Quiz : The Seventh

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26 Oct 2012

This test totals 20 points and you get 25 minutes to do it. Good luck!

1. (2 pts) If $f$ has a local maxima or minima at $c$, then either

   $f'(c)$ is ___________________________ or ___________________________

2. (2 pts) **Bonus**: Does $f(x) = x^{2013} + x^{2011} + x$ have a local maxima or a local minima anywhere on the real line. Why or why not?
3. (10 pts) Find absolute maxima and minima for \( f(x) = \sqrt{x}(3 - x) \) on \([0, 4]\). Show ALL your steps.
4. (a) (3 pts) State the Mean Value Theorem (also called Lagrange’s theorem).

(b) (5 pts) If \( f \) is continuous on \([0, 4]\), \( f(0) = 1 \) and \( 2 \leq f'(x) \leq 5 \) for all \( x \in (0, 4) \), then show that \( 9 \leq f(4) \leq 21 \)