

Answer on Question #47671-Engineering-Other

An object placed in front of a convex mirror of radius 20cm produces an erect image which is one-fifth the size of the object. How far is the object from the mirror?

Solution

$$f = -\frac{R}{2} = -\frac{20\text{cm}}{2} = -10 \text{ cm.}$$

The magnification is $M = -\frac{d_i}{d_o} = \frac{1}{5} \rightarrow d_i = -\frac{1}{5}d_o$.

$$\frac{1}{f} = \frac{1}{d_o} + \frac{1}{d_i} \rightarrow \frac{1}{f} = \frac{1}{d_o} - \frac{5}{d_o} \rightarrow -\frac{1}{10 \text{ cm}} = -\frac{4}{d_o} \rightarrow d_o = 40 \text{ cm.}$$

Answer: 40 cm.