

Physics 161
Lecture 2
One-dimensional Motion

September 7, 2017

Lecture 2: learning objectives

You will know the three kinematics equations (relating displacement, velocity and acceleration) for motion with constant acceleration.

You will apply the kinematics equations to objects in free fall (constant acceleration due to gravity).

Kinematic equations

The three kinematic equations for motion with constant acceleration are:

$$v = v_0 + at$$

Velocity as a function of time

$$x = x_0 + v_0 t + \frac{1}{2} at^2$$

Displacement as a function of time.

$$v^2 = v_0^2 + 2a\Delta x$$

Velocity as a function of displacement.

Kinematics equations

We can analyze one-dimensional motion through displacement-time, velocity-time and acceleration-time graphs.

Examples for motion with constant acceleration:
Also consider the graphs in the sequence a, v, x .

