

Oct 28, 01

Holiday and Resnick ed 6

Rec - CH9 - 1

Q5

(a)  $\vec{v}_{com} = \frac{m_1 \vec{v}_1 + m_2 \vec{v}_2}{m_1 + m_2}$  for two particles

Since we need the center of mass to be stationary ( $\vec{v}_{com} = 0$ ) and  $m_2 = m_1$

$$\Rightarrow \vec{v}_1 = -\vec{v}_2$$

pairs a, c  
b, c  
c, d

(b)  $x_{com} = \frac{m_1 x_1 + m_2 x_2}{m_1 + m_2}$

$$0 = \frac{m x_1 + m x_2}{m_1 + m_2}$$

$$0 = x_1 + x_2$$

$$\text{or } x_1 = -x_2$$

Similarly  $y_1 = -y_2$

pairs b, c

(c) pairs a, d (not stationary)  
b, c

Q6

(a) stationary  $\Rightarrow a_{com} = 0$  and  $v_{com} = 0$

$$F_{net} = M a_{com} = 0$$

$$\Rightarrow \vec{F}_{net} = 0 \Rightarrow F_3 = 3 \text{ N to right.}$$

(b) constant velocity  $\Rightarrow a_{com} = 0$

$$\Rightarrow F_3 = 3 \text{ N to right}$$

(c)  $F_3 > 3 \text{ N to right.}$