

The diagram illustrates the principle of a camera obscura. A scene, represented by triangle ABC , is positioned on the left. Light rays from the vertices of this triangle pass through a lens, represented by the line segment CD . The rays converge and then diverge, forming an inverted image, represented by triangle QRS , on a screen or wall on the right. The center of the lens is labeled C , and the focal length is indicated by the distance f from the center of the lens to the focal point P on the optical axis. The optical axis is a horizontal line passing through A , B , C , P , and S . The screen is represented by the vertical line segment TS , where T is the top of the screen and S is the bottom. The image QRS is inverted, with Q at the top and S at the bottom. The rays from A and B pass through the lens and converge at Q and R respectively, while the rays from C pass through the lens and converge at S .

$$\begin{aligned} (1) \quad & ABCD = APQ - BPC - DCQ, \\ (2) \quad & CSRT = 2 \cdot SRC. \end{aligned}$$
$$APQ = k \cdot PQ^2 = k(PC + CQ)^2 = k \cdot PC^2 + 2k \cdot PC \cdot CQ + k \cdot CQ^2,$$

$$BPC = k \cdot PC^2, \quad DCQ = k \cdot CQ^2,$$
$$2 \cdot SRC = 2k \cdot CR^2 = 2k \cdot PC \cdot CQ.$$

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