# Croatian Team Selection Test 2003

Pula, May 9

1. Find all pairs $(m, n)$ of natural numbers for which the numbers $m^2 - 4n$ and $n^2 - 4m$ are both perfect squares.

2. Let $B$ be a point on a circle $k_1$, $A \neq B$ be a point on the tangent to the circle at $B$, and $C$ a point not lying on $k_1$ for which the segment $AC$ meets $k_1$ at two distinct points. Circle $k_2$ is tangent to line $AC$ at $C$ and to $k_1$ at point $D$, and does not lie in the same half-plane as $B$. Prove that the circumcenter of triangle $BCD$ lies on the circumcircle of $\triangle ABC$.

3. For which $n \in \mathbb{N}$ is it possible to arrange a tennis tournament for doubles with $n$ players such that each player has every other player as an opponent exactly once?



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