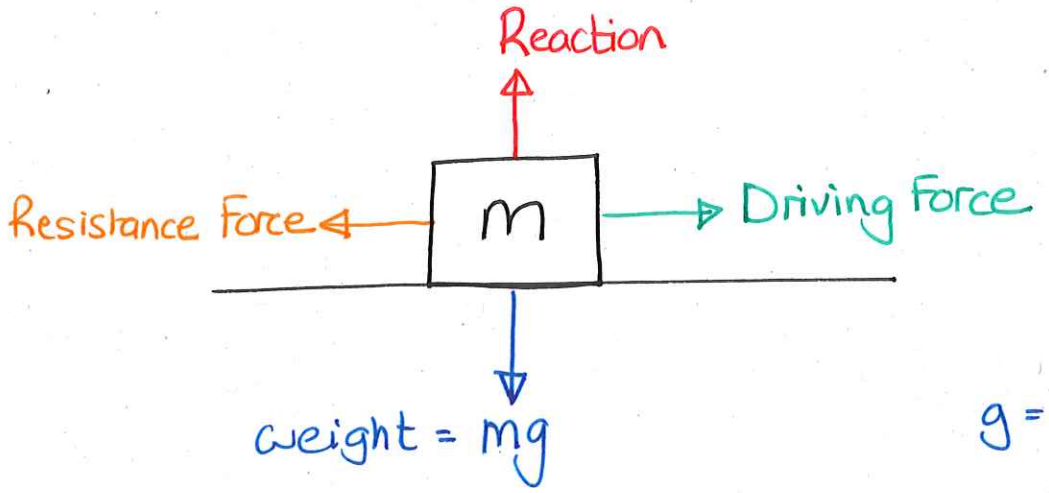
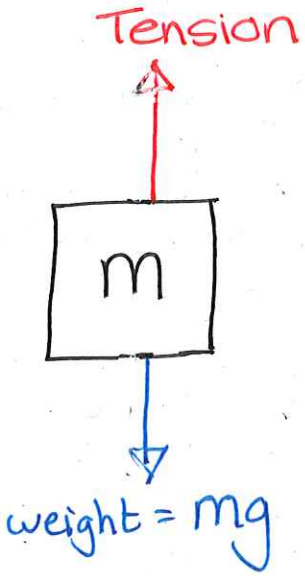
YEAR 1 APPLIED **FORCES AND MOTION** chapter 10

- FORCE DIAGRAMS (surface)



$g = 9.8\ ms^{-2}$

- FORCE DIAGRAMS (vertical movement)



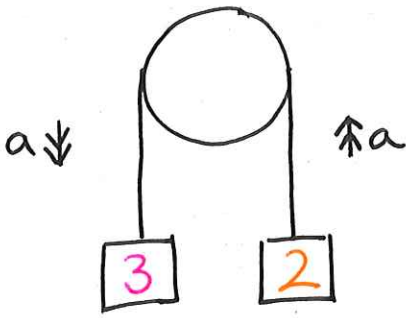
$g = 9.8\ ms^{-2}$

- $F = ma$

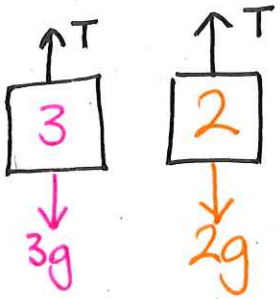
RESULTANT FORCE = Mass x acceleration

NOTE: Resultant force is all driving forces minus all resistant forces

– PULLEYS



becomes



$F = ma$

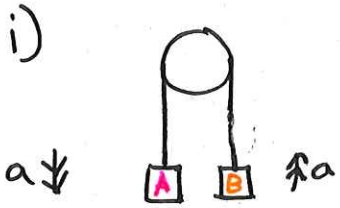
$3g - T = 3a$

$F = ma$

$T - 2g = 2a$

– PULLEYS + SUVAT

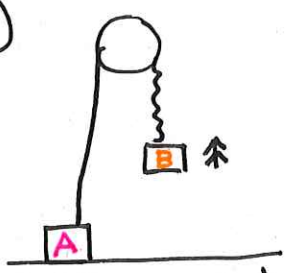
Part i)



system is released

$(u = 0)$

Part ii)



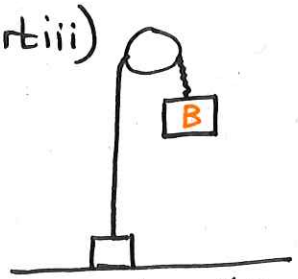
A hits ground

B keeps traveling up

(For B, driving force now = 0

recalculate a using f = ma)

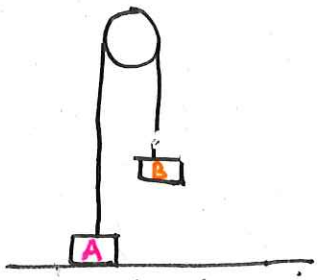
Part iii)



B reaches its greatest height

$(V = 0)$

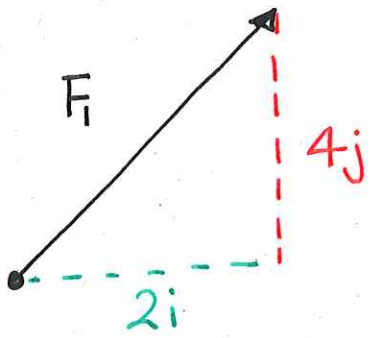
Part iv)



string taut again

(Time from part ii to part iii is equal to Time from part iii to part iv)

– FORCES AND VECTORS



$F_1 = 2i + 4j$

magnitude (use pythagoras) $= \sqrt{2^2 + 4^2} = 5$

– ADDING FORCE VECTORS

$F_1 = 3i + -8j$

$F_2 = 2i + 6j$

Resultant force $= F_1 + F_2 = (3+2)i + (-8+6)j$

$= 5i + -2j$

– F=ma and VECTORS

Resultant Force (F) $= 16i - 8j$

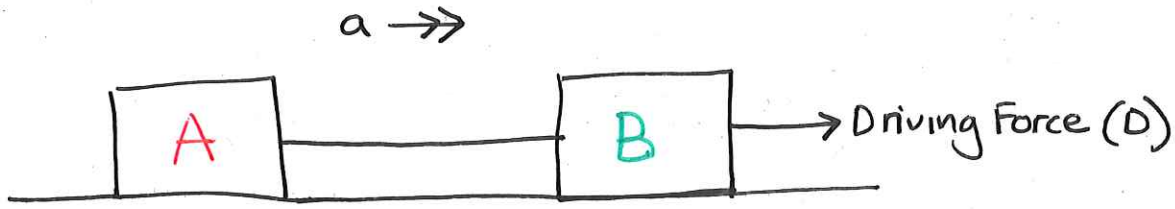
Mass $= 8$

$F = ma$

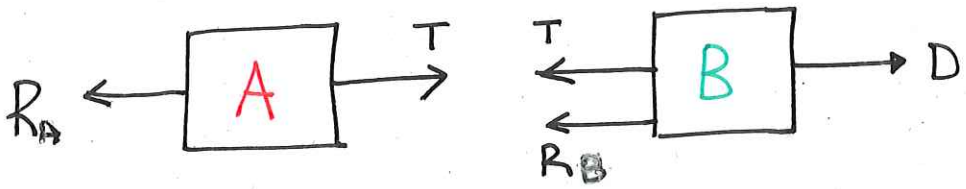
$16i - 8j = 8a$

$a = \frac{16i}{8} - \frac{8j}{8} = 2i - j$

– CONNECTED PARTICLES



Individually it becomes:



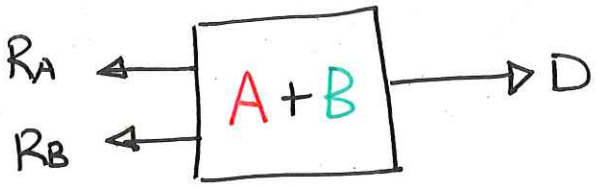
Particle A $F=ma$

$$T - R_A = Aa$$

Particle B $F=ma$

$$D - T - R_B = a$$

Overall it becomes:

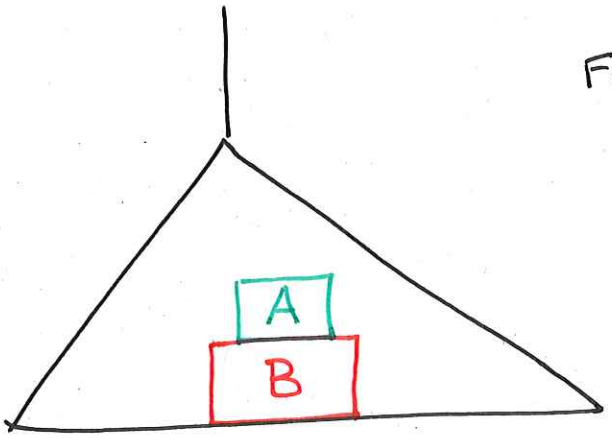


overall $F=ma$

$$D - R_A + R_B = (A+B)a$$

— NEWTONS 3RD LAW / SCALE-PANS

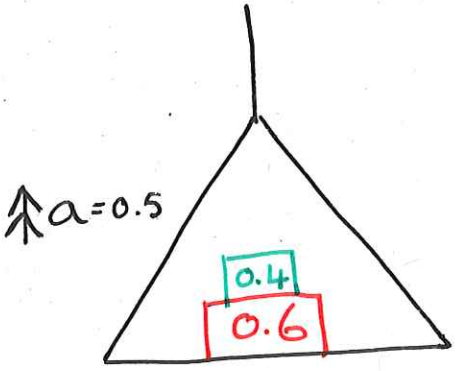
Every action has a equal and opposite reaction



Force exerted on B by A = Force exerted on A by B

ALWAYS easier to work out forces exerted using the particle on TOP.

Ascending



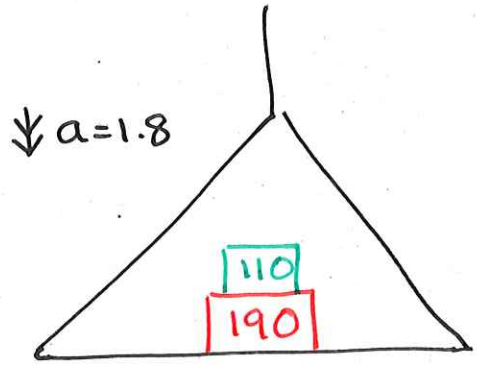
$F = ma$

$R - 0.4g = 0.4(0.5)$

$R = 4.12$

Force exerted on A by B = 4.12 N

Descending



$F = ma$

$110g - R = 110(1.8)$

$R = 880$

Force exerted on A by B = 880 N