

Task:

A projectile is launched horizontally with the velocity of $30 \frac{m}{0.001 s} = 30000 \frac{m}{s}$. What is the magnitude of the vertical component of velocity after 3 milliseconds? What is the magnitude of the vertical component of velocity after 1 second?

Solution:

$$h(t) = \frac{g \cdot t^2}{2} = \frac{v_y(t)^2}{2g}$$

$$v_y(0.003 s) = \sqrt{g^2 \cdot t^2} = g \cdot t = 9.81 \cdot 0.003 \frac{m}{s} = 0.02943 \frac{m}{s}$$

$$v_y(1 s) = \sqrt{g^2 \cdot t^2} = g \cdot t = 9.81 \cdot 1 \frac{m}{s} = 9.81 \frac{m}{s}$$

Answer:

$$v_y(0.003 s) = 0.02943 \frac{m}{s}$$

$$v_y(1 s) = 9.81 \frac{m}{s}$$