# UNIVERSITY OF CALIFORNIA AT BERKELEY
## College of Engineering
## Department of Electrical Engineering and Computer Science

**Professor J. Bokor**          **Discussion Section 3**                     **EECS 119**
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1. An optical system consists of a thin lens of 4cm focal length and 12cm diameter and a 6cm diameter aperture stop. The object plane is 10cm in front of the lens and the stop is 2 cm behind the lens.

   (a) Determine the position and size of the entrance and exit pupils.
   (b) Determine the position of the image point for an object point 2 cm above the axis.
   (c) Sketch the chief ray and two marginal rays from the tip of the object.
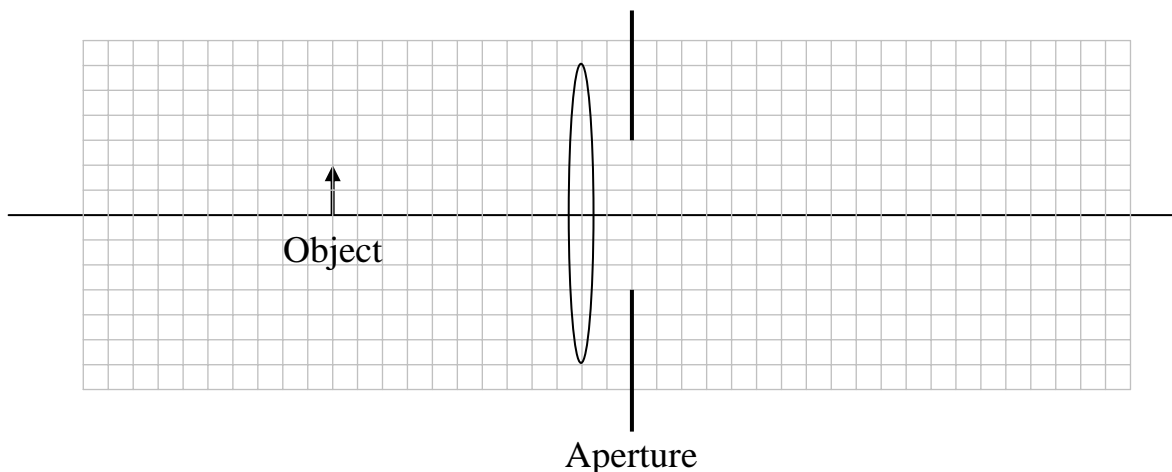


2. Design a double-convex lens with $1.5 < n < 1.7$ and $f = +60$ cm. One surface is to have twice the radius of the other.

3. You are the lens designer for a small startup company in Berkeley. You must design a 2-lens system to project a non-inverted image with a magnification of 25 onto a screen 125 cm away from an object. The mechanical designer tells you that lens 1 must be located exactly 20 cm from the object, but you have freedom to choose where to place lens 2. The purchasing department already bought a bunch of 10-cm focal length lenses that fit into the mechanical mount for lens 1. Your job is to determine the focal length and position or lens 2. Give your answer for position in terms of the separation between lens 1 and lens 2.