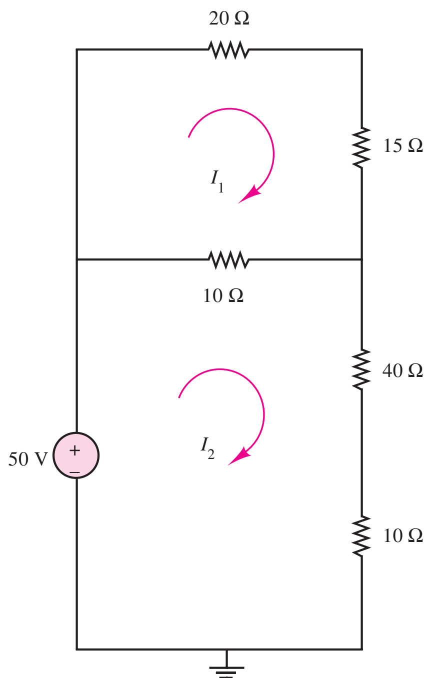

Figure P3.15

3.16 Using mesh current analysis, find the voltage, v, across the 3-Ω resistor in the circuit of Figure P3.16.

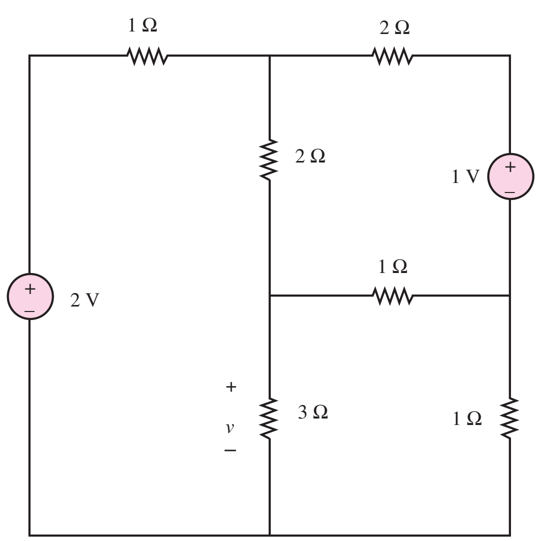

Figure P3.16

3.17 Using mesh current analysis, find the currents I_1, I_2, and I_3 and the voltage across the 40-Ω resistor in the circuit of Figure P3.17 (assume polarity according to I_2).

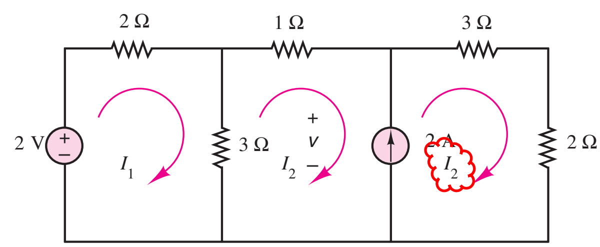

Figure P3.17

3.18 Using mesh current analysis, find the voltage, v, across the source in the circuit of Figure P3.18.

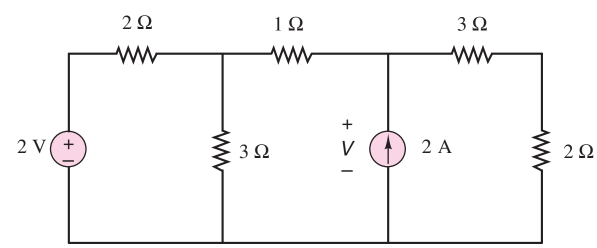

Figure P3.18

3.19 a. For the circuit of Figure P3.19, write the mesh equations in matrix form. Notice the form of the $[R]$ and $[V]$ matrices in the $[R][I] = [V]$, where

$$[R] = \begin{bmatrix} r_{11} & r_{12} & r_{13} & \cdots & r_{1n} \\ r_{21} & r_{22} & \cdots & \cdots & r_{2n} \\ r_{31} & & \ddots & & \\ \vdots & & & \ddots & \\ r_{n1} & r_{n2} & \cdots & \cdots & r_{nn} \end{bmatrix} \quad \text{and} \quad [V] = \begin{bmatrix} V_1 \\ V_2 \\ \vdots \\ \vdots \\ V_n \end{bmatrix}$$

b. Write the matrix form of the mesh equations again by using the following formulas:

$r_{ii} = \sum$ resistances around loop i
$r_{ij} = -\sum$ resistances *shared* by loops i and j
$V_i = \sum$ source voltages around loop i