Kinematics Review Sheet

Position (x)
The location of an object as measured from a reference point.

Distance (d or x)
The total distance traveled along the path taken from start to finish.

- Distance is a scalar quantity.
- The units for distance are meters.

Displacemement (x)
Displacement is the straight line distance from the starting point to the ending point. It is independent of the path taken.

- Displacement is a vector quantity.
- The direction of displacement is measured from the start point to the end point.
- The units for displacement are meters.
- The displacement of an object can be positive, negative or zero.
- The displacement of an object is zero if it begins and ends at the same point.
- If the object ends at a point that is below its starting point, its displacement is negative.

Speed (v)
Distance traveled over time. It is the rate of change of distance.

- Speed describes how fast an object is moving with no indication of direction.
- Speed is a scalar quantity.
- The units for speed are m/s.
- The speed of an object is constant if it travels the same distance in each unit of time.
- Instantaneous speed is the speed at a given instant of time such as what you see in the speedometer.

Velocity (v)
Distance traveled over time. It is the rate of change of displacement or position.

- Velocity describes how fast and in what direction an object is moving.
- Velocity is a vector quantity.
- The direction of the velocity of the object is always the same as the direction in which the object is moving.
- The units for velocity are m/s.
- Velocity can be either positive, negative or zero.
- The velocity of an object is zero if it is not moving.
- A negative velocity indicates that the object is moving in the negative direction.
- The velocity of an object is constant if it travels the same displacement and in the same direction in each unit of time.
- Instantaneous velocity is the velocity at an instant of time. It cannot be read from a speedometer.

Acceleration (a)
Acceleration is the change in velocity over time. It is the rate of change of velocity.

- Acceleration results from a change in either the magnitude or the direction of velocity.
- Acceleration is a vector quantity.
- The direction of acceleration is the direction in which the velocity of the object is changing.
- The units for acceleration are m/s^2.
- The acceleration of an object is constant if the velocity changes by the same amount in each unit of time.
- Acceleration can be either positive, negative or zero.
- The acceleration of an object is zero in the following situations: (a) The object is not moving, (b) The object is moving with a constant velocity.