Problems

2.1 For the circuit shown in Fig. P2.1, select node d as the reference node. (a) Use nodal analysis to find the node voltages. (b) Use the node voltages to determine i_1, i_2, i_3, and i_4.

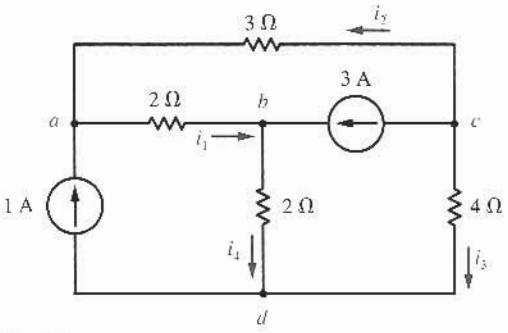

Fig. P2.1

2.2 For the circuit shown in Fig. P2.1, select node c as the reference node. (a) Use nodal analysis to find the node voltages. (b) Use the node voltages to determine i_1, i_2, i_3, and i_4.

2.3 For the circuit shown in Fig. P2.1, select node b as the reference node. (a) Use nodal analysis to find the node voltages. (b) Use the node voltages to determine i_1, i_2, i_3, and i_4.

2.4 For the circuit shown in Fig. P2.1, select node a as the reference node. (a) Use nodal analysis to find the node voltages. (b) Use the node voltages to determine i_1, i_2, i_3, and i_4.

2.5 Find the node voltages for the circuit shown in Fig. P2.5.

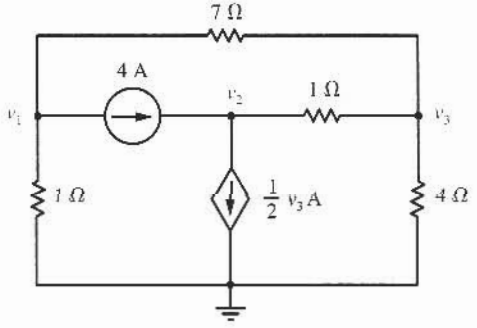

Fig. P2.5

2.6 Find the node voltages for the circuit shown in Fig. P2.6.

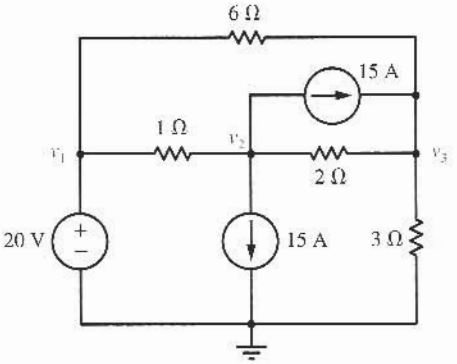

Fig. P2.6

2.7 Find the node voltages for the circuit shown in Fig. P2.7. (See p. 100.)

2.8 Find the node voltages for the circuit shown in Fig. P2.8.

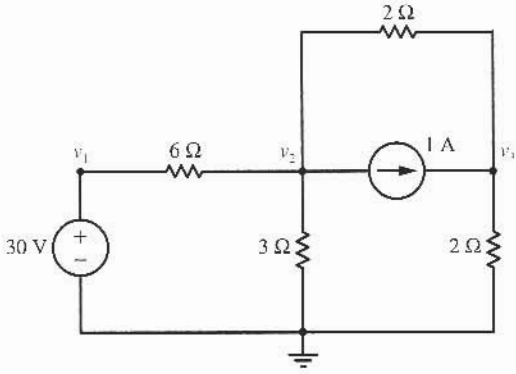

Fig. P2.8

2.9 Find the node voltages for the circuit shown in Fig. P2.9.

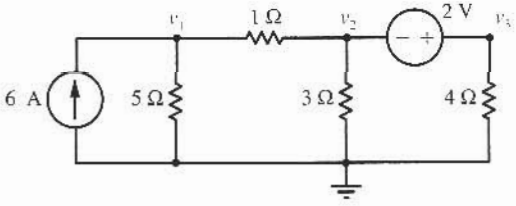

Fig. P2.9

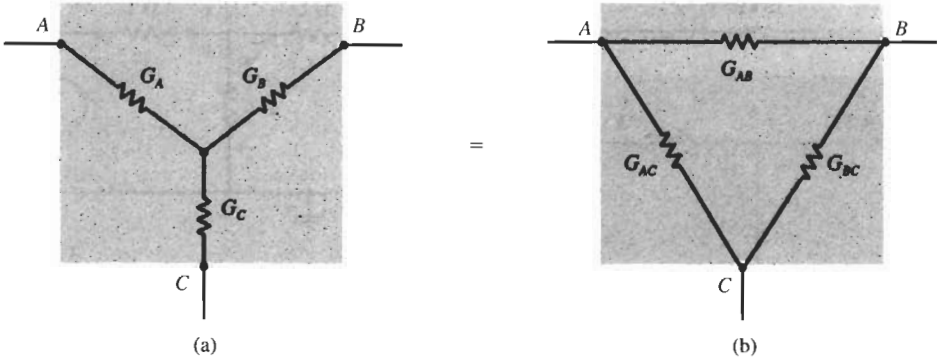

Fig. P2.17 *a,b*

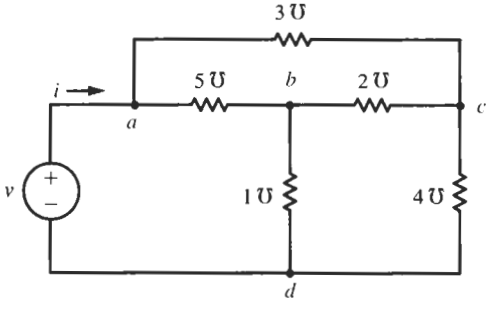

Fig. P2.17 *c*

$$R_A = \frac{R_{AB}R_{AC}}{R_{AB} + R_{AC} + R_{BC}} \quad R_B = \frac{R_{AB}R_{BC}}{R_{AB} + R_{AC} + R_{BC}}$$

$$R_C = \frac{R_{AC}R_{BC}}{R_{AB} + R_{AC} + R_{BC}}$$

where $R = 1/G$. Such a process is called a **Δ-Y (delta-wye) transformation.**

The circuit shown in Fig. P2.18 is identical to the circuit given in Fig. P2.16. Use a Δ-Y transformation on the 2-Ʊ, 3-Ʊ, and 5-Ʊ conductances, and then combine elements in series and parallel to determine $G = i/v$.

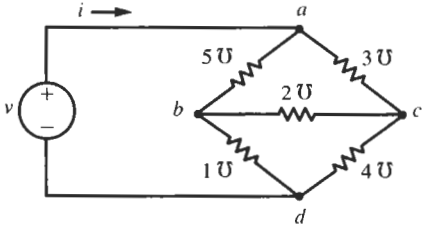

Fig. P2.18

2.19 Find the mesh currents for the circuit shown in Fig. P2.19.

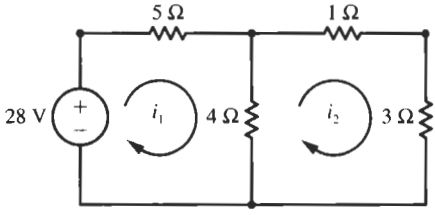

Fig. P2.19

2.20 Assume clockwise mesh currents for the circuit shown in Fig. 2.9 on p. 64. Use mesh analysis to find these mesh currents.

2.21 Assume clockwise mesh currents for the circuit shown in Fig. P2.7. Use mesh analysis to find these mesh currents.

2.22 Assume clockwise mesh currents for the circuit shown in Fig. P2.9. Use mesh analysis to find these mesh currents.

2.23 Assume clockwise mesh currents for the circuit shown in Fig. P2.10. Use mesh analysis to find these mesh currents.

2.24 Use mesh analysis to find the conductance $G = i/v$ for the circuit given in Fig. P2.18.

2.25 Assume clockwise mesh currents for the circuit shown in Fig. P2.8. Use mesh analysis to find these mesh currents.

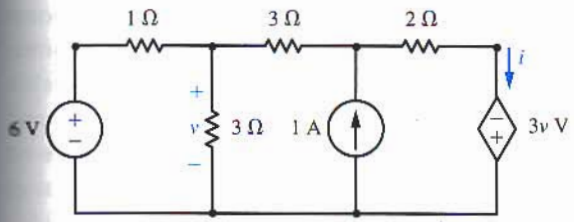

Fig. P2.60

2.60 Consider the circuit shown in Fig. P2.60. (a) Find the portion of i and the portion of v that are due to the 6-V voltage source. (b) Find the portion of i and the portion of v that are due to the 1-A current source. (c) Find i and v.

2.61 Consider the circuit shown in Fig. P2.61. (a) Find the portion of i and the portion of v that are due to the 2-A current source. (b) Find the portion of i and the portion of v that are due to the 6-V voltage source. (c) Find the portion of i and the portion of v that are due to the 4-V voltage source. (d) Find i and v.

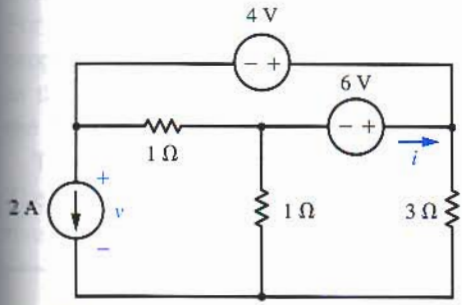

Fig. P2.61

2.62 Consider the circuit shown in Fig. P2.62. (a) Find the portion of i and the portion of v that are due to the 12-V voltage source. (b) Find the portion of i and the portion of v that are due to the 6-V voltage source. (c) Find the portion of i and the portion of v that are due to the 6-A current source. (d) Find i and v.

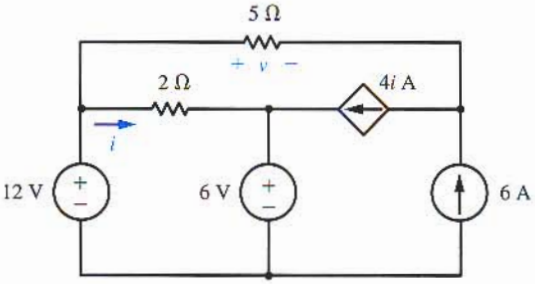

Fig. P2.62