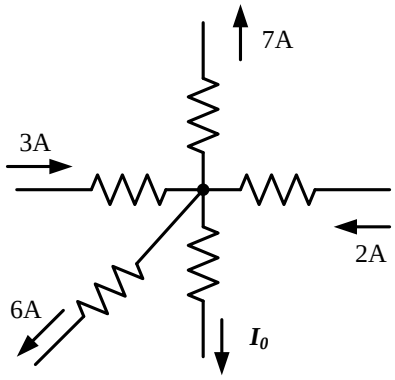
EE 109 Homework 1[1]

Name: _____

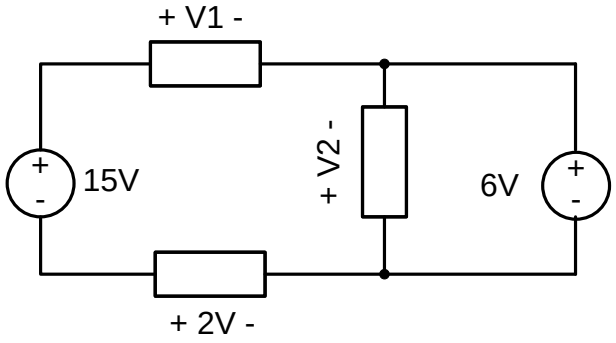
Due: See website **Score: _____**

Submit your answers on Blackboard.

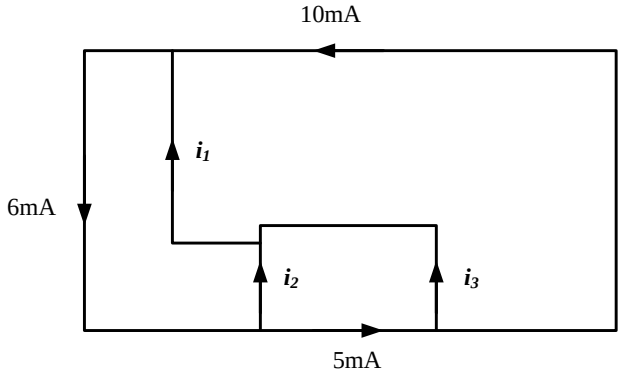
1.) **[5 pts.]** Use KCL to solve for I_0.



2.) **[8 pts.]** Use KVL to solve for V1 and V2.

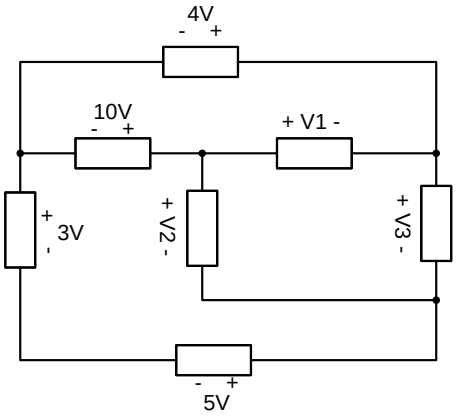


3.) **[9 pts.]** Solve for the currents i_1, i_2, i_3.

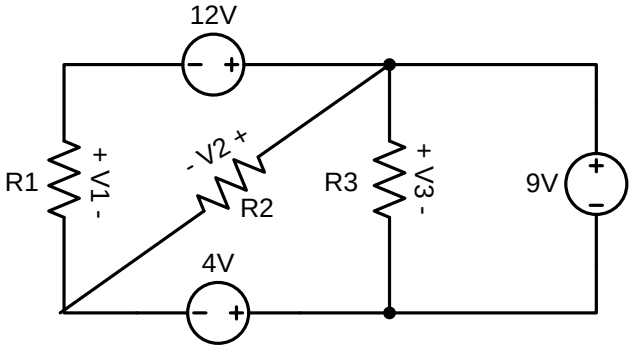


[1] Many of these exercises were derived or inspired from Fundamentals of Electric Circuits, 3rd ed. By Alexander, Sadiku. McGraw-Hill Publishers.

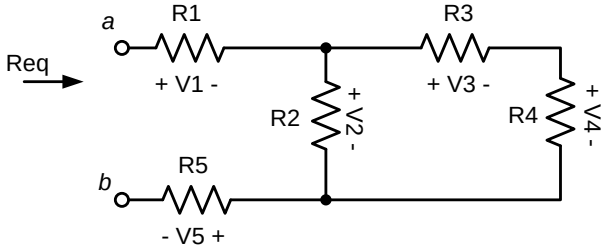
4.) **[9 pts.]** Solve for the voltages V1, V2, V3



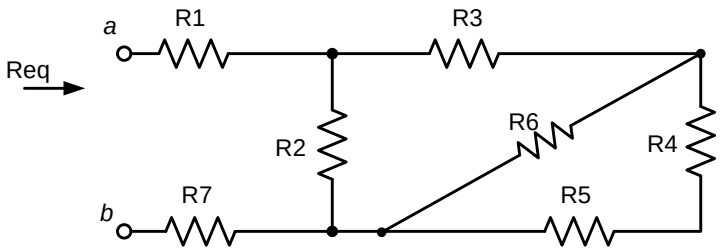
5.) **[9 pts.]** Solve for the voltages V1, V2, V3 across the respective resistors.



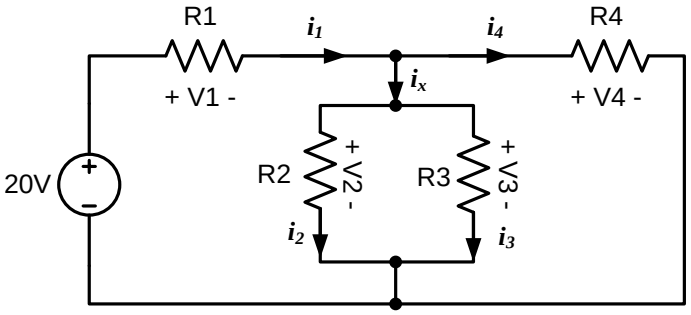
6.) **[10 pts.]** Reduce the resistor network shown below to a single equivalent resistance. Assume the values of the resistors are given as R1=3Ω, R2=4Ω, R3=2Ω, R4=2Ω, R5=1Ω.



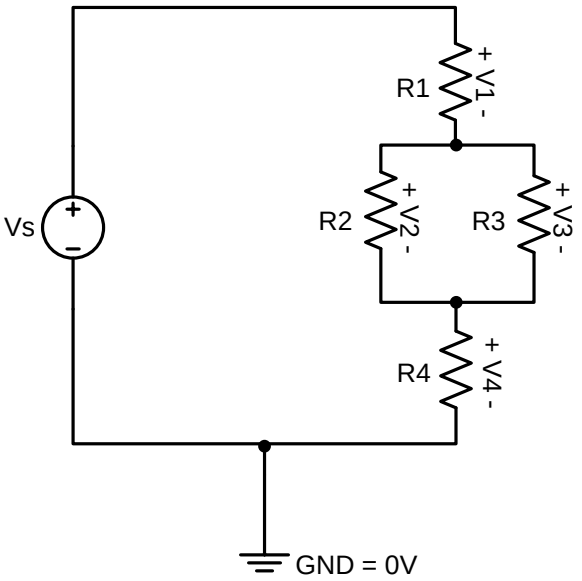
7.) **[10 pts.]** Reduce the resistor network shown below to a single equivalent resistance assuming the following resistor values: R1=5Ω, R2=4Ω, R3=3Ω, R4=1Ω, R5=1Ω, R6=2Ω, R7=7Ω.
Hint: Start by combining R4 and R5 then combine those with R6 and keep going…



8.) **[8 pts.]** Find an expression for the current ***i1*** if R1=4Ω, R2=3Ω, R3=6Ω, R4=2Ω.
Hint: Combine R2, R3, R4 into an equivalent resistance which will be in series with R1. From here you can use a KVL loop or Ohm's law to solve for i1.



9.) **[16 pts.]** Use the generalized concept of a voltage divider (review your notes/lecture slides) to find expressions for the voltage V1 and also V4 in the circuit below. Your expression should be in terms of Vs and R1-R4.



10.) **[6 pts.]** Look at the circuit from problem 9. If R4 is very large (approaches infinity) what would V4 be (approximately)? Your expression should be in terms of Vs and (possibly) some of R1-R4.
Hint: Use your equation from the previous problem and let R4 go to infinity…

11.) **[5 pts.]** Look at the circuit from problem 9. If R3 is very large (approaches infinity) again solve (approximately) for the voltage V4? Your expression should be in terms of Vs and (possibly) some of R1-R4.
Hint: Use your equation from problem 9 and let R3 go to infinity.

12.) **[5 pts.]** Look at the circuit from problem 9. If R3 is effectively 0Ω (i.e. replaced by a wire), solve (approximately) for the voltage V4? Your expression should be in terms of Vs and (possibly) some of R1-R4.