Problem 1 (25 points) Node-voltage method
Use the node-voltage method to find all node voltages and $i_x$ in the following circuit. Do not simplify the circuit.

Node voltages = _____, _____, _____

$i_x = _____$
Problem 2 (25 points) Determine the node voltages for the following circuit.

\[ V_a = \_] \]

\[ V_b = \_] \]
Problem 3 (25 points)

Problem 1 (25 points). Mesh-current analysis
Use mesh-current analysis to determine the current $i_1$ in the following circuit. Do not simplify the circuit.
Problem 2 (25 points) Maximum power transfer
For the following circuit:

(a) (15 points) Find the Thévenin equivalent at terminals a-b for the circuit shown.
(b) (5 points) What is the value of $R_L$ for maximum power transfer?
(c) (5 points) What is the maximum power that could be dissipated in $R_L$?
Problem 3 (25 points) Source transformations

Use source transformations and resistance combinations to simplify the circuit until only two elements remain to the left of terminals $a$ and $b$. 

![Circuit Diagram]