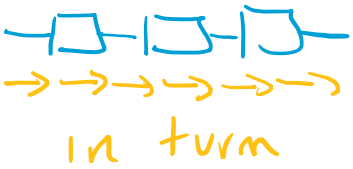
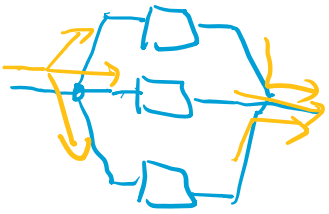
Series



in turn

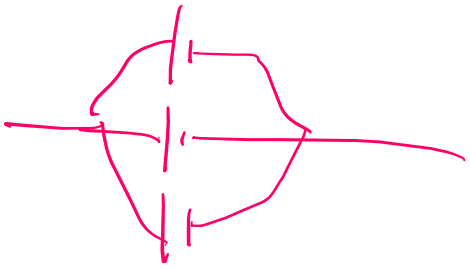
Parallel



Emf

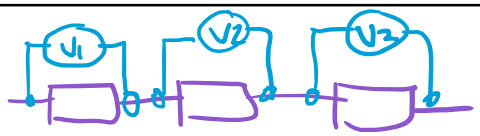
$Emf = emf_1 + emf_2 + emf_3$

$V = V_1 + V_2 + V_3$

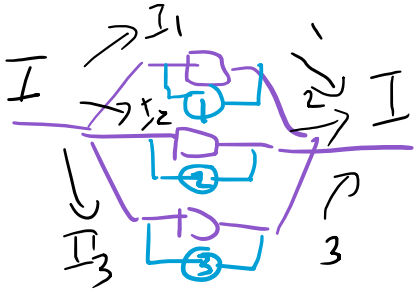


$Emf = Emf_1 = Emf_2 = Emf_3$

$V = V_1 = V_2 = V_3$



$V = V_1 + V_2 + V_3$



$V = V_1 = V_2 = V_3$

current

$I = I_1 = I_2 = I_3$

$I = I_1 + I_2 + I_3$

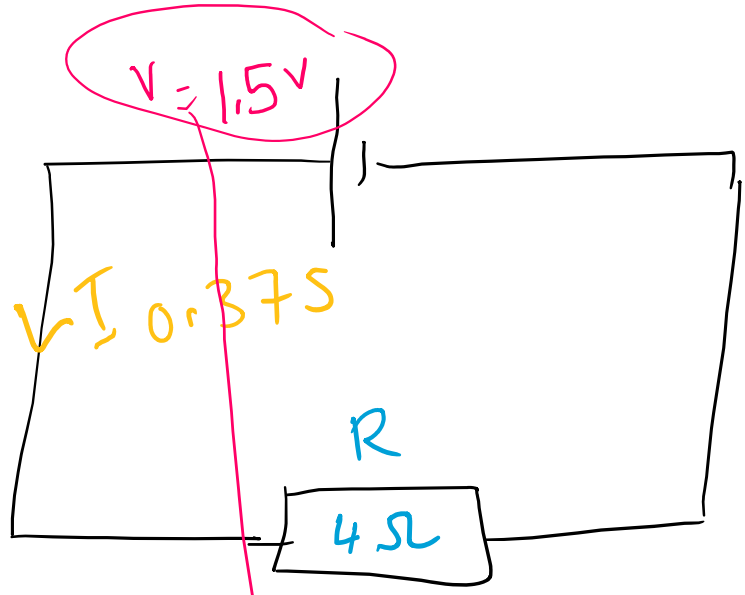
Resistance

$R = R_1 + R_2 + R_3$

$\frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$

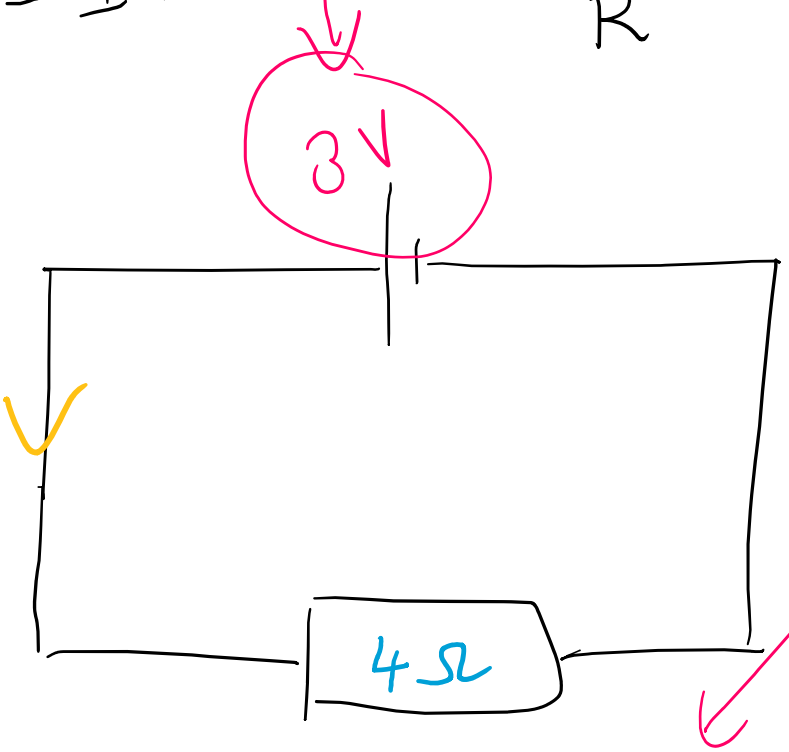
special case: only 2 R's

$R = \frac{R_1 R_2}{R_1 + R_2}$

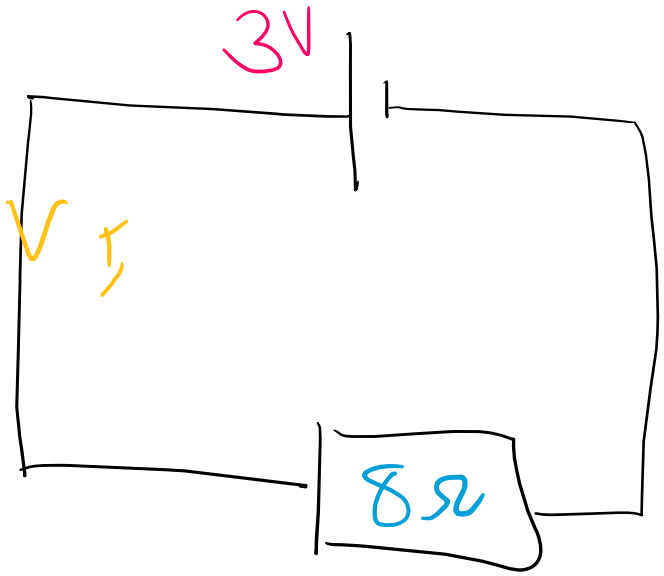


ohms Law

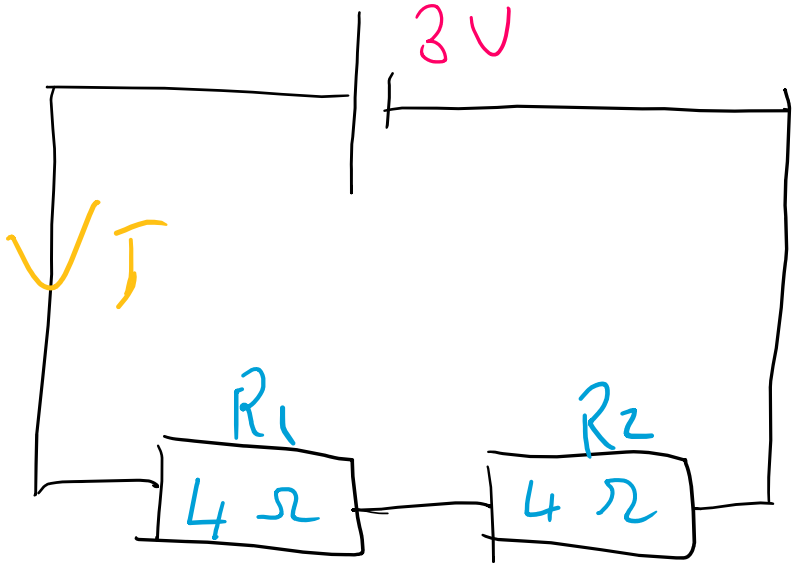
$V = IR$ $I = \frac{V}{R} = \frac{1.5}{4} = 0.375\,A$



$I = \frac{V}{R} = \frac{3}{4} = 0.75\,A$

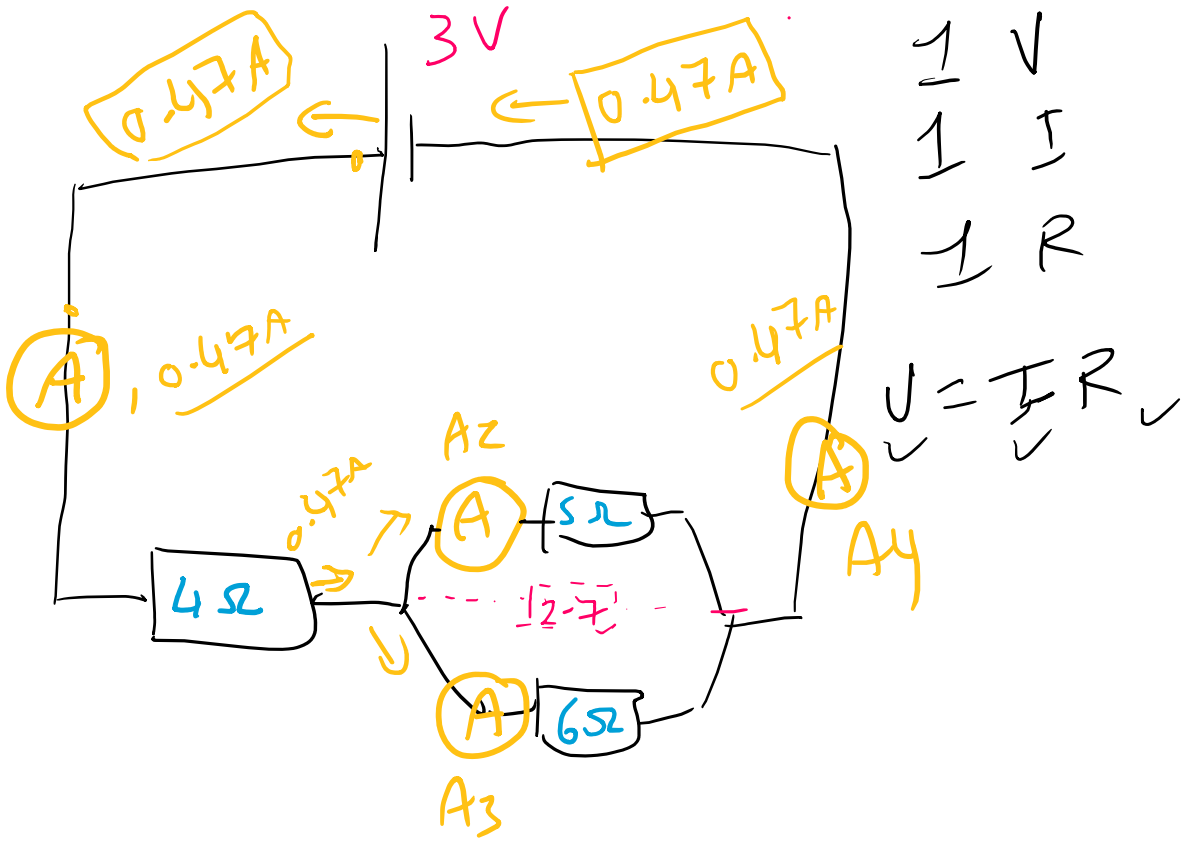


$$I = \frac{V}{R} = \frac{3}{8} = \boxed{0.375\ A}$$



$$I = \frac{V}{R} \qquad R = R_1 + R_2 = 4 + 4 = 8\Omega$$

$$I = \frac{V}{R} = \frac{3}{8} = \boxed{0.375A}$$

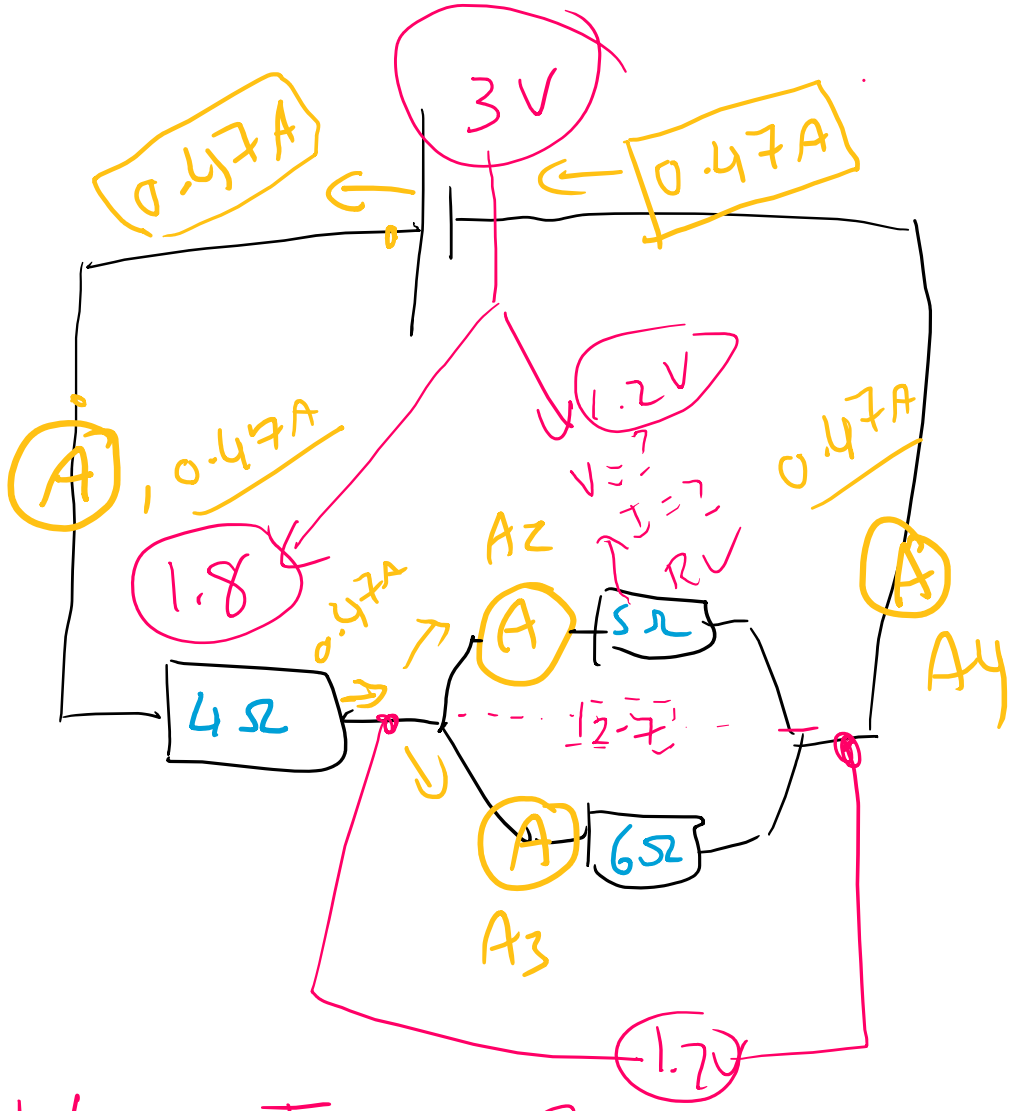


current out of the battery is based on the TOTAL resistance of the circuit AND is the same as current returning to the battery.

$$R_{parallel} = \frac{R_1 R_2}{R_1 + R_2} = \frac{5 \times 6}{5+6} = \frac{30}{11} = 2.7\,\Omega$$

$$R_{series} = 4 + 2.7 = 6.7\,\Omega$$

$$I = \frac{V}{R_t} = \frac{3}{6.7} = 0.47\,A$$



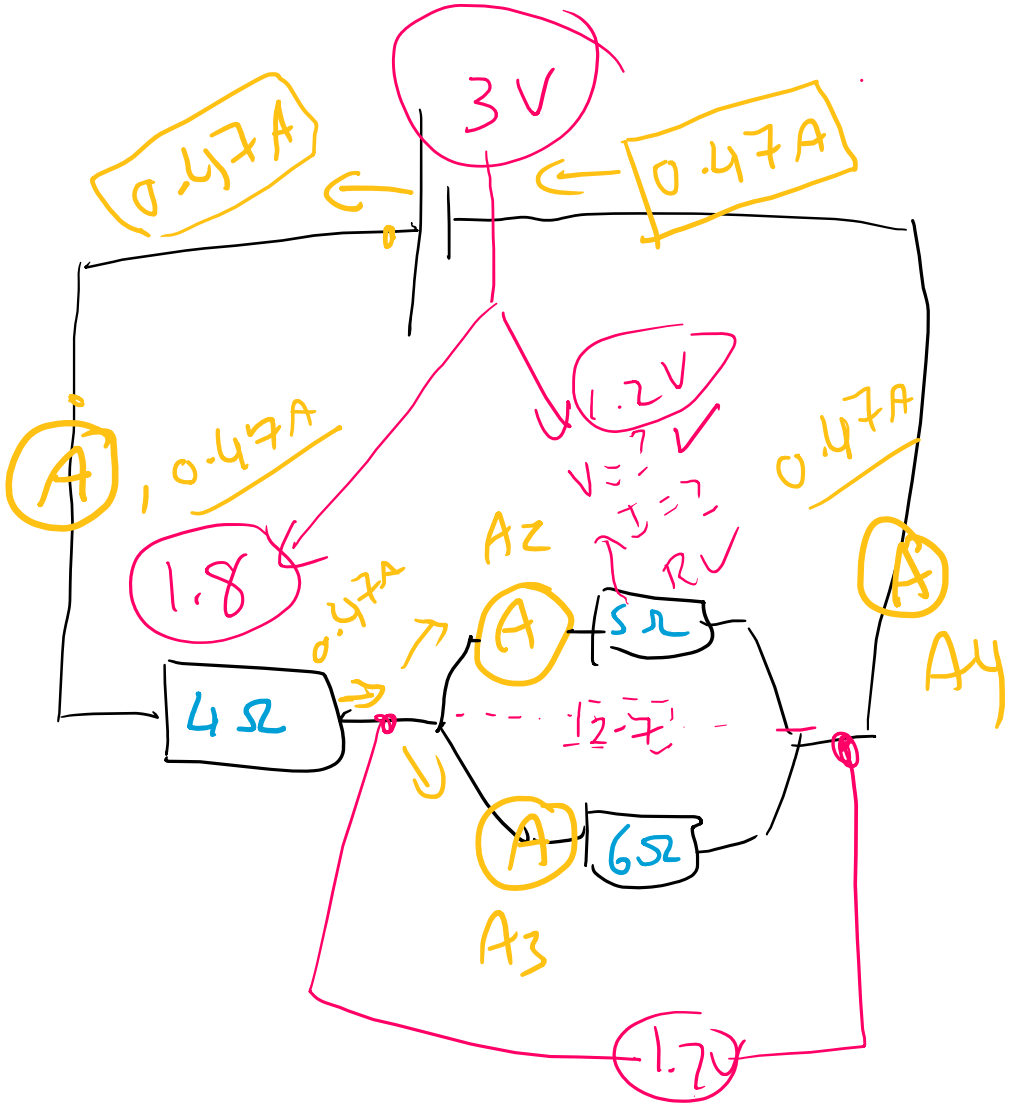
$$V_{2,7} = I_{2,7} \times R_{2,7}$$

$$= 0.47 \times 2.7 = \boxed{1.2\,V}$$

$$V_4 = I_4 \times R_4$$

$$= 0.47 \times 4 = \boxed{1.88\,V}$$

$$= 3.08V$$



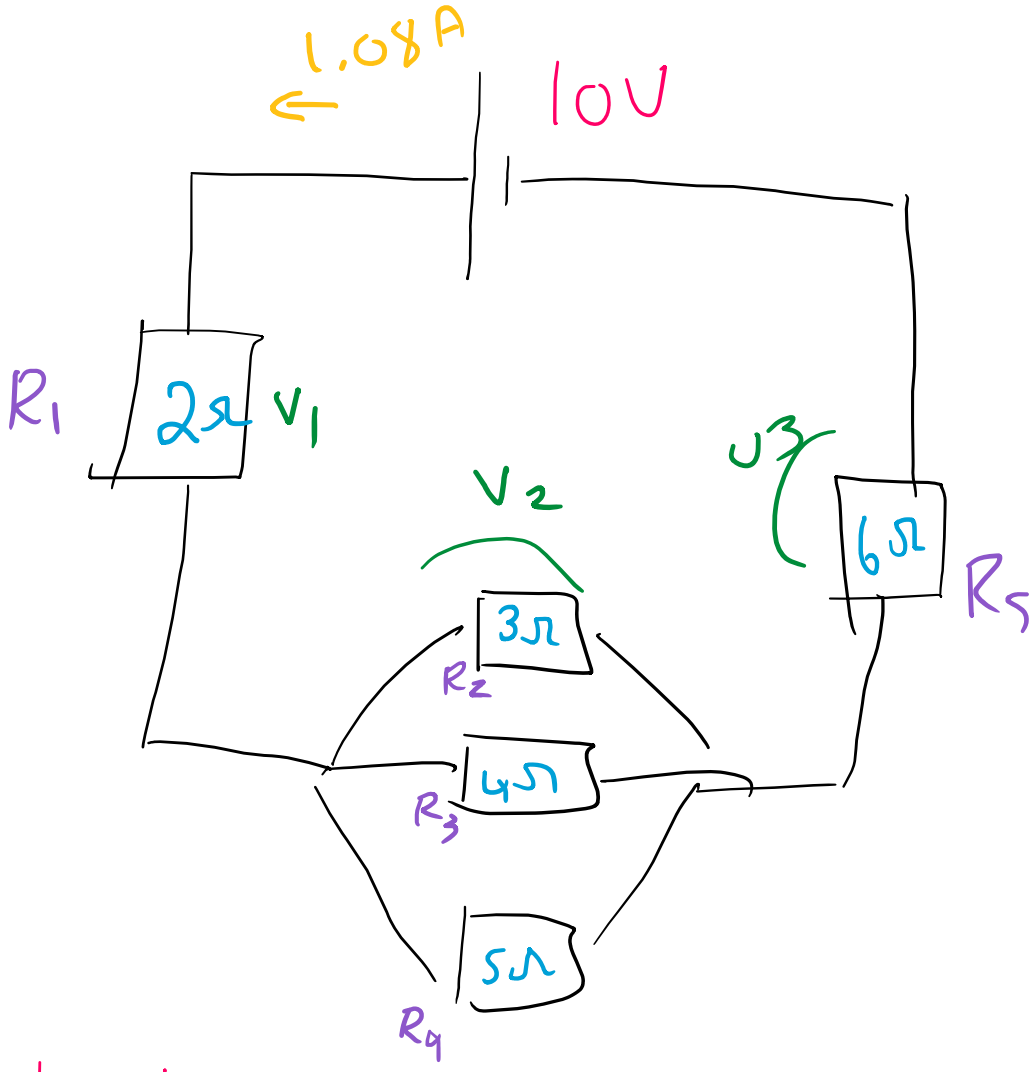
$$V_5 = I_5 R_5 \qquad I = \frac{V}{R} = \frac{1.2}{5} = 0.24A$$

$$V_6 = I_6 R_6 \qquad I = \frac{V}{R} = \frac{1.2}{6} = 0.2A$$

$$I = \boxed{0.44A}$$

Rules

1. Resolve All parallel R's into equivalent R's
2. Resolve All Rs & eq Rs in series
3. Get total current of circuit
4. Get small V's
5. Get small I's



Step 1

$$\frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$$

$$\frac{1}{R} = \frac{1}{3} + \frac{1}{4} + \frac{1}{5} = 0.783$$

$$R = \frac{1}{0.783} = 1.276\ \Omega$$

Step 2

$$R_t = 2 + 1.276 + 6$$

$$= 9.276\ \Omega$$

Step 3

$$I = \frac{V}{R} = \frac{10}{9.276} = \boxed{1.08\ A}$$

Step 4

$$V_1 = I R_1 = 1.08 \times 2 = \boxed{2.156\ V}$$

$$V_2 = I R_{234} = 1.08 \times 1.276 = \boxed{1.38\ V}$$

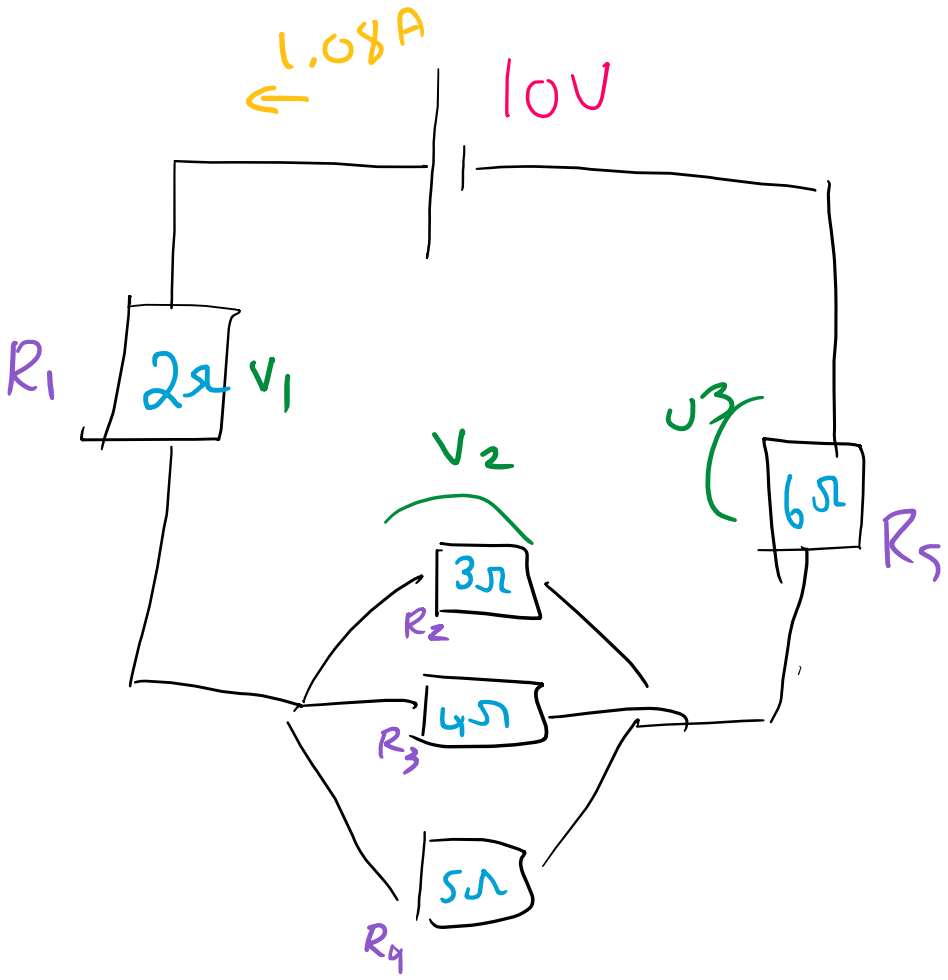
$$V_3 = EMF - V_1 - V_2 = 10 - 2.156 - 1.38 = \boxed{6.47\ V}$$

OR

$$V_3 = I R_5 = 1.08 \times 6 = \boxed{6.48\ V}$$

Step 5

$V = I R \quad I = \frac{V}{R}$



$I_1 = 1.08\ A$

$I_5 = 1.08\ A$

$I_2 = \frac{V}{R_2} = \frac{1.38}{3} = 0.46\ A$

$I_3 = \frac{V}{R_3} = \frac{1.38}{4} = 0.345\ A$

$I_4 = \frac{V}{R_4} = \frac{1.38}{5} = 0.276\ A$

$1.08\ A$