Problem Set 8: Extra Problems

1. Find the maximum volume of a rectangular box (with faces parallel to the coordinate planes) which can be fit in the ellipsoid

$$\frac{x^2}{9} + \frac{y^2}{4} + z^2 = 1.$$

2. The sum of three positive numbers is 120. What is the maximum possible value of their product?

3. A building in the shape of a rectangular box is to have a volume of 8000 cubic feet. Annual heating and cooling costs will amount to \$2 for each square foot of top, front and back and \$4 for each square foot of the two end walls. What dimensions of the building will minimize these annual costs?