Answer on Question #63013, Physics / Mechanics | Relativity

A projectile is launched from ground level with an initial speed of 47.5 m/s at an angle of 33.3° above the horizontal. It strikes a target in the air 2.82 seconds later. What are the horizontal and vertical distances from where the projectile was launched to where it hits the target?

Solution:

$$x = v_{0x} * t = v_0 cos\theta * t$$
$$x = 47.5 * cos(33.3) * 2.82 = 112.52 \, m$$

$$y0 = v_{0y} * t - \frac{1}{2} gt^2 = v_0 sin\theta * t - \frac{1}{2} gt^2$$
$$y = 47.5 * sin(33.3) * 2.82 - 0.5 * 9.8 * 2.82^2 = 88.46 \, m$$

Answer: 112.52 m and 88.46 m