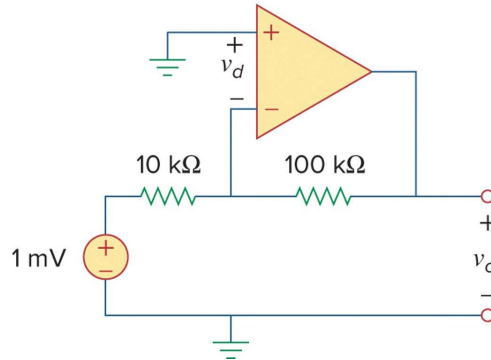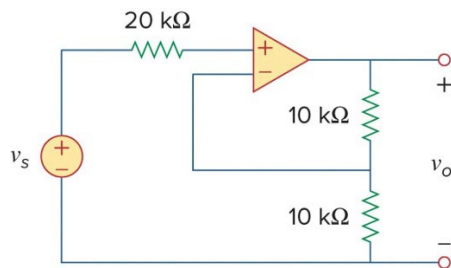# Electric Circuits
Homework Set 10

Except *for the one in problem 1, assume all other op amps are ideal.*

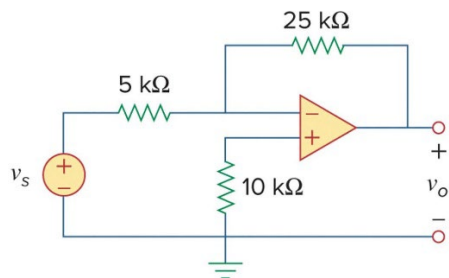1. The op amp below has $R_i = 100\ k\Omega$, $R_o = 100\ \Omega$, $A = 100{,}000$. Find the differential voltage, v_d, and the output voltage, v_o.
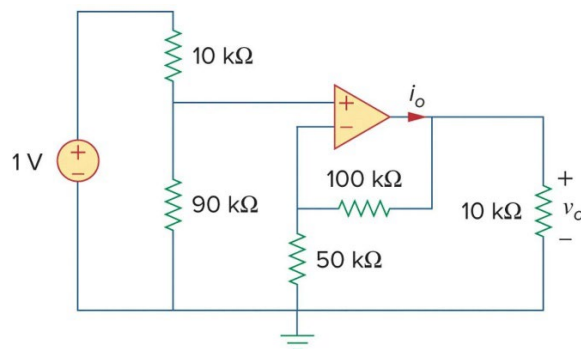
10 kΩ   100 kΩ

1 mV

v_d

v_o

2. Find the gain v_o/v_s of the following circuit.

20 kΩ

10 kΩ

v_s

v_o

10 kΩ

3. Calculate the voltage ratio v_o/v_s for the op amp circuit below.

25 kΩ

5 kΩ

v_s

10 kΩ

v_o

4. Find v_o and i_o in the circuit below.

10 kΩ

i_o

1 V

90 kΩ

100 kΩ

10 kΩ v_o
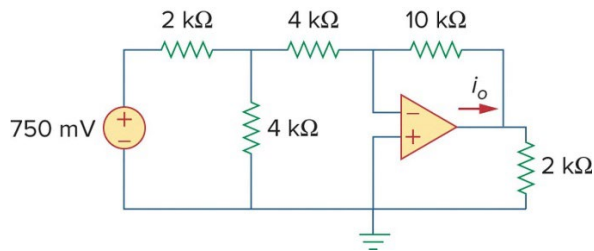
50 kΩ

5. Calculate the gain v_o/v_i when the switch in the following circuit is in:
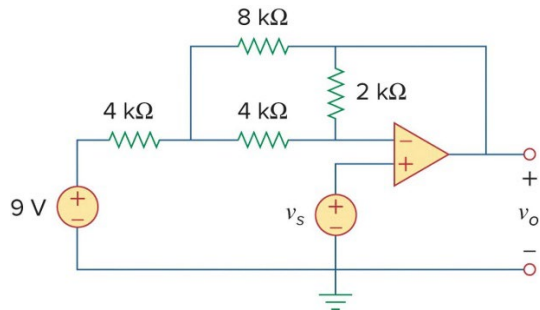
   a. Position 1

   b. Position 2
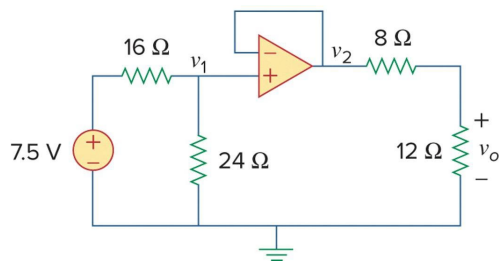
   c. Position 3
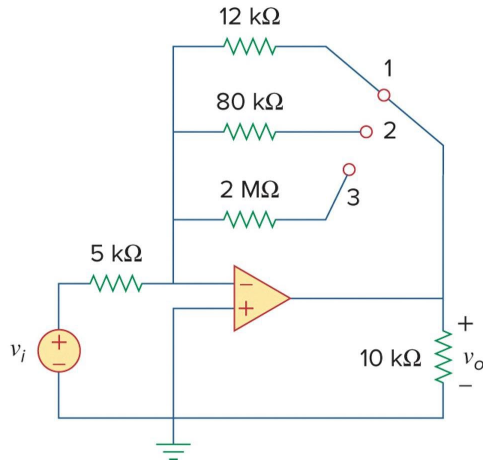
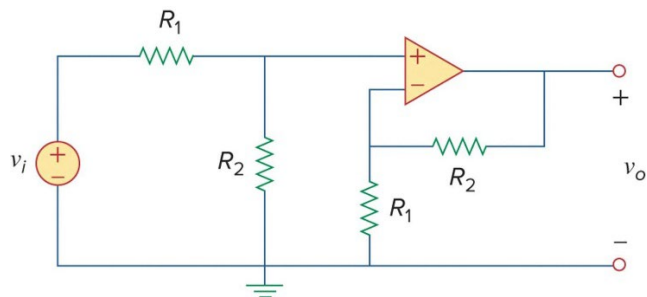6. Determine i_o in the circuit below.

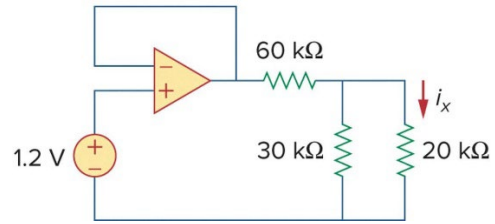7. In the circuit below, calculate v_o if $v_s = 2$ V.

8. Find v_o in the op amp circuit that follows.

9. **Determine the voltage gain v_o/v_i of the op amp circuit in the circuit below.

10. In the circuit shown, find i_x and the power absorbed by the 20 kΩ resistor.

11. For the circuit below, find i_x.