Answer on Question #47670-Engineering-Other

How far should an object be from a concave mirror of radius 30cm to form a real image 1/6 of its size?

Solution

$$f = \frac{R}{2} = \frac{30\text{cm}}{2} = 15 \text{ cm}.$$

The image is real and reduced, so it is inverted too. The magnification is

$$M = -\frac{d_i}{d_o} = -\frac{1}{6} \to d_i = \frac{1}{6} d_o.$$

$$\frac{1}{f} = \frac{1}{d_o} + \frac{1}{d_i} \to \frac{1}{f} = \frac{1}{d_o} + \frac{6}{d_o} = \frac{7}{d_o} \to d_o = 7f = 7 \cdot 15 \text{ cm} = 105 \text{ cm}.$$

Answer: 105 cm.