Mr. Kuncik Physics: Analyze Circuits 3: One-Step Accordion Circuits

G: Analyze Circuits 3: One-Step Accordion Circuits

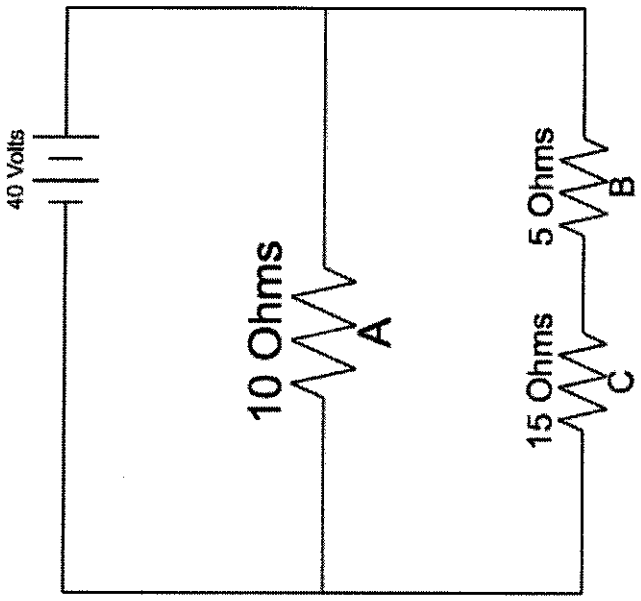
- Unit:
- Objective: Solve circuits with series components inside of parallel components or parallel sections in series.
- Level: 3

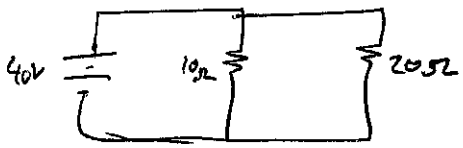
Series Circuit Inside of a Parallel Circuit

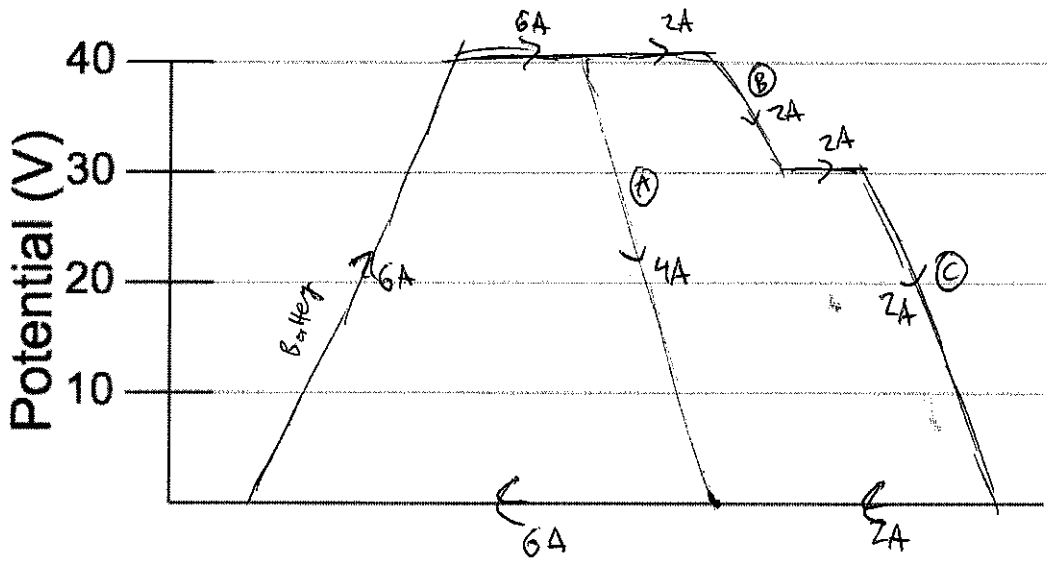
Draw equivalent circuit here.

Answer

(1)



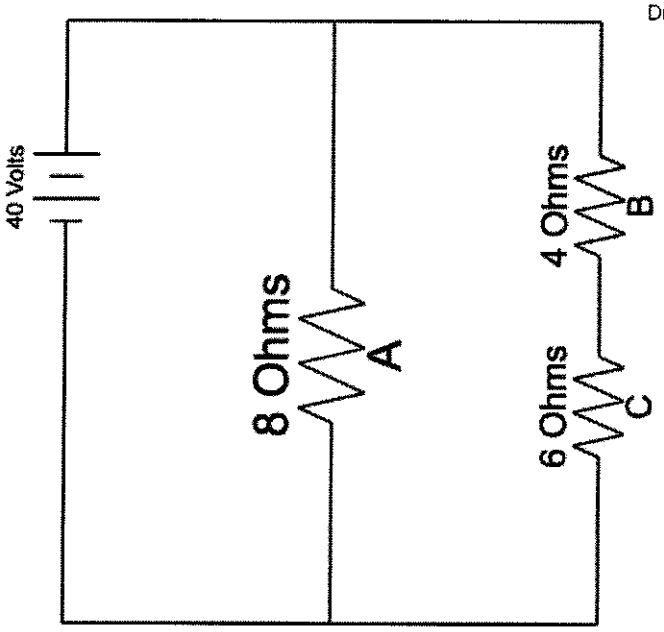


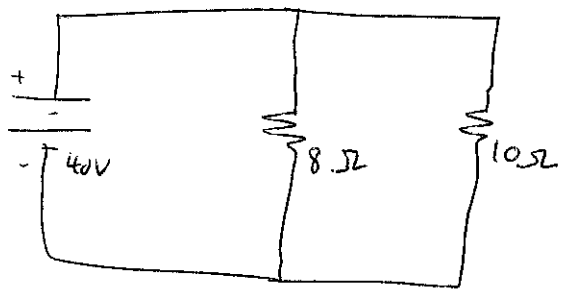


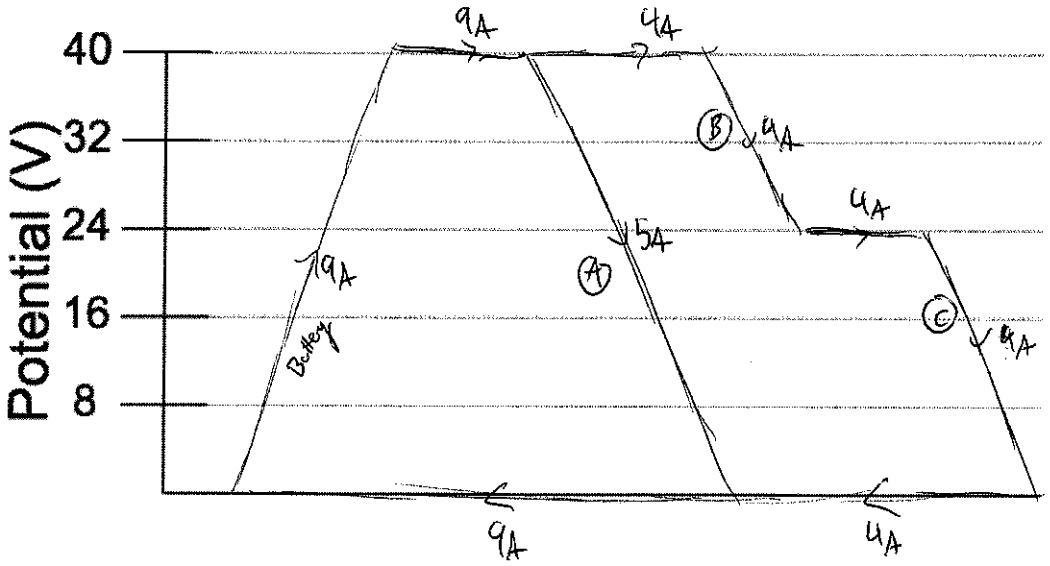
(2)

Draw equivalent circuit here.

Answers







Parallel Circuit inside of a Series Circuit

Answer

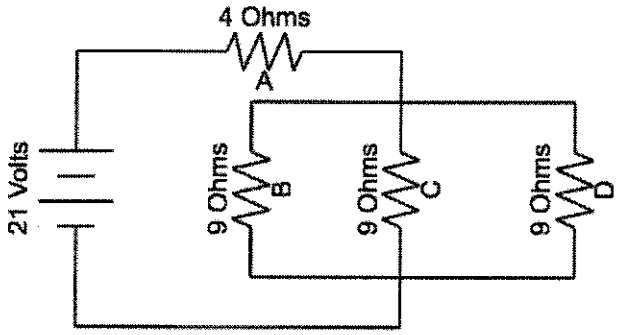
Formual For Equivalent Resistance of two resistors in parallel.

(3)

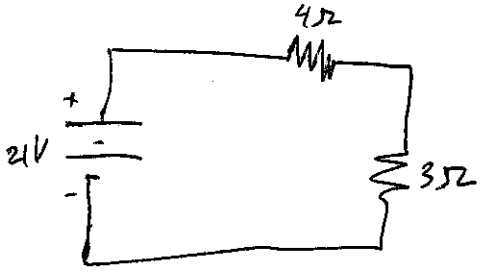
$$\frac{1}{R_T} = \frac{1}{R_1} + \frac{1}{R_2}$$

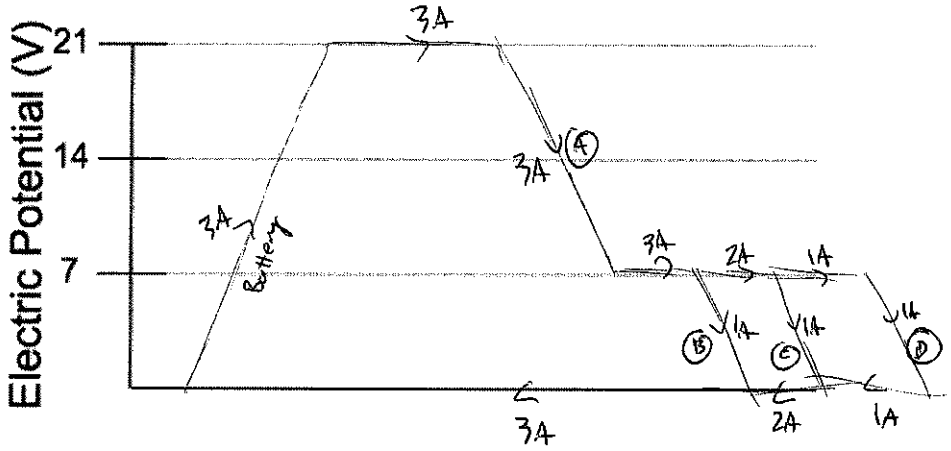
Steps

1. Use the formula above in order to figure out the *equivalent resistance* of the parallel element.
2. Draw an *equivalent circuit* in which the parallel element is replaced by a single element with one resistor of the equivalent resisance.
3. Draw an electric potential diagram for the equivalent circuit. It should look like a series circuit with two resistors. Make sure to indicate the current on this diagram using arrows.
4. Move your circuit back to the original circuit. Erase the equivalent resistance element on your electric potential diagram, and replace it with a parallel element. Indicate the current on each branch of the new parallel element.

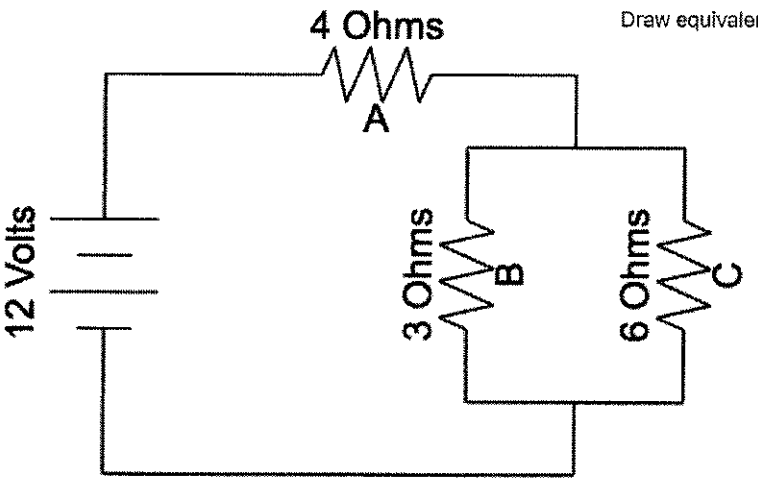


Draw equivalent circuit here.



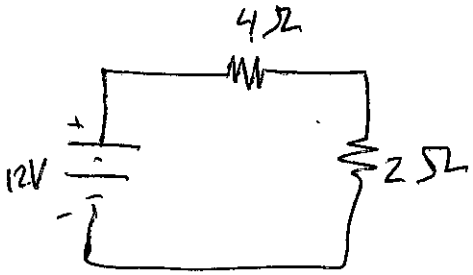


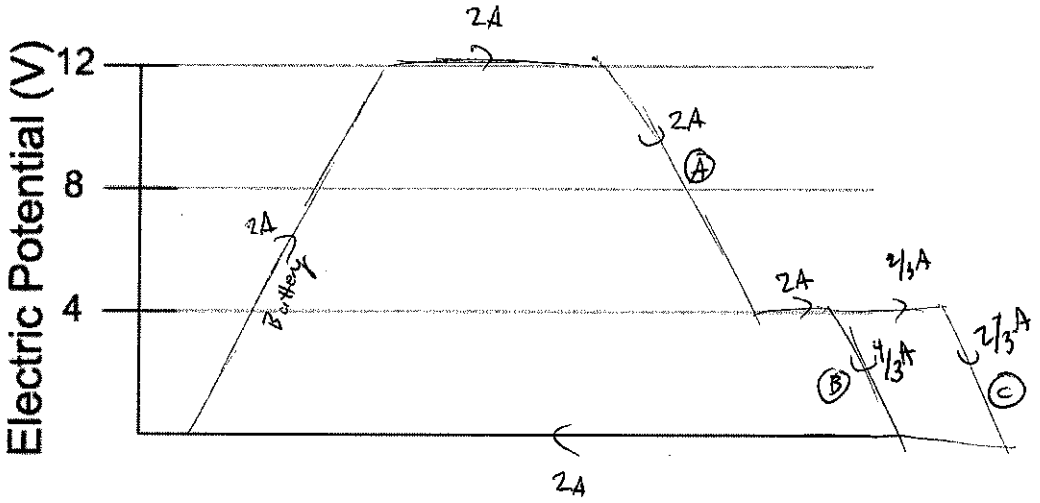
(4)



Draw equivalent circuit here.

Answer



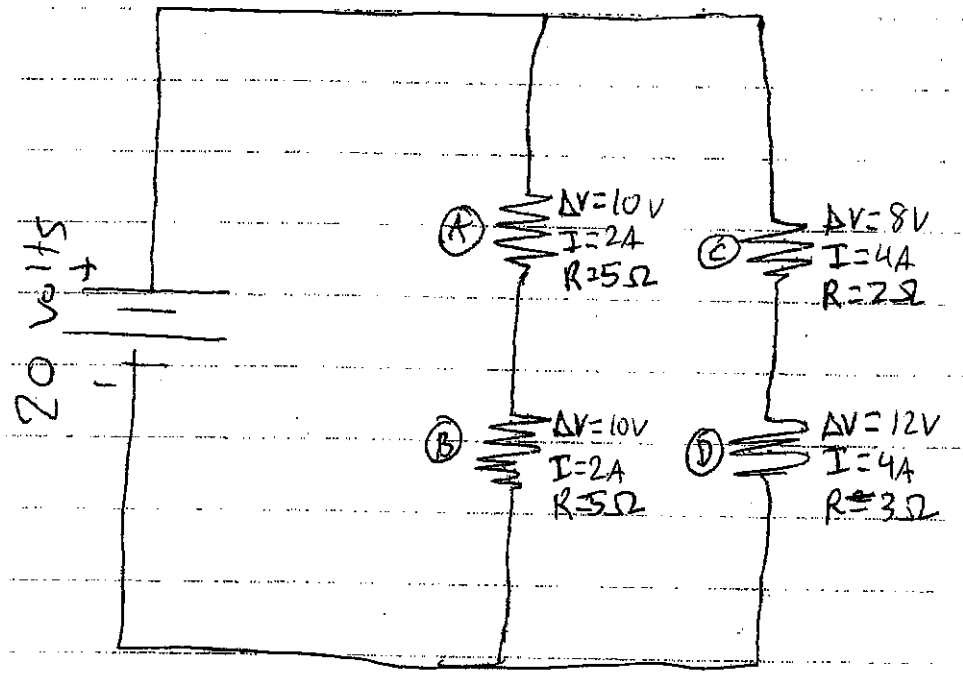


- Extra Problems!

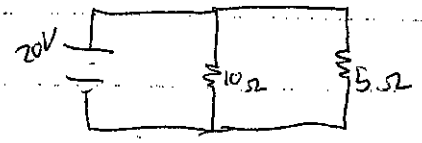
(65)

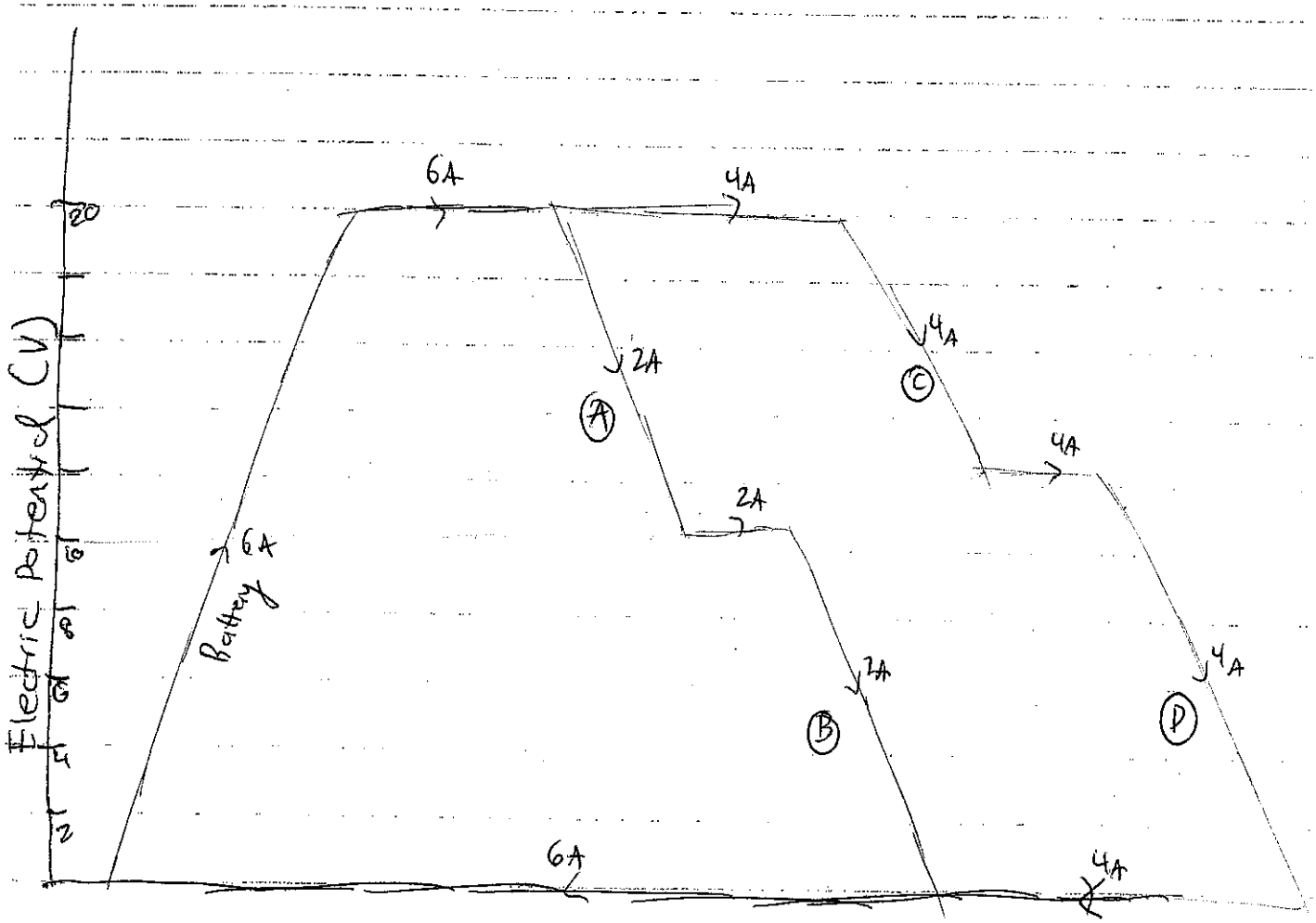
$\Delta V = I \cdot R$

Answer



Equivalent circuit





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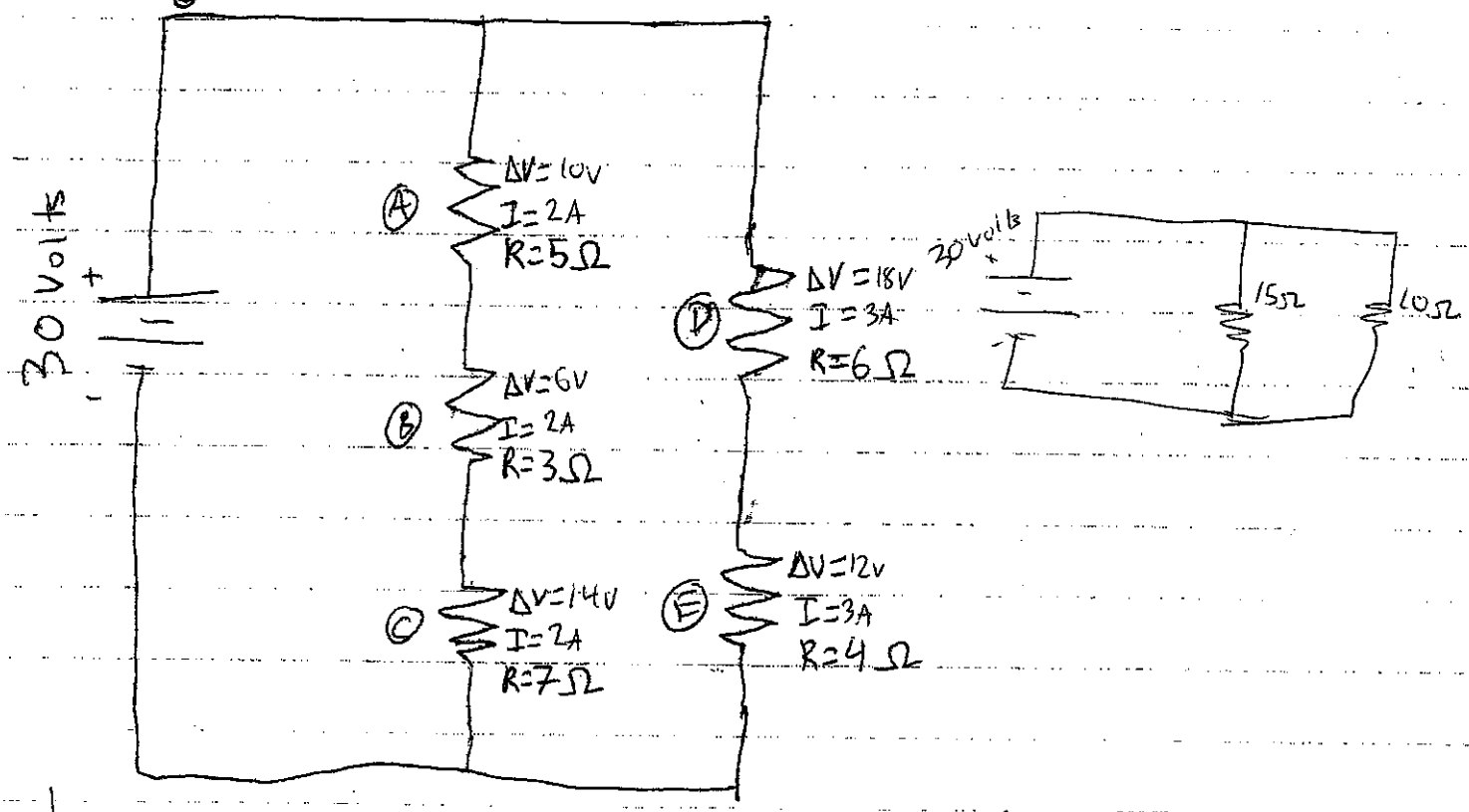
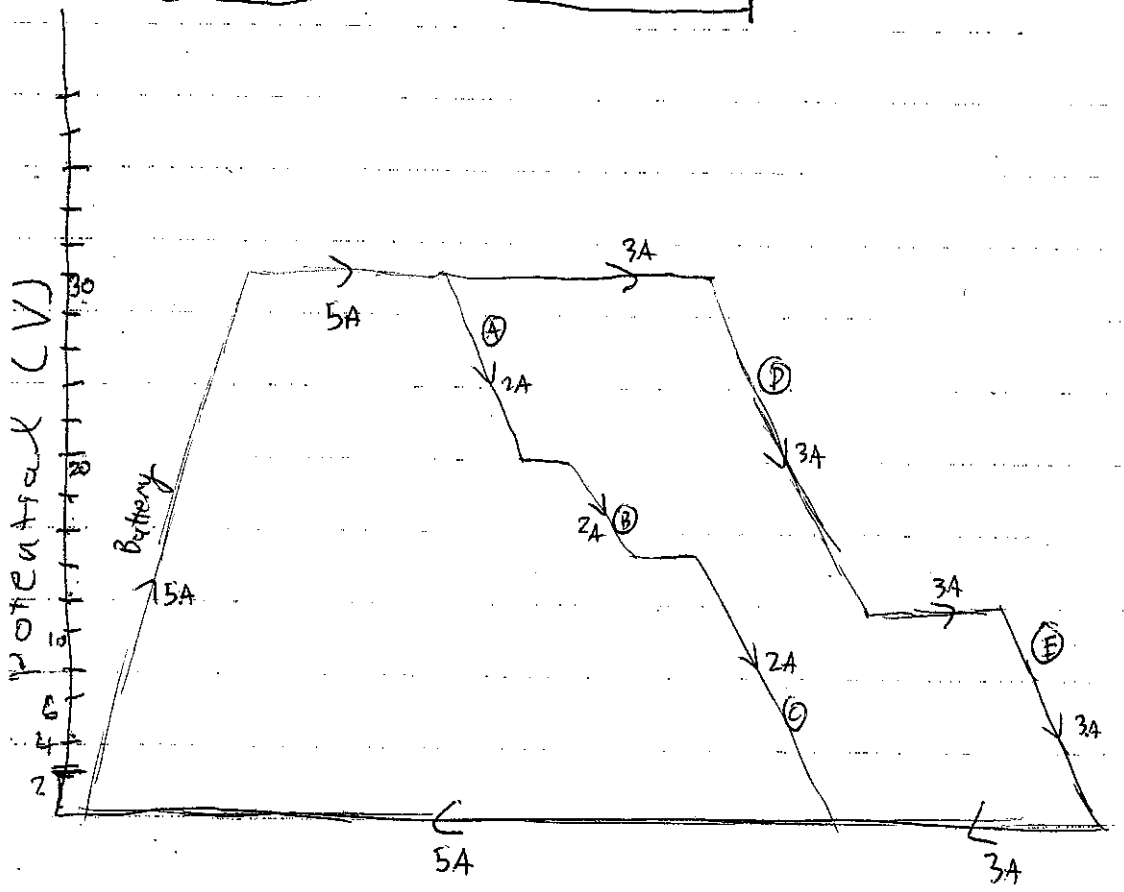
① - Draw an equivalent circuit ⑥ Draw the graph
② - Solve the equivalent circuit
③ - Draw the current on the equivalent circuit
④ - Go back to the original circuit and draw the current on it
⑤ - Solve each element of the original circuit

$\Delta V = I \cdot R$

Answer

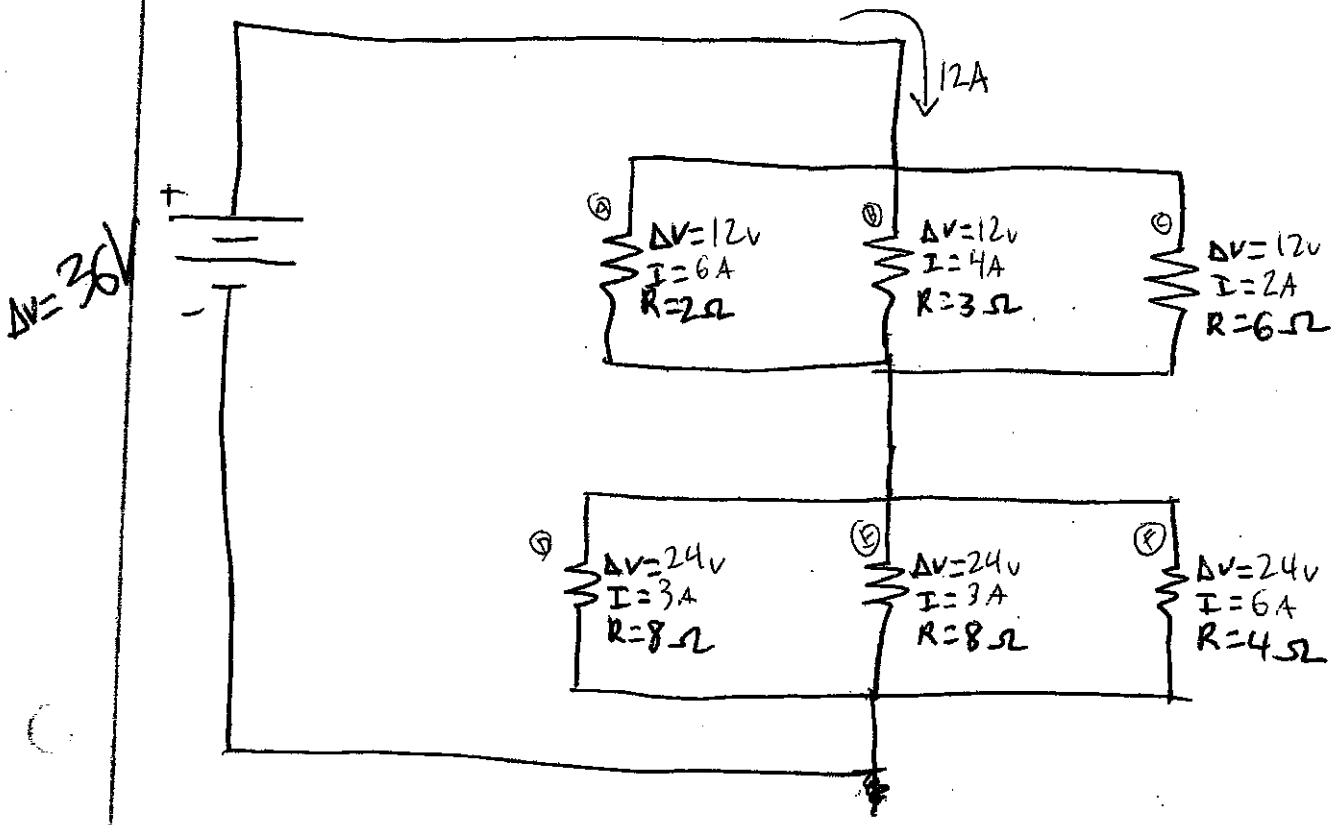




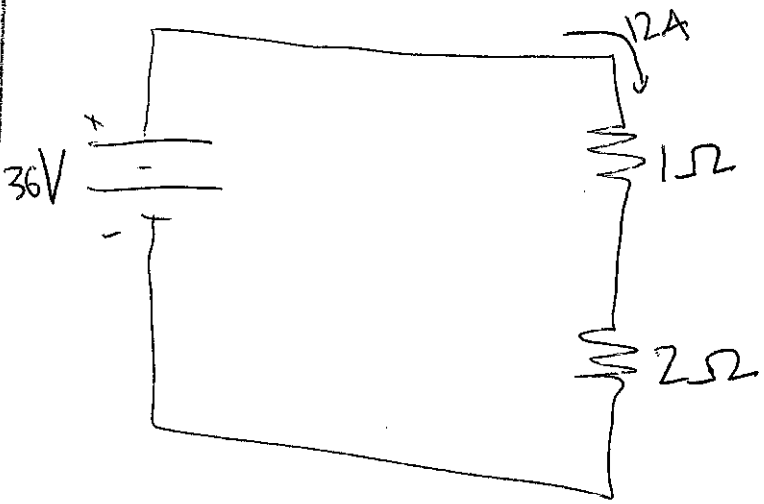
different steps!

$$\frac{1}{R_T} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$$ → formula to Answer

add resistors in parallel



Draw the equivalent circuit here



Answer!

G.7 cont.