Math at Work*

Need a light? Flip a switch. Want to watch TV? Turn it on. Want to reheat dinner? Push the microwave button.

Every day electricity performs hundreds of tasks for us dependably and cheaply. We take it for granted without questioning how it works or whether it will be there when we need it. Yet the way electricity works to bring us light, heat, and energy does not need to be a mystery.

Home lighting – like other electrically-powered appliances- results when an electrical circuit connects an energy source, such as the local power plant, with an energy receiver, such as a light bulb. When electricity flows through the circuit, the receiver resists some of the electrical current from passing through. If all of the receivers in a house were strung together like Christmas-tree lights, turning on one appliance would decrease the energy being received by other appliances.

To avoid this problem electricians connect each receiver in parallel circuits. The electricity startsa nd ends at the same source, but follows a separate path to each receiver. In a parallel circuit, the total resistance (R) of the circuit is given by the formula

$\frac{1}{R} = \frac{1}{R1} + \frac{1}{R2} + ...$ where R1 and R2 represent the resistance of each individual receiver.

Assume that an electrician is wiring a room that will have two receivers connected by a parallel circuit. If the resistance of the first receiver (R1) is 5 ohms, and the resistance of the second receiver (R2) is 10 ohms, find the total resistance of the circuit.

One year later, the homeowner decides to add a third receiver in the room. If the resistance of the third receiver is 6 ohms, then what is the total resistance of the circuit?

**adapted from Intermediate Algebra, Mark Dugopolski, Addison-Wesley, 1991*