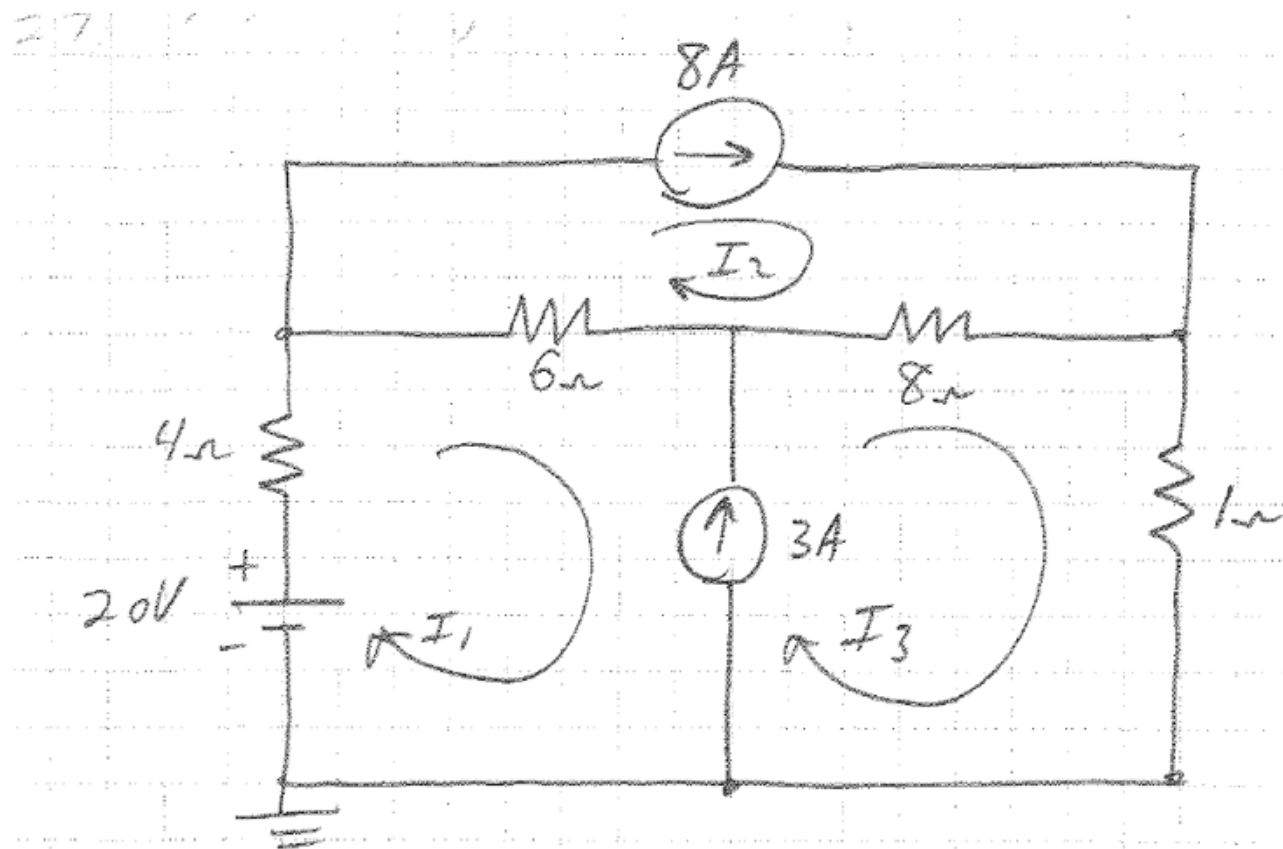


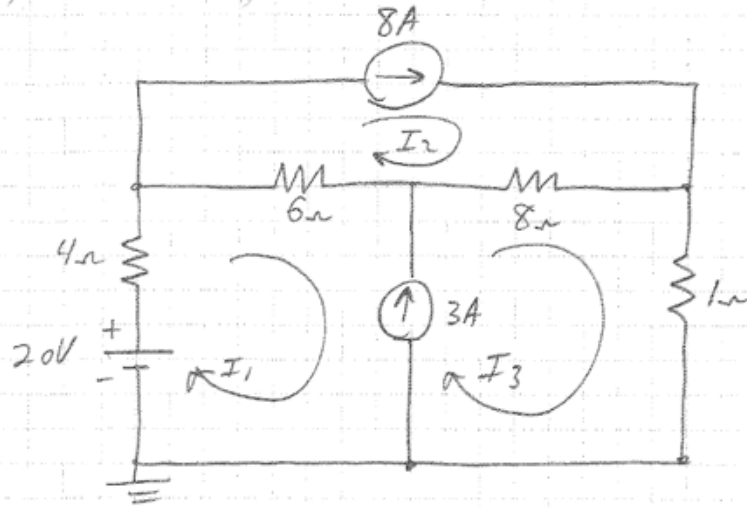
Breakout Problem #1



Find:

- The loop (MESH) currents as drawn
- The current (magnitude and direction) through the $20V$ source and also through the 6Ω resistor

Breakout Problem #1



$$I_{20V} = I_{4\Omega} = I_1 = 5.53A \quad \curvearrowright$$

$$I_{6\Omega} = I_2 - I_1 = 2.47A \quad \leftarrow$$

$$\begin{aligned} \text{KVL}(1,3): \quad & 20 - 4I_1 - 6I_1 + 6I_2 - 8I_3 + 8I_2 - I_3 = 0 \\ & -10I_1 + 14I_2 - 9I_3 = -20 \end{aligned} \quad (1)$$

$$\begin{aligned} \text{Also know:} \quad & I_2 = 8A \\ & I_3 - I_1 = 3A \end{aligned}$$

$$\rightarrow 0I_1 + I_2 + 0I_3 = 8 \quad (2)$$

$$-I_1 + 0I_2 + I_3 = 3 \quad (3)$$

$$\text{Solving:} \quad \begin{bmatrix} I_1 = 5.526A \\ I_2 = 8.0A \\ I_3 = 8.526A \end{bmatrix}$$