ITAMO 1996

www.artofproblemsolving.com/community/c1056490

by Andreas

1	Among all the triangles which have a fixed side l and a fixed area S, determine for which triangles the product of the altitudes is maximum.
2	Show that the equation $a^2 + b^2 = c^2 + 3$ has infinetely many triples of integers a, b, c that are solutions.
3	Given a cube of unit side. Let A and B be two opposite vertex. Determine the radius of the sphere, with center inside the cube, tangent to the three faces of the cube with common point A and tangent to the three sides with common point B.
4	There is a list of n football matches. Determine how many possible columns, with an even number of draws, there are.
5	Given a circle C and an exterior point A. For every point P on the circle construct the square $APQR$ (in counterclock order). Determine the locus of the point Q when P moves on the circle C.
6	What is the minimum number of squares that is necessary to draw on a white sheet to obtain a square grid of side n?