

PROB. 11-156

$$D_{\text{sun}} = 864,000 \text{ mi}, \quad a_{\text{sun}} = 900 \frac{\text{ft}}{\text{s}^2}, \quad (V_{\text{mean}})_{\text{orbit}} = 66,600 \frac{\text{mi}}{\text{H}}$$

FIND r_{earth}

$$R_{\text{sun}} = \frac{1}{2} D_{\text{sun}} = 432,000 \text{ mi}$$

$$a_n = g \left(\frac{R}{r} \right)^2 = \frac{v^2}{r}$$

$$r = g \left(\frac{R}{v} \right)^2$$

$$r = \left(900 \frac{\text{ft}}{\text{s}^2} \right) \left[\frac{(432,000 \text{ mi}) \left(\frac{5280 \text{ ft}}{\text{mi}} \right)}{\left(66,600 \frac{\text{mi}}{\text{H}} \right) \left(\frac{\text{H}}{3600 \text{ s}} \right) \left(\frac{5280 \text{ ft}}{\text{mi}} \right)} \right]^2$$

$$r = \left(4.907 \times 10^{11} \text{ ft} \right) \left(\frac{\text{mi}}{5280 \text{ ft}} \right) = 9.293 \times 10^7 \text{ mi}$$