Ex 8.4
p249

Before

After

Conserve momentum. $\Delta p_{tot_x} = 0$

$$\Delta p_A + \Delta p_B = 0$$

$$p_{A_f} - p_{A_i} + p_{B_f} - p_{B_i} = 0$$

$p_{A_i} = p_{B_i} = 0$

$$p_{A_f} = -p_{B_f}$$

$$m_A v_{A_f} = -m_B v_{B_f}$$

$$v_{A_f} = -\frac{m_B}{m_A} v_{B_f}$$

$$= -\frac{5.00 \times 10^{-3}\ kg}{3.00\ kg} (300\ ms^{-1})$$

$$v_{A_f} = -0.500\ ms^{-1}$$

$$p_{A_f} = m_A v_{A_f} = (3.00\ kg)(-0.500\ ms^{-1}) = -1.50\ kg$$

$$p_{B_f} = -p_{A_f} = 1.50\ kg\ ms^{-1}$$

KEs. $K_{Af} = \frac{1}{2} m_A v_{Af}^2 = \frac{1}{2}(3.00\,kg)(-0.500\,ms^{-1})^2$

$K_{Af} = 0.375\,J$

$K_{Bf} = \frac{1}{2} m_B v_{Bf}^2 = \frac{1}{2}(5.00\times10^{-3}\,kg)(300\,ms^{-1})^2$

$K_{Bf} = 225\,J$