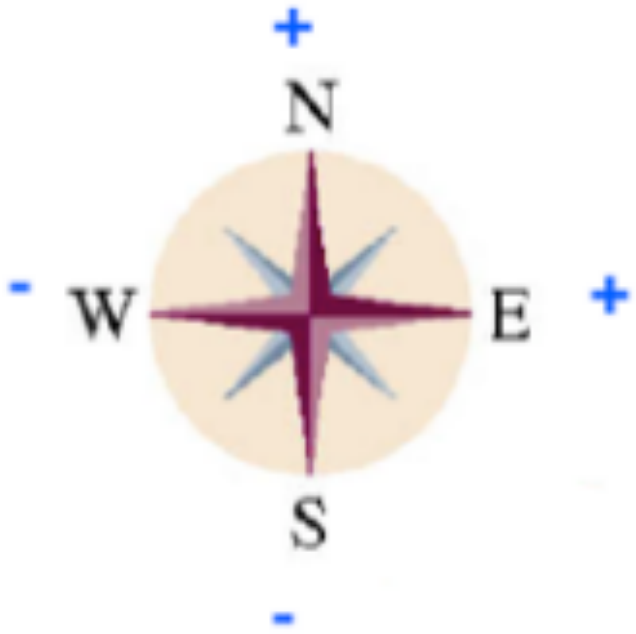
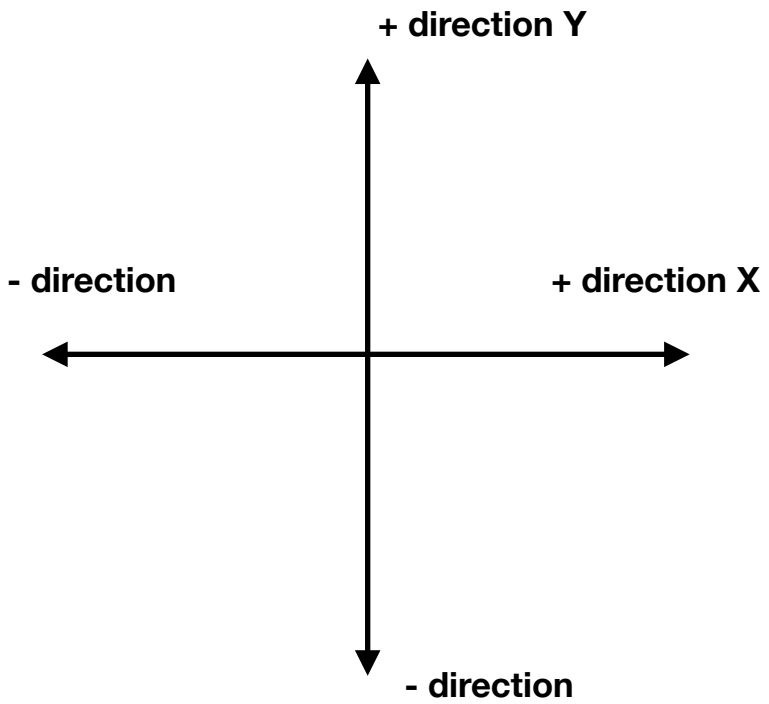
Western International High School
Physics Class Notes

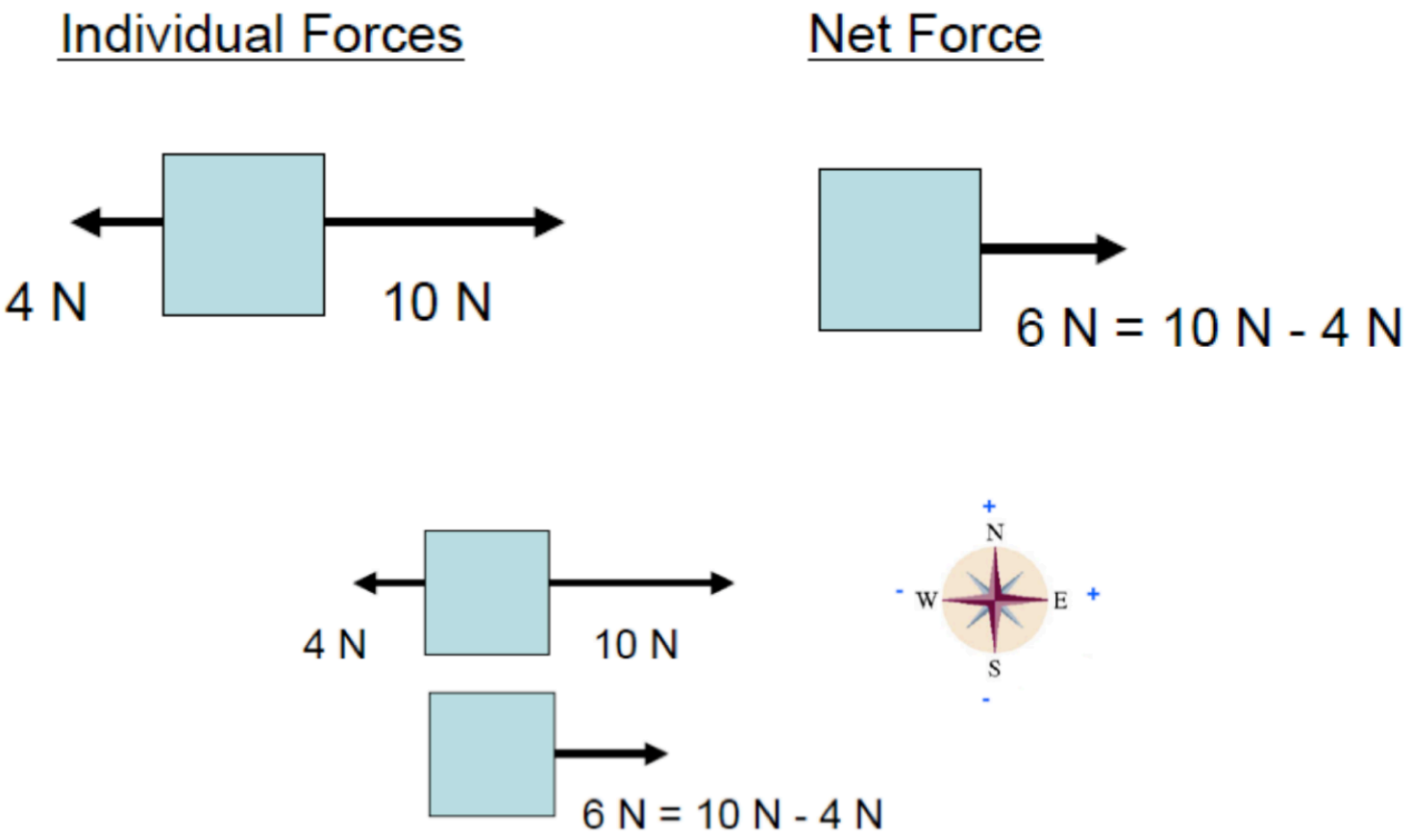
Nada Saab, Ph.D.

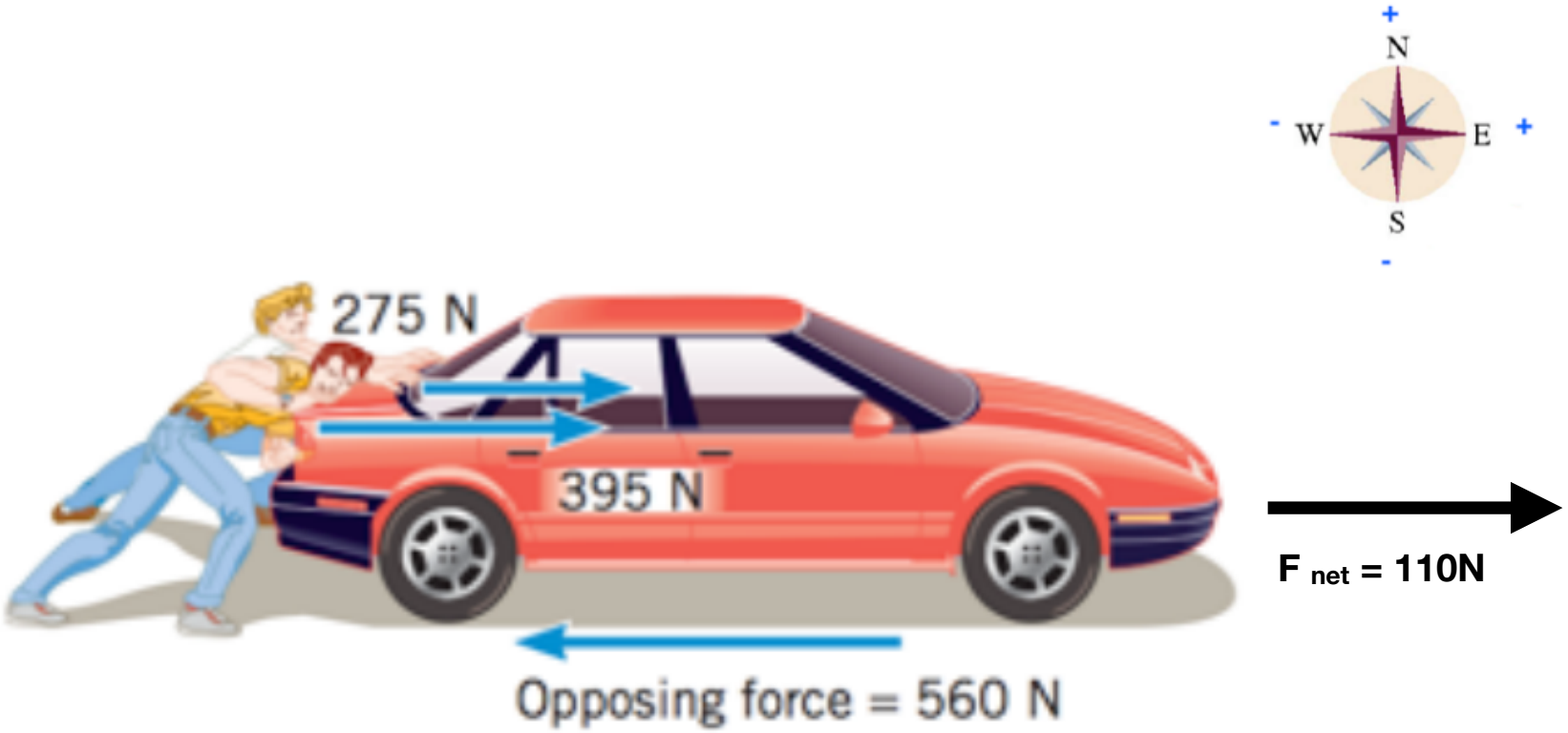
Semester 2, 2021


+
N
-
W
E
+
S
-


+ direction Y
- direction
+ direction X
- direction

Net Force (F net) = All forces in the positive direction - All forces in the negative direction





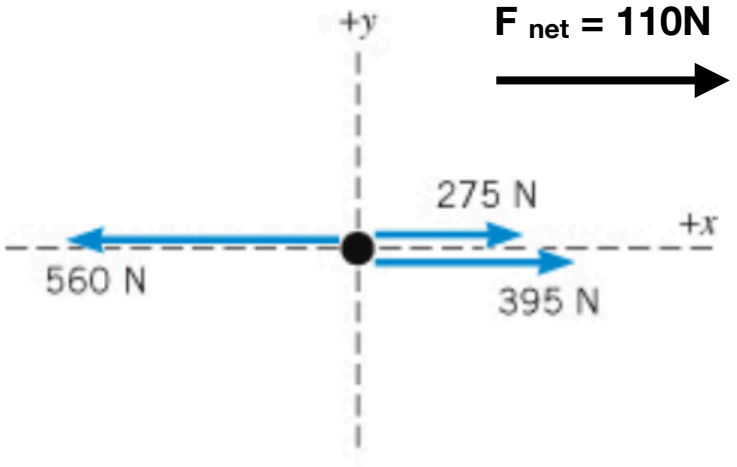
Net Force = (All positive direction forces) - (All negative direction forces)

= (275 + 395) - (560)

= 670 - 560

= + 110 N

(a)



(b) Free-body diagram of the car

Opposing force is the static frictional force (car is stalled): two surfaces in contact: Rubber (tires) and the concrete.

Direction:
Parallel to the surface of contact.
Opposite to motion

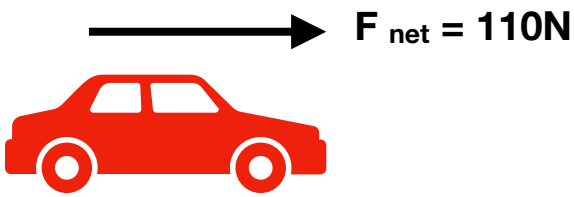
Net Force: How is the mass of the car affect the acceleration of the car?

Net force = Mass x acceleration

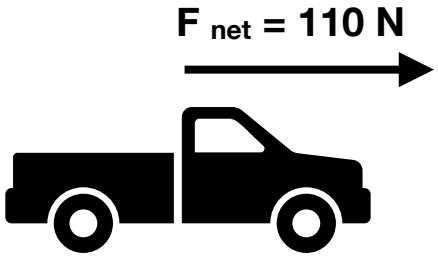
Sum of all forces = Mass x acceleration

$$\text{Acceleration} = \frac{\text{Net force}}{\text{Mass}}$$

~~**Force = mass x acceleration (not very accurate)**~~



(A) has a mass of 900 Kg;



(B) has a mass of 1850 Kg;

Which one will accelerate more?

Net Force = mass x acceleration

The red car will accelerate faster

What is the acceleration of the black truck. The weight of the truck is 1850 kg. The net force is 110 N.

Net Force = mass x acceleration

$$F_{net} = m \times a$$

$$110 = 1850 \times a$$

$$\frac{110}{1850} = \frac{1850}{1850} \times a$$

$$a = 0.0059 \text{ m/s}^2$$

What is the acceleration of the red car. The weight of the red car is 900 kg. The net force is 110 N.

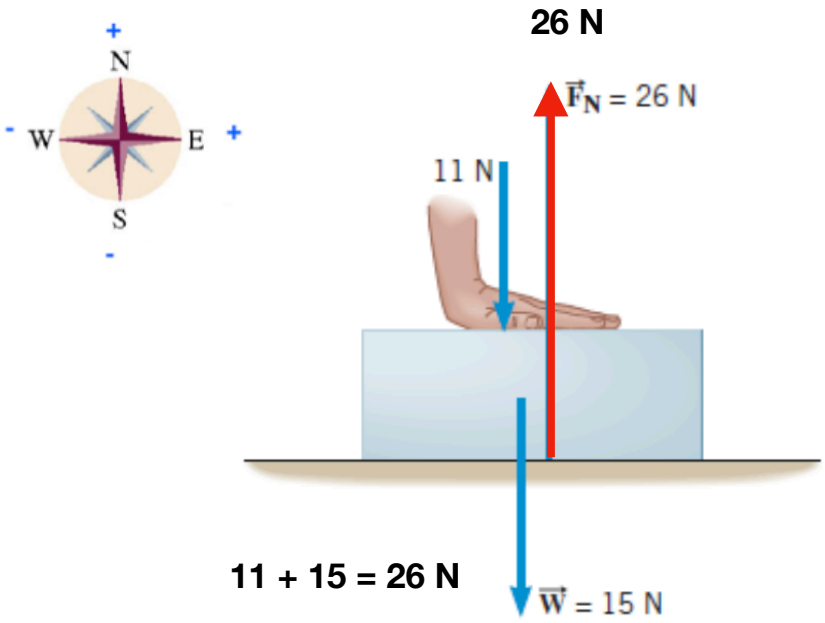
Net Force = mass x acceleration

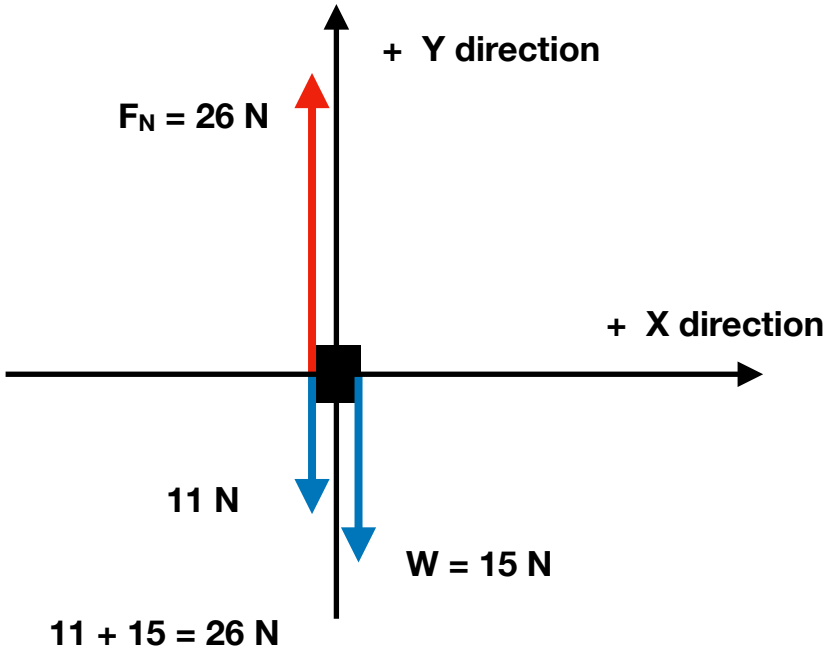
$$F_{net} = m \times a$$

$$110 = 900 \times a$$

$$\frac{110}{900} = \frac{900}{900} \times a$$

$$a = 0.1222 \text{ m/s}^2$$





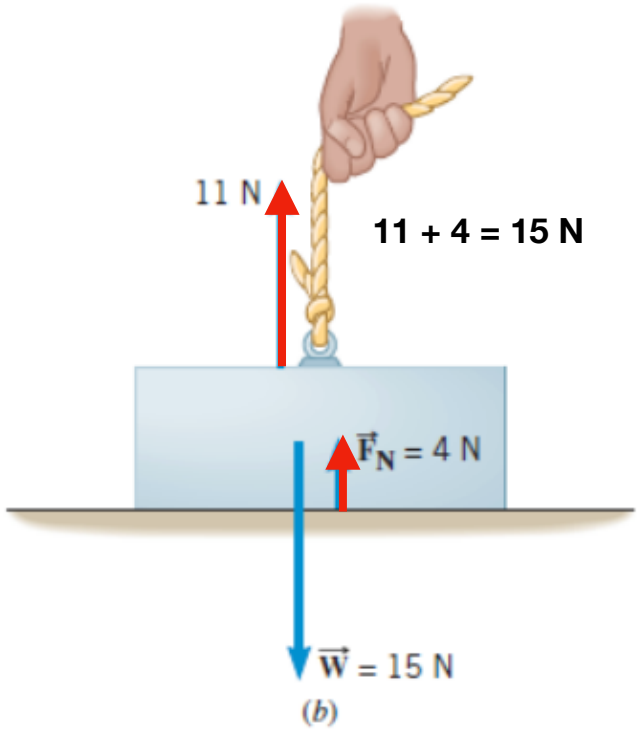
Free body diagram:

Net Force = (All positive direction forces) - (All negative direction forces)

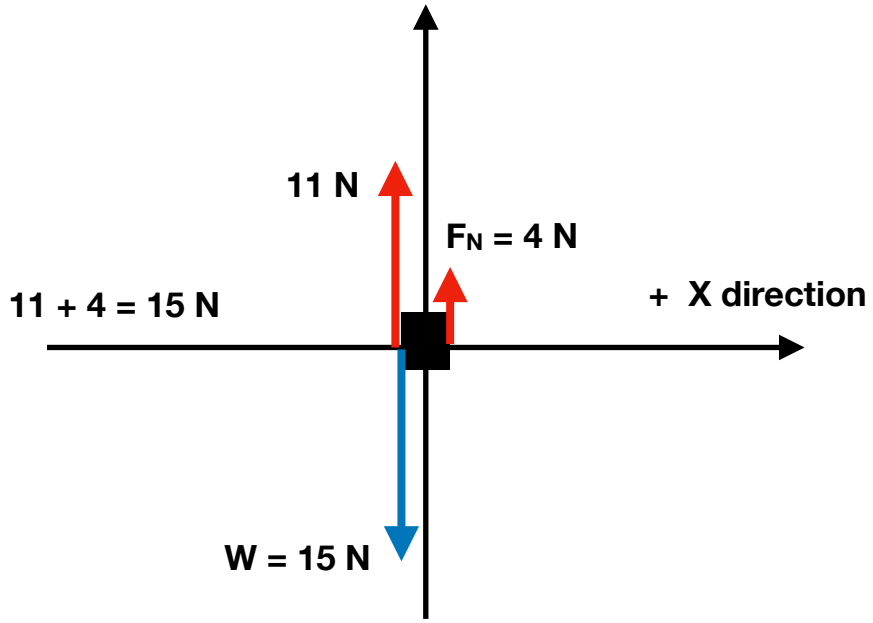
= (26) - (11 + 15)
= 26 - 26 = 0 N

Net force = 26 -11 - 15 = 0 N

+ Y direction



+ Y direction



Free body diagram

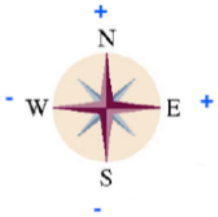
Net Force = (All positive direction forces) - (All negative direction forces)

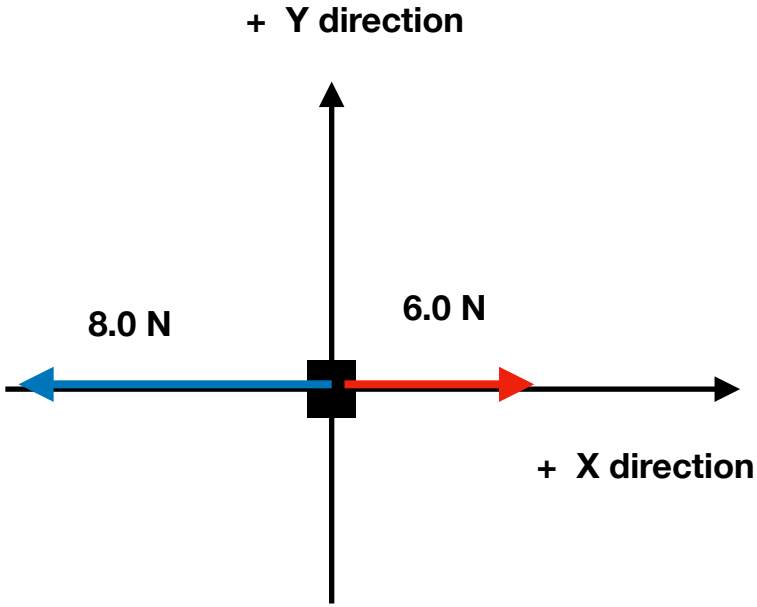
= (11 +4) - (15)

= 15 - 15 = 0 N

or 11 + 4 - 15 = 0 N (Equilibrium). The box does not move.

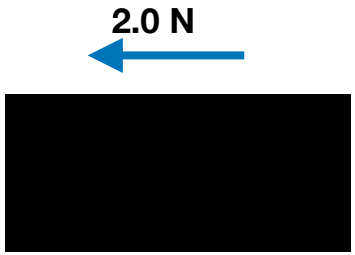
1) Determine the net force acting on the object:

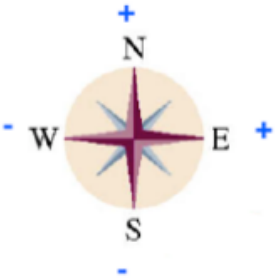




Net Force = (All positive direction forces) - (All negative direction forces)

= 6 - 8 = - 2 or 2 N in the West Direction.

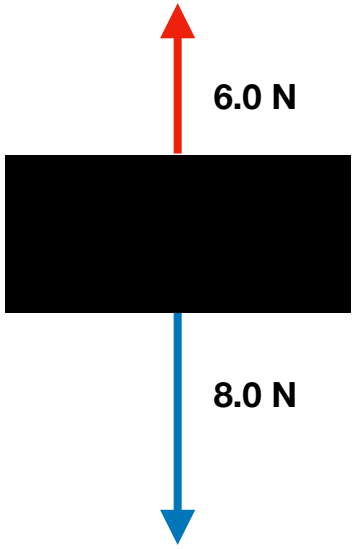


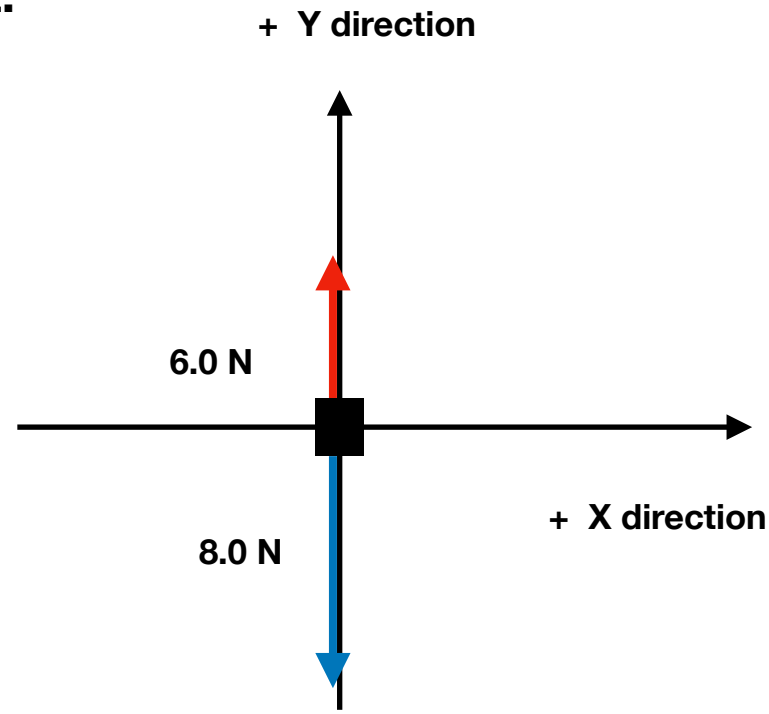


Net force = 2 N

If the box weight 5 Kg. What is the acceleration of the box?

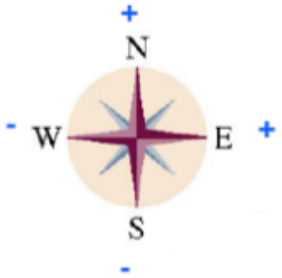
2) Determine the net force acting on the object:



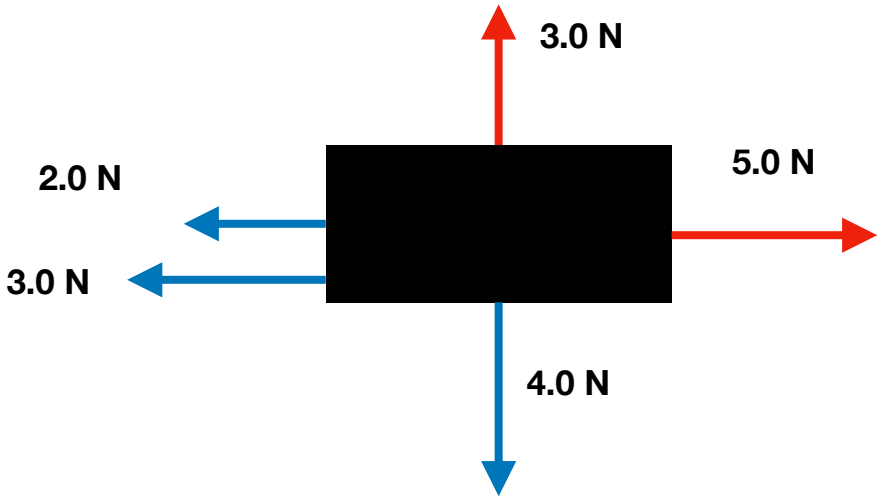


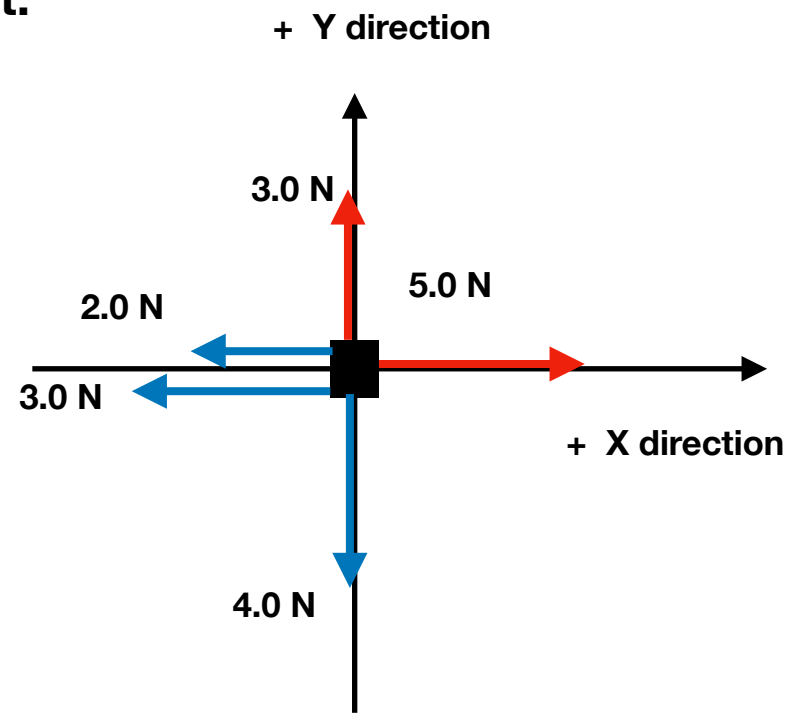
Net Force = (All positive direction forces) - (All negative direction forces)

= 6 - 8 = -2 or 2 N in the south direction (down)



3) Determine the net force acting on the object:

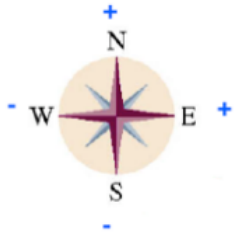




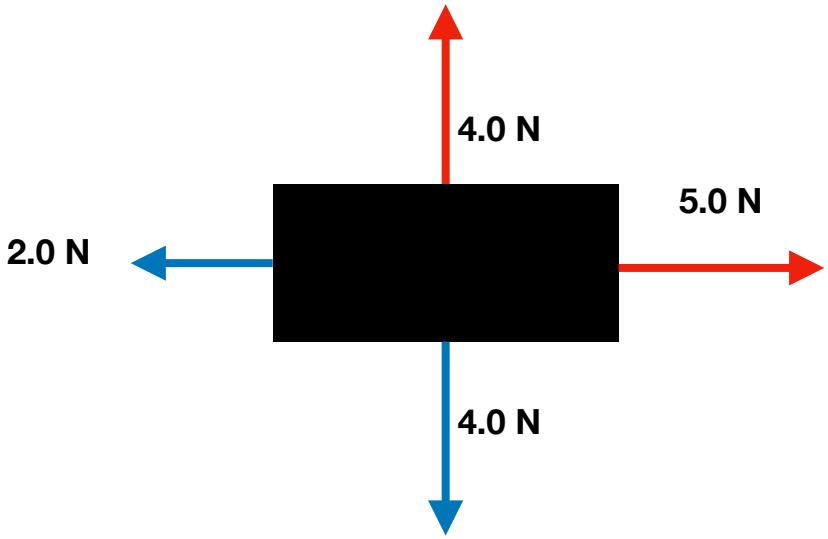
Free body diagram

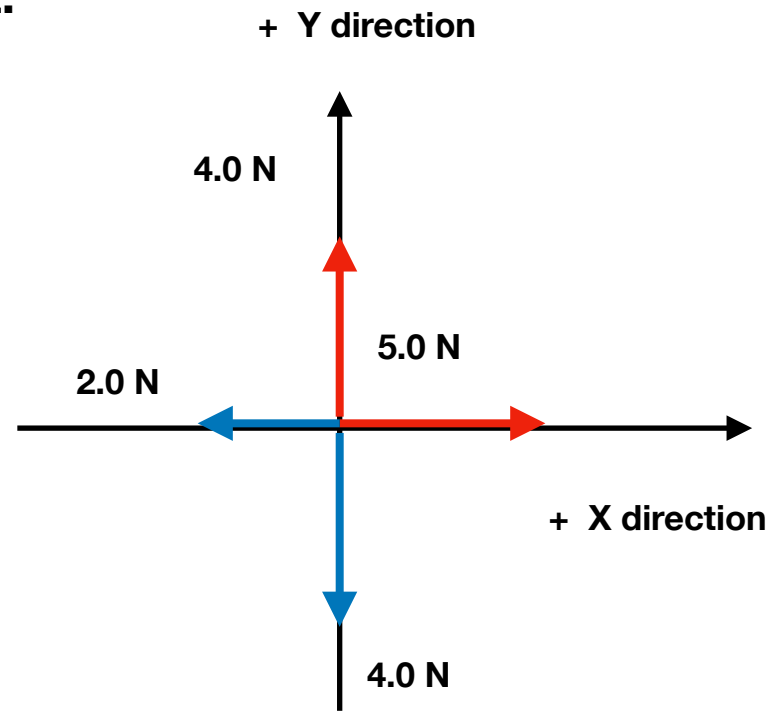
X axis : F net $_x$ = 5 - (3 + 2) = 5 -5 = 0 N

Y axis : F net $_y$ = 3 - 4 = - 1 or 1 N South (down)



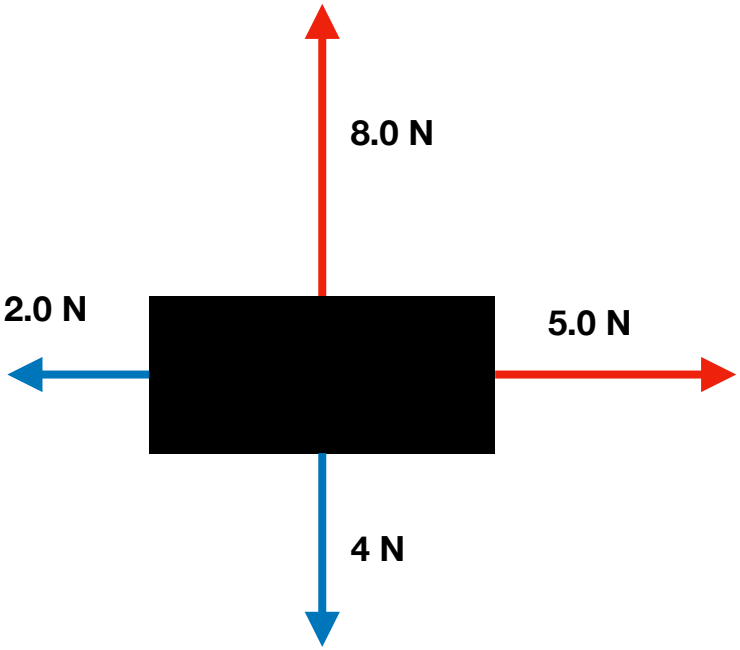
4) Determine the net force acting on the object:

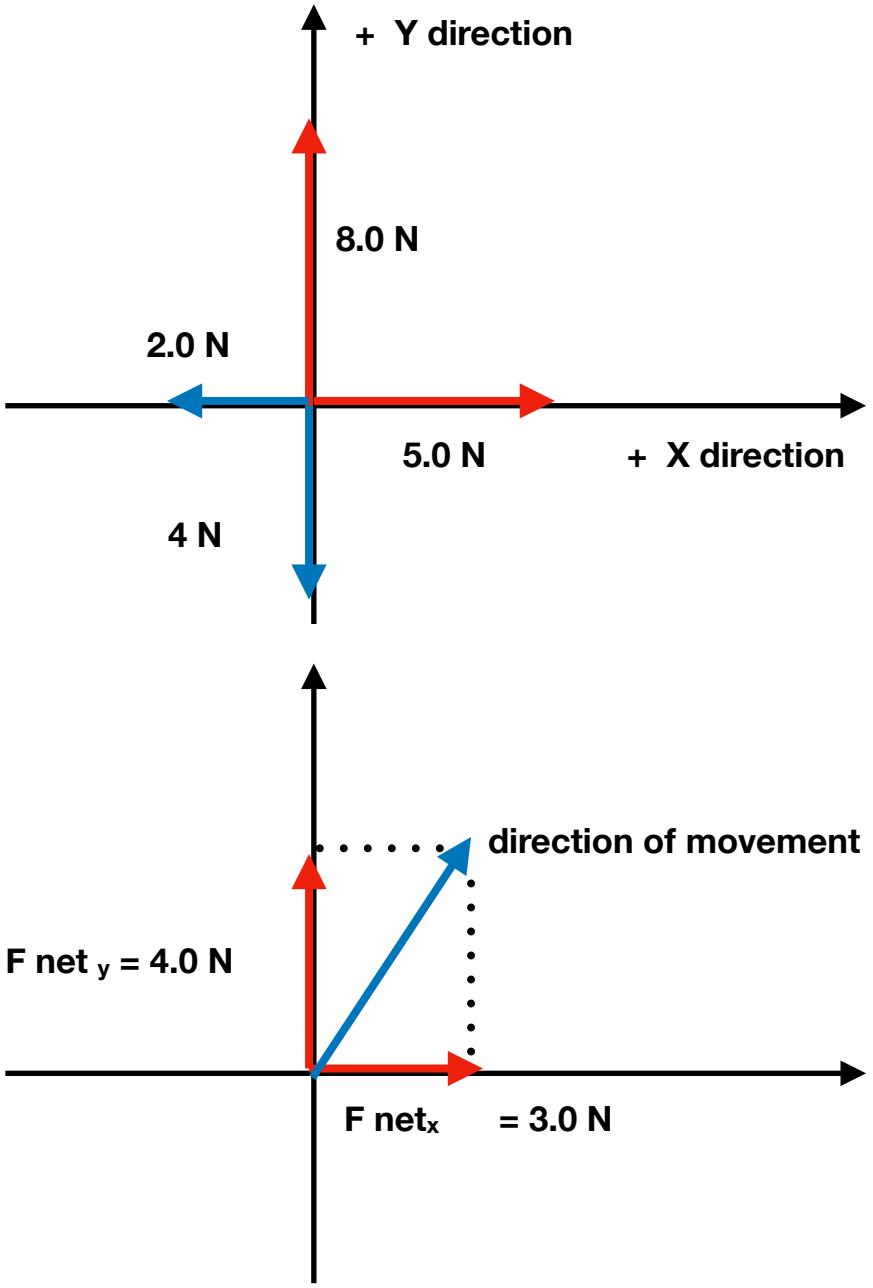




X axis : F net $_x$ = 5 - (2) = 3 N to the right or east.

Y axis : F net $_y$ = 4 - 4 = 0 N


8.0 N
2.0 N
5.0 N
4 N


+ Y direction
8.0 N
2.0 N
5.0 N
+ X direction
4 N
direction of movement
F net y = 4.0 N
F netx = 3.0 N