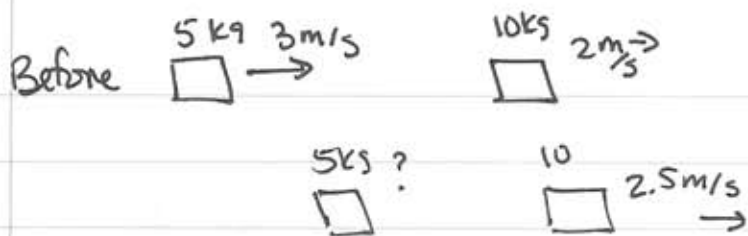


9-57



only ~~horizontal~~ x-component

$$m_1 v_{1, \text{before}} + m_2 v_{2, \text{before}} = m_1 v_{1, \text{after}} + m_2 v_{2, \text{after}}$$

$$(5)(3) + (10)(2) = 5v_{1a} + (10)(2.5)$$

$$\cancel{35} \quad 35 = 5v_{1a} + 25$$

$$10 = 5v_{1a}$$

$$2 = v_{1a}$$

$$\underline{\underline{v_{1a} = 2 \text{ m/s}}}$$

Energy before  $\frac{1}{2} m_1 v_{1b}^2 + \frac{1}{2} m_2 v_{2b}^2$   
 $= \frac{1}{2} (5)(3)^2 + \frac{1}{2} (10)(2)^2$   
 $= 42.5 \text{ Joule}$

Energy after  $= \frac{1}{2} m_1 v_{1a}^2 + \frac{1}{2} m_2 v_{2a}^2$   
 $= \frac{1}{2} (5)(2)^2 + \frac{1}{2} (10)(2.5)^2$   
 41.5 Joule      1 Joule lost

→  $(5)(3) + (10)(2) \neq 5v_{1a} + 10(4)$

$$35 = 5v_{1a} + 40$$

$$-1 \text{ m/s} = v_{1a}$$

→  $\frac{1}{2} (5)(1)^2 + \frac{1}{2} (10)(4)^2 = 82.5 \text{ Joule}$       40 Joules gained?

The calculation only accounts for kinetic energy. There must have been some kind of potential energy that got released.