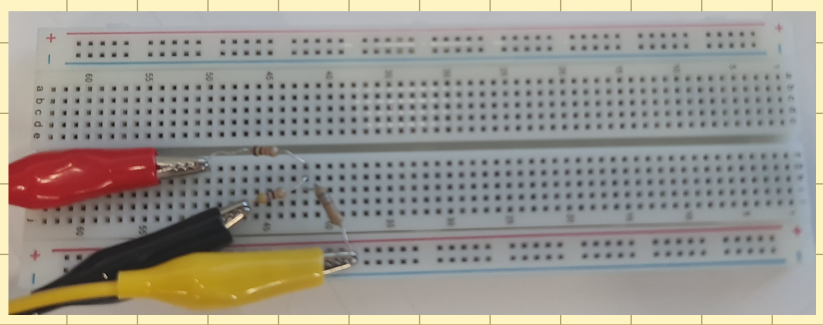
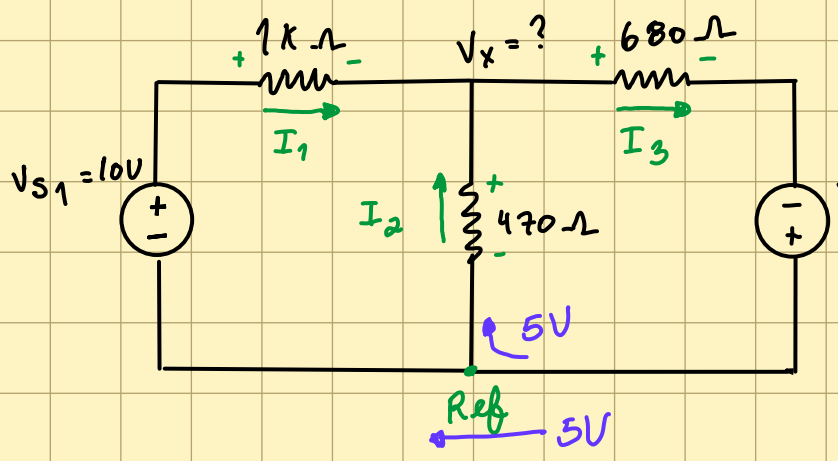
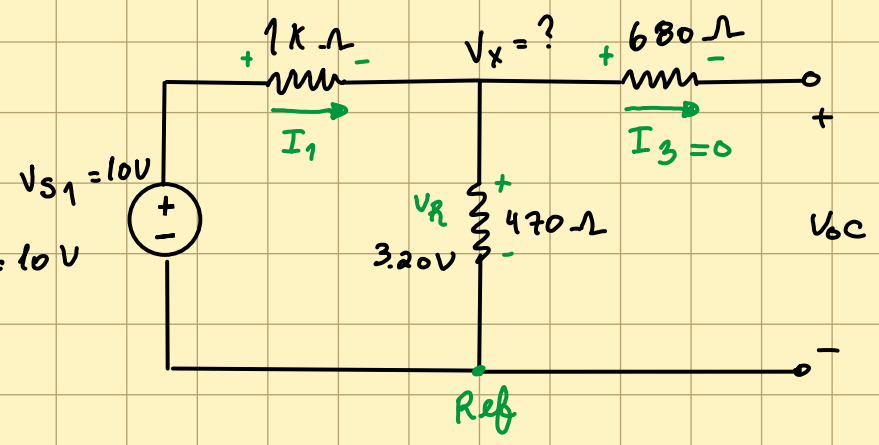
3.1.a)



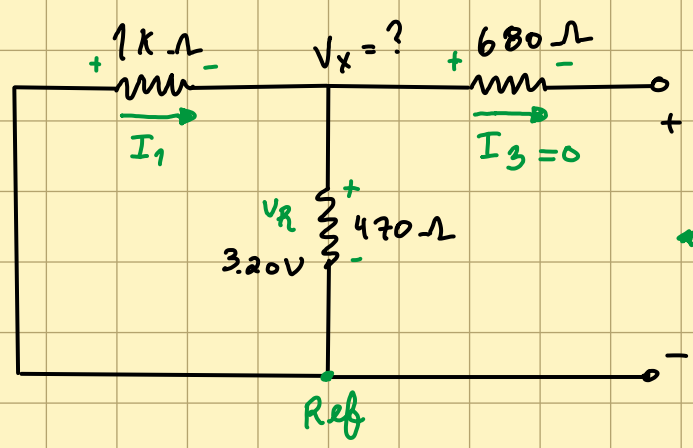
Com o multímetro na resistência, a medição foi $V_x = -1.0\ V$

3.1.b)

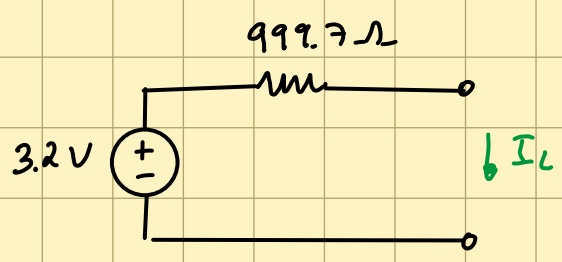




$$V_{OC} = V_R = \frac{470}{470+1000}\,10 \simeq 3.20\ V$$



$$R_{eq} = 1000 // 470 + 680 = \frac{1000 \cdot 470}{1470} + 680 = 999.7\ \Omega$$



$$I_L = \frac{3.2\ V}{999.7\ \Omega} = 0,0032\ A$$

3.1.c)

$P_D = U.i$, Com $U = R.i$ →

$$\begin{cases} P_D = U.i \\ P_D = R.i^2 \\ P_D = \dfrac{U^2}{R} \end{cases}$$

$$P_{D_1} = \frac{5^2\ V}{470\ \Omega} = 0.0532\ W$$

$$P_{D_2} = \frac{15^2\ V}{1K\ \Omega} = 0.225\ W$$

$$P_{D_3} = 680 \times 0.225^2 = 0.425\ W$$

3.1.d)

$V_{xA} = 2.30\ V$

$V_{xB} = -3.28\ V$

$V_x = V_{xA} + V_{xB} = 2.38 - 3.28 = -1.02\ V$

3.2.a) $V_o = \frac{R_2}{R_1+R_2} V_S \Leftrightarrow 8.8 = \frac{R_2}{3.3k+R_2} . 15V \Leftrightarrow 8.8(3.3k+R_2) = R_2 . 15V$

$\Leftrightarrow 8.8 \times 3.3 + 8.8 \times R_2 = R_2 \times 15 \Leftrightarrow 29.040 = 15 \times R_2 - 8.8 \times R_2$

$\Leftrightarrow R_2 = \frac{29.040}{6.2} \Leftrightarrow R_2 \approx 4.7 k\Omega$

↳ resistência a usar

- Valor medido:

$V_{oR_2} = 8.75 V$ → Valor medido nos terminais de R_2

3.2.b)

- Remove-se a resistência R_2 e substitui-se por R_i
- V_o com $R_i = 10\Omega$ → 11.22V
- V_o com $R_i = 2.2\Omega$ → 5.97V

} Lei de Ohm, quanto menor a resistência, menor a voltagem e vice-versa

Nota 1: Para medir a corrente, tem de ser com o circuito aberto

Nota 2: 15V com 2 resistências em série, dá cerca de metade da voltagem

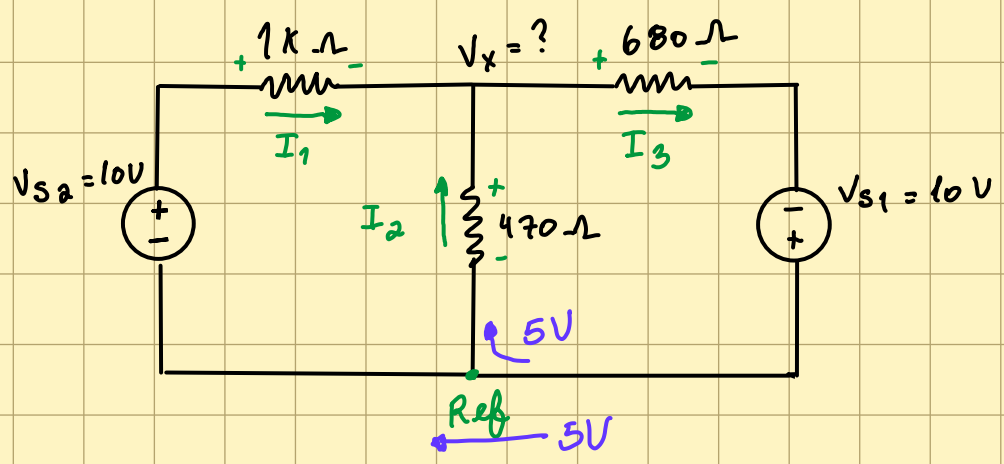
3.2.c)

3.2.d)

$I_{sc} = 1.89 mA$

$V_{oc} = 15V$

$I = \frac{15}{3.3+4.7} = \frac{15}{8} = 1.875 mA$ ← circuito aberto



$$I_1 = \frac{10 - V_x}{1000} \quad , \quad I_2 = \frac{5}{470\,\Omega}$$

$$I_3 = \frac{-10\,V - V_x}{680\,\Omega}$$

$$I_1 + I_2 - I_3 = 0$$

$$\Leftrightarrow \frac{10 - V_x}{1000} + \frac{5}{470} - \frac{-10 - V_x}{680} = 0 \Leftrightarrow V_x \approx 1{,}31\ V$$