

### Answer on Question #46992-Physics-Optics

A camera obscura used by a potrait painter is located 6 m from a child who stands 1 m tall. How tall is her image if the back of the camera obscura is 2 m away?

$$\frac{1}{3} m$$

$$\frac{1}{2} m$$

1 m

3 m

### Solution

Assume for simplicity that a light ray from the child's feet goes through the pinhole horizontally and strikes the back of the camera. Then consider a light ray from the top of the child's head as it works its way to the back of the camera. You get two similar triangles, one outside the camera and one inside the camera. The ratio of the distances, child to pinhole divided by pinhole to back, is  $\frac{6}{2} = 3$ . Hence, the ratio of child's height to image on back of camera is also 3, so the image must be  $\frac{1}{3} m$  (which multiplied by 3 gives 1m for the child's actual height).

**Answer:**  $\frac{1}{3} m$ .