



Problems – 11/20/2025

The solutions to the problems below  
will be published on Sunday 11/23/2025

**Problem 1.** Prove that every integer can be represented in the form  $\pm 1^2 \pm 2^2 \pm \dots \pm k^2$  for some  $k > 1$  and some choice of signs.

**Problem 2.** For sets  $X, Y$  of integers we define  $X - Y = \{x - y \mid x \in X, y \in Y\}$ . Given are sets  $A, B, C$  of integers. Prove the inequality

$$|A - B| \cdot |A - C| \geq |A| \cdot |B - C|.$$

*Good Luck!*

We encourage you to submit your solutions via the website:

<https://mathlovers.eu/submit-solution/>!