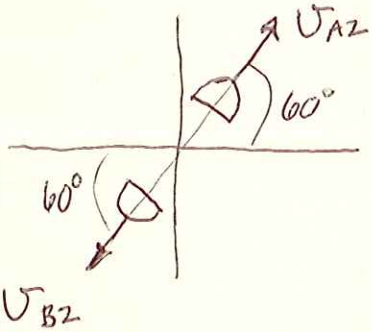
PROB. 14-42

$m_A = 2.5\ kg$, $m_B = 1.5\ kg$, $V_1 = 120^{\circ}$

$\vec{v}_0 = (8)\hat{i}\ \frac{m}{s}$, $\theta = 120°$, FIND v_{A2} AND v_{B2}

FROM PROB. 14-41, $v_{A2} = 6\ \frac{m}{s}$, $v_{B2} = 10\ \frac{m}{s}$



$\vec{v}_{A2} = (6 \cdot \cos 60°)\hat{i} + (6 \cdot \sin 60°)\hat{j}$

$\vec{v}_{A2} = (3)\hat{i} + (5.196)\hat{j}\ \frac{m}{s}$

$\vec{v}_{B2} = (-10 \cdot \cos 60°)\hat{i} + (-10 \cdot \sin 60°)\hat{j}$

$\vec{v}_{B2} = (-5)\hat{i} + (-8.66)\hat{j}\ \frac{m}{s}$

$\vec{v}_A = \vec{v}_G + \vec{v}_{A/G} = (8)\hat{i} + (3)\hat{i} + (5.196)\hat{j}$

$\vec{v}_A = (11)\hat{i} + (5.196)\hat{j}$, $\theta = TAN^{-1}\left(\frac{5.196}{11}\right) = 25.28°$

$\boxed{\vec{v}_A = 12.16\ \frac{m}{s} \angle 25.28°}$

$\vec{v}_B = \vec{v}_G + \vec{v}_{B/G} = (8)\hat{i} + (-5)\hat{i} + (-8.66)\hat{j}$

$\vec{v}_B = (3)\hat{i} + (-8.66)\hat{j}$, $\theta = TAN^{-1}\left(\frac{8.66}{3}\right) = 70.89°$

$\boxed{\vec{v}_B = 9.165\ \frac{m}{s} \angle 70.89°}$