Q- A falling flowerpot takes 0.20 s to fall past a window that is 1.9 m tall. From what height above the top of the window was the flowerpot dropped?

Let the height above the window top from which the flowerpot dropped be h_0

Velocity v_0 of the flower pot at the top of the window is given by using third equation of motion as

$$\left[v_f^2 = v_{in}^2 + 2as\right]$$

$$v_0^2 = 0 + 2gh_0 \qquad \text{-------------------------} \quad (1)$$

Here g is the acceleration of gravity and downward direction is taken positive.

Now for the further displacement h = 1.9m in time t = 0.20s we can write second equation of motion as

$$\left[s = v_{in}t + \frac{1}{2}at^2\right]$$

$$h = v_0t + \frac{1}{2}gt^2$$

Or $\quad 1.9 = v_0 * 0.20 + \frac{1}{2}9.8 * 0.20^2$

Or $\quad 1.9 = 0.20\, v_0 + 0.196$

Or $\quad v_0 = 8.52\, m/s$

Substituting the value in equation (1) we get

$$8.52^2 = 2 * 9.8 * h_0$$

Gives $h_0 = 3.70$ m.