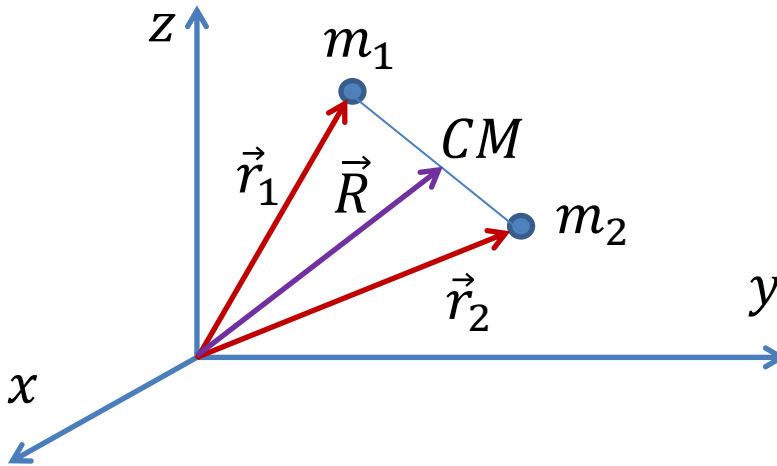


Answer on Question #82826, Physics / Classical Mechanics

Question. Prove the position of centre of mass or formula?

Answer.



$$m_1(\vec{R} - \vec{r}_1) = m_2(\vec{r}_2 - \vec{R}) \rightarrow m_1\vec{R} - m_1\vec{r}_1 = m_2\vec{r}_2 - m_2\vec{R} \rightarrow$$

$$m_1\vec{R} + m_2\vec{R} = m_1\vec{r}_1 + m_2\vec{r}_2 \rightarrow \vec{R} = \frac{m_1\vec{r}_1 + m_2\vec{r}_2}{m_1 + m_2} \text{ or}$$

$$X = \frac{m_1x_1 + m_2x_2}{m_1 + m_2},$$

$$Y = \frac{m_1y_1 + m_2y_2}{m_1 + m_2},$$

$$Z = \frac{m_1z_1 + m_2z_2}{m_1 + m_2}.$$

For n particles

$$X = \frac{\sum m_i x_i}{\sum m_i}, \quad Y = \frac{\sum m_i y_i}{\sum m_i}, \quad Z = \frac{\sum m_i z_i}{\sum m_i},$$

Answer provided by <https://www.AssignmentExpert.com>