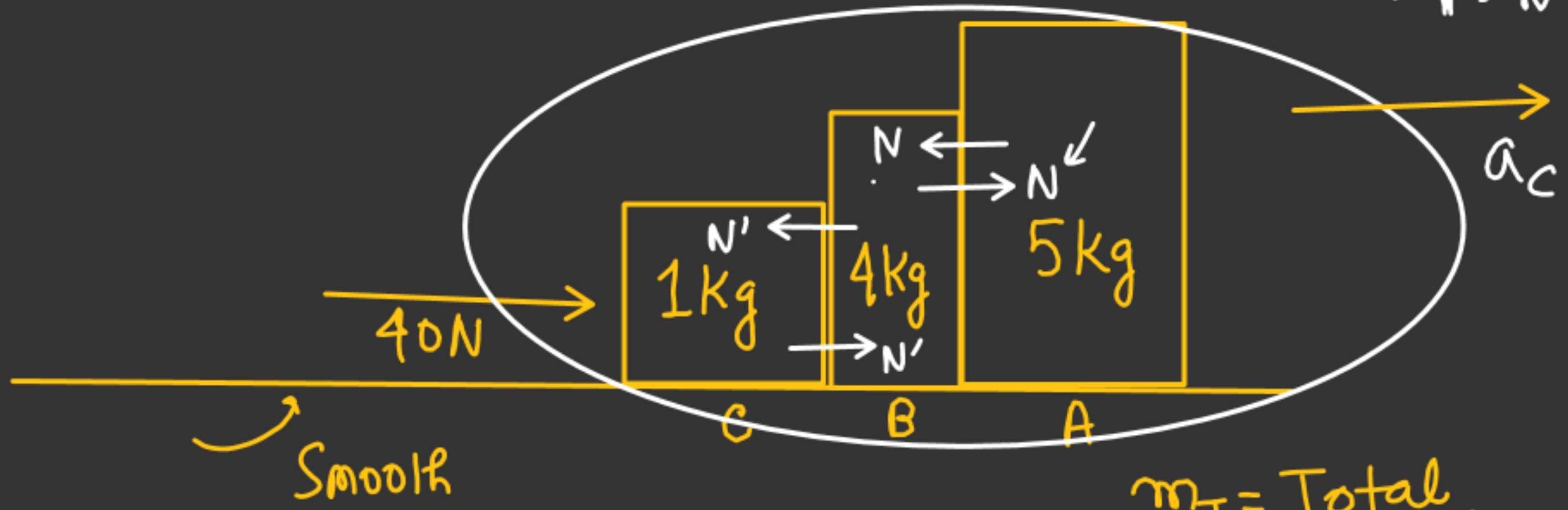
Nishant Jindal

Normal reaction b/w each blocks



m_T = Total mass of the System

$$(F_{net}) = m_T a_c$$

$$a_c = \frac{F_{net}}{m_T} = \frac{40}{10} = 4\,ms^{-2}$$

$$\Rightarrow$$

$$40 - N' = 1 \times a_c$$

$$40 - N' = 4$$

$$N' = 36 \text{ Newton}$$

$$N = 5a_c$$

$$N = 5 \times 4$$

$$N = 20 \text{ Newton}$$

$$[N_g = 5g = 50 \text{ Newton}]$$

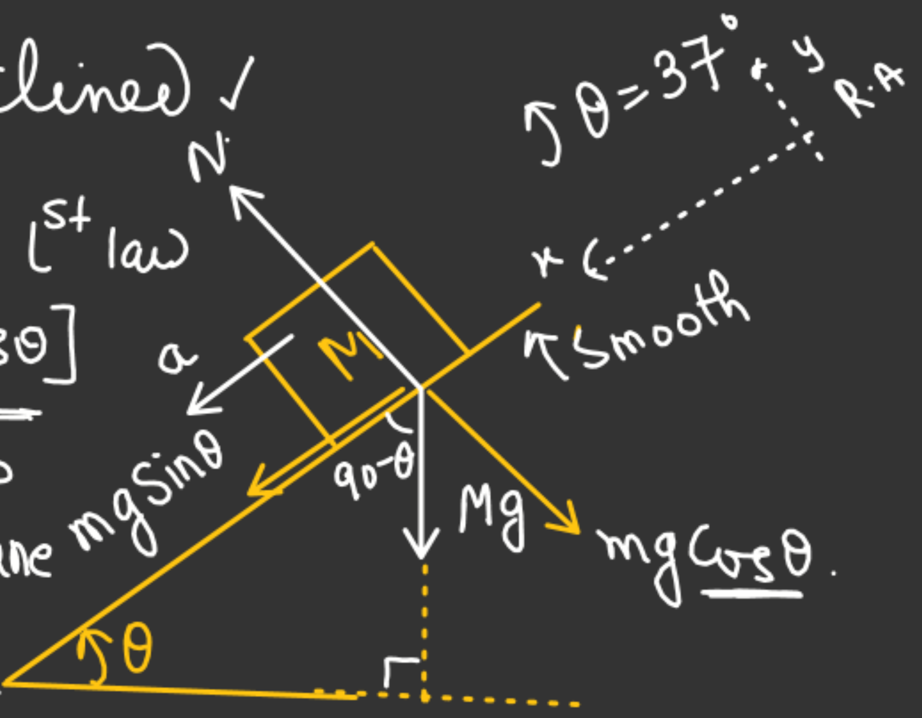
Find Normal reaction b/w all the blocks in both the cases.??

⊥ to Inclined plane ✓

Newton's 1st law

$[N = mg\cos\theta]$

Parallel to Inclined plane



$mg\sin\theta = ma$

$$\boxed{a = g\sin\theta}$$

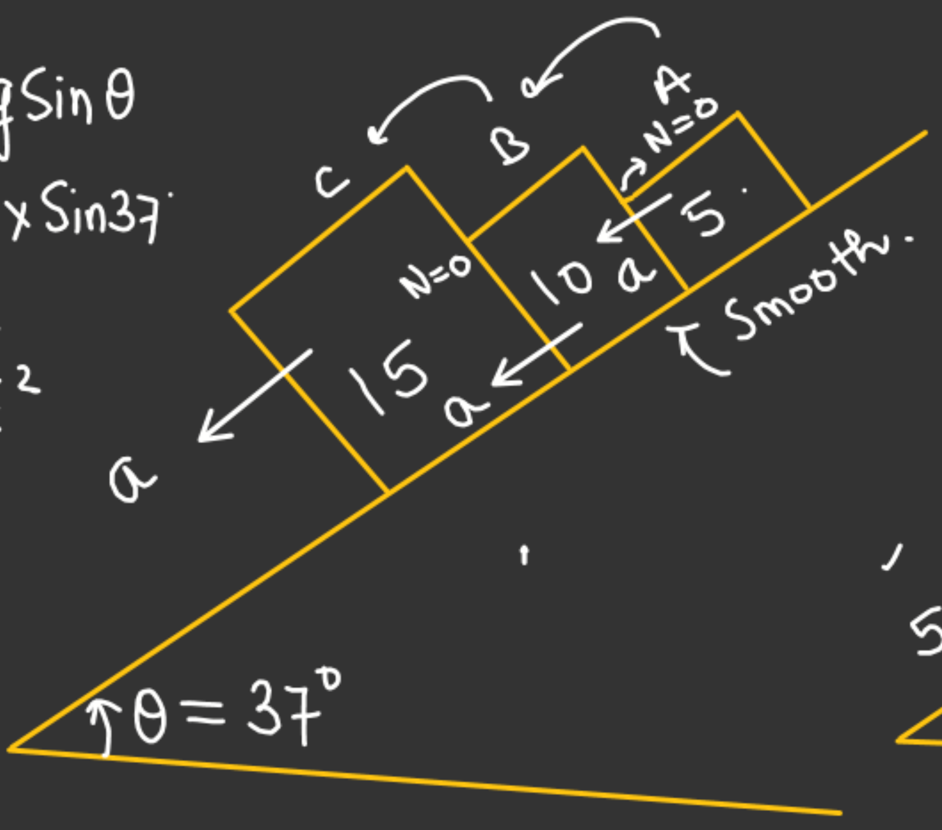
Case-2 ✓

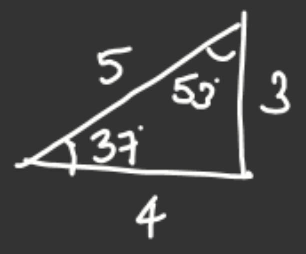
$a = g\sin\theta$

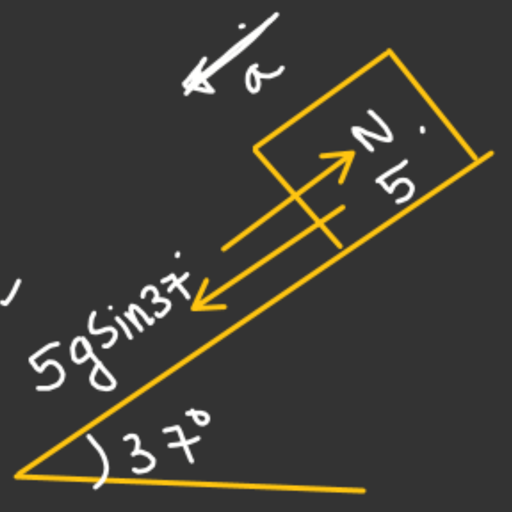
$a = 10 \times \sin 37^\circ$

$a = 10 \times \frac{3}{5}$

$a = 6\ m s^{-2}$







⇓

$5g\sin 37^\circ - N = 5 \times 6$

$50 \times \frac{3}{5} - N = 30$

$30 - N = 30$

$$\boxed{N = 0}$$ ✓

H.W

(Take $F = 90N$)

$a_{15} = ?$

$a_{10} = ?$

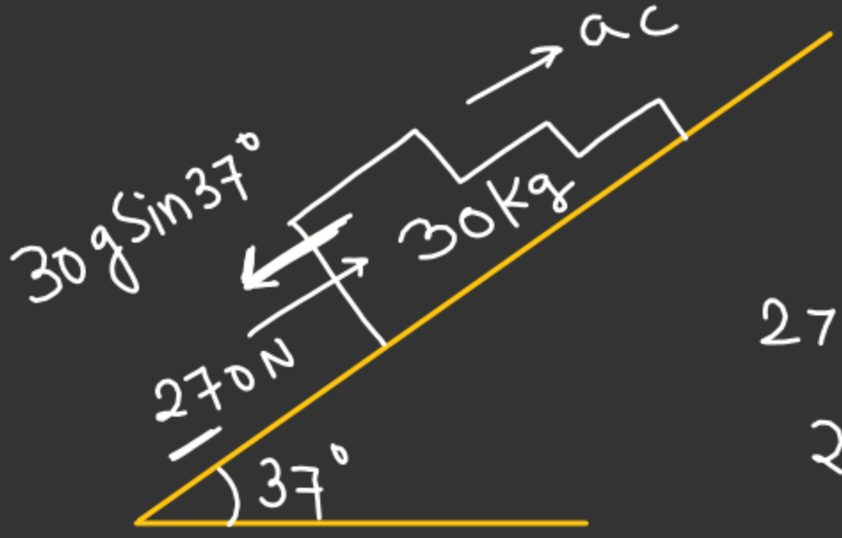
$a_5 = ?$

Total downwar force $= \left(15 \times 10 \times \frac{3}{5} + 10 \times 10 \times \frac{3}{5} + 5 \times 10 \times \frac{3}{5}\right)$

$= 30 \times 10 \times \frac{3}{5}$

$= 180\,N$ ✓

All move with different acclerations

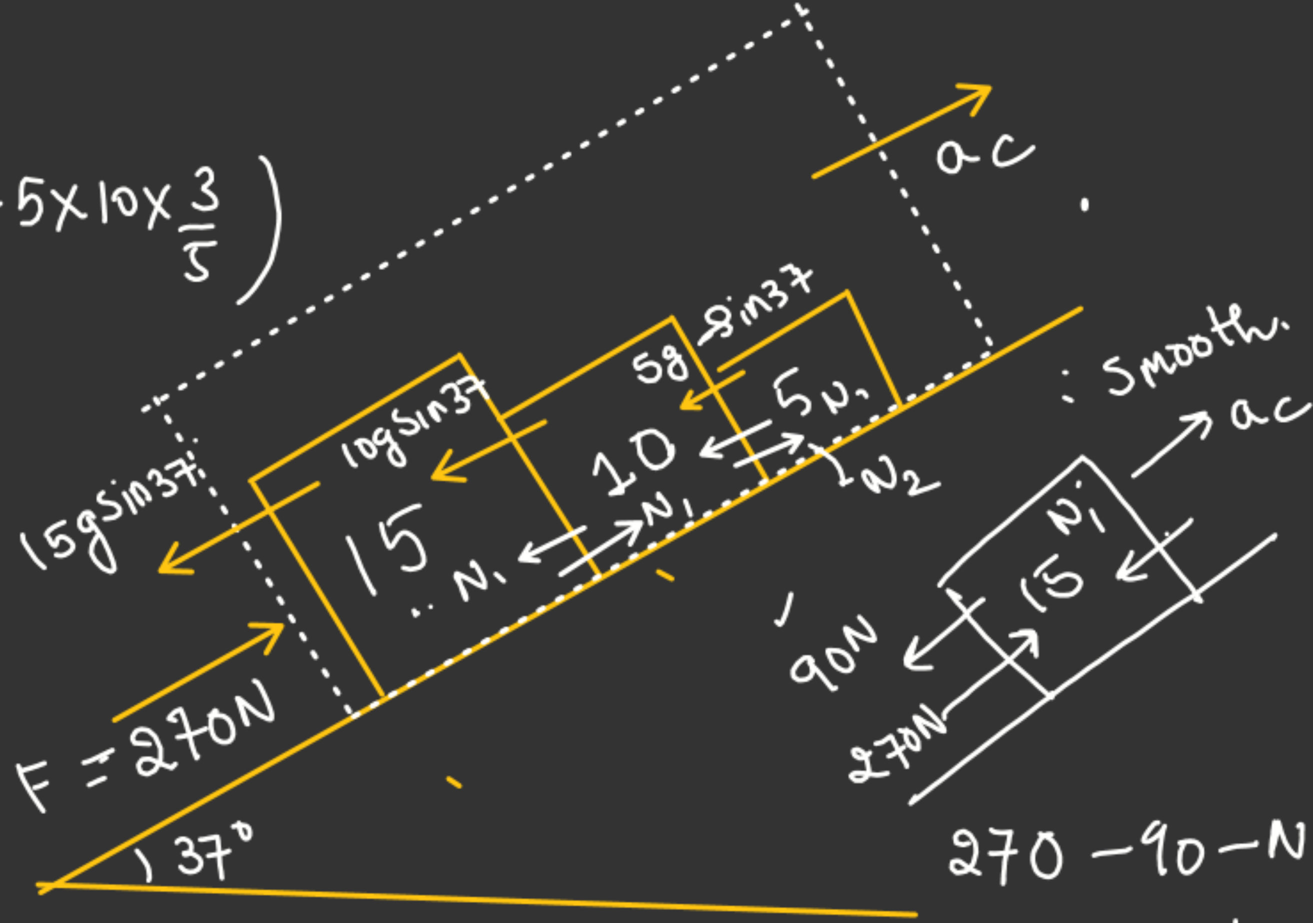


$270 - 30 \times 10 \times \frac{3}{5} = 30a_c$

$270 - 180 = 30a_c$

$90 = 30a_c$

$a_c = 3ms^{-2}$



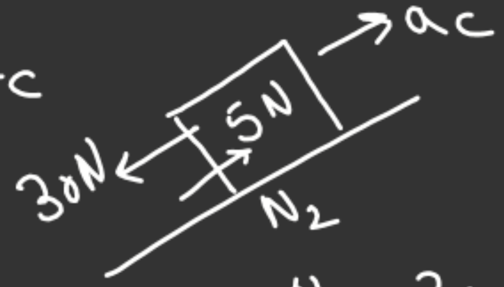
$270 - 90 - N_1 = 15 \times 3$

$N_1 = 270 - 90 - 45$

$N_1 = 270 - 135$

$N_1 = 135$

Ans



$N_2 - 30 = 5a_c$

$N_2 = 30 + 5 \times 3$

$N_2 = 45N$

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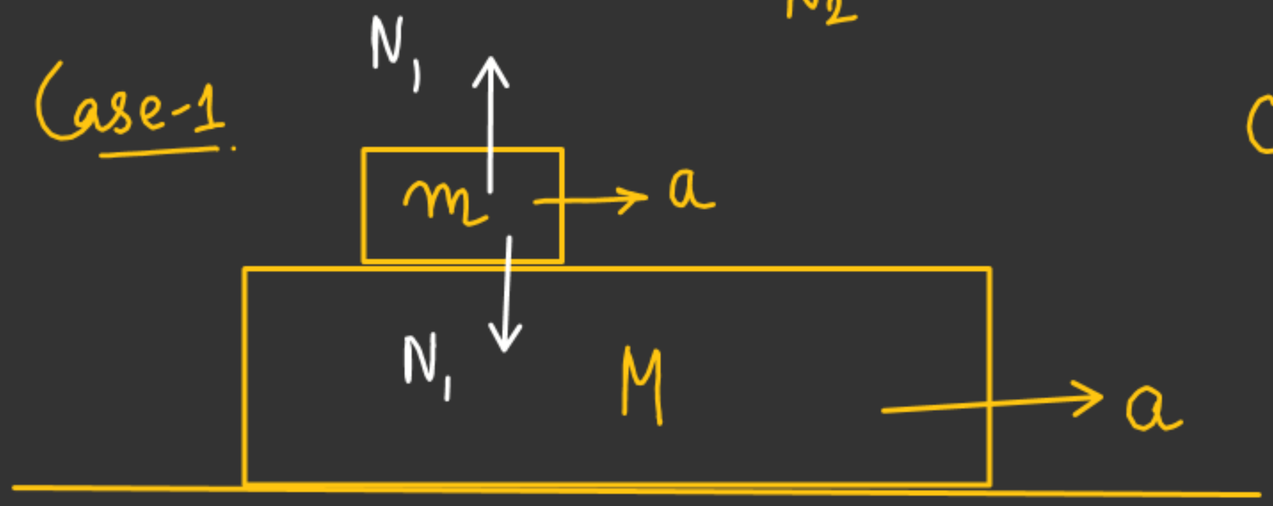
let, N_1 and N_2 be the normal reaction acting b/w block & plank.

Find $\frac{N_1}{N_2} = ??$

Case-1

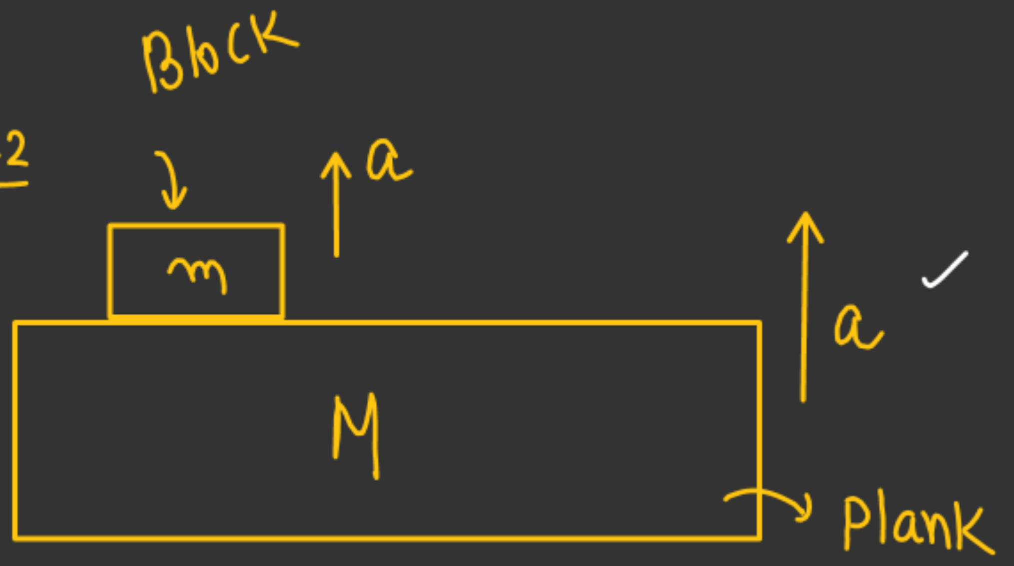


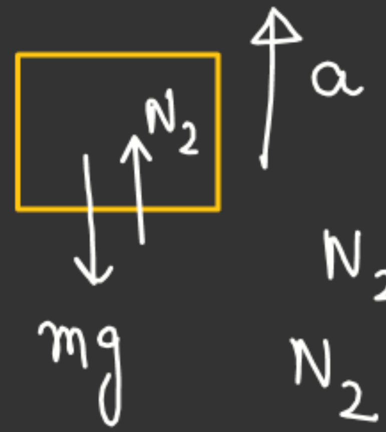
$\rightarrow \boxed{N_1 = mg}$ ✓

$\rightarrow$ a

Newton 1st law

Case-2





Newton 2nd Law

$$N_2 - mg = ma$$

$$N_2 = m(g+a)$$

$$\frac{N_1}{N_2} = \frac{\cancel{m}g}{\cancel{m}(g+a)}$$

$$\frac{N_1}{N_2} = \left(\frac{g}{g+a}\right)$$ ✓

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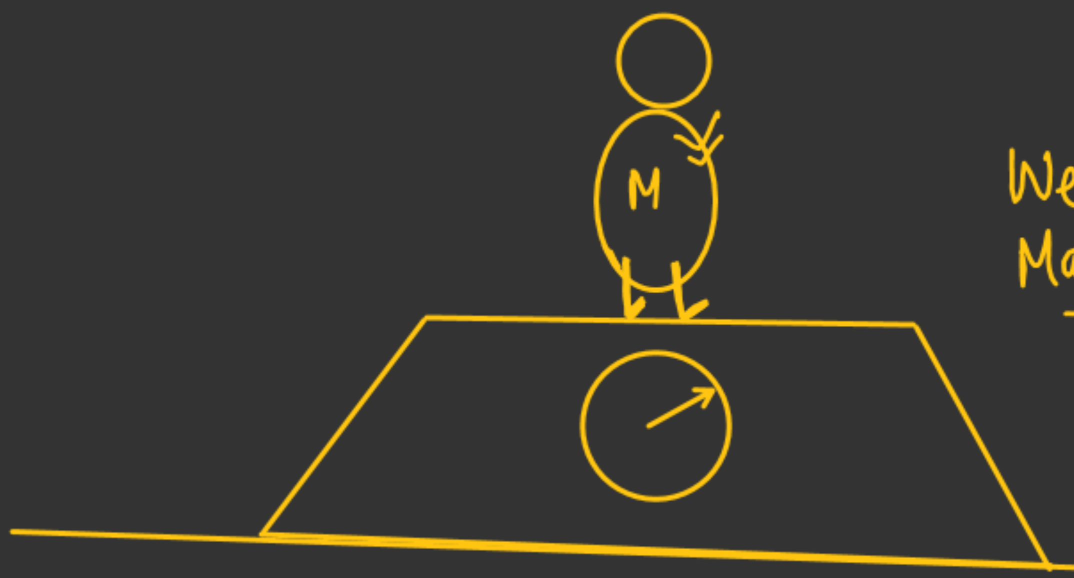
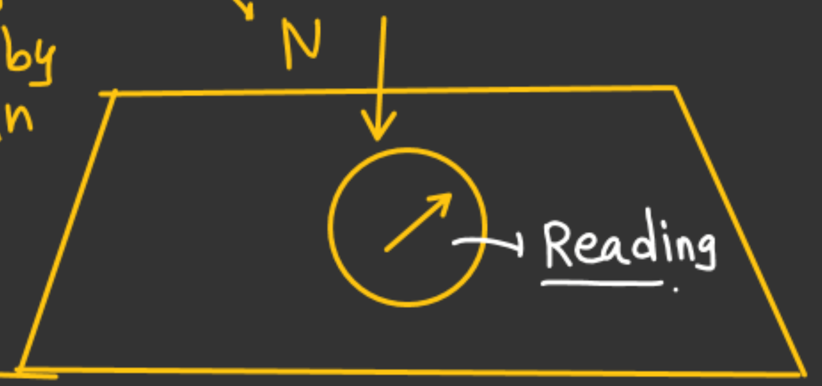
Case of Weighing Machine (Measure Weight of the body)



F.B.D of Weighing Machine



⇓

Newton's 1st Law

$$\boxed{N = Mg}$$

⇓

Weight.

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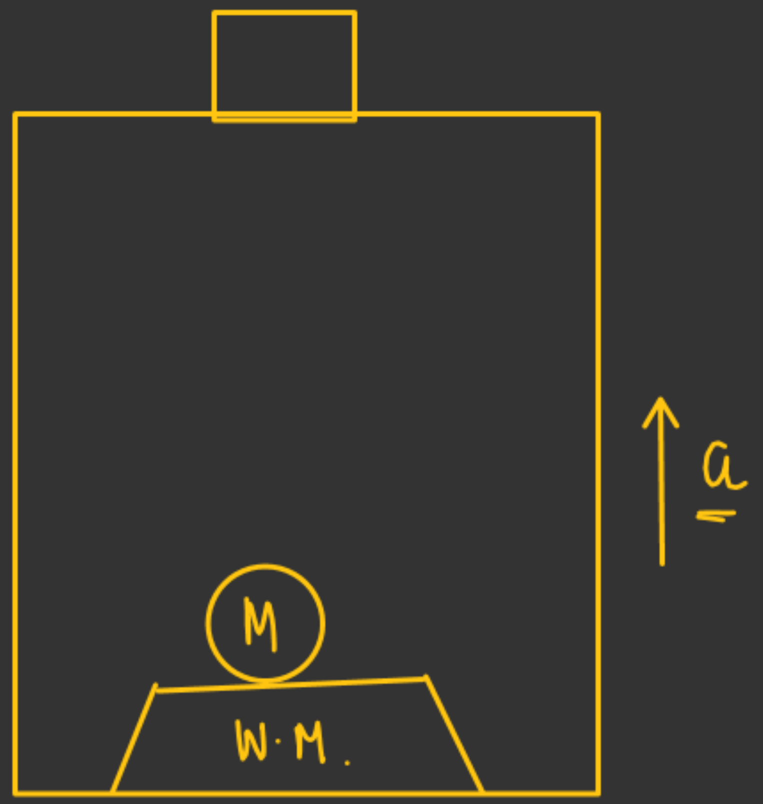
Case of Apparent Weight



$F_{net} = Ma$

$N - mg = Ma$

$$\boxed{N = M(g+a)}$$

$\rightarrow$ $W_{apparent}$ weight.

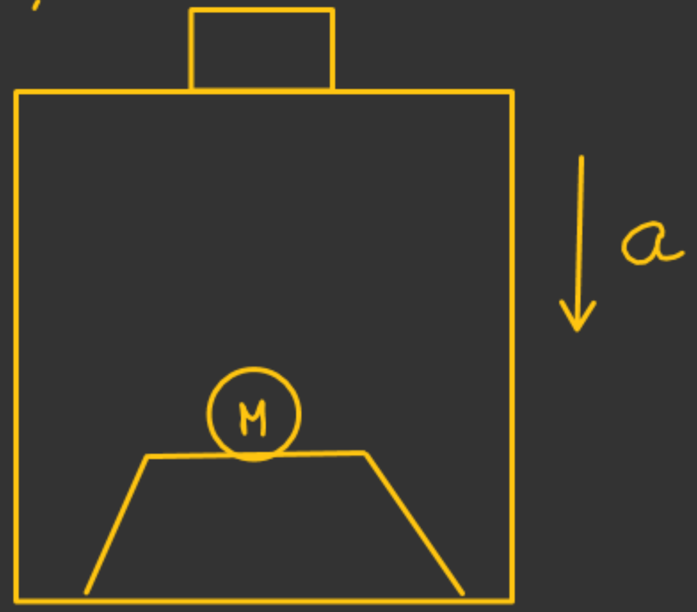
$W_{app} > W_{real}$

$W_{real} = Mg$

Note:- If elivator is moving with constant velocity

$$\boxed{N = Mg}$$ ✓

If elivator is moving downward:-



$Mg - N = Ma$

$N = M(g-a) \Leftarrow$ (Case of weight lessness)

$\Downarrow$

W_{app}