Review Sheet

11. b) during braking

$V_1 = 25\,m/s$

$V_2 = 0\,m/s$

$a = -9.3\,m/s^2$

$\Delta d = ?$

$V_2^2 = V_1^2 + 2a\Delta d$

$\frac{V_2^2 - V_1^2}{2a} = \Delta d$

$\Delta d = \frac{-(25\,m/s)^2}{2(-9.3\,m/s^2)}$

$\Delta d = 33.6\,m$ ← only during braking

add this to answer for part (a) ←

12. $\Delta d = 5.85\,m$

$V_2 = 0\,m/s$

$a \leq -9.81\,m/s^2$

$V_1 = ?$

$V_2^2 = V_1^2 + 2a\Delta d$

$V_1^2 = V_2^2 - 2a\Delta d$

$V_1^2 = 0 - 2(-9.81\,m/s^2)(5.85\,m)$

$V_1 = 10.7\,m/s$

$\frac{3600\,s/h}{1000\,m/km} = 38.6\ km/h$

Dynamics

$F_{net} = ma$ (Newton's Second Law)

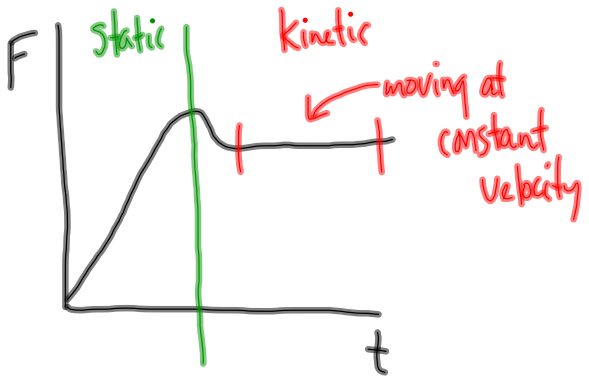
1. Law of Inertia
2. $F_{net} = ma$ $\left(a \propto F, a \propto \frac{1}{m} \right)$ $\Sigma F = ma$
3. Action-Reaction

Weight => Force of Gravity $F_g = mg$

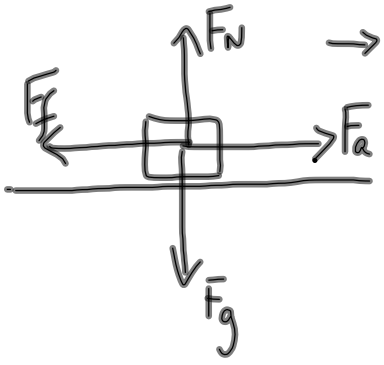
Friction => static + kinetic $F_f = \mu F_N$

(stationary) (moving)

$F_f \leq \mu_s F_N$ $F_f = \mu_k F_N$



Free Body Diagrams are very very important



13. $m = 8.0\,g$

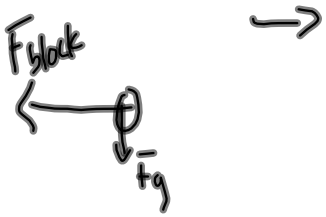
$V_1 = 400\,m/s$

$V_2 = 100\,m/s$

$\Delta t = 4.0 \times 10^{-4}\,s$

$F_{ave} = ?$

$\Delta d = ?$



$a = \frac{\Delta V}{\Delta t}$

$a = \frac{100\,m/s - 400\,m/s}{4.0 \times 10^{-4}\,s}$

$a = -7.5 \times 10^{5}\,m/s^2$

$F_{ave} = m a$

$F_{ave} = (0.0080\,kg)(-7.5 \times 10^{5}\,m/s^2)$

$F_{ave} = -6.0 \times 10^{3}\,N$

$\vec{F}_{ave} = 6.0 \times 10^{3}\,N$ [opposite motion]