

# Team Exercise #7 - Max-Min Problems

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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  $x^2 + y^2 + z^2 = 1$ ?