Find $i$ and $V_o$ in the circuit of Fig. 2.100.

![Figure 2.100](image)

For Prob. 2.36.

Given the circuit in Fig. 2.101 and that the resistance, $R_{eq}$, looking into the circuit from the left is equal to 100 $\Omega$, determine the value of $R_1$.

![Figure 2.101](image)

For Prob. 2.37.

Find $R_{eq}$ and $i_o$ in the circuit of Fig. 2.102.

![Figure 2.102](image)

For Prob. 2.38.
9.13

Evaluate the following complex numbers:

- (a) \[
\frac{2 + j3}{1 - j6} + \frac{7 - j8}{-5 + j11}
\]

- Answer

- (b) \[
\frac{(5/10^\circ)(10/-40^\circ)}{(4/-80^\circ)(-6/50^\circ)}
\]

- Answer

- (c) \[
\begin{vmatrix}
2 + j3 & -j2 \\
-j2 & 8 - j5
\end{vmatrix}
\]

- Answer

9.14

Simplify the following expressions:

- (a) \[
\frac{(5 - j6) - (2 + j8)}{(-3 + j4)(5 - j) + (4 - j6)}
\]

- (b) \[
\frac{(240/75^\circ + 160/-30^\circ)(60 - j80)}{(67 + j84)(20/32^\circ)}
\]

- (c) \[
\left(\frac{10 + j20}{3 + j4}\right)^2 \sqrt{(10 + j5)(16 - j20)}
\]

9.15

Evaluate these determinants:

- (a) \[
\begin{vmatrix}
10 + j6 & 2 - j3 \\
-5 & -1 + j
\end{vmatrix}
\]
Find current $I_o$ in the network of Fig. 9.52.

Figure 9.52
For Prob. 9.45.

Answer

If $v_s = 100 \sin(10t + 18^\circ)$ V in the circuit of Fig. 9.53, find $i_o$.

Figure 9.53
For Prob. 9.46.

In the circuit of Fig. 9.54, determine the value of $i_s(t)$.

Figure 9.54
For Prob. 9.47.

Answer

Given that $v_x(t) = 20 \sin(100t - 40^\circ)$ in Fig. 9.55, determine $i_x(t)$.
9.49

Find \( v_s(t) \) in the circuit of Fig. 9.56 if the current \( i_x \) through the 1-Ω resistor is \( 8 \sin 200t \) A.

\[\text{Figure 9.56 For Prob. 9.49.}\]

9.50

Determine \( v_x \) in the circuit of Fig. 9.57. Let \( i_s(t) = 5 \cos(100t + 40^\circ) \) A.

\[\text{Figure 9.57 For Prob. 9.50.}\]

9.51

If the voltage \( v_o \) across the 2-Ω resistor in the circuit of Fig. 9.58 is \( 90 \cos 2t \) V, obtain \( i_s \).

\[\text{Figure 9.58 For Prob. 9.51.}\]

9.52

If \( V_o = 8/30^\circ \) V in the circuit of Fig. 9.59, find \( I_s \).
10.13 Determine $V_x$ in the circuit of Fig. 10.62 using any method of your choice.

Answer

10.14 Calculate the voltage at nodes 1 and 2 in the circuit of Fig. 10.63 using nodal analysis.

10.15 Solve for the current $I$ in the circuit of Fig. 10.64 using nodal analysis.
Use nodal analysis to find \( V_x \) in the circuit shown in Fig. 10.65.

By nodal analysis, obtain current \( I_o \) in the circuit of Fig. 10.66.

Use nodal analysis to obtain \( V_o \) in the circuit of Fig. 10.67 below.
10.33

Compute $I$ in Prob. 10.15 using mesh analysis.

Answer

10.34

Use mesh analysis to find $I_o$ in Fig. 10.28 (for Example 10.10).

10.35

Calculate $I_o$ in Fig. 10.30 (for Practice Prob. 10.10) using mesh analysis.

Answer

10.36

Compute $V_o$ in the circuit of Fig. 10.81 using mesh analysis.

10.37

Use mesh analysis to find currents $I_1$, $I_2$, and $I_3$ in the circuit of Fig. 10.82.