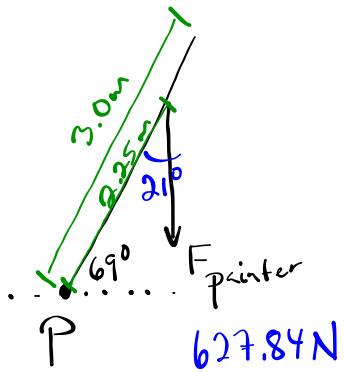
PP/495

30.



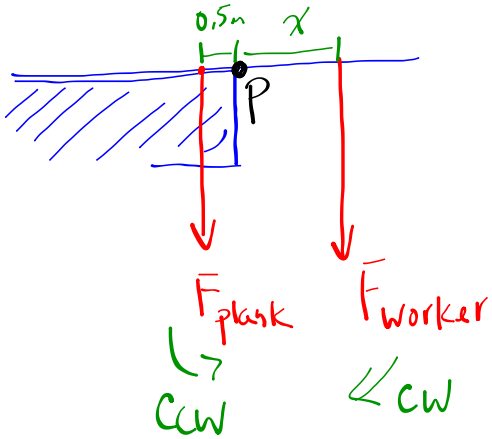
$\tau = rF\sin\theta$

$\tau = (2.25\text{m})(627.84\text{N})\sin 21^\circ$

$\tau = 5.1 \times 10^2\ \text{N}\cdot\text{m}$

FOP/86-3

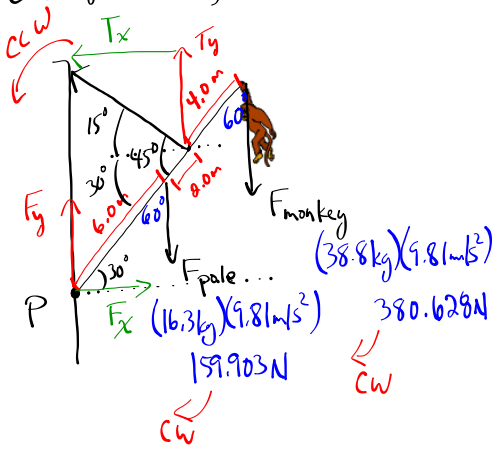
2.

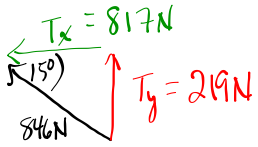


$\Sigma\tau_{CCW} = \Sigma\tau_{CW}$

$\tau_{plank} = \tau_{worker}$

Monkey on a Flagpole (FoP)





$$\Sigma\tau_{ccw} = \Sigma\tau_{cw}$$

Recall $\tau = rF\sin\theta$

$$\tau_T = \tau_{pole} + \tau_{monkey}$$

$$(8.0m)T(\sin 45^\circ) = (6.0m)(159.903N)\sin 60^\circ + (12.0m)(380.628N)\sin 60^\circ$$

$$(8.0m)T(\sin 45^\circ = 830.88 N\cdot m + 3955.60 N\cdot m$$

$$T = \frac{4786.48 N\cdot m}{(8.0m)(\sin 45^\circ)}$$

$$T = 846 N$$

Vertically:

$$F_y + T_y = F_{pole} + F_{monkey}$$

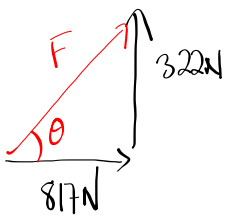
$$F_y = 159.903 N + 380.628N - 219N$$

$$F_y = 322N$$

Horizontally:

$$F_x = T_x$$

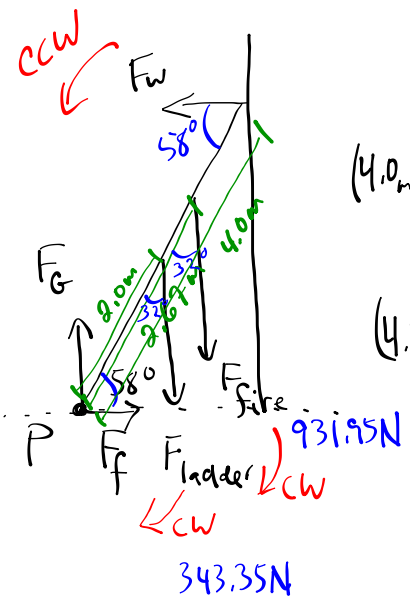
$$F_x = 817N$$



The reaction force at the end of the pole is:

878 N [outward 22° above horizontal]

MP|496



$\Sigma\tau_{ccw} = \Sigma\tau_{cw}$

$\tau_w = \tau_{ladder} + \tau_{fire}$

$(4.0m)F_w(\sin 58^\circ) = (2.0m)(343.35N)(\sin 32^\circ) + (2.67m)(931.95N)\sin 32^\circ$

$(4.0m)F_w(\sin 58^\circ) = 1682 N \cdot m$

$F_w = 496 N$

$\therefore F_G = 496N$ ← horizontally.

vertically

$F_G = F_{ladder} + F_{fire}$

$F_G = 343.35N + 931.95N$

$F_G = 1275.3N$

↑ normal force at the bottom of ladder.

$F_f = \mu F_N$

$\mu = \frac{F_f}{F_N}$

$\mu = \frac{496N}{1275.3N} = 0.389$

TO DO

① PP|501

② FOP|§6-3|5-7