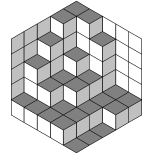




Croatia
Team Selection Tests
2008



- 1 Let x, y, z be positive numbers. Find the minimum value of: (a) $\frac{x^2 + y^2 + z^2}{xy + yz}$
(b) $\frac{x^2 + y^2 + 2z^2}{xy + yz}$
- 2 For which $n \in \mathbb{N}$ do there exist rational numbers a, b which are not integers such that both $a + b$ and $a^n + b^n$ are integers?
- 3 Point M is taken on side BC of a triangle ABC such that the centroid T_c of triangle ABM lies on the circumcircle of $\triangle ACM$ and the centroid T_b of $\triangle ACM$ lies on the circumcircle of $\triangle ABM$. Prove that the medians of the triangles ABM and ACM from M are of the same length.
- 4 Let S be the set of all odd positive integers less than $30m$ which are not multiples of 5, where m is a given positive integer. Find the smallest positive integer k such that each k -element subset of S contains two distinct numbers, one of which divides the other.