

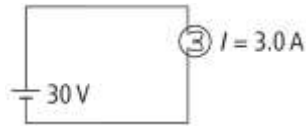
Worksheet 9.1 Electrical Power and Energy

- A current of 5.0 A flows through a flashlight bulb when it is connected to 6.0 V. What is the power of this bulb? *30W*
- A 600 W electric heater is connected to a 120 V source. What current flows through the heater? *5A*
- A 2.5 A current flows through a 100 W lamp. What is the voltage across the lamp? *40V*
- What is the current through a 6.0 W light bulb when it is connected to a 1.5 V battery? *4A*
- What is the power, in watts, of an unknown device if a current of 35 mA flows through the device when it is connected to 3.0 V? *0.105W*
- How much energy, in joules and in kW•h, is consumed by a 120 W light bulb if it is left on for 15 min?
 $1.08 \times 10^5 \text{ J} = 0.03 \text{ kW}\cdot\text{h}$
- How much energy, in joules and kW•h, is consumed by a 200 W stereo if it is left on for 4.0 h? *$2.9 \times 10^6 \text{ J} = 0.8 \text{ kW}\cdot\text{h}$*
- A portable hair dryer, plugged into a 110 V outlet, has a current of 10 A flowing through it. What is the power rating of the hair dryer? *1100W*
- A meter reader determines that a business has used 3550 kW•h of energy in two months. If electricity costs 10¢ per kW•h, calculate the bill. *\$355.00*
- An electric heater draws 1100 W of power. Electricity costs 8¢ per kW•h. How much does it cost to operate the heater 3.0 h a day for 30 days? *\$7.92*
- A toaster is used an average of 5.0 h a month. The toaster draws 8.0 A of current from a 110 V outlet. If electricity costs 8¢ per kW•h, how much will it cost to operate the toaster for one year? *\$4.22*
- A countertop convection oven is plugged into an outlet that provides a potential difference of 110 V. What is the power rating of the oven if the current is 12 A? *1320W*
- A DVD player that is not being used still uses energy at a rate of 25 W. What current is passing through it if the DVD player is plugged into a 110 V electrical outlet? *0.227A*
- Calculate the power of the light bulb in the circuit shown below. *60W*



- A microwave oven operates on 1500 W of power and is used for 20 minutes. How much electrical energy, in joules and kW•h, is used by the microwave oven?
 $1.8 \times 10^6 \text{ J} = 0.45 \text{ kW}\cdot\text{h}$
- A refrigerator operates on average for 12 hours a day. If the power rating of the fridge is 600 W, how much electrical energy does the fridge use in one week, in joules and kW•h?
 $1.81 \times 10^8 \text{ J} = 50.4 \text{ kW}\cdot\text{h}$

17. A 60 W kitchen light is left on for an entire year. If the cost of electricity is \$0.08 per kW•h, what did it cost to leave on the light bulb? *\$42.05*
18. A hair dryer that has a power rating of 1200 W uses 2.50 kW•h in one week. For how many hours (or minutes) is the hair dryer used daily on average? *2.08h*
19. How much energy, in joules and kW•h, did the light bulb in the circuit below use if it was left on for 12 hours? *$3.9 \times 10^6 \text{ J} = 1.08 \text{ kW}\cdot\text{h}$*



20. Assume that the electric utility company charges \$0.09 for every kW•h of energy. How much does it cost to:
- operate a dryer that uses 25 A of current at 240 V for 1.75 hours? *\$0.94*
 - operate twelve 100 W light bulbs for an average of 5 hours per day? *\$0.54*
 - operate a refrigerator for a week if it draws 2.5 A of current from a 110 V source that turns on for 15 minutes every hour? *\$1.04*
21. If your computer uses 3.5 A at 110 V, how much will it cost to use the computer for 3 hours a day, seven days a week for two weeks? Assume that the cost of electricity is \$0.09 for every kW•h of energy. *\$1.46*
22. A clothes dryer has a power rating of 4500 W. How long did it take to dry a load of laundry if electric power costs \$0.09/ kW•h and the cost of using the dryer was \$0.63? *1.6h*