

Pg. 467 #1-12

1. (a) In a circuit of fixed resistance, voltage and current are directly related. If voltage increases, current increases.
 (b) Current and resistance are inversely related in a circuit with constant voltage. If resistance increases, current decreases.

2. Ohm's law states that resistors have constant resistance, and current is directly proportional to potential difference in simple circuits ($V = IR$).

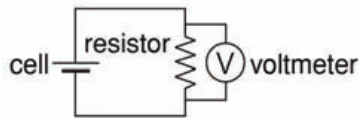
3.

V	I	R
0.5 V	0.01 A	50 Ω
2000 V	20 A	100 Ω
6.0 V	4.0 A	1.5 Ω

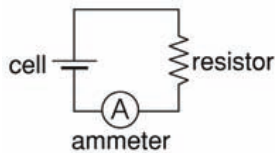
4. (a) voltmeter
 (b) ammeter

5. A voltmeter measures potential difference. An ammeter measures current.

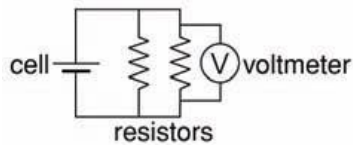
6. (a) Voltmeter in a series circuit:



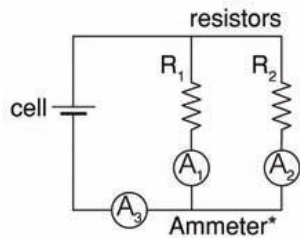
Ammeter in a series circuit:



(b) Voltmeter in a parallel circuit:



Ammeter in a parallel circuit:



7. (a) A fuse is a safety device in an electrical circuit that has a metallic conductor with a low melting point compared to the circuit's wires.
(b) When a current that is too large flows through the fuse, the conductor melts, opening the circuit and disrupting the flow of current.
(c) A melted fuse creates an open circuit.

8. The resistance in the circuit shown is 2.0Ω .

9. (a) The current in the circuit is 0.50 A .
(b) The current drawn from the battery would be 0.25 A .

10. (a) The current in the circuit would be 0.125 A .
(b) The $12\text{-}\Omega$ bulb has a potential difference of 1.5 V across it; the 36-V resistor has a potential difference of 4.5 V across it.

11. (a) In a circuit in which voltage is kept constant, the current will be halved if resistance is doubled.
(b) In a circuit in which voltage is kept constant, the current will be quartered if resistance is quadrupled.

12. (a) A ground fault circuit interrupter (GFCI) is intended to protect against electric shock. Because water can be a good conductor of electricity and thus presents a possible route for current to ground, a GFCI is commonly used near water to help protect the user from accidental current flow through the water. A GFCI should not be relied upon however, and therefore electric appliances should be handled with great care if there is a possibility of splashing or submersion.

(b) Electrical outlets that are positioned close to water or that may be exposed to water (such as those near sinks, showers, or tubs, and those on the exterior of a house) should be protected by a GFCI. This will provide short-circuit protection for devices plugged into those outlets such as (but not limited to) hair dryers or shavers in a bathroom, blenders or toasters in a kitchen, lawn mowers or trimmers used outside, and so on.