Newton's 3rd Law

PH 111

System

$\vec{F}_{ext} = m_T \vec{a}$ m_T = total system mass

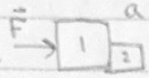
↑ applied forces (weight, friction)

internal forces - keep objects moving together as one unit - FBD

(contact force, tension)

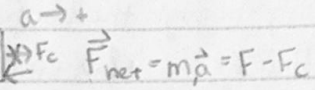
↑ Shows all the forces exerted on the object, not by the object

a.



$F = (m_1 + m_2)a$

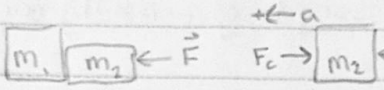
$a = F/(m_1 + m_2)$ in m/s^2



$\vec{F}_{net} = m_1\vec{a} = F - F_c$

$F_c = -m_1\vec{a} + F$

b.

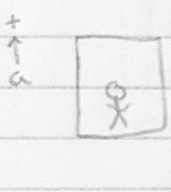


$\vec{F}_{net} = m_2\vec{a} = F - F_c$

$F_c = F - m_2\vec{a}$

Part (a) because $m_1 > m_2$

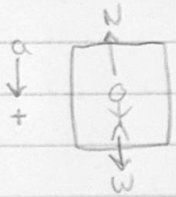
Elevator problem: find N



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

$N - W = ma$ $W = mg$

$N = m(a + g)$



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

$W - N = ma$

$N = m(g - a)$

Pulley

$\vec{F}_{ext} = m_T\vec{a}$