SERIES $I_{total} = I_1 = I_2 = I_3$ **PARALLEL** $I_{total} = I_1 + I_2 + I_3$

$$\frac{1}{R_{total}} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$$

$R_{total} = R_1 + R_2 + R_3$

$V_{total} = V_1 + V_2 + V_3$ $V_{total} = V_1 = V_2 = V_3$ **OHMS' LAW** $V = IR$

POWER $P = IV = I^2R = \frac{V^2}{R}$ **ENERGY** $E = Pt = IVt = I^2Rt = \frac{V^2}{R}t$

Physics
Unit 4 Review

Name _____
Date _____

1. Suppose you have a 15 A circuit breaker in series with the following parallel combinations all across 120-V: Television – 10 Ω, Alarm Clock – 60 Ω, Lamp – 40 Ω. Can you have all 3 things on at the same time?

2. A curling iron of resistance 80-0 Ω is plugged into a 120-V outlet. How much thermal energy is produced in 2 minutes?

3. A 13.0-Ω resistors and a 52.0-Ω resistors are connected in series and placed across a 130-V generator.
   a) What is the equivalent resistance of the circuit?

   b) What is the value of the current in the circuit?

   c) What is the potential drop (**voltage**) across each resistor?

   d) Calculate the power of each resistor.

   e) What is the total power of the circuit?

4. A 3.0-Ω resistor, a 6.0-Ω resistor and two 12.0-Ω resistors are connected in parallel and placed across a 9.0-V power supply.
   a) What is the equivalent resistance of the circuit?

   b) What is the value of the current in each branch of the circuit?

   c) What is the value of the total current through the circuit?

   d) Calculate the power of each resistor.

   e) What is the total power of the circuit?

5. A blow dryer rated at 1500 W is plugged into an outlet of 120-V. What is the resistance of the blow dryer?

6. A digital clock has a resistance of 12,000 Ω and is plugged into a 115-V outlet.
   a) How much current does it draw?

   b) How much power does it use?

   c) If the clock is constantly on (in use 24 hours a day), how much energy in kWh does the clock use in one day?

   c) If the owner of the clock pays $0.10 per kWh, how much does it cost to operate the clock for 30 days?

7. Tim left for school at 6:45 a.m. and forgot to turn off his TV, which is rated at 300 W when plugged into a 120-V source. After he came home from school, he left the TV on until leaving for work at 3:45 p.m.
   a) How much energy (in kWh) did the TV use?

   b) At $0.13 per kWh, how much did it cost to run the TV?