

Worksheet 20 - MVT

Period _____

For each problem, find the values of c that satisfy the Mean Value Theorem.

1) $h(s) = 2s^2 - 3$; $[-2, 0]$

2) $g(x) = -x^3 + 12x^2 - 45x + 50$; $[2, 5]$

For each problem, determine if the Mean Value Theorem can be applied. If it can, find all values of c that satisfy the theorem. If it cannot, explain why not.

3) $h(w) = \frac{w^2}{3w + 6}$; $[-3, -1]$

4) $g(x) = \frac{-x^2 + 9}{3x}$; $[-6, -1]$

For each problem, determine if Rolle's Theorem can be applied. If it can, find all values of c that satisfy the theorem. If it cannot, explain why not.

5) $h(s) = \sec(2s)$; $[-\pi, \pi]$

6) $g(t) = -\sin(2t)$; $[-\pi, \pi]$

7) Let f be the function defined by $f(x) = |x| - 2$ on the interval $-2 \leq x \leq 2$. Does the Mean Value Theorem imply that there exists some number c on the interval $(-2, 2)$ such that $f'(c) = \frac{f(2) - f(-2)}{4}$?

Explain why or why not.

8) Let f be the function defined by $f(x) = 1 - |x|$ on the interval $-1 \leq x \leq 1$. Does the Rolle's Theorem imply that there exists some number c on the interval $(-1, 1)$ such that $f'(c) = 0$? Explain why or why not.

9) The speed limit on a highway is 60 mph. At 3:00 PM a police officer sees a car slow down to 55 mph. That officer radios another police officer 50 miles down the highway who sees the same car go by at 3:40 PM also at 55 mph. Find the average speed of the car. Did the car ever go above 60 mph? Explain why or why not.

10) Suppose that we know that $f(x)$ is continuous and differentiable on $6 \leq x \leq 15$. Let's also suppose that we know that $f(6) = -2$ and that $f'(x) \leq 10$. What is the largest possible value for $f(15)$?

11) Suppose that we know that $f(x)$ is continuous and differentiable on $-7 \leq x \leq 0$. Let's also suppose that we know that $f(0) = -3$ and that $f'(x) \leq 2$. What is the smallest possible value for $f(-7)$?