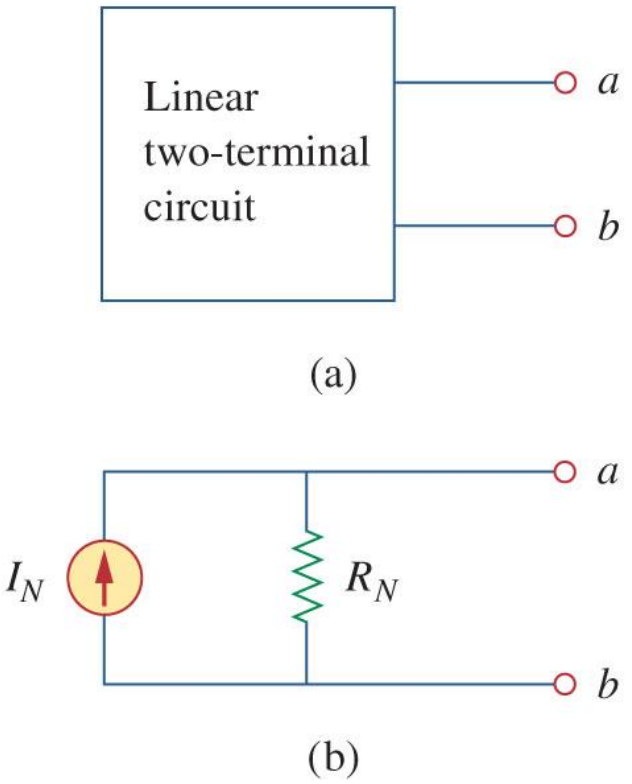
Norton's theorem

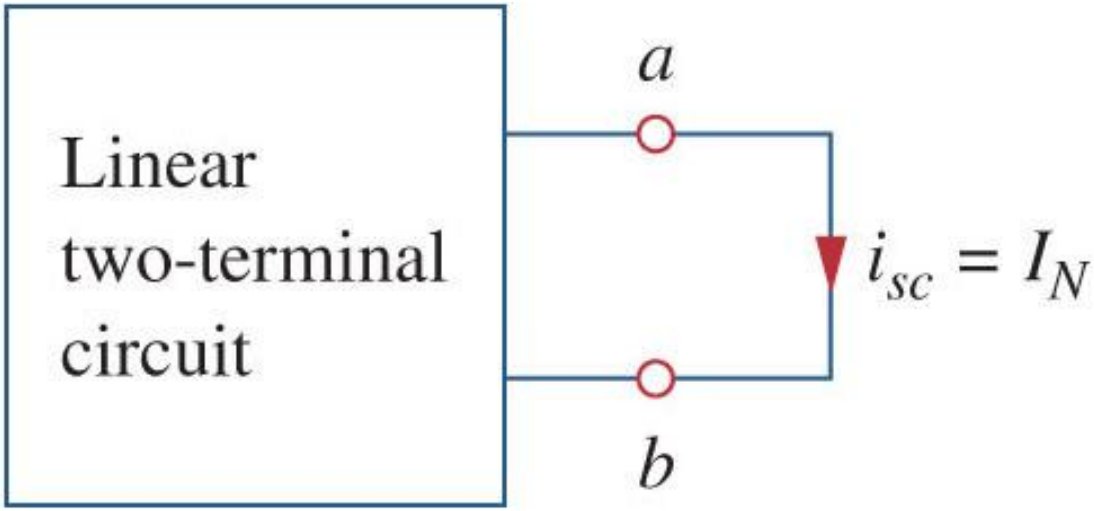
- Similar to Thevenin's theorem, Norton's theorem states that a linear two terminal circuit may be replaced with an equivalent circuit containing a resistor and a current source.
- The Norton resistance will be exactly the same as the Thevenin.



Norton's theorem II

- The Norton current I_N is found by short circuiting the circuit's terminals and measuring the resulting current.

$$I_N = i_{sc}$$



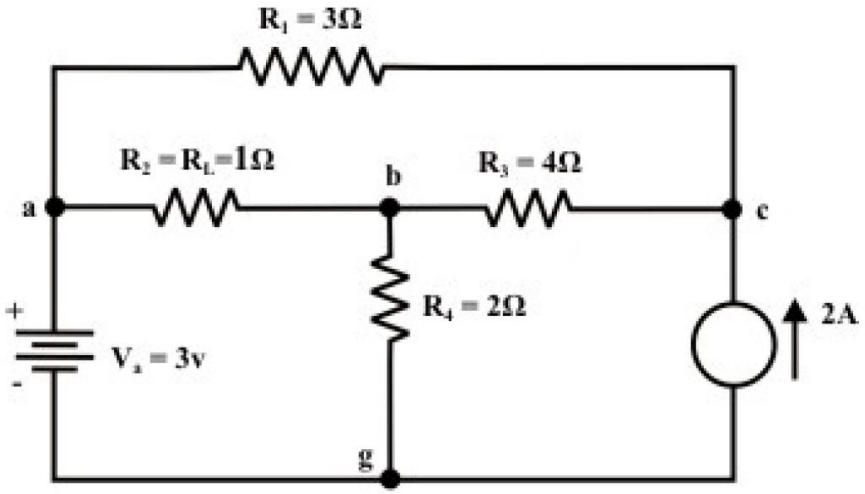
Norton vs. Thevenin

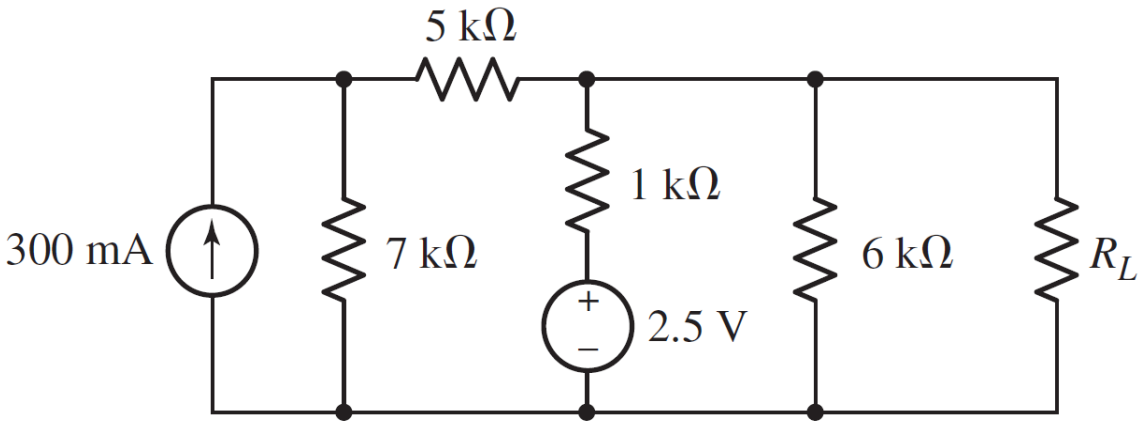
- These two equivalent circuits can be related to each other.
- One need only look at source transformation to understand this.
- The Norton current and Thevenin voltage are related to each other as follows:

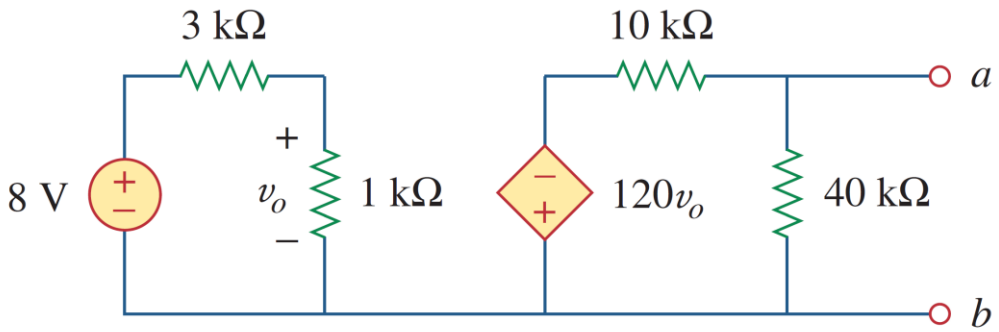
$$I_N = \frac{V_{Th}}{R_{Th}}$$

Norton vs. Thevenin II

- With V_{TH}, I_N, and (R_{TH}=R_N) related, finding the Thevenin or Norton equivalent circuit requires that we find:
  - The open-circuit voltage across terminals *a and b.*
  - The short-circuit current at terminals *a and b.*
  - The equivalent or input resistance at terminals *a and b when* all independent sources are turned off.


R1 = 3Ω
R2 = RL=1Ω
b
R3 = 4Ω
a
c
+
R4 = 2Ω
2A
Vs = 3v
-
g


5 kΩ
1 kΩ
300 mA
7 kΩ
6 kΩ
R_L
+
–
2.5 V


3 kΩ
10 kΩ
a
8 V
+
v_o
−
1 kΩ
−
+
$120v_o$
40 kΩ
b

Determinar el valor de R_o para que I_o sea $-10A$.