Problem Set 8

UW Math Circle – Advanced Group

Session 13 (16 January 2014)

1. (BAMO 2007) The points of the plane are coloured black and white in such a way than whenever three vertices of a parallelogram are the same colour, the fourth vertex is that colour, too. Prove that all points in the plane are the same colour.

2. (a) Prove that a square can be dissected into any number of squares greater than 5.

   (b) Prove that a cube can be dissected into any number of cubes greater than 200.

3. (a) How many ways are there to fill a 3×3 table with 0s and 1s so that each row and each column has an odd number of 1s?

   (b) Same question for a 3×4 table.

   (c) Same question for a 4×4 table.