

$$m_1 = 2000 \text{ kg}$$

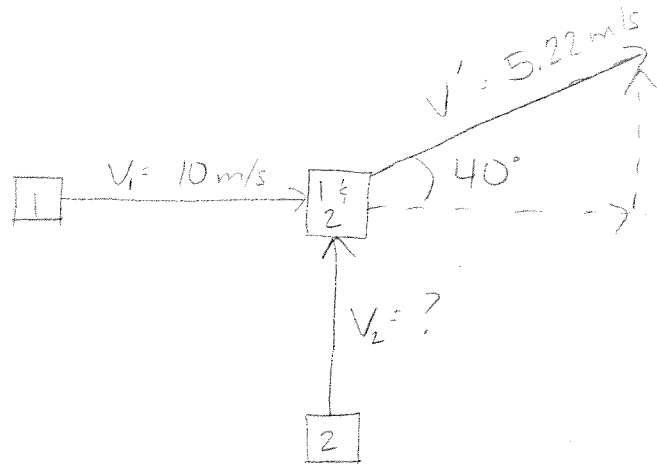
$$V_1 = 10 \text{ m/s, east}$$

$$m_2 = 3000 \text{ kg}$$

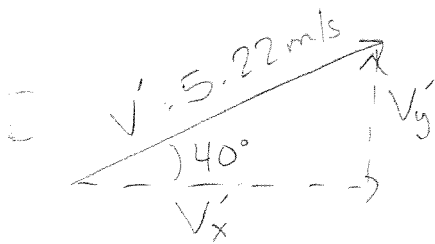
$$V_2 = ? \text{ (north)}$$

$$V' = 5.22 \text{ m/s}$$

$$\theta = 40^\circ \text{ north of east}$$



From trigonometry:



$$V'_y = V' \cdot \sin \theta$$

$$= (5.22 \text{ m/s}) (\sin 40^\circ)$$

$$V'_y = 3.36 \text{ m/s}$$

From conservation of momentum (y direction):

$$m_1 = 2000 \text{ kg}$$

$$V_{1y} = 0 \text{ m/s}$$

$$m_2 = 3000 \text{ kg}$$

$$V_{2y} = ?$$

$$V'_y = 3.36 \text{ m/s}$$

$$m_1 \cdot V_1 + m_2 \cdot V_2 = (m_1 + m_2) \cdot V'$$

$$(\cancel{2000 \text{ kg}})(10 \text{ m/s}) + (3000 \text{ kg}) \cdot V_2 = (5000 \text{ kg})(3.36 \text{ m/s})$$

$$V_2 = 5.59 \text{ m/s}$$