

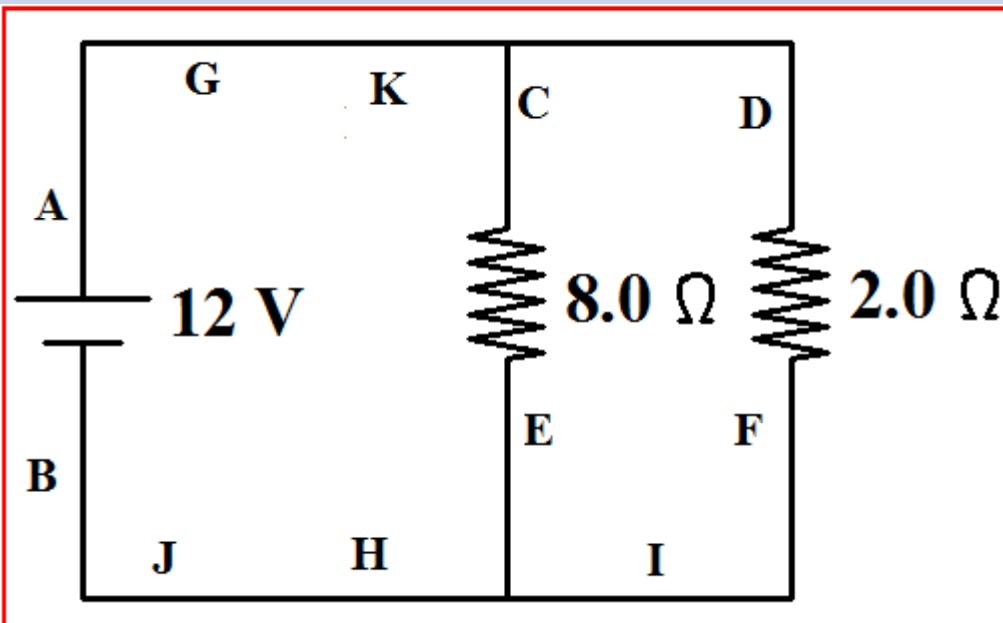
Traditional: 09-07

Themed: 06-07

Mathematically Solving Parallel &
Series Circuits

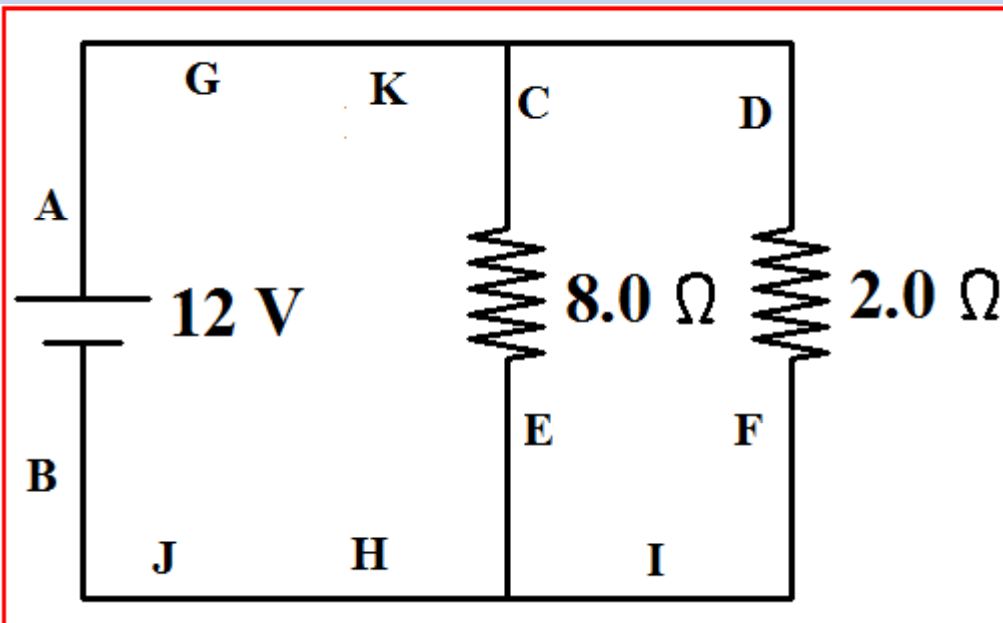
Solving Simple Circuits

- Combine resistors & solve via Ohm's law
 - Realize voltage drops only take place over resistors
 - Combine in series: $R_e = R_1 + R_2$
 - Combine in parallel: Parallel $1/R_e = 1/R_1 + 1/R_2$
- Which pts have 12 V? 0 V?
 - How much current goes
 - Through 8Ω resistor?
 - Through 2Ω resistor?
 - In/out of battery?
 - What's R_e for this circuit?
 - How much current does that R_e predict?



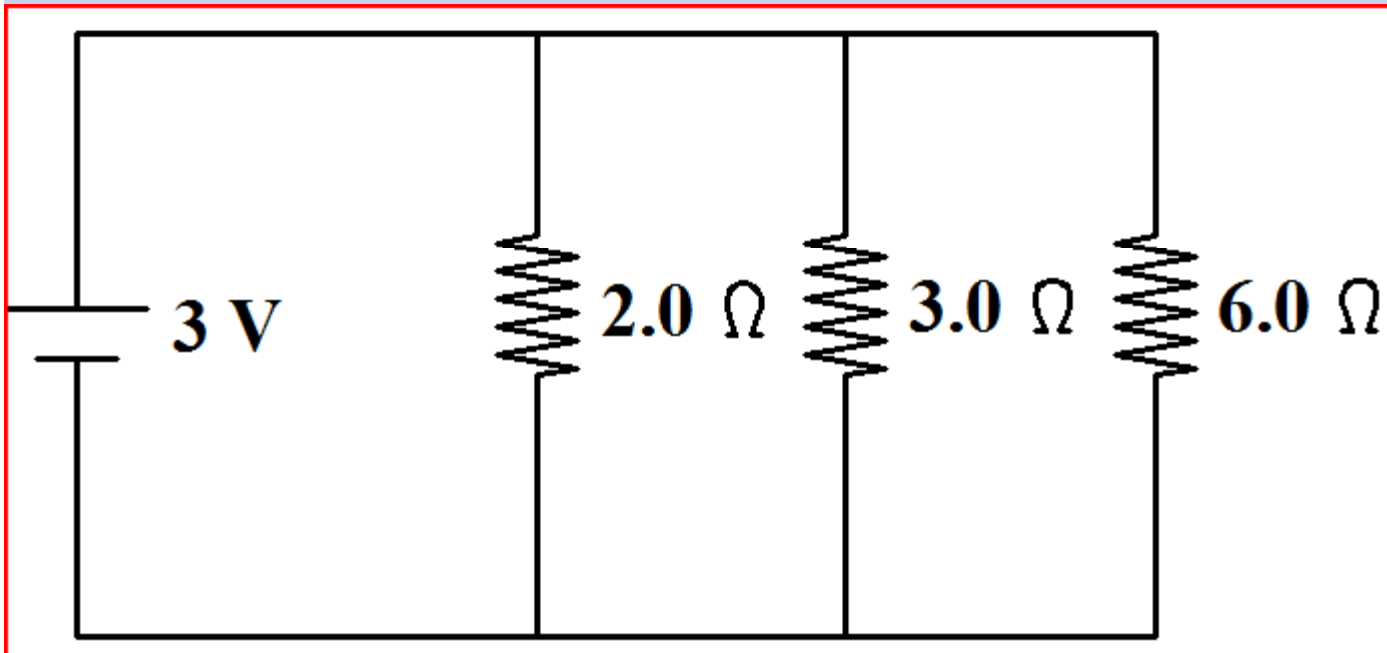
Recognizing where voltages are same

- Remember we said: For any calculation, assume no resistance in copper wires
- $V = iR$ says that: No voltage drop occurs over wire
- Voltage only drops across resistors!
- Which voltages are the same?



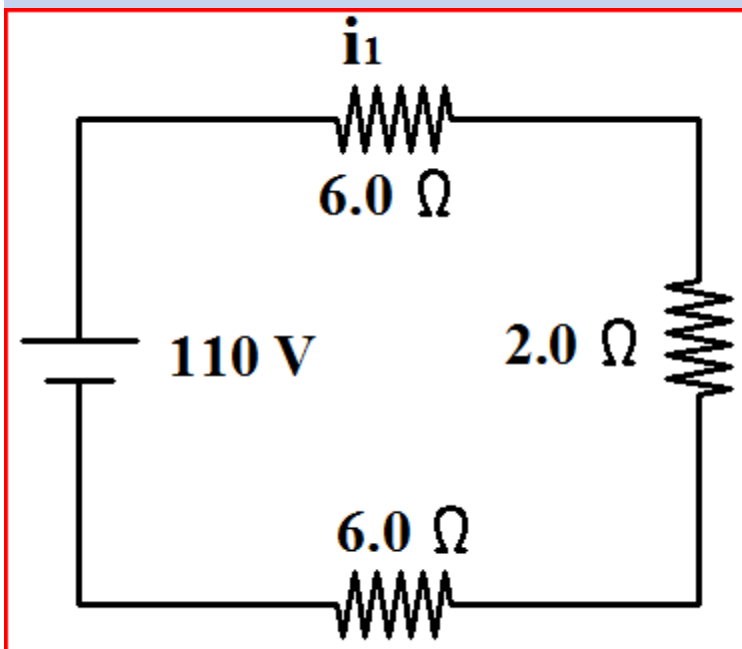
Resistors in parallel - example

- Resistors in parallel have the same voltage drop across them
- What would be the equivalent resistance for this circuit?
- Now you can find the current entering/leaving battery



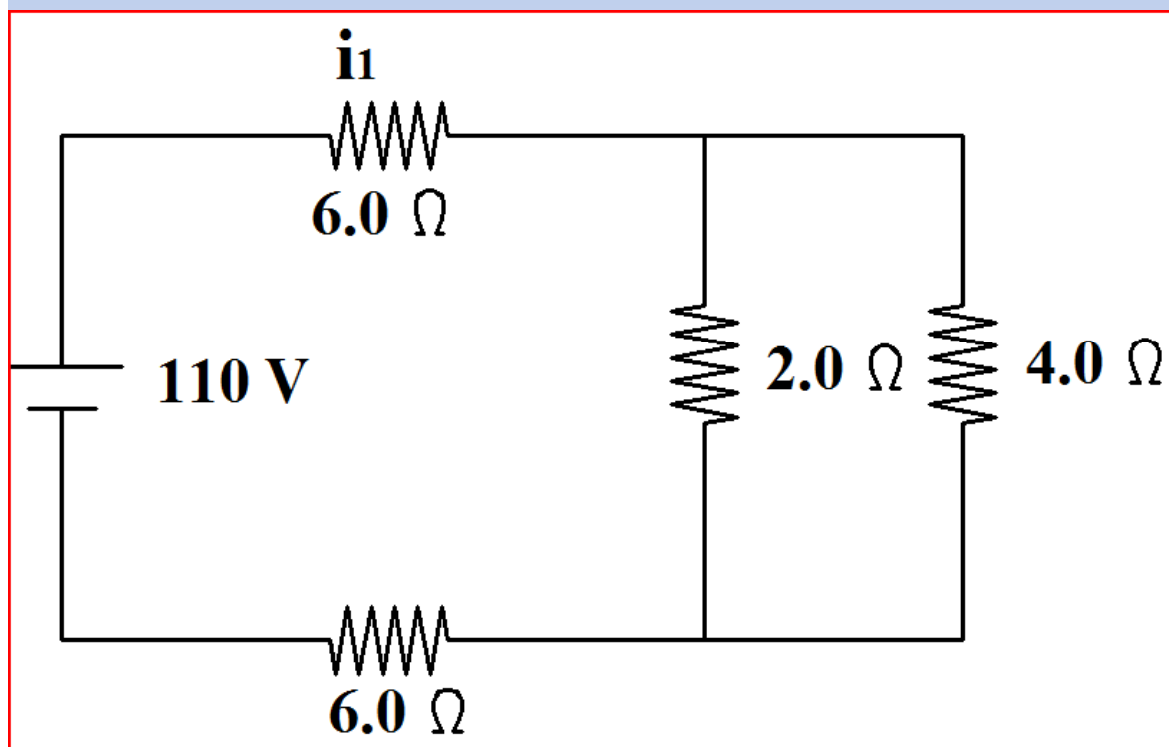
Resistors in series - example

- Resistors in series have the same current passing through them
- Where could current possibly split off?
- What would be the equivalent resistance for this circuit?



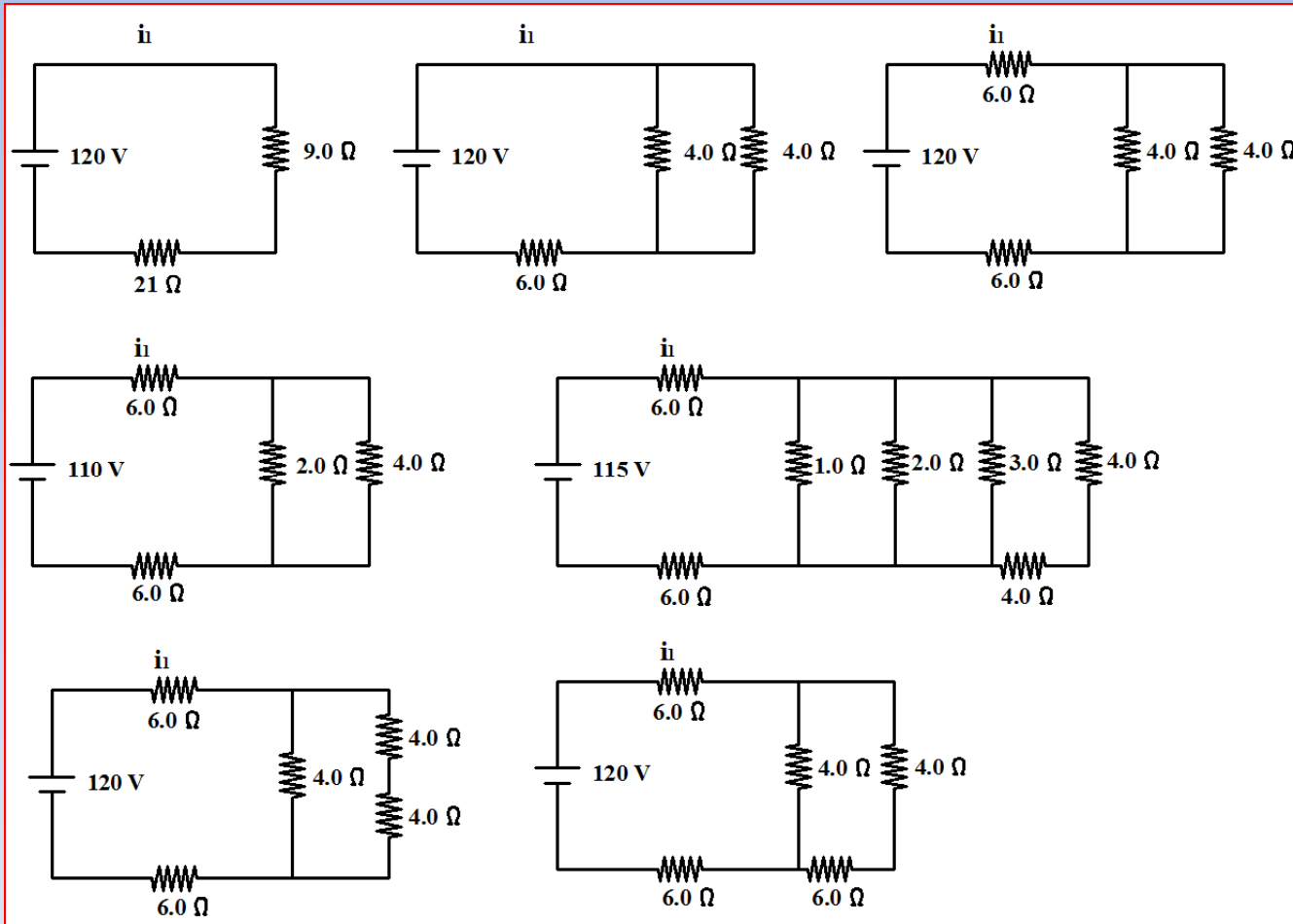
Mixed circuit - example

- How would you figure the equivalent resistance for this circuit?
- Do you see how neither the 2 or 4 ohm resistors are in series, but their equivalent is?



- Do it in two steps:
 - 1) find R_e for 2 and 4 ohm resistors
 - 2) add all three now in series

How would you simplify these?



Can you find the current and power consumed by all resistors? The energy costs?

