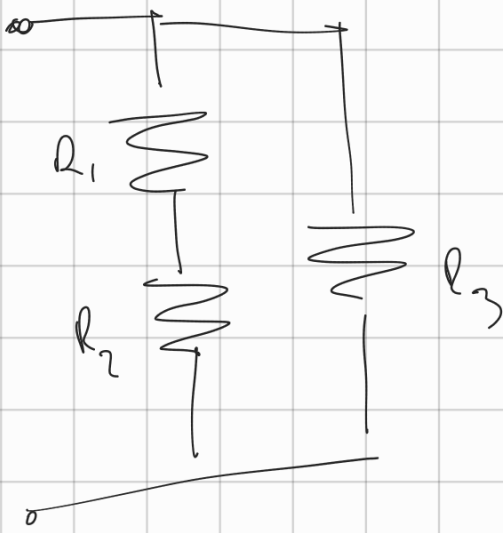




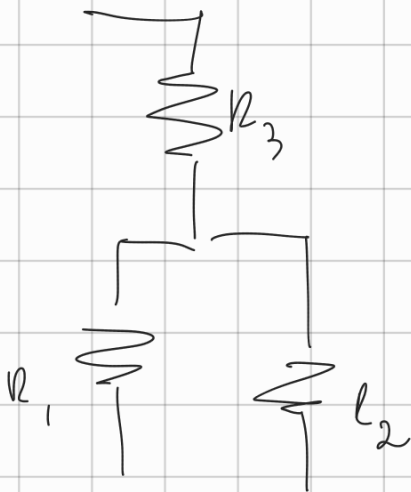
$$R_1 = 10 \Omega$$

$$R_2 = 30 \Omega$$

$$R_3 = 40 \Omega$$

$$R_{1-2} = 40 \Omega$$

$$R_{eq} = \frac{1}{\frac{1}{40} + \frac{1}{10}} = \left(\frac{1+4}{40} \right)^{-1} = \frac{40}{5} = 8 \Omega$$



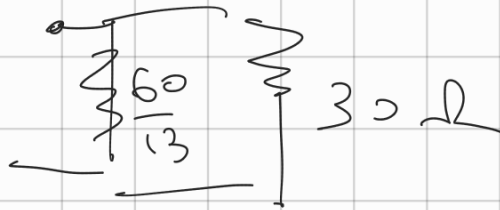
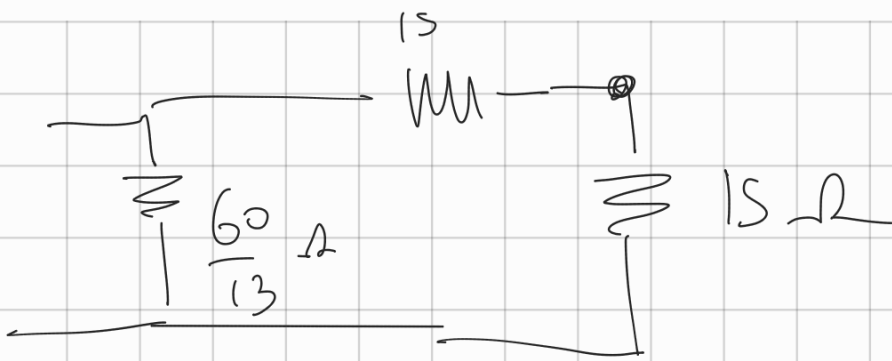
$$R_1 = 14 \Omega$$

$$R_2 = 35 \Omega$$

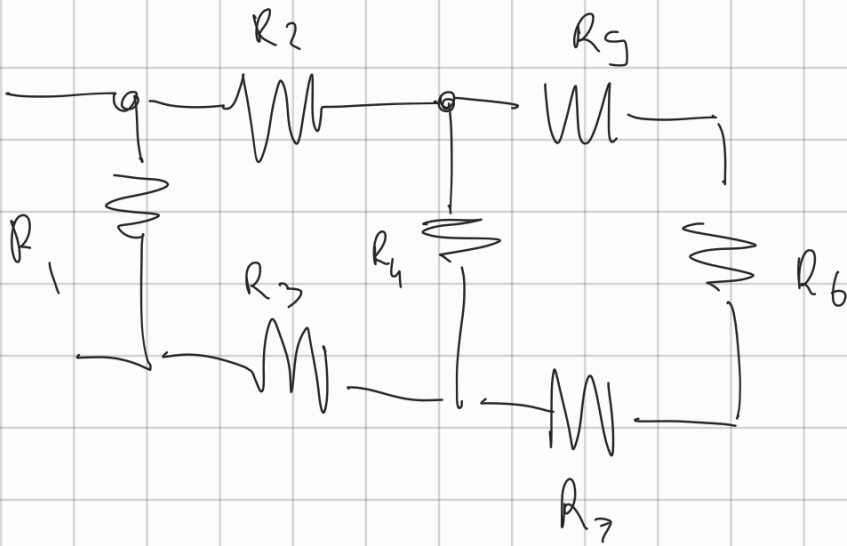
$$R_3 = 20 \Omega$$

$$R_{1,2} = \frac{1}{\frac{1}{14} + \frac{1}{35}} = 10 \Omega$$

$$R_{eq} = 30 \Omega$$



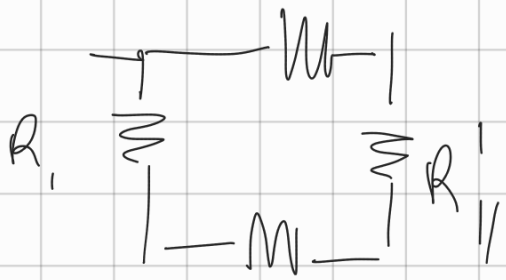
$$R_{eq} = 4\ \Omega$$



$$R_{5-6-7} = 20\ \Omega$$



$$R_{4||5-6-7} = \frac{1}{\frac{1}{5} + \frac{1}{20}} = 4\ \Omega$$



$$R_2 \parallel R_3 = 12 \Omega$$

$$R_{eq} = \frac{1}{\frac{1}{4} + \frac{1}{12}} = 3 \Omega$$



$$R_1 = 30 \Omega$$

$$R_2 = 15 \Omega$$

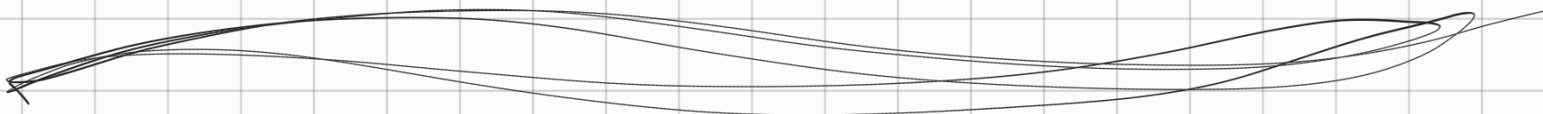
$$R_3 = 5 \Omega$$

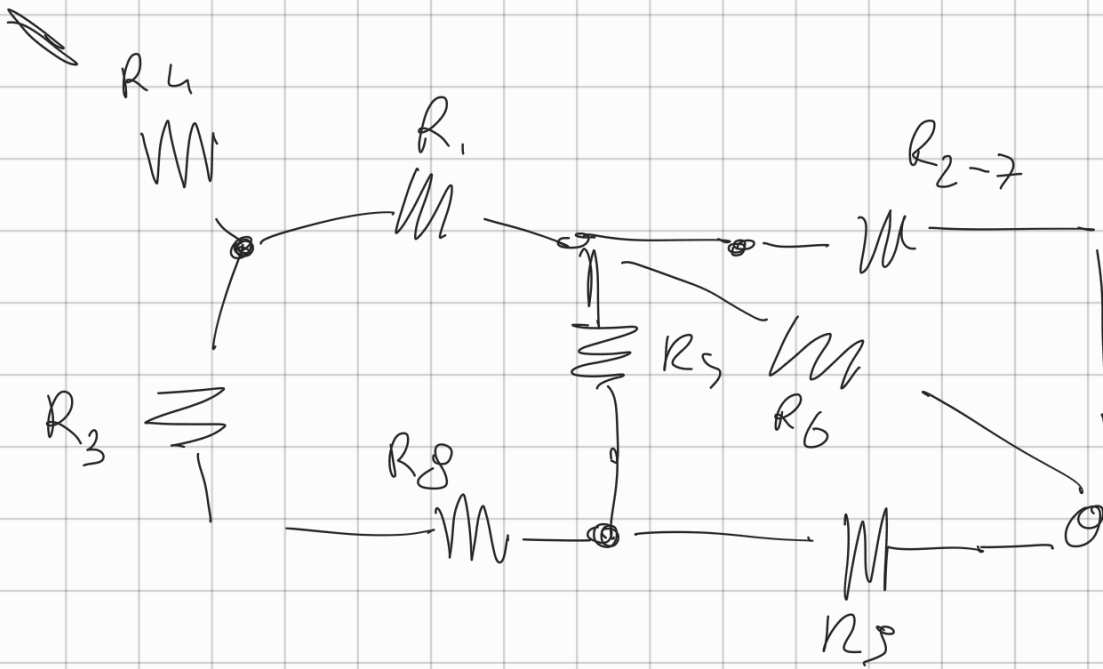
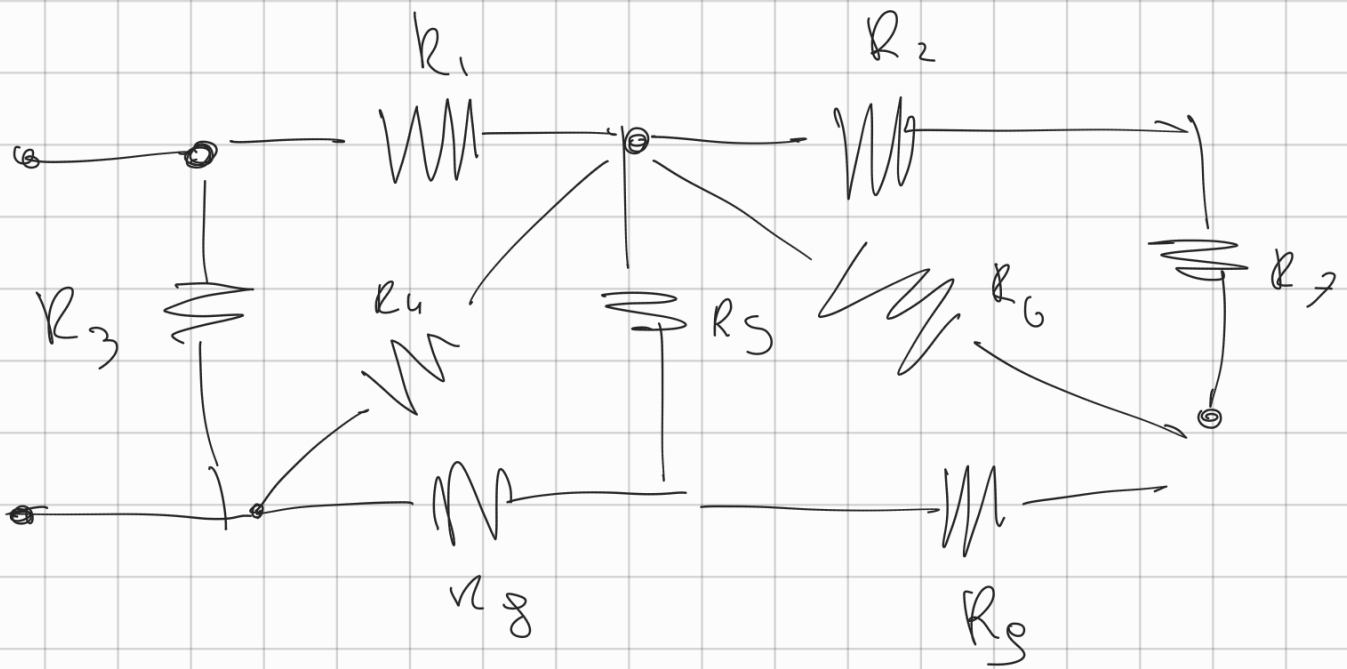
$$R_4 = 10 \Omega$$



$$R_{eq} = \frac{1}{\frac{1}{30} + \frac{1}{15} + \frac{1}{15}}$$

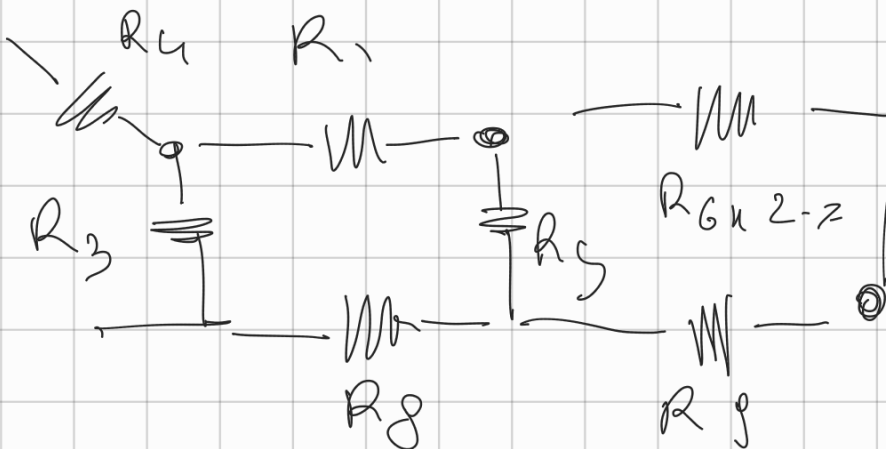
$$R_{eq} = 6 \Omega \checkmark$$

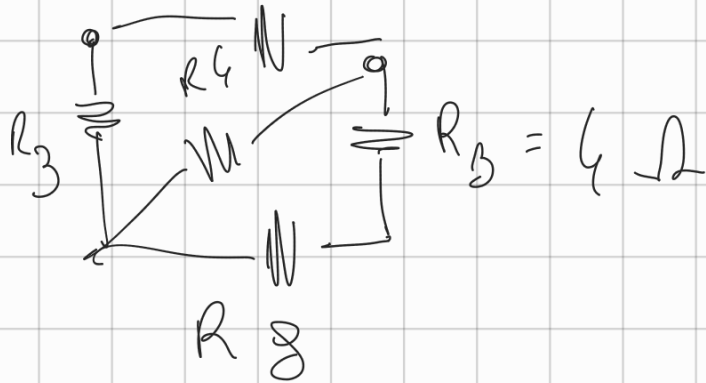
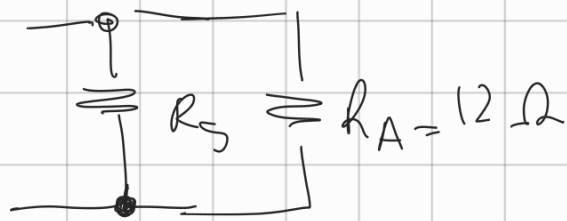




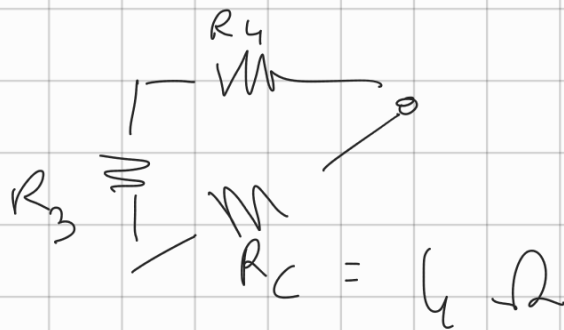
$$R_{2-7} = 12 \Omega$$

$$R_6 \parallel R_{2-7} = 3 \Omega$$





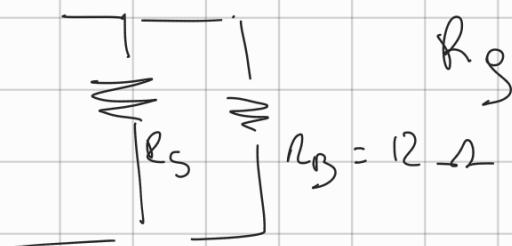
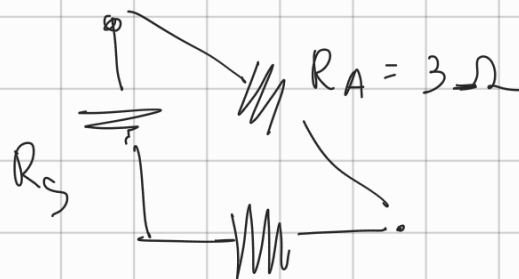
$$R_{B-8} = 16\ \Omega$$

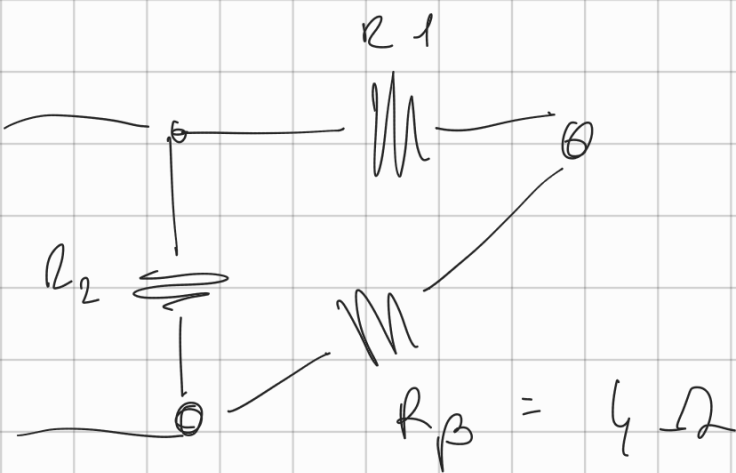
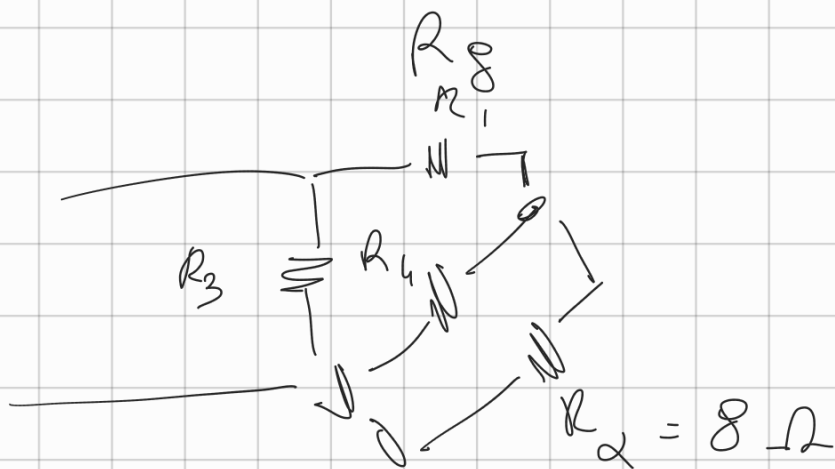
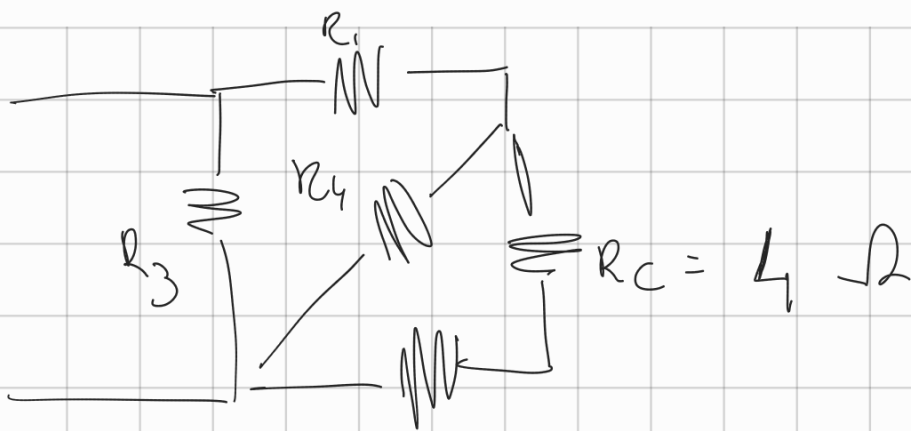


$$8 + 4 = 12$$

NO

$$R_{2-3} = 12\ \Omega$$



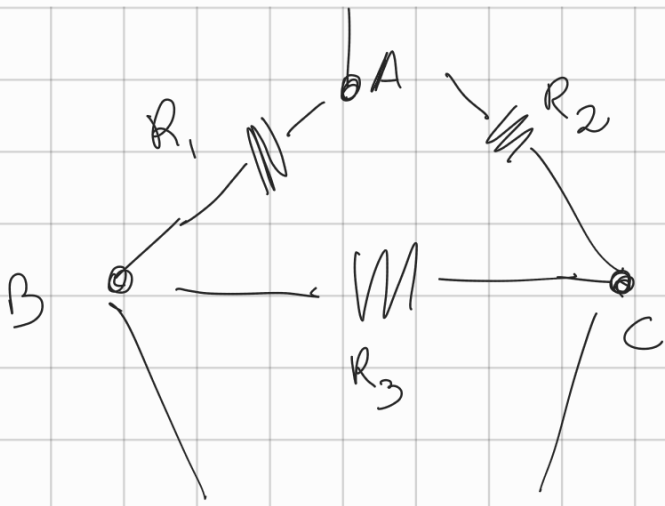


$$R_B = 4 \Omega$$

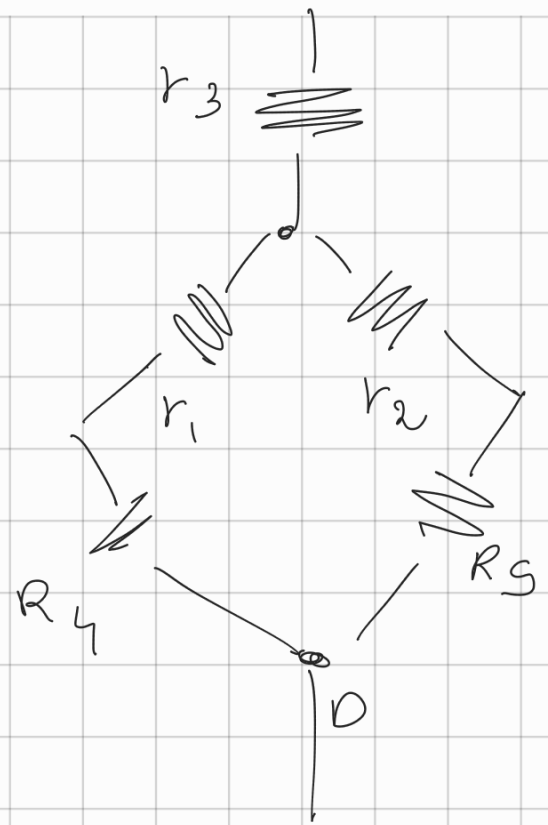
$$R_1 = 2 \Omega$$

$$R_2 = 4 \Omega$$

$$R_{eq} = \frac{1}{\frac{1}{4} + \frac{1}{6}} = 2.4$$



$\Rightarrow$



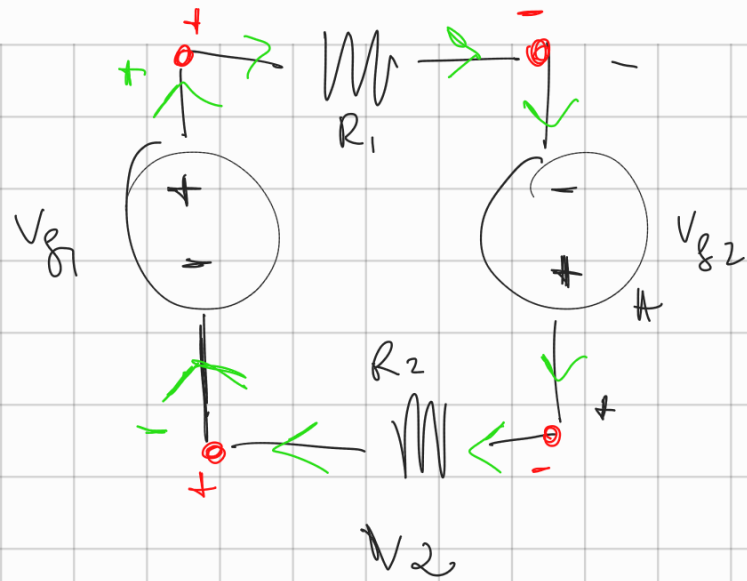
$$r_3 = \frac{R_1 \cdot R_2}{R_1 + R_2 + R_3} = 6 \Omega$$

$$r_1 = \frac{R_2 \cdot R_3}{36} = 3 \Omega$$

$$r_2 = \frac{R_1 \cdot R_3}{36} = 2 \Omega$$

$$r_1 + r_4 = 10 \Omega \quad \parallel \quad 5 \Omega = \frac{35}{12}$$

N_1



$$R_1 = 2 \Omega$$

$$R_2 = 3 \Omega$$

$$V_{g1} = 15 \text{ V}$$

$$V_{g2} = 10 \text{ V}$$

$$-V_{g1} + V_1 - V_{g2} - V_2$$

i.e. KVL

$$V_1 = V_{g1} + V_{g2} + V_2$$

$$i = \frac{V_1}{R_1} = -\frac{V_2}{R_2}$$

$$\frac{V_1}{R_1} = -\frac{V_2}{R_2}$$

$\Rightarrow$

$$V_2 = -\frac{V_1 R_2}{R_1}$$

$$V_1 = V_{g1} + V_{g2} - \frac{V_1 R_2}{R_1}$$

$$V_1 + \frac{V_1 R_2}{R_1} = V_{g1} + V_{g2}$$

$$\frac{V_1 R_1 + V_1 R_2}{R_1} = V_{g1} + V_{g2}$$

$$\Rightarrow V_1 (R_1 + R_2) = R_1 (V_{g1} + V_{g2})$$

$$\Rightarrow V_1 = \frac{R_1 (V_{g1} + V_{g2})}{R_1 + R_2}$$

$$\Rightarrow V_1 = \frac{2(25)}{5} = 10 \text{ V}$$

$$\Rightarrow V_2 = -15 \text{ V}$$

$$P_{G1} = V_1 \cdot i \quad i = 5 \text{ A}$$

$$P_{G1} = 50 \text{ W}$$

$$P_{G2} = V_2 \cdot i' = -7$$

$$i_1 = \frac{V_1}{R_1} = 5 \text{ A}$$

$$P_1 = 5 \text{ A} \cdot 10 \text{ V} = 50 \text{ W}$$

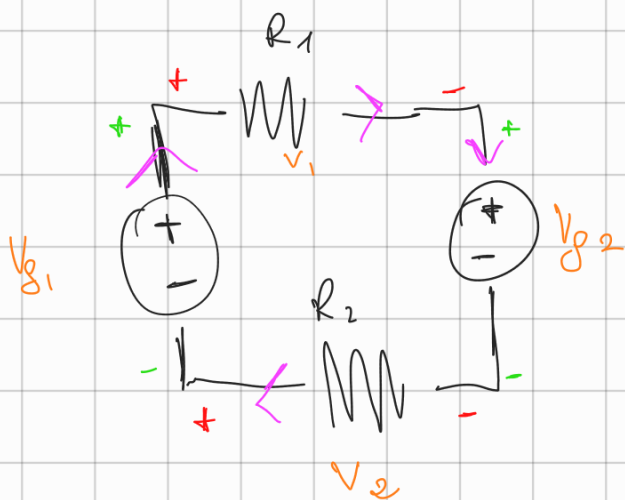
R_1 onale 50 W

$$i_2 = - \frac{V_2}{R_2} = - \frac{-15}{3} = 5A$$

$$P_2 = R_2 i_2^2 = 3 \cdot 25 = 75W$$

$$P_{g1} = 15 \cdot 5A = 75W$$

$$P_{g2} = 50W$$



$$V_1 = R_1 i$$

$$V_2 = R_2 i$$

$$\text{KVL} - V_{g1} + V_1 + V_{g2} - V_2 = 0$$

$$i = \frac{V_1}{R_1} = \frac{V_2}{R_2}$$

$$V_1 = - \frac{V_2}{R_2} R_1$$

$$- \frac{V_2}{R_2} R_1 - V_2 = V_{g1} - V_{g2}$$

$$-V_2 R_1 - V_2 R_2 = R_2 (V_{g1} - V_{g2})$$

$$V_2 (-R_1 - R_2) = \frac{5 \cdot 3}{-5} =$$

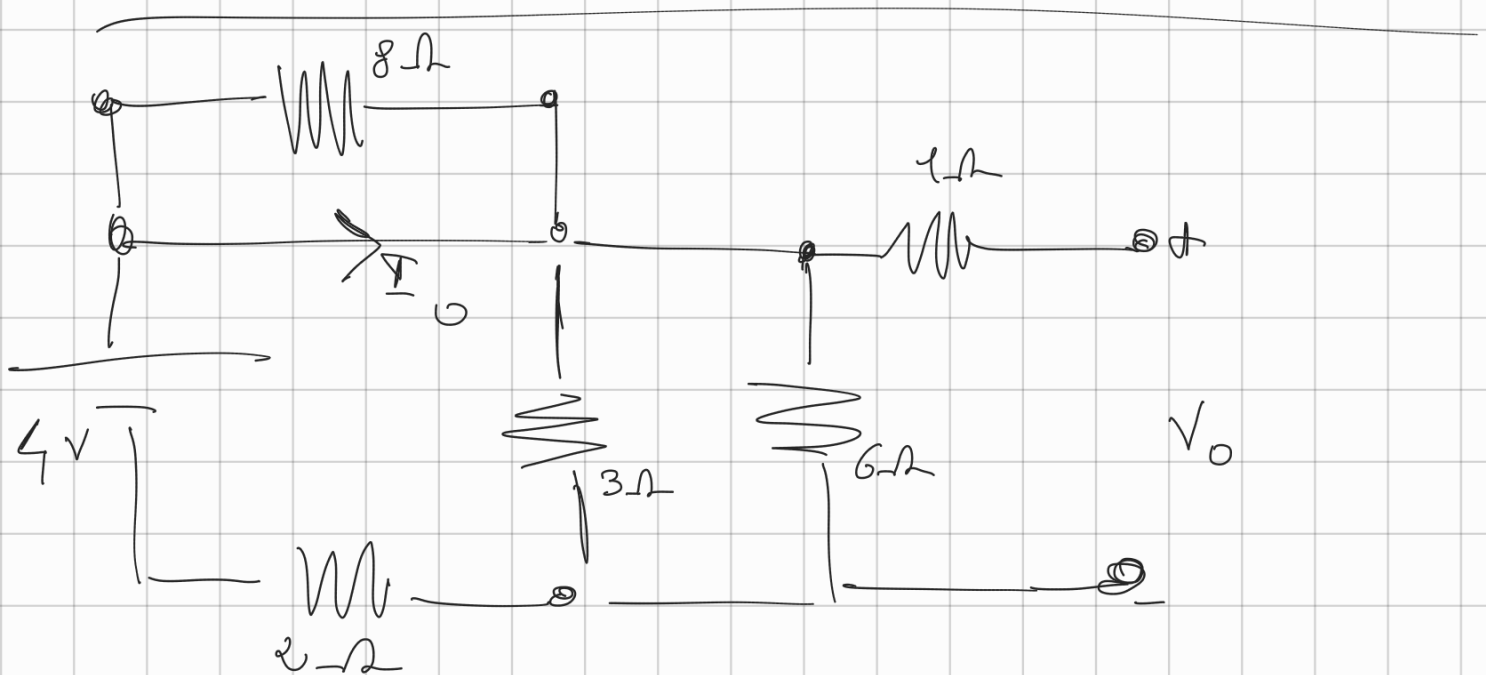
$$V_2 = -3 \text{ V}$$

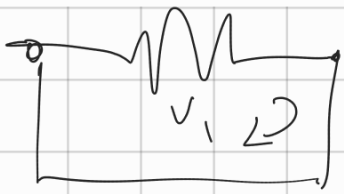
$$V_1 = 2 \text{ V}$$

$$P_1 = V_1 \cdot i = 2 \text{ W}$$

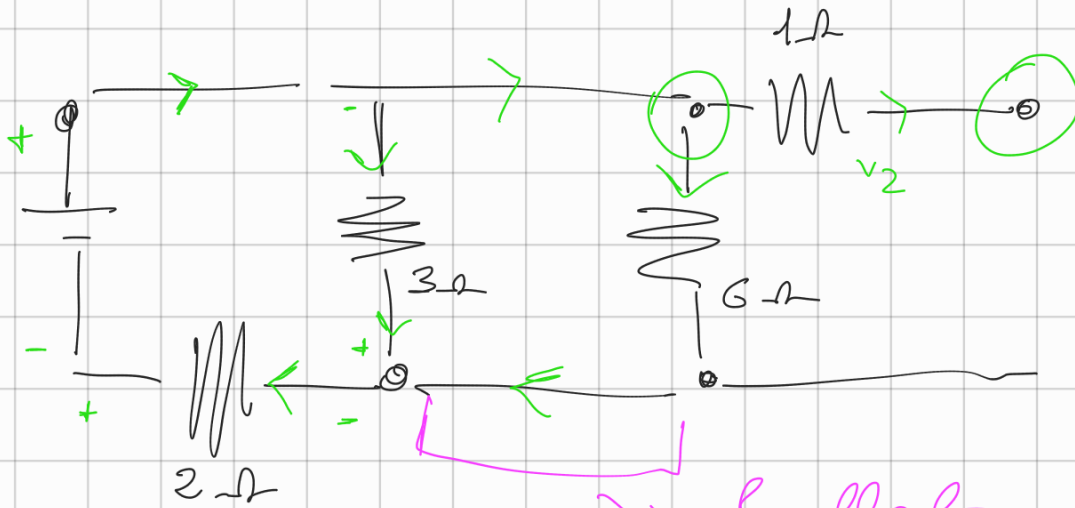
$$P_2 = V_2 \cdot i = 3 \text{ W}$$

$$P_{g1} = 15 \text{ W} \quad P_{g2} = 10 \text{ W}$$





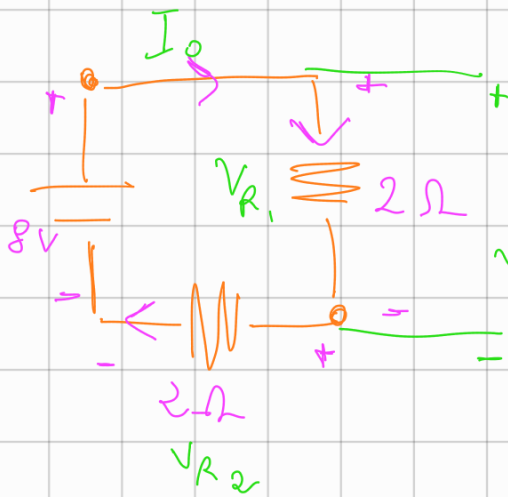
$$V_1 = 0V, \Rightarrow i_1 = 0A$$



$$i_2 = 0, \Rightarrow V_2 = 0$$

parallel

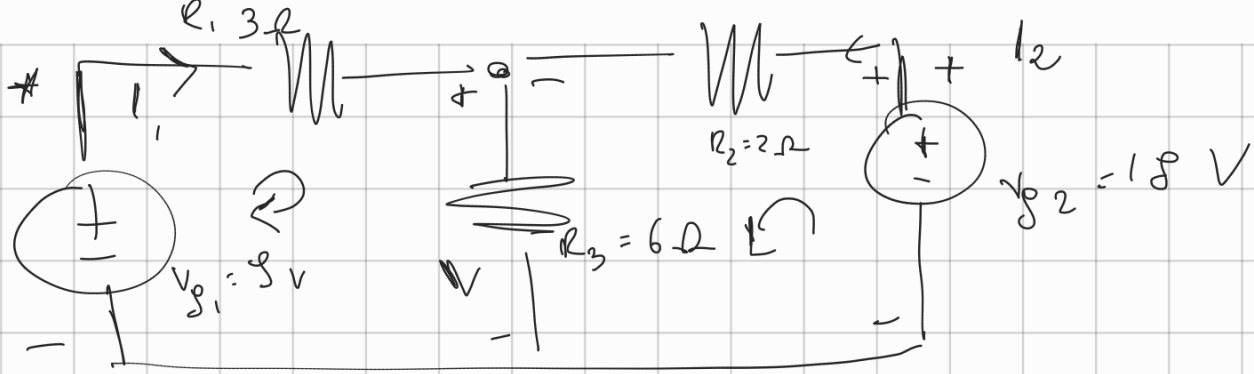
$$\frac{1}{\frac{1}{3} + \frac{1}{6}} = \frac{1}{\frac{2+1}{6}} = 2$$



$$V_{R2} = 2\Omega \cdot I_0$$

$$V_0 = 2\Omega I_0 + 2\Omega I_0$$

$$\frac{V_0}{4} = I_0 = 1A \quad V_0 = 4V$$



$$V = 12V$$

$$v_{g1} = i_1 R_1 + V = 3i_1 + 12 = 9$$

$$3i_1 = -3 \Rightarrow i_1 = -1A$$

$$-v_{g2} + R_2 i_2 + 12 = 0 \Rightarrow i_2 = \frac{18 - 12}{2} = 3A$$

$$P_{g1} = -9W$$

$$P_{g2} = 18 \cdot 3 = 54$$