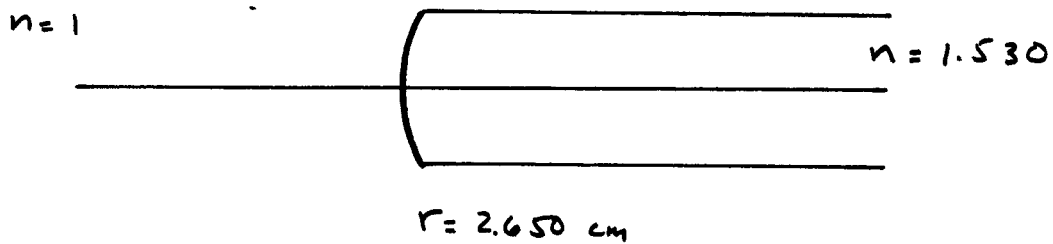


# Plastic Rod



## a) Gaussian Properties

The rod forms a refracting surface

$P, P'$  are at the vertex.

$N, N'$  are at the center of curvature.

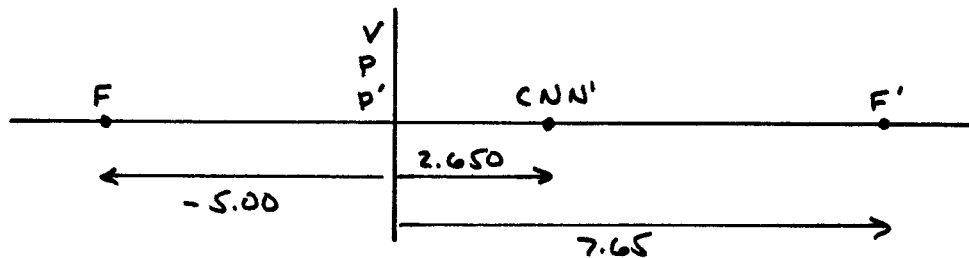
$$\phi = (n' - n) C \quad C = 1/r$$

$$\phi = .200 / \text{cm}$$

$$f_e = \frac{1}{\phi} = 5 \text{ cm}$$

$$f_e = - \frac{n}{\phi} = - \frac{1}{\phi} = -5 \text{ cm}$$

$$f'_e = \frac{n'}{\phi} = \frac{1.530}{\phi} = 7.65 \text{ cm}$$



b) Object.  $h_o = 2.5 \text{ cm}$

$$z = -16 \text{ cm} \quad (\text{from } V)$$

Use Gaussian Eqs:

$$\frac{n'}{z'} = \frac{n}{z} + \phi$$

$$\phi = .200/\text{cm}$$

$$z = -16 \text{ cm}$$

$$n = 1.0$$

$$n' = 1.530$$

$$\frac{n'}{z'} = .1375$$

$$\boxed{z' = 11.13 \text{ cm}} \quad (\text{inside the rod})$$

$$m = \frac{h_o'}{h_o} = \frac{z'/n'}{z/n} = \frac{11.13/1.530}{-16/1.0} = -.454$$

$$h_o' = h_o m = 2.5(-.454)$$

$$\boxed{h_o' = -1.14 \text{ cm}}$$

