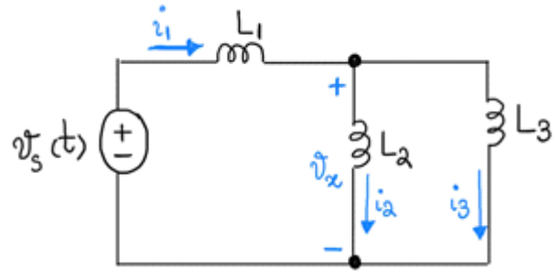
Exercise 8, Question 1

Three inductors are connected to a voltage source. Given the following, compute $i_1(t), v_x(t)$ for ≥ 0. Also, find the energy stored in inductor L_1 at $t = 0$ and $t = \infty$.

$v_s(t) = 10\ e^{-5t}$ V, for $t \geq 0$

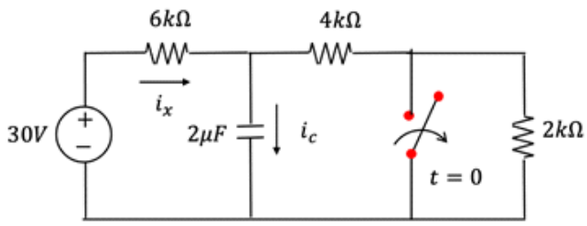
$L_1 = 0.8$ H, $i_1(0) = -6$ A
$L_2 = 2$ H, $i_2(0) = -10$ A
$L_3 = 3$ H, $i_3(0) = 4$ A



Exercise 8, Question 2a

The switch was closed for long time. At $t = 0$, the switch is open.

- Complete the table below by finding $i_c \; and \; i_x$ at the shown times.
- Find τ the circuit time constant for $t \geq 0^+$
- Sketch the variation of $v_c(t)$, showing the initial value, the final value, and the duration of the transient.



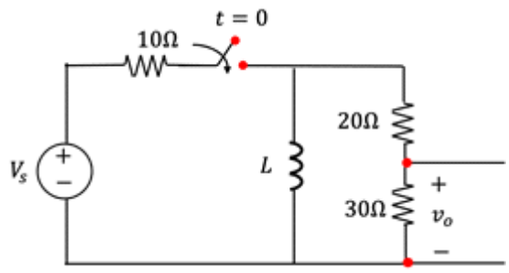
	i_c	i_x
$t = 0^+$		
$t = \infty$		

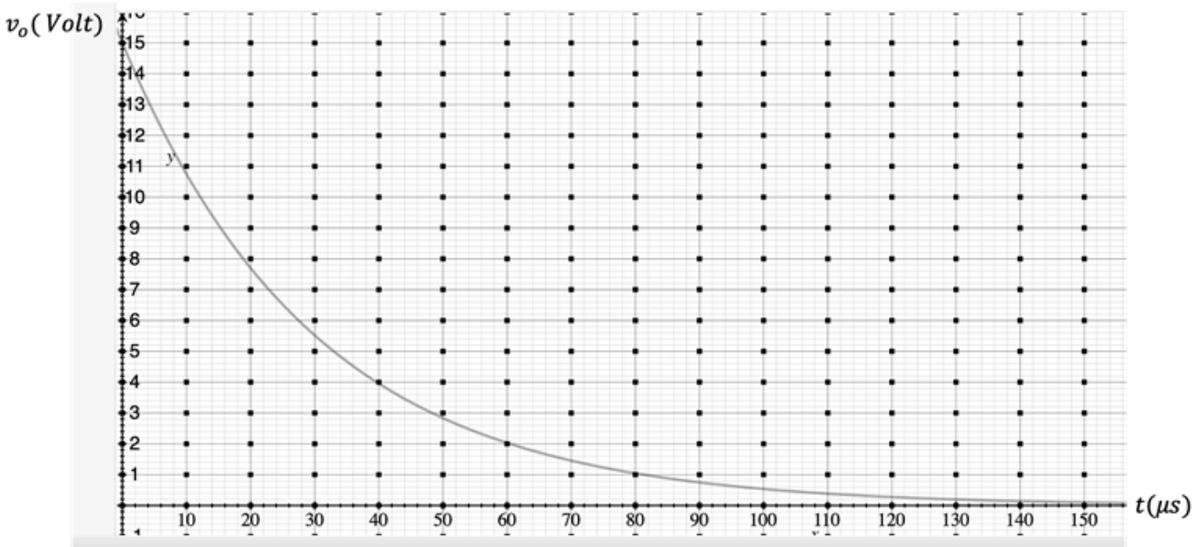
Exercise 8, Question 2b

The switch was open for a long time. At $t = 0$, the switch is closed
The variation of $v_o(t)$ for $t \geq 0^+$ is as shown,

- Find the value the inductance L
- Find the value of the voltage source V_s

Hint:
You may assume that the signal reaches its final value after a time approximately equal 5τ





Exercise 8, Question 3

3. In the above circuit, the switch closes at t = 0 after being opened for a long time. Determine the mathematical expression for $v_C(t)$ for > 0.

HINT: In steady-state analysis, determine I_x and make good use of this finding.