Question 30758

The law of motion is as follows: $v_x = v_{0x} = v_0$ (according to conditions of the task, object was dropped only with horizontal initial velocity, let us denote it v_0). For vertical part of velocity: $v_y = v_{0y} - g\,t = -g\,t$ (because $v_{0y} = 0$).

Hence, horizontal distance, traveled by object is $S_x = v_0 \cdot t$, from where $v_0 = \dfrac{S_x}{t}$ ($S_x = 125\,m$).

Time might be found from vertical law of motion $S_y = \dfrac{g\,t^2}{2} \Rightarrow t = \sqrt{\dfrac{2\,S_y}{g}}$ ($S_y = 40\,m$).

Plugging the latter formula into formula for v_0, obtain $v_0 = S_x \dfrac{\sqrt{g}}{\sqrt{2\,S_y}} = 43.8\dfrac{m}{s}$.