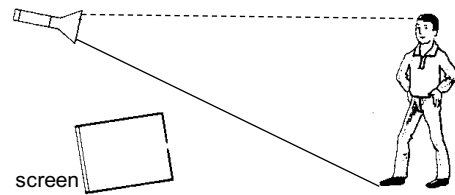


1. Incident light rays are reflected in any direction off every point of a boy's surface (diffuse reflection). Some of the reflected light rays are travelling through the opening of the pinhole camera, reaching the screen at the back of the box.

Depict the path of two of the many light rays which are reflected: one off the boy's head (dashed line) and one off his foot (solid line), reaching the screen at the back of the box.



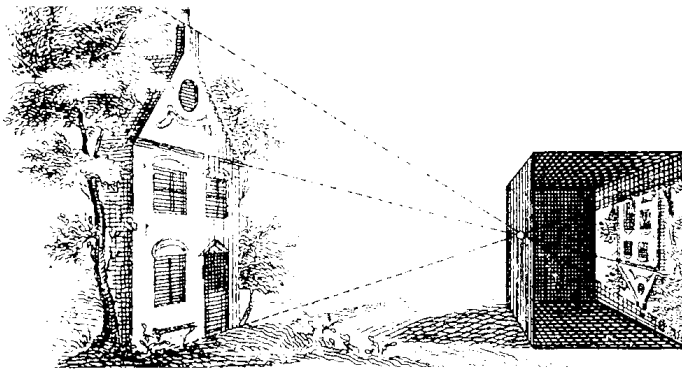
2. Here's an object and its image formed on the screen of a pinhole camera. The opening of the camera is missing in the picture and has to be found.

- a) Sketch the paths of two light rays: one travelling from the top of the object to its image point and one travelling from the bottom of the object to its image point.
- b) Where is the opening of the pinhole camera?
- c) Measure the object height, image height, object distance, and the image distance.
- d) Calculate the magnification.



3. Draw to scale: A figure of 3.0 cm height is located in front of the opening of a pinhole camera. The distance between the figure and the pinhole camera's screen is 12.0 cm. The magnification of the image shall be 0.50. Determine d_i , d_o and h_i .

4.



There's a mistake in this drawing. Look at the image at the back of the pinhole camera and compare it closely to the object. Can you spot the mistake?

5. An object of 17 cm height casts a shadow of 0.51 m height onto the wall. Calculate the magnification.
6. The object height is 1.8 m and the magnification of the image formed by a pinhole camera is 0.20. Calculate the image height.
7. The image height in a (large) pinhole camera is 5.0 m, the magnification is 2.5. Calculate the object height.

8. A person of 1.76 m height is standing at a distance of 5.39 m in front of the opening of a pinhole camera. The image is 3.40 cm high.
- What is the magnification?
 - What is the image distance?
9. A student has made a pinhole camera from a shoe box which is 43 cm long. She's pointing the opening of the camera at a tree of 2.86 m height. She observes that the image of the tree is 5.7 cm high.
- What is the magnification?
 - What's the distance between the tree and the opening of the pinhole camera?
10. Trevor is standing between a lamp and a white wall. The distance between Trevor and the lamp is 3.40 m, while Trevor and the wall are spaced 40.0 cm apart. He casts a shadow of 1.80 m height on the wall.
How tall is Trevor?
Hint: Depict the situation and figure out what d_o and d_i are.

solutions

5. 3.0
6. 36 cm
7. 2.0 m
8. a) 0.0193 b) 10.4 cm
9. a) 0.020 b) 22 m
10. 1.61 m