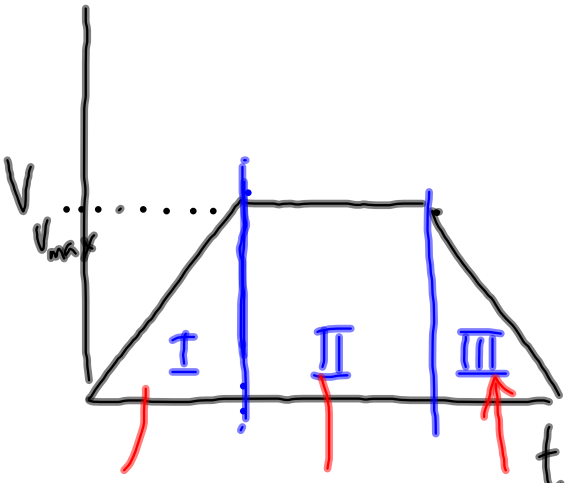
Review

8.



$V_{ave} = \frac{\Delta d}{\Delta t}$ $V = \frac{\Delta d}{\Delta t}$ $V_{ave} = \frac{\Delta d}{\Delta t}$

I: $V_1 = 0$

$V_2 = ?$

$\Delta t = 6.0s$

$a = 2.0 m/s^2$

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

$a = \frac{V_2 - V_1}{\Delta t}$ ($V_1 = 0$)

$V_2 = a\Delta t$

$V_2 = (2.0 m/s^2)(6.0s)$

$V_2 = 12 m/s$ ..... keeping

11. $t_{reaction} = 0.80\,s$, $V = 25\,m/s$ } constant velocity, $\Delta d = ?$ $\quad V = \frac{\Delta d}{\Delta t}$

Brakes

$V_1 = 25\,m/s$
$V_2 = 0$
$a = -9.3\,m/s^2$
$\Delta d = ?$

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

12. speed limit: 50 km/h = 13.9 m/s

know: $\Delta d = 5.85\,m$

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

$V_2 = 0$

$V_1 = ?$

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

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

$V_1^2 = 114.777\,m^2/s^2$

$V_1 = 10.7\,m/s$

Since $V_1 < 13.9\,m/s$, they were not speeding

Sep 9-2:14 PM

Force Review

Newton's Laws

1. Law of Inertia
2. $a \propto F$, $a \propto \frac{1}{m} \Rightarrow a \propto \frac{F}{m}$
3. Action/Reaction

$F \propto ma$

$F = kma$ $\left(k = \frac{1N}{1kg \cdot m/s^2}\right)$

$\vec{F}_{net} = m\vec{a}$

Weight

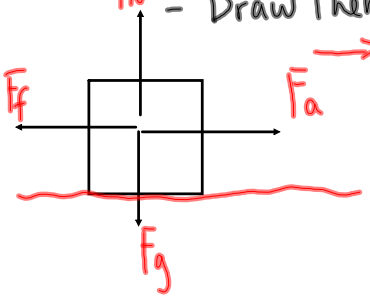
$F_g = mg$

Friction

$F_f = \mu F_N$ → μ: coefficient of friction; F_N: normal force ⊥ to surface

FBD – Free Body Diagrams are VERY IMPORTANT

F_N – Draw them!

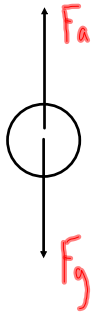


If moving:

$F_a = F_f$, constant v

$F_a < F_f$, deceleration

$F_a > F_f$, acceleration



If the surface is horizontal and F_a is horizontal, then $F_N = F_g$

If $F_a > F_g$, + acc

- speed up going up
- slow down going down

If $F_a < F_g$, − acc

- slow down going up
- speed up going down

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