

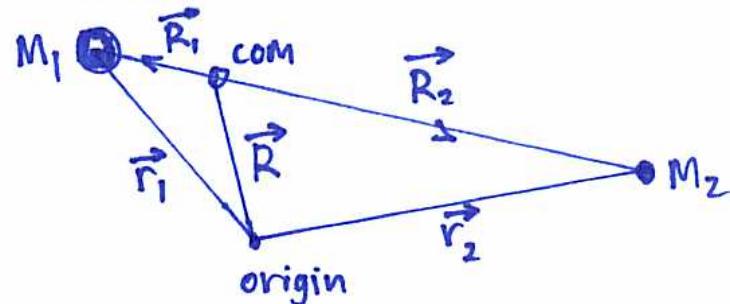
AY 212

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 .

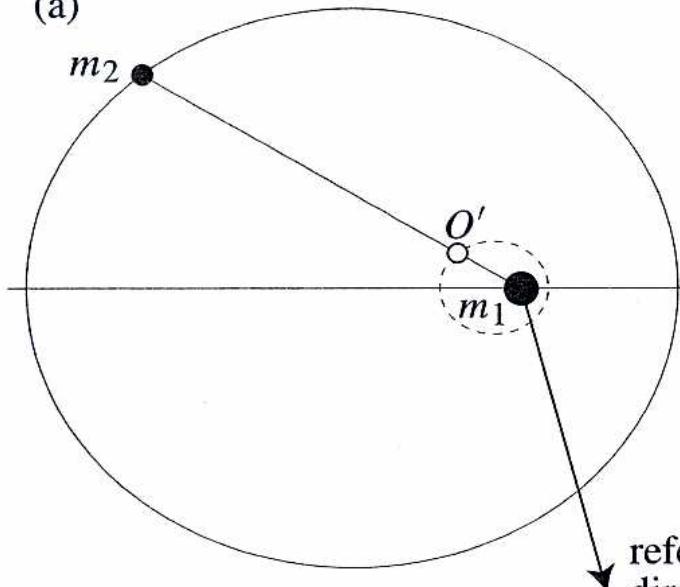
The center of mass is always on the line joining M_1 and M_2 :

$$R_1 = \frac{M_2}{M_1 + M_2} r \quad R_2 = \frac{M_1}{M_1 + M_2} r$$

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 $M_2/(M_1 + M_2)$.



(a)



(b)

