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by randomusername

1   Let $p > 2$ be a prime number and let $L = \{0, 1, \ldots, p-1\}^2$. Prove that we can find p points in L with no three of them collinear.

2   The center of the circumcircle of $\triangle ABC$ is O. The incenter of the triangle is I, and the intouch triangle is $A_1B_1C_1$. Let H_1 be the orthocenter of $\triangle A_1B_1C_1$. Prove that O, I, and H_1 are collinear.

3   Prove that the vertices of any planar graph can be colored with 3 colors such that there is no monochromatic cycle.