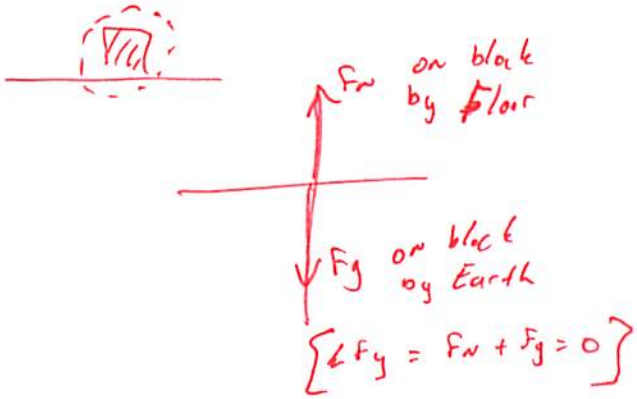
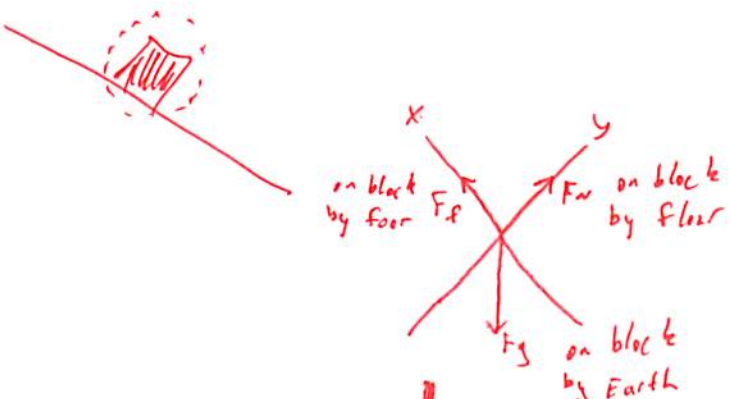
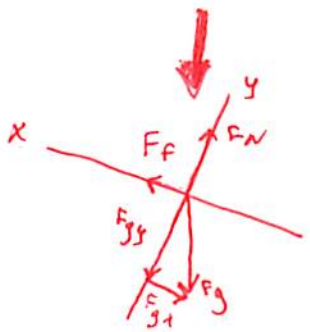
#1)

$$\left[\sum F_y = F_N + F_g = 0\right]$$

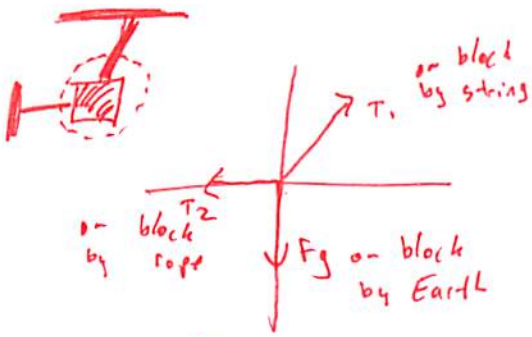


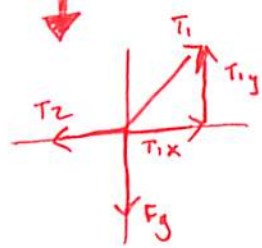
$$\left\{\sum F_y = F_N + F_g = 0\right\}$$



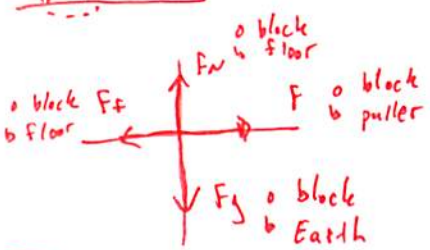


$$\left[\sum F_x = f_f + f_{gx} = 0\right]$$
$$\left[\sum F_y = F_N + F_{gy} = 0\right]$$

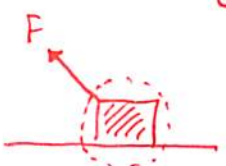


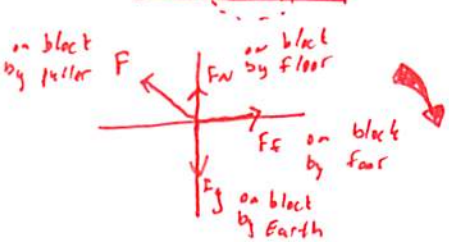


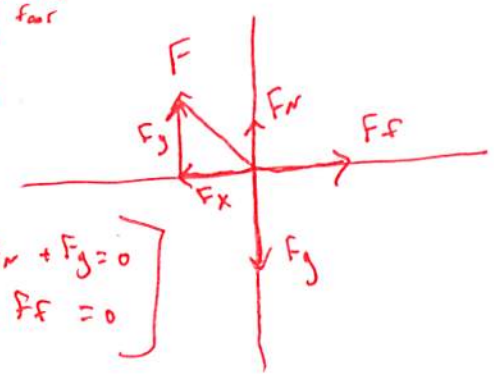
$$\left[\sum F_x = T_2 + T_{1x} = 0\right]$$
$$\left[\sum F_y = F_g + T_{1y} = 0\right]$$



$$\left[\sum F_y = F_N + F_g = 0\right]$$
$$\left[\sum F_x = F_f + F = 0\right]$$

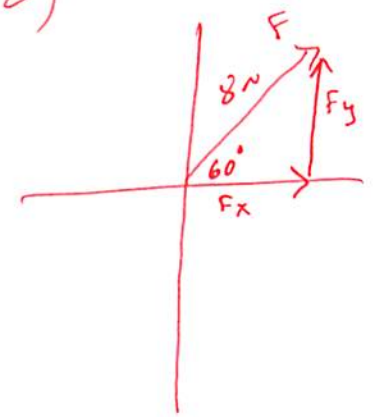






$$\left[\sum F_y = F_y + F_N + F_g = 0\right]$$
$$\left[\sum F_x = F_x + F_f = 0\right]$$

#2)



$\sin\theta = \frac{o}{h}$

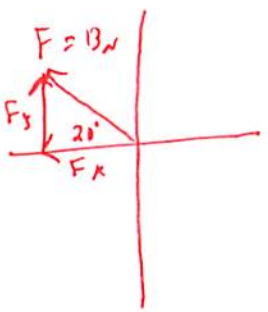
$\sin 60 = \frac{F_y}{8}$

$F_y = 4\sqrt{3}_N$ or 6.9_N

$\cos\theta = \frac{a}{h}$

$\cos 60 = \frac{F_x}{8}$

$F_x = 4_N$



$\sin\theta = \frac{o}{h}$

$\sin 20 = \frac{F_y}{13}$

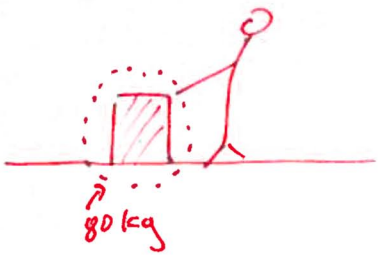
$F_y = 4.4_N$

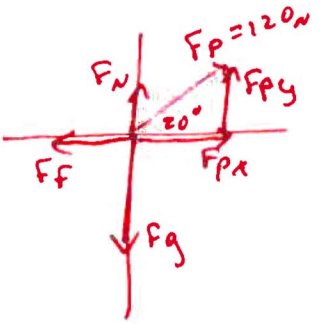
$\cos\theta = \frac{a}{h}$

$\cos 20 = \frac{F_x}{13}$

$F_x = 12.2_N$

3)





a) $\Sigma F_x = F_f + F_{px} = 0$

b) $\Sigma F_y = F_{py} + F_N + F_g = 0$

c) $\sin\theta = \frac{opp}{hyp}$ $\quad \cos\theta = \frac{adj}{hyp}$

$\sin 20 = \frac{F_{py}}{120_N}$ $\quad \cos 20 = \frac{F_{px}}{F_p}$

$.3420 = \frac{F_{py}}{120}$ $\quad .9397 = \frac{F_{px}}{120}$

$F_{py} = 41.04_N$ $\quad F_{px} = 112.76_N$

d) $F_g = (9.8\frac{N}{kg})M$

$F_g = 9.8\frac{N}{kg} \cdot 80\,kg$

$F_g = 784_N$

$\Sigma F_y = F_N + F_{py} + F_g = 0$

$F_N + (41.04) + (-784) = 0$

$[F_N = 742.96_N]$

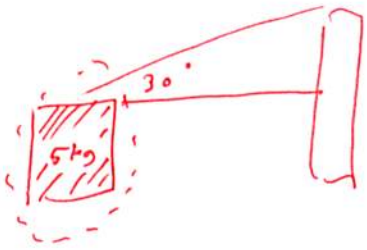
$\Sigma F_x = F_f + F_{px} = 0$

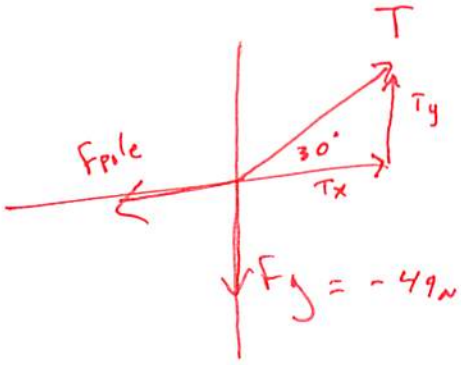
$F_f + (112.76_N) = 0$

$[F_f = -112.76_N]$

#5)

boom → horizontal pole





$F_g = 9.8 \frac{N}{kg} \cdot M$

$F_g = 9.8 \frac{N}{kg} \; 5\,kg$

$F_g = 49\,N$

a) $T = ?$

$\Sigma F_y = T_y + F_g = 0$

$T_y + (-49) = 0$

$T_y = 49_N$

$\sin 30 = \frac{T_y}{T}$

$\sin 30 = \frac{49}{T}$

$\boxed{T = 98_N}$

b) $\Sigma F_x = T_x + F_{pole} = 0$

$\cos 30 = \frac{T_x}{T}$

$\cos 30 = \frac{T_x}{98}$

$T_x = 84.9_N$

$84.9_N + F_{pole} = 0$

$\boxed{F_{pole} = -84.9_N}$