1. A massive truck and a small passenger car are hitting brakes in a panic stop situation. Which one is going to stop in a shorter distance? Both vehicles are equipped with the identical braking system and have identical tires.

ABS - ANTILOCK BRAKING SYSTEM

Prevents brakes from locking up; it maintains the static friction between tires and the road. $F_{Fs}>F_{Fk}$, because $mu_s>mu_k$.

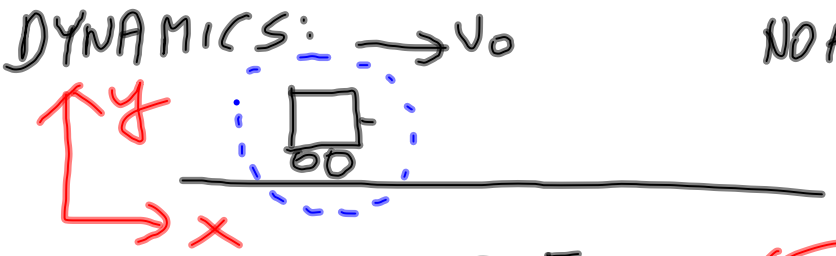
$\Delta x = ?$

$$\Delta x = \frac{v^2 - v_0^2}{2a}$$

In order to find the displacement, we need to find the acceleration first.

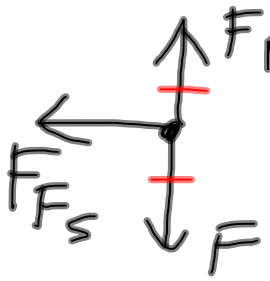
Dec 10-7:44 AM

DYNAMICS:



NO AIR RESISTANCE.

$F_g = m \cdot g$



$$\Sigma F_x = m \cdot a_x$$

$$-F_{F_s} = m \cdot a_x$$

$$-\mu_s F_N = m \cdot a_x$$

$$-\mu_s \cdot \cancel{m} \cdot g = \cancel{m} \cdot a_x$$

$$\boxed{a_x = -\mu_s g}$$

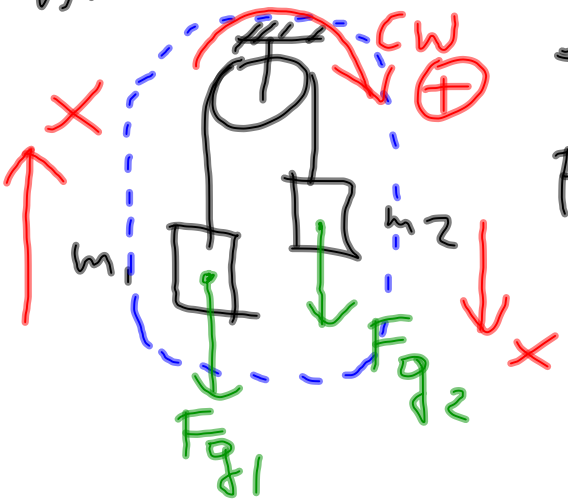
Both vehicles will stop at the same distance!!!

Acceleration is mass INDEPENDENT - no mass in the equation!!!

Dec 10-8:04 AM

ATWOOD'S MACHINE.

FBD for your lab, where m1 and m2 are treated as a system.



$$\Sigma F_x = m_{1+2} \cdot a_x$$

$$F_{g_2} - F_{g_1} = m_{1+2} \cdot a_x$$

Dec 10-8:22 AM