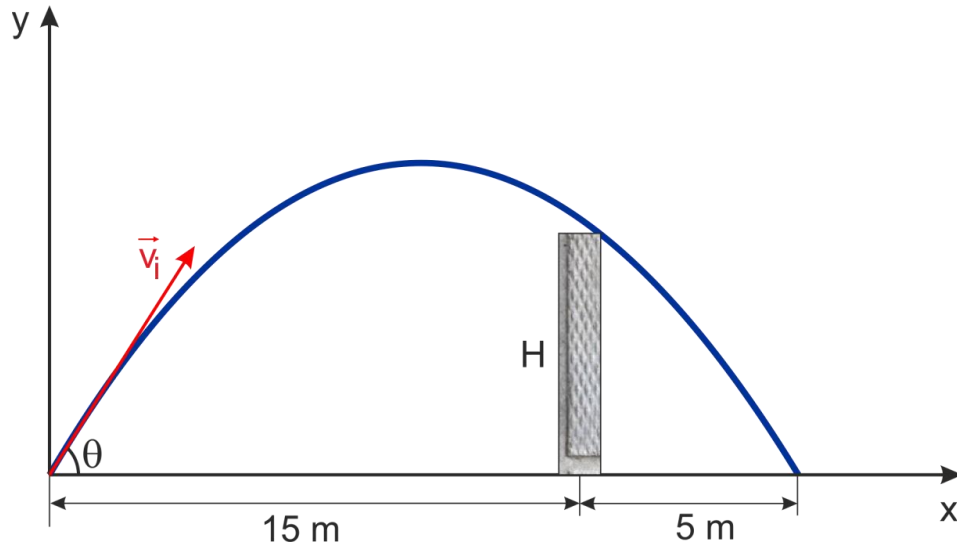


### Answer on Question #80873 Physics / Other

From a point on the ground at a distance 15 m from the foot of a vertical wall, a ball is thrown at an angle of  $45^\circ$  which just clear the top of the wall and afterwards strikes the ground at a distance 5 m on the other side. Find the height of the wall.

**Solution:**



The ball trajectory equation

$$y(x) = \tan(\theta) \cdot x - \frac{g}{2v_i^2 \cos^2(\theta)} \cdot x^2$$

The range of the ball motion

$$R = \frac{v_i^2 \sin(2\theta)}{g} = 20 \text{ m}$$

So

$$\frac{v_i^2}{g} = \frac{20 \text{ m}}{\sin(2 \times 45^\circ)} = 20 \text{ m}$$

Therefore

$$y(x) = \tan(45^\circ) \cdot x - \frac{1}{2 \times 20 \cos^2(45^\circ)} \cdot x^2$$

$$y(x) = x - \frac{x^2}{20}$$

Finally

$$H = y(15) = 15 - \frac{15^2}{20} = 3.75 \text{ m}$$

**Answer:** 3.75 m