THE XXI INTERNATIONAL MATHEMATICAL OLYMPIAD
LONDON 1979

PROBLEMS PROPOSED BY THE SOVIET UNION.

SU1 Let N be the number of integral solutions of the equation $x^2 - y^2 = z^3 - t^3$ satisfying the condition $0 \leq x, y, z, t \leq 10^6$, and M be the number of integral solutions of the equation $x^2 - y^2 = z^3 - t^3 + 1$ satisfying the condition $0 \leq x, y, z, t \leq 10^6$. Prove that $N > M$.

SU2 There are 1979 equilateral triangles: $T_1, T_2, \ldots, T_{1979}$. A side of triangle T_k is equal to $1/k$, $k = 1, 2, \ldots, 1979$. At what values of a number a can one place all these triangles into the equilateral triangle with a side equal to a lest they should intersect /points of contacts are allowed/?

SU3 There are two circles on the plane. Let a point A be one of the points of intersection of these circles. Two points begin moving simultaneously with constant velocities from the point A, each point along its own circle. The two points return to the point A at the same time.

Prove that there is a point P on the plane such that at every moment of time the distances from the point P to the moving points are equal.