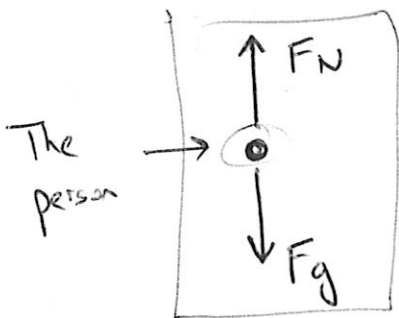


Elevator Query Solutions

- ① Draw a diagram of the forces acting on the person while he is in the elevator which is at rest!



(Forces are balanced)

From the diagram we can now generate an equation

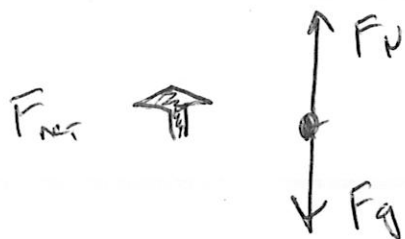
$$F_N = F_g$$

but we know $F_g = mg$ so

$$\begin{aligned} F_N &= mg \\ &= (42)(9.8) \\ &= 411.6 \text{ N} \end{aligned}$$

The scale would say the person weighs 410 N

- ② Because the elevator is accelerating upwards the forces acting on the person are no longer balanced. There would be a net force pointing upwards



therefore $F_{net} = F_N - F_g$

solve for F_N (apparent weight)

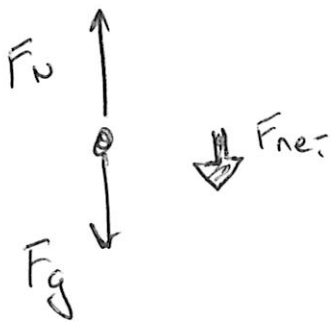
$$F_N = F_{net} + F_g$$

sub int $F_{net} = ma$ and $F_g = mg$

$$\begin{aligned} F_N &= ma + mg \\ &= m(a + g) \\ &= 42(5.2 + 9.8) \\ &= 630 \text{ N} \end{aligned}$$

The scale would say the person weighs 630 N!

③



$$F_{net} = F_g - F_N$$

$$\begin{aligned} F_N &= F_g - F_{net} \\ &= mg - ma \\ &= m(g - a) \\ &= 42(9.8 - 4.8) \\ &= 210 \text{ N} \end{aligned}$$

The scale would say
the person weighs 210 N