

MATH CLUB: COLORING AND CUTTING

FEB 25, 2018

1. Is it possible to cut a 10×10 board into L-shaped pieces, each consisting of 4 squares? (All cuts must follow the grid lines.)
2. Is it possible to cut a 10×10 board into 1×4 pieces? (All cuts must follow the grid lines.)
3. On every square of a 9×9 board there is an ant. At a signal, each ant moves to one of the squares diagonally adjacent to his. As a result, some squares will have more than one ant, and some will be empty.
What is the smallest possible number of empty squares?
4. Michael took a 29×29 square ruled sheet of paper and cut out 99 2×2 squares out of it (all cuts follow the grid lines). Show that the remaining part contains at least one more 2×2 square.
5. Julie had baked a square cake and placed a candle in the center. Each of the kids at the party cuts himself a triangular piece of cake, by making one cut through two **adjacent** sides (cuts can not go through vertices). Can one of the kids get the piece with the candle?
6. The plane is colored using 3 colors: red, green, and blue. Prove that it is possible to find 2 points at distance 1 which have the same color.