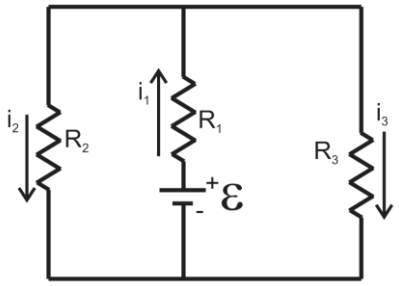
Team Design Circuit Lab

Theory

Consider the following circuit: (Note that the directions for the currents have been chosen for you.) The following are the predicted values for your circuit elements: ε = 5.0 V, R1 = 50.0 Ω, R2 = 60.0 Ω, R3 = 300.0 Ω.



- Predict the equivalent resistance and record it in the table (make your own in excel).
- Using Kirchhoff's laws, find the currents: i_1, i_2, and i_3. Record your predicted currents in the data table, along with the predicted resistance and voltage values.
- Use the predicted currents above to calculate the predicated power lost by each resistor and the power supplied by the battery.

Experiment

Verify that your circuit is setup properly on the breadboard.

- You should measure each resistor's actual resistance, and the equivalent resistance and put that in your data table. Measure resistance using the **Ω** setting (for individual resistances you must take the resistor out of the circuit).
- Measure the voltage across the power supply and record that as well, using the $\overline{\overline{V}}$ setting.
- Next measure each current. In order to measure the current you will have to move the red lead to the port with an **A**. The mustimeter will need to be in the $\overline{\overline{A}}$ mode, AND more importantly you need to "break" open the circuit and insert the multimeter in series at the location you wish to measure the current.
- Calculate the powers, and fill in the table. Check that the power dissipated by resistors is equal to the power supplied by the battery.
- Calculate percent difference: $\frac{|measured-predicted|}{predicted}\text{x}100\%$

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Data Table

	Predicted (Ω)	Measured (Ω)	%Difference
R_1	50		
R_2	60		
R_3	300		
R_{eq}			
	Predicted (V)	Measured (V)	%Difference
$\mathcal{E}$	5		
	Predicted (A)	Measured (A)	%Difference
i_1			
i_2			
i_3			
	Predicted (W)	Measured (W)	%Difference
P_{R1}			
P_{R2}			
P_{R3}			
$P_{\mathcal{E}}$			