INMO 2026

Common mistakes

February 18, 2026

Problem 1. Most of the errors for this problem consisted of assuming statements without proving them. We list a few of them below:

1. Given $x_k = m^2$, assuming the form of x_{k+i} without proof (or after checking a few numbers, and then saying "similarly, we can prove that").

2. Trying to prove the forms of x_{k+i} inductively, but not justifying the value of $\lfloor \sqrt{x_{k+i}} \rfloor$ by bounding x_{k+i} between squares.

3. While showing that the square that comes after m^2 is $4m^2$, not justifying why none of the intermediate terms are perfect squares.

4. Assuming the claim that the sequence $a_n = \lfloor \sqrt{x_n} \rfloor$ contains every number two or three times and m appears three times iff there is some k for which $x_k = m^2$ without proof.

5. While trying to prove the above claim, only showing that m appears three times iff there is some k for which $x_k = m^2$, but not showing that every other number appears twice.

6. Given the above claim, claiming that this implies that if $x_k = m^2$, then $x_{k+2m+1} = m^2 + 3m + 2(m+1) + \cdots + 2(2m-1) = 4m^2$. (Note that, to show this, we need to ensure that the intermediate squares do not appear in our sequence (x_n).)

Problem 2. One of the errors for this question was misunderstanding the definition of the function f. We list some of the other errors below:

1. Assuming that the function f takes infinitely many different values without proving it.

2. Claiming that if $f(n) = k$ where $n > 2026$ and k does not appear in $f(1), f(2), \dots, f(n-1)$, then $f(n) = f(n + f(n))$, but not proving this claim.

3. Proving the above claim and claiming that this implies the problem without justifying why we can find infinitely many pairs (k, n) as in the claim.

4. Taking the first $n > 2026$ such that $f(n) = k$ does not appear in $f(1), f(2), \dots, f(2026)$, then claiming that for every $l \geq k$, if $n_l > k$ is the smallest number for which $f(n_l) = l$, then $f(n_l) = f(n_l + f(n_l))$. (This will not be true if the number l appears in the sequence $f(1), f(2), \dots, f(2026)$.)

Problem 3.

1. The most common mistake was reasoning based on isosceles triangle diagrams where A, M, N are collinear. A related mistake is reasoning from diagrams that are special cases of the problem.

2. A common misstep was attempting an angle chase without any additional construction.

3. Many incomplete trigonometric/coordinate/complex calculations.

Problem 4.

1. The most common error was usually in the attempt to show $p^n + 1$ and $p + 1$ are not companions . Here you need to first rule out the n even case, which many have done. However, the n odd case is more subtle and needs to be handled by a careful use of the Lifting the Exponent Lemma.

2. Another common mistake is to not give proper attribution to the theorems one needs, for example Dirichlet's theorem or Kobayashi's Theorem.

3. In the application of Zsigmondy's theorem, it needs to be made clear that the edge cases are being handled carefully.

Problem 5. There are no points for the following -

- Incomplete trigonometric/coordinate/complex calculations.
- The observation that the reflection of the orthocentre of a triangle in any of the sides lies on the circumcircle.
- Making this incorrect argument - If H is the orthocentre, then H_i are concyclic, which makes all H_{ij} concyclic, which makes all H_{ijk} concyclic.
- Claiming that P is the centre of the circle on which all P_{ijk} lie.

This argument is incomplete: "P lies on the perpendicular bisectors of AB, CD, EF. So, the six points A, B, C, D, E, F are concyclic." There is a missing step here; one needs to show that $PA = PC = PE$.

Problem 6.

1. A common mistake is to assume that a_1 beats every card in $b_1, \ldots, b_{39}$ and is evenly matched with b_{40} and so on. This gives a time of at most 820 minutes. One can do better if a_1 does not interact with b_{39} as given in the official solution.

2. A common attempt is to use some sort of probabilistic interpretation or a combinatorial interpretation based on the factorisation of $356 \times 60 = 21360$ minutes. Most of these have been wrong.

3. Some have claimed that it takes at most $n^2 - n + 1$ minutes for the first evenly matched pair to appear on top. However, their proof goes something like this: n^2 pairs are possible to appear on top. n pairs are evenly matched and by PHP, $n^2 - n + 1$ minutes will give us an evenly matched pair on top. But this argument doesn't count for loops of unevenly matched or non-interacting cards occurring in the middle of the game. An argument has to be made to rule these cases out.