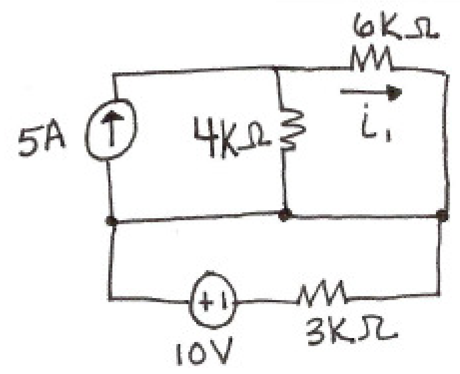
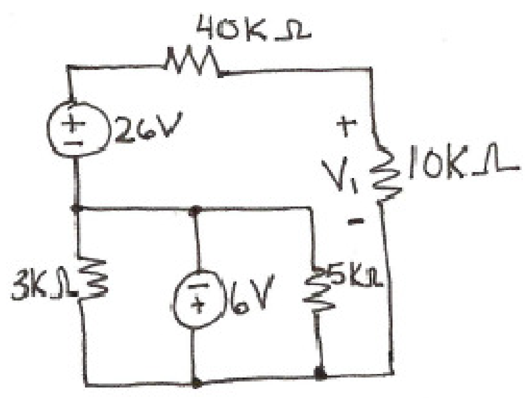
1.



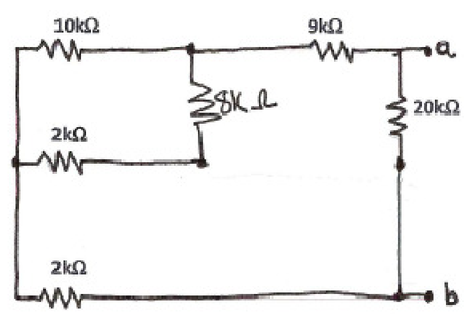
Calculate i_1.

2.

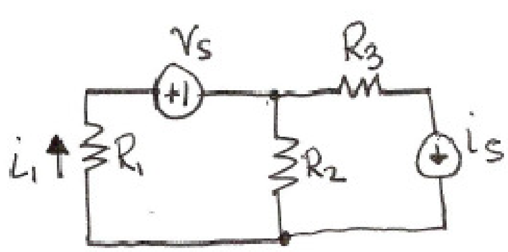


Calculate V_1.

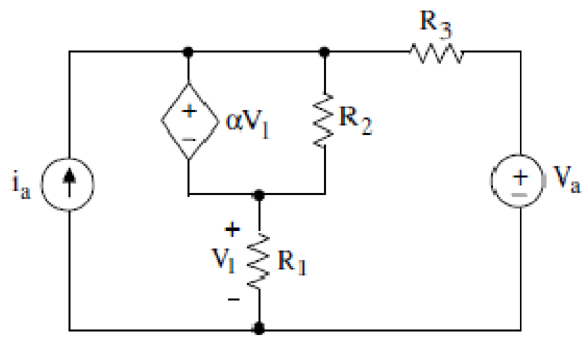
3. Find the total resistance between terminals **a** and **b.**



4. Derive an expression for i_1 in the circuit below containing not more than circuit parameters R1, R2, R3, Vs, and/or is.



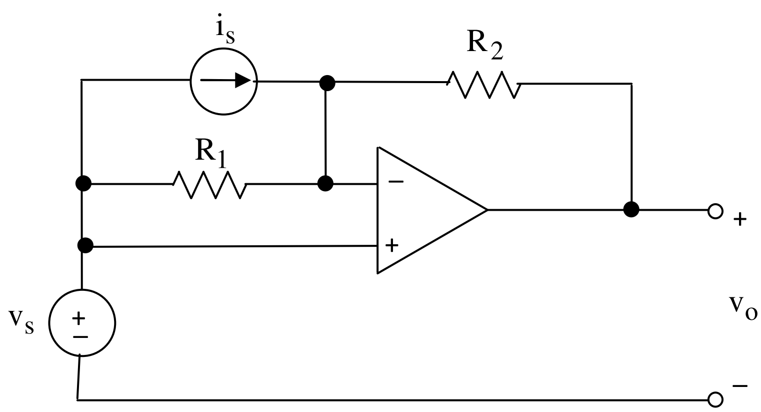
5.



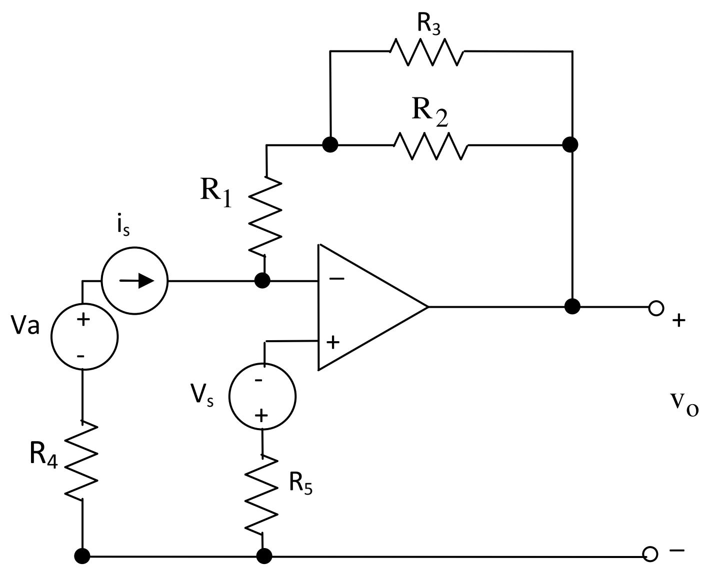
) Derive the expression for V_1 containing not more than circuit parameters α, R_1, R_2, R_3, V_a, and i_a.

6. Using the circuit shown in Problem #5, derive an expression for the power through R2. The known values are α, i_a, V_a, R_1, R_2 and R_3.

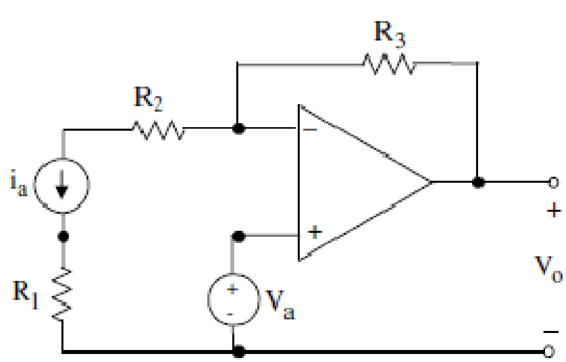
7. The op-amp operates in the linear mode. Using an appropriate model of the op amp, derive an expression for v_o in terms of not more than V_S, i_s, R_1, and/or R_2. Note that the current source is **not** ideal and has a voltage drop across it.



8. The op-amp operates in the linear mode. Using an appropriate model of the op amp, derive an expression for v_O in terms of not more than V_a, V_S, i_s, R_1, R_2, R_3, R_4 and R_5. Note that the current source is **not** ideal and has a voltage drop across it.



9. The op-amp operates in the linear mode. Using an appropriate model of the op-amp, derive an expression for Vo in terms of not more than i_a, R1, R2, R3, and/or Va. Note that the current source is **not** ideal and has a voltage drop across it.



10. The op-amp operates in the linear mode. Using an appropriate model of the op-amp, derive an expression for Vo in terms of not more than i_a, R1, R2, R3, and/or Va. Note that the current source is **not** ideal and has a voltage drop across it. *(updated figure)*