Homework 4/ **Algebraic combinatorics**

(1) Construct an explicit isomorphism between the symmetry group of an equilateral triangle, and the symmetric group S_3.
(2) Let $\mathbb{C}^*$ act on $\mathbb{C}^2 - \{0\}$ by scaling: i.e. $\lambda.(x, y) := (\lambda x, \lambda y)$. Convince yourself that the set of orbits can be identified with a sphere.
(3) How many groups are there of order 21, up to isomorphism? Prove your assertion.
(4) Prove that the parity of a permutation is well-defined.