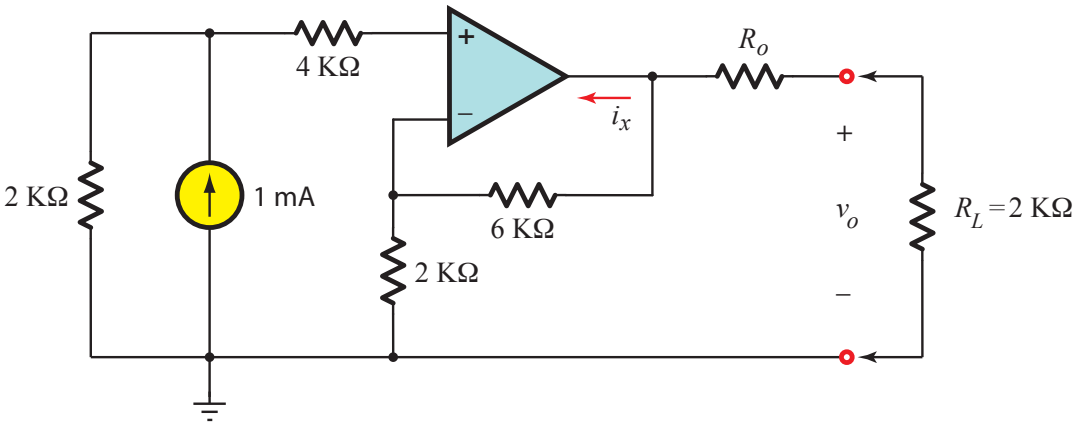
University of Calgary
Department of Electrical and Computer Engineering

ENGG 225 - Fundamentals of Electrical Circuits and Machines
Winter, 2017

Problem Assignment #5

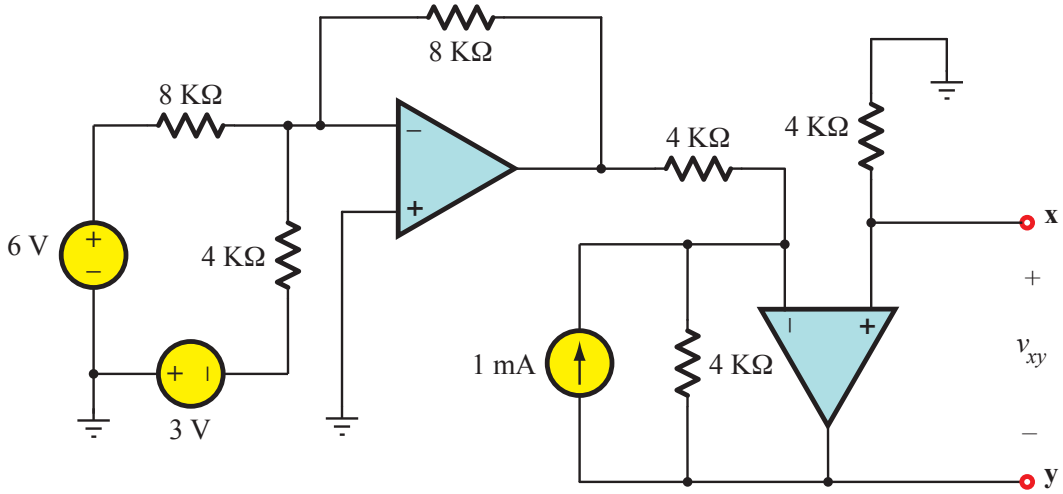
Please solve the operational amplifier problems below. Unless otherwise stated, express all your currents in Amperes, and voltages in Volts.

1. **[1 mark.]** In the circuit below, let $R_o = 500\ \Omega$. Determine the output voltage v_o with the 2 KΩ load resistance attached as shown.

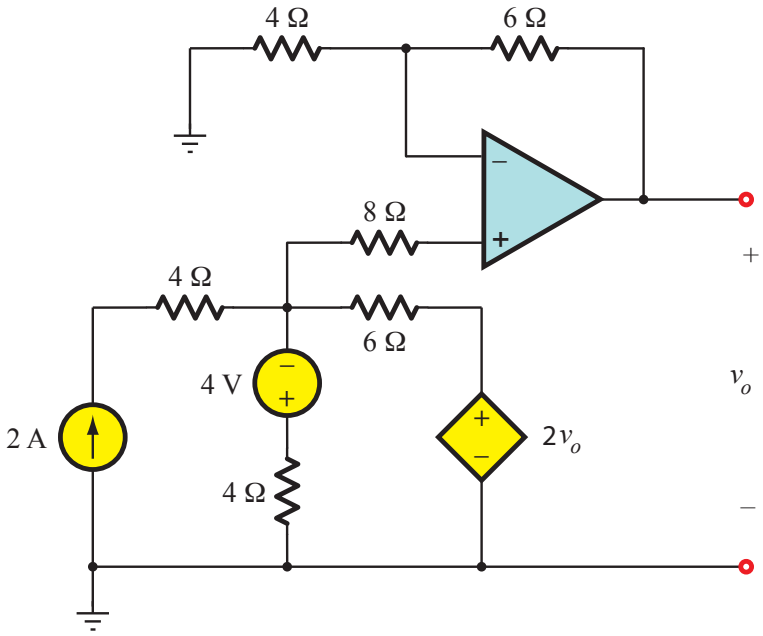


2. **[1 mark.]** In Problem 1 above, using the same values of R_o and R_L, calculate the current i_x. Express your answer in *milliAmperes (mA)*.

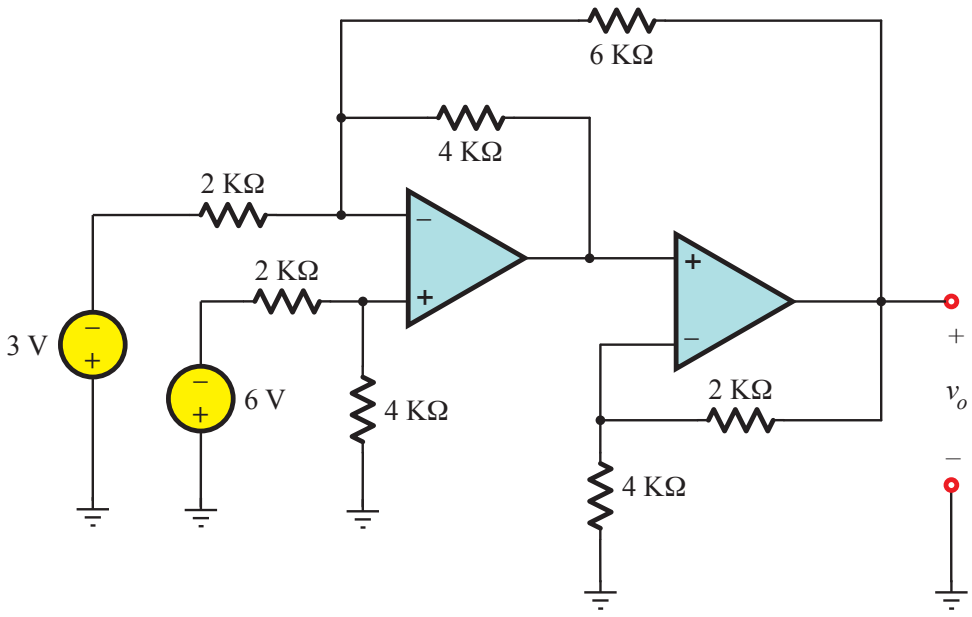
3. **[2 marks.]** Use superposition to analyze the following circuit, and find the output voltage v'_{xy} due to the *3-V source* acting alone.



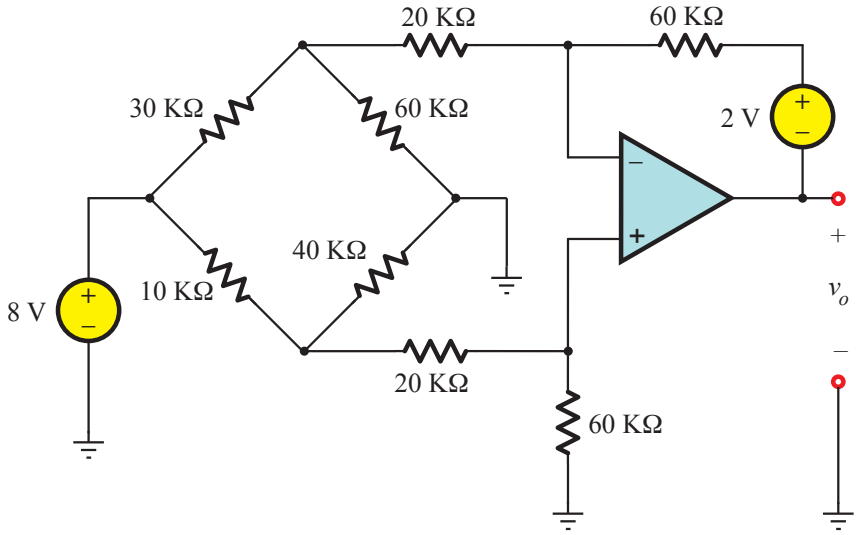
4. **[2 marks.]** Determine the output voltage v_o in the following circuit.



5. **[2 marks.]** Determine the output voltage v_o in the following circuit.



6. **[2 marks.]** Determine the output voltage v_o in the following circuit.



7. **[2 marks.]** Determine the output voltage v_o in the following circuit.