Optimization

Technical Mathematics for Geomatics, MATH 2511

- (1) The cost of fuel for running a train is proportional to the square of the speed maintained, and is \$50 per hour when the speed is 20 mph. Other charges, such as labour, for example, are \$200 per hour. What should be the speed for a 500-mile trip in order that the total cost shall be as little as possible?
- (2) The product of the concentration of hydrogen ions, C_{h^+} , and hydroxyl ions, C_{oh^-} , in any aqueous solution is a constant = 10^{-14} . At what concentration of hydrogen ions will the sum of hydrogen ions and hydroxyl ions be a minimum?
- (3) Find the number that exceeds its square by the greatest amount.
- (4) A rectangular garden is to be surrounded by a fence and divided into two equal parts by a fence parallel to one side. If the area is to be 600 square feet, what should be the dimensions in order to require the least amount of fencing?
- (5) Find the dimensions (height and radius) of the largest (in volume) right circular cylinder that can be inscribed in a sphere six inches in diameter.

