

Glancing collision 2D example: Glancing Collision

Ball A (0.155 kg) moving North at 3.5 m/s collides with stationary ball B (0.052 kg). If ball A moves off at 3.1 m/s 15 degrees bearing, find the velocity of ball B after.

do not stick

$V_A = 3.5 \text{ m/s (N)}$

$V_A' = 3.1 \text{ m/s } @ 15^\circ$

$V_B = 0$

$V_B' = ?$

x dir $F_x = 0$

$0 = m_A V_{Ax}' + m_B V_{Bx}'$

$0 = m_A 3.1 \cos 15 + m_B V_{Bx}'$

y dir $F_y = 0$

$0 = m_A V_{Ay}' + m_B V_{By}'$

$0 = (0.155 \text{ kg})(3.5 \text{ m/s}) + m_B V_{By}'$

$P_{Ty} = (0.155 \text{ kg})(3.5 \text{ m/s}) = 0.5425 \text{ kg}\cdot\text{m/s}$

Put back together

$V_B' = 2.83 \text{ m/s } @ 32.5^\circ$

$\tan \theta = \frac{1.52}{2.39} = 32.5^\circ$

$V_B = 1.52^2 + 2.39^2 = 2.83 \text{ m/s}$

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