



F

**GENERAL CERTIFICATE OF SECONDARY EDUCATION
MATHEMATICS SYLLABUS A**

J512/02

Paper 2 (Foundation Tier)

**Friday 10 June 2011
Morning**

Duration: 2 hours

Candidates answer on the question paper.

OCR supplied materials:
None

- Other materials required:**
- Electronic calculator
 - Geometrical instruments
 - Tracing paper (optional)



Candidate forename		Candidate surname	
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Centre number						Candidate number				
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INSTRUCTIONS TO CANDIDATES

- Write your name, centre number and candidate number in the boxes above. Please write clearly and in capital letters.
- Use black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully. Make sure you know what you have to do before starting your answer.
- Show your working. Marks may be given for a correct method even if the answer is incorrect.
- Write your answer to each question in the space provided. Additional paper may be used if necessary but you must clearly show your candidate number, centre number and question number(s).
- Answer **all** the questions.
- Do **not** write in the bar codes.

INFORMATION FOR CANDIDATES

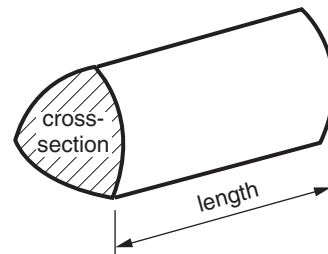
- The number of marks is given in brackets [] at the end of each question or part question.
- You are expected to use an electronic calculator for this paper.
- Use the π button on your calculator or take π to be 3.142 unless the question says otherwise.
- The total number of marks for this paper is **100**.
- This document consists of **24** pages. Any blank pages are indicated.

Formula Sheet: Foundation Tier

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

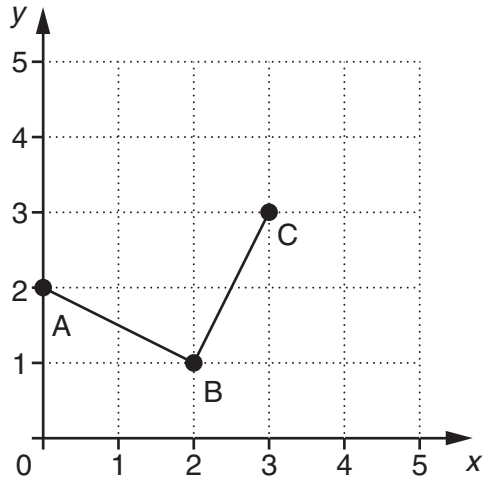


Volume of prism = (area of cross-section) \times length



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1



(a) Write down the coordinates of point A.

(a) (_____ , _____) [1]

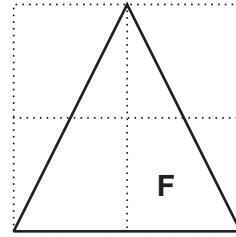
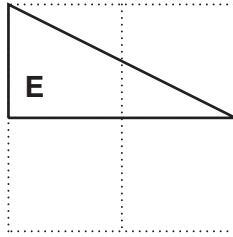
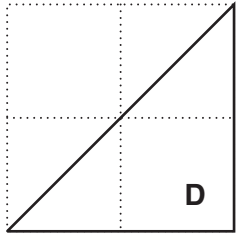
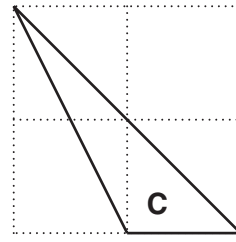
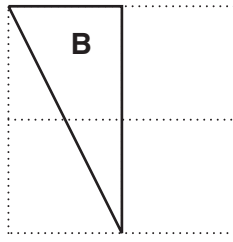
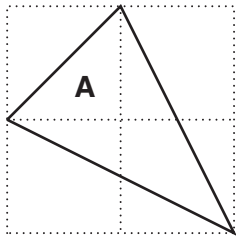
(b) Write down the coordinates of point B.

(b) (_____ , _____) [1]

(c) Plot point D so that ABCD is a square.

[1]

2 Rachel draws some triangles on square grids.



(a) Which triangle has an obtuse angle?

(a) _____ [1]

(b) Which triangle is isosceles **and** has a right angle?

(b) _____ [1]

(c) Which two triangles are congruent?

(c) _____ and _____ [1]

(d) Which three triangles have a line of symmetry?

(d) _____ and _____ and _____ [1]

(e) Rachel says that triangle **F** is equilateral.

Explain why Rachel is wrong.

 _____ [1]

3 These are the temperatures in three European cities on a day in January.

Berlin -11°C

London 5°C

Paris -2°C

(a) How much warmer is Paris than Berlin?

.....
.....

(a) _____ $^{\circ}\text{C}$ [1]

(b) How much warmer is London than Berlin?

.....
.....

(b) _____ $^{\circ}\text{C}$ [1]

(c) The temperature in London that day is 18°C higher than the temperature in Montreal.

What is the temperature in Montreal?

.....
.....

(c) _____ $^{\circ}\text{C}$ [1]

- 4 Jacob was given £95 for his birthday.
He spent £47.50 on a new phone and bought two shirts costing £14.95 each.

How much of the £95 does he have left?

.....

.....

.....

.....

.....

.....

.....

£ _____ [3]

5 Use your calculator to work these out.

(a) the sum of 1026 and 389

.....
.....

(a) _____ [1]

(b) one third of 738

.....
.....

(b) _____ [1]

(c) the difference between 4.9 and 32

.....
.....

(c) _____ [1]

(d) 54 added to half of 328

.....
.....
.....

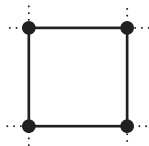
(d) _____ [2]

(e) the square root of 7.84

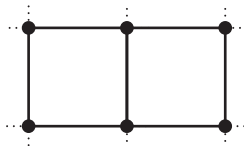
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(e) _____ [1]

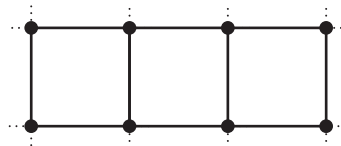
6 This is a sequence of dot patterns.



Pattern 1

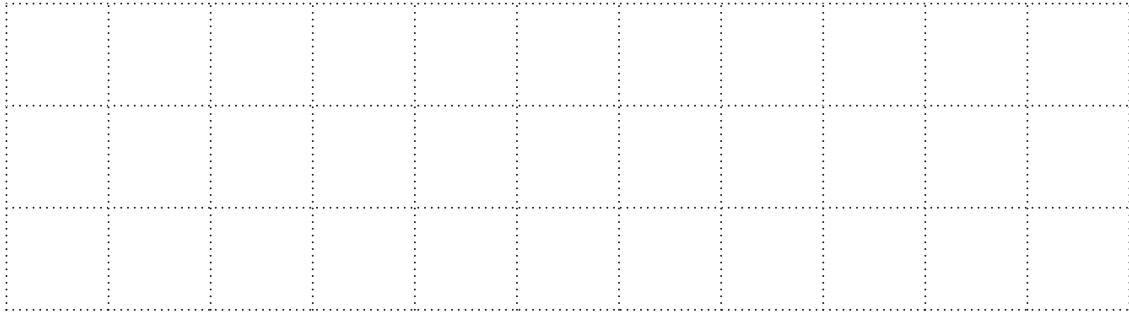


Pattern 2



Pattern 3

(a) Draw the next pattern in the sequence.



[1]

(b) Complete the table for this sequence.

Pattern number	1	2	3	4
Number of dots	4	6	8	

[1]

(c) How many dots will there be in

(i) Pattern 5,

(c)(i) _____ [1]

(ii) Pattern 12?

.....

.....

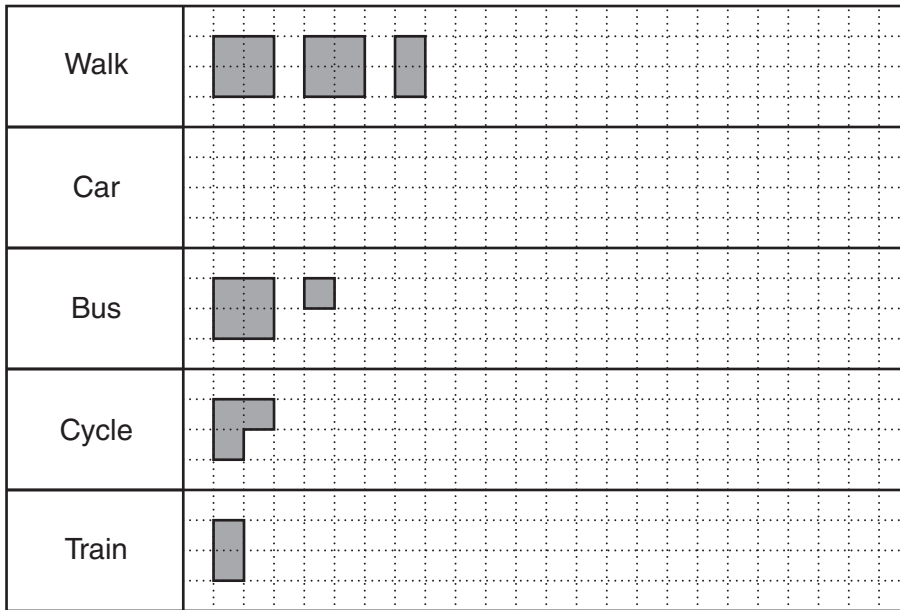
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
(ii) _____ [2]

(d) Explain why a pattern in this sequence cannot have 79 dots.

_____ [1]

7 In their environmental project a class recorded how they each travelled to school in the morning. They represented the results in this pictogram.



Key:  represents 4 pupils

(a) 6 pupils travelled by car.

Complete the pictogram.

[1]

(b) How many pupils travelled by bus?

.....

(b) _____ [1]

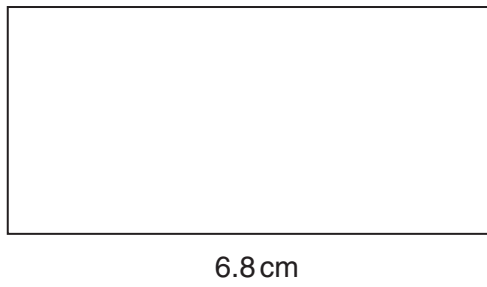
(c) How many pupils walked or cycled to school?

.....

(c) _____ [1]

10

8 A rectangle has length 6.8 cm and width 4.5 cm.



NOT TO SCALE

Work out the area of the rectangle.
Give the units of your answer.

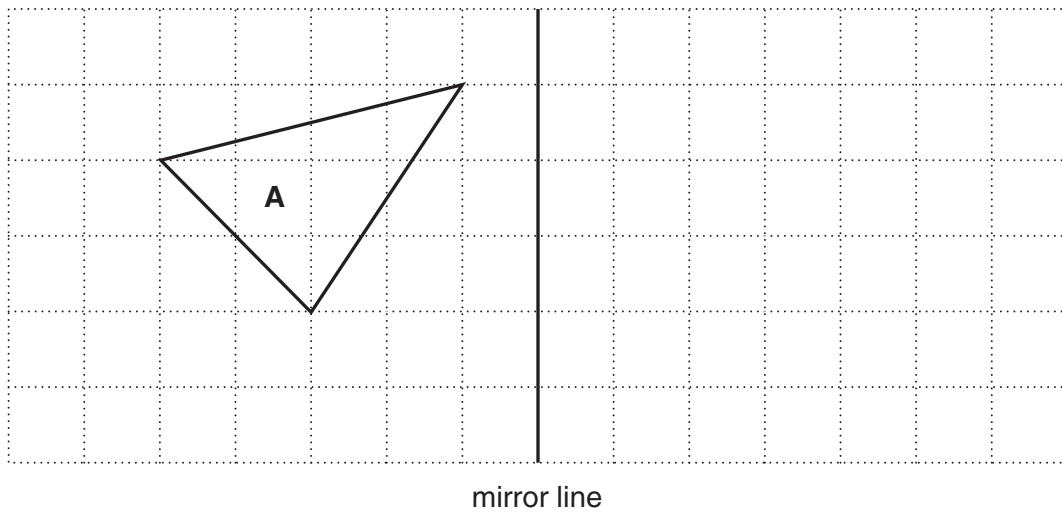
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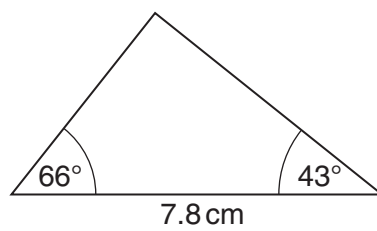
_____ [3]

- 9 (a) Reflect triangle **A** in the mirror line.



[2]

- (b) Draw this triangle full-size in the space below.

NOT TO
SCALE

[3]

- 10 (a) Amy goes on a business trip to America.
The exchange rate is \$1.58 to £1.

How many dollars (\$) does Amy receive when she changes £400?

.....

(a) \$ _____ [2]

- (b) When Amy returns from America, the exchange rate is still \$1.58 to £1.
She changes \$120 into pounds.

How much money does Amy receive?

.....

(b) £ _____ [2]

- 11 (a) Claudia is an ice skater.
When she makes a jump, she rotates through $1\frac{1}{2}$ turns.

How many degrees is this?

.....

(a) _____ ° [2]

- (b) Matt is a snow boarder.
When he makes a jump, he rotates through 1260° .

How many turns is this?

.....

(b) _____ [2]

12 880 people were asked where they went on their summer holidays. These are the results.

UK	Europe	Rest of the world	Did not go on holiday
220	450	143	67

(a) Work out the percentage of the people in the survey who replied

(i) UK,

.....

(a)(i) _____ % [1]

(ii) Rest of the world.

.....

(ii) _____ % [2]

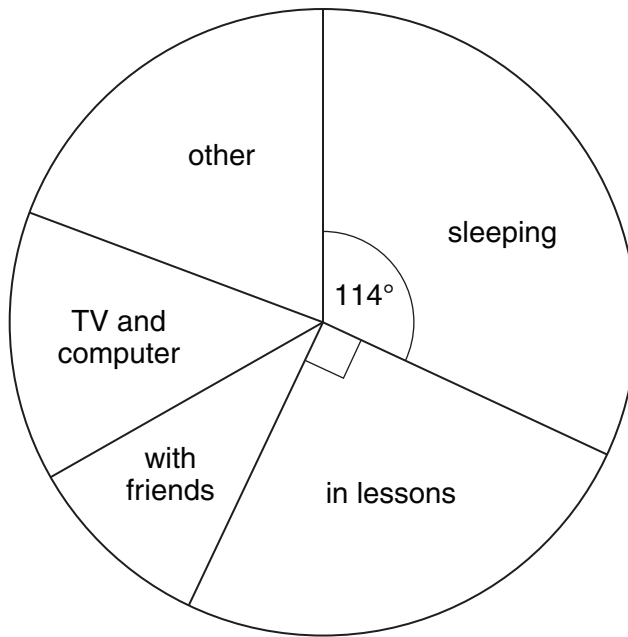
(b) 450 people went to Europe. Of these, 46% went to Spain.

How many people went to Spain?

.....

(b) _____ [2]

13 This pie chart shows how Ivan spent the 24 hours of a day.



(a) How many hours did Ivan spend in lessons?

.....

(a) _____ [2]

(b) (i) What fraction of the day did Ivan spend sleeping?

(b)(i) _____ [1]

(ii) How long did he spend sleeping?

.....

(ii) _____ [2]

14 In a charity raffle 425 blue and 372 yellow tickets have been sold.
All the tickets sold are put into a tub.
The mayor draws a ticket from the tub for the first prize without looking.

(a) What is the probability that the ticket drawn for the first prize is blue?

.....
.....

(a) _____ **[2]**

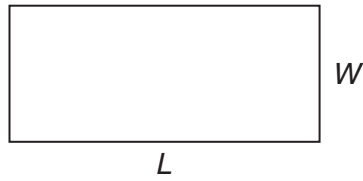
(b) Rhian has bought 5 tickets.

What is the probability that Rhian wins the first prize?

.....
.....

(b) _____ **[1]**

- 15 (a) (i) Explain why the formula for the perimeter, P , of a rectangle of length L and width W is $P = 2L + 2W$.



[1]

- (ii) A rectangle has a perimeter of 23 cm.
The length of the rectangle is 8 cm.

Work out the width of the rectangle.

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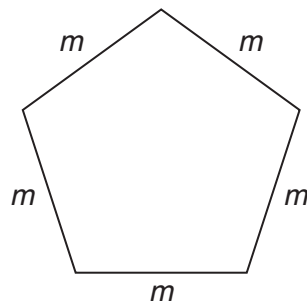
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(a)(ii) _____ cm [3]

- (b) Write down an expression for the perimeter of each of these shapes.
Write each answer as simply as possible.

(i)



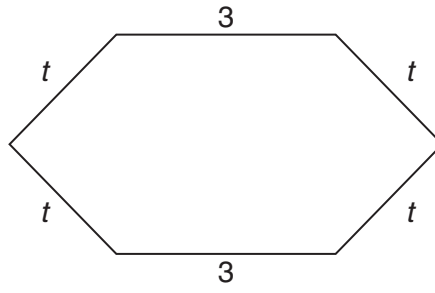
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(b)(i) _____ [1]

17

(ii)

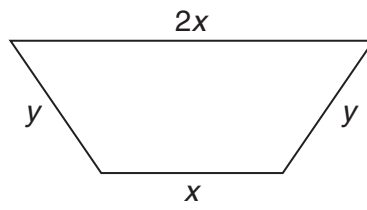


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.....

(ii) _____ [1]

(iii)



.....

.....

(iii) _____ [1]

16 For the sequences in this question, each number is the sum of the two previous numbers.

Here is an example.

2	5	7	12	19
		$= 2 + 5$	$= 5 + 7$	$= 7 + 12$

(a) (i) Write the next number of this sequence in the box.

2	13	15	28	
----------	-----------	-----------	-----------	--

[1]

(ii) Complete the first five terms of this sequence.

.....

.....

.....

.....

		10		27
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[3]

(b) Complete the first five terms of this sequence with simplified algebraic expressions.

.....

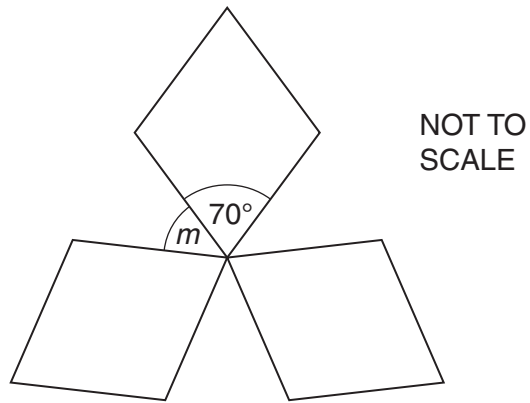
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n	3	$n + 3$		
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[2]

- 17 This pattern has rotation symmetry of order 3.



Work out the size of angle m .

.....

.....

.....

.....

.....

.....

_____ ° [3]

- 18** Josh raised £650 for charity.
He divided the amount between two charities in the ratio 7 : 1.

How much did each charity receive?

.....

.....

.....

£ _____

£ _____ [2]

- 19** Calculate.

(a) $\frac{34.7}{6.97 + 7.68}$

Give your answer correct to 1 decimal place.

.....

.....

(a) _____ [2]

(b) $\sqrt{3.6^2 + 2.25}$

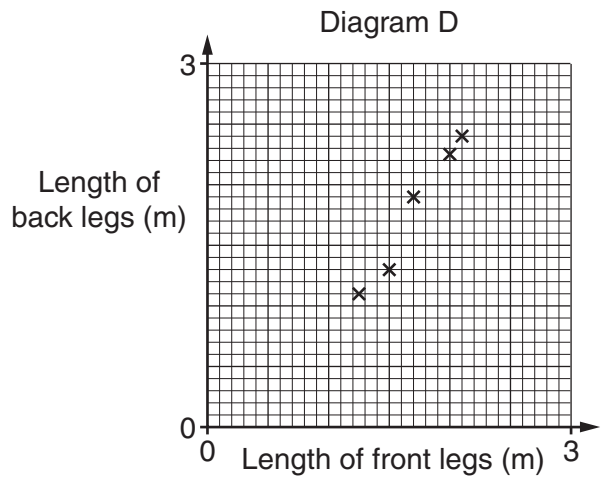
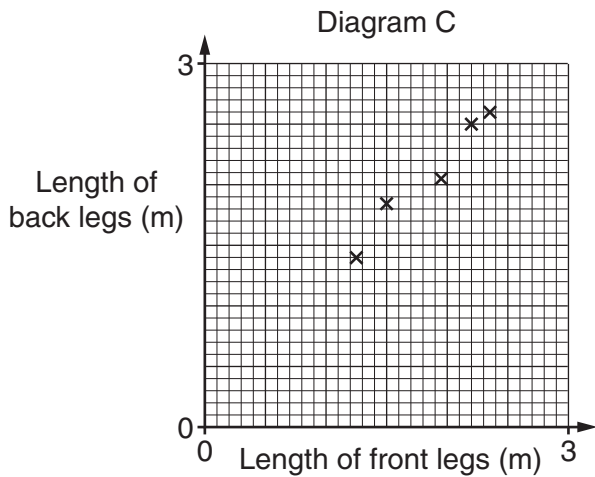
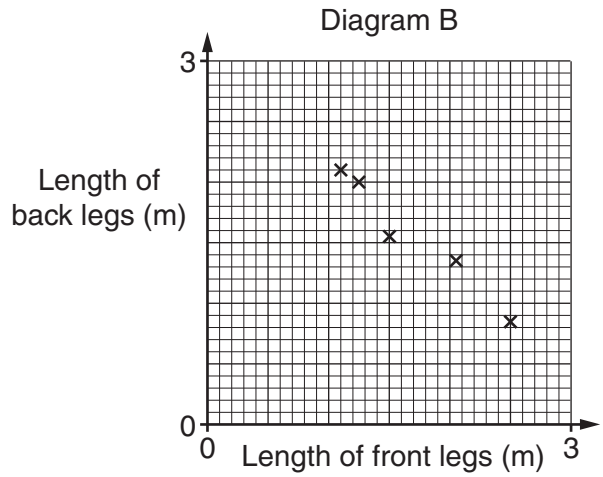
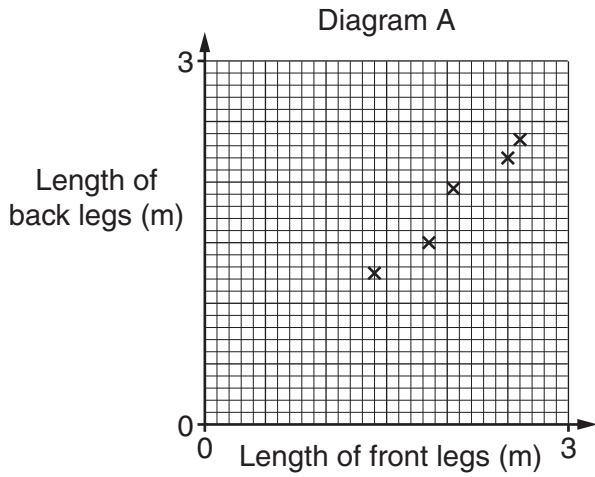
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.....

(b) _____ [2]

22 (a) The front legs of a giraffe are always longer than the back legs.

Which one of these diagrams shows this information?



.....

.....

(a) Diagram _____ [1]

(b) The table summarises the times, in minutes, that giraffes in a herd slept during 24 hours.

Time (t minutes)	Frequency
$0 < t \leq 20$	1
$20 < t \leq 40$	4
$40 < t \leq 60$	10
$60 < t \leq 80$	12
$80 < t \leq 100$	3
$100 < t \leq 120$	2

(i) Write down the modal class interval for the time a giraffe in this herd slept.

.....

(b)(i) _____ minutes [1]

(ii) Work out an estimate of the mean time that a giraffe in this herd slept in 24 hours.

.....

(ii) _____ minutes [4]

(c) It is known that none of these giraffes slept for less than 15 minutes.

What effect does this fact have on

(i) the modal class,

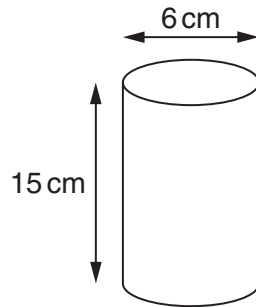
_____ [1]

(ii) the mean?

_____ [1]

TURN OVER FOR QUESTION 23

- 23 A drinking glass is a cylinder.
The interior dimensions of the glass are as shown.



- (a) Work out the volume of liquid needed to fill the glass.

.....

.....

.....

.....

(a) _____ cm³ [3]

- (b) Is it possible to pour the entire contents of a $\frac{1}{2}$ litre bottle of water into this glass?
Show how you decide.

_____ [1]

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