NAME THE NASTIEST THEOREM IN MATHEMATICS.

For each function f(x) on the given closed interval [a, b],

a) find the value of the slope $m = \frac{f(b) - f(a)}{b - a}$,

b) find the value(s) of $c \in (a, b)$, if any, such that $f'(c) = \frac{f(b) - f(a)}{b - a}$,

c) match with a graph that illustrates the function, secant and tangent lines.

Example: $f(x) = 2x - x^2$; [0, 3]

$f(0) = 0$ and $f(3) = -3$

find the slope $m = \frac{f(b) - f(a)}{b - a}$

$m = \frac{f(3) - f(0)}{3 - 0} = \frac{-3 - 0}{3 - 0} = -1$, $\therefore$ $f'(c) = -1$

$f(x) = 2x - x^2$

$f'(x) = 2 - 2x$

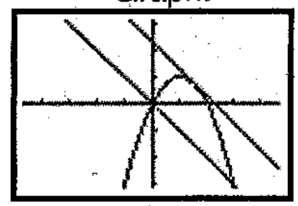
since $f'(c) = -1$

$2 - 2c = -1$

$-2c = -3$

$c = 1.5$

Graph:

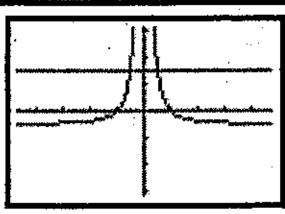


Functions.

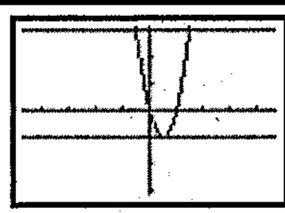
1) $f(x) = x^2 - 3x + 2$; [0, 2]	2) $f(x) = 4x^2 - 4x$; [−0.5, 1.5]
3) $f(x) = \frac{1}{x}$; [0.5, 2]	4) $f(x) = (1 - x^2)/2x^2$; [−0.5, 0.5]
5) $f(x) = \lvert x \rvert - 1$; [−1, 2]	6) $f(x) = x^3 - 2x^2$; [−1, 2]

Values **a)** of the slope, **b)** of c, and **c)** the graphs.

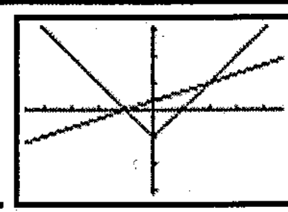
A. −1	**B.** −2	**C.** −3	**E.** 1	**F.** 3	**H.** $\frac{1}{3}$
J. 5	**M.** 0	**N.** $\frac{1}{2}$	**O.** ±1	**R.** $\frac{2 \pm \sqrt{7}}{3}$	**T.** no value



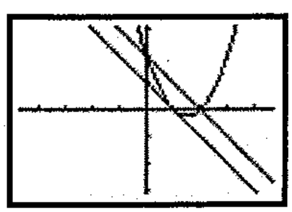
E.



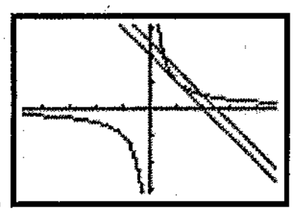
H.



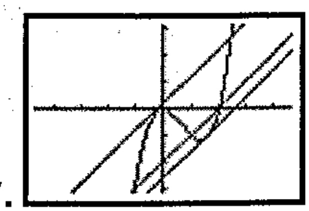
L.



O.



U.



V.

7) The value of **c** as described above will exist if the function f(x) is

A. continuous on [a. b].	**C.** differentiable on (a, b).	**E.** Both continuous on [a. b], **and** differentiable on (a, b).

5b	5a	1b

2a	7	1a	2b

6c	3a	5c	3c	4c

4b	2c	3b	1c	6b	6a	4a