1. The Ramsden eyepiece is made up of two planar-convex lenses of equal focal length f' separated by a distance 2f'/3. Determine the overall focal length f of the thin-lens combination and locate the principal planes and position of the field stop.

(Answer) f=3f'/4, f'/2, -f'/2

2. Suppose we have a positive meniscus lens of radii 6 cm and 10 cm and a thickness of 3 cm, with an index of 1.5. Determine its focal length and the location of tis principal points.

(Answer) 24 cm, -2.4 cm, -4 cm

3. It is found that sunlight is focused to a spot 29.6 cm from the back face of a thick lens, which has its principal points H_1 at +0.2 cm and H_2 at -0.4 cm. Determine the location of the image of a candle that is placed 49.8 cm in front of the lens.

(Answer) 75 cm from H_2 or 74.6 cm from the back face of the lens

4. A crown glass double-convex lens, 4.0 cm thick and operating at a wavelength of 900 nm, has an index of refraction of 3/2. Given that its radii are 4.0 cm and 15 cm, locate its principal points and compute its focal length. If a television screen is placed 1.0 m from the front of the lens, where will the real image of the picture appear?

(Answer) 5 cm from the back face of the lens

5. Compute the system matrix for a thick biconvex lens of index 1.5 having radii of 0.5 cm and 0.25 cm and a thickness of 0.3 cm. Check that |A|=1.

(Answer) $A=\begin{pmatrix} 0.6 & -2.6 \\ 0.2 & 0.8 \end{pmatrix}$, |A|=1