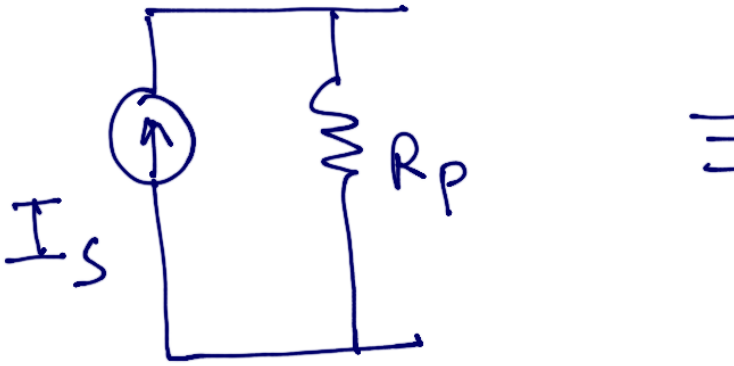
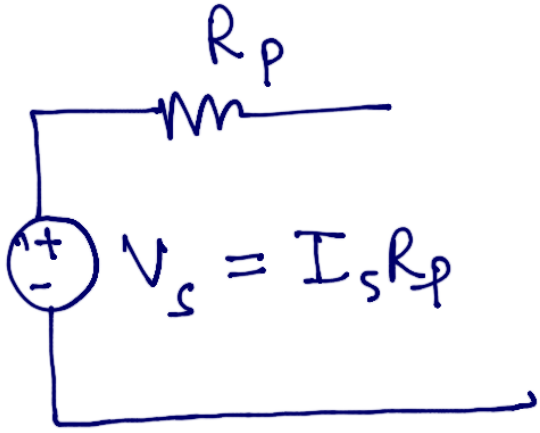
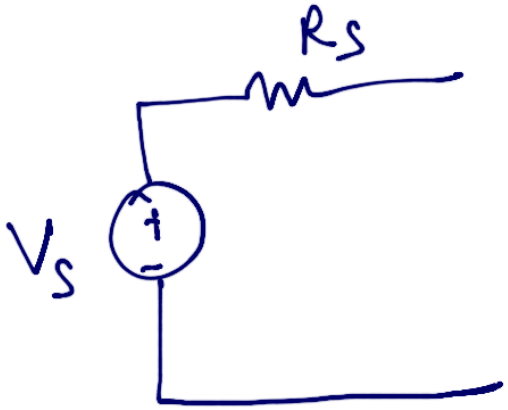


Current Source

$\equiv$

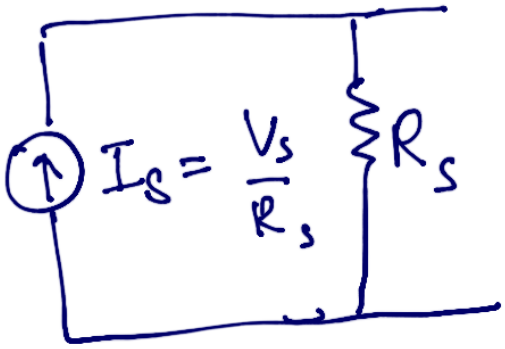


Voltage Source



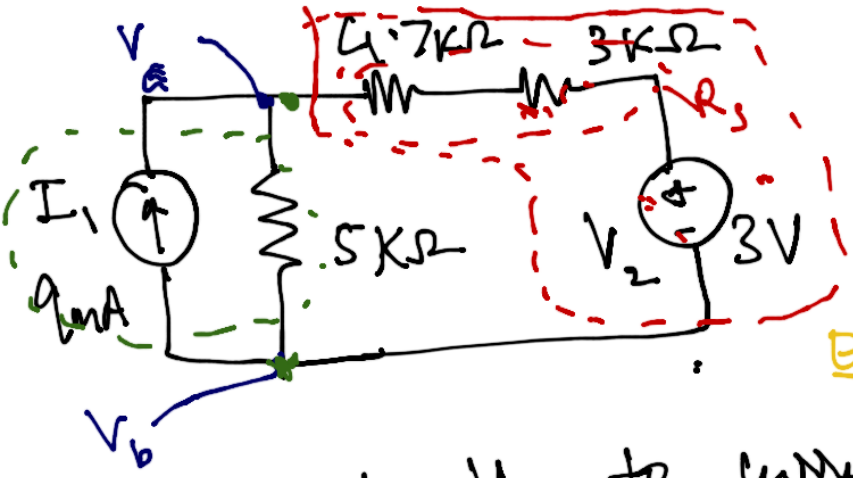
Voltage Source

$\equiv$



Source Transformation

Summary



$V_a V_b \rightarrow R_L$

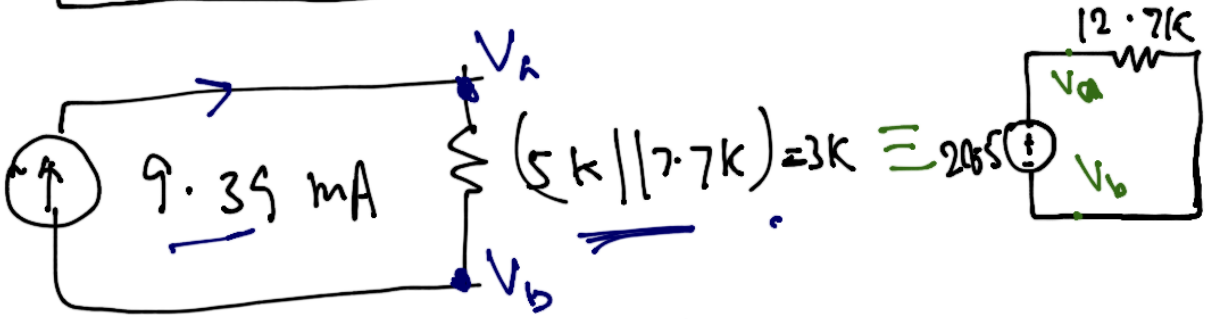
Example (Sowe transformation)

I Convert V_2 to current source I_2

$$I_2 = \frac{V_2}{4.7K + 3K} = \frac{3}{7.7K} = .39\,mA$$

$$R_{P_2} = 4.7K + 3K\Omega = 7.7K\Omega$$

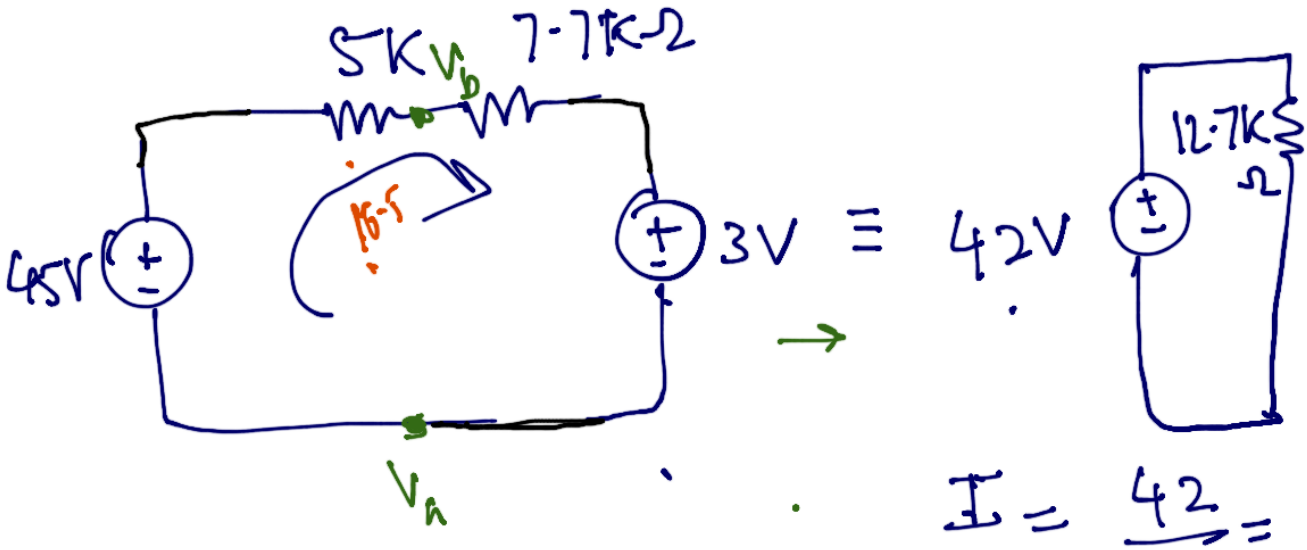
≡



II Convert I_1 to V_1 voltage source

$$V_1 = I_1 * R_p = 9mA * 5K\Omega = 45\,V$$

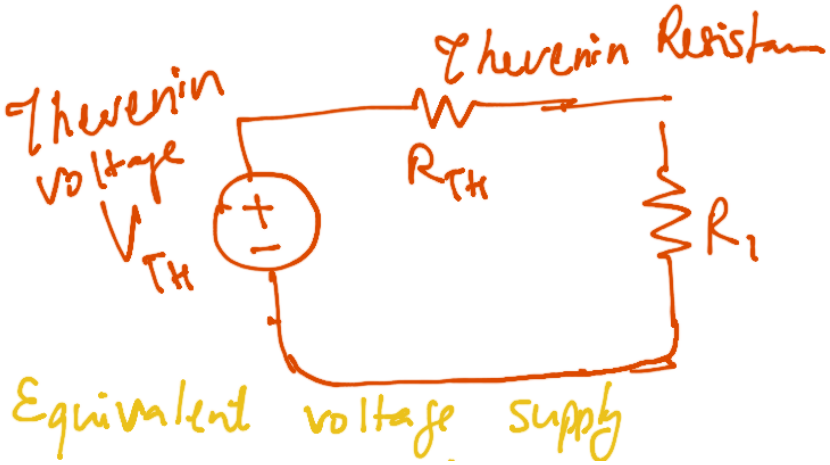
$$R_{S_1} = 5K\Omega$$

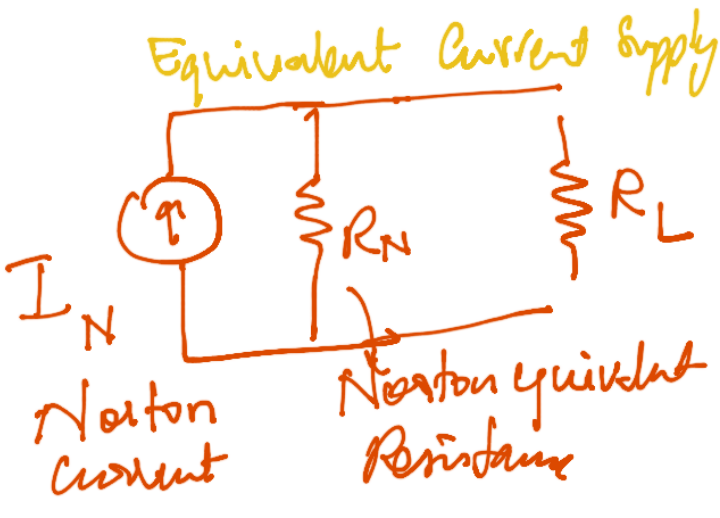


$$I = \frac{42}{12.7K} = 3.3\,mA$$

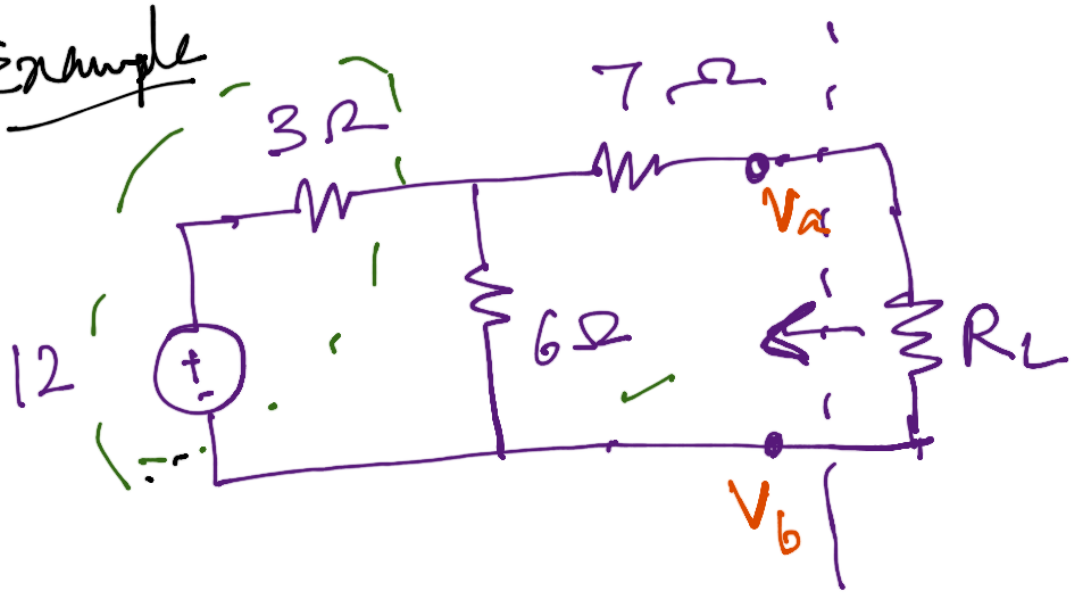
Norton & Thevenin Circuits

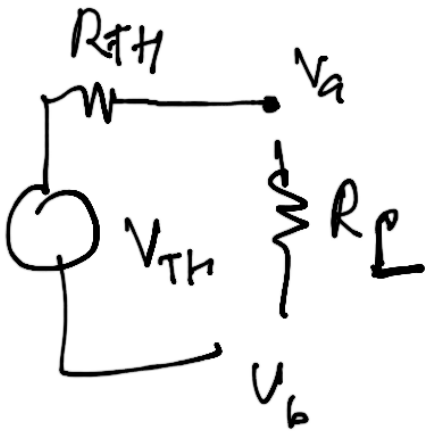
Supply System can be simplified across the load terminals.



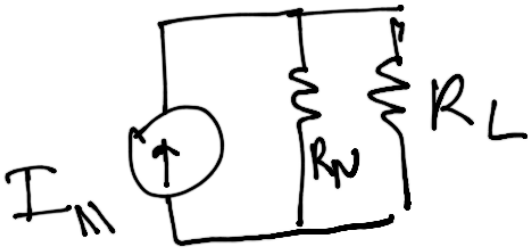


Example

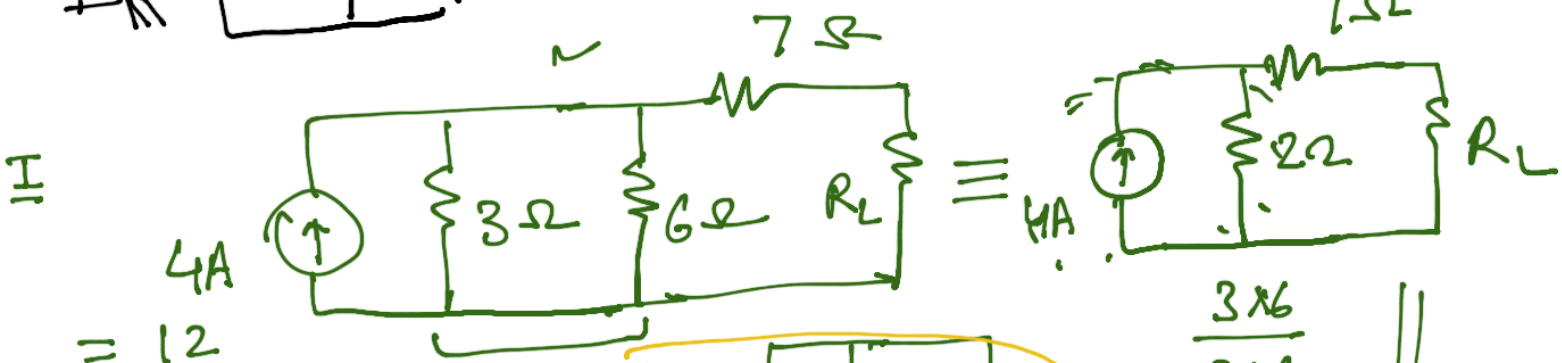




→ Between V_a & V_b what is the supply (V_{TH}, R_{TH}) or (I_N, R_N) ?



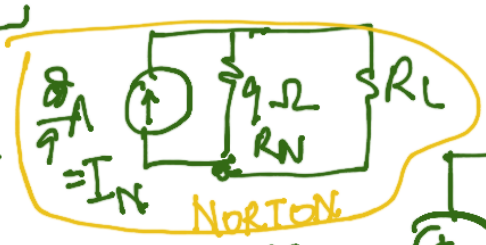
Thevenin & Norton are equivalent & interchangeable.



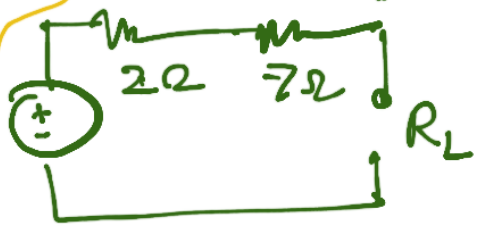
$= \frac{12}{3}$

$\frac{3 \times 6}{3+6}$

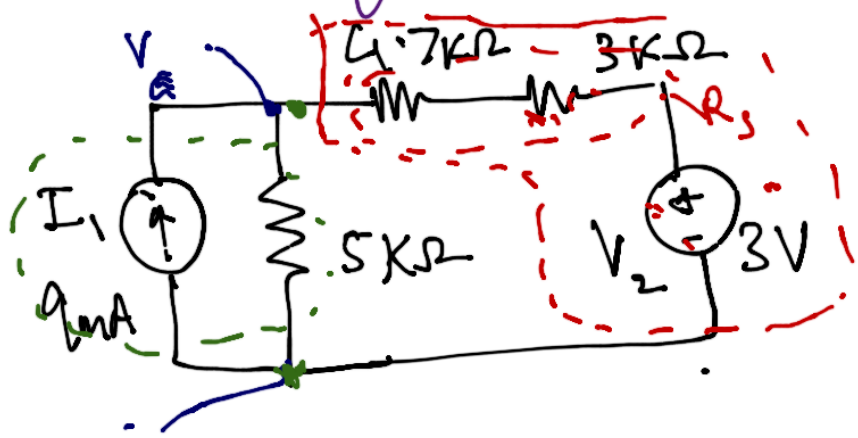
≡



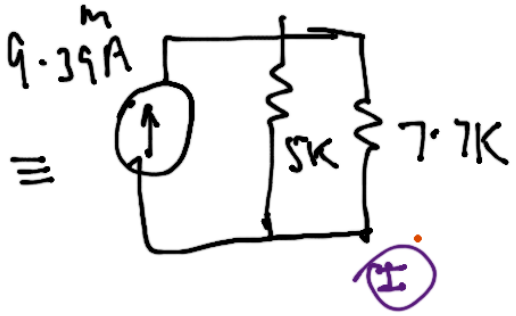
≡



Revisiting Circuits to evaluate drop across 5K



≡



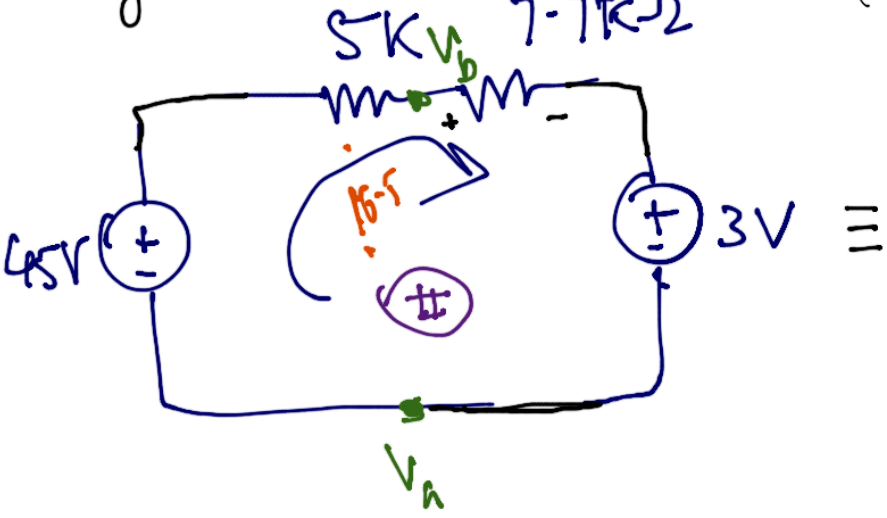
Voltage across 5K in (I) Equi ckt. $= \frac{7.7}{5+7.7} * 9.39 * 5K$

$= \underline{28.46\ V}$

$(V_a - V_b)$

Voltage across 5K in (II) Equi Ckt $= = 3 + \underbrace{7.7K * \frac{42}{5K+7.7K}}_{\text{Drop across } 7.7K} = 3 + \frac{7.7K * 42}{12.7}$

$= 3 + 25.46 = \underline{28.46V}$



≡

The drop across V_a & V_b points (original terminals of 5K) is same in both the simplification process.

HW: Please use KCL, KVL and verify the $(V_a - V_b)$ also.