$$[x]_{x_0}^{x} = \int_0^t v_0 .dt + \int_0^t at .dt$$

OR
$$x - x_0 = v_0 [t]_0^t + a\left[\frac{t^2}{2}\right]_0^t$$

OR
$$x - x_0 = v_0 (t - 0) + a(\frac{t^2}{2} - 0)$$

$$\mathbf{x - x_0 = v_0\, t + (1/2)\, at^2}$$

(iii) $V^2 = u^2 + 2aS$ or $V^2 = v_0^{\,2} + 2a\,(x - x_0)$

By definition

$$a = \frac{dv}{dt} \quad Or \quad a = \frac{dv}{dx}.\frac{dx}{dt}$$

$$Or \quad a = v.\frac{dv}{dx} \quad Or \quad v.dv = a.dx$$

Integrating both sides $\int_{V_0}^{V} v.dv = \int_{x_0}^{x} a.dx$

$$\left[\frac{v^2}{2}\right]_{V_0}^{V} = a\int_{x_0}^{x} dx \quad \text{OR} \quad \frac{v^2}{2} - \frac{v_0^2}{2} = a[x]_{x_0}^{x}$$

$$\frac{1}{2}(v^2 - v_0^2) = a(x - x_0)$$

$$Or \quad v^2 - v_0^2 = 2a(x - x_0)$$

$$Or \quad v^2 = v_0^2 + 2a(x - x_0)$$