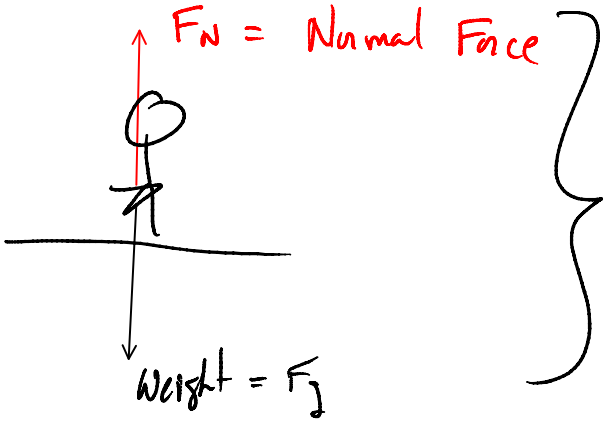
October-12-10
3:16 PM

Normal force

Newton's 3rd law states that for every force there is an equal but opposite force

ex) Zac's mass 81 kg, Zac's weight

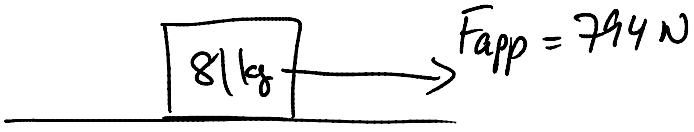
$\vec{weight} = mass \cdot \vec{g}$ Since it is a vector, it must have magnitude and direction.



$\vec{F_N} + \vec{F_g} = F_{NET} = 0$

Zac could either be stationary or constant velocity

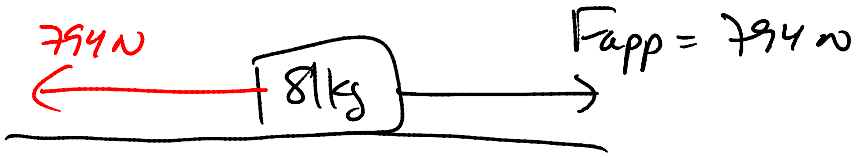
ex



Calculate "a"

$a = 9.8\ m/s^2$

ex

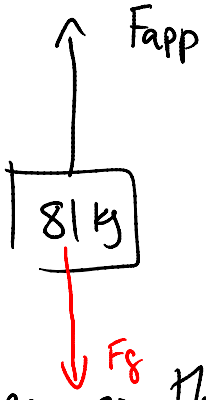


calculate a

$a = 0$ Since $F_{NET} = 0$

it could still be moving since we can have constant velocity in either direction

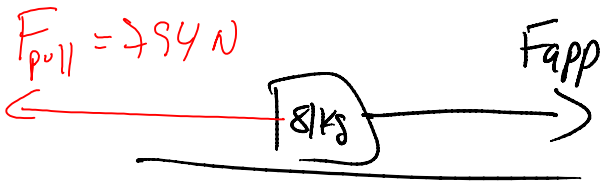
ex



Find Fapp so that this 81 kg block moves up w/ constant velocity

$F_{app} = 794\ N$ needs to Equal its weight.

ex



find "a" add the two Forces to Find

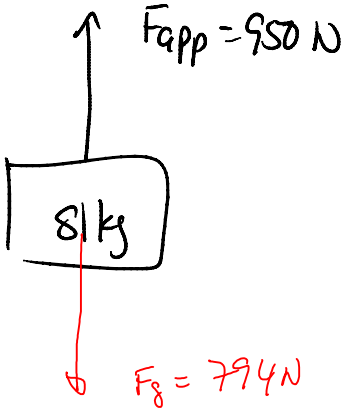
$F_{NET} = F_{app} + F_{pull}$

$= 950N + -794\ N$

$= 156\ N$ right

find a

$a = 1.9\ \frac{m}{s^2}$



or

find a

$a = 1.9\ m/s^2$ up

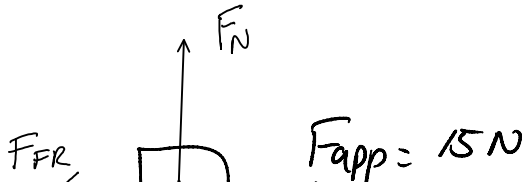
Force of Friction - is a force that opposes the direction of motion

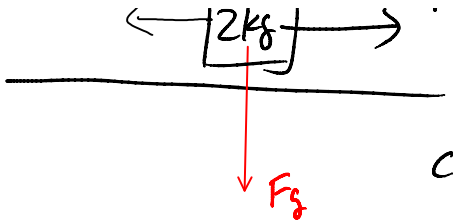
$F_{FR} = \mu_K F_N$ where μ_K (μ k)

μ_K is a coefficient of kinetic friction

F_N is just the normal force

$0 < \mu_K < 1$



ex 

find "a" if the coefficient of friction is 0.15

Step 1 find F_{FR}

$$F_{FR} = \mu_K F_N$$

$F_g = -19.6\,N$ $\therefore$ $F_N = 19.6\,N$

$F_{FR} = (0.15)\ 19.6\,N$

$= 2.94\,N$

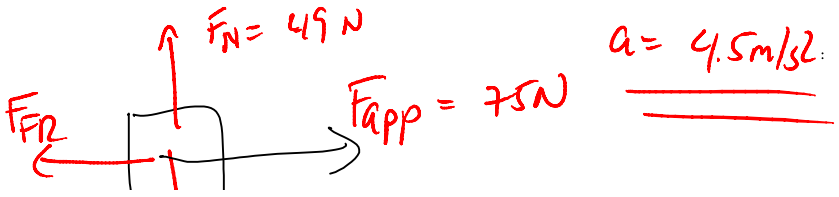
$F_{NET} = F_{app} + F_{FR}$

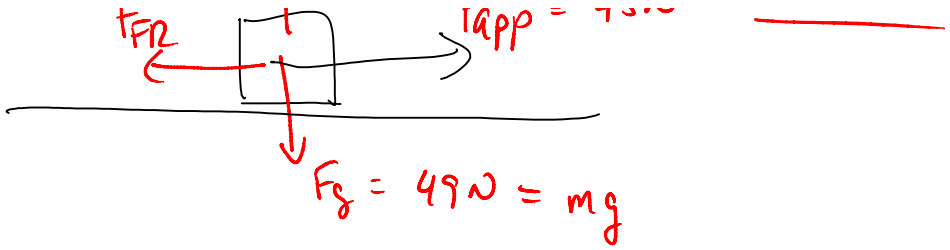
$= 15N + -(2.94\,N)$

$= 12.06\,N$

$a = 6.03\ m/s^2$

ex) If a 5.0kg block is accelerated at a rate of $4.5\ \frac{m}{s^2}$ by an applied force of 75N calculate the Friction Force





$F_{NET} = (5kg)(4.5 \frac{m}{s^2})$

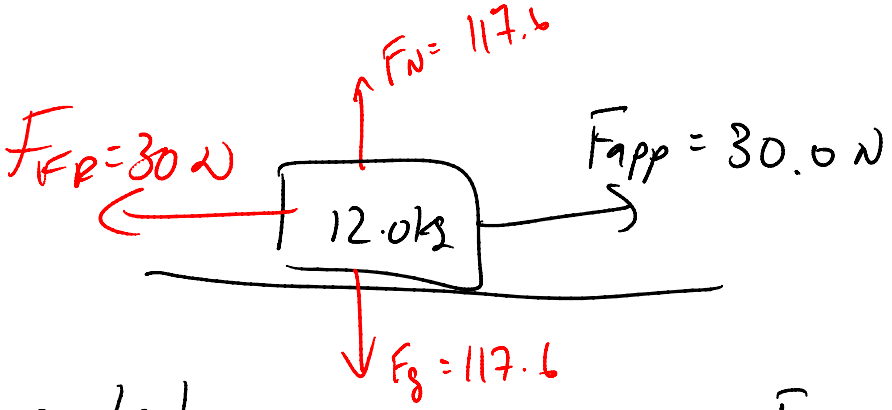
$= 22.5N$

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

$22.5 = 75N + F_{FR}$

$F_{FR} = -52.5N$

T/B pg 106 chp 5 Q# 15



Since constant v ∴ a = 0 ∴ $F_{NET} = 0$

$F_{FR} = 30.0N$ to the left

$F_{FR} = \mu_k F_N$ $\quad F_N = -F_g$

$= -(-117.6N)$

?

$= 117.6$

$$\mu_k = \frac{F_{FR}}{F_N} = \frac{30.0\,N}{117.6\,N}$$

$$= .255$$

23 pg 107 T/B

$$F_{NET} = (5\,kg)\left(6\,\frac{m}{s^2}\right)$$

$$= 30N$$

$$F_{FR} = 10N$$

$$F_{FR} = \mu_k F_N$$

$$\mu_k = \frac{F_{FR}}{F_N} = \frac{10N}{49N} = .20$$

HW T/B # 17, 18, 21, 25

W/B pg 163 # 1-5 all