Note: **Do not use Mesh or Node analysis.** This review homework set is meant to give you practice in using KVL, KCL, Ohm’s law and the passive sign convention. All of your solutions should be neat and indicate which loop or node you are writing the equation for followed by the equation with variable, then one with numbers.

**Problem 1**

Using the passive sign convention, mark the polarity of the current source and the direction of current flow through the voltage source and resistors.

![Problem 1 Diagram](image)

**Problem 2**

Using Ohm’s Law, given that \( V_{R1} = 3 \text{ volts}, R_1 = 1500 \Omega, i_{R2} = 40 \text{ mA} \) and \( R_1 = 1 \text{ k}\Omega \), find the current through \( R_1 \) and the voltage drop across \( R_2 \). Make sure to use the correct units and indicate the direction of current flow through \( R_3 \) and polarity of the voltage across \( R_1 \).

![Problem 2 Diagram](image)

**Problem 3**

Using KCL, find values for \( I_S \) and \( i_4 \) given that \( i_{R2} = 20 \text{ mA}, i_{R3} = 10 \text{ mA} \) and \( i_{R5} = 3 \text{ mA} \). A complete solution will include KCL equations.

![Problem 3 Diagram](image)
**Problem 4**

Using KVL, find values for $V_{R1}, V_{R2}$. A complete solution will include KVL equations.

**Problem 5**

Using KCL, KVL and Ohm’s Law:

Given:
- $V_s = 25$ V
- $V_{R3} = 5$ V
- $R_1 = 1000$ Ω
- $R_2 = 500$ Ω
- $R_3 = 500$ Ω

Find:
1. The voltage across each resistor
2. The current through each resistor
3. The power added by the source
4. The power dissipated by each resistor.
5. Is the power added by the source equal to the sum of the power dissipated by the resistors?

**Problem 6**

Using KVL and knowing that $V_{R1} = 5$ V, $V_{R2} = 7$ V, $V_{R6} = 5$ V and $V_{R7} = 4$ V, find $V_s, V_{R3}, V_{R4},$ and $V_{R5}$. What does a negative voltage indicate?
**Problem 7**

Using KCL and knowing that $i_{R1} = 5 \text{ A}$, $i_{R2} = 2 \text{ A}$, $i_{R3} = 3 \text{ A}$ and $i_{R7} = 4 \text{ A}$, find $I_s$, $i_{R4}$, $i_{R5}$, and $i_{R6}$. What does a negative value indicate?

![Diagram of a circuit](image)

**Problem 8**

Write the KCL equation for the supernode shown in the figure below. Using the values for the currents found in Problem 7, show that KCL is valid for the supernode.

![Diagram of a supernode](image)

**Text Problem:** 2.26