Problem Set 2
Chapter 3: Resistive Circuits
Due: see website for due date

P3.2-14
Determine the voltage and current of each of the circuit elements in the circuit.
Solution: 1.5A, 15V, 1.0A, 10V, 0.5A, 5V, 10V, 0.4A, 1.1A, 0.1A, 20V, 10V

P3.2-21
Determine the value of the current $i_m$ in the circuit. Solution: 9 A

P3.2-29
The voltage source in the circuit supplies 2 W of power. The value of the voltage across the 25-Ω resistor is $v_2 = 4$ V. Determine the values of the resistance $R_1$ and of the gain, $G$, of the VCCS.

P3.3-4
Determine the voltage $v$ in the circuit shown. Solution: $-4$ V
P3.4-9
Determine the value of the voltage $v$ in circuit. Solution: 30 mV

![Circuit Diagram](image)

P3.4-13
Determine the values of the resistances $R_1$ and $R_2$ for the circuit shown. Solution: 4Ω, 10Ω

![Circuit Diagram](image)

P 3.6-4
Determine the currents $i_a$, $i_b$, $v_1$, and $i_2$ shown in the circuit.
Solution: 3.0A, 2.3A, −10V, 1.1A

![Circuit Diagram](image)

P 3.8-5
Computer analysis of the circuit shows that $i_a = −0.5$ mA and $i_b = −2$ mA. Was the computer analysis done correctly?

![Circuit Diagram](image)

DP 3-1
The circuit shown uses a potentiometer to produce a variable voltage. The voltage $v_{m}$ varies as a knob connected to the wiper of the potentiometer is turned. The wiper leaves a portion of resistance $R_P$ above with resistor $R_1$ and below with resistance $R_2$. Specify the resistances $R_1$ and $R_2$ so that the following three requirements are satisfied:

1. The voltage $v_{m}$ varies from 8 V to 12 V as the wiper moves from one end of the potentiometer to the other end of the potentiometer: $R'_{P} = aR_{P}$ where $a = [0, 1]$.
2. The voltage source supplies less than 0.5 W of power.
3. Each of $R_1$, $R_2$, and $R_P$ dissipates less than 0.25 W.
   (There are multiple solutions)
**Challenge Problem 2A**
Find $P_{4\Omega}$ in the circuit.
Solution: 16W

**Challenge Problem 2B**
In the given circuit, $P_{6\Omega} = 96$ mW. Find $I_S$. Solution: 16 mA

**Challenge Problem 2C**
Find $V_{6\Omega}$ in the circuit. (Hint: find a Delta-Y transformation on the web). Solution: 9 V

**Challenge Problem 2D**
Find the power absorbed by the 10kΩ resistor in the circuit. (VCCS has units of mA)
Solution: 10mW