AP Calculus AB

Name: _____

Rolle's Theorem and MVT

HW 3-4

For each problem, verify that Rolle's Theorem applies. If it does, find the value of c that satisfies it.

1) $y = x^3 - 2x^2 - x - 1$; $[-1, 2]$

2) $y = \frac{x^2 + x - 6}{-x + 3}$; $[-3, 2]$

3) $y = -x^2 + 4$; $[-2, 2]$

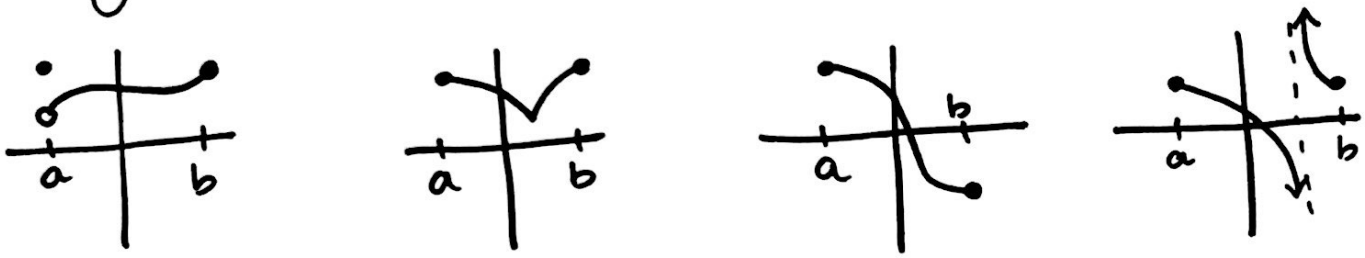
4) $y = 2\tan x$; $[-\pi, \pi]$

For each problem, verify that the Mean Value Theorem applies. If it does, find the value of c that satisfies it.

5) $y = x^2 + 2x - 1$; $[-1, 2]$

6) $y = \frac{x^2}{2x - 4}$; $[-4, 1]$

7) If the function satisfies the conditions of the Mean Value Theorem, circle it. If it does not, state why.



8) State if each of the following functions satisfies the Mean Value Theorem. If it does not, explain why. (Draw pictures if necessary!)

a) $f(x) = |x| + 1$

b) $f(x) = \frac{1}{x^2}$

c) $f(x) = \sin 2x$

9) The function $f(x) = \begin{cases} 1, & x \leq -1 \\ x, & x > -1 \end{cases}$ does not satisfy the MVT for which reason?

a) $f(-1) \neq f(1)$

b) $f(-1)$ does not exist

c) f is not differentiable on $(-1,1)$

d) f is not continuous on $(-1,1)$

e) f is not continuous on $[-1,1]$

10) At how many c-values on the interval $[0, 2\pi]$ is the MVT satisfied for $f(x) = \cos 2x + \sin x$?