

Problem 10.1 A remote sensing satellite is in circular orbit around Earth at an altitude of 1,100 km above Earth's surface. What is its orbital period?

Solution: The orbit's radius is $R_0 = R_e + h = 6,378 + 1,100 = 7478$ km. Rewriting Eq. (10.6) for T :

$$\begin{aligned} T &= \left(\frac{4\pi^2 R_0^3}{GM_e} \right)^{1/2} = \left[\frac{4\pi^2 \times (7.478 \times 10^6)^3}{6.67 \times 10^{-11} \times 5.98 \times 10^{24}} \right]^{1/2} \\ &= 4978.45 \text{ s} = 82.97 \text{ minutes.} \end{aligned}$$
