CCEA GCSE MATHEMATICS (MODULAR)

MATHS



EXAM QUESTION PACK

MODULE N2 PAPER 2 (CALCULATOR) FOUNDATION TIER GMN22 PAPERS

STEMUP

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Rewarding Learning

Centre Number

71	

Candidate Number

General Certificate of Secondary Education
January 2012

Mathematics



Module N2 Paper 2
(With calculator)
Foundation Tier

[GMN22]

WEDNESDAY 11 JANUARY

10.30 am – 11.15 am

GMN22

TIME

45 minutes.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.
Write your answers in the spaces provided in this question paper.
Answer **all twelve** questions.
Any working should be clearly shown in the spaces provided since marks may be awarded for partially correct solutions.

INFORMATION FOR CANDIDATES

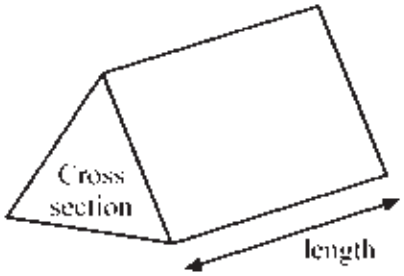
The total mark for this paper is 44.
Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.
You should have a calculator, ruler, compasses, set-square and protractor.
The Formula Sheet is on page 2.

For Examiner's use only	
Question Number	**Marks**
1	
2	
3	
4	
5	
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7	
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11	
12	
Total Marks	

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Formula Sheet

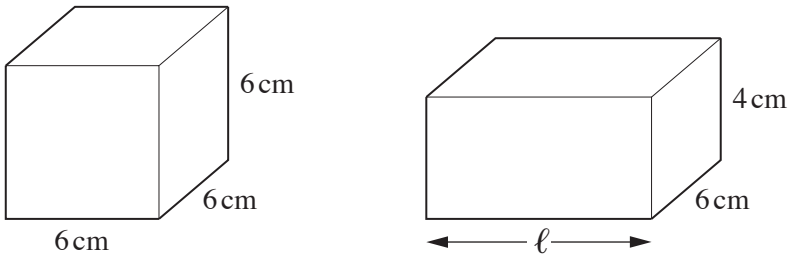
Volume of prism = area of cross section × length



Examiner Only	
Marks	Remark

1 The volumes of this cube and this cuboid are the same.

What is the missing length marked ℓ on the cuboid?



Answer _____ [3]

---

2 Each student in Year 10 studies one language (French, Spanish or German).

There are 135 students in Year 10.

Two-fifths study French, one-third study Spanish and the rest study German.

How many students study German?

Answer _____ [4]

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Examiner Only	
Marks	Remark

3 In the spaces provided, write down the next two numbers in the sequence

18, 17, 14, 9, _____, _____ [2]

4 120 Year 13 students each study one science.

The table below shows some information about these students.

	Biology	**Chemistry**	**Physics**	**Total**
Female	27			68
Male			29	
Total		31	48	120

Complete the table. [2]

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Examiner Only	
Marks	Remark

5 **(a)** Which of the following fractions is nearest in size to $\frac{3}{5}$?

Show your working.

$\frac{7}{10}$ $\frac{11}{20}$ $\frac{17}{30}$ $\frac{1}{2}$

Answer _____ [2]

(b) Calculate

(i) $\frac{1}{2.5^2}$

Give your answer as a **decimal**.

Answer _____ [2]

(ii) $\frac{6.5 \times 5.8}{5.3 + 2.1}$

Give your answer correct to 2 decimal places.

Answer _____ [2]

(iii) $\sqrt{5.62^3 - 3.4^2}$

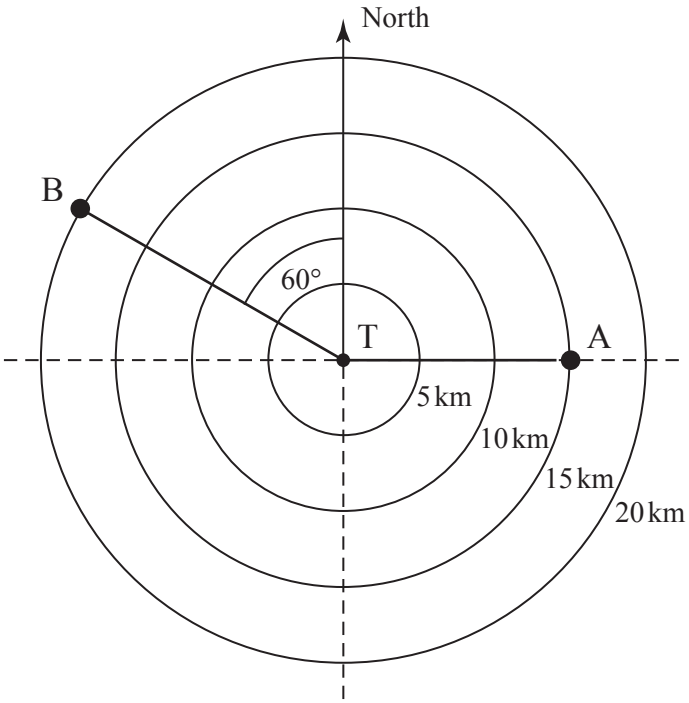
Give your answer correct to 3 significant figures.

Answer _____ [2]

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Examiner Only	
Marks	Remark

6 A radar screen shows the position of mountain rescue teams at the centre T and two climbers who need help at positions A and B.



Complete the following sentences:

(a) To help climber A a rescue team must travel

_____ km on a bearing of _____°. [1]

(b) To help climber B a second rescue team must travel

_____ km on a bearing of _____°. [1]

(c) Another climber C needs help at a distance of 12.5 km from T on a bearing of 210°. Mark the position of climber C on the diagram. [2]

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7 Work out the value of x in the quadrilateral below.

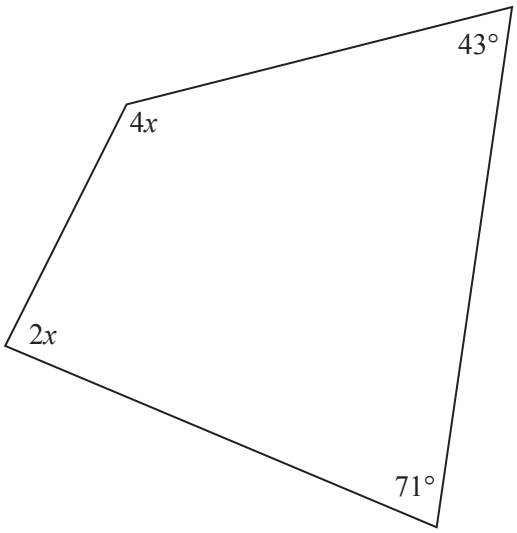


Diagram not drawn accurately

Answer x = _____° [4]

Examiner Only	
Marks	Remark

8 In April last year, it rained on 24 days.

What percentage of days in April were dry?

Answer _____% [2]

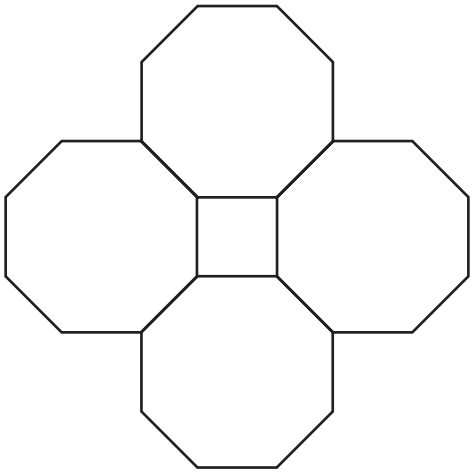
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Examiner Only	
Marks	Remark

9 **(a)** Calculate the size of the interior angle of a regular octagon.

Answer _____° [2]

(b) Four floor tiles, each in the shape of a regular octagon are placed together as shown. Explain why the shape between them must be a square.



Answer _____

_____ [2]

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(Questions continue overleaf)

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10 The table shows information about the number of pages (P) that 100 children printed from a computer last week.

Number of pages	Frequency
$0 < P \leq 3$	10
$3 < P \leq 6$	19
$6 < P \leq 9$	23
$9 < P \leq 12$	32
$12 < P \leq 15$	10
$15 < P \leq 18$	6

(a) What is the modal class?

Answer _____ [1]

(b) Which class interval contains the median?

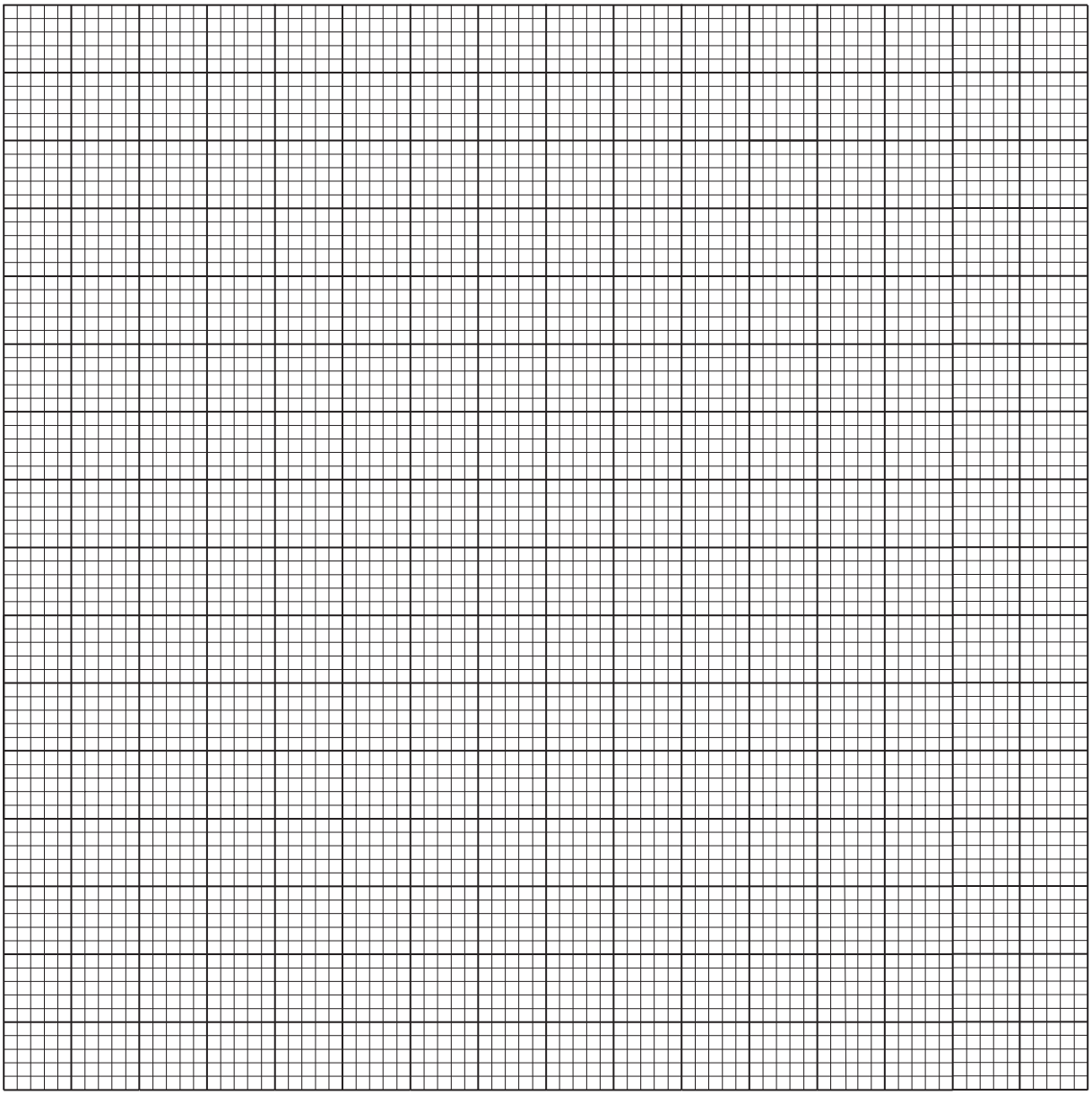
Answer _____ [1]

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Marks	Remark

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(c) On the grid below draw a frequency polygon to illustrate the data opposite.



[2]

Examiner Only	
Marks	Remark

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11 **(a)** Find the midpoint of the line joining the points $(-5, 6)$ and $(3, -6)$.

Answer _____ [1]

(b) Calculate the length of the line joining the points $(-2, -2)$ and $(3, 10)$.

Answer _____ [3]

Examiner Only	
Marks	Remark

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12 The mean test score for a class of 20 pupils was 15.

Some scores are shown below.

Score	Frequency	
18	4	
16	11	
12	3	
	2	

Calculate the missing score.

Answer _____ [3]

Examiner Only

Marks	Remark

THIS IS THE END OF THE QUESTION PAPER

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Module N2 Paper 2
(With calculator)
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It is our intention to reward candidates for any demonstration of relevant knowledge, skills or understanding. For this reason we adopt a policy of following through their answers, that is, having penalised a candidate for an error, we mark the succeeding parts of the question using the candidate's value or answers and award marks accordingly.

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(a) a numerical error in one entry in a table of values might lead to several answers being incorrect, but these might not be essentially separate errors;

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General Marking Advice

(i) If the correct answer is seen in the body of the script and the answer given in the answer line is clearly a transcription error, full marks should be awarded.

(ii) If the answer is missing, but the correct answer is seen in the body of the script, full marks should be awarded.

(iii) If the correct answer is seen in working but a completely different answer is seen in the answer space, then some marks will be awarded depending on the severity of the error.

(iv) Work crossed out but not replaced should be marked.

(v) In general, if two or more methods are offered, mark only the method that leads to the answer on the answer line. If two (or more) answers are offered (with no solution offered on the answer line), mark the poorest answer.

(vi) For methods not provided for in the mark scheme, give as far as possible equivalent marks for equivalent work.

(vii) Where a follow through mark is indicated on the mark scheme for a particular part question, the marker must ensure that you refer back to the answer of the previous part of the question.

(viii) Unless the question asks for an answer to a specific degree of accuracy, always mark at the greatest number of significant figures seen. E.g. the answer in the mark scheme is 4.65 and the candidate then correctly rounds to 4.7 or 5 on the answer line. Allow full marks for 4.65 seen in the working.

(ix) Anything in the mark scheme which is in brackets (…) is not required for the mark to be earned, but if present it must be correct.

(x) For any question, the range of answers given in the mark scheme is inclusive.

Quality of written communication

In GCSE Mathematics, particular questions are identified where candidates must demonstrate the quality of their written communication.

In particular, candidates must:

(i) ensure that text is legible and that spelling, punctuation and grammar are accurate so that meaning is clear (i.e comprehension and meaning is clear by using the correct notation and labelling conventions);

(ii) select and use a form and style of writing appropriate to their purpose and to complex subject matter (i.e reasoning, explanation or argument is correct and appropriately structured to convey mathematical reasoning); and

(iii) organise information clearly and coherently, using specialist vocabulary where appropriate (i.e the mathematical methods and processes used are coherently and clearly organised and appropriate mathematical vocabulary used).

This assessment may be through, for example, an explanation of the geometrical properties of a given shape or, for example, through concise mathematical argument in a multi-step problem.

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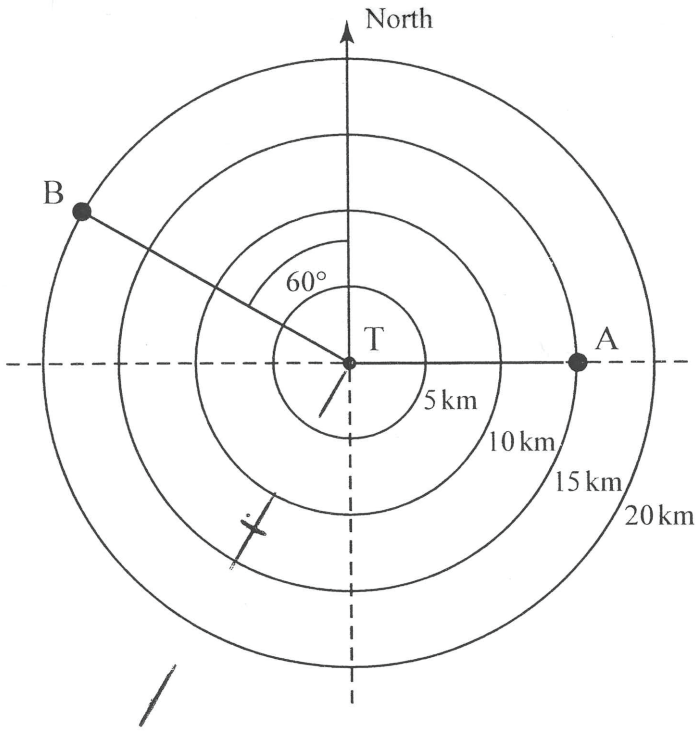
			AVAILABLE MARKS
1	$6 \times 6 \times 6 = 216$	MA1	
	$4 \times 6 \times \ell = 24\ell$		
	$24\ell = 216$ $\quad \ell = 9$ cm	MA1, A1 units	3
2	$\frac{2}{5}$ of $135 = 54$	MA1	
	$\frac{1}{3}$ of $135 = 45$	MA1	
	$54 + 45 = 99$	MA1	
	$135 - 99 = 36$	MA1	4
3	2, –7	A1, A1	2
4	22 19		
	14 9 52		
	41	A2	2
5	**(a)** $\frac{42}{60}, \frac{33}{60}, \frac{34}{60}, \frac{30}{60}$ **or** 0.7, 0.55, 0.566 ..., 0.5	M1	
	$\frac{17}{30}$	A1	
	(b) **(i)** $1 \div 6.25$	MA1	
	0.16	A1	
	(ii) 5.09459 ...	MA1	
	= 5.09	A1	
	(iii) 12.8819	MA1	
	12.9	A1	8
6	**(a)** 15 km on 090	A1	
	(b) 20 km on 300	A1	
	(c) C at correct distance on correct bearing	A1, A1	4
7	$4x + 2x + 71 + 43 = 360$ or equivalent	MA1	
	$6x + 114 = 360$	MA1	
	$6x = 246$	MA1	
	$x = 41$	A1	4

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				AVAILABLE MARKS
8	$\frac{6}{30}$ or 80%		MA1	
	20%		A1	2
9	**(a)** $\frac{360}{8} = 45$	$6 \times 180 = 1080$	MA1	
		or		
	$180 - 45 = 135$	$1080 \div 8 = 135$	MA1	
	(b) Angles are $360 - 270 = 90$		MA1	
	Sides are all equal sides of regular octagon (explanation needed)		MA1	4
10	**(a)** $9 < P \leq 12$		A1	
	(b) $6 < P \leq 9$		A1	
	(c) Accurate frequency polygon drawn		MA2	4
11	**(a)** $(-1, 0)$		A1	
	(b) $\sqrt{(5^2 + 12^2)} = 13$		M1, A1, A1	4
12	72, 176, 36		MA1	
	$300 - 284 = 16$		MA1	
	$16 \div 2 = 8$		MA1	3
			Total	**44**

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GCSE MATHEMATICS JANUARY 2012
MODULE N2–2
OVERLAY QUESTION 6



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Rewarding Learning

Centre Number

71	

Candidate Number

General Certificate of Secondary Education
2011

Mathematics



Module N2 Paper 2
(With calculator)
Foundation Tier

[GMN22]

TUESDAY 31 MAY

10.30 am–11.15 am

GMN22

TIME

45 minutes.

INSTRUCTIONS TO CANDIDATES

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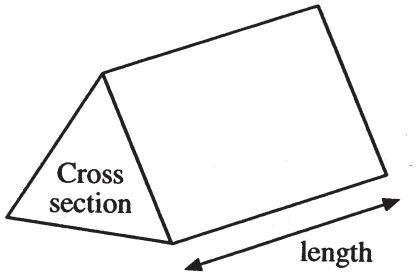
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Question Number	**Marks**
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
Total Marks	

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Formula Sheet

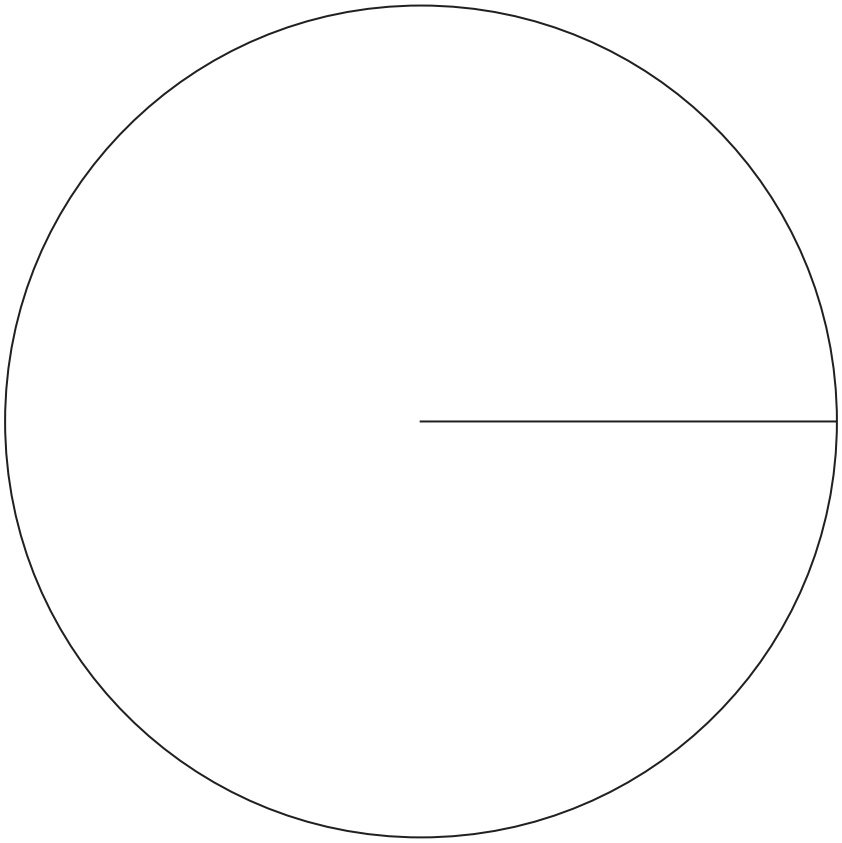
Volume of prism = area of cross section × length



1 The number of buns sold in a bakery was recorded as follows.

Cream	16
Fruit	10
Jam	9
Chocolate	25

Draw a pie chart to illustrate this information.



[4]

Examiner Only

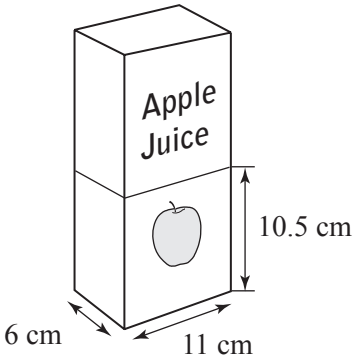
Marks	Remark

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Examiner Only	
Marks	Remark

2 **(a)** A rectangular carton holds apple juice. The base of the carton has dimensions of 6 cm and 11 cm. The height of the juice in the carton is 10.5 cm above the base. (1 cm^3 = 1 ml).

What is the volume of juice left in the carton in millilitres?



Answer _____ ml [2]

(b) John pours himself a glass of juice. The volume in the carton is now 412.5 ml.

What is the height of the juice above the base now?

Answer _____ [3]

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Examiner Only	
Marks	Remark

3 **(a)** Calculate

(i) the cube root of 64

Answer _____ [1]

(ii) $3.3^2 + 6^3$

Answer _____ [1]

(b) Write 23.35 correct to three significant figures.

Answer _____ [1]

---

4 Andrew earns £900 a month. He spends $\frac{1}{4}$ of this money on rent and $\frac{1}{5}$ on computer games. What fraction of the £900 has he left?

Answer _____ [4]

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Examiner Only	
Marks	Remark

5 An adult ticket for a show costs £a.

A child ticket costs £4 less than an adult ticket.

(a) Write down an expression, in terms of a, for the cost of a child ticket.

Answer £ _____ [1]

(b) Daisy buys two adult tickets and three child tickets. The total cost is £23.

(i) Use this information to write down an **equation** in terms of a.

Answer _____ [2]

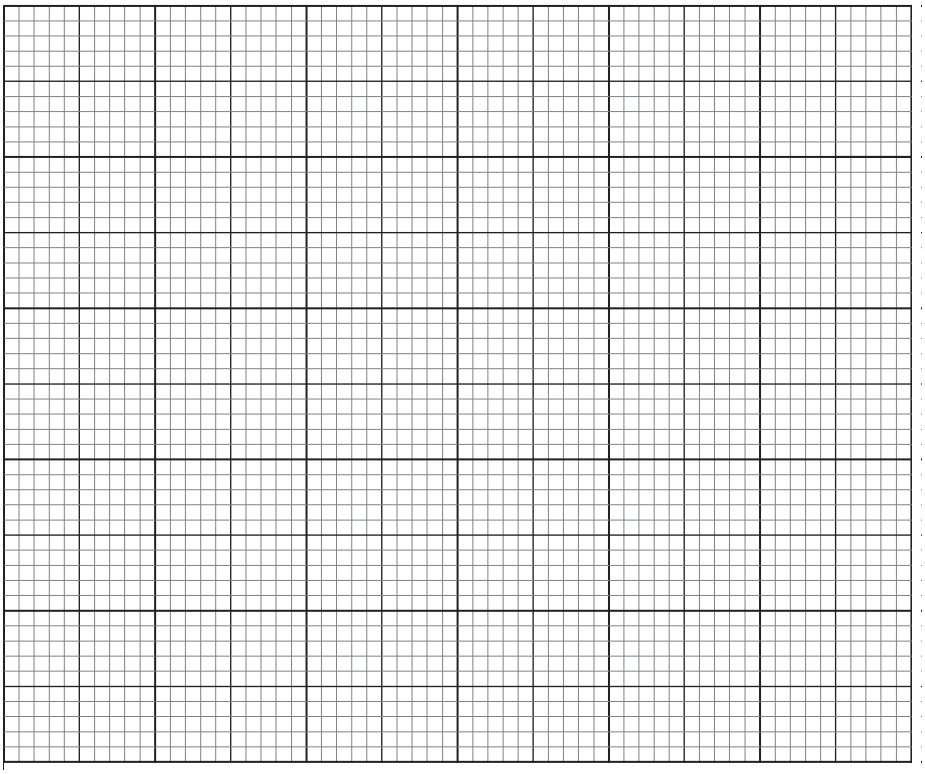
(ii) Solve your equation to find the cost of an adult ticket.

Answer £ _____ [2]

6 The increase in test scores of 100 children over a period of time was recorded.

Increase in test scores (w)	$0 < w \leq 5$	$5 < w \leq 10$	$10 < w \leq 15$	$15 < w \leq 20$	$20 < w \leq 25$
Frequency	16	36	22	14	12

Show this information on a grouped frequency diagram. [3]



Examiner Only

Marks	Remark

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Examiner Only	
Marks	Remark

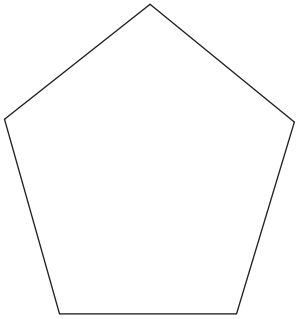
7 **(a)** 

© The Royal Mint

A ten pence piece has a radius of 1.4 cm.

Calculate the circumference of this coin.

Answer _____ cm [2]

(b) 

Explain why the sum of the interior angles in a regular pentagon is 540°.

_____

_____

_____

_____

[2]

---

8 A new bicycle is priced at £240

In a sale it is reduced by 35%.

Calculate the sale price.

Answer £ _____ [3]

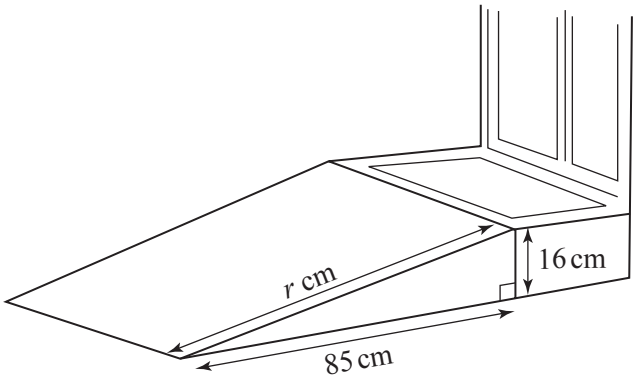
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Examiner Only	
Marks	Remark

9 A ramp is placed next to a step to allow wheelchair access.

The ramp is 16 cm high and reaches 85 cm from the step.

Calculate the sloping length, r cm, of the ramp to the edge of the step.



Answer _____ cm [3]

10 **(a)** At birth a baby boy weighed 4 kg. Six weeks later he weighed 7 kg.

What was the percentage increase in his weight?

Answer _____ % [2]

(b) Colin leaves £4800 in the bank for two years.

It earns compound interest of 3% per year.

Calculate the total amount Colin has in the bank at the end of the two years.

Answer £ _____ [2]

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11 One solution of $x^2 + 4x = 50$ lies between 5 and 6

Use the method of **trial and improvement** to find this solution correct to one decimal place.

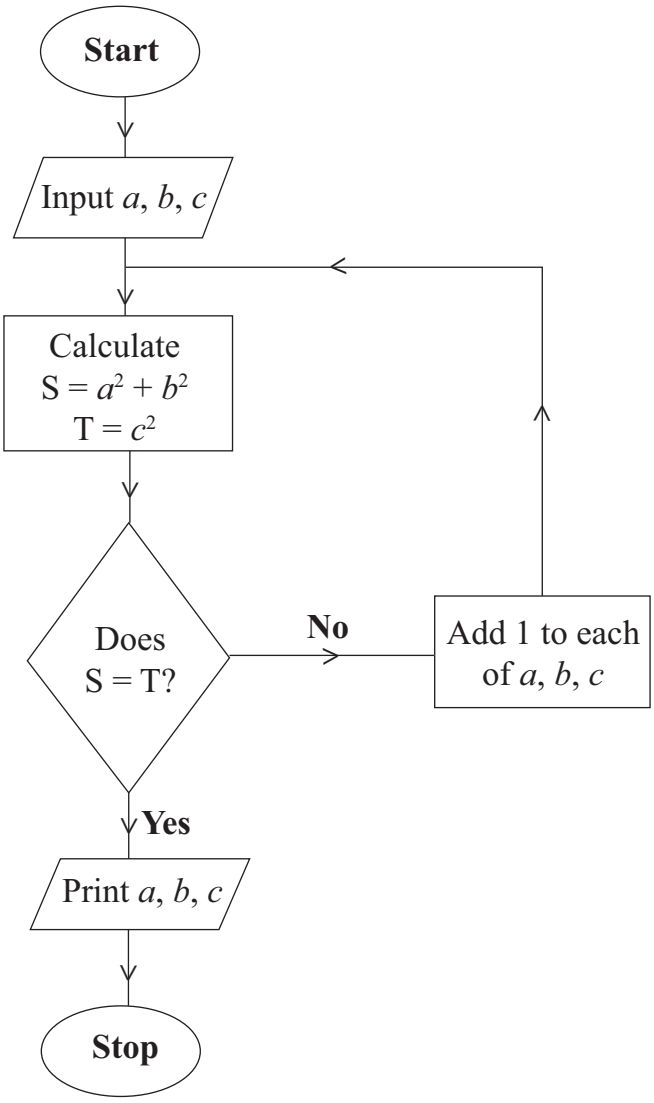
Show all your working.

Answer $x =$ _____ [3]

Examiner Only	
Marks	Remark

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12



Starting with $a = 2$, $b = 9$, $c = 10$ use the flow chart to find the values printed.

a	b	c	S	T
2	9	10		

Answer $a =$ _____, $b =$ _____, $c =$ _____ [3]

THIS IS THE END OF THE QUESTION PAPER

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(i) If the correct answer is seen in the body of the script and the answer given in the answer line is clearly a transcription error, full marks should be awarded.

(ii) If the answer is missing, but the correct answer is seen in the body of the script, full marks should be awarded.

(iii) If the correct answer is seen in working but a completely different answer is seen in the answer space, then some marks will be awarded depending on the severity of the error.

(iv) Work crossed out but not replaced should be marked.

(v) In general, if two or more methods are offered, mark only the method that leads to the answer on the answer line. If two (or more) answers are offered (with no solution offered on the answer line), mark the poorest answer.

(vi) For methods not provided for in the mark scheme, give as far as possible equivalent marks for equivalent work.

(vii) Where a follow through mark is indicated on the mark scheme for a particular part question, the marker must ensure that you refer back to the answer of the previous part of the question.

(viii) Unless the question asks for an answer to a specific degree of accuracy, always mark at the greatest number of significant figures seen. E.g. the answer in the mark scheme is 4.65 and the candidate then correctly rounds to 4.7 or 5 on the answer line. Allow full marks for 4.65 seen in the working.

(ix) Anything in the mark scheme which is in brackets (...) is not required for the mark to be earned, but if present it must be correct.

(x) For any question, the range of answers given in the mark scheme is inclusive.

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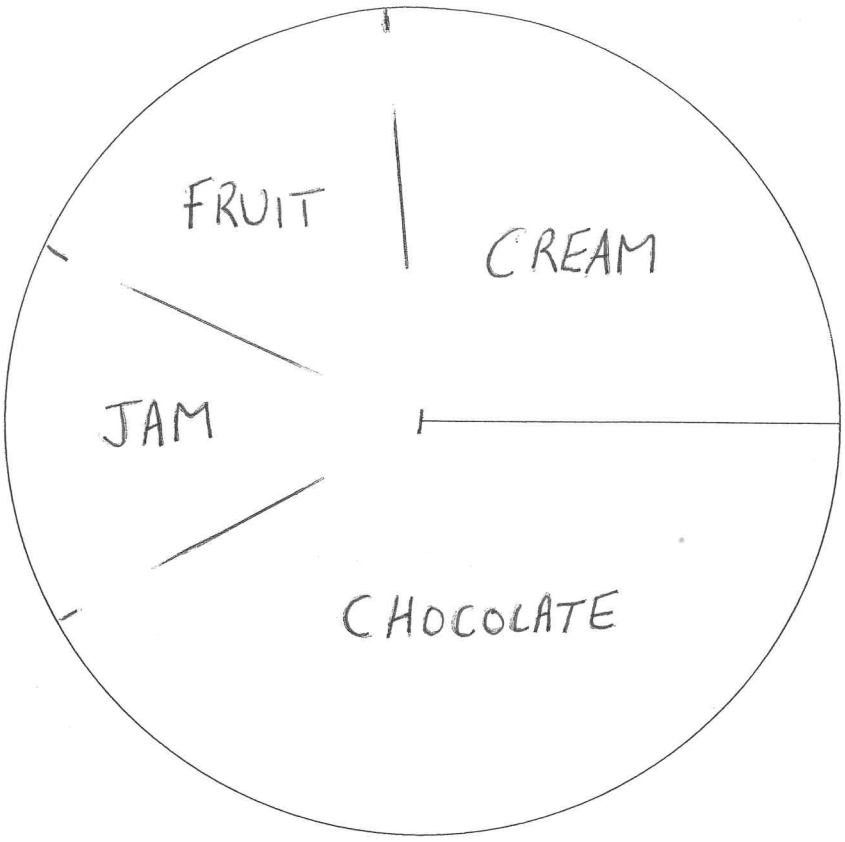
			AVAILABLE MARKS
1	see overlay 96º, 60º, 54º, 150º (award one mark for evidence of 6) all sectors correct and labelled (allow A1 for 2 correct and labelled)	A2 A2	4
2	**(a)** $6 \times 11 \times 10.5 = 693$	M1 A1	
	(b) $6 \times 11 \times h = 412.5$		
	$h = \frac{412.5}{66}$	MA1	
	$h = 6.25\,\text{cm}$	A1 A1 units	5
3	**(a)** **(i)** 4	A1	
	(ii) 226.89	A1	
	(b) 23.4	A1	3
4	£225 or $\frac{1}{4} + \frac{1}{5}$	MA1	
	£180 or $\frac{9}{20}$	MA1	
	£495 or $1 - \frac{9}{20}$	MA1	
	$\frac{495}{900}$ or $\frac{11}{20}$	MA1	4
5	**(a)** $a - 4$	A1	
	(b) **(i)** $2a + 3(a - 4) = 23$ A1 for correct expression set up/A1 for equation		
	(ii) $2a + 3a - 12 = 23$ $5a - 12 = 23$ $5a = 35$ $a = 7$	 MA1 MA1	5
6	correct scales correct heights (award A1 for 3 correct heights)	A1 A2	3

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				AVAILABLE MARKS
7	**(a)**	$C = \pi \times 2.8$ $= 8.796$ ..... cm	MA1 A1	
	(b)	EITHER 3 Triangles $= 3 \times 180 = 540^o$ OR Explain Interior $= 108^o$ Total $= 108 \times 5 = 540^o$	A2	4
8		$0.35 \times 240 = 84$ or 0.65×240 $240 - 84 = 156$	M1 A1 MA1	3
9		$r^2 = 85^2 + 16^2$ $r^2 = 7481$ $r = 86.5$	MA1 A1 A1	3
10	**(a)**	$\frac{3}{4} \times 100$ 75	MA1 A1	
	(b)	4944 5092.32	MA1 MA1	4
11		$5.3 \rightarrow 49.29$ $5.4 \rightarrow 50.76$ 5.35 tested $\rightarrow 50.0225$ 5.3 5.35 must be tested for full marks	MA1 MA1 A1	3
12		$S_1 = 85, T_1 = 100$ $S_2 = 109, T_2 = 121$ $S_3 = 137, T_3 = 144$ $S_4 = 169, T_4 = 169$ 5, 12, 13	MA1 MA1	3
			Total	**44**

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GCSE MATHEMATICS SUMMER 2011
MODULE N2-2
OVERLAY QUESTION 1



Rewarding Learning

Centre Number

71	

Candidate Number

General Certificate of Secondary Education
January 2011

Mathematics



Module N2 Paper 2
(With calculator)
Foundation Tier

[GMN22]

TUESDAY 11 JANUARY

10.30 am – 11.15 am

GMN22

TIME

45 minutes.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.
Write your answers in the spaces provided in this question paper.
Answer **all fourteen** questions.
Any working should be clearly shown in the spaces provided since marks may be awarded for partially correct solutions.

INFORMATION FOR CANDIDATES

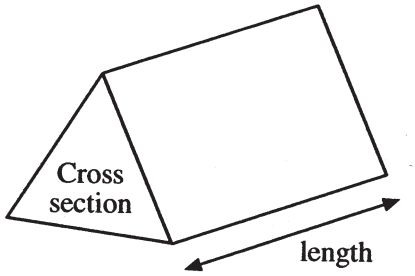
The total mark for this paper is 44.
Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.
You should have a calculator, ruler, compasses, set-square and protractor.
The Formula Sheet is on page 2.

For Examiner's use only	
Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
Total Marks	

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Formula Sheet

Volume of prism = area of cross section × length



Examiner Only	
Marks	Remark

1

VANZ-TO-GO

Van hire charges

£52 per day

plus

19p per mile

Bob hires a van for two days.

When he returns it the total hire charge is £137.06

How many miles did he drive it for?

Answer _____ miles [3]

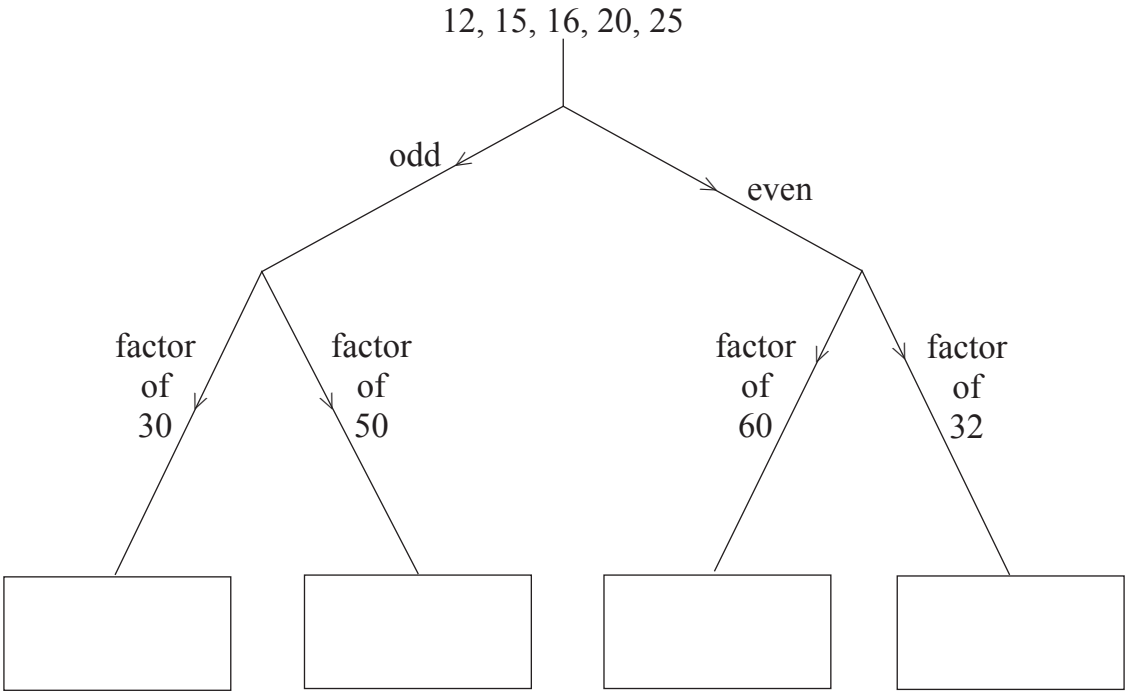
---

2 Simplify $\dfrac{10-3a+2-5a}{2}$

Answer _____ [3]

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3 Using the decision tree, sort these numbers into the correct boxes.



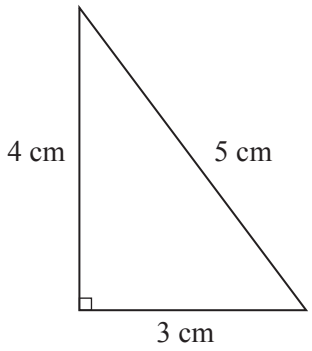
[2]

Examiner Only	
Marks	Remark

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Examiner Only	
Marks	Remark

4 **(a)** A right-angled triangle has sides of 3 cm, 4 cm and 5 cm.



On the grid below show how two of these triangles can be put together to make a parallelogram.

[2]

(b) Calculate angle t in the triangle below.

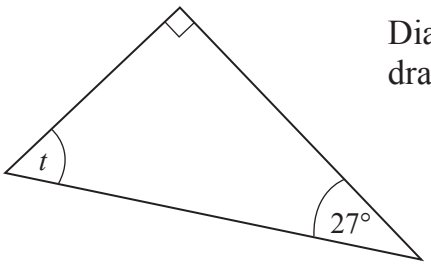


Diagram not drawn accurately

Answer _____ ° [2]

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Examiner Only	
Marks	Remark

5 **(a)** Evaluate $\sqrt{5.76} + 3.5^2$

Answer _____ [1]

(b) Which of the following fractions is nearest to $\frac{3}{4}$?

Show your working.

$$\frac{7}{10}, \quad \frac{17}{20}, \quad \frac{23}{30}, \quad \frac{29}{40}$$

Answer _____ [2]

---

6 The stem and leaf diagram shows a list of temperatures.

2	2	3	6	8	9	
3	0	2	4	5	6	7
4	1	1				

Key $4 \mid 1 = 41\,°C$

Write down

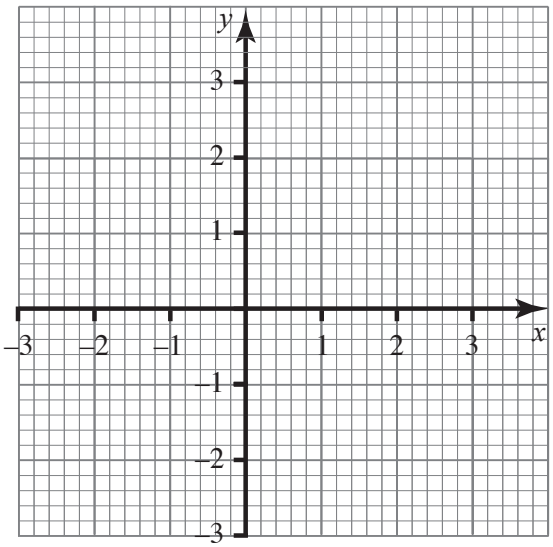
(a) the range,

Answer _____ °C [1]

(b) the median.

Answer _____ °C [1]

7 Draw the graph of $y = 2x - 1$



[3]

8 James is designing a questionnaire to test the idea that

"the amount of sleep you need changes with age".

(a) One of his questions will find out the ages of those being questioned.

Write a suitable question he could ask, with response boxes for people to tick.

[2]

Having completed his questionnaire James decided to give it out to all his school friends and their parents.

(b) Give one reason why this is not a good sample.

Answer _____

_____ [1]

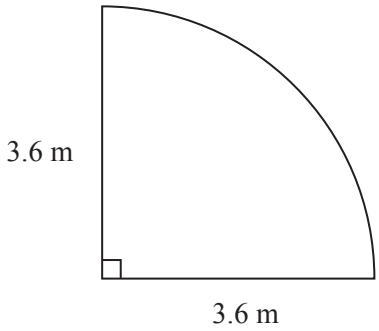
Examiner Only

Marks	Remark

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Examiner Only	
Marks	Remark

9 Calculate the perimeter of the garden shown below.



Answer _____ [4]

10 **(a)** A packet of porridge oats contains 660 g.

A special offer packet contains an extra 15%.

How many grams of porridge oats are in the special offer packet?

Answer _____ g [3]

(b) Richard bought a games console for £240

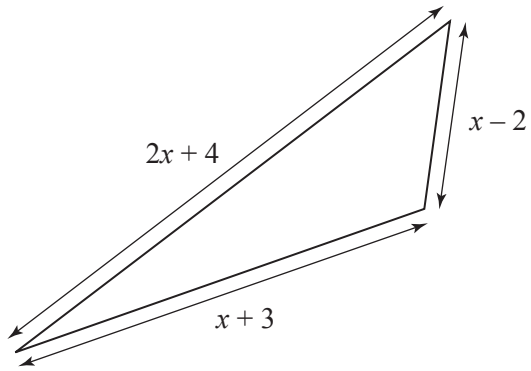
Two years later he sold it for £150

Work out his percentage loss.

Answer _____ % [3]

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11 **(a)** Write an expression, in terms of x, for the perimeter of the triangle shown. Give your answer in its simplest form.



Answer _____ [2]

(b) The perimeter of this triangle is 29 cm.

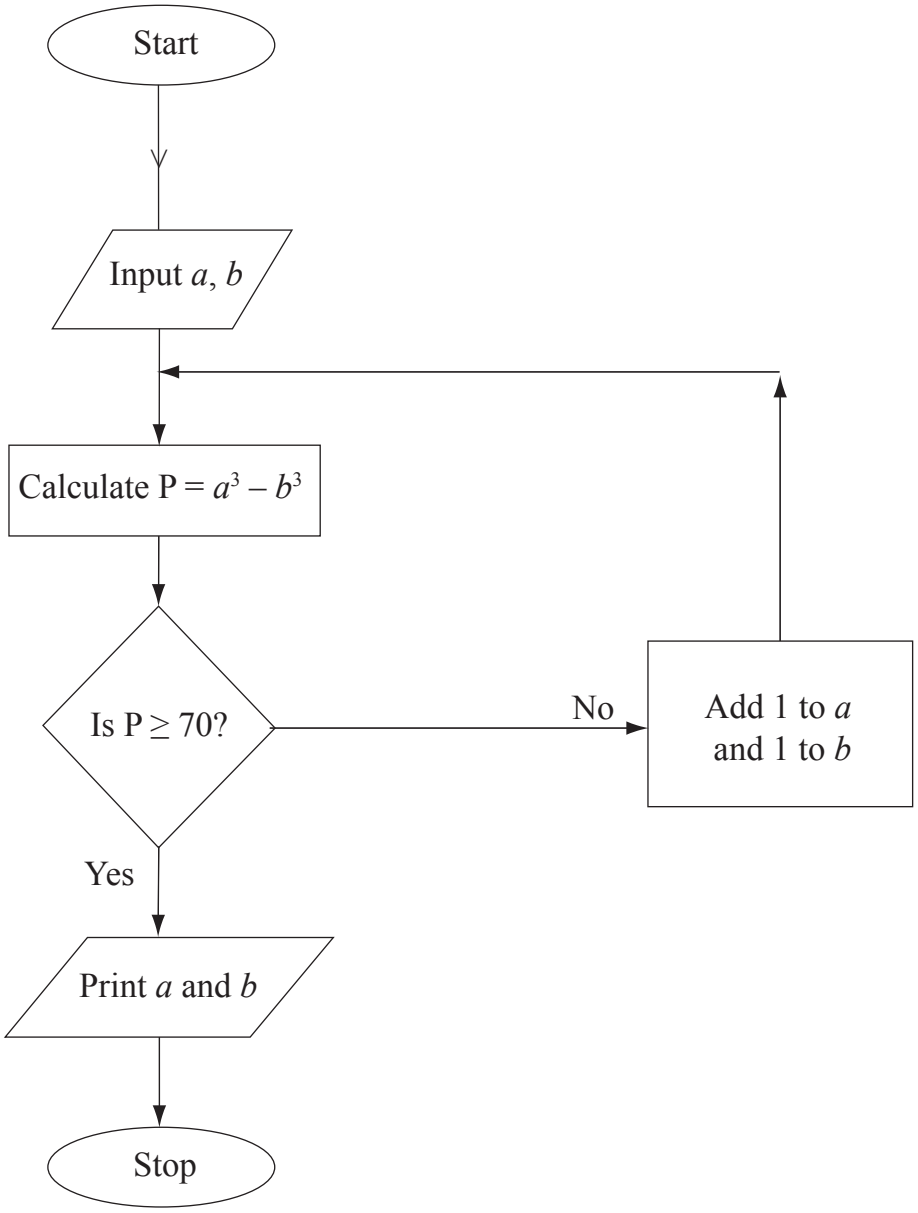
Write down an equation for the perimeter in terms of x and solve it to find x.

Answer x = _____ [2]

Examiner Only	
Marks	Remark

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12



Starting with $a = 2$, $b = 1$ use the flow chart to find the values printed.

a	b	P
2	1	

Answer $a =$ _____, $b =$ _____ [3]

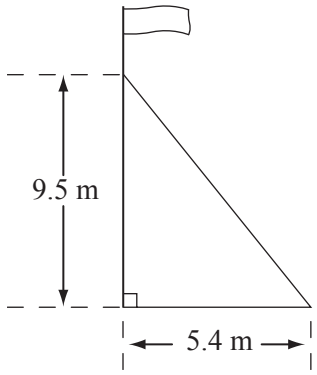
Examiner Only

Marks	Remark

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Examiner Only	
Marks	Remark

13 A flagpole is held vertically by a wire fixed to a point 9.5 m above the horizontal ground and to a point on the ground 5.4 m from the pole.



Calculate the length of the wire.

Answer _____ m [3]

14 Write down the *n*th term for the sequence

6, 12, 18, 24, ...

Answer _____ [1]

THIS IS THE END OF THE QUESTION PAPER

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Rewarding Learning

General Certificate of Secondary Education
January 2011

Mathematics

Module N2 Paper 2
(With calculator)
Foundation Tier

[GMN22]

TUESDAY 11 JANUARY
10.30 am – 11.15 am

MARK SCHEME

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Introduction

The mark scheme normally provides the most popular solution to each question. Other solutions given by candidates are evaluated and credit given as appropriate; these alternative methods are not usually illustrated in the published mark scheme.

The marks awarded for each question are shown in the right hand column and they are prefixed by the letters **M**, **A** and **MA** as appropriate. The key to the mark scheme is given below:

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A later part of a question may require a candidate to use an answer obtained from an earlier part of the same question. A candidate who gets the wrong answer to the earlier part and goes on to the later part is naturally unaware that the wrong data is being used and is actually undertaking the solution of a parallel problem from the point at which the error occurred. If such a candidate continues to apply correct method, then the candidate's individual working must be **followed through** from the error. If no further errors are made, then the candidate is penalised only for the initial error. Solutions containing two or more working or transcription errors are treated in the same way. This process is usually referred to as "follow-through marking" and allows a candidate to gain credit for that part of a solution which follows a working or transcription error.

It should be noted that where an error trivialises a question, or changes the nature of the skills being tested, then as a general rule, it would be the case that not more than half the marks for that question or part of that question would be awarded; in some cases the error may be such that no marks would be awarded.

Positive marking:

It is our intention to reward candidates for any demonstration of relevant knowledge, skills or understanding. For this reason we adopt a policy of **following through** their answers, that is, having penalised a candidate for an error, we mark the succeeding parts of the question using the candidate's value or answers and award marks accordingly.

Some common examples of this occur in the following cases:

(a) a numerical error in one entry in a table of values might lead to several answers being incorrect, but these might not be essentially separate errors;

(b) readings taken from candidates' inaccurate graphs may not agree with the answers expected but might be consistent with the graphs drawn.

When the candidate misreads a question in such a way as to make the question easier only a proportion of the marks will be available (based on the professional judgement of the examiner).

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			AVAILABLE MARKS
1	$137.06 - 104 = 33.06$ $3306 \div 19 = 174$	MA1 M1, A1	3
2	$\dfrac{12-8a}{2}$ $6 - 4a$	A1, A1 A1	3
3	15 | 25 | 12, 20 | 16	A2 allow A1 for 3 correct	2
4	**(a)** parallelogram formed	M1, A1	
	(b) $180 - (90 + 27) = 63$	M1, A1	4
5	**(a)** 14.65	A1	
	(b) 0.7, 0.85, $0.76\dot{6}$, 0.725	MA1	
	$\frac{23}{30}$	A1	3
6	**(a)** Range = 41 – 22 = 19	A1	
	(b) Median is 7th i.e. 32	A1	2
7	Correct graph to include – intercept at (0,–1)/correct gradient of 2 and a straight line drawn	A3	3
8	**(a)** Suitable question and response boxes, non-overlapping, covering all ages	MA2 allow 1 for partial answer	
	(b) Suitable reason	MA1	3
9	$2 \times \pi \times 3.6 = 22.61946711$ $22.61946711 \div 4 = 5.654866776$ Perimeter = $2 \times 3.6 + 5.65 = 12.85$ m	MA1 MA1 MA1, A1 units	4

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				AVAILABLE MARKS
10	**(a)** $660 \times 0.15 = 99$ 759		M1, A1 A1	
	(b) $240 - 150 = 90$		A1	
	$\frac{90}{240} \times 100 = 37.5$		M1, A1	6
11	**(a)** $2x + 4 + x + 3 + x - 2$ $= 4x + 5$		MA1 A1	
	(b) $4x + 5 = 29$ $4x = 24$ $x = 6$		MA1 A1	4
12	a b P 2 1 7 3 2 19 4 3 37 5 4 61 6 5 91	$a = 6$ $b = 5$	all correct MA2 (3, 4 correct) (MA1) MA1	3
13	$9.5^2 + 5.4^2$ $= 119.41$ $\sqrt{119.41} = 10.93$		M1 A1 MA1	3
14	$6n$		A1	1
			Total	44

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Rewarding Learning

Centre Number	
71	

Candidate Number

General Certificate of Secondary Education
2010

Mathematics



Module N2 Paper 2
(With calculator)
Foundation Tier

[GMN22]

GMN22

TUESDAY 1 JUNE

10.30 am – 11.15 am

TIME

45 minutes.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.
Write your answers in the spaces provided in this question paper.
Answer **all thirteen** questions.
Any working should be clearly shown in the spaces provided since marks may be awarded for partially correct solutions.

INFORMATION FOR CANDIDATES

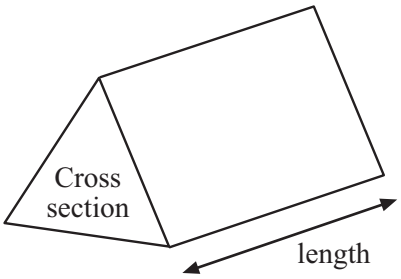
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You should have a calculator, ruler, compasses, set-square and protractor.
The Formula Sheet is on page 2.

For Examiner's use only	
Question Number	**Marks**
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
Total Marks	

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Formula Sheet

Volume of prism = area of cross section × length



Examiner Only	
Marks	Remark

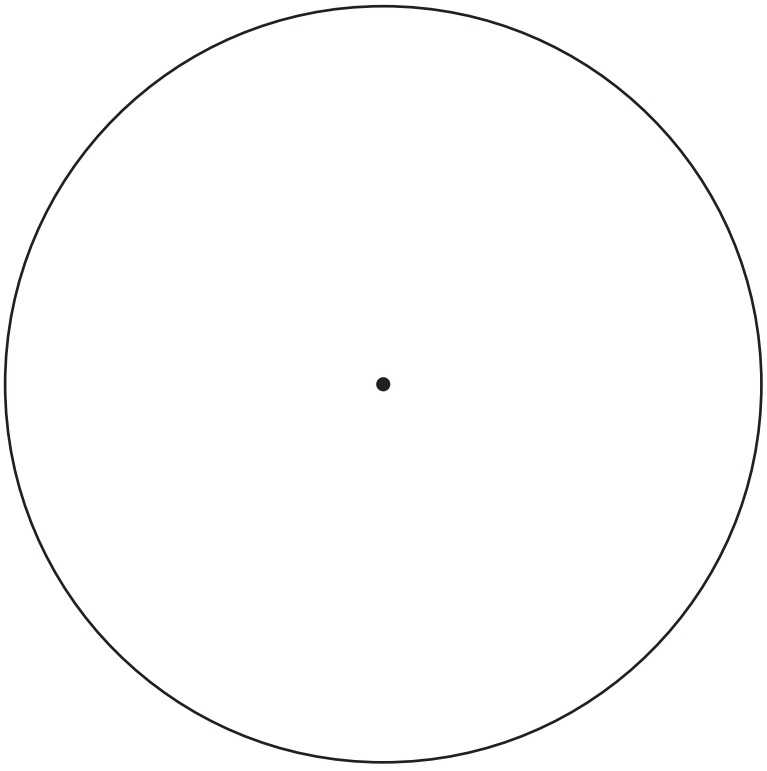
1 Calculate $42^3 + \sqrt{9800}$
Give your answer correct to 2 significant figures.

Answer _____ [2]

---

2 A hurling coach divides his 40 players into four groups.
Complete the table and draw a pie chart to show this information.

Group	Number of players	Angle
Stick work	12	
Tackling	10	
Catching	6	
Shooting	12	



[4]

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Examiner Only	
Marks	Remark

3 **(a)** Find the volume of water in a full tank which measures 35 cm by 42 cm by 60 cm.

Answer _____ [3]

(b) A second full tank contains the same volume of water as the first tank. It has a length of 35 cm and a breadth of 84 cm.
What is its height?

Answer _____ cm [2]

---

4 Find the value of $5x + 3y$ when $x = -3$ and $y = 2$

Answer _____ [2]

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5



Cost: £119.90

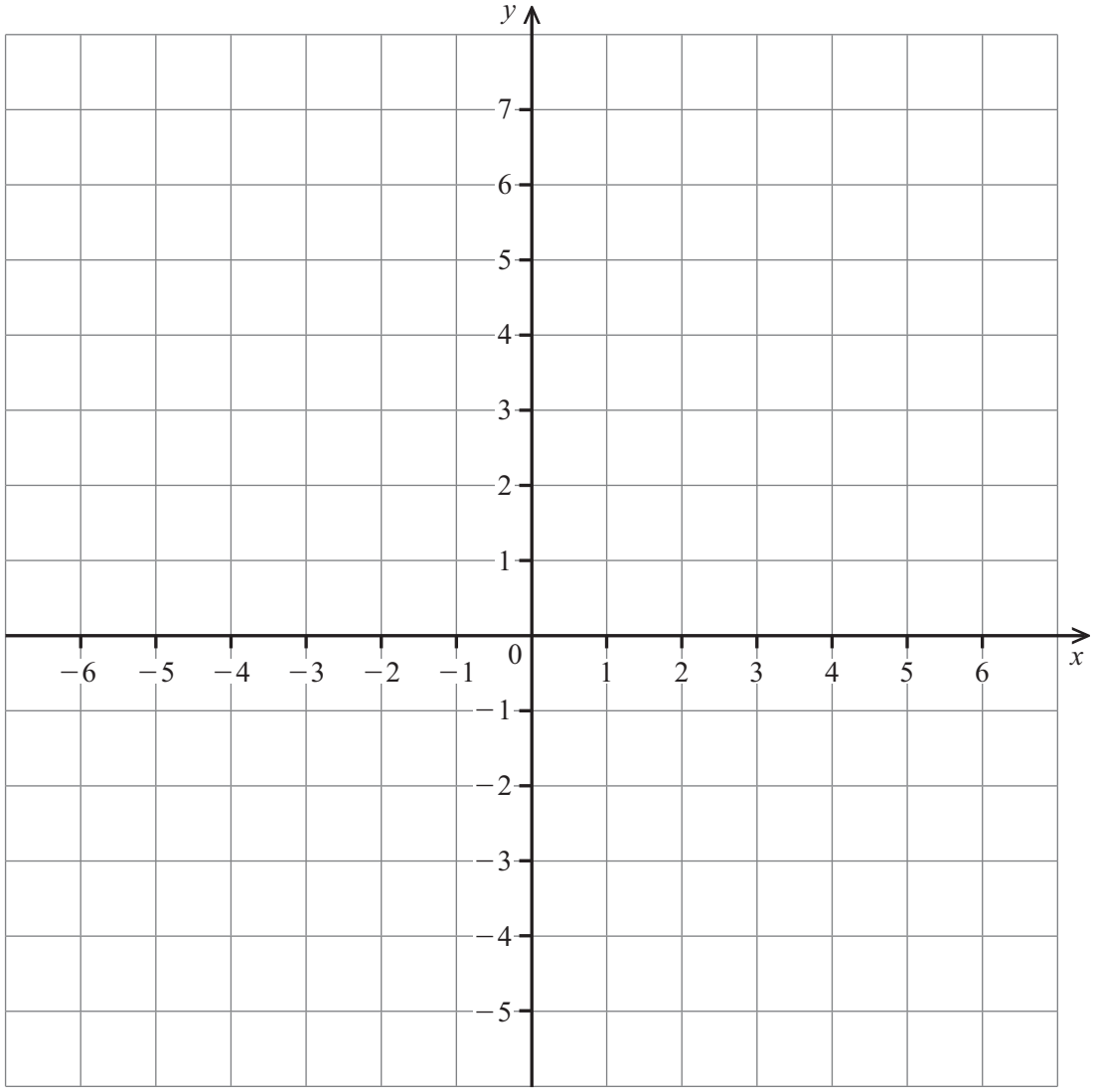
An iPod costs £119.90
Dylan has already saved £35 towards the cost of the iPod.
He continues to save £7.50 per week.
How many complete weeks will it be before he can buy the iPod?

Answer _____ weeks [4]

Examiner Only	
Marks	Remark

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6



Draw the line $y = 2x - 1$ on the grid above. [3]

Examiner Only	
Marks	Remark

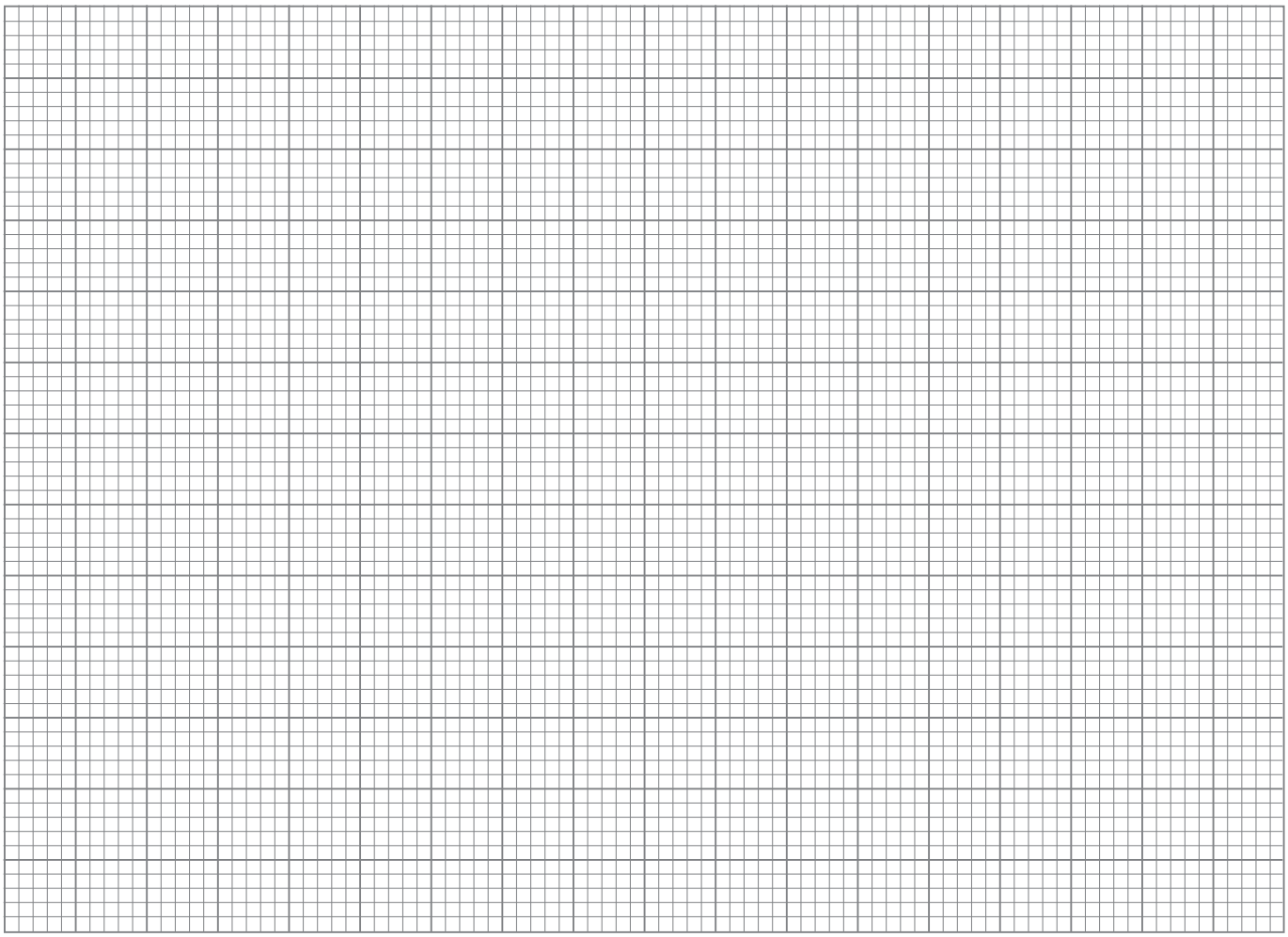
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7 The ages of members of a health club were recorded.

Examiner Only	
Marks	Remark

Age (years)	0–9	10–19	20–29	30–39	40–49	50–59
Frequency	5	28	36	25	14	10

Draw a grouped frequency diagram for this data. [3]



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Examiner Only	
Marks	Remark

8 Jane is having a party. She needs twelve cans of cola.
A single can of cola costs 40p in each of two local shops.
Each shop has a particular offer on cans of cola.

* Ventra *	* Viva *
20% off every twelve cans	buy 3 for the price of 2

Which is better value?
Show your working clearly.

Answer _____ [4]

9 Give the names of two shapes which both have equal sides of length x and both have perimeters of length $4x$.

Answer _____ and _____ [3]

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Examiner Only	
Marks	Remark

10 **(a)** A = (4, –5), B = (–2, 9)
Find the co-ordinates of the midpoint of the line AB.

Answer (_____, _____) [2]

(b) The exterior angle of a regular polygon is 20°.
Find the number of sides.

Answer _____ [2]

---

11 The time taken by ladies to complete the Belfast "Runher" Fun Run were recorded to the nearest minute.

Time (min)	Number of ladies	Mid value	
25–34	13	29.5	
35–44	107		
45–54	234		
55–64	71		
65–74	22		
75–84	1		

(a) Which class interval contains the median time?

Answer _____ [1]

(b) Calculate an estimate for the mean time to complete the Fun Run.

Answer _____ minutes [3]

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Examiner Only	
Marks	Remark

12 The mass of bacteria in a mixture increases by 5% every hour.
At 9.00 am there is 120 mg of bacteria.
What will the mass of bacteria be at midday?

Answer _____ mg [3]

13 Find the perimeter of a semi-circle with diameter 15 cm.

Answer _____ cm [3]

THIS IS THE END OF THE QUESTION PAPER

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GCSE

Mathematics (Modular)

Summer 2010

Mark Schemes

Issued: October 2010

STEMUP.CO.UK

Rewarding Learning

General Certificate of Secondary Education
2010

Mathematics

Module N2 Paper 2
(With calculator)
Foundation Tier

[GMN22]

TUESDAY 1 JUNE

10.30 am – 11.15 am

MARK SCHEME

STEMUP.CO.UK

GCSE MATHEMATICS 2010

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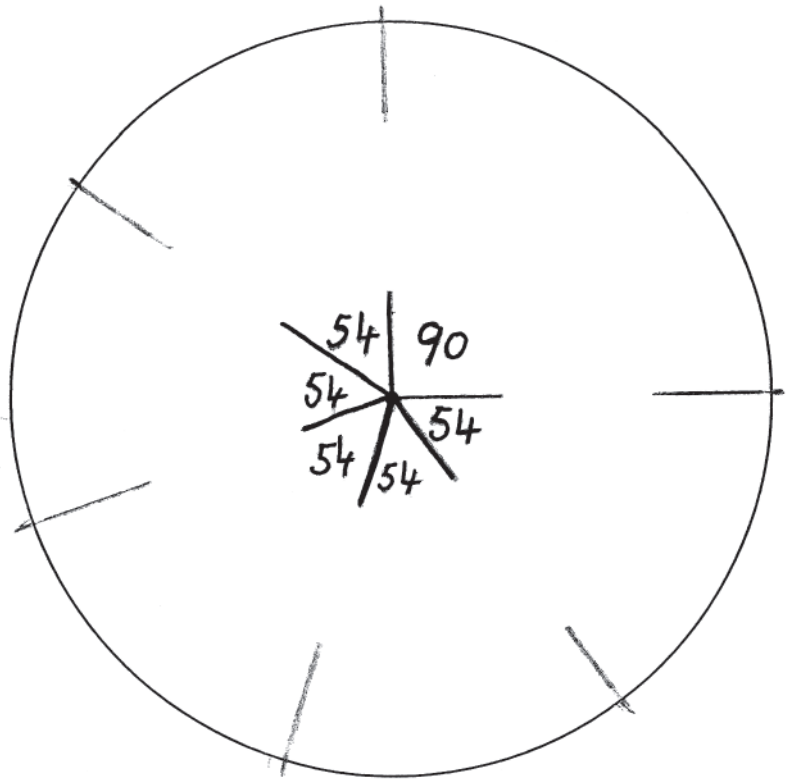
			AVAILABLE MARKS
1	74186.995	MA1	
	74000	A1	2
2	360° / 40 = 9°	A1	
	Angles 108°, 90°, 54°, 108°	A1	
	Correct pie chart drawn – see overlay	A2	4
3	**(a)** 35 × 42 × 60	MA1	
	= 88200 cm^3	A1	
		A1 units	
	(b) 88200/(35 × 84) = 30	M1, A1	5
4	− 15 + 6	MA1	
	− 9	A1	2
5	£119.90 − £35 = £84.90	MA1	
	£84.90 ÷ £7.50	M1	
	= 11.32	A1	
	12 weeks	A1	4
6	one correct point	MA1	
	second correct point	A1	
	correct line	A1	3
7	frequency diagram	M1, A2	3
8	Ventra – £3.84 or Viva – £3.20	M1, A1	
	Viva – £3.20 or Ventra – £3.84	MA1	
	Viva is better	MA1	4
9	Square and Rhombus	A1, A2	3

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				AVAILABLE MARKS
10	**(a)**	(1, 2)	A1, A1	
	(b)	360 ÷ 20 = 18	M1, A1	4
11	**(a)**	45 – 54	A1	
	(b)	Mid values 29.5, 39.5, 49.5, 59.5, 69.5, 79.5		
		"fx" values 383.5, 4226.5, 11583, 4224.5, 1529, 79.5	A1	
		22026 / 448 = 49.2 (1 d.p.)	M1, A1	4
12		5% of 120 = 6 120 + 6 = 126	MA1	
		5% of 126 = 6.3 126 + 6.3 = 132.3	MA1	
		5% of 132.3 = 6.615 132.3 + 6.615 = 138.915	MA1	3
13		Curved part = $\pi \times 7.5 = 23.56....$	MA1, A1	
		Straight part = 15 23.56.... + 15 = 38.6	MA1	3
			Total	**44**

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GCSE MATHEMATICS SUMMER 2010
MODULE N2-2
OVERLAY QUESTION 2



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Rewarding Learning

Centre Number	
71	

Candidate Number

General Certificate of Secondary Education
January 2010

Mathematics



Module N2 Paper 2
(With calculator)
Foundation Tier

[GMN22]

GMN22

TUESDAY 12 JANUARY

10.30 am – 11.15 am

TIME

45 minutes.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.
Write your answers in the spaces provided in this question paper.
Answer **all twelve** questions.
Any working should be clearly shown in the spaces provided since marks may be awarded for partially correct solutions.

INFORMATION FOR CANDIDATES

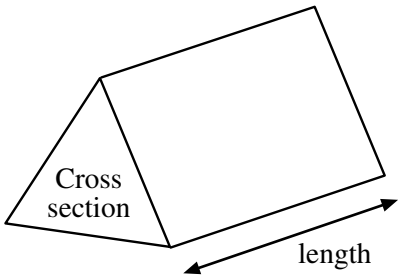
The total mark for this paper is 44.
Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.
You should have a calculator, ruler, compasses, set-square and protractor.
The Formula Sheet is on page 2.

For Examiner's use only	
Question Number	**Marks**
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
Total Marks	

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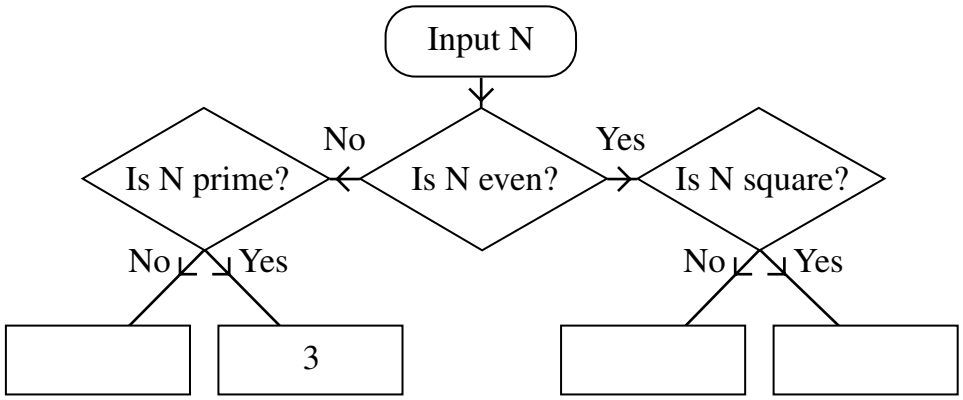
Formula Sheet

Volume of prism = area of cross section × length



Examiner Only	
Marks	Remark

1



Use the decision tree diagram to sort the integers from 1 to 10
The integer N = 3 has already been done. [2]

2 **Broadband for speed and savings**

Download speed	15 Mb
Wireless router	One off payment £20
Monthly price	£16 per month for first six months £22 per month thereafter

Darragh wants Internet Broadband together with a wireless router and signs up for the 15 Mb package.

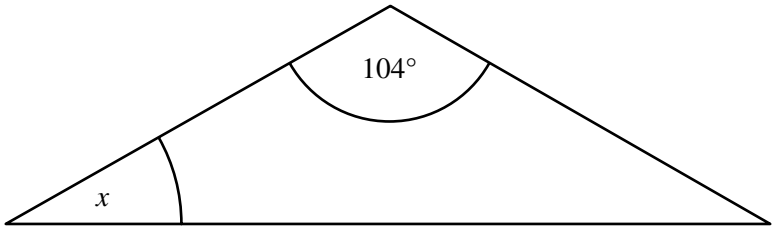
After a period of time he decides to upgrade to a new package. At this stage he has paid £270 altogether. After how many months did he decide to upgrade?

Answer _____ [4]

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3 **(a)**

Diagram not drawn accurately



Calculate the angle x in the isosceles triangle.

Answer _____° [2]

(b) A rectangle measures 6.8 cm by 2.6 cm.
Calculate

(i) the area,

Answer _____ cm^2 [2]

(ii) the perimeter of this rectangle.

Answer _____ cm [1]

Examiner Only	
Marks	Remark

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4 A taxi firm operates with a number of cars and n minibuses.

Examiner Only	
Marks	Remark

(a) Each minibus can hold 13 passengers. Write an expression for the maximum number of passengers that can be transported by n minibuses.

Answer _____ [1]

(b) The taxi firm has 16 times as many cars as minibuses.
Write an expression for the number of cars the taxi firm has.

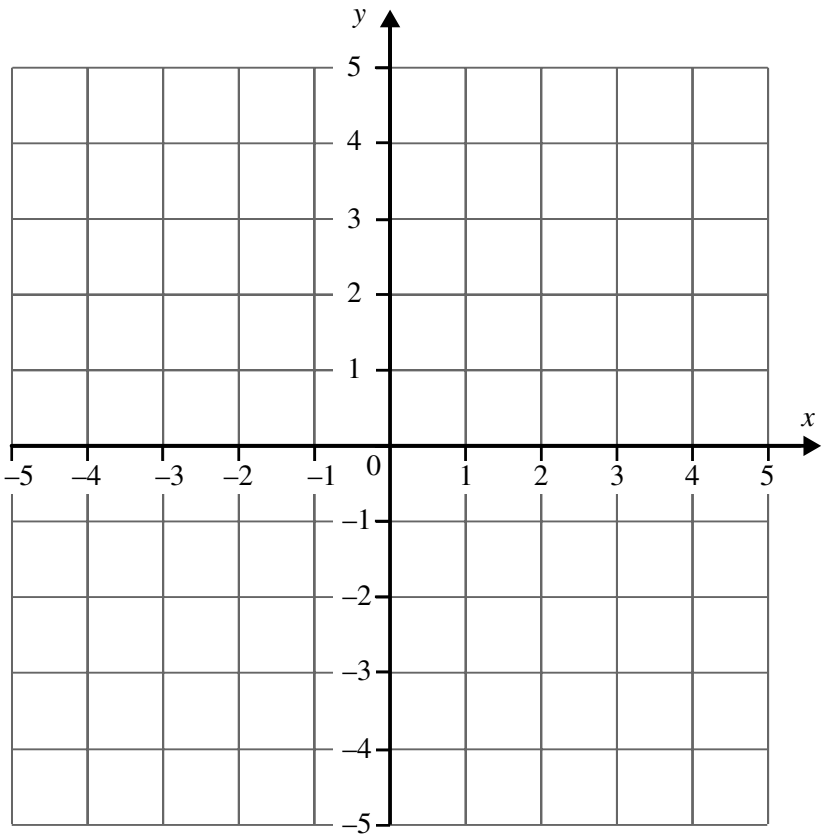
Answer _____ [1]

(c) Each car can hold four passengers. Write an expression for the maximum number of passengers that can be transported using cars only.

Answer _____ [1]

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5 **(a)** Draw the graph of $y = 2x - 3$ on the grid below.



[3]

(b) Solve $\frac{t}{3} = 12$

Answer $t =$ _____ [1]

Examiner Only

Marks	Remark

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6 **(a)** Find the cube root of 35 correct to two significant figures.

Answer _____ [2]

(b) Calculate $\frac{4.3 \times 3.9}{7.8 - 1.9}$ correct to one decimal place.

Answer _____ [2]

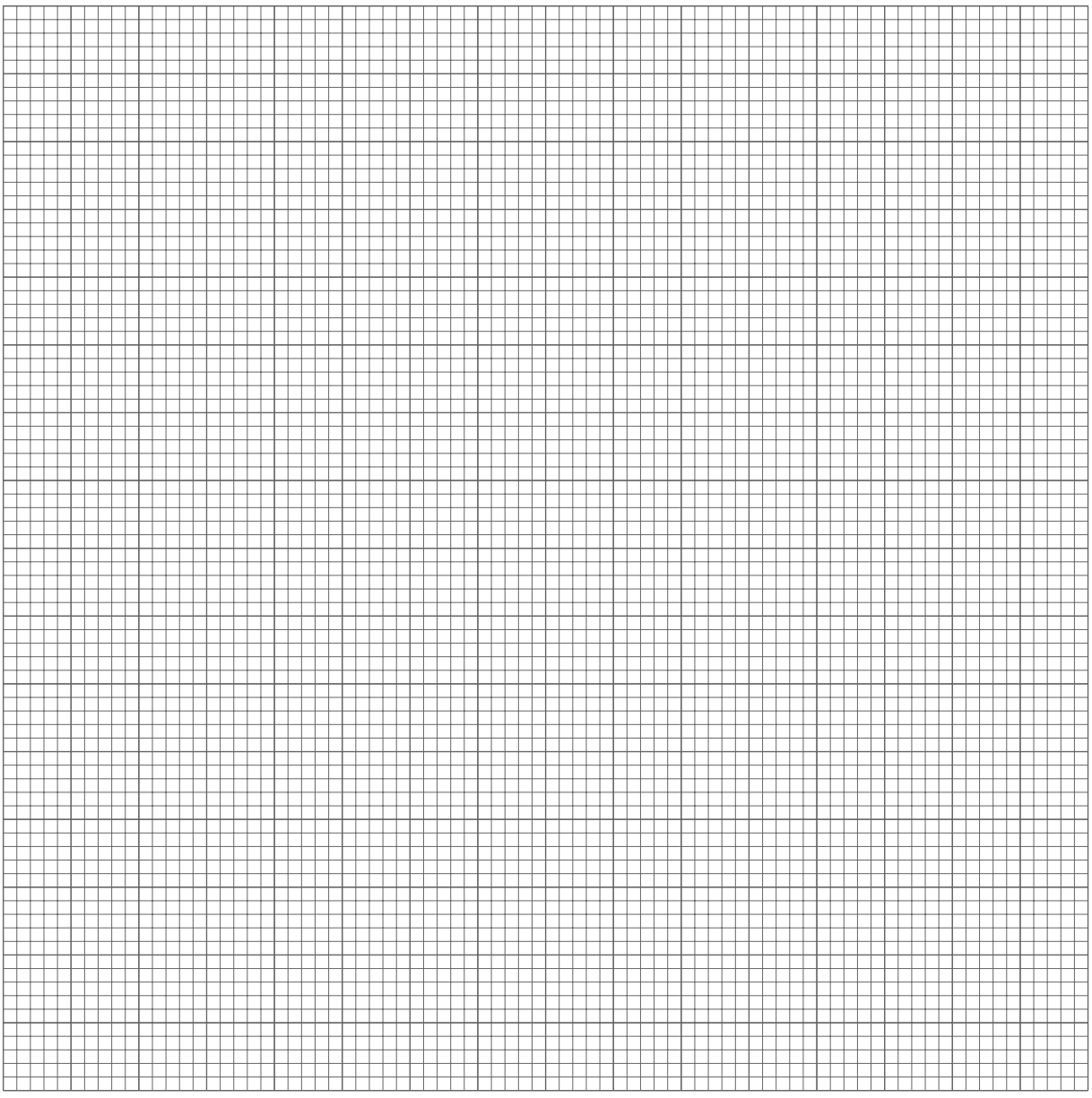
Examiner Only	
Marks	Remark

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7 Penny recorded the play time of each of the tracks on her iPod.
The results are shown in the table below.

Time (t seconds)	$90 < t \leqslant 120$	$120 < t \leqslant 150$	$150 < t \leqslant 180$	$180 < t \leqslant 210$	$210 < t \leqslant 240$
Frequency	22	35	18	10	6

(a) Show this information on a grouped frequency diagram.



[3]

Examiner Only	
Marks	Remark

(b) What is the modal class interval?

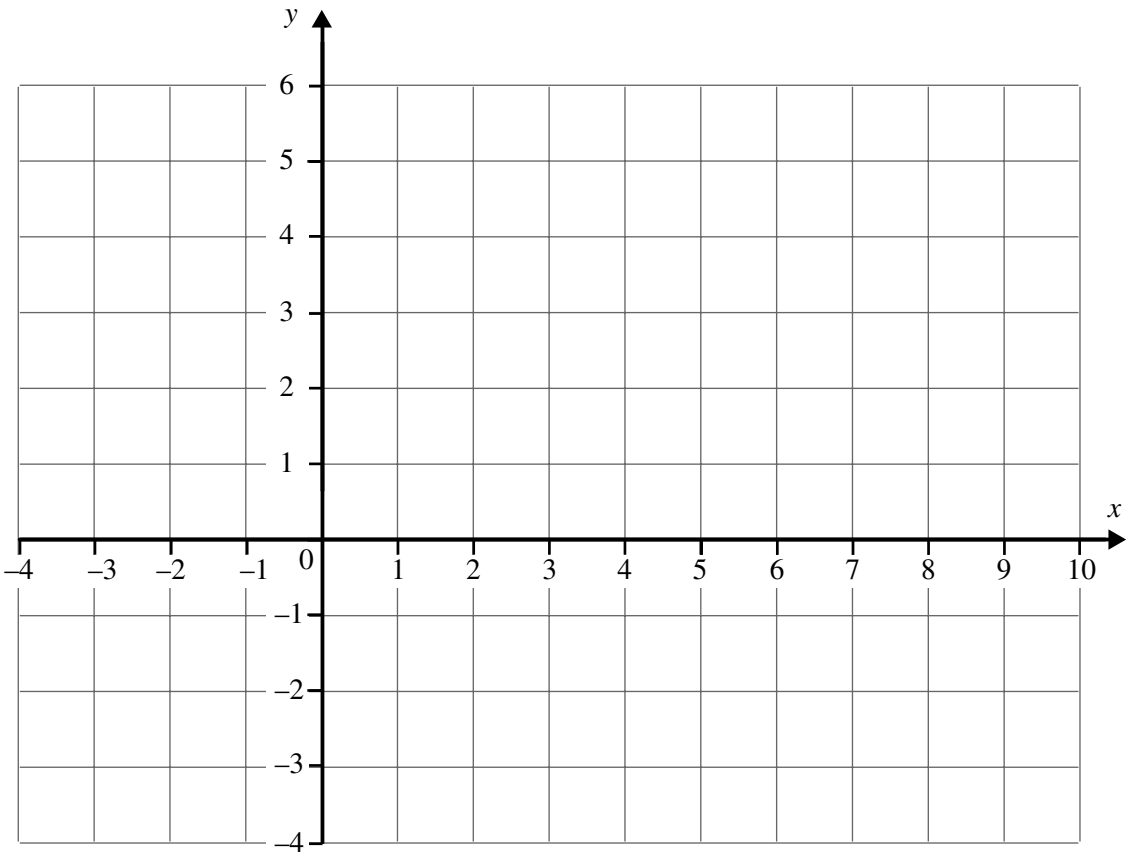
Answer _____ [1]

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8 **(a)** Change 4.6 m^2 into cm^2.

Answer _____ cm^2 [2]

(b)



G is the point (–2, 4). H is the point (8, –2).
Find the co-ordinates of the midpoint of GH.

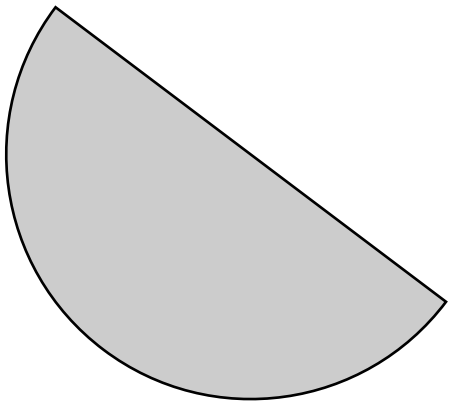
Answer (_____ , _____) [2]

Examiner Only

Marks	Remark

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9



Calculate the perimeter of a semicircle with diameter 8 cm.

Answer _____ [4]

Examiner Only	
Marks	Remark

10 In September, Georgina received £600 commission on sales she had made that month.
In October she received 15% less than September.
In November her commission **increased** by 18% and in December by 25% on the previous month.
How much commission did Georgina receive in December?

Show all your working.

Answer £ _____ [3]

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Examiner Only	
Marks	Remark

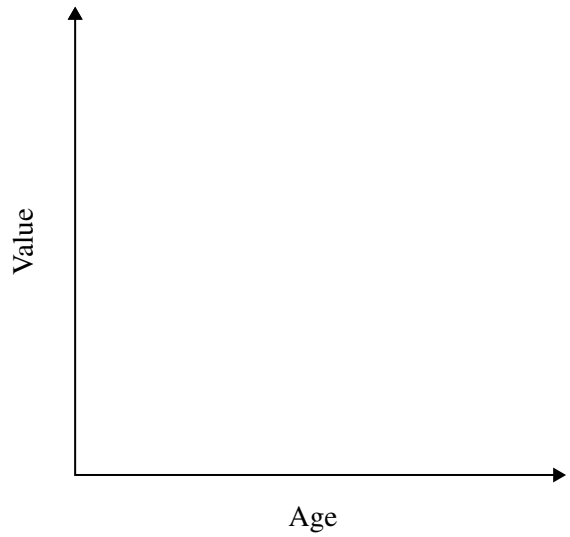
11 **(a)** What type of correlation exists between the ages of cars and their mileage travelled?

Answer _____ [1]

(b) **(i)** What type of correlation exists between the ages of cars and their value?

Answer _____ [1]

(ii) Sketch a scatter graph with at least six points to illustrate this correlation.



[1]

(c) Write down a variable for cars which would have no correlation to the ages of the cars.

Answer _____ [1]

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12 The size of the angles, in degrees, of the triangle below are $2x$, $2x + 19$ and $x + 16$

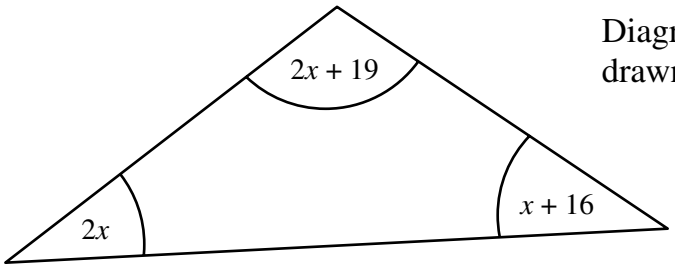


Diagram not drawn accurately

Examiner Only	
Marks	Remark

(a) Use the information to write down an equation in terms of x.

Answer _____ [1]

(b) Solve your equation to find the value of x.

Answer x = _____ [2]

THIS IS THE END OF THE QUESTION PAPER

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GCSE

Mathematics (Modular)

January 2010

Mark Schemes

Issued: April 2010

Rewarding Learning

General Certificate of Secondary Education
January 2010

Mathematics

Module N2 Paper 2
(With calculator)
Foundation Tier

[GMN22]

TUESDAY 12 JANUARY

10.30am – 11.15am

MARK SCHEME

STEMUP.CO.UK

GCSE MATHEMATICS 2010

Introduction

The mark scheme normally provides the most popular solution to each question. Other solutions given by candidates are evaluated and credit given as appropriate; these alternative methods are not usually illustrated in the published mark scheme.

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It should be noted that where an error trivialises a question, or changes the nature of the skills being tested, then as a general rule, it would be the case that not more than half the marks for that question or part of that question would be awarded; in some cases the error may be such that no marks would be awarded.

Positive marking:

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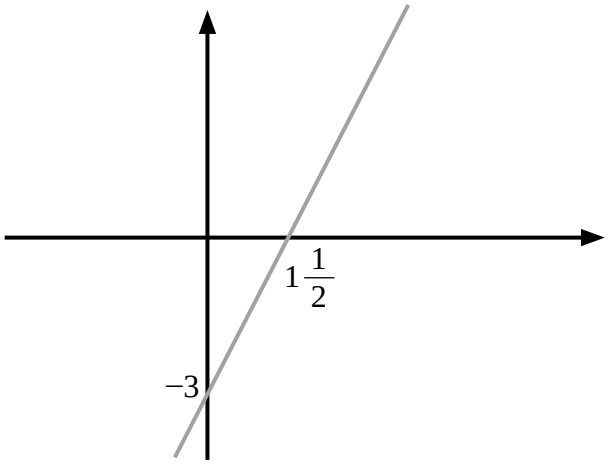
Some common examples of this occur in the following cases:

(a) a numerical error in one entry in a table of values might lead to several answers being incorrect, but these might not be essentially separate errors;

(b) readings taken from candidates' inaccurate graphs may not agree with the answers expected but might be consistent with the graphs drawn.

When the candidate misreads a question in such a way as to make the question easier only a proportion of the marks will be available (based on the professional judgement of the examiner).

			AVAILABLE MARKS
1			
	1 9	3 5 7	2 6 8 10	4	
	All correct	MA2	
	(5 correct MA1)		2
2	$20 + 6 \times 16 = 116$	MA1	
	$270 - 116 = 154$	MA1	
	$154 \div 22 = 7$	MA1	
	13 months	MA1	4
3	**(a)** 76	MA1	
	38	A1	
	(b) **(i)** 6.8×2.6 or 17.6	M1	
	17.68 or 17.7	A1	
	(ii) 18.8	MA1	5
4	**(a)** $13n$	A1	
	(b) $16n$	A1	
	(c) $64n$	A1	3
5	**(a)** correct point	MA1	
	2nd point	MA1	
	line	MA1	



	(b) 36	A1	4

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				AVAILABLE MARKS
6	**(a)**	$\sqrt[3]{35} = 3.2710...$	A1	
		$= 3.3$ (2 s.f.)	A1	
	(b)	2.8423	MA1	
		2.8	A1	4
7	**(a)**	appropriate diagram	M1, accuracy A2	
	(b)	$120 < t \leq 150$	MA1	4
8	**(a)**	4.6×10000	MA1	
		46 000	A1	
	(b)	(3,1)	A2	4
9		$\pi \times 8 \div 2 = 12.56637061$	M1, A1	
		20.56637061 cm	A1, A1 units	4
10	October	$600 \times 0.85 = £510$	MA1	
	November	$510 \times 1.18 = £601.80$	MA1	
	December	$601.80 \times 1.25 = £752.25$	MA1	3
11	**(a)**	Positive	A1	
	(b)	**(i)** Negative	A1	
		(ii) Suitable sketch	A1	
	(c)	For example height, number of doors, amount of tyre wear, age of owner	A1	4
12	**(a)**	$2x + 2x + 19 + x + 16 = 180$ or equivalent	MA1	
	(b)	$5x = 145$	MA1	
		$x = 29$	MA1	3
			Total	**44**

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Rewarding Learning

Centre Number	
71	

Candidate Number

General Certificate of Secondary Education
2009

Mathematics



Module N2 Paper 2
(**With calculator**)
Foundation Tier

[GMN22]

GMN22

MONDAY 18 MAY

2.45 pm – 3.30 pm

TIME

45 minutes.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.
Write your answers in the spaces provided in this question paper.
Answer **all twelve** questions.
Any working should be clearly shown in the spaces provided since marks may be awarded for partially correct solutions.

INFORMATION FOR CANDIDATES

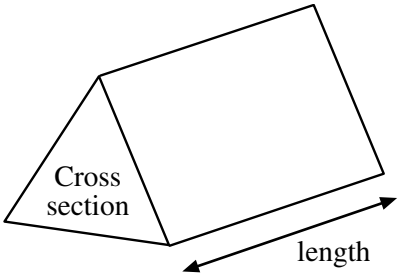
The total mark for this paper is 44.
Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.
You should have a calculator, ruler, compasses, set-square and protractor.
The Formula Sheet is on page 2.

For Examiner's use only	
Question Number	**Marks**
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
Total Marks	

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Formula Sheet

Volume of prism = area of cross section × length



Examiner Only	
Marks	Remark

1 The 10 boys in Class 12A gained the following marks in a test:

18, 12, 15, 9, 13, 14, 20, 11, 10, 8

The 8 girls in Class 12A gained a total of 128 marks.

Which group did better, boys or girls? Give a reason for your answer.

Answer _____

because _____

_____ [4]

---

2 **(a)** Ravi has £600. He spends $\frac{1}{4}$ of this money on clothes and $\frac{1}{6}$ of the money on his holiday. What fraction of the £600 has he left?

Answer _____ [4]

(b) Which of the following fractions is nearest to $\frac{1}{4}$?

$$\frac{2}{10}, \quad \frac{3}{20}, \quad \frac{7}{30}, \quad \frac{11}{40}$$

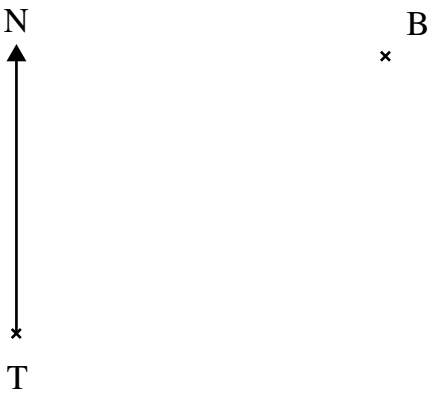
Show clearly how you decided on your answer.

Answer _____ [2]

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Examiner Only	
Marks	Remark

3 (a)



T is a point at the centre of a town square.

A bank, B, is marked on the diagram above.

(i) Find the bearing of B from T.

Answer _____° [1]

The scale of the diagram is 1 cm = 20 m.

The cinema C is 90 m from T and on a bearing of 160 ° from T.

(ii) Mark the position of the cinema, C, on the diagram above. [2]

(b)

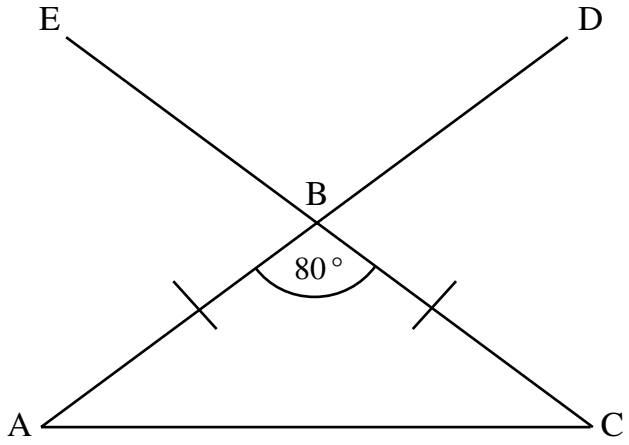


Diagram not drawn accurately

ABC is an isosceles triangle. ABD and CBE are straight lines.
Angle ABC is 80°

Find the size of

(i) angle EBD,

Answer _____° [1]

(ii) angle BAC.

Answer _____° [2]

Examiner Only	
Marks	Remark

Examiner Only	
Marks	Remark

4 Katy wants to know how many times a month, on average, the people in her town go to the cinema. She asks 200 pupils in her school.

Explain why Katy's sample may not be representative of the people in her town.

Answer _____

_____ [1]

---

5 **(a)** Solve the equation $\frac{y}{3} = 6$

Answer y = _____ [1]

(b) Expand and simplify $4(2a + 3) - 7$

Answer _____ [2]

---

6 The heights (in centimetres) of twenty boys in a local hockey club are:

181	170	162	153	182	171	163	158	185	174
166	157	177	167	178	167	178	167	169	168

Construct a stem and leaf diagram to illustrate these heights.

[3]

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7 Construct a rhombus of side 6.5 cm which has one of its diagonals 5 cm in length.

[4]

Examiner Only	
Marks	Remark

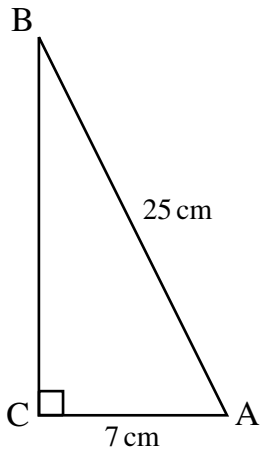
8 A wardrobe was priced at £640
In a sale its price was reduced by 35%. Calculate the sale price of the wardrobe.

Answer £_____ [3]

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Examiner Only	
Marks	Remark

9 Calculate the length of BC in the right angled triangle below.



Answer _____cm [3]

10 A man is filling his garden pond with water. He can fill a bucket of water and empty it into the pond every 25 seconds.
The bucket holds 15 litres of water.
It takes the man 4 minutes and 35 seconds to fill the pond.

What volume of water does the pond hold?

Answer _____ [4]

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Examiner Only	
Marks	Remark

11 £2500 is placed in a bank account and gains 4% compound interest per year.
What should be the total amount in the account at the end of 3 years?

Answer £_____ [3]

---

12 Use trial and improvement to solve

$$x^3 - 2x = 41$$

giving the answer correct to 1 decimal place.
Show your working.

Answer _____ [4]

THIS IS THE END OF THE QUESTION PAPER

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GCSE

Mathematics (Modular)

Summer 2009

Mark Schemes

Issued: October 2009

Rewarding Learning

General Certificate of Secondary Education
Summer 2009

Mathematics

Module N2 Paper 2
(With calculator)
Foundation Tier

[GMN22]

MONDAY 18 MAY
2.45 pm – 3.30 pm

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STEMUP.CO.UK

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			AVAILABLE MARKS
1	Girls	A1	
	Boys' mean = $\frac{130}{10} = 13$	M1, A1	
	Girls' mean = $\frac{128}{8} = 16$	MA1	4
2	**(a)** $\frac{1}{4}$ of £600 = £150 **or** $\frac{1}{4}+\frac{1}{6}$	MA1	
	$\frac{1}{6}$ of £600 = £100 **or** $\frac{3}{12}+\frac{2}{12}=\frac{5}{12}$ Total = £250	MA1	
	Remainder = £600 – £250 = £350 **or** Remainder = $1-\frac{5}{12}$	MA1	
	Fraction = $\frac{350}{600}$ or $\frac{7}{12}$	MA1	
	(b) $\left(\frac{2}{10}=\frac{24}{120}\right)$ $\frac{3}{20}=\frac{18}{120}$ $\left(\frac{1}{4}=\frac{30}{120}\right)$ $\frac{7}{30}=\frac{28}{120}$ $\frac{11}{40}=\frac{33}{120}$	MA1 (same fractions or decimal form)	
	$\therefore$ Ans $\frac{7}{30}$	MA1 selection/reason	6
3	**(a)** **(i)** 053° or N53°E (±2°)	A1	
	(ii) distance 4.5 cm (±2 mm)	A1	
	bearing 160° (±2°)	A1	
	(b) **(i)** 80°	MA1	
	(ii) 180 – 80 = 100	MA1	
	100 ÷ 2 = 50	MA1	6
4	Suitable answer, e.g. sample is made up totally of young people/teenagers etc. sample does not represent all age groups etc.	A1	1
5	**(a)** $y = 18$	MA1	
	(b) $8a + 12 – 7$	MA1	
	$= 8a + 5$	A1	3

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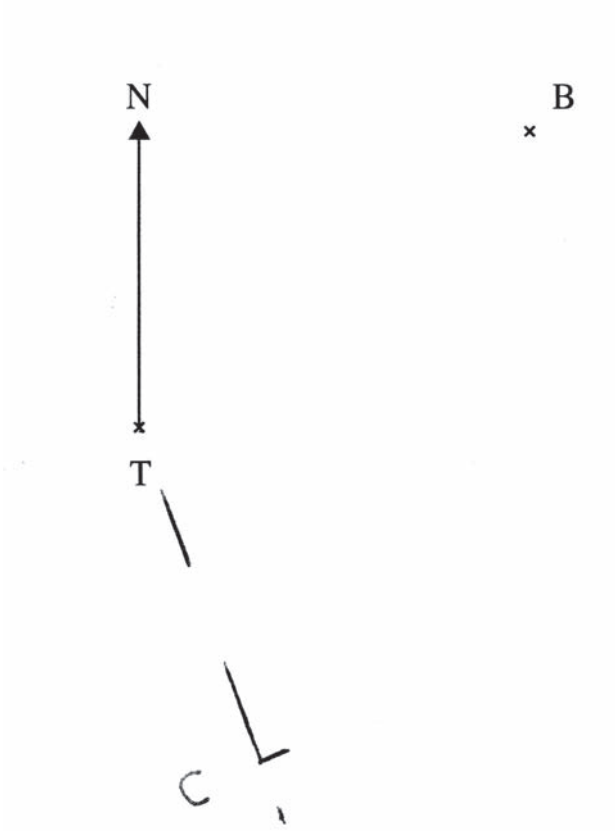
			AVAILABLE MARKS
6	15 | 3 7 8 16 | 2 3 6 7 7 7 8 9 17 | 0 1 4 7 8 8 18 | 1 2 5	M1, A1	
	Key: 15 | 7 means 157 cm	MA1	3
7	diagonal 5 cm (±2 mm)	A1	
	Arcs 6.5 cm (±2 mm) above and below diagonal	A1, A1	
	Rhombus completed	A1	4
8	$\frac{35}{100} \times 640$	M1	
	$= £224$	A1	
	$640 - 224 = £416$	MA1	3
9	$25^2 = 7^2 + x^2$	MA1	
	$625 = 49 + x^2$		
	$576 = x^2$	MA1	
	BC = 24 cm	MA1	3
10	4 minute 35 sec = 275 seconds	MA1	
	$\frac{275}{25} = 11$ buckets	MA1	
	$11 \times 15 = 165$ litres	MA1, A1 units	4
11	1st yr interest $= \frac{4}{100} \times 2500 = £100$		
	value yr 1 = £2600	MA1	
	2nd yr interest $= \frac{4}{100} \times 2600 = £104$		
	value yr 2 = £2704	MA1	
	3rd yr interest $= \frac{4}{100} \times 2704 = £108.16$		
	value yr 3 = £2812.16	MA1	3

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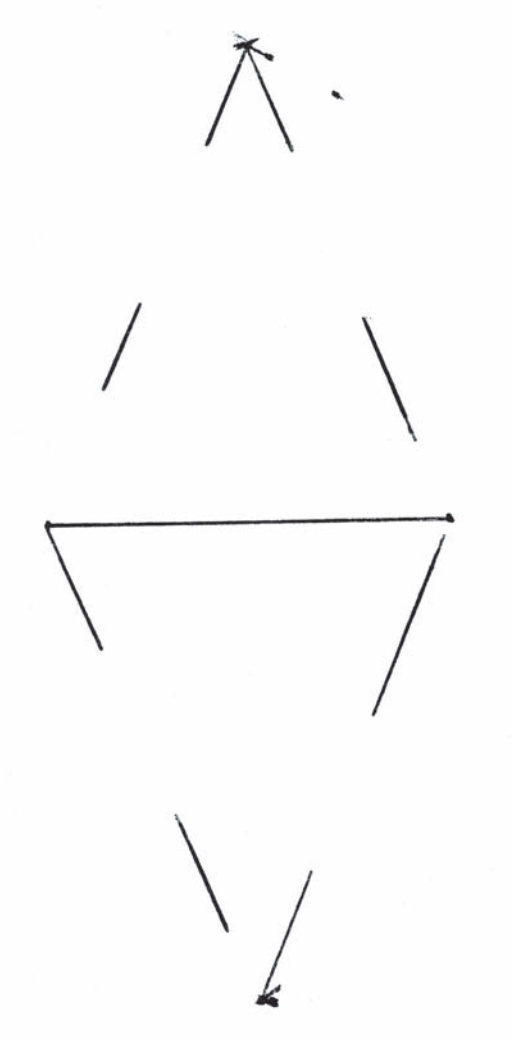
				AVAILABLE MARKS
12	$x = 4$	56		
	$x = 3$	21	MA1	
	$x = 3.6$	39.456		
	$x = 3.7$	43.253	MA1	
	$x = 3.65$	41.327…	MA1	
	$x = 3.6$		A1	4
			Total	**44**

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GCSE MATHEMATICS SUMMER 2009
MODULE N2-2
OVERLAY QUESTION 3



GCSE MATHEMATICS SUMMER 2009
MODULE N2-2
OVERLAY QUESTION 7



Rewarding Learning

Centre Number	
71	

Candidate Number

General Certificate of Secondary Education

January 2009

Mathematics



Module N2 Paper 2
(With calculator)
Foundation Tier

[GMN22]

GMN22

FRIDAY 9 JANUARY

10.30 am – 11.15 am

TIME

45 minutes.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.
Write your answers in the spaces provided in this question paper.
Answer **all fourteen** questions.
Any working should be clearly shown in the spaces provided since marks may be awarded for partially correct solutions.

INFORMATION FOR CANDIDATES

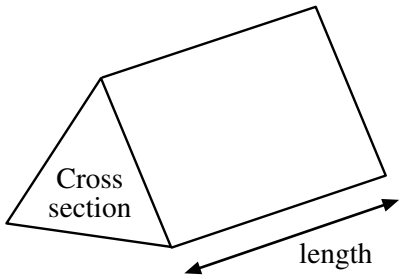
The total mark for this paper is 44.
Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.
You should have a calculator, ruler, compasses, set-square and protractor.
The Formula Sheet is on page 2.

For Examiner's use only	
Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
Total Marks	

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Formula Sheet

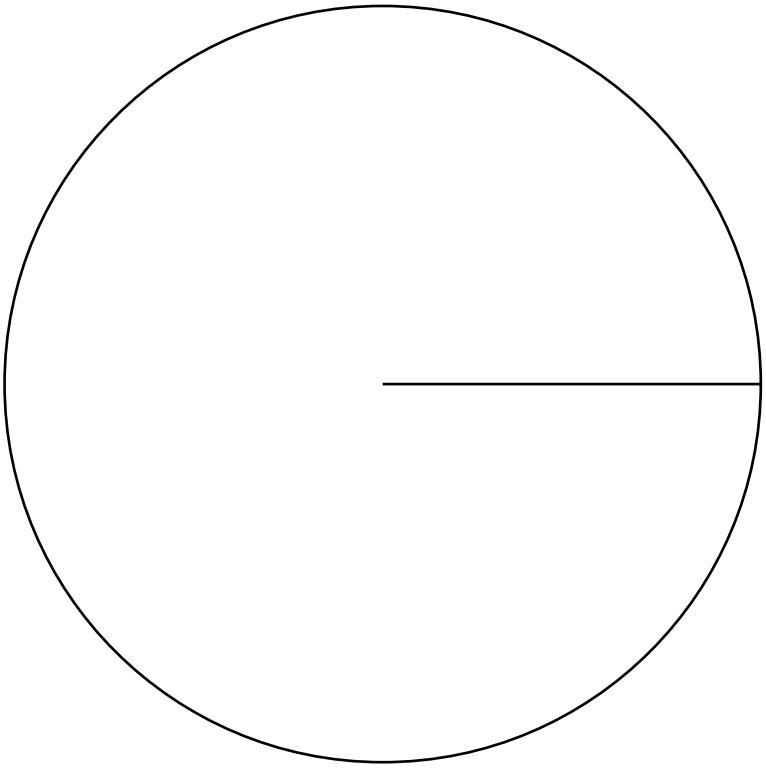
Volume of prism = area of cross section × length



1 The table below gives the estimated population of each of five countries in the year 2000.

Draw a pie chart to illustrate this information.

Country	Population (millions)
N. Ireland	1.6
Wales	2.7
Republic of Ireland	3.9
Scotland	5.0
England	46.8



[4]

Examiner Only	
Marks	Remark

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2 **(a)** Simplify $4x - 3y + 5y - x$

Answer _____ [2]

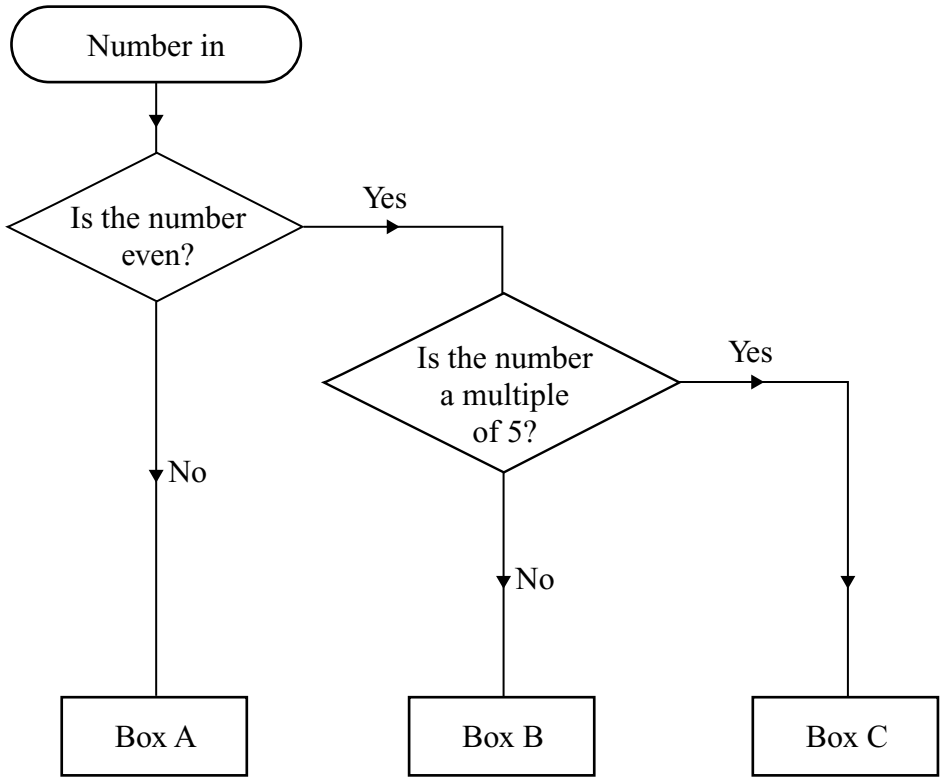
(b) Write down the next term in the sequence

22, 15, 8, 1, ...

Answer _____ [1]

Examiner Only	
Marks	Remark

3



Using the decision tree diagram, name the box for

(a) 22 Answer Box _____

(b) 31 Answer Box _____

(c) 40 Answer Box _____ [2]

4 A boy starts school at 9 am. He finishes at 3.25 pm.
There is a 15 minute mid-morning break and a 50 minute lunch break.
There are 8 lessons in the day, each of the **same** length.
How long is each lesson?
Show your working.

Answer _____minutes [3]

Examiner Only

Marks	Remark

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Examiner Only	
Marks	Remark

5 Calculate

(a) (i) the cube of 6

Answer _____ [1]

(ii) 2^4

Answer _____ [1]

(b) Write 34.56 correct to three significant figures.

Answer _____ [1]

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Examiner Only	
Marks	Remark

6 **(a)** A cuboid has volume 300 cm^3. Its breadth is 5 cm.
Write down possible dimensions for its length and height.

Answer _____ cm and _____ cm [1]

(b) Calculate the area of a circle of radius 2.5 cm.

Answer _____ cm^2 [2]

---

7 A new table is priced at £140
In a sale it is reduced by 35%
Calculate the sale price.

Answer £_____ [3]

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8 The table shows the engine capacity in litres and the fuel consumption (number of miles per gallon (mpg)) for a selection of new cars.

Car	Engine capacity (litres)	Fuel consumption (mpg)
Aster	1.3	45
Viva	2.0	37
Megro	2.5	32
Lazio	1.6	42
Torino	1.8	39
Serene	1.0	50

(a) Draw a scatter graph on the grid opposite to show the data in the table. [2]

(b) Describe the type of correlation shown on the scatter graph.

Answer _____ [1]

(c) Draw a line of best fit for the data. [1]

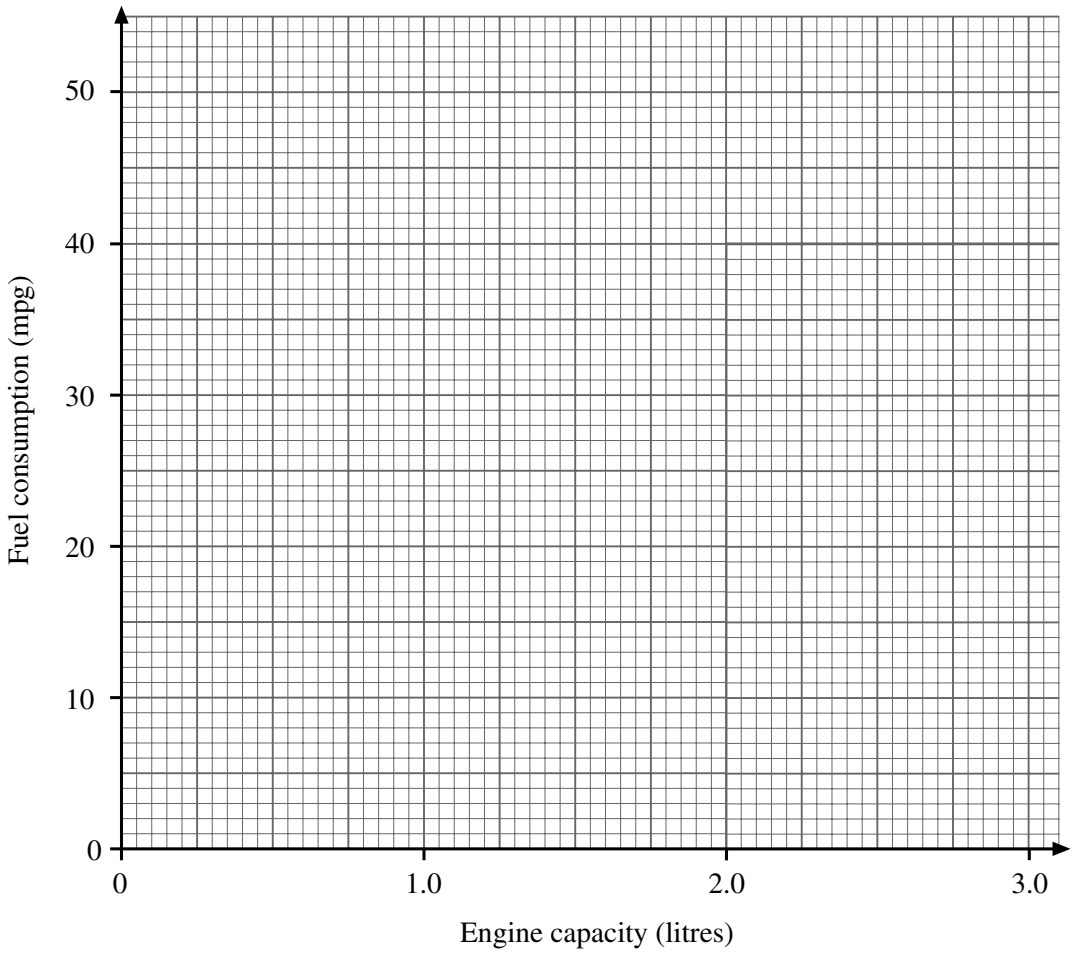
(d) Using your line of best fit, what fuel consumption in mpg would you expect from a car with an engine capacity of 2.2 litres?

Answer _____ mpg [1]

Examiner Only

Marks	Remark

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Fuel consumption (mpg)
50
40
30
20
10
0
0
1.0
2.0
3.0
Engine capacity (litres)

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9

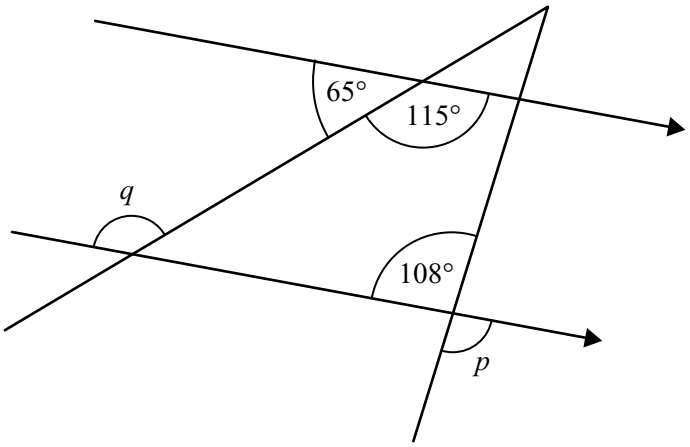


Diagram not drawn accurately

Calculate

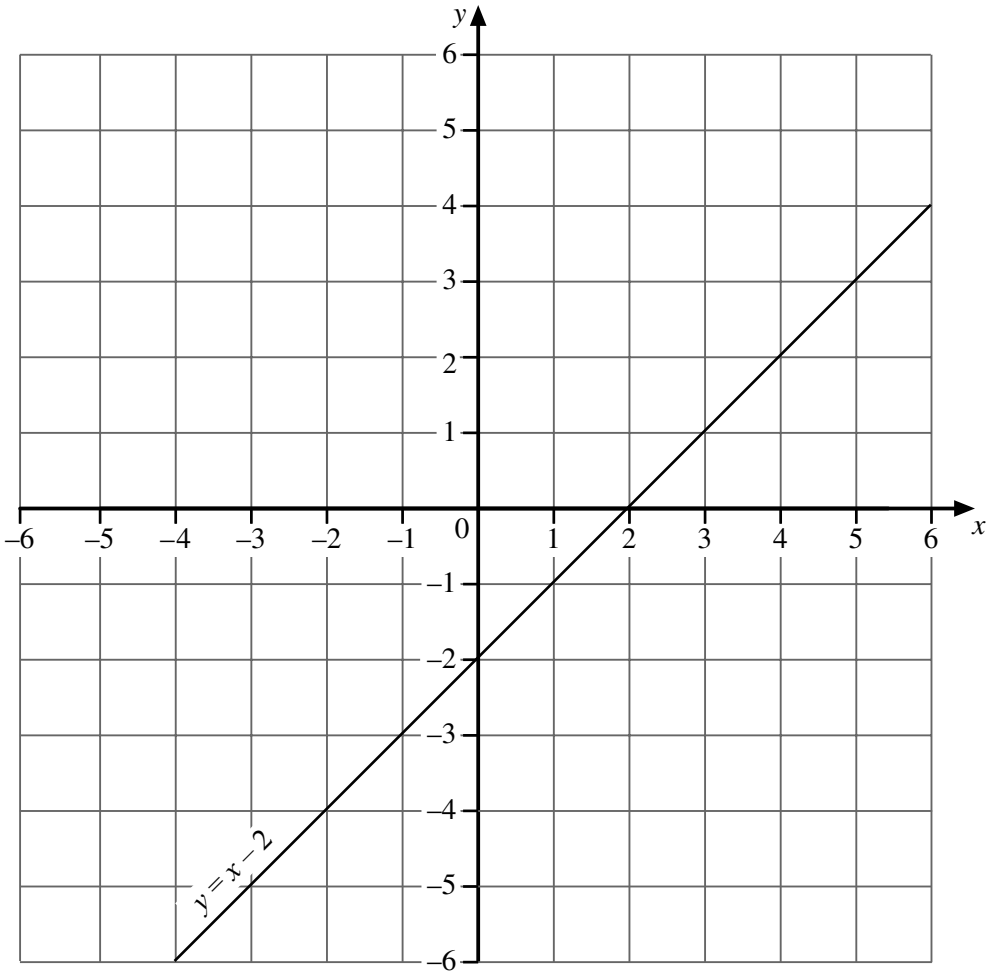
(a) angle p Answer _____° [1]

(b) angle q Answer _____° [1]

Examiner Only	
Marks	Remark

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10



The line $y = x - 2$ has been drawn on the grid.

(a) Draw the line $y = \frac{1}{2}x + 1$ on the same grid. [3]

(b) Write down the coordinates of the point of intersection of the two lines.

Answer (_____ , _____) [1]

Examiner Only

Marks	Remark

Examiner Only	
Marks	Remark

11 Carol leaves £1200 in the bank for three years.
It earns compound interest of 6% each year.

Calculate the total amount Carol has in the bank at the end of the three years.

Answer £ _____ [3]

12 The PSNI recorded the speeds of a number of vehicles passing under a bridge on the M2 motorway during a 2 minute period one morning.
The speeds recorded are in miles per hour (mph).

Speed s (mph)	**Frequency**		
$44 \leq s < 50$	3		
$50 \leq s < 56$	7		
$56 \leq s < 62$	8		
$62 \leq s < 68$	6		
$68 \leq s < 74$	5		
$74 \leq s < 80$	1		

Calculate an estimate for the mean speed.

Answer _____ mph [4]

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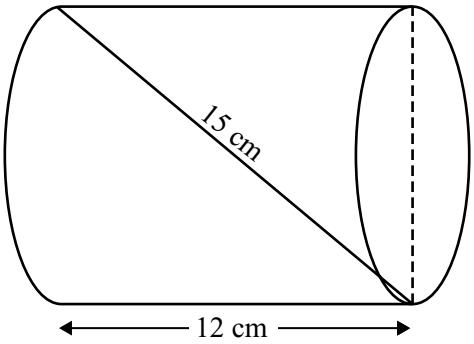
Examiner Only	
Marks	Remark

13 The interior angle of a regular polygon is 135°

How many sides has the polygon?
Show your working.

Answer _____ [2]

14



A straw of length 15 cm just fits inside a cylindrical container of length 12 cm as shown. Calculate the diameter of the cylinder.

Answer _____ cm [3]

THIS IS THE END OF THE QUESTION PAPER

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GCSE

Mathematics (Modular)

January 2009

Mark Schemes

Issued: April 2009

Rewarding Learning

General Certificate of Secondary Education

January 2009

Mathematics

Module N2 Paper 2

(With calculator)

Foundation Tier

[GMN22]

FRIDAY 9 JANUARY

10.30 am – 11.15 am

MARK SCHEME

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GCSE MATHEMATICS JANUARY 2009

Introduction

The mark scheme normally provides the most popular solution to each question. Other solutions given by candidates are evaluated and credit given as appropriate; these alternative methods are not usually illustrated in the published mark scheme.

The marks awarded for each question are shown in the right hand column and they are prefixed by the letters **M**, **A** and **MA** as appropriate. The key to the mark scheme is given below:

M indicates marks for correct method.

A indicates marks for accurate working, whether in calculation, readings from tables, graphs or answers.

MA indicates marks for combined method and accurate working.

The solution to a question gains marks for correct method and marks for an accurate working based on this method. Where the method is not correct no marks can be given.

A later part of a question may require a candidate to use an answer obtained from an earlier part of the same question. A candidate who gets the wrong answer to the earlier part and goes on to the later part is naturally unaware that the wrong data is being used and is actually undertaking the solution of a parallel problem from the point at which the error occurred. If such a candidate continues to apply correct method, then the candidate's individual working must be **followed through** from the error. If no further errors are made, then the candidate is penalised only for the initial error. Solutions containing two or more working or transcription errors are treated in the same way. This process is usually referred to as "follow-through marking" and allows a candidate to gain credit for that part of a solution which follows a working or transcription error.

It should be noted that where an error trivialises a question, or changes the nature of the skills being tested, then as a general rule, it would be the case that not more than half the marks for that question or part of that question would be awarded; in some cases the error may be such that no marks would be awarded.

Positive marking:

It is our intention to reward candidates for any demonstration of relevant knowledge, skills or understanding. For this reason we adopt a policy of **following through** their answers, that is, having penalised a candidate for an error, we mark the succeeding parts of the question using the candidate's value or answers and award marks accordingly.

Some common examples of this occur in the following cases:

(a) a numerical error in one entry in a table of values might lead to several answers being incorrect, but these might not be essentially separate errors;

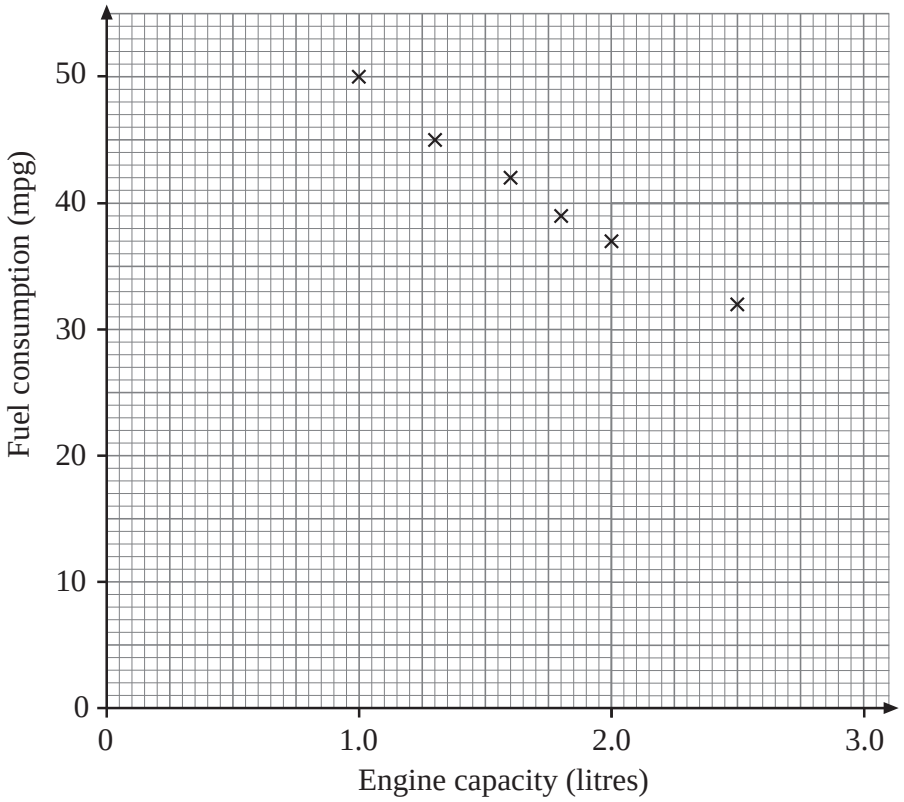
(b) readings taken from candidates' inaccurate graphs may not agree with the answers expected but might be consistent with the graphs drawn.

When the candidate misreads a question in such a way as to make the question easier only a proportion of the marks will be available (based on the professional judgement of the examiner).

			AVAILABLE MARKS
1	See overlay		
	Total = 60 (million)	MA1	
	9.6°, 16.2°, 23.4°, 30°, 280.8°	MA1	
	Sectors, labels	A1, A1	4
2	**(a)** $3x + 2y$	A1, A1	
	(b) -6	A1	3
3	**(a)** B		
	(b) A		
	(c) C Allow A1 for 2 correct	A2	2
4	9.00 am to 3.25 pm = 6 hours 25 minutes	MA1	
	6 hours 25 minutes – 65 minutes		
	= 5 hours 20 minutes	MA1	
	320 ÷ 8 = 40 minutes	MA1	3
5	**(a)** **(i)** 216	A1	
	(ii) 16	A1	
	(b) 34.6	A1	3
6	**(a)** any pair of values with a product of 60	A1	
	(b) $\pi \times 2.5^2$	MA1	
	$= 19.6$	A1	3
7	$0.35 \times 140 = 49$	M1, A1	
	$140 - 49 = 91$	MA1	3

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8

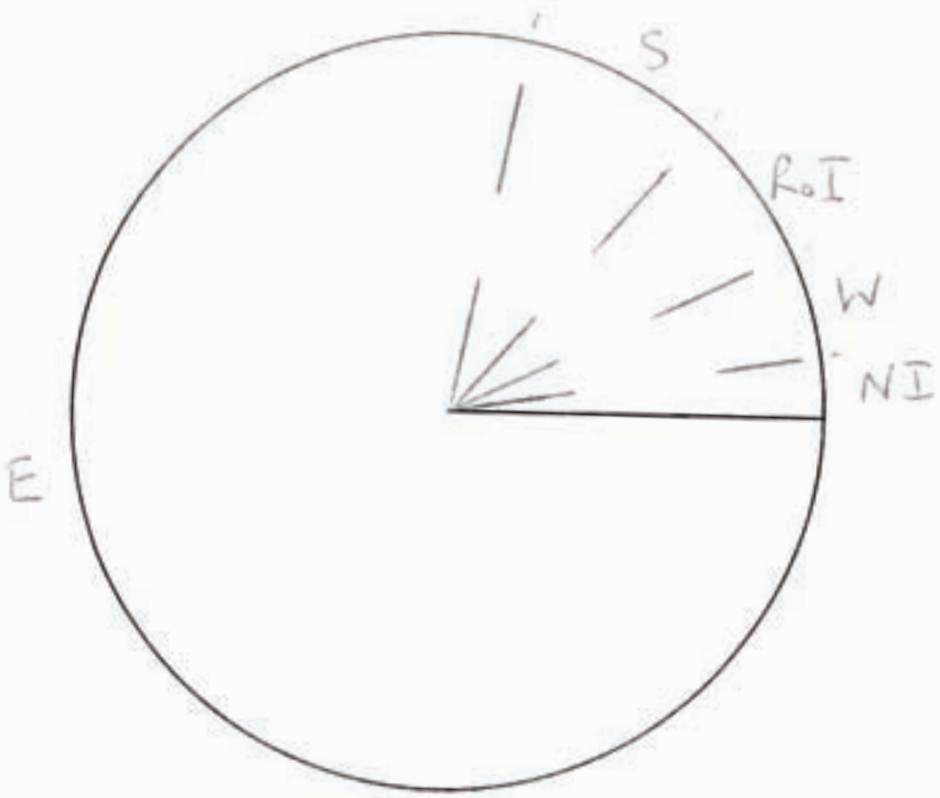


			AVAILABLE MARKS
(a)	See overlay points, A1 for 3 correct	A2	
(b)	negative	A1	
(c)	line	A1	
(d)	reading from line	A1	5
9 **(a)**	108	A1	
(b)	115	A1	2
10 **(a)**	(0, 1) or 1 other correct point	A1	
	second correct point	A1	
	Line drawn correctly	MA1	
(b)	(6, 4)	A1	4

			AVAILABLE MARKS
11	$1200 \times 0.06 = 72$		
	$1200 + 72 = 1272$	MA1	
	$1272 \times 1.06 = 1348.32$	MA1	
	$1348.32 \times 1.06 = £1429.22$	MA1	3
12	47, 53, 59, 65, 71, 77	MA1	
	141, 371, 472, 390, 355, 77	MA1	
	$\frac{1806}{30} = 60.2$	M1, A1	4
13	Exterior = 180 – 135 = 45	MA1	
	360 ÷ 45 = 8	MA1	2
14	$15^2 = 12^2 + d^2$	MA1	
	$225 = 144 + d^2$		
	$d^2 = 225 - 144 = 81$	MA1	
	$d = \sqrt{81} = 9\,\text{cm}$	MA1	3
		Total	**44**

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GCSE MATHEMATICS JANUARY 2009
MODULE N2-2
OVERLAY QUESTION 1



GCSE MATHEMATICS JANUARY 2009
MODULE N2-2
OVERLAY QUESTION 8

