Name Answer Key Date _____

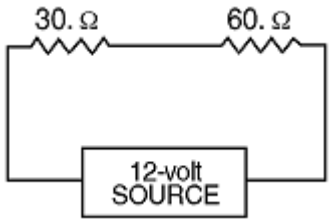
Honors Physics Electric Circuits WS #7H

Period _____ Mrs. Nadworny

Series Circuit

Directions: Read online textbook pages 730 – 740. Solve the following problems using the GUESS method and proper significant figures. Be sure to show ALL work.

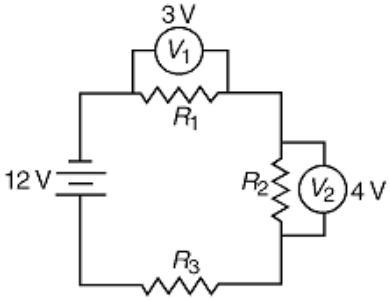
1. A 30. ohm resistor and a 60. ohm resistor are connected in an electric circuit as shown below.



Compared to the electric current through the 30. ohm resistor, the electric current through the 60. ohm resistor is

(A) larger (B) smaller (C) the same

2. The diagram below shows three resistors, R_1, R_2, R_3, connected to a 12 volt battery.



If voltmeter V_1 reads 3 volts and voltmeter V_2 reads 4 volts, what is the potential drop across resistor R_3?

(A) 5 V (B) 12 V (C) 0 V (D) 4 V

3. Three resistors, 5.0 Ω, 8.0 Ω, and 1.0 Ω, are in series in a circuit. The total current flowing through the circuit is 4.23 A.
   a. Calculate the equivalent resistance of the circuit.

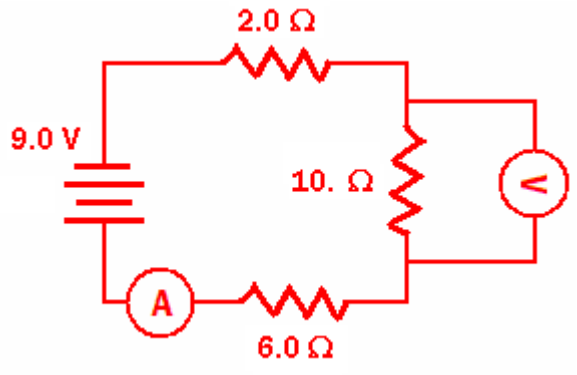
$$R_{eq} = R_1 + R_2 + R_3 = 5.0\Omega + 8.0\Omega + 1.0\Omega = 14.0\Omega$$

   b. Calculate the potential difference supplied by the battery.

$$V_T = I \bullet R = (4.23A)(14.0\Omega) = 59.2V$$

Continued on next page

4. A 9.0 volt battery is connected in series to a 10. Ω resistor, a 2.0 Ω resistor and a 6.0 Ω resistor. There is an ammeter to measure the total current flowing through the circuit and a voltmeter to measure the potential difference across the 10. Ω resistor.
   a. Draw a circuit diagram using proper schematic symbols.



   b. Calculate the equivalent resistance of the circuit.

$$R_{eq} = R_1 + R_2 + R_3 = 10.\Omega + 2.0\Omega + 6.0\Omega = 18\Omega$$

   c. Calculate the total current in the circuit.

$$I_T = \frac{V_T}{R_{eq}} = \frac{9.0V}{18\Omega} = 0.50A$$

   d. Calculate the potential drop across each resistor.

$$V_1 = I \bullet R_1 = (0.50A)(10.\Omega) = 5.0V$$

$$V_2 = I \bullet R_2 = (0.50A)(2.0\Omega) = 1.0V$$

$$V_3 = I \bullet R_3 = (0.50A)(6.0\Omega) = 3.0V$$

Answers in size order: 0.50, 1.0, 3.0, 5.0, 14.0, 18, 59.2