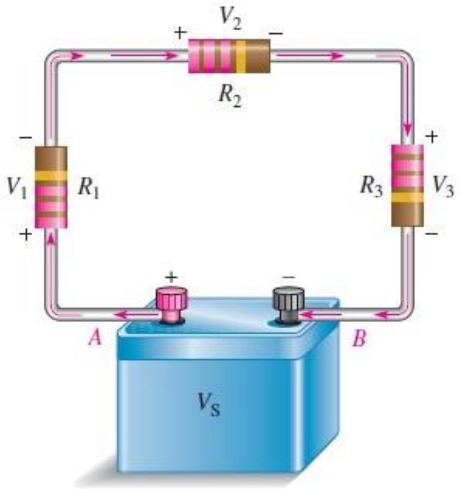
Kirchhoff's Voltage Law (KVL)

KVL

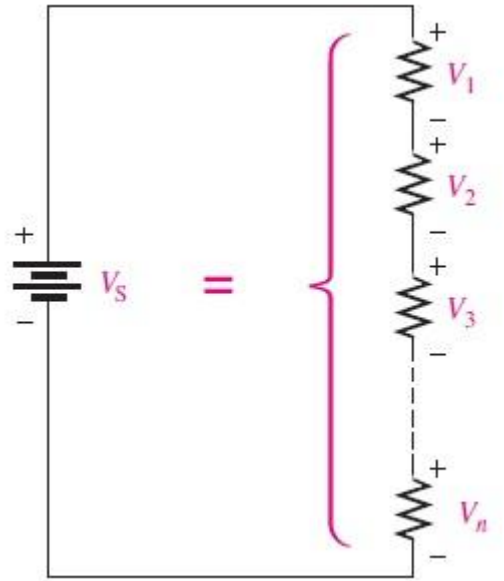
The sum of all the voltage drops around a single closed path in a circuit is equal to the total source voltage in that loop.

$$Vs = V1 + V2 + V3 + \ldots + Vn$$



▶ FIGURE 30

Illustration of voltage polarities in a closed-loop circuit.



KVL Cont...

The algebraic sum of all the voltages (both source and drops) around a single closed path is zero.

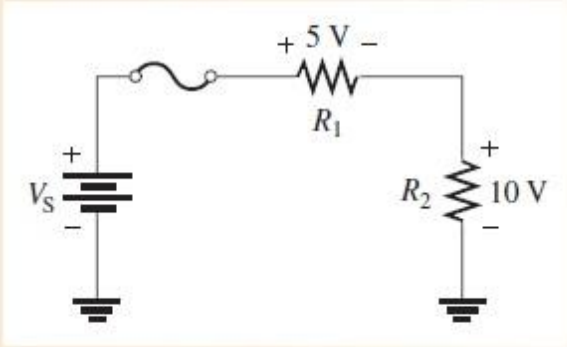
Therefore, another way of expressing Kirchhoff's voltage law in equation form is

$$VS - V1 - V2 - V3 - Á - Vn = 0$$

EXAMPLE 13

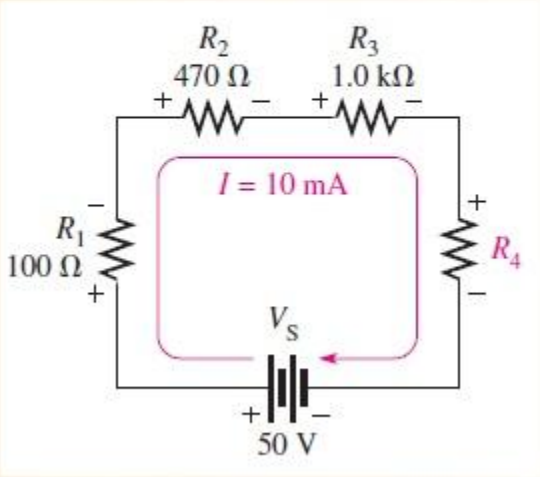
Determine the source voltage V_S in Figure 33 where the two voltage drops are given. There is no voltage drop across the fuse.

▶ FIGURE 33



EXAMPLE 14 Find the value of R_4 in Figure 34.

▶ FIGURE 34



Determine the unknown voltage drop, V_3, in Figure 35.

▶ FIGURE 35