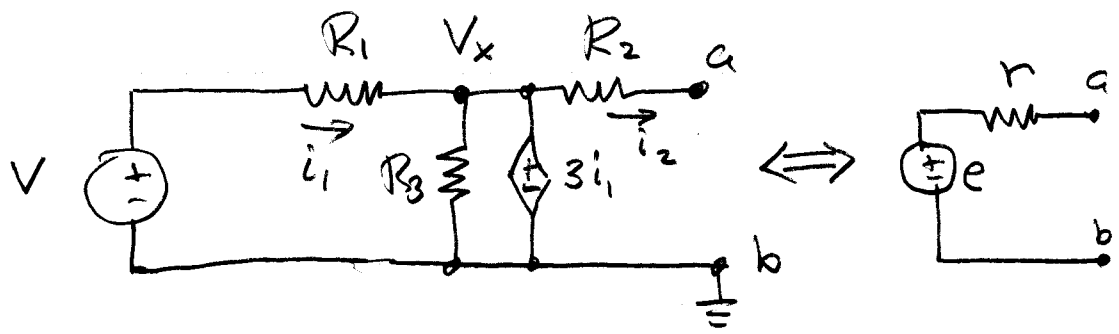
Find Thévenin equiv : (S.I. units)



(G) Find $V_{oc} = V_{th} \equiv e$

$= V_x$ since $i_2 = 0$

$V - V_x = i_1 R_1$, $V_x = 3 i_1$

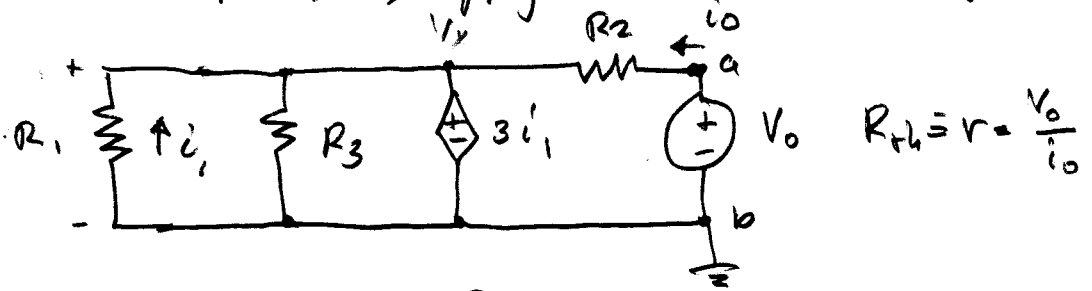
[note units: V_x (volts) $= 3 \frac{\text{Volts}}{\text{Amps}} i_1$(A)]

(unit is Ohms)

$V - V_x = \frac{V_x}{3} R_1$

$V_x = \frac{V}{1 + \frac{R_1}{3}} = \frac{3V}{R_1 + 3}$

(b) Find $R_{th} = r$. Set indep. sources to 0, leave dep. as-is, apply source if necessary.



$R_{th} = r = \frac{V_0}{i_0}$

Eliminate V_x, i_1, find $\frac{V_0}{i_0} = r$.

$\frac{V_0 - V_x}{R_2} = i_0$, $V_x = 3i_1$, $V_x = -i_1 R_1$ (note sign)

$3i_1 = -i_1 R_1 \Rightarrow i_1(3+R_1) = 0$

$\Rightarrow i_1 = 0$

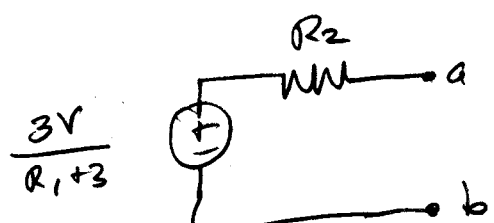
(unless $R_1 = -3$)

(assume R_1 is just a resistor)

(must be positive)

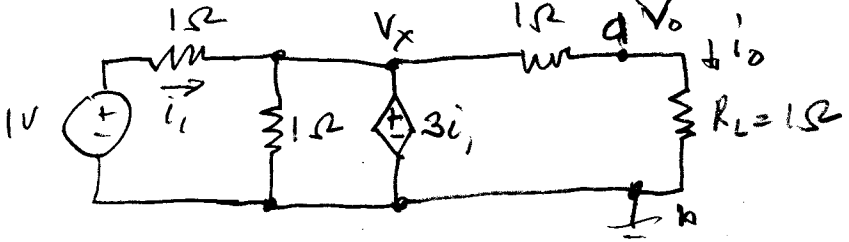
$V_x = 3i_1 \Rightarrow V_x = 0$.

$V_0 = i_0 R_2 \Rightarrow \frac{V_0}{i_0} = r = \underline{\underline{R_2}}$.



Check simple case: $V = 1V$, $R_1 = R_2 = R_3 = 1\Omega$

Connect $R_{Load} = 1\Omega$

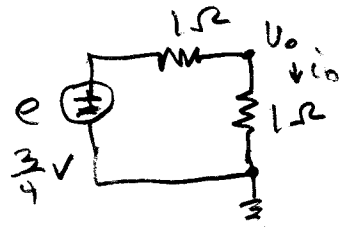


$\frac{1 - V_x}{1} = i_1$, $V_x = 3(\Omega) i_1$

$1 - V_x = \frac{V_x}{3} \Rightarrow V_x = \frac{3}{4} V$

$V_o = \frac{1}{2} V_n = \frac{3}{8} V$

$i_o = \frac{V_o}{R_L} = \frac{3}{8} A$



$V_o = \frac{3}{4} V$

$i_o = \frac{3}{8} A$