Kinematics Study Guide for PHYS 2211 Introductory Physics I Mechanics

Definitions:

Kinematics: The branch of mechanics that deals with the motion of objects without considering the forces that cause the motion.

Displacement: The change in position of an object from its initial position.

Velocity: The rate of change of displacement with respect to time.

Acceleration: The rate of change of velocity with respect to time.

Equations:

Displacement:

$x = x_0 + v_0t + ½at^2$

Velocity:

$v = v_0 + at$

Acceleration:

$a = (v - v_0)/t$

Practice Problems:

1. An object is moving in a straight line with an initial velocity of 10 m/s and an acceleration of 2 m/s2. What is the displacement of the object after 5 seconds?

Answer: The displacement of the object after 5 seconds is 75 m. This can be calculated using the displacement equation: $x = x_0 + v_0t + ½at^2$. Plugging in the given values, we get $x = 0 + 10(5) + ½(2)(5)2 = 75$ m.

2. An object is moving in a straight line with an initial velocity of 5 m/s and a displacement of 20 m. What is the acceleration of the object?

Answer: The acceleration of the object is 2 m/s2. This can be calculated using the acceleration equation: $a = (v - v_0)/t$. Plugging in the given values, we get $a = (5 - 0)/20 = 2$ m/s2.