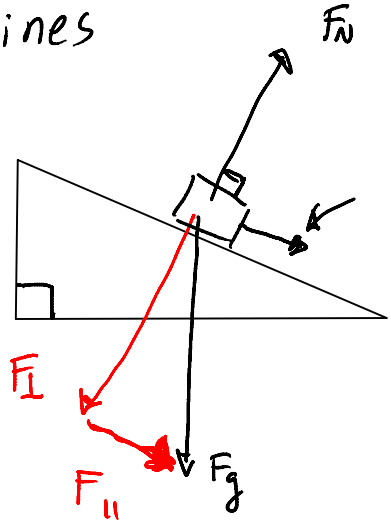
October-14-10
1:44 PM

Next unit Thur Oct 21

Inclines



Recall F_N is always @ right angles to the surface

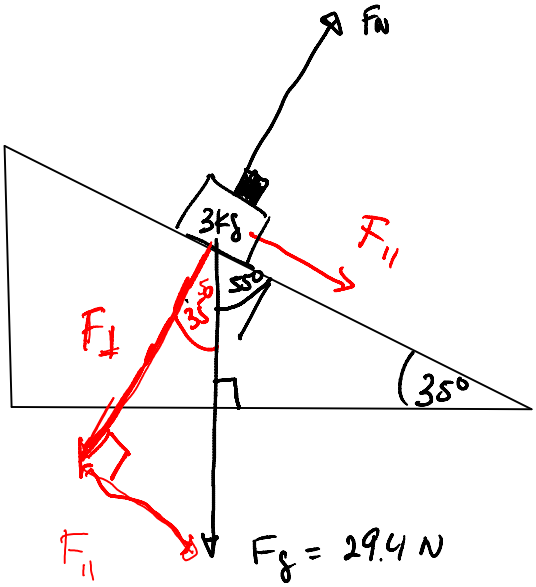
is actually a portion of gravity

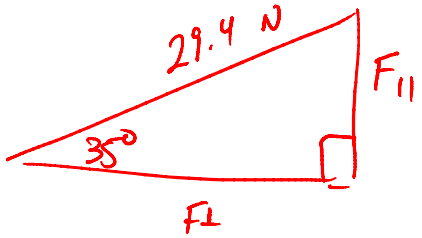
$F_\perp$ = Force $\perp$
= Force perpindicular

$F_\perp = F_N$

$F_{||}$ = Force parallel and is the component of gravity That makes the object move

ex





$\cos 35° = \frac{F_\perp}{29.4N}$

$F_\perp = 29.4N \cdot \cos 35°$

$F_\perp = 24.1\ N$

$F_{11} = 29.4\,N \sin 35^\circ$

$= 16.86\,N$

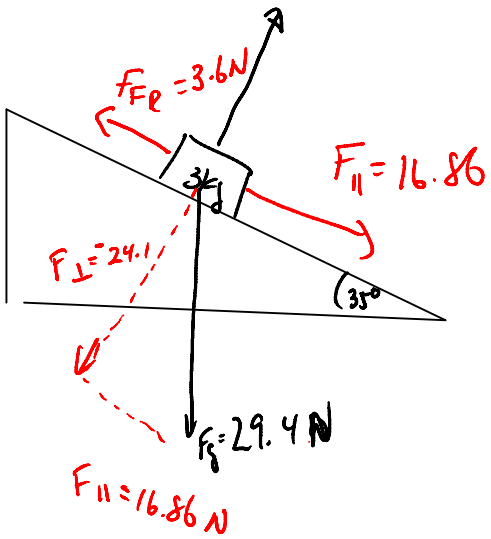
since F_{11} is the only force making obj move it is now considered F_{NET} ∴ we can calc "a"

$$a = \frac{F_{NET}}{m} = \frac{16.86\,N}{3kg} = 5.63\,m/s^2$$

We can now calculat problems with Friction

lets assume $\mu_k = 0.15$ from previous problem find New F_{NET}

$\mu = 0.15$



Since μ_k exists ∴ F_{FR} exists

$F_{FR} = \mu_k F_N$

$= (0.15)(24.1\,N)$

$= 3.6\,N$

$F_{NET} = F_{FR} + F_{11}$

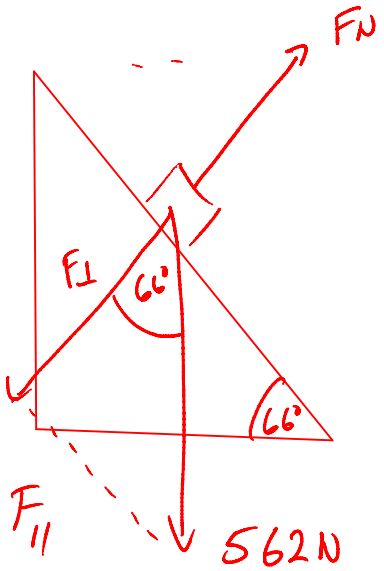
$= -3.6N + 16.86N$

$= 13.26\,N$

$$a = \frac{F_{NET}}{m} = \frac{13.26\,N}{3\,kg} = 4.42\,\frac{m}{s^2}$$

Pg 126 T/B #23-25 (No Forctim involved)

23)



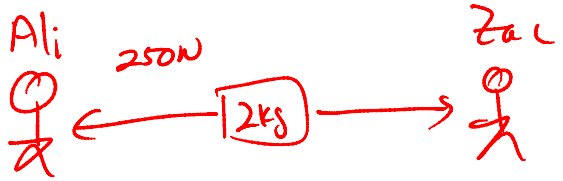
$F_{||} = 562 \sin 66°$

$F_{\perp} = 562 \cos 66°$

24 Same as above but now we need Mass of car $F_g = -1.2 \times 10^4 N$ $g = -9.8 \frac{m}{s^2}$

$m = \frac{F_g}{g} = 1.224 \times 10^3 kg$

Equilibrium = $F_{NET} = 0$ or $\sum \vec{f} = 0$

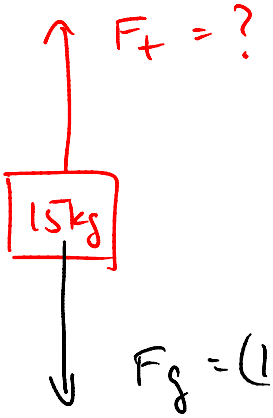


Ali pulls 250N left

∴ Zac must pull 250 N Right

$$\Sigma F = F_{all} + F_{tac}$$
$$0 = -250\,N + 250\,N$$

Vertical



$$F_g = (15)(9.8\,\tfrac{m}{s^2})$$
$$= 147\,N$$

Calculate F_T so that the block is in equilibrium

$\Sigma F = 0$ (1)

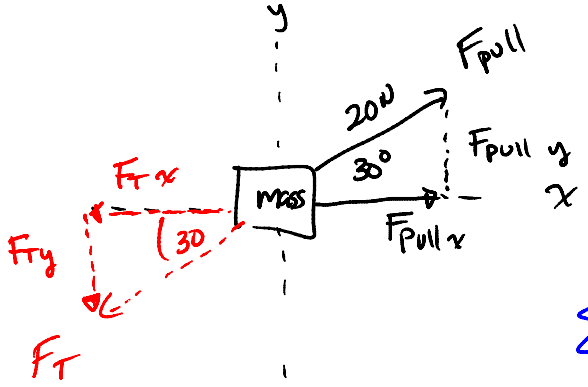
$0 = F_T + F_g$

$F_T = -F_g$

$= -(15kg)(-9.8\,\tfrac{m}{s^2})$

$= +147N$

ex

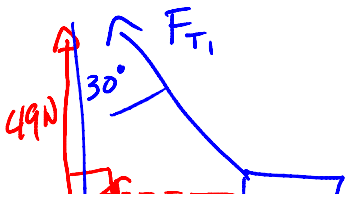


20N @ 30° N of E

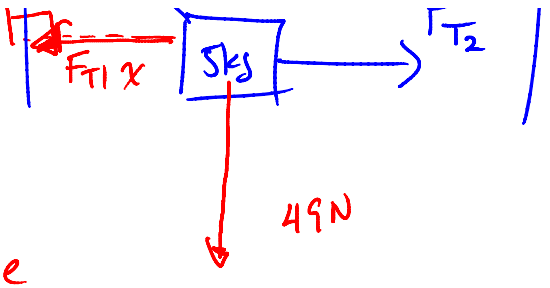
F_T 20N @ 80° S of W

$\Sigma F_x = 0$
$\Sigma F_y = 0$ } equilibrium

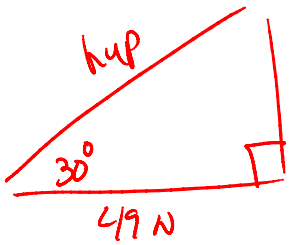
ex



Calc F_{T1}
F_{T2}



One vector we always see when there is a mass



$$hyp(\cos 30^\circ) = \left(\frac{49N}{hyp}\right) hyp$$

$$hyp = \frac{49N}{\cos 30^\circ} = 56.6\,N = F_{T1}$$

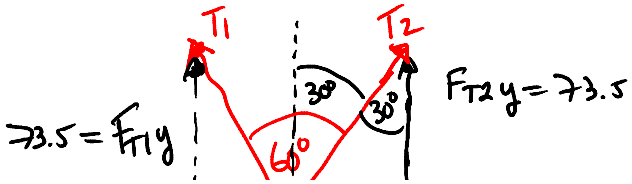
$$F_{T2} = -F_{T1x}$$

$$F_{T1x} = -56.6 \sin 30^\circ$$
$$= -28.3\,N \quad \therefore F_{T2} = 28.3\,N$$

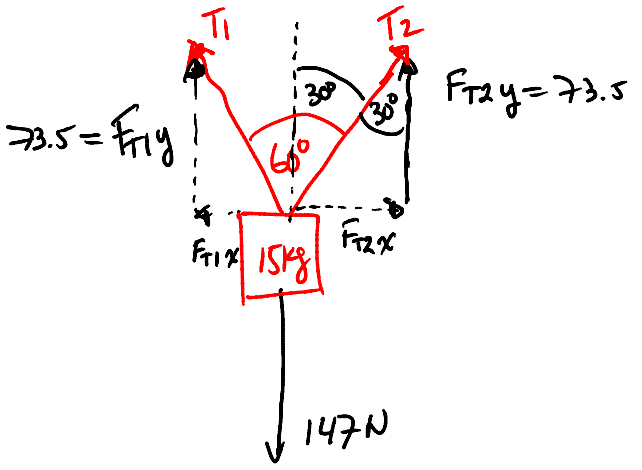
Try Q# 32 pg 131 T1B

Tension B = 433 N

Ex If we have a 15 kg mass suspended by 2 cables at an angle of 60° Determine the tension in each cable



$$\Sigma f_y = 0$$
$$0 = F_{T1y} + F_{T2y} + -147N$$



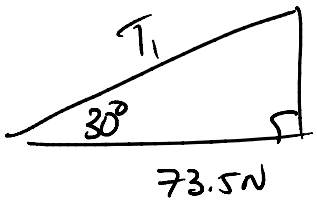
$$\Sigma f_y = 0$$

$$0 = F_{T1y} + F_{T2y} + -147N$$

$$= 2 \cdot F_{Ty} - 147$$

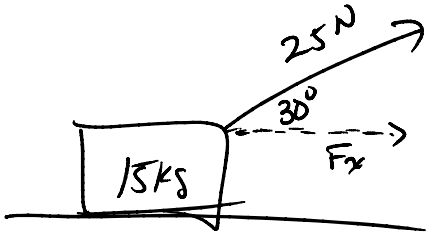
$$F_{Ty} = 73.5\,N$$

Find T_1, T_2



$T_1 = T_2$ $\quad T_1 = 84.9\,N$

ex



Frictionless find a we need component of Force in the same direction as its motion

$\therefore F_x = 25N \cos 30^\circ$

$= 21.60\,N$ This is considered net force since there is no other forces in the horizontal

$$a = \frac{F_{NET}}{m} = \frac{21.60N}{15kg} = 1.44\,\frac{m}{s^2}$$

Pg 130 # 21, 22, 23a, 24, 31, 35 abcd,