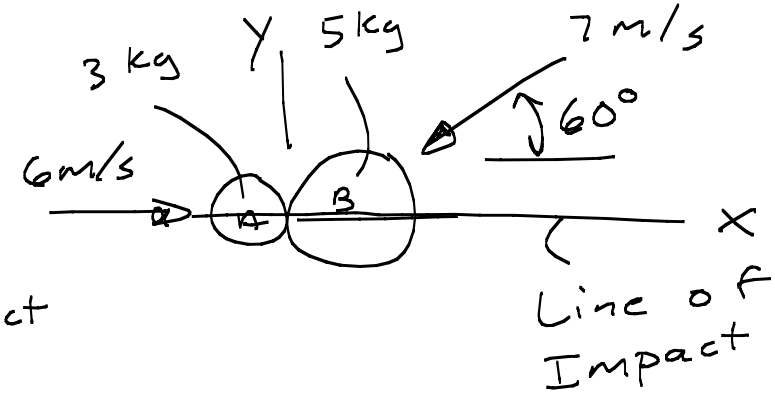
Problem 2

$e = 0.65$



Determine

The velocities just after impact

$$\stackrel{+}{\rightarrow} \quad (3\,kg)(6\,m/s) - (5\,kg)(7\,m/s)(\cos 60^\circ) = (3\,kg)(v_A)_{2x} + (5\,kg)(v_B)_{2x}$$

$$\stackrel{+}{\rightarrow} \quad 0.65 = \frac{(v_B)_{2x} - (v_A)_{2x}}{(6\,m/s) - (-7\,m/s)\cos 60^\circ}$$

$$\boxed{\begin{aligned} (v_A)_{2x} &= -3.80\,m/s \\ (v_B)_{2x} &= 2.378\,m/s \end{aligned}}$$

$$(v_A)_{2y} = (v_A)_{1y} = 0$$

$$(v_B)_{2y} = (v_B)_{1y} = -(7\,m/s)\sin 60^\circ$$

$$= -6.062\ m/s$$

$$\boxed{(v_A)_2 = -3.80\ m/s}$$

$$(v_B)_2 = \sqrt{(2.378)^2 + (6.062)^2} = \boxed{6.51\ m/s}$$

$$\theta_2 = \tan^{-1}\left(\frac{6.062}{2.378}\right)$$

$$\theta_2 = 68.6^\circ$$

$$(\vec{v}_B)_2 = 6.51\ m/s \angle 68.6^\circ$$