Coursework

Geometrical Optics

Instructions: answer all questions. Each question is worth 20 marks and add-up to 40 marks in total for this assignment. Explain clearly all your workings and draw appropriate and annotated diagrams for full mark.

Question:

A laser pointer is placed inside a cubic mirror of side length a. The laser pointer lies on the bottom face of the cube. Figure 1 represents a top view of the pointer shining a beam on one of the side mirrors with an incidence angle of 30 degrees. The ray hits the cube side at point b located at a distance $a/4$ from the bottom left corner O (see Figure 1). After few reflections the ray hits the same side again at point c.

a) Use the diagram to draw the path followed by the beam inside the cube until it reaches point c. Use graphical drawing tools or precise computer drawing tools for full mark.

[20 marks]

b) Find the distance at which c is located from the bottom left corner O.

[20 marks]

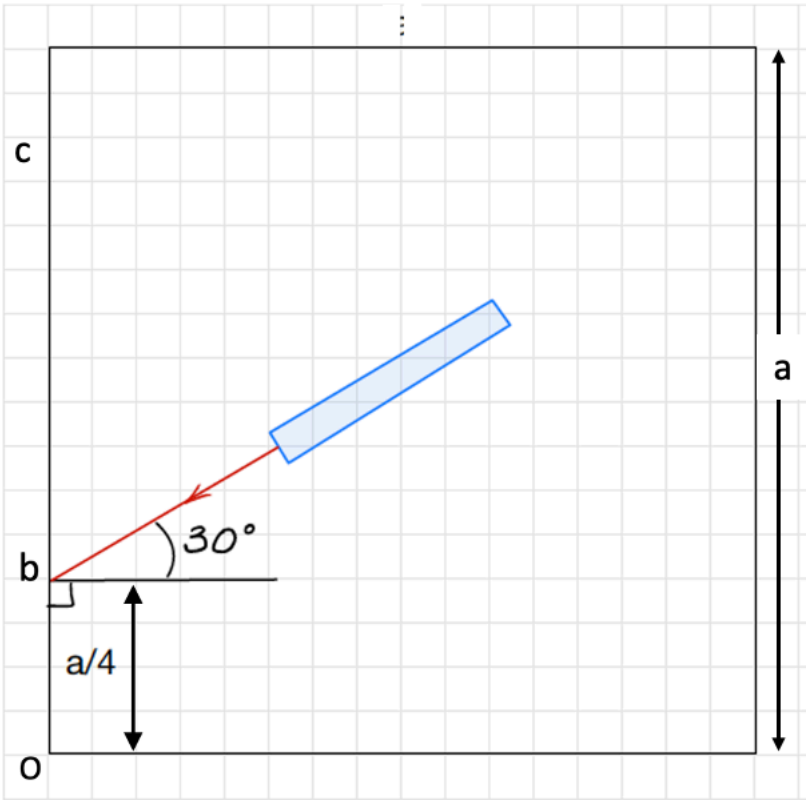

Figure 1: Setting of the problem. Location of point c is indicative and not to scale.