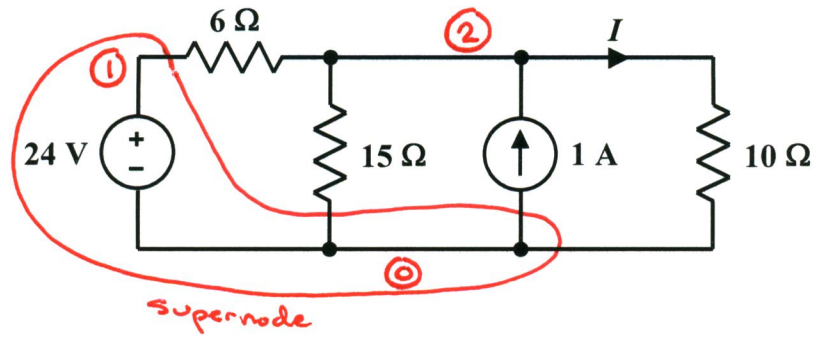# Problem #05

Use the nodal analysis method to determine the voltage across the 10 Ω resistor. Then apply Ohm's Law to determine I.

$V_1 = 24V$ (supernode constraint equation)

$$\frac{V_2 - V_1}{6\Omega} + \frac{V_2}{15\Omega} - 1 + \frac{V_2}{10\Omega} = 0$$ (KCL at node 2)

$$\begin{bmatrix} 1 & 0 \\ -1/6 & 1/3 \end{bmatrix} \begin{bmatrix} V_1 \\ V_2 \end{bmatrix} = \begin{bmatrix} 24 \\ 1 \end{bmatrix}$$

$$V_2 = 15V$$

$$I = \frac{V_2}{10\Omega} = 1.5 A$$