

### Answer on Question #44453, Physics, Mechanics | Kinematics | Dynamics

A particle projected from origin moves in x-y plane with a velocity  $\mathbf{v} = 3\mathbf{i} + 6\mathbf{j}$  where  $\mathbf{i}$  and  $\mathbf{j}$  are the unit vectors along x and y axis. Find the equation of path followed by the particle

**Solution:**

We have

$$\mathbf{v}(t) = 3\mathbf{i} + 6\mathbf{j}$$

Integrating will give us the equation of path

$$\mathbf{r}(t) = \int \mathbf{v}(t) dt = \int (3\mathbf{i} + 6\mathbf{j}) dt = 3t\mathbf{i} + 6t\mathbf{j} + \mathbf{c}$$

where  $\mathbf{c}$  is an arbitrary constant vector. Since the initial location is in origin.

This gives us  $0 = \mathbf{r}(0) = \mathbf{c}$ .

Thus,

$$\mathbf{r}(t) = (3\mathbf{i} + 6\mathbf{j})t$$

**Answer:**  $\mathbf{r}(t) = (3\mathbf{i} + 6\mathbf{j})t$