



New Zealand Mathematical Olympiad Committee

Sample Combinatorics Problems

by Ross Atkins

1. How many odd positive integers are less than 7000, and are not a multiple of 5 nor 7?
2. Consider a region formed by removing two opposite corner cells from an 8×8 chessboard. Show that this region cannot be tiled using 2×1 rectangles.
3. In how many ways can you place Alice, Bob and Chris in a line of 10 seats, so that no two people are seated next to each other?
4. Prove that amongst any 10 points within a 3×3 square, there must exist a pair, such that the distance between them is at most $\sqrt{2}$.