NAME: MATH1210-002

Quiz 9: §3.4, 3.6 & 3.7

July 15, 2016

Instructions: Please show all of your work as partial credit will be given where appropriate, *and* there may be no credit given for problems where there is no work shown. All answers should be boxed and completely simplified, unless otherwise stated. No electronics are allowed.

1. **[15 points]** A rental car agency owns 24 identical cars. The owner of the agency finds that at the price of \$10 per day, all of the cars will be rented. However, for each one dollar increase in rental price, one of the cars is not rented. How much should he charge to maximize the income of the rental agency? *(You must use calculus to earn credit for solving this problem.) Hint: Income is the rental price times the number of cars rented. Making a table of values may help finding the formula for income.*

Answer: _____

2. **[10 points]** For $f(x) = x - \frac{1}{x}$ on $[-2, -1]$ decide whether or not the Mean Value Theorem (for derivatives) applies and state the reason why. If it does, find all possible values of c.

   MVT applies: True or False *(circle one)*

   Why? _____

   If true, then $c =$_____

3. **[15 points]** Use Newton's method to approximate the only root of the equation $4x^3 + 2\sqrt{x} - 20 = 0$, correct to three decimal places.

   What is the specific formula for x_{n+1} with Newton's method, for this equation?

   $x_{n+1} =$_____ your initial guess, $x_0 =$_____

   Fill in this table with your calculated values until you reach the desired precision.

n	x_n
0	
1	
2	
3	
4	
5	
6	