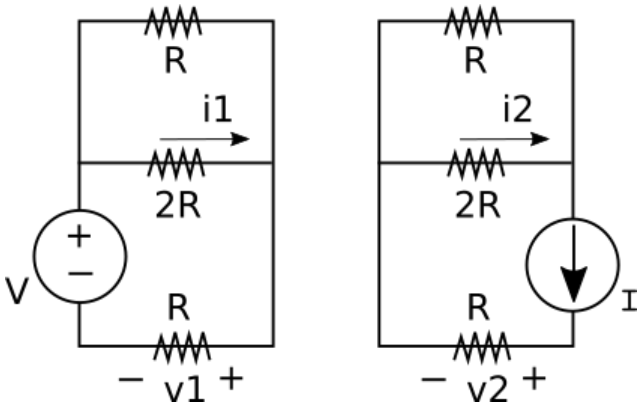
CSU0007 Basic Electronics, Homework 2

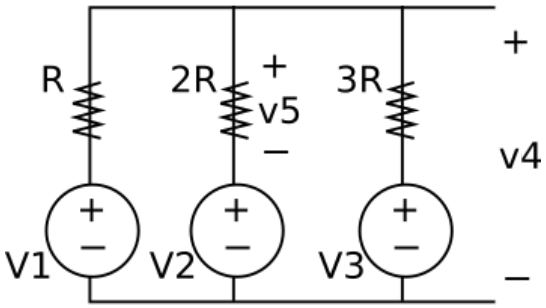
Submit your work via Moodle before 9AM, Oct 27th.

Clearly label your answer for each question. Clearly state your calculation steps.

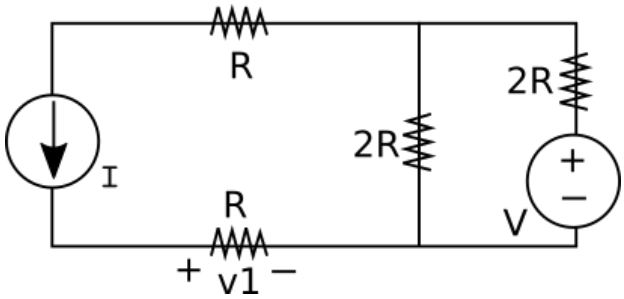
1. (10 points) For the following circuits, use the node analysis method to determine i1, i2, v1, and v2.



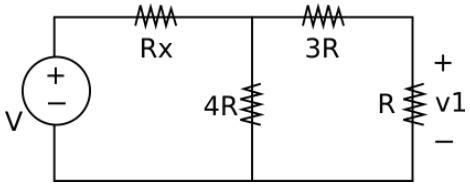
2. (20 points) For the following circuit,
    1. (10 points) use the node analysis method to determine v4 and v5;
    2. (10 points) now use superposition instead to determine v4 and v5.



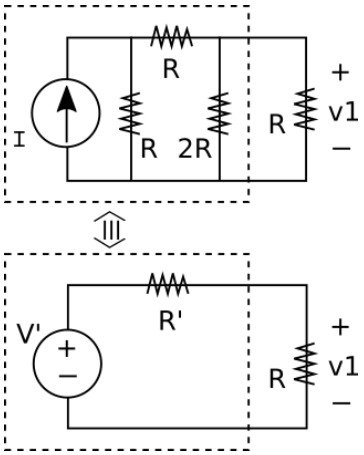
3. (10 points) For the following circuit,
    1. (3 points) use the basic analysis method to determine v1;
    2. (3 points) use the node analysis method to determine v1;
    3. (4 points) use superposition to determine v1.



4. (20 points) For the following circuit, consider these four separated questions:
    1. (5 points) If Rx = R Ω, what will be the value of v1?
    2. (5 points) In order to increase v1, shall we increase or decrease Rx? Explain.
    3. (5 points) In order to have v1=$\frac{1}{5}$V, what should be the value of Rx?
    4. (5 points) Is it possible to make v1=$\frac{1}{3}$V by setting Rx = $y\ \Omega$ for some $y > 0$? Explain.



5. (15 points) For the following circuit, use Thevenin's Theorem to determine v', R', and v1 in the equivalent circuit. Five points each.



6. (25 points) For the following circuit,
    1. (10 points) Determine i1 using either the basic analysis method, the node analysis method, superposition, or some combination of the three techniques.
    2. (15 points) Use Thevenin's Theorem to determine v', R', and i3 in the equivalent circuit.