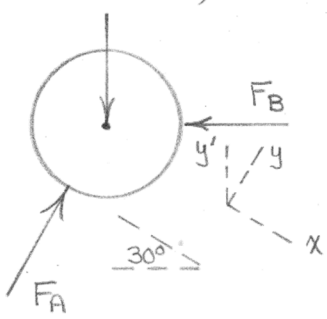
3/1



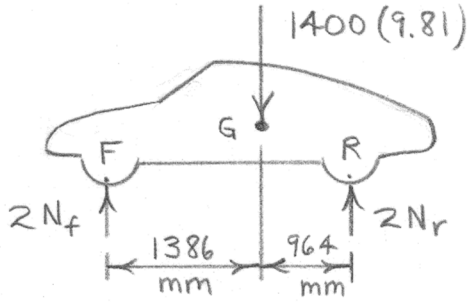
$\Sigma F_x = 0: \quad 50(9.81)\sin 30° - F_B \cos 30° = 0$

$F_B = 283 \text{ N}$

$\Sigma F_{y'} = 0: \quad F_A \cos 30° - 50(9.81) = 0$

$F_A = 566 \text{ N}$

3/2



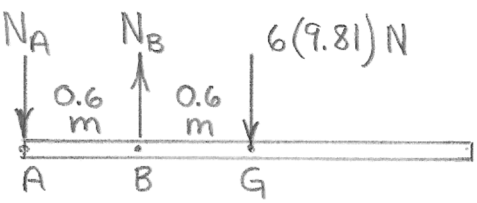
$+\uparrow \Sigma F = 0: \quad 2N_f + 2N_r - 1400(9.81) = 0$

$\circlearrowleft + \Sigma M_F = 0: \quad -1400(9.81)(1386) + 2N_r(1386 + 964) = 0$

Solution: $\begin{cases} N_f = 2820 \text{ N} \\ N_r = 4050 \text{ N} \end{cases}$

Assumes G midway between left and right wheels.

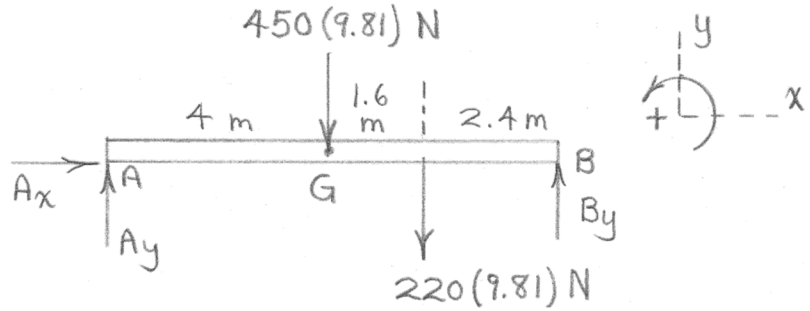
3/3



$\curvearrowleft + \sum M_A = 0: \quad N_B(0.6) - 6(9.81)(1.2) = 0, \quad N_B = 117.7 \text{ N}$

$+\uparrow \sum F = 0: \quad -N_A + 117.7 - 6(9.81) = 0, \quad N_A = 58.9 \text{ N}$

3/4



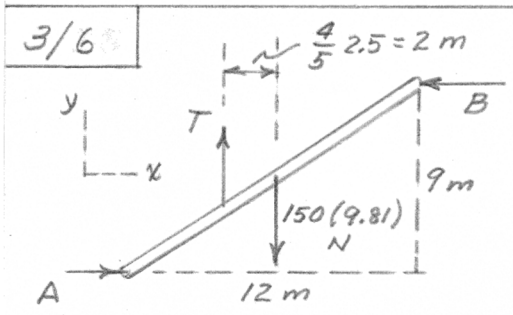
From $\Sigma F_x = 0$, $A_x = 0$

$\Sigma M_A = 0$: $-450(9.81)4 - 220(9.81)(5.6) + B_y(8) = 0$, $\underline{B_y = 3720 \text{ N}}$

$\Sigma F_y = 0$: $A_y - 450(9.81) - 220(9.81) + 3720 = 0$

$\underline{A_y = 2850 \text{ N}}$

3/6



$\Sigma F_y = 0$; $T - 150(9.81) = 0$

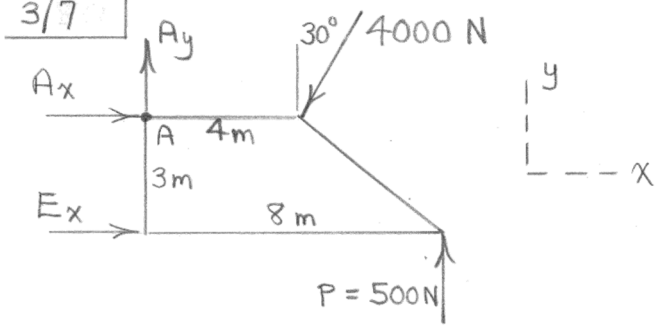
$T = 1472$ N

$\Sigma F_x = 0$; $A = B$

$\Sigma M = 0$; $1472(2) - A(9) = 0$

$A = B = 327$ N

3/7



$\Sigma F_x = 0$: $A_x + E_x - 4000 \sin 30° = 0$

$\Sigma F_y = 0$: $A_y - 4000 \cos 30° + 500 = 0$

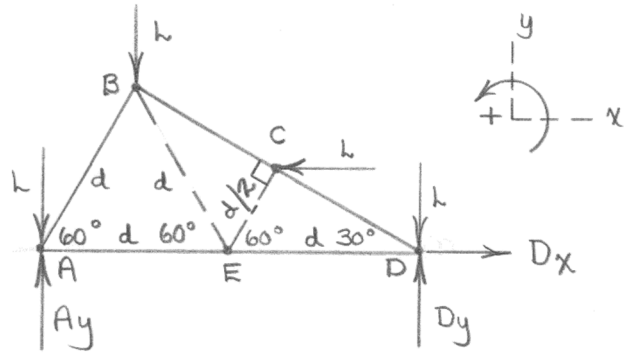
$\Sigma M_A = 0$: $E_x(3) + 500(8) - 4000 \cos 30°(4) = 0$

$\Rightarrow$ $A_x = -1285$ N, $A_y = 2960$ N, $E_x = 3290$ N

For maximum P: $E_x = 0$ and $\Sigma M_A = 0$:

$P(8) - 4000 \cos 30°(4) = 0$, $P = 1732$ N

3/30



$\Sigma F_x = 0$: $D_x - L = 0$, $\underline{D_x = L}$

$\Sigma F_y = 0$: $A_y + D_y - 3L = 0$

$\Sigma M_A = 0$: $D_y(2d) + L\left(\frac{d}{2}\frac{\sqrt{3}}{2}\right) - L\left(\frac{d}{2}\right) - L(2d) = 0$

Solving the last 2 equations: $A_y = \frac{L}{4}\left(7 + \frac{\sqrt{3}}{2}\right)$

$\underline{D_y = \frac{L}{4}\left(5 - \frac{\sqrt{3}}{2}\right)}$

(or $A_y = 1.967L$, $D_y = 1.033L$)