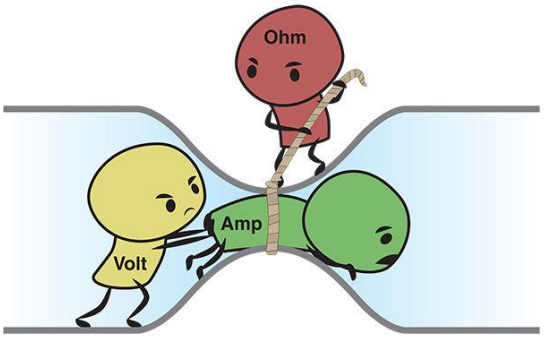
Ohm's Law

The most important relationship for helping to understand circuits

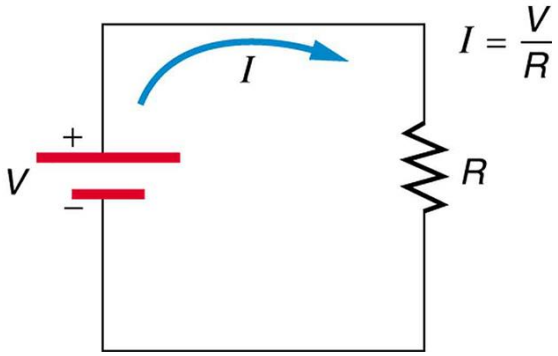
$$I = \frac{V}{R}$$

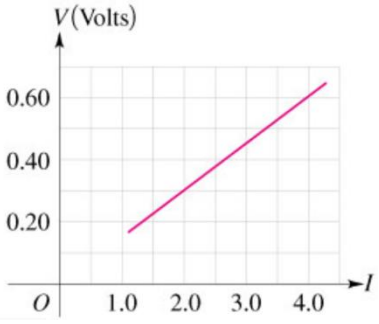


Look at the equation above. Ohm's law is an equation that simply represents the following:

1. **MORE Voltage** (Energy) means **MORE current flow** you will get.

2. **MORE Resistance** means **LESS current flow**.





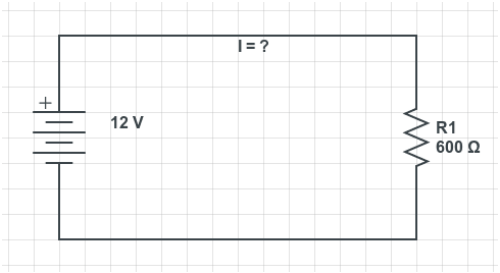
Ohm's Law is more commonly written as:

$$V = IR$$

$V = IR$

Examples:
Below is a very simple circuit with a battery and a resistor. The battery is a 12 volt battery, and the resistance of the resistor is 600 Ohm. How much current flows through the circuit?

I=V/R
I = 12 V/600 Ohm
I = 0.02 A

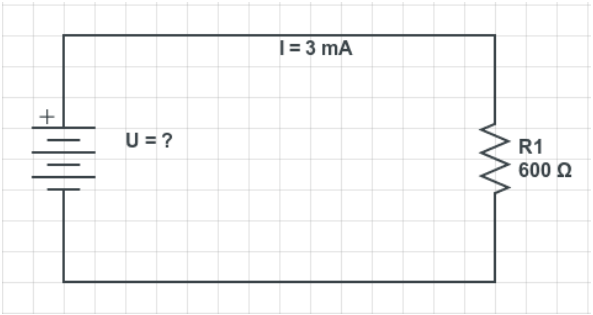


So the current in the circuit is 0.02 Amps or 20 mA.

Note: 1 Amp = 1000 milliamps (1 A = 1000mA)

Below we have a circuit with a resistor and a battery again. But this time we don't know the voltage of the battery. What Voltage must the battery be supplying?

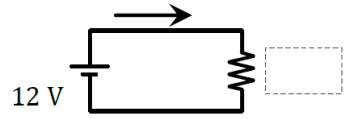
V = IR
V = (0.03 Amps) x (600 Ohms)
V = 1.8 V



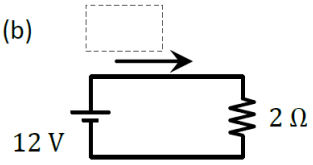
So the voltage of the battery must be 1.8 V.

1. Use ohm's Law to determine the missing values in the circuits below. **Watch your units.**

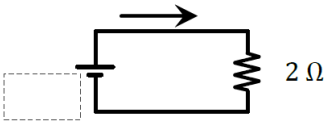
(a) 3 A



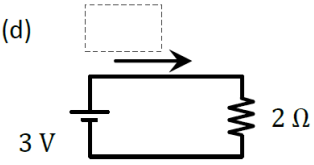
(b)



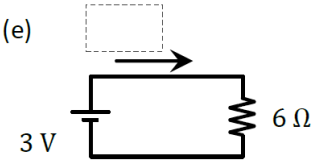
(c) 3 A



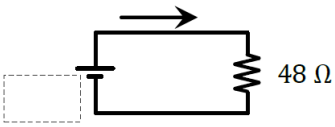
(d)



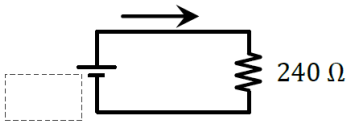
(e)



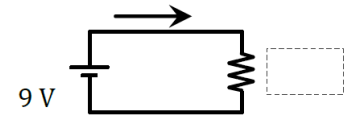
(f) 0.5 A



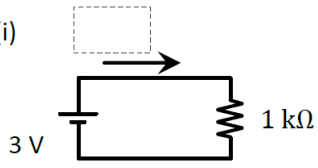
(g) 100 mA



(h) 500 mA



(i)



Answers

a) 4 Ω
b) 6 A
c) 6 V
d) 1.5 A
e) 0.5 A
f) 24V
g) 24 V
h) 18 Ω
i) 0.003