

Hints 3-4

- 3.1 If C and D lie on different sides with respect to AB then the segment CD intersects the line AB .
- 3.3 (*) This is a direct computation based on the definition of isometry.
- 3.4 This is just to apply the definition of a discrete action and of an orbit space.
- 3.5 (*) There are many ways to choose the group H for this question. Go for the easiest one: it will be helpful for later parts of this question.
 - (d) If F is a fundamental domain for G and H is a subgroup of G , then F tiles the fundamental domain for H (why?). The index $[G:H]$ may be found as the number of the tiles.
- 4.1 The geodesics on X come from geodesics on $\mathbb{E}^2$ - just find the good ones.
- 4.2 Use lines of rational/irrational slopes on $\mathbb{E}^2$.
- 4.3 A couple of perpendicular bisectors will do the job.
- 4.4 (*) Try to project something somewhere.