4^{th} JUNIOR BALKAN MATHEMATICAL OLYMPIAD

1. Let $x, y \in \mathbf{Z}$ so that $x^3 + y^3 + (x+y)^3 + 30xy = 2000$. Prove that $x + y = 10$.

2. Find all the numbers $n \in \mathbf{N}^*$ so that $n^2 + 3^n$ is a perfect square.

3. A semicircle of diameter EF stands on the side $[BC]$ of ΔABC and it is tangent to AB, AC in points Q, P. Let AD be the altitude of ΔABC and $\{K\} = EP \cap FQ$. Prove that $K \in [AD]$.

4. At a tennis tournament participated twice as many boys as girls. Each pair of contestants played exactly once (and there warn't equal scores). The ratio between the number of victories of girls and the number of victories of boys is 7:5. How many contestants were there at this tournament?

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