Review

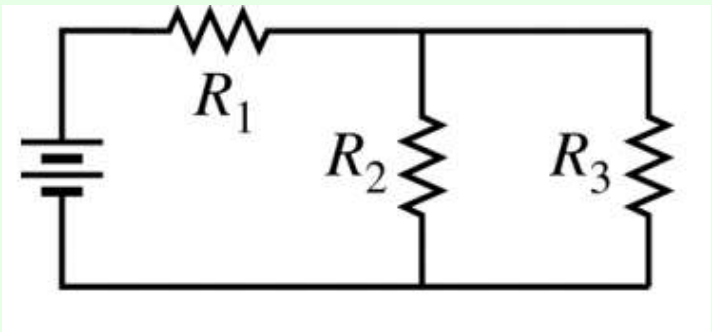
1.

Circuit Element	Potential Difference (V)	Current (A)
Battery	10	8
Resistor R_1	6	8
Resistor R_2	4	3
Resistor R_3	4	5

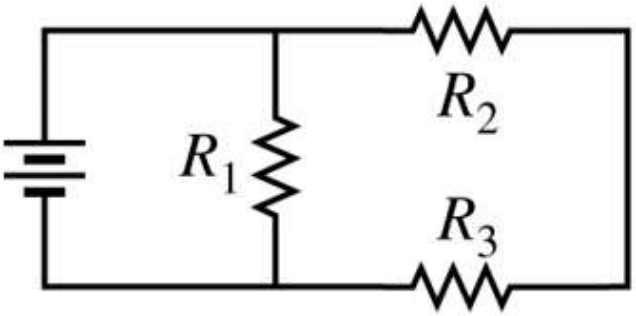
The above table shows the potential difference and current for each circuit element in a circuit consisting of a battery and three resistors. Which of the following diagrams could represent the circuit?

Review

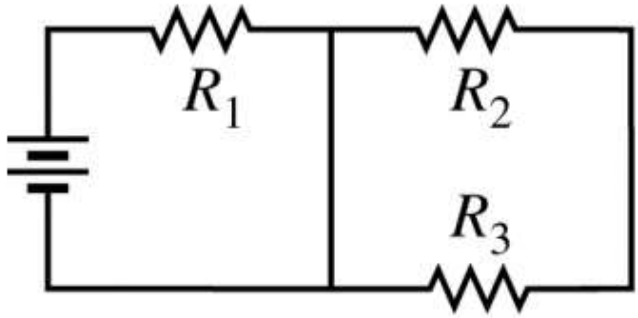
A



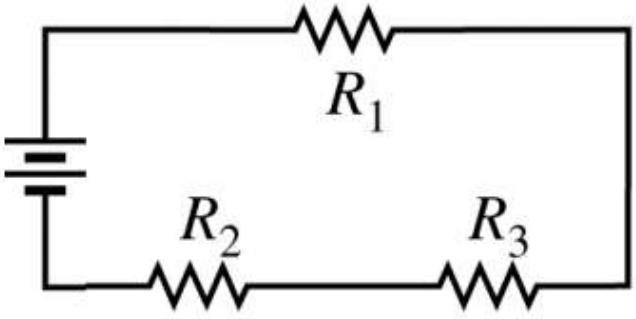
B



C



D



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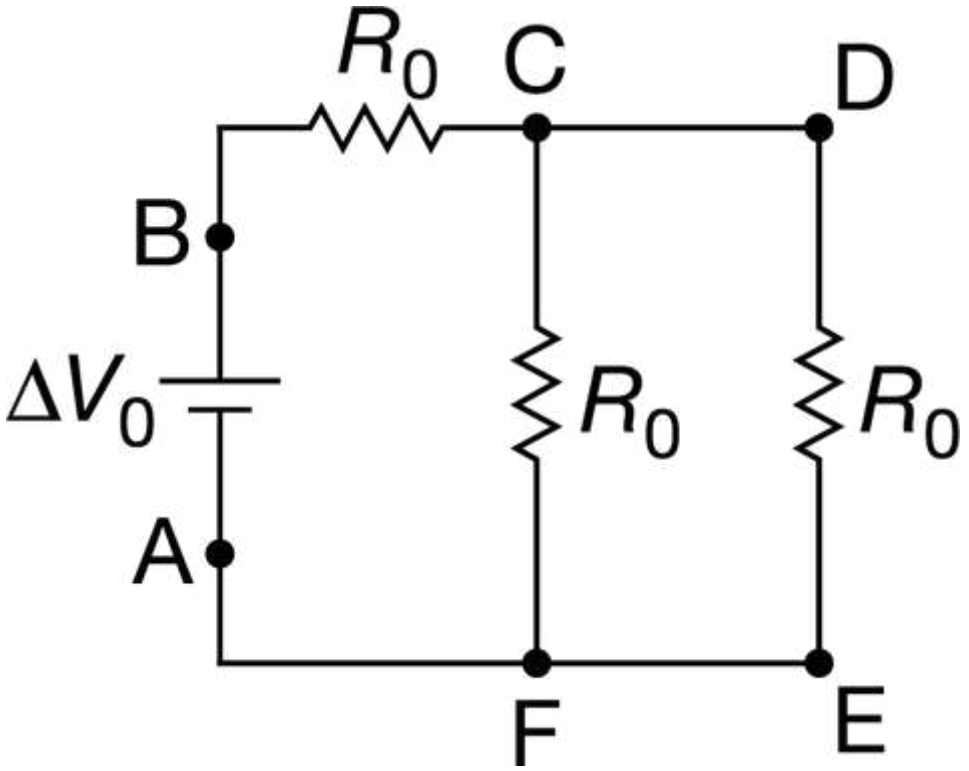


Three resistors of known resistance R0 are arranged in the circuit that is shown. The potential difference across the battery is ΔV0.

2. The current at point E is I_0. What is the current that flows through point A?

(A) Zero

(B) $\frac{I_0}{2}$

(C) I_0

(D) $2I_0$

3. The resistor between point B and point C is changed so that it has a resistance of $2R_0$. Which of the following claims is correct about the new current that flows through the resistor between point D and point E and the new current that flows out of the battery?

Review

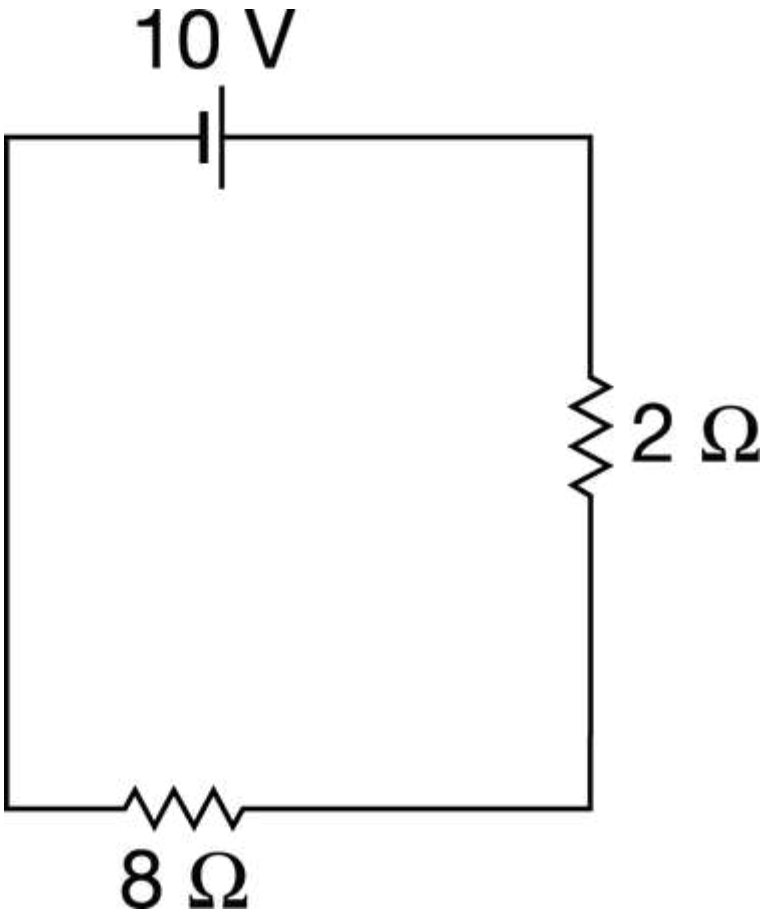
(A) The current that flows through the resistor decreases, and the current that flows out of the battery decreases.

(B) The current that flows through the resistor decreases, and the current that flows out of the battery increases.

(C) The current that flows through the resistor increases, and the current that flows out of the battery decreases.

(D) The current that flows through the resistor increases, and the current that flows out of the battery increases.

4.



A student creates a circuit that consists of a single battery and two resistors that are arranged as shown in the figure. What is the current that passes through the $2\ \Omega$ resistor?

Review

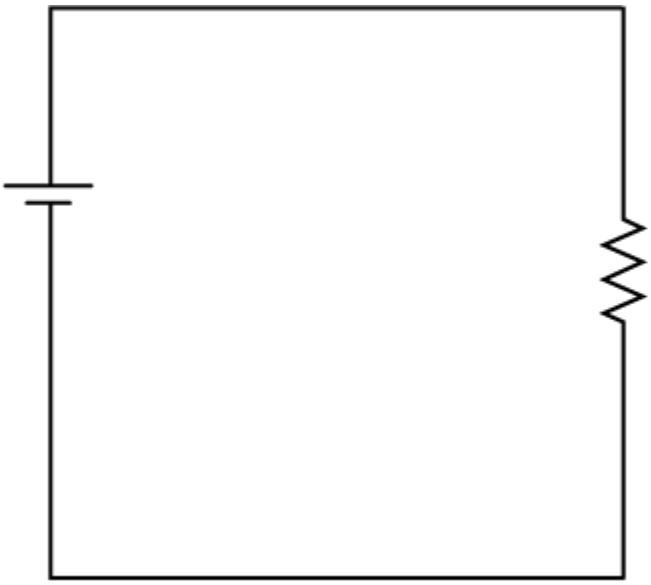
(A) 0.5 A

(B) 1 A

(C) 1.25 A

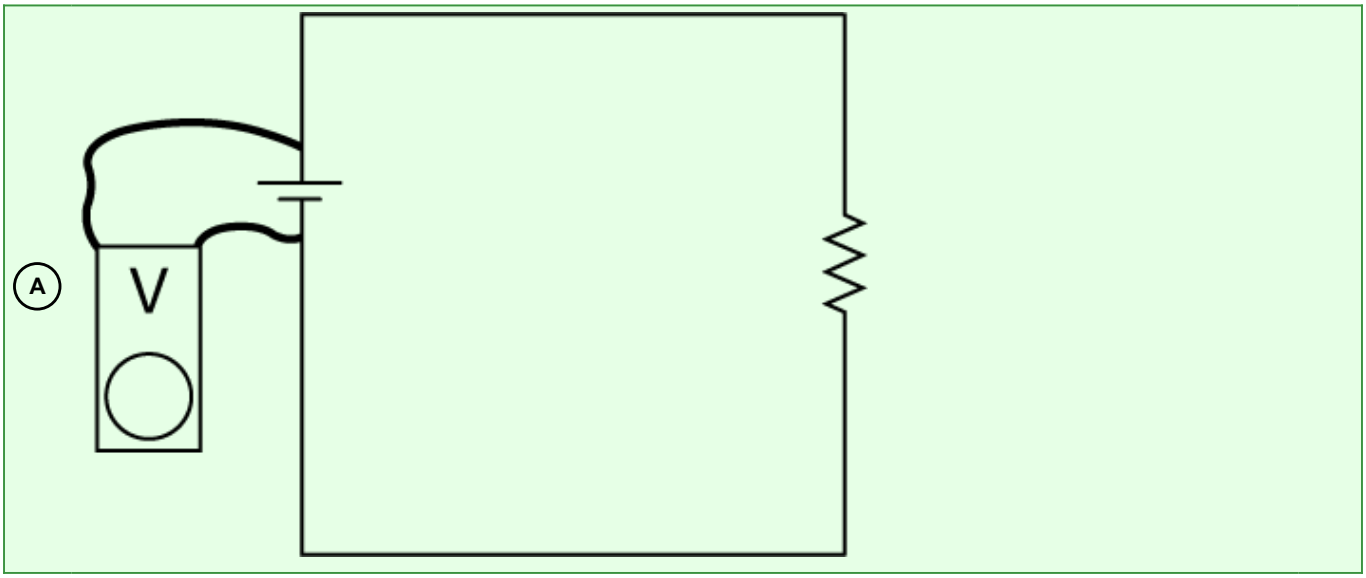
(D) 5 A

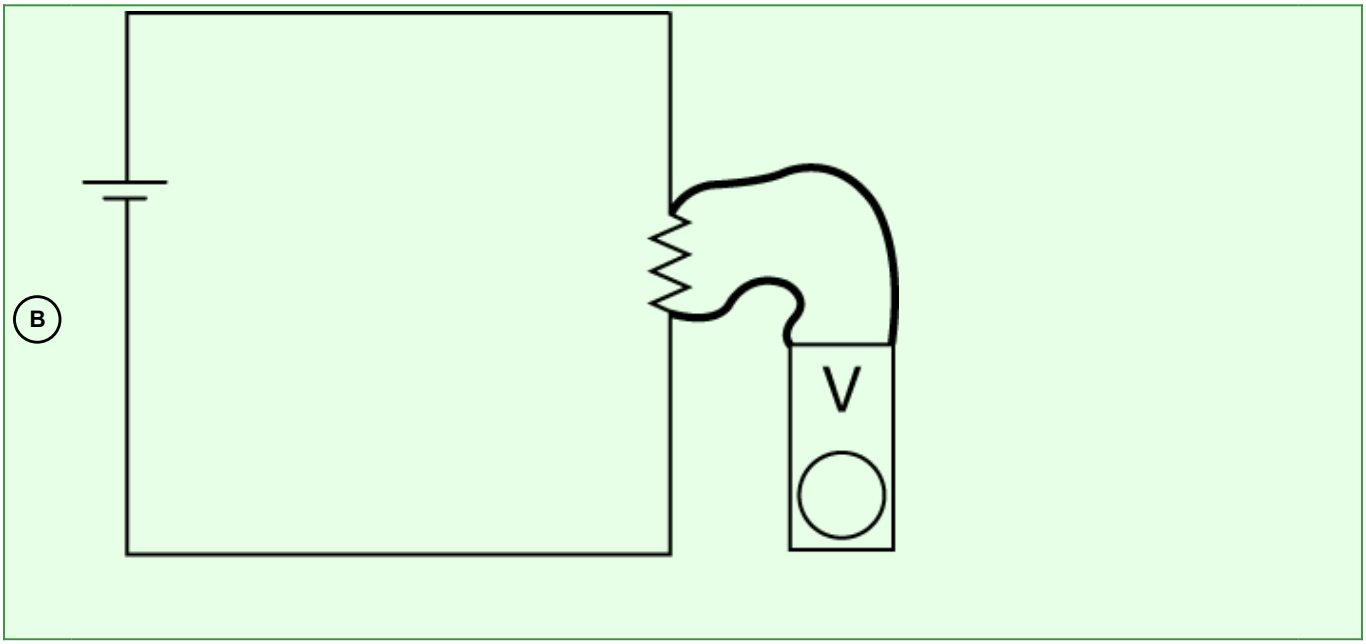
5.



A student must experimentally verify Kirchhoff's loop rule to determine if the conservation of energy applies for the circuit that is shown. Which two of the following diagrams show the location and orientation in which a voltmeter should be attached in the circuit in order to collect the data necessary to verify the loop rule? Select two answers.

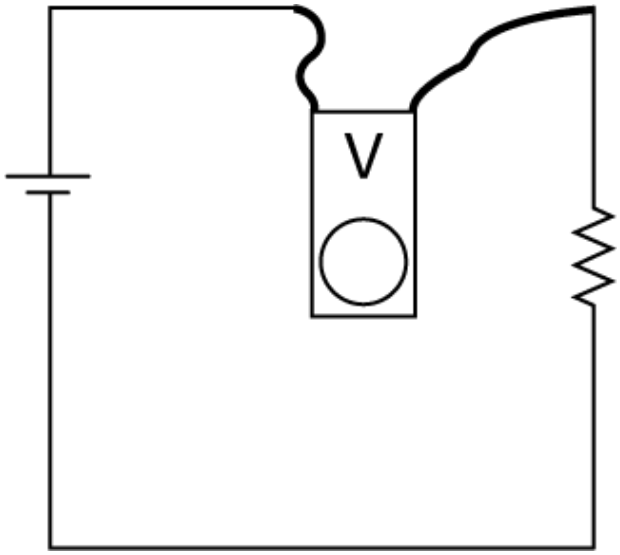
Review



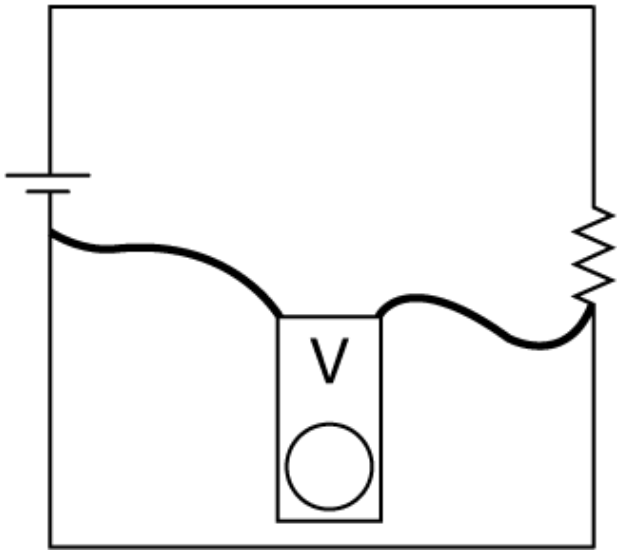


Review

C

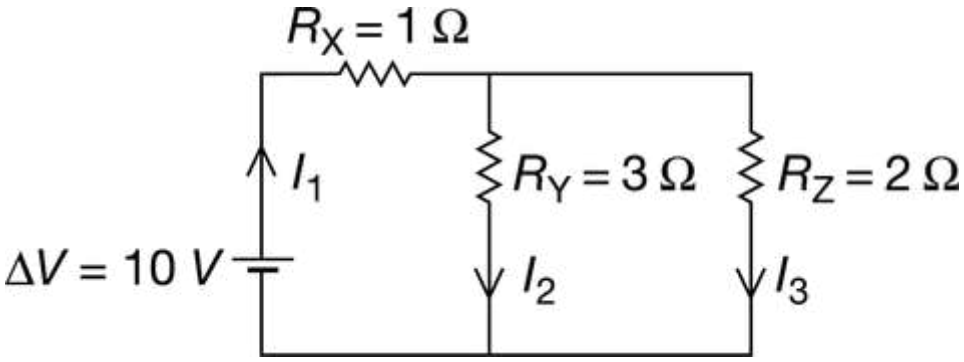


D



Review

6.



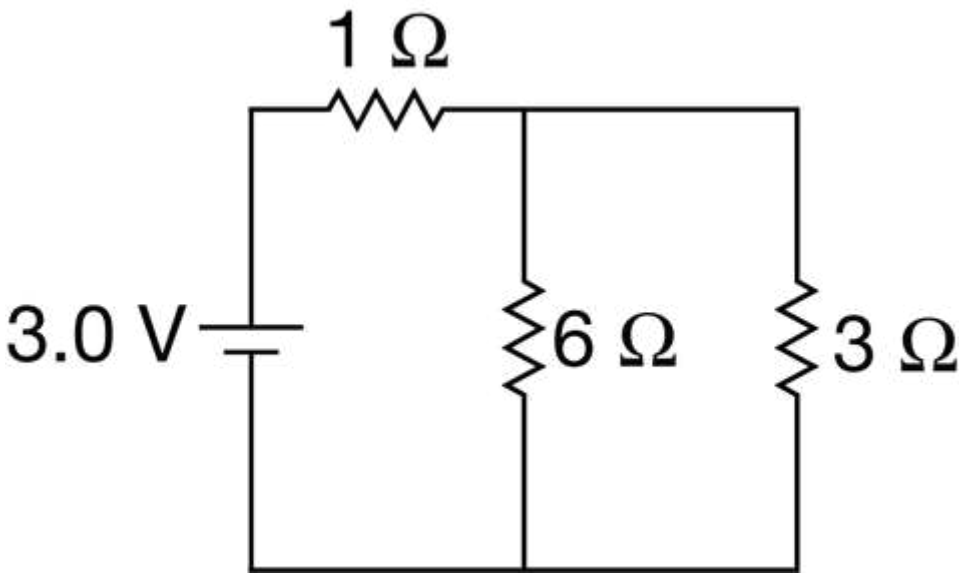
A circuit consists of a single battery and three resistors. Current flows from the battery and splits at the junction, as shown in the diagram. Which two of the following claims is true regarding the circuit? Select two answers.

(A) I_2 is larger than I_3.

(B) Increasing the resistance of R_X will increase I_3.

(C) $10\ \text{V}$ is the sum of ΔV_X and ΔV_Z .

(D) ΔV_Y is the same as ΔV_Z .



A student creates a circuit that consists of a single battery and three resistors that are arranged as shown.

Review

The battery supplies a total current of 1A.

7. The battery connected to the circuit is changed such that the total current that flows out of the battery is now $2\ \text{A}$. Which of the following claims is correct regarding how much charge flows into the battery after the current is allowed to flow for $60\ \text{s}$?

(A) Less than $120\ \text{C}$

(B) Exactly $120\ \text{C}$

(C) More than $120\ \text{C}$

(D) The answer cannot be determined without knowing the new potential difference for the battery.

8. Which of the following claims is correct regarding the current that flows through the different branches of the circuit?

(A) The current is the same for the $1\ \Omega$ and the $3\ \Omega$ resistors.

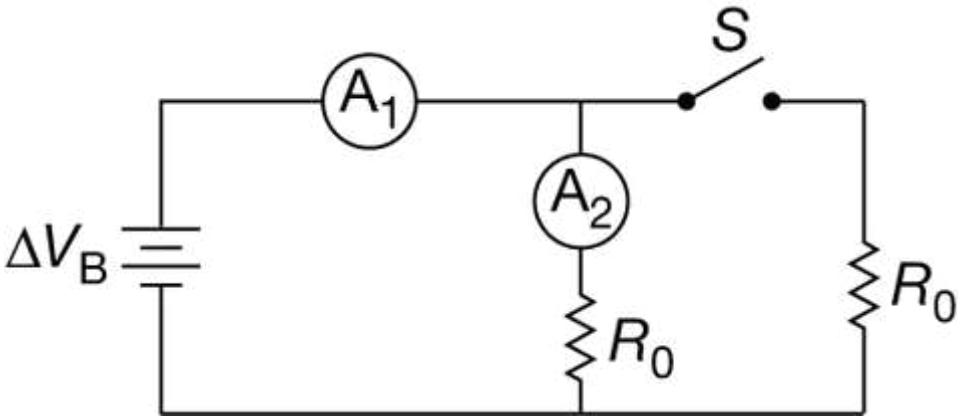
(B) More current flows through the $6\ \Omega$ resistor than the $3\ \Omega$ resistor in the parallel branch.

(C) The total current that flows through the $6\ \Omega$ resistor and $3\ \Omega$ resistor in the parallel branches is equal to the current that flows through the battery.

(D) More current would flow from the battery if all three resistors were in series.

Review

9.



Battery V_B , switch S, two ammeters, $\mathrm{A_1}$ and $\mathrm{A_2}$, and two identical resistors of resistance R_0 are arranged in the circuit that is shown. Current I_0 flows through ammeters when the switch S is open. Which of the following correctly predicts the current in the ammeters when the switch is closed?

(A) The current through ammeter $\mathrm{A_1}$ would be $2\ I_0$.

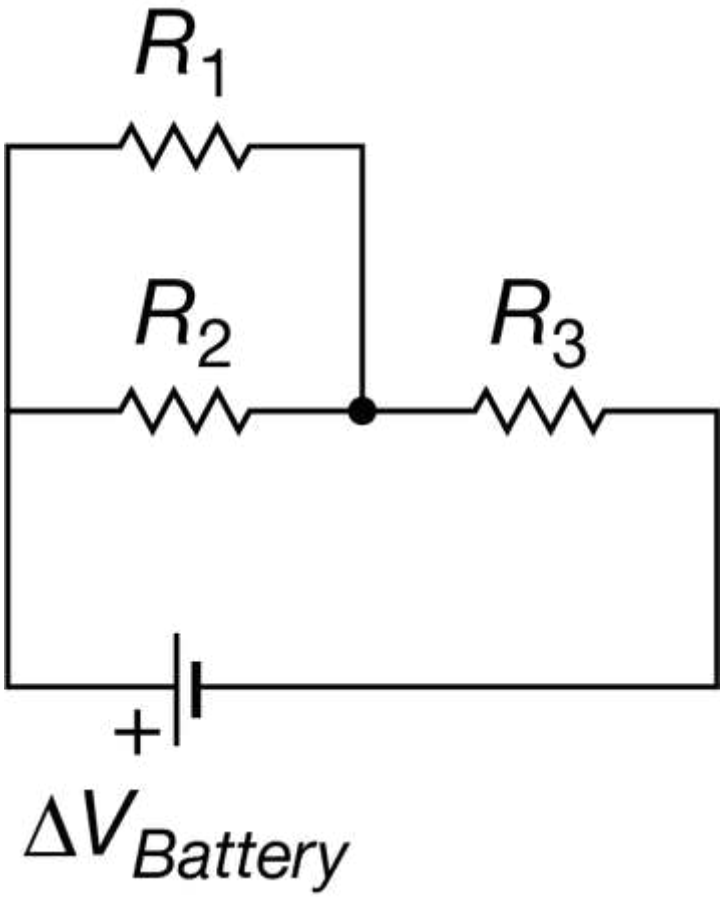
(B) The current through ammeter $\mathrm{A_1}$ would be I_0 .

(C) The current through ammeter $\mathrm{A_1}$ and ammeter $\mathrm{A_2}$ would be I_0 .

(D) The current through ammeter $\mathrm{A_1}$ would be $\frac{1}{2}\ I_0$.

Review

10.



A circuit consists of a single battery and three resistors that are arranged as shown, where $R_1 > R_2 = R_3$. The potential differences across resistors R_1, R_2, and R_3 are ΔV_1, ΔV_2, and ΔV_3, respectively. Which of the following is true regarding the magnitude of the potential difference across the circuit elements under consideration?

(A) $|\Delta V_1| > |\Delta V_2|$

(B) $|\Delta V_2| > |\Delta V_3|$

(C) $|\Delta V_3| > |\Delta V_1|$

(D) $|\Delta V_1| > |\Delta V_{\text{Battery}}|$

Review

11.

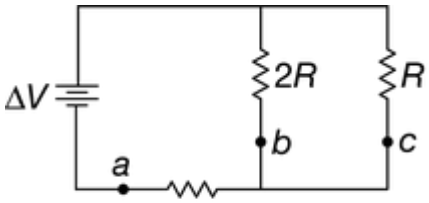


Figure 1

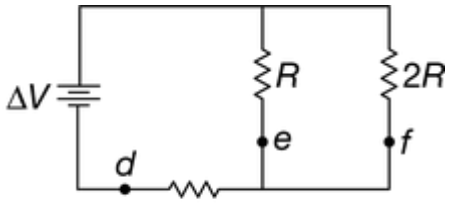


Figure 2

Figures 1 and 2 are circuits that each consist of a single battery and three resistors that are arranged as shown. The potential difference across the batteries in both circuits are identical. Different locations, a through f, are indicated in the figures. Which two of the following claims are correct regarding the circuits in Figure 1 and Figure 2? Select two answers.

(A) The current at location b is twice is great as the current through location c.

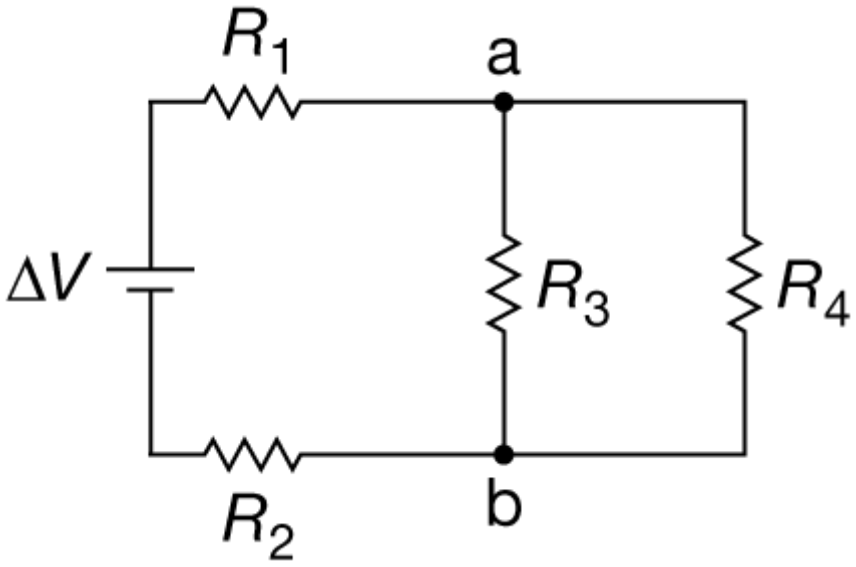
(B) The current at location a is equal to the sum of the current that flows through locations e and f.

(C) The current at location b is the same as the current at location e.

(D) The current at location f is equal to the current through location a minus the current through location c.

Review

12.



A student creates a circuit that consists of a single battery and four resistors that are arranged as shown. The student has an ammeter and a voltmeter to collect data about the circuit. What data should the student collect to verify the conservation of charge at junction a ?

(A) The current through R_1, the current through R_2, and the current through R_3

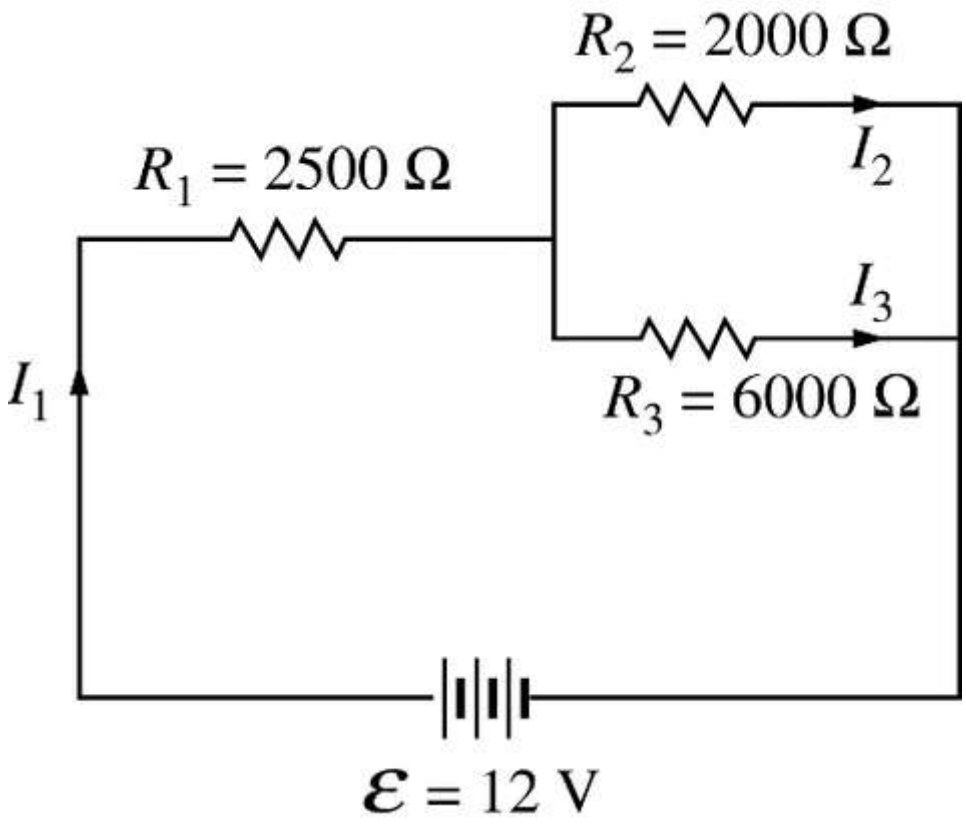
(B) The current through R_1, the current through R_3, and the current through R_4

(C) The potential difference across the battery, the potential difference across R_3, and the potential difference across R_4

(D) The potential difference across R_1, the potential difference across R_2, and the potential difference across R_4

The following questions relate to the circuit diagram below.

Review



13. How do the currents I_1, I_2, and I_3 compare?

(A) $I_1 > I_2 > I_3$

(B) $I_1 > I_3 > I_2$

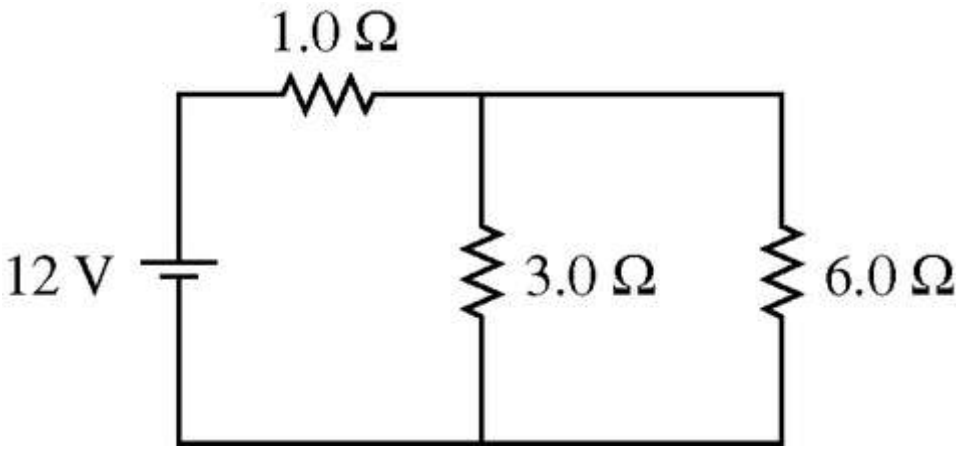
(C) $I_2 > I_1 > I_3$

(D) $I_3 > I_1 > I_2$

(E) $I_3 > I_2 > I_1$

Review

14.



The current through the 3 Ω resistor in the circuit shown above is most nearly

(A) 1.3 A

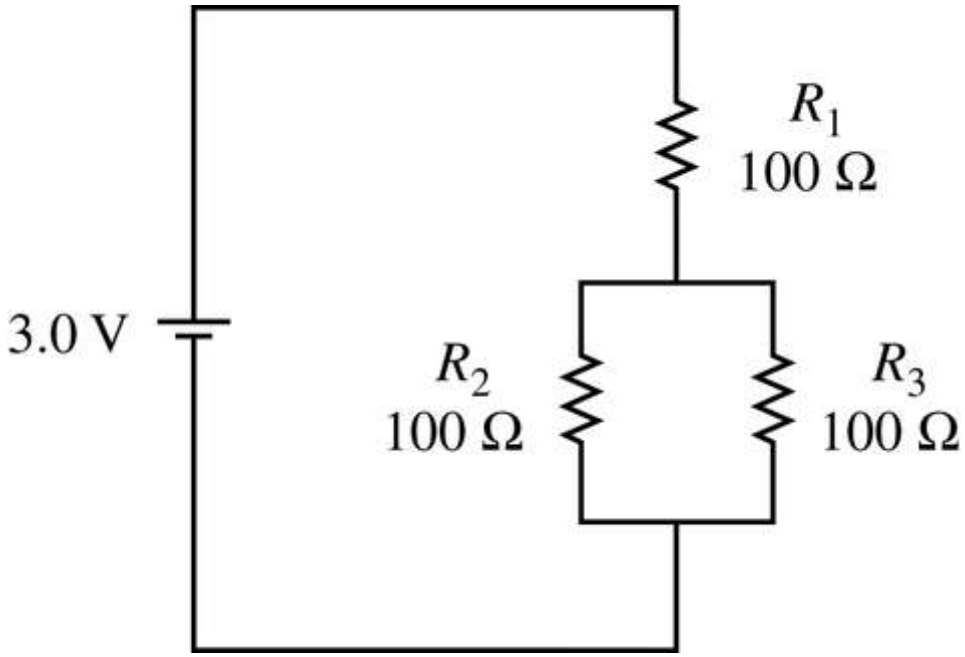
(B) 2.7 A

(C) 3.0 A

(D) 4.0 A

Review

15.



When the circuit shown above is set up, the potential difference across the battery is 3.0 V. By how much will the magnitude of the potential difference across R_2 change when R_3 is removed and its branch is left open?

(A) The magnitude of the potential difference across R_2 does not change.

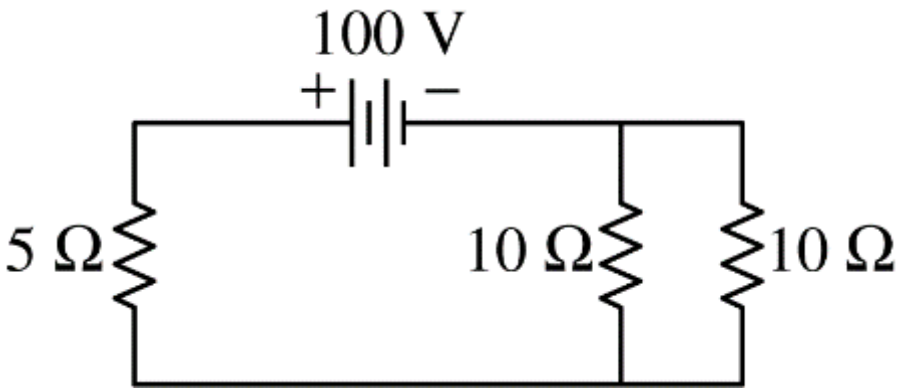
(B) The magnitude of the potential difference across R_2 decreases by 0.5 V.

(C) The magnitude of the potential difference across R_2 increases by 0.5 V.

(D) The magnitude of the potential difference across R_2 increases by 1.0 V.

Review

16.



In the circuit shown above, what is the current in the 5 Ω resistor?

(A) 40 A

(B) 25 A

(C) 20 A

(D) 10 A

(E) 4 A