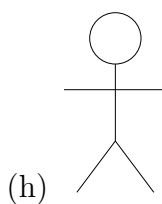
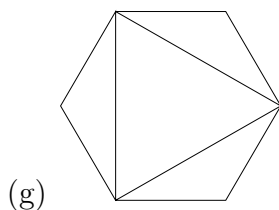
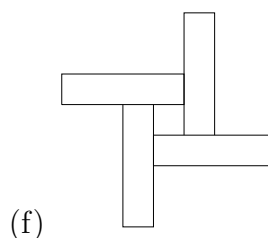
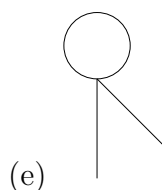
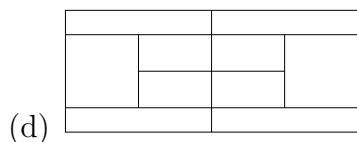
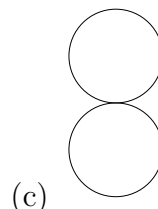
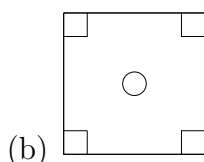
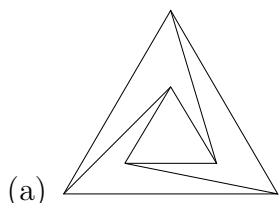


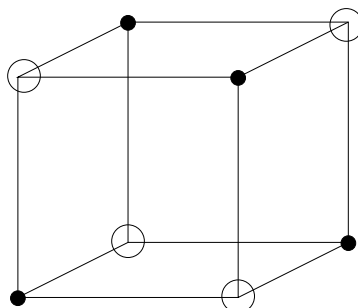
MA3615 Groups and Symmetry

Exercise Sheet 6: Finite symmetry groups in 2D and 3D

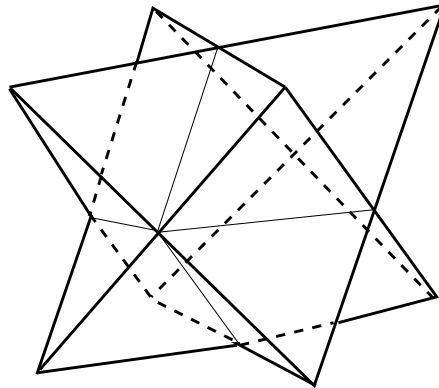
1. Identify the full symmetry group for each of the following plane figures.



2. The vertices of a cube are coloured black or white as in the picture below. Show that the rotational symmetry group G of this decorated cube is isomorphic to A_4 . [Hint: Use the Orbit-Stabilizer theorem to show that $|G| = 12$ then consider the action of G on the set of white vertices].



3. A solid is made of two regular tetrahedron arranged so that their edges bisect one another at right angles (see picture below). Find the rotational symmetry group of this solid. [You may use the classification of finite rotation groups seen at the lectures].



4. Show that the symmetry group of the cuboctahedron (see picture below) is isomorphic to S_4 . [You may use the classification of the finite rotation groups seen at the lectures].

