ENGR 202
HW #A-
DUE 9/2/02
JOE BURNS

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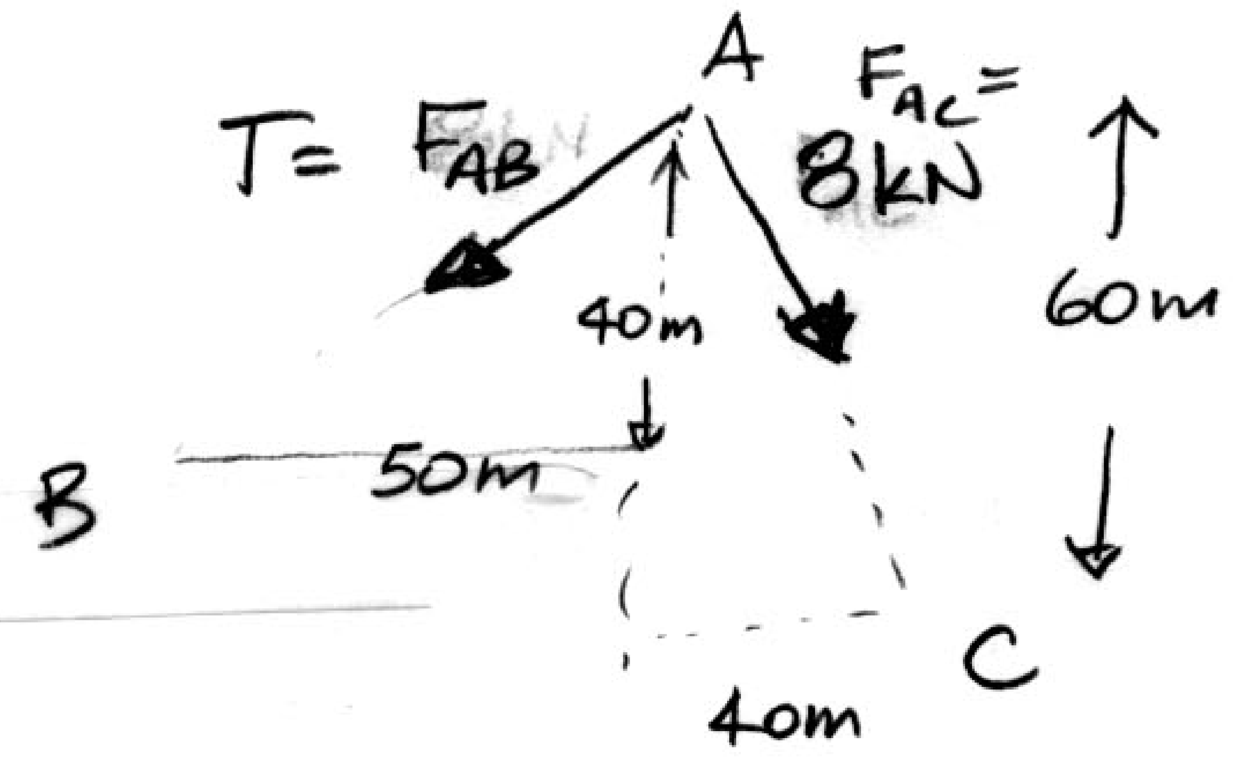

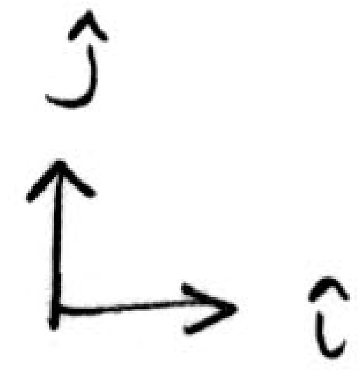

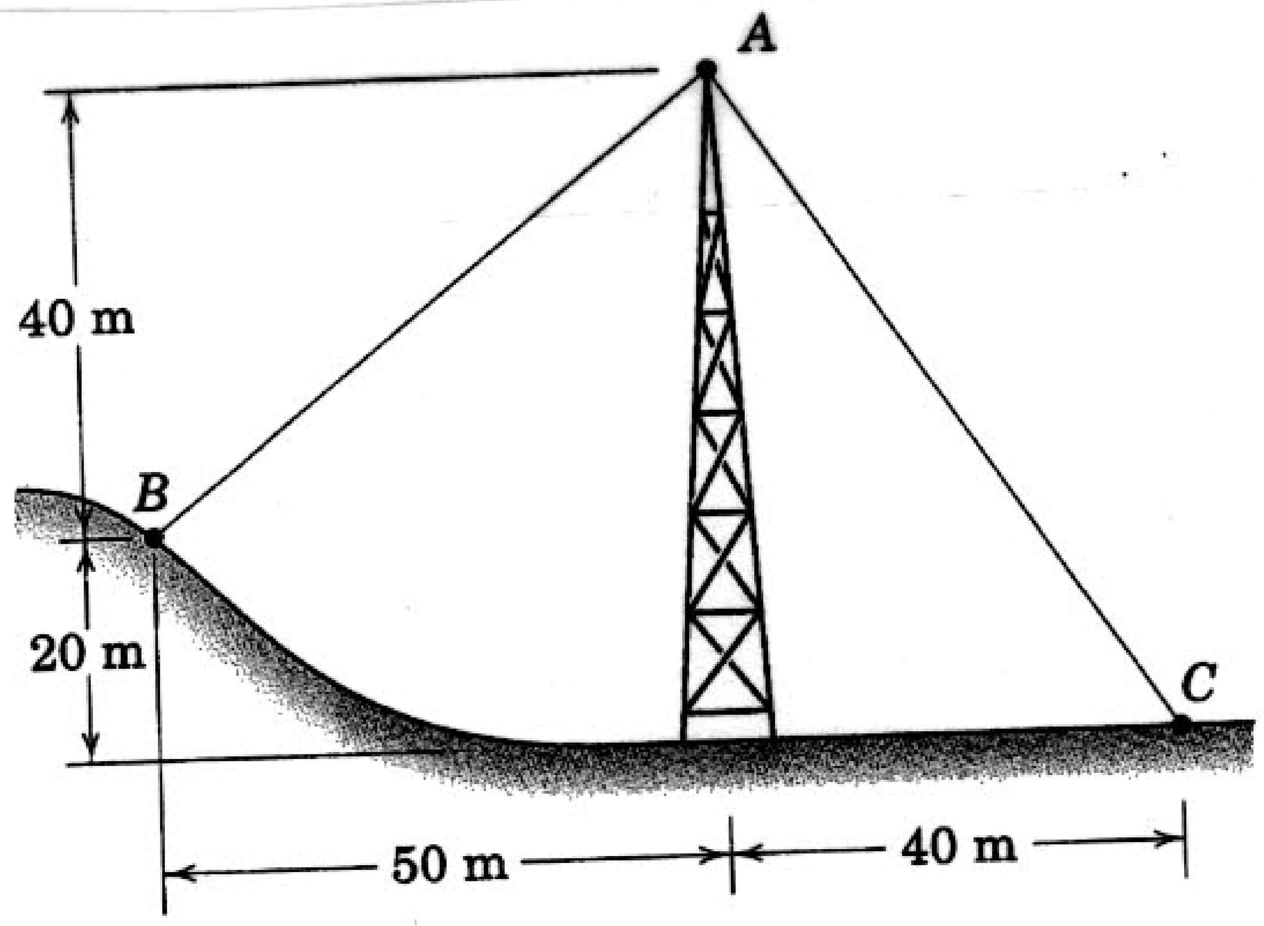

We want $F_{AB} + F_{AC} = F\hat{j}$ (vertical component only)

This means $-F_{AB_x} = F_{AC_x}$

$$F_{AB}\frac{50}{\sqrt{40^2+50^2}} = (8\text{ kN})\frac{40}{\sqrt{40^2+60^2}}$$

$$\therefore F_{AB} = 8\left(\frac{40}{50}\right)\left(\frac{\sqrt{40^2+50^2}}{\sqrt{40^2+60^2}}\right)\text{kN}$$

$$\text{or } T = 6.4\sqrt{\frac{41}{52}}\text{ kN} = \boxed{5.68\text{ kN}}$$

$$R = T_y + F_{AC_y}$$

$$= \left[5.68\left(\frac{4}{\sqrt{4^2+5^2}}\right) + 8\frac{6}{\sqrt{4^2+6^2}}\right]\text{kN}$$

$$\boxed{R = 10.21\text{ kN}}$$

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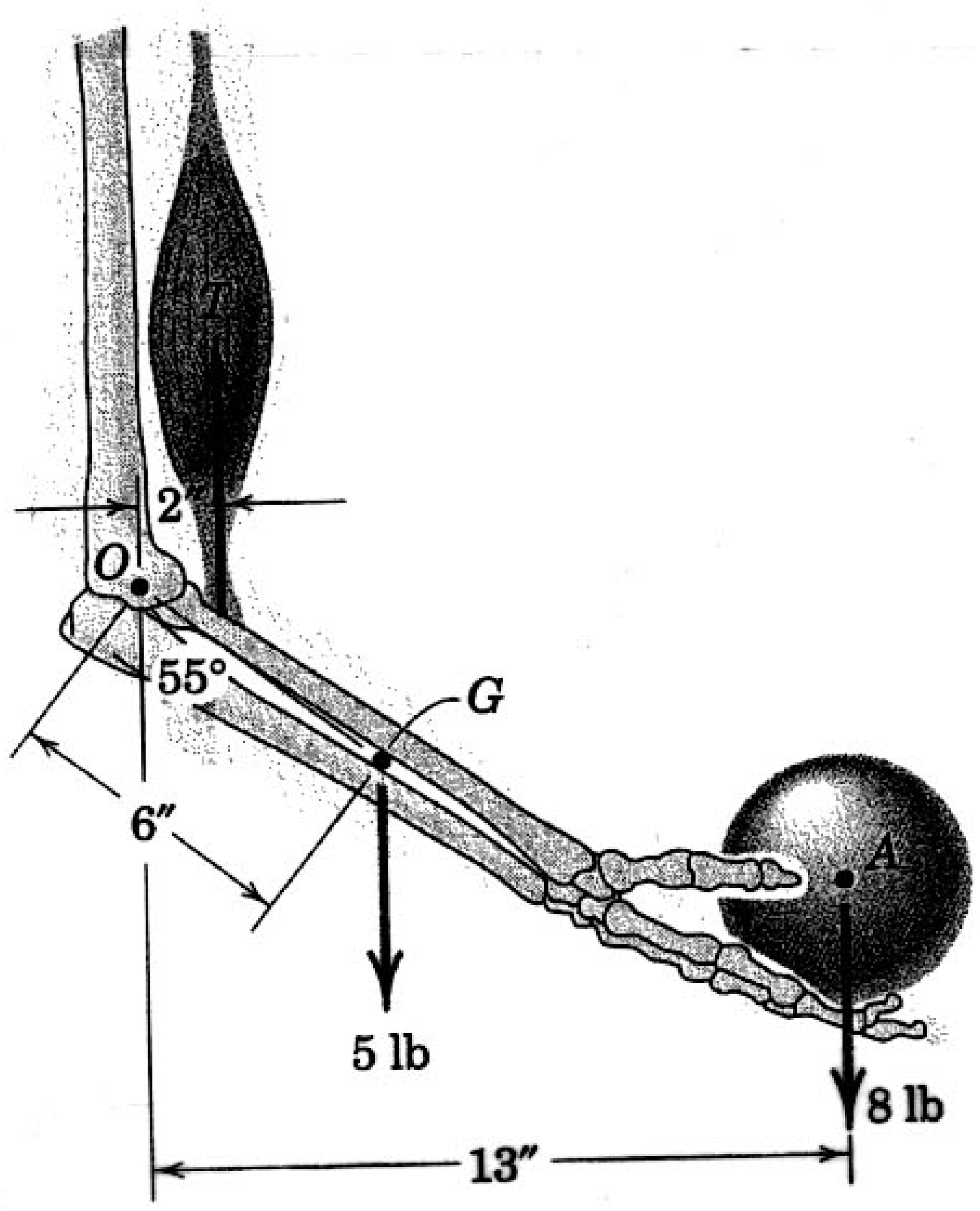

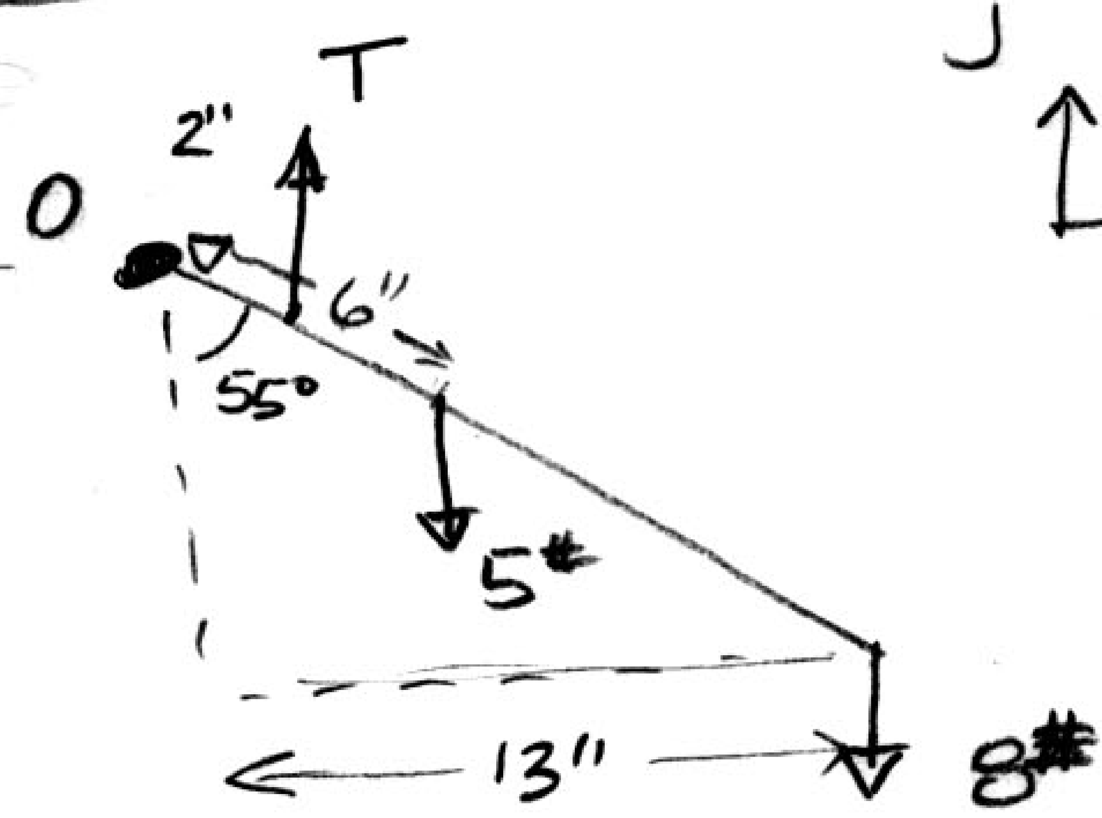

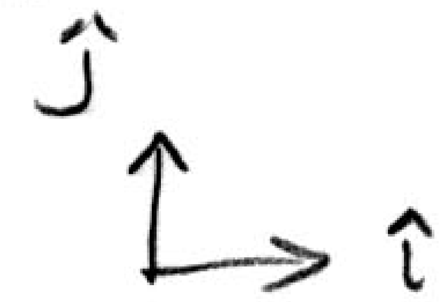

$$\Sigma \underline{M}_o \cdot \hat{k} = -8^{\#}(13'') - 5^{\#}(6\sin 55°)$$

$$\boxed{= -128.6\ \#\text{-in}}$$

into paper

If biceps resists

$$\Sigma \underline{M}_o \cdot \hat{k} = 0 = -128.6\ \#\text{in} + (2\text{ in})T$$

$$\therefore \boxed{T = 64.3^{\#}}$$

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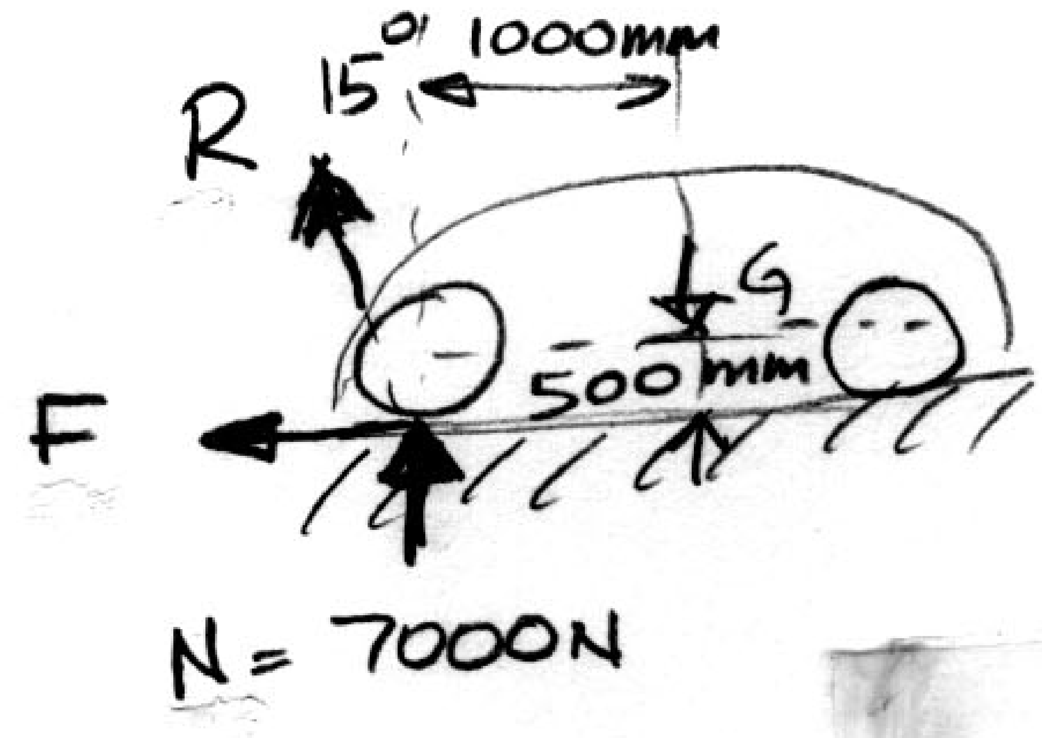

HW # A

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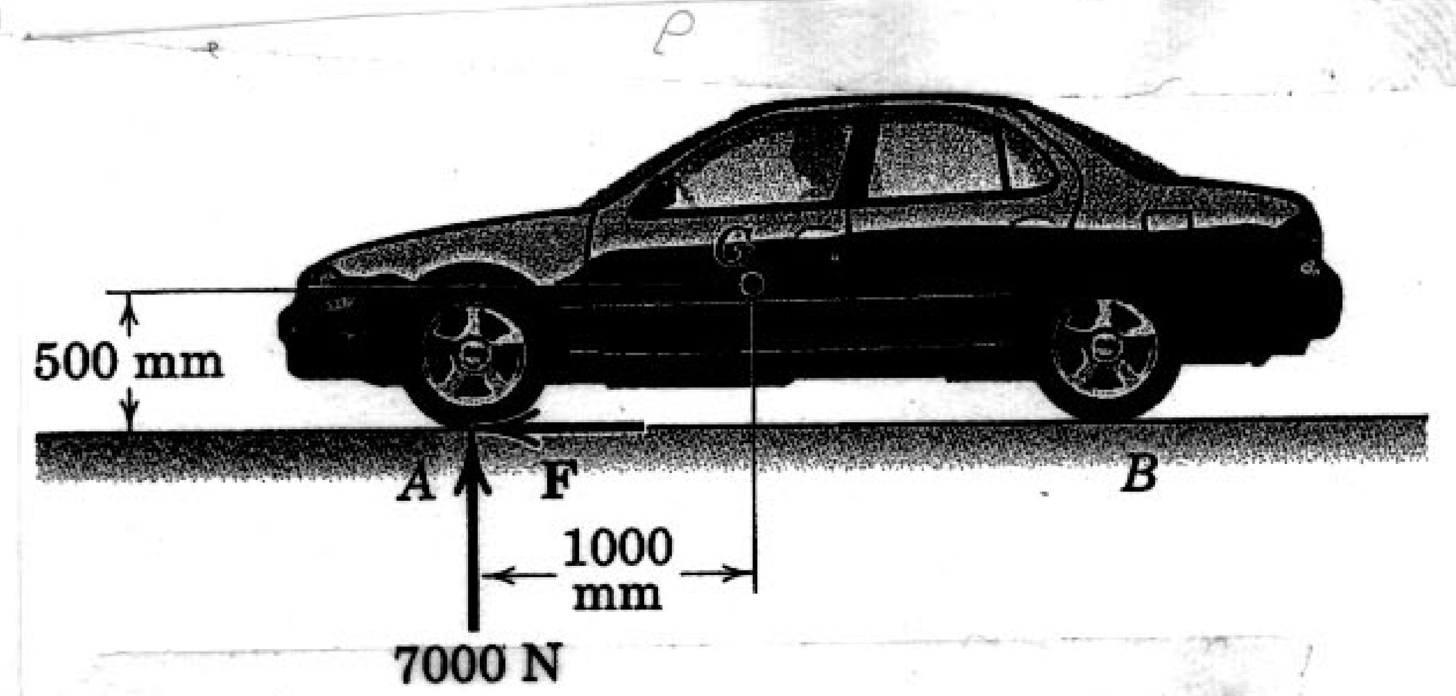
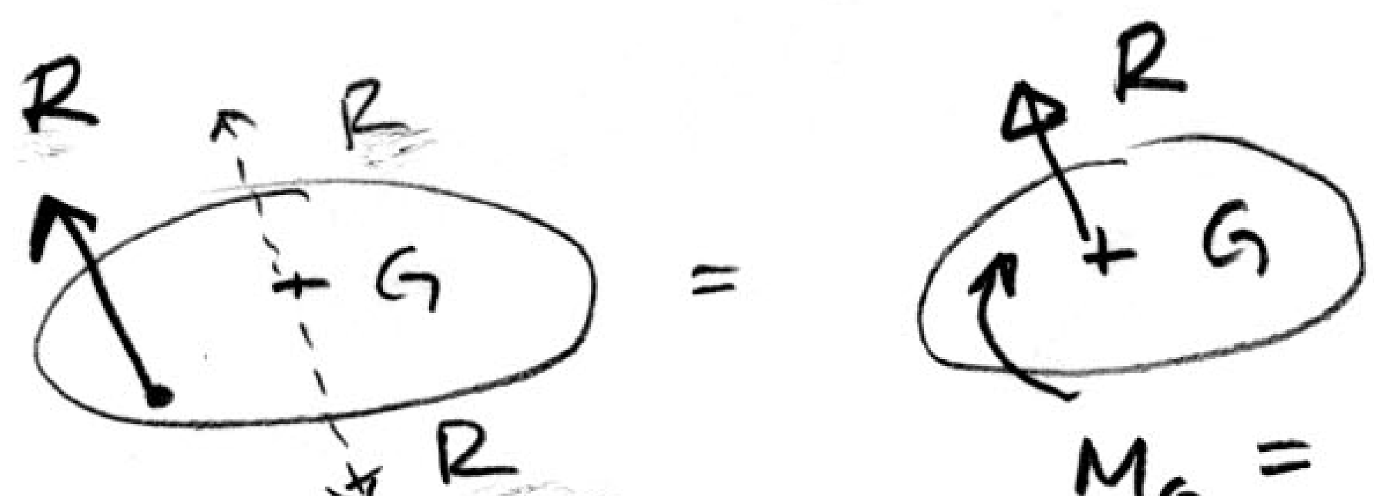
$\underline{N} + \underline{F} = \underline{R}$



To find F : $\frac{F}{N} = \tan 15$

$\therefore F = N \tan 15$

$= 1875$ Newtons



$M_G = Fy + Nx$ since F is only x, N is only y

$R = \sqrt{7000^2 + 1875^2}$

$\boxed{R = 7250\text{ N}}$

$= 1875\text{N}(0.5\text{m}) + 7000\text{N}(1\text{m})$

$\boxed{M_G = 7940 \text{ N-m} \circlearrowright \text{CW}}$

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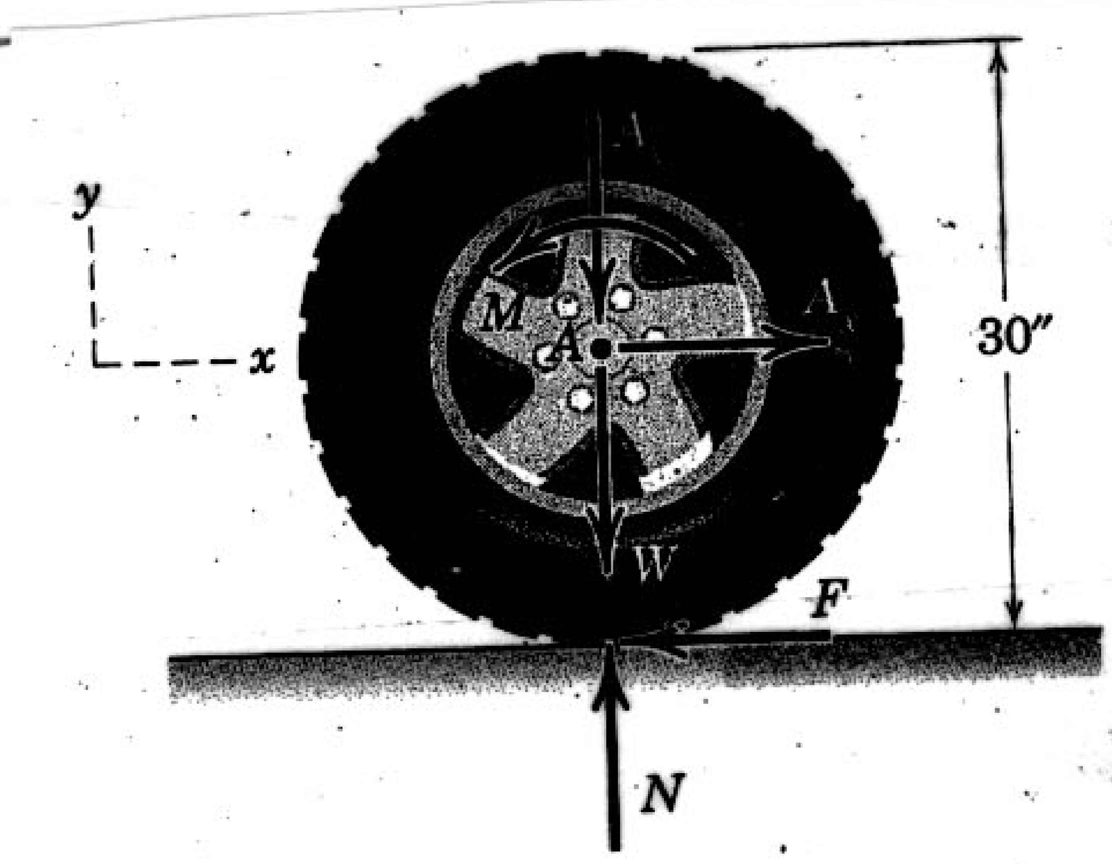

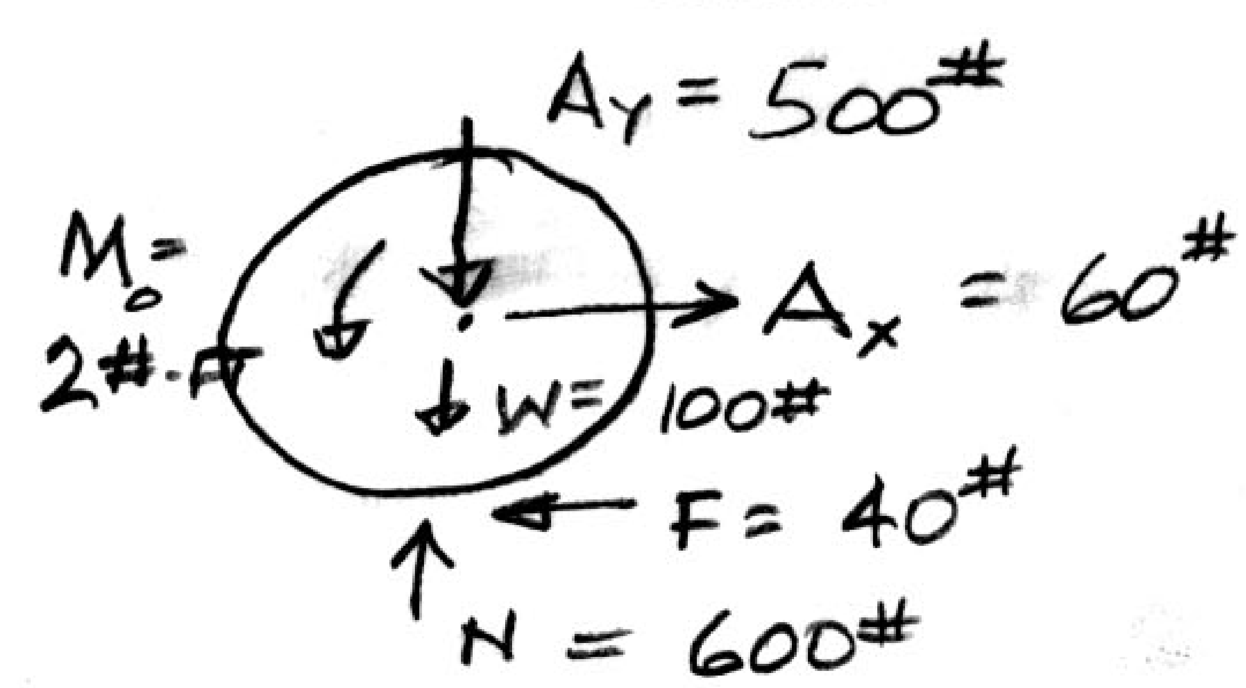

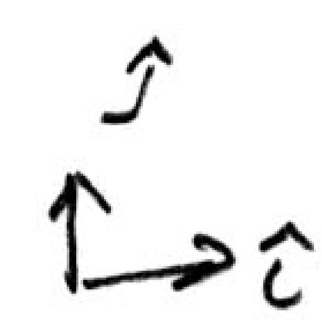

$\underline{R} = \Sigma \underline{F} = \underline{A} + \underline{F} + \underline{W} + \underline{N} = (60\hat{\imath} - 500\hat{\jmath} + 600\hat{\jmath} - 100\hat{\jmath} - 40\hat{\imath})^{\#}$

$\boxed{\underline{R} = 20\hat{\imath}\ ^{\#}}$

Where should $\underline{R}$ be placed to give the same $\underline{M}$?

$(-\frac{15}{12}\hat{\jmath}) \times (-40\hat{\imath}) + M_o\hat{k} = \underline{r} \times \underline{R} = (x\hat{\imath} + y\hat{\jmath}) \times 20^{\#}\hat{\imath}$

location rel to A

$(-50\hat{k} + 2\hat{k})^{\#}\text{-FT} = -48\hat{k}^{\#\text{-ft}} = -20y^{\#}\hat{k} \Longrightarrow \boxed{y = 2.4 \text{ FT}}$ x is immaterial