

# HomeWork Solution

## Chapter 1

Pb #3.

$$m_1 = 2000 \text{ Kg} \quad v_1 = 20 \text{ m/s}$$

$$m_2 = 1500 \text{ Kg} \quad v_2 = 0$$

In the rest frame momentum is conserved

$$p_i = p_f$$

$$\Rightarrow m_1 v_1 + m_2 v_2 = (m_1 + m_2) v$$

$$2000 \times 20 = 3500 v \Rightarrow v = \frac{40000}{3500}$$

$$v = 11.43 \text{ m/s}$$

In the moving frame, is momentum conserved?

$$p_i \stackrel{?}{=} p_f$$

$$m_1 = 2000 \text{ Kg} \quad v_1 = 20 - 10 = 10 \text{ m/s}$$

$$m_2 = 1500 \text{ Kg} \quad v_2 = 0 - 10 = -10 \text{ m/s}$$

$$v = 1.143 \text{ m/s} = 11.43 - 10$$

$$p_i = (2000)(10) + (1500)(-10) = 5000 \text{ Kg} \cdot \frac{\text{m}}{\text{s}}$$

$$p_f = (3500)(1.143) = 5000 \text{ Kg} \cdot \frac{\text{m}}{\text{s}}$$

$\Rightarrow$  momentum is conserved!