

# AY 212

So far, we have been discussing the relative motion of the vector  $\vec{r}$  that connects  $m_1$  to  $m_2$ . Hence, from the point of view of either body, the other body is executing an elliptical orbit of semi-major axis  $a$ .

The center of mass is always on the line joining  $m_1$  and  $m_2$ :

$$R_1 = \frac{m_2}{m_1 + m_2} r \quad R_2 = \frac{m_1}{m_1 + m_2} r$$

Therefore, whichever conic section describes the relative motion of the two masses, each mass will also orbit the center of mass of the system in a path described by the same conic section reduced in scale by  $m_1/(m_1+m_2)$  or  $m_2/(m_1+m_2)$ .

