

Watt ? More Power Problems!!

$$V = I \cdot R$$

$$P = I \cdot V$$

$$\text{Energy converted} = \text{Power} \times \text{Time}$$

Show all work for full credit.:

1. A meal is cooked in an electric oven. It takes one hour and the oven uses 1500 W.
a) How much energy does the oven use?

$$E = P \cdot t = \left(\frac{1500}{1000} \right) (1) = 1.5 \text{ kW} \cdot \text{hrs}$$

- b) At \$0.080 kWh, what does it cost to cook the meal in the oven? (\$ 0.12)

$$\text{Cost} = 1.5 (0.08) = \$ 0.12$$

2. An advertisement for a floodlight bulb claims that it gives 150 watts of light with only 120 watts of energy. Explain why this statement is incorrect.

The light cannot give off more light (150 watts) than it uses 120 w. Also watts is a measurement of Power not Energy.

3. What is the potential difference of a battery that causes a current of 0.70 A to flow through
a) light bulb with 15 Ω resistance (10.5 V)

~~$$P = I \cdot V$$~~

$$V = IR = 0.70 (15) = 10.5 \text{ Volts}$$

4. A toaster when connected to a 120 V outlet uses energy at the rate of 1500 W.
a) What is the current through the toaster? (12.5 A)

$$P = IV \quad I = \frac{1500}{120} = 12.5 \text{ Amps}$$

$$1500 = 120 I$$

- b) What is the resistance of the toaster? (9.6 Ω)

$$V = IR \Rightarrow R = \frac{V}{I} = \frac{120}{12.5} = 9.6 \Omega$$