

Object A has a mass of 3.1 kg and is moving along the x axis with a velocity of +5.5 m/s. It makes collides with object B, which has a mass of 7.1 kg and is initially at rest. After the collision, the two pucks fly apart with the angles: Object A= 65 degrees, Object B= -37 degrees.

$$m_A = 3.1 \text{ kg}$$

$$v_{Ax} = 5.5 \text{ m/s}$$

$$v_{Ay} = 0.00 \text{ m/s}$$

$$\rho_{Ax} = 3.1 \text{ kg} * 5.5 \text{ m/s} = 17 \text{ kg m/s}$$

$$\rho_{Ay} = 3.1 \text{ kg} * 0.00 \text{ m/s} = 0.00 \text{ kg m/s}$$

$$m_B = 7.1 \text{ kg}$$

$$v_{Bx} = 0.00 \text{ m/s}$$

$$v_{By} = 0.00 \text{ m/s}$$

$$\rho_{Bx} = 7.1 \text{ kg} * 0.00 \text{ m/s} = 0.00 \text{ kg m/s}$$

$$\rho_{By} = 7.1 \text{ kg} * 0.00 \text{ m/s} = 0.00 \text{ kg m/s}$$

$$\rho_{sys x} = \rho_{Ax} + \rho_{Bx} = 17 \text{ kg m/s} + 0.00 \text{ kg m/s} = 17 \text{ kg m/s}$$

$$\rho_{sys y} = \rho_{Ay} + \rho_{By} = 0.00 \text{ kg m/s} + 0.00 \text{ kg m/s} = 0.00 \text{ kg m/s}$$

$$\rho_{Ax}' = \rho_A' * \cos 65^\circ = \rho_A' * 0.42$$

$$\rho_{Bx}' = \rho_B' * \cos -37^\circ = \rho_B' * 0.80$$

$$\rho_{sys x} = \rho_{sys x}' = \rho_{Ax}' + \rho_{Bx}'$$

$$\boxed{17 \text{ kg m/s} = \rho_A' * 0.42 + \rho_B' * 0.80} \text{ Equation 1}$$

$$\rho_{Ay}' = \rho_A' * \sin 65^\circ = \rho_A' * 0.91$$

$$\rho_{By}' = \rho_B' * \sin -37^\circ = \rho_B' * -0.60$$

$$\rho_{sys y} = \rho_{sys y}' = \rho_{Ay}' + \rho_{By}'$$

$$0.00 \text{ kg m/s} = \rho_A' * 0.91 + \rho_B' * -0.60$$

$$\rho_A' = \rho_B' * 0.60 / 0.91$$

$$\boxed{\rho_A' = \rho_B' * 0.66} \text{ Equation 2}$$

Combining equations 1 and 2:

$$17 \text{ kg m/s} = \boxed{\rho_B' * 0.66} * 0.42 + \rho_B' * 0.80$$

$$17 \text{ kg m/s} = 1.1 * \rho_B'$$

$$\rho_B' = 15 \text{ kg m/s}$$

$$v_B' = \rho_B' / m_B$$

$$v_B' = 15 \text{ kg m/s} / 7.1 \text{ kg} = 2.1 \text{ m/s}$$

$$\rho_A' = \rho_B' * 0.66 = 9.9 \text{ kg m/s}$$

$$v_A' = \rho_A' / m_A$$

$$v_A' = 9.9 \text{ kg m/s} / 3.1 \text{ kg} = 3.2 \text{ m/s}$$