Moscow Mathematical Olympiad 1937

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– tour 1

032 Solve the system $\begin{cases} x+y+z=a \\ x^2+y^2+z^2=a^2 \\ x^3+y^3+z^3=a^3 \end{cases}$

033 * On a plane two points A and B are on the same side of a line. Find point M on the line such that $MA+MB$ is equal to a given length.

034 Two segments slide along two skew lines. Consider the tetrahedron with vertices at the endpoints of the segments. Prove that the volume of the tetrahedron does not depend on the position of the segments

– tour 2

035 Given three points that are not on the same straight line. Three circles pass through each pair of the points so that the tangents to the circles at their intersection points are perpendicular to each other. Construct the circles.

036 * Given a regular dodecahedron. Find how many ways are there to draw a plane through it so that its section of the dodecahedron is a regular hexagon?

037 Into how many parts can an n-gon be divided by its diagonals if no three diagonals meet at one point?