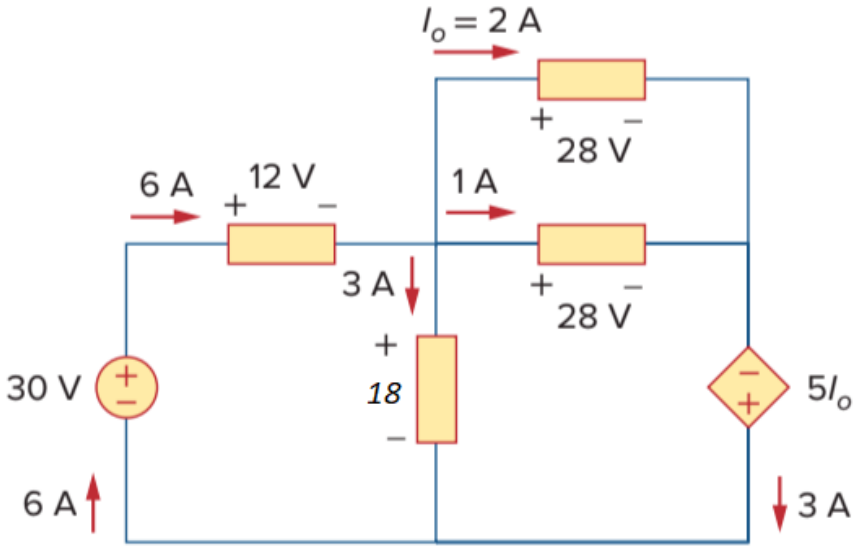
CSE250: Circuits and Electronics
Practice Problems Set 1

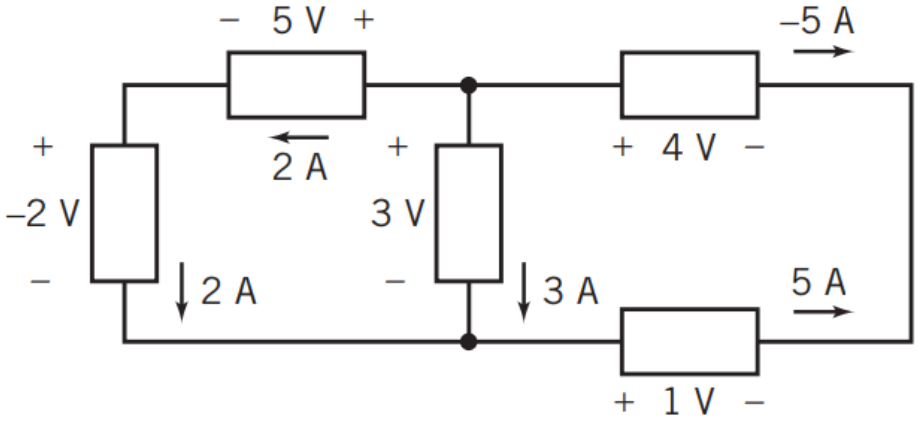
1.	Calculate the amount of charge represented by 6.667 billion protons.	***Answer:*** *1.0681×10^{-9} c*
2.	If the potential difference between two points is 60 V, how much energy is expended to bring 8 mC from one point to the other?	***Answer:*** *±0.48 J*
3.	How much charge passes through a radio battery of 9 V if the energy expended is 72 J?	***Answer:*** *±8 C*
4.	To move charge q from point b to point a requires 25 J. Find the voltage drop v_{ab} if: (a) q = 5 C, (b) q = −10 C.	***Answer:*** *(a) 5V, (b) – 2.5 V*
5.	If 10 J work is done on a – 2C charge in moving it from point A to point B, where V_B = 20 V, what is the potential of point A?	***Answer:*** *22 V*
6.	The total charge entering a terminal is given by $q = (10 - 10e^{-2t})$ mC. Calculate the current at t = 0.5 s.	***Answer:*** *2.707 mA*
7.	A home electric heater draws 10 A when connected to a 115 V outlet. How much energy is consumed by the heater over a period of 6 hours?	***Answer:*** *6.9 kWh*

8. Find the power supplied/absorbed by each of the elements shown in the circuit below.



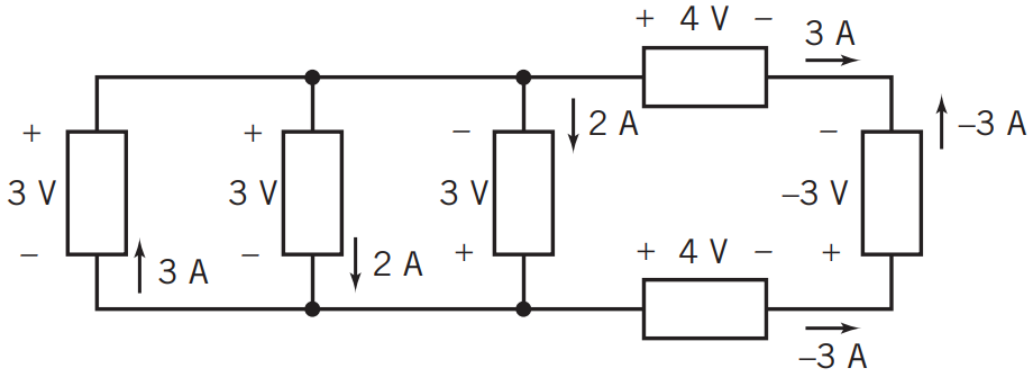
Answer:
$-180\ W, 72\ W, 54\ W, 28\ W, 56\ W, -30\ W$

9. Find the power supplied/absorbed by each of the elements shown in the circuit below.



Answer:
$-4\ W, 10\ W, 9\ W, -20\ W, 5\ W$

10. Find the power supplied/absorbed by each of the elements shown in the circuit below



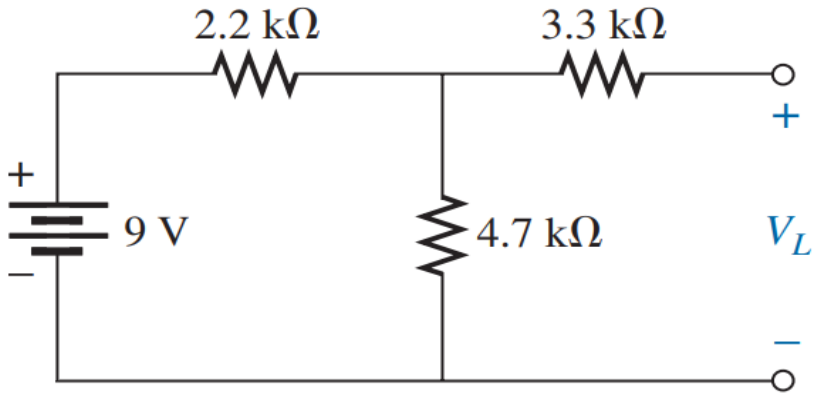
Answer:
$-9\ W, 6\ W, -6\ W, -12\ W, -12\ W, 9\ W$

11. For the network shown below,

a. Determine the open-circuit voltage V_L.

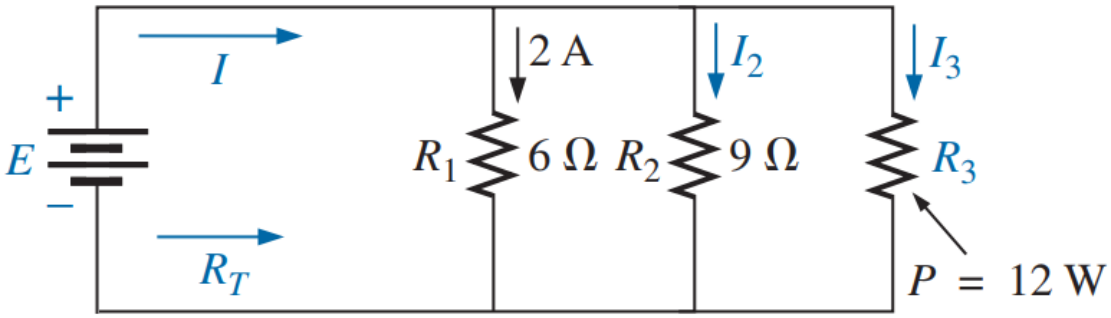
b. If the 2.2 kΩ resistor is short circuited, what is the new value of V_L?

c. Determine V_L if the 4.7 kΩ resistor is replaced by an open circuit.



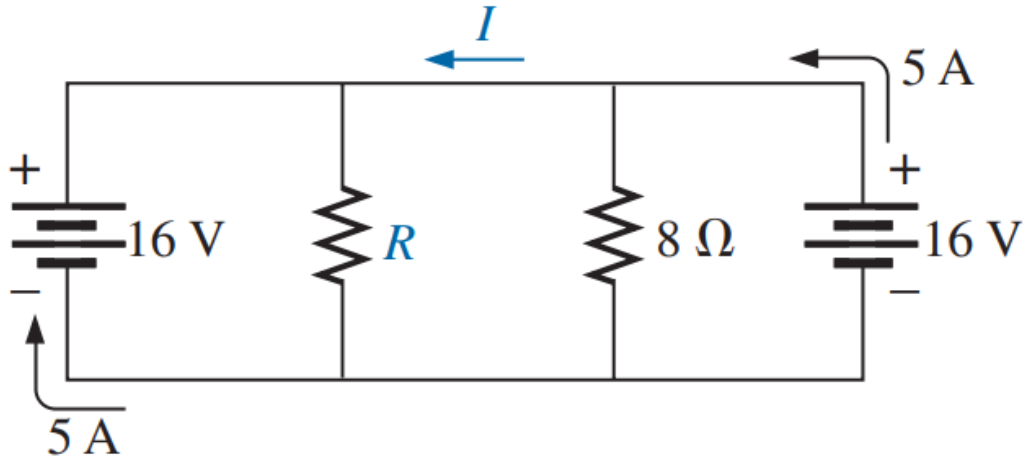
Answer:
6.13 V, 9 V, 9 V.

12. Find $R_3, I_3, I_2, I, R_T, and\ E$.



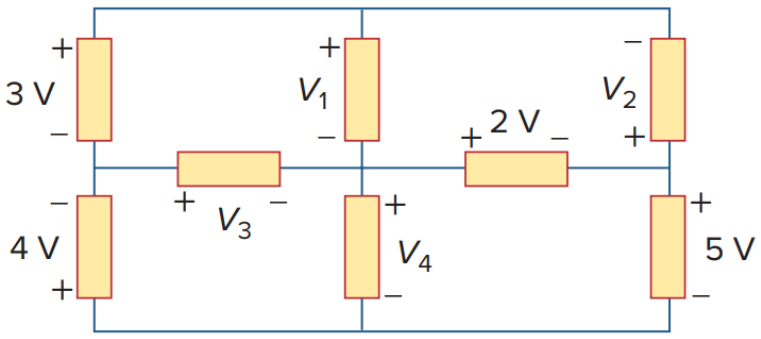
Answer:
$12\Omega, 1\ A, \frac{4}{3}A,$
$\frac{13}{3}A, \frac{36}{13}A,$
12 V

13. Assuming identical supplies, determine the current I and resistance R for the parallel network shown below.



Answer: *3 A*

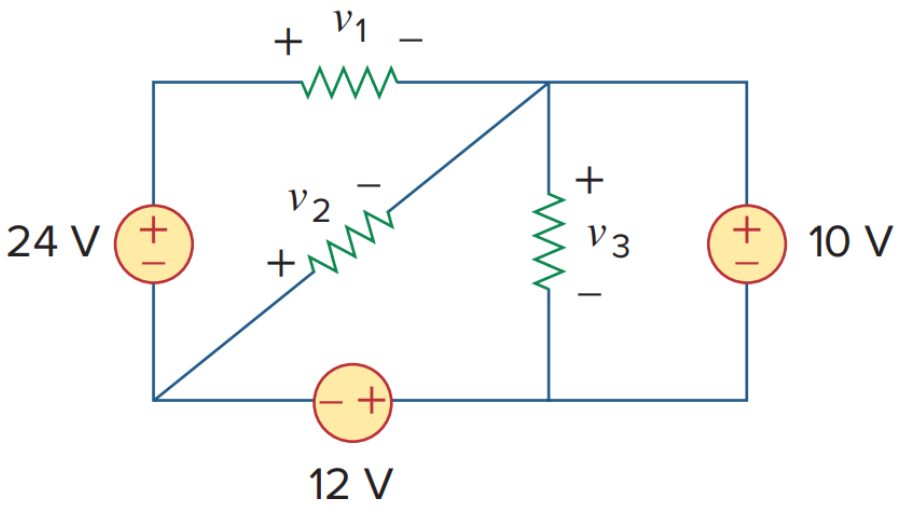
14. Given the circuit below, use KVL to find the branch voltages V_1 to V_4



Answer:
$-8\ V, 6\ V$
$-11\ V, 7\ V$

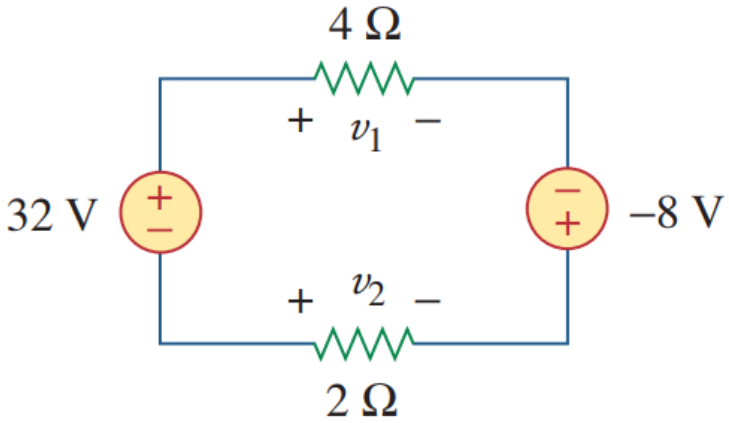
15. Obtain v_1 through v_3 in the following circuit.

Answer: *2 V, −22 V, 10 V.*



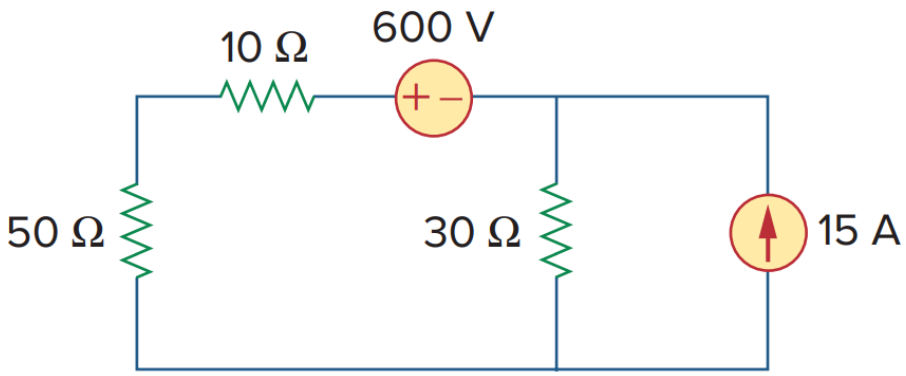
16. Find V_1 and V_2 in the following circuit.

Answer: *16 V, −8 V.*



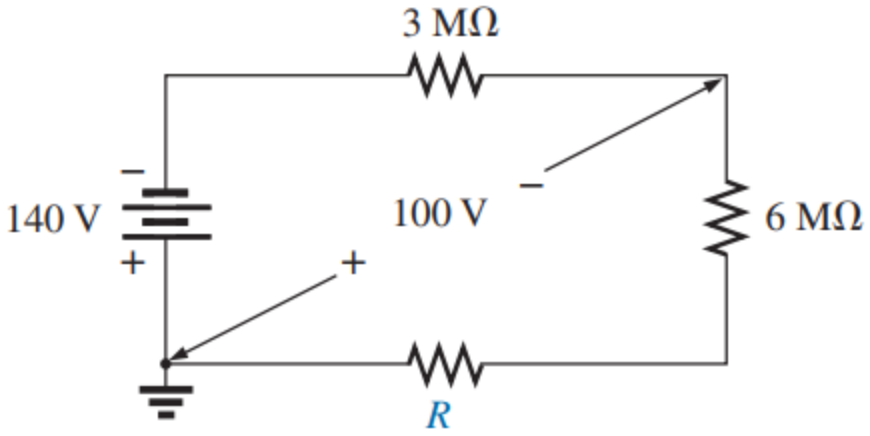
17. Using circuit laws determine the power of the 600 V source.

Answer: *−7 kW*



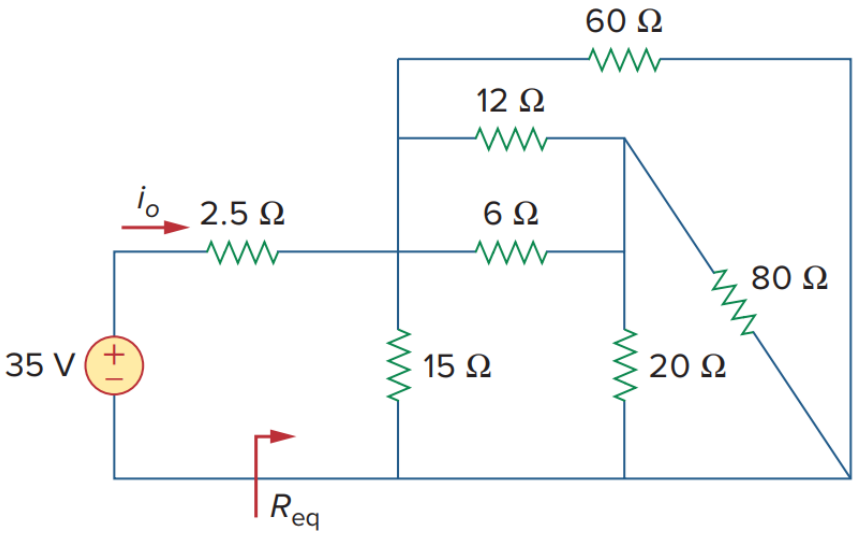
18. Using the voltage divider rule, find the unknown resistance for the configuration below.

Answer: *1.5 MΩ.*



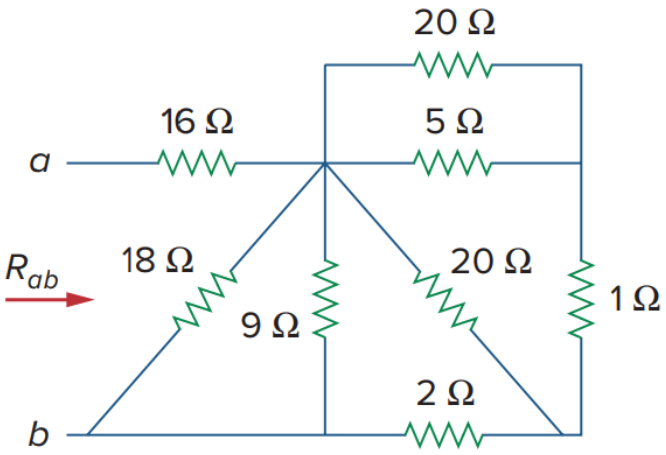
19. Find R_{eq} and i_0 in the circuit shown below.

Answer: *7.5 , 3.5 A*



20. Find R_{ab} for the circuit shown below.

Answer: *19 Ω*



21. Find the equivalent resistance at terminals $a - b$.

Answer: 27.5 Ω.