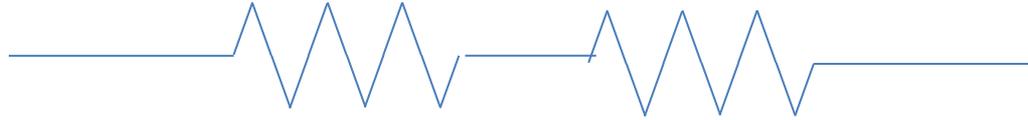


EELE 250: Circuits, Devices, and Motors

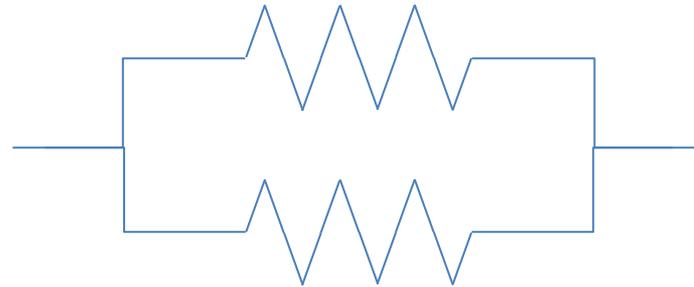
Lecture 3

Resistor combinations

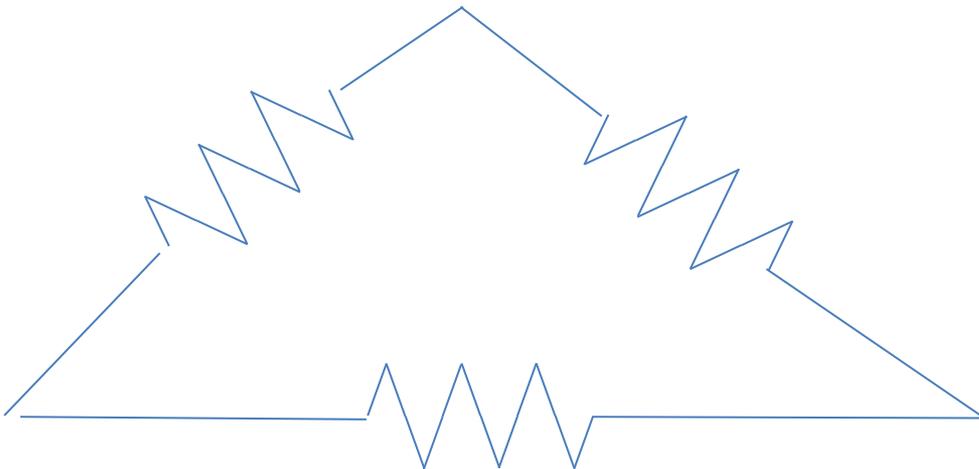
- Series



- Parallel

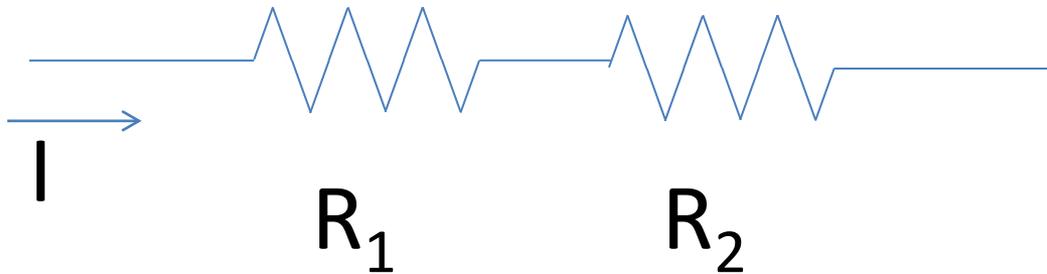


- Delta



Series Resistance

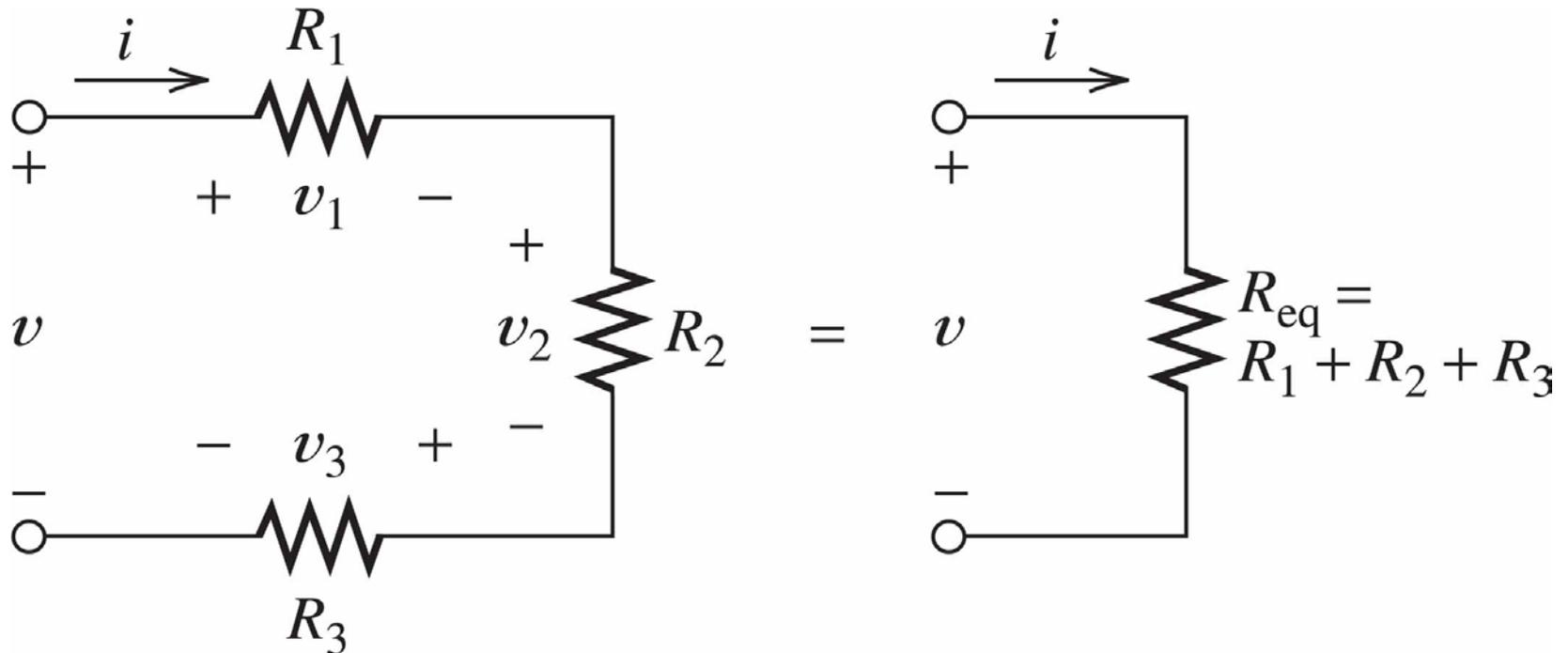
- Same current in both resistors, so total voltage is $IR_1 + IR_2 = I(R_1 + R_2) = IR_{eq}$
- Note that R_{eq} is always larger than the largest series resistor



Parallel Resistors

- Resistors connected in *parallel* have the same voltage across them. The total current is the sum of the individual currents.
- $I_{\text{tot}} = (V/R_1) + (V/R_2) = V(1/R_1 + 1/R_2) = V/R_{\text{eq}}$
- $$R_{\text{eq}} = \frac{1}{\left(\frac{1}{R_1} + \frac{1}{R_2}\right)} = \frac{R_1 \cdot R_2}{R_1 + R_2}$$
- Note that R_{eq} is always smaller than the smallest parallel resistor.

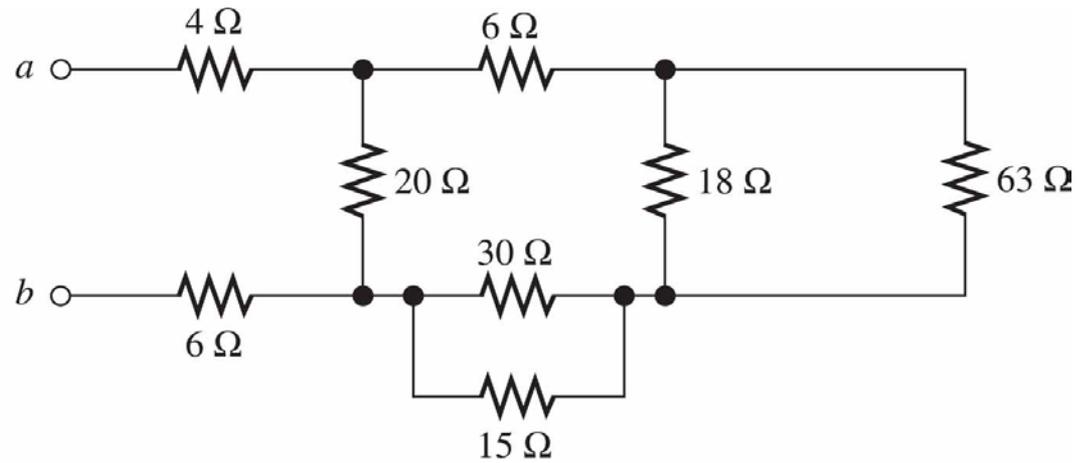
Simplifying Resistor Networks



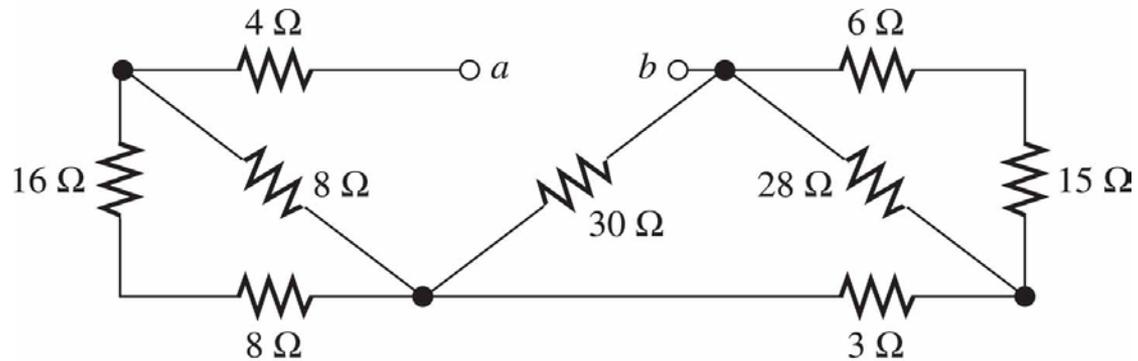
(a) Three resistances
in series

(b) Equivalent
resistance

Simplifying Resistor Networks (cont.)

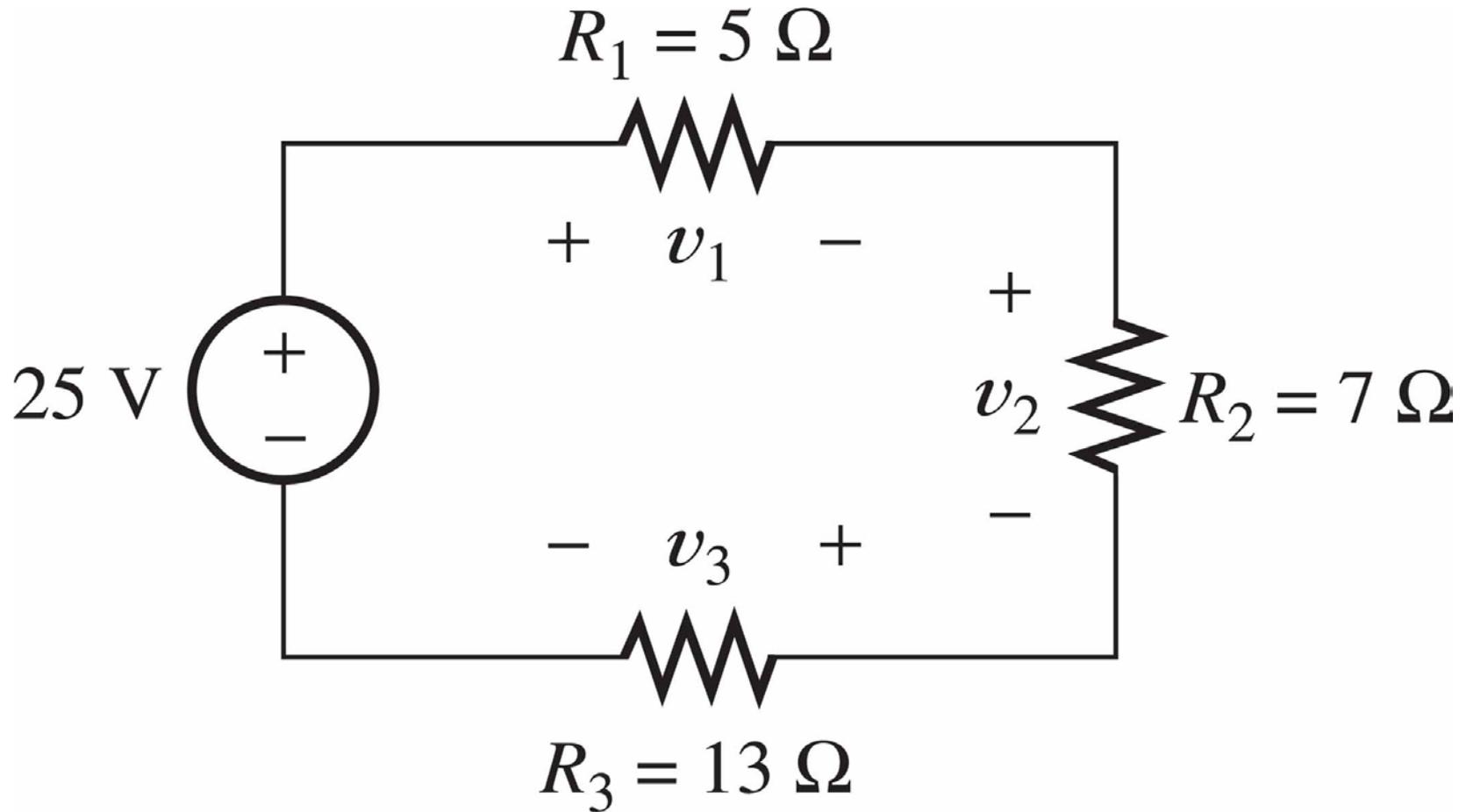


(a)

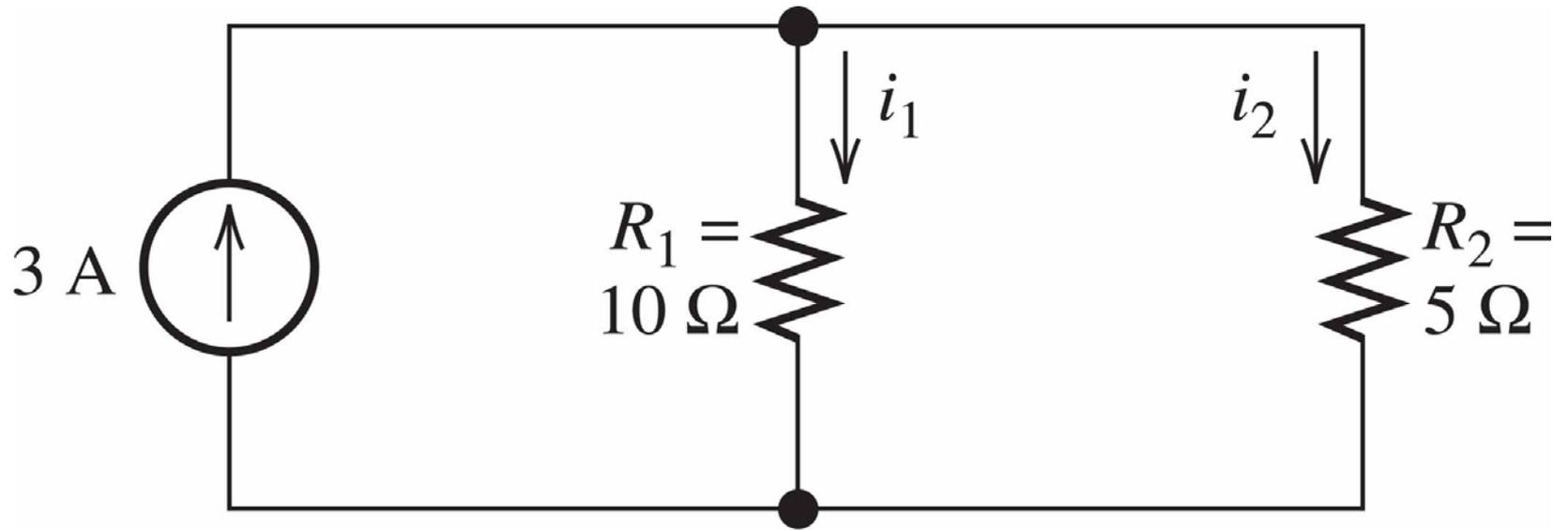


(b)

Voltage Divider



Current Divider



Summary and Review

- Series
- Parallel
- Voltage divider
- Current divider

Assignment Reminder

- Read 1.1 through 1.7
- Read 2.1 through 2.3
- Practice problems:
- P1.12, P1.14, P1.36, P1.37, P1.41, P1.42
- P2.1, P2.6, P2.23, P2.24, P2.27

Then

- TAKE D2L QUIZ before Friday, 5PM
- **And Read 2.4-2.7 for next week**