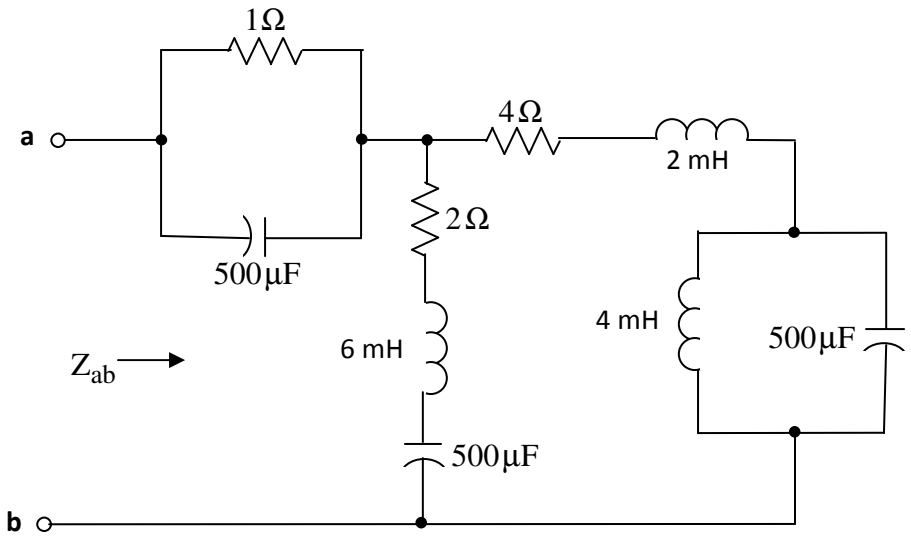
1. Plot each of the following complex numbers as vector in the complex plane:
   a. (3-3j)
   b. $e^{j\pi/4}$
   c. $\frac{1+j}{2}-\frac{1-j}{4}$
   d. $\frac{1}{j^3}$
   e. $\frac{1-j}{-1+j}$

2. Give numerical answers to each of the following questions:
   a. Rationalize $\frac{-80-j60}{28-j96}$. Express your answer in rectangular form.
   b. Find the polar form of $(1+j)^*\left(\sqrt{1+\frac{\sqrt{3}}{2}}-j\sqrt{1-\frac{\sqrt{3}}{2}}\right)^*$ (Note: The asterisk means conjugate.)
   c. Find the following phasor: $\mathrm{P}\left[3\sin(25kt-120^o)\right]$.
   d. Find the magnitude of $\frac{(1-j7)2e^{-j10^o}}{1-e^{j90^o}}$.
   e. Find the imaginary part of $\frac{1+j\sqrt{3}}{e^{-j30^o}}$.

3. a. Write phasors (as both $Ae^{j\phi}$ and $A\angle\phi$) for each of the following signals:
      i. v(t)=9cos(2kt+30°)V
      ii. i(t)=2sin(ωt+10°)mA
      iii. v(t)=cos(5t+30°)V+5sin(5t-30°)V

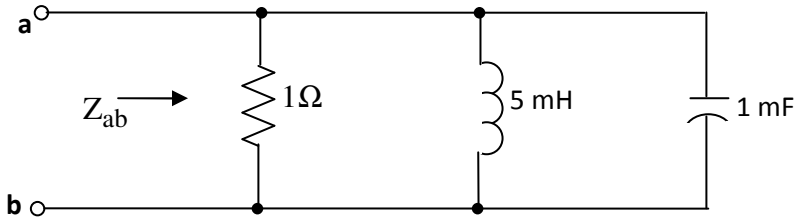
   b. Given w=3krad/sec, write inverse phasors for each of the following signals:
      i. **I**= $34e^{j20^o}$ A
      ii. **V**= $-j^3$ V
      iii. **I**= $3e^{+\pi-j20^o}$ A

4.



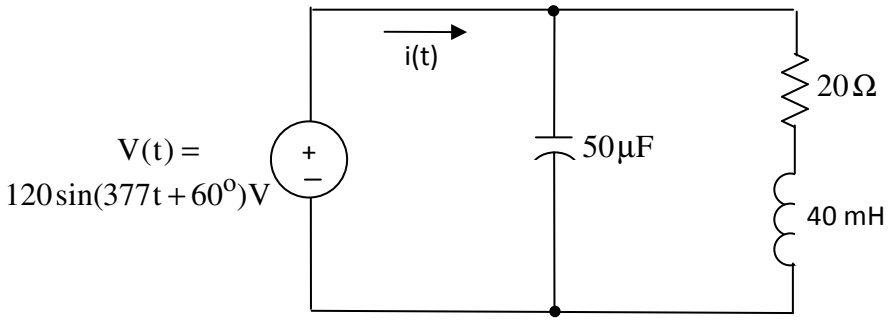
Given $\omega = 1\text{k}$ rad/sec, find Z_{ab}.

5.



Given $\omega = 447$ rad/sec, find Z_{ab}.

6.

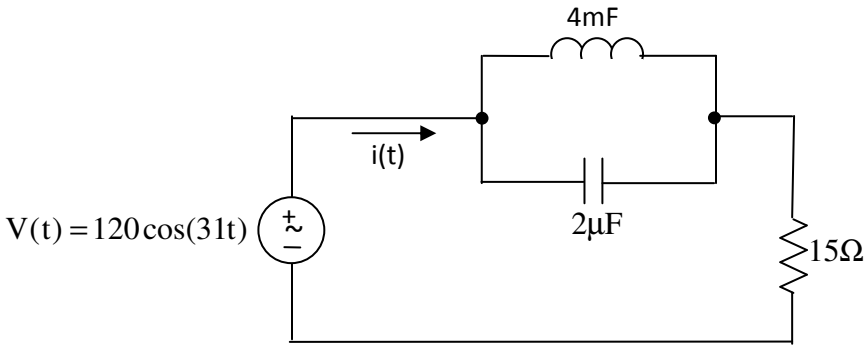


a. Find the phasor value for V(t).

b. Draw the frequency-domain circuit diagram, including the phasor value for V(t) and the impedance values for components.

7. Find the phasor value for i(t) from the circuit in Problem 6.

8.

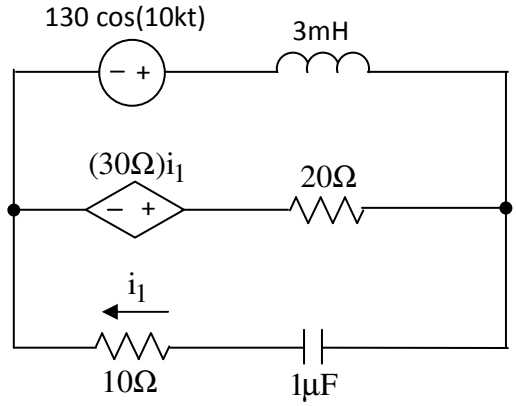


a. Find the phasor value for V(t).

b. Draw the frequency-domain circuit diagram, including the phasor value for V(t) and the impedance values for components.

9. Find the phasor value for i(t) for the circuit in Problem 8.

10.



Find $i_1(t)$.