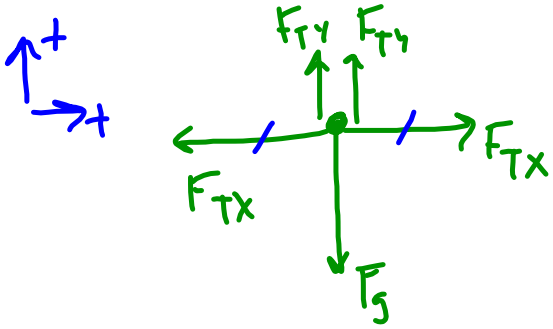
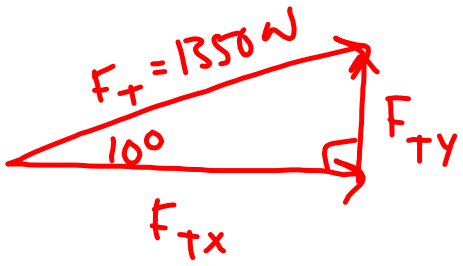
Forces PS #3: Equilibrium with Angles

3)





$$\sin 10° = \frac{F_{TY}}{F_T}$$

$$\sum F_y = \emptyset$$

$$F_{TY} + F_{TY} - F_g = \emptyset$$

$$F_g = 2F_{TY} = 2(234\,N)$$

$$= 468\,N$$

$$F_{TY} = F_T \sin 10°$$

$$= (1350\,N)\sin(10°)$$

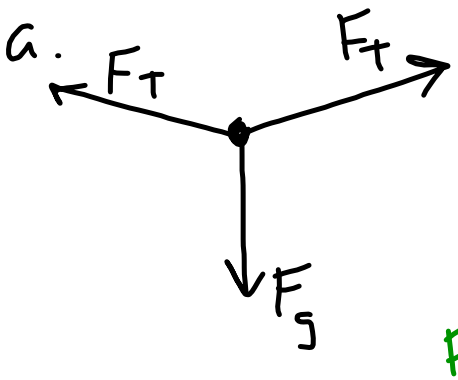
$$= 234\,N$$

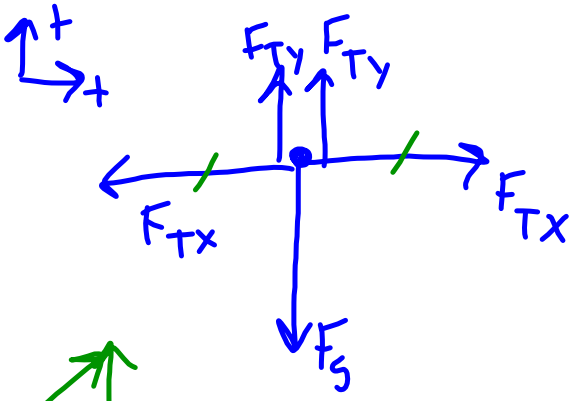
$$F_g = mg_g$$

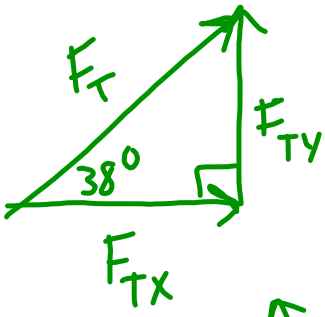
$$m = \frac{F_g}{g_g} = \frac{468\,N}{9.8\,m/s^2} = 46.9\,kg$$

Worksheet 4

1) a.







$$\sin 38° = \frac{F_{TY}}{F_T}$$

$$\sum F_y = \emptyset$$

$$F_T = \frac{F_{TY}}{\sin(38°)}$$

$$F_{TY} + F_{TY} - F_g = \emptyset$$

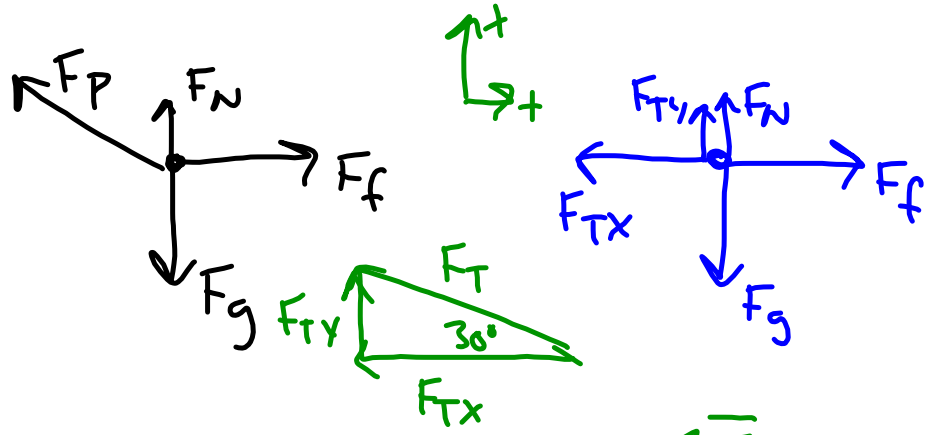
$$= 101.5\,N$$

$$2F_{TY} = F_g$$

$$F_{TY} = \frac{F_g}{2} = \frac{125\,N}{2} = 62.5\,N$$

b. $$F_T = \frac{62.5\,N}{\sin(50)} = 717\,N$$

2)



$\sum F_x = \emptyset$

$F_f - F_{Tx} = \emptyset$

$F_f = F_{Tx}$

$= 173\,N$

$F_{Tx} = 200\,N \cos(30°)$

$= 173\,N$

$F_{Ty} = 200\,N \sin(30°)$

$= 100\,N$

$\sum F_y = \emptyset$

$F_{Ty} + F_N - F_g = \emptyset$

$F_N = F_g - F_{Ty}$

$= (50\,kg)(9.8\,m/s^2) - 100\,N$

$= 408\,N$