

A satellite of mass  $m$  orbits the sun of mass  $M$  in a circular orbit of radius  $R$ .

1. Express the speed of the satellite in terms of  $G$ ,  $R$  and  $M$

1. An asteroid of mass  $2m$  moving with the same speed, but opposite direction to the satellite collides perfectly elastically with the satellite. Calculate the final speed of the satellite.