

$$\dot{0} = \frac{m + 2m \cdot y_3}{4m}$$

$$m + 2m y_3 = 0 \Rightarrow 2m y_3 = -m$$

$$\boxed{y_3 = -1/2 m}$$

Final position of 3rd part is $(-\frac{1}{2}, -\frac{1}{2})m$.