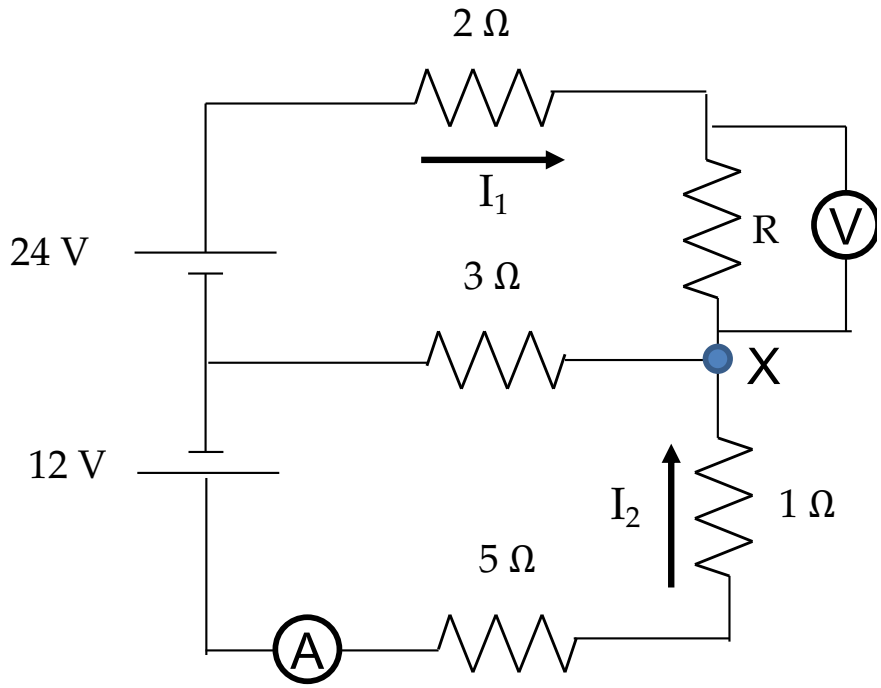
One last "seat of your pants" example

Can the following circuit be simplified completely into a single equivalent resistor? Why or why not?

- For this circuit, the current through the 3 Ω resistor is 3 A, and the voltmeter reads 10 V.
  - In which direction would you expect I_3 to flow? Why?
  - How can you relate I_1, I_2, and I_3 in an equation? (this is often called a node equation - why?)
  - How would you determine what the ammeter reads? What is R? What's the potential at point X?



General approach: when faced with a circuit that can't be simplified into a single resistor, go piece by piece! Find places where you know two things and can use Ohm's law to find the third, then relate to other places in the circuit. Remember that current is the same in all parts of a single branch, and that drops in voltage around a loop have to end up at zero. Don't get thrown by crazy looking circuits - use your head!

Answers: $I_1 = 2.5$ A, $I_2 = 0.5$ A (so ammeter reads this), R = 4 ohms, 9V

Circuit boards activity

- You need an internet-capable device (laptop is preferred). Each person should complete the activity for themselves, though you may work in groups of 2-3 to discuss ideas. Remember that what you write down must be your OWN words!
- Part 1 is using a computer simulation to investigate simple circuit combos. This part should take no more than 15-20 minutes and is designed to give you an idea of potential options.
- Part 2 requires you to observe and interpret some unknown circuit boxes around the classroom. There are 5 boxes; you can choose any 2 you'd like to analyze.
- If you finish before class is done, please turn in your sheet and you can study for the test.