Series DC Circuit

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Series DC Circuit

EXAMPLE 4 For the series circuit in Fig. 15:

a. Find the total resistance R_T.
b. Calculate the resulting source current I_s.
c. Determine the voltage across each resistor.

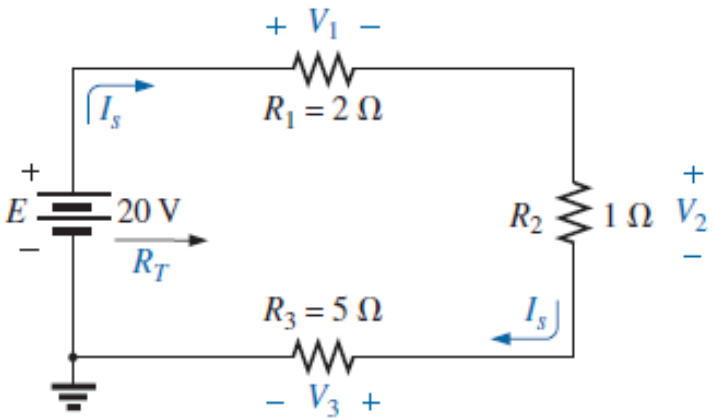

FIG. 15
Series circuit to be investigated in Example 4.

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EXAMPLE 5 For the series circuit in Fig. 16:

a. Find the total resistance R_T.
b. Determine the source current I_s and indicate its direction on the circuit.
c. Find the voltage across resistor R_2 and indicate its polarity on the circuit.

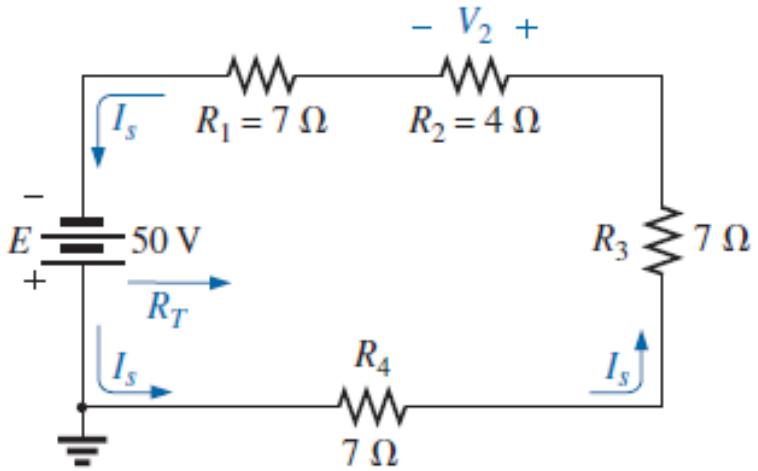

FIG. 16
Series circuit to be analyzed in Example 5.

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EXAMPLE 6 Given R_T and I_3, calculate R_1 and E for the circuit in Fig. 18.

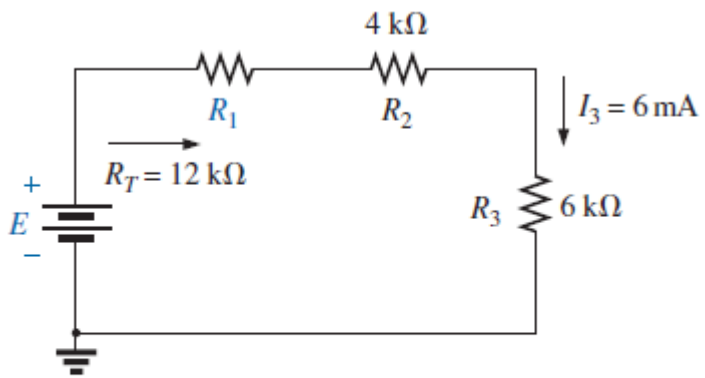

FIG. 18
Series circuit to be analyzed in Example 6.

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EXAMPLE 7 For the series circuit in Fig. 22 (all standard values):

a. Determine the total resistance R_T.
b. Calculate the current I_s.
c. Determine the voltage across each resistor.
d. Find the power supplied by the battery.
e. Determine the power dissipated by each resistor.
f. Comment on whether the total power supplied equals the total power dissipated.

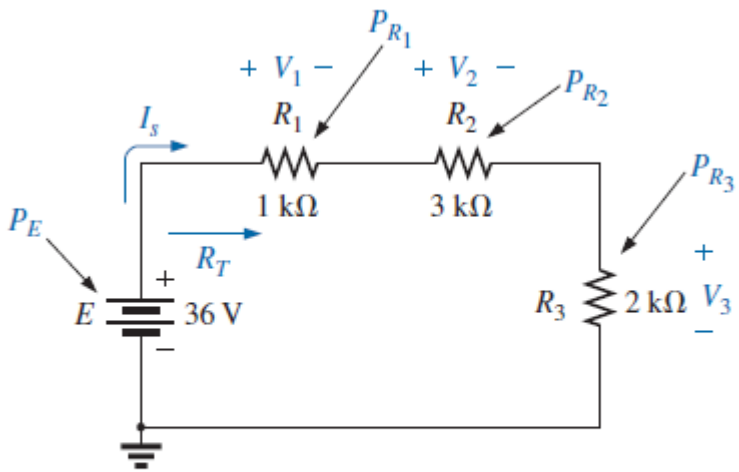

FIG. 22
Series circuit to be investigated in Example 7.

Voltage Source in Series

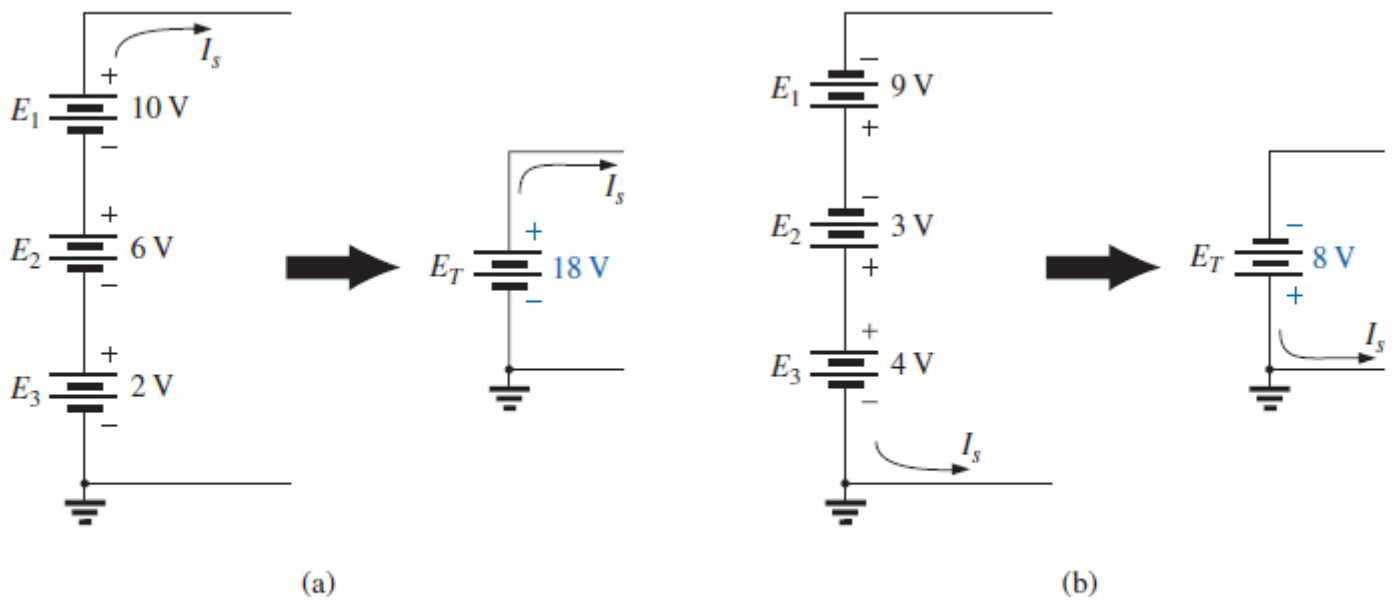

FIG. 23

Reducing series dc voltage sources to a single source.

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EXAMPLE 15 For the series circuit in Fig. 37.

a. Without making any calculations, how much larger would you expect the voltage across R_2 to be compared to that across R_1?
b. Find the voltage V_1 using only the voltage divider rule.
c. Using the conclusion of part (a), determine the voltage across R_2.
d. Use the voltage divider rule to determine the voltage across R_2, and compare your answer to your conclusion in part (c).
e. How does the sum of V_1 and V_2 compare to the applied voltage?

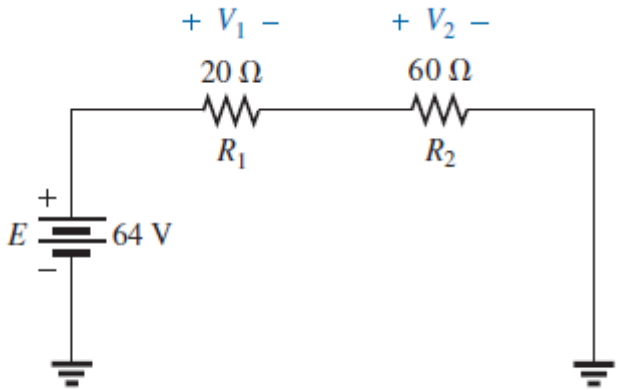

FIG. 37

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EXAMPLE 20 Determine I and the voltage across the 7 Ω resistor for the network in Fig. 43.

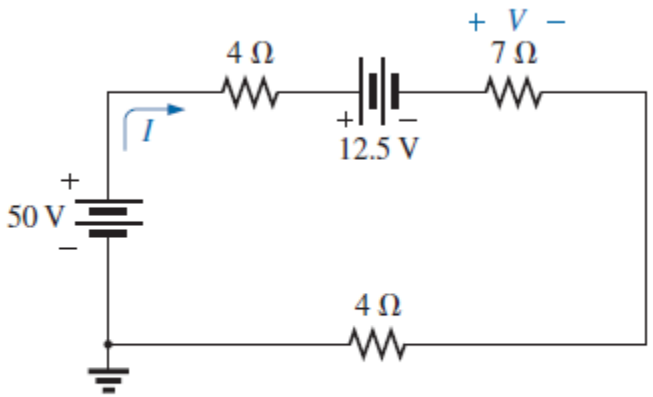

FIG. 43
Example 20.

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EXAMPLE 26 Using the voltage divider rule, determine the voltages V_1 and V_2 of Fig. 62.

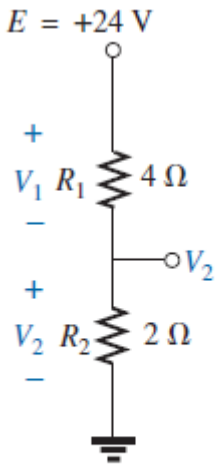

FIG. 62
Example 26.

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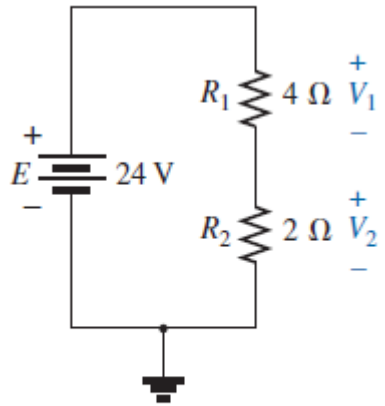

FIG. 63
Circuit of Fig. 62 redrawn.