

General Mathematics and CPS II

Exercise 6

February 20, 2015

1. (Ivanov, p. 34, Problem 6.) A billiard ball sits against the cushion of a billiard table. In which direction should the ball be cued so that after bouncing off the three other sides of the table, it returns to its point of departure?
2. (Ivanov, p. 34, Problem 9.) Consider two squares situated in the same plane. Join any corner of one square to any corner of the other by means of a line segment, and then, proceeding in the same direction around both squares, the next corner to the next, and so on.

Prove that the midpoints of the four line segments so constructed are also the vertices of a square.

3. (Ivanov, p. 35, Exercise.) Prove that the composite of two axial symmetries (an *axial symmetry* is a reflection about a line, the *axis*) with intersecting axes of symmetry is a rotation about the point of intersection of these axes through an angle equal to twice the angle between them.