EELE 354: Electric Power Applications
Homework 3: Resistive Electrical Circuits
Assigned: Monday, 09/17/2014
Due: Monday, 09/24/2014

Read through Chapter 5 of your textbook, Industrial Electricity, 8th Edition by Brumbach. At the end of the chapter are review questions.

1. Answer the multiple choice questions 1 through 7.

2. Solve problems 1-3. The book asks you to find the "unknown values." Specifically, the unknown values you need to find to achieve full credit are: the source current and power (total current and power delivered to the circuit by the voltage source), the current through each resistor, the voltage across each resistor, and the power dissipated in each resistor.

3. The circuit shown on page 2 is often called a "voltage divider" as the total voltage applied to the circuit is divided between the two resistors. Electrical engineers and electricians know that this circuit can be analyzed to find a value for the output voltage, Vout, without having to first find a value for the current, I.

   (a) Show that this is true by showing that the output voltage is given by the formula,

$$V_{out} = \frac{R_2}{R_1 + R_2} V_{in}$$

(b) From Kirchhoff's Voltage Law, we know that the voltage drop through the two resistors must sum to the voltage supplied by the source, Vin. What then must be the formula for the voltage drop across R1? Give answer in terms of R1, R2, and Vin only.
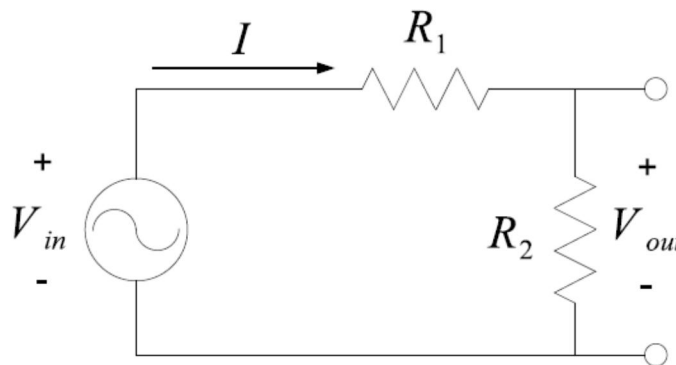

Figure 1: Voltage Divider Circuit