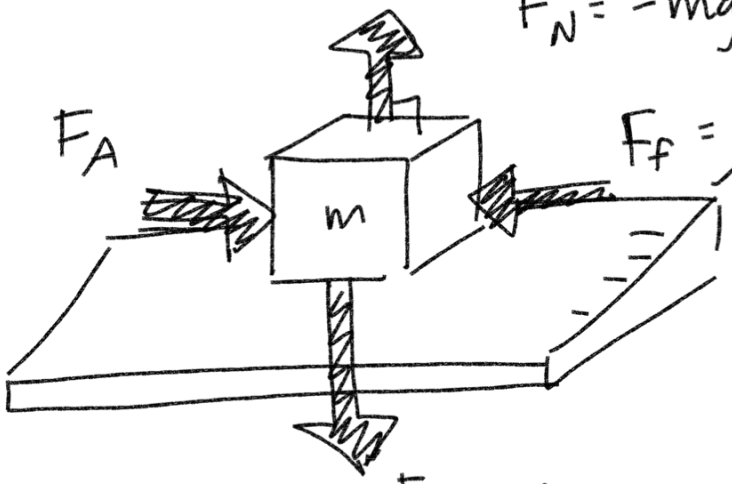
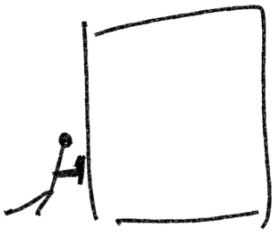
M-GP General Physics Week 27 4/24



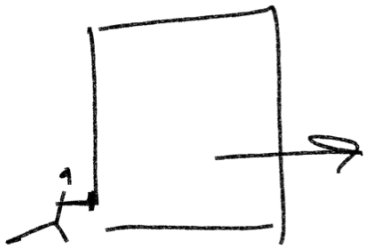
$F_A > F_f$ moves

$F_A < F_f$ no movement



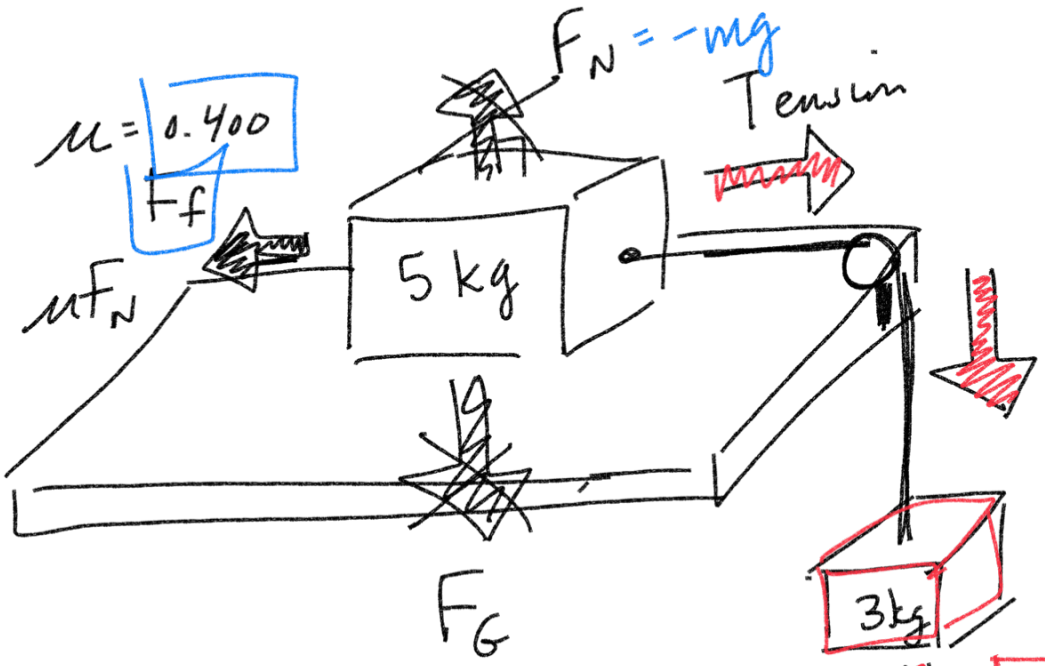
static friction

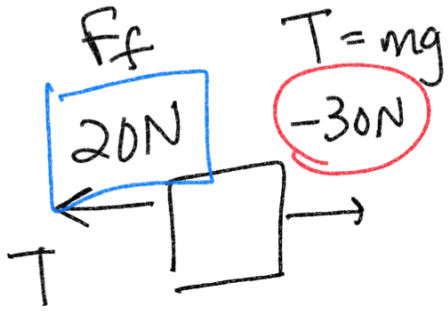
force required to move object at rest



dynamic/kinetic friction

force required to keep moving objects moving





$F_{net} = -10N$

$g = \sim -10 m/s^2$

$F_G = mg$

$(3kg)(-10 m/s^2) = -30N$

$F_f = \mu F_N$

$-(0.400)(5kg)(-10 m/s^2)$

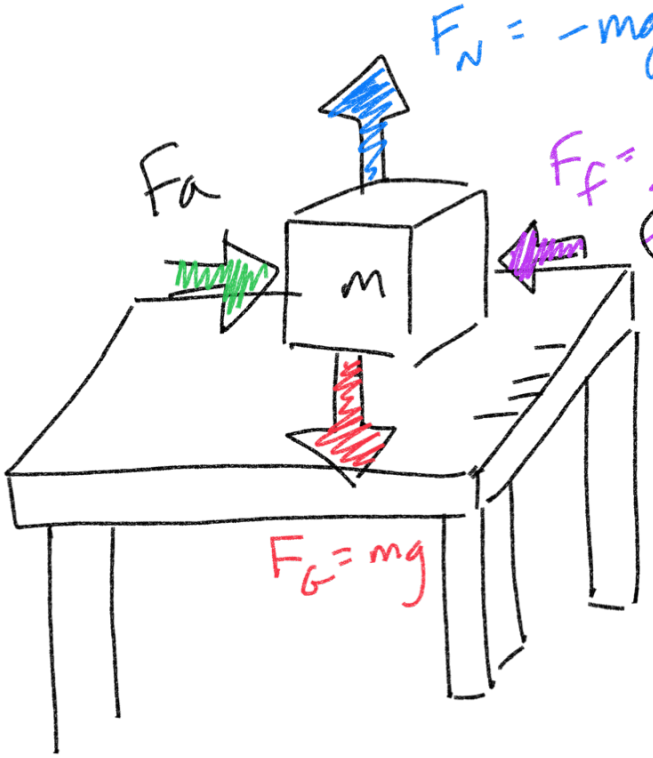
$m \quad g$

20N

$\frac{F}{m} = \frac{ma}{m}$

$a = \frac{F}{m} = \frac{F}{m_1 + m_2} = \frac{-10N}{5kg + 3kg} = \frac{-10N}{8kg}$

$= -1.25 m/s^2$



$m = 12.0\,kg$

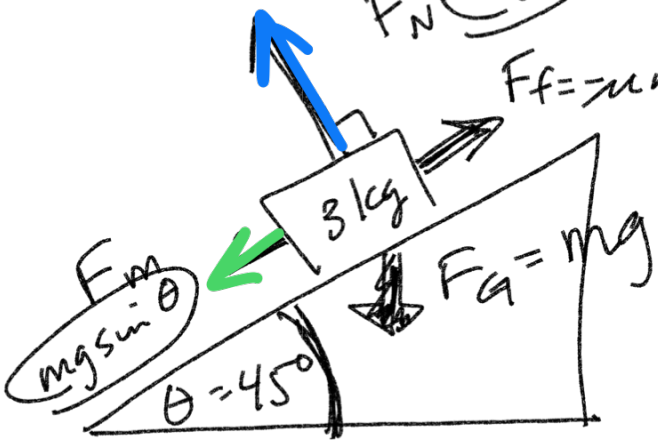
$\mu = 0.200$

What force would be required to move the block?

$F_a = F_f$

$F_a = +(0.2)(12.0\,kg)(+10\,m/s^2)$

$= \boxed{24N}$



What is the acceleration of the block on a frictionless plane?

$\mu = 0$ $F_f = 0$

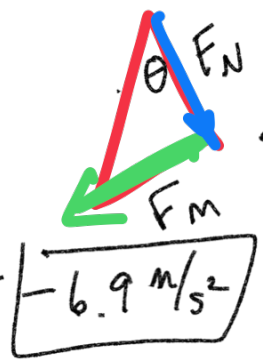
$F_m = mg\sin\theta$

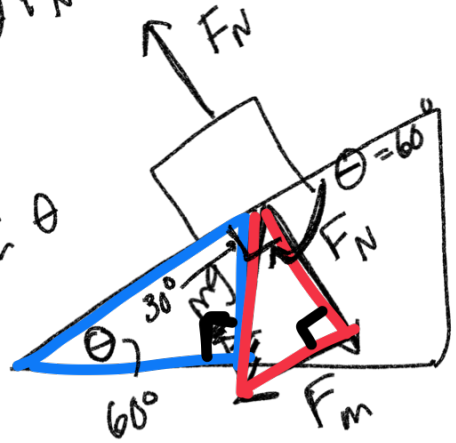
$(3\,kg)(9.8\,m/s^2)(\sin 45°)$ $\cos\theta$ F_N

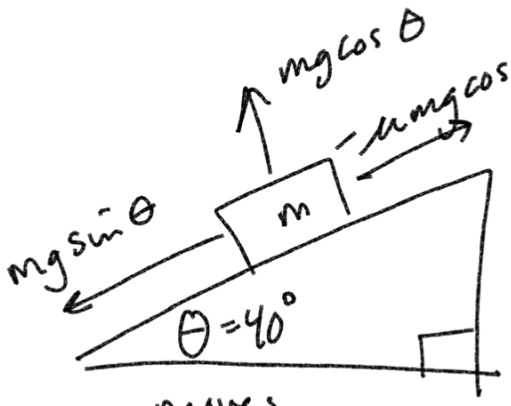
$F_m = -20.8N$

$\frac{F}{m} = \frac{ma}{m}$

$a = \frac{F}{m} = \frac{-20.8N}{3\,kg} = \boxed{-6.9\,m/s^2}$







$m = 18.0\ kg$

$\mu = 0.300$

a) Does it move? yes

b) F_{net}? $-74.3N$

c) acceleration?

moves

$mg\sin\theta > -\mu mg\cos\theta$

$(18.0kg)(-10\ m/s^2)\sin 40°$ ↓ $-115.7N$

$-(0.3)(18.0kg)(-10\ m/s^2)\cos 40°$ ↓ $41.4N$

$-115.7N + 41.4N = \boxed{-74.3N}$

$F = ma$

$\frac{F}{m} \quad \frac{ma}{m}$

$a = \frac{F}{m} = \frac{-74.3N}{18.0kg} = \boxed{-4.1\ m/s^2}$