Moscow Mathematical Olympiad 1936

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by parmenides51

–	tour 1
022	Find a four-digit perfect square whose first digit is the same as the second, and the third is the same as the fourth.
023	All rectangles that can be inscribed in an isosceles triangle with two of their vertices on the triangles base have the same perimeter. Construct the triangle.
024	Represent an arbitrary positive integer as an expression involving only 3 twos and any mathematical signs. (P. Dirac)
025	Consider a circle and a point P outside the circle. The angle of given measure with vertex at P subtends a diameter of the circle. Construct the circles diameter with ruler and compass.
026	Find 4 consecutive positive integers whose product is 1680.
–	tour 2
027	Solve the system $\begin{cases} x+y=a \\ x^5+y^5=b^5 \end{cases}$
028	Given an angle less than 180^o, and a point M outside the angle. Draw a line through M so that the triangle, whose vertices are the vertex of the angle and the intersection points of its legs with the line drawn, has a given perimeter.
029	The lengths of a rectangles sides and of its diagonal are integers. Prove that the area of the rectangle is an integer multiple of 12.
030	How many ways are there to represent 10^6 as the product of three factors? Factorizations which only differ in the order of the factors are considered to be distinct.
031	Given three planes and a ball in space. In space, find the number of different ways of placing another ball so that it would be tangent the three given planes and the given ball.

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