1 | Given

2 | Derive the kinematic equations for constant acceleration

$$v = \int adt = at + C_v$$
$$x = \int vdt = \int (at + C_v)dt = \frac{1}{2}at^2 + C_vt + C_x$$

Letting $x_0 = C_x$ and $v_0 = C_v$,

$$x = x_0 + v_0 t + \frac{1}{2} a_0 t^2$$