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: 25V*
6.	The total charge entering a terminal is given by $q = (10 - 10e^{-2t})$ mC. Calculate the current at t = 0.5 s.	*Answer: 7.358 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*

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

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

$I_o = 2\,A$

6 A   12 V   1 A

28 V

3 A   +

28 V

30 V   +   18

5I_o

6 A   3 A
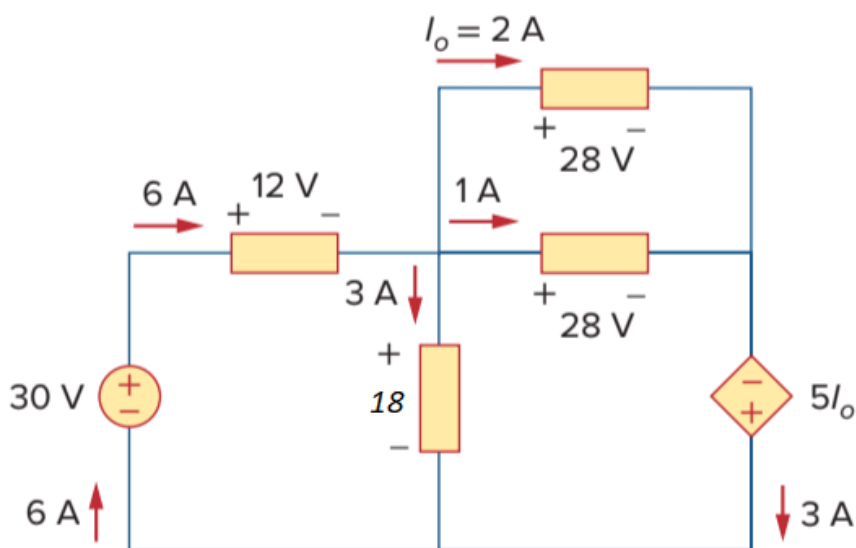
9. Find the power supplied/absorbed by each of the elements shown in the circuit below.

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

− 5 V +   −5 A

+

2 A   +   + 4 V −

−2 V   3 V

2 A   3 A   5 A

+ 1 V −

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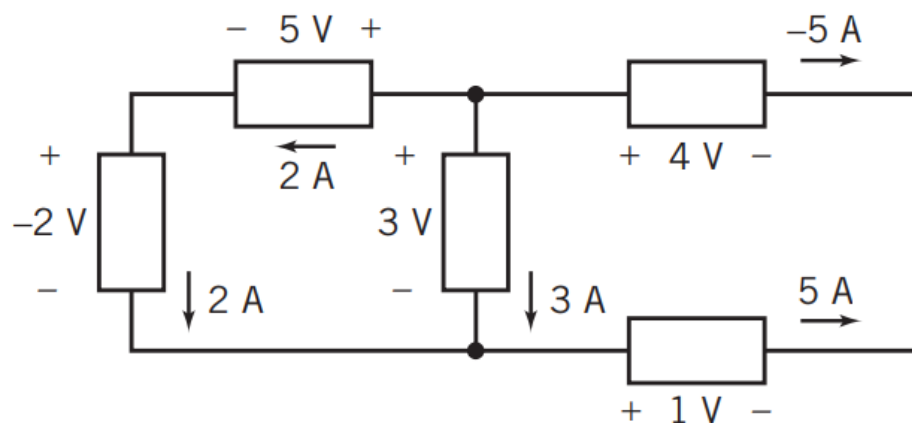
10. Find the power supplied/absorbed by each of the elements shown in the circuit below

Answer:
$-9\,W, 6\,W, -6\,W,$
$-12\,W, -12\,W, 9\,W$
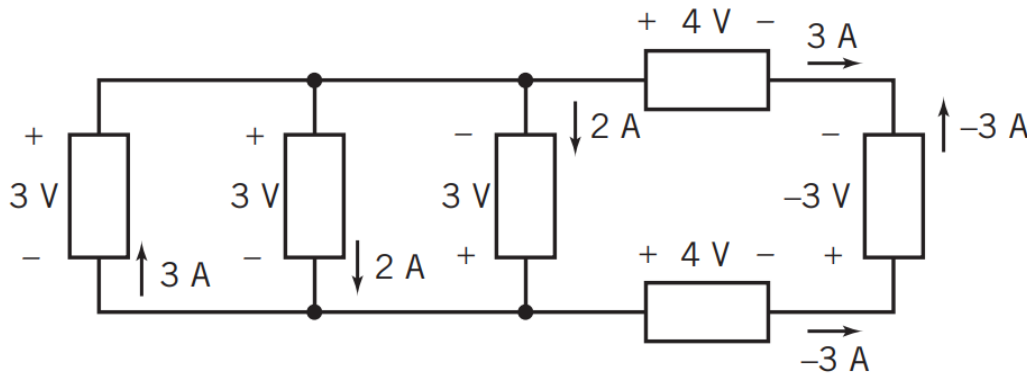
11. For the network shown below,
   a. Determine the open-circuit voltage V_L.
   b. If the 2.2 kΩ resistor is short circuited, what is the new value of V_L?
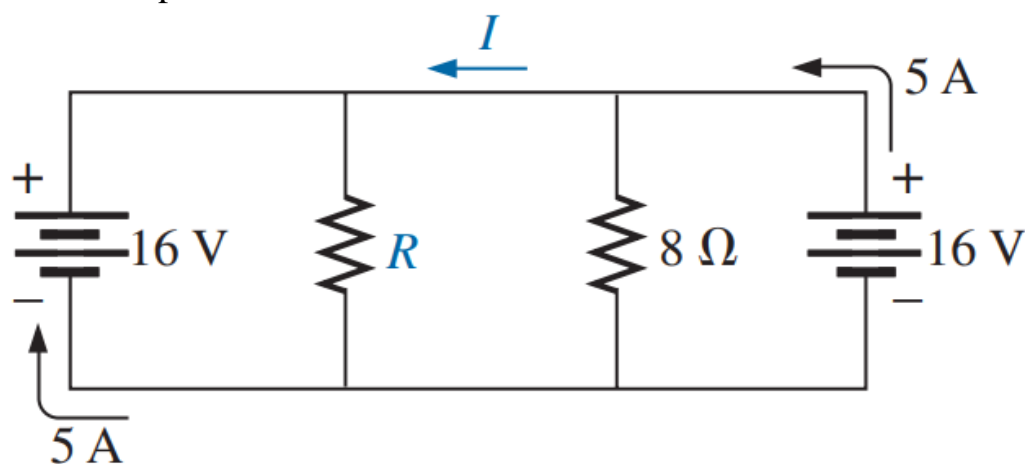   **c.** Determine V_L if the 4.7 kΩ resistor is replaced by an open circuit.
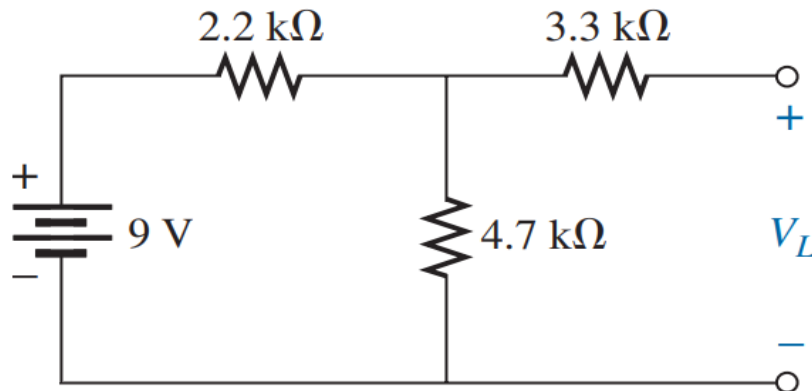
Answer:
$6.13\,V, 9\,V, 9\,V.$

12. Find $R_3, I_3, I_2, I, R_T, and\ E$.
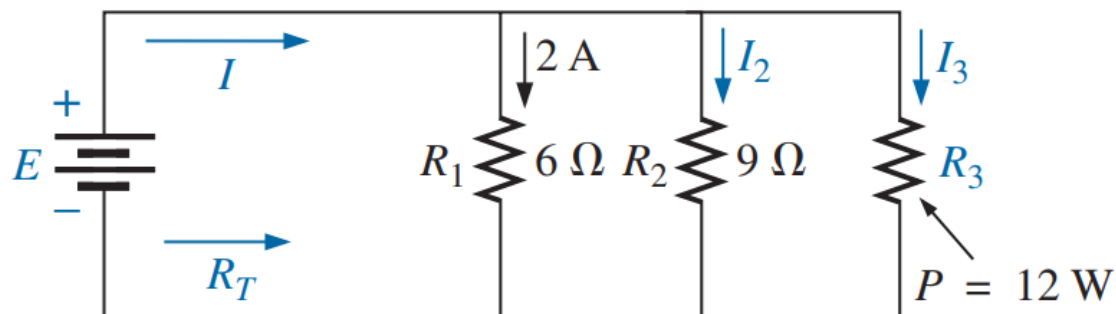
Answer:
$12\Omega, 1\ A, \frac{4}{3}A,$
$\frac{13}{3}A, \frac{36}{13}A,$
$12\ V$

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

Answer: 3 A

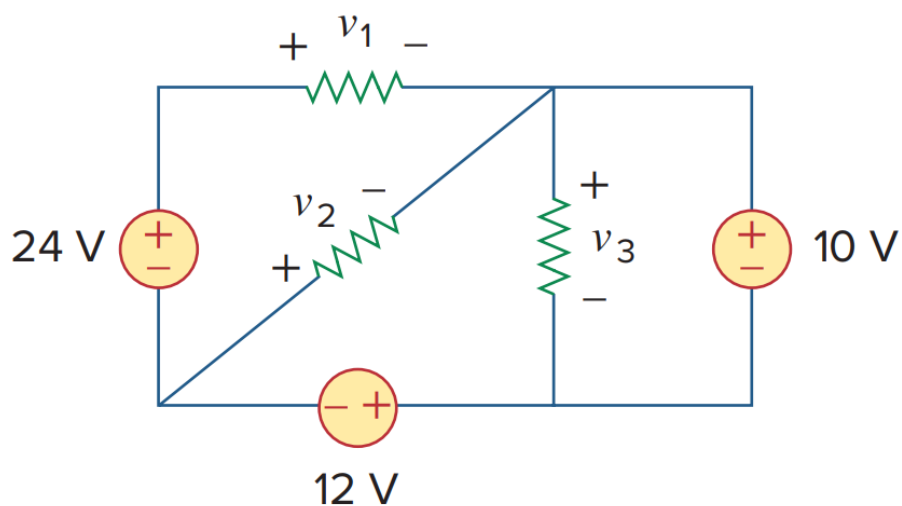**14.** Given the circuit below, use KVL to find the branch voltages V_1 to V_4
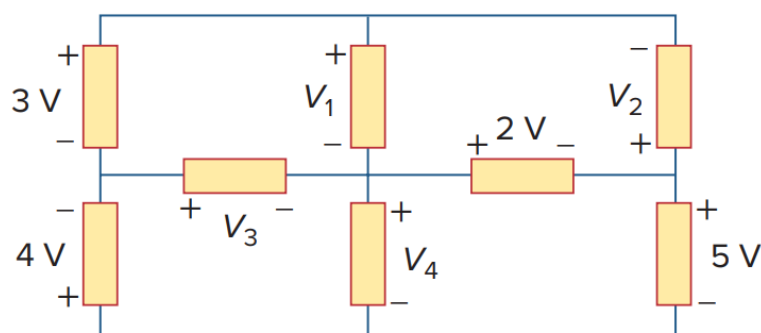
Answer:
$-8\ V, 6\ V$
$-11\ V, 7\ V$

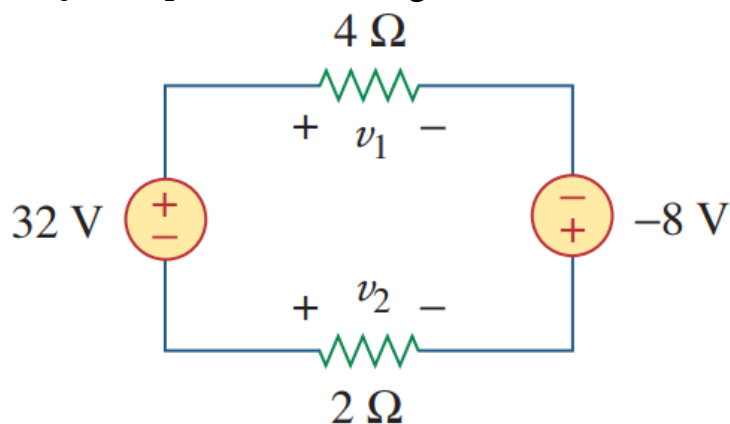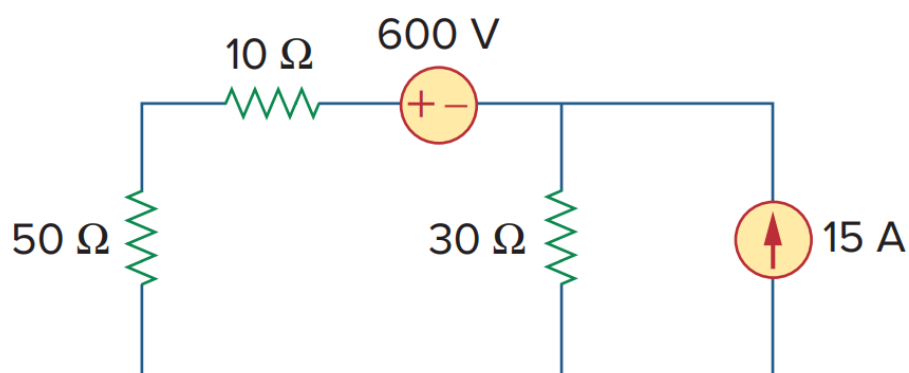**15.** Obtain v_1 through v_3 in the following circuit.   *Answer:* **2 V, −22 V, 10 V.**

16. Find V_1 and V_2 in the following circuit.   *Answer:* **16 V, −8 V.**

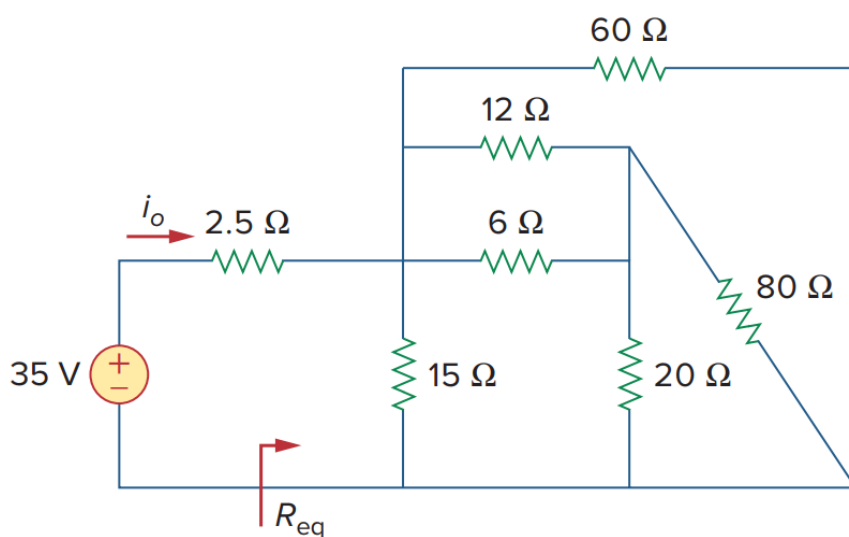**17.** Using circuit laws determine the power of the 600 V source.   *Answer:* **−7 kW**

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18. Using the voltage divider rule, find the unknown resistance for the configuration below.   *Answer: 1.5 MΩ.*
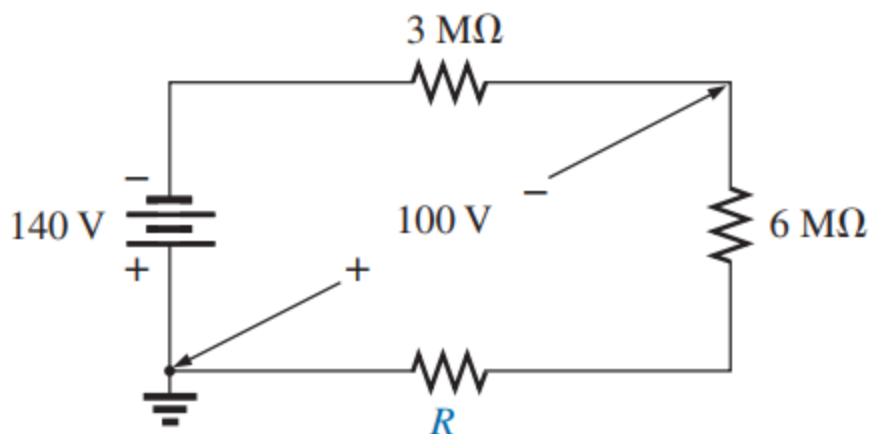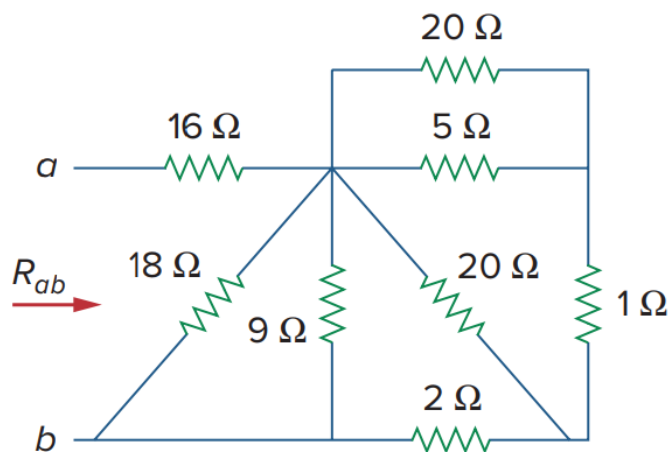

19. Find R_{eq} and i_0 in the circuit shown below.   *Answer: 7.5 , 3.5 A*

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.