Resistor Problem (1)

A heating element is made of a wire with a cross-sectional area $A = 2.60 \times 10^{-6}\mathrm{m}^2$ and a resistivity $\rho = 5.00 \times 10^{-7}\Omega\mathrm{m}$.

(a) If the element dissipates 5000W when operating at a voltage $V_1 = 75.0$V, what is its length L_1, its resistance R_1, and the current I_1 running through it?

(b) What must be the voltage V_2, the resistance R_2, and the length L_2 of a heating element made of the same wire if the same power should be generated with half the current?

Resistor Problem (2)

A 1250W radiant heater is constructed to operate at 115V.

(a) What will be the current in the heater?

(b) What is the resistance of the heating coil?

(c) How much thermal energy is generated in one hour by the heater?