



Problems – 10/23/2025

The solutions to the problems below
will be published on Sunday 10/26/2025

Problem 1. Prove that for any prime number $p > 3$ the following holds

$$p^2 \mid \binom{p^2}{p} - \binom{p}{1}.$$

Bonus: Prove that the above expression is divisible by a higher power of p . By which highest one?

Problem 2. Prove, that for $a, b, c \in [0, 1]$ the following inequality is true

$$\sqrt{abc} + \sqrt{(1-a)(1-b)(1-c)} \leq 1.$$

Good Luck!

We encourage you to submit your solutions via the website:

[https://mathlovers.eu/submit-solution/!](https://mathlovers.eu/submit-solution/)