C4 Problems

Practice Problem 4.1

For the circuit in Fig. 4.3, find v_o when $i_s = 30$ and $i_s = 45$ A.

Answer: 40 V, 60 V.

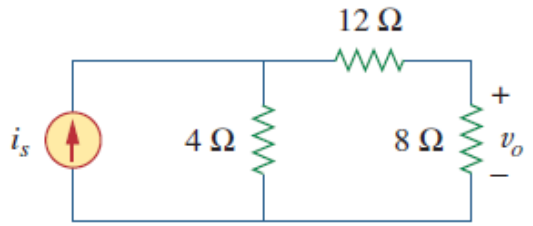

Figure 4.3
For Practice Prob. 4.1.

Practice Problem 4.2

Assume that $V_o = 1$ V and use linearity to calculate the actual value of V_o in the circuit of Fig. 4.5.

Answer: 16 V.

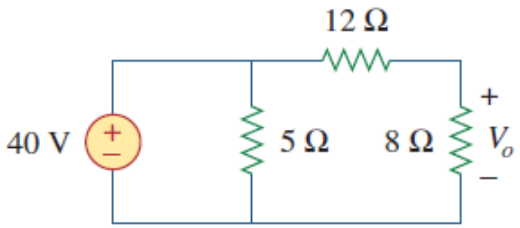

Figure 4.5
For Practice Prob. 4.2.

Practice Problem 4.3

Using the superposition theorem, find v_o in the circuit of Fig. 4.8.

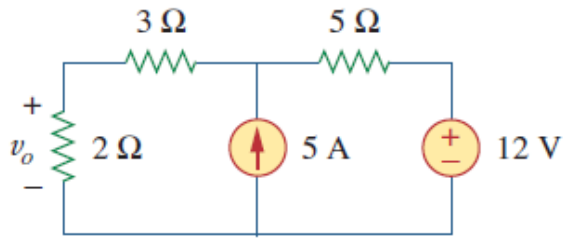

Figure 4.8
For Practice Prob. 4.3.

Answer: 7.4 V.

Practice Problem 4.5

Find I in the circuit of Fig. 4.14 using the superposition principle.

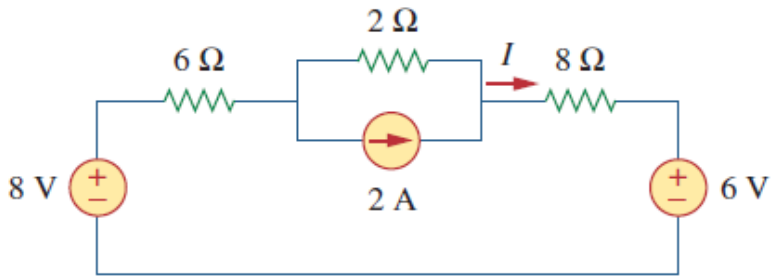

Figure 4.14
For Practice Prob. 4.5.

Answer: 375 mA.

Practice Problem 4.6

Find i_o in the circuit of Fig. 4.19 using source transformation.

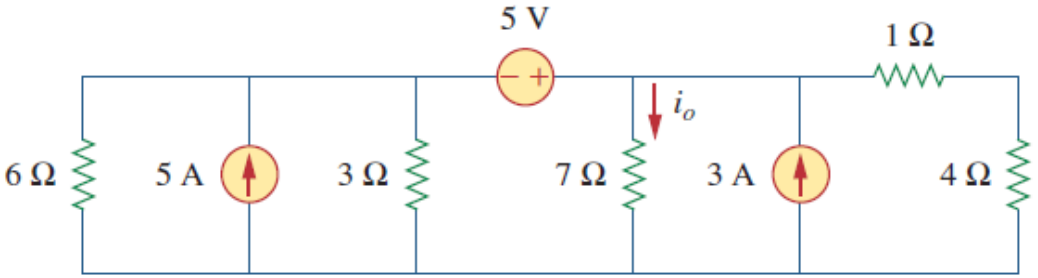

Figure 4.19
For Practice Prob. 4.6.

Answer: 1.78 A.

Practice Problem 4.8

Using Thevenin's theorem, find the equivalent circuit to the left of the terminals in the circuit of Fig. 4.30. Then find I.

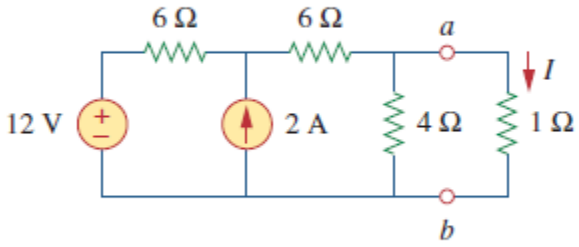

Figure 4.30
For Practice Prob. 4.8.

Answer: $V_{Th} = 6$ V, $R_{Th} = 3\ \Omega$, $I = 1.5$ A.

Practice Problem 4.10

Obtain the Thevenin equivalent of the circuit in Fig. 4.36.

Answer: $V_{Th} = 0$ V, $R_{Th} = -7.5\ \Omega$.

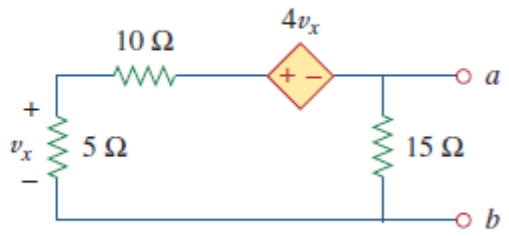

Figure 4.36
For Practice Prob. 4.10.

Practice Problem 4.12

Find the Norton equivalent circuit of the circuit in Fig. 4.45 at terminals *a*-*b*.

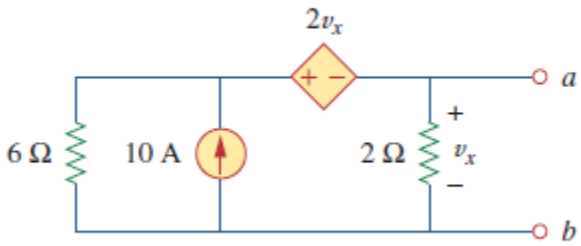

Figure 4.45
For Practice Prob. 4.12.

Answer: $R_N = 1\ \Omega, I_N = 10$ A.

Practice Problem 4.13

Determine the value of R_L that will draw the maximum power from the rest of the circuit in Fig. 4.52. Calculate the maximum power.

Answer: 4.222 Ω, 2.901 W.

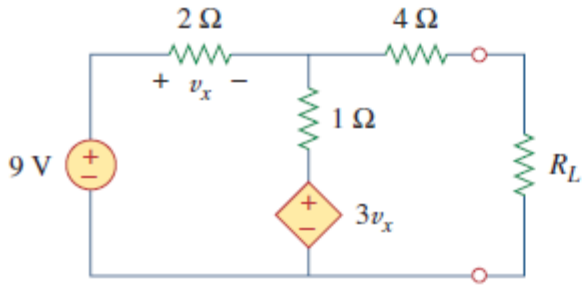

Figure 4.52
For Practice Prob. 4.13.

Practice Problem 4.16

The measured open-circuit voltage across a certain amplifier is 9 V. The voltage drops to 8 V when a 20-Ω loudspeaker is connected to the amplifier. Calculate the voltage when a 10-Ω loudspeaker is used instead.

Answer: 7.2 V.