

Math 123 HW 7

1. This is a problem from the book. Recall that \overline{G} is the graph whose edge set is the complement of the edge set of G . Prove that $\chi(G)\chi(\overline{G}) \geq n$. This implies that one of $\chi(G)$ or $\chi(\overline{G})$ is at least \sqrt{n} .
2. Let S denote the set of unit area squares in the usual square grid in the plane. Let T denote the set of unit area equilateral triangles in the usual tiling of the plane by equilateral triangles. Prove that there is a way to match each square in S to each triangle in T such that the matched shapes are less than 100 away. This is basically an application of Hall's Marriage Theorem, but you need to take a limit.
3. I had meant to ask this on the last HW. Suppose that a positive integer n is given. Prove that there is some N such that any N general position points in \mathbf{R}^3 contain n points which are the vertices of a convex polyhedron.