Lesson 3 - Resultant Forces

Physics - KS3

Forces and Motion

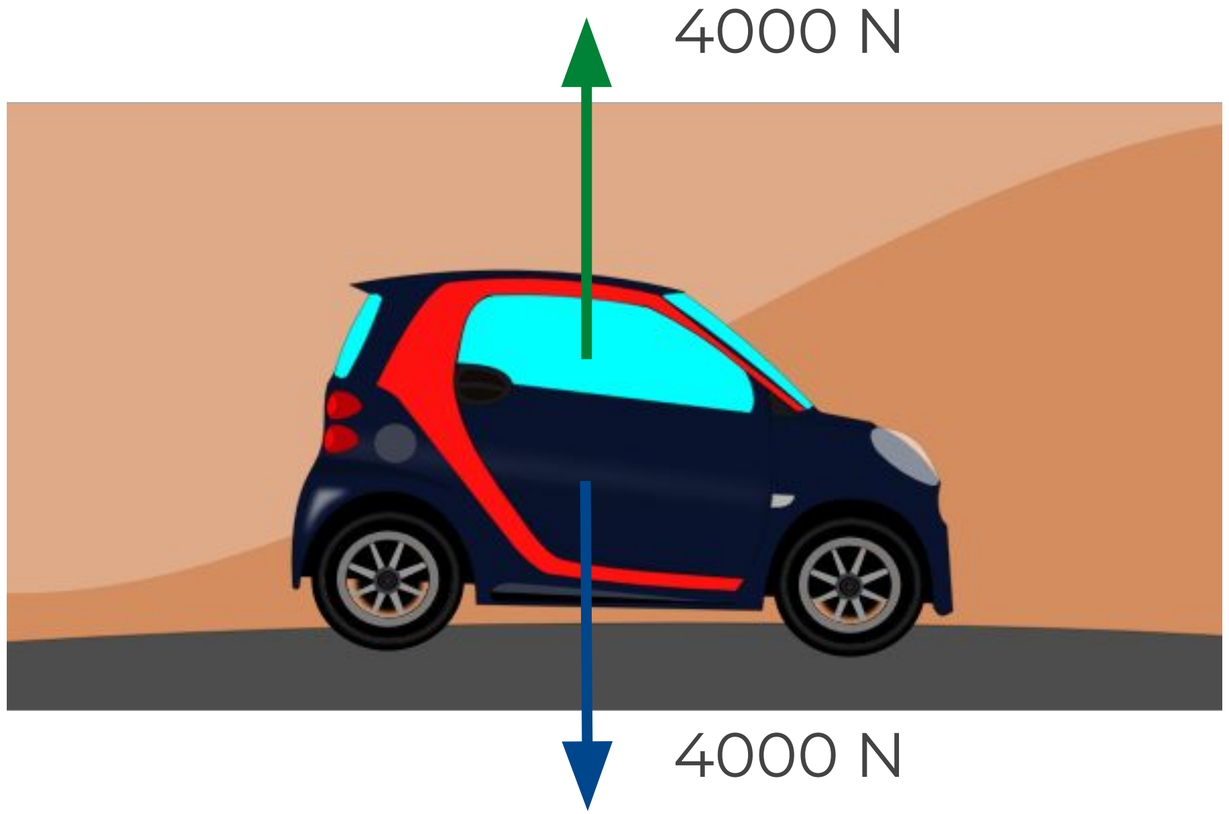
Mrs Wolstenholme

Balanced

Credit: no attribution required

Unbalanced

Credit: no attribution required



Balanced

Credit: no attribution required

How does this affect the motion of the car?

Credit: no attribution required

Balanced

No effect on the motion.

If the object is stationary it will remain stationary.

If the object is moving it will continue at a **constant** speed and in the **same direction.**

For forces to be balanced, opposing forces must have the same .....

Option 1

Direction

Option 2

Size

Option 3

Grades

Option 4

Friends

If forces on an object are balanced, what will happen to its speed?

Option 1

Increase

Option 2

Decrease

Option 3

Not change

Option 4

Disappear

If forces on an object are balanced, what will happen to its direction?

Option 1

Turn left

Option 2

Turn right

Option 3

Not change

Option 4

Disappear

A person rides a bike at a constant speed in a straight line. What can we say about the forces?

Option 1

The forces are balanced.

Option 2

The forces are unbalanced.

Option 3

There are exactly 1000 forces.

Option 4

There are no forces.

How does this affect the motion of the car?

Credit: no attribution required

Unbalanced

Change in speed.

Accelerates in the direction of the larger force.

Change in direction.

For forces to be unbalanced, opposing forces must have be .....

Option 1

The same direction

Option 2

The same size

Option 3

Different sizes

Option 4

Friends

If forces on an object are unbalanced, what could happen to its speed? (2 answers)

Option 1

Increase

Option 2

Decrease

Option 3

Not change

Option 4

Disappear

If forces on an object are unbalanced, what could happen to its direction?

Option 1

Get larger

Option 2

Change

Option 3

Not change

Option 4

Disappear

A person accelerates as they ride a bike in a straight line. What can we say about the forces?

Option 1

The forces are balanced.

Option 2

The forces are unbalanced.

Option 3

There are exactly 1000 forces.

Option 4

There are no forces.

A person rides a bike at constant speed and turns left. What can we say about the forces?

Option 1

The forces are balanced.

Option 2

The forces are unbalanced.

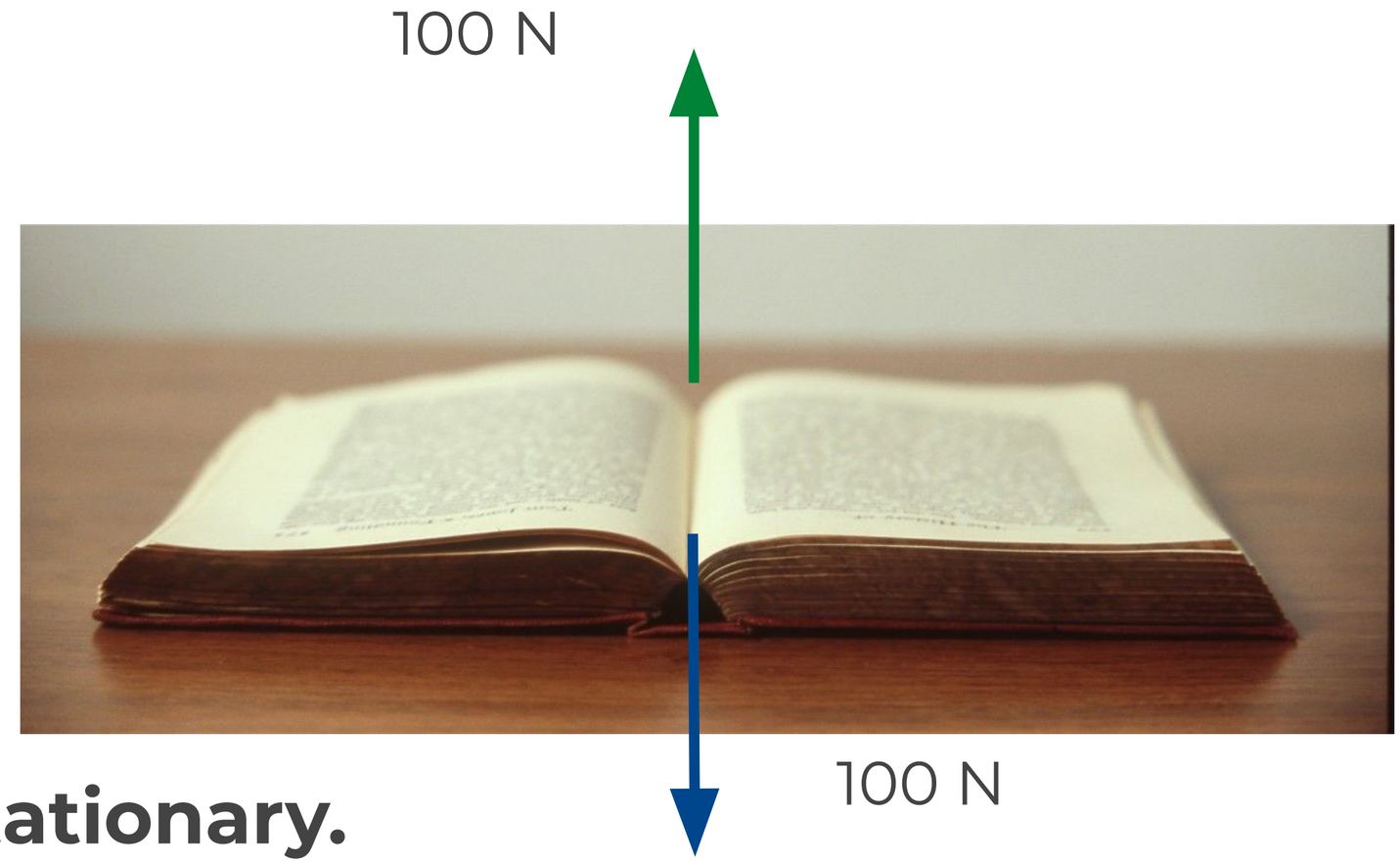
Option 3

There are exactly 1000 forces.

Option 4

There are no forces.

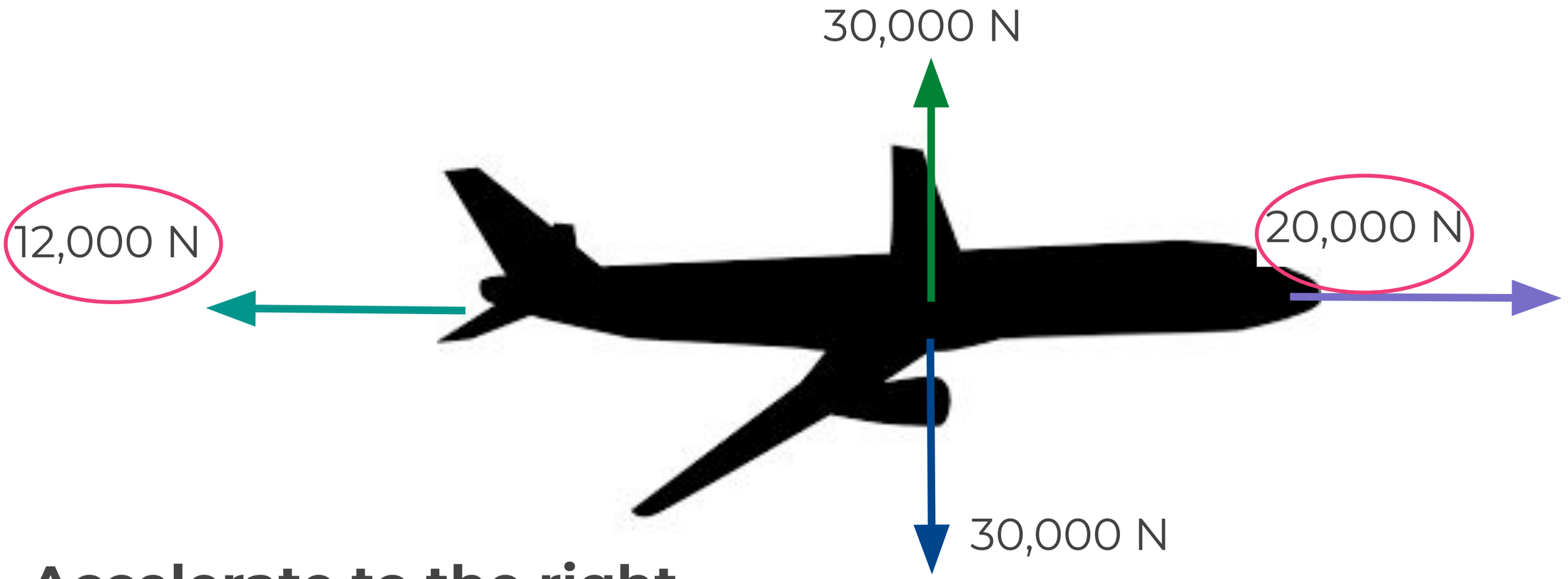
What will happen to this object?



Remain stationary.

Credit: no attribution required

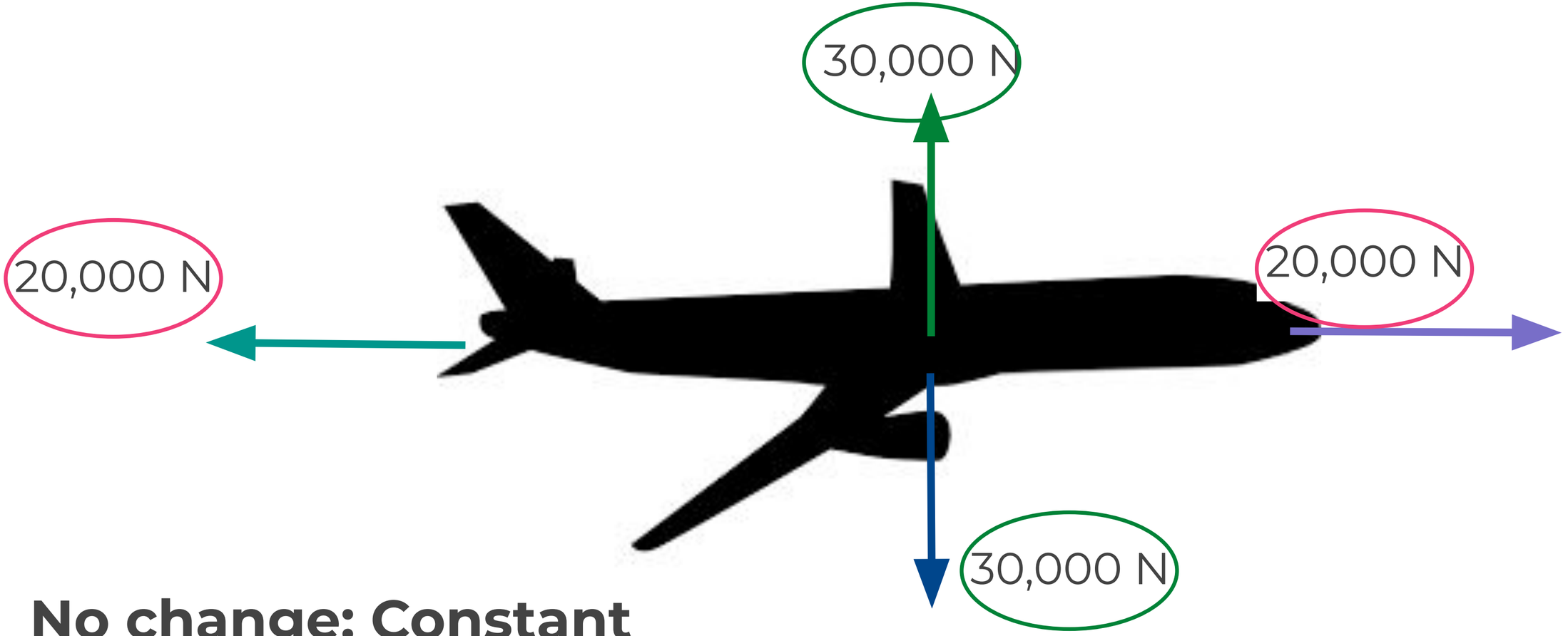
What will happen to this object?



Accelerate to the right.

Credit: no attribution required

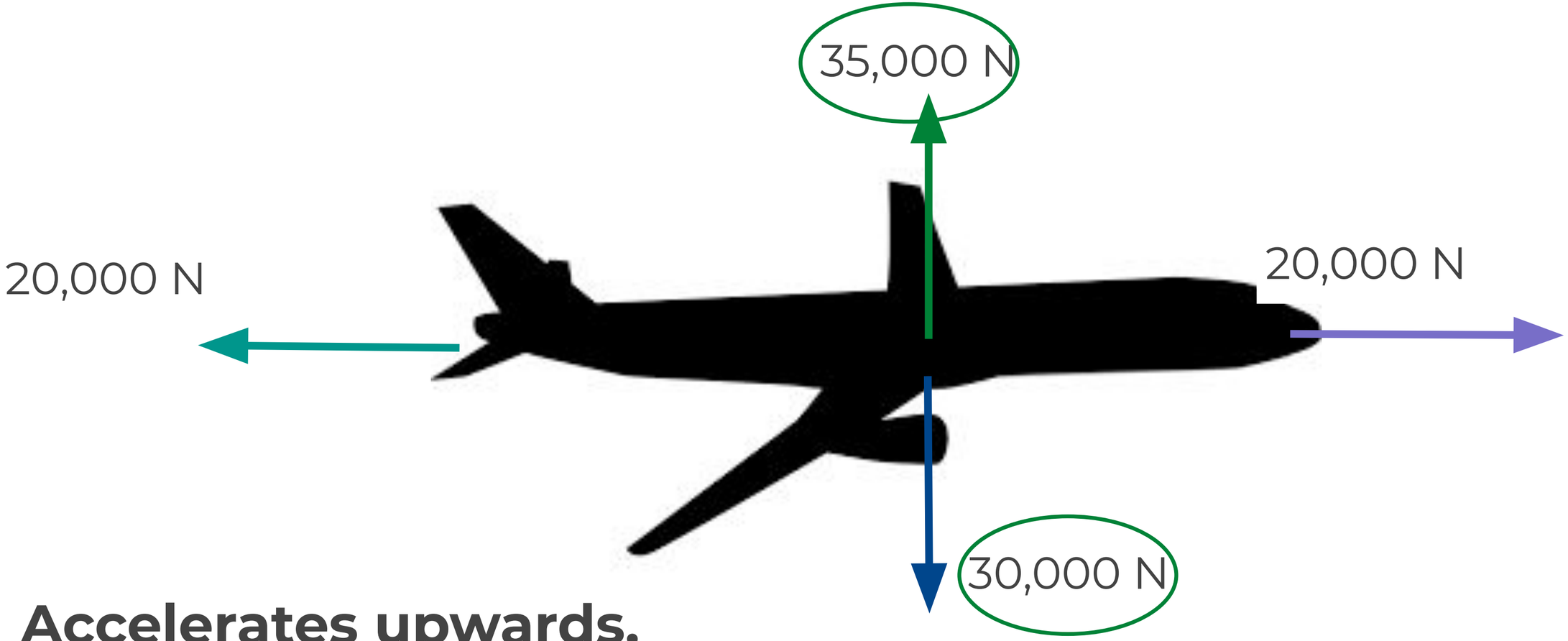
What will happen to this object?



No change: Constant speed and direction.

Credit: no attribution required

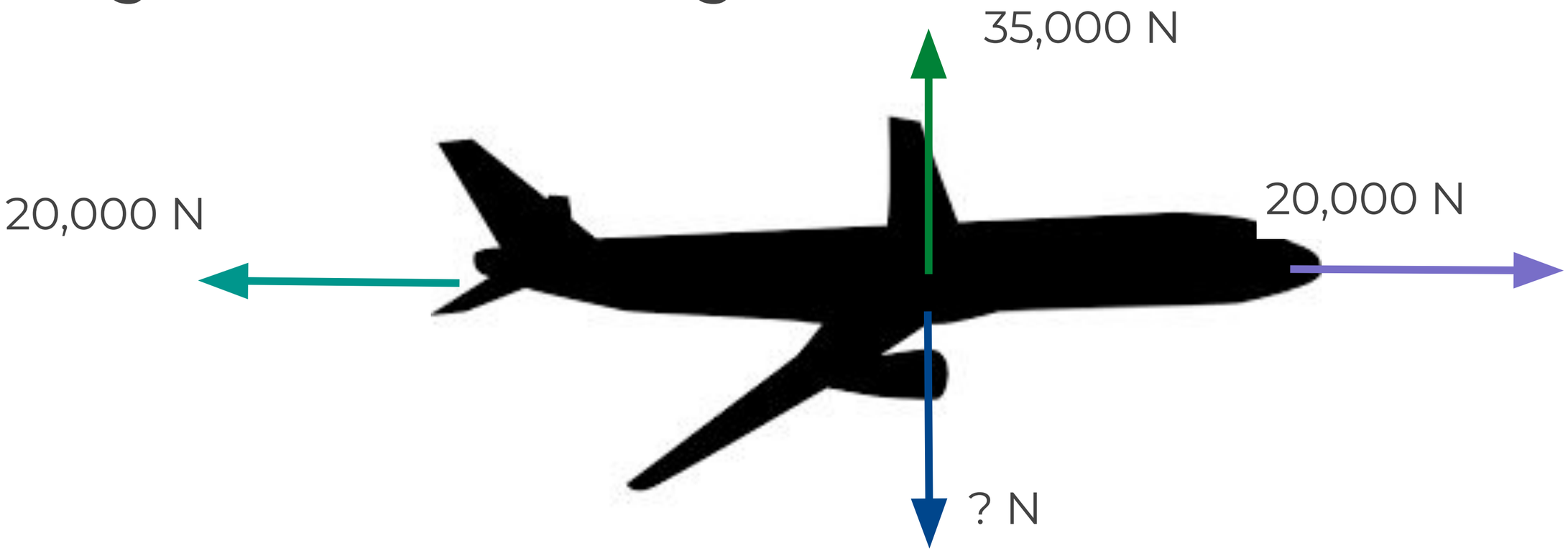
What will happen to this object?



Accelerates upwards.

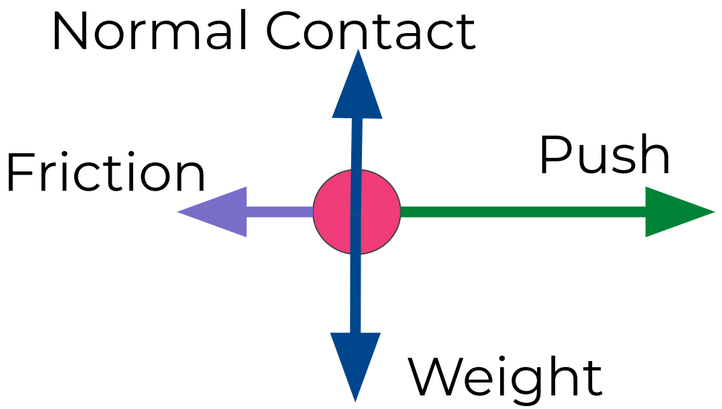
Credit: no attribution required

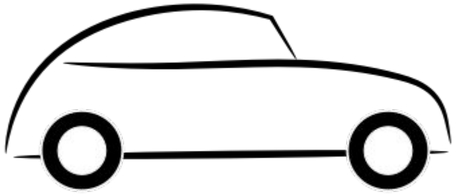
The plane is traveling at a constant speed and height. What is the weight?



Credit: no attribution required

Example

Picture	 Credit: no attribution required
Description	Trolley is accelerating forwards.
Free Body Diagram	
Balanced or Unbalanced?	Unbalanced. Push is larger than friction because it is accelerating.

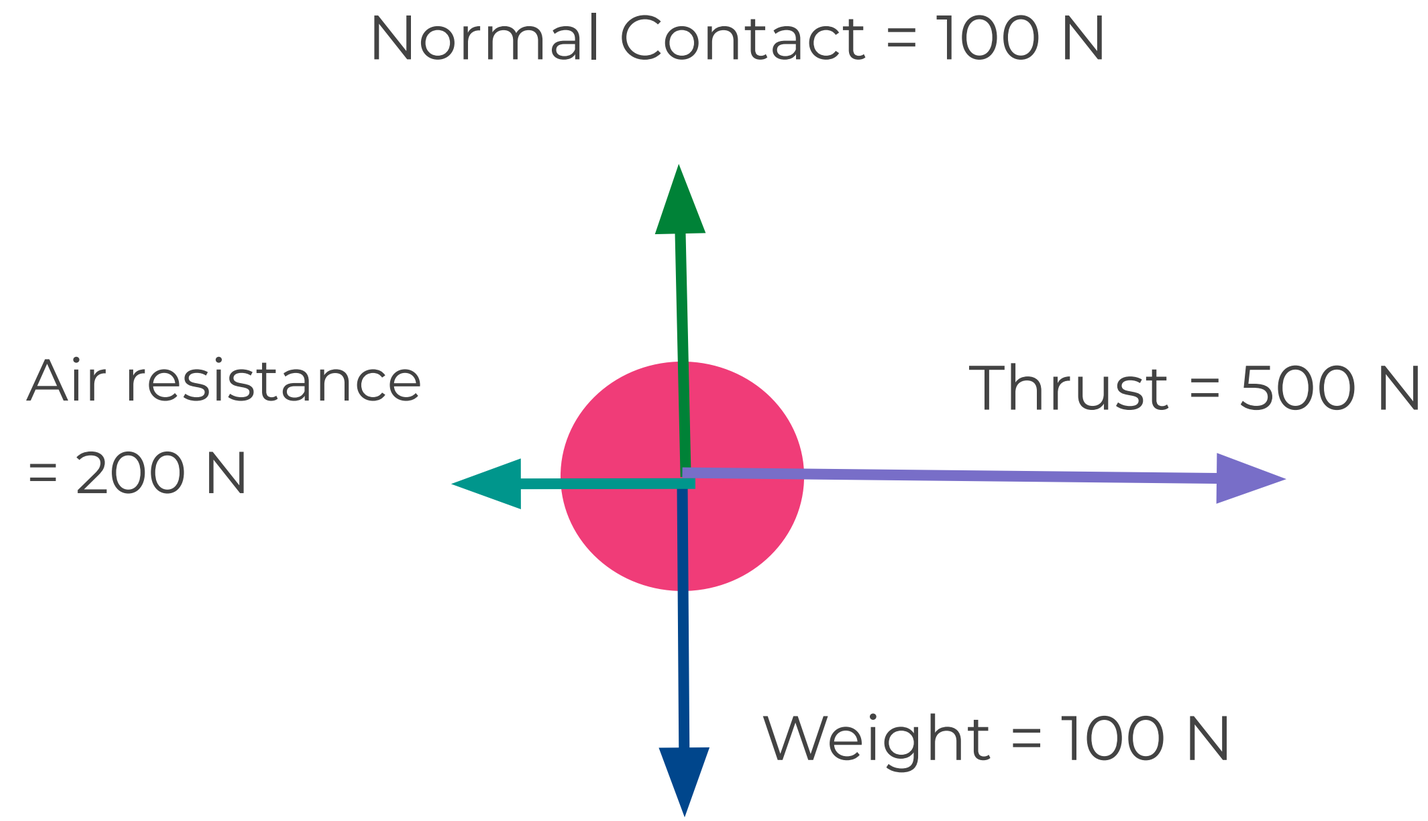
Picture			Credit: no attribution required 
Description	The ice skater is slowing down	The plane is accelerating upwards and forwards.	The car is travelling at a constant speed.
Free Body Diagram			
Balanced or Unbalanced?			

Picture			Credit: no attribution required 
Description	The parachutist is accelerating towards the Earth	The parachutist is moving downwards at a constant speed	The speed boat is slowing down.
Free Body Diagram			
Balanced or Unbalanced?			

Calculating resultant force

Resultant Force -> Overall Force

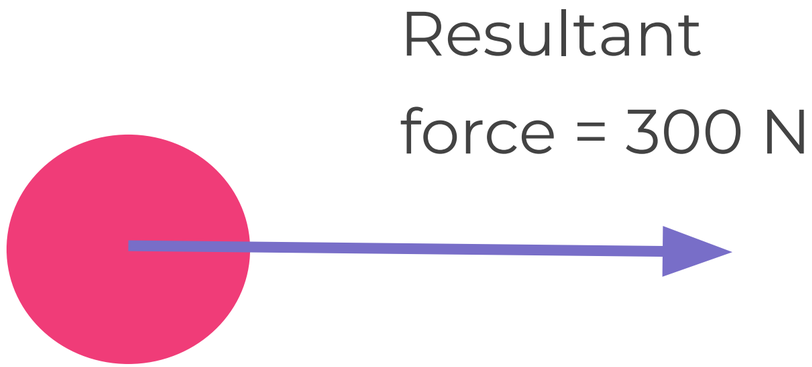
Credit: public domain



Calculating resultant force

Resultant Force -> Overall Force

Credit: public domain



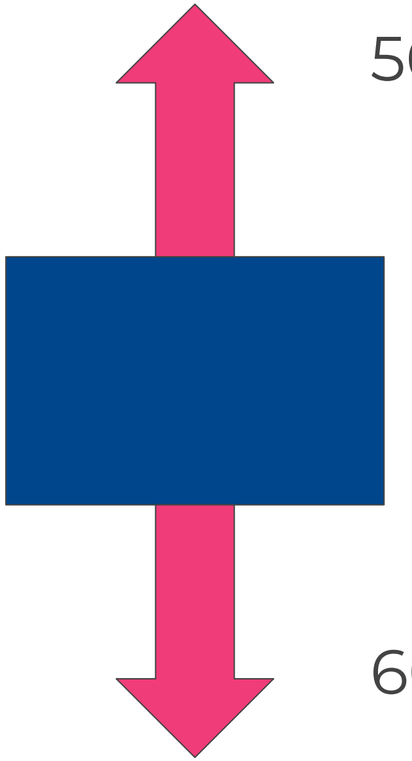
Calculating resultant force

Resultant Force -> Overall Force

Same Direction: Add together

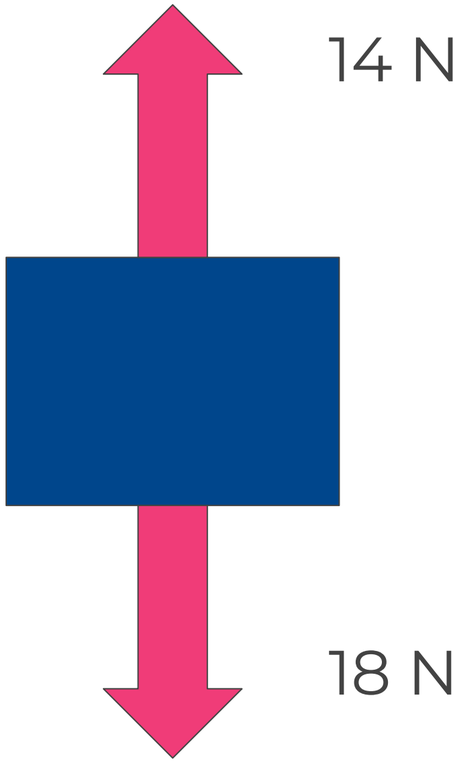
Opposite Directions: Subtract

Calculating resultant force

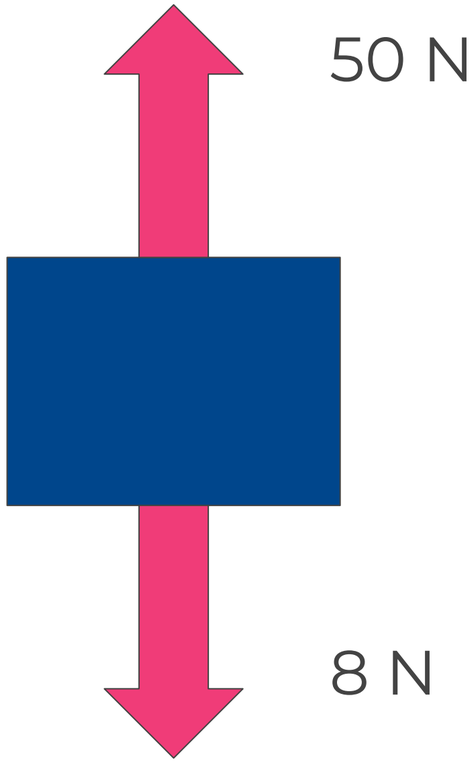


Resultant Force = 600 - 50 = 550 N down

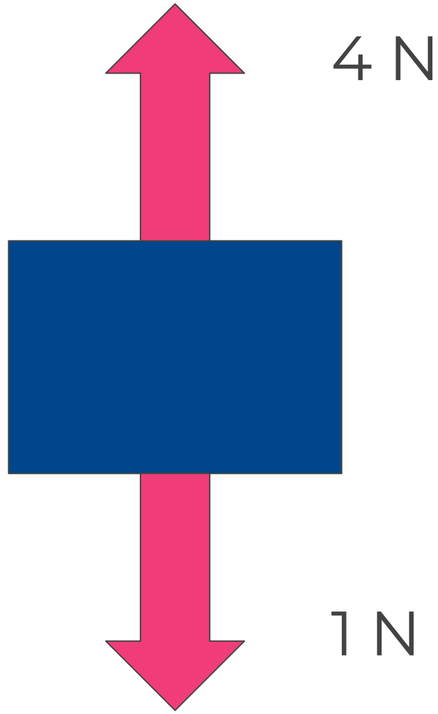
Your Turn: Calculating resultant force



Resultant Force =



Resultant Force =



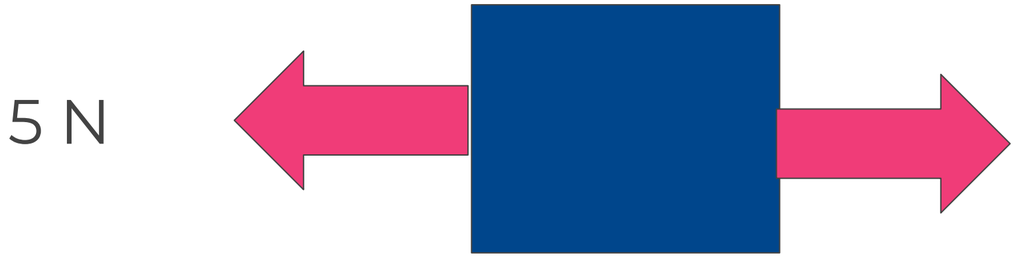
Resultant Force =

Calculating resultant force

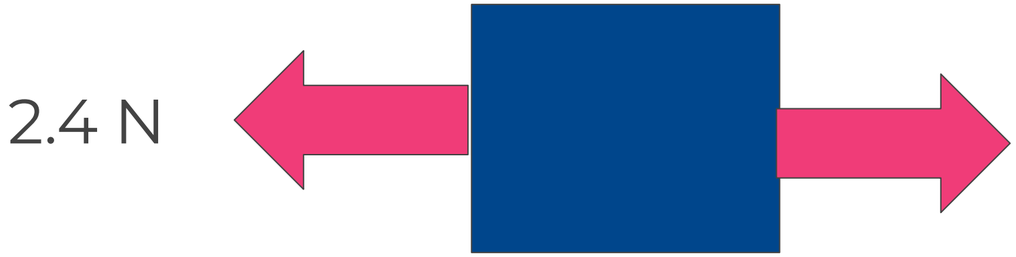
Resultant Force = 20 - 18 = 2 N left

Your Turn: Calculating resultant force

Resultant Force =



Resultant Force =



Resultant Force =

Putting it together

This motorcycle is **travelling along** the road. Describe the effect of the forces on its motion.

Resultant Force = 300 - 300 = 0 N

The motorcycle will continue at a constant speed.

300 N

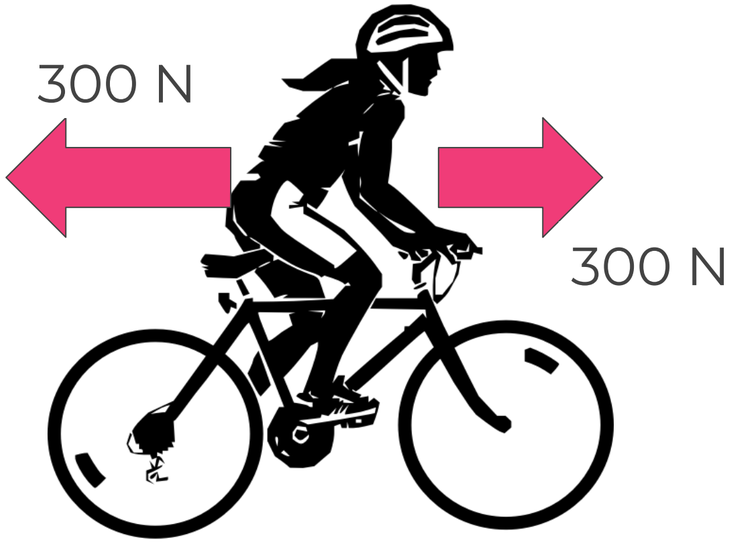
300 N

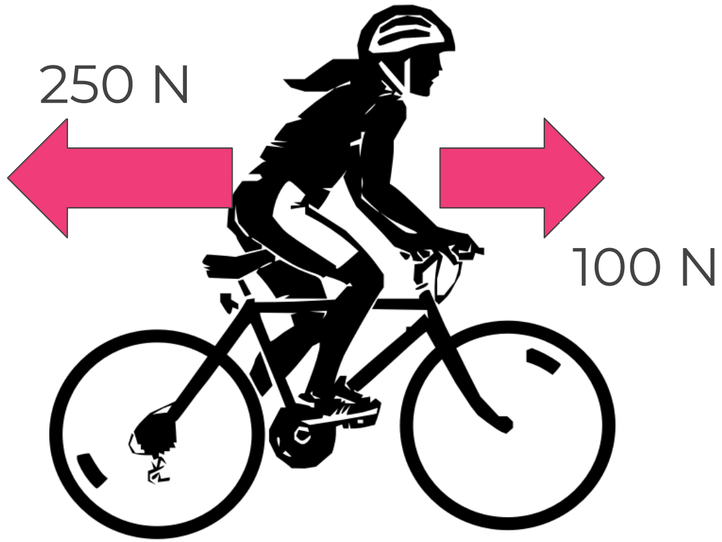
Credit: no attribution required

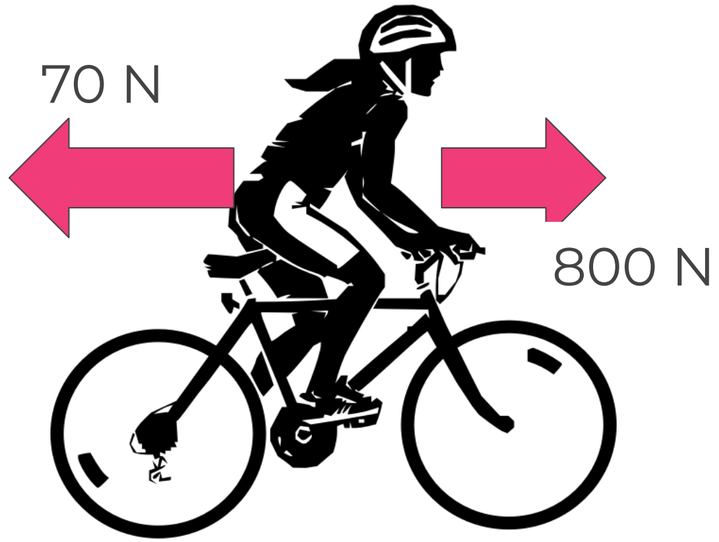
Your Turn: Putting it together

The cyclist is moving forwards. Calculate the resultant force and state what will happen to the cyclist (Accelerate, decelerate, or constant speed)

Credit: no attribution required

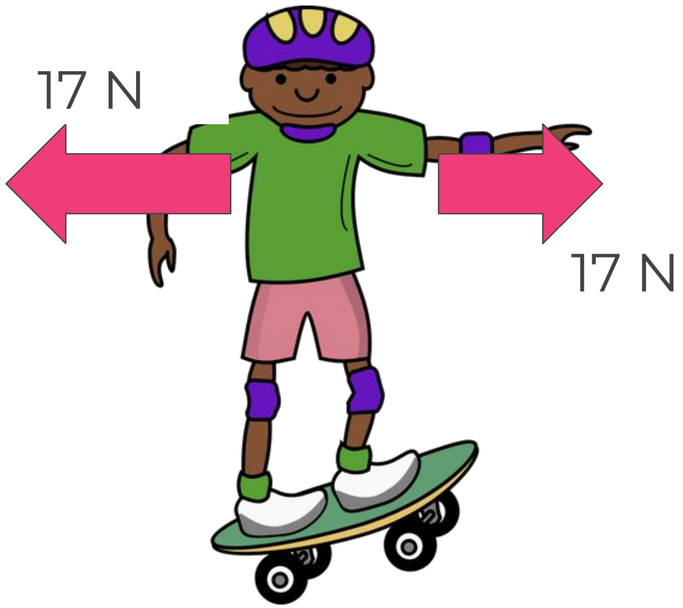


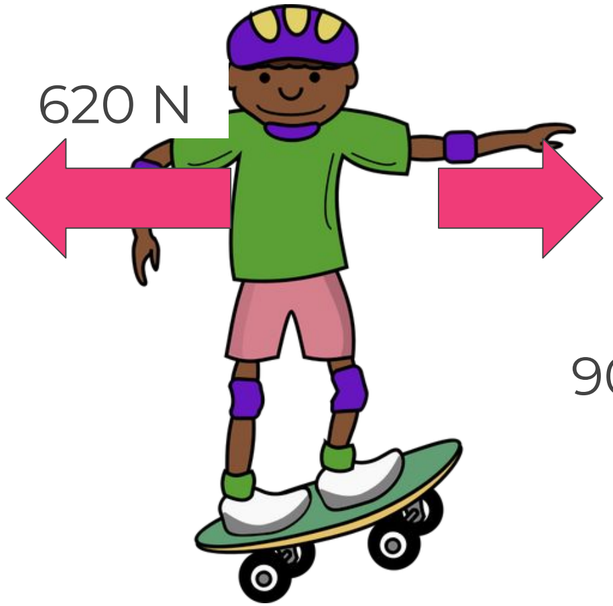


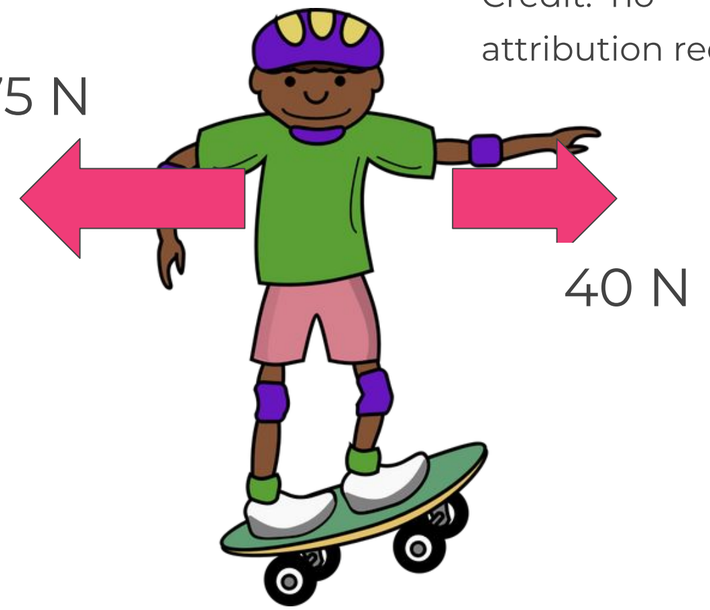


Your Turn: Putting it together

The skateboarder is stationary. Calculate the resultant force and state which direction they will move in.







Well Done!