

# Motion: Basic Equations

Substitution in the value of time

Information about two moments  
Change = change per second \* time  
Information about any moment

### Position

Coord. → init:  $(x_0, y_0)$   
          final:  $(x, y)$

Vect. → init:  $\vec{r}_0 = x_0 \vec{i} + y_0 \vec{j}$   
          final:  $\vec{r} = x \vec{i} + y \vec{j}$

Change in position →

### Displacement

Coord. →  $\Delta x = x - x_0$   
           $\Delta y = y - y_0$

Vect. →  $\Delta \vec{r} = (x - x_0) \vec{i} + (y - y_0) \vec{j}$   
           $\Delta \vec{r} = \Delta x \vec{i} + \Delta y \vec{j}$   
           $\Delta \vec{r} = \vec{r} - \vec{r}_0$

### Equation of position

Coord. →  $x = x_0 + \Delta x; x = x_0 + v_x * t$   
           $y = y_0 + \Delta y; y = y_0 + v_y * t$

Vect. →  $\vec{r} = \vec{r}_0 + \Delta \vec{r}$   
           $\vec{r} = (x_0 + v_x * t) \vec{i} + (y_0 + v_y * t) \vec{j}$

### Equation of displacement

Coord. →  $\Delta x = v_x * t$   
           $\Delta y = v_y * t$

Vect. →  $\Delta \vec{r} = v_x * t \vec{i} + v_y * t \vec{j}$