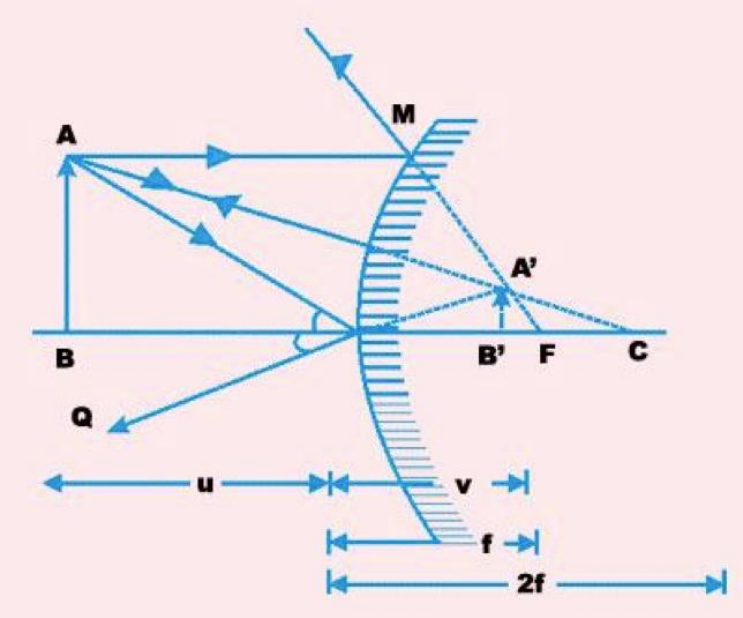
Answer on Question #46348 – Physics – Other

In an experiment involving a spherical mirror, 1/v was plotted on the vertical axis and 1/u on the horizontal axis. What is the linear magnification?

slope of the graph
inverse of the the slope of the graph
intercept on the vertical axis
intercept on the horizontal axis

Solution:



Optical magnification is the ratio between the apparent size of an object (or its size in an image) and its true size, and thus it is a dimensionless number.

If v is distance from mirror to image and u is distance from object to mirror, then magnification is equal to:

$$M = \frac{v}{u} = \frac{\frac{1}{u}}{\frac{1}{v}}$$

$\frac{1}{u}$ was plotted on the horizontal axis and $\frac{1}{v}$ was plotted on vertical axis, hence linear magnification is the **inverse of the the slope of the graph**

$$\left(\text{Inverse slope of the graph } = \frac{1}{\frac{\text{vertical axis}}{\text{horizontal axis}}} = \frac{\text{horizontal axis}}{\text{vertical axis}} = \frac{\frac{1}{u}}{\frac{1}{v}} = M \right)$$

Answer: inverse of the the slope of the graph.