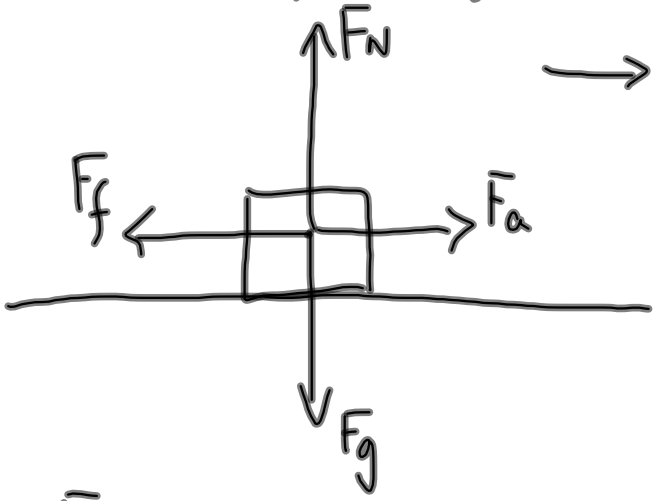
Friction

Consider pushing a block along a horizontal surface:

FBD
(Free Body Diagram)



Vertically: $F_N = F_g$

horizontally: $F_a = F_{f(kin)}$ (constant velocity)

$F_a = F_{f(stat)}$ (just starting to move)

$F_f = \mu F_N$ (F_f depends on the nature of the surfaces (μ) and F_N.)

MP|141

$m = 2.00 \times 10^2 \text{ kg}$

rubber & wet concrete

$\mu_s = 0.70$

$F_f = ?$

$F_f = \mu F_N$ $\quad F_N = F_g$

$F_f = \mu F_g$

$F_f = \mu mg$ $\quad F_g = mg$

$F_f = 0.70\left(2.00 \times 10^2 \text{ kg}\right)\left(9.81 \text{ m/s}^2\right)$

The increase in the static frictional force due to the addition of the sandbags. $\rightarrow$ $F_f = 1.4 \times 10^3 \text{ N}$

MP|143

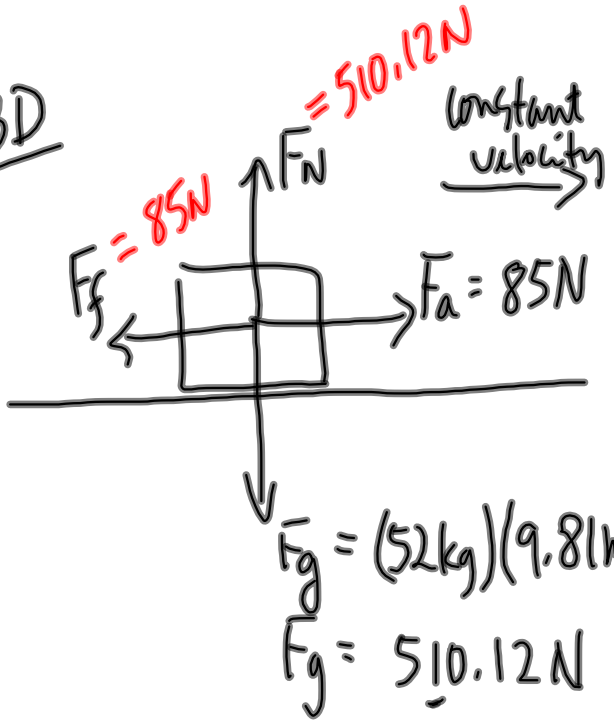
$F_a = 85N$

$m = 52kg$

$\mu = ?$

constant velocity

FBD



$F_g = (52kg)(9.81m/s^2)$

$F_g = 510.12N$

$F_f = \mu F_N$

$\mu = \frac{F_f}{F_N}$

$\mu = \frac{85N}{510.12N}$

$\mu = 0.17$

TO DO

PP|144