

Name: _____

ID # _____

Key

- 1) Two blocks approach each other at right angles on a frictionless surface. Block A has a mass of 40 kg and travels along the +ve x-axis at 3 m/s. Block B has a mass of 80 kg and is moving in the +ve y-axis at 2 m/s. They collide and stick together. Find the final velocity of the two blocks

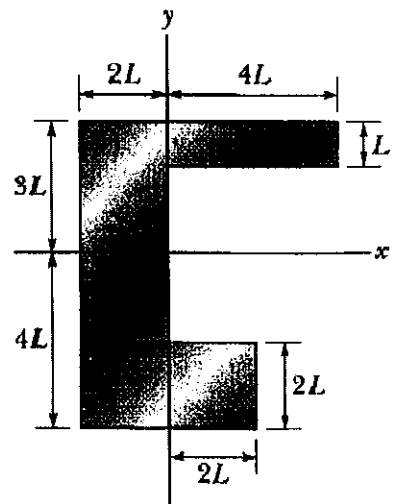
$$\vec{P}_i = \vec{P}_f$$

$$m_1 \vec{v}_{1i} + m_2 \vec{v}_{2i} = (m_1 + m_2) \vec{v}_f$$

$$\vec{v}_f = \frac{m_1 \vec{v}_{1i} + m_2 \vec{v}_{2i}}{(m_1 + m_2)} = \frac{40(3\hat{i}) + 80(2)\hat{j}}{40 + 80} = \frac{120\hat{i} + 160\hat{j}}{120}$$

$$\vec{v}_f = (1\hat{i} + 1.33\hat{j}) \frac{m}{s}$$

- 2) What are (a) the x coordinate and (b) the y coordinate of the center of mass for the uniform plate shown in Fig. if $L = 5.0$ cm?



- Area is proportional to mass
- divide the shape into 3-parts.

$$a) X_{com} = \frac{4(10) + 4(5) + 14(-5)}{4 + 4 + 14} = \frac{40 + 20 - 70}{22} = \frac{-10}{22} = -0.45 \text{ cm}$$

$$b) Y_{com} = \frac{4(12.5) + 4(-15) + 14(-2.5)}{4 + 4 + 14} = \frac{50 - 60 - 35}{22} = -2.045 \text{ cm}$$

