Voltage, current, and resistance

Follow the directions below to demonstrate what you know about voltage, current, and resistance.

1. Define the following terms.
   
   (a) current
   
   (b) voltage
   
   (c) resistance
   
   (d) Ohm's law
   
   (e) resistor

2. Complete the following table. The table has been partially completed to help you.

<table>
<thead>
<tr>
<th>Current</th>
<th>Voltage</th>
<th>Resistance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Symbol</td>
<td>/</td>
<td>ohm (Ω)</td>
</tr>
<tr>
<td>Unit</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meter used for measurement</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Formula</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Calculations with Ohm's law

Use Ohm's law to complete the following table. Write the formula you will use and substitute the known values into the formula. Show all your work and include the correct unit with your answer. The first question has been done to help guide you.

<table>
<thead>
<tr>
<th>Question</th>
<th>Show your work</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. A current through a resistor in a circuit is 1.5 A. If the potential difference across the resistor is 6 V, what is the resistance of the resistor?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>[ R = \frac{V}{I} ]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>[ = \frac{6,V}{1.5,A} ]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>[ = 4,Ω ]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 Ω</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. A toaster is plugged into a 120 V outlet. What is the resistance of the toaster if the current in the toaster is 10 A?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. A light bulb with a resistance of 30 Ω is connected to a battery. If the current in the light bulb is 0.2 A, what is the voltage of the battery?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. What is the current in a flashlight bulb with a resistance of 24 Ω if the voltage provided by the flashlight battery is 3 V?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. An electric iron plugged into a wall socket has a resistance of 20 Ω. If the current in the iron is 6 A, what is the voltage provided by the wall socket?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Use with textbook pages 290-297.

**Relationship between current, voltage, and resistance**

Use the graph below to answer the questions that follow.

![Graph showing voltage vs. current](image)

1. (a) What happens to the voltage as the current increases?

   

(b) What does this suggest about the relationship between voltage and current?

2. According to the graph, what happens to the voltage when the current is doubled?

9. Which of the following describes resistance?
   
   I. It resists the flow of electrons.
   II. It speeds up the current flow in a circuit.
   III. It causes the electron's electrical energy to be converted to heat and light energy.

   A. I and II only
   B. I and III only
   C. II and III only
   D. I, II, and III

10. Which of the following occurs if resistance is increased in a circuit?
   
   A. Both voltage and current will increase.
   B. Both voltage and current will decrease.
   C. Voltage will increase and current will decrease.
   D. Voltage will decrease and current will increase.

11. What does the symbol \( \Omega \) represent?

   A. a load
   B. a resistor
   C. a voltmeter
   D. an ammeter

12. A 6 V battery is connected to a 10 \( \Omega \) resistor. What is the current flowing in the circuit?

   A. 0.6 A
   B. 1.67 A
   C. 4 A
   D. 60 A