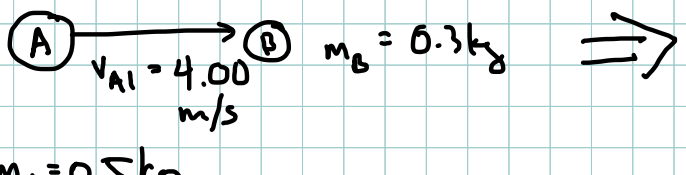

$m_A = 0.5$kg

$v_{A2} = 2.0$ m/s

$v_{B2} = 4.47$ m/s

momentum conservation:

x-dir: $m_A v_{A1} = m_A v_{A2} \cos\alpha + m_B v_{B2} \cos\beta$

y-dir: $0 = m_A v_{A2} \sin\alpha - m_B v_{B2} \sin\beta$

$m_A v_{A2} \cos\alpha = m_A v_{A1} - m_B v_{B2} \cos\beta$

$$\cos\alpha = \frac{m_A v_{A1} - m_B v_{B2} \cos\beta}{m_A v_{A2}}$$

$m_A v_{A2} \sin\alpha = m_B v_{B2} \sin\beta$

$$\sin\alpha = \frac{m_B v_{B2} \sin\beta}{m_A v_{A2}}$$

$$\sin^2\alpha + \cos^2\alpha = 1 = \frac{(m_A v_{A1} - m_B v_{B2}\cos\beta)^2 + m_B^2 v_{B2}^2 \sin^2\beta}{m_A^2 v_{A2}^2}$$

$$m_A^2 v_{A2}^2 = m_A^2 v_{A1}^2 - 2 m_A m_B v_{A1} v_{B2} \cos\beta + m_B^2 v_{B2}^2 \cos^2\beta + m_B^2 v_{B2}^2 \sin^2\beta$$

$$= m_A^2 v_{A1}^2 - 2 m_A m_B v_{A1} v_{B2} \cos\beta + m_B^2 v_{B2}^2$$

$$\Rightarrow \cos\beta = \frac{m_A^2 v_{A1}^2 + m_B^2 v_{B2}^2 - m_A^2 v_{A2}^2}{2 m_A m_B v_{A1} v_{B2}} = 0.894 \Rightarrow \beta = 26.6^\circ$$

$$\frac{\sin\alpha}{\cos\alpha} = \tan\alpha = \frac{m_B v_{B2} \sin\beta}{m_A v_{A1} - m_B v_{B2} \cos\beta} = 0.75 \Rightarrow \alpha = 36.9^\circ$$