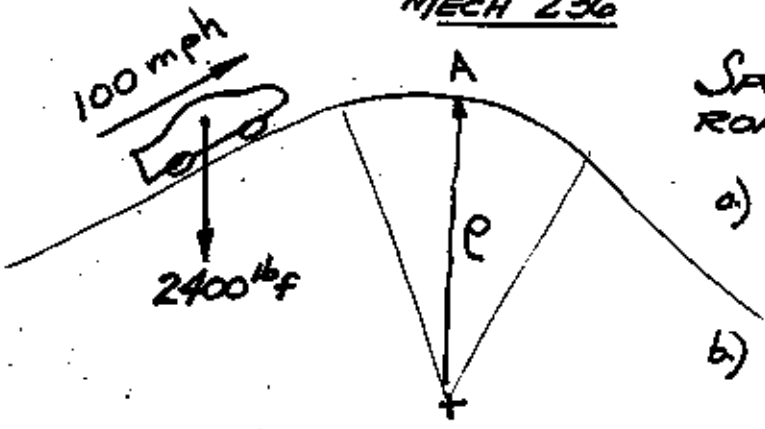
MECH 236

PROB. 12.46

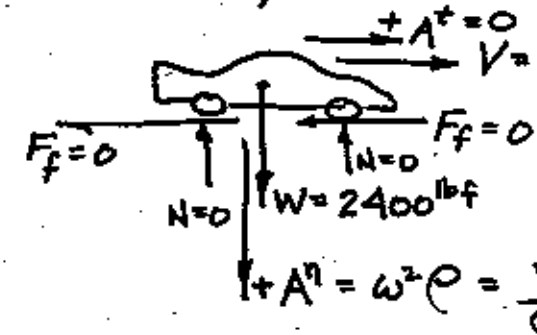


SPORTS CAR LOSES ROAD CONTACT AT A

a) ? ρ = RADIUS of CURVATURE at A.

b) F ON DRIVER = 160 lbf BY THE SEAT OF A DIF. CAR = 3100 lbf @ CONSTANT V = 50 mph.

(a) CAR at pt. A.



$V = 100 \frac{mi}{h.} \times \frac{88 \frac{ft}{sec}}{60 \frac{mi}{h.}} = 146.67 \frac{ft}{sec}$.

} No Contact w/ Road Surf.

$$\Sigma \vec{F}_{on\ CAR} = m_{CAR} \vec{a}$$

TANGENTIAL: $\Sigma F = m a^t \ \pm\rightarrow$

$0 = 0$

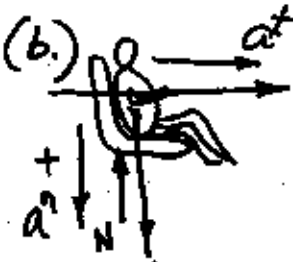
NORMAL: $\Sigma F = m a^n = \frac{W}{g}\left[\frac{V^2}{\rho}\right] \ +\downarrow$

$$2400^{lbf} = \frac{2400^{lbf}}{32.2 \frac{ft}{s^2}} \frac{(146.67 ft/s)^2}{\rho}$$

$$\rho = \frac{(146.67)^2}{32.2} \frac{ft^2/s^2}{ft/s^2} = 668.077'$$

$\boxed{\rho = 668 ft.}$

(b.)



$V = 50 \frac{mi}{h.}\left[\frac{88 ft/s}{60 mph}\right] = 73.33 \frac{ft}{sec}$ CONSTANT

TANGENTIAL: $\Sigma F = m a^t$

$0 = 0$

NORMAL: $\Sigma F_{on\ man} = m_{man} a^n = \frac{W}{g}\frac{V^2}{\rho}$

$$160^{lbf} - N = \frac{160^{lb.}}{32.2 \frac{ft}{s^2}} \frac{(73.33)^2}{668 ft.}$$

FORCE on MAN = $\boxed{N = 120\ lbf}$ Check your algebra!