# Yugoslav IMO Team Selection Test 1995

Vrbas, April 16, 1995.

*Time allowed* 180 *minutes.*
*Each problem is worth* 25 *points.*

1. Determine all triples $(x,y,z)$ of positive rational numbers with $x \leq y \leq z$ such that $x+y+z$, $\frac{1}{x}+\frac{1}{y}+\frac{1}{z}$ and $xyz$ are natural numbers.

2. A natural number $n$ has exactly 1995 units in its binary representation. Show that $n!$ is divisible by $2^{n-1995}$.

3. Let $SABCD$ be a pyramid with the vertex $S$ whose all edges are equal. Points $M$ and $N$ on the edges $SA$ and $BC$ respectively are such that $MN$ is perpendicular to both $SA$ and $BC$. Find the ratios $SM : MA$ and $BN : NC$.