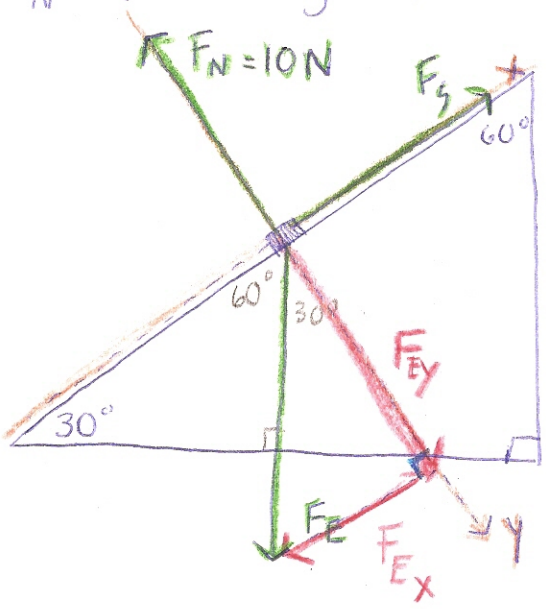
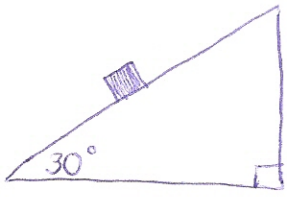
Find the mass of the block

$F_N = 10\ N$ system in static equillibrium



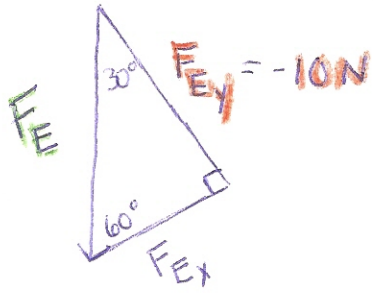


$\Sigma F_x = 0 = F_S + F_{EX}$

$\Sigma F_y = 0 = F_N + F_{EY}$

$0 = (10\ N) + F_{EY}$

$-10\ N = F_{EY}$



$\sin(60°) = \frac{F_{EY}}{F_E}$

$0.866 = \frac{10N}{F_E}$

$F_E = \frac{10\ N}{0.866}$

$F_E = 11.5\ N$

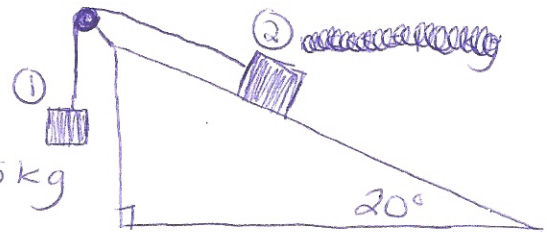
$F_E = mg$

$11.5\ N = m(9.8\ N/kg)$

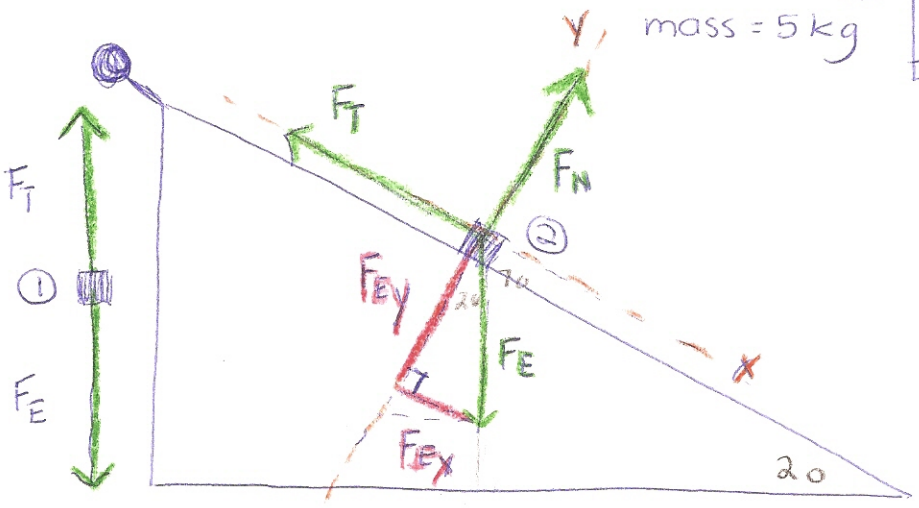
$m = 1.18\ kg$

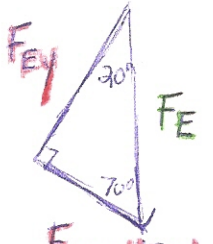
Find F_N

frictionless, static equillibrium



mass = 5 kg





$\tan(70°) = \frac{F_{EY}}{F_{EX}}$

$F_{EY} \tan(70°) = F_{EY}$

$134.6\ N = F_{EY}$

Object #1

$\Sigma F_y = 0 = F_E + F_T$

$0 = F_E + F_T \quad F_E = mg$

$-F_T = (5kg)(9.8\ N/kg)$

$F_T = -49\ N$

Object 2

$\Sigma F_x = F_T + F_{Ex} = 0$

F_T is same as Obj. 1 (same rope)

$0 = 49\ N + F_{Ex}$

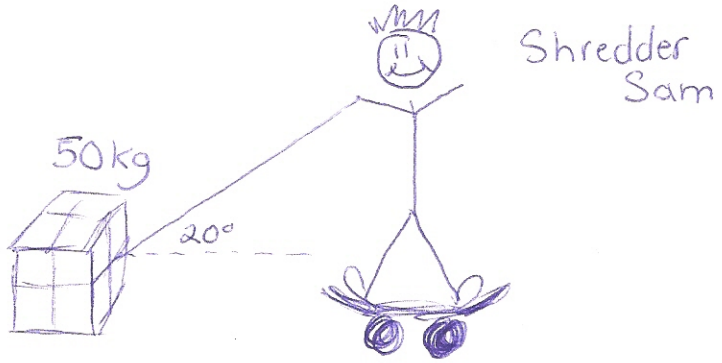
$F_{Ex} = -49\ N$

$\Sigma F_y = 0 = F_{EY} + F_N$

$0 = 134.6\ N + F_N$

$F_N = 134.6\ N$

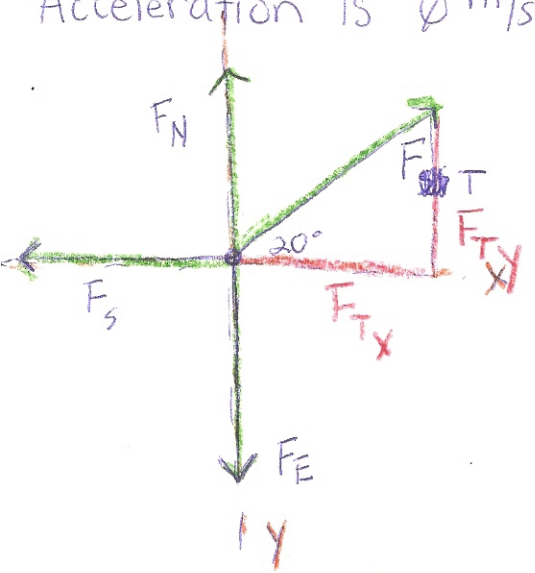
Shredder Sam pulls the box to the right at 127 m/s with a force of 100N. There is no friction on his skateboard.



Find the frictional force on the box

Find the normal force on the box

Acceleration is $0\ m/s^2$, so net forces = 0 N



$$\Sigma F_y = F_N + F_E + F_{TY} = 0$$

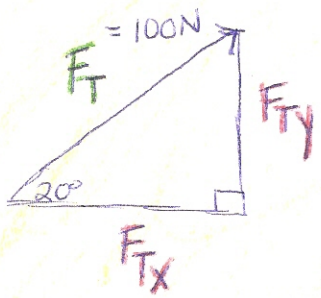
$$0 = F_N + (-490N) + (34.2N)$$

$$455.8\ N = F_N$$

$$\Sigma F_x = 0 = F_S + F_{TX}$$

$$0 = F_S + (94N)$$

$$F_S = -94\ N$$



$$\sin(20°) = \frac{F_{TY}}{F_T} \qquad \cos(20°) = \frac{F_{TX}}{F_T}$$

$$\sin(20°) = \frac{F_{TY}}{100N} \qquad 100N \sin(20°) = F_{TX}$$

$$34.2\ N = F_{TY} \qquad 94\ N = F_{TX}$$

$$F_E = mg$$

$$F_E = (50kg)(9.8\ N/kg)$$

$$F_E = 490\ N$$