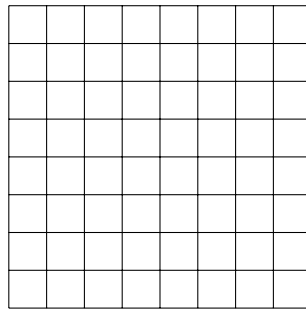


## MCC Mathematical Auction

### Problem 1

*400 MMC dollars* - A diagonal is drawn in each small square of an  $8 \times 8$  square. Look at the union of these small diagonals. It consists of a few not-connected components such that all of the diagonals within each component are connected. Within a component, you can walk from point to point along the diagonal lines. Draw the diagonals in such a way that you get as many components as possible.

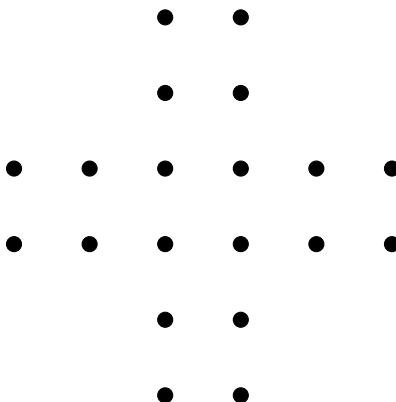


### Problem 2

*600 MMC dollars* - A tower of 80 coins is placed at the central square of a  $1 \times 1001$  board. During a turn, one can lift  $k$  of the top coins from any tower (you can lift any number of coins, even all coins), and place them onto a square  $k$  fields to the right or to the left. If this square contains some coins already, then the relocated coins are placed on top. The goal is to relocate all coins from the original position to the square immediately right from it. Do this in as few turns as possible.

### Problem 3

400 MMC dollars - How many squares with vertices at the marked points can you find?



### Problem 4

600 MMC dollars - Express the number 2375 using several identical one-digit numbers, four arithmetic operations (+, -, ×, ÷) and parenthesis. (Do not combine one-digit number into multi-digit numbers.) Use as few one-digit number as possible.

Example: the solution  $2375 = 5 + 5 + 5 + \dots + 5$  uses 475 fives.