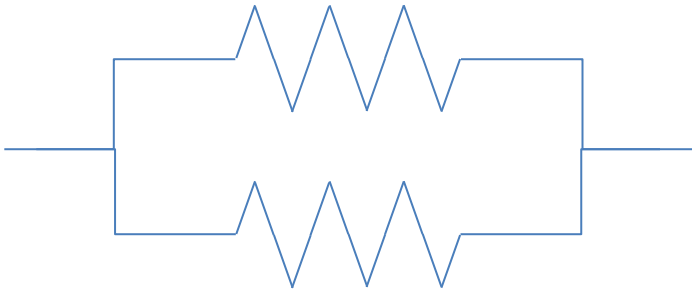
EELE 250: Circuits, Devices, and Motors

Lecture 3

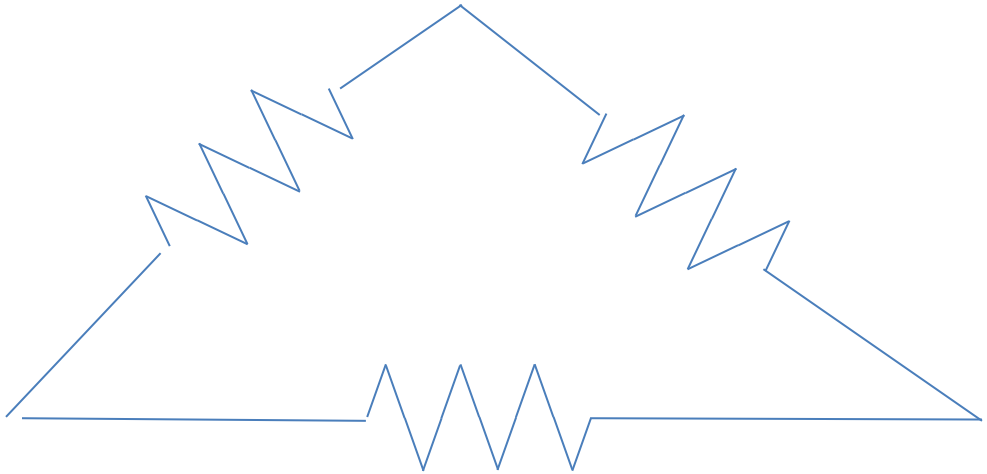
Resistor combinations

- Series

- Parallel

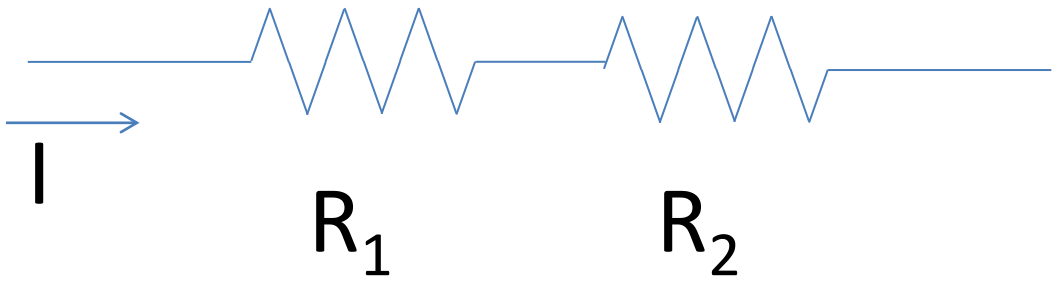


- Delta



Series Resistance

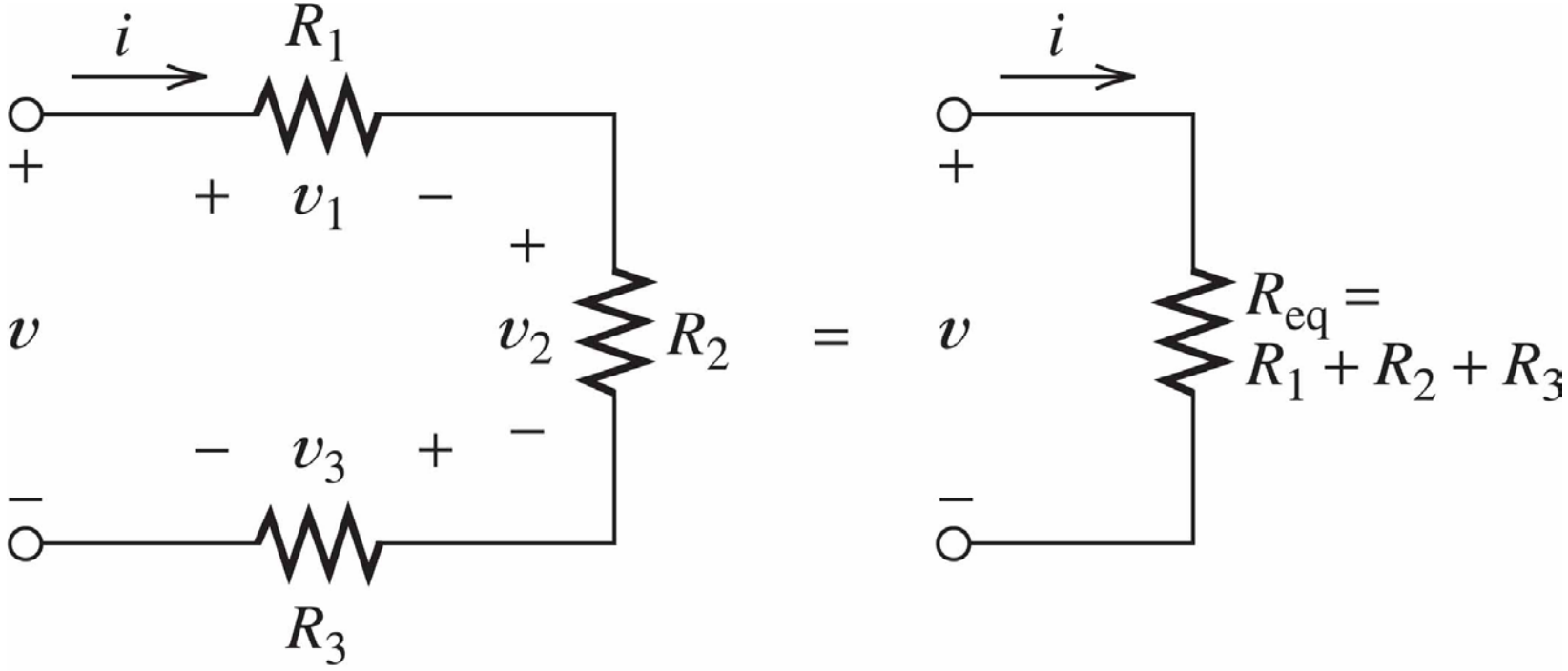
- Same current in both resistors, so total voltage is $IR_1 + IR_2 = I(R_1 + R_2) = IR_{eq}$
- Note that R_{eq} is always larger than the largest series resistor (quick way to check whether your answer is reasonable)



Parallel Resistors

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

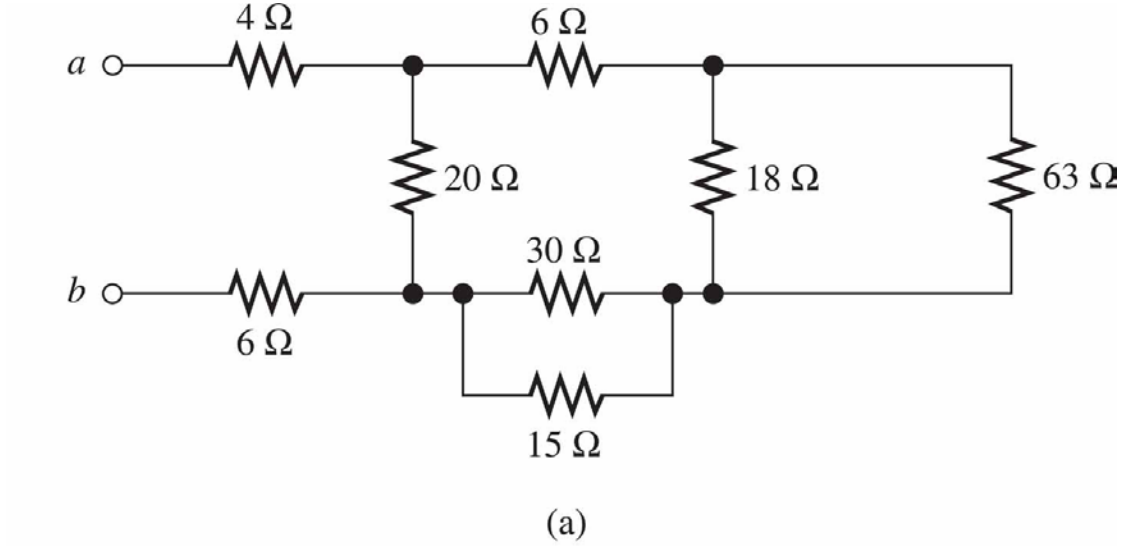
Simplifying Resistor Networks



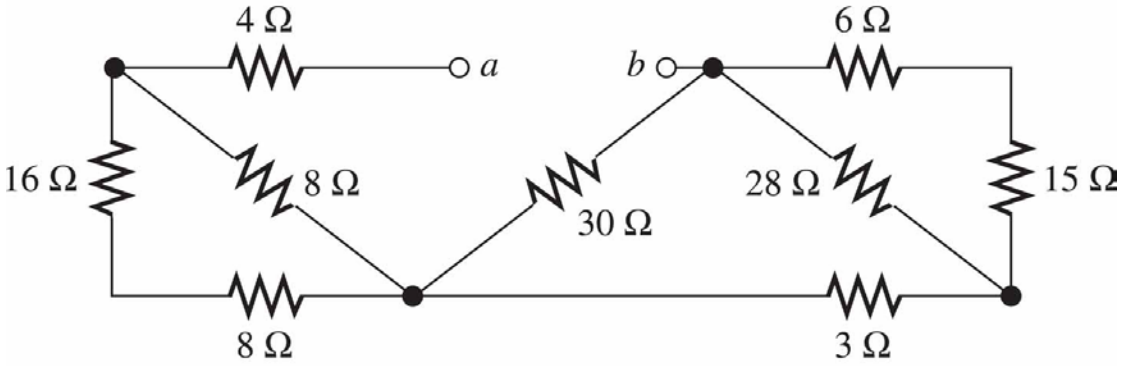
(a) Three resistances in series

(b) Equivalent resistance

Simplifying Resistor Networks (cont.)

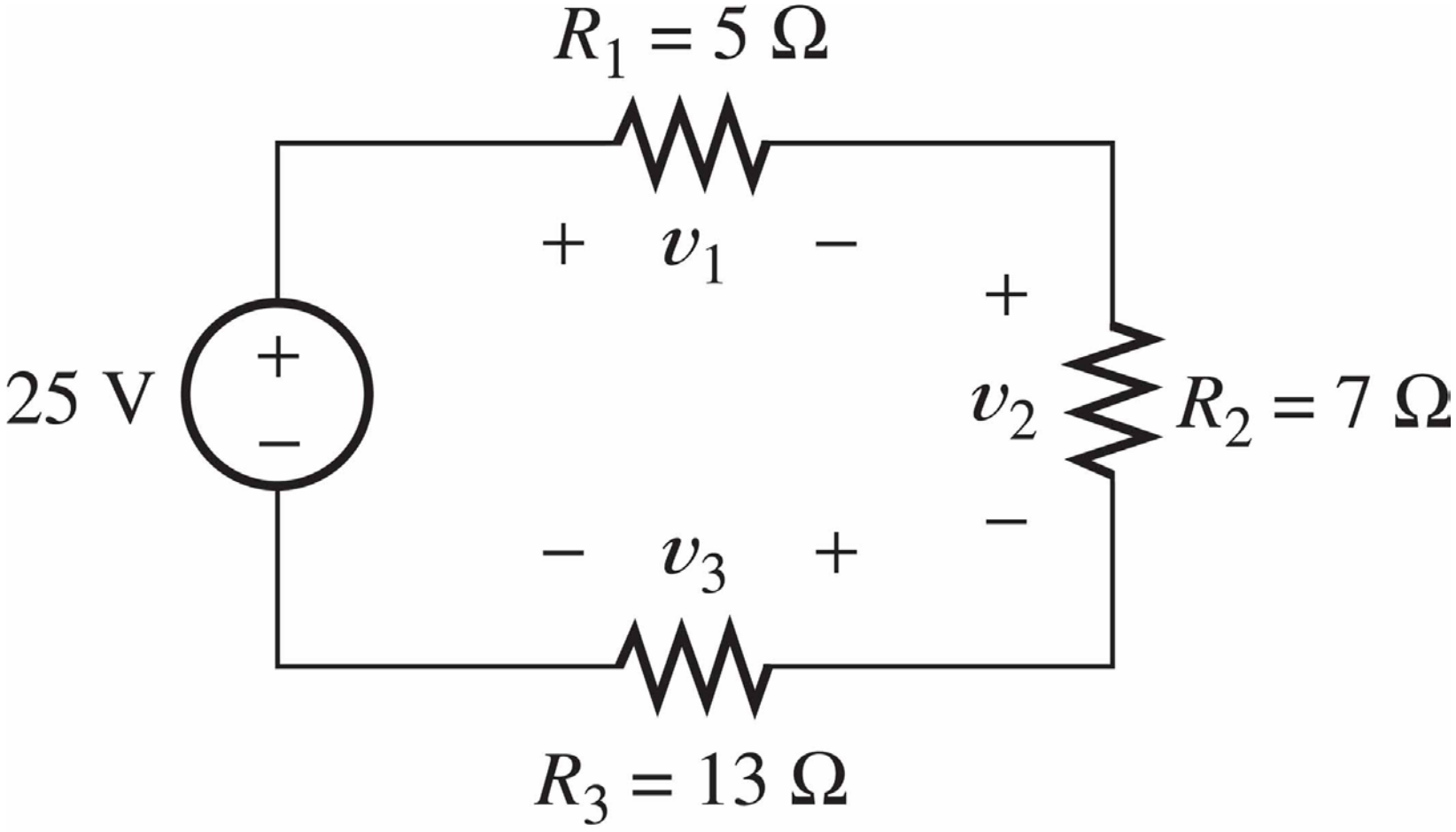


(a)

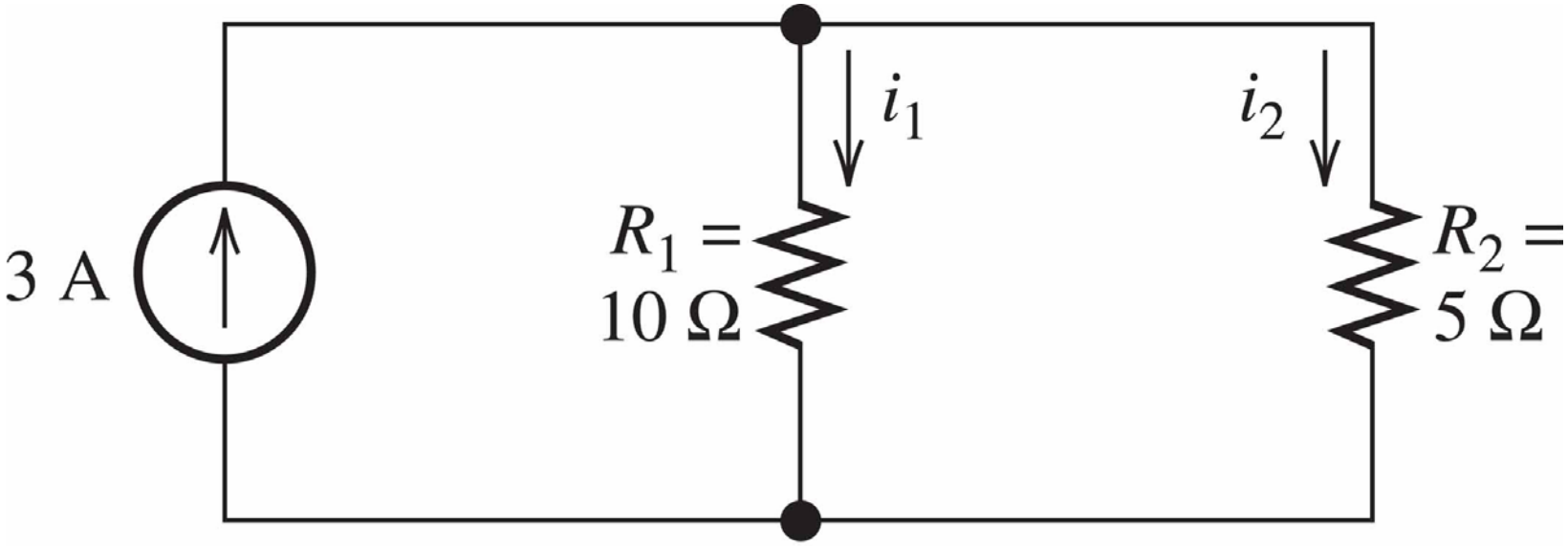


(b)

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 (complete before M 9/9/2013):
  - Chapter 1:
    1.6, 1.7, 1.9, 1.11, 1.17
    1.25, 1.32, 1.38, 1.42, 1.43
  - Chapter 2:
    2.1, 2.4, 2.16, 2.25, 2.32, 2.40
    2.67, 2.71, 2.77, 2.83, 2.85, 2.97
- TAKE D2L QUIZ this week before Friday, 5PM
- **And Read 2.4-2.7 for next week**