Applications of Extrema of Functions of Two Variables

1. Find the minimum distance from the point to the plane: $x + y - z = 5$ (Hint: to simplify the computations, minimize the square of the distance) (Similar to p.966 #1-2)

$(2,3,-5)$

2. Find three positive integers x, y, and z that satisfy the given conditions (Similar to p.966 #5-8)

The product is 8 and the sum is a minimum

3. A rectangular room is having the walls and ceiling painted. The volume of the room is 1000 cubic feet. The cost of the wall paint is $0.05 per square foot and the cost of the ceiling paint is $0.10 per square foot. Find the room dimensions (rounded to one decimal place) that result in a minimum cost for the paint. What is the minimum cost for the paint? (Similar to p.966 #9)