

University of Washington Math Hour Open Olympiad, 2013  
Grades 6-7



6. 2013 people attended Cinderella's ball. Some of the guests were friends with each other. At midnight, the guests started turning into mice:

After the first minute, everyone who had no friends at the ball turned into a mouse. After the second minute, everyone who had exactly one friend among the remaining people turned into a mouse. After the third minute, everyone who had two human friends left in the room turned into a mouse, and so on.

What is the maximal number of people that could have been left at the ball after 2013 minutes?

7. Bill and Charlie are playing a game on an infinite strip of graph paper. On Bill's turn, he marks two empty squares of his choice (not necessarily adjacent) with crosses. Charlie, on his turn, can erase any number of crosses, as long as they are all adjacent to each other. Bill wants to create a line of 2013 crosses in a row. Can Charlie stop him?

