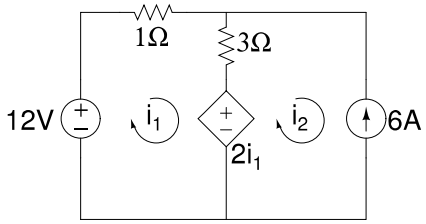
2. (25 pts) The two parts in this problem are unrelated.

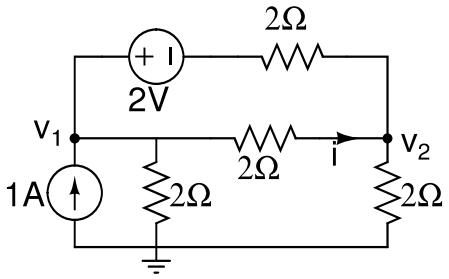
(a) Find the loop currents i_1 and i_2 in the following circuit.



$i_1 =$ _____

$i_2 =$ _____

(b) Find the node voltages v_1, v_2 and the current i in the following circuit.

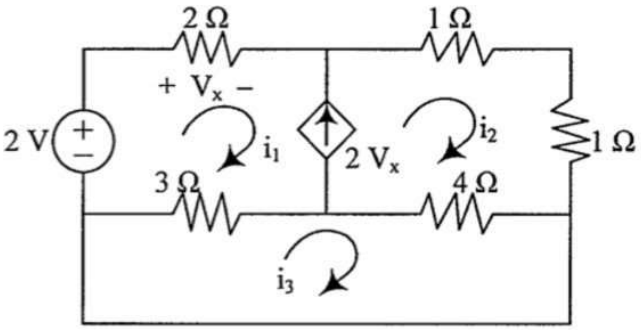


$v_1 =$ _____

$v_2 =$ _____

$i =$ _____

4. (15 points) For the following circuit:



(a) (2 pts) What is V_x in terms of loop current i_1 ?

V_x = _____

(b) (3 pts) What is loop current i_2 in terms of loop current i_1 ?

i_2 = _____

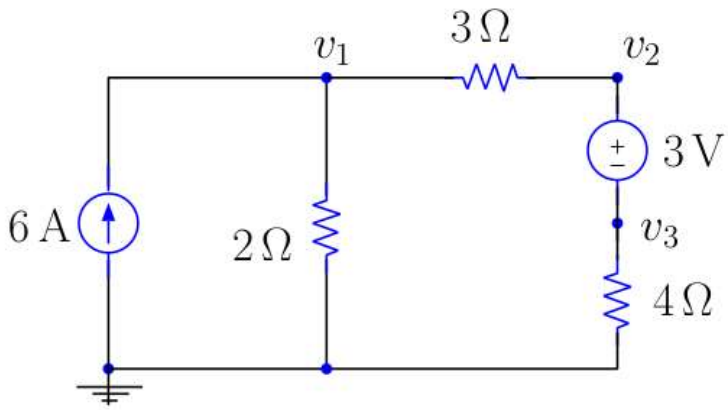
(c) (5 pts) Write the KVL equation for loop 3 in terms of i_1, i_2 and i_3.

equation: _____

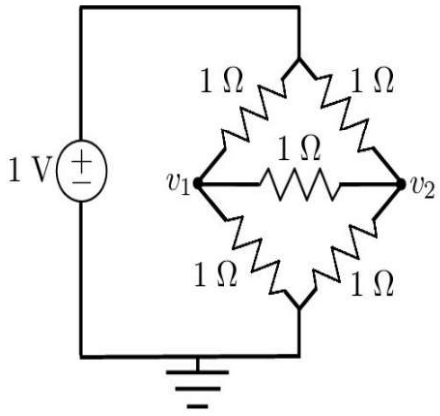
(d) (5 pts) Write one additional KVL equation for the circuit in terms of i_1, i_2 and i_3, which makes it possible to solve for these three variables. You are not required to solve the system.

equation: _____

Find v_1 , v_2 , v_3 .



. (10 pts) Write, *but do not solve*, two node equations in order to solve for v_1 and v_2. Fill in your final answer in the space provided, but be sure to show your work.

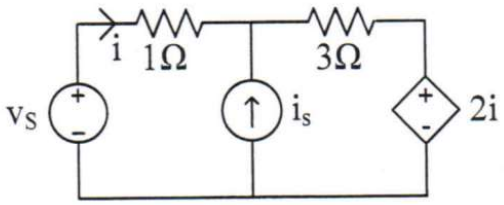


Answer:

(_____)v_1 + (_____)v_2 = (_____)

(_____)v_1 + (_____)v_2 = (_____)

The current i in the following circuit can be expressed as $i = K_1 v_S + K_2 i_S$. Find the values of K_1 and K_2 if $v_S = 12V$, $i_S = 6A$.



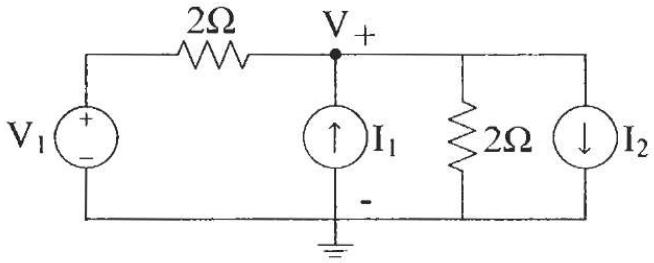
$K_1 =$ _____

$K_2 =$ _____

In the following circuit, using the principle of linearity and superposition, we can write the node voltage V as

$$V = AV_1 + BI_1 + CI_2$$

Use source suppression to find the constants A, B, and C.

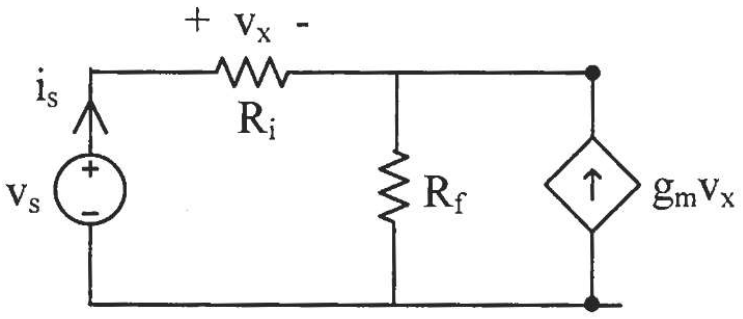


A = _____

B = _____

C = _____

) Use the loop method to find the current i_s. Assume that v_s, R_i, R_f, and g_m are known.



Use the node method to find v_o as a function of the independent sources v_s and i_o. At terminals a-b what is the equivalent resistance and the open circuit voltage.