

$$E = P \times t$$

$$E = I \times V \times t$$

### Energy Questions 1

1. A radio is on for 2 hours and has 700 W of power. How much energy was used in J?

$$E = (700)(7200) = \underline{5\,040\,000\text{ J}}$$

2. A radio is on for 2 hours and has 700 W of power. What is the energy in kWh?

$$E = (0.7\text{ kW})(2\text{ h}) = \underline{1.4\text{ kWh}}$$

3. A hairdryer is used for 20 minutes a day 3 days a week. It uses 190 V and 3 A. How much energy is used in J for the three days? What is the energy in kWh?

$$\begin{aligned} \Delta t &= 60\text{ min} \\ P &= (190)(3) = 570\text{ W} \\ E &= (3)(190)(3600) = \underline{2\,052\,000\text{ J}} \\ E &= (0.570\text{ kW})(1\text{ hr}) = \underline{0.570\text{ kWh}} \end{aligned}$$

4. How much energy in J does a computer use if it is on for 3 hours and uses 200 V and 2.0 A.

$$E = (2)(200)(10800) = \underline{4\,320\,000\text{ J}}$$

5. If a computer used 950 000 J of energy and 100 W of power. How long did you use the computer for?

$$t = \frac{E}{P} = \frac{950\,000\text{ J}}{100} = \underline{9500\text{ s}}$$

6. If a TV used 750 000 J of energy and 90 W of power. How many hours did you watch TV for?

$$\Delta t = \frac{E}{P} = \frac{750\,000\text{ J}}{90\text{ W}} = 8333.\bar{3}\text{ s} = \underline{2.31\text{ hours}}$$

7. How much power did it take to use a microwave for 90 seconds and consumed 70 000 J of energy?

$$P = \frac{E}{t} = \frac{70\,000}{90} = \underline{777.\bar{7}\text{ W}}$$

8. How much power did it take when a dishwasher ran for 55 minutes and consumed 50 000 J of energy?

$$P = \frac{E}{t} = \frac{50\,000}{3300\text{ s}} = \underline{15.15\text{ W}}$$

9. A hairdryer uses 220 V and 7 A. If the hairdryer used 525 000 J of energy, how much time did you use it for in minutes?

$$\begin{aligned} \Delta t &= \frac{E}{I \cdot V} = \frac{525\,000\text{ J}}{(7)(220)} = 340.90\text{ s} \\ &= \underline{5.68\text{ min}} \end{aligned}$$

$$\Delta t = \frac{E}{I \cdot V} = \frac{925\,000}{(0.5)(220)} = 8409.09\text{ s} = \underline{2.3\text{ hrs}}$$

10. An aquarium uses 220 V and 0.5 A. If the aquarium used 925 000 J of energy, how much time was the aquarium used in hours?

### Energy Questions 2

1. What 2 variables does energy take into account?

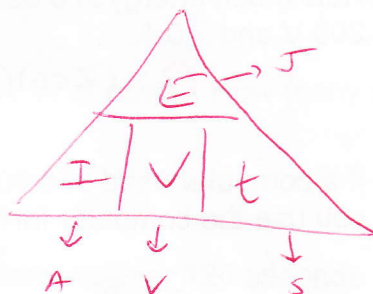
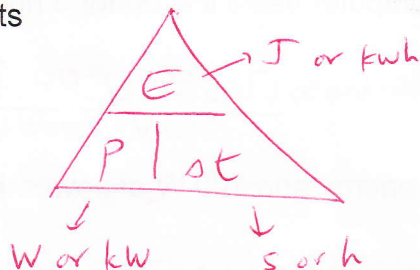
Power, time

2. What are the 2 energy formulas?

$$E = P \cdot t$$

$$E = I \cdot V \cdot t$$

3. What triangle is used to solve for energy and its variables? Include the units



4. Convert the following time units:

Seconds to minutes  $\div 60$   
 Seconds to hours  $\div 60 \div 60$   
 Hours to seconds  $\times 60 \times 60$

Minutes to seconds  $\times 60$   
 Minutes to hours  $\div 60$   
 Hours to minutes  $\times 60$

5. You used a 750 W hairdryer for 20 minutes a day, 7 days a week. How much energy was used in kWh?

$$\Delta t = 140\text{ min} = 2.3\text{ hrs}$$

$$P = 750\text{ W}$$

$$E = (0.75\text{ kW})(2.3\text{ hrs}) = \underline{1.75\text{ kWh}}$$

6. An oven is used for 50 minutes per day for 60 straight days. Its voltage is 100 V and its intensity is 4.5 A. How much energy was used in J for the 60 days?

$$\Delta t = 50 \times 60 = 3000\text{ min} = 180\,000\text{ s}$$

$$E = (4.5)(100)(180\,000) = \underline{81\,000\,000\text{ J}}$$

7. How much power was used if a TV was on for 3 hours and needed 600 000 J of energy?

$$P = \frac{E}{\Delta t} = \frac{600\,000\text{ J}}{10\,800\text{ s}} = \underline{55.5\text{ W}}$$

8. A kettle is used for 15 minutes a day and used 700 000 J of energy. How much power was used?

$$P = \frac{E}{\Delta t} = \frac{700\,000\text{ J}}{900\text{ s}} = \underline{777.7\text{ W}}$$



9. A computer is on for 3 hours a day for 90 days. It has a voltage of 350 V and an intensity of 12 A. How much energy is used in J for the 90 days?

$$\Delta t = 270 \text{ hours} \\ = 972000 \text{ s}$$

$$E = (12)(350)(972000) \\ = \underline{4082400000 \text{ J}}$$

10. A stereo is on for 20 minutes a day and has a power of 200 W. How much energy is used in kWh?

$$E = P \cdot \Delta t = (0.2 \text{ kW})(0.3 \text{ hrs}) \\ = \underline{0.06 \text{ kWh}}$$

11. A humidifier is used for 1 000 minutes a day for 60 days. Its voltage is 100 V and its intensity is 3 A. What is the energy used in kWh for the 60 days?

$$\Delta t = 60000 \text{ min} \\ = 1000 \text{ hrs.}$$

$$E = (0.3 \text{ kW})(1000 \text{ hrs}) \\ = \underline{300 \text{ kWh}}$$

$$P = I \cdot V = (3)(100) = 300 \text{ W}$$

12. How much time elapsed in hours if a TV used 500 000 J of energy and needs 200 W of power?

$$\Delta t = \frac{E}{P} = \frac{500000 \text{ J}}{200 \text{ W}} = 2500 \text{ s} = \underline{0.694 \text{ hrs}}$$

13. 12. A toaster takes 45 seconds to toast a piece of bread. If it uses 200 W of power how much energy will be used up in J?

$$E = P \cdot \Delta t = (200 \text{ W})(45) = \underline{9000 \text{ J}}$$

14. A computer uses 7000 W of power and is used for 115 minutes a day. How much energy is used for one day in J?

$$E = P \cdot t = (7000)(6900 \text{ s}) = \underline{48300000 \text{ J}}$$

15. You recharge your cell phone for 4 hours a night, 3 days a week. It uses 200 V and 3 A to recharge. How much energy was used in kWh for the week?

$$\Delta t = 12 \text{ hours}$$

$$P = (3)(200) = 600 \text{ W}$$

$$E = (0.6 \text{ kW})(12 \text{ hrs}) \\ = \underline{7.2 \text{ kWh}}$$

16. Your dustbuster uses 180 000 J of energy and 300 W of power. How many minutes did you use your dustbuster for?

$$\Delta t = \frac{E}{P} = \frac{180000 \text{ J}}{300 \text{ W}} = 600 \text{ s} \\ = 10 \text{ min}$$

$$E = P \cdot \Delta t = 500 \cdot 3600 \text{ s} = \underline{1\,800\,000 \text{ J}}$$

17. A radio is on for 1 hours and has 500 W of power. How much energy was used in J?

18. A blow-dryer is used for 15 minutes a day. It uses 190 V and 3 A. How much energy is used in J?

$$E = (3)(190)(900) = \underline{513\,000 \text{ J}}$$

19. How much energy in kWh does a computer use if it is on for 7 hours and uses 300 V and 2.0 A.

$$\Delta t = 7 \text{ hrs}$$

$$E = (0.6 \text{ kW})(7 \text{ hrs})$$

$$P = (2)(300) = 600 \text{ W}$$

$$= \underline{4.2 \text{ kWh}}$$

20. If a computer used 850 000 J of energy and 90 W of power. How long did you use the computer for?

$$\Delta t = \frac{E}{P} = \frac{850\,000 \text{ J}}{90 \text{ W}} = \underline{9444.\bar{4} \text{ s}}$$

21. If a TV used 850 000 J of energy and 90 W of power. How many hours did you watch TV for?

$$\Delta t = \frac{E}{P} = \frac{850\,000 \text{ J}}{90 \text{ W}} = 9444.\bar{4} \text{ s} = \underline{2.62 \text{ hrs}}$$

22. How much power did it take to use a microwave for 120 seconds and consumed 60 000 J of energy?

$$P = \frac{E}{\Delta t} = \frac{60\,000 \text{ J}}{120} = \underline{500 \text{ W}}$$

23. How much power did it take when a dishwasher ran for 45 minutes and consumed 40 000 J of energy?

$$P = \frac{E}{\Delta t} = \frac{40\,000}{2700} = \underline{14.8 \text{ W}}$$

24. A hairdryer uses 220 V and 5.5 A. If the hairdryer used 520 000 J of energy, how much time did you use it for in minutes?

$$\Delta t = \frac{E}{I \cdot V} = \frac{520\,000}{(5.5)(220)} = 429.75 \text{ s} = \underline{7.16 \text{ min}}$$

25. An aquarium uses 220 V and 1.5 A. If the aquarium used 800 000 J of energy, how much time was the aquarium used in hours?

$$\Delta t = \frac{E}{I \cdot V} = \frac{800\,000 \text{ J}}{(1.5)(220)} = 2424.\bar{24} \text{ s}$$

$$= \underline{0.67 \text{ hrs}}$$

26. Which appliance produced more energy

a- A blow-dryer used for 20 minutes and having 300 W of power  $(300)(1200) = 360\,000 \text{ J}$

b- A TV used for 2 hours and having 100 W of power

c- A microwave used for 90 seconds and needing 220 V and 1.5 A

$$a) 360\,000 \text{ J}$$

$$b) (100)(7200) = 720\,000 \text{ J}$$

$$c) (1.5)(220)(\frac{10}{100}) = 29700 \text{ J}$$