

A body is thrown vertically upward such that it crosses the same height after 2 sec. and after 8 sec. What is the value of the mentioned height?

mentioned height equals:

$$h = \frac{v_0^2 - v_1^2}{2g}$$

where,  $v_0$  – initial speed,  $v_1$  – speed after 2 sec.

$v_1$  equals:

$$v_1 = v_0 - g * t_0$$

where,  $t_0 = 2 \text{ sec}$

Therefore:  $v_0 = v_1 + 2g$

In another side:

$$2v_1 = g * (t_1 - t_0)$$

where  $t_1 = 8 \text{ sec}$ , therefore  $v_1 = 3g$

$$v_0 = v_1 + 2g = 3g + 2g = 5g$$

From first equation:

$$h = \frac{v_0^2 - v_1^2}{2g} = g * \frac{5^2 - 3^2}{2} = 80 \text{ m}$$

Answer: 80 m