Review of Unit 3–4:

- **Electric circuits** are similar to viscous fluid flow:

Electric circuits	Viscous fluid flow
wire	tube
resistor	flow restriction
light bulb	N/A
constant voltage supply (battery)	N/A
constant current supply	pump
voltage	pressure
current	flow
Resistance	flow resistance

- In order for a current to flow continuously through a circuit, it must be *complete* (that is, there must be a way for the current to flow out of the positive terminal of the power supply and come back to its negative terminal)

Review of Unit 3–4:

- Important: A current arrow is drawn in the direction in which positive charge carriers would move, even if the actual charge carriers are negative and move in the opposite direction.

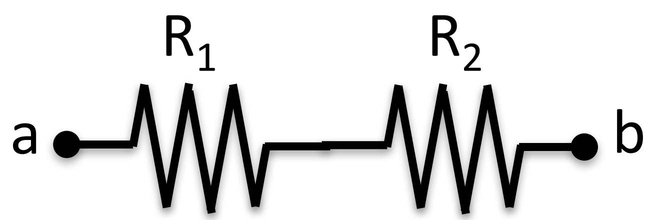
- **Ohm's Law**: Current through a resistor is proportional to the voltage difference across it.

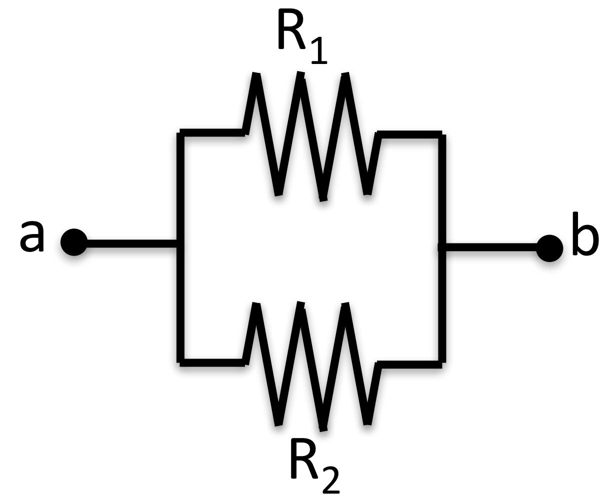
$$\Delta V = IR \qquad \text{or} \qquad I = \frac{\Delta V}{R}$$

analogous to $f = \dfrac{\Delta P}{R}$

Review of Unit 3–4:

- **Resistors in Series vs Parallel**





$$\boxed{R_{eq} = R_1 + R_2}$$

$$\boxed{\frac{1}{R_{eq}} = \frac{1}{R_1} + \frac{1}{R_2}}$$

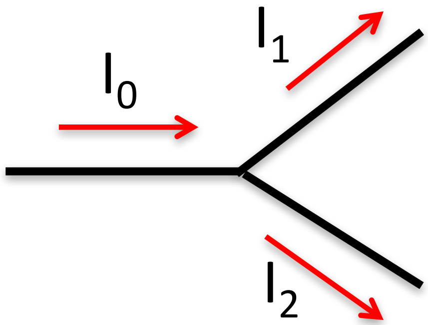
- Same current flows through both resistors
- Electric potential across two resistors are not necessarily the same

- Same electric potential V across two resistors
- Current through two resistors are not necessarily the same

Review of Unit 3–4:

- **Kirchhoff's Junction Rule**: Current into a junction must equal to current out.

$$\sum_{in} I = \sum_{out} I$$



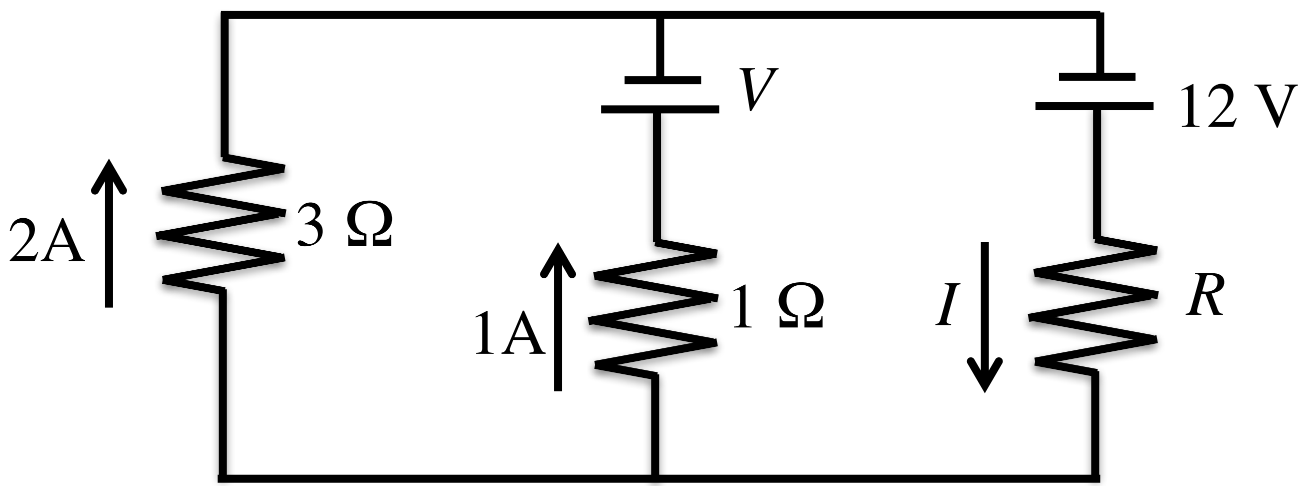
- **Kirchhoff's Loop Rule**: the sum of voltage differences around any loop is zero.

$$0 = \sum V$$

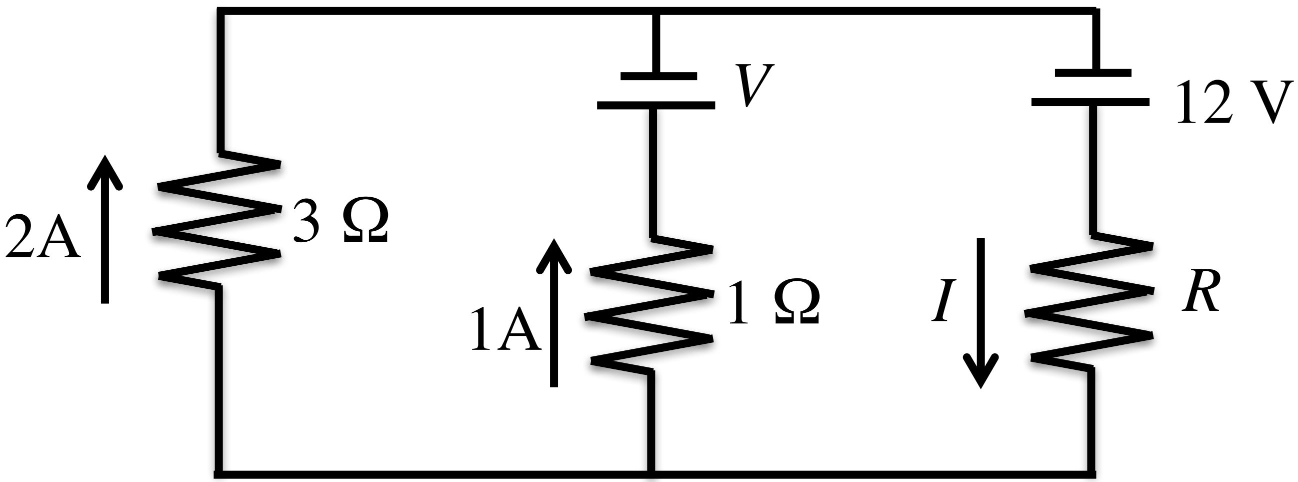
Note: You have determine if the voltage increases or decreases as you move across each circuit element, and use the appropriate sign.

- Kirchhoff's junction rule and loop rule are particularly useful when you have more than one batteries in a circuit or when you cannot determine the direction of the current.

Example: Find I, R and V in the circuit below.



Example: Find I, R and V in the circuit below.



I=3A, V=5V, R=2Ω