WJEC

INTERMEDIATE TIER

REVISION BOOK

SJHS

Contents:

(a) Students are taking tests in English and Welsh.
The English test is marked out of 80.
The Welsh test is marked out of 70.

(i) Dyfed scores 35 in his English test.
Estimate Dyfed's score as a percentage.
Circle your answer. [1]

4% 20% 23% 44% 51%

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(ii) Liam scores 22 in his Welsh test.
Estimate Liam's score as a percentage.
Circle your answer. [1]

0·3% 3% 22% 31% 40%

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(a)

Lotty and Rafael decide to enter a prize draw.
They agree to share any money they win in the ratio 2 : 3 respectively.
After winning a total of £2000, they think again and decide that Lotty's share should be increased by 30%.

(i) Rafael thinks that his share will be reduced by 30%.
Without any calculation, explain why Rafael's thinking is incorrect. [1]

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(ii) Calculate the amount of money Lotty wins after the decision is made to increase her share. [4]

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(iii) Find the ratio that is now used to share the money between Lotty and Rafael.
Express your answer in its simplest form. [3]

Lotty's winnings : Rafael's winnings = ... : .....

(b) In another prize draw, it was planned to give £5000 as the first prize.
To make it more popular, the organisers decide to increase this first prize by 26%.

The most efficient method of calculating the amount of the increased first prize is

$$1{\cdot}26 \times 5000.$$

The second prize was planned to be £3000, but it is now decided to decrease this prize by 6%.

Write down the most efficient method of calculating the amount of the decreased second prize.
You are not expected to work out the answer. [1]

Lazar wants to send a package to Germany.
He looks at pricing charts for three different companies, *ParcelMax*, *DirectGo* and *Pack2save*.

ParcelMax
Total cost = Sum of the 3 dimensions in cm × £0.60

DirectGo
Total cost = Volume measured in cm^3 × £0.01

Pack2save
Total cost = Total area of all 6 faces measured in cm^2 × £0.02

Lazar's parcel is a cuboid measuring 10 cm by 20 cm by 30 cm.

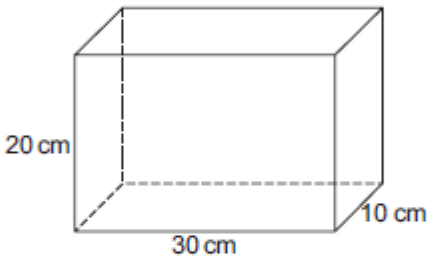

Diagram not drawn to scale

(a) Find the cost of sending the parcel for each of the three different companies.
Give each of your answers in pounds (£).

(i) *ParcelMax* [2]

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(ii) *DirectGo* [3]

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(iii) *Pack2save* [4]

(b) What is the **percentage saving** that Lazar will make by choosing the cheapest option rather than the most expensive option? [2]

(a) Jasmine entered herself, Sophie and Bryn as a group in a talent contest.
Bryn only had a minor part.

Bryn, Sophie and Jasmine won the contest.
They shared the prize money in the ratio 2 : 6 : 7, with Bryn getting the smallest share.
Jasmine won £560, the largest share.

(i) How much money did Bryn and Sophie each win? [4]

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Bryn receives £ .....

Sophie receives £ .....

(ii) Jasmine gave 15% of her winnings to charity.
How much did Jasmine have left? [2]

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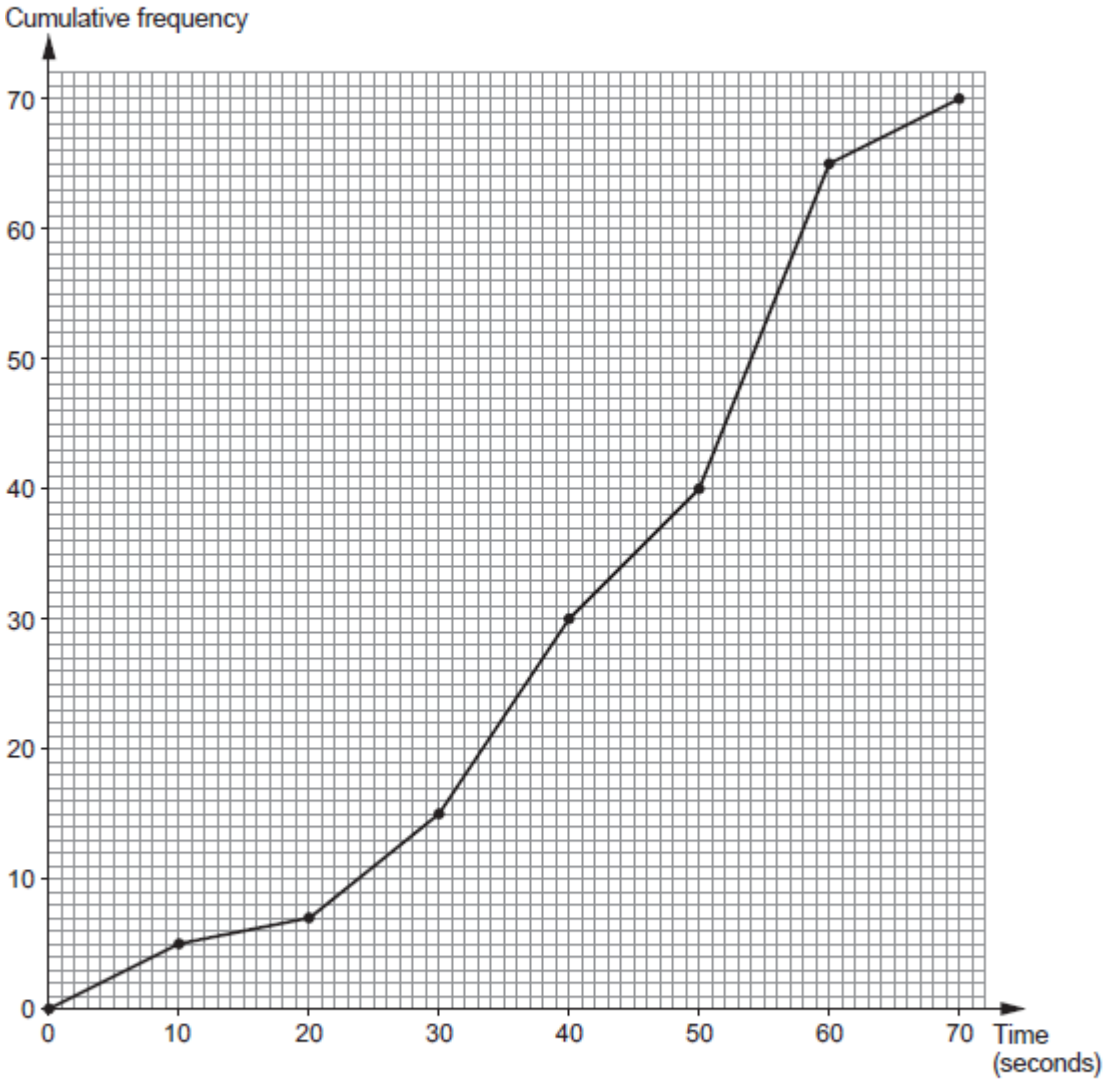
(b) The talent contest is held once a year.
Every year, the cost of putting on the talent contest increases by 10% of the previous year's cost.
In summer 2014 the cost was £6600.

Calculate the cost of putting on the summer 2017 talent contest.
You must show all your working. [3]

10. *Cambria Airlines* has planes that can carry up to 70 passengers.
For safety, the crew practise the emergency exit procedures with a group of 70 passengers.
Every 10 seconds the safety officer records the total number of passengers who have left the plane.
He has displayed the results in the cumulative frequency diagram shown below.



(a) Estimate the median time taken by the passengers to leave the plane. [1]

..... seconds

(b) How many passengers took more than 50 seconds to leave the plane?
Circle your answer. [1]

10 20 30 40 50

(c) *Cambria Airlines* has a policy that states the following.

'In the event of an emergency exit procedure, at least 90% of the 70 passengers must have left the plane within 1 minute.'

Did the practice emergency exit procedure meet the requirements of the airline's policy?
You must show all your working. [4]

Loretta is paid in euros.
She is checking her tax bill for last year.

The tax rates last year were as follows:

- No tax on the first €3500 of earnings
- Earnings in excess of €3500 and up to €10 500: taxed at a rate of 25%
- Earnings above €10 500: taxed at a rate of 35%

Last year, Loretta's total earnings before tax were €34 500.

How much tax did Loretta pay in total?
You must show all your working. [6]

Tax paid = € .....

(a) The total area of all the woodlands in Wales is **303 000 hectares**.

Individual woodlands that have an area of 2000 hectares or more make up 76% of the total area of all the woodlands in Wales.

Complete the following statement.

'Woodlands with areas of **less than** 2000 hectares in Wales cover a total area of

..... hectares.' [3]

Gwenda enjoys road running.

(a) She keeps a record of her run each day this week.

Day	Sun	Mon	Tues	Wed	Thurs	Fri	Sat
Distance	4·6 km	5·4 km	2·2 km	6·2 km	7·2 km	2·2 km	3·4 km
Time	26 mins	31 mins	12 mins	35 mins	40 mins	14 mins	22 mins

Last week, her average speed for the week was 9·6 kilometres per hour.
Calculate Gwenda's percentage improvement in her average speed from last week to this week.
You must show all your working. [6]

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Percentage improvement is ..... %

Luigi lives in south Wales.
Rosina lives in west Wales.
For each of the first 65 days of 2017, they recorded whether or not it rained.

Luigi recorded that it rained on 28 of these days.
Rosina recorded that it rained on 40% of these 65 days.

Luigi says,

> 'For the first 65 days of 2017, there were more days with rain where I live than where Rosina lives.'

Is Luigi correct?
You must show all your working. [3]

Mali's scooter depreciated (decreased) in value by 24% in the **first** year.
In all further years, her scooter depreciated by 13% of its previous year's value.
She originally paid £850 for her scooter.
Calculate the value of Mali's scooter after 7 years. [3]

After 7 years, the value of Mali's scooter was £ .....

(b) The television was reduced in the sale by 26% of its original price.
It cost Marta £710.40 in the sale.
What was the original price of the television? [2]

Original price £ .....

A newspaper report claimed the following:

- 12% of the world population is left-handed.
- Twice as many men as women are left-handed.
- 30% of the world population is mixed-handed.
  Mixed-handed people prefer to use the left hand for some tasks and the right hand for others.
- It is very rare to be ambidextrous, that is being able to do all tasks equally well with either hand.

In 2011, Wales had a population of 3063000.
In 2014, Wales had a population of 3092000.

(a) Calculate the number of left-handed people living in Wales in 2011.
State what assumption you have made. [3]

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Assumption:

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(b) In 2011, Wales had a population of 3063000.
1559000 of these people were women.

In 2011, what **percentage** of the population of Wales were **men**?
Give your answer correct to 1 decimal place. [3]

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(c) How many mixed-handed people do you think were living in Wales in 2014?
You must show your working.
Give your answer to the nearest 1000 people. [2]

(d) A country of 6 million people meets all the claims given in the newspaper report.
8% of the women in this country are left-handed.

There are 3 million men living in this country.
How many left-handed men would you expect there to be in this country? [4]

Small bottle
300 ml for 66p

Medium bottle
400 ml for 92p

Large bottle
500 ml for £1.25

(a) *In this part of the question, you will be assessed on the quality of your organisation, communication and accuracy in writing.*

Roland is going to buy some orange juice for a party.
Which size bottle of orange juice offers the best value for money?
You must show your working. [3 + 2 OCW]

(b) Galina needs to buy **exactly** 800 ml of orange juice.
Which is the best option for Galina?
You must show your working and consider all options.
You must give a reason for your choice. [3]

Marcin has a market stall to sell his printed T-shirts.

It costs him:
- £250 to buy 100 **plain** T-shirts,
- 50p to print a design on each T-shirt.

Marcin sells his printed T-shirts for £4.00 each.

At the start of the week:
- His bank account balance is £820.
- Marcin has 100 printed T-shirts ready to sell.
- He has already paid for these printed T-shirts.

During the week:
- Marcin sells his stock of 100 T-shirts.
- He pays all the money he takes from selling T-shirts into his bank account.
- He buys and prints another 400 T-shirts.
- Marcin **does not** sell any of these 400 T-shirts.

How much will Marcin have in his bank account at the end of this week?
You must show all your working. [4]

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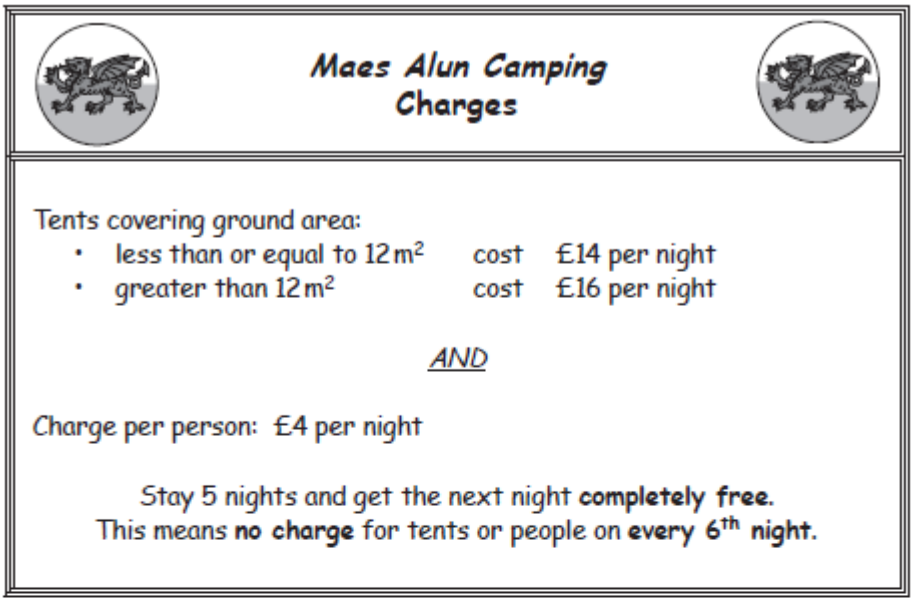
In this question, you will be assessed on the quality of your organisation, communication and accuracy in writing.



Rhodri and Lars are planning a camping holiday, staying at *Maes Alun Camping*.
They are going to
- take only one tent between them,
- take a tent covering a rectangular ground area, measuring 2·5 metres by 4·4 metres,
- both stay for a total of 12 nights.

Their holiday is just 8 weeks away.
They **each** plan to save £15 per week from now until their holiday in 8 weeks' time.

Will the amount they save be enough to pay for their holiday?
You must show all your working. [8 + 2 OCW]

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Lazar wants to send a package to Germany.
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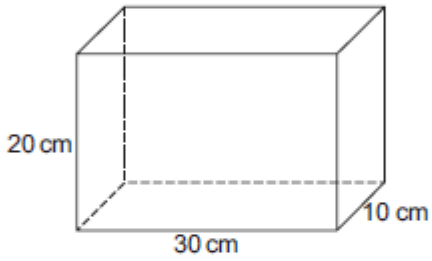

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You must show all your working. [3]

Bethan builds a rectangular sheep pen.

(a) The perimeter fence of the sheep pen is 18 m long.
It costs her £1.10 for every 0·5 metres of fencing used to make the sheep pen.

(i) Calculate the cost of the fencing used to make this sheep pen. [2]

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Cost is £ .....

Pont y Ddraig (Dragon's Bridge) opened in Rhyl harbour in autumn 2013.

The harbour development cost £9·8 million.
£4·3 million of this money was spent on Pont y Ddraig.

(a) How much was spent on the rest of the harbour development in Rhyl?
Circle your answer. [1]

£55 000 £550 000 £5 500 000 £55 000 000 £550 000 000

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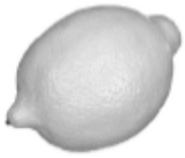
. Four different supermarkets have special offers on the price of lemons.



Supermarket	Special offer
Cost 4go	Lemons: usually 40p each Now on offer! Buy 3 for the price of 2
Edges Mart	A net of 4 lemons for 75p
Food Uno	A bag of 5 lemons for 76p
Greenway	Lemons: only 26p each

Aled needs 6 lemons to make lemon cakes for a birthday party.

(a) *In this part of the question, you will be assessed on the quality of your organisation, communication and accuracy in writing.*

Aled only has time to go to one supermarket.

Calculate how much Aled would pay in each of the supermarkets.
In which supermarket will he be able to get the lemons he needs for the least amount of money?
You must show all your working. [5 + 2 OCW]

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(b) Aled can use any left over lemons to make muffins.

Which supermarket gives the best value for money?
Give a reason for your answer. [1]

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3. Mehmet needs a new fence for one end of his garden.
Fences are constructed using panels and posts.

(a) Posts are needed between each fence panel and at both ends.
How many posts are needed for a fence made with 34 panels?
Circle your answer. [1]

33 35 37 34 36

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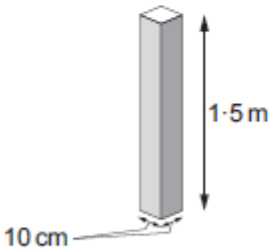
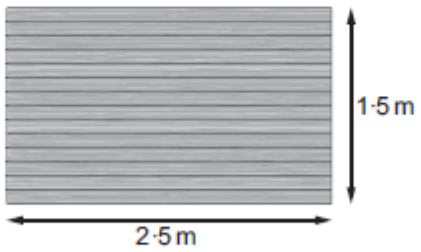
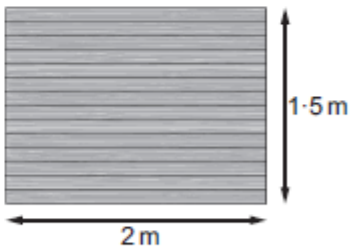
(b) Mehmet wants a new 1·5 m high fence for his garden.
The fence panels come in different lengths.
The posts Mehmet wants to use are all the same size.
Mehmet has the following information.



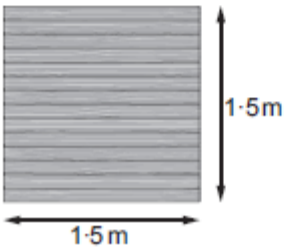
Posts cost £14 each



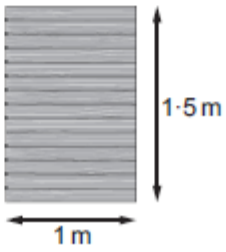
Large £40 each



Medium £30 each



Small £26 each



Extra small £18 each

The fence Mehmet wants to make is 8·5 m long, including the posts.
He has started to sketch a plan, as shown below.

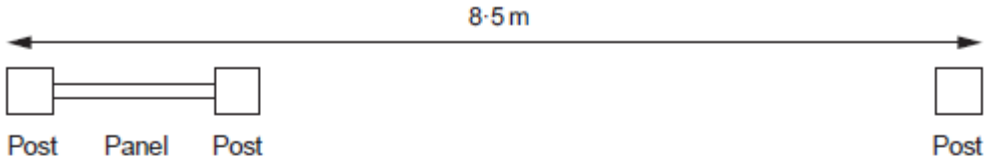


Diagram not drawn to scale

Mehmet needs to use 5 posts.
Work out **one** possible choice of panels that Mehmet could use.
You may use the plan to help you.
Calculate the total cost of the posts and panels for this choice of fence. [6]

Total cost of making the 8·5 m fence is £ .....

(c) It costs 2p to paint each 100 cm^2 of a fence post.
How much will it cost to paint the 4 vertical sides of 1 fence post? [3]

5. *Truetool* is a tool hire company.

Hire charges
The cost of hiring a cement mixer in £: 13 × number of days + 26
The cost of hiring a jet washer in £: 9 × number of days + 38

(a) Sara hires a cement mixer for 5 days and a jet washer for 7 days from *Truetool*.
How much **change** would she get from £200? [3]

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(b) Geraint hired a cement mixer for a number of days.
Lois hired a jet washer for the same number of days.
They each paid the same amount of money.

For how many days did they each hire these tools from *Truetool*?
You must show all your working. [3]

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Number of days .....

11. Megan Pugh's electricity bill is shown below.
It covers the period May, June and July 2017.

Megan Pugh
203 Stryd Bryntor
Maesgwyn

Period	Previous meter reading	Present meter reading	Number of units of electricity used
May, June and July 2017	13450	13900	450

Charge for electricity: 450 units at **20p per unit**	£90.00
Standing charge: 3 months at **£7.60 per month**	£22.80
Total charges:	£112.80

VAT at 5%: 5% of £112.80	£5.64

Amount to pay: £112.80 + £5.64 = **£118.44**

(a) On 1 August 2017, the charge per unit for electricity was increased by 5%.
What is the increased cost per unit of electricity?
Circle your answer. [1]

20.5p 21p 21.5p 22p 22.5p

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(b) Megan wants to calculate her next 3-monthly electricity bill.
She knows the following:

- Her meter reading on 31 October 2017 was 14400.
- The charge per unit for electricity has increased by 5% since her last bill.
- The standing charge has increased by 20p **per month** since her last bill.
- VAT remains at 5%.

On 31 October 2017, Megan had £470 in her bank account.

After paying her next 3-monthly electricity bill, will Megan be able to buy a new washing machine costing £330?
You must show all your working. [9]

Loretta is paid in euros.
She is checking her tax bill for last year.

The tax rates last year were as follows:

- No tax on the first €3500 of earnings
- Earnings in excess of €3500 and up to €10 500: taxed at a rate of 25%
- Earnings above €10 500: taxed at a rate of 35%

Last year, Loretta's total earnings before tax were €34 500.

How much tax did Loretta pay in total?
You must show all your working. [6]

Tax paid = € .....

Ewan is going on holiday to India.
He has saved £450 to exchange for Indian rupees.

(a) The exchange rate on the internet last week was £1 = 99.40 rupees.
Had Ewan been going on holiday last week, how many rupees could he have bought?
[2]

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(b) Ewan exchanges his money on arrival in India.
The exchange rate is now £1 = 99.72 rupees.

The exchange bureau only has 500 rupee notes.
Ewan wants to buy as many rupees as possible with his £450 savings.

How much of his £450 will Ewan spend buying rupees?
Give your answer correct to the nearest penny.
You must show all your working. [4]

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(a) *In this part of the question, you will be assessed on the quality of your organisation, communication and accuracy in writing.*

Railcard for 16 to 25 year olds

£30 for a year

Get $\frac{1}{3}$ **off** all your rail travel

Nerys and Eleri are sisters.
Nerys is 22 years old and Eleri is 27 years old.

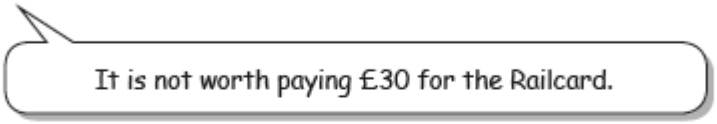
The two sisters live in Holyhead.
Their aunt lives in Milford Haven.
They travel by train to visit their aunt 3 times a year.

Nerys buys a 16-25 Railcard to use for these journeys.
They buy single rail tickets for each journey.
The cost of a **single** rail ticket from Holyhead to Milford Haven is £84.50.
The journey home from Milford Haven also costs £84.50 per ticket.

In a year, how much less does Nerys pay than Eleri for the journeys to Milford Haven and back?
You must show all your working. [5 + 2 OCW]

(b) Cristiano is 22 years old.
He sometimes travels from Rhyl to Llandudno Junction by train.
The cost of a single rail ticket from Rhyl to Llandudno Junction is £7.80.

Nerys advises Cristiano to buy a Railcard.
Cristiano says,



How many times in a year would Cristiano have to travel to make it worthwhile for him to buy a Railcard? [3]

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(b) The price of softwood changes each year.
The price has increased by 6% per annum for each of the last **5 years**.
Before this, the price had decreased by 2% per annum.
Seven years ago the price of softwood was £34 per m^3.

Calculate the current price of softwood. [3]

Current price of softwood is £ ..... per m^3

(b) *In this part of the question, you will be assessed on the quality of your organisation, communication and accuracy in writing.*

Organics4U has 16 vehicles on the road every working day.
The company has 6 vans and 10 trucks.

Ffion has the following information for each type of vehicle.

Type of vehicle	Average distance travelled per litre (km per litre)	Average distance travelled per day (km per day)
Van	8	256
Truck	5·5	704

The fuel used by all of the 16 vehicles costs £1.10 per litre.
Use this information to calculate the **total** fuel bill for 1 working day.
You must show all your working. [6 + 2 OCW]

Mali's scooter depreciated (decreased) in value by 24% in the **first** year.
In all further years, her scooter depreciated by 13% of its previous year's value.
She originally paid £850 for her scooter.
Calculate the value of Mali's scooter after 7 years. [3]

After 7 years, the value of Mali's scooter was £ .....

(b) The television was reduced in the sale by 26% of its original price.
It cost Marta £710.40 in the sale.
What was the original price of the television? [2]

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Original price £ .....

(c) A television uses 1 unit of electricity every 10 hours.
A unit of electricity costs 9.8p.

(i) Calculate the cost of having a television turned on for 24 hours.
Circle your answer. [1]

£23.52 £2.35 40.83p 23.52p 2.45p

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(ii) On average, Marta watches 4 hours of television each day.
On average, how much **a week** does it cost her to watch television?
Circle your answer. [1]

27.44p £27.44 £39.20 39.2p 10.78p

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The diagram below shows where Levi wants to attach a string of lights to his house.

Levi wants to attach a single string of lights from *B* to *A* and then from *A* to *C*.
The diagram below shows the measurements Levi has taken.

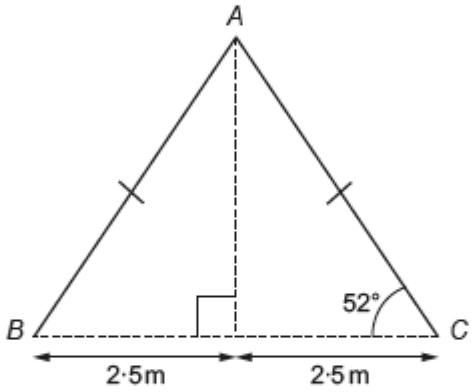

Diagram not drawn to scale

He spends £410 at the electrical store buying a string of lights.
After putting up the lights, Levi finds he has 6 metres of the string of lights left over at one end.

How much did the electrical store charge Levi, per metre, for the string of lights? [6]

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Raspberries cost £3.60 per kg

Pears cost £2.60 per kg

Rhys buys some raspberries and some pears.
Rhys weighs the fruit he buys.
The raspberries cost him £4.50.

(a) Calculate the mass of the raspberries Rhys buys. [2]

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(b) *In this part of the question, you will be assessed on the quality of your organisation, communication and accuracy in writing.*

He finds that the mass of the pears is three times the mass of the raspberries.
How much change does Rhys get from £20 when buying the raspberries and pears?
You must show all your working. [4 + 2 OCW]

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(c) The currency widely used in Patagonia is the Argentine peso.

Alvaro sells alpaca fleeces from Patagonia.
His fleeces are priced in Argentine pesos.
Tom lives in Wales and buys fleeces from Alvaro.
Tom pays for the fleeces in pounds.

Tom's purchases are shown in the table below.

	Number of fleeces bought	Price per fleece, in Argentine pesos	Exchange rate
January 2015	80	19.20	£1 = 15.47 Argentine pesos
March 2016	20	22.30	£1 = 15.21 Argentine pesos
April 2017	100	24.50	£1 = 14.93 Argentine pesos

For each of Tom's 3 purchases he paid correct to the nearest penny.

How much did Tom pay for these 200 fleeces, in pounds?
Give your answer correct to the nearest penny.
You must show all your working. [4]

Handmade socks, knitted using pure cashmere wool, are very expensive to buy.

Rowena buys cashmere wool in 20 g balls.
Each ball of cashmere wool costs her £1.42.
She pays her sister £8 to knit each pair of socks.
135 g of cashmere wool is used to knit each pair of socks.

Rowena sells 40 pairs of cashmere socks for £18.95 per pair.
What is her percentage profit?
Give your answer correct to 2 significant figures.
You must show all your working. [7]

Bethan has a plan of her rectangular lawn, which she has labelled *ABCD*.
She wants to cut out a triangular flowerbed from her lawn, labelled *GHD*.
Bethan decides that *AG* : *GD* should be 1 : 2 and that *DH* = *HC*.

She has made a sketch shown below.

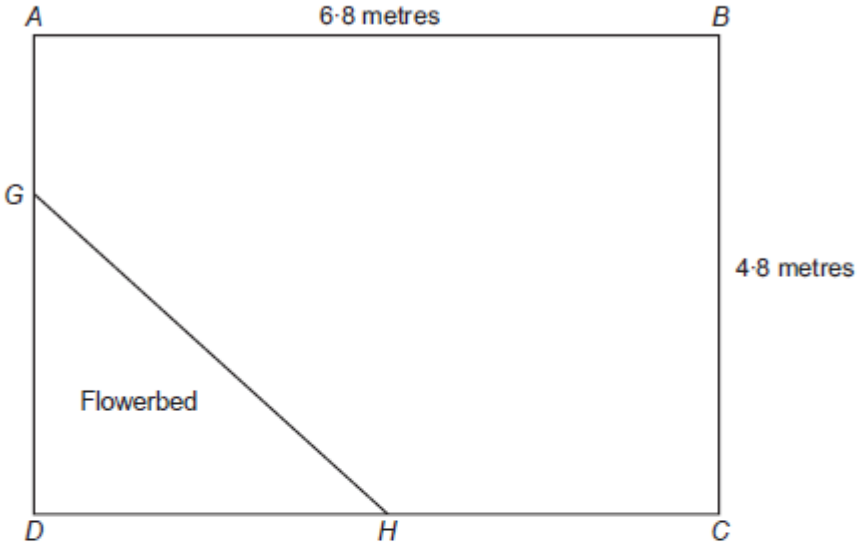


Diagram not drawn to scale

(a) Calculate the length of *GH*. [4]

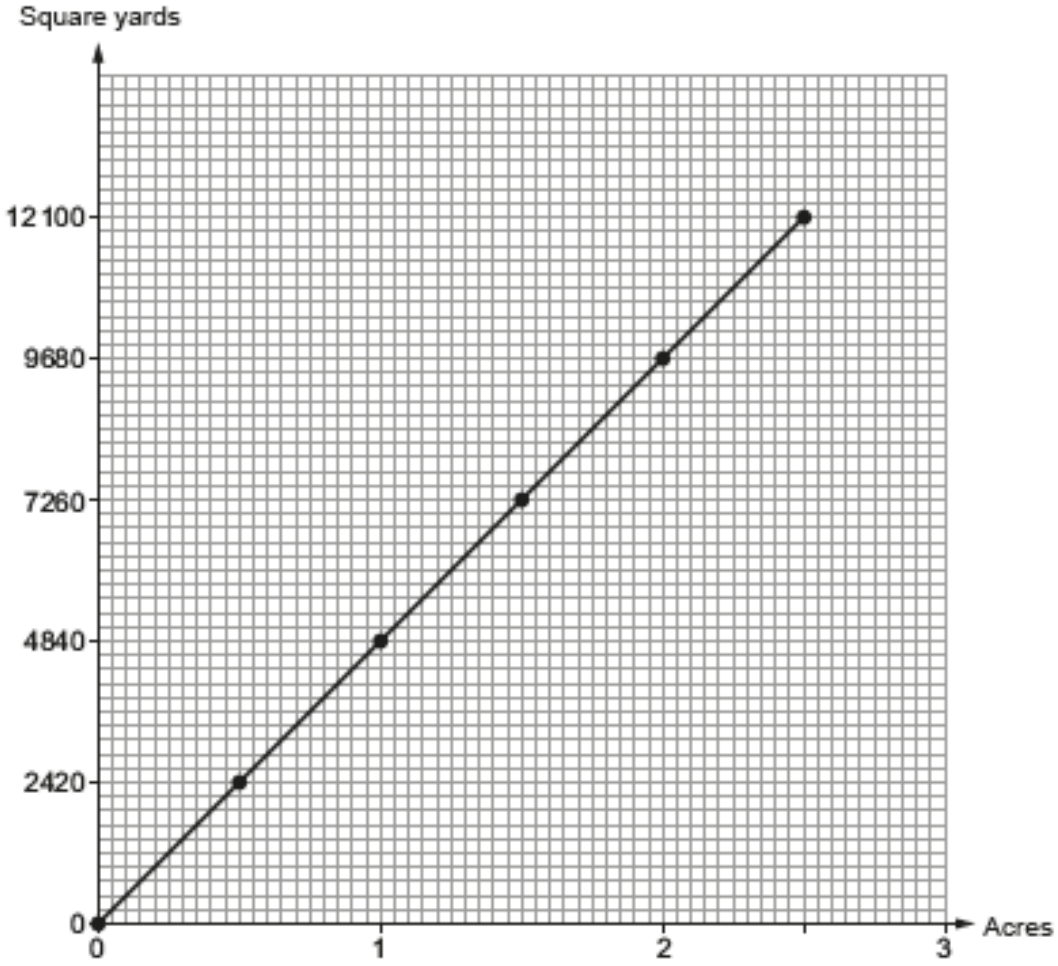
(b) The flowerbed, *GHD*, is to have a flexible edging strip placed around its perimeter. The edging strip costs £3.50 per metre and can only be bought in strips of complete metres.

- How much will the edging strip cost Bethan?
- What length of strip will be left over? Give your answer in centimetres. [4]

Cost £ .....

..... cm left over

. Marcus is a farmer.
He has his own conversion graph to change between acres and square yards.



Complete each of the following statements.

(a) 3 acres is equal to ..... square yards. [1]

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(b) 5·5 acres is equal to ..... square yards. [2]

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. Petra is organising a prom for her year group.
The number of people attending the prom is likely to be between 20 and 80.

The cost of holding the prom at *Hotel Afonwen* would be as follows.

- Hire of the room: £100
- Food: £15 per person
- Welcome drink on arrival: £3 per person
- Decorations: £2 per person

(a) Draw a graph to illustrate the total cost of holding the prom for between 20 and 80 people.
Use the graph paper below. [4]

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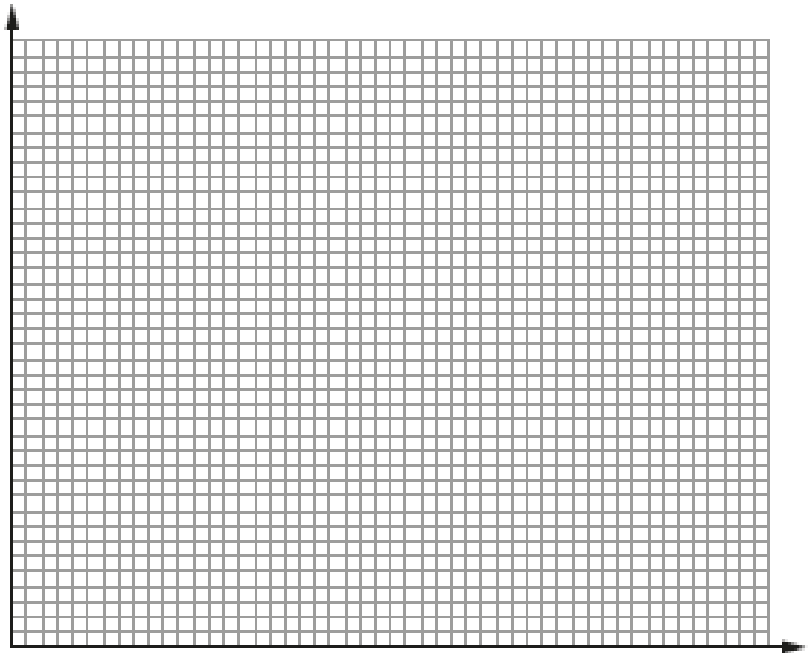


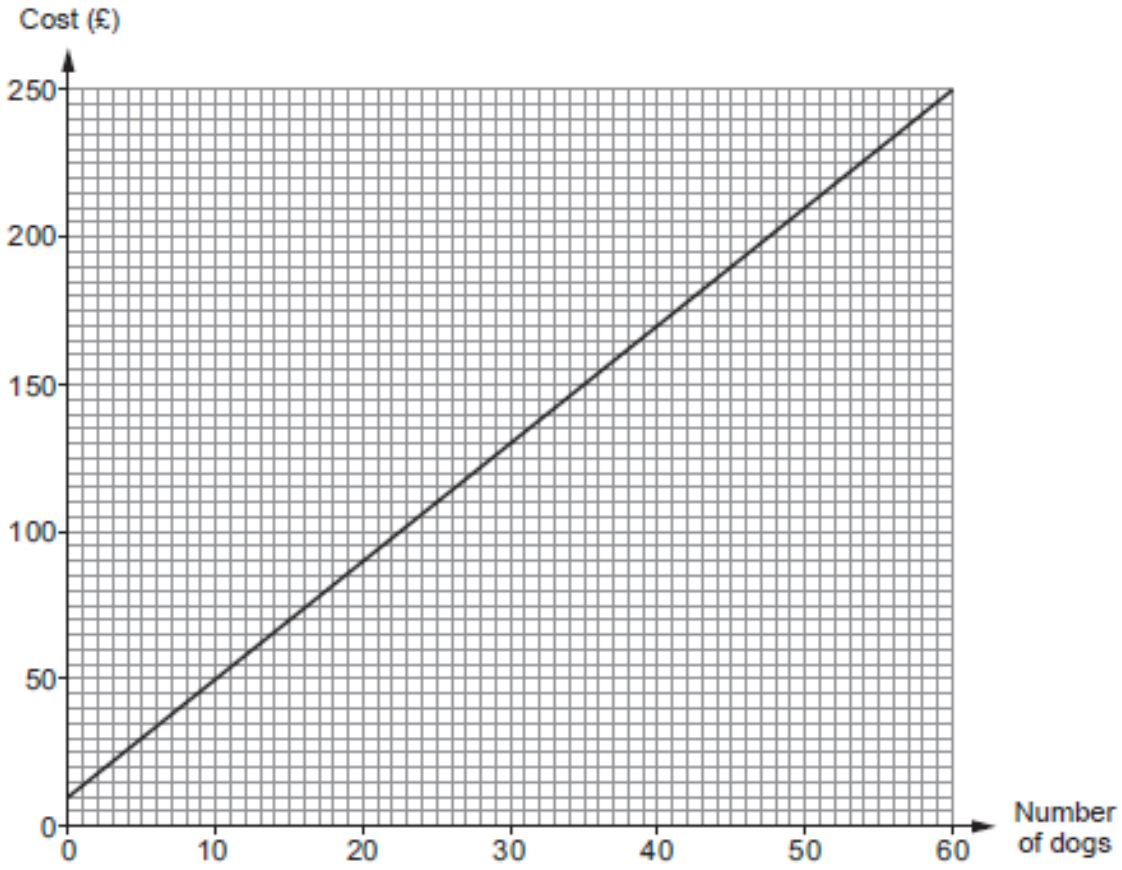
(b) Petra decides to share all the costs equally between the people attending.

- Let £P be the price paid per person.
- Let N be the number of people attending the prom.

Write a formula for P, in terms of N. [3]

(c) Hiring a larger room at *Hotel Afonwen* costs £200.
The cost per person for food, welcome drinks and decorations remains the same.
If the total cost is £2240, how many people attend? [2]

William owns and runs dog kennels.
His costs depend on the number of dogs in the kennels.
The running costs for one day are shown on the graph below.



(a) Why does the graph not pass through (0, 0)? [1]

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(b) What is the increase in the daily running costs for each additional dog that is kept in the kennels? [2]

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(c) (i) Freda also runs a dog kennels.
The cost of keeping 20 dogs in her kennels for one day is £130.
She knows that as the number of dogs increases, the overall cost increases at the same rate as in William's kennels.

Display this information on the graph paper opposite. [2]

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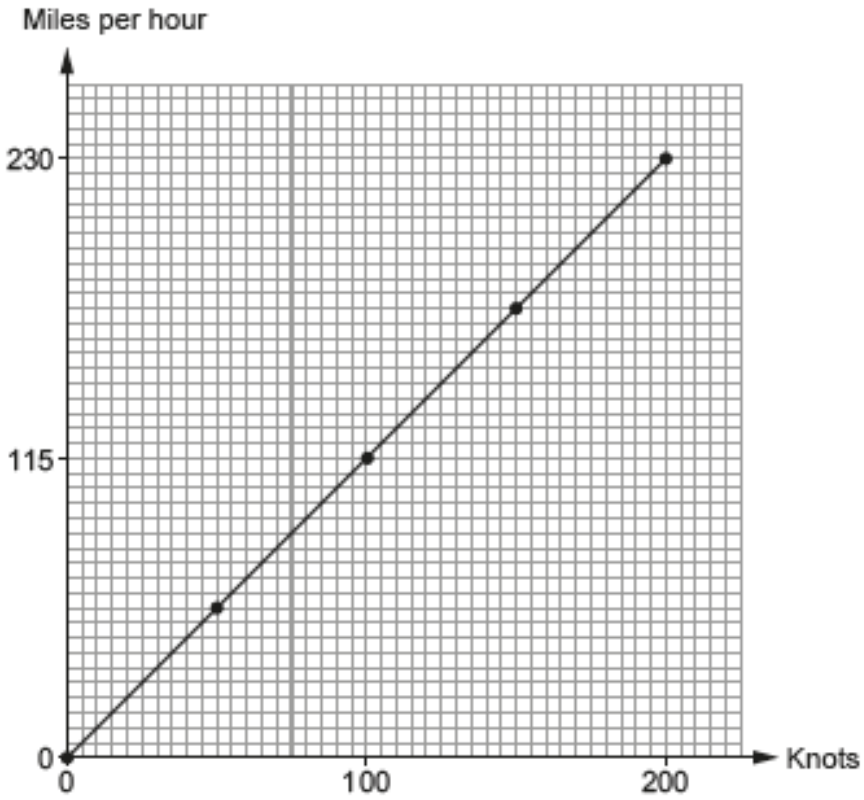
(ii) Find the cost of keeping 30 dogs for one day in Freda's kennels. [1]

£ .....

Alun has made his own conversion graph to change knots to miles per hour.



(a) Use Alun's conversion graph to write 150 knots in miles per hour. [1]

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(b) Nikita thinks Alun's conversion graph may be inaccurate.

Nikita knows that 1000 knots is 1150.779 miles per hour, correct to 3 decimal places.

Convert 20 knots to miles per hour
- using Alun's conversion graph, and then
- using Nikita's values.

Calculate the difference, in miles per hour, between your answers.
Give your answer correct to 2 decimal places.
You must show all your working. [4]

The scale diagram opposite shows an Eisteddfod camping field.

The camping field is 100 metres long and 80 metres wide.

A river runs along the side *AB*.
There is a hedge along *AD*.
There is a fence along *BC*.
DC is an opening with access to the Eisteddfod camping field.

The scale used is **1 cm represents 10 metres**.

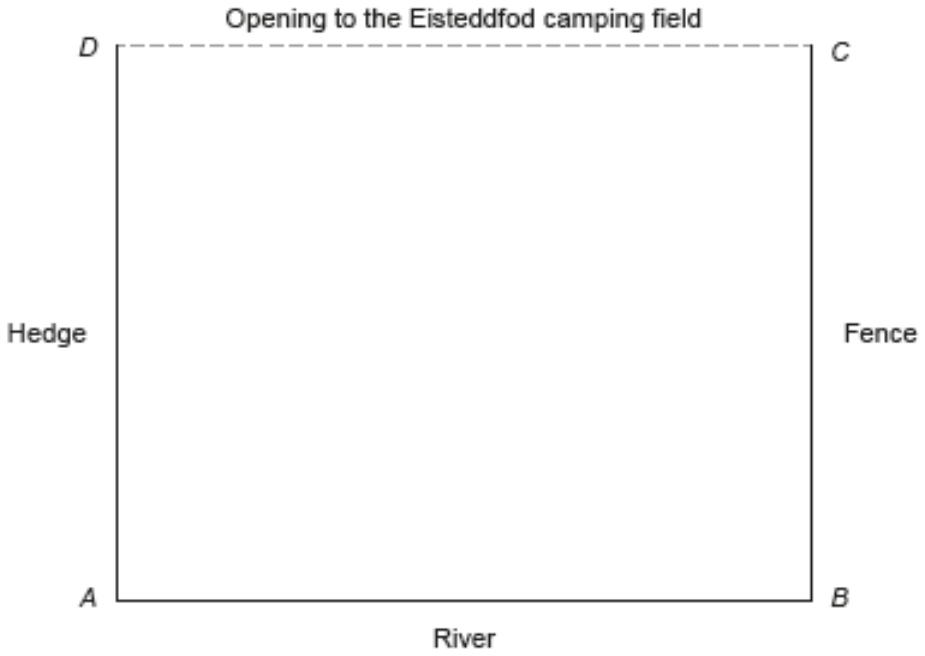
A barbecue area is to be built on the camping field.

The barbecue area must be

- nearer to the river than to the opening to the Eisteddfod camping field,
- nearer to the river than to the hedge,
- more than 30 metres from the corner of the field where the hedge meets the river.

Draw suitable lines on the diagram and shade the region where the barbecue area could be built. [5]

1 cm represents 10 metres



Kari is making a jigsaw puzzle.
She has designed the pattern on a piece of paper.
Kari plans to make each piece of the jigsaw a different colour.

Part of her plan is shown below.

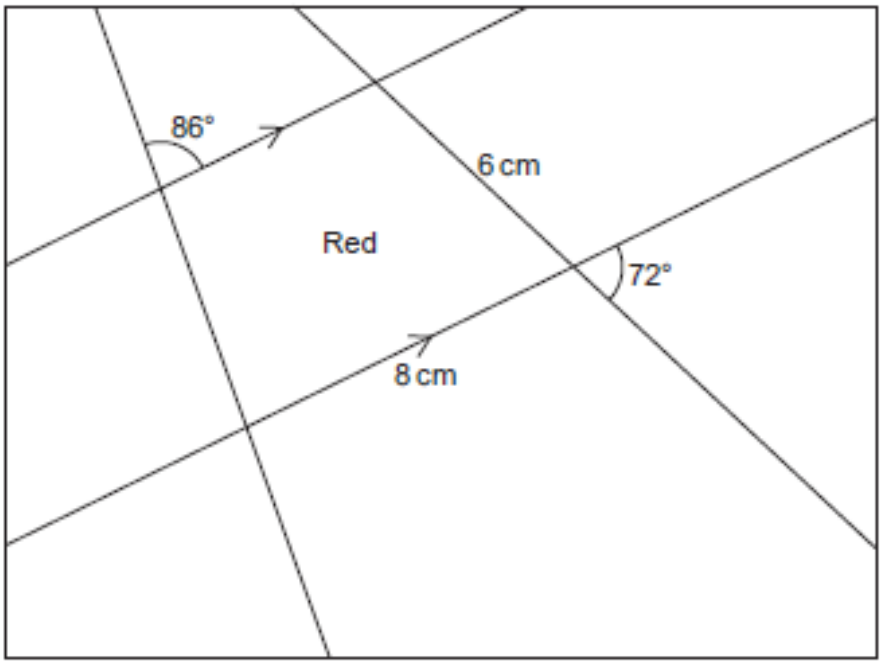
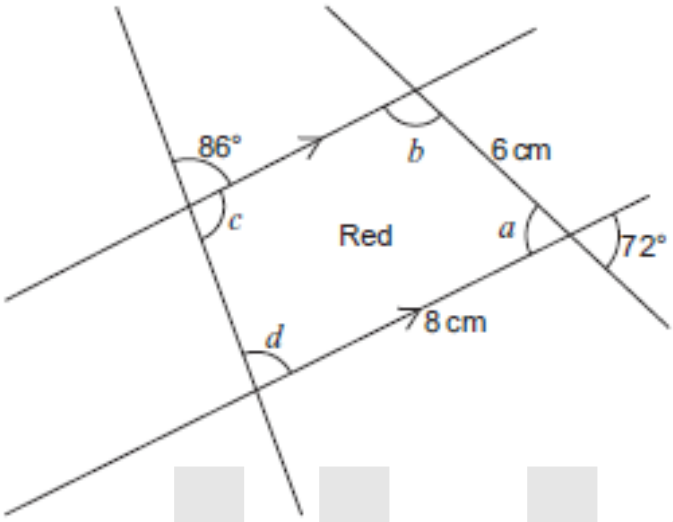


Diagram not drawn to scale

Kari now sketches a diagram of the red piece of the jigsaw, which is shown below.
She shows some extended lines and indicates all the angles she needs to find.



Find the 4 missing angles in the red piece of the jigsaw.
Draw the red piece of Kari's jigsaw accurately.
One side has been drawn for you. [6]

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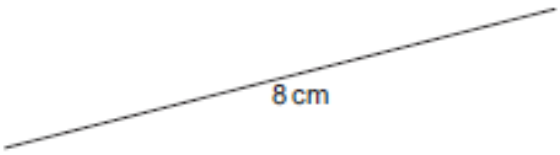
a = ... °, b = ... °, c = ... °, d = ... °

Space for drawing the red piece of jigsaw:



The diagram below shows a sketch of the existing gas pipes that run to and from Tŷ Gwyn.
It also shows a proposed 180 m gas pipe which is to be laid to provide gas to Cae Nia.
The proposed pipe bisects the angle formed by the existing pipes at Tŷ Gwyn.

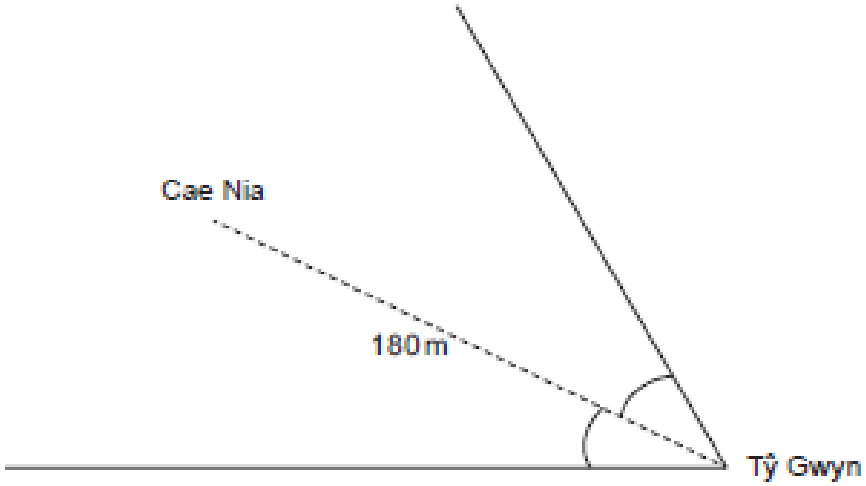


Diagram not drawn to scale

Complete the scale drawing below to show the proposed pipe.

- You must use a pair of compasses to construct the angle bisector.
- Use a scale of 1 cm to represent 20 metres. [3]

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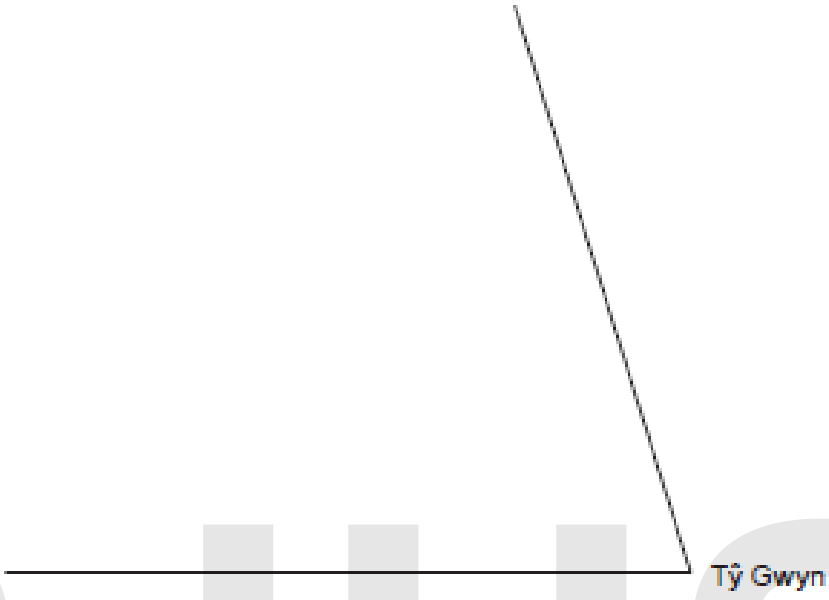

(a) *Organics4U* is planning to have its headquarters in Wales.
The manager has instructed Ffion to look for a site for the headquarters.

Here are the instructions that Ffion has been given by her manager.

'Find the point that is
- an equal distance between Wrexham and Aberporth, and
- an equal distance between Caernarfon and Swansea.

The new headquarters needs to be within 20 miles of this point.'

On the map below, shade the region, **in Wales**, that Ffion should identify for her manager. [4]

(b) *In this part of the question, you will be assessed on the quality of your organisation, communication and accuracy in writing.*

Organics4U has 16 vehicles on the road every working day.
The company has 6 vans and 10 trucks.

Ffion has the following information for each type of vehicle.

Type of vehicle	Average distance travelled per litre (km per litre)	Average distance travelled per day (km per day)
Van	8	256
Truck	5·5	704

The fuel used by all of the 16 vehicles costs £1.10 per litre.
Use this information to calculate the **total** fuel bill for 1 working day.
You must show all your working. [6 + 2 OCW]

(a) Bronwen and Alvaro decide to keep some alpacas on their farm in Patagonia.

Alvaro knows it is possible to keep between 4 and 6 alpacas on each acre of suitable farmland.
They have 13 hectares of farmland that they want to use to keep the alpacas.
Bronwen knows that 1 acre is 4046·86 m^2 and that 10000 m^2 = 1 hectare.

Use this information to advise Bronwen and Alvaro on the number of alpacas they could keep on their farmland.
State any assumption that you make.
You must show all your working. [6]

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Assumption:

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(b) Bronwen decides to place a cylindrical water container in the small paddock on the farm.

The water container has a diameter of 1·4 metres.

(i) The scale diagram opposite shows the small paddock on the farm.
The small paddock is rectangular, measuring 7 metres by 5 metres.

Scale 2 cm represents 1 m

Bronwen decides to place the centre of the water container so that it is:

- equidistant from the south fence and the east fence,
- 3 metres from the south fence.

Show the placement of the water container on the scale diagram of the small paddock above.
Your diagram should include an **accurate plan view** of the **water container**. [4]

(ii) The water container holds 900 litres of water when full.
Calculate the height of the water container in centimetres. [4]

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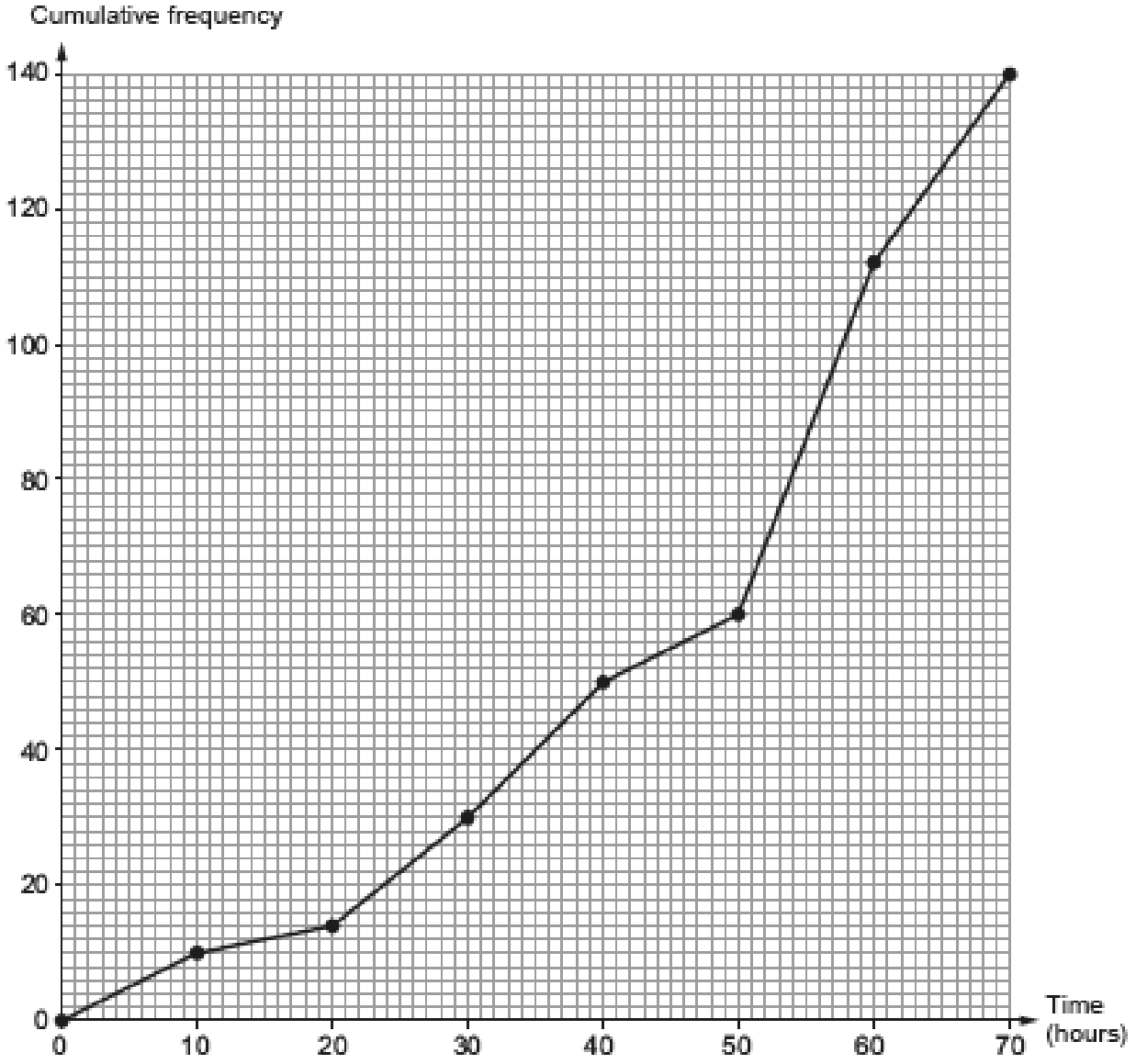
The height of the water container is ..... cm

11. *(a)* 140 girls were asked how long they spent revising for their GCSE examinations. The cumulative frequency diagram shows the results.



(i) Estimate the median time the girls spent revising.
Circle your answer. [1]

35 hours 40 hours 48 hours 52 hours 70 hours

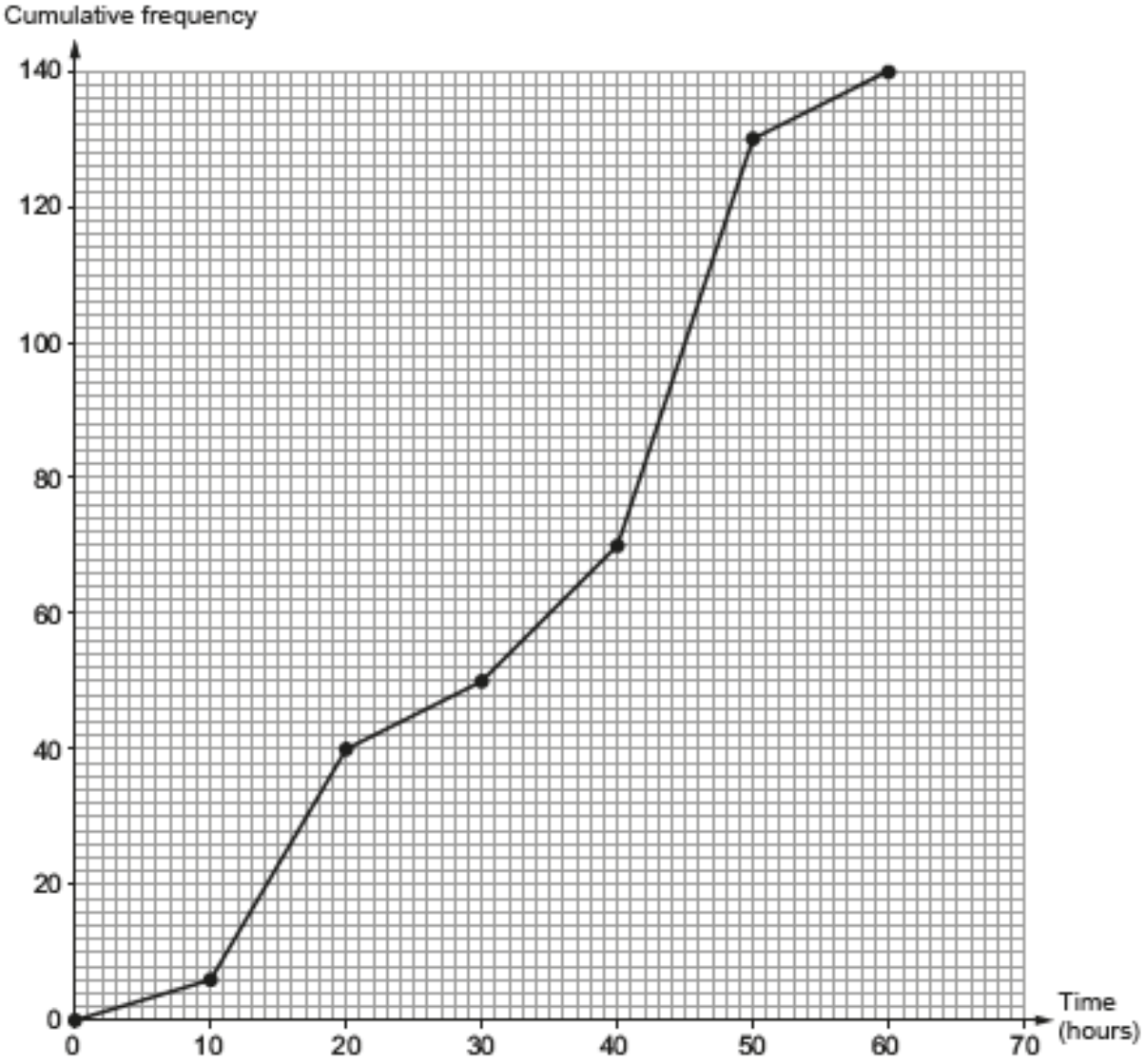
(ii) Calculate the number of girls who spent between 40 and 50 hours revising.
Circle your answer. [1]

0 girls 5 girls 10 girls 15 girls 20 girls

(iii) Circle either TRUE or FALSE for each of the following statements. [2]

25 girls spent between 30 and 50 hours revising.	TRUE	FALSE
No girls spent more than 80 hours revising.	TRUE	FALSE
The modal group is between 50 and 80 hours spent revising.	TRUE	FALSE
20 girls spent more than 60 hours revising.	TRUE	FALSE

(b) 140 boys were asked how long they spent revising for their GCSE examinations. The cumulative frequency diagram below shows the results.



Trefor makes two statements.

1. The boys' interquartile range is greater than the girls' interquartile range.

2. On average, boys spent more time revising.

Are both Trefor's statements correct?
Show calculations and give reasons to support your answers. [4]

Statement 1: .....

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Statement 2: .....

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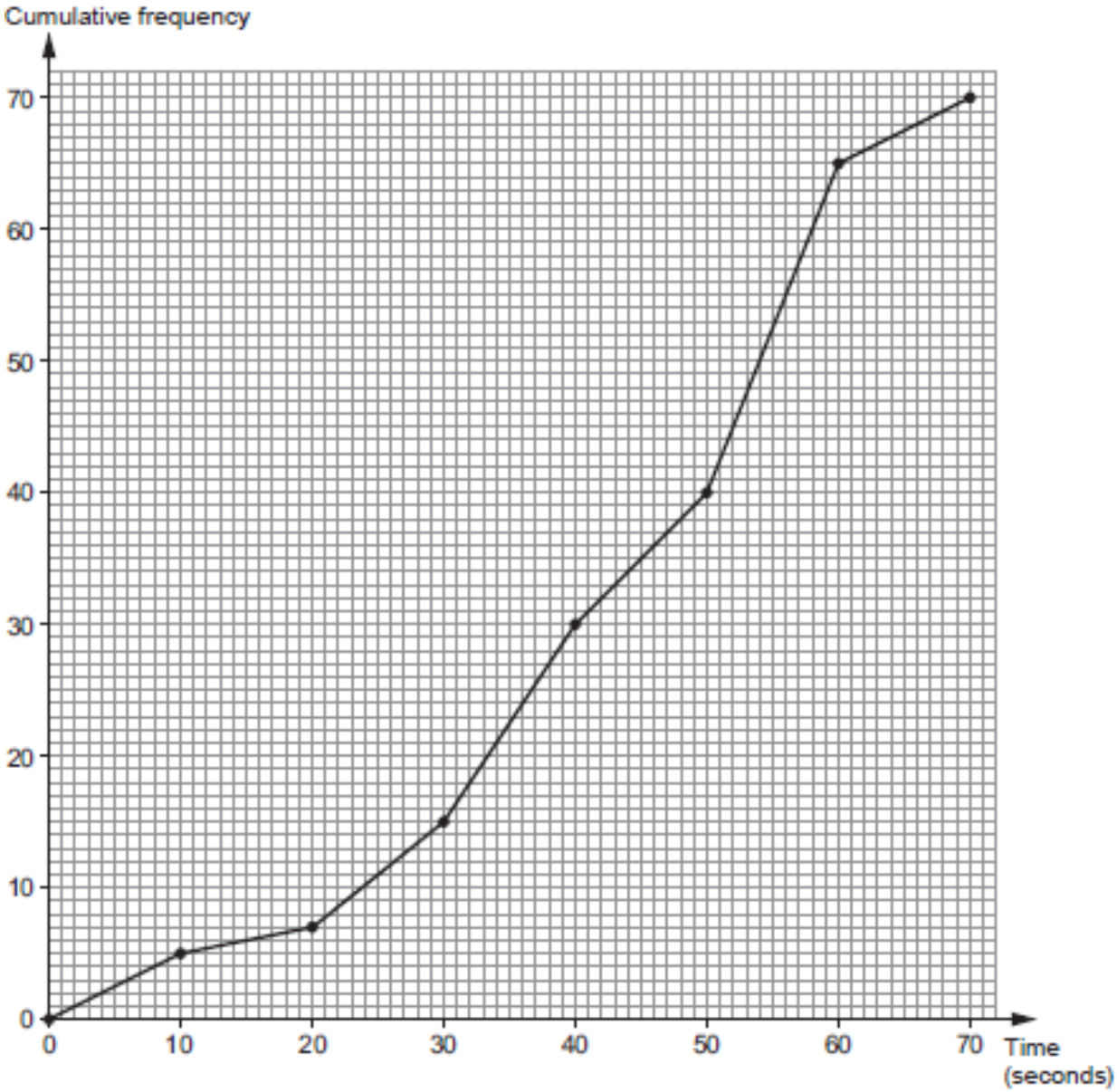
10. *Cambria Airlines* has planes that can carry up to 70 passengers.
For safety, the crew practise the emergency exit procedures with a group of 70 passengers.
Every 10 seconds the safety officer records the total number of passengers who have left the plane.
He has displayed the results in the cumulative frequency diagram shown below.



(a) Estimate the median time taken by the passengers to leave the plane. [1]

..... seconds

(b) How many passengers took more than 50 seconds to leave the plane?
Circle your answer. [1]

10 20 30 40 50

(c) *Cambria Airlines* has a policy that states the following.

'In the event of an emergency exit procedure, at least 90% of the 70 passengers must have left the plane within 1 minute.'

Did the practice emergency exit procedure meet the requirements of the airline's policy?
You must show all your working. [4]

10.

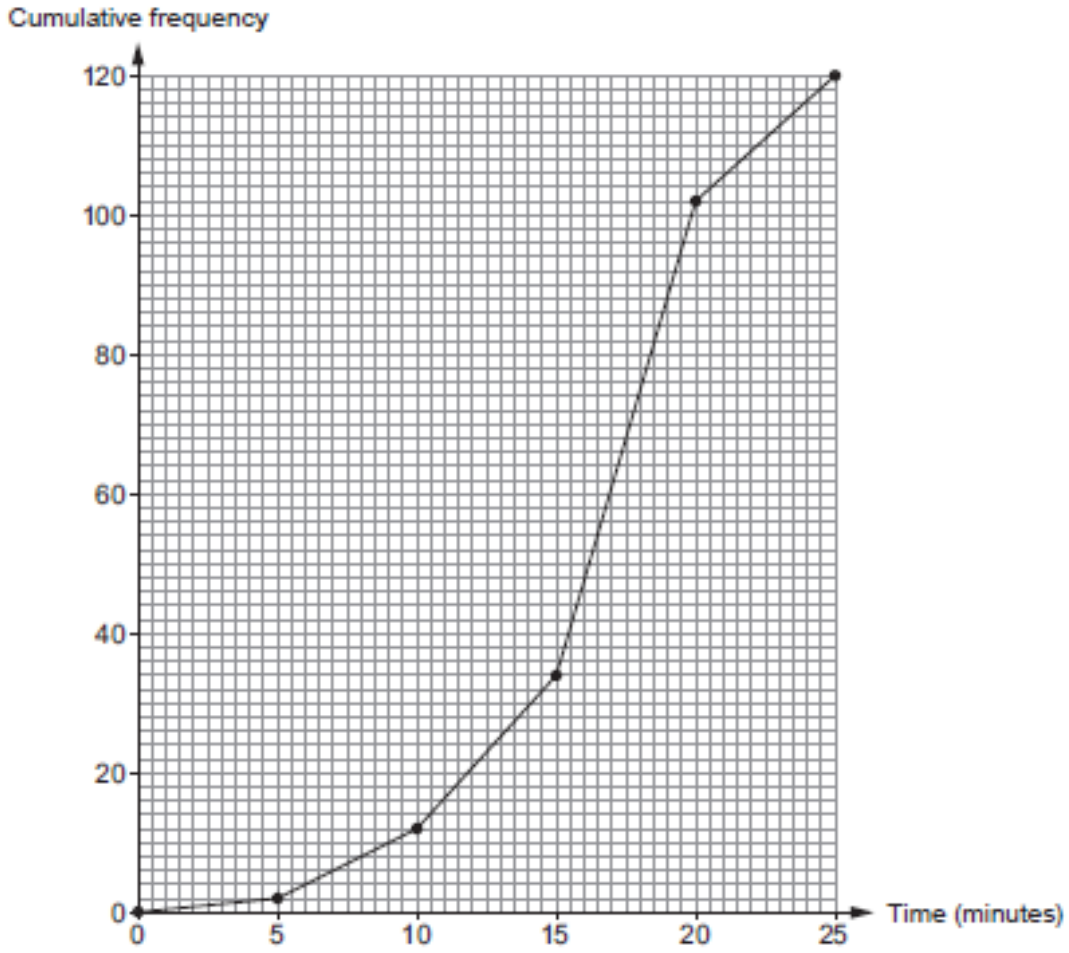
Meirion's Window Cleaning Business

No job too small!

Email: meirion@mwcb.cymru

Meirion is a window cleaner.
From Monday to Friday, he records how long he spends cleaning windows for each of his customers.

He draws a cumulative frequency diagram to display the findings.



(a) (i) Use Meirion's cumulative frequency diagram to find the median and interquartile range of the times he spends cleaning windows for each of his customers. [3]

Median ..... minutes

.....

Interquartile range ..... minutes

(ii) Meirion looks back at his raw data.
He finds that the median is actually 17 minutes 30 seconds.
Why is there a difference between the median from his cumulative frequency diagram and the actual median from his raw data? [1]

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(b) Meirion is looking at the time it took to clean individual customers' windows.
Find the number of customers whose windows took between 10 and 15 minutes to clean. [2]

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(c) Meirion thinks that for approximately 80% of his customers, he cleaned their windows in less than 20 minutes.
Is Meirion correct?
You must show all your working. [3]

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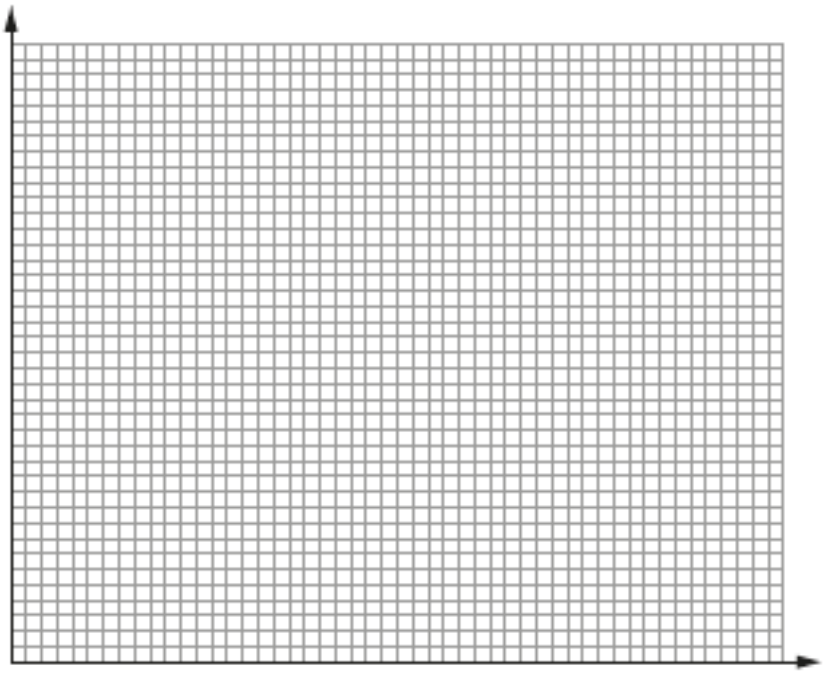
Petra is organising a prom for her year group.
The number of people attending the prom is likely to be between 20 and 80.

The cost of holding the prom at *Hotel Afonwen* would be as follows.

- Hire of the room: £100
- Food: £15 per person
- Welcome drink on arrival: £3 per person
- Decorations: £2 per person

(a) Draw a graph to illustrate the total cost of holding the prom for between 20 and 80 people. Use the graph paper below. [4]



(b) Petra decides to share all the costs equally between the people attending.

- Let £P be the price paid per person.
- Let N be the number of people attending the prom.

Write a formula for P, in terms of N. [3]

(c) Hiring a larger room at *Hotel Afonwen* costs £200.
The cost per person for food, welcome drinks and decorations remains the same.
If the total cost is £2240, how many people attend? [2]

Bethan builds a rectangular sheep pen.

(a) The perimeter fence of the sheep pen is 18 m long.
It costs her £1.10 for every 0·5 metres of fencing used to make the sheep pen.

(i) Calculate the cost of the fencing used to make this sheep pen. [2]

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Cost is £ .....

(ii) The length of Bethan's sheep pen is two times its width.
Find the length and width of this sheep pen.
You must show your working. [2]

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Length is ..... metres

Width is ..... metres

(b) Bethan decides to build a new sheep pen.
The perimeter fence of the new sheep pen is 16 m long.
The length of the new sheep pen is 3 metres longer than the width.

Form an equation and solve it to find the dimensions of this new sheep pen. [3]

Length is ..... metres

Width is ..... metres

6. *Truetool* is a tool hire company.

Hire charges	
The cost of hiring a cement mixer in £:	13 × number of days + 26
The cost of hiring a jet washer in £:	9 × number of days + 38

(a) Sara hires a cement mixer for 5 days and a jet washer for 7 days from *Truetool*.
How much **change** would she get from £200? [3]

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(b) Geraint hired a cement mixer for a number of days.
Lois hired a jet washer for the same number of days.
They each paid the same amount of money.

For how many days did they each hire these tools from *Truetool*?
You must show all your working. [3]

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Number of days .....

7. *(a)* The Headteacher of Ysgol Bro Gwyn investigates building a new bike shed.

Bike sheds are built on a rectangular base of width x metres and length y metres.

(i) Which is the correct expression for the perimeter of the bike shed?
Circle your answer. [1]

xy metres xy square metres $x + y$ metres $2x + y$ metres $2x + 2y$ metres

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(ii) The Headteacher is given a formula for working out the number of bikes, b, that can be stored in a bike shed that has a base of width x metres and length y metres.

He is told the formula only works when
- x and y are whole numbers
- x is greater than 3
- y is greater than 5

The formula is as follows:

$$b = \frac{6xy}{5}$$

- According to the formula, how many bikes can be stored in a bike shed 5 metres wide and 8 metres long?
Circle your answer. [1]

3 7 42 48 240

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- A bike shed x metres wide and y metres long can hold b bikes.
According to the details the Headteacher has been given, what is the formula for calculating the length, y metres?
Circle your answer. [1]

$y = \frac{b-5}{6x}$ $x = \frac{6b}{5y}$ $y = \frac{b+5}{6x}$ $y = \frac{5b}{6x}$ $y = \frac{6x}{5b}$

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(b) The Headteacher decides to place signs around the school site to stop pupils using their bikes on grassed areas.

He introduces a new sign to pupils in the school newsletter.
The size of the sign in the newsletter is shown below.

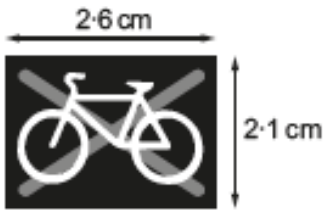

Diagram not drawn to scale

A mathematically similar new sign is placed near the side of the playing field.

Diagram not drawn to scale

It is 33·6 cm high.
How wide is this sign? [2]

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Width is ..... cm

(a) Gustav is making some scones for his sister's birthday party.

<u>Recipe to make **12 scones**</u>

450g self raising flour
2 teaspoons of baking powder
75g butter
50g caster sugar
2 eggs
225ml milk

Bake at **428°F** for 10 to 15 minutes

(i) How much self raising flour will Gustav need to make 30 scones?
Circle your answer. [1]

900g 1000g 1100g 1125g 1350g

(ii) In the recipe, the temperature of the oven is given in degrees Fahrenheit, F.
The temperature gauge on Gustav's oven shows degrees Celsius, C.

The formula below is used to convert Fahrenheit into Celsius.

$$C = \frac{5F - 160}{9}$$

At what temperature should Gustav bake the scones?
Give you answer in degrees Celsius. [2]

..... °C

(b) Gustav also makes a birthday cake for his sister.
The top face of the cake is in the shape of a trapezium.

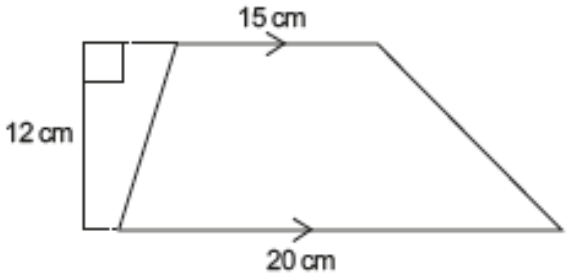

Diagram not drawn to scale

Gustav plans to ice the top face of the cake.
Each packet of icing costs £1.35 and is enough to cover 65 cm^2.
He has to buy complete packets of icing.

(i) Calculate the area of the top face of the cake Gustav has made. [2]

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(ii) How much will it cost Gustav to ice the top face of the cake?
You must show all your working. [3]

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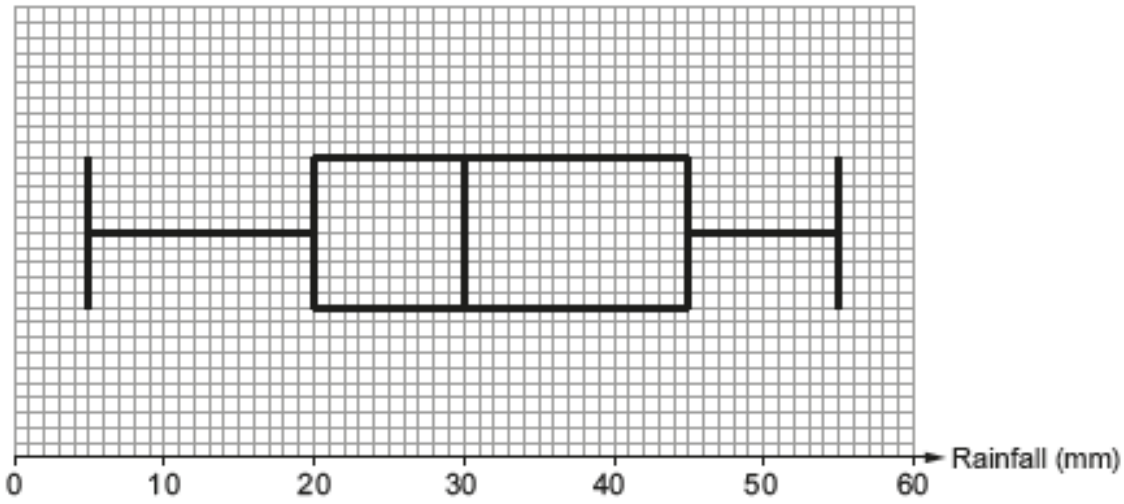
(iii) Gustav also plans to decorate the cake with small pieces of marzipan shaped as shown below.
The top face of each piece of marzipan is a rhombus.
Will these pieces of marzipan tessellate?

Yes ☐ No ☐

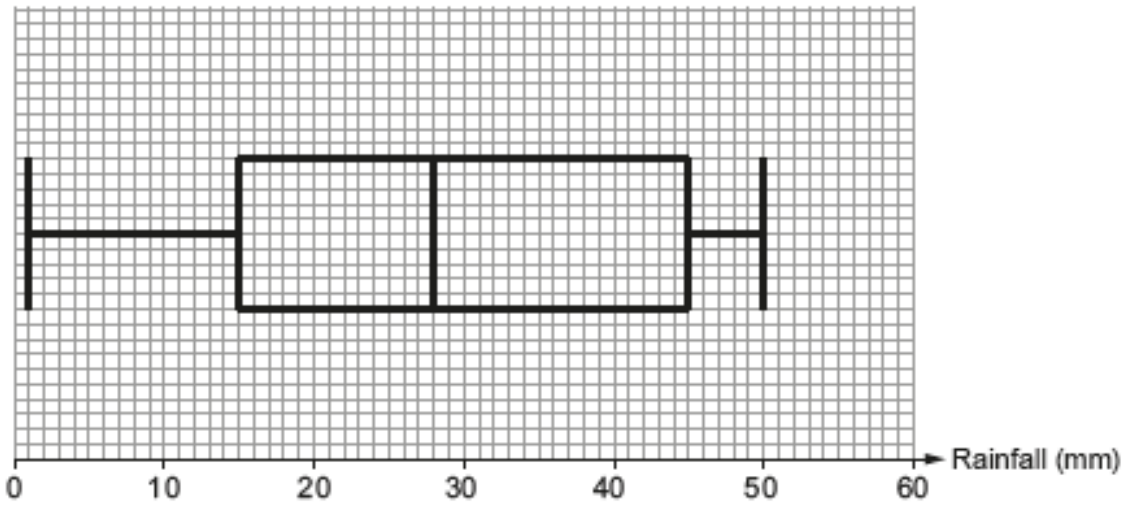
Draw a simple diagram to support your answer. [1]

The following box-and-whisker plots illustrate the daily rainfall for April 2016 in Trefwen and in Nawrby.

April rainfall in Trefwen



April rainfall in Nawrby



(a) Complete the following table. [4]

	Range	Median	Interquartile range
Trefwen	..... mm	..... mm	..... mm
Nawrby	..... mm	..... mm	..... mm

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(b) Iona is going on holiday next April.
She is hoping for good weather, with hardly any rain.
She decides to go to Nawrby.
Give a reason to support Iona's decision.
Include values for both Trefwen and Nawrby. [1]

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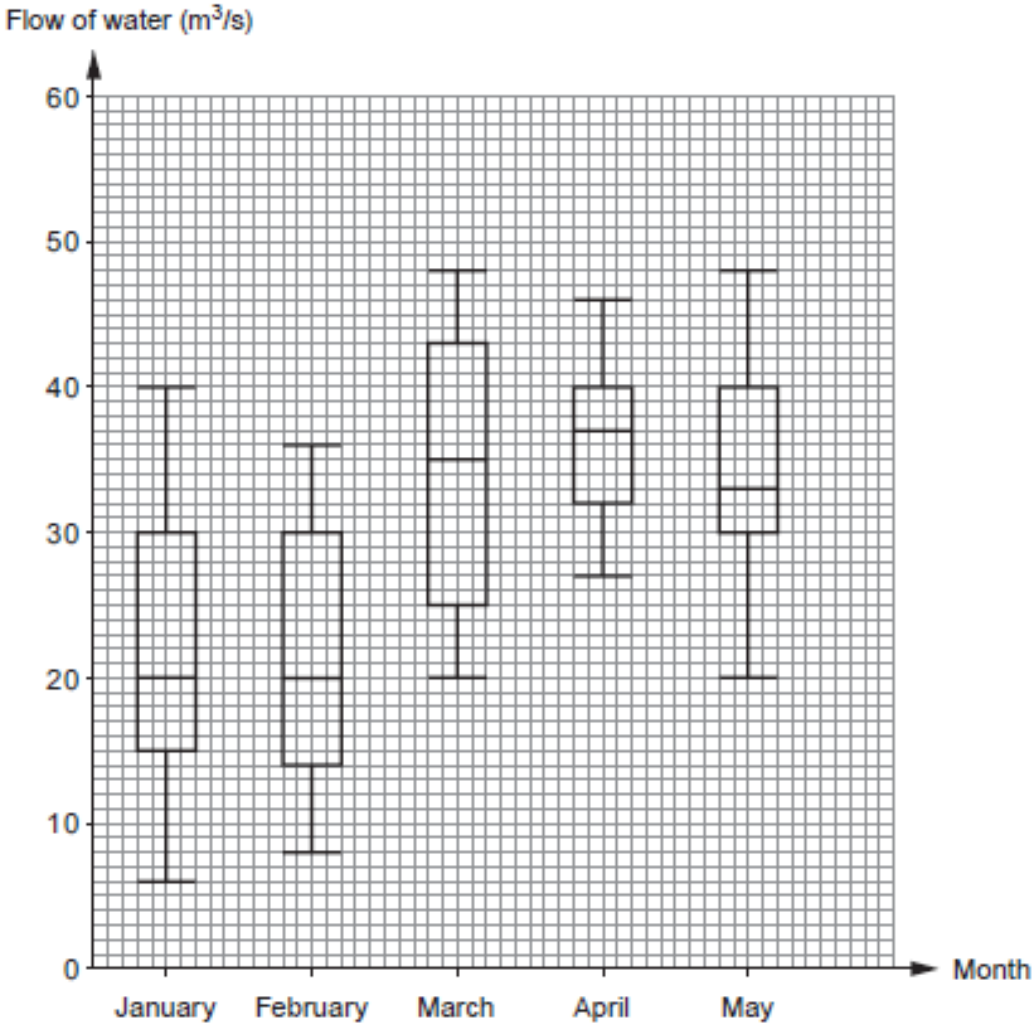
The following box and whisker plots show the flow of water through a drain, measured in m^3/s.
The flow of water was measured at 11 a.m. each day for the first 5 months of the year.



(a) In which of the five months was the median flow of water the greatest? [1]

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(b) In which of the five months was the range of the flow of water the greatest? [1]

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(c) Iona is writing some statements for a report on the flow of water through the drain. Complete each of the statements given below.

(i) 'Both the upper quartiles and medians in the months of .....

and ..... were the same.' [1]

(ii) '25% of the results in March show the flow of water was greater than

..... m^3/s.' [1]

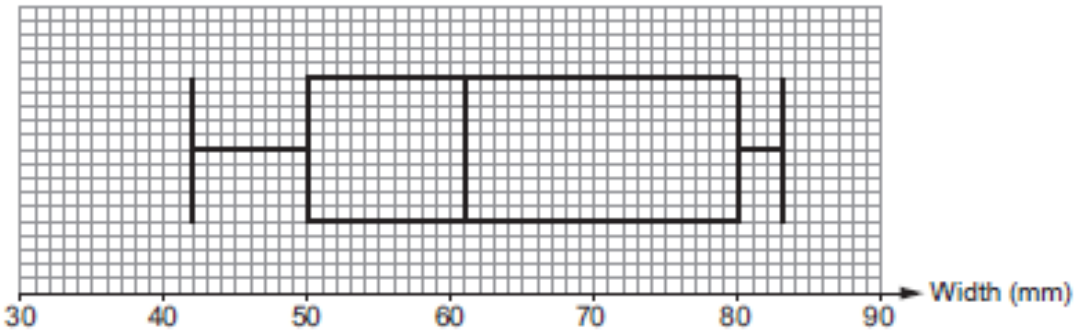
(d) Circle either TRUE or FALSE for each of the following statements. [2]

25% of the results in January show the flow of water was less than 6 m^3/s.	TRUE	FALSE
The units, m^3/s, measure the volume of water passing through the drain each second.	TRUE	FALSE
The mean flow of water in April was **certainly** greater than 36 m^3/s.	TRUE	FALSE
The month with the greatest difference between the lower quartile and the median was May.	TRUE	FALSE

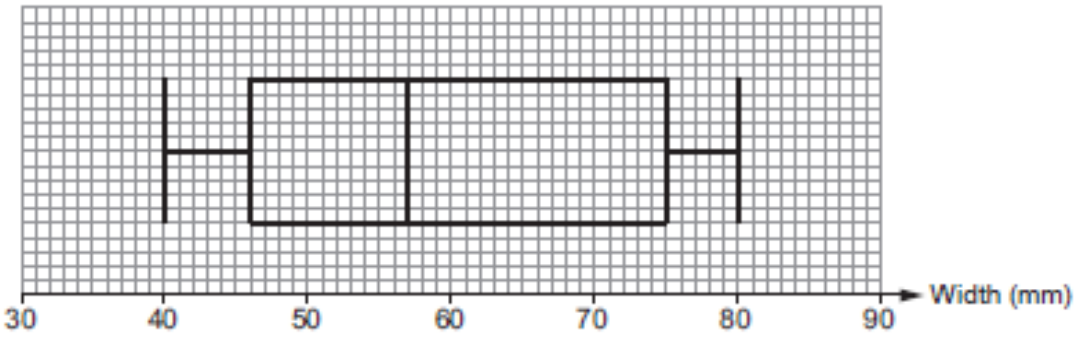
Lena has three apple trees in her garden.
She has one Gala apple tree, one Orange Pippin tree and one Pink Lady tree.
She picks 50 apples from each of the 3 trees.
She records the width of each apple, as shown.

Lena constructs box and whisker diagrams for the widths of the apples collected from each of the three trees.

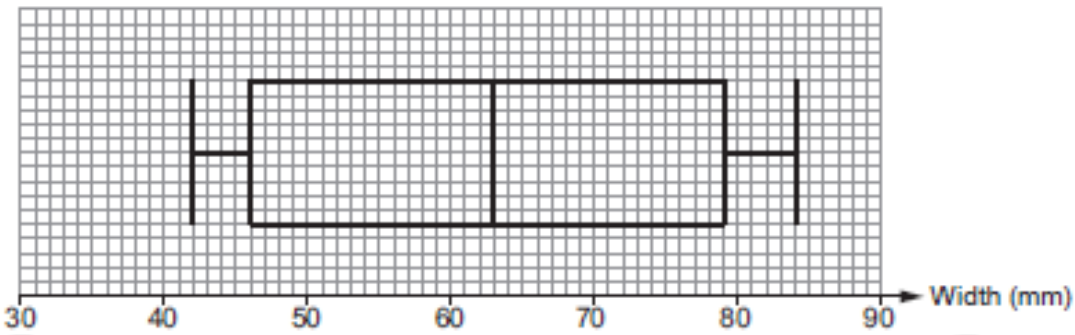
Gala apple tree



Orange Pippin apple tree



Pink Lady apple tree



(a) Complete each of the following statements.

(i) 'Apples from the ..... apple tree have the least median width.

The median width of apples recorded for this tree is ..... mm.' [1]

(ii) 'The range of the widths of apples recorded for the Gala apple tree

is ..... mm.' [1]

.....

(iii) 'The ..... apple tree has apples with the greatest interquartile range of widths.

The interquartile range of the widths of apples recorded for this tree

is ..... mm.' [2]

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(b) Which tree has a higher proportion of larger apples?
You must give a reason for your answer. [1]

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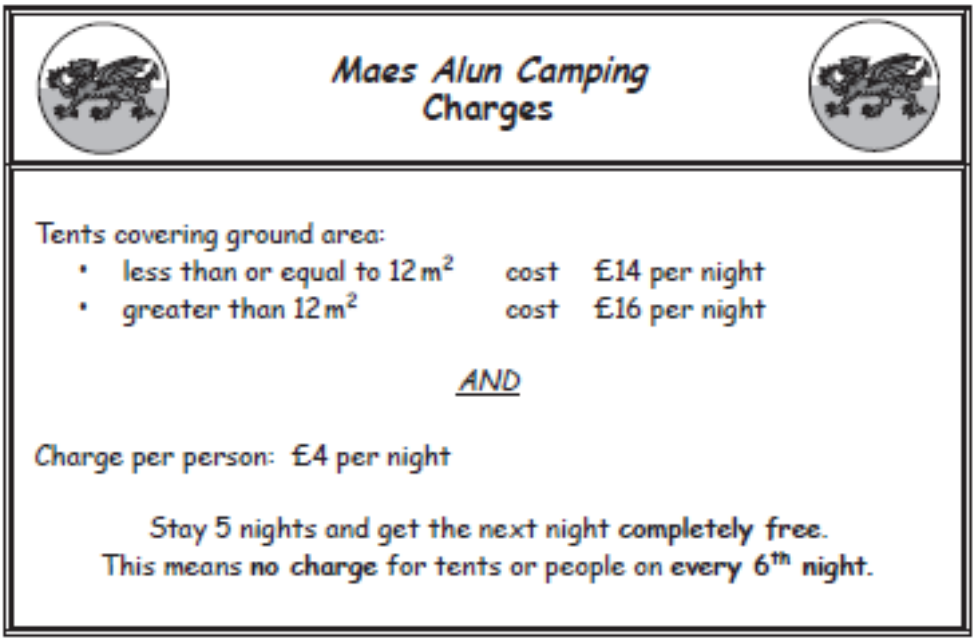
In this question, you will be assessed on the quality of your organisation, communication and accuracy in writing.



Rhodri and Lars are planning a camping holiday, staying at *Maes Alun Camping*.
They are going to

- take only one tent between them,
- take a tent covering a rectangular ground area, measuring 2·5 metres by 4·4 metres,
- both stay for a total of 12 nights.

Their holiday is just 8 weeks away.
They **each** plan to save £15 per week from now until their holiday in 8 weeks' time.

Will the amount they save be enough to pay for their holiday?
You must show all your working. [8 + 2 OCW]

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Lazar wants to send a package to Germany.
He looks at pricing charts for three different companies, *ParcelMax*, *DirectGo* and *Pack2save*.

ParcelMax
Total cost =
Sum of the 3 dimensions in cm × £0.60

DirectGo
Total cost =
Volume measured in cm^3 × £0.01

Pack2save
Total cost =
Total area of all 6 faces measured in cm^2 × £0.02

Lazar's parcel is a cuboid measuring 10 cm by 20 cm by 30 cm.

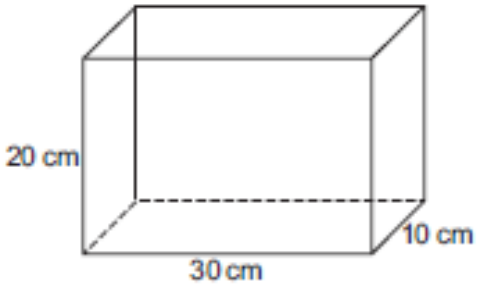

Diagram not drawn to scale

(a) Find the cost of sending the parcel for each of the three different companies.
Give each of your answers in pounds (£).

(i) *ParcelMax* [2]

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(ii) *DirectGo* [3]

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(iii) *Pack2save* [4]

(b) What is the **percentage saving** that Lazar will make by choosing the cheapest option rather than the most expensive option? [2]

Bethan builds a rectangular sheep pen.

(a) The perimeter fence of the sheep pen is 18 m long.
It costs her £1.10 for every 0·5 metres of fencing used to make the sheep pen.

(i) Calculate the cost of the fencing used to make this sheep pen. [2]

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Cost is £ .....

(ii) The length of Bethan's sheep pen is two times its width.
Find the length and width of this sheep pen.
You must show your working. [2]

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Length is ..... metres

Width is ..... metres

(b) Bethan decides to build a new sheep pen.
The perimeter fence of the new sheep pen is 16 m long.
The length of the new sheep pen is 3 metres longer than the width.

Form an equation and solve it to find the dimensions of this new sheep pen. [3]

Length is ..... metres

Width is ..... metres

(b) Gustav also makes a birthday cake for his sister.
The top face of the cake is in the shape of a trapezium.

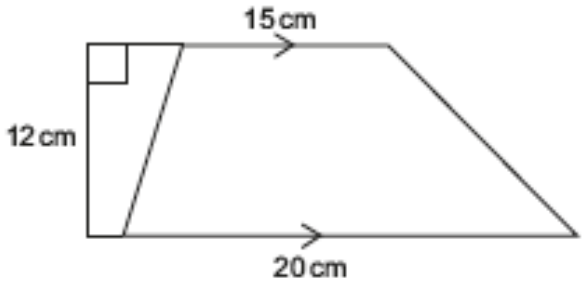

Diagram not drawn to scale

Gustav plans to ice the top face of the cake.
Each packet of icing costs £1.35 and is enough to cover 65 cm^2.
He has to buy complete packets of icing.

(i) Calculate the area of the top face of the cake Gustav has made. [2]

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(ii) How much will it cost Gustav to ice the top face of the cake?
You must show all your working. [3]

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(iii) Gustav also plans to decorate the cake with small pieces of marzipan shaped as shown below.
The top face of each piece of marzipan is a rhombus.
Will these pieces of marzipan tessellate?

Yes ☐ No ☐

Draw a simple diagram to support your answer. [1]

(a) Bronwen and Alvaro decide to keep some alpacas on their farm in Patagonia.

Alvaro knows it is possible to keep between 4 and 6 alpacas on each acre of suitable farmland.
They have 13 hectares of farmland that they want to use to keep the alpacas.
Bronwen knows that 1 acre is 4046·86 m^2 and that 10000 m^2 = 1 hectare.

Use this information to advise Bronwen and Alvaro on the number of alpacas they could keep on their farmland.
State any assumption that you make.
You must show all your working. [6]

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Assumption:

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Bethan has a plan of her rectangular lawn, which she has labelled *ABCD*.
She wants to cut out a triangular flowerbed from her lawn, labelled *GHD*.
Bethan decides that *AG* : *GD* should be 1 : 2 and that *DH* = *HC*.

She has made a sketch shown below.

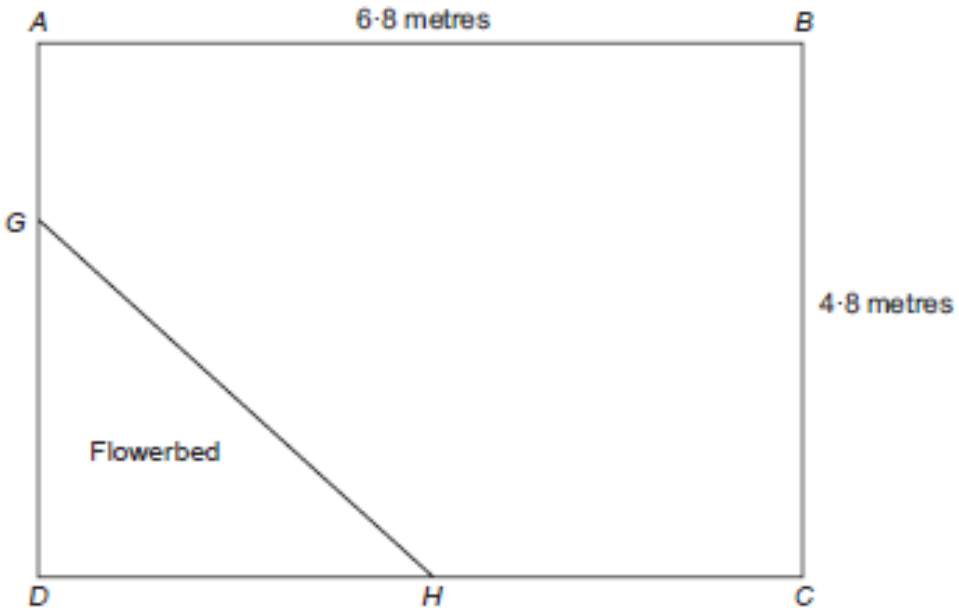

Diagram not drawn to scale

(a) Calculate the length of *GH*. [4]

(b) The flowerbed, *GHD*, is to have a flexible edging strip placed around its perimeter. The edging strip costs £3.50 per metre and can only be bought in strips of complete metres.

- How much will the edging strip cost Bethan?
- What length of strip will be left over? Give your answer in centimetres. [4]

Cost £ .....

..... cm left over

The wire window guard shown below is to be made.

Diagram not drawn to scale

The length of the sides of each small wire square shown is 3·3 cm.

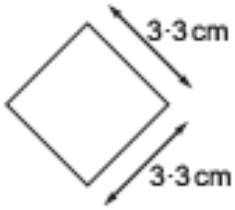

Diagram not drawn to scale

Llinos considers the length of the diagonal of each small square.

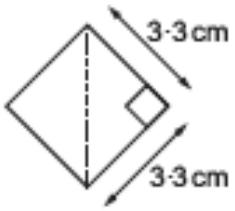

Diagram not drawn to scale

She says,

The height of the window guard is equal to 9.5 diagonals of the square.
The width of the window guard is equal to 11 diagonals of the square.

(a) Calculate the length of the diagonal of a small square.
Give your answer correct to 1 decimal place. [3]

(b) Calculate the area of the **window guard**.
You must show all your working. [3]

. Marta buys a new television.

(a) Marta wants to fit the television in a bookcase on the wall.
In the shop she forgot to write down the length of the television.
She did write down the height and the diagonal of the screen.

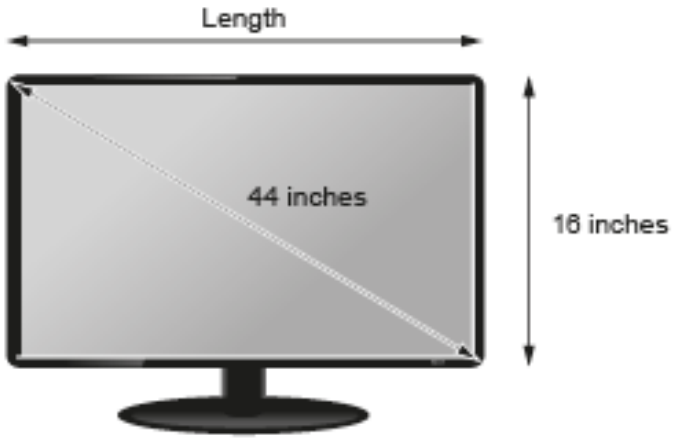

Diagram not drawn to scale

Marta needs to know the length of the screen before she opens the box, in case she wants to return the television.
Calculate the length of the screen.
Give your answer correct to 2 significant figures. [4]

Length is ..... inches, correct to 2 significant figures.

Bethan has a plan of her rectangular lawn, which she has labelled *ABCD*.
She wants to cut out a triangular flowerbed from her lawn, labelled *GHD*.
Bethan decides that *AG* : *GD* should be 1 : 2 and that *DH* = *HC*.

She has made a sketch shown below.

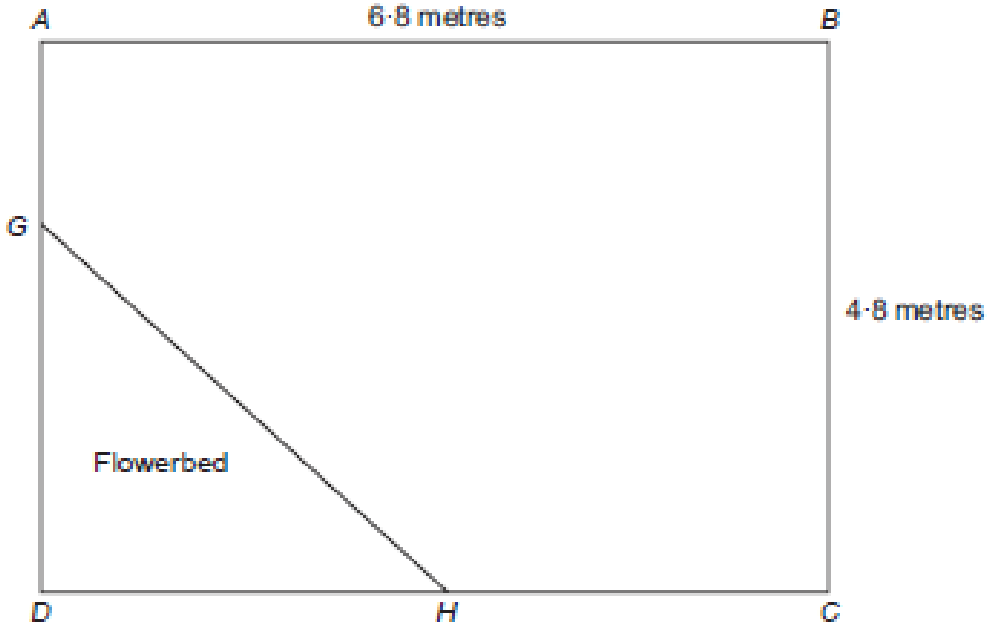

Diagram not drawn to scale

(a) Calculate the length of *GH*. [4]

(b) The diagram shows the cross-section of one part of her run.

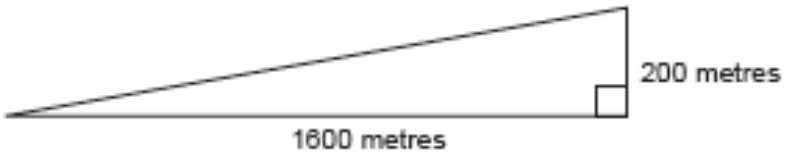

Diagram not drawn to scale

Calculate the angle of elevation of the road. [3]

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(c)

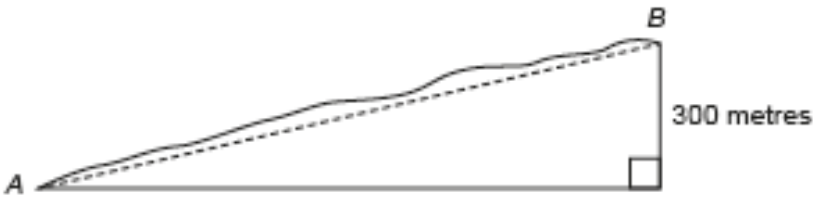

Diagram not drawn to scale

Gwenda runs on another section of uneven road from *A* to *B*.
The rise in this section of the road is 300 metres.
The angle of elevation of *B* from *A* is 10°.

(i) Calculate an estimate of how far Gwenda has run.
State any assumption you have made. [4]

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Assumption: .....

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(ii) What is the impact of your assumption on your answer? [1]

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Ursula is lying on her surfboard 180 metres away from the foot of a vertical cliff.
The height of the cliff is 146 metres.

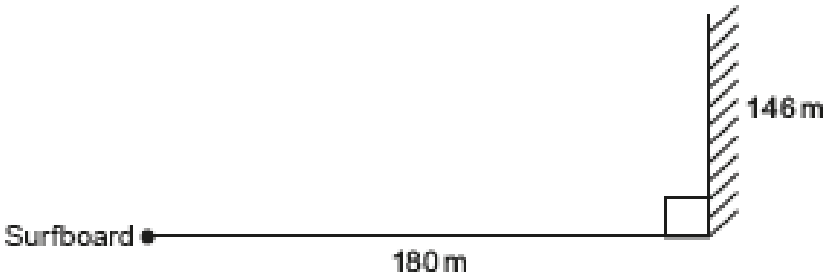


Diagram not drawn to scale

Ursula was told that if the angle of elevation of the top of the cliff from her lying position is between 42° and 45°, it is safe for her to attempt to stand on her surfboard.

Calculate the angle of elevation of the top of the cliff from Ursula's position lying on her surfboard.

State whether it is

- safe for Ursula to attempt to stand, or
- not safe as she is too near the cliff, or
- not safe as she is too far out at sea. [4]

The diagram below shows where Levi wants to attach a string of lights to his house.

Levi wants to attach a single string of lights from *B* to *A* and then from *A* to *C*.
The diagram below shows the measurements Levi has taken.

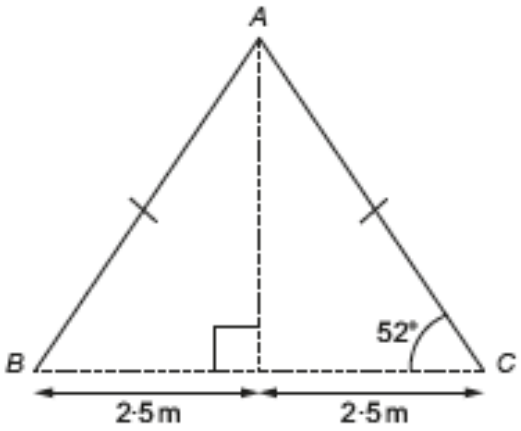


Diagram not drawn to scale

He spends £410 at the electrical store buying a string of lights.
After putting up the lights, Levi finds he has 6 metres of the string of lights left over at one end.

How much did the electrical store charge Levi, per metre, for the string of lights? [6]

Rhodri has carried out an experiment to measure the diameters of 20 spherical dust particles, in microns.

Here are his results.

Diameter, d (microns)	Frequency
$1 \leqslant d < 2$	2
$2 \leqslant d < 4$	6
$4 \leqslant d < 5$	8
$5 \leqslant d < 9$	4

(a) (i) Calculate an estimate of the mean diameter of a dust particle. [4]

(b) Yesterday morning, Simon only managed to sample 10 people.
He calculated the mean hand span of these 10 people to be 22·8 cm.

Yesterday afternoon, Simon recorded the hand spans of a **further** 20 people.

The results for these 20 people are shown in the frequency table below.

Hand span, to the nearest mm	Frequency
20·0 cm to 20·8 cm	2
20·9 cm to 21·7 cm	3
21·8 cm to 22·6 cm	10
22·7 cm to 23·5 cm	5

Calculate an estimate of the mean of all **30 hand spans** that Simon measured yesterday. [6]

(c) What could Simon do to improve his estimate of the mean hand span of people in Wales? [1]

Alptai is a ski resort.
The daily snowfall for January is given in the table below.

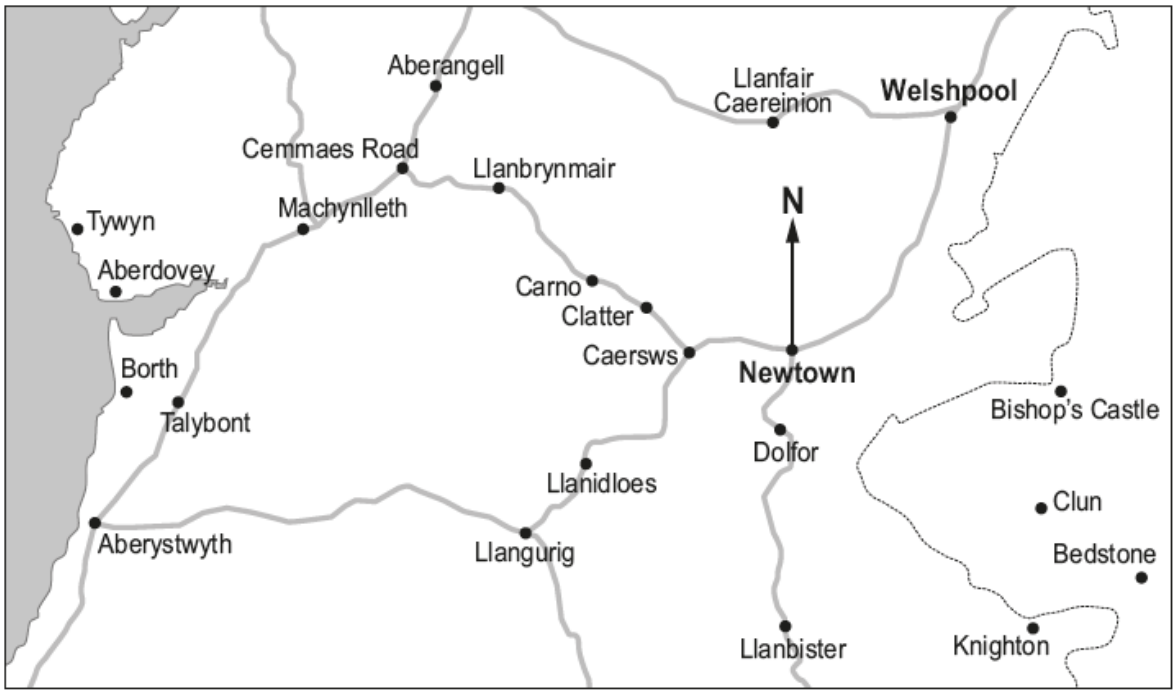
Daily snowfall, s (cm)	Number of days
$0 \leqslant s < 5$	10
$5 \leqslant s < 10$	16
$10 \leqslant s < 20$	4
$20 \leqslant s < 30$	0
$30 \leqslant s < 50$	1

(a) Calculate an estimate for the mean daily snowfall for the 31 days of January. [4]

(b) Circle either TRUE or FALSE for each of the following statements. [2]

The table above shows that there definitely was snowfall on each of the 31 days in January.	TRUE	FALSE
There were 16 days when the daily snowfall was less than 10 cm.	TRUE	FALSE
There was only 1 day with snowfall greater than or equal to 20 cm.	TRUE	FALSE
The modal group also contains the median daily snowfall.	TRUE	FALSE

4. The map shows a part of Wales.
The position of Newtown is shown on the map.



(a) Write down the bearing of Welshpool from Newtown. [1]

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(b) Name the place on the map that is on a bearing of 235° from Newtown. [2]

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(c) The distance from Newtown to Welshpool is approximately 14 miles by road.

(i) **Estimate** the distance by road from Welshpool to Llanfair Caereinion in miles. [1]

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..... miles

(ii) Megan lives in Cemmaes Road.
To travel to work, she starts by heading towards Machynlleth.
Her journey to work is approximately **40 km**.

Convert 40 km to miles. [2]

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..... miles

In which town or village could Megan work? [1]

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(d) A different map has a scale of 1 : 10 000.
Megan measures 3 cm on this map.
What distance does this represent in **metres**? [2]

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..... metres

. Pont y Ddraig (Dragon's Bridge) opened in Rhyl harbour in autumn 2013.

The harbour development cost £9·8 million.
£4·3 million of this money was spent on Pont y Ddraig.

(a) How much was spent on the rest of the harbour development in Rhyl?
Circle your answer. [1]

£55000 £550000 £5500000 £55000000 £550000000

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(b) A newspaper at the time said,
'Pont y Ddraig provides the final link in 15 miles of traffic-free cycling across Conwy and Denbighshire.'

Write 15 miles in kilometres. [2]

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(c) The height of the mast on the bridge is 148 feet.
Using the conversion 1 foot = 30 cm, calculate the height of the mast in **metres**. [3]

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(a)

Lotty and Rafael decide to enter a prize draw.
They agree to share any money they win in the ratio 2 : 3 respectively.
After winning a total of £2000, they think again and decide that Lotty's share should be increased by 30%.

(i) Rafael thinks that his share will be reduced by 30%.
Without any calculation, explain why Rafael's thinking is incorrect. [1]

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(ii) Calculate the amount of money Lotty wins after the decision is made to increase her share. [4]

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(iii) Find the ratio that is now used to share the money between Lotty and Rafael.
Express your answer in its simplest form. [3]

Lotty's winnings : Rafael's winnings = ... : .....

(b) In another prize draw, it was planned to give £5000 as the first prize.
To make it more popular, the organisers decide to increase this first prize by 26%.

The most efficient method of calculating the amount of the increased first prize is

$$1{\cdot}26 \times 5000.$$

The second prize was planned to be £3000, but it is now decided to decrease this prize by 6%.

Write down the most efficient method of calculating the amount of the decreased second prize.
You are not expected to work out the answer. [1]

(a) Jasmine entered herself, Sophie and Bryn as a group in a talent contest.
Bryn only had a minor part.

Bryn, Sophie and Jasmine won the contest.
They shared the prize money in the ratio 2 : 6 : 7, with Bryn getting the smallest share.
Jasmine won £560, the largest share.

(i) How much money did Bryn and Sophie each win? [4]

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Bryn receives £ .....

Sophie receives £ .....

(ii) Jasmine gave 15% of her winnings to charity.
How much did Jasmine have left? [2]

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(b) The talent contest is held once a year.
Every year, the cost of putting on the talent contest increases by 10% of the previous year's cost.
In summer 2014 the cost was £6600.

Calculate the cost of putting on the summer 2017 talent contest.
You must show all your working. [3]

Rhodri has carried out an experiment to measure the diameters of 20 spherical dust particles, in microns.

Here are his results.

Diameter, d (microns)	Frequency
$1 \leqslant d < 2$	2
$2 \leqslant d < 4$	6
$4 \leqslant d < 5$	8
$5 \leqslant d < 9$	4

(a) (i) Calculate an estimate of the mean diameter of a dust particle. [4]

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(ii) Rhodri measures the diameters of another 25 dust particles.

Rhodri is told,

> 'The ratio of dust particles with diameters less than 4 microns to those with diameters greater than or equal to 4 microns is 7 : 8.'

He finds this fact is true when he considers all 45 dust particles.

How many of the extra 25 dust particles have a diameter of less than 4 microns?
You must show your working. [3]

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(a) Gustav is making some scones for his sister's birthday party.

Recipe to make **12 scones**

450g self raising flour
2 teaspoons of baking powder
75g butter
50g caster sugar
2 eggs
225ml milk

Bake at **428°F** for 10 to 15 minutes

(i) How much self raising flour will Gustav need to make 30 scones?
Circle your answer. [1]

900g 1000g 1100g 1125g 1350g

(ii) In the recipe, the temperature of the oven is given in degrees Fahrenheit, *F*.
The temperature gauge on Gustav's oven shows degrees Celsius, *C*.

The formula below is used to convert Fahrenheit into Celsius.

$$C = \frac{5F - 160}{9}$$

At what temperature should Gustav bake the scones?
Give you answer in degrees Celsius. [2]

..... °C

(a) *Organics4U* is planning to have its headquarters in Wales.
The manager has instructed Ffion to look for a site for the headquarters.

Here are the instructions that Ffion has been given by her manager.

'Find the point that is
- an equal distance between Wrexham and Aberporth, and
- an equal distance between Caernarfon and Swansea.

The new headquarters needs to be within 20 miles of this point.'

On the map below, shade the region, **in Wales**, that Ffion should identify for her manager. [4]

(b) *In this part of the question, you will be assessed on the quality of your organisation, communication and accuracy in writing.*

Organics4U has 16 vehicles on the road every working day.
The company has 6 vans and 10 trucks.

Ffion has the following information for each type of vehicle.

Type of vehicle	Average distance travelled per litre (km per litre)	Average distance travelled per day (km per day)
Van	8	256
Truck	5·5	704

The fuel used by all of the 16 vehicles costs £1.10 per litre.
Use this information to calculate the **total** fuel bill for 1 working day.
You must show all your working. [6 + 2 OCW]

(a) 36 000 people took part in a survey to find out their favourite type of TV programme. The pie chart shows the results.

(i) How many people chose *Drama* as their favourite type of TV programme? You must show your working. [3]

(ii) How many more people chose *Sport* rather than *News* as their favourite type of TV programme? You must show your working. [3]

(iii) Twice as many women as men chose *Talent shows* as their favourite type of TV programme.
Calculate how many women chose *Talent shows*.
You must show your working. [3]

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(b) 1000 people were asked,

'Should news programmes include details of the weather?
Yes or No?'

70% of the people answered 'yes'.
A pie chart is to be drawn to represent the answers to this question.
What size would the angle be to represent the answer 'yes'? [2]

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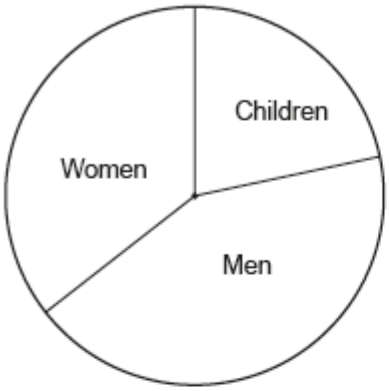
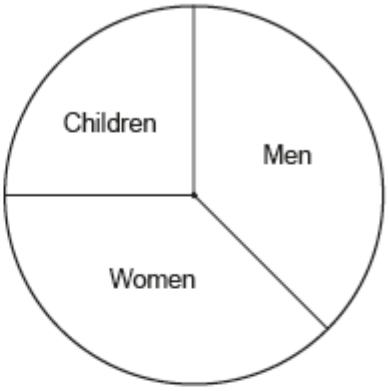
Angle representing 'yes' is ..... °

3. Tomos is looking at gym memberships for *Hadon's Gym* and *Workout Palace*.
Each of these gyms displays its membership in a pie chart.

Hadon's Gym	*Workout Palace*
	

(a) About what percentage of the members at *Hadon's Gym* are children?
Circle your answer. [1]

10% 20% 30% 40% 50%

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(b) Which of the following is the best estimate for the percentage of the members at *Workout Palace* who are women?
Circle your answer. [1]

25% 28% 30% 32% 38%

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(c) Tomos says,
'There are more men with membership at *Hadon's Gym* than at *Workout Palace*.'

Is Tomos **certain** to be correct?
You must give a reason for your answer. [1]

Yes ☐ No ☐

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Lloyd has carried out a survey in his school.
He surveyed 300 pupils.
Below is a section from his questionnaire.

1.	Which year group are you in? .....
2.	Do you like the colours of the school uniform? .....
3.	What is your favourite colour? .....

(a) Afterwards, Lloyd thinks he should have given option boxes in questions 1 and 2.
What could these option boxes be? [2]

Question 1:

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Question 2:

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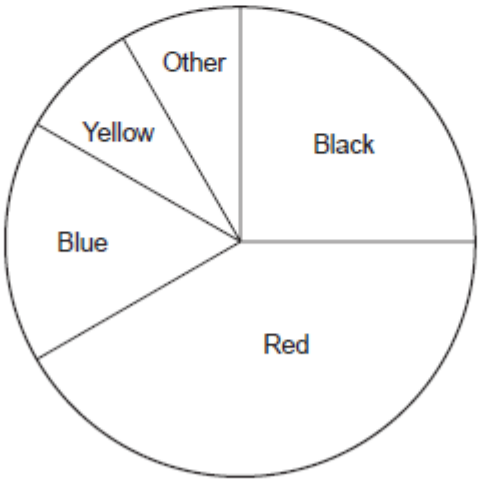
(b) A pie chart displaying the results from question 3 of the questionnaire is shown below.



(i) Which colour was chosen by 75 pupils as their favourite colour?
Circle your answer. [1]

Black Red Blue Yellow Other

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(ii) What fraction of the pupils said that blue was their favourite colour?
Give your answer in its simplest form. [3]

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Lazar wants to send a package to Germany.
He looks at pricing charts for three different companies, *ParcelMax*, *DirectGo* and *Pack2save*.

ParcelMax
Total cost =
Sum of the 3 dimensions in cm × £0.60

DirectGo
Total cost =
Volume measured in cm^3 × £0.01

Pack2save
Total cost =
Total area of all 6 faces measured in cm^2 × £0.02

Lazar's parcel is a cuboid measuring 10 cm by 20 cm by 30 cm.

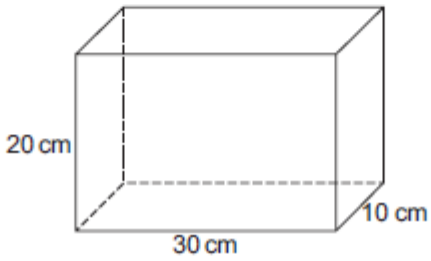

Diagram not drawn to scale

(a) Find the cost of sending the parcel for each of the three different companies.
Give each of your answers in pounds (£).

(i) *ParcelMax* [2]

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(ii) *DirectGo* [3]

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(iii) *Pack2save* [4]

(b) What is the **percentage saving** that Lazar will make by choosing the cheapest option rather than the most expensive option? [2]

Rhodri has carried out an experiment to measure the diameters of 20 spherical dust particles, in microns.

Here are his results.

Diameter, d (microns)	Frequency
$1 \leqslant d < 2$	2
$2 \leqslant d < 4$	6
$4 \leqslant d < 5$	8
$5 \leqslant d < 9$	4

(a) (i) Calculate an estimate of the mean diameter of a dust particle. [4]

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(ii) Rhodri measures the diameters of another 25 dust particles.

Rhodri is told,

> 'The ratio of dust particles with diameters less than 4 microns to those with diameters greater than or equal to 4 microns is 7 : 8.'

He finds this fact is true when he considers all 45 dust particles.

How many of the extra 25 dust particles have a diameter of less than 4 microns? You must show your working. [3]

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(b) Rhodri studies a cylindrical cell under his microscope.
The height of the cell is 2 microns.
The circumference of the cell is 5 microns.

Calculate the volume of the cell he sees under the microscope.
Give your answer in microns^3, correct to 1 significant figure. [5]

Volume is ..... microns^3

Elin's old fish tank is leaking.

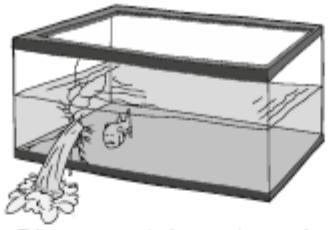

Diagram not drawn to scale

This old fish tank is in the shape of a cuboid.
The base of this tank measures 60 cm by 40 cm.
Before the leak, the height of the water level in Elin's old fish tank was 45 cm.

Elin decides to replace her fish tank with a cylindrical one.

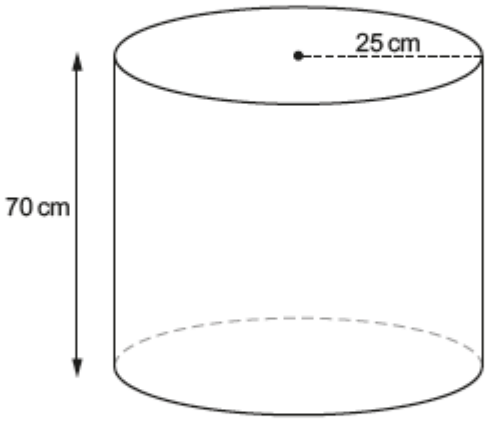

Diagram not drawn to scale

She selects a new cylindrical fish tank that has a radius of 25 cm and a height of 70 cm.

Will all the original contents, including the water and the fish, fit into this cylindrical tank?
You must show all your working. [4]

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Glenda plans to drive from Flint to Cardiff.
On a long journey, her average speed is usually 42 mph.
Last time she drove from Flint to Cardiff it took her $3\frac{1}{2}$ hours.

(a) Use this information to calculate the distance between Flint and Cardiff. [2]

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..... miles

(b) Give a possible reason why your answer in *(a)* is only an estimate of the distance between Flint and Cardiff. [1]

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(a) What is 3 hours 12 minutes in hours?
Circle your answer. [1]

3·102 hours 3·12 hours 3·15 hours 3·2 hours 3·25 hours

(b) The first 40 miles of a journey took 1 hour 15 minutes.
The remaining 80 miles were completed in 2 hours 15 minutes.
Calculate the average speed, in mph, of the 120-mile journey. [3]

Kari is making a jigsaw puzzle.
She has designed the pattern on a piece of paper.
Kari plans to make each piece of the jigsaw a different colour.

Part of her plan is shown below.

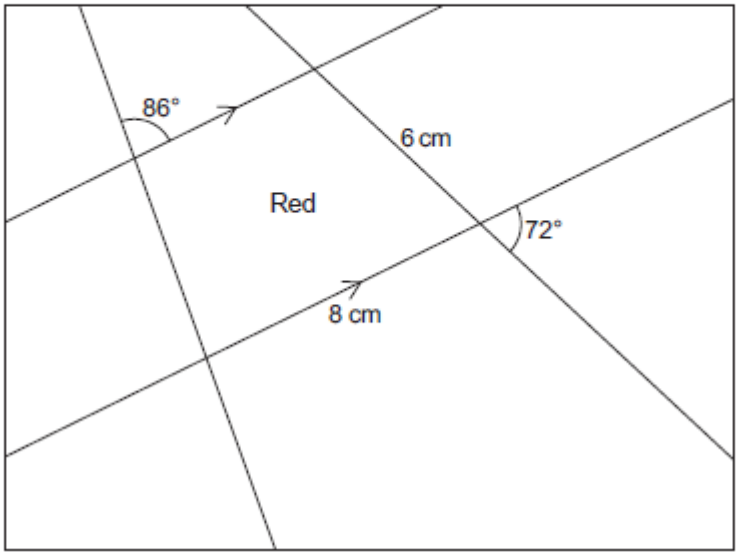

Diagram not drawn to scale

Kari now sketches a diagram of the red piece of the jigsaw, which is shown below.
She shows some extended lines and indicates all the angles she needs to find.

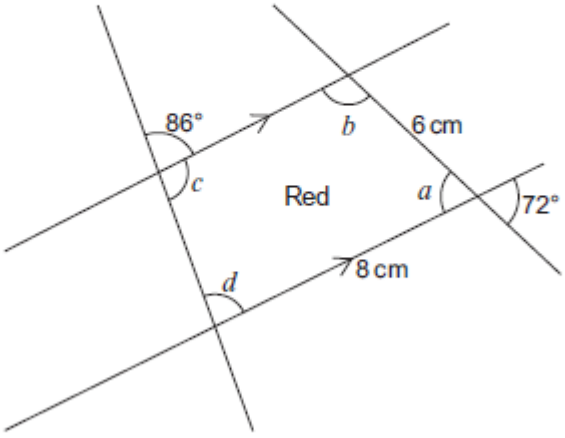

Diagram not drawn to scale

Find the 4 missing angles in the red piece of the jigsaw.
Draw the red piece of Kari's jigsaw accurately.
One side has been drawn for you. [6]

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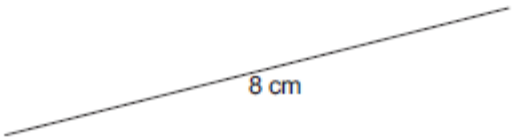
a = ... °, b = ... °, c = ... °, d = ... °

Space for drawing the red piece of jigsaw:



A number of paths are to be laid to join three new office buildings.
A sketch of the architect's plan is shown below.

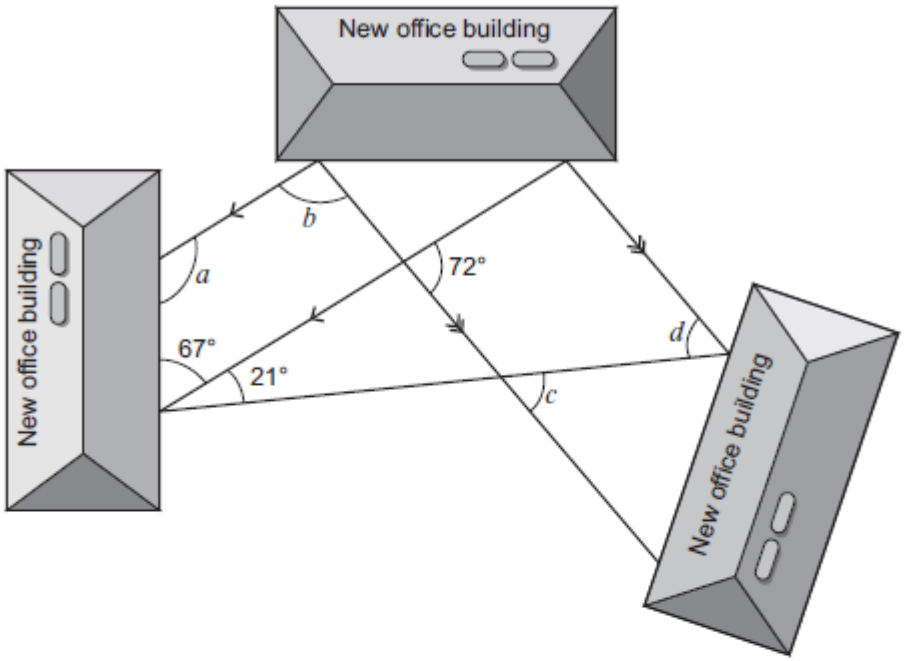


Diagram not drawn to scale

The architect has shown a number of the angles in his planning for the new paths.

Calculate the size of each of the angles a, b, c and d. [4]

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a = ... ° b = ... ° c = ... ° d = ... °