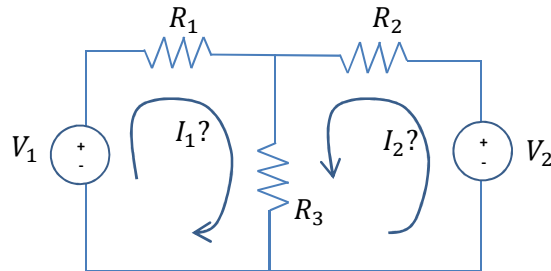


**Take 3 full minutes to read the ENTIRE cover sheet first.**

**SUBMIT script file (NO ZIP) before the end of the class time. Turn in cover sheet.**

An electrical circuit is set up the following way. Calculate the currents  $I_1$  and  $I_2$  (in Amps) that flow through this circuit.



Don't panic: the symbols and meaning are not important to solve the problem, but their values and the equations given below can be used to solve the problem graphically. With R values typically from 1 to 9 (in Ohms), V values typically from 1 to 10 (in Volts), I values tend to be very small (less than 1).

By solving the circuit,  $I_2$  can be expressed as a function of  $I_1$  by two equations. These equations are linear equations of the form  $y(x) = m * x + b$ :

Equation 1: 
$$I_2(I_1) = -\frac{(R_1+R_3)}{R_3} * I_1 + \frac{V_1}{R_3}$$

Equation 2: 
$$I_2(I_1) = -\frac{R_3}{(R_2+R_3)} * I_1 + \frac{V_2}{(R_2+R_3)}$$

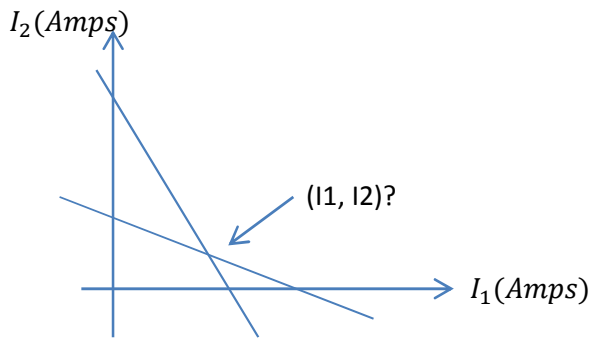
Assuming all values but the currents  $I_1$  and  $I_2$  are known by the user, develop a program that can solve the currents for any similar circuit by plotting both equations above and reading  $(I_1, I_2)$  on the intersection of these lines. When complete, fill in the table (5pts):

V1 (Volts)	V2 (volts)	R1 (Ohms)	R2 (Ohms)	R3 (Ohms)	I1 (Amps) 2 decimals	I2 (Amps) 2 decimals
5	7	4	5	2		
4	6	2	4	5		

Using the full 7 steps taught in this class, and only the material taught in this class at this time, develop a program that is easily reusable to solve the problem.

Step1(5pts):

Step2:



Step3: (Equations given already)

Step4: (Assume values from scenario1 (line 1 in the table))

Step5: (solve graphically – hence no step5 needed)

Step6: not applicable

Step7a (comments) and 7b (place directly on the script file).

**Requirements for the program itself:**

- **(12pts)** prompt the user for the values of  $V_1, V_2, R_1, R_2,$  and  $R_3$ .
- **(15pts)** define all vectors that can plot equation1 and 2
- **(10pts)** plot correctly, using colors, markers and line specifications AS SHOWN in the videos.
- **(15pts)** label the plot properly and fully

**(7pts – other random errors!)**

Within script:

name/section/description **(3pts)**

commands to clean up previous execution of MATLAB codes **(3pts)**

comments (which is considered the algorithm) **(5pts)**

spacing of code **(5pts)**

appropriate variable names (no single letters) **(5pts)**

semi-colon hiding intermediate calculations **(5pts)**

Step7c **(5pts)**: Verify mathematically your solution seems accurate.