

MVT Wrap Up

Name _____

1.

x	10	11	12	13	14
$f(x)$	5	2	3	6	5

The table above gives values of the continuous function f at selected values of x . If f has exactly two critical points on the open interval $(10, 14)$, which of the following must be true?

- (A) $f(x) > 0$ for all x in the open interval $(10, 14)$.
- (B) $f(x)$ exists for all x in the open interval $(10, 14)$.
- (C) $f(x) < 0$ for all x in the open interval $(10, 11)$.
- (D) $f(12) \neq 0$

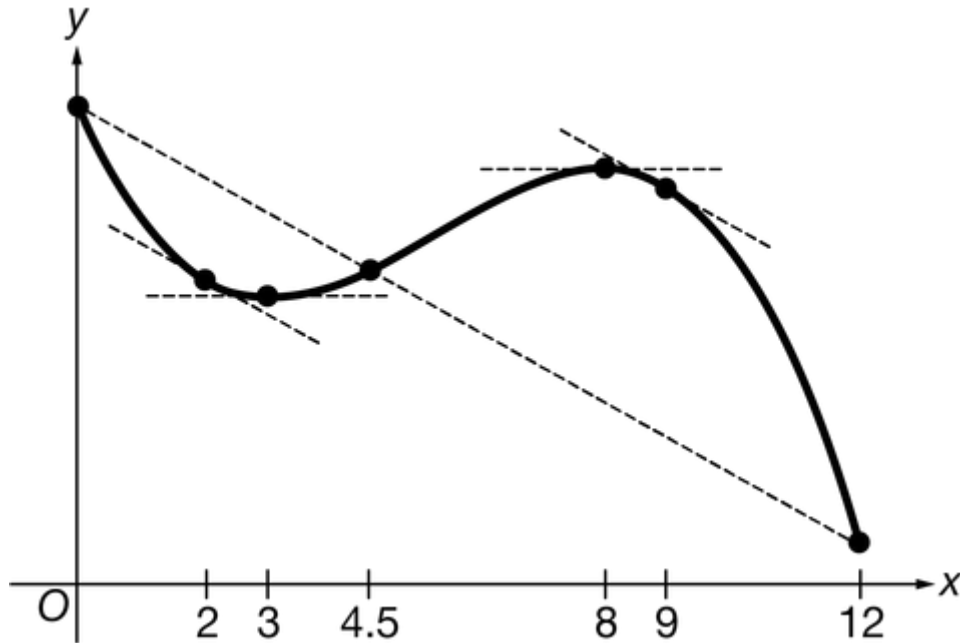
2. Which of the following functions of x is guaranteed by the Extreme Value Theorem to have an absolute maximum on the interval $[0, 4]$?

- (A) $y = \tan x$
- (B) $y = \tan^{-1} x$
- (C) $y = \frac{x^2 - 16}{x^2 + x - 20}$
- (D) $y = \frac{1}{e^x - 1}$



MVT Wrap Up

3.



The function f shown in the figure above is continuous on the closed interval $[0, 12]$ and differentiable on the open interval $(0, 12)$. Based on the graph, what are all values of x that satisfy the conclusion of the Mean Value Theorem applied to f on the closed interval $[0, 12]$?

- (A) 4.5 only because this is the value where $f(x)$ equals the average rate of change of f on $[0, 12]$.
- (B) 3 and 8 because these are the values where $f'(x) = 0$ on $[0, 12]$.
- (C) 2 and 9 only because these are the values where the instantaneous rate of change of f at those values is equal to the average rate of change of f on $[0, 12]$.
- (D) 2, 4.5, and 9 because these are the values where either the instantaneous rate of change of f at the value is equal to the average rate of change of f on $[0, 12]$ or the value of $f(x)$ is equal to the average rate of change of f on $[0, 12]$.

4. The Mean Value Theorem can be applied to which of the following functions on the closed interval $[-3, 3]$?



MVT Wrap Up

(A) $f(x) = x^{\frac{2}{3}}$

(B) $f(x) = |x - 1|$

(C) $f(x) = \frac{x-2}{x-5}$

(D) $f(x) = \frac{x-5}{x-2}$

5.

x	0	4	8	12	16
$f(x)$	8	0	2	10	1

The table above gives selected values for the differentiable function f . In which of the following intervals must there be a number c such that $f'(c) = 2$?

(A) $(0, 4)$

(B) $(4, 8)$

(C) $(8, 12)$

(D) $(12, 16)$

6.

x	0	1	2	3
$f(x)$	0	4	7	6

Let f be a function with selected values given in the table above. Which of the following statements must be true?

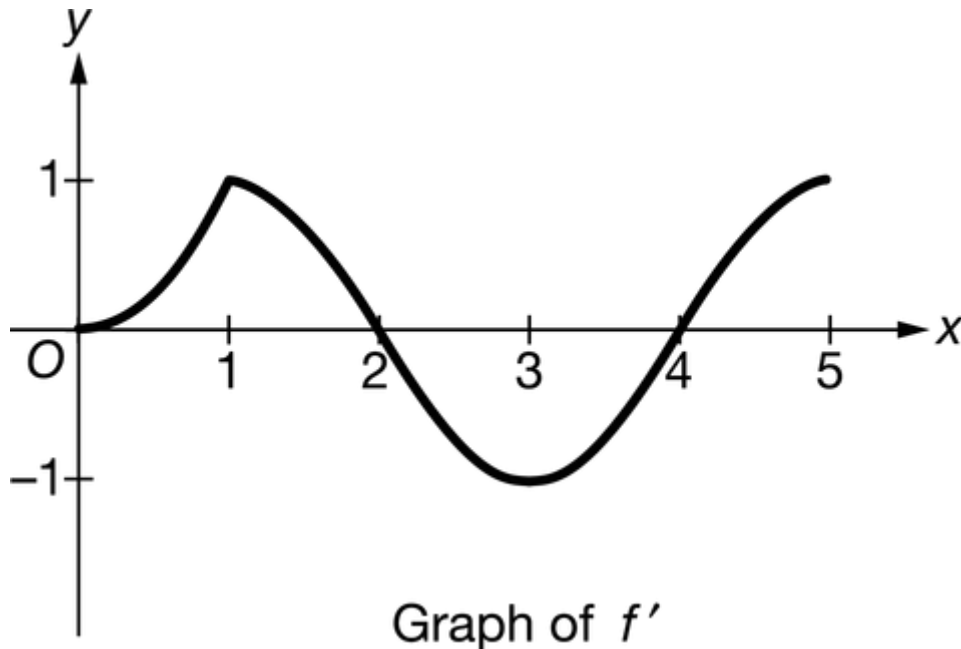
1. By the Intermediate Value Theorem, there is a value c in the interval $(0, 3)$ such that $f(c) = 2$.
2. By the Mean Value Theorem, there is a value c in the interval $(0, 3)$ such that $f'(c) = 2$.
3. By the Extreme Value Theorem, there is a value c in the interval $[0, 3]$ such that $f(c) \leq f(x)$ for all x in the interval $[0, 3]$.



MVT Wrap Up

- (A) None
- (B) I only
- (C) II only
- (D) I, II, and III
-

7.



The function f is continuous on the closed interval $[0, 5]$. The graph of f' , the derivative of f , is shown above. On which of the following intervals is f increasing?

- (A) $[0, 1]$ and $[2, 4]$
- (B) $[0, 1]$ and $[3, 5]$
- (C) $[0, 1]$ and $[4, 5]$ only
- (D) $[0, 2]$ and $[4, 5]$



MVT Wrap Up
