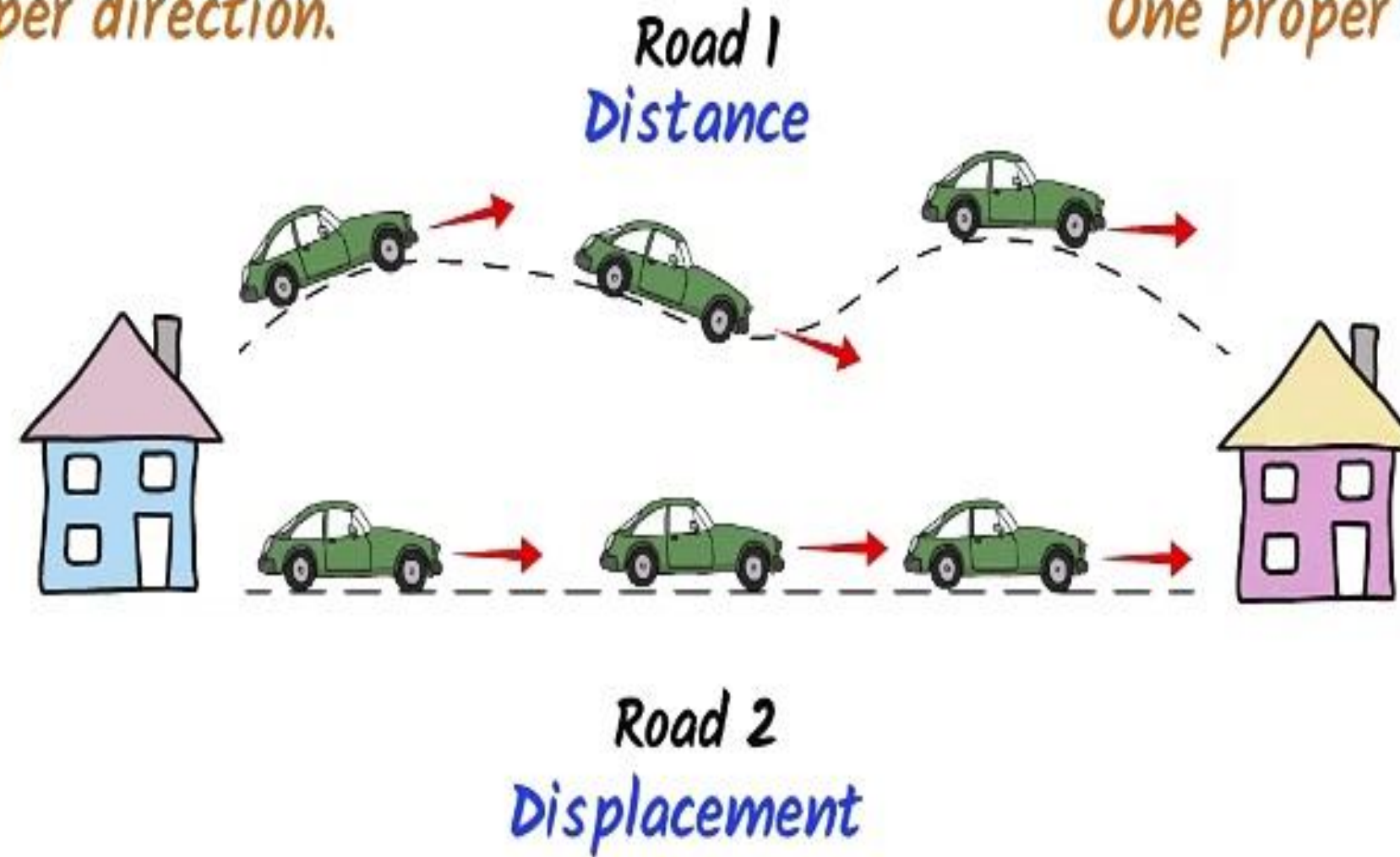




# Motion

*Distance is a scalar?*  
The direction of a car is  
constantly changing.  
*No proper direction.*

*Displacement is a vector?*  
The direction of a car is  
not changing.  
*One proper direction.*



**Distance**- The distance travelled by a body is the actual length of the path covered by a moving body irrespective of the direction in which the body travels.

It is measured in metre.

Denoted by 's'.

## **Displacement-**

**Shortest distance between two points.**

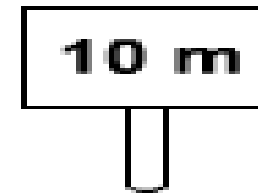
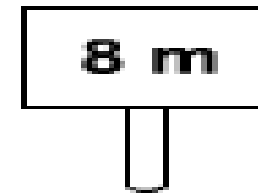
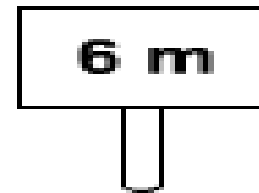
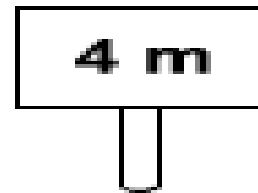
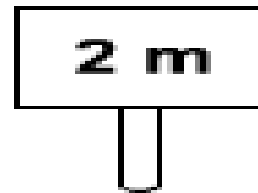
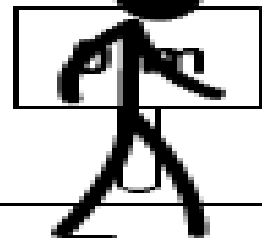
**For a moving body it can be positive, negative or zero.**

**It is the shortest distance between initial and final point.**



# Displacement: 0 m

start



**1- Distance is a scalar quantity (because it has magnitude only, it has no specified direction).**

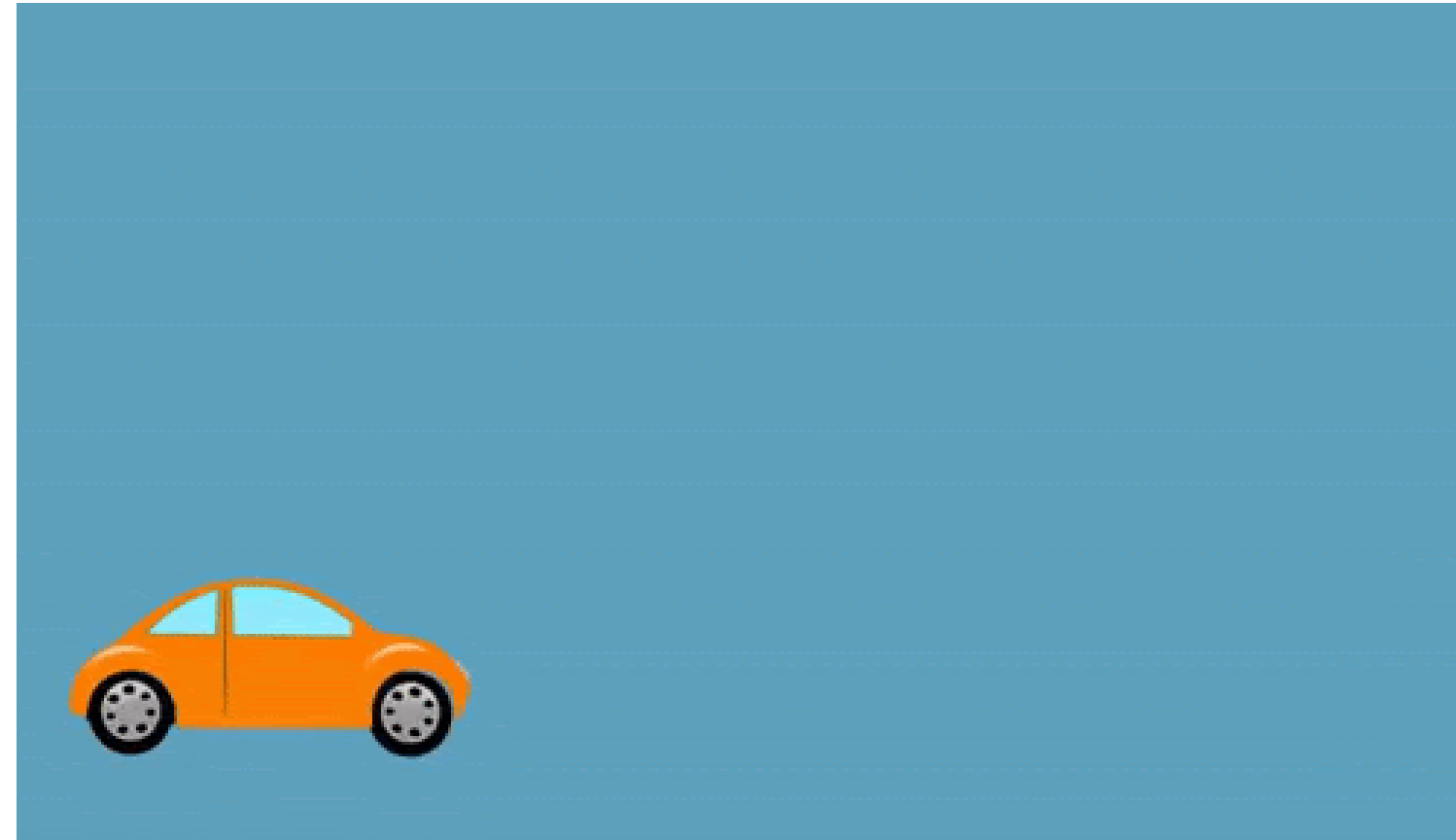
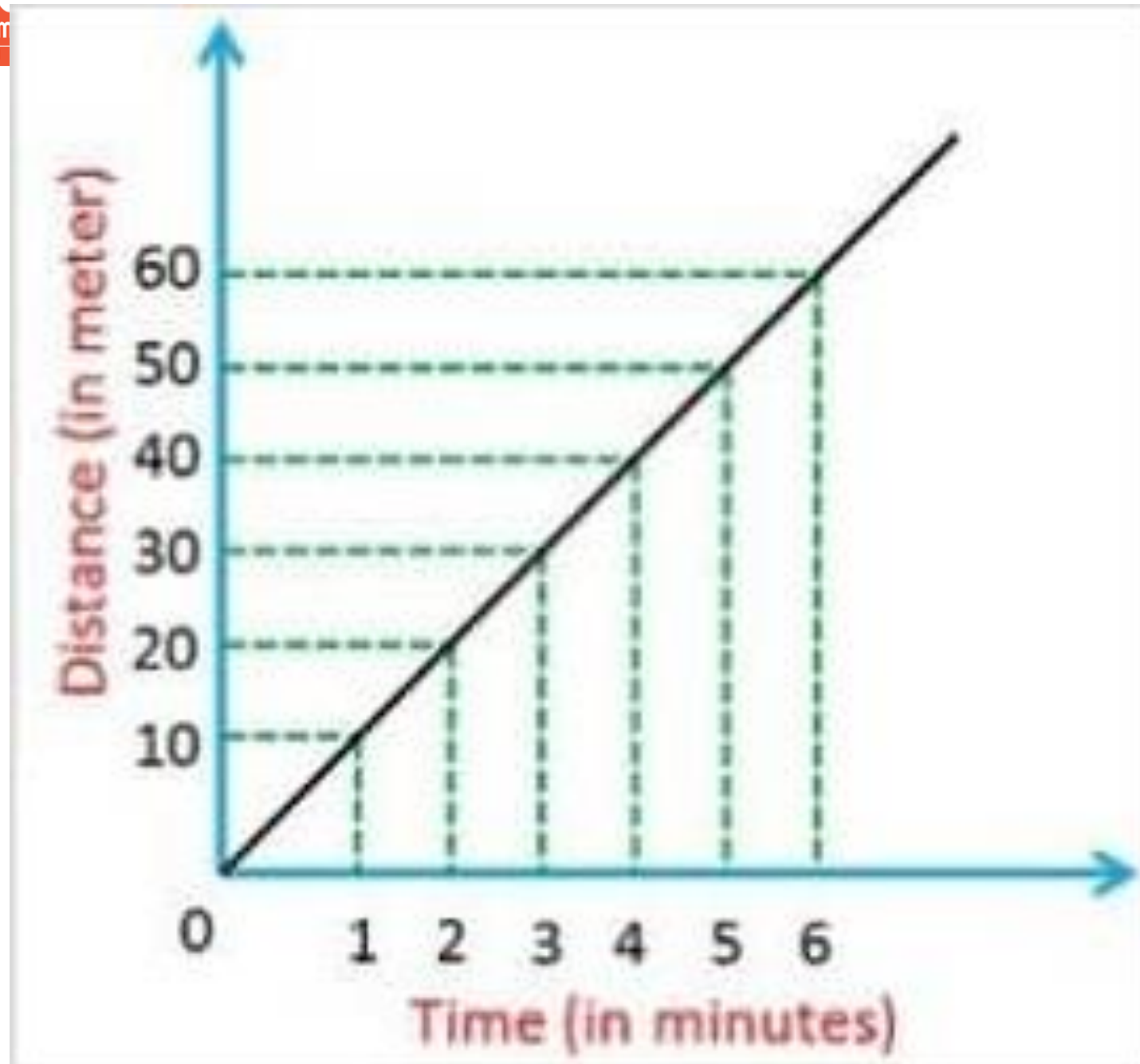
**2- Displacement is a vector quantity (because it has magnitude as well as a direction).**



**3- Distance travelled by a moving body cannot be zero but the final displacement of a moving body can be zero.**

**The displacement of a moving body will be zero if, after travelling a certain distance, the moving body finally comes back to its starting point.**

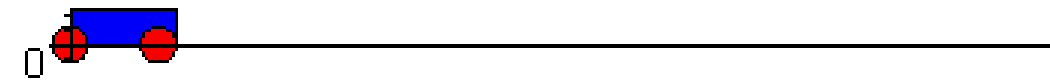
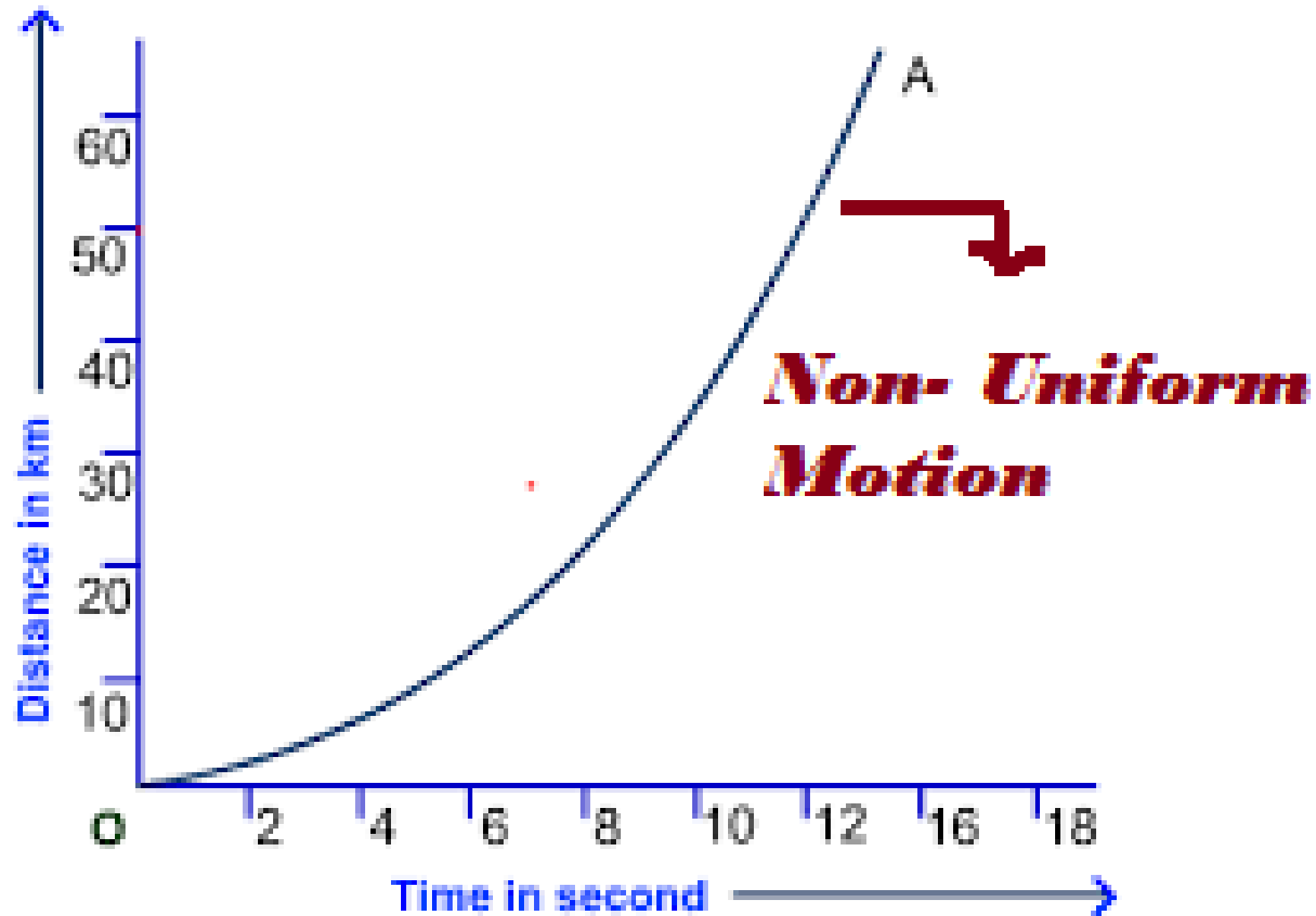
# Uniform Motion



**Uniform motion**- A body has a uniform motion if it travels equal distances in equal intervals of time, no matter how small these time intervals may be. The distance-time graph for uniform motion is a straight line. Ex.- the motion of a car in a straight-line with constant speed



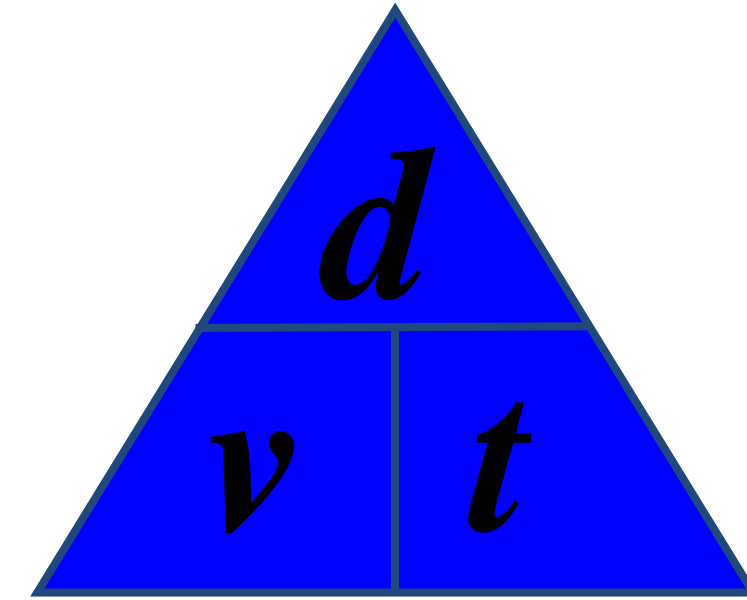
# Non-Uniform motion



- A body has a non-uniform motion if it travels unequal distance in equal intervals of time. The distance-time graph for a having non-uniform motion is a curved line.

# Speed & Velocity

- **Speed**
  - rate of motion
  - distance traveled per unit time



$$\text{speed} = \frac{\text{distance}}{\text{time}}$$

S.No	Distance	Displacement
1.	It is defined as the actual path travelled by a body.	Shortest distance between two points between which the body moves.
2.	scalar quantity	Vector quantity
3.	It can never be negative or zero.	It can be negative, zero or positive.
4.	Distance can be equal to or greater than displacement(numerical value)	Displacement can be equal to or less than distance(numerical value)
5.	Distance between two points gives full information of the type of path followed by the body.	Displacement between two points does not give full information of the type of path followed by the body.
6.	<b>Distance never decreases with time. For a moving body it is never zero.</b>	Displacement can decrease with time. For a moving body it can be zero.



**Thank You**