

Answer on Question #51846-Physics-Optics

12 In an experiment to determine the focal length of a convex lens, $\frac{1}{v}$ (cm⁻¹) was plotted on horizontal and $\frac{1}{u}$ (cm⁻¹) on the vertical axis, where u and v have their usual meaning. What is the physical significance of the reciprocal of the slope of the graph?

- a) linear magnification (b) focal length (c) object distance (d) image distance

Solution

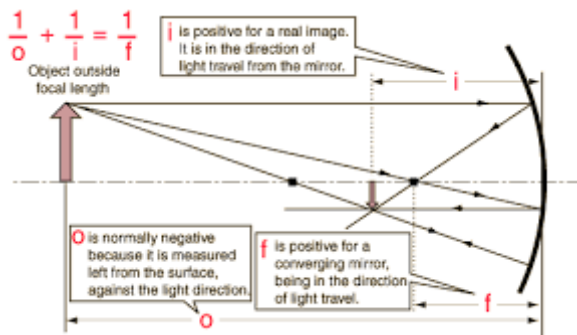
The reciprocal of the intercept on the horizontal axis is u - object distance.

Answer: (c) object distance.

14 In an experiment with a concave mirror, the image of an optical pin which is 4 times less its size was cast on a screen 6m from the object pin. How far from the object pin should the mirror be placed?

- a) 8m b) 6m c) 3m d) 2m

Solution



The magnification of a mirror is defined as the height of the image divided by the height of the object:

$$m = \frac{h_i}{h_o} = \frac{i}{o},$$

where $o - i = 6m$.

Thus,

$$\frac{1}{4} = \frac{o - 6m}{o}$$

The object position is

$$o = \frac{24m}{3} = 8m.$$

Answer: a) 8m.

1 A convex mirror has a radius of 20 cm. An object is placed 30 cm in front of the mirror. Determine where the image will appear.

(a) -4.5cm (b) -5.5cm (c) -6.5cm (d) -7.5cm

Solution

Since the radius is 20 cm (which is the distance from the mirror to the center), and since the focal point is half ways in between and negative for a convex mirror, $f = -10 \text{ cm}$:

$$\frac{1}{f} = \frac{1}{D_o} + \frac{1}{D_i}$$

$$\frac{1}{D_i} = \frac{1}{f} - \frac{1}{D_o}$$

$$D_i = \frac{1}{\frac{1}{-10} - \frac{1}{30}} = -7.5 \text{ cm.}$$

Answer: (d) -7.5cm.

<http://www.AssignmentExpert.com/>