TEST 'MODULAR ARITHMETIC', 24-09-2018
(FIRST PART OF THE COURSE "KALEIDOSCOPE MATHEMATICS"),
3:00–4:00 PM
THE TEST CONSISTS OF THREE PROBLEMS,
YOU CAN SCORE IN TOTAL 10 POINTS,
1 POINT YOU GET FOR FREE.
USING A SIMPLE CALCULATOR DURING THE TEST IS ALLOWED.

(1) [3 points] Compute $(7 \bmod 42) \cdot (13 \bmod 42)^{-1}$.

(2) [3 points] Prove that $9 | (2^{24092018} + 5)$.

(3) [2+1 points] Suppose $n$ is an integer. Prove that
$$0 \text{ is a unit modulo } n \Leftrightarrow n = \pm 1.$$