QUIZ 7 - MATH 112 Friday, March 12

YOUR NAME:_____ George Voutsadakis

Read each problem **very carefully** before starting to solve it. Each problem is worth around 5 points. It is necessary to show **all** your work. Correct answers without explanations are worth 0 points. GOOD LUCK!!

1. Consider the function $f(x) = 2x^4 - 8x^3 + 30$.

   (a) Compute $f'(x)$ and find critical points.

   (b) Compute $f''(x)$ and find critical points.

   (c) Create the combined sign table for f' and f'' and draw conclusions about monotonicity, relative extrema, concavity and inflection points.

2. Consider $f(x) = x + \dfrac{9}{x}$. Use the second derivative test to find the relative extrema of f. (Hint: To find the critical points of f' write it as a single fraction.)

3. A certain company produces a gadget. The cost per gadget produced in \$3,000 and the fixed costs are \$10,000. Moreover, the price the company charges per gadget is $p(x) = 7000 - 10x$, where x is the number of gadgets produced and sold.

   (a) Write an expression for the company's cost function $C(x)$.

   (b) Write an expression for the company's revenue function $R(x)$.

   (c) Write an expression for the company's profit function $P(x)$ and simplify it.

   (d) Find the number of gadgets that need to be sold and the price at which they should be sold to maximize the company's profit.