Name _____
Calculus Review – Relative Extrema and Optimization

1) Find the Relative minimum and maximum of the following functions in the given interval:
   a. $f(x) = 6x + x^2$ [-7, 2]

   b. $f(x) = \frac{x + 3}{2x - 3}$

2) The Martha Jefferson Cruise Boat can sell out all 240 tickets to its Port Jefferson Harbor Cruise at a price of $35 per ticket. For every $10 increase in the ticket price, 7 people will not go on the cruise.
   a. What price should the crew charge to maximize their revenue for the boat ?

   b. How many people will be on the cruise?

   c. What is the total revenue for the boat?

3) Find the dimensions of rectangle of maximum area that can be created with its base resting on the x-axis, and the top confined by the curve $y = 81 – x^2$

4) A chemical manufacturer sells sulfuric acid at a price of $100 per gallon. If the daily total production costs are $100,000 + 50x + .0025x^2$ where x is the number of gallons produced:
   a. Find the number of gallons needed to produce the maximum profit.

   b. What is the maximum profit?

   c. Assume that the capacity of the plant is 7000 gallon of sulfuric acid per day. Is this a problem? Why or Why not?