

# ***Motion***

---

- 1.Motion**
- 2.Types of motion**
- 3. Speed**
- 4. Vectors**
- 5.Distance, Time**

***In physics, motion is a change in position of an object over time.***

***Motion is described in terms of displacement, distance, velocity, acceleration, time, and speed.***

# **Types of motion**

- 1.Uniform motion**
- 2.Linear motion**
- 3.non-uniform motion**
- 4.Circular motion**
- 4.Projectile motion**
- 5.Elliptic motion**
- 6.Accelerated and decelerated motion**
- 7.Motion with constant acceleration or deceleration**

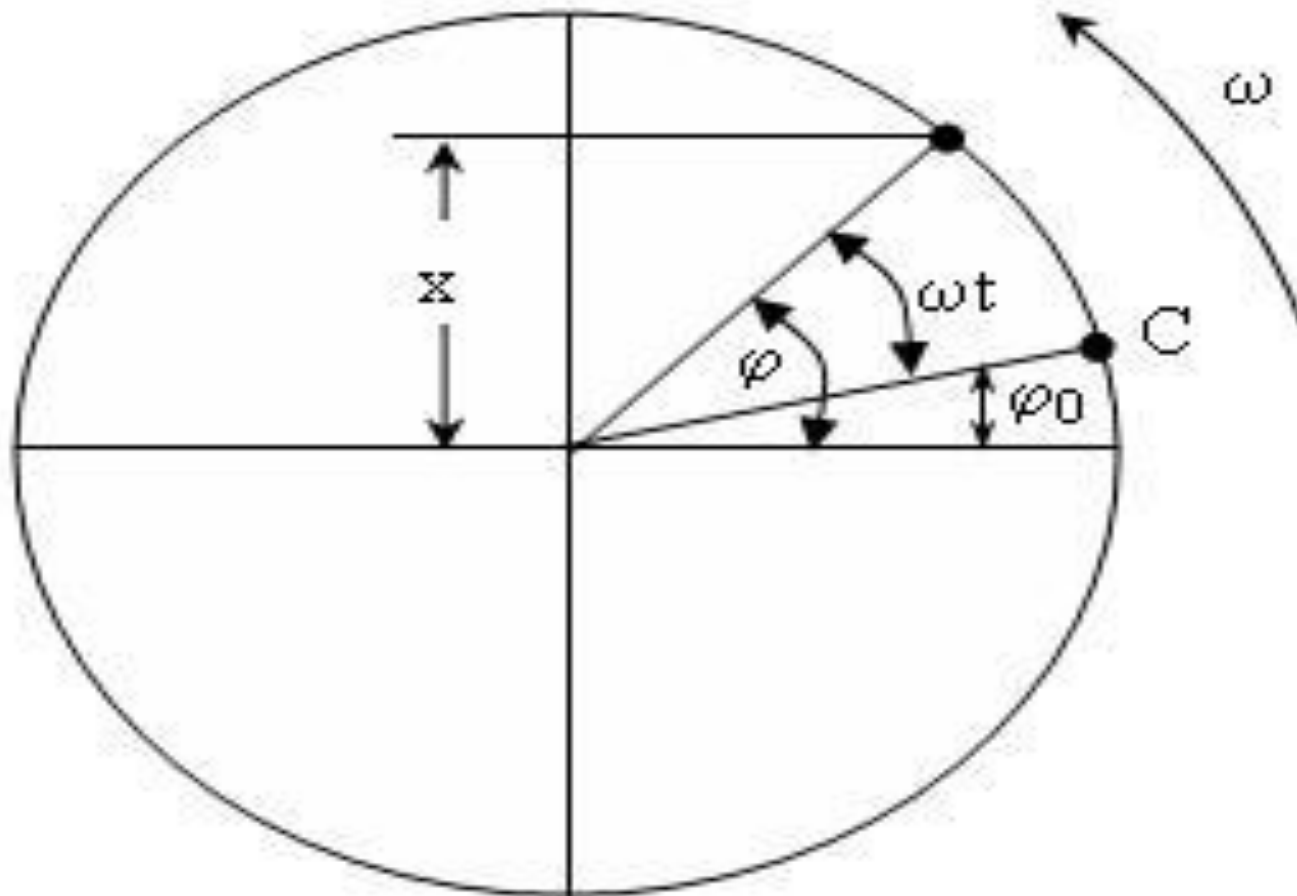
**If the body moves equally along  
the same length, the motion is  
called a uniform motion.**



If the body moves in an equally distinct time, it is called **non-uniform motion**.



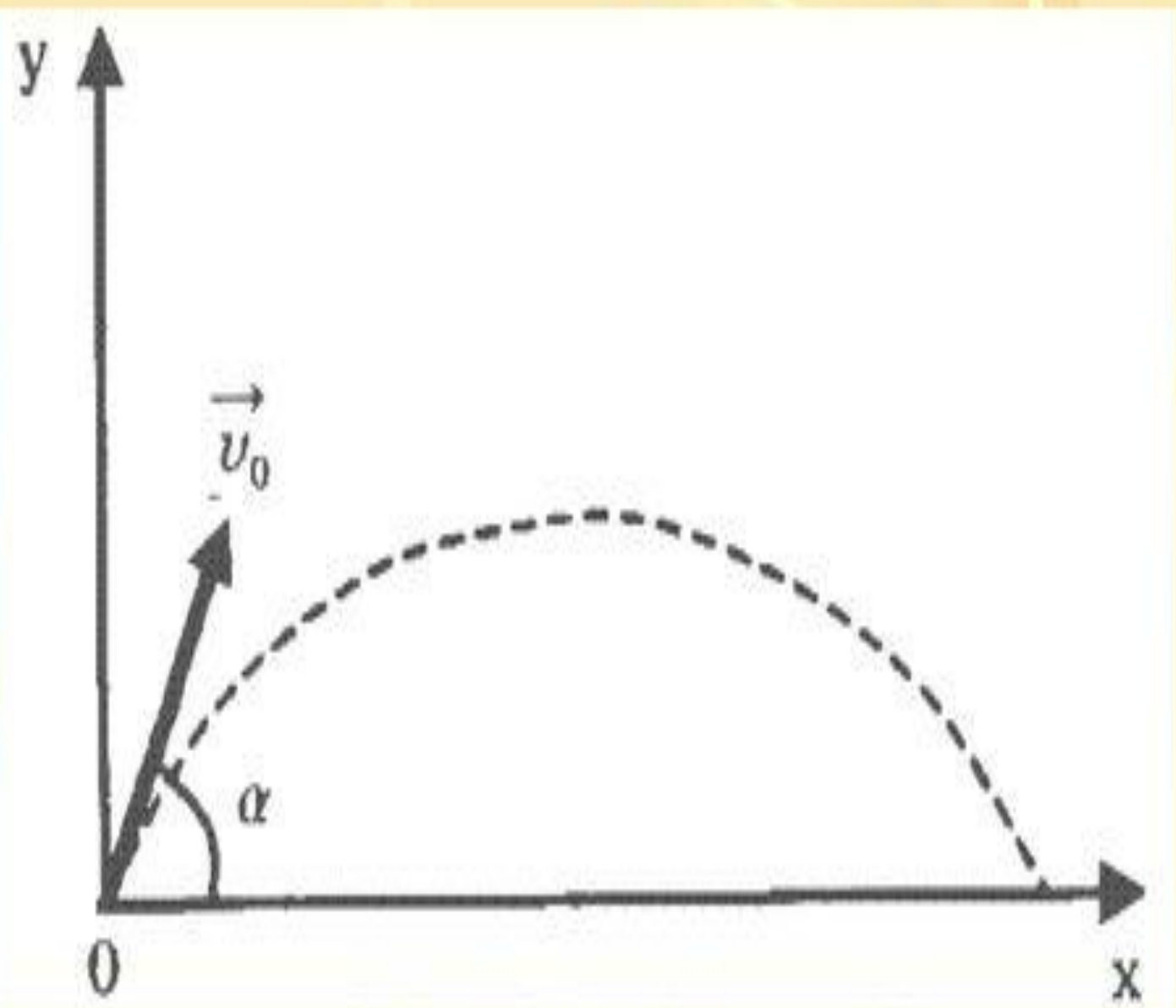
**What kind of motions do these photos refer to?**





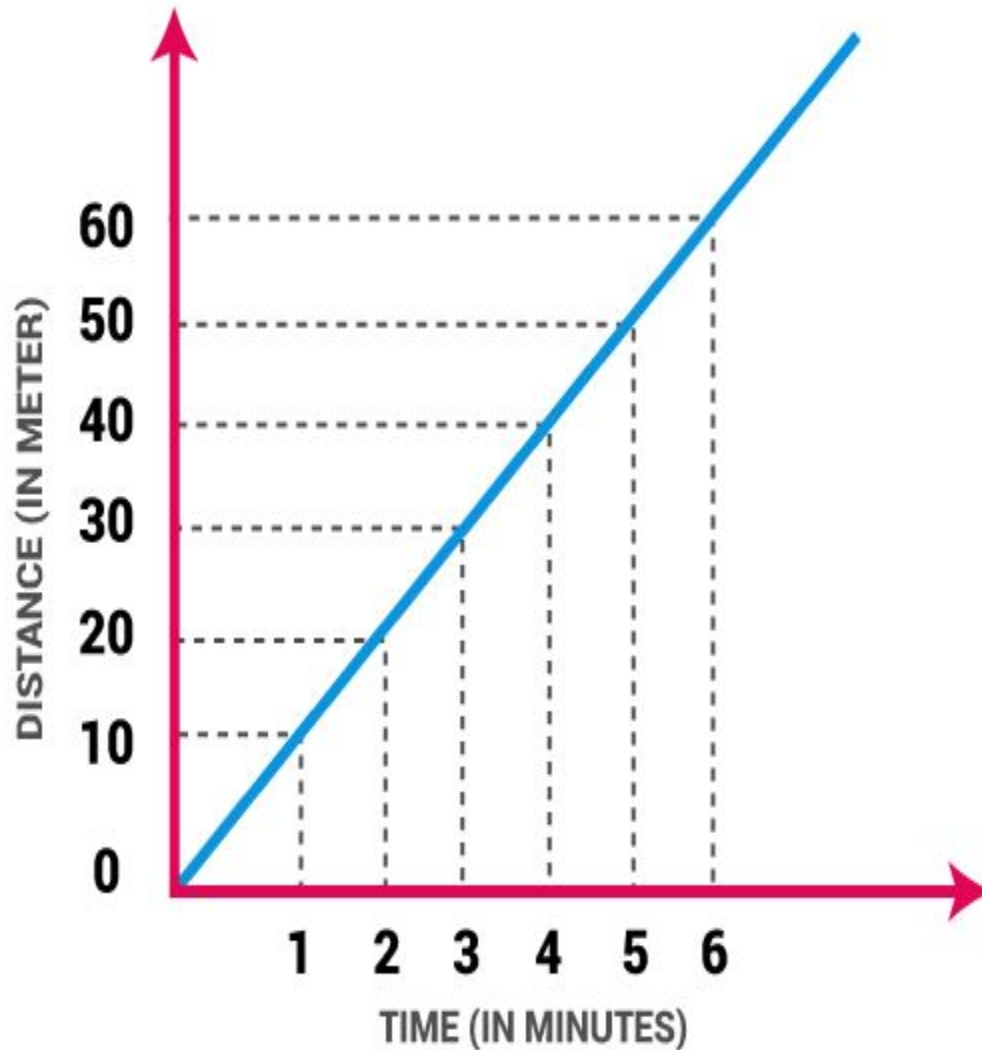
# Circular Motion



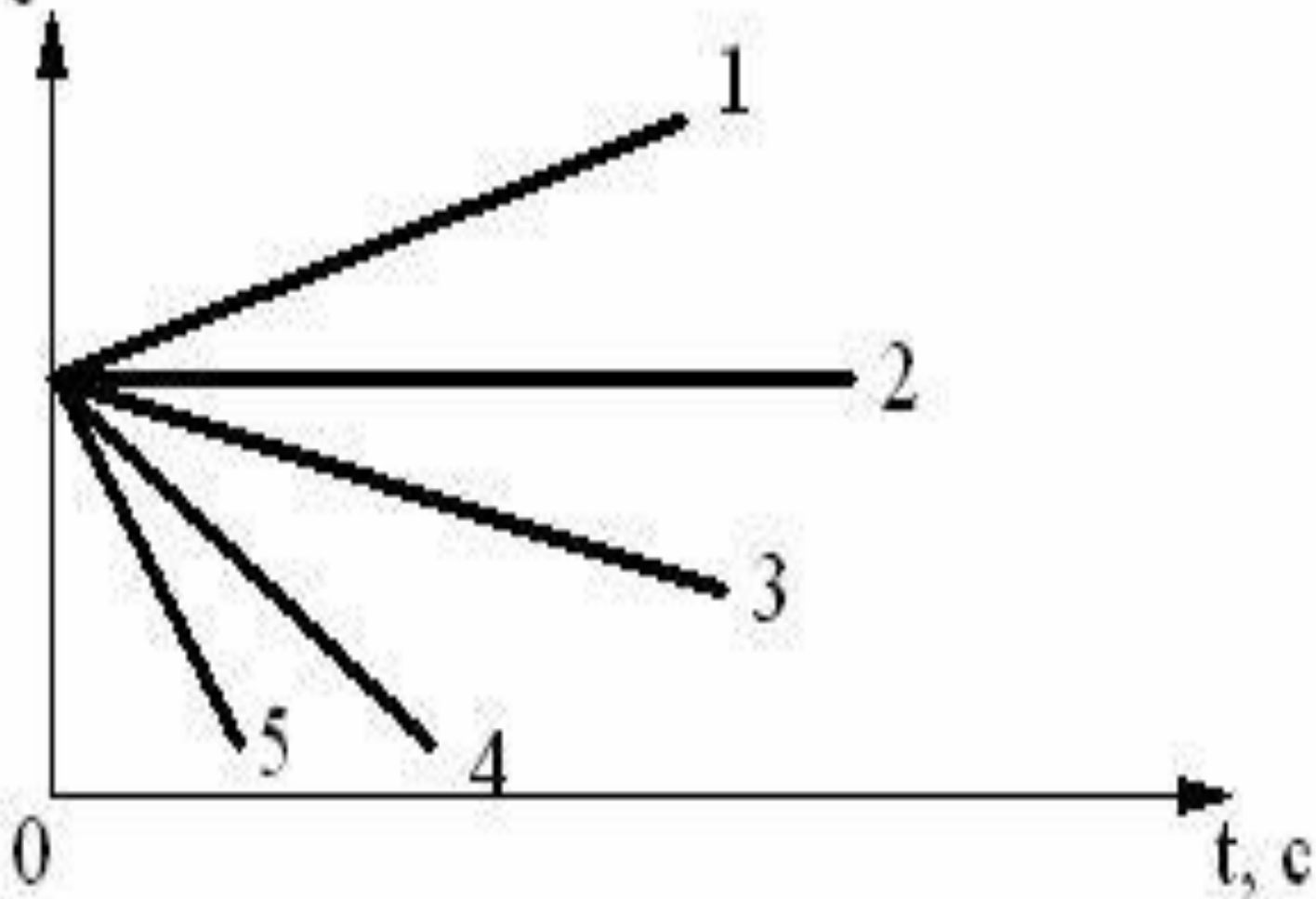




# UNIFORM MOTION GRAPH



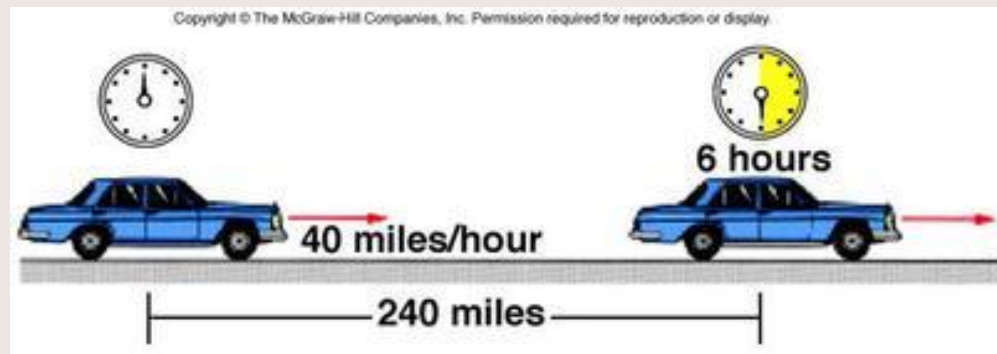
$\vartheta, \text{ m/c}$



# 2-1. Speed

- Definitions:
  - Speed
    - The rate at which something moves a given distance.
    - Faster speeds = greater distances
  - General formula for speed:
    - Speed = distance / time
    - Abbreviations commonly used:  
 $d$  = distance    $t$  = time    $v$  = speed

$$v = d/t$$



# 2-1. Speed

---

## Velocity

$$v = \left( \frac{d}{t} \right) = \left( \frac{100 \text{ miles}}{2.5 \text{ hours}} \right) = 40 \frac{\text{miles}}{\text{hour}} = 40 \text{ mph}$$

## Distance

$$d = v \cdot t = 30 \left( \frac{\text{miles}}{\text{hour}} \right) \cdot 6 \text{ hours} = 180 \text{ miles}$$

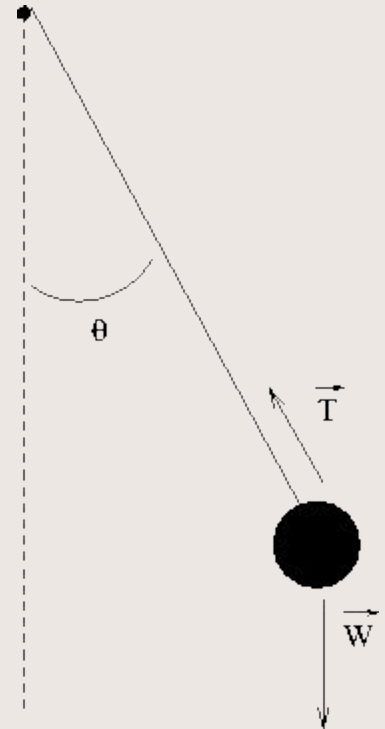
## Time

$$t = \left( \frac{d}{v} \right) = \left( \frac{100 \text{ miles}}{40 \text{ miles / hour}} \right) = 2.5 \frac{\text{miles}}{\text{miles / hour}} = 2.5 \text{ hours}$$

# 2-1. Speed

**Average speed** is the total distance traveled by an object divided by the time taken to travel that distance.

**Instantaneous speed** is an object's speed at a given instant of time.



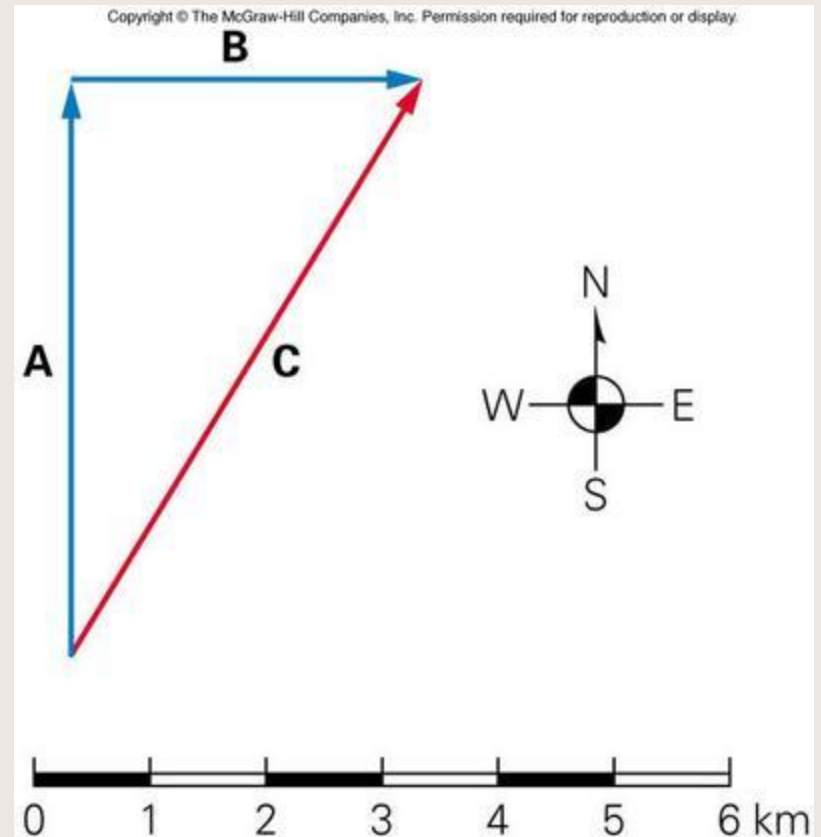


## 2-2. Vectors

**Magnitude** of a quantity tells how large the quantity is.

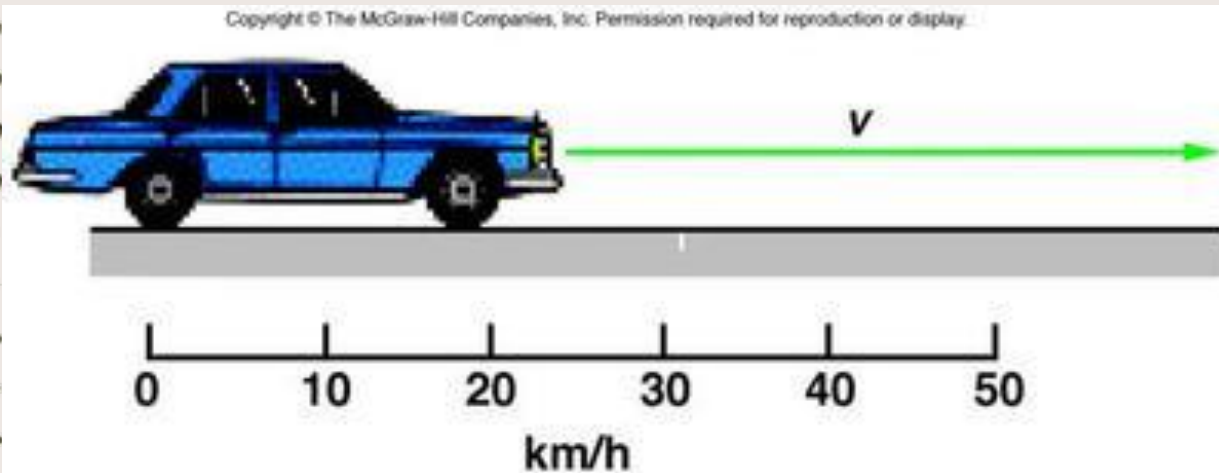
**Scalar** quantities have magnitude only.

**Vector** quantities have both magnitude and direction.



## 2-2. Vectors

**Velocity** is a vector quantity that includes both speed and direction.



## 2- 4. Distance, Time

---

$$V_{\text{avg}} = \frac{(V_1 + V_2)}{2} = \frac{(20_{\text{mph}} + 60_{\text{mph}})}{2} = 40_{\text{mph}}$$

$$d = v_{\text{avg}} t \quad 30_{\text{mph}} \cdot 2_{\text{hr}} = 60_{\text{miles}}$$

# Semantic card

	Uniform motion	Decelera tion	Position	Санак нүктесі	Орын ауыстыр у	Равноме рное движени е	ускорен ие
<b>Орын</b>							
<b>Displasem ent</b>							
<b>Reference point</b>							
<b>Бірқалы пты қозғалыс</b>							
<b>Тежелу</b>							
<b>Uniform motion</b>							
<b>Үдеу</b>							