Targil 4.

(Taking the extreme).

1. On a plane, there are $2n$ points in general position (no 3 are on the same line). Half of them are blue, others are red. Prove that it is possible to divide them into pairs, each pair consisting of one blue point and one red point in each pair, so that the straight intervals connecting these pairs won't intersect.

2.* Inside a regular N-gon N points are marked. Consider N pairs: in each pair there is one side of the N-gon and one marked points. Each marked point and each side of the triangle is used in one pair precisely. From each pair, a triangle is formed (as a convex hull of the side and the point of that pair).
Show that the pairing can be chosen in such a way, that the triangles won't overlap.

3. Prove that $1+\frac{1}{2}+\frac{1}{3}+\frac{1}{4}+...+\frac{1}{n}$ isn't integer.

4.* A finite number of points are chosen on a plane. A line through any two of the chosen points contains at least 3 chosen points. Prove that all points are collinear.

5. Consider a connected graph. At some vertexes, real numbers are written. Prove that you can write real numbers at all the other vertexes, so that every number written by you will be equal to the average of its neighbors.

6.* A billiard table is convex and has a smooth boundary. Prove that there an infinite number of different closed trajectories of the billiard ball (in other words, infinite number of closed broken lines inside the given table, such that at every vertex is on the boundary, and the sides at this vertex are symmetric w.r.t. the normal).