1. Let A and B be two points on the plane, and let l and m be parallel lines separating A from B. Find the shortes broken line connecting A to B and having the segment between l and m perpendicular to l. (If l and m are the shores of a river, where to make the shortest road between vallages A and B crossing the river with a bridge perpendicular to the shores.)

2. Given circles b and c which have a common point A. Find a line l which passes through A and cut congruent chords AB and AC on the circles b and c.

3. Find all rational solutions of the equation $y^3 = x^2 - y^2$.

4. How to detect whether it is possible to draw a given planar graph (i.e., a network of arcs on the plane) without passing any of the arcs twice and without raising the pen?