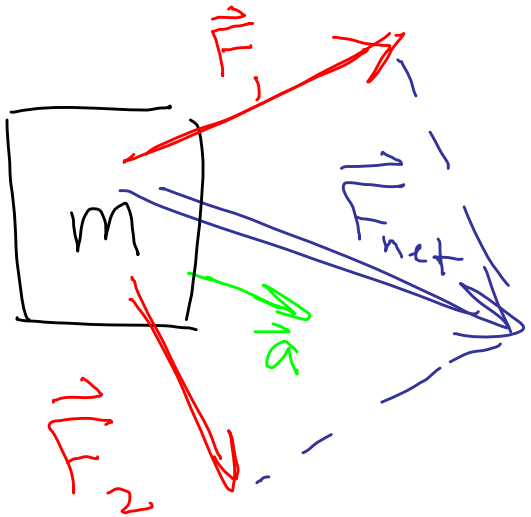
Phys 2110-4 2/3/12

Note Title 2/3/2012



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

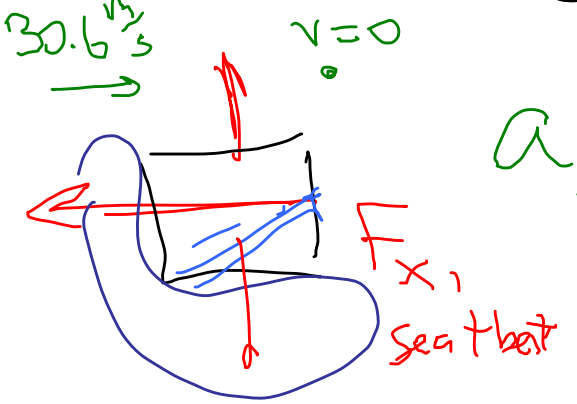
$$\vec{F}_{net} = m\vec{a}$$

Newton's 2nd Law

4.15 A car leaves the road trav. at $110\ \frac{km}{h}$ hits tree, coming to a stop in 0.14s. What average force does seatbelt exert on 60kg passenger during collision?

$-1.3\times10^4\ N$

$\rightarrow 3kN$

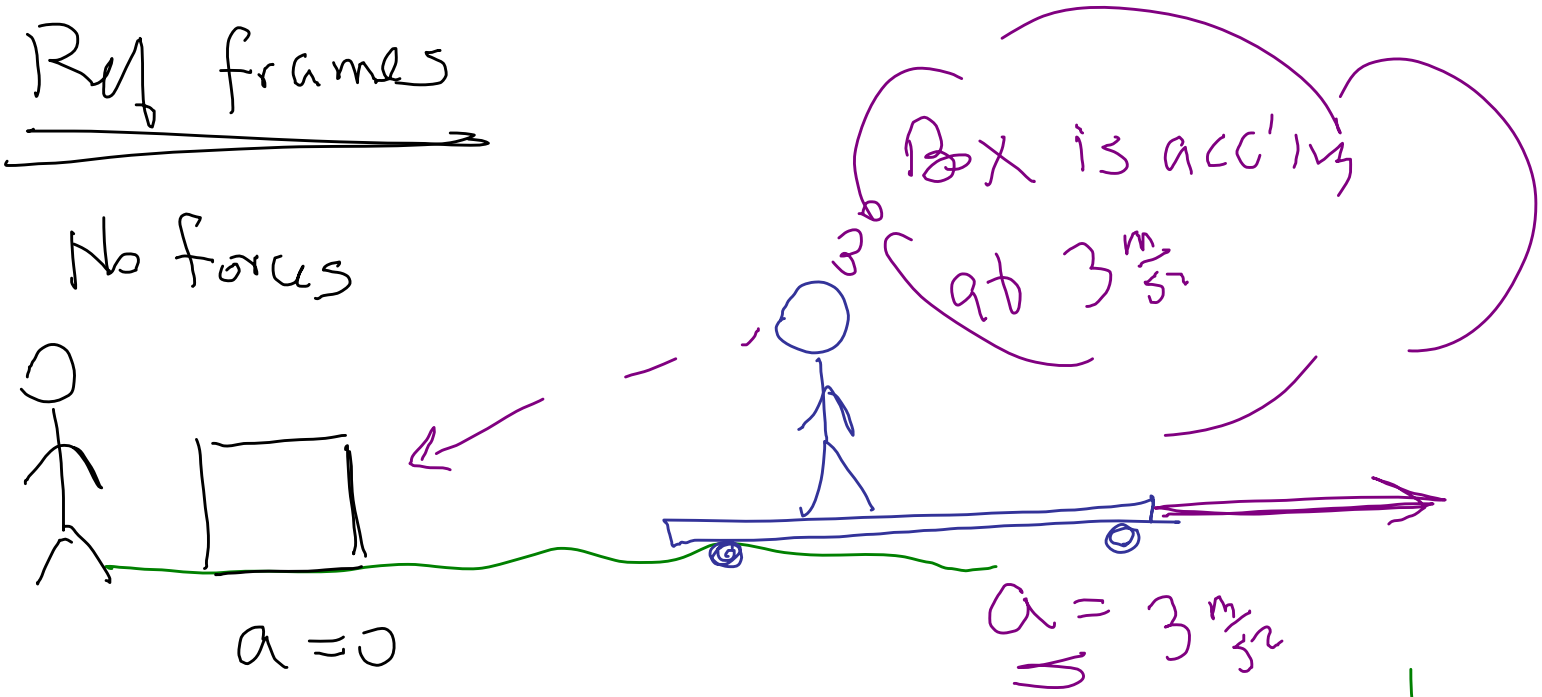


$$a_x = \frac{\Delta v}{\Delta t} = \frac{0 - 30.6\ \frac{m}{s}}{0.14\ s} = -2.18\times10^2\ \frac{m}{s^2}$$

$$F_x = ma_x = (60kg)\left(-2.18\times10^2\ \frac{m}{s^2}\right)$$

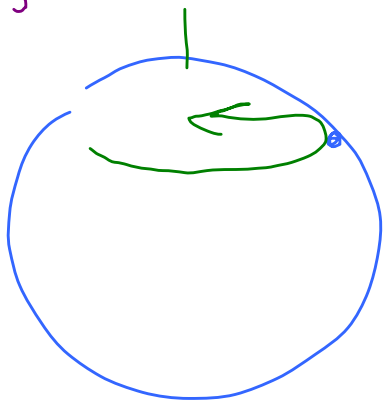
Ref frames

No forces



Must use inertial ref frame.

Will say ref frame is good enough.



Where do forces come from?

Fundamentally 4 forces

- Gravity
- Electromagnetic } Electroweak
- Weak force
- Strong force

Our macroscopic force

- gravity
- "tension
  normal force"
  friction.