Answer on Question #44018-Physics- Mechanics-Kinematics-Dynamics

A ball is hit at an initial speed of 80 m/s. At what angle should it leave the bat if it has to travel 300 m horizontally?

Solution

The horizontal distance of projectile is

$$d = \frac{v^2}{g}\sin 2\theta,$$

where v is an initial speed of a ball, g is the acceleration of the gravity, θ is an angle.

So,

$$\sin 2\theta = \frac{gd}{v^2} = \frac{9.8\frac{m}{s^2}\cdot 300\text{ m}}{\left(80\frac{m}{s}\right)^2} = 0.459375 \to \theta = \frac{\sin^{-1} 0.459375}{2} = 13.7°.$$

Answer: $\mathbf{13.7}°$.