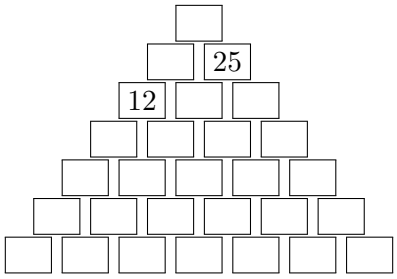
2025 SSMO Tiebreaker Round

SMO Team

Tiebreaker Round Problem 1: In a triangular grid, each cell must contain exactly one number such that:

- Each cell in the bottom row contains either 0 or 1.
- Each cell not in the bottom row contains the sum of the two numbers in the cells directly below it.

Determine the number in the topmost cell.



Tiebreaker Round Problem 2: Determine the largest positive integer n satisfying

$$\frac{\sqrt{n+1}-\sqrt{n}}{\sqrt{n+2026}-\sqrt{n+2025}} > 2.$$

Tiebreaker Round Problem 3: Find the number of functions $f : \{1,2,3,4,5,6,7,8\} \to \{1,2,3,4\}$ such that $f(2f(x)) = f(x)$ for all $x \in \{1,2,3,4,5,6,7,8\}$.