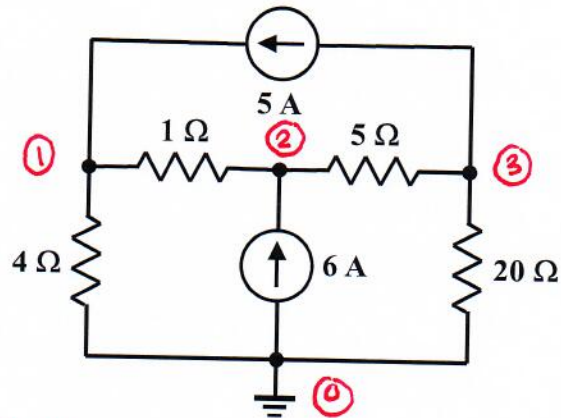


## Homework Problem #012

Develop node equations and express them in the matrix form discussed in class.



$$-5 + \frac{V_1 - V_2}{1\Omega} + \frac{V_1}{4\Omega} = 0 \quad (\text{KCL for node 1})$$

$$\frac{V_2 - V_1}{1\Omega} - 6 + \frac{V_2 - V_3}{5\Omega} = 0 \quad (\text{KCL for node 2})$$

$$5 + \frac{V_3 - V_2}{5\Omega} + \frac{V_3}{20\Omega} = 0 \quad (\text{KCL for node 3})$$

In matrix form:

$$\begin{bmatrix} \frac{5}{4} & -1 & 0 \\ -1 & \frac{6}{5} & -\frac{1}{5} \\ 0 & -\frac{1}{5} & \frac{1}{4} \end{bmatrix} \begin{bmatrix} V_1 \\ V_2 \\ V_3 \end{bmatrix} = \begin{bmatrix} 5 \\ 6 \\ -5 \end{bmatrix}$$