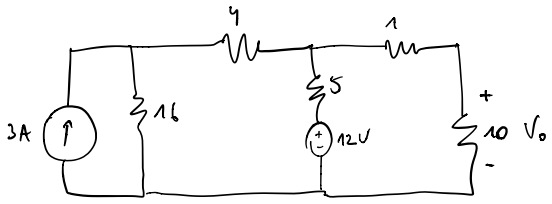
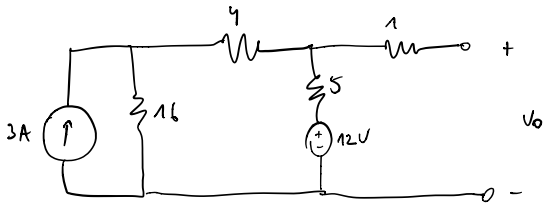
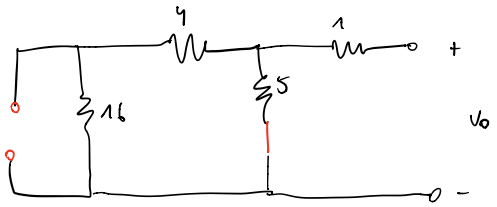
Exercice 2



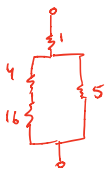


- Trouver l'équivalent de Thévenin :

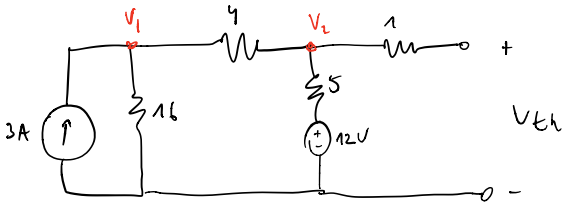
R_{eq} = ? ↠ Il faut annuler toutes les sources. Les sources de courants deviennent des circuits ouverts, et les sources de tension sont court-circuitées.



$R_{eq} = 1\,\Omega + (20 \,//\, 5) = 5\,\Omega$



V_{th} = ? ↠ Trouver la ddp aux bornes de l'équivalent.

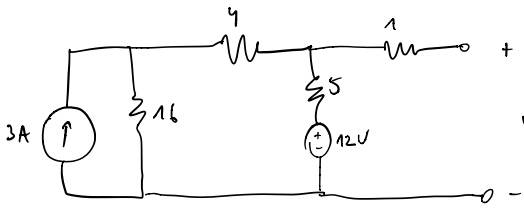


① $3A = \frac{V_1}{16} + \frac{V_1 - V_2}{4} \iff 48 = 5V_1 - 4V_2$

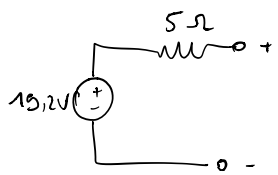
② $\frac{V_1 - V_2}{4} + \frac{12 - V_2}{5} = 0 \iff 48 = -5V_1 + 9V_2$

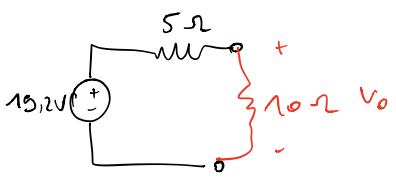
$V_2 = 19{,}2\ V.$

Donc par le théorème de Thévenin :



Vo ⟺



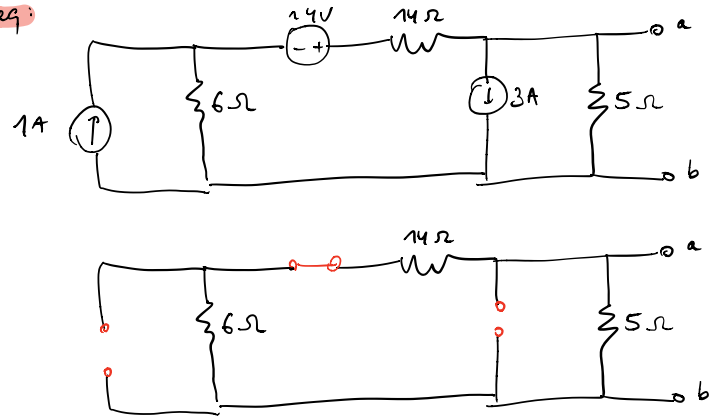


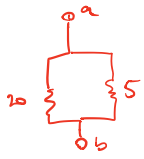
Diviseur de tension : $\boxed{V_o = \frac{10}{15}\,19{,}2 = 12{,}8\ V}$

Exercice 2 :

Thévenin :

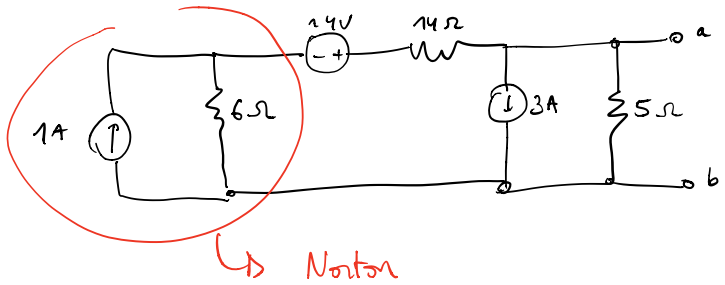
Req :



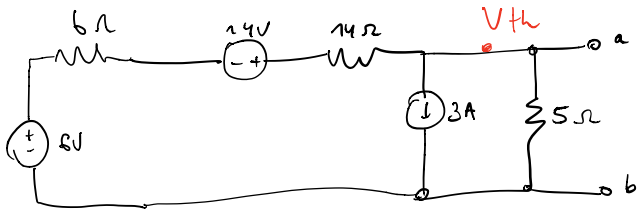


$Req = (20 // 5) = 4\Omega$

V_{th} =



↳ Norton

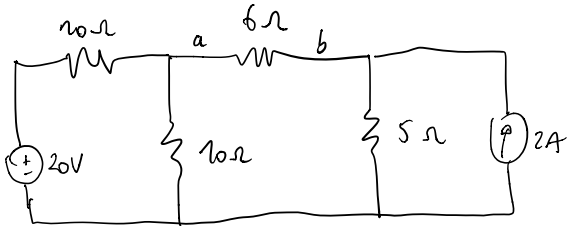


$\frac{14 + 6 - V_{th}}{20} = 3 + \frac{V_{th}}{5} \Leftrightarrow V_{th} = -8V$

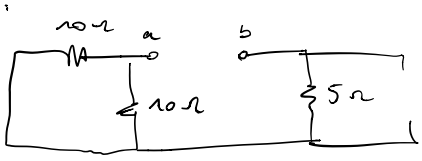
Finalement :

$V_{th} = -8V$, $R_{th} = R_N = 4\Omega$, $I_N = -2A$.

Exercice 3:

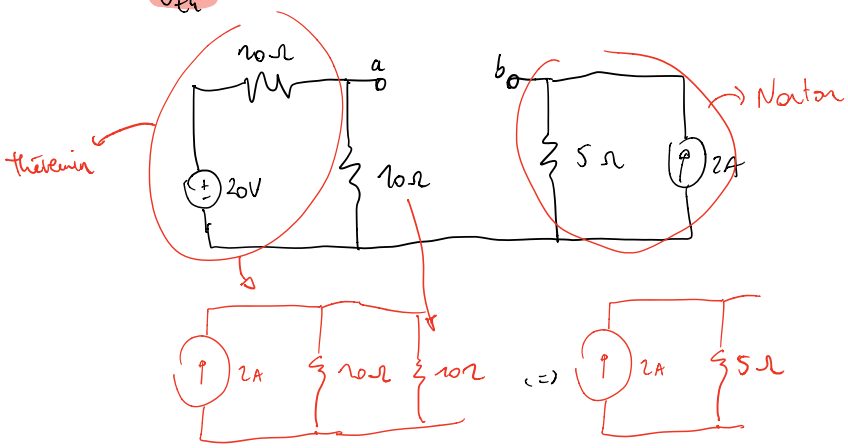


R_{th} :



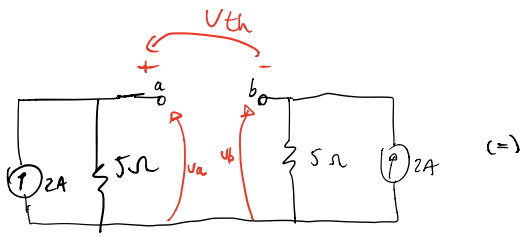
$R_{th} = (10 // 10) + 5 = 10\ \Omega$

V_{th}



$V_b = 2 \times 5 = 10\ V$

$\Leftrightarrow V_a = 2 . (10 // 10) = 10\ V$



$\Leftrightarrow$

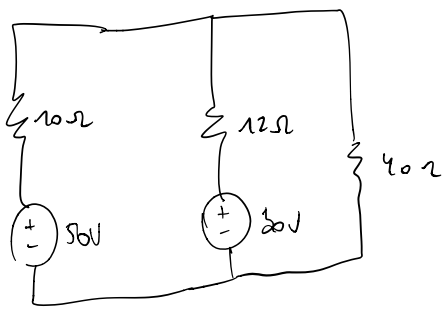
$V_{th} - V_a + V_b = 0 \Leftrightarrow V_{th} = 0\ V$

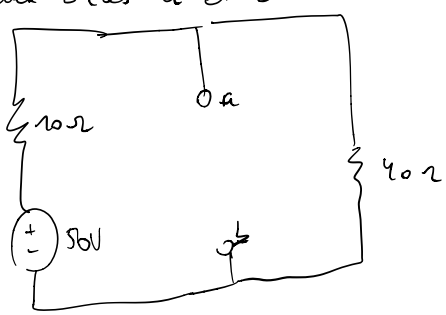
Finalement.

$i_x = 0\ A.$

Exercice 4

D'abord, trouvons l'équivalent de Thévenin aux bornes a et b:



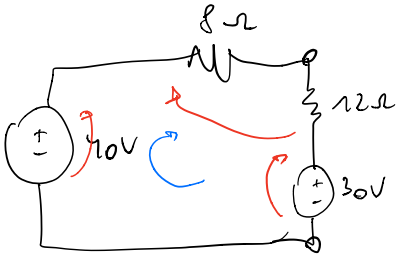


$R_{eq} = 40 // 10 = 8\ \Omega$

$V_{th} =$

$$\frac{50 - V_{th}}{10} = \frac{V_{th}}{40} \Leftrightarrow \frac{5V_{th}}{40} = 50 \Leftrightarrow V_{th} = 40\ V$$

En utilisant l'équivalent de Thévenin, le circuit peut se réécrire comme:



En utilisant la loi de Kirchhoff:

$30V - 40V + (8+12) \cdot i = 0 \quad \Leftrightarrow \quad i = 500\,mA.$