AI Response:

Kinematics is a branch of physics that deals with the motion of objects without co

Key Concepts

1. **Position (x)**: The location of an object in space, often described in coordina

2. **Displacement (”x)**: The change in position

$$
\Delta x = x_f - x_i
$$
where x_f is the final position and x_i is the initial position.

3. **Velocity (v)**: The rate of change of displacement with respect to time. It can

- Average velocity (v_{avg}):
$$
v_{avg} = \frac{\Delta x}{\Delta t}
$$

- Instantaneous velocity: The velocity of an object at a specific moment in time
$$
v = \frac{dx}{dt}
$$

4. **Acceleration (a)**: The rate of change of velocity with respect to time. Like v

- Average acceleration (a_{avg}):
$$
a_{avg} = \frac{\Delta v}{\Delta t}
$$

- Instantaneous acceleration: The acceleration of an object at a specific mome
$$
a = \frac{dv}{dt}
$$

Equations of Motion (for constant acceleration)

For an object moving with constant acceleration, the following kinematic equation

1. $v_f = v_i + a t$

2. $x_f = x_i + v_i t + \frac{1}{2} a t^2$