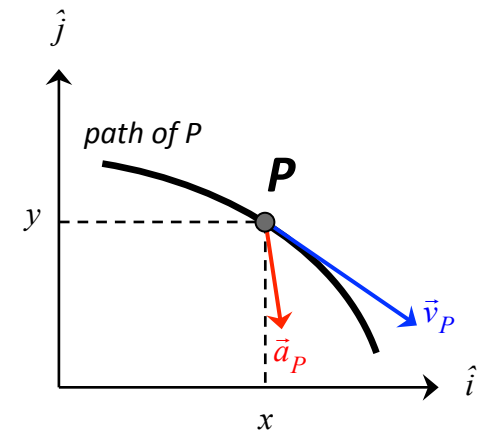# *Summary*: Particle Kinematics – Cartesian Description

1. *PROBLEM*: Motion of a point is described in Cartesian *xy*-coordinates.

2. *FUNDAMENTAL EQUATIONS*:

$$\vec{v}_P = \dot{x}\hat{i} + \dot{y}\hat{j} = velocity \ of \ P$$

$$\vec{a}_P = \ddot{x}\hat{i} + \ddot{y}\hat{j} = acceleration \ of \ P$$

with $\dot{x} = \dfrac{dx}{dt}$, etc.

3. *CHAIN RULE OF DIFFERENTIATION*: Suppose that *y* is given in terms of *x* (instead of time *t*) – how do you find $\dot{y} = dy \, / \, dt$??

The chain rule!! $\dot{y} = \dfrac{dy}{dt} = \dfrac{dy}{dx}\dfrac{dx}{dt} = \dot{x}\dfrac{dy}{dx}$ (⬅ remember this!)

4. *COMMENT*: The Cartesian description is easy to use, but not as useful as other descriptions. More later…