Answer on Question #62131-Physics-Optics

A 2.5 cm high object is placed on the principal axis at a distance 12 cm from the pole. If the image is inverted real and 5 cm high find the focal length of the mirror and the location of the image?

Solution

$$\frac{1}{u} + \frac{1}{v} = \frac{1}{f}.$$

$$m = -\frac{5}{2.5} = -2.$$

$$m = -2 = -\frac{v}{u} \rightarrow v = 2u.$$

$$\frac{1}{u} + \frac{1}{2u} = \frac{1}{f}$$

$$\frac{3}{2u} = \frac{1}{f}$$

The focal length of the mirror is

$$f = \frac{2}{3}u = \frac{2}{3}(-12) = -8\ cm.$$

$$v = 2u = 2(-12) = -24\ cm.$$

The image is formed at a distance 24 cm from the pole.