Answer on Question #68211- Physics / Classical Mechanics-Relativity

A balloon is tied up with a wooden piece is moving upward with a velocity of 15 m/s At a height of 300m above the ground the wooden piece is detached from the balloon.How much time will it take to reach the ground?(neglect air resistance)

Solution:

The initial velocity of the wooden piece is directed up ward, so $v_0 = -15\frac{\text{m}}{\text{s}}$

The displacement

$$h = v_0 t + \frac{gt^2}{2}$$

Thus

$$4.9t^2 - 15t - 300 = 0$$

$$D = 15^2 - 4{\times}4.9{\times}(-300) = 6105$$

$$t = \frac{15 + \sqrt{6105}}{2{\times}4.9} = 9.5 \text{ s}$$

Answer: $t = 9.5$ s