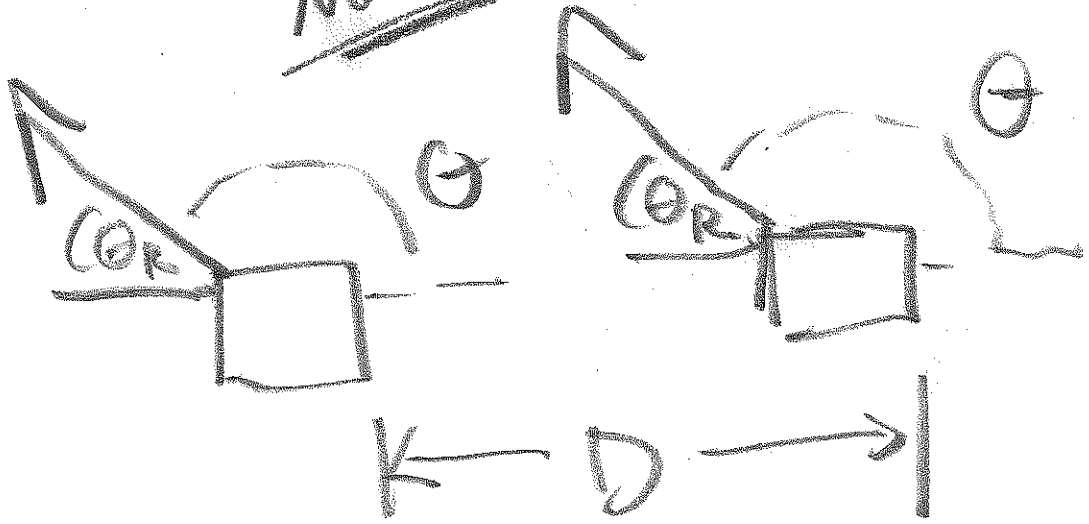
10-7-13

(D

Ch 7 note

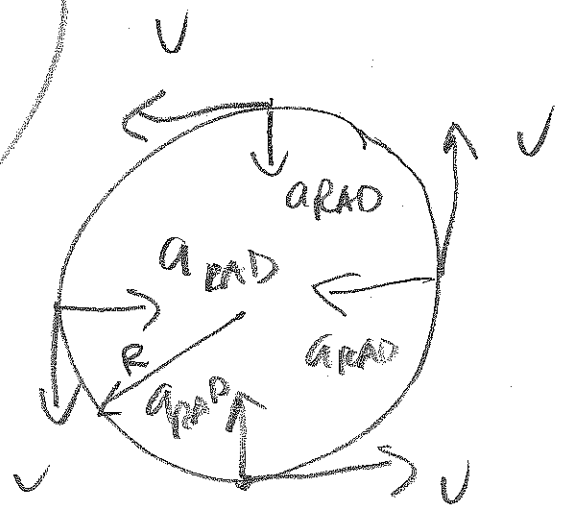
Ch 7 Note:



$W = F_{\cos\theta} \cdot D$

$= -F_{\cos\theta_R} \cdot D$

10-7-13

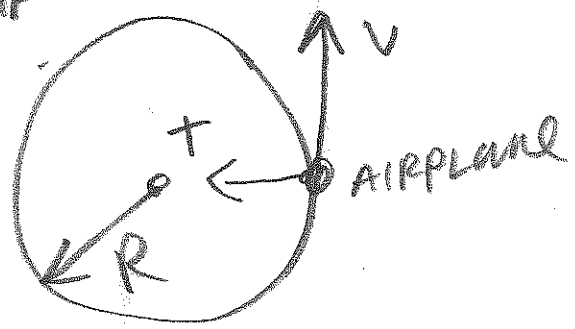


$$a_{RAD} = \frac{v^2}{R}$$

$$F = m a_{RAD}$$

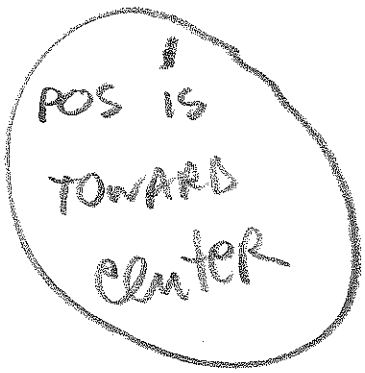
$$F = \frac{mv^2}{R}$$

Example 1

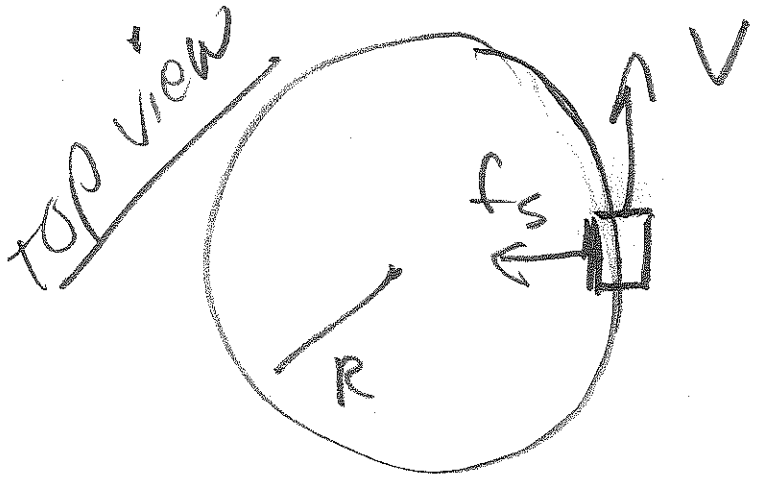


$$\sum F_R = POS - NEG$$

$$\frac{mv^2}{R} = T - 0$$



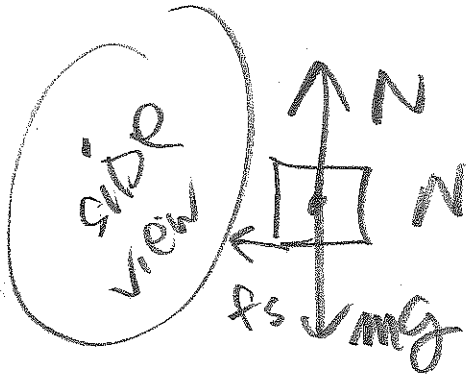
Example 3



$$\sum F_R = F_{OS} - F_{IG}$$

$$\frac{mv^2}{R} = f_s$$

NOTE: $f_{s_{MAX}} = \mu_s \cdot N$



$N = mg$

$$\frac{mv_{MAX}^2}{R} = f_{s_{MAX}}$$

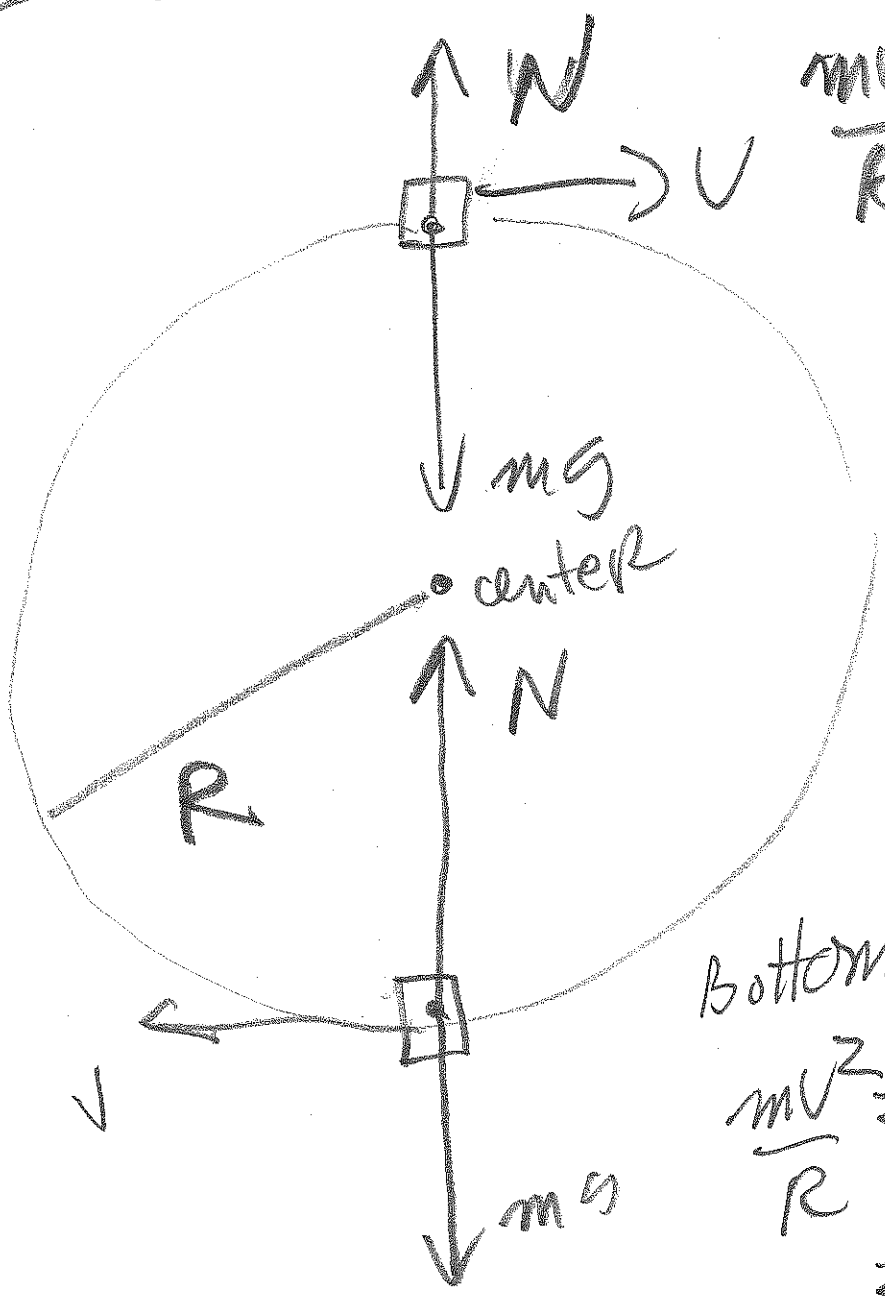
$$\frac{mv_{MAX}^2}{R} = \mu_s mg$$

$$\Rightarrow v_{MAX} = \sqrt{gR\cdot\mu_s}$$

BAD TIRES: $\mu_s = 0$

$v_{MAX} = 0$

Ex. 5



Top:

$$\frac{mv^2}{R} = \text{pos} - mg \quad (3)$$

$$\frac{mv^2}{R} = mg - N$$

$$N_T = m\left(g - \frac{v^2}{R}\right)$$

Bottom:

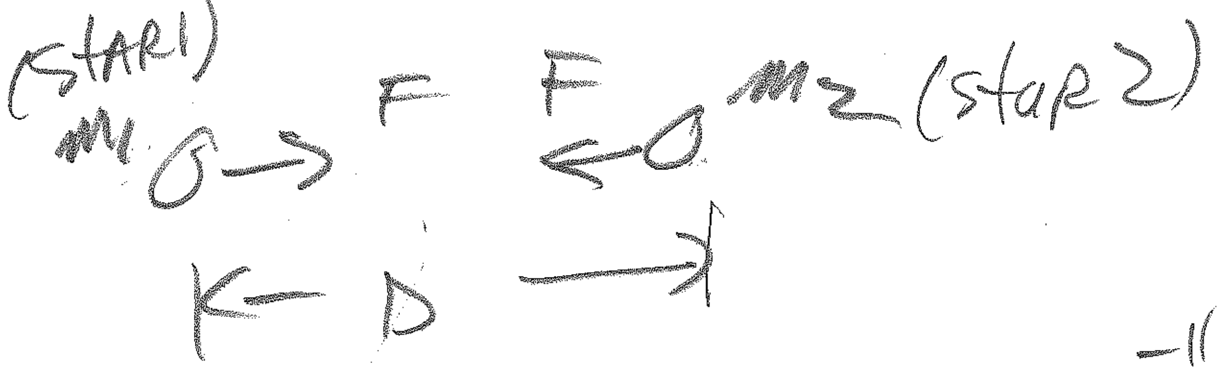
$$\frac{mv^2}{R} = \text{pos} - mg$$

$$\frac{mv^2}{R} = N - mg$$

$$N_B = m\left(g + \frac{v^2}{R}\right)$$

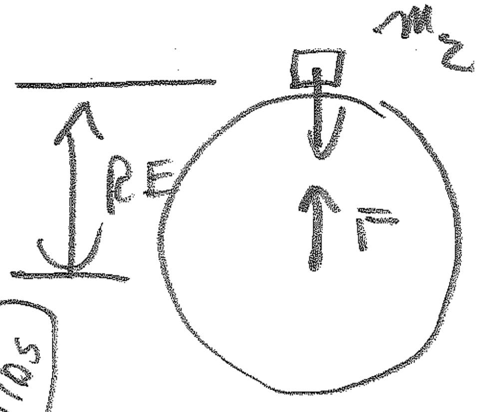
CH6 :

GRAVITY



$$F = \frac{G m_1 m_2}{D^2} \; ; \; G = 6.67 \times 10^{-11} \frac{N \cdot m^2}{kg^2}$$

m_2 = YOU !

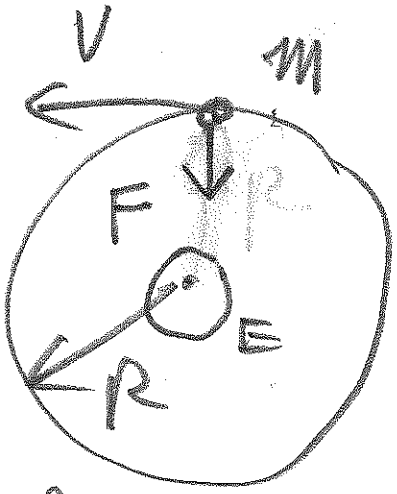


$m_1 = M_E$

(120 lbs) → $m_2 g = \frac{G m_2 M_E}{R_E^2}$

$$\boxed{g = \frac{G M_E}{R_E^2}} = 9.8 \frac{m}{s^2}$$

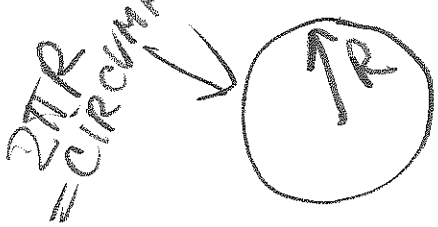
satellites



$$\Sigma F_R = F_{CS} - mg$$

$$\frac{mv^2}{R} = \frac{GmM_E}{R^2}$$

$$v^2 = \frac{GM_E}{R}$$



$$v = \frac{2\pi R}{T} \Rightarrow v^2 = \frac{4\pi^2 R^2}{T^2}$$

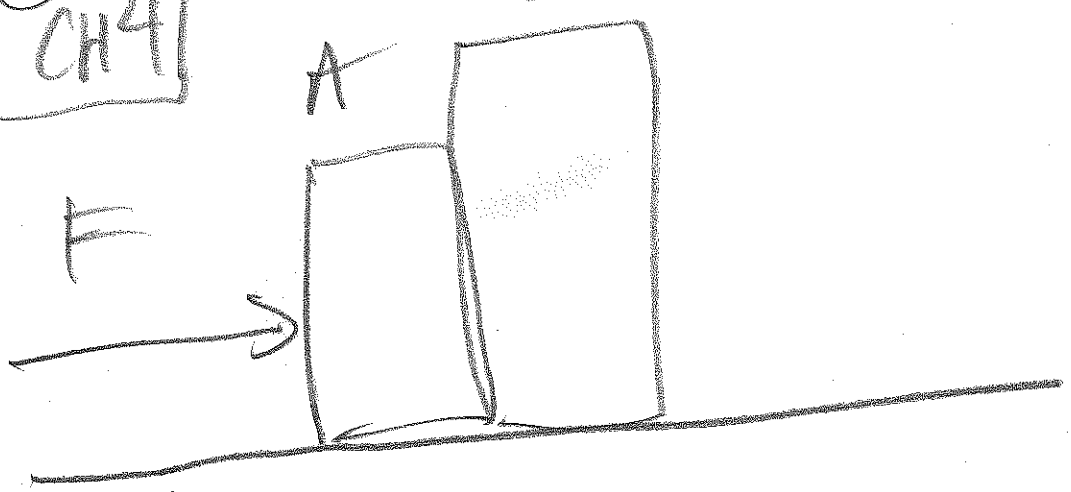
T - PERIOD

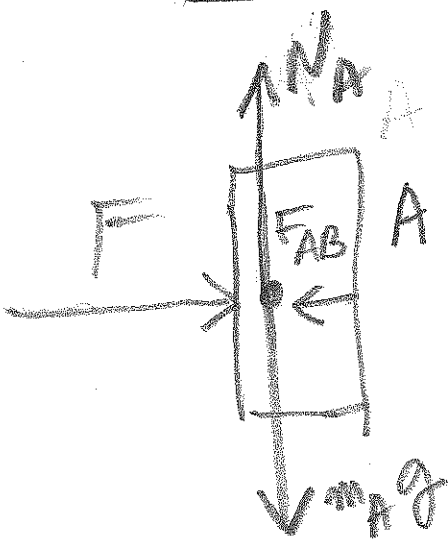
$$\frac{4\pi^2 R^2}{T^2} = \frac{GM_E}{R}$$

$$\Rightarrow \boxed{T^2 = \frac{4\pi^2}{GM_E} R^3 \quad \text{KEPLER'S LAW}}$$

(26) CH4

→ a = acceleration (right)

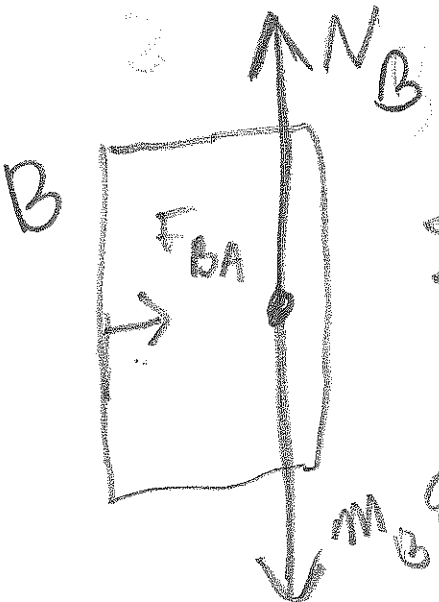




ΣF_x = pos − neg

$m_A a = F - F_{AB}$

note: $F_{AB} = F_{BA} = F_C$



ΣF_x = pos − neg

$m_B a = F_{BA}$ — ②

(A) $m_A a = F - F_c$

(B) $m_B a = F_c$

$m_A a + m_B a = F$ ADD

$a = \dfrac{F}{(m_A + m_B)}$

and $F_c = m_B \cdot a$

$= \dfrac{m_B \cdot F}{(m_A + m_B)}$