

General Certificate of Secondary Education January 2010

Mathematics



Module N3 Paper 1 (Non-calculator) Higher Tier [GMN31]

TUESDAY 12 JANUARY 9.15 am – 10.15 am



TIME

1 hour.

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.

You must not use a calculator for this paper.

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 ruler, compasses, set-square and protractor. The Formula Sheet is on page 2.



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Formula Sheet

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



Volume of prism = area of cross section × length

In any triangle *ABC*

Area of triangle = $\frac{1}{2}ab \sin C$

Sine rule: $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$ Cosine rule: $a^2 = b^2 + c^2 - 2bc \cos A$



Volume of cone $=\frac{1}{3}\pi r^2 h$ Curved surface area of cone $=\pi r l$



Quadratic equation:

The solutions of $ax^2 + bx + c = 0$, where $a \neq 0$, are given by

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

1	The BBC wishes to survey opinion on a new TV series. A researcher interviews 250 people leaving a supermarket between 10	am	Examin Marks	er Only Remark
	and noon, one Monday morning.	uiii		
	Give one reason why this survey may be biased.			
		 [1]		
		_ [-]		
2	(a) Expand $4(3 - x)$			
	Answer	_[1]		
	(b) Factorise $k^2 - k$			
	Answer	_[1]		
	(c) Solve $7x + 5 = 3x + 8$			
	Answer $x =$	_[3]		
5414	L Contraction of the second		[Tur	n over

Seven friends compared the costs of their mobile phones and how many 3 times they had to recharge them in a period of 2 months.

Examiner Only [2]

The table shows the results.

	00
Times recharged 38 31 28 24 20 16	8

(a) Draw a scatter graph for this data.



Marks Remar (b) Draw a line of best fit on the scatter graph. [1] (c) Estimate the cost of another mobile phone which had to be recharged four times. Answer £_____ minutes [1]

4 A parallelogram has sides 6 cm and 5 cm. The shorter diagonal is 5 cm.

Make an **accurate** drawing of this parallelogram. One side has been drawn for you.

6 cm



Examiner Only Marks Remark



5	(a)	$\frac{5}{2}$ of the length of a wall has been completed.	Examin Marks	er Only Remark
-		g er ute tengen er a man nac eren remptereta		
		If there is still 30 ft to build, how long will the wall be when it is finished?		
		Answer ft [3]		
	(b)	Calculate $6\frac{3}{4} - 4\frac{1}{3}$		
		Answer [3]		

Write down an expression	for the <i>n</i> th term of the se	equence	Examiner O Marks Rei
-3, -6, -9, -1	2,		
	Answer <i>n</i> th term = $_$	[1]	
Jake asked a number of stu their home computer.	udents in his year group	how much they paid for	
The results are shown in the	ne frequency table.]	
Price (£ <i>P</i>)	Frequency		
$0 < P \le 500$	5		
$500 < P \le 1000$	20		
$1000 < P \le 1500$	10		
$1500 < P \le 2000$	4		
$2000 < P \le 2500$	1		
	Answer £	[4]	

8	The interior angle of a How many sides has t	a regular polygon is 140°. his regular polygon?	Examiner Only Marks Remark	
		Answer [3]		
9	Simplify (a) $\frac{3a}{2} + \frac{2a}{3}$			
	(b) $\frac{(x+2)^2}{2(x+2)}$	Answer [3]		
		Answer [1]		
5414				

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(Questions continue overleaf)

10 The time taken by a number of adults to complete a Sudoku puzzle was recorded. The cumulative frequency graph for the results is shown.



Use the graph to estimate			Examiner Only Marks Remark
(a) the median time,			
	Answer	minutes [1]	
(b) the interquartile range.			
	Answer	minutes [2]	



y = 3 - 3x

and y = -1

Hence indicate clearly the region R where



[3]

Examiner Only Marks

Remar

surround was slightly damaged.	Marks	Remark
30% of the original price had been deducted		
What was the original price?		
what was the original price?		
Answer £ [3]		
5414	[Tur	n over
J+1+	LIUII	

12 A new HD ready TV was sold at the reduced price of $\pounds 434$ because the

Examiner Only

13	A, B, C and D are points on the circumference of a circle with centre O.			Examiner Only	
	Angle DAC = 20°			Remark	
	A 20° O D C	Diagram not drawn accurately			
	(a) Find the size of angles:				
	(i) DOC,	Answer ° [1]			
	(ii) ADC.	Answer ° [1]			
	(b) Explain why angle DBC = 20°				
	Answer	[1]			

THIS IS THE END OF THE QUESTION PAPER

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