Important Remarks

- Homework is due on Sept. 6th, 2011 at the beginning of class
- Start early and get help if you need it
- Start a new page per problem
- Show all the work
- Specify all the units
- Circle your answers
- Staple pages

1. Given Figure 1, perform the following
   (a) Use Kirchoff's Current Law (KCL) to find I_1 and I_2.
   (b) Use Kirchoff's Voltage Law (KVL) to find V_1, V_2, and V_3.
   (c) Calculate power absorbed by each circuit element and perform a power balance check.

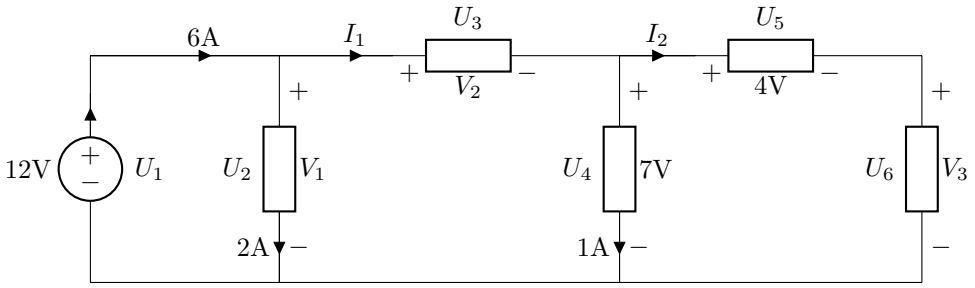


Figure 1: Schematic for Problem 1

2. V_1 is providing 600Wto the circuit shown in Figure 2. Using KVL, KCL, Ohms Law (OL), and Watts Law (WL), label voltage reverences (+ and − polarity markers) for all circuit elements and solve for all unknown variables (V_1, V_2, V_3, V_4, V_5, I_1, I_2, I_3, R_1, R_3). Note which rule you are using for each calculation and perform a power balance check.

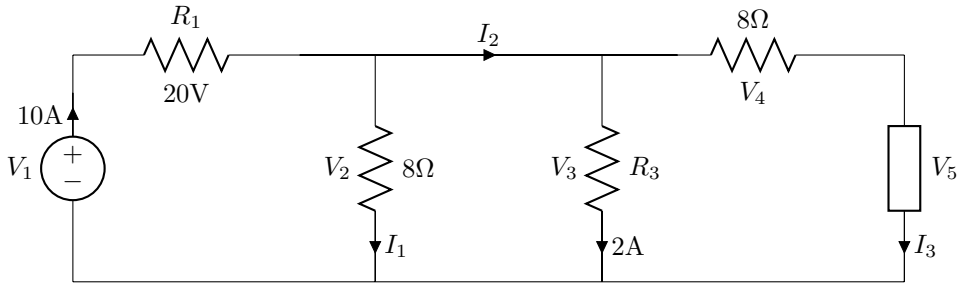
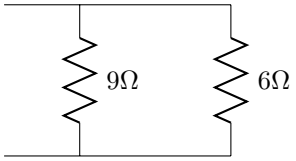


Figure 2: Schematic for Problem 2

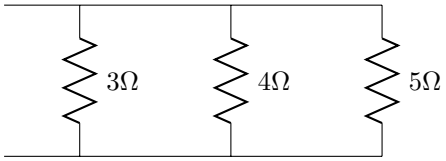
3. For the following figures, reduce the circuit using what you know about resistors in series and parallel. Redraw each in fully reduced form (a single resistor, or a single resistor and voltage source for d and e), and label the equivalent resistance of your result. Hint: Leave your calculator out of this one and solve these algebraically.

(a)

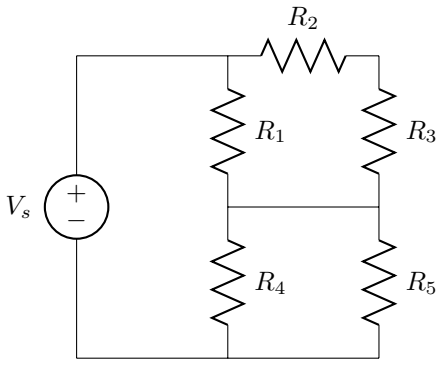
(b)



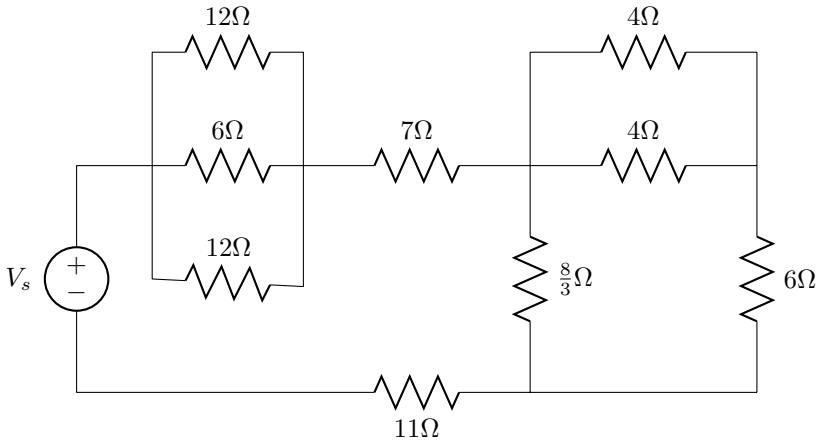
(c)



(d)



(e)



4. For Figure 3, label current and voltage references (+ and − polarity markers for voltage and arrows for current). Calculate all unknown voltages and currents. Hint: Combine resistors until you can determine the value of Is (put away your calculator and use algebra!).

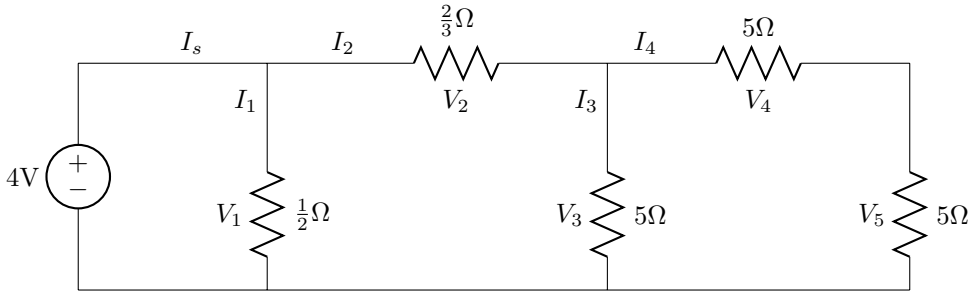


Figure 3: Schematic for Problem 4

5. Perform the following unit conversions. Do it in steps and show your work. Express your answer both in decimal numbers (like this: 0.00001) and in scientific notation (like this: 1.0×10^{-6}).

   (a) 0.035mV to Volts

   (b) 273kΩ to Ω

   (c) 15nF to µF (F is the abbreviation for Farads, our unit for measuring capacitance).

   (d) 1725mA to kA