

Answer on Question #58967-Physics-Optics

A reflecting, spherical Christmas tree ornament has a diameter of 7.0 cm. A child looks at the ornament from a distance of 28 cm. Describe the image she sees.

Solution

A focal length of the mirror is

$$f = \frac{R}{2} = \frac{D}{4} = \frac{7.0 \text{ cm}}{4} = 1.75 \text{ cm}.$$

We need substitute $-f$ in the mirror equation because the mirror is convex.

$$\frac{1}{o} + \frac{1}{i} = -\frac{1}{f} \rightarrow \frac{1}{28} + \frac{1}{i} = -\frac{1}{1.75}$$

$$i = \frac{1}{-\frac{1}{1.75} - \frac{1}{28}} = -1.65 \text{ cm}.$$

Answer: -1.65 cm.