

Exercise 8-21

Linear momentum is conserved.

$$\therefore \underbrace{m_H v_{Hx} + m_B v_{Bx}}_{\text{before collision}} = \underbrace{(m_H + m_B) v_x'}_{\text{after collision}}$$

$$\therefore 100(0) + (90.0)(-15.0 \sin 30.0^\circ) = 190 v_x'$$

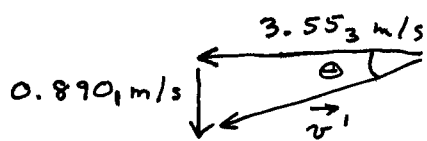
↑
note neg. sign

$$\therefore v_x' = -3.55_3 \text{ m/s}$$

$$\text{and } m_H v_{Hy} + m_B v_{By} = (m_H + m_B) v_y'$$

$$\therefore (100)(10.0) + (90.0)(-15.0 \cos 30.0^\circ) = 190 v_y'$$

$$\therefore v_y' = -0.890_1 \text{ m/s}$$



$$v' = \sqrt{(3.55_3)^2 + (0.890_1)^2} = 3.66 \text{ m/s}$$

$$\Theta = \tan^{-1} \left(\frac{0.890_1}{3.55_3} \right) = 14.1^\circ$$