1. Determine all functions $f$:$R \to R$ such that the euality

   $f(\lfloor x \rfloor y)$=$f(x)\lfloor f(y) \rfloor$

   holds for all $x, y \in R$.(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 $\Gamma$ be its circumcircle. Let the line $AI$ intersect $\Gamma$ 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 $\Gamma$.

3. Let $N$ be the set of positive integers. Determine all functions $g$:$N \to N$ such that

   $(g(m) + n)(m + g(n))$

   is a perfect square for all $m, n \in N$.

4. Let $P$ be a point inside the triangle $ABC$. The lines $AP$, $BP$ and $CP$ intersect the circumcircle $\Gamma$ of triangle $ABC$ again at the points $K, L$ and $M$ respectively. The tangent to $\Gamma$ 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 $n \leq N$.