MAT 284 Final Exam (12/12/12). Max total score 60

Student: ____________________________________________

Read this first: Do not open the exam booklet until told to do so.

You may use a calculator such as TI-83/84, but not a symbolic one such as TI-89. You may not use the textbook or notes.

Giving or receiving unauthorized aid during an exam is a violation of Syracuse University Academic Integrity Policy.

Numeric answers can be given either as a fraction or as a decimal number.

You must show your work. If the answer came from a calculator, write down what you entered into it.

Each problem is worth 5 points.
2. Let \( f(x) = x - \frac{1}{x} \). Find the intervals on which \( f \) is concave up, and the intervals on which it is concave down. Explain how you used \( f'' \) to find these intervals.
4. The total cost of producing $q$ units is $c = 60000 + 280q + q^2$ dollars. Each unit sells for $800. At what level of output will profit be maximized?
6. What is the domain of the function \( g(x) = \frac{x^2 - x}{\sqrt{x-2}} \)? (You can describe it in words; it is not necessary to use interval notation.)
8. Given \( h(x) = (3x - 1)^7 \), find functions \( f \) and \( g \) such that \( h(x) = f(g(x)) \).
10. The total cost function is $c(q) = 3000 + 200q - 0.1q^{3/2}$. Find the marginal cost function.
12. Let $g(x) = \ln(x \sqrt{1 - x})$. Find $g'(x)$. 
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