

Homework 5/ **Algebraic combinatorics I**/ Due Tu 6pm, Aug 6

- (1) Let G be a group, and X be a set on which G acts. Let $x \in X$ be an element, and let y be an element in $Orb(x)$. How is $Stab(y)$ related to $Stab(x)$? Prove your assertion.
- (2) Give a formula for $|Aut_n(\mathbb{F}_p)|$ in general, and write down the complete arguments. You can use the method we used in class, but inventing a different method is even better.
- (3) Try to imagine the geometry of $\mathbb{P}_{\mathbb{C}}^1$, and try to justify what you think. Can you think of a group acting on $\mathbb{P}_{\mathbb{C}}^1$, and work out the stabilizer of a point?
- (4) Find an integer n bigger than 1 such that $1^2 + 2^2 + \dots + n^2$ is a perfect square (i.e. a square of an integer).