Resistance

- Resistance is what causes the load to convert electrical energy into heat energy
- Resistances are the barriers to the flow of charge
  - Resistance is calculated using Ohms Law

    $R = V/I$

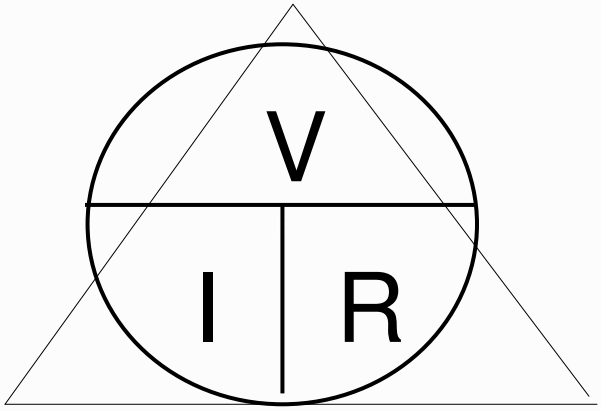
  - The Unit of resistance is ohms Ω

Factors that Affect Resistance

- Length of Wire
  - Eg. Extension cords heating up
  - Longer the wires the more resistance
- Cross Sectional Area
  - Larger the cross sectional area the less the resistance
- Temperature
  - Higher the temperature the more the resistance
  - The longer devices are used, the warmer wires get and the less efficient they become.
- Material
  - Some materials are better conductors than others
  - E.g. copper is a better conductor than iron

There are 3 variations of the formula

- V = I * R
- I = V/R
- R = V/I



Using the GRASS PROBLEM SOLVING METHOD

- GIVEN
- REQUIRED
- ANALYSIS
- SOLUTION
- STATEMENT

Calculate the Resistance Using Ohms Law

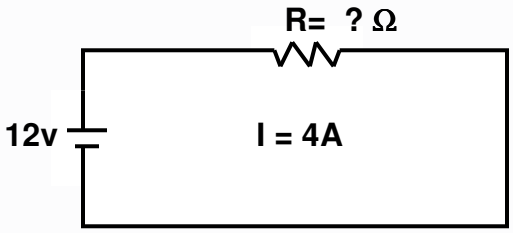
What is the resistance of the resistor in the following circuit?

Given

I = 4 A

V = 12 V

R = ? Ω



Calculate Current Using Ohms Law

A 4v battery is placed in a series circuit with a 2Ω resistor.

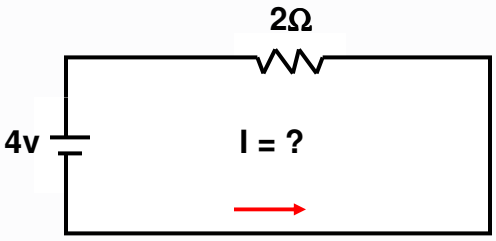
What is the total current that will flow through the circuit?

Given

R = 2 Ω

V = 4V

I = ?



Calculate the Voltage using Ohms Law

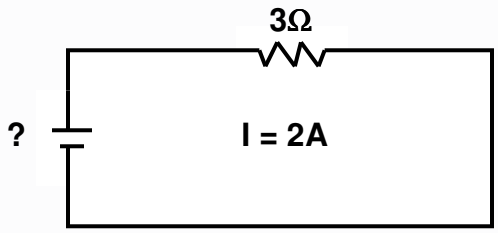
What voltage is required to produce 2a though a circuit with a 3Ω resistor.

Given

I = 2 A

R = 3Ω

V = ?



More Complex Problem Solving

Problem Solving

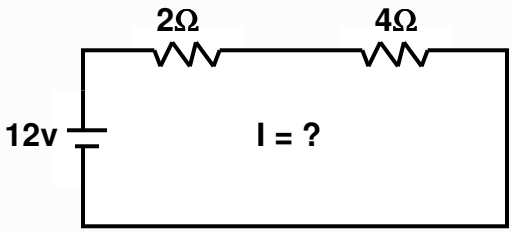
Resistance in series sum together when calculating total resistance

What is the current in the circuit below?

V = 12 V

R total = 2Ω + 4Ω

I = ?



Problem Solving

What is the voltage of the resistor?

What is the Voltage of the light bulb?

V = IR