Gas and Electricity

Resource sheet 1: The electricity bill

Dan is living in his own place for the first time. He moves into the house on the 28th of May, but expects three other housemates to join him in September. So because he is initially responsible for the house, he has set up a Direct Debit through his bank to pay the Gas and Electricity bill each month. The energy supply company estimated that he will need to pay £121 per month for a four-bedroomed house, for both fuels.

The house has gas central heating, which also heats the water. There is a gas hob but an electric oven.

The energy company has sent him his first statement, showing the estimated costs of the electricity that has been used.

28 May – you gave us your first meter reading	89597
14 June – estimated meter reading	89741
Estimated kWh used over 18 days	144.00
144 kWh × 11.700p = £16.85 Cost of electricity used this period	£16.85
Standing charge 18 days at 24.770p per day	£4.45
Total electricity used	£21.30
Dual fuel discount	- £0.71
VAT at 5.00%	£1.02
Total electricity including VAT	£21.61

Dan notes that the company has used an estimated meter reading to work out the bill, so he decides to check the meter. It reads 89701.

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Question 1: The electricity bill

a) What should be the cost of electricity used this period?
b) Recalculate the whole bill. Leave the dual fuel discount at –£0.71.

28 May – you gave us your first meter reading	89597
14 June – Dan's meter reading	
kWh used over 18 days	
…… kWh × 11.700p = Cost of electricity used this period	
Standing charge 18 days at 24.770p per day*	£4.45
Total electricity used	
Dual fuel discount	–£0.71
VAT at 5.00%	
Total electricity including VAT	

* Note that the Standing Charge and the VAT calculations on your energy bills are truncated to the penny below and not rounded to the nearest penny.
The calculations for the gas and electricity are rounded normally.

Question 2: The gas bill

The next page of Dan's dual fuel bill shows the cost of the gas he has used.

The energy supplier shows how it calculates the price of energy from gas. The following information is written on the monthly statement:

Gas is a natural product. One unit (Ft^3) *does not always produce exactly the same amount of energy. In order to price energy from gas consistently, we convert your units used into kilowatt hours of energy, using the following formula:*

a. Imperial units used (measured in Cubic Feet, calculated from the meter reading)	The number of cubic feet used
b. Multiplied by the metric conversion	× 2.83
c. Multiplied by the calorific value	× 40.1
d. Multiplied by the volume correction	× 1.0226400
e. Divided by kWh conversion	÷ 3.6
f. Equals the kWh	

The energy company estimated that Dan used 12 cubic feet of gas in this period. They charge 4.080p per kWh.

a) How much did they charge him for the gas, not including the standing charge or VAT?
b) Add a standing charge of £4.45 to your figure, and 5% VAT. What is the total gas bill for this period?
c) What single calculation can you use to replace the formula used by the energy company to convert from Ft^3 to kWh?

The Total Bill

Dan's first statement is dated the 15th of June and shows the balance of his account up to then.

The energy company explains that Dan is in credit by £78.15.

On 28 May, your balance was	£0.00
Total charges (including VAT and discounts)	£42.85
What you've paid Direct Debit 12 June	-£121.00
Your account balance is in credit by	£78.15
Gas credit balance	£58.76
Electricity credit balance	£19.39

Question 3: Why is Dan in credit?

Give at least two possible reasons why Dan's energy bill for June is much less than the monthly direct debit the energy company estimated he should pay.

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Energy usage and monthly payments

On the 27th of July, Dan takes the meter readings for his gas and electricity.

The electricity meter shows 89844 kWh.

The gas meter shows 7345 Ft^3

In May the readings were 89597 kWh for electricity and 7342 Ft^3 for gas.

Electricity is charged at 11.700p per kWh.

Gas is converted from Ft^3 to kWh by multiplying by 32.2367375.
It is then charged at 4.080p per kWh.

The standing charge for both gas and electricity is the same: both are charged at 24.770 pence per day.

Question 4: Actual usage, actual costs

For this question, we will not include the 'dual fuel discount'.

a) Calculate the actual cost of gas and electricity used in this period.
b) Calculate the standing charge for both fuels.
c) If VAT is charged at 5%, calculate the total bill for the two months.

Switching supplier

Energy companies now publish a Tariff Comparison Rate (TCR) for each fuel to enable customers to compare their bills with other suppliers. This figure can only give a rough estimate of the total cost of the fuel, including the standing charge and VAT, because it is based on an average user.

The electricity TCR for this account is 15.02 pence per kWh.

This means if we multiply the kWh of electricity used by the TCR, we should get an estimate of the electricity cost.

Use these figures for this question:

Dan's estimated electricity usage: 144kWh

Dan's estimated gas energy usage: 386.84 kWh

Worked example

In this case the calculation for Dan's first electricity bill would be:
144 kWh × 15.02p = 2162.88p, which gives an estimate of £21.63.
The actual bill (in Question 1) was £21.61.

Question 5: Estimating bills, using the TCR

a) The TCR for gas on this account is published as 4.93p.
   i) Use these figures to estimate the gas bill, using the kWh above.
   ii) How accurate is this estimate, compared to your answer to question 2b?

b) Another supplier publishes its TCR for electricity at 11.62p per kWh and the TCR for gas at 3.85p per kWh. Estimate what Dan's first bill for gas and electricity would have been using these figures.