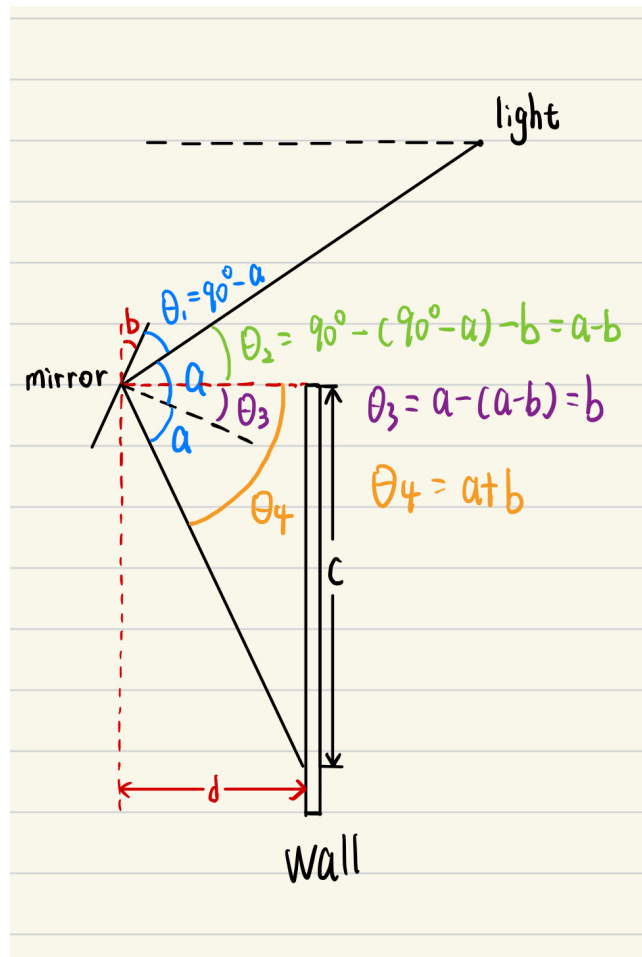


# Light Causality

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As shown in the figure, variable  $a$  is the angle of incidence, which is the angle between the incident light and the normal of the mirror; variable  $b$  is the tilt angle of the mirror, with the clockwise direction considered positive; variable

$c$  is the position where the reflected light hits the wall; the constant  $d$  is the distance from the mirror to the wall.

Let  $\theta_1$  be the angle between the incident light and the plane of the mirror, so:

$$\theta_1 = 90^\circ - a$$

Let  $\theta_2$  be the angle between the incident light and the horizontal line, so:

$$\theta_2 = 90^\circ - \theta_1 - b = 90^\circ - (90^\circ - a) - b = a - b$$

Let  $\theta_3$  be the angle between the normal of the mirror and the horizontal line, so:

$$\theta_3 = a - \theta_2 = a - (a - b) = b$$

Let  $\theta_4$  be the angle between the reflected light and the horizontal line, so:

$$\theta_4 = a + b$$

Therefore, the causal relationship we derive is:

$$c = d \cdot \tan(\theta_4) = d \cdot \tan(a + b)$$