# Yugoslav IMO Team Selection Test 1981

Ohrid, April 1981

1. Let $n \geq 3$ be a natural number. For a set $S$ of $n$ real numbers, $A(S)$ denotes the set of all strictly increasing arithmetic sequences of three terms in $S$. At most, how many elements can the set $A(S)$ have?

2. Suppose that there is a point $S$ inside a quadrilateral $ABCD$ such that segments $SA, SB, SC, SD$ divide the quadrilateral into four triangles of equal areas. Prove that one of the diagonals of the quadrilateral bisects the other one.

3. Let $a, b$ be nonnegative integers. Prove that $5a > 7b$ if and only if there exist nonnegative integers $x, y, z, t$ such that

$$\begin{aligned} x+2y+3z+7t &= a, \\ y+2z+5t &= b. \end{aligned}$$



The IMO Compendium Group,
D. Djukić, V. Janković, I. Matić, N. Petrović
www.imomath.com