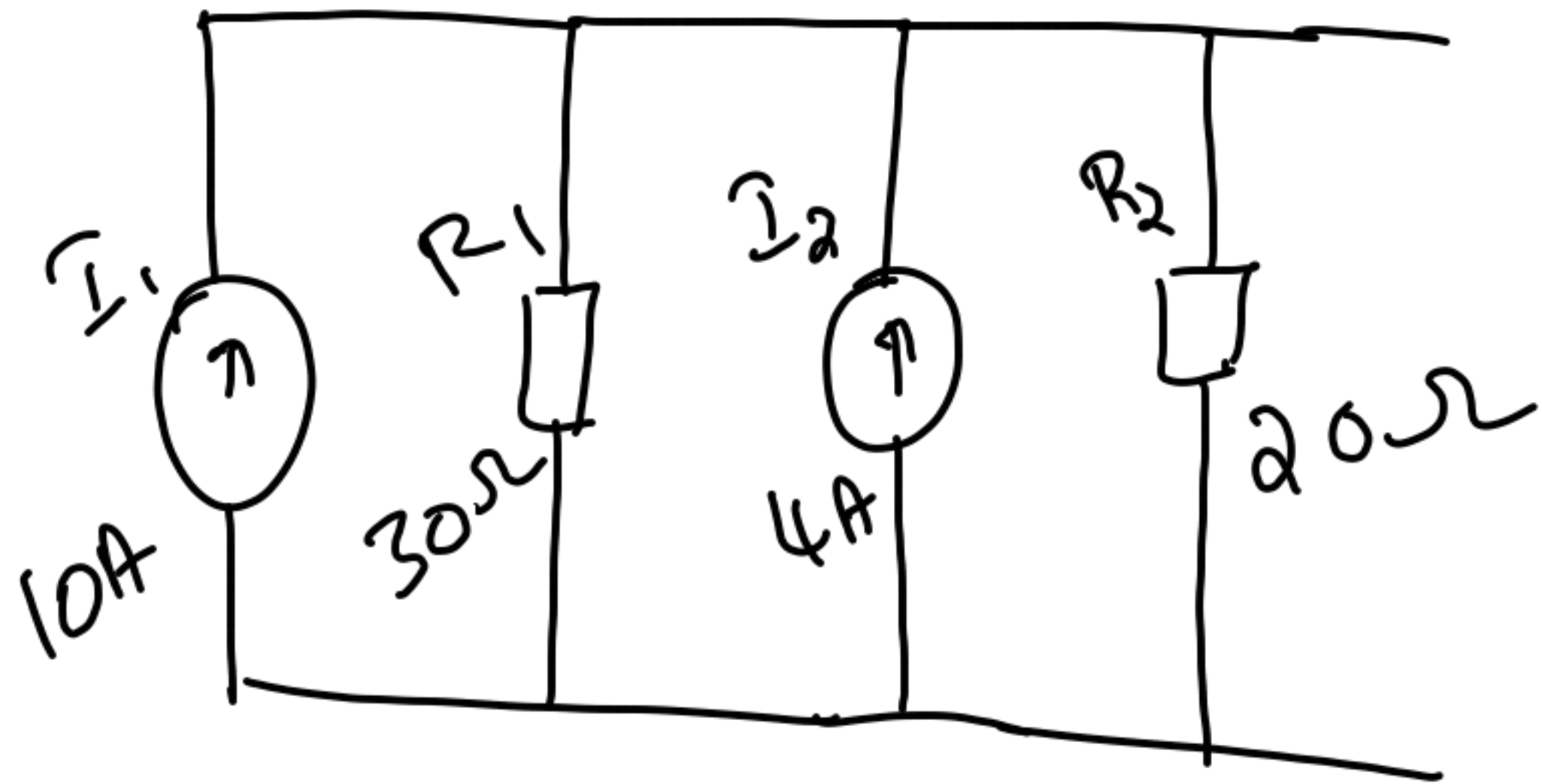


1) For the circuit Shown below,  
Simplify it into a Single current  
Source circuit.

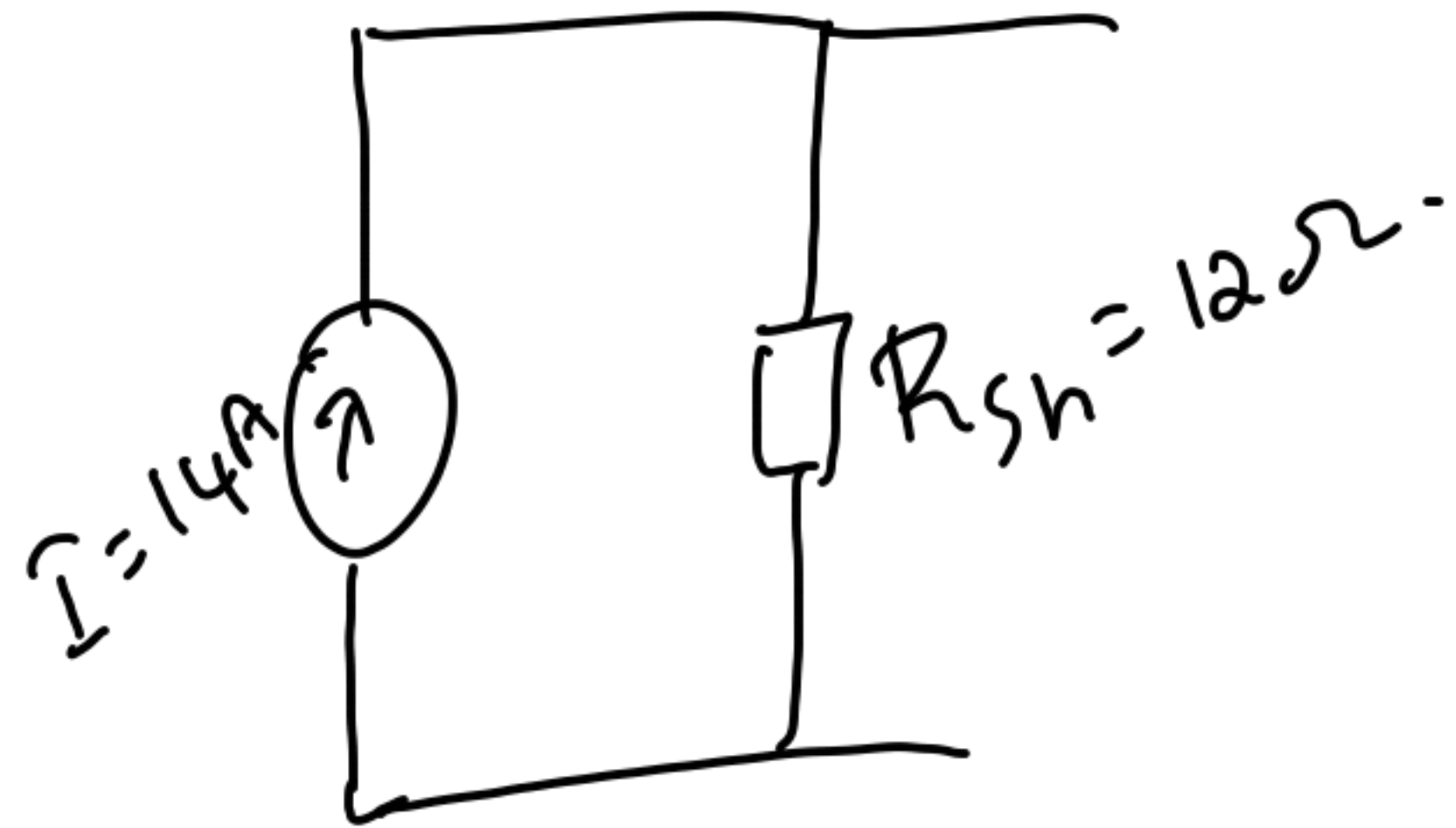


$$I = I_1 + I_2 = 14A$$

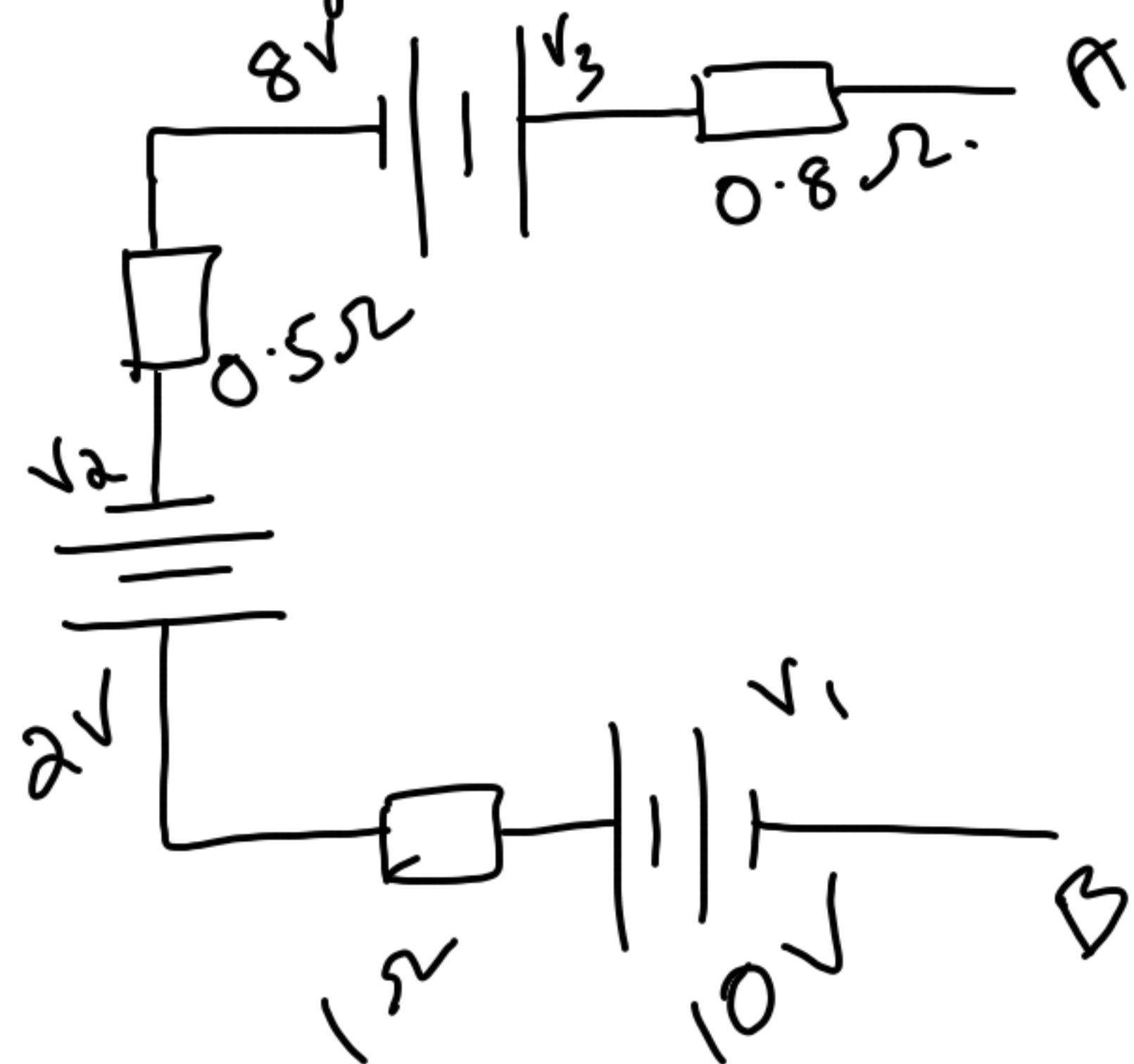
Total Resistance

$$R_{Total} = \frac{1}{\frac{1}{30} + \frac{1}{20}}$$

$$R_{Total} = 12\Omega.$$



2) For the Circuit shown below  
Obtain a circuit with a single  
Voltage source.



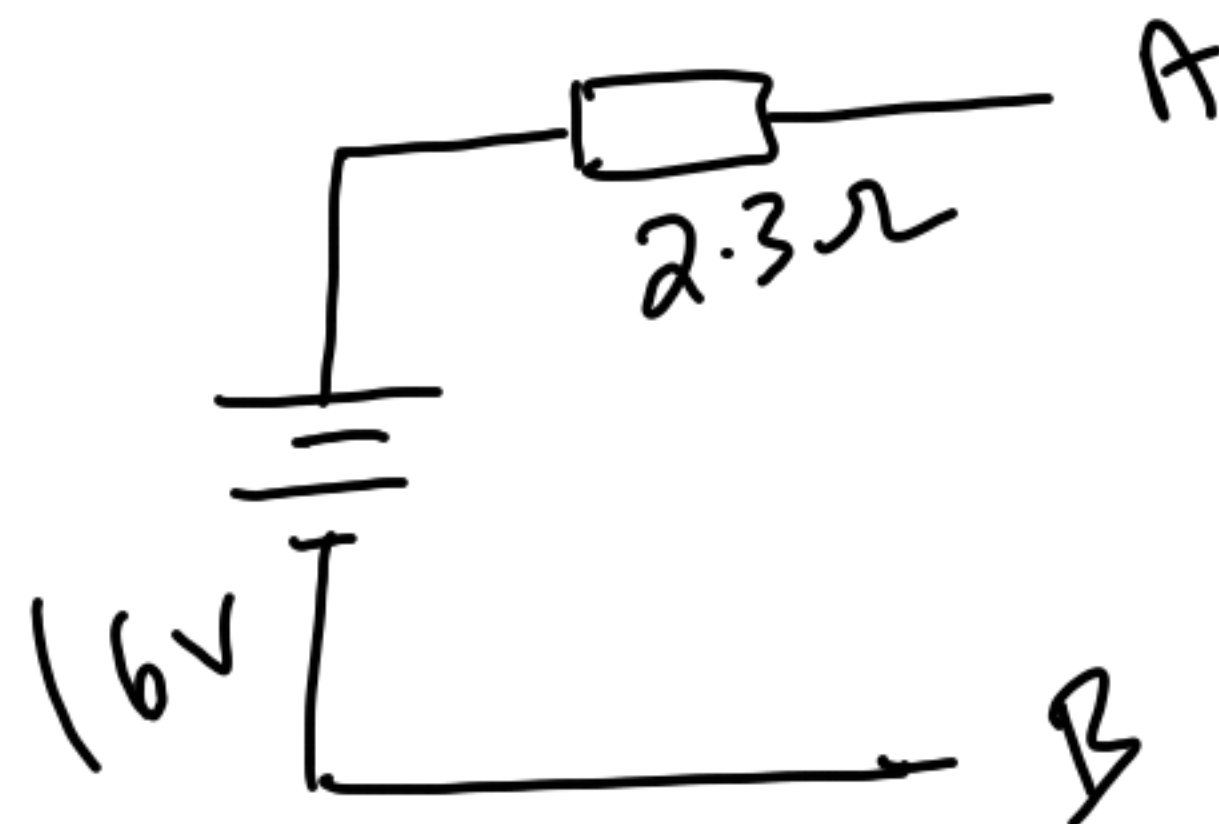
$$R_{\text{Total}} = 1 + 0.5 + 0.8$$

$$R_{\text{Total}} = 2.3 \Omega$$

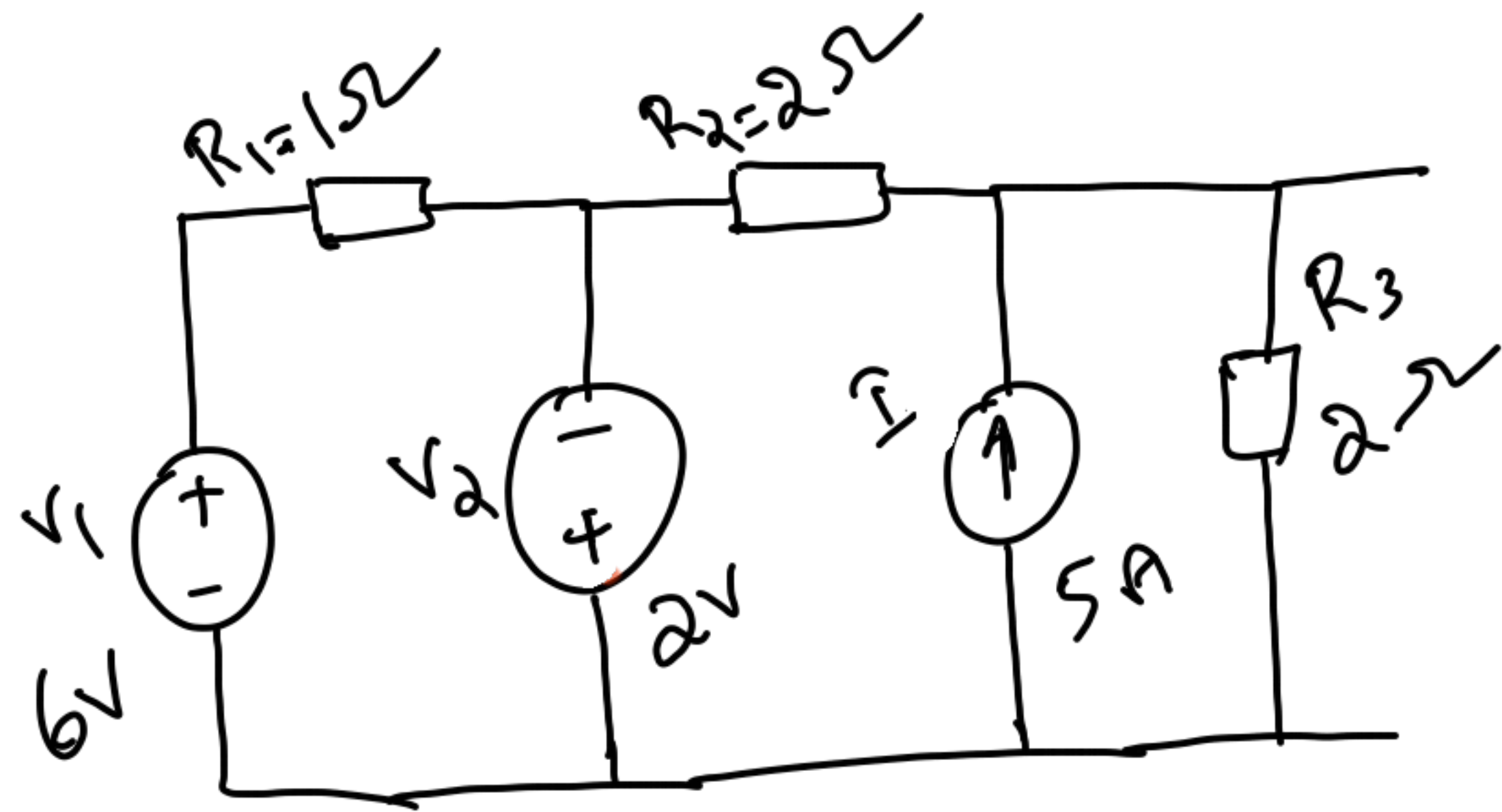
$$V = V_1 - V_2 + V_3$$

$$V = 10 - 2 + 8$$

$$V = 16V$$



3) For the circuit shown below, convert it into a single current source circuit.



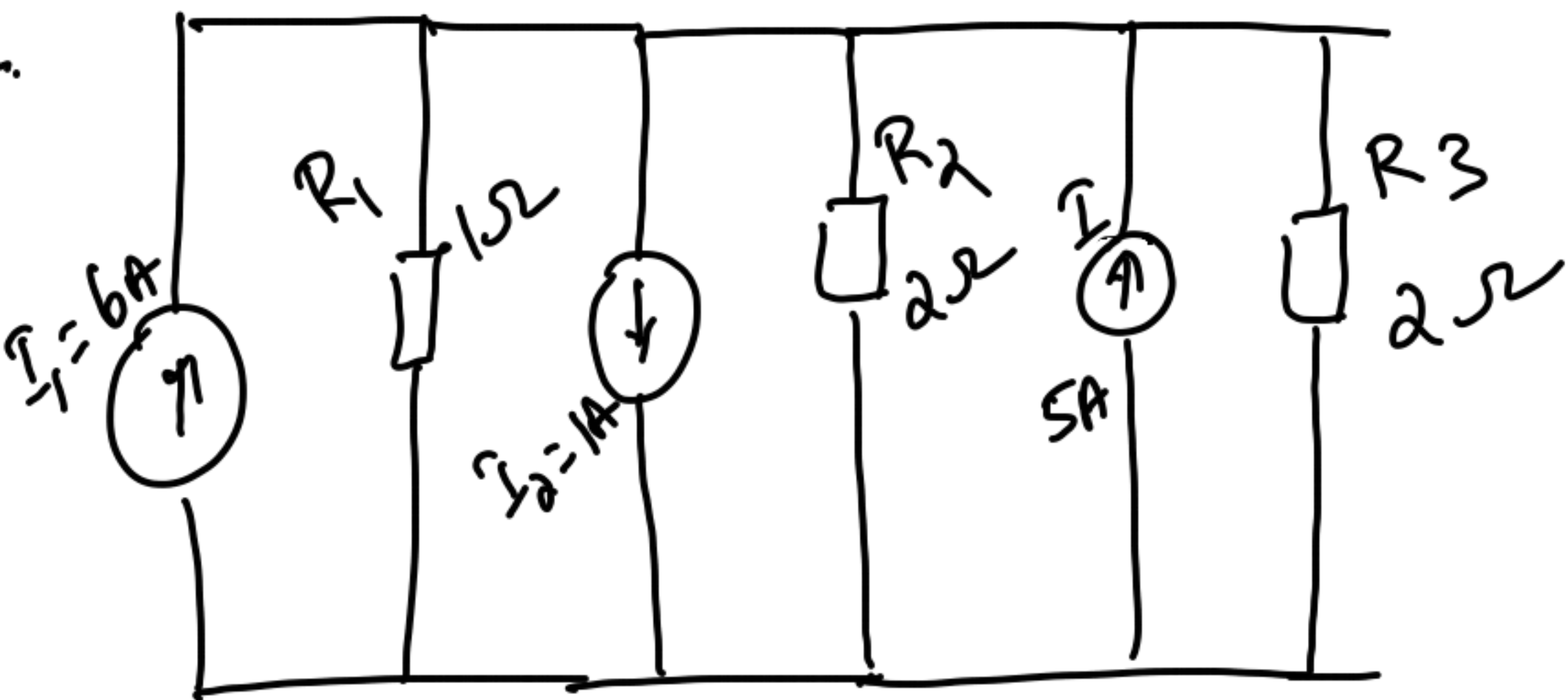
Soln:

Voltage source in parallel  $\rightarrow$  Convert each voltage source to current source

If the current sources are in series  $\rightarrow$  convert the current source into voltage source and solve it.

Convert  $V_1$  and  $V_2$  to current source

$$I_1 = \frac{V_1}{R_1} = \frac{6}{1} = 6A \quad \bigg| \quad I_2 = \frac{V_2}{R_2} = \frac{2}{2} = 1A$$



$$I_{total} = \hat{I}_1 - \hat{I}_2 + \hat{I}_3$$

$$= 6 - 1 + 5$$

$$\hat{I}_{total} = 10A$$

$$R_{total} = \frac{1}{\frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}}$$

$$R_{total} = \frac{1}{\frac{1}{1} + \frac{1}{2} + \frac{1}{2}} = 0.5\Omega$$

