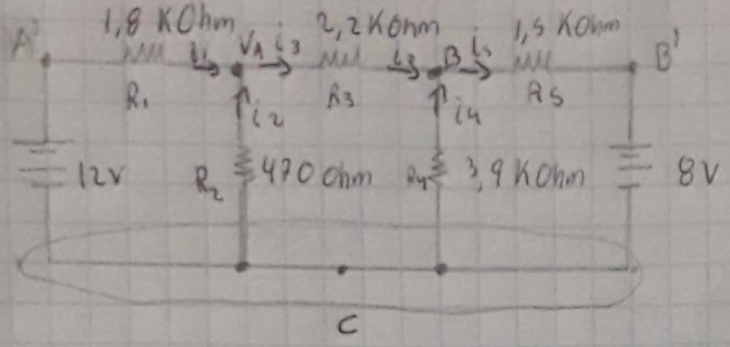
Mida cada uno de los voltajes de nodo



Nodo A

$\Sigma i = 0 \Rightarrow i_1 + i_2 - i_3 = 0$

$i_1 = \frac{V_1}{R_1} \quad i_2 = \frac{V_2}{R_2} \quad i_3 = \frac{V_3}{R_3} \quad V_1 = V_{A'} - V_A \quad V_2 = V_C - V_A \quad V_3 = V_A - V_B$

$\frac{V_{A'} - V_A}{R_1} + \frac{V_C - V_A}{R_2} - \frac{V_A - V_B}{R_3} = 0 \Rightarrow \frac{12 - V_A}{1800} + \frac{0 - V_A}{470} - \frac{V_A - V_B}{2200}$ Ecuación ①

Nodo B

$\Sigma i = 0 \Rightarrow i_3 + i_4 - i_5$

$i_3 = \frac{V_3}{R_3} \quad i_4 = \frac{V_4}{R_4} \quad i_5 = \frac{V_5}{R_5} \quad V_3 = V_A - V_B \quad V_4 = V_C - V_B \quad V_5 = V_B - V_{B'}$

$\frac{V_A - V_B}{R_3} + \frac{V_C - V_B}{R_4} - \frac{V_B - V_{B'}}{R_5} \Rightarrow \frac{V_A - V_B}{2200} + \frac{0 - V_B}{3900} - \frac{V_B - 8}{1500}$ Ecuación ②

Sistema de ecuaciones

$\frac{12 - V_A}{1800} - \frac{V_A}{470} - \frac{V_A - V_B}{2200} = 0$

$\frac{12}{1800} - \frac{V_A}{1800} - \frac{V_A}{470} - \frac{V_A}{2200} + \frac{V_B}{2200} = 0$

$\frac{V_B}{2200} - V_A\left(\frac{1}{1800} + \frac{1}{470} + \frac{1}{2200}\right) + \frac{1}{150} = 0$

$$\frac{V_B}{2200} - V_A\left(\frac{73}{23265}\right) + \frac{1}{150} = 0 \quad (1)$$

$$\frac{V_A - V_B}{2200} - \frac{V_B}{3900} - \frac{V_B - 9}{1500} = 0$$

$$\frac{V_A}{2200} - \frac{V_B}{2200} - \frac{V_B}{3900} - \frac{V_B}{1500} + \frac{8}{1500} = 0$$

$$\frac{V_A}{2200} - V_B\left(\frac{1}{2200} + \frac{1}{3900} + \frac{1}{1500}\right) + \frac{2}{375} = 0$$

$$\frac{V_A}{2200} - V_B\left(\frac{197}{143000}\right) + \frac{2}{375} = 0$$

$$V_A = \left[V_B\left(\frac{197}{143000}\right) - \frac{2}{375}\right] 2200 \quad (2)$$

(2) en (1)

$$\frac{V_B}{2200} - 2200\left[V_B\left(\frac{197}{143000}\right) - \frac{2}{375}\right]\left(\frac{73}{23265}\right) + \frac{1}{150} = 0$$

$$\frac{V_B}{2200} - 9,5098 \times 10^{-3} + \frac{1168}{31725} + \frac{1}{150} = 0$$

$$9,05528 \times 10^{-3} V_B = \frac{2759}{63450} \qquad V_B = 4,802\,[V]$$

$$V_A = \left[4,802\left(\frac{197}{143000}\right) - \frac{2}{375}\right] 2200 = 2,820\,[V]$$

$$V_A = 2,820\,[V] \qquad V_B = 4,802\,[V]$$