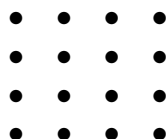2nd MATHEMATICAL CONTEST
of Friendship
in Honor and Memory
OF GRAND DUCHY OF LITHUANIA

1. Sixteen points are placed in the centers of a 4×4 chess table in the following way:

   (a) Prove that one may choose 6 points such that no isoceles triangle can be drawn with the vertices at these points.
   (b) Prove that one cannot choose 7 points with the above property.

2. Find all positive integers n for which there are distinct integer numbers $a_1, a_2, \ldots, a_n$ such that
$$\frac{1}{a_1} + \frac{2}{a_2} + \cdots + \frac{n}{a_n} = \frac{a_1 + a_2 + \cdots + a_n}{2}.$$

3. At a strange party, each person knew exactly 22 others.

   For any pair of people X and Y who knew each other, there was no other person at the party that they both knew.

   For any pair of people X and Y who did not know one another, there were exactly 6 other people that they both knew.

   How many people were at the party?

4. In the triangle ABC angle C is a right angle. On the side AC point D has been found, and on the segment BD point K has been found such that $\angle ABC = \angle KAD = \angle AKD$. Prove that $BK = 2DC$.

5. Find positive integers n that satisfy the following two conditions:

   (a) the quotient obtained when n is divided by 9 is a positive three digit number, that has equal digits.
   (b) the quotient obtained when $n + 36$ is divided by 4 is a four digit number, the digits beeing $2, 0, 0, 9$ in some order.