Introduction to Combinatorics
Probabilistic method – Hints

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1. Try random partition.

2. Try random coloring and estimate number of arithmetic sequences of length k within given interval of integers.

3. a) Try random subset (each vertex is chosen independently with some probability p). However it will likely not be independent... So try making it so.

b) Try ordering vertices randomly and using that order to get some independent set.

4. Try determining what these weird expressions in inequality mean. After getting to know their meaning, what kind of condition would tell you that sum of their values is not bigger than one?

5. a) Try taking random subset of lines (each line is chosen independently with some probability p). However it will likely not be a good set. So try making it so.

b) Take any good set of lines that is maximal in a meaning that you cannot put any new line to it so that it remains good. Charge not chosen lines and transfer their charge to points that lie on intersections of chosen lines.