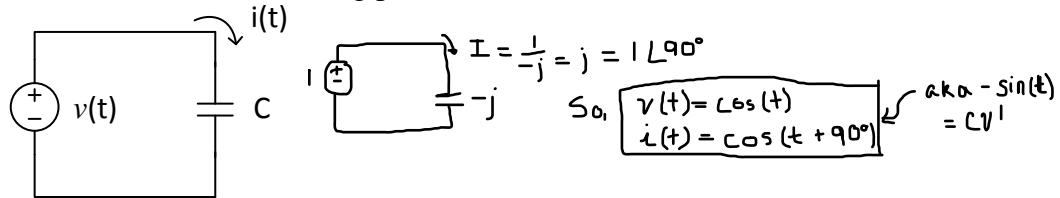
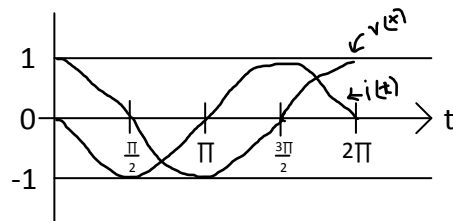


1. Can you have a circuit in which no current flows when the voltage is maximum, and no voltage pressure when current is maximum?

a) Consider this circuit. Using phasors, solve for  $i(t)$  when  $v(t) = \cos(t)$  and  $C = 1F$

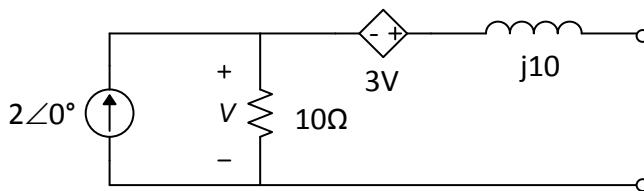


b) Now plot  $i(t)$  and  $v(t)$  below. Where is  $v(t)$  max?  $i(t)$  max?



Whenever  $i(t)$  at maximum,  $v(t) = 0$   
 and vice-versa!

2. Find the Thevenin equivalent of the circuit below:



① Find  $V_{oc}$  : Open ckt  $\Rightarrow$  all current flows in left loop  
 $\Rightarrow \mathcal{I} = 10 \cdot 2 = 20$   
 $\Rightarrow$    
 $\Rightarrow$  By KVL right loop  $V_{oc} = 80V$

② Find  $I_{sc}$ . Many ways to do this.  
 Source transform left (note  $V$  remains outside transform)  
  
 KVL little left loop:  $-20 + 10I_{sc} + V = 0 \Rightarrow V = 20 - 10I_{sc}$   
 KVL big loop:  $-20 + 10I_{sc} - 3(20 - I_{sc}) + j10I_{sc} = 0$   
 $I_{sc}(40 + j10) = 80$   
 $= I_{sc} = \frac{80}{40 + j10}$

③ Find  $R_{eq} = \frac{V_{oc}}{I_{sc}} = \frac{80}{80/(40 + j10)} = 40 + j10 \quad (= 41.2 \angle 14.0^\circ \Omega)$

