UNIT

12

OHM'S LAW

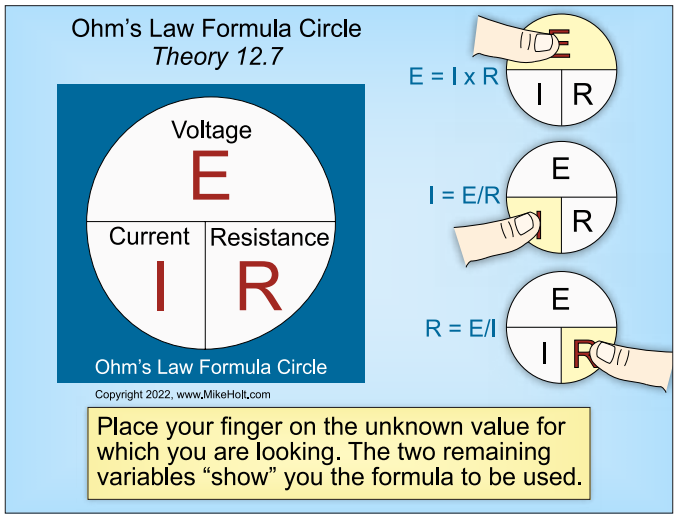
12.1 Introduction

To understand electrical circuits, you must understand electrical terminology. In this unit you will learn:

- what electromotive force, intensity, and resistance are
- what voltmeters, ammeters, and ohmmeters are
- how to use the Ohm's Law formula

12.7 Ohm's Law Formula Circle

To determine which formula in the Ohm's Law Formula Circle to use, place your finger on the unknown value for which you are looking. The two remaining variables "show" you the formula to be used. ▸Figure 12–12

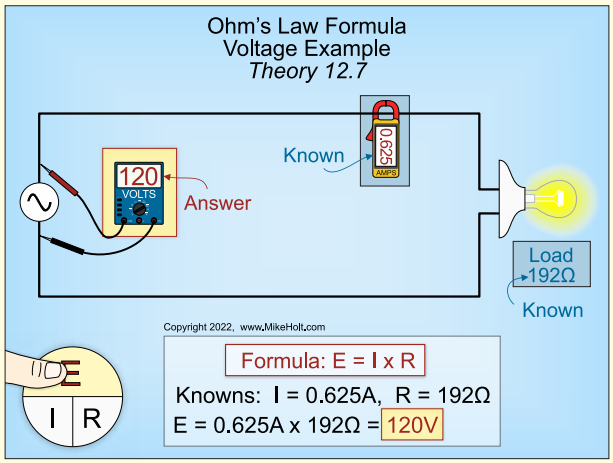


▸Figure 12–12

▶ Electromotive Force E = I × R Example

Question: *The voltage to a 192Ω resistor carrying 0.625A is _____.* ▸Figure 12–13

(a) 1V (b) 110V (c) 120V (d) 125V



▸Figure 12–13

Solution:

The voltage of this circuit is determined by the formula ***E = I × R****.*

E = I × R

I = 0.625A

R = 192Ω

E = 0.625A × 192Ω

Answer: *(c) 120V*

Intensity I = E/R Example

Question: *If a 120V source supplies a 192Ω light bulb, the current flow in the circuit will be _____.* Figure 12–14

(a) 0.525A (b) 0.625A (c) 1.30A (d) 2.50A

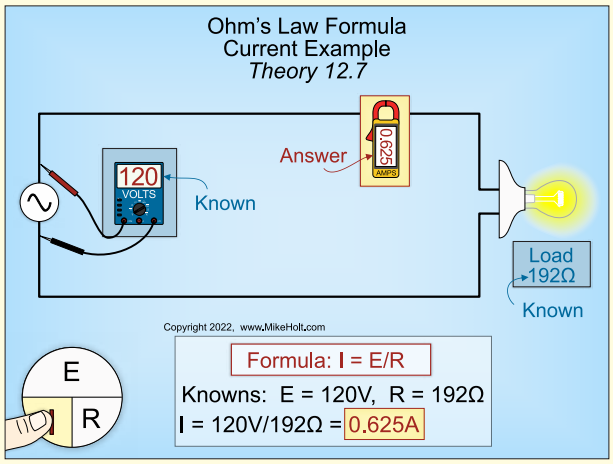


Figure 12–14

Solution:

Step 1: *What is the question? What is "I"?*

Step 2: *What do you know?*

Voltage (E) = 120V
Resistance (R) = 192Ω

Step 3: *The formula to use is* ***I = E/R****.*

Step 4: *The answer is I = 120V/192Ω.*

Step 5: *The answer is I = 0.625A.*

Answer: *(b) 0.625A*

Resistance R = E/I Example

Question: *The resistance of an incandescent light bulb rated 120V drawing 0.625A is _____.* Figure 12–15

(a) 100Ω (b) 175Ω (c) 192Ω (d) 200Ω

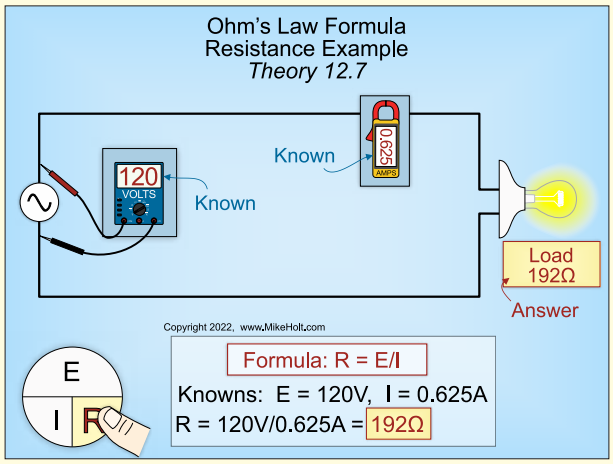


Figure 12–15

Solution:

Step 1: *What is the question? What is "R"?*

Step 2: *What do you know?*

Voltage (E) = 120V
Current (I) = 0.625A

Step 3: *The formula to use is* ***R = E/I****.*

Step 4: *The answer is R = 120V/0.625A.*

Step 5: *The answer is R = 192Ω.*

Answer: *(c) 192Ω*