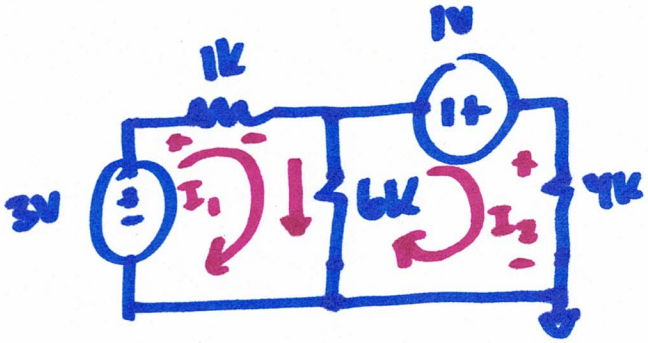
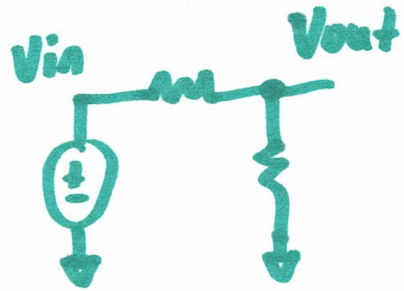
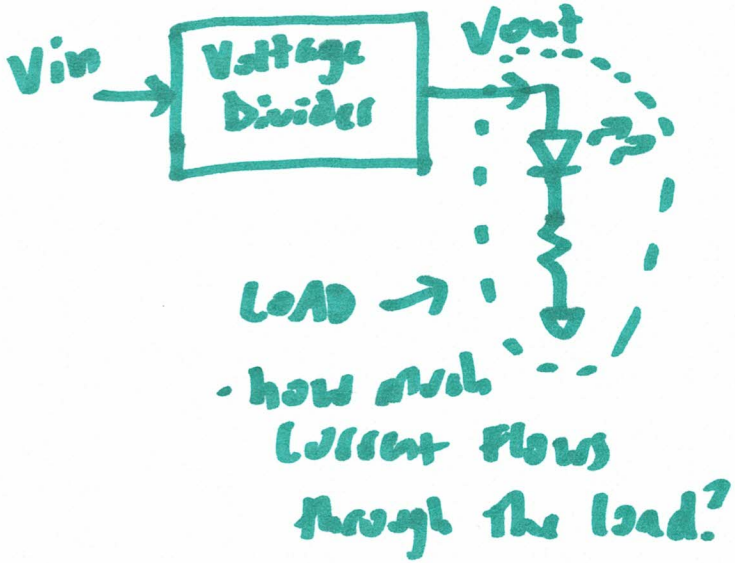
EE 220: Circuits I



① $+3V - I_1 \cdot 1K - (I_1 - I_2) \cdot 6K = 0$

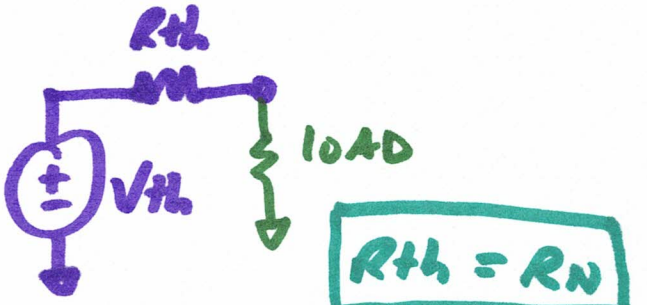
② $+1V - I_2 \cdot 4K - (I_2 - I_1) \cdot 6K = 0$





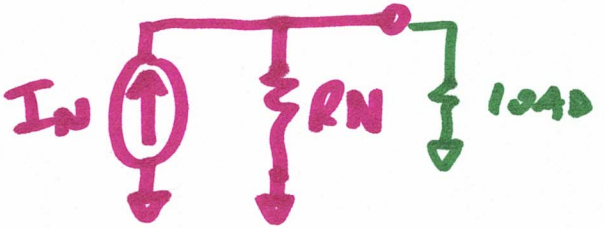
Thevenin & Norton Equiv. CKts

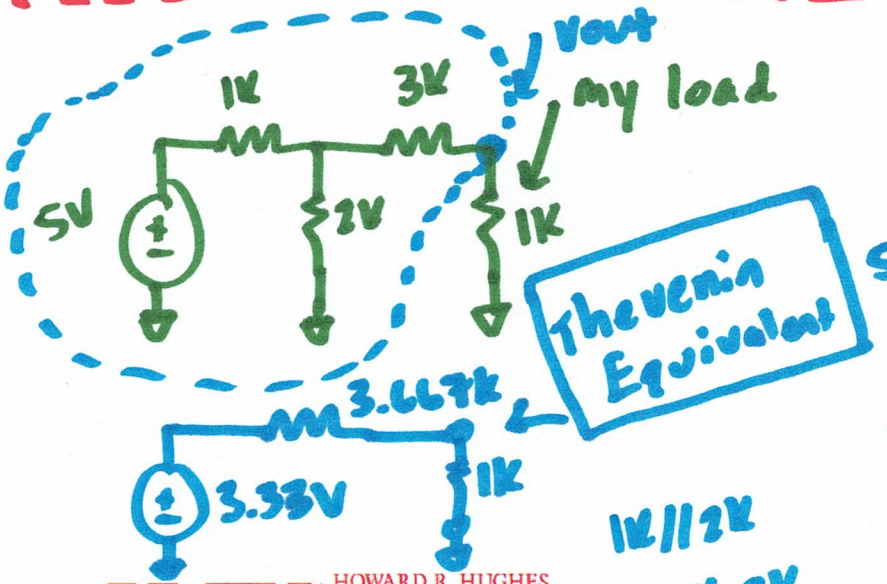
- Thevenin: any linear circuit →



$R_{th} = R_N$

- Norton: any linear circuit →

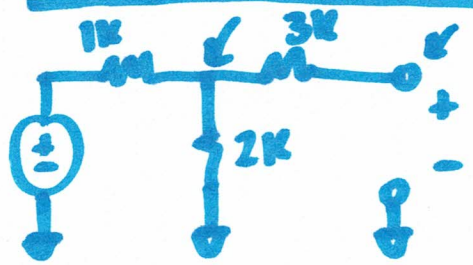




UNLV | HOWARD R. HUGHES COLLEGE OF ENGINEERING

$1K // 2K = \frac{1K \cdot 2K}{1K + 2K}$

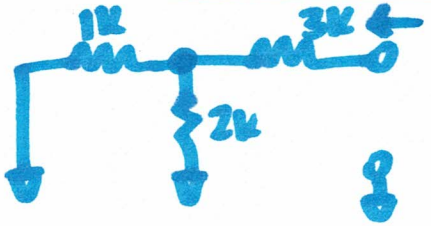
1. Find thevenin voltage



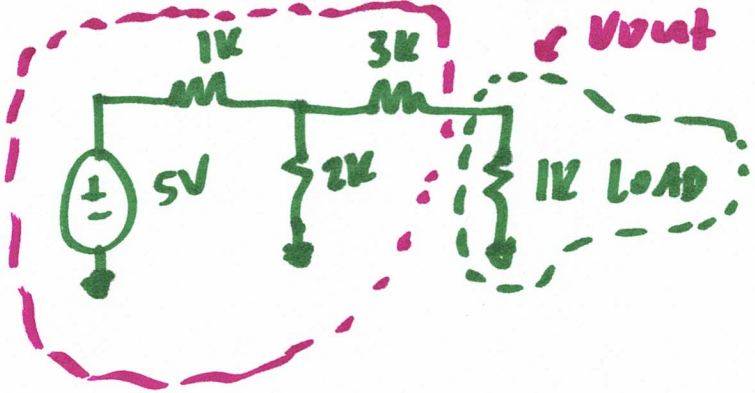
$V_{th} = 5V \cdot \frac{2K}{1K+2K}$

$V_{th} = 3.33V$

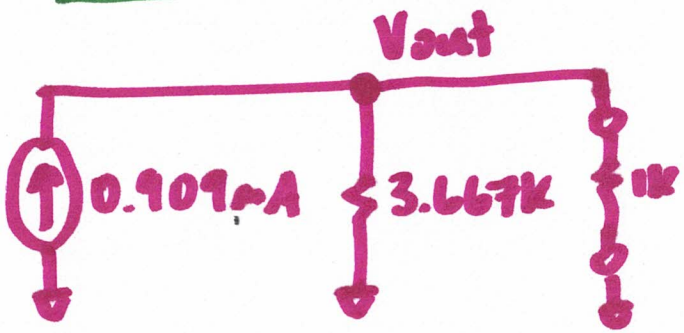
2. Find thevenin resistance



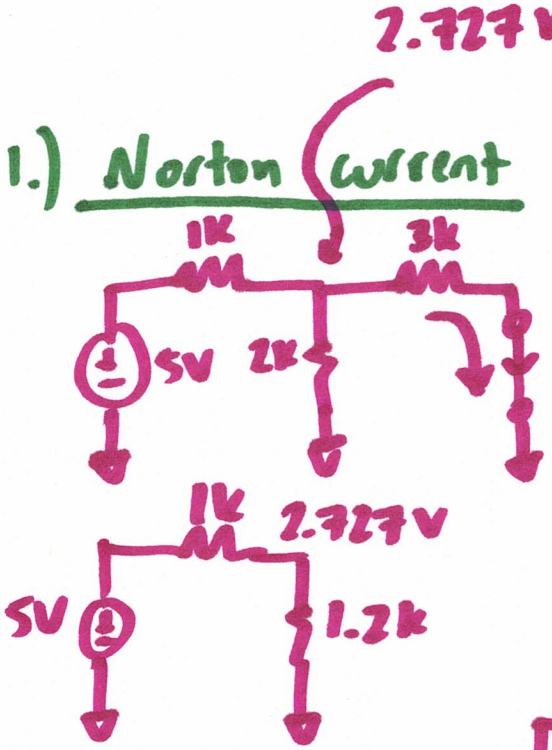
$R_{th} = 3.667K$



Norton equivalent



1.) Norton current



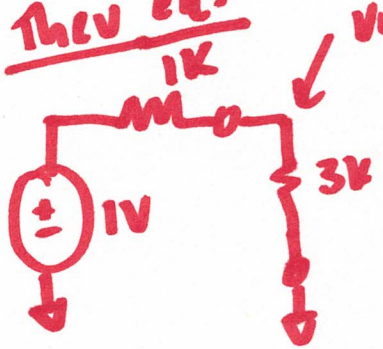
$3k // 2k = 1.2K$

$5 \cdot \frac{1.2}{2.2} = \frac{2.727V}{3K}$

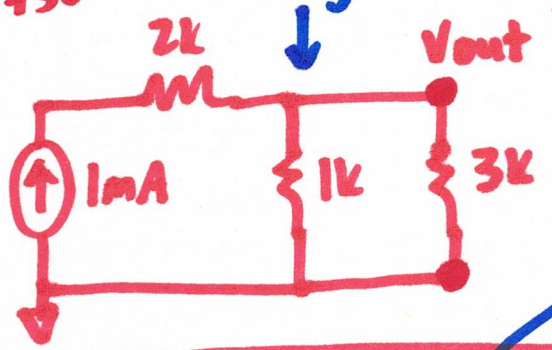
$I_N = 0.909mA$

$R_{th} = R_N = 3.667k$

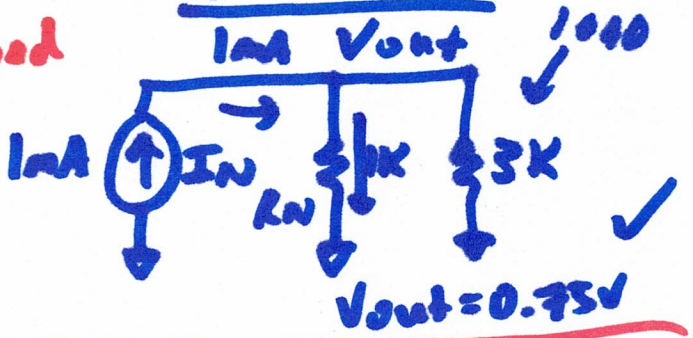
Thev eq.



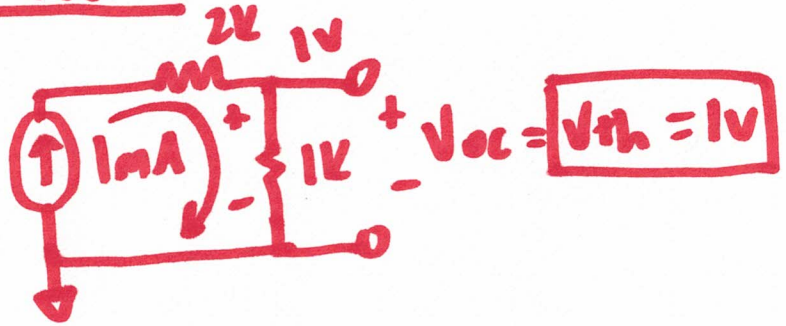
orig.

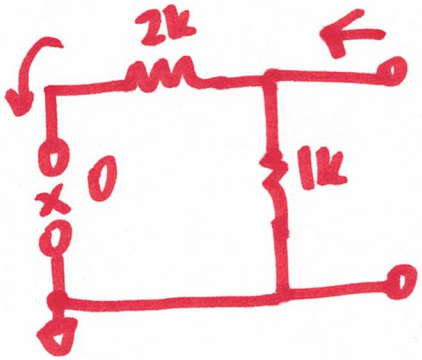


Norton eq.



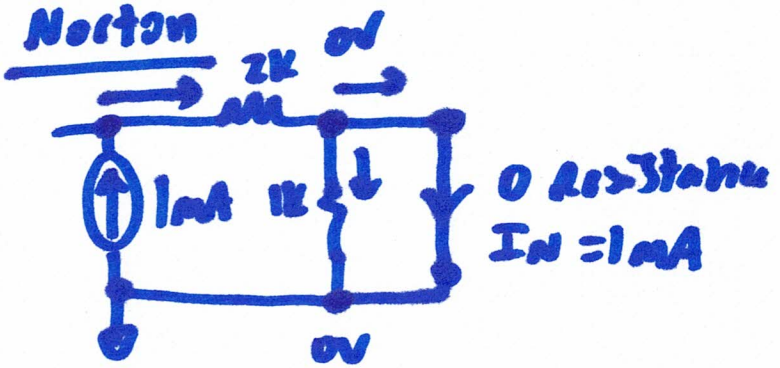
Thevenin





$R_{th} = 1K = R_N$ ✓

Norton



$I_T = 1mA$

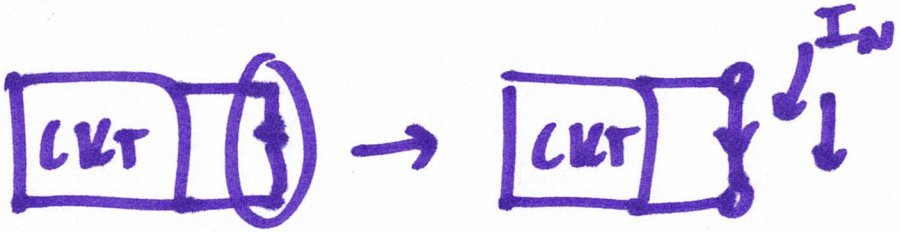
$$I(1K) = 1mA \cdot \frac{3K}{4K} = 0.75mA$$

UNLV | HOWARD R. HUGHES COLLEGE OF ENGINEERING

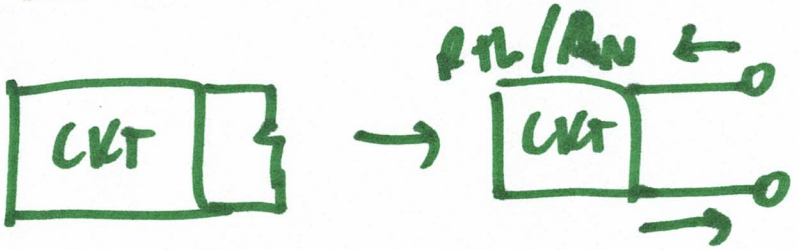
When finding:

1. Thevenin voltage

2. Norton current



3. Thevenin/Norton Resistance



UNLV | HOWARD R. HUGHES COLLEGE OF ENGINEERING

Do:

1. Find the voltage across the load terminals with load resistor removed. (open)

2. Find the current through the load terminals with load resistor removed (short)

3. Get rid of all power sources (short across Vsources), open Isources) find resistance between the two load terminals.