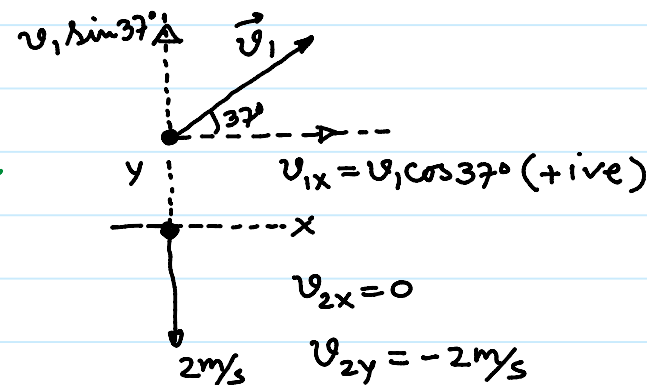
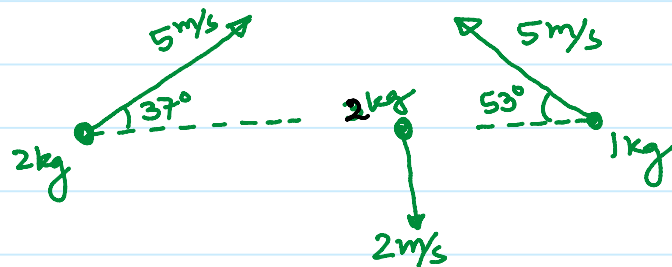
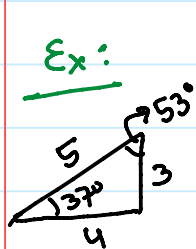
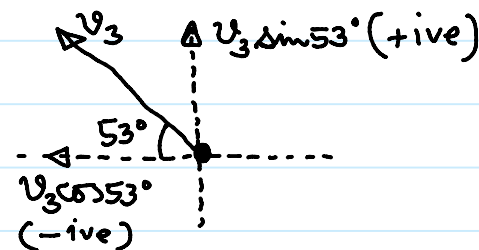




Sol:

$$\begin{aligned}
 v_{cmx} &= \frac{m_1 v_{1x} + m_2 v_{2x} + m_3 v_{3x}}{m_1 + m_2 + m_3} \\
 &= \frac{2 \times v_1 \cos 37^\circ + 2 \times 0 + 1 \times (-v_3 \cos 53^\circ)}{2 + 2 + 1} \\
 &= \frac{2 \times 5 \times \frac{4}{5} + 0 - 5 \times \frac{3}{5}}{5} = \frac{8 - 3}{5} = \frac{5}{5} = 1 \text{ m/s}
 \end{aligned}$$



$$v_{cm y} = \frac{m_1 v_{1y} + m_2 v_{2y} + m_3 v_{3y}}{m_1 + m_2 + m_3} = \frac{2 \times v_1 \sin 37^\circ + 2 \times (-2) + 1 \times v_3 \sin 53^\circ}{2 + 2 + 1}$$

$A_x \& A_y$
 $|\vec{A}| = \sqrt{A_x^2 + A_y^2}$

$$= \frac{2 \times 5 \times \frac{3}{5} - 4 + 5 \times \frac{4}{5}}{5} = \frac{6 - 4 + 4}{5} = \frac{6}{5} = 1.2 \text{ m/s}$$

$$v_{cm} = \sqrt{v_{cmx}^2 + v_{cm y}^2} = \sqrt{1^2 + 1.2^2} = \sqrt{1 + 1.44} = \sqrt{2.44} \text{ m/s}$$