

$$\frac{dx}{dt} = x^2 t^3 + xt \quad \text{for } t > 0$$

$$x(0) = ?$$

insufficient condition / information

532:

$$\frac{dy}{dx} = (\sin 3x) y^{1/3}$$

$$\frac{dy}{y^{1/3}} = dx \cdot \sin 3x$$

$$y^{-1/3} \cdot dy = \sin 3x \cdot dx$$

$$\left[\frac{y^{-1/3+1}}{-1/3+1} \right] = -\cos 3x + C_1$$

$$\frac{y^{2/3}}{2/3} = -\cos 3x + C_1$$

$$\text{at } y(0) = 0$$

$$0 = 0 + C_1 \Rightarrow \boxed{C_1 = 0}$$

$$\frac{y^{2/3}}{2/3} = -\cos 3x + 0$$

$$\left[\frac{(y)^{2/3}}{(2/3)} \right]^3 = (-\cos 3x)^3$$

$$y^2 = \frac{8}{27} \cos^3 3x \Rightarrow$$

$$\boxed{y = \sqrt{\frac{8}{27}} (\cos^3 3x)^{1/2}}$$