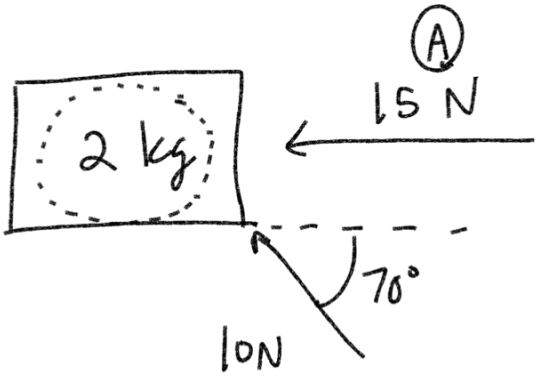
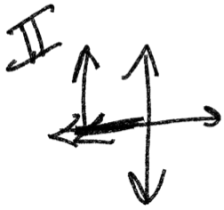
M-GP General Physics Week 26 4/17



a) Find net force

b) Find acceleration

Components



	X	y
	−15N	0 N
	$-10\cos 70°$	$10\sin 70°$
	−15 N	
	−3.4N	
	−18.4N	9.4N

$r = \sqrt{x^2+y^2}$

$\sqrt{(-18.4N)^2 + (9.4N)^2}$

$= \boxed{20.7N}$

$\theta = \tan^{-1}\frac{y}{x} = \tan^{-1}\left(\frac{9.4}{18.4}\right)$

$\therefore -27.1$

$+180$

$153°$

$F_{net} = \boxed{(20.7N, 153°)}$

$\sum F = ma \quad a = \frac{F}{m}$

$\frac{20.7N}{2\ kg} = \boxed{(10.3\ m/s^2, 153°)} = a$

2nd Law

$F = ma$

$[F_G = mg]$

(3rd Law)

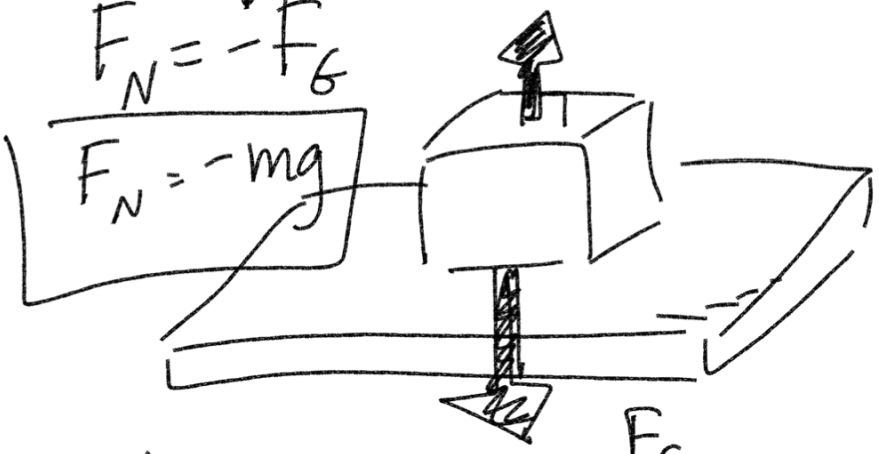
Equal and opposite

Normal force perpendicular to surface

opposite

$F_N = -F_G$

$F_N = -mg$

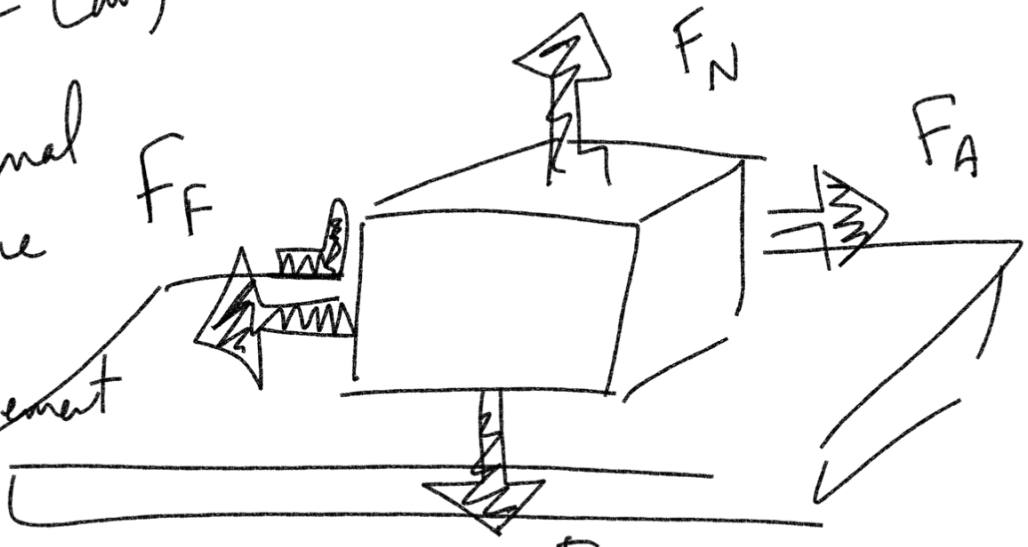


(1st Law)

Frictional force

f_F

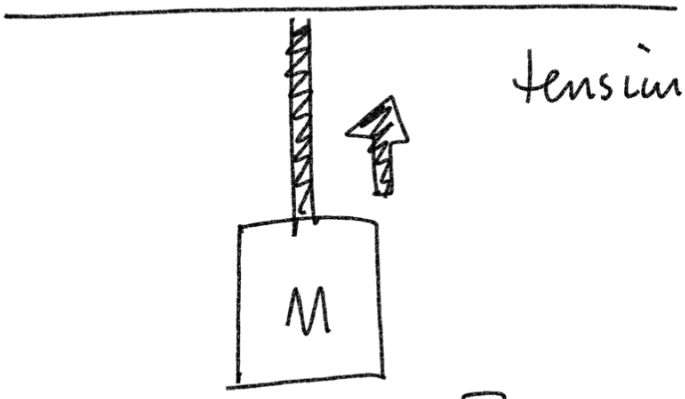
resists movement



coefficient of friction

μ

$F_f = \mu mg$



up to 15kN

tension $T = -mg$

$15000N = T$

F_G

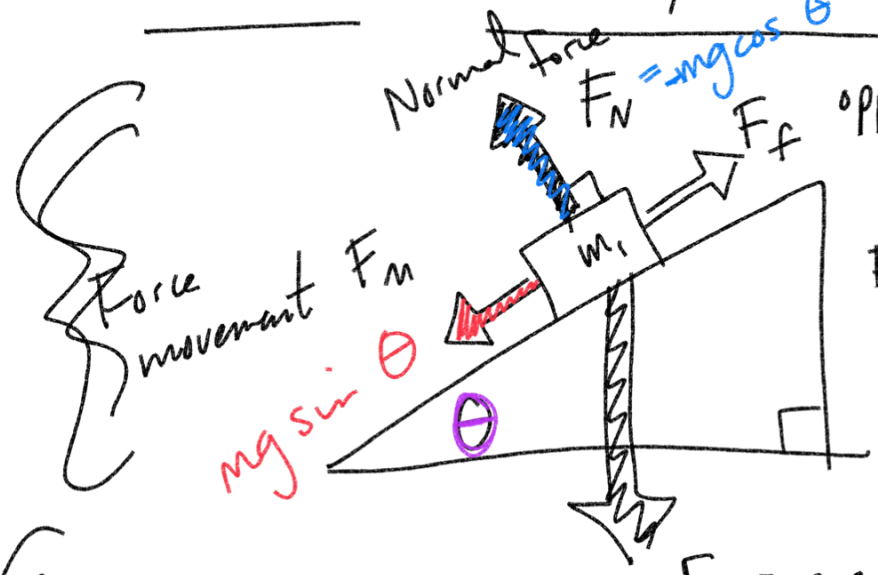
$\frac{T}{-g} = \frac{-mg}{-g}$

$g = -9.8 m/s^2$

$m = \frac{T}{-(-g)} = \frac{15000N}{-(-9.8 m/s^2)} = 1530 kg$

$1530 kg * \frac{2.2 lb}{1 kg} = 3373 lbs$

Incline Block / Plane



$F_G = mg$

$F_N = -mg\cos\theta$

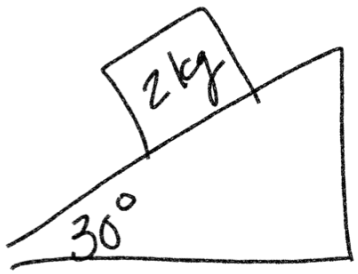
$F_f = -\mu mg\cos\theta$

$F_{movement} = mg\sin\theta$

$F_n = mg\sin\theta$

$F_n > F_f$ block moves

$F_n < F_f$ block static



$$F_N = -mg\cos\theta = -(2\,kg)(-9.8\,m/s^2)\cos 30°$$

$$16.97\,N$$

$$F_n = mg\sin\theta = (2\,kg)(-9.8\,m/s^2)\sin 38°$$

$$-9.8\,N$$