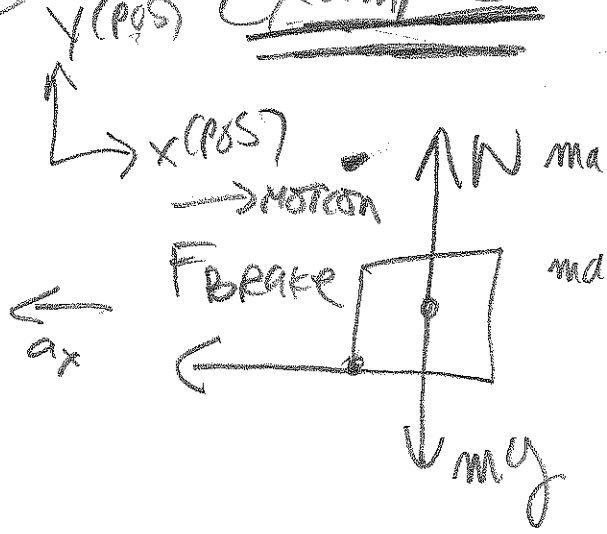
CH 4: Newtons 2nd Law 9-18-13

Example 4.4

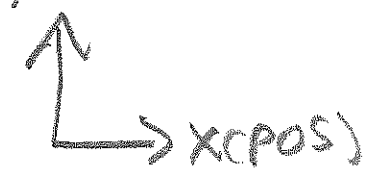


$ma_x = \sum F_x$ = pos − neg

$ma_y = \sum F_y$ = pos − neg

subtracting magnitudes

Labels are magnitudes.



$\vec{g} = (0, -g)$

$ma_x = 0 - F_{brake}$

$ma_y = N - mg = 0$

$N = mg$

$a_x = \dfrac{-F_{brake}}{m}$

$= \dfrac{-1.50 \times 10^4 N}{2000 kg}$

$\Rightarrow a_x = -7.5 m/s^2$

Note:

$g = 9.8 \frac{m}{s^2}$

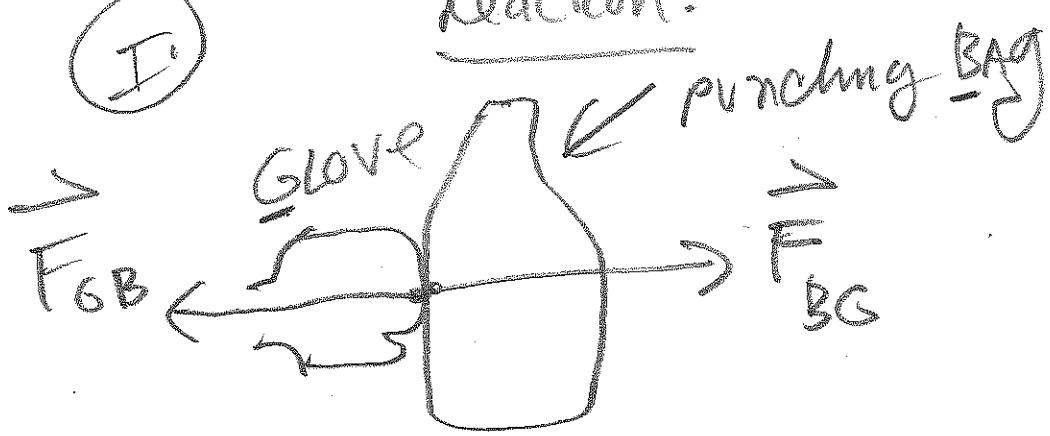
$-g = -9.8 \frac{m}{s^2}$

g is positive

Newton's 3RD LAW

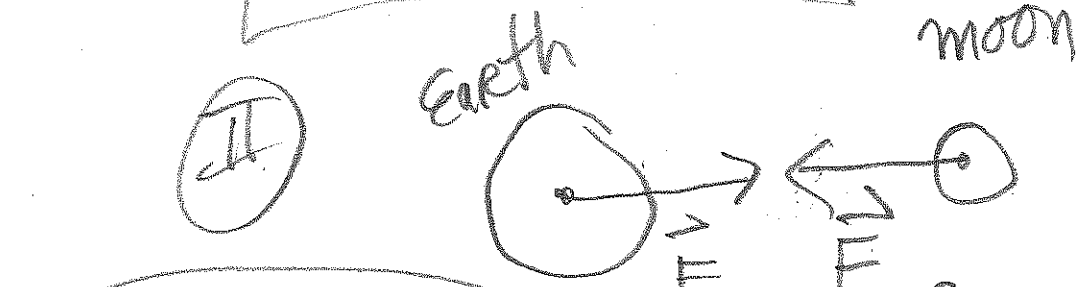
FOR every action there is an equal and opposite Reaction.

(I)



$$\vec{F}_{GB} = -\vec{F}_{BG}$$

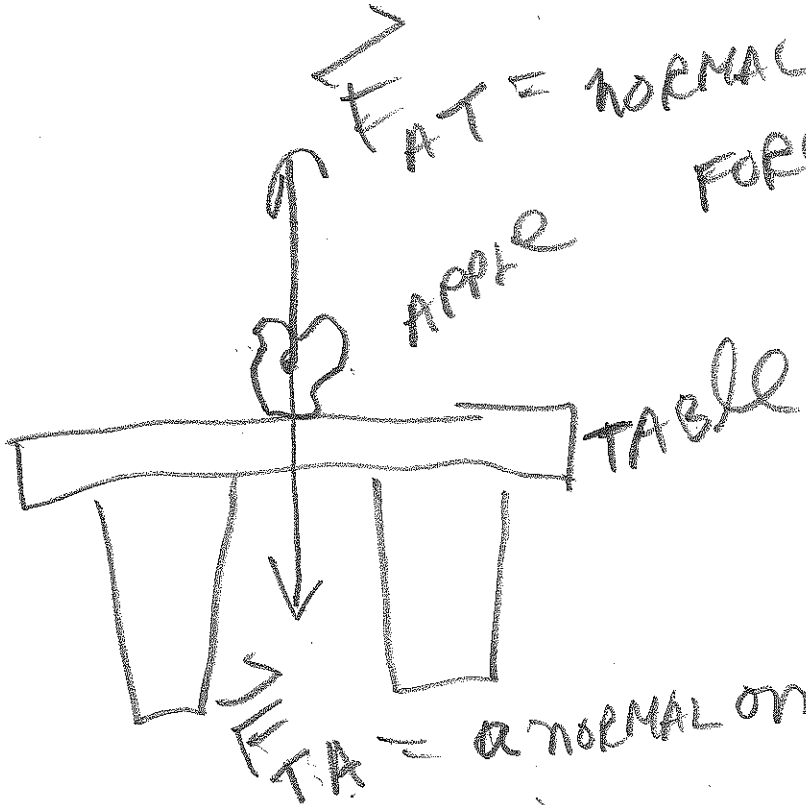
(II)



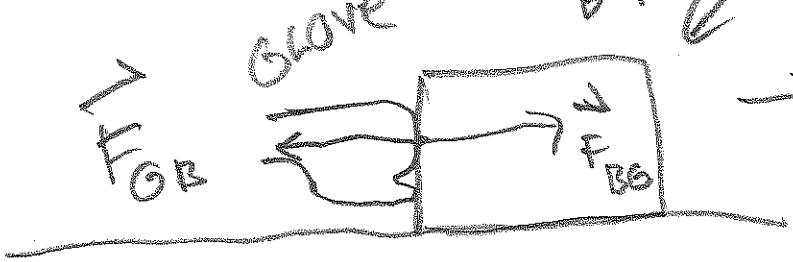
NOTE: MASS OF EARTH IS SO LARGE, EARTH IS AT REST.

$$\vec{F}_{EM} = -\vec{F}_{ME}$$

III



$$\vec{F}_{TA} = -\vec{F}_{AT}$$



$$\vec{F}_{BG} = +3N$$

$$\vec{F}_{GB} = -3N$$

FOR BOX: $\sum F_x = \text{POS} - \text{NEG}$ (no friction)

$$ma_x = F_{BG} - 0$$

(4

$$ma_x = F_{BG}$$

$$(2kg)a_x = 3N$$

$$a_x = \frac{3}{2} m/s^2$$

Question 2) Lab note:

WAY (2) $\bar{V}_y = \dfrac{V_{A_y}^{0} + V_{BY}}{2}$

and $\Delta y = \bar{V}_y \cdot \Delta t$

2ND WAY TO GET V_y

find V_{BY}.

WAY 1: FORMULA* TO GET V_{BY}

WAY 2: $\Delta y = \left(\dfrac{V_{A_y} + V_{BY}}{2}\right) \cdot \Delta t$ FIND V_{BY}

*CM's