**Example** A ray of light coming from the point (1, 2) is reflected at a point A on the $x$-axis and then passes through the point (5, 3). Find the coordinates of the point A.

**Solution** Let the incident ray strike $x$-axis at the point A whose coordinates be $(x, 0)$. From the figure, the slope of the reflected ray is given by

$$\tan\theta = \frac{3}{5-x} \qquad (1)$$

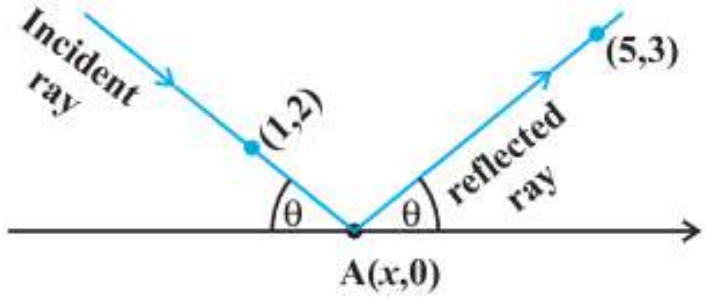


**Fig. 10.2**

Again, the slope of the incident ray is given by

$$\tan(\pi - \theta) = \frac{-2}{x-1} \qquad \text{(Why?)}$$

or

$$-\tan\theta = \frac{-2}{x-1} \qquad (2)$$

Solving (1) and (2), we get

$$\frac{3}{5-x} = \frac{2}{x-1} \quad \text{or} \quad x = \frac{13}{5}$$

Therefore, the required coordinates of the point A are $\frac{13}{5}, 0$ .