Answer on Question #66893-Physics-Mechanics-Relativity

A balloon is rising at a constant velocity of 3m/s. While the balloon is rising, something falls off. It takes 3s to hit the ground. What is the velocity when they hit the ground? How high was the balloon?

Solution

The initial velocity of the something is 3 m/s.

$$v_{final} = v_0 - gt = 3 - 10(3) = -27\frac{m}{s}.$$

The negative sign means that it falls downwards.

$$h_{final} = h_0 + v_0 t - \frac{gt^2}{2} = 0$$

$$h_0 = \frac{gt^2}{2} - v_0 t = \frac{10(3)^2}{2} - (3)(3) = 36\,m.$$

Answer: $\boldsymbol{-27\frac{m}{s}; 36\ m}$.