

Candidate Name	Centre Number				Candidate Number			
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GCSE

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

2nd SPECIMEN PAPER SUMMER 2017

1 HOUR 45 MINUTES

ADDITIONAL MATERIALS

A calculator will be required for this paper.
A ruler, protractor and a pair of compasses may be required.

INSTRUCTIONS TO CANDIDATES

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

Answer **all** the questions in the spaces provided in this booklet.

Take π as 3.14 or use the π 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.

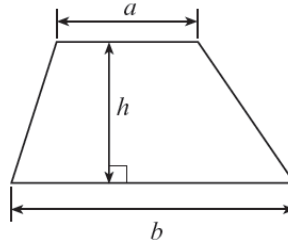
The number of marks is given in brackets at the end of each question or part-question.

The assessment will take into account the quality of your linguistic and mathematical organisation, communication and accuracy in writing in question **4(c)(i)**.

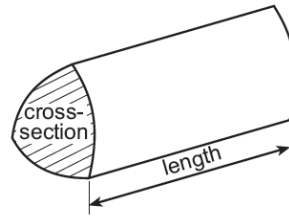
For Examiner's use only		
Question	Maximum Mark	Mark Awarded
1.	5	
2.	2	
3.	4	
4.	11	
5.	6	
6.	3	
7.	7	
8.	5	
9.	8	
10.	3	
11.	7	
12.	8	
13.	6	
14.	5	
TOTAL	80	

Formula list

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




Volume of a prism = area of cross section \times length

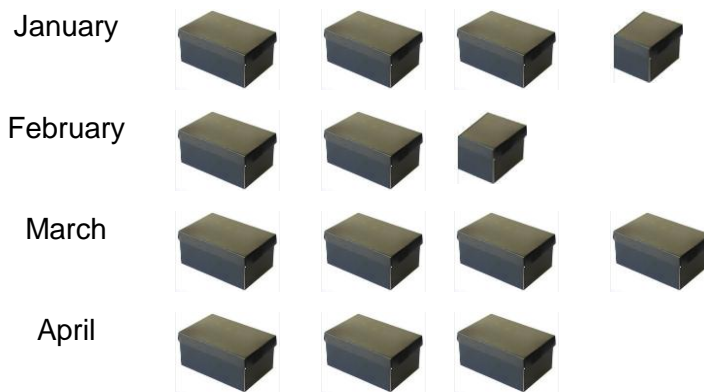


2. A pair of trainers is sold in a box.



The number of pairs of trainers sold each month from January to April is shown in the pictogram.

The symbol  represents 100 pairs of trainers



- (a) What is the approximate range of the numbers of pairs of trainers sold each month?
Circle your answer.

[1]

100 150 200 250 300

- (b) The total number of trainers sold from January to April is 1300.
What is the mean of the number of pairs of trainers sold each month?
Circle your answer.

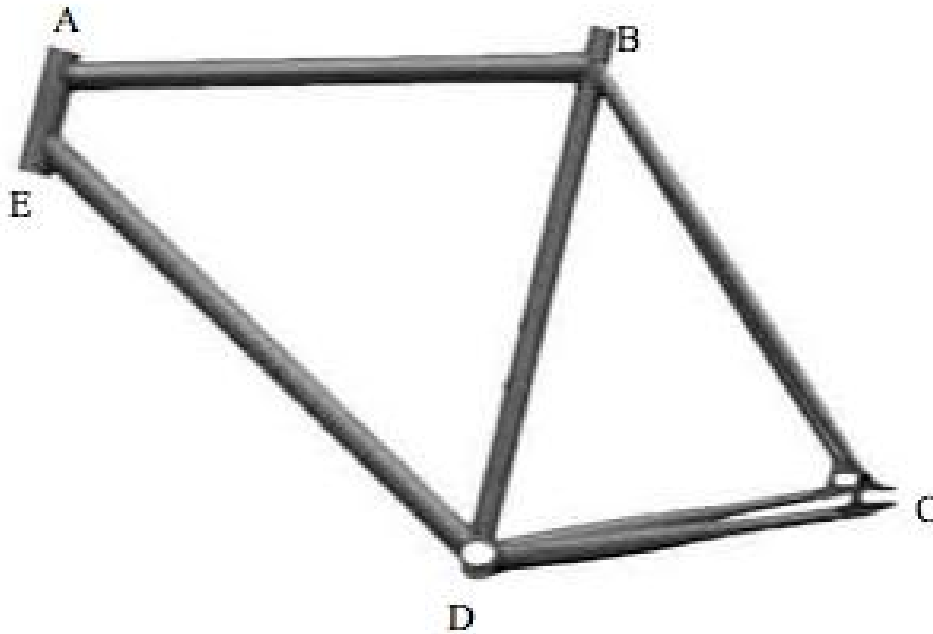
[1]

250 300 325 380 400

3. Bikes are built around a frame.



The diagram below is a scale drawing of a bike frame.
It is drawn to a scale of 1: 8.



(a) Write down an approximate length of the cross bar AB .
Give your answer in **metres**.

[2]

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(b) Is AE parallel to BD ?
Use angle facts to explain your answer.

[2]

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4. Boat owners are charged to keep their boats in a harbour.



Charges for a North Wales harbour are given in the table below.

Period	Price per metre (£ per metre) exclusive of VAT	Notes
Annual	320	Minimum length of boat 9 m
Six monthly	180	Minimum length of boat 7 m
Monthly	40	No minimum length
<p><u>Notes</u></p> <ul style="list-style-type: none"> • VAT is charged at a rate of 20%. • All charges are per metre; any part metre is charged as a complete metre. • Combinations of the periods are allowed. For example, for exactly 7 months, pay for 6 months then pay for an extra month, or pay monthly for each of the 7 months. 		

(a) **Including VAT**, how much would the **monthly** charge be for a 10 m boat?
Circle your answer.

[1]

£40 £48 £400 £480 £4800

(b) **Excluding VAT**, how much would the **six monthly** charge be for an
8.2 m boat?

[1]

£180 £1440 £1620 £1944 £1728

(c) (i) *You will be assessed on the quality of your organisation, communication and accuracy in writing in this part of the question.*

Lars owns a 9.3 m boat.
He wants to keep his boat in the harbour for 11 months.
Which option should he choose?

You should consider all possibilities, including VAT.
Show all your working.

[6 + OCW 2]

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(ii) What is the greatest saving that Lars could make by selecting your option? [1]

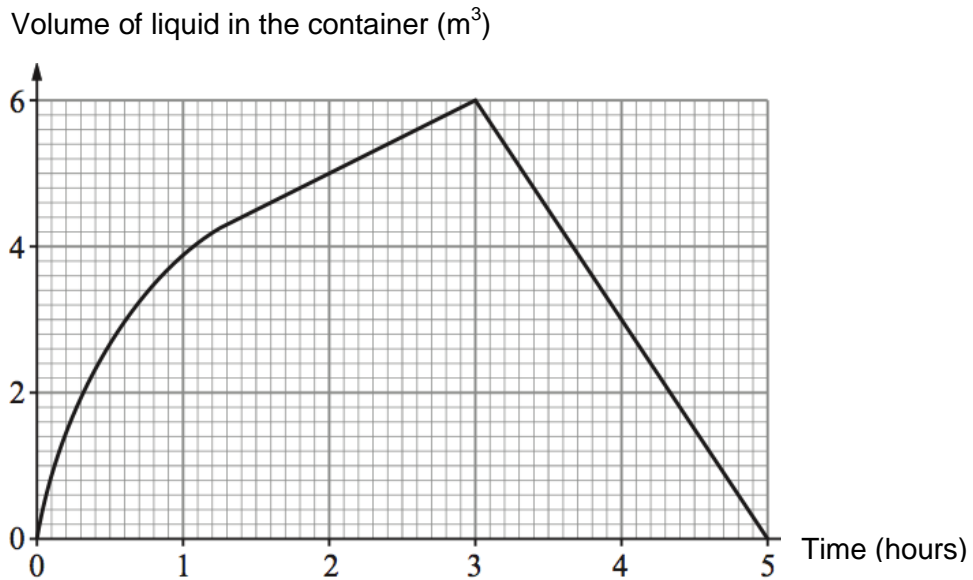
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Greatest possible saving is £

5. A container is used to collect the liquid produced by a factory.
 As soon as the container is full, it starts to empty the liquid into a tanker.
 As soon as the container is empty, it starts to fill again.

The graph shows the process of the container being filled and emptied into the tanker.



- (a) What is the volume of the liquid in the container $2\frac{1}{2}$ hours into the process?

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[1]

- (b) How long does it take to half fill the container?
 Give your answer in minutes.

[2]

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- (c) The container is empty at 8:36 a.m.
 At what other times is the container empty between 9 a.m. and 9 p.m.?

[2]

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(d) Put a tick in the box next to the correct statement.

[1]

The container fills at a constant rate from when it is empty to when it is full.	<input type="checkbox"/>
The container fills at a constant rate to start with, then slows down.	<input type="checkbox"/>
After starting to fill, the rate at which the container fills up increases.	<input type="checkbox"/>
The container starts to fill quickly, then slows down to a constant rate.	<input type="checkbox"/>
It is not possible to tell whether or not the rate at which the tank fills up remains the same.	<input type="checkbox"/>

6. Newspapers often give temperatures in both degrees Fahrenheit ($^{\circ}F$) and degrees Celsius ($^{\circ}C$).
In the formula below, c represents a temperature in Celsius and f represents a temperature in Fahrenheit.

$$9c + 160 = 5f$$

(a) Complete the following statement.

$10^{\circ}C$ is the same as $^{\circ}F$.

[2]

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(b) Make c the subject of the formula.

$$9c + 160 = 5f$$

[2]

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7. A construction company is working on plans to lay a new gas pipeline. The gas pipeline is to run from Abermor to Brentor to Cantefore then continue on to another town.

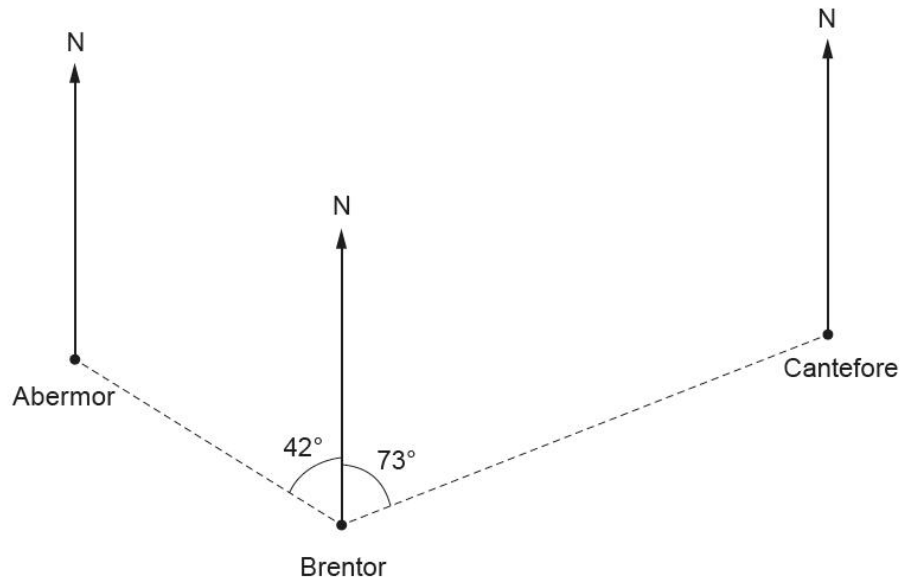


Diagram not drawn to scale

(a) The above diagram shows the section of gas pipeline from Abermor to Cantefore.

(i) The bearing of Cantefore from Brentor is

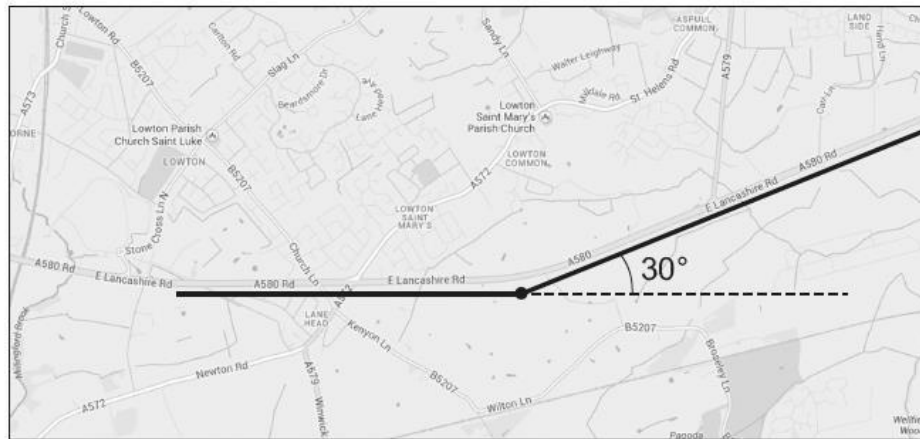
- 073° 107° 163° 253° 287°

(ii) Write down the bearing of Abermor from Brentor.

[3]

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- (b) As the gas pipeline continues towards the next town, it has to make a 30° turn so that it follows the road, as shown in the sketch.



Using a pair of compasses and a ruler, construct a line that shows the direction of the gas pipeline as it follows the road after the 30° turn. You must show all of your construction lines and arcs.

[3]



8.



A ribbon is tied around **all** the faces of a box, as shown in the picture.
The ribbon is placed across **each** face of the box and meets all the edges of the box at right angles.
A bow is tied on top of the box.

- (a) A box has length 8.5 cm, width 4.6 cm and height 2.2 cm.
The bow is made using 18 cm of ribbon.
Calculate the total length of ribbon required.

[3]

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- (b) A different box is to be decorated with ribbon in the same way.
The box has length l cm, width w cm and height h cm.
The bow is made using 18 cm of ribbon.
Write down an expression for the total length of ribbon needed to decorate this box.

[2]

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9. Lech went on holiday from his home in Wales to Poland.
Before going, he went into his local money exchange shop to buy some Polish zloty.

Lech only had £250 to spend on buying zloty.
He wanted to buy as many zloty as possible.
Unfortunately, the money exchange shop only had 50 zloty notes.
The exchange rate to buy zloty was £1 = 4.37 zloty.

- (a) How much did Lech pay for the zloty?

[5]

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- (b) While in Poland, Lech spent 340.40 zloty.
On returning to Wales from his holiday, Lech changed his zloty back to pounds.
Unfortunately, the money exchange shop would only buy back a whole number of zloty.
The exchange rate used for changing zloty back to pounds was
£1 = 4.43 zloty.
Calculate how much Lech received back from the money exchange shop.
Give your answer correct to the nearest penny.

[3]

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11.(a) The North Hoyle Offshore Wind Farm is located approximately 7.5 km off the coast of North Wales.

When this wind farm opened, it was working at 35% of its full capacity, and it produced enough annual electricity for 50 000 homes.
 For how many homes would the wind farm have been able to produce electricity each year if it had worked at full capacity?

[2]

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(b) There are many offshore wind farms off the coast of Wales, Scotland and England.

The full power of the individual wind turbines is different in the various wind farms.

The table shows information for 4 wind farms.



Wind farm	Full power of each turbine in Mega Watts (MW)	Number of wind turbines
North Hoyle	2.0	30
Lynn and Inner Dowsing	3.5	54
Rhyl Flats	3.6	25
Robin Rigg	3.0	60

If each of these 4 wind farms worked at 45% of full power, what would be the mean power of a single wind turbine?

Give your answer correct to 2 decimal places.

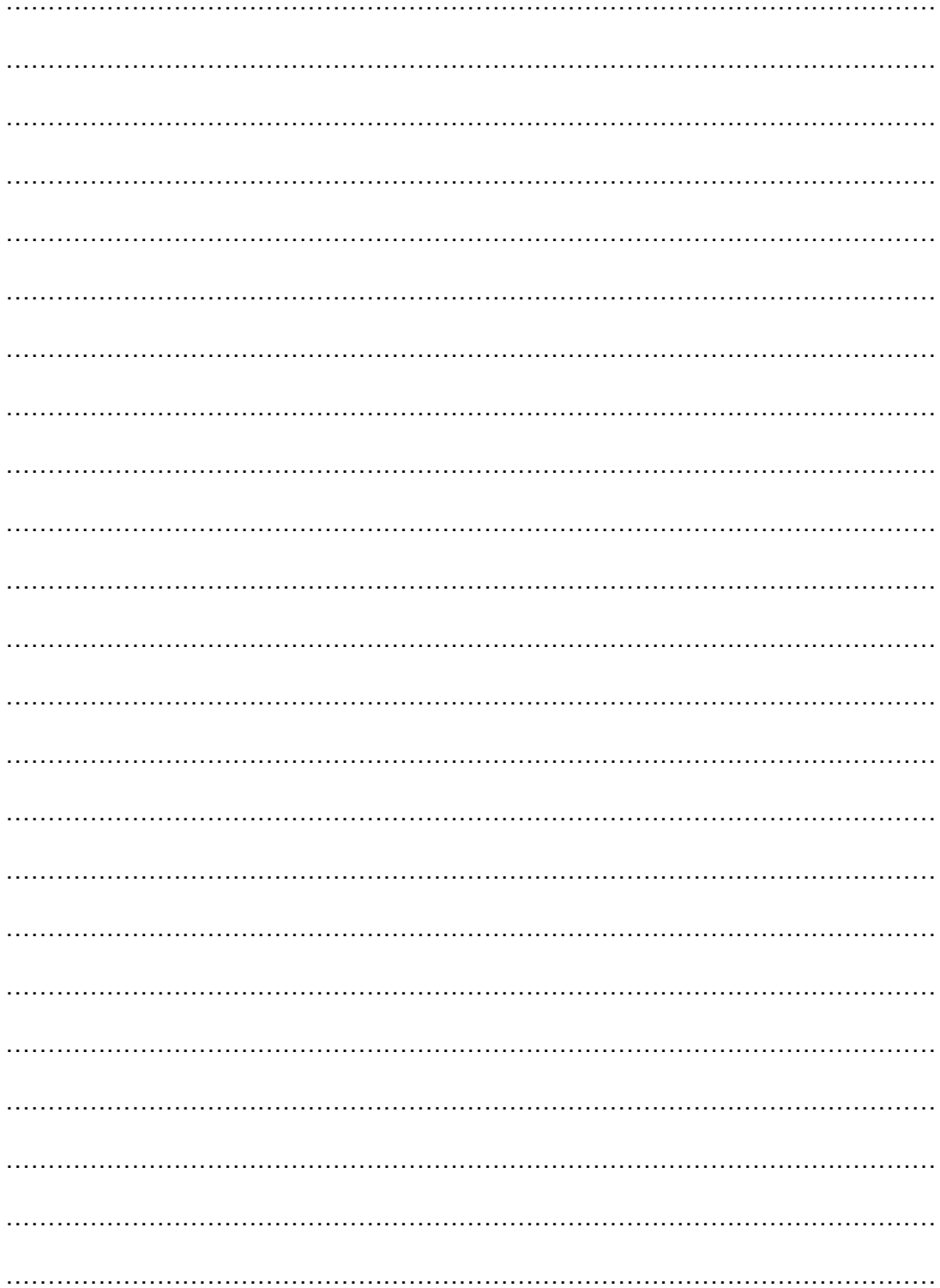
You must show all your working.

[5]

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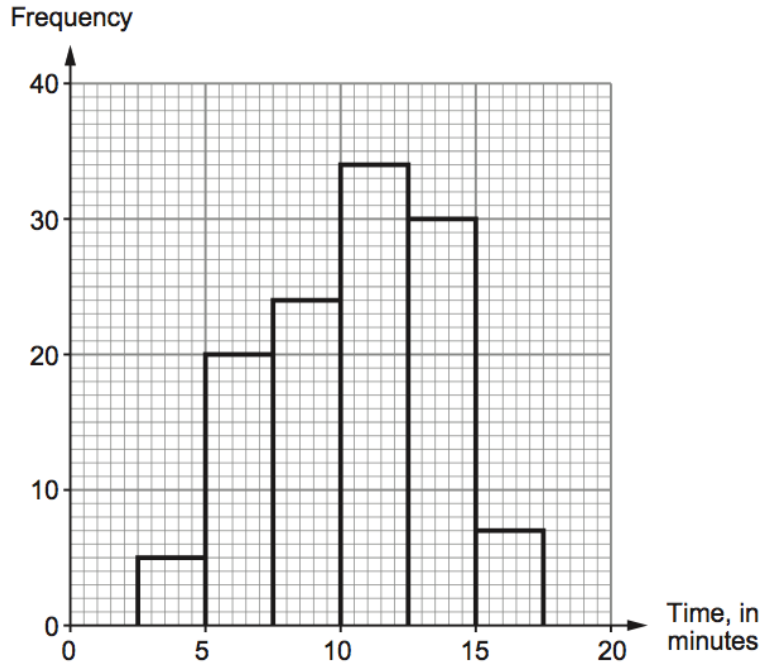
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12. In Aberfar, a group of local people took part in a challenge to learn how to tie a Celtic knot.



The frequency diagram shows the times taken by the local people to tie a Celtic knot for the first time.



- (a) Complete the cumulative frequency table for the times taken by the local people to tie a Celtic knot for the first time.

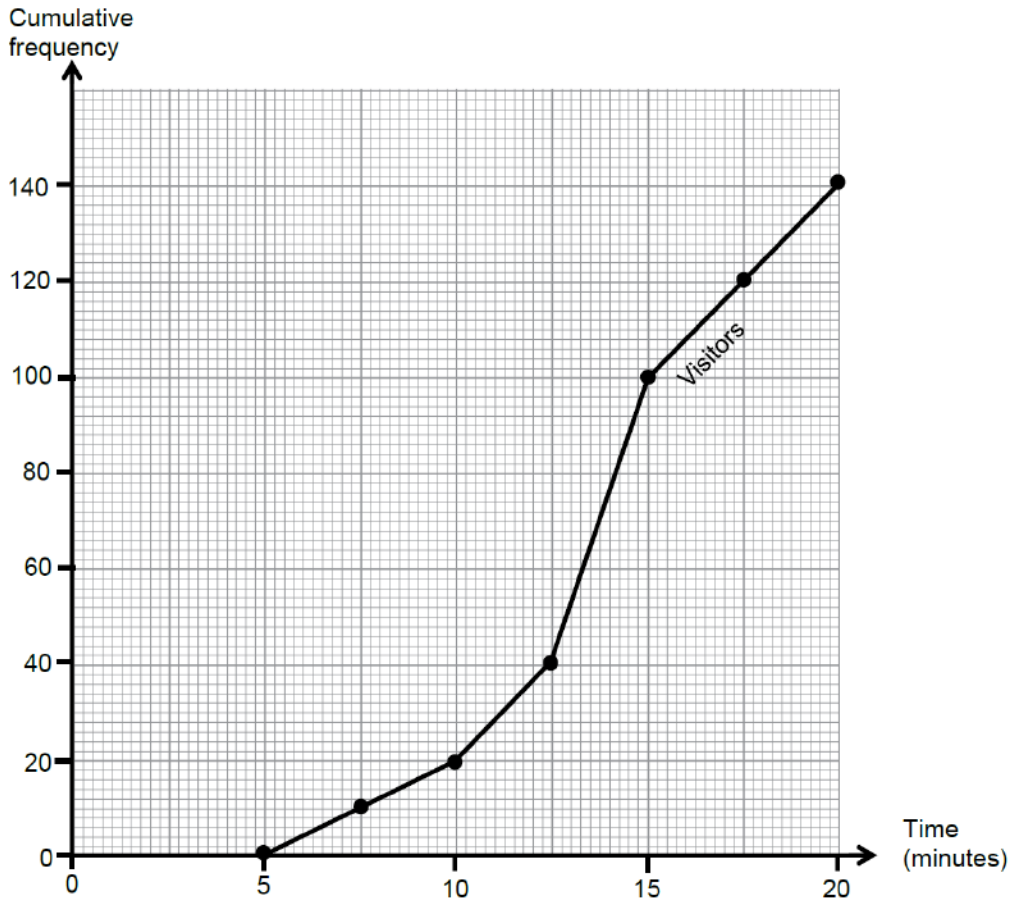
[2]

Time, t in minutes	$t \leq 2.5$	$t \leq 5$	$t \leq 7.5$	$t \leq 10$	$t \leq 12.5$	$t \leq 15$	$t \leq 17.5$
Cumulative frequency							

- (b) The graph paper opposite shows a cumulative frequency diagram of the times taken by 140 visitors to Wales to tie a Celtic knot for the first time.

On the same graph, draw a cumulative frequency diagram for the times taken by the local people to tie a Celtic knot for the first time.

[2]



(c) The visitors had been set a target that 100 of the group would finish within $17\frac{1}{2}$ minutes. By how many minutes did they miss or beat their target?

[2]

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Did they miss the target or beat the target?

By how many minutes?

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

The tenth percentile reading for the local people is between 5 minutes and 7 minutes.	TRUE	FALSE
40% of the visitors took less than $12\frac{1}{2}$ minutes.	TRUE	FALSE
The estimated median time taken by the visitors is 13.75 minutes.	TRUE	FALSE
The difference between the estimated median times of the two groups of people is about 3 minutes.	TRUE	FALSE
If there had been only 120 visitors, they would certainly all have finished within 18 minutes.	TRUE	FALSE

13. Luis has a large dog which lives in a kennel.
 In order to design a similar kennel for a smaller dog, Luis wants to calculate the angle of elevation of the roof of his dog's kennel.
 He has noticed that the front of his dog's kennel is symmetrical.

He has measured a number of lengths and recorded them on a diagram of the kennel, as shown below.

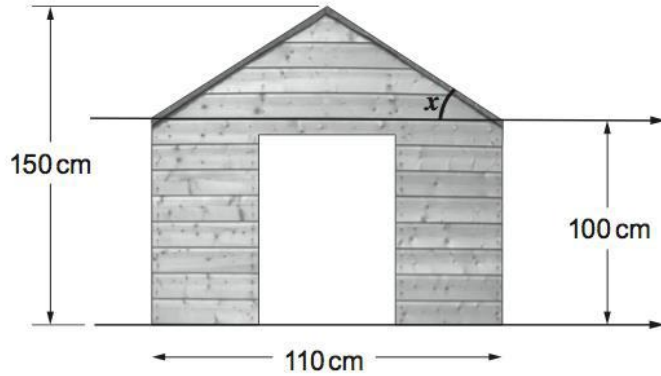


Diagram not drawn to scale

Luis has marked the angle of elevation with an x on the diagram.

- (a) Calculate the size of angle x to an appropriate degree of accuracy.

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- (b) Explain why, in practice, this angle may not be as accurate as you have calculated.

[1]

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14. The length of the flag shown is twice its width.



Diagram not drawn to scale

The diagonal of the flag measures 2.5 metres.
Calculate the width of the flag.

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Width of the flag is

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