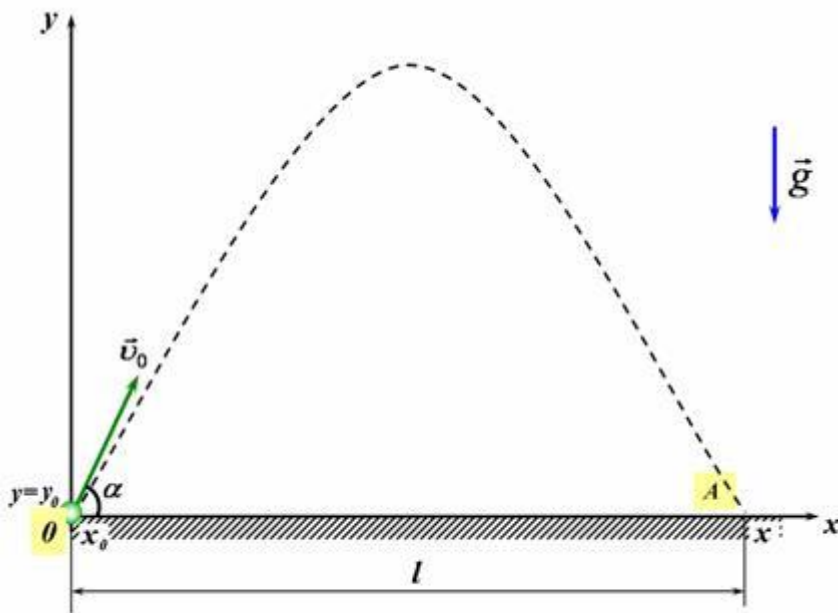**Question #71525, Physics / Mechanics | Relativity |**
An athlete accelerates to 10 m/sex and then jumps at a 25° angle. How far Will he jumps?
**Answer:** Draw -



$v_0 = 10\dfrac{m}{s}$

$\alpha = 25^0$

Need to find: $l$ - ?

$l = x = v \cdot t = v_0 \cdot cos\alpha \cdot t$

y – direction:

$y = y_0 + v_0 \cdot t + \dfrac{g \cdot t^2}{2}, 0 = 0 + v_0 \cdot sin\alpha \cdot t - \dfrac{g \cdot t^2}{2}$

Then - $v_0 \cdot sin\alpha = \dfrac{g \cdot t}{2}, t = \dfrac{2 \cdot v_0 \cdot sin\alpha}{g}$ - the flight time of the body to fall to the ground.

$l = v_0 \cdot cos\alpha \cdot \dfrac{2 \cdot v_0 \cdot sin\alpha}{g} = \dfrac{v_0^2 \cdot (2 \cdot cos\alpha \cdot sin\alpha)}{g}$

From mathematics it is known that - $2 \cdot cos\alpha \cdot sin\alpha = sin2\alpha$, then

$l = \dfrac{v_0^2 \cdot sin2\alpha}{g}$

let's calculate, $l = \dfrac{10^2 \frac{m^2}{s^2} \cdot sin2 \cdot 25}{9.8 \frac{m}{s^2}} \approx 7.81 \ m$

He jumps on 7,81 meters.