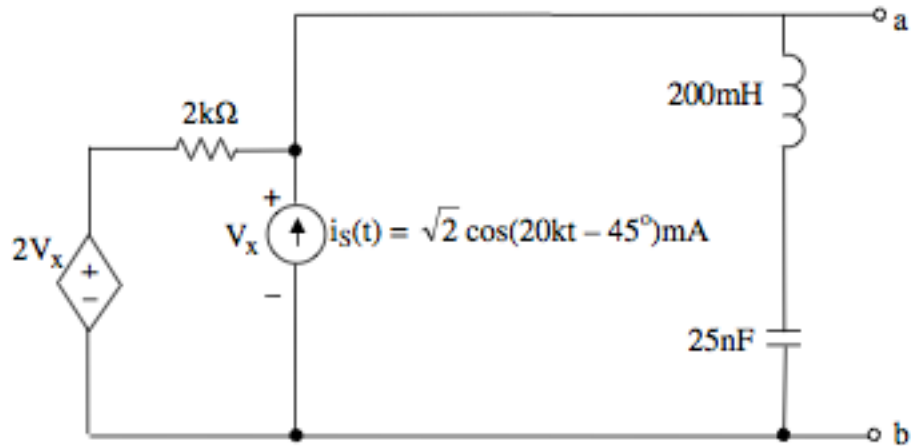
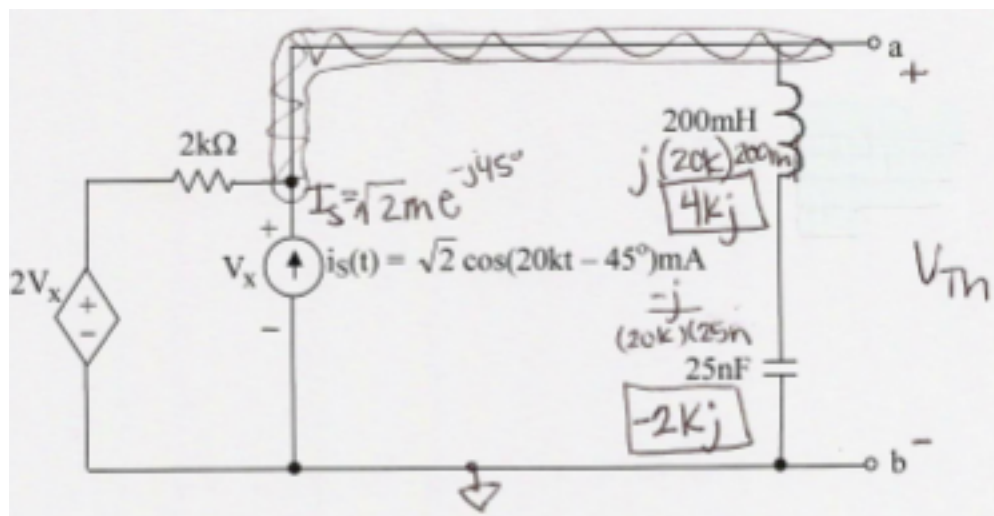


Ex:



- Draw a frequency-domain equivalent of the above circuit. Show a numerical phasor value for  $i_s(t)$ , and show numerical impedance values for  $R$ ,  $L$ , and  $C$ . Label the dependent source appropriately.
- Find the Thevenin equivalent (in the frequency domain) for the above circuit. Give the numerical phasor value for  $V_{Th}$  and the numerical value for the impedance value of  $z_{Th}$ .

SOL'N: a)



b)

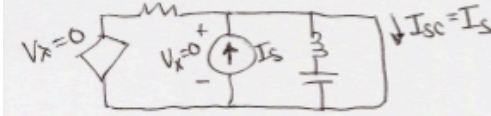
① Find  $V_{Th}$ :  
 $V_{Th} = V_x$   
 Using node-voltage:  

$$\frac{V_{Th} - 2V_{Th}}{2k} + \frac{V_{Th}}{(4kj - 2kj)} - \sqrt{2}me^{-j45^\circ} = 0$$

$$V_{Th} \left( \frac{j}{2kj} - \frac{2j}{2kj} + \frac{1}{2kj} \right) = \sqrt{2}me^{-j45^\circ}$$

$$V_{Th} \left( \frac{1-j}{2kj} \right) = \frac{\sqrt{2}me^{-j45^\circ} \cdot (2ke^{j90^\circ})}{(1-j)} = \frac{\sqrt{2}m(2k)e^{j45^\circ}}{\sqrt{2}e^{-j45^\circ}}$$

$$V_{Th} = 2e^{j90^\circ}$$

② Find  $Z_{Th}$ :  


$$Z_{Th} = \frac{V_{Th}}{I_{sc}} = \frac{2e^{j90^\circ}}{\sqrt{2}me^{-j45^\circ}}$$

$$Z_{Th} = \frac{2kj^{135^\circ}}{\sqrt{2}e}$$

$$V_{Th} = 2e^{j90^\circ} \text{ V}$$

$$z_{Th} = \frac{2k\Omega}{\sqrt{2}} e^{j135^\circ}$$