

**Answer on Question #43412, Physics, Mechanics — Kinematics — Dynamics**

If the gravitational force exerted by the planet Saturn on a 560 kg lunar vehicle is  $5.83 \cdot 10^3$  N, the radius of Saturn is?

Solution

Gravitational force is equal to weight:

$$F = \frac{GM_{\text{saturn}}m_{\text{vehicle}}}{R_{\text{saturn}}^2}$$

Hence, radius of Saturn is

$$R_{\text{saturn}} = \sqrt{\frac{GM_{\text{saturn}}m_{\text{vehicle}}}{F}} = \sqrt{\frac{6.67 \cdot 10^{-11} \cdot 5.68 \cdot 10^{26} \cdot 560}{5.83 \cdot 10^3}} \approx 60.2 \cdot 10^6 \text{ m} = 60200 \text{ km}$$