Announcements

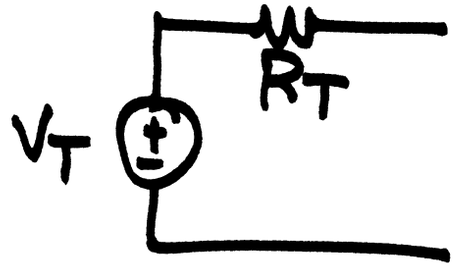
① bjh7 Ben Hothem (Glennan 519)
mxc106 Matt Cross
brian.inderhees
flm Glennan 518

② passwords
user: engr210
password: kirchoff

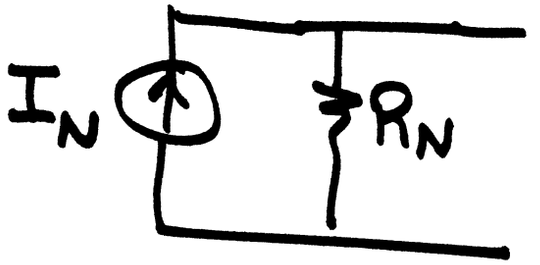
③ problem 5, current hw
(a) 9.876543 mA

④ new hw policy
hw due at beginning of class
NO LATE HW ACCEPTED.

Thevenin Equivalent Circuit

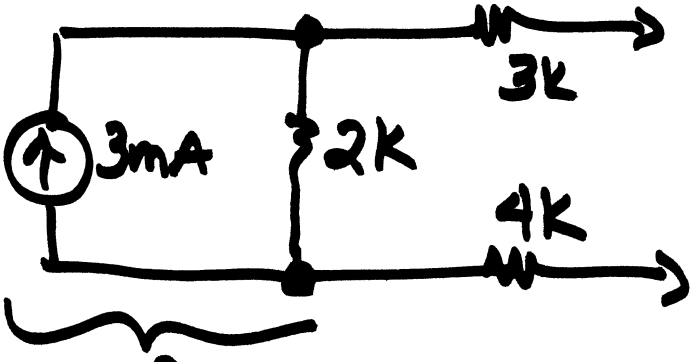


Norton Equivalent Circuit

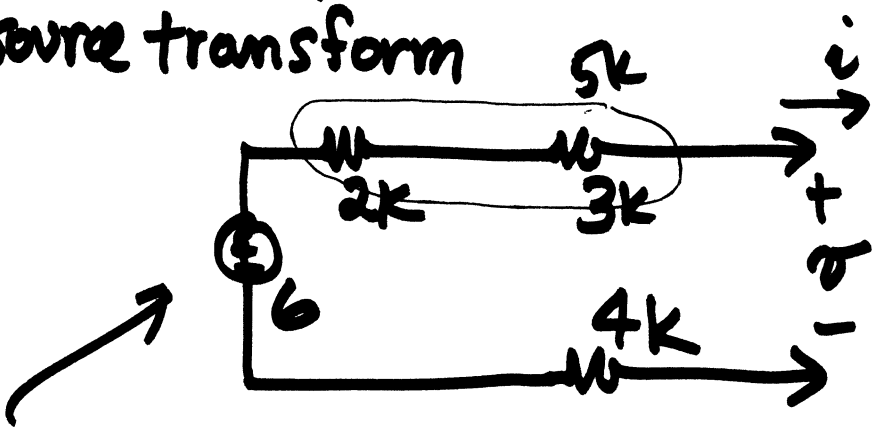


How to find equivalent circuits

1. transformation
2. mathematically equivalent circuits
3. Thevenin's Theorem
4. opencircuit voltage/short circuit current

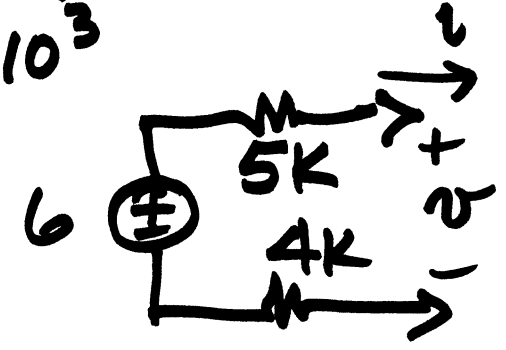


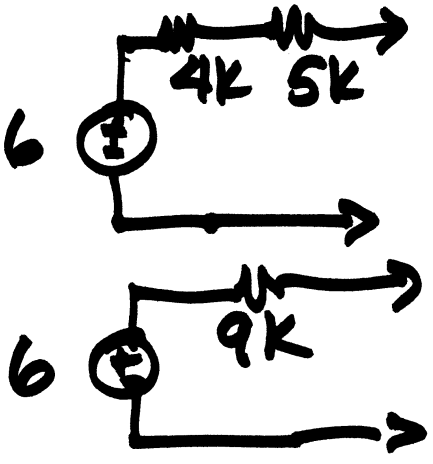
source transform



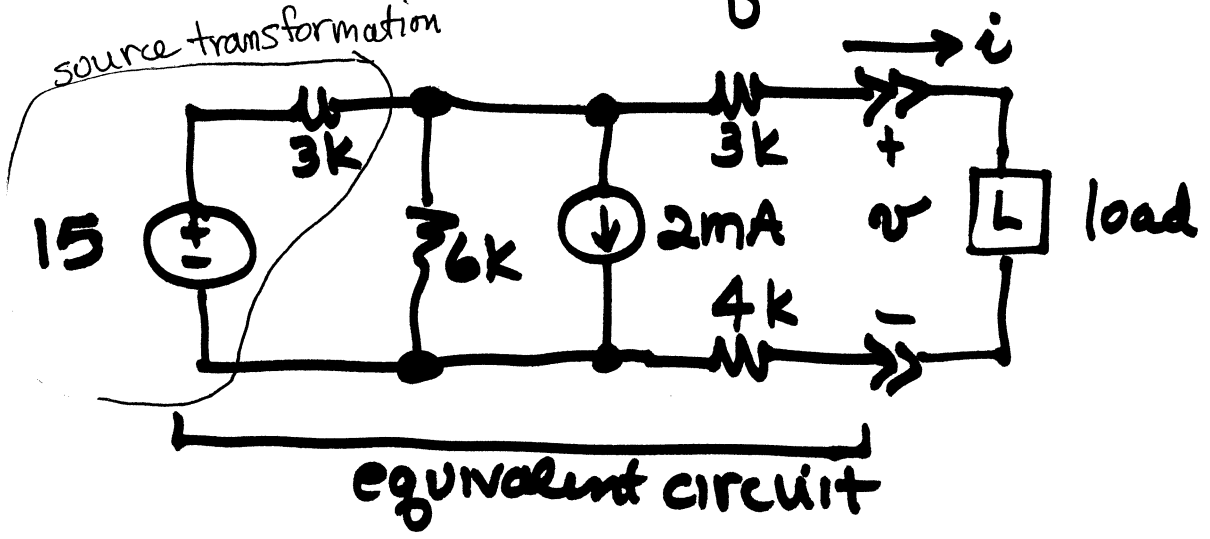
$V = iR = (3mA)(2k) = 6$ volts

10^{-3} 10^{3}

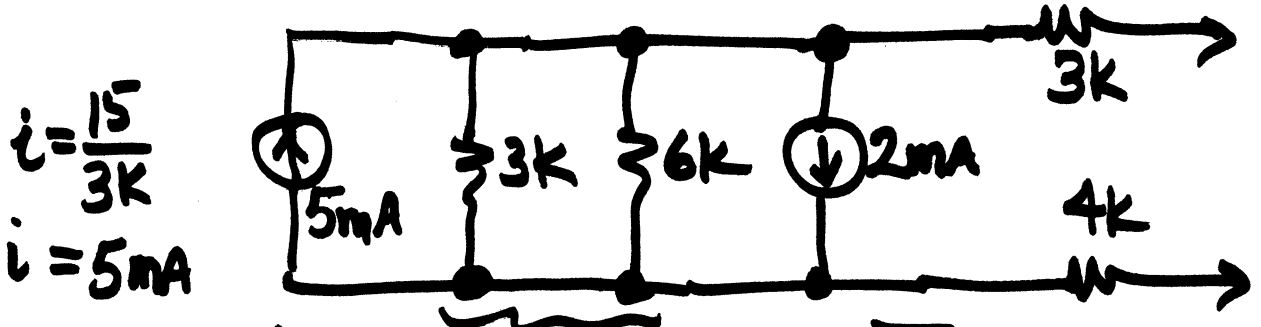




Example 3-13 (source transformation) equivalent resistance



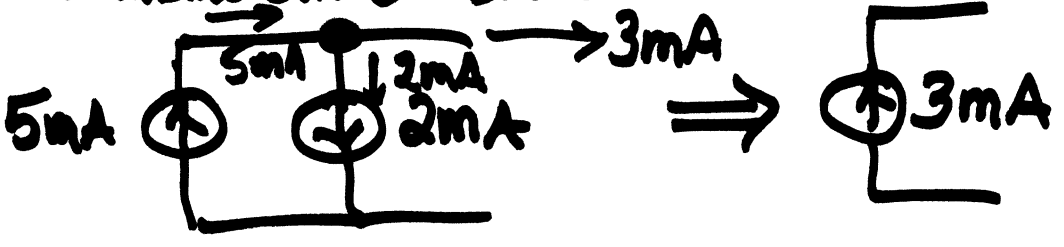
equivalent circuit



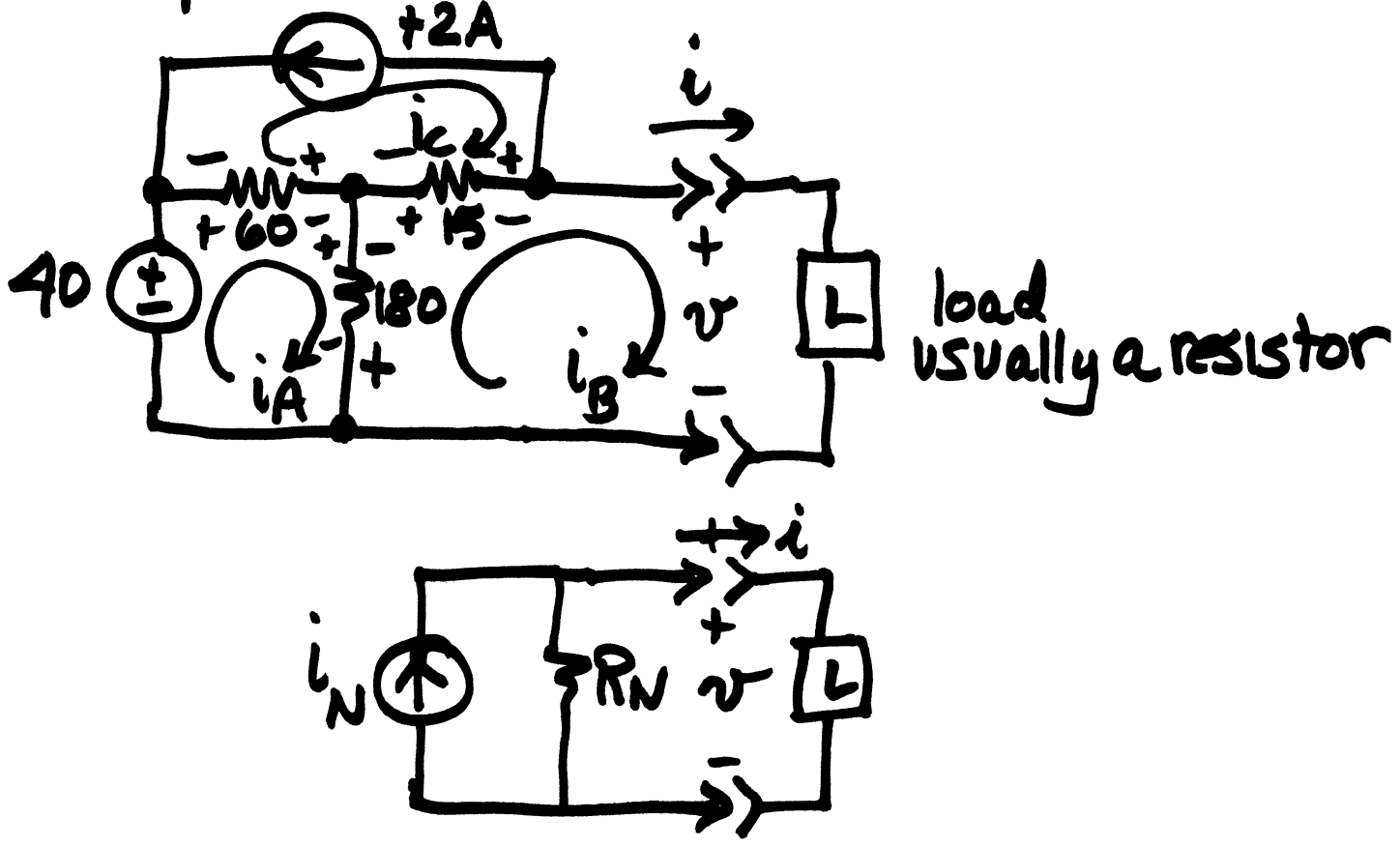
combine resistors

$$R_{EQ}=\frac{(3k)(6k)}{3k+6k}=2K$$

combine current sources



Example 3-14



---

complicated (given circuit)
+ treat v and i at interface
basically as known

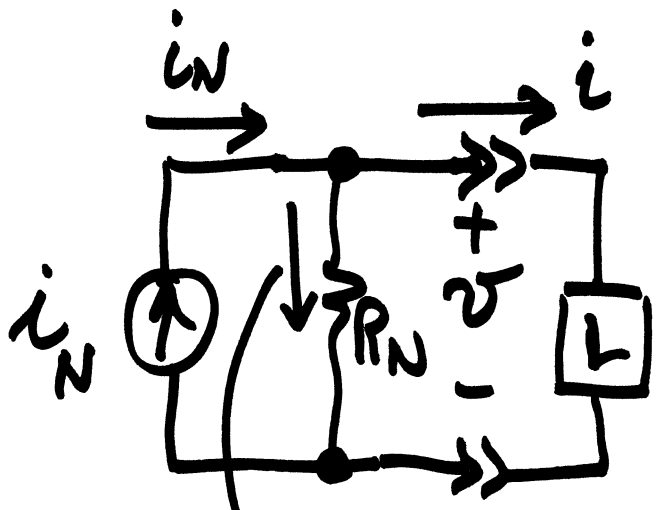
by inspection: $i_c = -2$ amps

A: ↻ $\quad -40 + 60 i_A - 60 i_c + 180 i_A - 180 i_B = 0$

B: ↻ $\quad +180 i_B - 180 i_A + 15 i_B - 15 i_c + v = 0$

$i_B = i$

$i = -1.5 - \frac{v}{60}$ solving equations



KCL: $i_{R_N} = \frac{v}{R_N}$

$$+i_N - \frac{v}{R_N} - i = 0$$

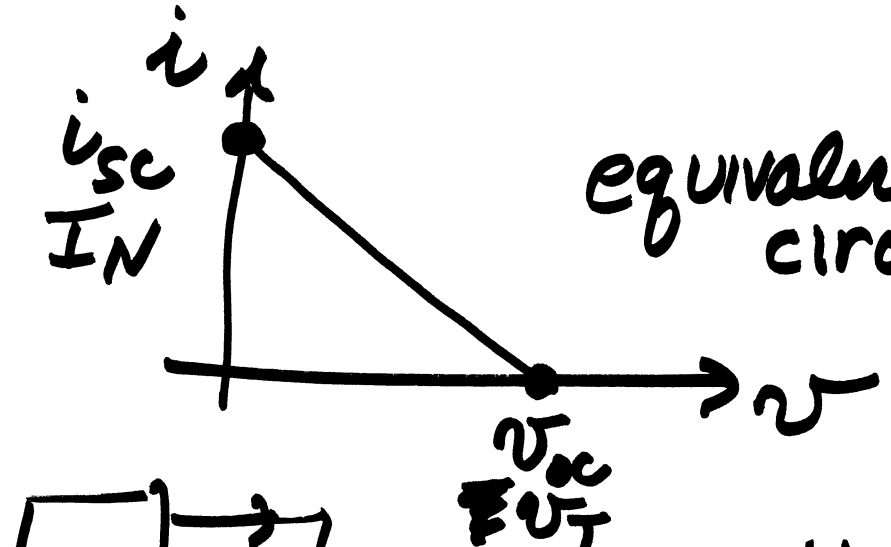
$$i = i_N - \frac{v}{R_N}$$

$$i = -1.5 - \frac{v}{60}$$

$$i_N = -1.5$$

$$R_N = 60$$

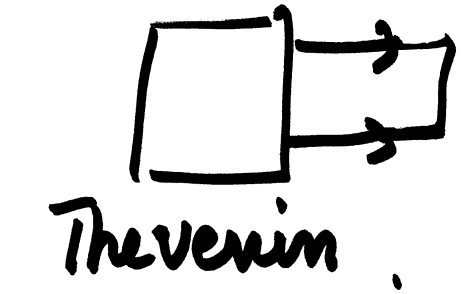
④



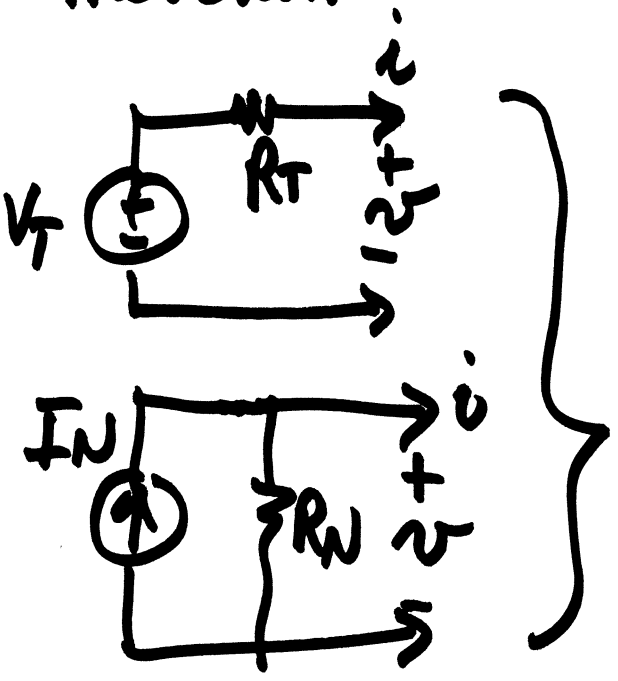
equivalent circuit

open circuit voltage
$i = 0$

short circuit current
$v = 0$



Thevenin

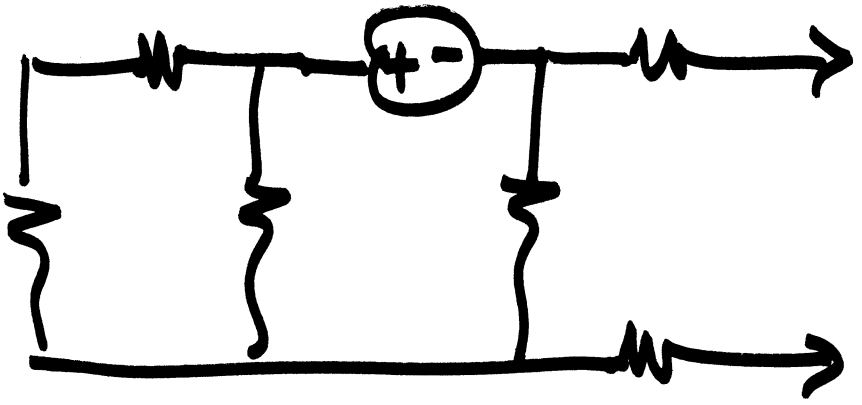


$R_T = R_N$

$V_T = I_N R_N$

source transform

Thevenin's Theorem



① measure (calculate) $V_{OC} = V_T$

② turn all sources off determine R_{EQ}