www.artofproblemsolving.com/community/c103157
by randomusername

1   Is there a set $S \subset \mathbb{R}^3$ of 2006 points such that not all its points are coplanar, no three of the points are collinear, and for any $A, B \in S$ we can find points $C, D \in S$ for which $AB||CD$?

2   Let a, t, n be positive integers such that $a \le n$. Consider the subsets of $\{1, 2, \ldots, n\}$ whose any two elements differ by at least t. Prove that the number of such subsets not containing a is at most t^2 times the number of those that do contain a.

3   We deal $n - 1$ cards in some way to n people sitting around a table. From then on, in one move a person with at least 2 cards gives one card to each of his/her neighbors. Prove that eventually a state will be reached where everyone has at most one card.