

$$y' = e^{-3x}, \quad y(0) = 0$$

Integrate:

$$\begin{aligned} y &= \int e^{-3x} dx = -\frac{1}{3} \int -3e^{-3x} dx \\ &= -\frac{1}{3} e^{-3x} + C \end{aligned}$$

Apply initial value:

$$y(0) = -\frac{1}{3} e^{-3(0)} + C = 0$$

$$-\frac{1}{3} + C = 0$$

$$C = \frac{1}{3}$$

so,

$$y = -\frac{1}{3} e^{-3x} + \frac{1}{3}$$