

Maths Emporium

Meters and Bills



Introduction

Past papers aren't just for practising your mathematics skills – they also include things you're going to need to know about in the future, not least utility bills for electricity, gas and water. Do you know how much these cost? Or do you just leave it to someone else to pay the bills?

Information

The marks for individual recipes are shown in round brackets: e.g. (2).

There are only 3 questions in this booklet. The total mark is 13.

Questions marked with an asterisk (*) will require you to show some working.

Calculators must not be used for questions marked with a † sign.

Advice

Show all stages in any calculations.

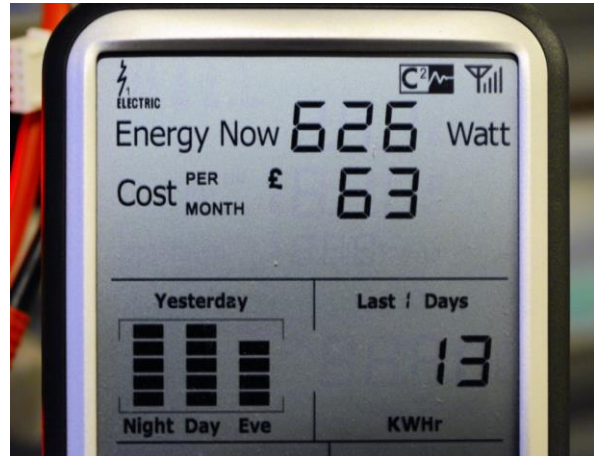
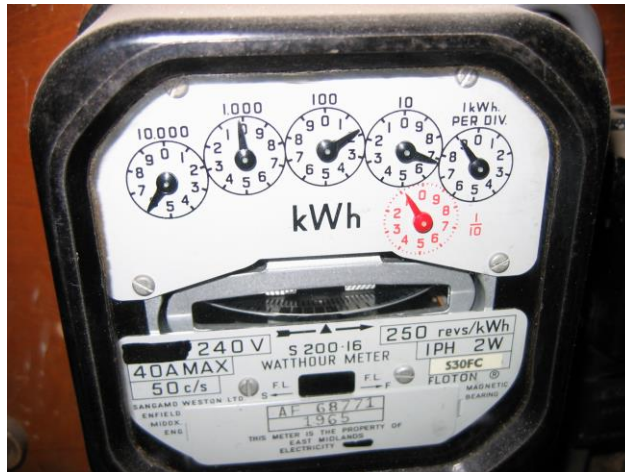
Work steadily through the paper. Do not spend too long on one recipe.

If you cannot answer a question, leave it and attempt the next one.

Return at the end to those you have left out.

An electricity meter is a device that measures the amount of energy consumed by a residence or business. Energy companies use electric meters to measure how much energy is used by customers so that bills can be calculated accurately.

Electricity meters come in many designs – a few are shown below. Some residences are metered so that bills can be paid quarterly (every three months); some have pay-as-you-go meters which are operated by keys which can be topped up. In some residences, energy bills are included in the rent and so might not be metered.



Electricity meters are often found outside the home, or else under the stairs or in the garage.

1. Where in your home can the electricity meter be found?

2. If your electricity meter has a reading, write it here:
3. Find out the amount paid where you live for the most recent electricity bill £.....

4

I'd like more detail

About your tariff

This information will help you to compare your current tariff with others available.

Your electricity tariff

| | |
|--|--------------------------|
| Tariff name | Fixed Price January 2017 |
| Payment method | Cash/Cheque |
| End date | 31 January 2017 |
| Exit fees (if you switch supplier before end date) | £50.00 |
| Your actual usage in the last 12 months | 3503.69 kWh |

About your TCR

Tariff Comparison Rate (TCR):
18.30p per kWh

The TCR can be used to compare the price of energy tariffs across suppliers.

The TCR is not based on your actual consumption but is based on the energy consumption of a typical customer using 3200 kWh of electricity and should be used as a guide only.

For more information on our tariffs and TCRs go to britishgas.co.uk/tariffs

What you paid – thank you

| | | |
|-----------------------|-------------|----------------|
| Postal Payment | 4 June 2014 | £109.20 |
| Total payments | | £109.20 |

Your electricity use in detail

Meter number: S04H28229

| | |
|--|-------|
| 29 May 2014 - you gave us your meter reading | 43742 |
| 31 Jul 2014 - you gave us your meter reading | 44311 |

| | |
|-------------------------------------|---------------|
| Actual kWh used over 64 days | 569.00 |
| 569 kWh x 14.080p | £80.12 |

| | |
|------------------------|---------------|
| Standing Charge | £11.02 |
| 29 May 14 - 31 Jul 14 | |
| 64 days at 17.227p/day | |

| | |
|------------------------|--------|
| Total electricity used | £91.14 |
|------------------------|--------|

| | |
|---|--------|
| Prompt Pay discount for payment made on 29 May 14 | -£3.58 |
|---|--------|

| | |
|--------------|-------|
| VAT at 5.00% | £4.38 |
|--------------|-------|

| | |
|--|---------------|
| Total electricity including VAT | £91.94 |
|--|---------------|

| | |
|-----------------------|---------|
| Your previous balance | £109.20 |
|-----------------------|---------|

| | |
|---------------|----------|
| Your payments | -£109.20 |
|---------------|----------|

| | |
|---------------------|---------------|
| Total to pay | £91.94 |
|---------------------|---------------|

Your actual meter reading

Electricity 44311

How does this compare with last year?

586.55 kWh

29 May 13 - 31 Jul 13

569.00 kWh

29 May 14 - 31 Jul 14

Electricity bills often look a bit like this one; the bills used in GCSE Mathematics examinations aren't as complicated.

†1. Here is part of Gary's electricity bill.

| Electricity bill | |
|--------------------|------------|
| New reading | 7155 units |
| Old reading | 7095 units |
| Price per unit 15p | |

Work out how much Gary has to pay for the units of electricity he used.

$$\begin{array}{r} \text{The number of units used} = 7155 \\ - 7095 \\ \hline 60 \text{ units.} \end{array}$$

$$\begin{array}{l} \text{Cost of 60 units } 60 \times 15p = 900p \\ = \underline{\underline{\pounds 9.00}} \end{array}$$

$$\begin{array}{r} 15 \\ \times 6 \\ \hline 90 \\ 3 \end{array}$$

(Total 4 marks)

An gas meter is a device that measures the amount of gas consumed by a residence of business. Energy companies use gas meters to measure how much energy is used by customers so that bills can be calculated accurately.

Gas meters come in many designs – a few are shown below. Some residences are metered so that bills can be paid quarterly (every three months); some have pay-as-you-go meters which are operated by keys which can be topped up. In some residences, energy bills are included in the rent and so might not be metered.



Gas meters are often found outside the home, or else under the stairs or in the garage.

1. Where in your home can the gas meter be found?
.....
2. If your gas meter has a reading, write it here:
3. Find out the amount paid where you live for the most recent gas bill £.....

Some bills charge for both electricity and gas at the same time:



2 Mr AB Smith
10 Example Street
Anytown
Countyshire
AB12 3CD

3 **Date of bill**
18 April 2009
We sent your last bill
on 10 January 2009
This is not a tax invoice

4 **Any questions?**
Call us on
0845 052 0000
Monday to Friday 8am to
8pm and Saturday 8am to
6pm. All our call centres
are in the UK.
→ **Your account number**
1234 5678 9012

Your electricity and gas bill

5 **Your energy & plan**
Your plan
E.ON Track and Save 2
Your plan end date
1 September 2010
You've used
848 kWh of electricity
8927 kWh of gas
These figures are based
on your readings

6 **Discounts & rewards**
304 Tesco Clubcard Points
earned this time
Your discounts
3% for paying promptly

£9.97
credit

7 **Please pay now**
To continue to get a
3% discount off your bill
for paying promptly,
please pay by 2 May

£338.46

8 **We've used your meter readings**
Electricity: read by you 18 Apr 09
⚡ 69708
Gas: read by you 18 Apr 09
🔥 4025

We've included your key facts
We've included an annual
reminder of the the key facts
about your usage and your
plan with this bill.

Girobank **9**
ank plc. Menspide G1R DAA

Reference: **0891156918980 992**

Credit account number: **157 8464**

Amount due
No fee payable at PO counter
£ 338.46

bank giro credit
By transfer from
Alliance and Leicester Giro account number

158
208
288
24



63312608915669189806

57-84-64

Cheque payable to: POST OFFICE COUNTERS LTD
Signature _____
Date _____

| | | |
|--------|--|--|
| | | |
| Cash | | |
| Cheque | | |
| £ | | |



Please do not write below this line or fold this payment slip

2. Here is part of Dani's gas bill.

Gas Bill

New reading 2968 units

Old reading 2675 units

Price per unit 18p

Work out how much Dani has to pay for the units of gas she has used.

$$\begin{array}{r} \text{Number of units used} \quad 2968 \\ - 2675 \\ \hline 293 \end{array}$$

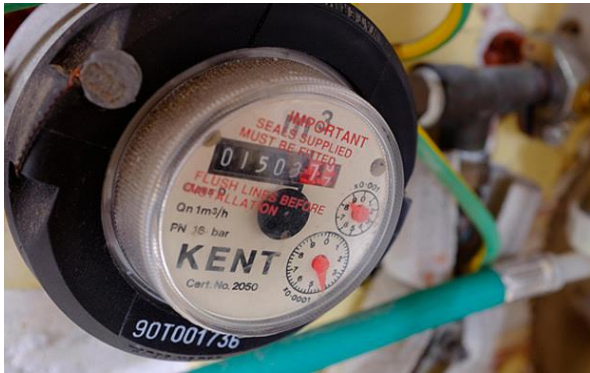
$$\begin{aligned} \text{Cost of units} &= 293 \times 18p \\ &= 5274p \\ &= \underline{\underline{\pounds 52.74}} \end{aligned}$$

$$\begin{array}{r} 293 \\ \times 18 \\ \hline 2344 \\ 2930 \\ \hline \pounds 5274 \end{array}$$

(Total 4 marks)

An water meter is a device that measures the amount of water consumed by a residence of business. Water companies use water meters to measure how much water is used by customers so that bills can be calculated accurately.

Water meters come in many designs – a few are shown below. Some residences are metered so that bills can be paid quarterly (every three months); many residences are unmetered and the water company charges a flat rate annually.



Water meters are usually found outside the home, or perhaps in the garage.


1. If you have one, where in your home can the water meter be found?

.....

2. If your water meter has a reading, write it here:

3. Find out the amount paid where you live for the most recent water bill £.....

Water bills typically look like this:



Bill date
21 July 2009

1 Account Number
12345-67890

Water Services Bill
Tel: 0845 9200 887

12345 678 90
MR EXAMPLE
ADDRESS LINE 1
ADDRESS LINE 2
POST CODE

PROPERTY/STREET/NUMBER

If you like the convenience of using online services,
you can pay your bill, tell us you're moving and
more, simply log on to www.thameswater.co.uk

MR A EXAMPLE

2 Your water services bill for 1 April 2009 to 16 July 2009

Total payable **£82.19** **3** The total shown is now due

See below

Service charges 1 April 2009 - 16 July 2009 (107 days)
This is your first bill for this property


| | Volume charge £ | Fixed charge £ | |
|--|-----------------|----------------|-----------------|
| 4 Water 36 m ³ @ 113.13p | 5 40.73 | 6 7.62 | 7 £48.35 |
| Wastewater 36 m ³ @ 55.76p | 20.07 | 13.77 | £33.84 |
| Charges | | | £82.19 |

Meter Readings

| Meter number | Charged size mm | Previous reading | New reading | Volume used m ³ |
|------------------------|-----------------|------------------------------|---------------|----------------------------|
| 17 July 2009 12A345678 | 8 12 | 9 469 Initial reading | 10 505 | 10 36 |

Alliance Leicester

COMMERCIAL BANK Equitic Meritvale CB 0AA
Reference (customer account number)

bank giro credit 

9826 9274 0184 6031 3417 5
Draft account number Standard fee payable at PO Counter

138

12345 67890 1

257 2753

£ 82.19

Cheques NOT acceptable at Post Office

Customer stamp and address

Signature

MR EXAMPLE
ADDRESS LINE 1
ADDRESS LINE 2
POST CODE

Date

57-27-53

Cash

Cheques

£

Please do not write or mark below this line and do not fold this document

8460313417X V4322572753 000082198 74 X

†3. Henry is thinking about having a water meter.

These are the two ways he can pay for the water he uses.

Water Meter

A charge of £28.20 per year

plus

91.22p for every cubic metre of water used

1 cubic metre = 1000 litres

No Water Meter

A charge of £107 per year

Remember there are 365 days a year

Henry uses an average of 180 litres of water each day.

Henry wants to pay as little as possible for the water he uses.
Should Henry have a water meter?

$$\text{Total amount of water} = 180 \text{ litres} \times 365 = 65,700 \text{ litres}$$

$$\begin{array}{l} \times 65.7 \downarrow \\ 1 \text{ cubic metre} = 1000 \text{ litres} \\ 65.7 \text{ cubic metres} = 65,700 \text{ litres} \downarrow \times 65.7 \end{array}$$

So every year he uses 65.7 cubic metres

$$\begin{array}{l} \text{Cost} \\ 65.70 \times 91.22 = 5993.154 \text{ p} \\ = \pounds 59.93 \end{array}$$

$$\begin{array}{r} \text{plus} \\ 28.20 \\ \hline 88.13 \end{array} = \pounds 88.13$$

A water metre is cheaper at £88.13 than not having a water metre £107

(Total 5 marks)

TOTAL FOR PAPER IS 13 MARKS