Newton's First Law

1. State Newton's First Law.

Newton's First Law states that an objects motion will not change unless acted upon by an unbalanced force.

2. State the definition of:
   a. Inertia.

The tendency of objects to resist change to their motion.

   b. Resultant force.

The net force/overall effect of all the forces acting on an object.

   c. Equilibrium

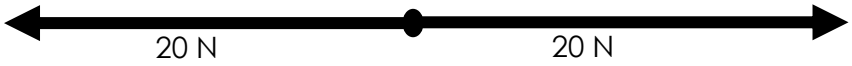
When all the force acting upon an object are equal/balanced.

3. Explain the difference between balanced and unbalanced forces.

Balanced forces combine to make a resultant force of 0 N, unbalanced forces do not cancel each other out/make a non-zero resultant force.

4. Complete the table for each scenario after calculating the resultant force in each case.

a.



Resultant Force = **20 N – 20 N = 0 N**

Initial motion	Resulting motion
Object was initially stationary	**Object remains stationary**
Object was initially moving at constant speed to the right	**Object continues moving at constant speed to the right**
Object was initially moving at constant speed to the left	**Object continues moving at constant speed to the left**

b. 

Resultant Force = **20 N – 10 N = 10 N left**

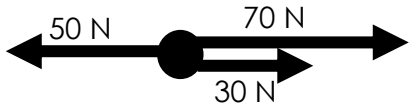
Initial motion	**Resulting motion**
Object was initially stationary	**Object will accelerate to the left**
Object was initially moving at constant speed to the right	**Object will accelerate towards the left. <u>This does not mean it moves to the left.</u> This means it will slow down but still be moving towards the right, until it comes to a stop.**
Object was initially moving at constant speed to the left	**Object will accelerate (speed up) to the left**

c. 

Resultant Force = **100 N – (70 N + 30 N) = 0 N**

Initial motion	**Resulting motion**
Object was initially stationary	**Object remains stationary**
Object was initially moving at constant speed to the right	**Object continues moving at constant speed to the right**
Object was initially moving at constant speed to the left	**Object continues moving at constant speed to the left**

d.



Resultant Force = **(70 N + 30 N) – 50 N = 50 N right**

Initial motion	**Resulting motion**
Object was initially stationary	**Object will accelerate towards the right**
Object was initially moving at constant speed to the right	**Object will accelerate (speed up) towards the right**
Object was initially moving at constant speed to the left	**Object will accelerate towards the right. <u>This does not mean it moves to the right.</u> This means it will slow down but still be moving towards the left, until it comes to a stop.**