Problem I: [20 pts.] Superposition

Given the following circuit:

and known values $i_a$, $v_b$, $i_c$, $r$, $R_1$, $R_2$, and $R_3$, find $i_m$ using superposition. You must redraw the circuit each time to get full credit for this problem.
Problem II: [15 pts.] Thévenin-Norton I

Given the following circuit:

![Circuit Diagram](image)

and known values $i_a$, $v_b$, $R_1$, and $R_2$, determine and draw both the Thévenin and Norton equivalent circuits as seen at terminals $AZ$. 
Problem III: [20 pts.] Thévenin-Norton II

Given the following circuit:

![Circuit Diagram]

and known values $g$, $R_1$, $R_2$, and $R_3$, determine and draw the Thévenin equivalent circuit as seen at terminals $AZ$. 
Problem IV: [20 pts.] Operational Amplifiers

Given the following circuit:

and known values $v_s$, $R_1$, $R_2$, $R_3$, $R_4$, and $R_5$, find $v_x$ in terms of the known values. You may assume both operational amplifiers are ideal.
Problem V: [25 pts.] Inductors and Capacitors

Given the following circuit:

![Circuit Diagram]

and known values \( v_a, i_b, R, L, \) and \( C, \)

(1) find a differential equation for \( v_C \) in terms of the known values. If done correctly, you will end up with a second order differential equation. *Hint: use \( v_C \) and \( i_L \) as your only unknowns to develop two equations for the circuit, then substitute one into the other to get a single equation with \( v_C \) and its derivatives.*

(2) Assume that \( v_a \) and \( i_b \) are constant and that this circuit has been in place for a very long time. Determine the capacitor voltage \( v_C \) and inductor current \( i_L \) in terms of the known values.