

Surname	Centre Number	Candidate Number
First name(s)		0



**GCSE**

3310U40-1



**THURSDAY, 7 NOVEMBER 2024 – MORNING**

**MATHEMATICS – NUMERACY  
UNIT 2: CALCULATOR-ALLOWED  
INTERMEDIATE TIER**

1 hour 45 minutes

**ADDITIONAL MATERIALS**

A calculator will be required for this paper.

A ruler, a protractor and a pair of compasses may be required.

**INSTRUCTIONS TO CANDIDATES**

Use black ink or black ball-point pen. Do not use gel pen or correction fluid.

You may use a pencil for graphs and diagrams only.

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** questions.

Write your answers in the spaces provided in this booklet. If you run out of space, use the additional page(s) at the back of the booklet, taking care to number the question(s) correctly.

Take  $\pi$  as 3.14 or use the  $\pi$  button on your calculator.

**INFORMATION FOR CANDIDATES**

You should give details of your method of solution when appropriate.

Unless stated, diagrams are not drawn to scale.

Scale drawing solutions will not be acceptable where you are asked to calculate.

The number of marks is given in brackets at the end of each question or part-question.

In question **5**, the assessment will take into account the quality of your linguistic and mathematical organisation, communication and accuracy in writing.

For Examiner's use only		
Question	Maximum Mark	Mark Awarded
1.	4	
2.	6	
3.	5	
4.	8	
5.	6	
6.	4	
7.	13	
8.	16	
9.	8	
10.	10	
<b>Total</b>	<b>80</b>	

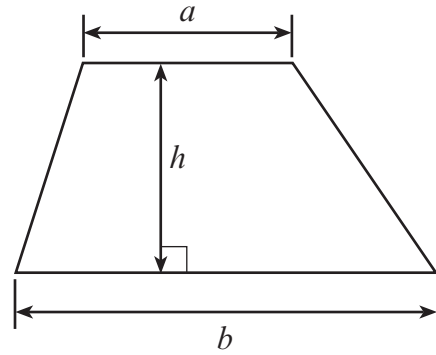
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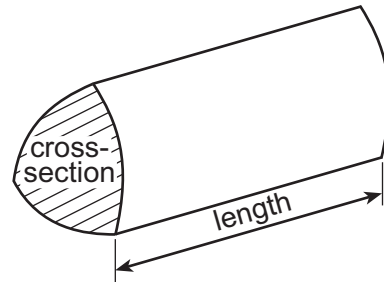
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## Formula List – Intermediate Tier

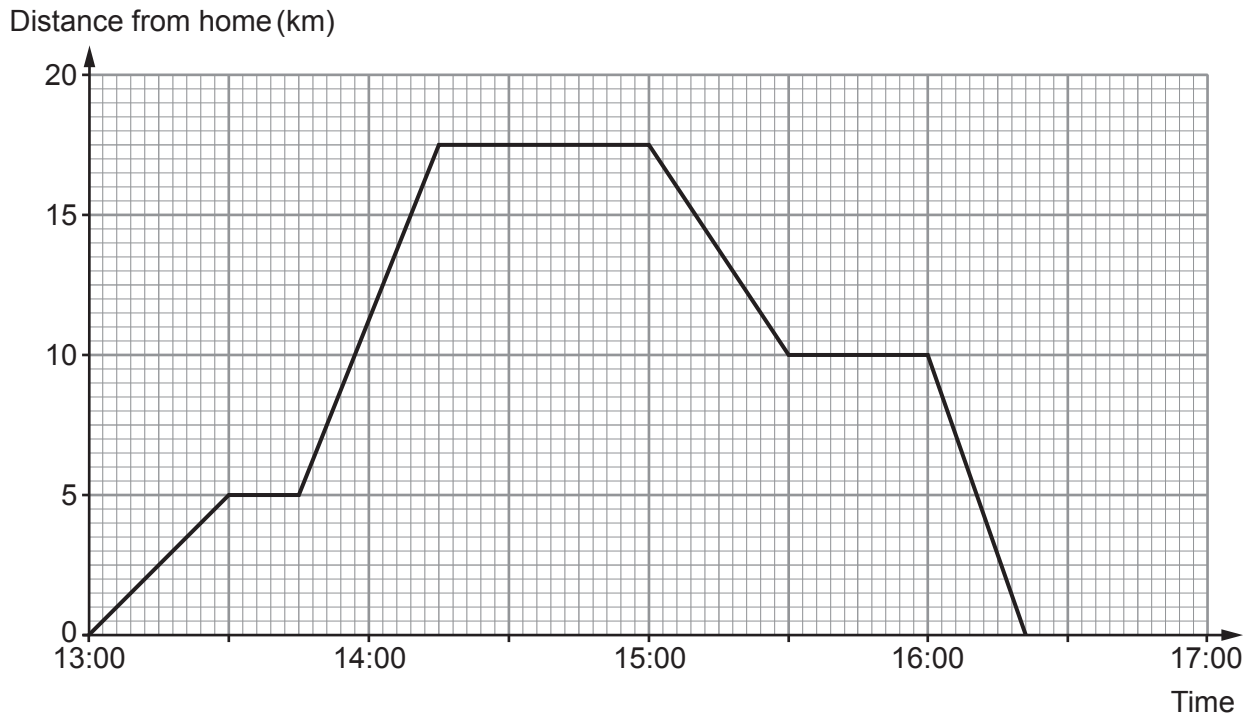
Area of trapezium =  $\frac{1}{2}(a + b)h$



Volume of prism = area of cross-section  $\times$  length



1. Yesterday, Jemila cycled along a straight track from home to the beach and back.



(a) For how many minutes was Jemila 17.5 km from home? [1]

..... minutes

(b) At what time did Jemila first start cycling in the direction of home?  
Circle your answer. [1]

13:30      14:15      15:00      15:30      16:00

(c) By 15:30, how many kilometres in total had Jemila cycled? [1]

..... km

(d) Jemila was due to get home at 16:30.  
She arrived home early.  
How many minutes early was she? [1]

..... minutes


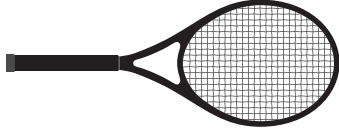

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2. (a) Lewis buys an annual discount card to use in a sports shop.  
He pays £9.95 for the discount card.

For one year, Lewis gets 15% off anything he buys in this sports shop when he shows his discount card.

During the year, Lewis buys the following three items.

Full price <b>before</b> discount		
		
Trainers £55	Tennis racket £18	T-shirt £12

How much did Lewis save during the year by using his discount card?  
Remember that Lewis had to buy his discount card.  
You must show all your working.

[4]

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- (b) Sally buys clothes from the same sports shop.  
She does not have a discount card.

In a sale, there is  $\frac{1}{6}$  off the full price of a hoodie.

On the last day of the sale, customers could buy the hoodie for half of the sale price.



Sally buys the hoodie on the last day of the sale.  
What fraction of the original full price of the hoodie does Sally pay?

[2]

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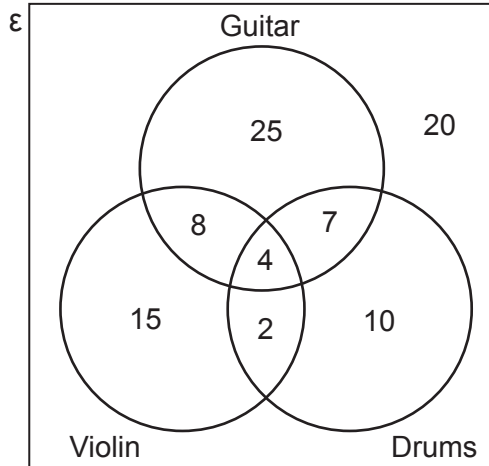
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3. A music teacher asked all Year 7 students to choose which musical instruments they would like to be able to play. They could choose from three instruments: guitar, drums and violin. The students could choose as many of these instruments as they wished.

The Venn diagram shows the results.



(a) How many students did not choose an instrument? [1]  
 ..... students

(b) How many students chose all 3 instruments? [1]  
 ..... students

(c) How many Year 7 students were there? [1]  
 ..... students

(d) How many students chose 2 or more instruments? [1]  
 ..... students

(e) Which was the least popular instrument? [1]  
 How many students chose this instrument?  
 .....

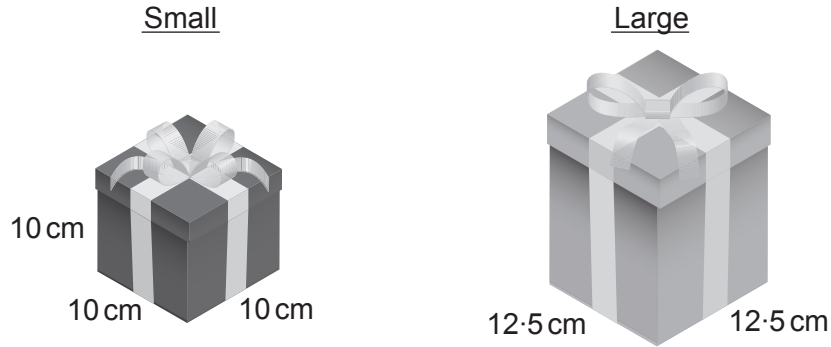
Least popular instrument .....

Number of students .....



4. PressiePacs is a company that designs and makes presentation boxes.

- (a) Two designs, small and large, are shown below.  
PressiePacs wants the large box to have **twice** the volume of the small box.



*Diagrams not drawn to scale*

Calculate the height of the large box.

[5]

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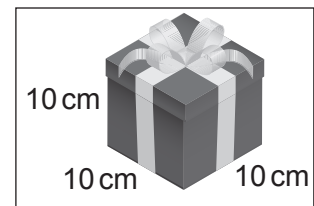
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- (b) Customers can use this formula to calculate the cost of a presentation box:

$$\text{Cost in } \pounds = \text{Surface area of the box in cm}^2 \div 240$$



Calculate the cost of the **small** presentation box.

[3]

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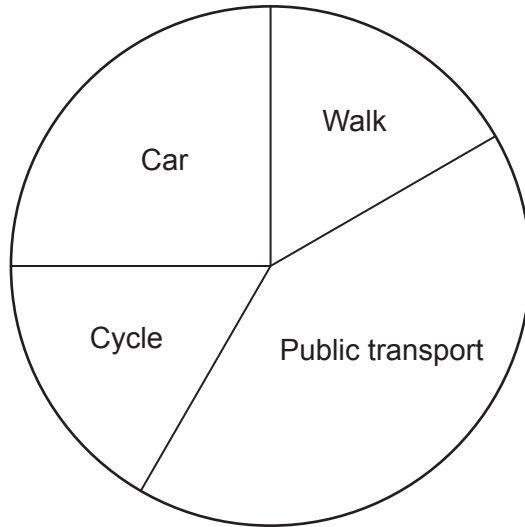
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Cost of the small presentation box is £ .....



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

72 000 people were asked to state their main way of travelling to work. The results are shown accurately in the pie chart.



The people who said 'Public transport' travel to work **either** by bus **or** by train.  
 For every person who travels to work by bus, there are 4 people who travel by train.  
 Calculate the number of people who travel to work by **train**.  
 You must show all your working.

[4 + 2 OCW]

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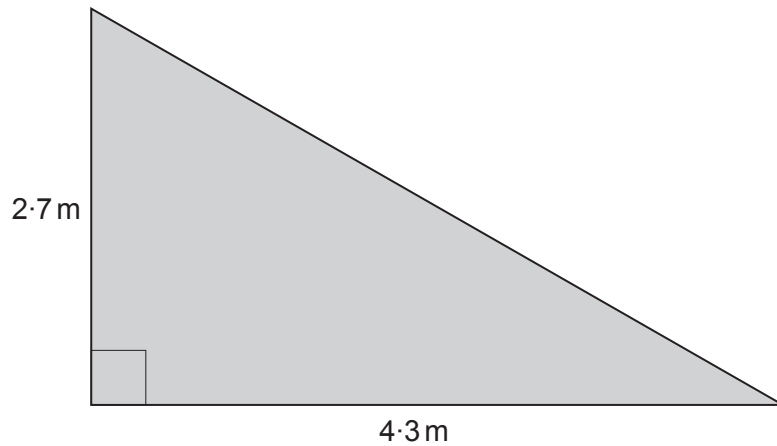
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6. Alfred has been given the job of varnishing a floor. A plan of the floor is shown in the diagram below.



*Diagram not drawn to scale*

One tin of varnish contains enough to cover an area of  $1.6 \text{ m}^2$ .

Alfred says,

I only need 3 tins of varnish to do this job.

Is Alfred correct?

Yes

No

You must show all your working.

[4]

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7. (a) Steffan uses 654 kWh of electricity in a three-month period.

Electricity costs £0.30 per kWh.  
The standing charge for the three-month period is £54.  
Steffan has to pay VAT at 5% on the **total** cost.

Calculate Steffan's electricity bill.  
You must show all your working.

[5]

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(b) Steffan always leaves his fridge-freezer turned on.  
His fridge-freezer uses electricity costing £2.31 per week.  
Electricity costs £0.30 per kWh.  
Calculate the number of kWh of electricity Steffan's fridge-freezer uses **per day**.  
You must show all your working.

[3]

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(c) Steffan is thinking of buying the fridge-freezer shown below.

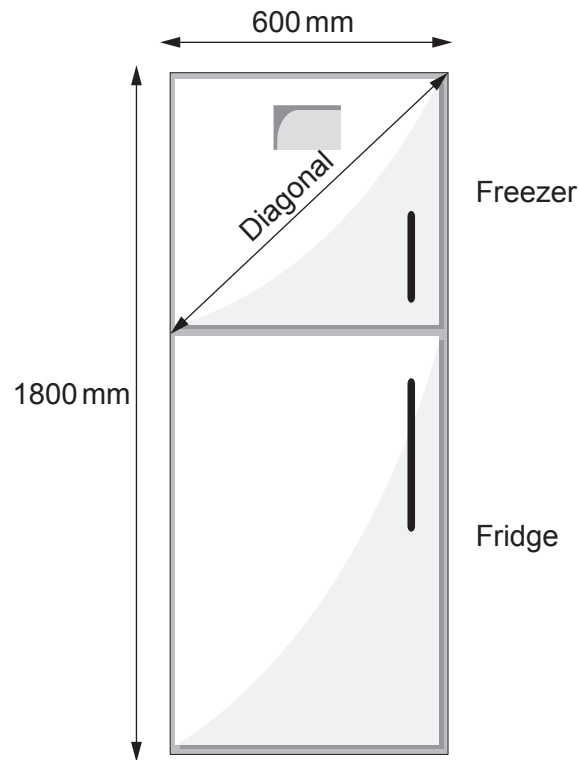


Diagram not drawn to scale

Steffan needs to check that the **freezer** compartment of this fridge-freezer has enough room.

The height of the freezer door is  $\frac{2}{5}$  of the total height of the fridge-freezer.

Calculate the length of the **diagonal** of the freezer door.

Give your answer in millimetres.

You must show all your working.

[5]

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(b) Cheryl keeps fit by running every day.



(i) Cheryl has a mass of 143 pounds.  
What is Cheryl's mass in kg?

[2]

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..... kg

(ii) Cheryl burns 690 calories per hour when she runs.  
Eating a banana gives Cheryl 92 calories of energy.

Cheryl wants to burn off the energy in this banana.  
For how many minutes would she need to run?  
You must show all your working.

[3]

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..... minutes

(iii) Cheryl runs at an average speed of 9 km per hour.  
Yesterday morning she ran for 38 minutes.  
Calculate the distance Cheryl ran yesterday morning.

[3]

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..... km



9. (a) The base of a flagpole is fixed to horizontal ground. It is held vertically by a straight rod of length 3.8 m. The rod is fixed to the ground and to a point 1.5 m from the top of the flagpole. The flagpole and the rod are shown in the diagram below.

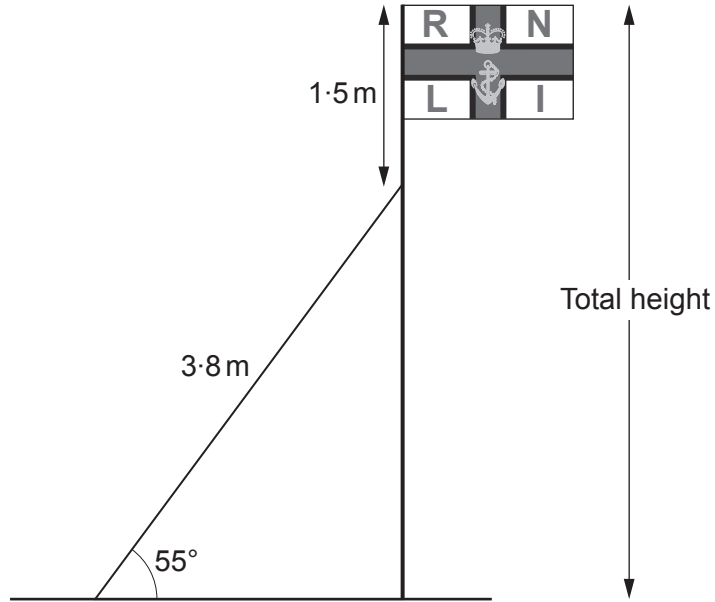


Diagram not drawn to scale

Calculate the **total** height of the flagpole.  
Give your answer correct to the nearest centimetre.

[4]

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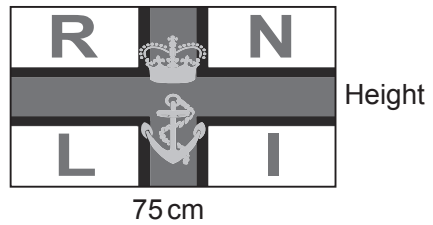
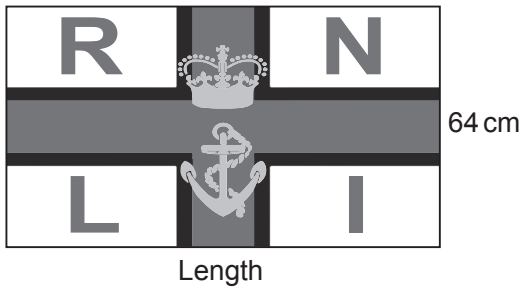
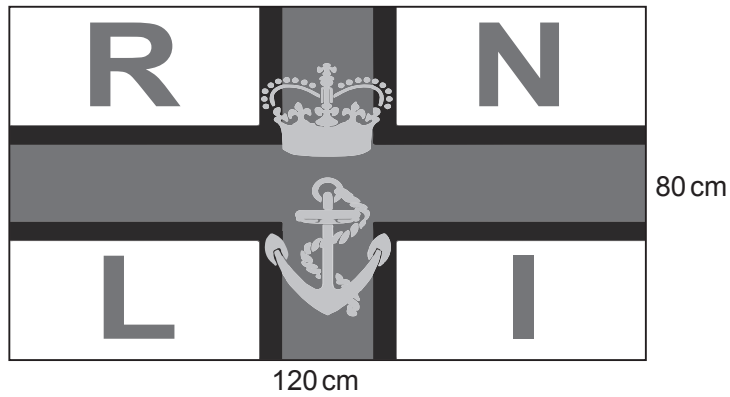
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(b) Mathematically similar large, medium and small flags are made.



*Diagrams not drawn to scale*

(i) Calculate the length of the medium flag. [2]

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Length of the medium flag is ..... cm

(ii) Calculate the height of the small flag. [2]

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Height of the small flag is ..... cm



10. Aderyn is a company that makes bird feeders.

Squirrels often try to steal food from bird feeders.

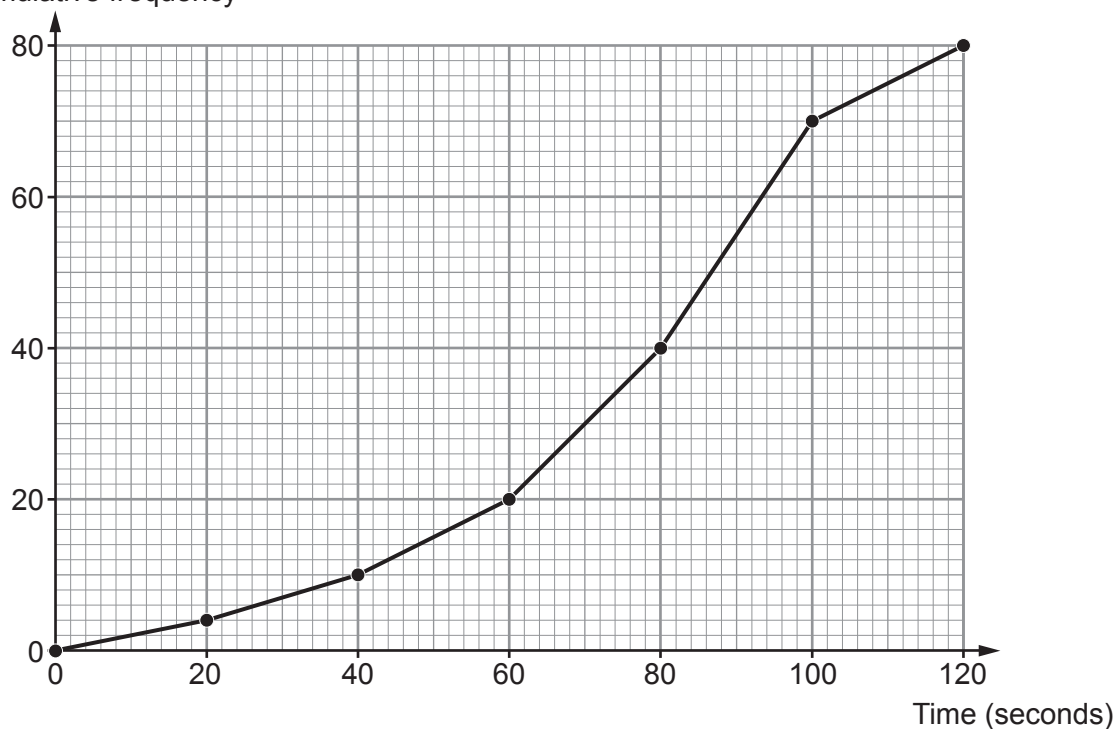
To make this more difficult, Aderyn has designed a **new** bird feeder. Aderyn tests its new feeder to check how long it takes squirrels to reach the food inside.

The results are displayed in the cumulative frequency diagram below.



New bird feeder

Cumulative frequency



- (a) Aderyn has the following information about the time it took squirrels to reach the food in its **original** bird feeder.

Original bird feeder	
Modal group	60 to 80 seconds
Median time	75 seconds
Interquartile range	20 seconds



Aderyn compared the times squirrels take to reach the food in the original bird feeder and the times they take to reach food in the new bird feeder.

(i) Complete this sentence:

'The modal group for the new bird feeder is between ..... and ..... seconds.'

Does the modal group for the new bird feeder imply that there is an improvement in the times? [1]

Yes  No

(ii) Use the cumulative frequency diagram and the table to give the best estimate to complete each of the following sentences.

I. 'The difference between the median times is ..... seconds.' [1]

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II. 'The difference between the interquartile ranges of the times is ..... seconds.' [2]

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(b) Use the cumulative frequency diagram to give the best estimate to complete the following sentence. [3]

'20% of the squirrels took ..... seconds or more to reach the food in the new bird feeder.'

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- (c) The population density of grey squirrels in forests depends on the variety of tree that grows there.

Variety of tree	Typical population density of grey squirrels per km <sup>2</sup>
Oak	1200
Chestnut	100
Pine	45



Rhian says,

I know that Maesgwyn forest has only one variety of tree:  
oak, chestnut or pine.

Maesgwyn forest covers an area of 21 500 m<sup>2</sup>.  
There are 24 grey squirrels living in Maesgwyn forest.

From this information, which variety of tree is most likely to be found in Maesgwyn forest?

You must show working to support your answer.

[3]

Oak

Chestnut

Pine

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