Answer on Question #83034, Physics / Molecular Physics | Thermodynamics

Question:

A projectile is launched at 60° from the horizontal and lands 50m from the launch point. What was the projectile's speed at launch?

Solution:

The distance L from the launch point to the landing point equals to

$$L = v\cos\alpha \cdot T = v\cos\alpha \cdot 2\frac{v\sin\alpha}{g} = \frac{v^2\sin 2\alpha}{g}$$, respectively $$v = \sqrt{\frac{Lg}{\sin 120^\circ}} = \sqrt{\frac{50\cdot 10\cdot 2}{\sqrt{3}}} = 24$$

(m/s).

The answer:

$$v = \sqrt{\frac{Lg}{\sin 120^\circ}} = \sqrt{\frac{50\cdot 10\cdot 2}{\sqrt{3}}} = 24 \text{ m/s.}$$