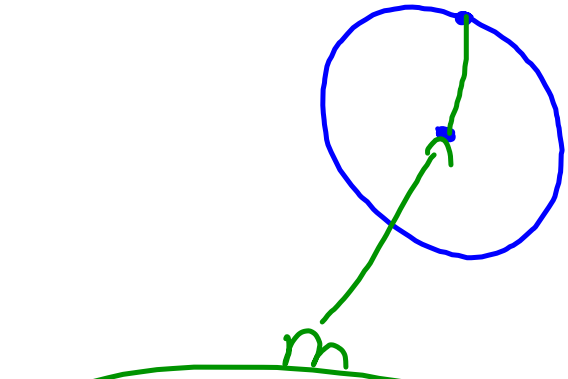
1. Calculate the orbital velocity of the planet Venus

$$V = \sqrt{\frac{GM}{r}}$$

$G = 6.672 \times 10^{-11} \frac{N m^2}{kg^2}$

$r = 1.0811 \times 10^{8}\ km$

$M = 1.991 \times 10^{30}\ kg$

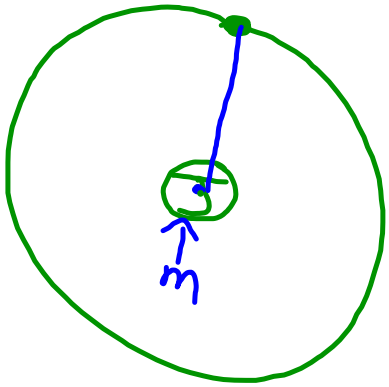


$V = 35048.19\ m/s$

$= 35.05\ km/s$

2. Calculate the orbital period of Europa (one of Jupiter's moon)

$$T = 2\pi\sqrt{\frac{r^3}{G m_J}}$$



$$T = (2)(\pi)\sqrt{\frac{(6.712\times10^{8}\,m)^3}{(6.67\times10^{-11})(1.901\times10^{27}\,kg)}}$$

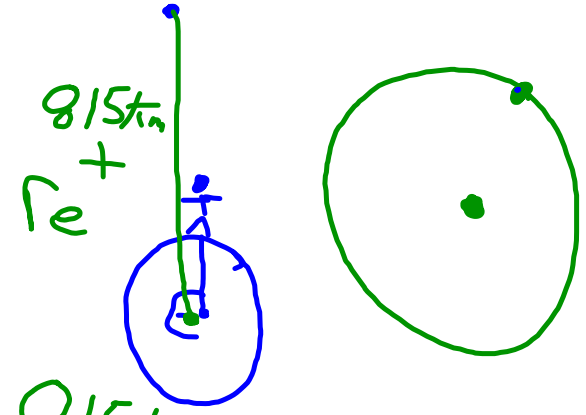
$$T = 3.068\times10^{5}\,sec$$

$$= 5113.90\,min \quad \div 60$$

$$= 85.23\,hours \quad \div 60 \quad \div 3600$$

3. What is the orbital velocity of the satellite that is orbit 815 km above the Earth's surface?

$$v = \sqrt{\frac{GM_e}{r}}$$



$r = 815\text{km} + 6371.315\text{km}$

$r = 7186.315\text{km}$

$r = 7186.315 \times 10^3\text{m}$

$\rightarrow 7.186315 \times 10^6\text{m}$

$$v = \sqrt{\frac{6.67 \times 10^{-11}\text{N m}^2/\text{kg}^2 \cdot 5.979 \times 10^{24}\text{kg}}{7.186315 \times 10^6\text{m}}}$$

$v = 7.45 \times 10^3\text{m/s}$