6-4 Soln)

$$I(t) = \frac{\mathcal{E}_B}{R}\left(1 - e^{-\frac{tR}{L}}\right) = \frac{\mathcal{E}_B}{R} - \frac{\mathcal{E}_B}{R}\, e^{-\frac{tR}{L}},$$

$$\frac{dI(t)}{dt} = 0 - \frac{\mathcal{E}_B}{R}\left(-\frac{R}{L}\right)e^{-\frac{tR}{L}} = \frac{\mathcal{E}_B}{L}\, e^{-\frac{tR}{L}}.$$

Now, substitute:

$$L\frac{dI}{dt} + RI = \mathcal{E}_B \ ,$$

$$L\left(\frac{\mathcal{E}_B}{L}\, e^{-\frac{tR}{L}}\right) + R\left(\frac{\mathcal{E}_B}{R} - \frac{\mathcal{E}_B}{R}\, e^{-\frac{tR}{L}}\right) = \mathcal{E}_B \ ,$$

$$\mathcal{E}_B e^{-\frac{tR}{L}} + \mathcal{E}_B - \mathcal{E}_B e^{-\frac{tR}{L}} = \mathcal{E}_B \ ,$$

$$\mathcal{E}_B = \mathcal{E}_B \ ,$$

$$1 = 1$$