4) A spacecraft has a speed of 120 km/s when it is 13.7×10^6 km from the Sun. Answer the following questions by taking $G = 6.7 \times 10^{-11}$ Nm²/kg², and the mass of the Sun, $m_{Sun} = 2 \times 10^{30}$ kg.

    a) Prove that the spacecraft is not in a circular orbit around the Sun.

    b) Will the spacecraft continue moving along a closed or open orbit about the Sun?

Solution continues on the back side of the page **Yes** □ **No** □

4) Consider a thin uniform disk of mass M and radius a, and a mass m located along the axis of the disk at a distance z away from the center. Find the gravitational potential energy U of the system.

m

a

z

M