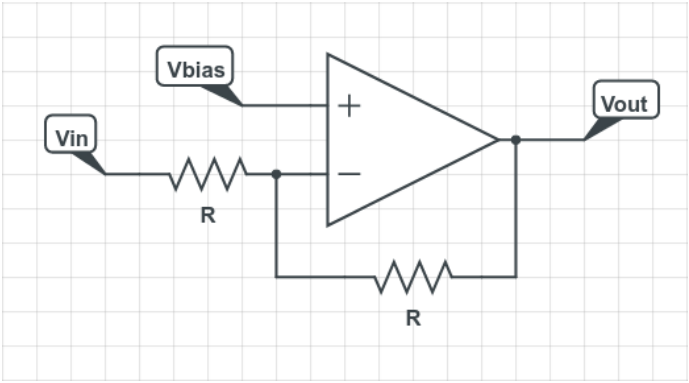
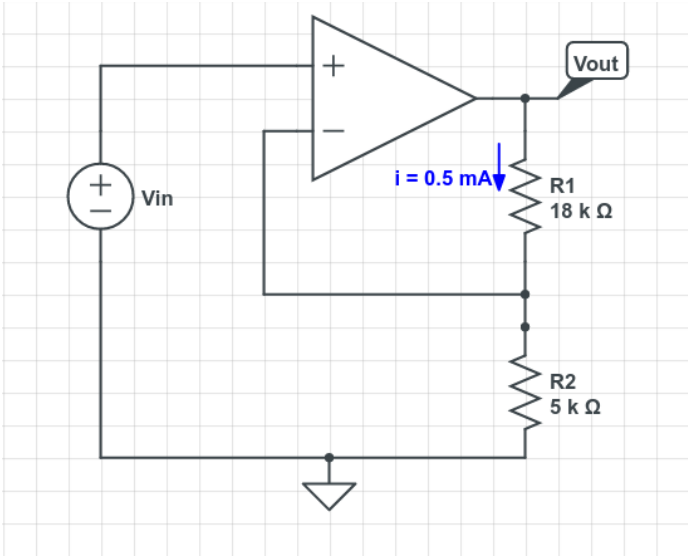
Operational Amplifiers

1. Find an expression relating V_{out}, V_{in} and V_{bias} in the given circuit.



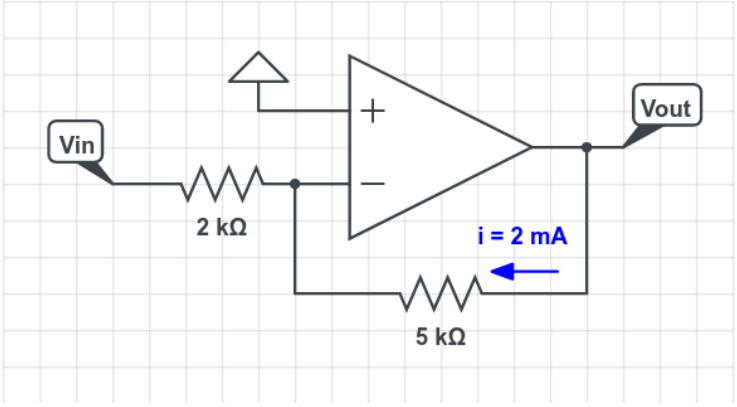
Answer: $V_{out} = 2V_{bias} - V_{in}$

2. Find the input voltage, V_{in} and the output voltage, V_{out} in the given circuit.



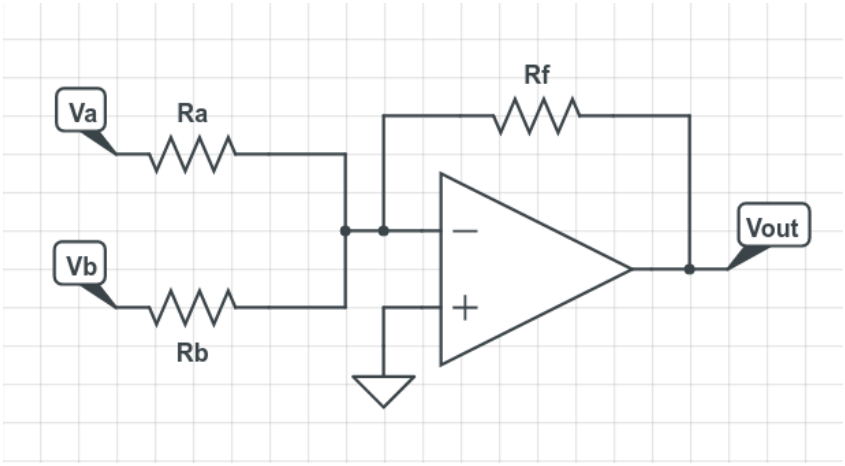
Answer: $V_{in} = 2.5$ V, $V_{out} = 11.5$ V

3. Find the input voltage, V_{in} and the output voltage, V_{out} in the given circuit.



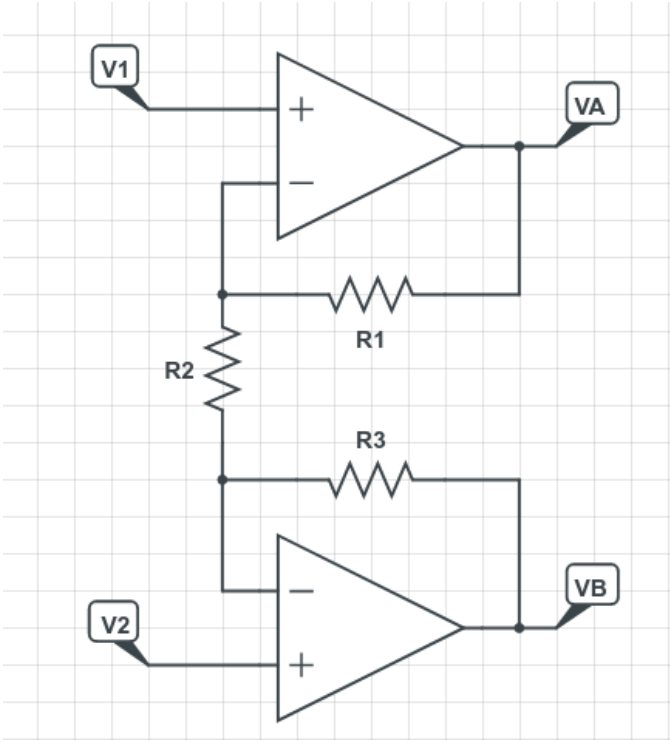
Answer: $V_{in} = -4$ V, $V_{out} = 10$ V

4. Using the properties of an ideal op amp, obtain an expression relating the input voltages to the output voltage of operational amplifier configuration given.



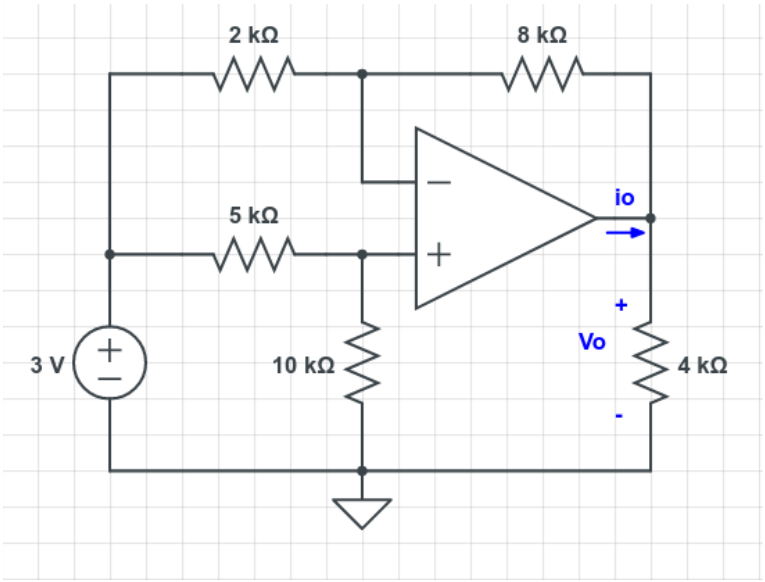
Answer: $V_{out} = - R_f (V_a/R_a + V_b/R_b)$

5. Find an expression relating V_A to V_1 and V_2.



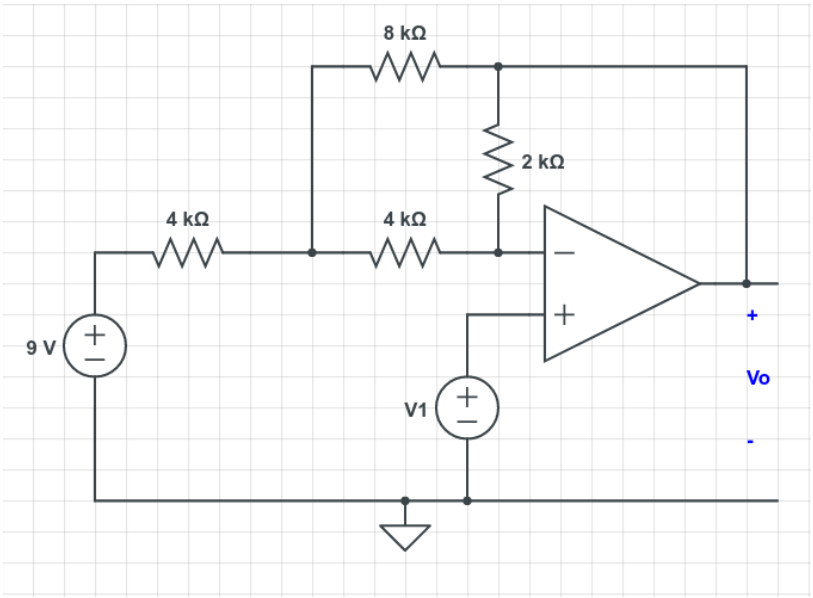
Answer: $V_A = V_1 + ((V_1 – V_2)/R_2)R_1$

6. Find V_o and i_o in the given circuit.



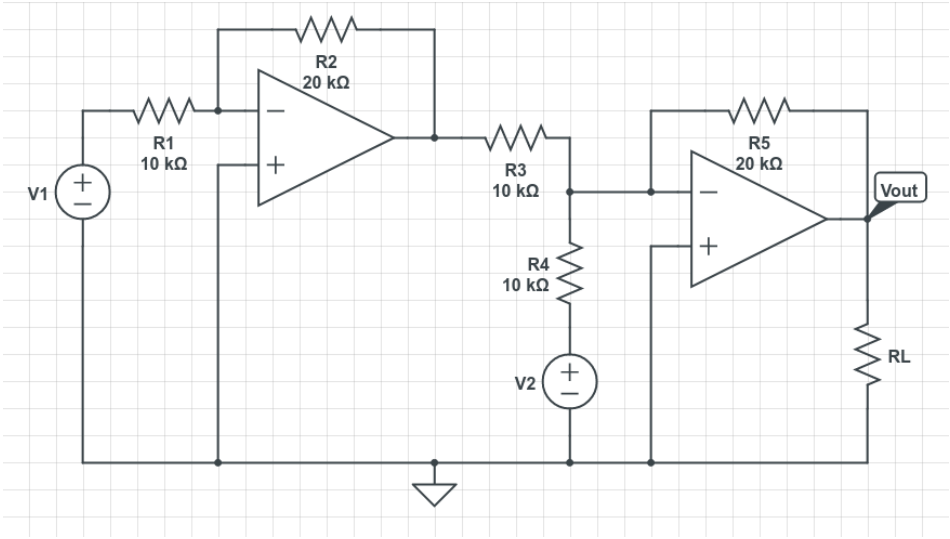
Answer: V_o = -2 V, i_o = -1 mA

7. Calculate V_o in the given circuit if V_1 = 0. Hint: You may need to use node voltage analysis.



Answer: V_o = - 1.6364 V

8. Find an expression for the output voltage, V_{out} (in terms of V_1 and V_2) in the given circuit.



Answer: $V_{out} = 4V_1 - 2V_2$