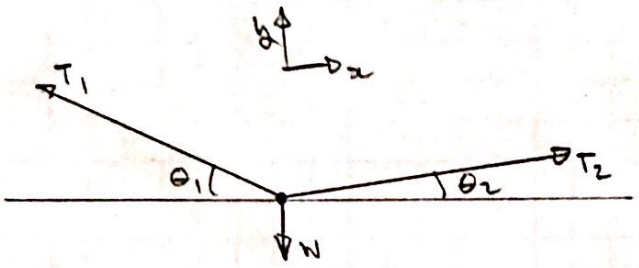
①

Given:



$\theta_1 = 20°$
$\theta_2 = 10°$
$W = 600\,lb$

Find: T_1 , T_2

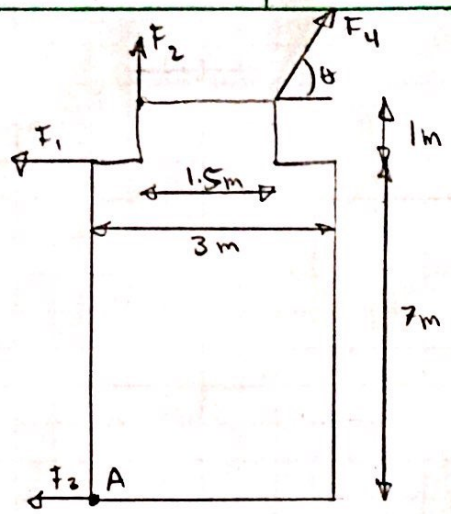
Solution:

$$\Sigma F_x: -T_1\cos\theta_1 + T_2\cos\theta_2 = 0$$
$$\Sigma F_y: -W + T_1\sin\theta_1 + T_2\sin\theta_2 = 0$$

T_1	T_2	k
$-\cos\theta_1$	$\cos\theta_2$	0
$\sin\theta_1$	$\sin\theta_2$	W

$T_1 = 1181.77\,lb$
$T_2 = 1127.62\,lb$

② Given:



$\theta = 60^\circ$

Find: a) M_A of $F_1 = 60N$
b) M_A of $F_2 = 40N$
c) M_A of $F_3 = 50N$
d) M_A of $F_4 = 100N$

Solution:

a) $M_A = r_\perp F_1$

$= 7m \cdot 60N$

$\boxed{M_A = +420\ N \cdot m}$ ↺

b) $M_A = r_\perp \cdot F_2$
$= 0.75m \cdot 40N$

$\boxed{M_A = +30\ N}$ ↺

c) $M_A = r_\perp \cdot F_3$
$= 0 \cdot 50N$

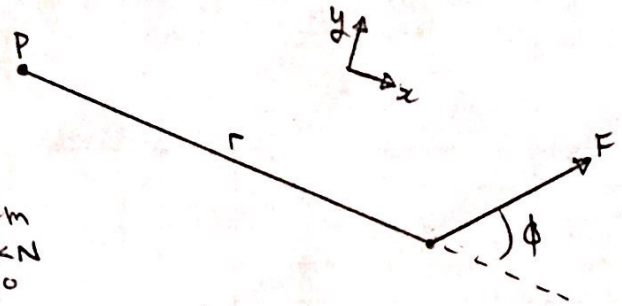
$\boxed{M_A = 0\ N \cdot m}$

d) $M_A = +r_x \cdot F_4 \sin\theta - r_y \cdot F_4 \cos\theta$
$= +2.25m \cdot 100N (\sin 60) - 8m \cdot 100N (\cos 60)$

$\boxed{M_A = -205.14\ N \cdot m}$ ↻

③

Given:



$r = 20\,cm$
$F = 20\,kN$
$\phi = 50°$

Find: M_p moment at P

Solution:

$$M_p = \bar{r} \times \bar{F}$$
$$= (r\,\hat{i}) \times (F\cos\phi\,\hat{i} + F\sin\phi\,\hat{j})$$
$$= +rF\sin\phi\,\hat{k}$$
$$= 0.2m \cdot 20{,}000\,N \cdot \sin 50°$$

$$\boxed{M_p = 3064.2\,N\cdot m}$$