Direct Current Circuits

No RC circuits, no multiple power supplies
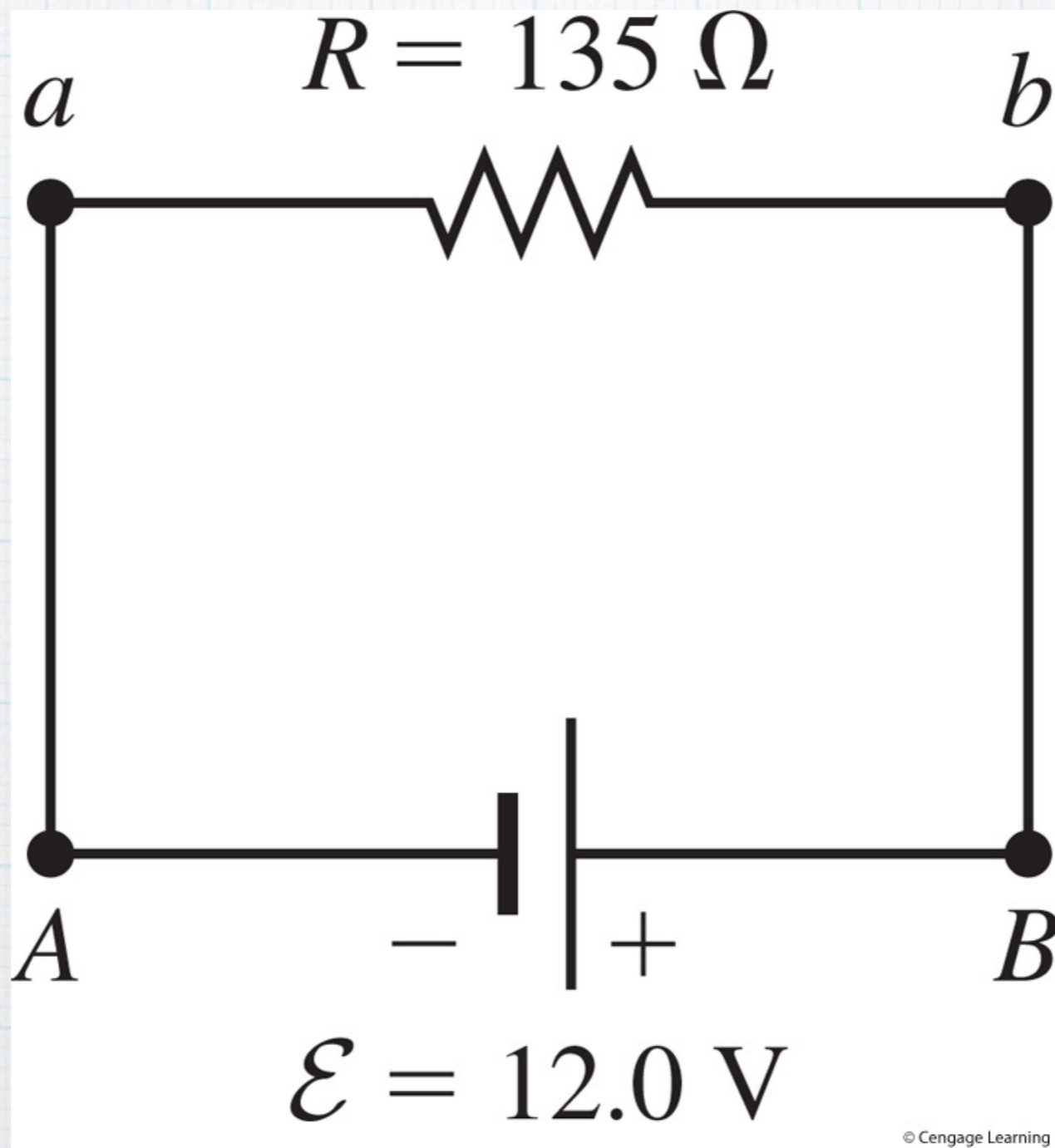
The book is a bit complicated, I'm doing it differently

* Know how to get the equivalent resistance
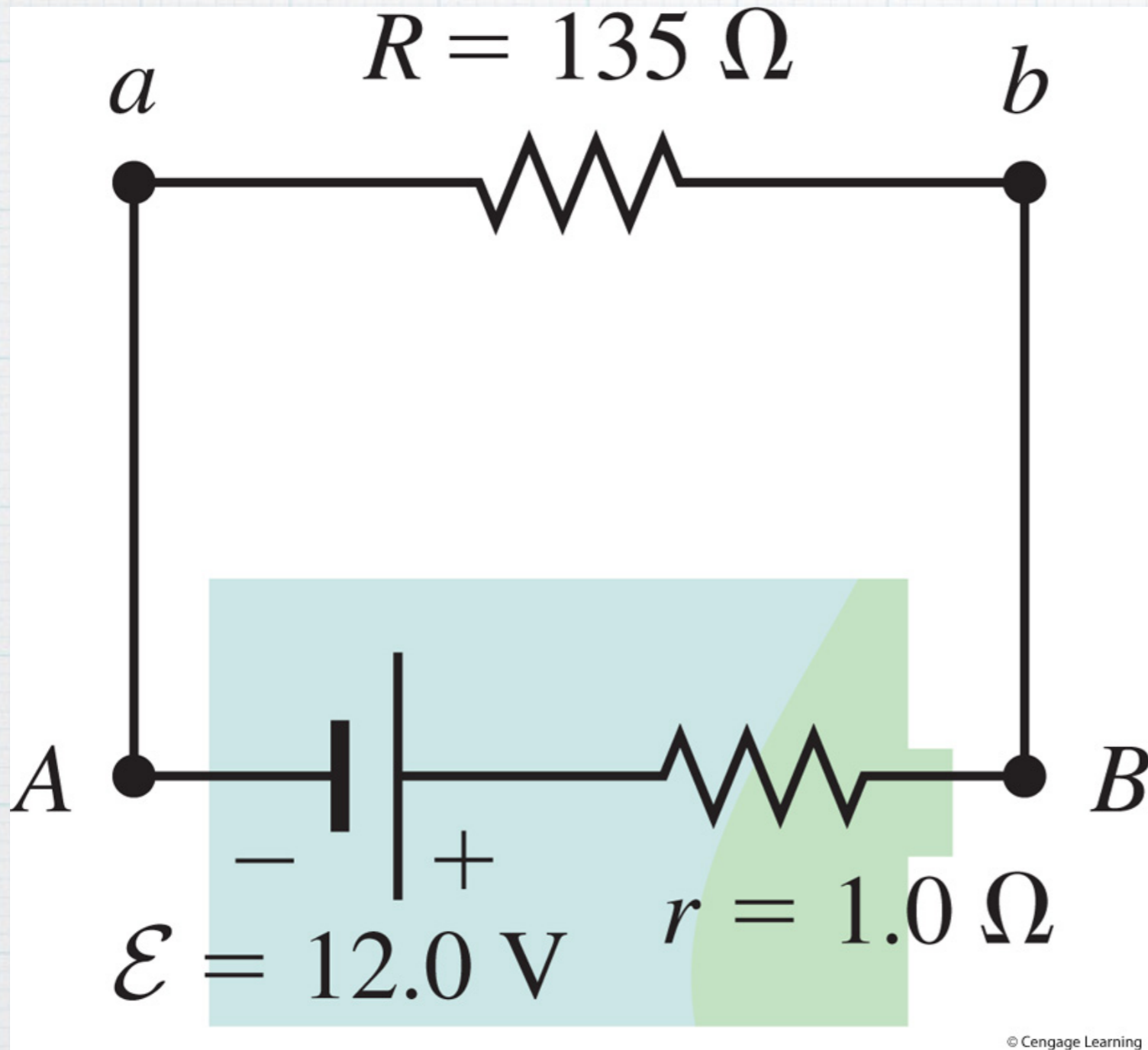
* Think in terms of absolute values

$$|\Delta V| = IR$$

$$P = I\xi = I\Delta V = I^2 R = \frac{\Delta V^2}{R}$$

Ideal Power Supply

$R = 135\ \Omega$

a b

$|\Delta V| = |IR| = \xi$

A $-$ $+$ B

$\mathcal{E} = 12.0\ \text{V}$

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Non-Ideal power supply

$R = 135 \ \Omega$

a

b

A

B

$-$ $+$

$\mathcal{E} = 12.0 \ V$

$r = 1.0 \ \Omega$

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$$|\Delta V| = |Ir| + |IR| = \xi$$

Various Combinations

* Reduce to one equivalent resistor then work backwards

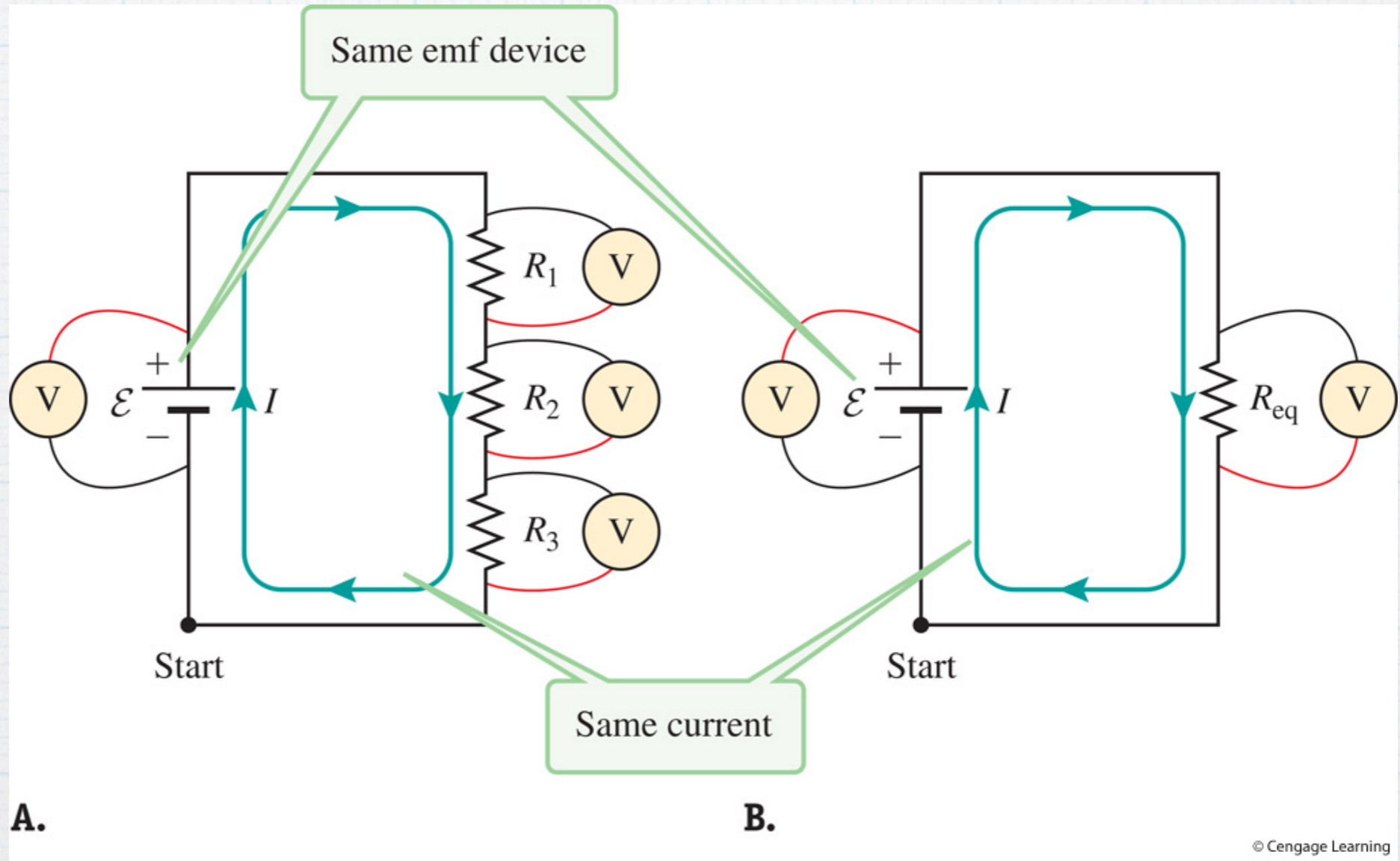* Resistors in series $\qquad R_{eq} = \sum_i R_i$

* Resistors in parallel $\qquad \dfrac{1}{R_{eq}} = \sum_i \dfrac{1}{R_i}$
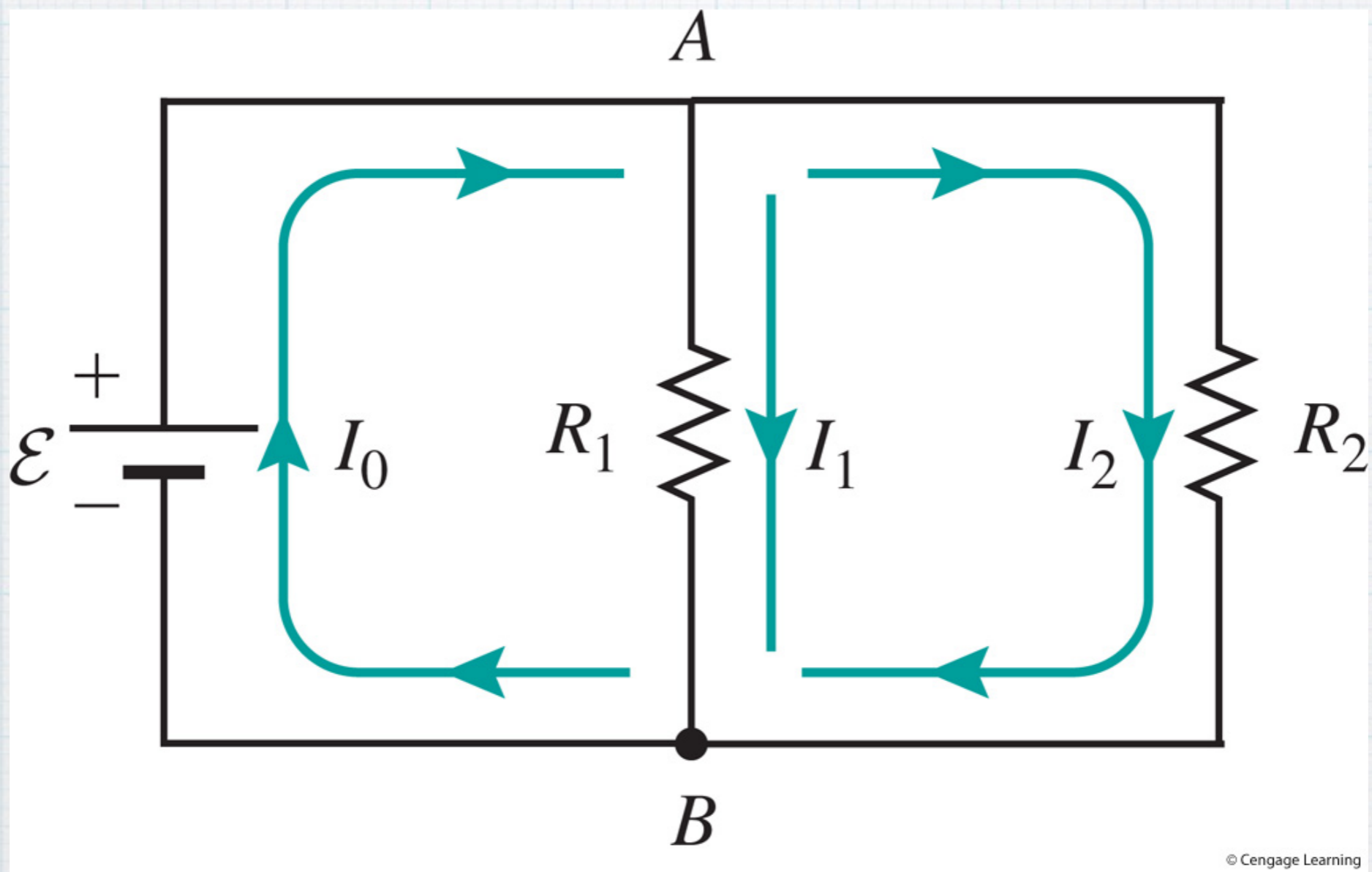
* Waterfall analogy

Rules

* The current is the same across resistors in series

* The voltage drop is the same across resistors in parallel

* Student/door analogy

Series

Same emf device

Same current

R_1

R_2

R_3

V

$\mathcal{E}$

I

Start

R_{eq}

A.

B.

Parallel

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Both