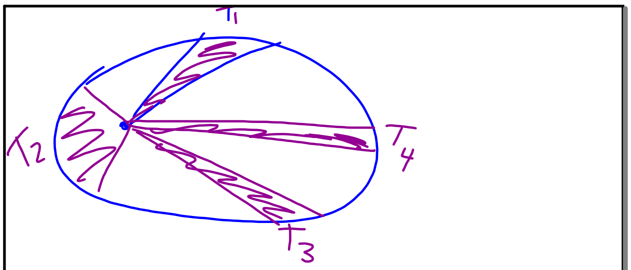


Nov 19-7:31 AM

$$\frac{T^2}{R^3} = \frac{4\pi^2}{GM}$$

central mass

$$\frac{T_1^2}{R_1^3} = \frac{T_2^2}{R_2^3}$$

Nov 19-7:33 AM

Jupiter 5x from sun T in years?

$R_E = 1.5\times10^{11}\,m$

$$\frac{T_E^2}{R_E^3} = \frac{T_J^2}{R_J^3}$$

$$\frac{1^2}{(1.5\times10^{11}\,m)^3} = \frac{T_J^2}{(5\times1.5\times10^{11}\,m)^3}$$

$$T_J^2(1.5\times10^{11})^3 = 5^3(1.5\times10^{11})^3$$

$$T_J^2 = 125\,yrs$$

$$T_J = 11.18\,yrs$$

Nov 19-7:34 AM

13 Oberon: T = 13 days R = ?

$$\frac{(1123200\,s)^2}{R^3} = \frac{4\pi^2}{G(86.81\times10^{24}\,kg)}$$

$$(1123200)^2(5.79\times10^{15}) = 4\pi^2R^3$$

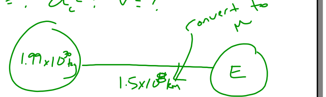
$$7.3\times10^{27} = 4\pi^2R^3$$

$$R^3 = 1.85\times10^{26}$$

$$R = 5.6\times10^{8}\,m$$

Nov 19-7:39 AM

$F_g = ?$ $a_c = ?$ $v = ?$



$$F_g = \frac{G(1.99\times10^{30}\,kg)(5.98\times10^{24}\,kg)}{(1.5\times10^{11}\,m)^2}$$

$5.98\times10^{24}\,kg$

$$F_g = 3.53\times10^{22}\,N$$

$$F_g = m_E a_c$$

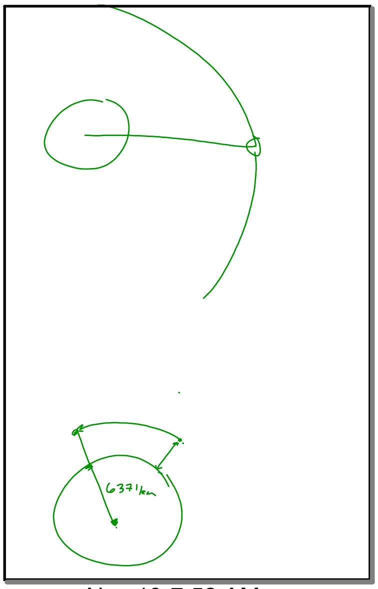
$$3.53\times10^{22}\,N = (5.98\times10^{24})\,a_c$$

$$5.9\times10^{-3}\,m/s^2 = a_c$$

$$5.9\times10^{-3}\,m/s^2 = \frac{v^2}{(1.5\times10^{11}\,m)}$$

$$v = 2.97\times10^{4}\,m/s$$

Nov 19-7:45 AM



Nov 19-7:52 AM

$$2F_g = \frac{Gm_1 2m_2}{(r)^2}$$

$$\frac{F_g}{4} = \frac{Gm_1m_2}{(2r)^2} \quad 4r^2$$

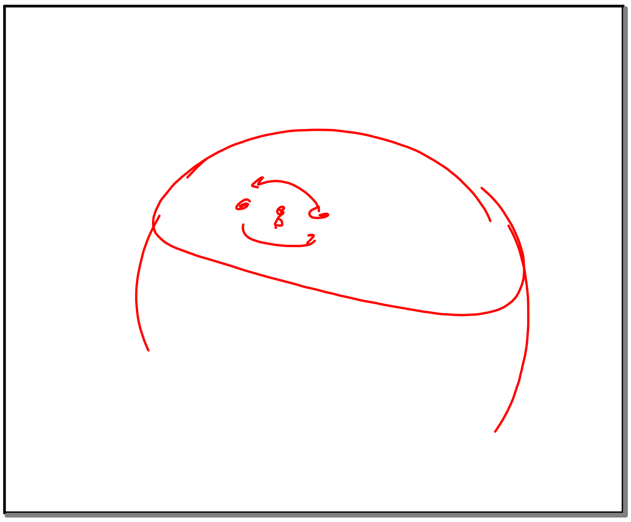
$$\frac{1}{9}F_g = \frac{Gm_1m_2}{(3r)^2}$$

$$4F_g = \frac{Gm_1m_2}{(\frac{1}{2}r)^2} \quad \frac{1}{4}$$

$$36F_g = \frac{Gm_1m_2}{(\frac{1}{6}r)^2} \quad \frac{1}{36}r^2$$

$$4F_g = \frac{Gm_1m_2}{(\frac{1}{2}r)^2} \quad \frac{1}{4}$$

Nov 19-7:56 AM



Nov 19-8:02 AM

A planet w/ a high eccentricity (v. elliptical) has a radius that decreases by $\frac{1}{3}$ of it's value between it's furthest + closest point

Or, $R_{close} = \frac{2}{3}R_{far}$

Find the relationship between $F_{g\,close}$ + $F_{g\,far}$

$$F_{g_{far}} = \frac{Gm_1m_2}{R_{far}^2}$$

$$\frac{F_{g_{far}}}{\frac{4}{9}} = \frac{Gm_1m_2}{(\frac{2}{3}R_{far})^2} \quad \frac{4}{9}$$

$$\frac{9}{4}F_{g_{far}} = F_{g_{close}}$$

Nov 19-8:03 AM