

Answer on question #59884, Physics - Mechanics – Relativity

Height  $h(t)$ :

$$h(t) = v_0 * t - \frac{gt^2}{2}$$

Then,

$$\begin{cases} h(t_1) = h = v_0 * t_1 - \frac{gt_1^2}{2} \\ h(t_2) = h = v_0 * t_2 - \frac{gt_2^2}{2} \end{cases}$$

From first,  $v_0 = \frac{2h+gt_1^2}{2t_1}$ ,

From second,  $v_0 = \frac{2h+gt_2^2}{2t_2}$ .

In each equation,  $v_0$  is the same, then

$$v_0 = \frac{2h + gt_1^2}{2t_1} = \frac{2h + gt_2^2}{2t_2}$$

$$2h \left( \frac{1}{t_1} - \frac{1}{t_2} \right) = g * (t_2 - t_1)$$

$$h = \frac{g * t_1 * t_2}{2}$$