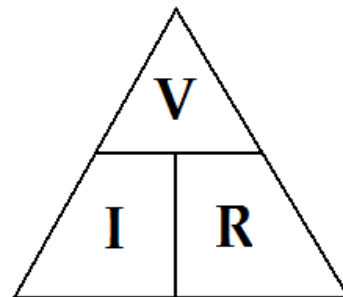


Ohms Law Calculations

Shows the relationship between resistance (R), current (I) and voltage (V).

Voltage (V) = Current (I) × Resistance (R)

Volts (V) amps (A) ohms (Ω)



EX. What is the current produced by a potential difference of 240 volts through a resistance of 0.2 ohms?

$$V = 240 \text{ V} \qquad I = \frac{V}{R} = \frac{240 \text{ V}}{0.2 \Omega} = 1200 \text{ A}$$

$$R = 0.2 \Omega$$

$$I = ?$$

Complete the following chart.

Voltage (V)	Current (A or mA)	Resistance (Ω)
<u>1000V</u>	5 A	200
250	<u>0.5</u> A	500
4.5	900 mA	<u>5.0 Ω</u>
<u>1V</u>	250 mA	4.0
4.0	<u>2</u> A	2.0
12	400 mA	<u>30 Ω</u>
15	<u>0.5</u> A	30
9	<u>50</u> mA	180
12	600 mA	<u>20 Ω</u>
<u>0.05V</u>	50 mA	1.0
6	<u>3</u> A	2
12	750 mA	<u>16 Ω</u>
3.0	<u>30</u> mA	100
<u>50V</u>	200 mA	250
10	<u>0.2</u> A	50

Name: _____

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1. What is the resistance of a toaster if a current of 12.5 A flows through it when it is connected to 120 V? (9.6 Ω)

2. A light bulb has a resistance of 90 Ω . What current flows through the bulb when it is connected to 120 V? (1.3 A)

3. A current of 0.50 A flows through a light bulb that has a resistance of 18 Ω . What is the voltage across this light bulb? (9.0 V)

4. A flashlight bulb has a resistance of 4.0 Ω . What current passes through the bulb if it is connected to 3.0 V? (0.75 A)

5. What potential difference is necessary to produce a current of 0.60 A in a load that has a resistance of 25 Ω . (15 V)

6. The current through a load in a circuit is 2.5 A. If the potential difference across the load is 75 V, what is the resistance of the load? (30 Ω)

7. (a) An 80 V potential difference is measured across a light bulb that has a resistance of 16 Ω . What is the current through this light bulb? (5.0A)

8. A 25 mA current flows through a 300 Ω lamp. What is the voltage across the lamp? (7.5 V)

(b) If the light bulb was replaced by a bulb with twice the resistance, what would be the new current through the bulb? (2.5 A)

Ohm's Law Problems

1. (a) What is the voltage across the resistor if the two cells are each 1.5 V in Figure 1? (3 V)

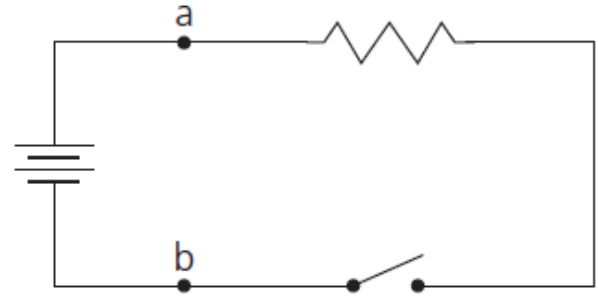


Figure 1

(b) If a current of 0.10 A is measured at point *a*, what is the resistance of the resistor? What is the current at *b*? (30 Ω , 0.10 A)

2. If a toaster has a resistance of 220 Ω , how much current will it draw from a 110 V outlet? (0.5 A)

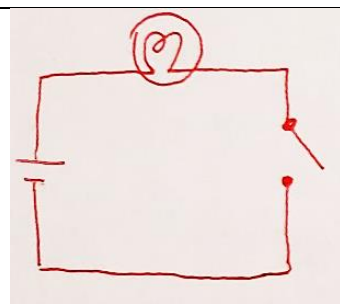
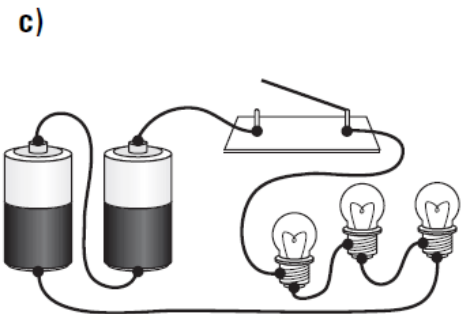
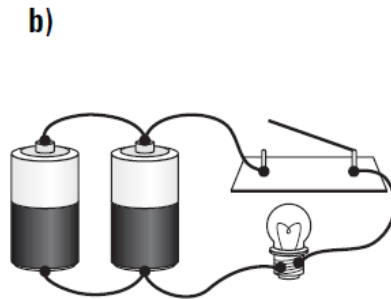
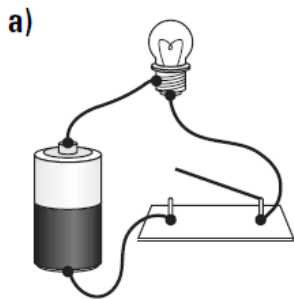
3. A calculator runs on two 6.0 V dry cells connected in parallel. If the calculator draws 0.001A, how many milliamps (mA) does it draw? What is the effective resistance of the calculator? (1 mA, 6000 Ω)

4. A resistor has a value of 100 Ω . If a current of 5 mA passes through it, what is the applied voltage? (0.5 V)

5. A resistor has a voltage of 10 mV (millivolts) applied to it. The current through the resistance is 0.5 mA. What is the value of the resistance? (20 Ω)

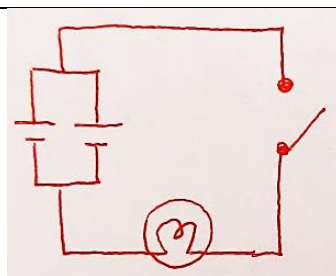
6. A hair dryer uses a current of 10 A when plugged into a 120 V outlet. What is the resistance of the hair dryer? (12 Ω)

7. Draw circuit diagrams for the following circuits. The resistance of the filament in each light bulb is 8.2 ohms and the voltage of each cell is 1.5 V. Determine the current through the bulbs when the switch is closed in each circuit.

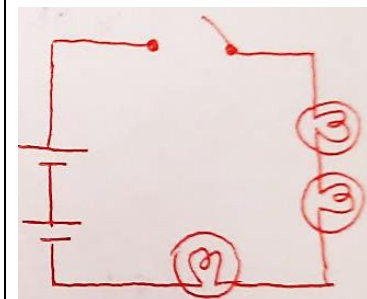


0.18

A



0.37 A



0.12 A

(Hint: how much voltage loss through a single light bulb? Calculate that first before determining current.)