

1 Shooting the Moon

In this problem assume that there is no atmospheric friction, and use a static model for the earth and moon system. Use: the mass of the earth is $M_E = 5.97 \times 10^{24}$ kg, the mass of the moon is $M_m = 7.35 \times 10^{22}$ kg, the radius of the earth is $R_E = 6.38 \times 10^6$ m, and radius of the moon is $R_m = 1.74 \times 10^6$, the orbit radius of the earth moon system as measured from earth's center to the moon's center is $R_o = 3.84 \times 10^8$ m, and the gravitation constant $G = 6.67 \times 10^{-11}$ Nm²/kg².

Find the minimum initial speed of a projectile that is shot to the surface of the moon, v_i . You must keep at least three significant figures. (The escape speed for earth is about $11200 \frac{\text{m}}{\text{s}}$, and this is not much different.)