

Problems for spare Time

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1. Let I be the incenter of the triangle ABC . Define the points A_1 and A_2 as the intersection point of the bisectors of the angles ABI and ACI , and the intersection point of the bisectors of the angles IBC and ICB , respectively. Define B_1 , B_2 , C_1 , and C_2 in the same way. Prove that the lines A_1A_2 , B_1B_2 , and C_1C_2 are concurrent.
2. Given two positive integers $n \leq k$, **I** and **II** play the following game on a blackboard. The game starts with the blackboard empty and the first turn is for **I**. In the turn $2m - 1$ **I** writes on the blackboard either $2m - 1$ or n . In the turn $2m$ **II** writes on the blackboard either $2m$ or n . The game ends when the sum of the numbers written on the blackboard is bigger than k , and who wrote the last number loses. For which duple (n, k) **I** has a winning strategy?