



Lecture 15: Node Method For Circuit Analysis

- Review of circuit-solving strategies
- Node Method steps
- Node Method with a “floating” source
- Practice with the Node Method

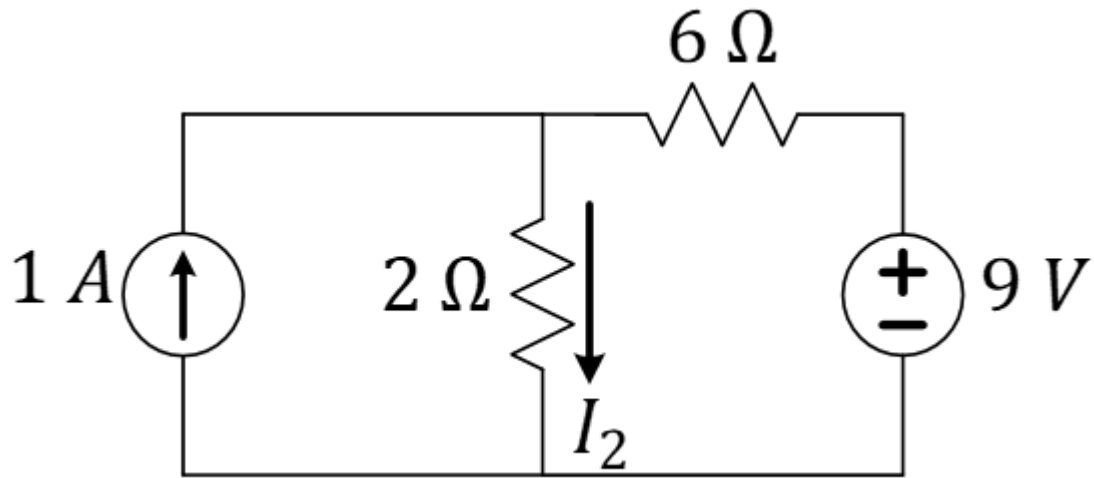


The Node Method

1. Identify or pick “ground” (0 V reference)
2. Label all the node voltages
(use values when you can; variables when you must)
3. Use KCL at convenient node(s)/supernode(s)
4. Use voltages to find the currents

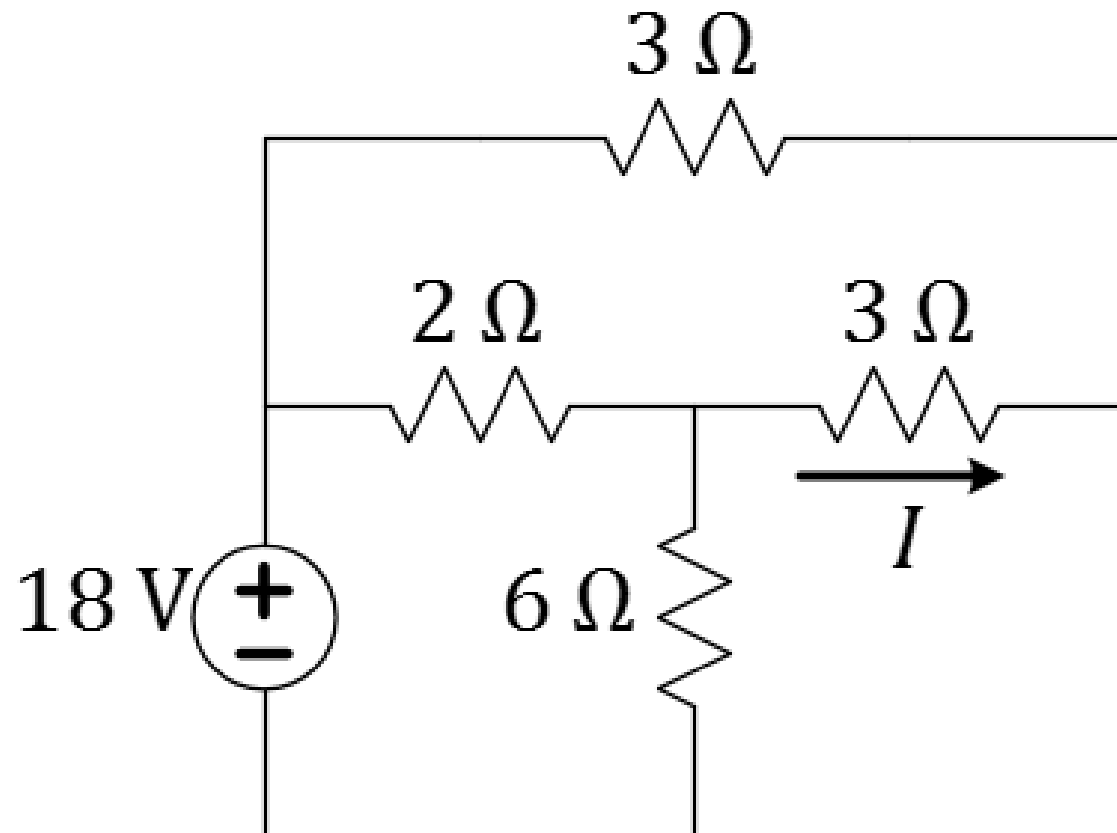
Try Node Method

Q: Find the value of I_2 .

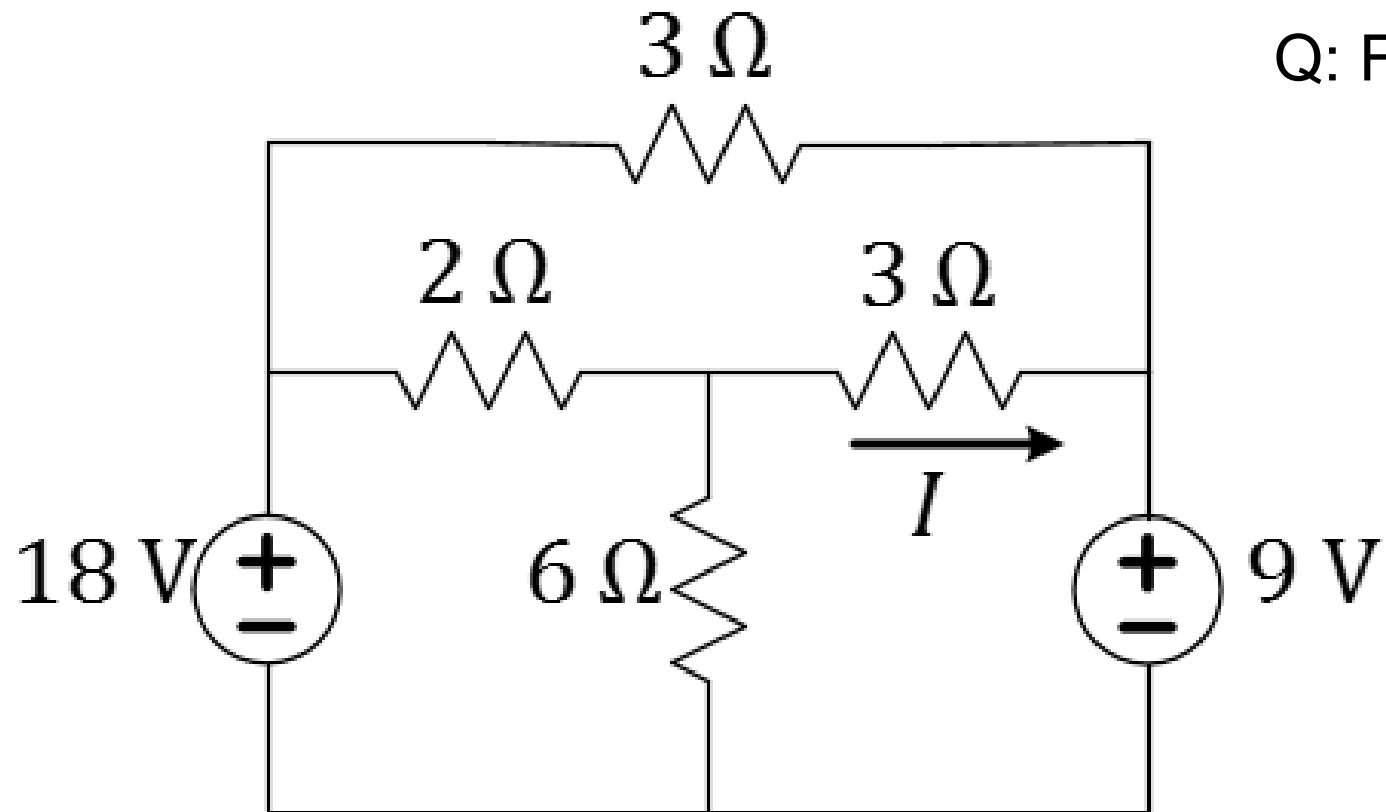


Try Node Method

Q: Find the value of I .



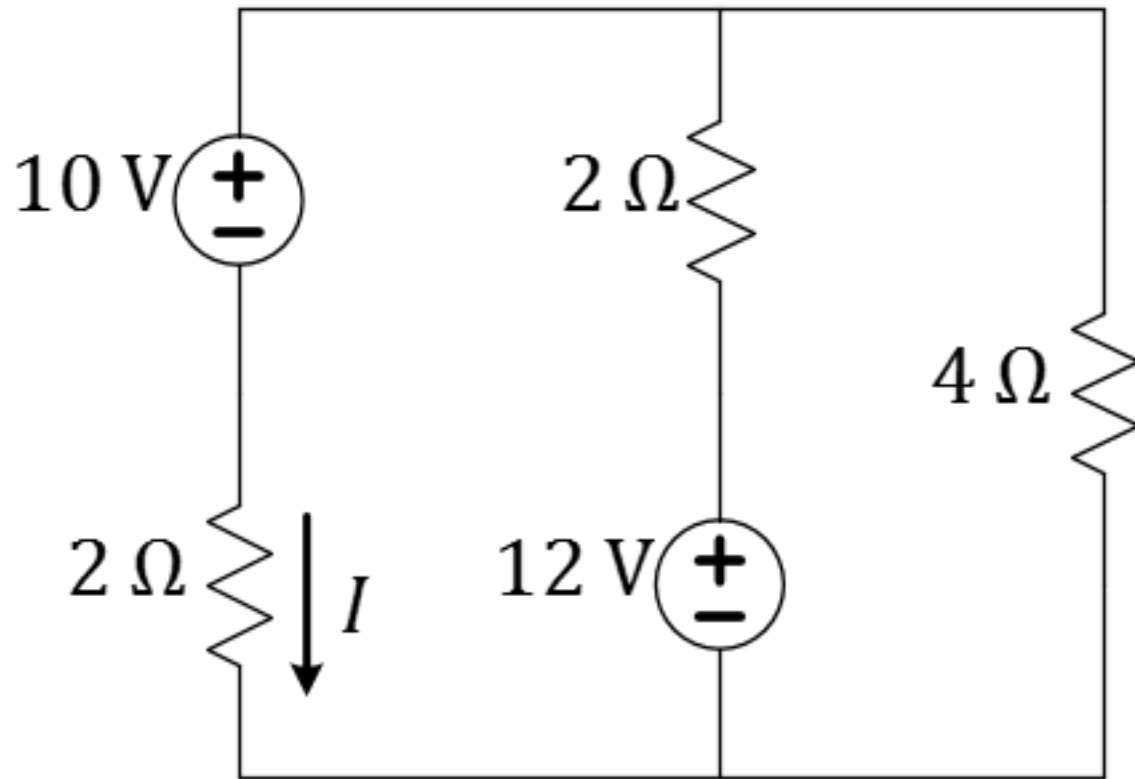
Node Method is Great for Multiple Sources



Q: Find the value of I .

Floating Voltage Source

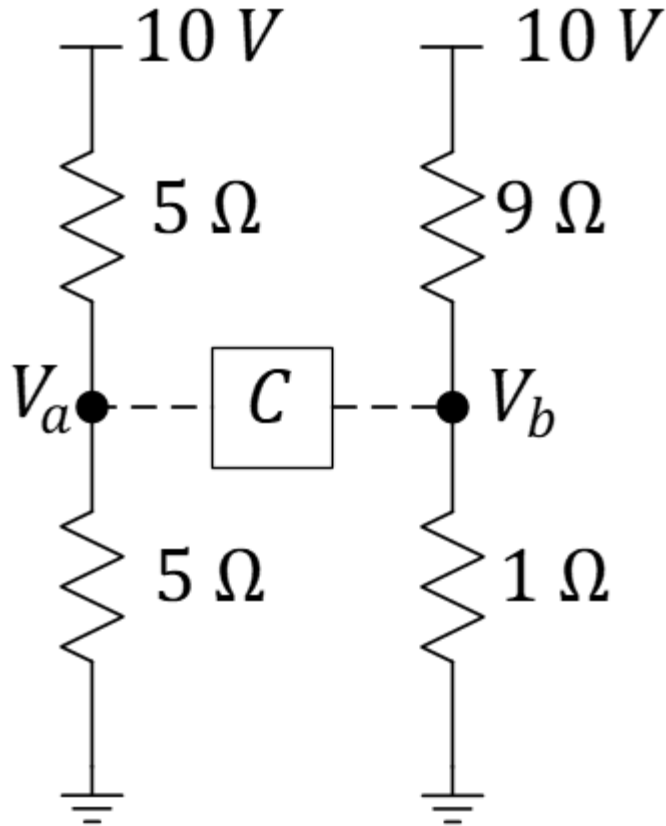
...is when no choice of ground node causes the node voltages of every voltage source to be known immediately.



Q: Find the value of I .

Here, we can ground one voltage source, but the voltage at either end of the other source remains unknown until solved.

Insight from Node Voltages

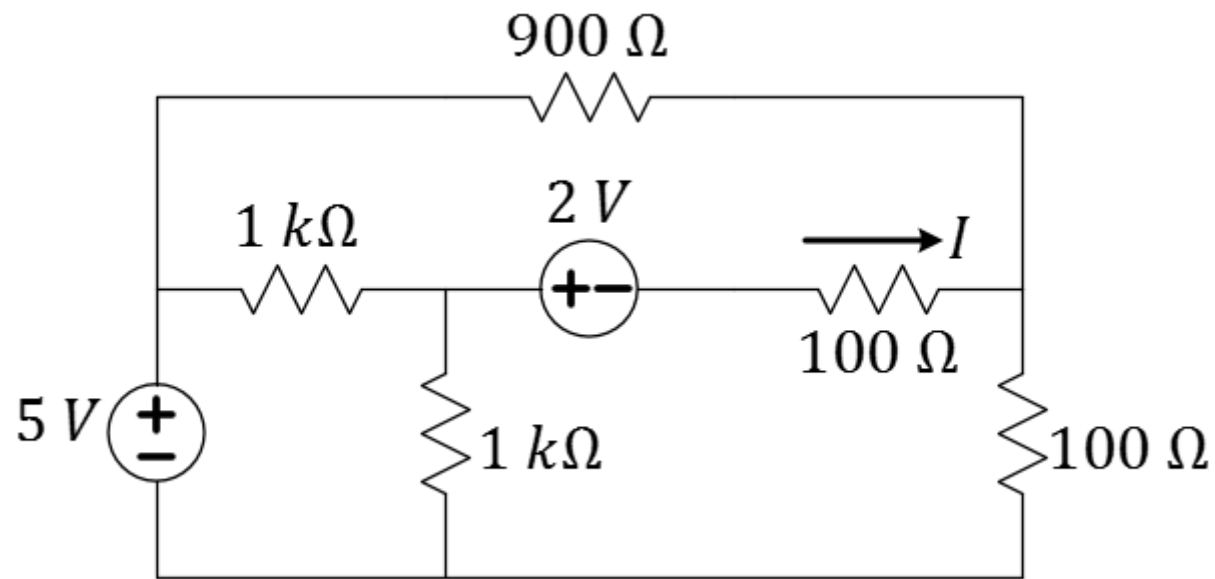


Q: Find the values of V_a and V_b when C is just an open circuit (no connection).

Next, discuss what value a voltage source placed at C must have that would have zero current through it.

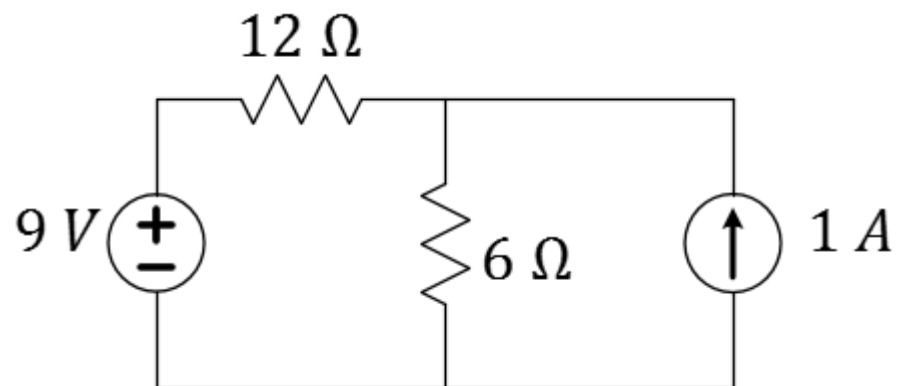
Sometimes *Two* Variables are Required

Q: Find the value of I .



$$I = 0\text{ A.}$$

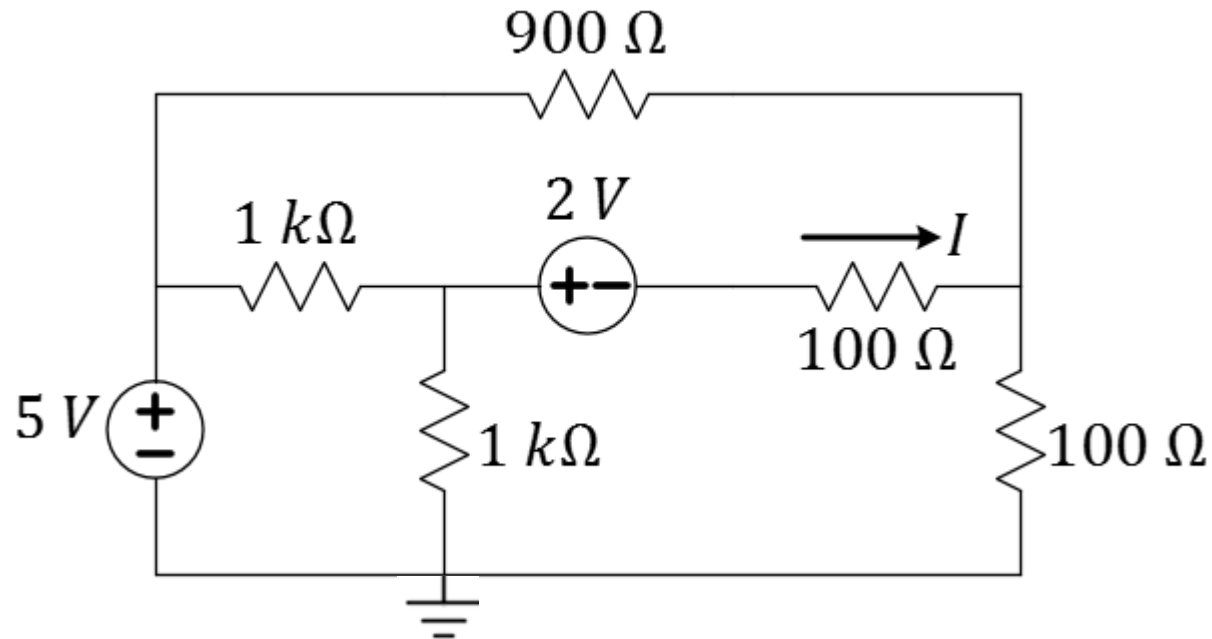
Power Revisited



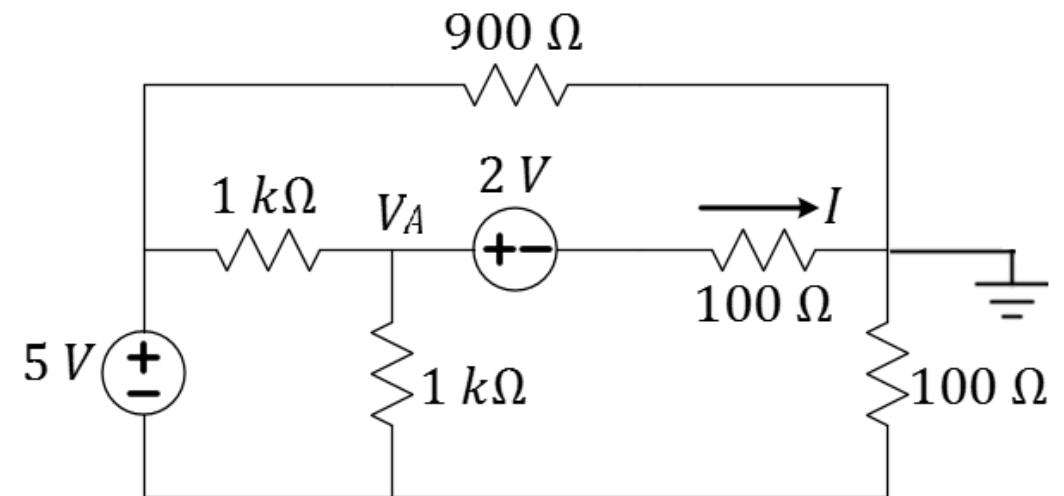
Q: Find the signed power of each circuit element.

Node Voltages Depend on Ground Location

Q: What is the value of V_A in the circuit below?



Q: Given $I = 0\text{ A}$, label the node voltages.





L15 Learning Objectives

- a. Outline (list, describe) steps of the Node Method
- b. Use these steps to speed the process of performing circuit analysis via KCL/KVL/Ohm's
- c. Identify circuit patterns in which different techniques might simplify the process of finding a solution (Practice!)