

Answer on Question # 84307, Physics / Mechanics | Relativity

Let $h = 1.5 \text{ m}$ and $v_0 = 5 \text{ m/s}$.

a. $x = v_0 t$ and $y = h - gt^2/2$. We will find $(x, 0)$:

$$h = gt^2/2 \Rightarrow t = \sqrt{2h/g} \Rightarrow x = v_0 \sqrt{2h/g} \approx 0.83 \text{ m}.$$

b. $v_x = v_0$ and $v_y = -gt$. From (a) $t = \sqrt{2h/g}$, then

$$v_x = 5 \text{ m/s} \text{ and } v_y = -\sqrt{2gh} \approx -5.42 \text{ m/s}.$$

c. $\vec{v} = (v_x, v_y) = (5, -5.42)$ and $v = |\vec{v}| = \sqrt{v_x^2 + v_y^2} \approx 7.38 \text{ m/s}$.