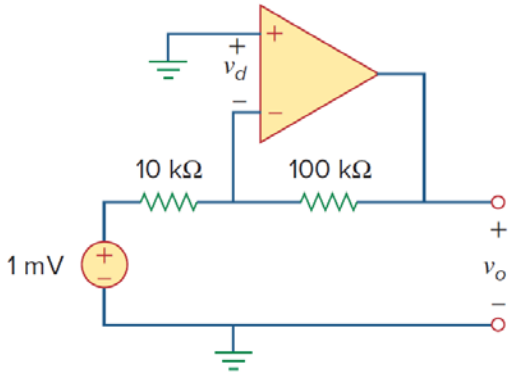
Assignment 7

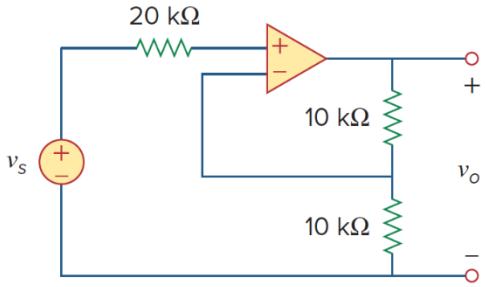
1. The inverting amplifier circuit is shown below.
   (a) If the input resistiancce of the op amp $R_i = 100\ k\Omega$, the output resistnace of the op amp $R_o = 100\ \Omega$, and the open loop gian of the op amp $A = 100{,}000$, find the differential voltage $v_d = v_p - v_n$ and the output voltage v_o.
   (b) If the input resistiancce of the op amp $R_i = \infty$, the output resistnace of the op amp $R_o = 0\ \Omega$, and the open loop gian of the op amp $A = \infty$, find the differential voltage $v_d = v_p - v_n$ and the output voltage v_o.
   (c) From the solutions from the above a and b, what can you conclude?

   (Round the solutions to 2 decimal places)



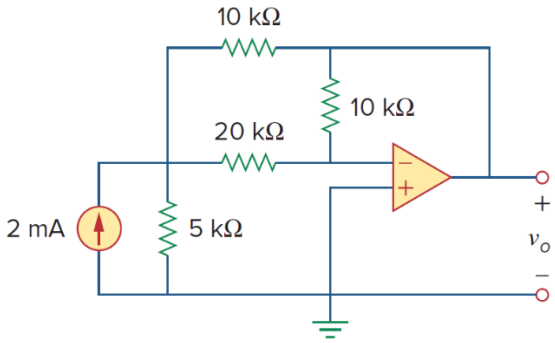
Answers: (a) $\boldsymbol{v_d \approx -100\ nV, v_o \approx -10\ mV}$. **(b)** $\boldsymbol{v_o = -10\ mV}$.

2. The op amp in the following circuit is ideal. Find the closed loop gain (v_o/v_s) of the following circuit.



   Answer: $\boldsymbol{v_o/v_s = 2}$

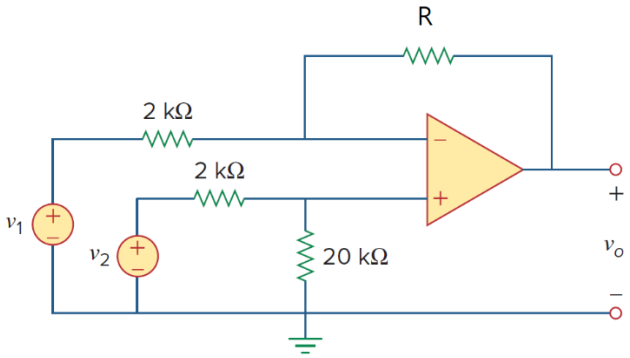
3. The op amp in the following circuit is ideal. Determine the output voltage v_0 in the following circuit.



Answer: $\boldsymbol{v_o = -2.5\ V}$

4. The op amp in the difference amplifier circuit below is ideal.
   - **(a)** Find v_0 and CMRR given that $v_1 = 1\ V, v_2 = 2v, and\ R = 20\ k\Omega$.
   - **(b)** Find v_0 and CMRR given that $v_1 = 1\ V, v_2 = 2v, and\ R = 19\ k\Omega$.
   - **(c)** Which circuit in (a) and (b) is better? Why?

   (Round the solutions to 2 decimal places)



Answers (a) $\boldsymbol{v_0 = 10\ V, CMRR = \infty}$**. (b)** $\boldsymbol{v_0 = 9.59\ V, CMRR = 211.56}$