

UW Math Circle

October 2, 2014

Homework

1. Snape has once again changed the rules in the secret hall! This time, Harry Potter is behind one door and Voldemort is behind the remaining two. He tells you at most one of the three signs is true.

I
Voldemort is in this room.

II
Harry Potter is in this room.

III
Voldemort is in room II.

Where is Harry Potter?

2. If you remove the lower left and upper right corners of a standard chessboard, is it possible to completely cover the board with non-overlapping 1×2 dominoes?
3. A grasshopper lives on an infinite number line. She started at 0, then jumped 1 step to either the left or the right. On her next jump, she jumped 2 steps to the left or right. Then 3, then 4, ..., then 2015. Could she end up where he started?
4. Somewhere in the middle of the ocean, 10 blue, 15 green, and 20 red chameleons are on an island. Whenever two chameleons of different colors meet, they switch to the third color (so if a blue and a green met, they would turn red!). Could all the chameleons eventually be the same color?

