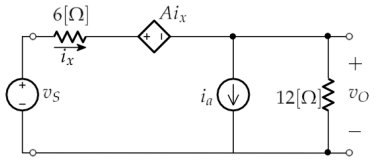
Problem 1

Use superposition to solve this problem. Choose values for i_a and A so that

$$v_0 = 1/2\, v_s - 3[\mathrm{V}]$$

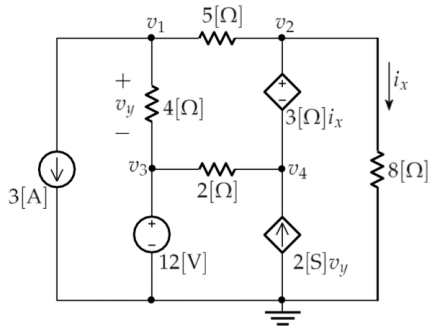
Hint: first find A by using only the voltage source, and then find the value of i_a by using only the current source.



Ans: A = 6Ω; i_a=0.5A

Problem 2

For the following circuit, use the node voltage method to determine the values of v_1, v_2, v_3, and v_4 with respect to the reference node.



Ans: v_1=23.5V, v_2=52.9V, v_3=12V, and v_4=33.1V

Problem 3

For the following circuit, you measure an open circuit potential $v_{oc} = 180/11$ [V] between nodes a and b when you remove the load resistor. When you attach a load resistor $R_L = 40[\Omega]$, you

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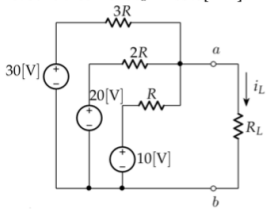
measure a current $i_L = 163.6$[mA]. Find R.

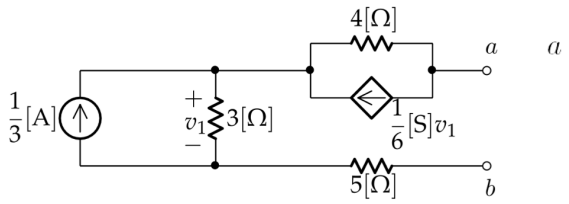


a

Ans: 110 Ω

Problem 4

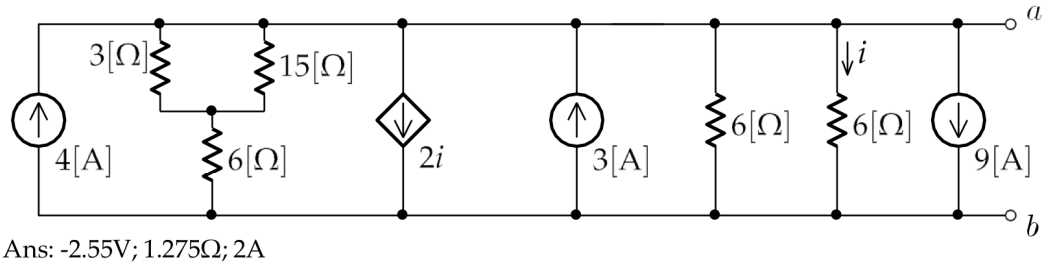
Find the Thevenin equivalent for the following circuit between nodes *a* and *b*.



Ans: 1/3V; 10Ω

Problem 5

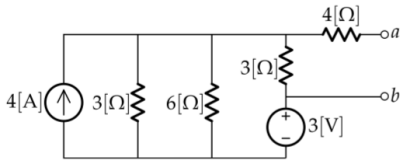
Find the Thevenin or Norton equivalent for the circuit below between nodes *a* and *b*.



Ans: -2.55V; 1.275Ω; 2A

Problem 6

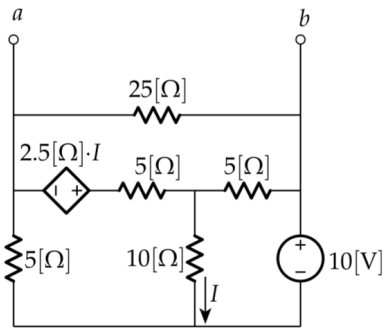
Find the Thévenin equivalent circuit at terminals (*a*,*b*) in the circuit below.



Ans: 3V; 26/5 Ω

Problem 7

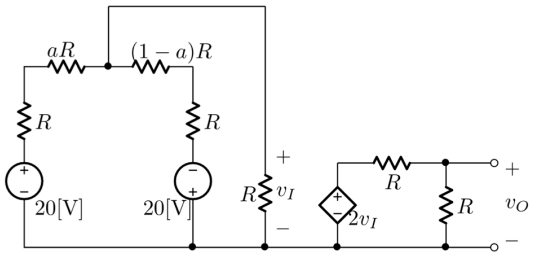
Find the Thévenin equivalent circuit at terminals (a,b) for the circuit below



Ans: -50/7V; =75/28Ω

Problem 8

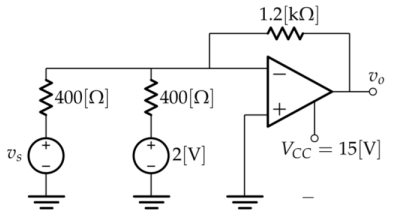
For the following circuit determine the value of v_o for a=1/2 and a=1/4



Problem 9

a. Determine the output voltage (v_o) in the circuit below in terms of v_s

b. Specify the linear range for v_s



Ans: -3v_S-6[V] for -7[V]< v_S <3[V]