

# Writing Test

INMOTC MP Region

January 12, 2025

**Problem 1.** *There are 2025 marked points in a plane with distinct pairwise distances. The following procedure is performed: Every marked point is joined to its closest marked point with a straight line. We say a natural number  $N$  is achievable if there is a configuration of marked points which contains a marked point that has  $N$  lines passing through them after the procedure is performed. Find all the achievable numbers, with proof.*

**Problem 2.** *Let  $n$  be a positive integer. We start with  $n$  piles of pebbles, each initially containing a single pebble. One can perform moves of the following form: choose two piles with an equal number of pebbles and form a new pile out of these pebbles. Find (in terms of  $n$ ) the smallest number of nonempty piles that one can obtain by performing a finite sequence of moves of this form.*