E84: HW1 (Due in class, Wednesday, September 12th)

1. (5 points) FoEE 1.8c, d

2. (15 points) In this problem, assume that voltages are present because of independent voltage sources. In other words, V_{AB} = 2 Volts would mean that the voltage at node A is 2 volts higher than the voltage at node B.
   a) Suppose V_{AB} = -3 Volts, V_{AC} = 4 Volts, and V_{DB} = -2 Volts. If Point C is at 3.5 Volts with respect to ground, what is the voltage at point D with respect to ground.
   b) Now suppose you close the circuit by connecting point D to a 17MOhm resistor. The other end of this resistor is connected to ground. What is the current through the resistor?
   c) What if you take the closed circuit in (b) and you cut the line at point A and insert another 17MOhm resistor (thus, closing the loop again). What is the current through the new 17MOhm resistor? What is the current through the first one?
   d) Instead of doing what you did in (c), now suppose you clip the circuit at point B and again insert a 17MOhm resistor. What is the current across this new resistor?
   e) Finally, assume that you take the same circuit from (d) and add another 17MOhm resistor in parallel to each of the existing (both) 17MOhm resistors. Now, what is the current through the voltage source that connects points B and D?

3. (10 points) FoEE 1.14a and 1.14b

4. (10 points) FoEE 1.25a and 1.25d

5. (10 points) FoEE 1.33c and 1.33d (for part c)

6. (10 points) FoEE 1.40

7. (10 points) FoEE 1.46

Optional Problems

8. (0 points) FoEE 1.7

9. (0 points) FoEE 1.24a

10. (0 points) FoEE 1.48