

# NEWTON'S LAWS

1. Write down Newton's Three Laws:

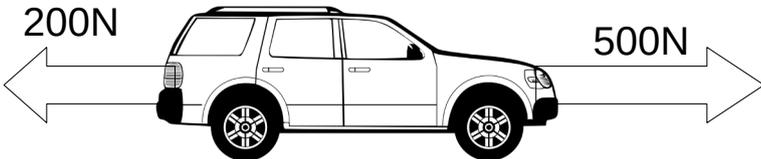
1.

2.

3.

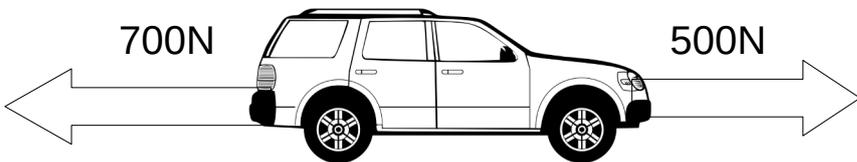
[3]

2. Describe the motion of these three cars (e.g the car will accelerate to the right/left, the car stays still etc.)



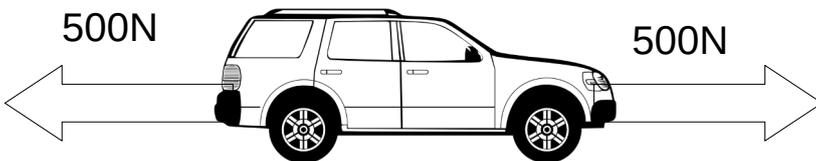
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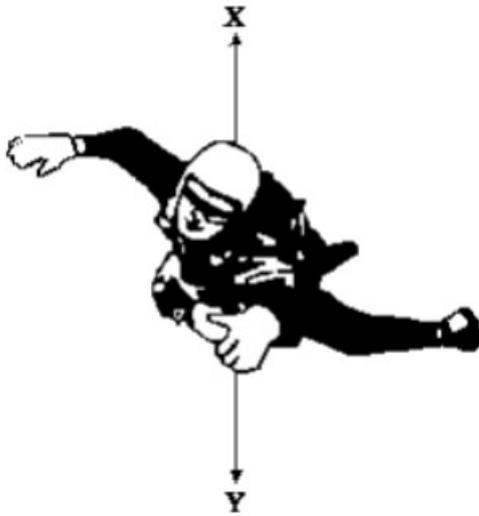


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[3]

3. The diagram shows a sky-diver in free fall. Two forces, **X** and **Y**, act on the sky-diver.



- (a) Complete these sentences by crossing out the **two** lines in each box that are wrong.

(i) Force **X** is caused by 

friction
gravity
weight

 . (1)

(ii) Force **Y** is caused by 

air resistance
friction
gravity

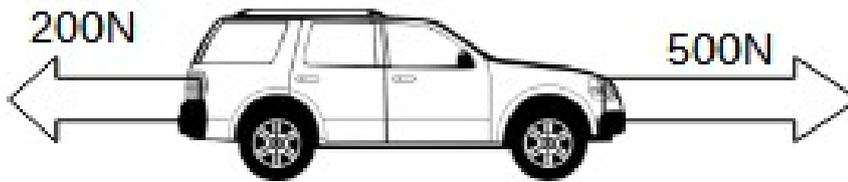
 . (1)

- (b) The size of force **X** changes as the sky-diver falls. Describe the motion of the sky-diver when:

(i) force **X** is smaller than force **Y**,  
.....  
..... (2)

(ii) force **X** is equal to force **Y**.  
.....  
..... (1)

**(Total 5 marks)**

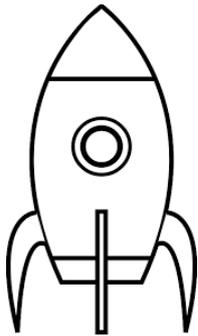


4. If this car has a mass of 1000kg, what is the acceleration it experiences?

\_\_\_\_\_ m/s<sup>2</sup>

[2]

More Challenging:



5. A rocket of mass 3500kg needs an acceleration of at least 20 m/s<sup>2</sup> at takeoff.

If the only downward force acting on it is its weight, what is the minimum upward force needed from the rocket engines?

[4]

6. For each of the following, determine whether or not they are a force-reaction pair according to Newton's third law.

a) The force exerted by a book on a table and the force exerted by the table on the book

This is a force-reaction pair

This is not a force-reaction pair

b) The weight of a skydiver and the air resistance acting on them

This is a force-reaction pair

This is not a force-reaction pair

c) The force of a boat on the water and the upthrust from the water on the boat.

This is a force-reaction pair

This is not a force-reaction pair

[3]