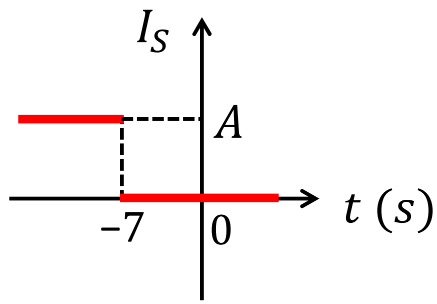
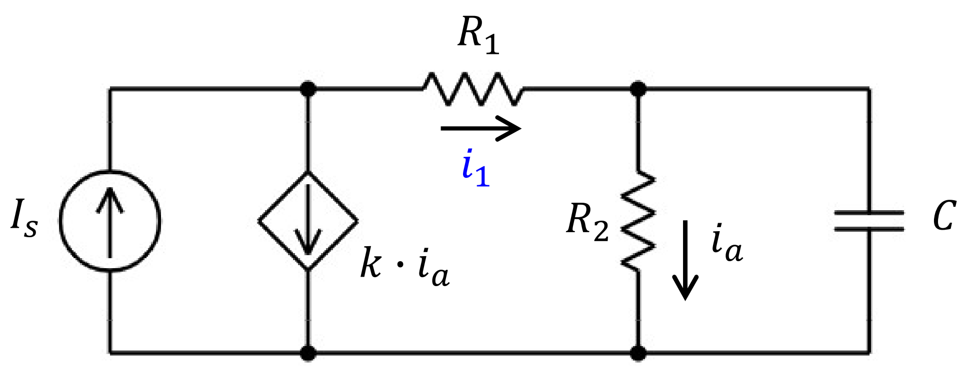
The current source I_s changes from *A* to 0 at *t* = -7 s, as shown on the right. For *t* < -7 s, you may assume the system has reached steady state.



(a) Find $i_1(-7^- s)$. (Note: we are asking for i_1, not i_a)

(b) Find $i_1(t)$ for *t* > -7 s. Write the equation.

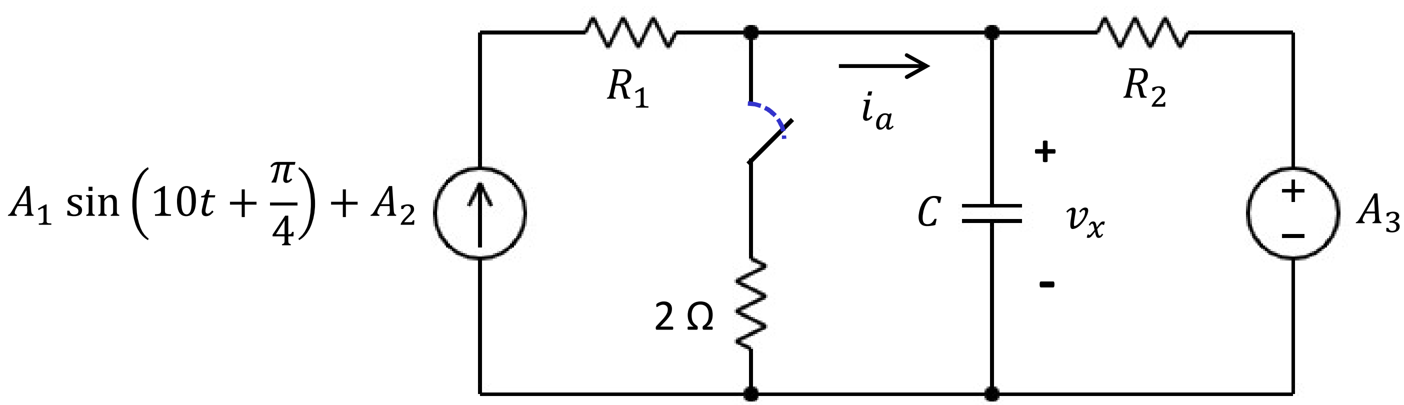
R1:	2 Ω
R2:	3 Ω
A:	6 A
k:	2 A/A
C:	2 nF



For $t < \frac{\pi}{40}$ s, the switch is open and you may assume the system has reached steady state. The switch closes at $t = \frac{\pi}{40}$ s and remains closed.

(a) Find $v_x\left(\frac{\pi}{40}^{-}\ \mathrm{s}\right)$ (i.e., just before the switch closes)

(b) Find $i_a\left(\frac{\pi}{40}^{+}\ \mathrm{s}\right)$ (i.e., right after the switch closes)



R1:	1 Ω
R2:	2 Ω
C:	50 mF
A1:	2 A
A2:	2 A
A3:	1 V

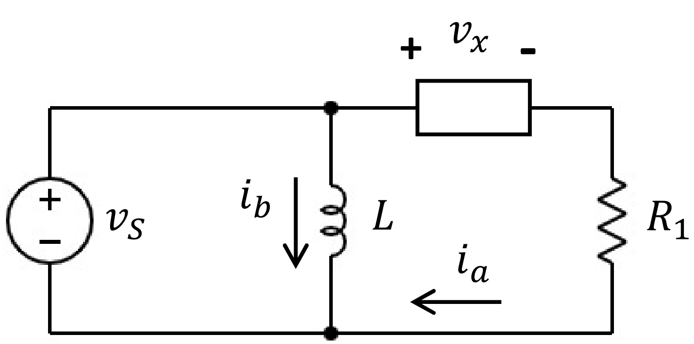
The AC circuit below has ω = 10 rad/s and is in steady state. The phasor diagram shows the phasors of v_x and i_a. You are given the angle α and $|\mathbf{V}_x|$. The element represented by the rectangular box is either an inductor or a capacitor but you are not told which.

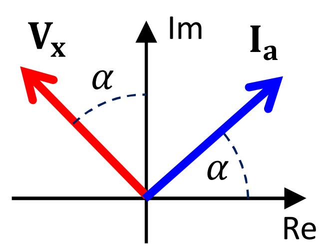
You are also told this piece of information: $v_S = A\ sin(\omega t)$ with some unknown value of *A* (positive or negative).

(a) At what time t_0 does the waveform of v_x reach its maximum value? (if there are multiple such times, giving one of them is sufficient).

(b) What is the mystery element (capacitor or inductor) and <u>why</u>?

(c) What is the value of i_b at time *T*/8 (with *T* the period)?





|Vx|:	3 V
alpha:	60 degrees
R1:	3 Ω
L:	2 H