

Problem 9.37

Determine the center of mass of the four bodies in the system.

$$\begin{aligned} y_{\text{cm}} &= \frac{\sum m_i y_i}{m_{\text{total}}} \\ &= \frac{m_1 y_1 + m_2 y_2 + m_3 y_3 + m_4 y_4}{m_1 + m_2 + m_3 + m_4} \\ &= \frac{(4.00 \text{ kg})(-0.500 \text{ m}) + (2.50 \text{ kg})(0 \text{ m}) + (3.00 \text{ kg})(2.50 \text{ m}) + (2.00 \text{ kg})(3.00 \text{ m})}{(4.00 \text{ kg}) + (2.50 \text{ kg}) + (3.00 \text{ kg}) + (2.00 \text{ kg})} \\ &= 1.00 \text{ m} \end{aligned}$$

$$\Rightarrow \vec{r}_{\text{cm}} = (0.0\hat{i} + 1.00\hat{j})\text{m}$$

