# Problems – 09/11/2025

The solutions to the problems below
will be published on Sunday 09/14/2025

**Problem 1.** On the board, the numbers

$$1, 2, 3, \ldots, 2025$$

are written. Scarlett and Antoni play a game. A move consists of replacing three numbers according to the rule

$$(a, b, c) \longrightarrow (a + b - c,\ b + c - a,\ c + a - b).$$

The winner is the player after whose move all the numbers on the board are equal. Scarlett moves first. Determine who has a winning strategy.

**Problem 2.** Prove that for any positive real numbers $x, y, z$ such that $(x + y)(y + z)(z + x) \neq 0$, the following inequality holds:

$$\frac{(1 + x^2)(1 + y^2)}{2(x + y)} + \frac{(1 + y^2)(1 + z^2)}{2(y + z)} + \frac{(1 + z^2)(1 + x^2)}{2(z + x)} \geqslant x + y + z.$$

*Good Luck!*

We encourage you to submit your solutions via the website:
https://mathlovers.eu/submit-solution/!