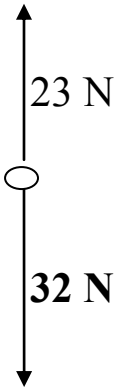
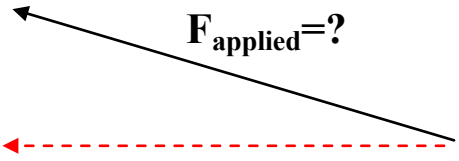
p142-44 answers More In-class examples:

1. Find the net force: 32N – 23 N = 9 N downwards.



2. **a) Find the applied force(it's applied 25^o with horizontal) if a 20 kg wagon is accelerating along the horizontal at 2.0 m/s^2.**



m = 20 kg; a = 2.0 m/s^2.

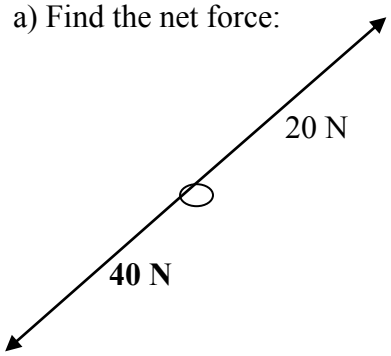
$F = ma = F_{effective} = F_{applied}*\cos\theta$
$20(2.0) = F_{applied}\cos(25)$
$F_{applied} = 40/\cos 25 = 44$ N

b) First find *mg* for the wagon and then show that there is not enough force to lift the wagon off the ground as it's being pulled.

Weight = mg = 20(9.8) = 196N which is greater than
$F_{upwards} = F_{applied}\sin\theta$
= 44sin25 = 18.6 N

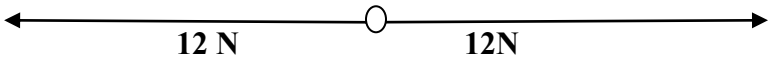
Exercises

1. a) Find the net force:



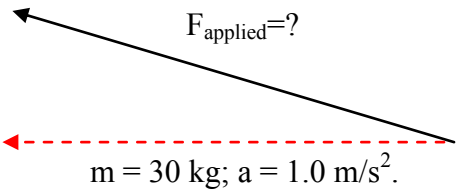
40N – 20 N = 20 N in the south western direction

b)



0N

2. a) Find the applied force (it's applied 25° with horizontal) if a 30 kg wagon is accelerating along the horizontal at 1.0 m/s^2.

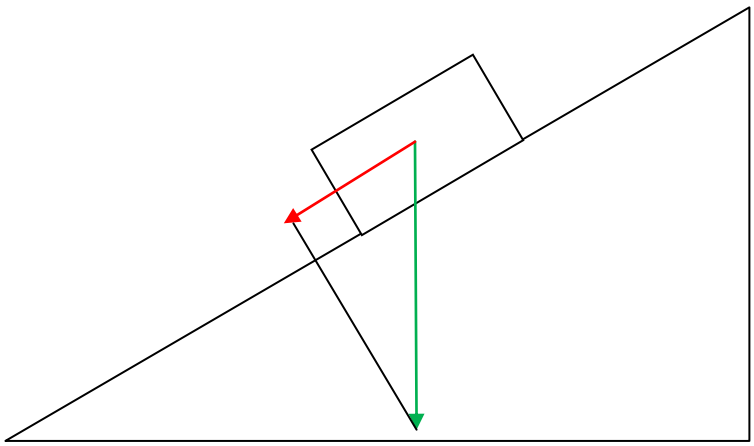


$F = ma = F_{effective} = F_{applied} * \cos\theta$
$30(1.0) = F_{applied}\cos(25)$
$F_{applied} = 30/\cos 25 = 33$ N

b) Show that there is not enough force to lift the wagon off the ground as it's being pulled.

Weight = mg = 30(9.8) = 294 N which is greater than
$F_{upwards} = F_{applied}\sin\theta$
$= 33\sin 25 = 13.9$ N

a) Find the effective force acting on the 20 kg mass accelerating down the 35^{o} ramp.



$F_{effective} =$ mg$\sin\theta$ **$= 20(9.8)(\sin 35) = 112.4$ N**

3. If gravitational acceleration on the moon is $1/6^{th}$ of what it is on Earth, find the weight of a 100 kg man on the moon.

$F = mg_{moon}$
$= 100kg(9.8/6\ N/kg) = 163\ N$

4. You fill a box with 100 g of carbon and a second box with 100 g of Al.

a) Which will have more atoms?

$100/12*6.02\ X10^{23} > 100/27\ *6.02\ X10^{23}$

b) Which, if any will hit the ground first? Why?

Neither, NOT because they have the same mass, but because g is the same for all masses.