1. Find the point on the plane $2x + y + z = 6$ with positive coordinates such that the product of the coordinates is a maximum.

2. Find the point on the surface $z^2 = xy - 3x + 9$ that is closest to the origin.

3. Show that the product of the sines of the angles of a triangle is maximum when the triangle is equilateral.

4. Show that a rectangular box (with a top) made out of $S$ square feet of material has maximum volume if it is a cube.

5. A rectangular box without a top is to be constructed of 900 square feet of material. What should its dimensions be in order that its volume is a maximum?

6. What are the maximum and minimum values of $f(x, y, z) = x^2y^2z^2$ on the sphere $x^2 + y^2 + z^2 = 1$?