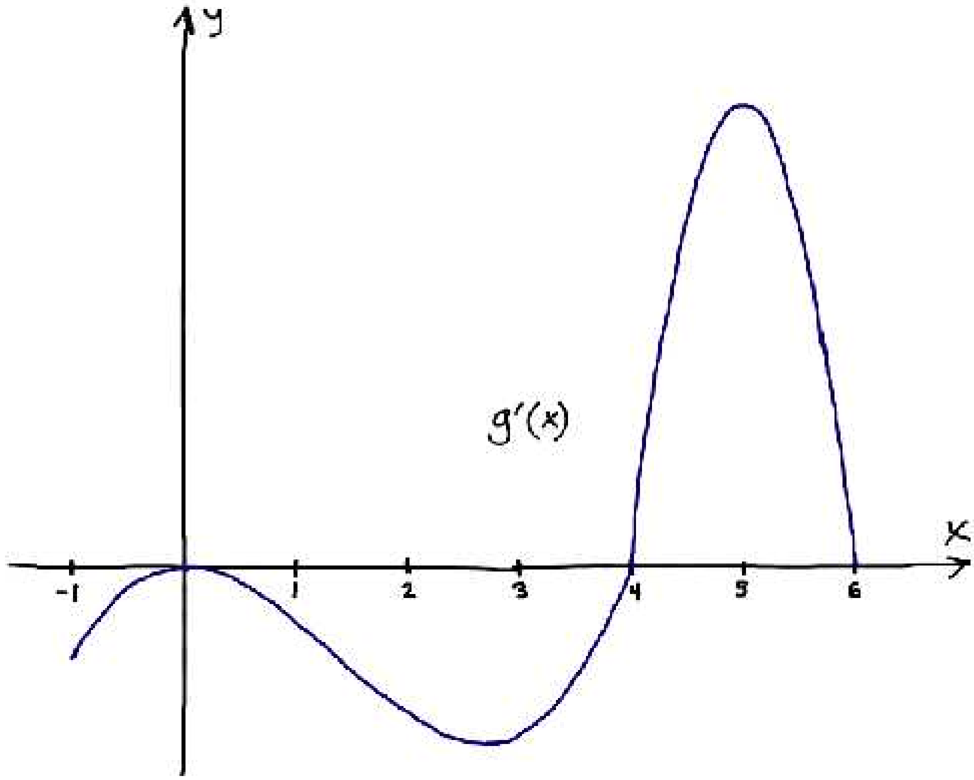
Name____ Date______________________ Period_____________

AB Calculus Test: 3.1-3.5 No Calculator

Part I: Multiple Choice



Use the graph above for questions 1 – 4.   Let *g* be a function that is differentiable on the interval $[-1,6]$. The graph of the continuous function g', the derivative of *g*, is given above.

_____ 1. At what value of *x* can the absolute minimum of g occur?

(A) -1 (B) 3   (C) 4   (D) 5   (E) 6

_____ 2. How many local extrema does the graph of g have on the interval $[-1,6]$?

(A) 0   (B) 1   (C) 2   (D) 3   (E) 4

_____ 3. How many inflection values does the graph of g have on the interval $[-1,6]$?

(A) 0   (B) 1   (C) 2   (D) 3   (E) 4

_____ 4. How many values of *x* satisfy the Mean Value Theorem for the function $g'(x)$ on the interval $[-1,6]$?

(A) 0   (B) 1   (C) 2   (D) 3   (E) 4

_____ 5. If $f(x)$ is a differentiable function such that $f(11)=19$ and $f'(x)\le 2$ for all x, what is the smallest possible value of $f(-1)$?

(A) 43   (B) -5 (C) 9   (D) -29 (E) 17

_____ 6. Use the EVT to find the range of the function $f(x)=\frac{4}{x}+2x^2$ on the interval $\frac{1}{2}\le x\le\frac{3}{2}$.

(A) $6\le f(x)\le\frac{43}{6}$ (B) $6\le f(x)\le\frac{17}{2}$ (C) $\frac{5}{2}\le f(x)\le\frac{21}{2}$ (D) $6\le f(x)\le\frac{21}{2}$ (E) $\frac{5}{2}\le f(x)\le\frac{43}{6}$

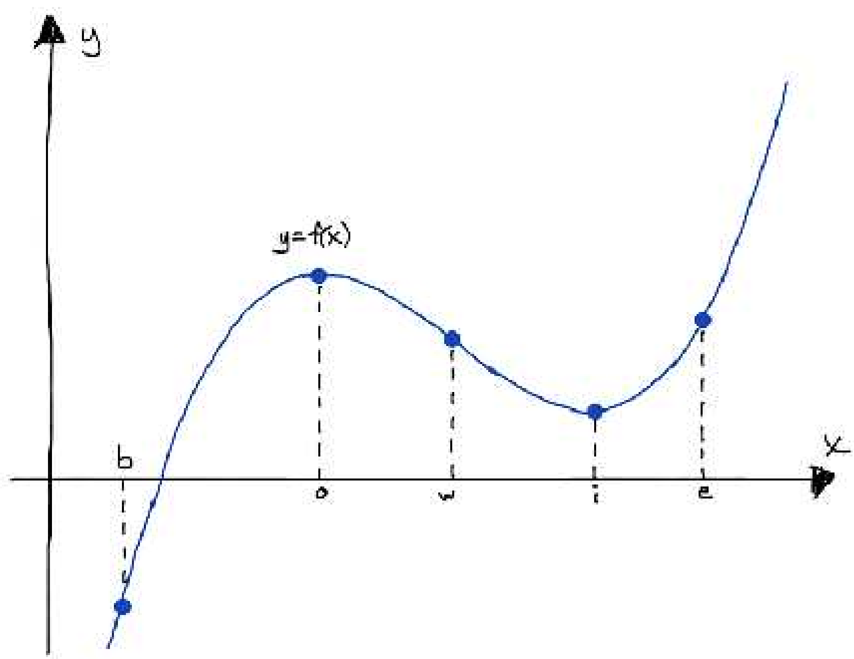
_____ 7. If $f'(x)=\left[x(x+5)^4(3x-1)^{-3/5}\right]^3$ for some continuous function f, then f has which of the following?

I. Local maximum at $x=0$

II. Local maximum at $x=-\frac{1}{3}$

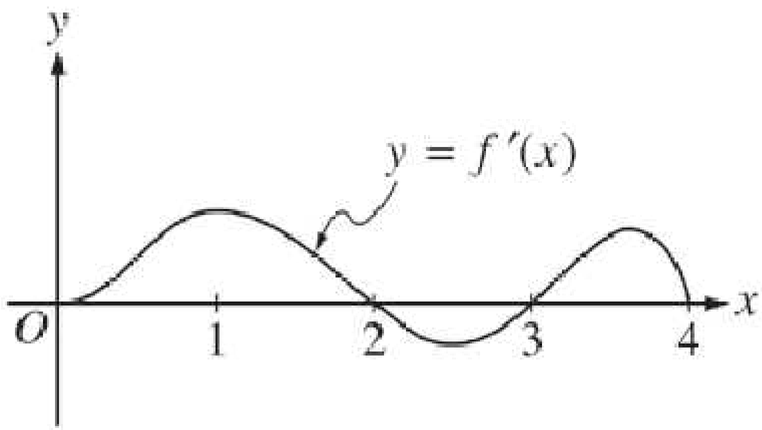
III. Local minimum at $x=-5$

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



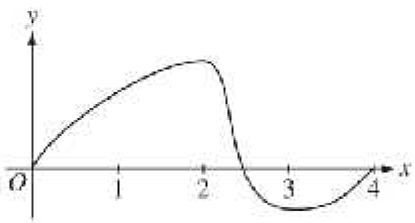
_____ 8. The function f is shown above with marked locations, b, o, w, i, and e. Of the following, which has the smallest value?

(A) $f'(b)$ (B) $f''(o)$ (C) $f''(w)$ (D) $f'(i)$ (E) $f''(e)$

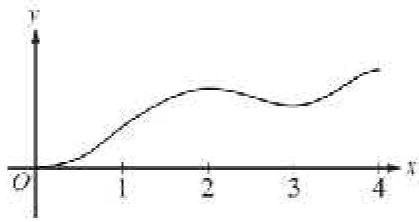


_____ 9. The figure above shows the graph of f', the derivative of the function f. If $f(0)=0$, which of the following could be the graph of f?

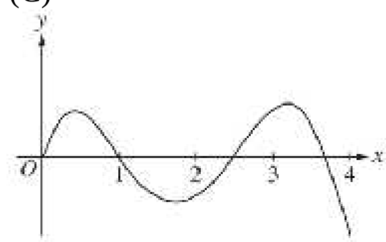
(A)



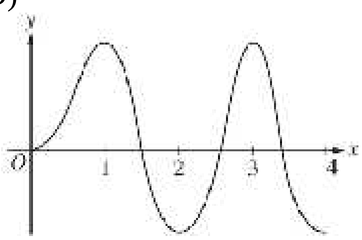
(B)



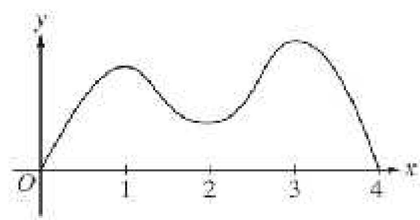
(C)



(D)



(E)



_____ 10. Selected information is given below about a continuous function $f(x)$ that is continuous for all real numbers.

	$x<0$	$x=0$	$0<x<2$	$x=2$
$f(x)$	negative	0	positive	4
$f'(x)$	positive	DNE	negative	0
$f''(x)$	negative	DNE	negative	–3

Which of the following must be true about the function $f(x)$

I. $f(x)$ has a local maximum of 4

II. $f(x)$ has a local maximum at 0

III. $f(x)$ has an inflection value at 2

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

Part II: AB Free Response:

Suppose f is a function given by $f(x) = -x^{1/3} - x^{2/3}$,

(a) Show that $f'(x) = \dfrac{1+2x^{1/3}}{-3x^{2/3}}$.

(b) Determine the x-coordinates of any local extrema of $f(x)$? Justify your answer using the 1st Derivative Test.

(c) Determine the intervals on which $f(x)$ is concave up.