

1. Plot each of the following complex numbers as vector in the complex plane:

a. $(-20-5j)$

b. $34e^{j45^\circ}$

c. $\frac{2+3j}{6} - \frac{3-2j}{4}$

d. $\frac{16}{4j^3}$

e. $\frac{-1+3j}{-5-4j}$

2. Give numerical answers to each of the following questions:

a. Rationalize $\frac{-10k \cdot (j2k)}{2k - j10k}$. Express your answer in rectangular form.

b. Find the polar form of $\left(\frac{5e^{j45^\circ}}{4+4j}\right)^* (30k - j10k)^*$ (Note: The asterisk means conjugate.)

c. Find the following phasor: $P[3\sin(3kt + 75^\circ)]$.

d. Find the magnitude of $\frac{(3-2j)2e^{-j60^\circ}}{2+j+4e^{j45^\circ}}$.

e. Find the imaginary part of $\frac{1-5j}{e^{-j60^\circ}(j1k+1k)}$.

3. a. Write phasors (as both $Ae^{j\phi}$ and $A\angle\phi$) for each of the following signals:

i. $v(t)=4\cos(5kt+60^\circ)V$

ii. $i(t)=16\sin(\omega t-123^\circ)mA$

iii. $v(t)=\cos(10t+60^\circ)V+5\sin(10t-30^\circ)V$

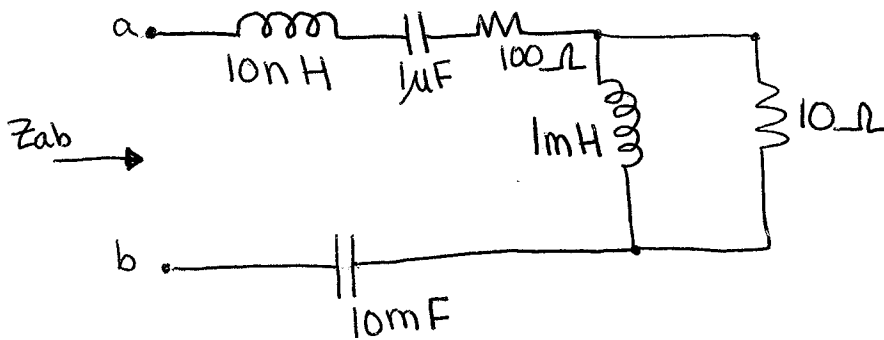
b. Given $\omega=3\text{krad/sec}$, write inverse phasors for each of the following signals:

i. $\mathbf{I}=76.8e^{j15^\circ} \text{ A}$

ii. $\mathbf{V}=-8j^2 \text{ V}$

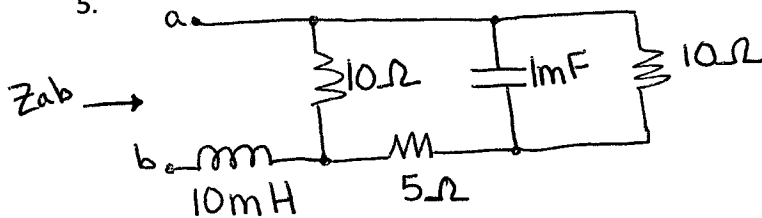
iii. $\mathbf{I}=5e^{+\frac{\pi}{2}-j30^\circ} \text{ A}$

4.



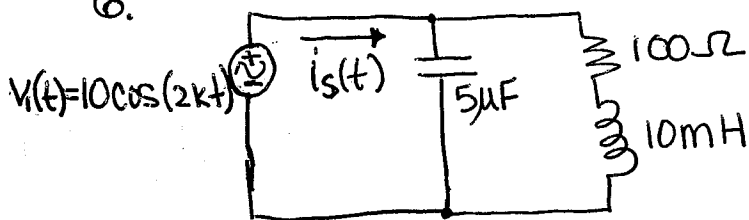
Given $\omega = 5\text{k rad/sec}$, find Z_{ab} .

5.



Given $\omega = 100\text{ rad/sec}$, find Z_{ab} .

6.

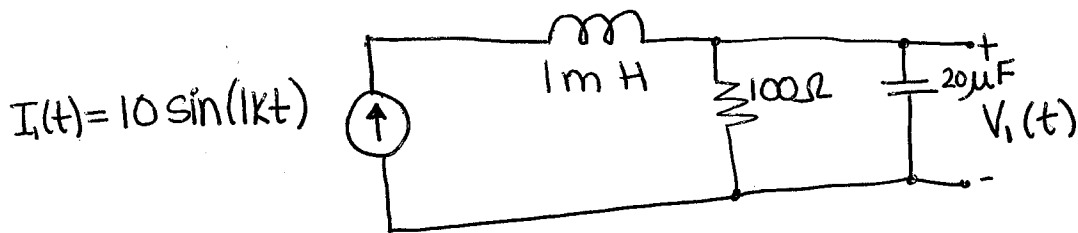


a. Find the phasor value for $V_i(t)$

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

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

8.



- Find the phasor value for $I_1(t)$.
- Draw the frequency-domain circuit diagram, including the phasor value for $I_1(t)$ and the impedance values for components.

9. Find the phasor value for $V_1(t)$ for the circuit in Problem 8.10. Determine I_c for the following circuit. Write the answer in phasor form. (Note: $\omega = 2k$)