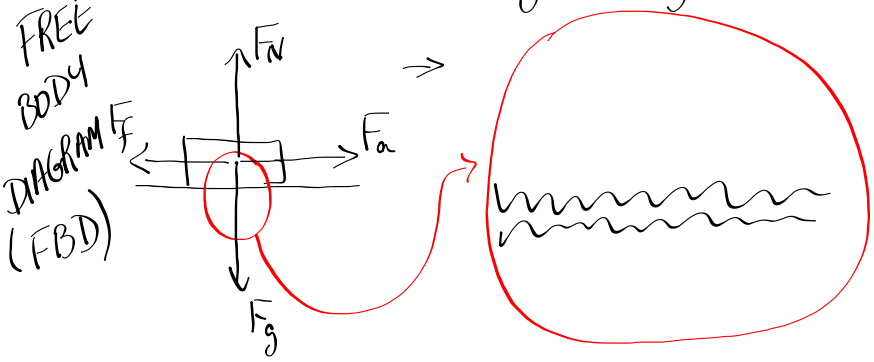
§4-2 Common Forces

Friction

Static friction - the frictional force that you need to overcome in order to just start an object moving (can be zero up to a maximum)

Kinetic friction - the frictional force that is experienced by a moving object.

FREE BODY DIAGRAM (FBD)



$$F_f \propto F_N$$

$$F_f = \mu F_N$$

Where F_f is the frictional force (N)

F_N is the normal force (N) (always perpendicular to the surface)

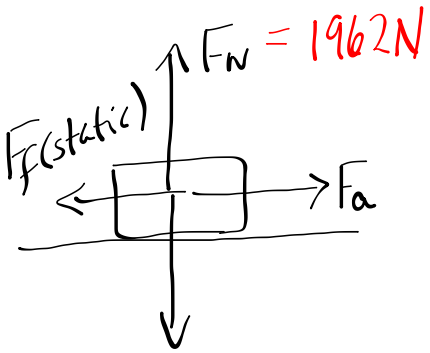
μ is the coefficient of friction. (depends on the surfaces)

MP 141

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

$F_f(\text{static}) = ?$

$\mu_s = 0.70$



$F_g = mg$

$F_g = (2.00 \times 10^2 \text{ kg})(9.81 \text{ m/s}^2)$

$F_g = 1962 \text{ N}$

$F_{f(static)} = \mu_s F_N$

$F_{f(static)} = 0.70\,(1962 \text{ N})$

$F_{f(static)} = 1.4 \times 10^3 \text{ N}$

The additional force of static friction is 1.4×10^3 N

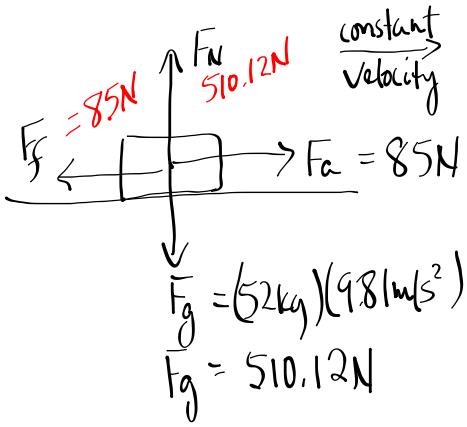
MP|143

$m = 52\,kg$

constant velocity

$F_a = 85N$

$\mu_k = ?$



Vertically: $F_N = F_g$ (if F_a is horizontal and the surface is horizontal)

$F_N = 510.12N$

Horizontally: $F_f = F_a$ (constant velocity)

$F_f = 85N$

$F_f = \mu F_N$

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

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

$\mu = 0.17$

TO DO

* PP|144
* Assignment (p151|26-35) – due Tues Nov 3