1. (24 pts) The ammeter, A, reads 20 mA. Remember that ideal ammeters have no resistance.
   a) The power dissipated by $R_2$ is 0.18 W, what is the value of $R_2$?

   \[ P = 0.18 \text{ W} \]

   \[ R_1 = ? \]

   \[ R_2 = ? \]

   b) The source provides 0.6 W of power. What is the value of $V_S$?

   c) What is the value of $R_1$?

2. (24 pts) Use the method of superposition to find the voltage across $R_3$ ($V_{R3}$) and the current through $R_2$ ($I_{R2}$). Be sure to clearly show and circle your intermediate results.

   \[ I_S = 12 \text{ mA} \]

   \[ V_S = 9 \text{ V} \]

   \[ R_1 = 150 \Omega \]

   \[ R_2 = 1.2 \text{ k}\Omega \]

   \[ R_3 = 600 \Omega \]

   \[ R_4 = 200 \Omega \]
3. (26 pts) a) Find and draw the Thévenin equivalent of the circuit shown. The load resistor is $R_L$.

![Circuit Diagram](image)

b) Find and draw the Norton equivalent of the same circuit.

c) Find the Voltage across the load using your Thévenin equivalent circuit. $V_{RL} = ?$

d) Select a load resistor to maximize the power delivered to the load and find that maximum power. $P_{RL_{max}} = ?$

4. (26 pts) a) Use nodal analysis to find the voltage across $R_2 (V_{R2})$.

You MUST show all the steps of nodal analysis work to get credit, including drawing appropriate symbols and labels on the circuit shown.

![Circuit Diagram](image)

**Answers**

1. a) 50 $\Omega$  
   b) 10 V  
   c) 86.7 $\Omega$

3. a) 7.2 V  
   b) 28.8 mA  
   c) 86.7 $\Omega$

2. a) 1 mA  
   b) 7.8 V  
   c) 1.2 V  
   d) 51.8 mW

4. a) 4 V  
   b) 10 mA

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