1. Determine all functions $f:\mathbb{R} \to \mathbb{R}$ such that the euality $f(\lfloor x \rfloor y)=f(x)\lfloor f(y) \rfloor$ holds for all $x, y \in \mathbb{R}$.(Here $\lfloor z \rfloor$ denotes the greatest integer less than or equal to z.)

2. Let I be the incentre of triangle ABC and let Γ be its circumcircle. Let the line AI intersect Γ again at D. Let E be a point on the arc $\overline{BDC}$ and F a point on the side BC such that $\angle BAF = \angle CAE \angle \frac{1}{2} \angle BAC$. Finally, let G be the midpoint of the segment IF. Prove that the lines DG and EI intersect on Γ.

3. Let $\mathbb{N}$ be the set of positive integers. Determine all functions $g:\mathbb{N} \to \mathbb{N}$ such that $(g(m) + n)(m + g(n))$ is a perfect square for all $m, n \in \mathbb{N}$.

4. Let P be a point inside the triangle ABC. The lines AP, BP and CP intersect the circumcircle Γ of triangle ABC again at the points K, L and M respectively. The tangent to Γ at C intersects the line AB at S. Suppose that $SC{=}SP$. Prove that $MK{=}ML$.

5. In each of six boxes B_1, B_2, B_3, B_4, B_5, B_6 there is initially one coin. There are two types of operation allowed:
   Type 1: Choose a nonempty box B_j with $1 \leq j \leq 5$. Remove one coin from B_j and add two coins to B_{j+1}.
   Type 2: Choose a nonempty box B_k with $1 \leq k \leq 4$. Remove one coin from B_k and exchange the contents of (possible empty) boxes B_{k+1} and B_{k+2}.
   Determine whether there is a finite sequence of such operations that results in boxes B_1, B_2, B_3, B_4, B_5 being empty and box B_6 containing exactly $2010^{2010^{2010}}$ coins. (Note that $a^{(b^c)}$.)

6. Let a_1, a_2, a_3,... be a sequence of positive real numbers. Suppose that for some positive integer s, we have $a_n = max\{a_k + a_{n-k} | 1 \leq k \leq n-1\}$ for all $n > s$. Prove that there exist positive integers l and N, with $l \leq s$ and such that $a_n{=}a_l{+}a_{n-l}$ for all $n \leq N$.