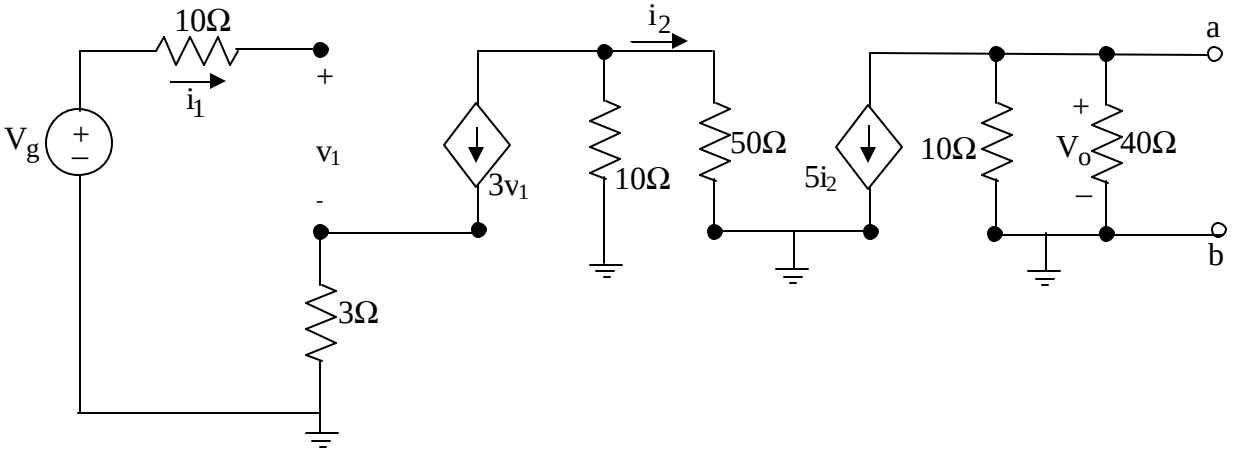
Homework #1:

1. Given V_g=10mV, find V_o. Find the Thevenin equivalent between terminals a-b. (Note: $v_1 \neq Vg$)



2. Sketch the following waveforms. Identify the dc component of the waveform and the ac component of the waveform.
   a. Vs=3sin(20t) V
   b. Vs=8V +2sin(15t-90°) V
   c. Vs=6V ± 0.5V

3. Explain in your own words the procedural steps for plotting Bode Plots.

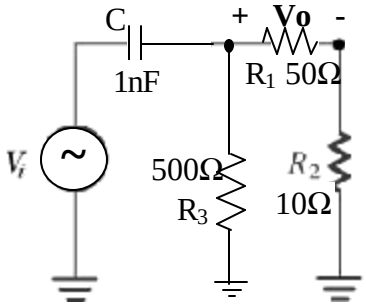
4. Sketch the Bode plots using a straight-line approximation (procedures described in class) and then use Matlab for each function listed below to obtain the Bode Plot. Compare the two:

a. $$H(s) = \frac{10{,}000s}{(s+10000)(s+10)}$$

b. $$H(s) = \frac{100(s+1)^2}{(s+100)(s+1000)}$$

c. $$H(s) = \frac{10000}{s(s+100{,}000)}$$

5. (a) Analyze the following circuit to find the transfer function Vo/Vi.
   (i) Solve the circuit symbolically first (with R_1, R_2, R_3, C).
   (ii) Find Vo/Vi with values.
   (b) Sketch the transfer function using a straight-line approximation procedure.



6. Use PSPICE to simulate the circuit of #5 and determine the Bode Plots. Print out the schematic, along with the plots. Compare to (b)

7. Analyze the following circuit to find the transfer function Vi/Vs. Solve the circuit symbolically first (with R_S, R_i, R_1, C_i) and then plug in their values. Sketch the transfer function using a straight-line approximation procedure.