1. Show that for any positive constants a, b, the function $h(x, y) = 5000 - ax^2 - by^2$ has a relative and absolute maximum at $(0, 0)$. (This is the height function from the previous worksheet.)

2. (Pb. 43, section 13.8, textbook) A closed rectangular box with a volume 16 ft^3 is made from two kinds of material. The top and bottom are made of material costing 10 cents per square foot and the sides from material costing 5 cents per square foot. Find the dimensions of the box so that the cost of the material is minimized.

3. (Pb. 24, section 13.9, textbook) Suppose that the temperature at a point (x, y) on a metal plate is $T(x, y) = 4x^2 - 4xy + y^2$. An ant walking on the plate traverses a circle of radius 5 centered at the origin. What are the highest and lowest temperatures encountered by the ant?