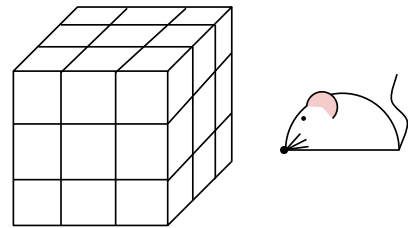


Math Circle - Homework 7

1. (10 points) A mouse is eating a 3×3 block of cheese, one 1×1 cube at a time. Having eaten a little cube, the mouse goes on to an adjacent one (having a common face with the previous). In the central square is hidden the hook of a mousetrap. Can the mouse eat all of cheese except the center?



2. (10 points) There is a creeper sitting on every square of a 5×5 sheet of graph paper. Kolya wants to write on the graph paper, so he claps loudly. The creepers are not nearly as scared as expected, so they simply all move to a neighboring square (up/down/left/right). When two creepers end up on the same square, they explode with a force beyond imagination. Is it possible that the creepers have moved in such a way that there is no explosion?

3. (10 points) The numbers $1, 2, 3, \dots, 2013$ are written on the board. A person comes and writes $+$ or $-$ between every two numbers that are next to each other. Could the final evaluated result be 0 ?

4. (10 points) Repeat question 3, but instead with the numbers $1, 2, 3, \dots, 2012$.