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–	Day 1
P1	On the sides of $\triangle ABC$ points $P, Q \in AB$ (P is between A and Q) and $R \in BC$ are chosen. The points M and N are defined as the intersection point of AR with the segments CP and CQ, respectively. If $BC = BQ$, $CP = AP$, $CR = CN$ and $\angle BPC = \angle CRA$, prove that $MP + NQ = BR$.
P2	Let $b_1, \dots, b_n$ be nonnegative integers with sum 2 and $a_0, a_1, \dots, a_n$ be real numbers such that $a_0 = a_n = 0$ and $\lvert a_i - a_{i-1}\rvert \leq b_i$ for each $i = 1, \dots, n$. Prove that $$\sum_{i=1}^{n}(a_i + a_{i-1})b_i \leq 2$$ I believe that the original problem was for nonnegative real numbers and it was a typo on the version of the exam paper we had but I'm not sure the inequality would hold
P3	Let $a_1 \in \mathbb{Z}$, $a_2 = a_1^2 - a_1 - 1, \dots, a_{n+1} = a_n^2 - a_n - 1$. Prove that a_{n+1} and $2n + 1$ are coprime.
–	Day 2
P4	Are there positive integers $m > 4$ and n, such that a) $\binom{m}{3} = n^2$; b) $\binom{m}{4} = n^2 + 9$?
P5	There are n points in the plane, some of which are connected by segments. Some of the segments are colored in white, while the others are colored black in such a way that there exist a completely white as well as a completely black closed broken line of segments, each of them passing through every one of the n points exactly once. It is known that the segments AB and BC are white. Prove that it is possible to recolor the segments in red and blue in such a way that AB and BC are recolored as red, meaning that recoloring every white as red and every black as blue is not acceptable, and that there exist a completely red as well as a completely blue closed broken line of segments, each of them passing through every one of the n points exactly once.
P6	Let $f(x)$ be a nonconstant real polynomial. The sequence $\{a_i\}_{i=1}^{\infty}$ of real numbers is strictly increasing and unbounded, as $$a_{i+1} < a_i + 2020.$$

The integers $\lfloor |f(a_1)| \rfloor$, $\lfloor |f(a_2)| \rfloor$, $\lfloor |f(a_3)| \rfloor$, $\ldots$ are written consecutively in such a way that their digits form an infinite sequence of digits $\{s_k\}_{k=1}^{\infty}$ (here $s_k \in \{0, 1, \ldots, 9\}$). If $n \in \mathbb{N}$, prove that among the numbers $\overline{s_{n(k-1)+1}s_{n(k-1)+2}\cdots s_{nk}}$, where $k \in \mathbb{N}$, all n-digit numbers appear.