Chapter 1, Solution 1

(a) $q = 6.482 \times 10^{17} \times [-1.602 \times 10^{-19}\ C] =$ **-0.10384 C**

(b) $q = 1.24 \times 10^{18} \times [-1.602 \times 10^{-19}\ C] =$ **-0.19865 C**

(c) $q = 2.46 \times 10^{19} \times [-1.602 \times 10^{-19}\ C] =$ **-3.941 C**

(d) $q = 1.628 \times 10^{20} \times [-1.602 \times 10^{-19}\ C] =$ **-26.08 C**

1.18 Calculate the power absorbed or supplied by each element in Fig. 1.29

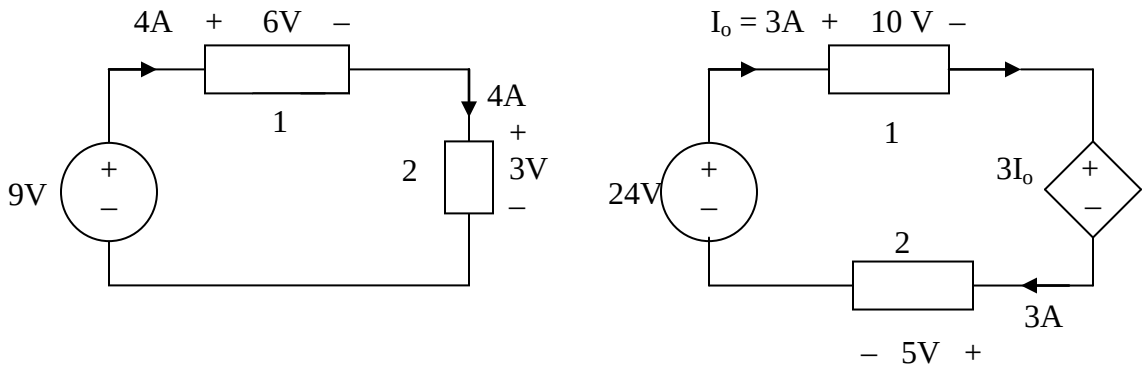


Figure 1.29
For Prob. 1.18

Solution: Note, we will express absorbed power as positive terms and delivered power as negative power absorbed.

(a) For the 9-V voltage source, p = -4 (9) = **–36 W**
For element 1, p = 4 (6) = **24W**
For element 2, p = 4 (3) = **12W**

(b) For the 24-V voltage source, p = 24 (-3) = **–72W**
For the current-controlled voltage source, $p = 3\,I_0(3) = 27\text{W}$ = **27 W**
For element 1, p = 10 (3) = **30 W**
For element 2, p = 3 (5) = **15 W**

Chapter 1, Solution 22

$$q = it = 30x10^{3}\,x2x10^{-3} = \underline{60\ \text{C}}$$

2.7 Find the number of branches and nodes in each of the circuits of Fig. 2.71.

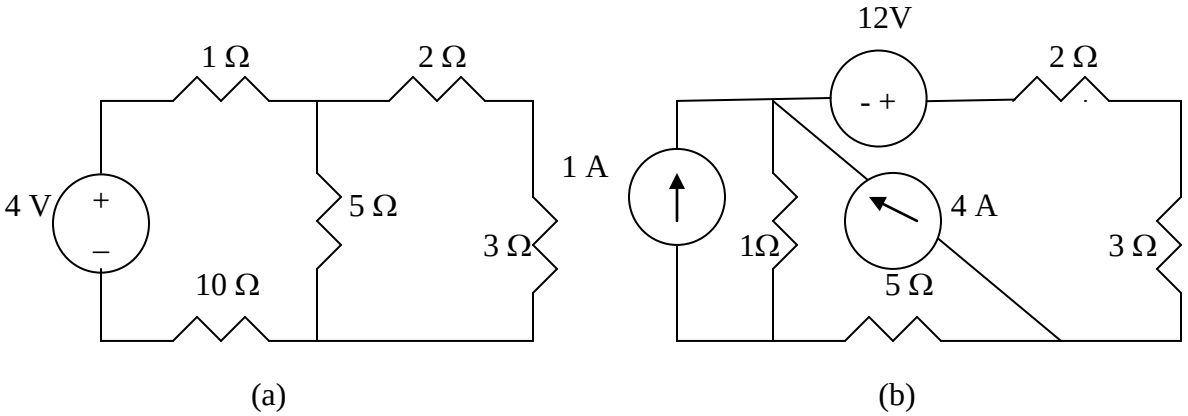
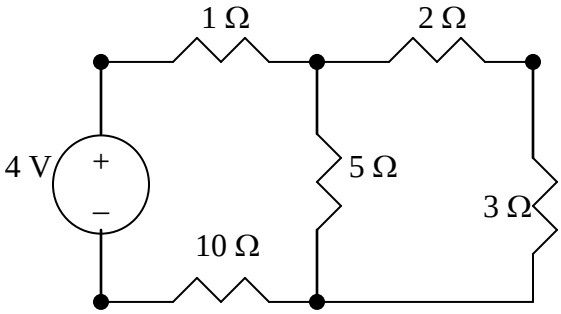


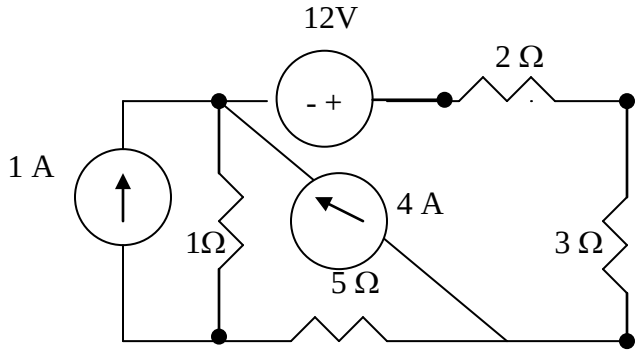
Figure 2.71
For Prob. 2.7

Solution
(a)



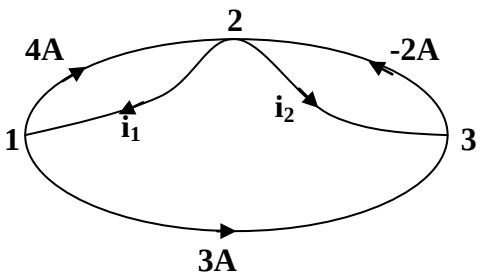
6 branches and 5 nodes.

(b)



7 branches and 5 nodes.

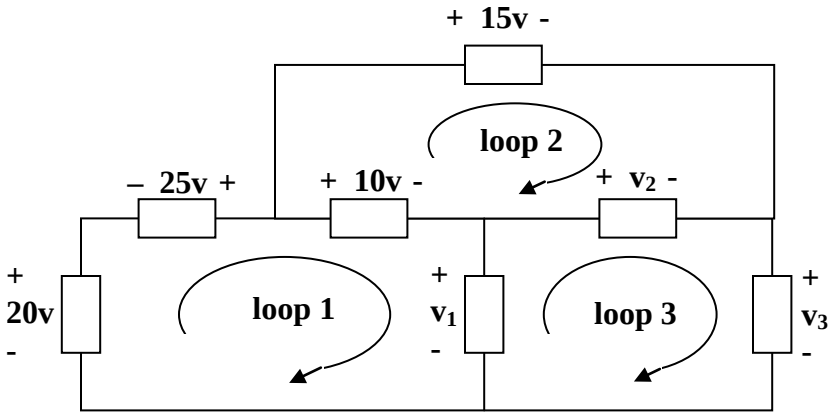
Chapter 2, Solution 10



At node 1, $4 + 3 = i_1 \longrightarrow$ **i_1 = 7A**

At node 3, $3 + i_2 = -2 \longrightarrow$ **i_2 = -5A**

Chapter 2, Solution 12

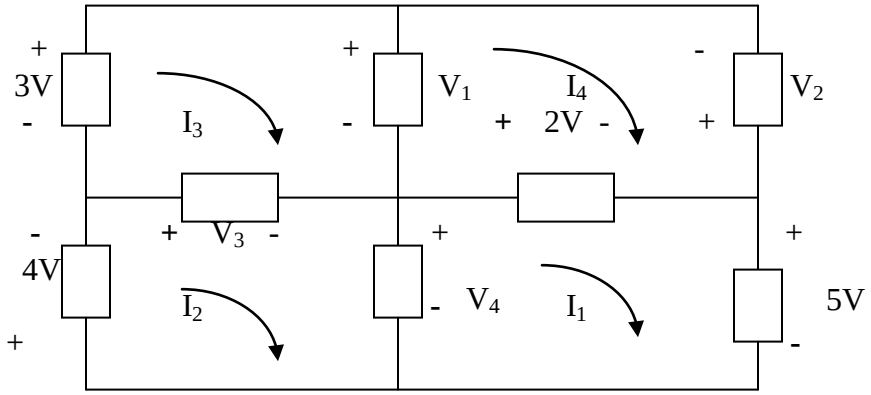


For loop 1, $-20 -25 +10 + v_1 = 0 \longrightarrow \underline{\mathbf{v_1 = 35v}}$

For loop 2, $-10 +15 -v_2 = 0 \longrightarrow \underline{\mathbf{v_2 = 5v}}$

For loop 3, $\mathbf{-v_1 +v_2 +v_3 = 0} \longrightarrow \underline{v_3 = 30v}$

Chapter 2, Solution 14



For mesh 1,

$$-V_4 + 2 + 5 = 0 \quad \longrightarrow \quad V_4 = 7V$$

For mesh 2,

$$+4 + V_3 + V_4 = 0 \quad \longrightarrow \quad V_3 = -4 - 7 = -11V$$

For mesh 3,

$$-3 + V_1 - V_3 = 0 \quad \longrightarrow \quad V_1 = V_3 + 3 = -8V$$

For mesh 4,

$$-V_1 - V_2 - 2 = 0 \quad \longrightarrow \quad V_2 = -V_1 - 2 = 6V$$

Thus,

$$V_1 = -8V, \quad V_2 = 6V, \quad V_3 = -11V, \quad V_4 = 7V$$