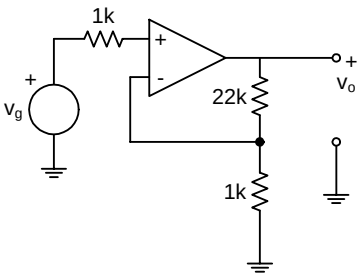
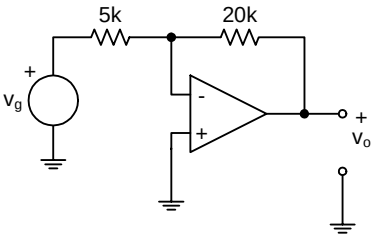
ELEC271 Electronic Systems **Problems III**

ALL OP-AMPS CAN BE ASSUMED IDEAL unless stated otherwise.

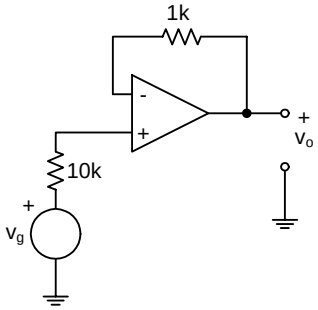
1. Calculate the closed loop gain $\frac{v_o}{v_g}$ for the following amplifiers.



a)

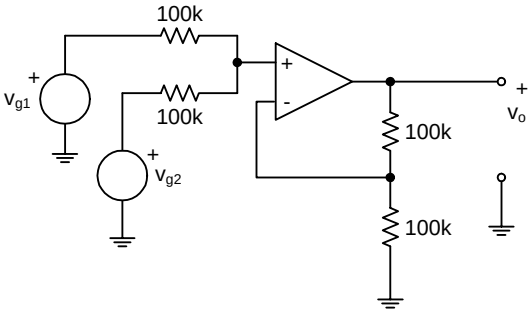


b)



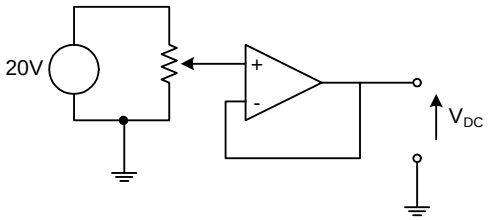
c)

2. Calculate v_o in terms of v_{g1} and v_{g2} for



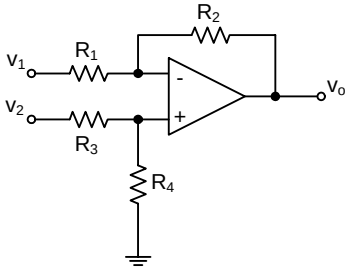
3. A method of generating a low output resistance DC voltage supply of any value between 0 and 20V is shown.

   If upper part of potential is 15k, and lower half is 5k, find V_{DC}



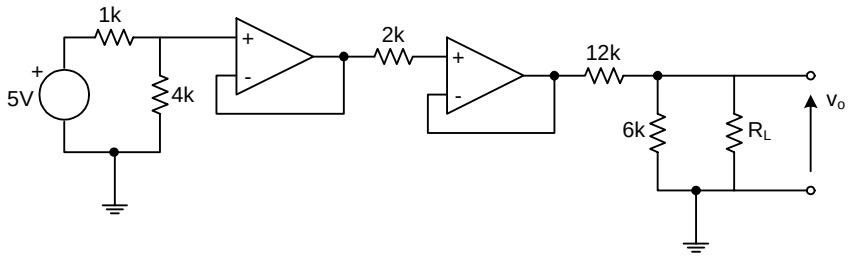
4. A voltage subtracting circuit is shown. Show that

$$v_o = \frac{1+R_2/R_1}{1+R_3/R_4}v_2 - \frac{R_2}{R_1}v_1$$

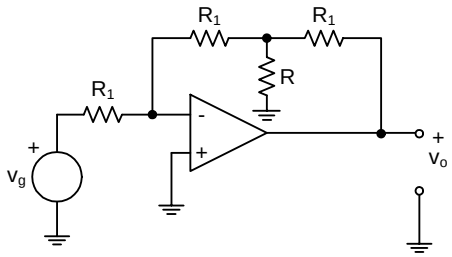


   Design a circuit with an output $v_o = 4v_2 - 11v_1$
   When $R_1 = 10k$ and $R_4 = 10k$

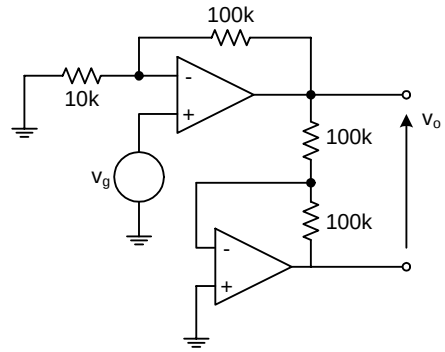
5. Find v_o if R_L = 12k



6. Find R such that $\frac{v_o}{v_g}$ = -100 when R_1 = 10k



7. Find $\frac{v_o}{v_g}$ for



8. Show that this simple analogue computer solves the differential equation $\frac{dv_o}{d_t} + 2v_o = +V_m Cos(\omega t)$