Answer on question #65354, Physics / Electric Circuits

Question My office is pretty cold. I run a space heater, which has a resistance of 15.0 and runs off the wall outlet which supplies a voltage of 120 V. If the heater runs for one hour a day for six weeks, what is the net cost of the electricity that it uses? Assume that the cost of electricity is \$0.13 per kWh.

Solution The cost of electricity is

$$N = P \cdot t \cdot C$$

where $P = U^2/R$ is power of heater (in Watts, dividing by 1000 to obtain kilowatts), $t = 1$ hour $\cdot 42$ days $= 42$ hours, and C is cost of electricity. Hence

$$N = \frac{120^2}{15 \cdot 1000} \cdot 42 \cdot 0.13 \approx 5.24\,\$$