Answer on Question #41844 – Physics – Other

Question.

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

$$\mathrm{M} = \frac{1}{4}$$

$$\mathrm{S}_2 = 6\ \mathrm{m}$$

$$\mathrm{S}_1 = ?$$

Solution.

By definition the magnification of the lens is given by:

$$\mathrm{M} = \frac{\mathrm{S}_2}{\mathrm{S}_1}$$

S_1 is the distance from the object to the lens;

S_2 is the distance from the lens to the image.

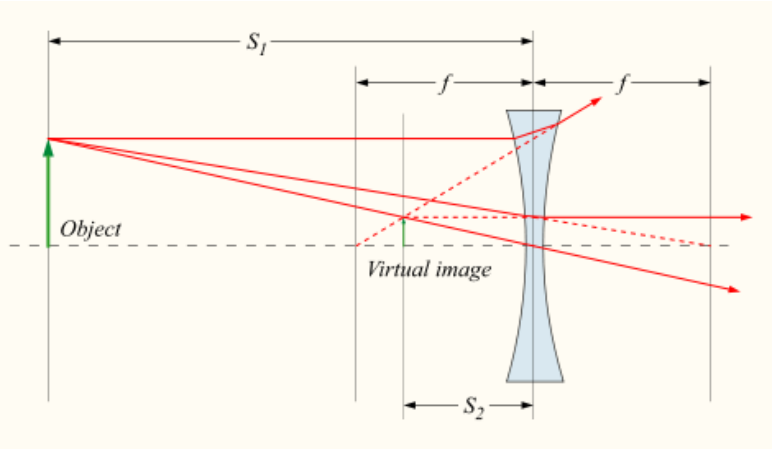

Fig.1. Path of rays in a concave lens.

f is the focal length of the lens.

So, image for a concave lens is always a reduced, virtual and direct. This means that the image size is always smaller than the size of the object. Therefore, $M < 1 \rightarrow M = \frac{1}{4}$.

So,

$$\mathrm{S}_1 = \frac{\mathrm{S}_2}{\mathrm{M}} = \frac{6}{0.25} = 24\ \mathrm{m}$$

Answer.

$$S_1 = \frac{S_2}{M} = 24 \text{ m}$$