

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.

1. After the collision, is the satellite still bound to the sun or is it free to move an infinite distance away from the sun?