

231 Quiz 3**Name:** _____

October 30, 2013

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Work in groups. You must do all problems together, discussing and agreeing on each answer; do not split up the work. Hand in one copy of the quiz with a very clear, concise writeup. You may use your Notebooks.

1. Use the DEFINITION OF DERIVATIVE to prove the following “reciprocal rule” for differentiation: *(Like #90 in 2.3)*

$$\frac{d}{dx} \left(\frac{1}{f(x)} \right) = \frac{-f'(x)}{(f(x))^2}.$$

Do NOT use the quotient rule or the chain rule; this is a proof using the definition of derivative.

2. Use derivatives and algebra to find the exact values of all $c \in [0, 5]$ for which the function $f(x) = \sqrt{3x+1}$ satisfies the Mean Value Theorem on the interval $[0, 5]$. Show your work clearly for full credit. A picture helps. *(Like #52 in 3.1)*