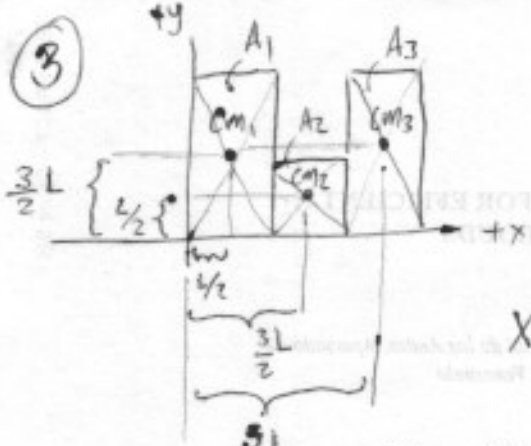
(3)



$$\begin{cases} m_1 = \sigma A_1 \\ m_1 = \sigma (3L)(L) \\ m_1 = \sigma 3L^2 \end{cases} \qquad \begin{cases} m_2 = \sigma A_2 \\ m_2 = \sigma (L)(L) \\ m_2 = \sigma L^2 \end{cases} \qquad \begin{cases} m_3 = \sigma A_3 \\ m_3 = m_1 \\ m_3 = \sigma 3L^2 \end{cases}$$

$$X_{cm} = \frac{m_1 X_1 + m_2 X_2 + m_3 X_3}{m_1 + m_2 + m_3}$$

$$X_{cm} = \frac{(\sigma 3L^2)(\frac{L}{2}) + (\sigma L^2)(\frac{3}{2}L) + (\sigma 3L^2)(\frac{5}{2}L)}{\sigma 3L^2 + \sigma L^2 + 3\sigma L^2}$$

$$X_{cm} = \frac{\frac{3}{2}L + \frac{3}{2}L + \frac{3}{2}(5L)}{3+1+3} = \frac{\frac{3}{2}(L+L+5L)}{7} = \frac{\frac{3}{2}(7L)}{7} = \frac{3}{2}L \quad (3\text{ pts})$$

$$y_{cm} = \frac{m_1 y_1 + m_2 y_2 + m_3 y_3}{m_1 + m_2 + m_3} = \frac{(\sigma 3L^2)(\frac{3}{2}L) + (\sigma L^2)(\frac{L}{2}) + (\sigma 3L^2)(\frac{3}{2}L)}{\sigma 3L^2 + \sigma L^2 + \sigma 3L^2}$$

$$y_{cm} = \frac{3(\frac{3}{2}L) + \frac{L}{2} + 3(\frac{3}{2}L)}{7} = \frac{\frac{L}{2}(9+1+9)}{7} = \frac{\frac{L}{2}(19)}{7} = \frac{19}{14}L \quad (3\text{ pts})$$

$$\vec{r}_{cm} = \frac{3}{2}L\hat{i} + \frac{19}{14}L\hat{j}$$

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$$\vec{r}_{cm} = (1{,}5)L\hat{i} + (1{,}36)L\hat{j}$$