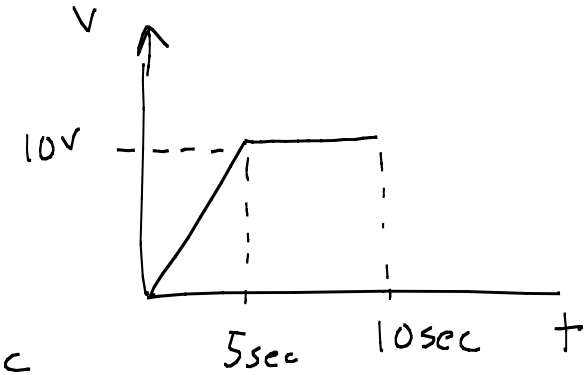
Problem 2



100mH Inductor

$i(0) = 0$

Determine: The current @ $t = 10\text{sec}$

$$i(t) = \frac{1}{L}\int_{t_0}^{t} v(t)\,dt + i(t_0)$$

$0 \leq t \leq 5$ sec

$$i_1(t) = \frac{1}{0.1\text{H}}\int_{0}^{t} v_1(t)\,dt + i(0)$$

$i(0) = 0$

$v_1(t) = 2t$

$$i_1(t) = 10\int_{0}^{t} 2t\,dt + 0$$

$$\boxed{i_1(t) = 10t^2}$$

$5 \le t \le 10\,\text{sec}$

$$i_2(t) = \frac{1}{L}\int_5^t v_2(t)\,dt + i(5)$$

$$i_2(t) = \frac{1}{0.1}\int_5^t 10\,dt + 250$$

$$i_2(t) = 10\,(10t - 50) + 250$$

$$\boxed{i_2(t) = 100t - 250}$$

@ $t = 10\,\text{sec}$

$$i_2(10) = 100(10) - 250$$

$$\boxed{i_2(10) = 750\,\text{A}}$$

$$i_1(5) = 10(5)^2 = 250\,\text{A}$$

$$v_2(t) = 10$$