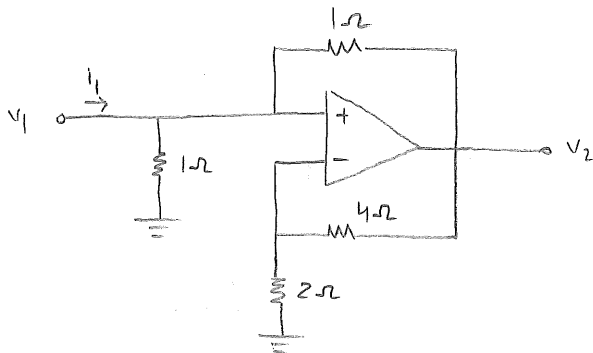


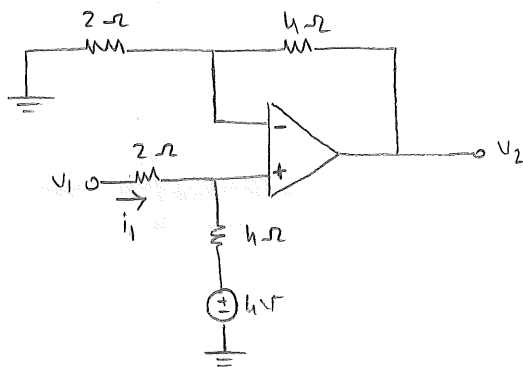
PROBLEM SET V

1 Find and sketch the transfer (v_1-v_2) and input (v_1-i_1) characteristics.



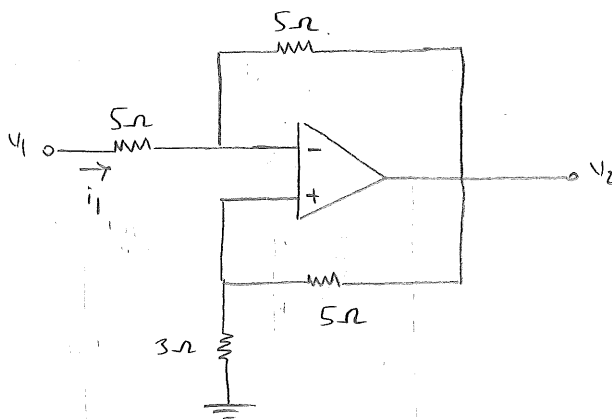
$$E_s = 12V$$

2 Find and sketch the transfer and input characteristics.



$$E_s = 18V$$

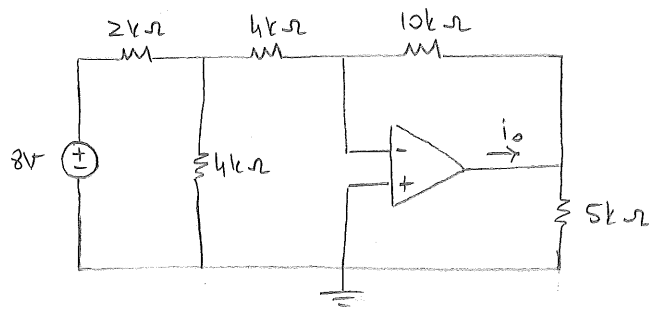
3 Find and sketch the transfer and input characteristics.



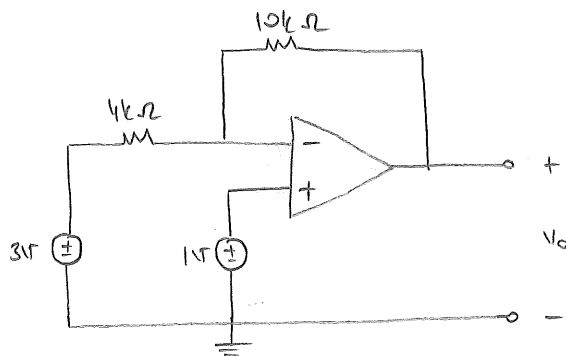
$$E_s = 16V$$

for the rest of the problems suppose the OP-AMP is in linear region.

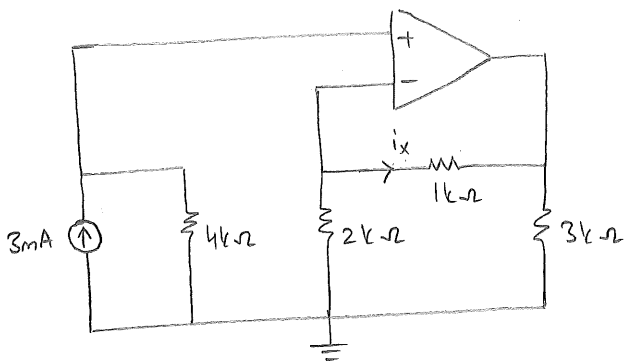
4) [A&S] Determine i_o .



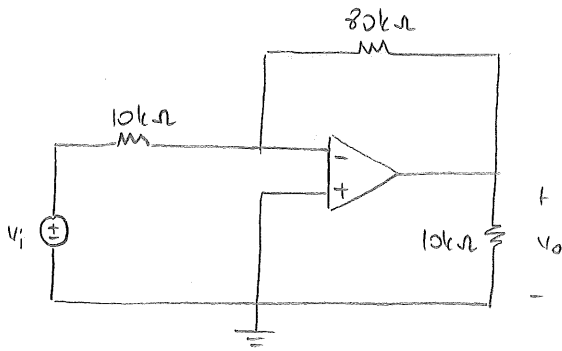
5) [A&S] Calculate v_o .



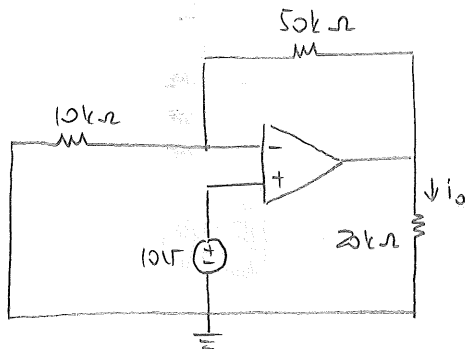
6) [A&S] Calculate i_x and the power dissipated by the 3kΩ resistor.



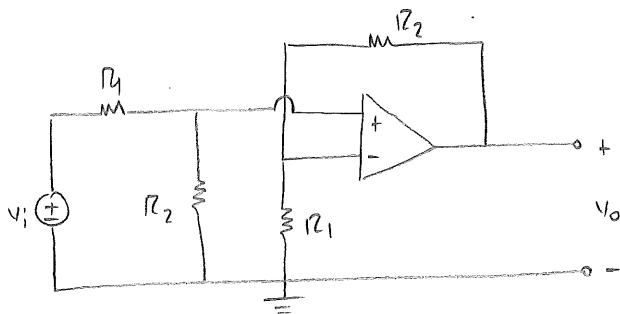
7) [A&S] calculate the gain v_o/v_i .



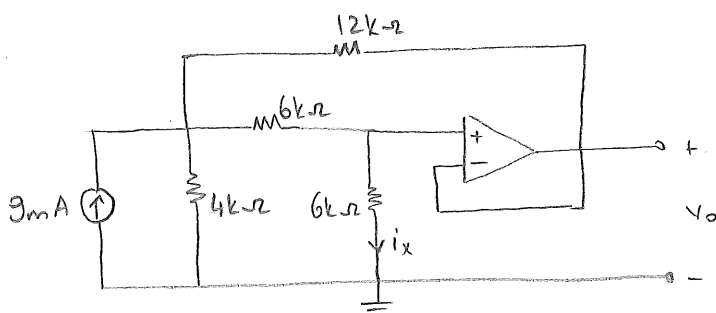
8) [A&S] Find i_o .

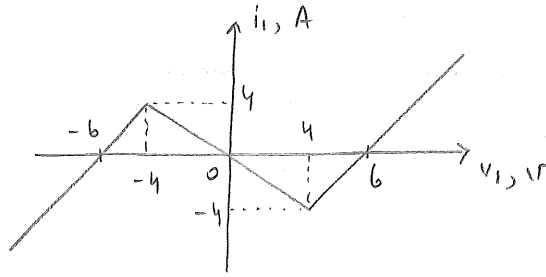
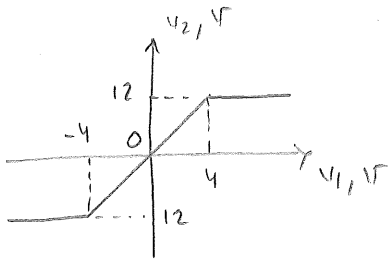
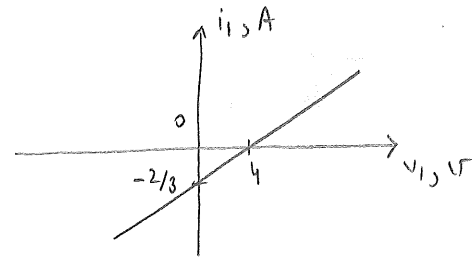
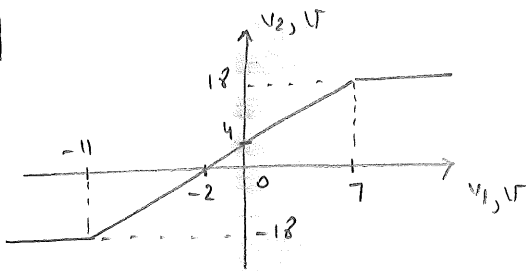
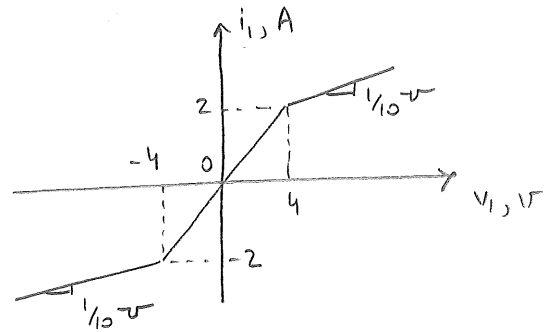
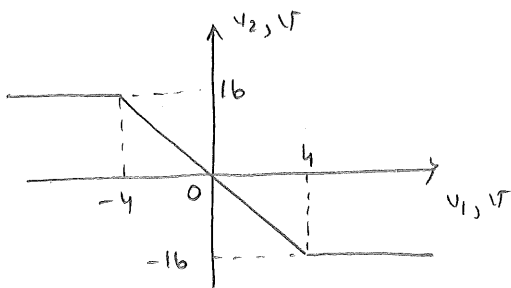


9) [A&S] Determine the gain v_o/v_i .



10) [A&S] Find i_x and v_o .



KEY1234 -3mA 5 -4V 6 $-6\text{mA}, 108\text{mW}$ 7 -8V/V 8 3mA 9 R_2/R_1 10 $2\text{mA}, 12\text{V}$