Quiz no. 2 (1100-1 Quantitative Analysis, Spring 2008)
February 8, 2008

25 min. No symbolic calculators allowed (TI-89 and similar)!
(TI-86 or lower are allowed.) Show all work.

1. (7 points) Find all points of inflection of the graph of $f(x) = \frac{1}{12}x^4 - 3x^3 - 10x^2 + 20x + 5$. Also determine the intervals where the graph is concave up or down, respectively.

2. (7 points) Find the relative minimum and maximum points of $f(x) = x^3 - 12x^2 + 45x + 35$. Hint: in this problem it is less work to use the 2nd derivative test.
3. \((11+1 \text{ points})\) A company estimates that the demand function for its product is given by \(p(x) = 400 - \frac{x}{50}\), where \(x\) is the number of units it wants to sell per month, and \(p(x)\) the price (in dollars) it can charge.

(a) Compute the revenue function \(R(x)\). \textit{Hint: the revenue can be computed as the number of units times the price per unit.}

(b) What production level should the company choose to maximize the revenue?

(c) The costs per unit are 300$. What production level should the company choose to maximize the profit? \textit{Bonus question: how much should the company charge for its product in this case?}