Phasor

Practice Problem 10.1

Using nodal analysis, find v_1 and v_2 in the circuit of Fig. 10.3.

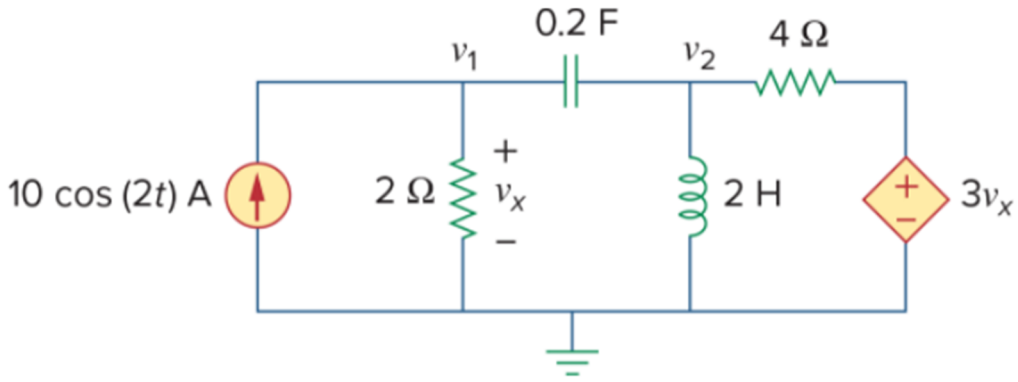

Figure 10.3
For Practice Prob. 10.1.

Answer: $v_1(t) = 11.325\cos(2t + 60.01°)$ V, $v_2(t) = 33.02\cos(2t + 57.12°)$ V.

Practice Problem 10.2

Calculate $\mathbf{V}_1$ and $\mathbf{V}_2$ in the circuit shown in Fig. 10.6.

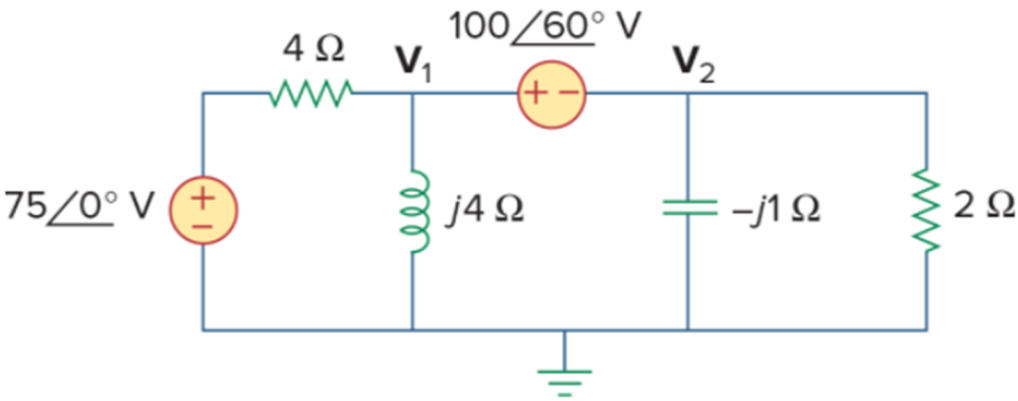

Figure 10.6
For Practice Prob. 10.2.

Answer: $\mathbf{V}_1 = 96.8\angle 69.66°$ V, $\mathbf{V}_2 = 16.88\angle 165.72°$ V.

Practice Problem 10.3

Find $\mathbf{I}_o$ in Fig. 10.8 using mesh analysis.

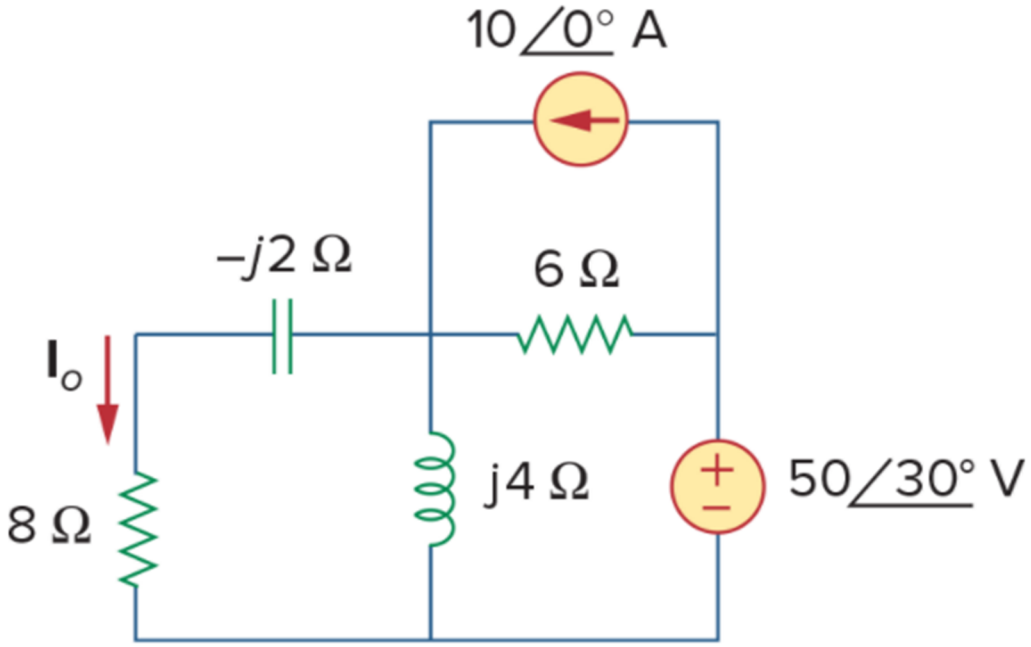

Figure 10.8
For Practice Prob. 10.3.

Answer: $5.969\angle 65.45°$ A.

Practice Problem 10.5

Find current $\mathbf{I}_o$ in the circuit of Fig. 10.8 using the superposition theorem.

Answer: $5.97\angle 65.45°$ A.

Practice Problem 10.6

Calculate v_o in the circuit of Fig. 10.15 using the superposition theorem.

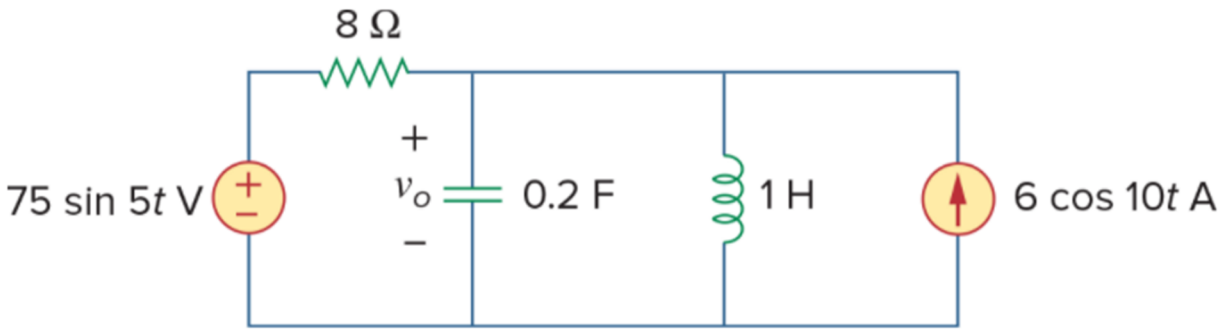

Figure 10.15
For Practice Prob. 10.6.

Answer: $11.577\ \sin(5t - 81.12°) + 3.154\ \cos(10t - 86.24°)$ V.

Practice Problem 10.7

Find $\mathbf{I}_o$ in the circuit of Fig. 10.19 using the concept of source transformation.

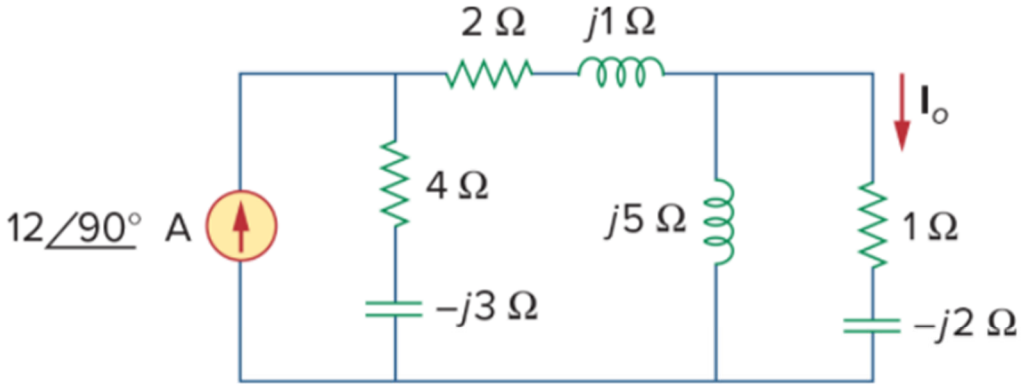

Figure 10.19
For Practice Prob. 10.7.

Answer: $9.863\angle 99.46°$ A.

Practice Problem 10.8

Find the Thevenin equivalent at terminals *a-b* of the circuit in Fig. 10.24.

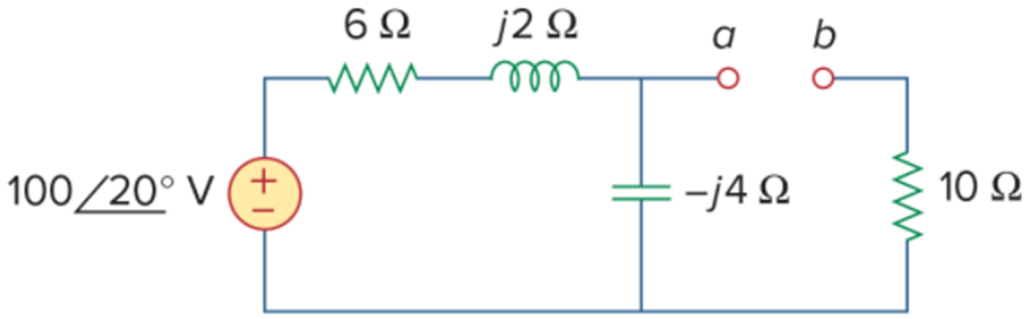

Figure 10.24
For Practice Prob. 10.8.

Answer: $\mathbf{Z}_{\text{Th}} = 12.4 - j3.2\ \Omega, \mathbf{V}_{\text{Th}} = 63.24\angle -51.57^\circ$ V.

Practice Problem 10.9

Determine the Thevenin equivalent of the circuit in Fig. 10.27 as seen from the terminals *a-b*.

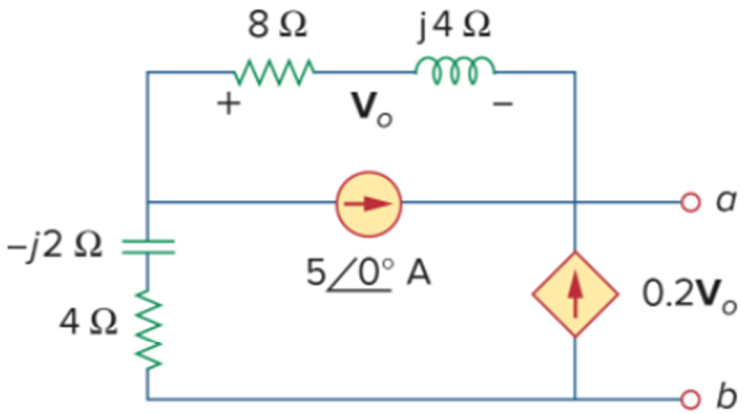

Figure 10.27
For Practice Prob. 10.9.

Answer: $\mathbf{Z}_{\text{Th}} = 4.473\angle -7.64^\circ\ \Omega, \mathbf{V}_{\text{Th}} = 7.35\angle 72.9^\circ$ volts.

Practice Problem 10.10

Determine the Norton equivalent of the circuit in Fig. 10.30 as seen from terminals *a-b*. Use the equivalent to find $\mathbf{I}_o$.

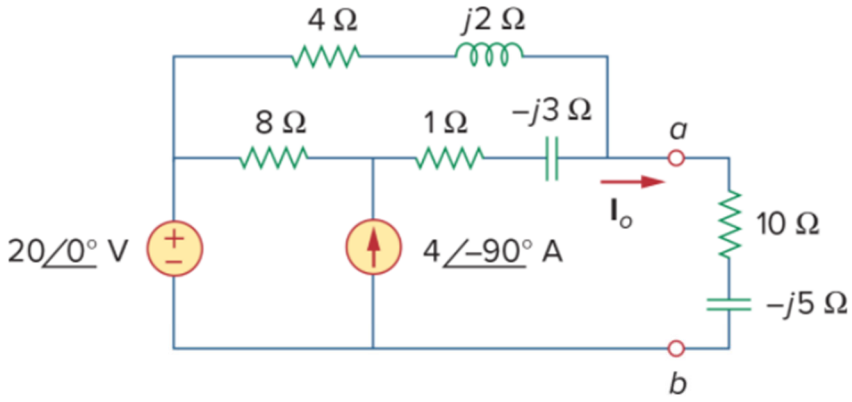

Figure 10.30
For Practice Prob. 10.10 and Prob. 10.35.

Answer: $\mathbf{Z}_N = 3.176 + j0.706\ \Omega, \mathbf{I}_N = 8.396\angle -32.68°$ A, $\mathbf{I}_o = 1.9714\angle -2.10°$ A.

RMS

Practice Problem 11.7

Find the rms value of the current waveform of Fig. 11.15. If the current flows through a 9-Ω resistor, calculate the average power absorbed by the resistor.

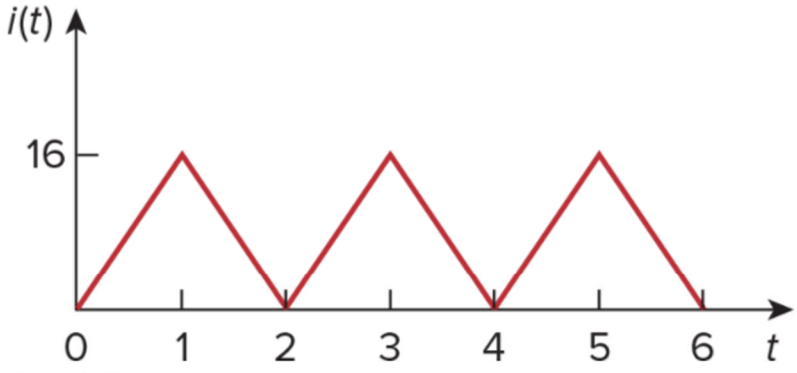

Figure 11.15
For Practice Prob. 11.7.

Answer: 9.238 A, 768 W.

Practice Problem 11.8

Find the rms value of the full-wave rectified sine wave in Fig. 11.17. Calculate the average power dissipated in a 6-Ω resistor.

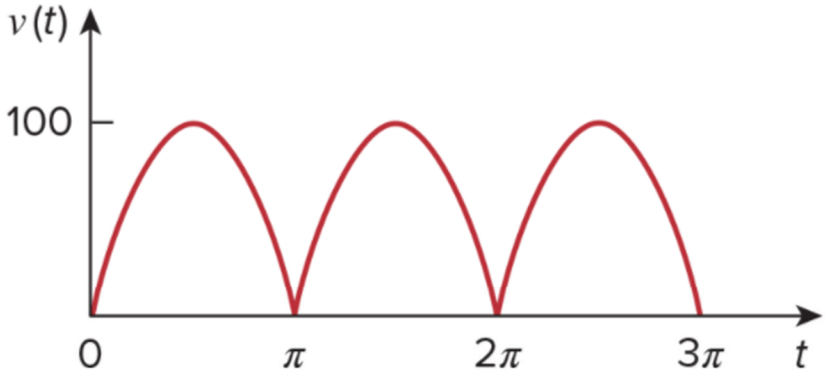

Figure 11.17
For Practice Prob. 11.8.

Answer: 70.71 V, 833.3 W.