Physics 2010
Fall Semester 2008
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COVER SHEET - EXAM 1

Data:

$g = 9.80\ m/s^2$

For $at^2 + bt + c = 0$ $\quad t = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

Equations:

For 1-D Motion

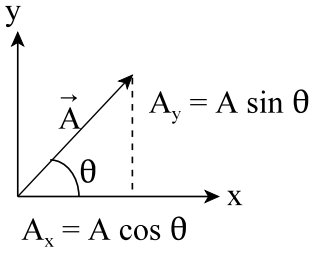
(a) Uniform Motion ($\vec{v}$ = constant)
$\vec{v}$ = slope of $\vec{x}$ vs t plot

(b) Uniform Acceleration
$\vec{v}_{inst}$ = slope of tangent line to curve of $\vec{x}$ vs. t plot
$\vec{a}$ = slope of $\vec{v}$ vs. t plot

Definition

$$\vec{v}_{av} = \frac{\Delta \vec{x}}{\Delta t} = \frac{\vec{x}_2 - \vec{x}_1}{t_2 - t_1}$$

$$v_{av} = \frac{\text{distance}}{\text{time}} = \frac{d}{\Delta t}$$



$$|\vec{A}| = A = \sqrt{A_x^2 + A_y^2}$$

$$\theta = \tan^{-1}\left(\frac{A_y}{A_x}\right)$$

Also,

$$\vec{A} = A_x\hat{i} + A_y j$$

To add a collection of vectors $\vec{A} + \vec{B} + \vec{C} + \ldots = \vec{R}$

1. $R_x = A_x + B_x + C_x + \ldots$
   $R_y = A_y + B_y + C_y + \ldots$
2. $\vec{R} = R_x\hat{i} + R_y\hat{j}$
   or
   $|\vec{R}| = R = \sqrt{R_x^2 + R_y^2}$ and
   $\theta = \tan^{-1}\left(\dfrac{R_y}{R_x}\right)$

Basic Equations for Motion with Constant Acceleration

x-equations

$$x = x_o + \left(\frac{v_x + v_{ox}}{2}\right)t$$

$$v_x = v_{ox} + a_x t$$

$$x = x_o + v_{ox}t + \frac{1}{2}a_x t^2$$

$$v_x^2 = v_{ox}^2 + 2a_x(x - x_o)$$

y-equations

$$y = y_o + \left(\frac{v_y + v_{oy}}{2} \right) t$$

$$v_y = v_{oy} + a_y t$$

$$y = y_o + v_{oy} t + \frac{1}{2} a_y t^2$$

$$v_y^2 = v_{oy}^2 + 2a_y (y - y_o)$$