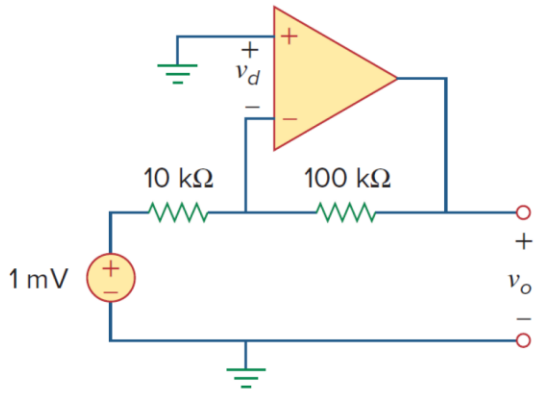
Homework 4

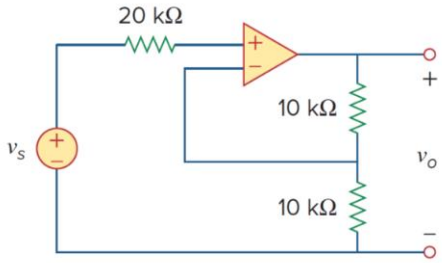
Answer all the required problems for each assignment and round your final solutions to two decimal places, if needed. The optional problems will not be graded but may show up on an exam.

Assignment 1

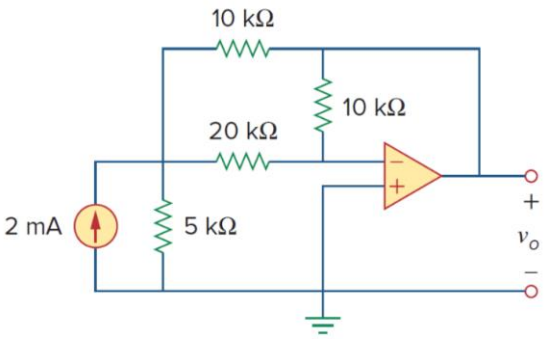
1. The inverting amplifier circuit is shown below. **(30 pts)**
   - **(a)** If the input resistiancce of the op amp $R_i = 100\ k\Omega$, the output resistnace of the op amp $R_o = 100\ \Omega$, and the open loop gian of the op amp $A = 100{,}000$, find the differential voltage $v_d = v_p - v_n$ and 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?



2. The op amp in the following circuit is ideal. Find the closed loop gain (v_o/v_s) of the following circuit. **(20 pts)**



3. The op amp in the following circuit is ideal. Determine the output voltage v_0 in the following circuit. **(25 pts)**



4. The op amp in the difference amplifier circuit below is ideal. **(25 pts)**
   - **(a)** Find v_0 and CMRR given that $v_1 = 1\,V, v_2 = 2\,V, and\ R = 20\ k\Omega.$
   - **(b)** Find v_0 and CMRR given that $v_1 = 1\,V, v_2 = 2\,V, and\ R = 19\ k\Omega.$
   - **(c)** Which circuit in (a) and (b) is better? Why?