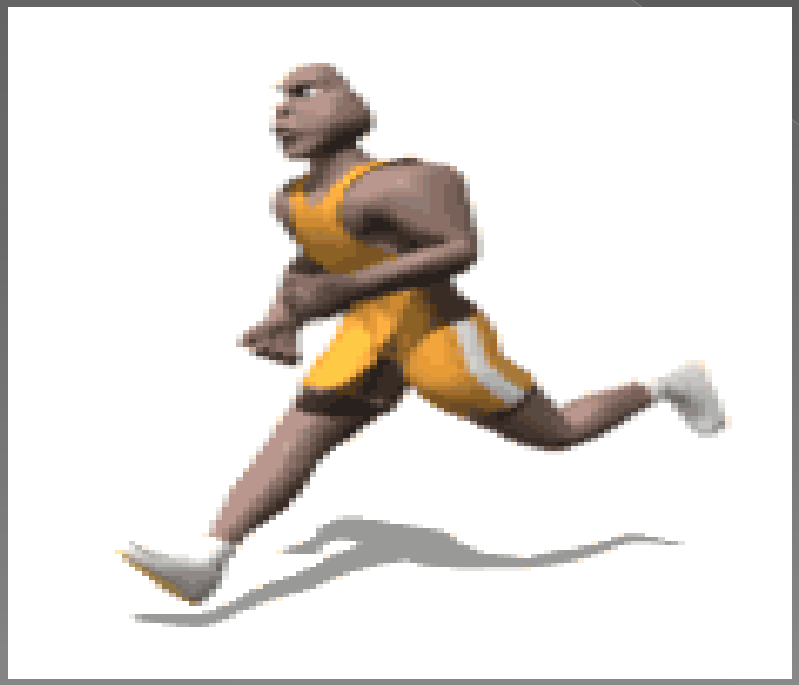
Chapter 2

Representing Motion



Sections 2.1

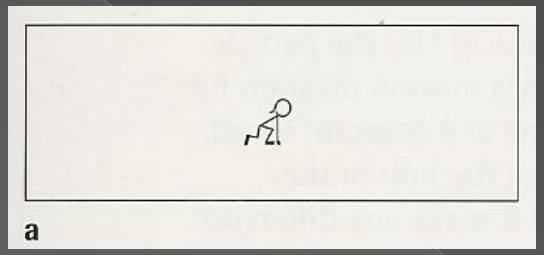
Picturing Motion

Motion – _____

- Ways to picture motion:
- _____ – a series of images of a moving object that records its _____ after _____ intervals.
- _____ – replacing the object in a motion diagram with a _____.

4 Types of Motion

- 1) _____ – no change in motion
- 2) _____ – the object will get through equal distances in each time frame
- 3) _____ – the object will cover a greater distance in each time frame.
- 4) _____ – the object will cover less distance in each time frame.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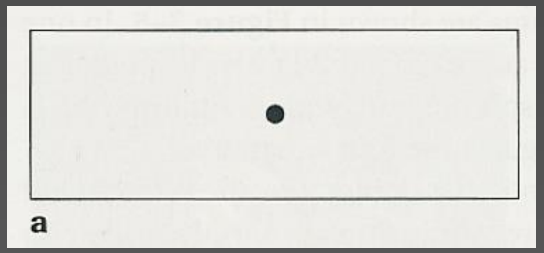
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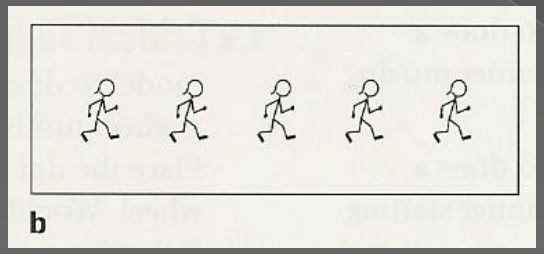
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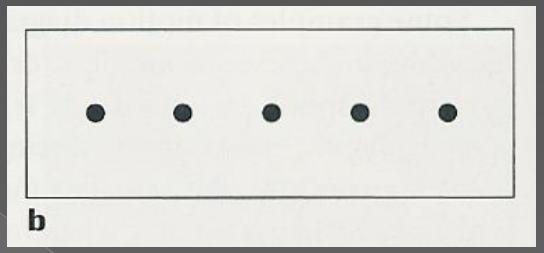
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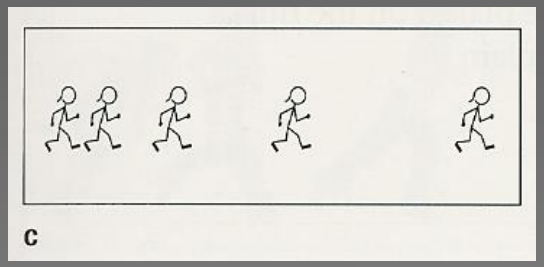
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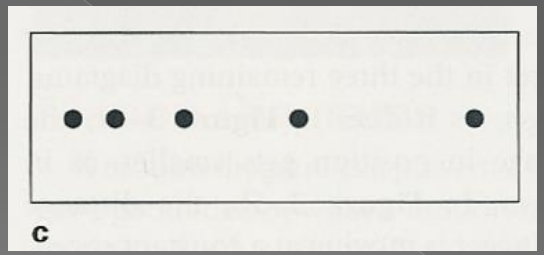
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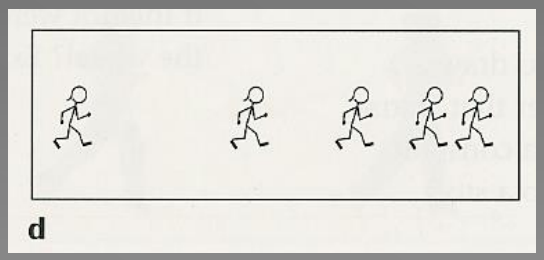
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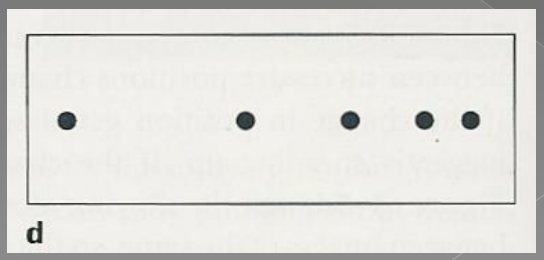
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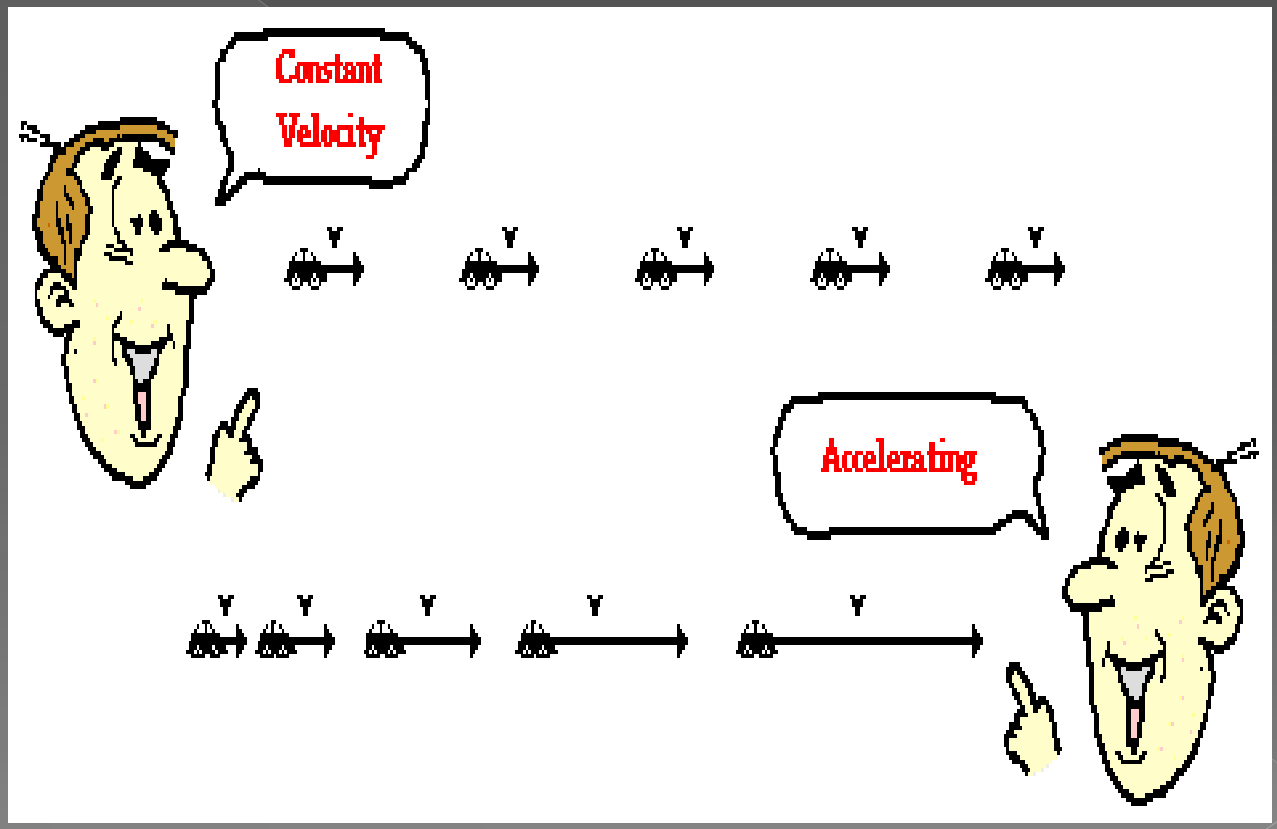
Vector Diagram



Use a particle model to draw a motion diagram for the following situations:

- Object starting at rest and speeding up.

- Object starting at rest, speeding up to a constant speed, and then slowing to a stop.

- A wheel turning at a constant speed.
  - First placing the dot on the hub.
  - Next placing the dot on the rim.

Section 2.2

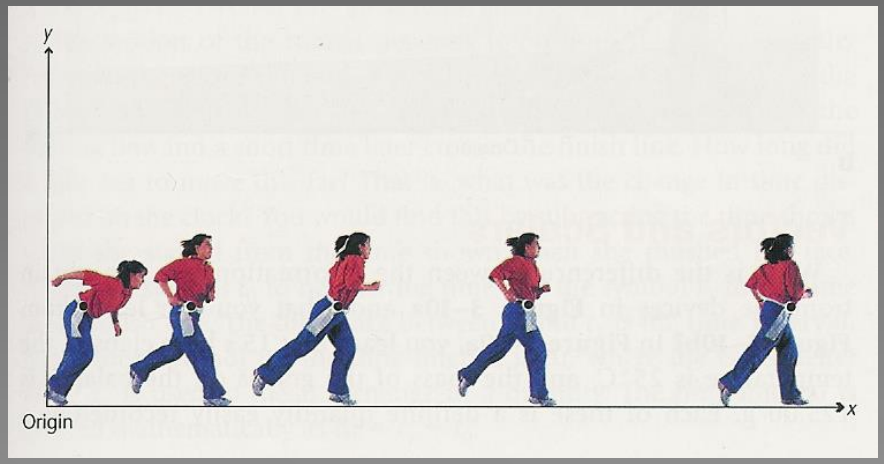
When and Where?

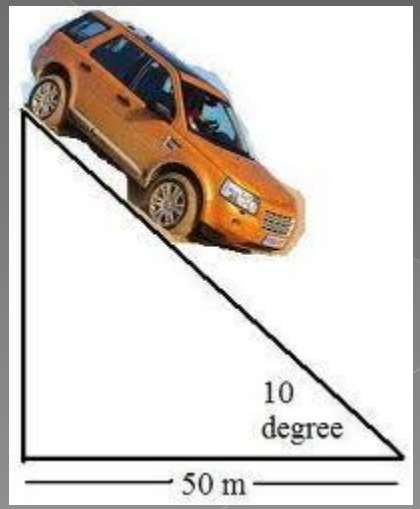
Coordinate System

- Tells the location of the _____ and the _____ directions.

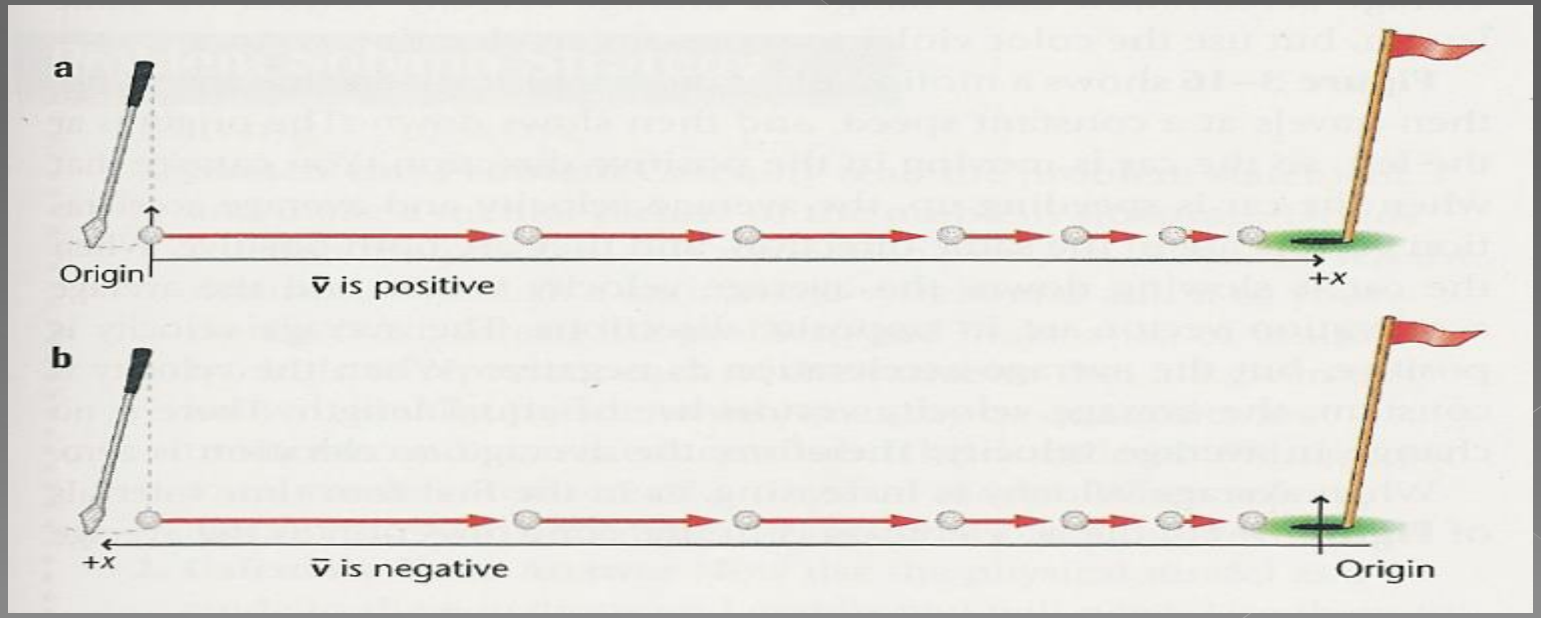
- _____ – the separation between an _____ and the _____.
  - Represented with an _____ drawn from the _____ _____

- To determine displacement, velocity, and acceleration, a _____ _____ must be specified.
- Set up whatever coordinate system that is most _____ for the situation.





- EX: The sign of average velocity depends upon the chosen coordinate system.
  - Two coordinate systems.
  - Same situation.
  - Different signs

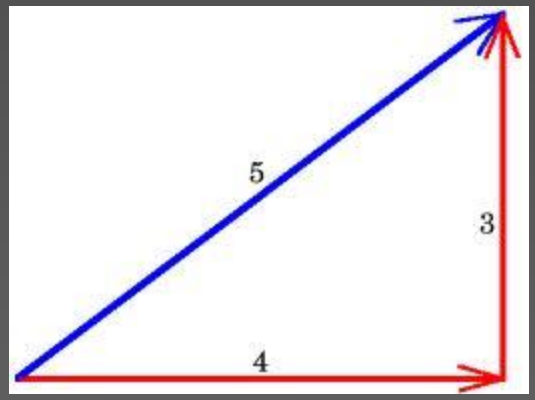


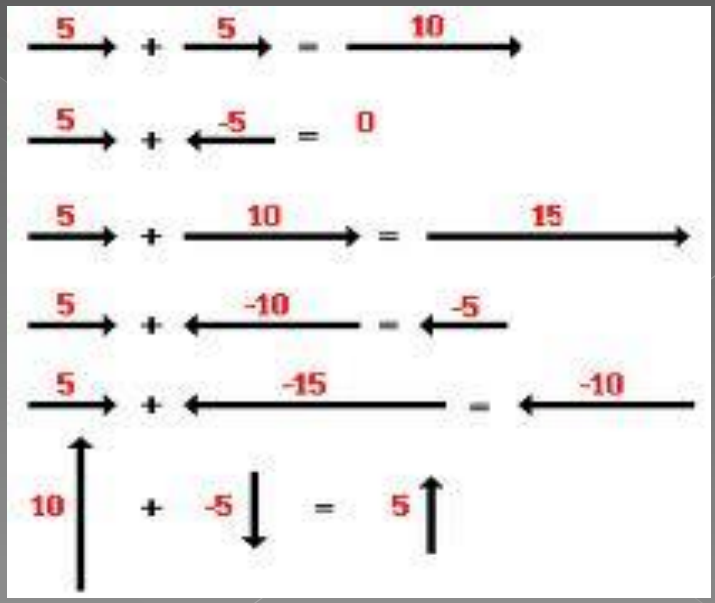
- _____ – a quantity that contains _____ only
  - EX:

- _____ – a quantity that contains both magnitude and _____.
  - EX:

Adding Vectors

- Vector are represented with _____.
- Add two vectors by placing them _____.
- _____ – the vector that represents the _____ of two or more vectors.
  - The resultant always points from the _____ _____ _____





Time

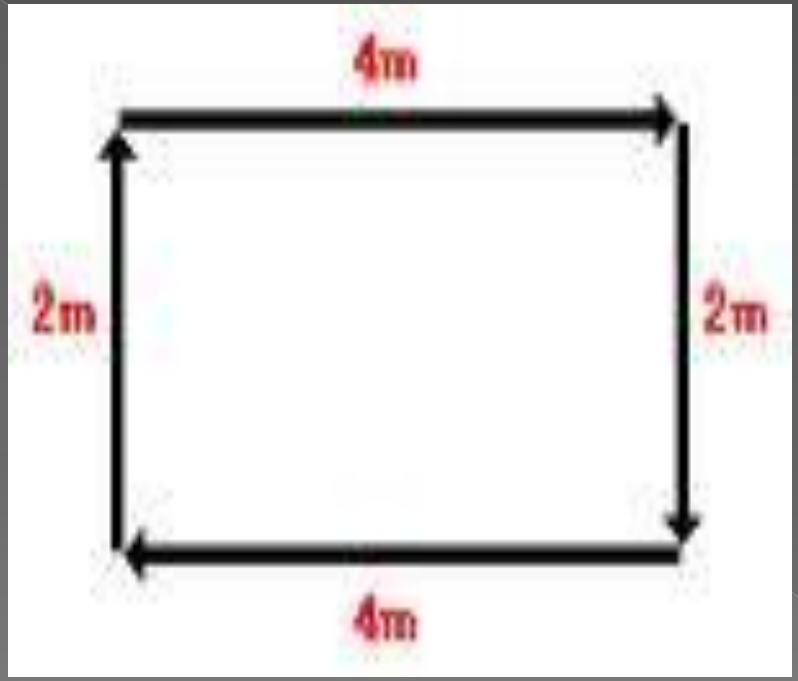
- Time is a _____.
- Time Interval – the _____ between two times.
- Change in time: Δt =
- EX: Splits

Distance vs. Displacement

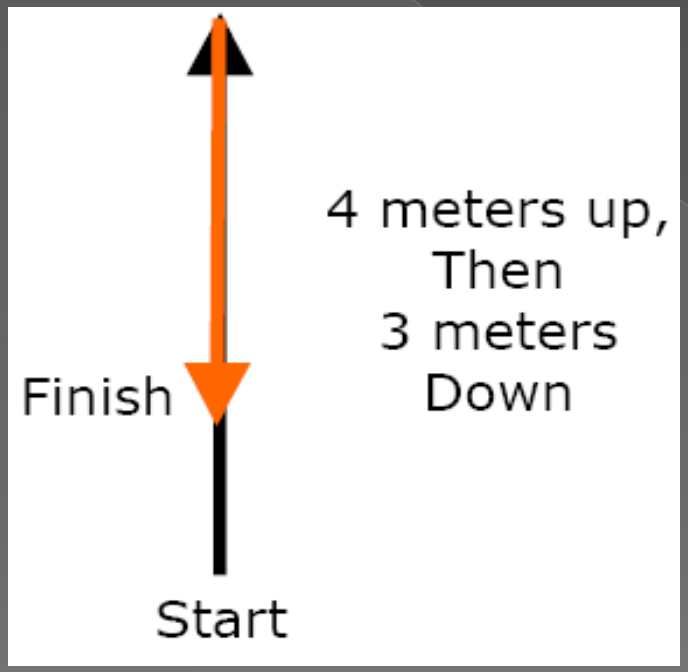
- _____ – the total amount traveled.
  - Scalar
  - "How much ground the object has covered"

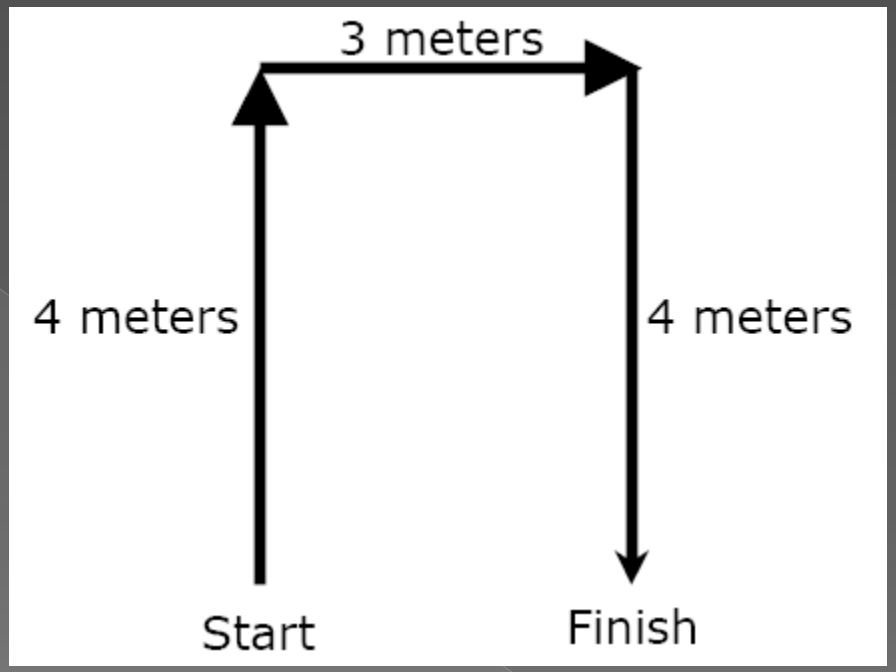
- _____ – the _____ in position of an object.
  - Δd =
  - Vector – must have a _____
  - "How far an object ended up from where it started"

Examples:

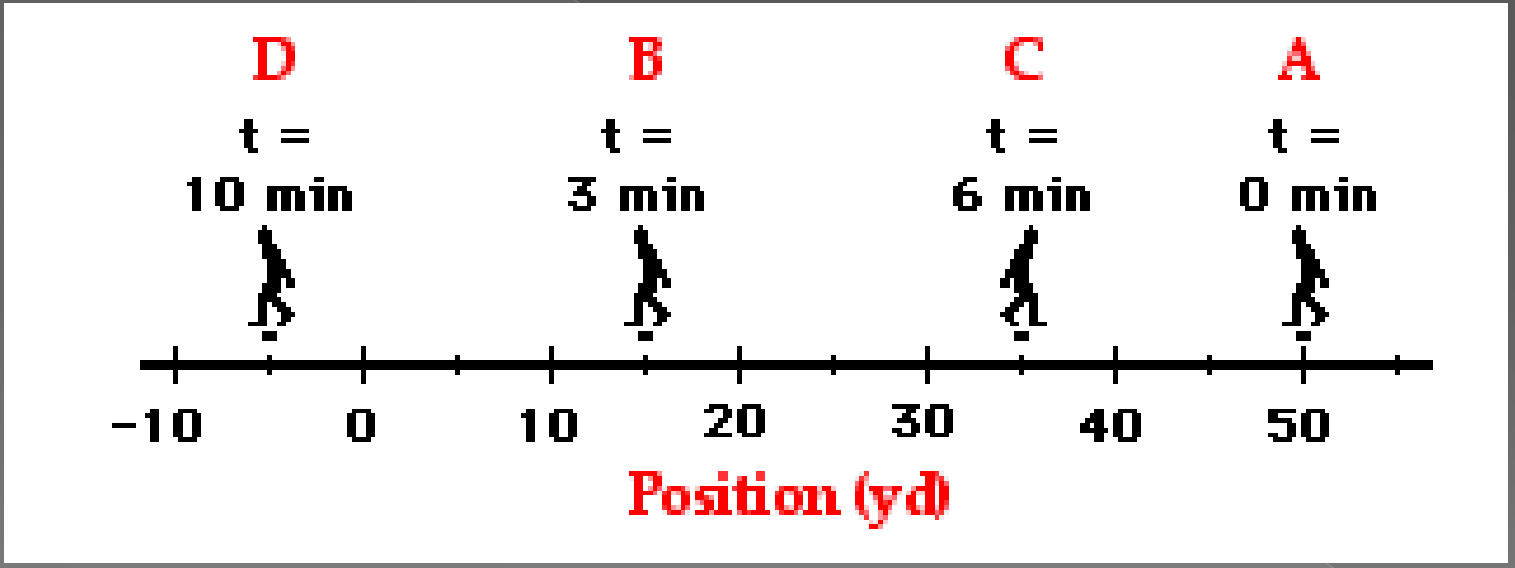


Examples:


4 meters up,
Then
3 meters
Down
Finish
Start


3 meters
4 meters
4 meters
Start
Finish

What is the coaches resulting distance and displacement?



Section 2.3 and 2.4

Position-Time Graphs
How Fast?

Speed

- The ratio of the total _____ traveled to the _____ of travel.

$$\text{Average Speed} = \frac{\text{Distance Traveled}}{\text{Time of Travel}}$$

- Scalar quantity – _____does not matter
  - EX:

- If it takes you 8 hours to travel 440 miles, what is your average speed?

Velocity

- Ratio of _____ to total _____.

$$\text{Average Velocity} = \frac{\Delta \text{position}}{\text{time}} = \frac{\text{displacement}}{\text{time}}$$

- Vector quantity – _____ matters
  - EX:

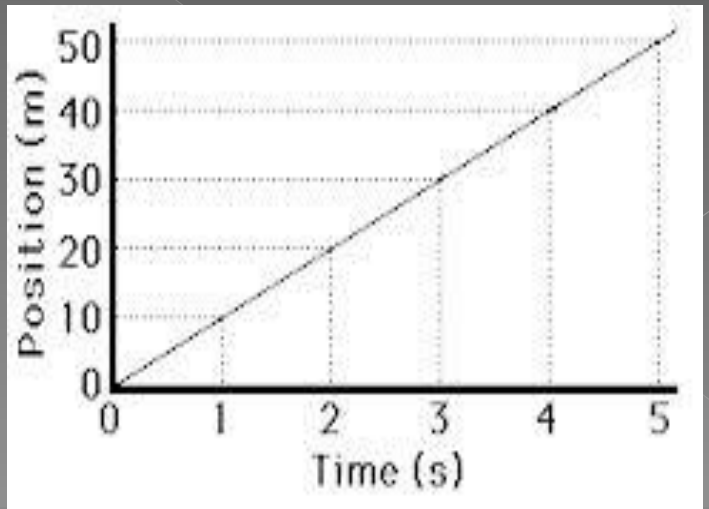
- Velocity will change if either d or t change OR if the direction of motion changes.

Instantaneous Velocity

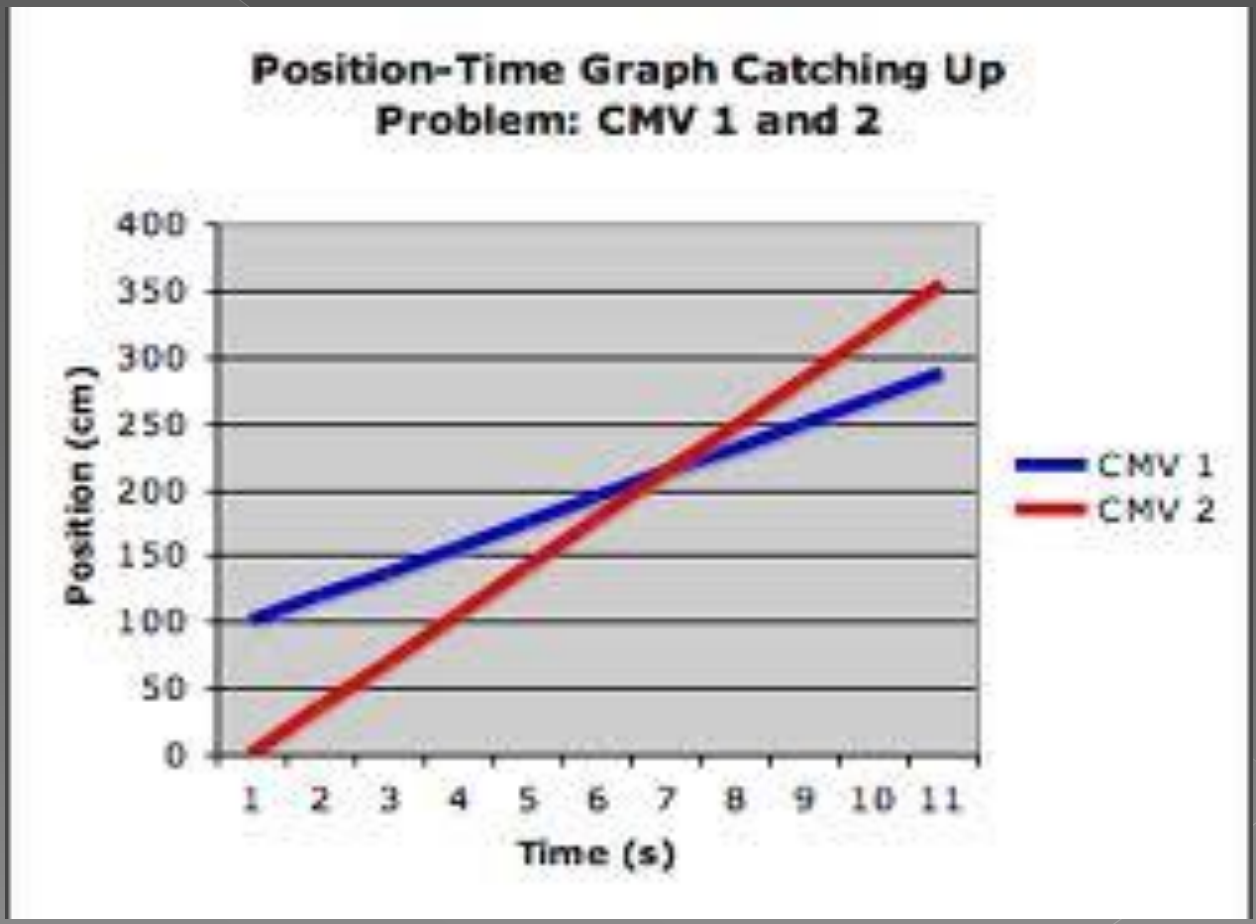
- The velocity of an object at a particular _____in time.
- EX: The speedometer reading on your car at an instant in time.
- EX: Instantaneous vs. Average

Position-Time Graphs

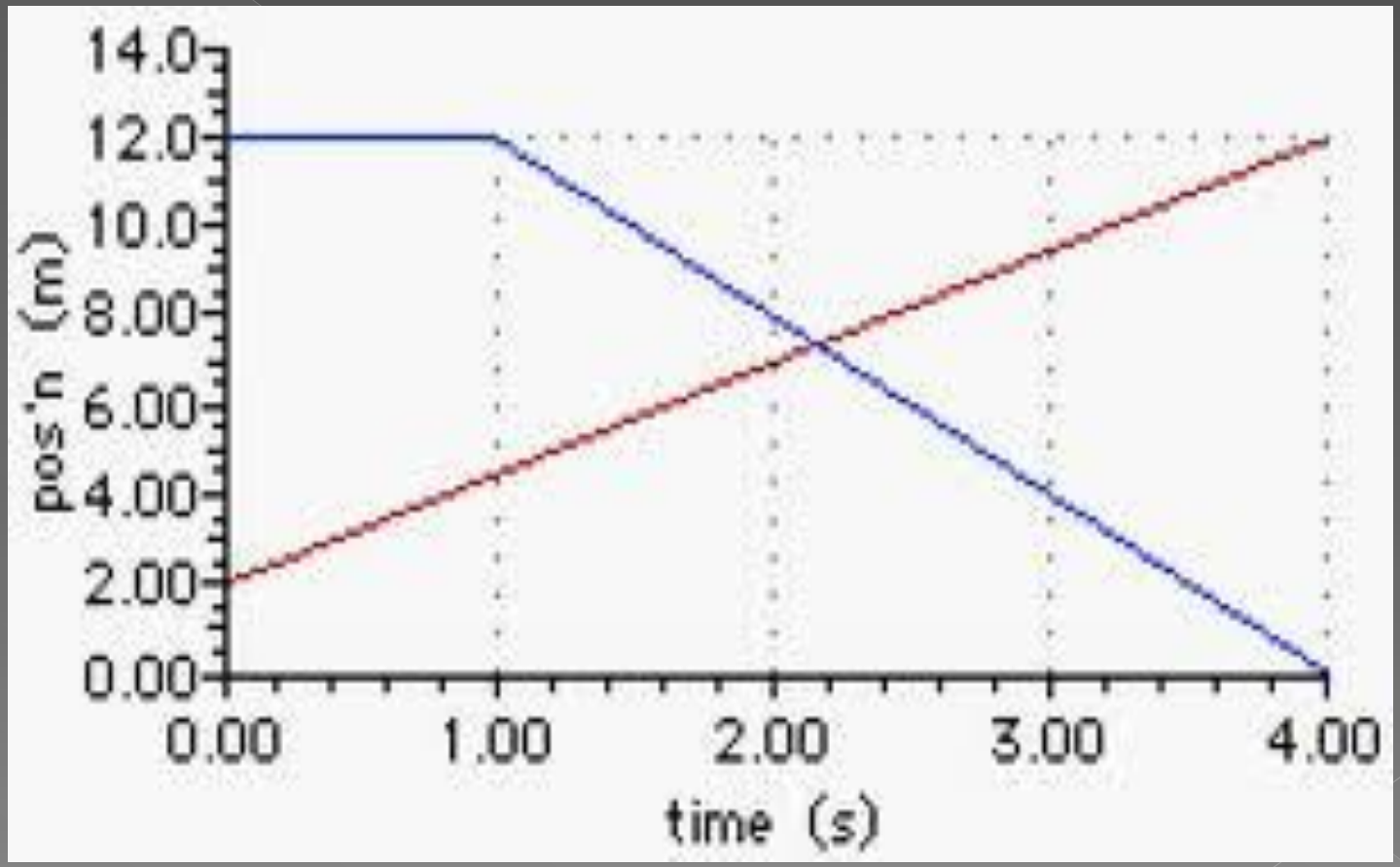
- Shows the a _____ of an object (compared to the origin) at equal _____ intervals.
- The _____ of a position-time graph is _____.
- Slope indicates both _____ and _____.
- Pay attention to units.



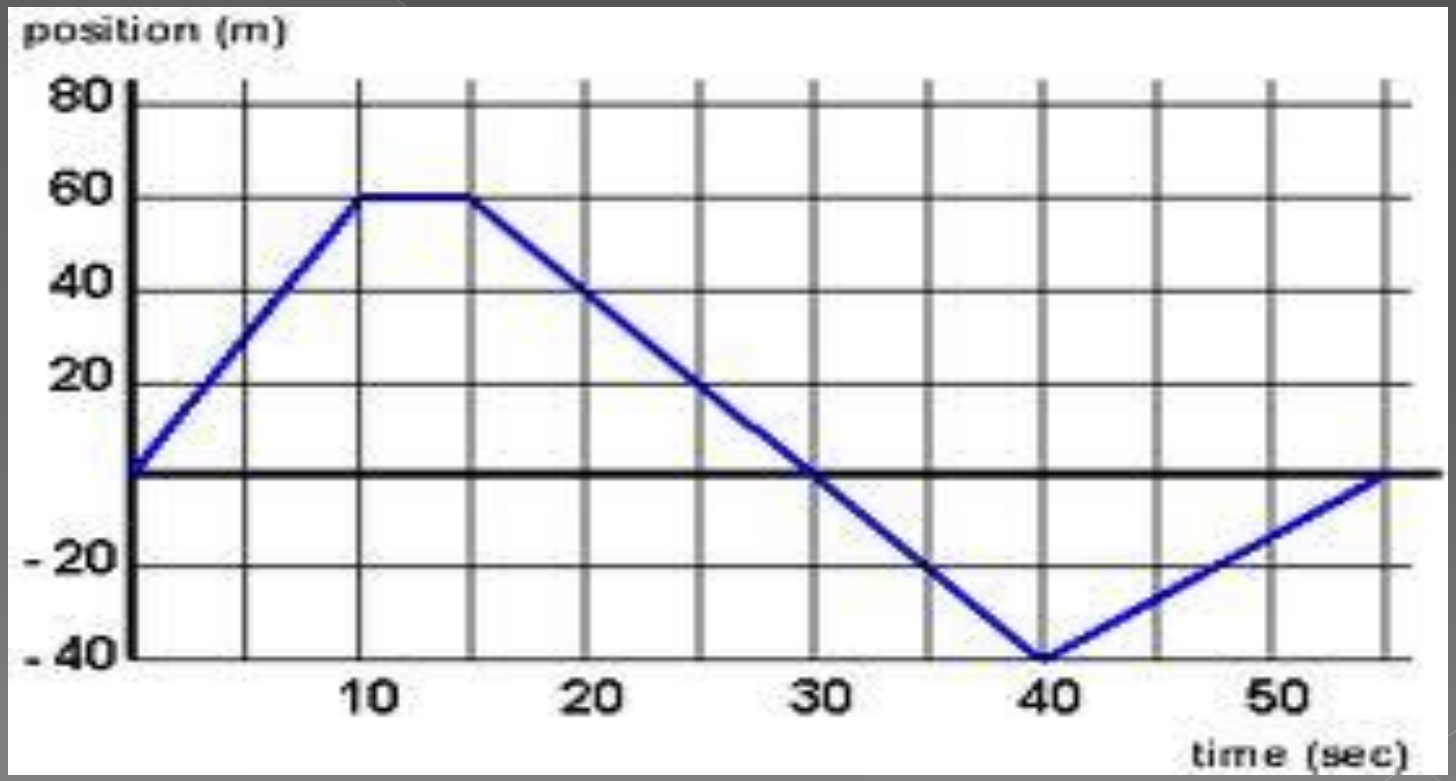
Describe the Motion.



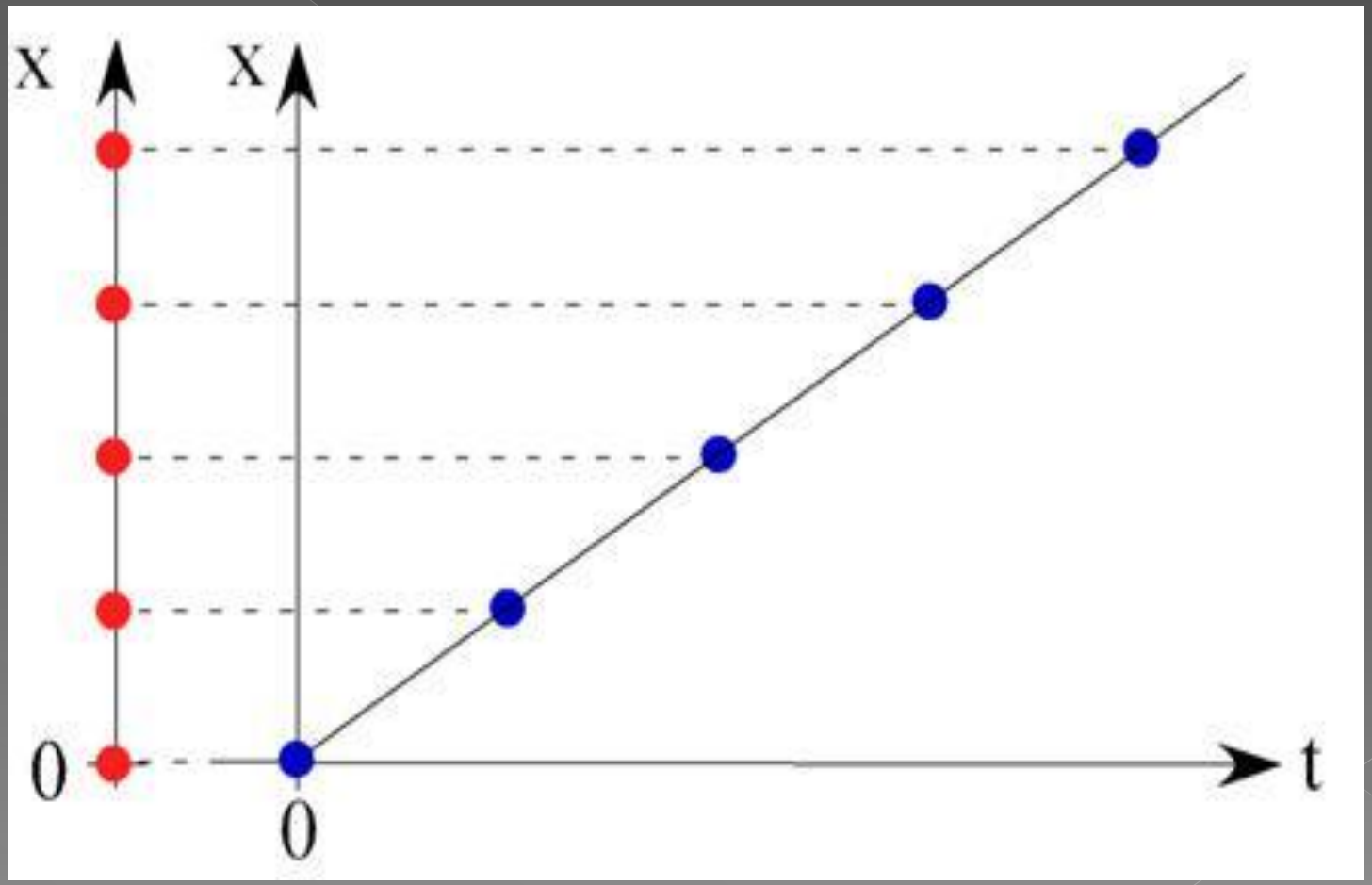
Describe the Motion.



Find the velocity for each section. Rank the velocities from least to greatest.

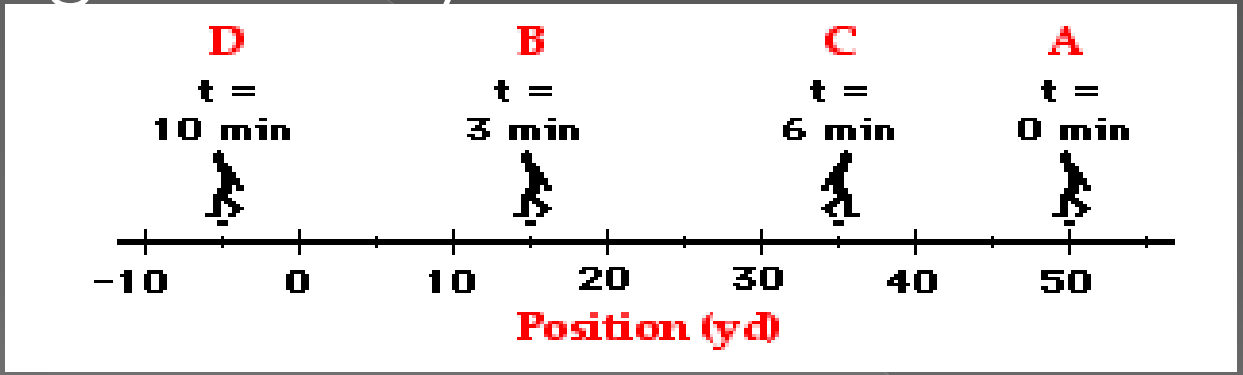


Motion Diagrams and P-t Graphs:



EX:

- What is the coach's average speed and average velocity?



- If Clara runs 1600m in lane 1 in 4:50 minutes, what is her average speed and average velocity (in m/s)?