



Datos

$$V_0 = 5 \text{ m/s}$$

$$t_0 = 0$$

$$g = 9.81 \text{ m/s}^2$$

$$y_0 = 0$$

$$a = \frac{dv}{dt} \rightarrow g = \frac{dv}{dt}$$

$$a) \quad \frac{dv}{dt} = -g$$

$$dv = -g \cdot dt$$

$$\int dv = \int -g \cdot dt$$

$$v = -gt + c$$

$$5 \text{ m/s} = -g(0) + c \rightarrow 5 \text{ m/s} = -9.81 \text{ m/s}^2(0) + c$$

$$5 \text{ m/s} = c$$

$$v = 5 - gt$$

$$v_f = 5 - gt$$

$$0 = 5 - gt$$

$$t = \frac{5}{g} = \frac{5 \text{ m/s}}{9.81 \text{ m/s}^2} = 0.51 \text{ s}$$

$$\begin{aligned} -gt &= \uparrow \text{ subida} \\ +gt &= \downarrow \text{ bajada} \end{aligned}$$

$$b) \quad v = \frac{dy}{dt} \quad \left. \vphantom{\frac{dy}{dt}} \right\} v = 5 - gt$$

$$\frac{dy}{dt} = 5 - gt$$

$$dy = (5 - gt) dt$$

$$\int dy = \int (5 - gt) dt$$

$$y = 5t - \frac{g}{2}t^2 + C_2 \rightarrow 0 = 5(0) - \frac{g}{2}(0)^2 + C_2$$

$$C_2 = 0$$

$$t = 0.51 \text{ s} \quad \left. \vphantom{t} \right\} y = 5t - \frac{g}{2}t^2$$

$$y = 5(0.51 \text{ s}) - \frac{9.81 \text{ m/s}^2}{2} (0.51 \text{ s})^2$$

$$y = 1.27 \text{ m}$$

$$h_{\max} = 1.27 \text{ m}$$

$$c) \quad v_f = v_0 + gt$$

$$v_f = 5 \text{ m/s} + 9.81 \text{ m/s}^2 \cdot (0.51 \text{ s})$$

$$v_f = 10 \text{ m/s}$$

$$d) \quad f(t) = 5t - \frac{9.81 \text{ m/s}^2}{2} \cdot t^2$$

$$\begin{aligned} t &= 0.51 \text{ s} \\ h_{\max} &= 1.27 \text{ m} \\ v_f &= 10 \text{ m/s} \end{aligned}$$