ECE 2100
Circuit Analysis

Lesson 15
Chapter 4: Circuit Theorems
Norton's Theorem
Maximum Power Transfer
Wheatstone Bridge
Operational Amplifiers

Daniel M. Litynski, Ph.D.

http://homepages.wmich.edu/~dlitynsk/

Circuit Theorems - Chapter 4

4.1 Motivation
4.2 Linearity Property
4.3 Superposition
4.4 Source Transformation
4.5 Thevenin's Theorem
4.6 Norton's Theorem
4.7 Maximum Power Transfer

ECE 2100
Circuit Analysis

Lesson 14
Chapter 4: Circuit Theorems
Thevenin's Theorem

Daniel M. Litynski, Ph.D.

http://homepages.wmich.edu/~dlitynsk/

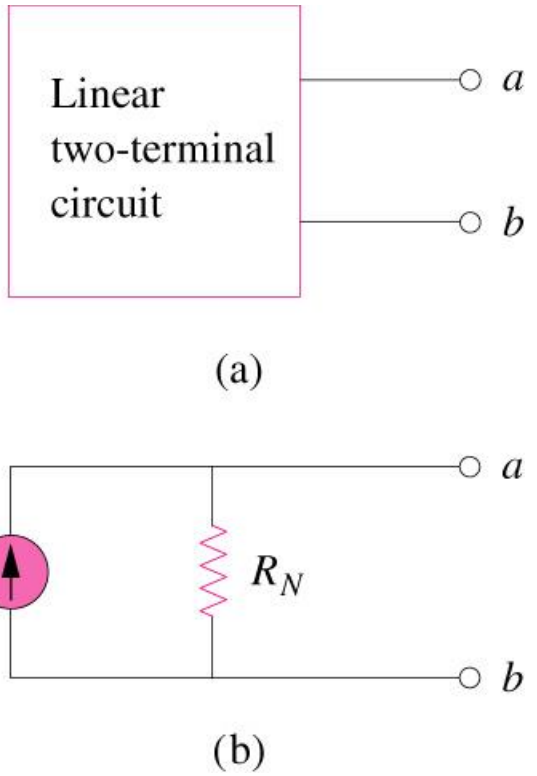
ECE 2100
Circuit Analysis

Lesson 15
Chapter 4: Circuit Theorems
Norton's Theorem
Maximum Power Transfer
Wheatstone Bridge
Operational Amplifiers

4.6 Norton's Theorem (1)

It states that a linear two-terminal circuit can be replaced by an equivalent circuit of a current source I_N in parallel with a resistor R_N, where

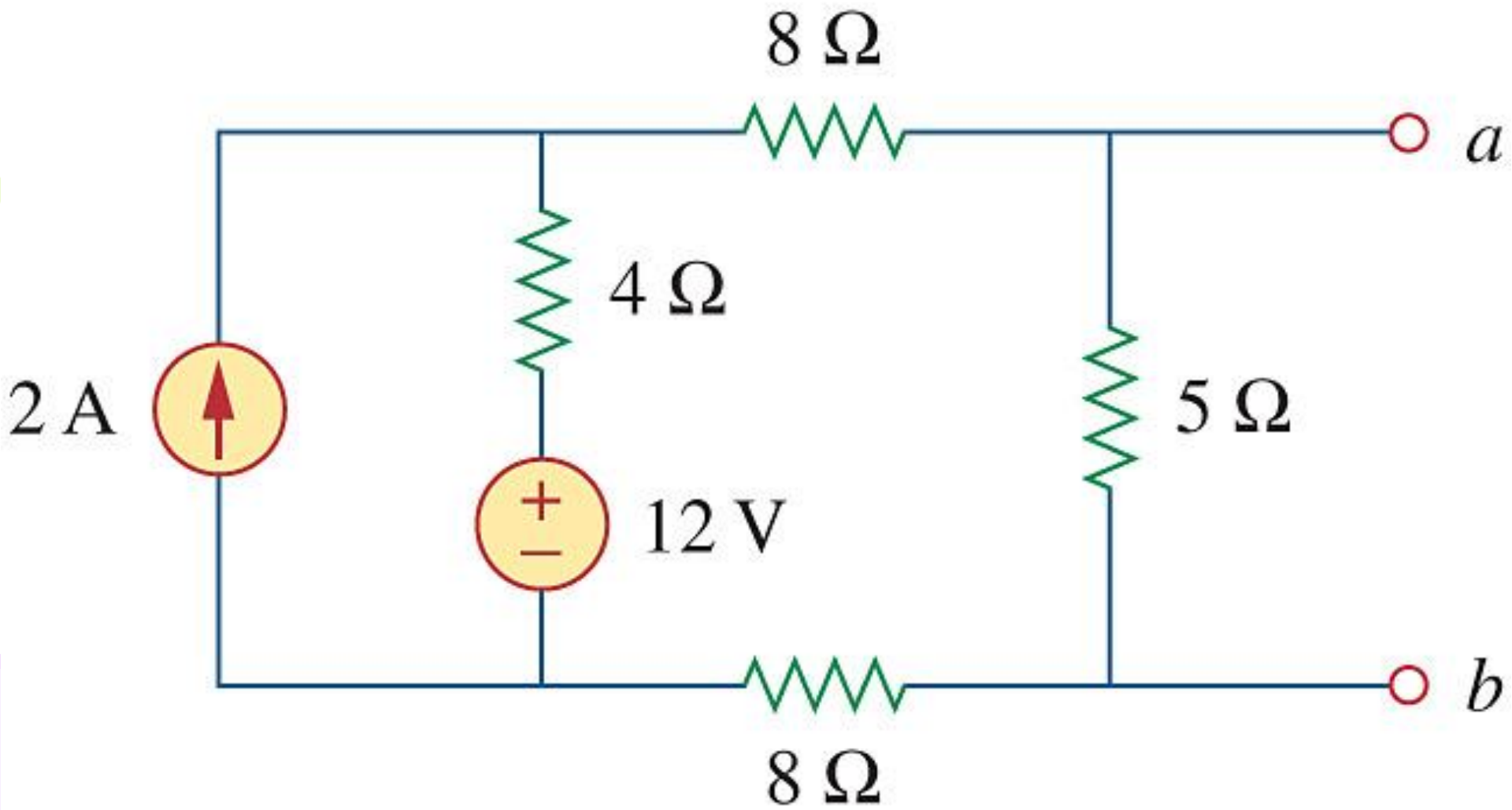
- I_N is the short circuit current through the terminals.
- R_N is the input or equivalent resistance at the terminals when the independent sources are turned off.

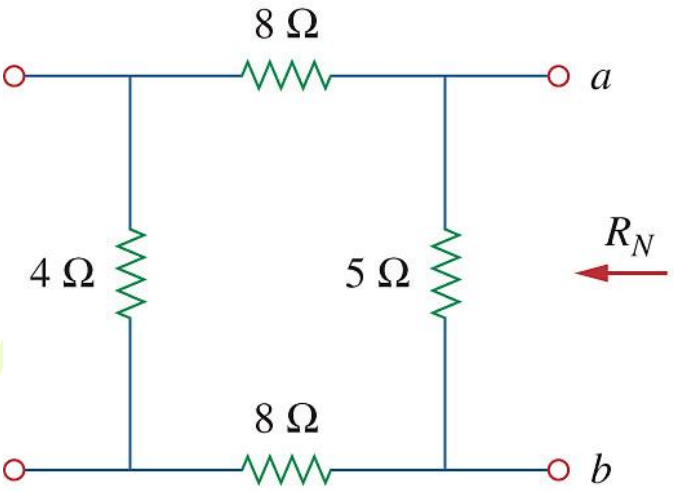


The Thevenin's and Norton equivalent circuits are related by a source transformation.

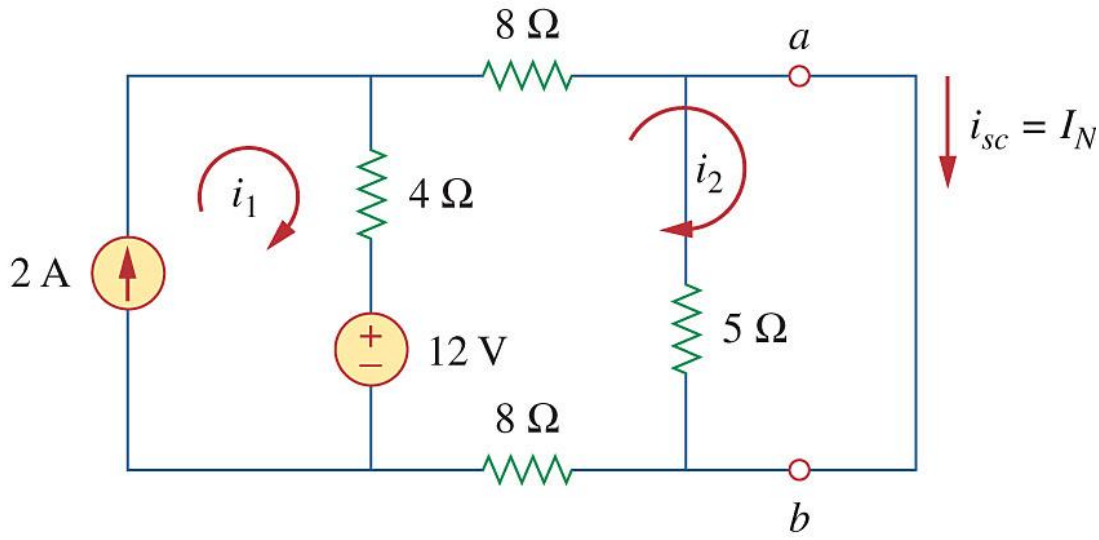
$R_N = R_{Th}$

$I_N = V_{Th}/R_{Th}$

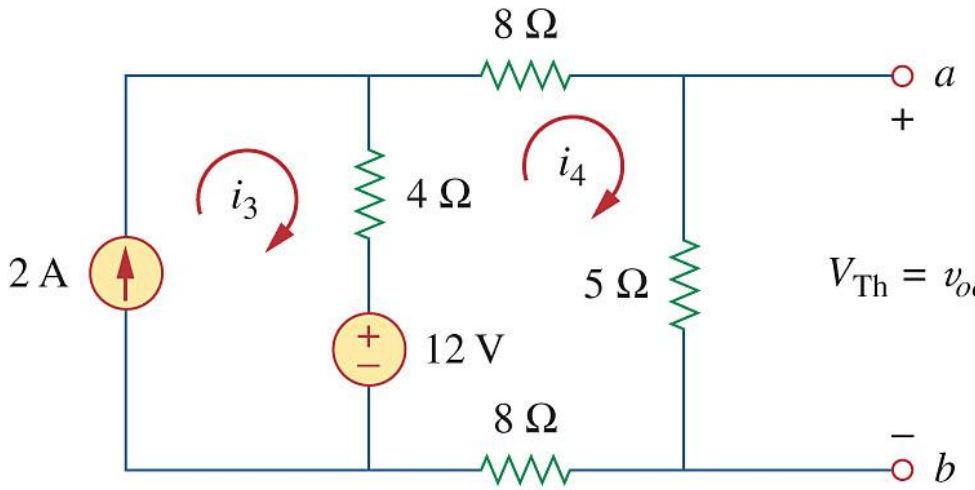




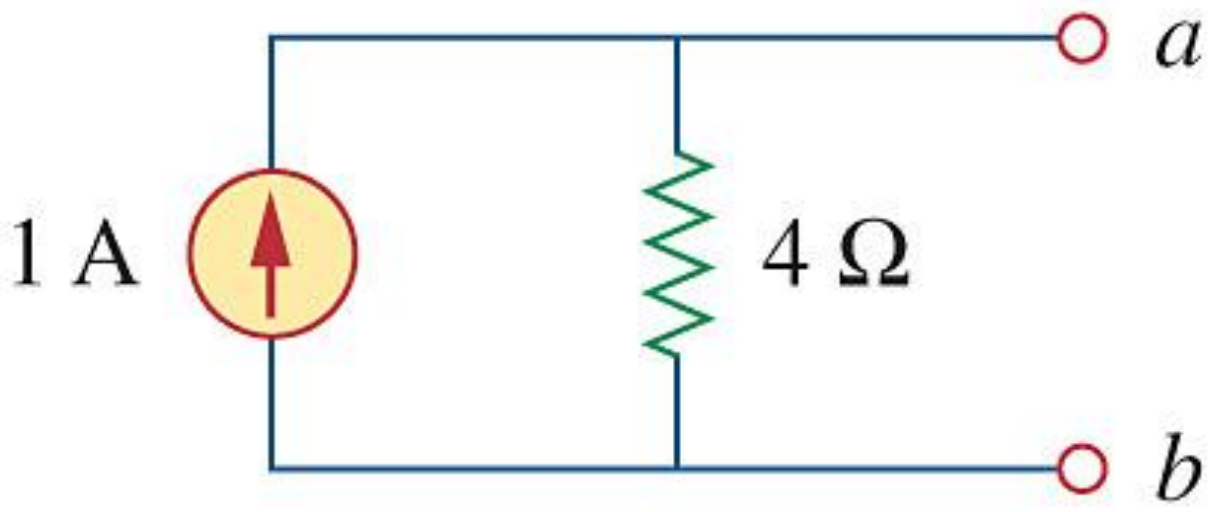
(a)

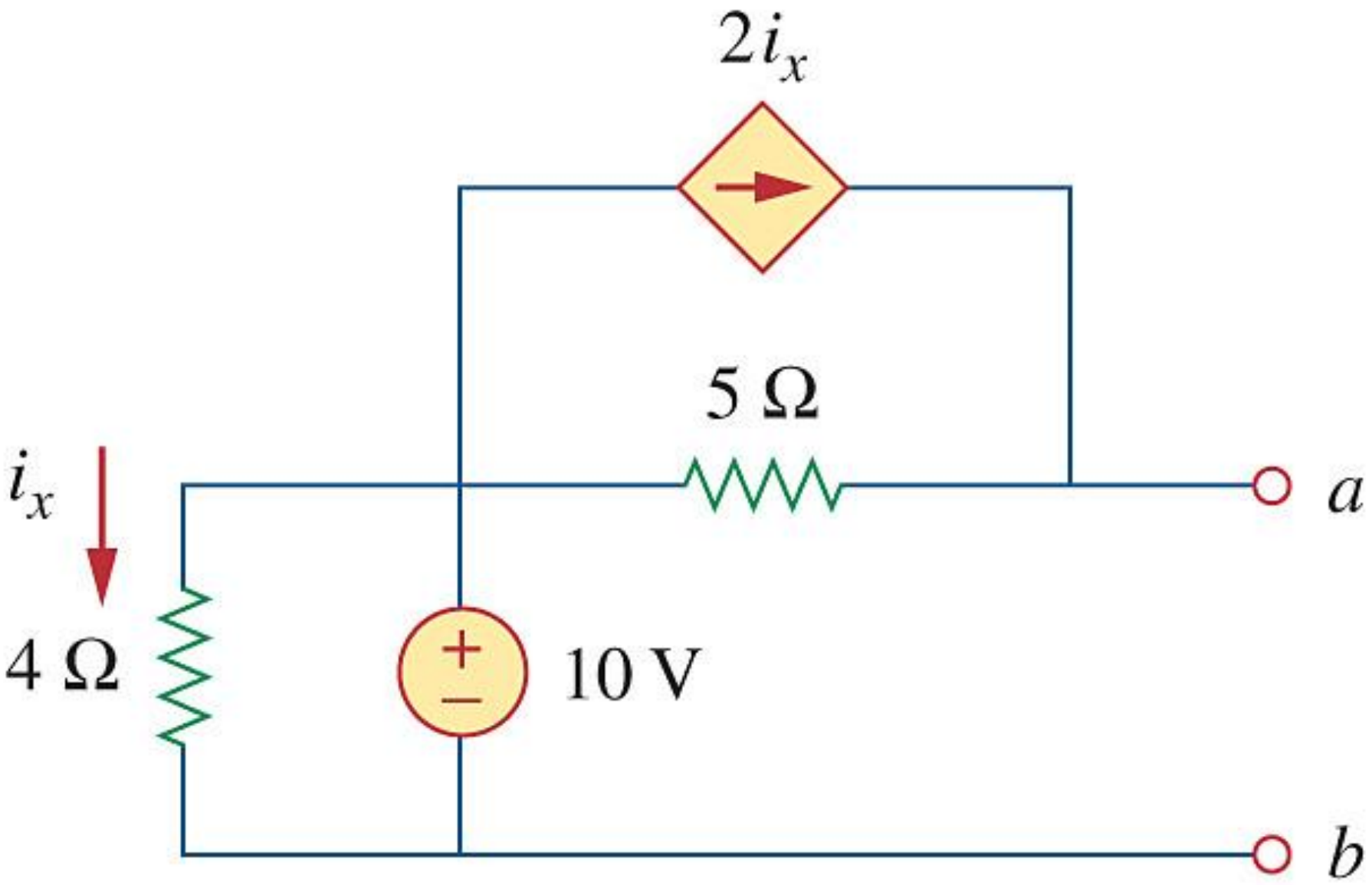


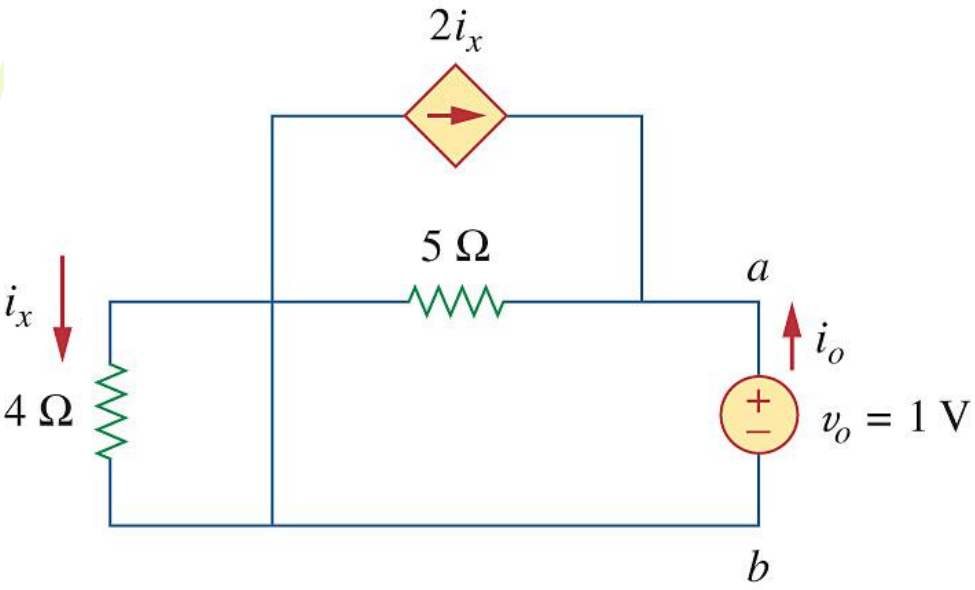
(b)



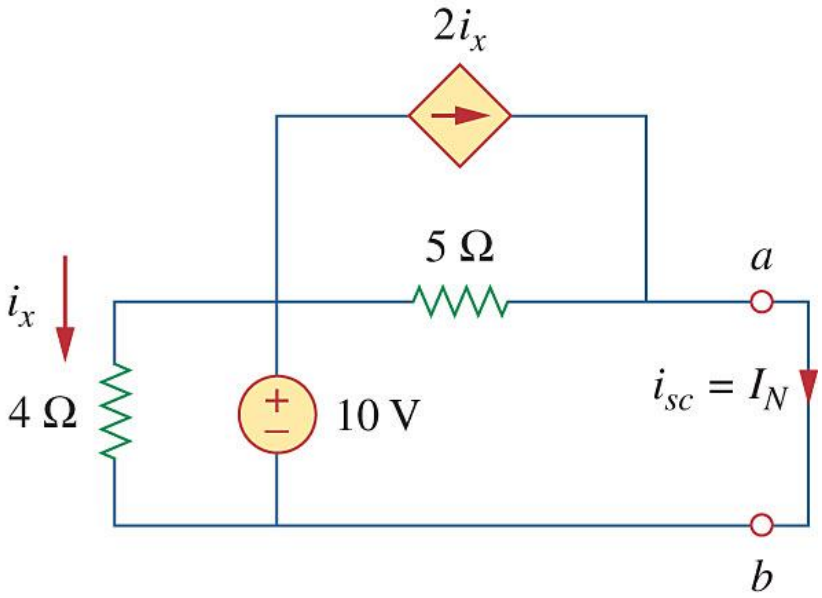
(c)



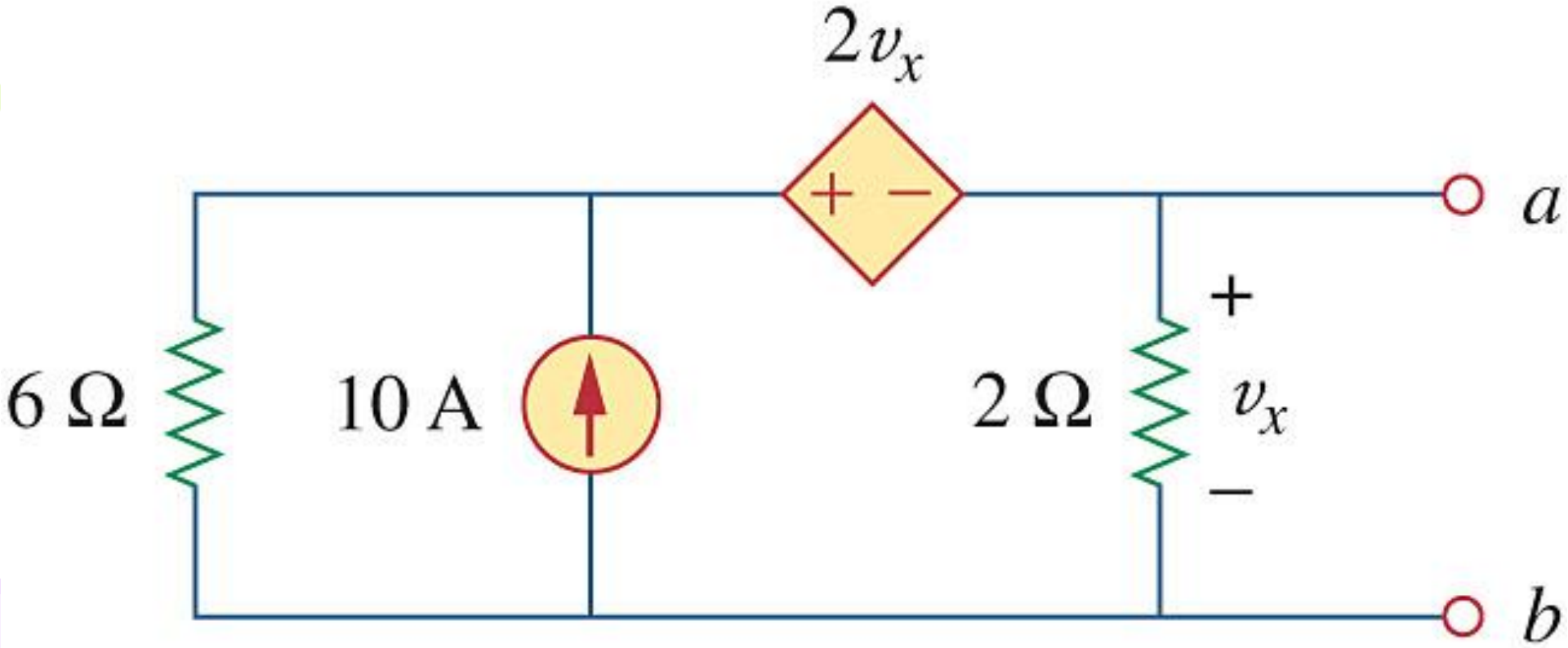




(a)



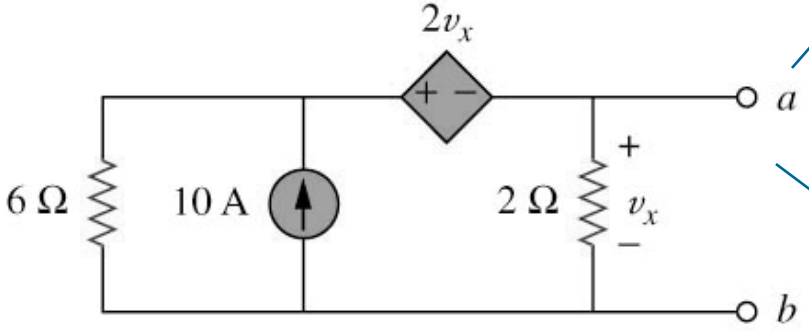
(b)

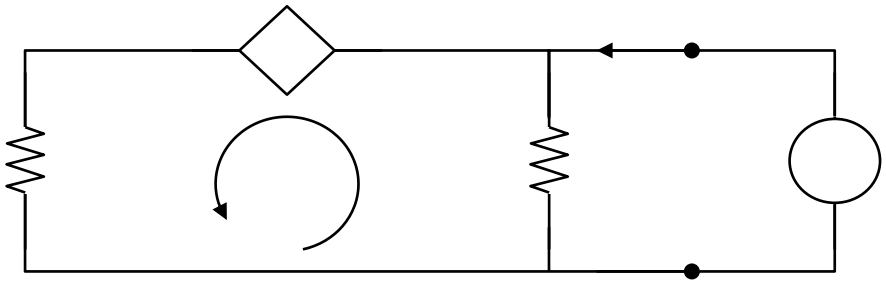


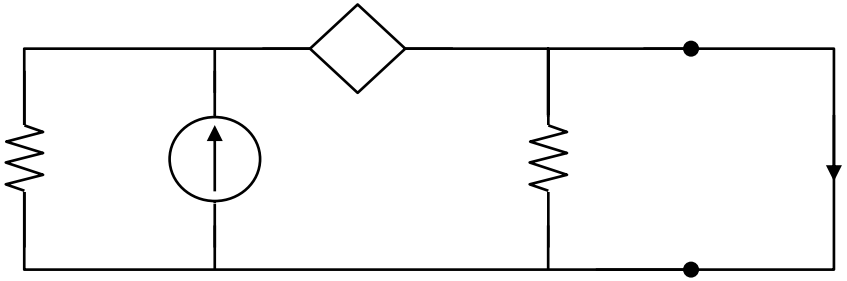
4.6 Norton's Theorem (2)

Example 7

Find the Norton equivalent circuit of the circuit shown below.







*Refer to in-class illustration, textbook, $R_N = 1\Omega$, $I_N = 10A$.