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.