P11 - 3.4 - Elevator Notes

Logic

$$\uparrow^{+} \rightarrow$$
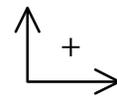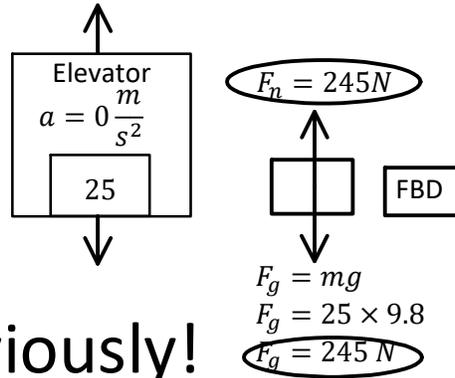
Find the weight of a 25 kg object on a scale in a stationary Elevator?

Elevator

25

$F_n = 245N$

FBD

$F_g = mg$
$F_g = 25 \times 9.8$
$F_g = 245\ N$
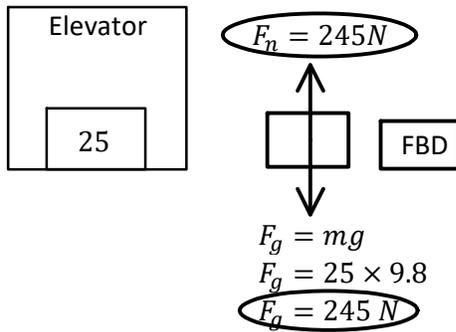
Obviously!

What is the weight of a 25 kg object on a scale in a Elevator moving at a constant velocity?

Elevator
$a = 0\dfrac{m}{s^2}$

25

$F_n = 245N$

FBD

$F_g = mg$
$F_g = 25 \times 9.8$
$F_g = 245\ N$

Find the weight of a 25 kg object on a scale in an Elevator moving up, $a = 5\dfrac{m}{s^2}$ upwards.

$v > 0$

Elevator
$a = 2\dfrac{m}{s^2}$

25

$F_n = 370N$

FBD

$F_g = mg$
$F_g = 25 \times 9.8$
$F_g = 245\ N$
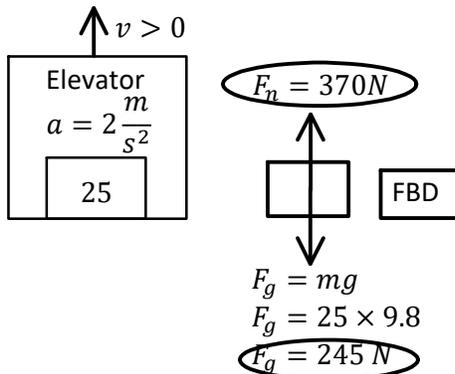
$F_{net} = ma$
$F_n - F_g = ma$
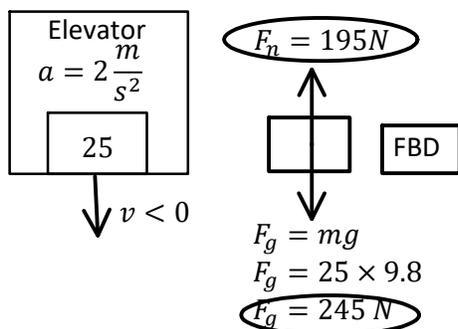$F_n = ma + F_g$
$F_n - 245 = (25)(5) + 245$
$F_n = 370\ N$

Obviously you would be Heavier

Or going up slowing down

Obviously!

Find the weight of a 25 kg object on a scale in an Elevator moving down, $a = 2\dfrac{m}{s^2}$ downward.

Elevator
$a = 2\dfrac{m}{s^2}$

25

$v < 0$

$F_n = 195N$

FBD

$F_g = mg$
$F_g = 25 \times 9.8$
$F_g = 245\ N$

$F_{net} = ma$
$F_g - F_n = ma$
$F_n = F_g - ma$
$F_n = 245 - (25)(2)$
$F_n = 195\ N$

Obviously you would be Lighter

Or going down speeding up

Obviously!