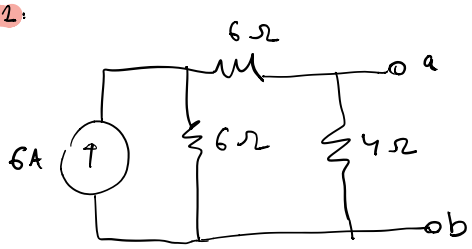
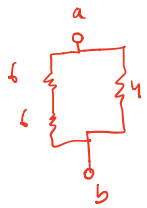
Exercice 1 :

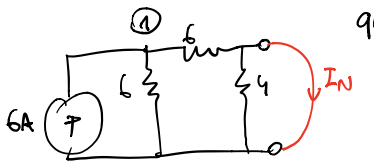


① R_{eq} = ? Comme pour les équivalents de Thévenin il faut annuler les sources.



$R_{eq} = (6+6) \,//\, 4 = 3\ \Omega$

② I_N = ? On court-circuite les bornes, la résistance de 4 Ω est court-circuitée ; le courant qui la traverse est nul.

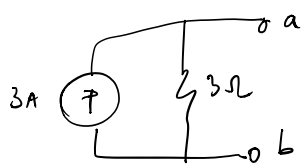


(↳ Pour s'en convaincre : court-circuiter (=) la diff de potentiel aux bornes de la résistance est nulle, et $i = \frac{V}{R} = 0\ A$)

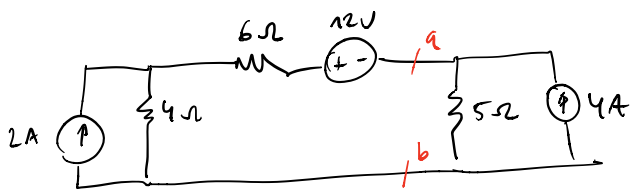
I_N = Diviseur de courant entre deux résistance de 6 Ω

$$I_N = \frac{6}{12} \cdot 6A = 3A.$$

Équivalent de Norton :



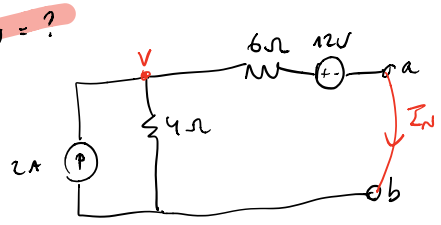
Exercice 2



R_{eq} = ?

$$R_{eq} = 6\ \Omega + 4\ \Omega = 10\ \Omega$$

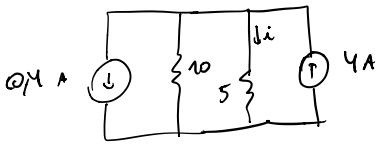
I_N = ?



$2 = \frac{V}{4} + \frac{V-12}{6} \Leftrightarrow V = 9.6V$

$I_N = \frac{V-12}{6} = -0,4\ A$

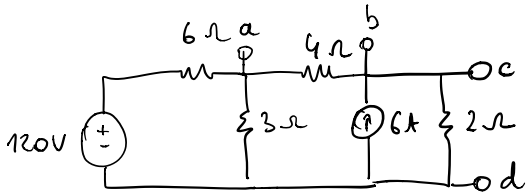
$i = ?$



Current divider:

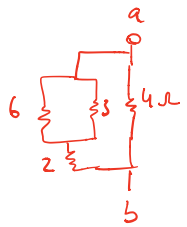
$$i = \frac{10}{15} \cdot (4 - 0{,}4) = 2.4\ A$$

Exercici 3:



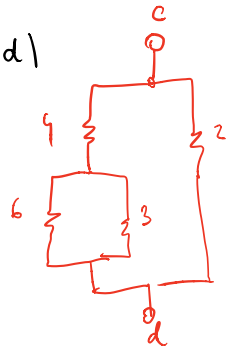
$R_{eq} = ?$

a-b)



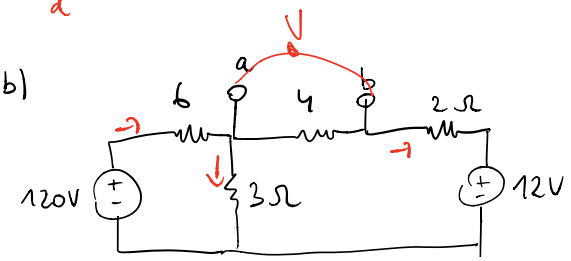
$$R_{eq} = ((6 \,//\, 3) + 2) \,//\, 4 = 2\ \Omega$$

c-d)



$$R_{eq} = 2 \,//\, (4 + 6 \,//\, 3) = 1{,}5\ \Omega$$

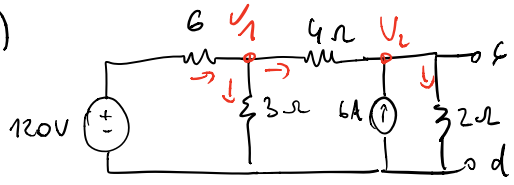
$I_N = ?$ a-b)



$$\frac{120 - V}{6} = \frac{V}{3} + \frac{V - 12}{2} \quad \Rightarrow V = 26\ V$$

$$I_N = \frac{V - 12}{2} = 7\ A$$

c-d)



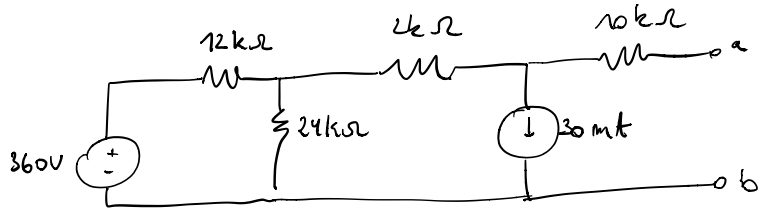
$$\frac{120 - V_1}{6} = \frac{V_1}{3} + \frac{V_1 - V_2}{4}$$

$$\frac{V_1 - V_2}{4} + 6 = \frac{V_2}{2}$$

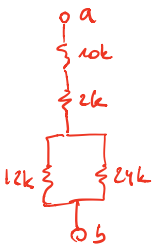
$$V_1 = 33\ V \quad \text{et} \quad V_2 = 19\ V$$

$$I_N = \frac{V_2}{R_{eq}} = \frac{19}{1{,}5} = 12{,}667\ A$$

Exercice 4:

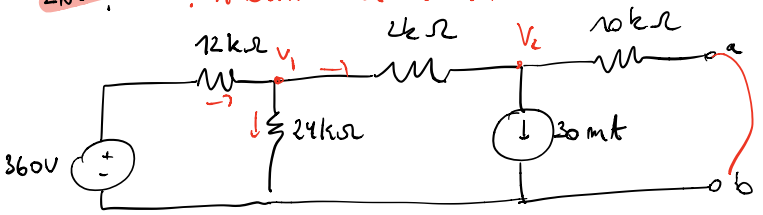


Req ?



Req = 14 kΩ

I_N = ? ! Attention aux unités !



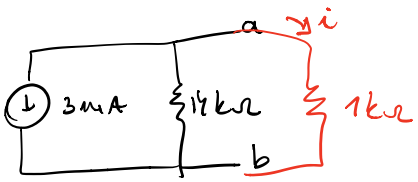
[mA] [mA] [mA]

$\frac{360 - V_1}{12} = \frac{V_1}{24} + \frac{V_1 - V_2}{2}$ $\quad V_1 = 24\,V$

$\frac{V_1 - V_2}{2} = \frac{V_2}{10} + 30$ $\quad V_2 = -30\,V$

$I_N = \frac{-30\,V}{10k\Omega} = -3\,mA$

Equivalent:



$i = \frac{14}{15} \cdot -3\,mA = -2{,}8\,mA$

$V_0 = -2{,}8\,mA \cdot 1k\Omega = -2{,}8\,V.$