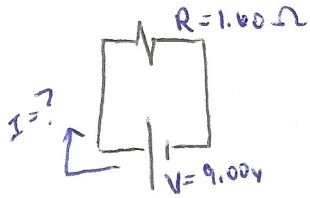
Ohm's Law

Example 4:

A 9.00 v battery is connected to a bulb whose resistance is 1.60 Ω. How much charge flows through the battery in a minute?



$V = IR$

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

$I = \frac{9.00}{1.60}$

$I = 5.625\ A$

amount of charge ?

$q = ?$

$I = \frac{\Delta q}{\Delta t}$

1.00 minute = 60 seconds

$5.625 = \frac{\Delta q}{60}$

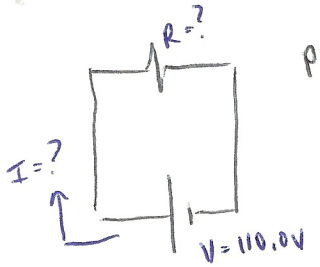
$\Delta q = 337.5\ C$

Example 5:

An electrical device, a _____, draws 605 W of power from a circuit with a 110.0 v battery.

A. What is the resistance of and current through this device?
B. If the voltage drops by 10.0%, what will the current be through the device, assuming the resistance of the device does not change?
C. What if instead of the voltage, the resistance of the device was reduced by 10.0%. What current would this device draw from the 110.0 v battery?

A.)



$P = 605\ W$

$P = I \cdot V$

$P = \left(\frac{V}{R}\right) \cdot V$

$P = \frac{V^2}{R}$

$P \cdot R = V^2$

$R = \frac{V^2}{P}$

$R = \frac{(110.0)^2}{605}$

$R = 20\ \Omega$

$V = I \cdot R$

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

$I = \frac{110}{20}$

$I = 5.50\ A$

B) 10% of 110.0 v is 11.0 v

So the new voltage is 99 v

$V = I \cdot R$

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

$I = \frac{99}{20}$

$I = 4.95\ A$

C.) 10% of 20 is 2 Ω

So $R = 18\ \Omega$

$V = IR$

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

$\frac{110}{18} = I$

$I = 6.11\ A$