

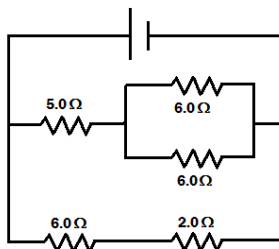
Name Answer Key
Honors Physics
Period _____

Date _____
Electric Circuits WS #10H
Mrs. Nadworny

Combination Circuits

Directions: Read online textbook pages 746 – 751. Solve the following problems using the GUESS method and proper significant figures. Be sure to show ALL work.

1. A circuit contains five resistors as shown. The total current flowing through the circuit is 3.71 A.



a. Calculate the equivalent resistance of the circuit.

- Step 1:

$$\frac{1}{R_{eq}} = \frac{1}{R_1} + \frac{1}{R_2} = \frac{1}{6.0\Omega} + \frac{1}{6.0\Omega} = \frac{2}{6.0}$$
$$R_{eq} = \frac{6}{2} = 3.0\Omega$$

- Step 2:

$$R_{eq} = R_1 + R_2 = 5.0\Omega + 3.0\Omega = 8.0\Omega$$

- Step 3:

$$R_{eq} = R_1 + R_2 = 2.0\Omega + 6.0\Omega = 8.0\Omega$$

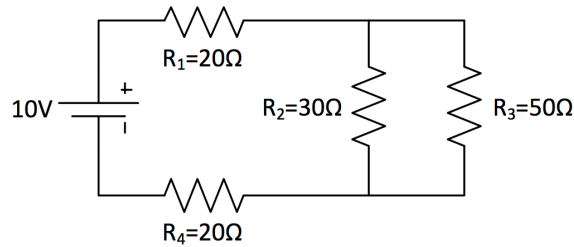
- Step 4:

$$\frac{1}{R_{eq}} = \frac{1}{R_1} + \frac{1}{R_2} = \frac{1}{8.0\Omega} + \frac{1}{8.0\Omega} = \frac{2}{8.0}$$
$$R_{eq} = \frac{8}{2} = 4.0\Omega$$

b. Calculate the total voltage provided by the cell.

$$V_T = I \cdot R = (3.71A)(4.0\Omega) = 15V$$

2. A circuit contains four resistors (20. ohms, 30. ohms, 50. ohms, and 20. ohms) as shown. The total voltage provided by the cell is 10. volts.



- a. Calculate the equivalent resistance of the circuit.

$$\frac{1}{R_{eq}} = \frac{1}{R_2} + \frac{1}{R_3} = \frac{1}{30.\Omega} + \frac{1}{50.\Omega}$$

$$R_{eq} = 19\Omega$$

$$R_{eq} = R_1 + R_{2,3} + R_4 = 20.\Omega + 19\Omega + 20.\Omega = 59\Omega$$

- b. Calculate the total current flowing through the circuit.

$$I = \frac{V}{R} = \frac{10.v}{59\Omega} = 0.17A$$

- c. Calculate the voltage across each resistor.

$$V_1 = I_1 \cdot R_1 = (0.17A)(20.\Omega) = 3.4V$$

$$V_4 = I_4 \cdot R_4 = (0.17A)(20.\Omega) = 3.4V$$

$$V_{2,3} = V_T - V_1 - V_4 = 10.V - 3.4V - 3.4V = 3.2V(= 3V)$$

Answers in size order: 0.17, 3.0, 3.2 (3), 3.4, 3.4, 4.0, 8.0, 8.0, 15, 59