

Mean Value Theorem: Suppose f is differentiable on a closed interval $[a, b]$. Then there is a number c (maybe more than one!) where

$$f'(c) = \frac{f(b) - f(a)}{b - a}$$

Examples:

1) Consider the function $f(x) = -x^2 + 3x + 5$ on $[1, 3]$. Find all the points c that are “promised” by the Mean Value Theorem.

2) Suppose f is differentiable, that $f(0) = -3$ and that, for every x , $f'(x) \leq 5$. What is the largest possible value for $f(4)$?