

GCSE

**Mathematics
(Modular)**

Summer 2010

Mark Schemes

Issued: October 2010

**NORTHERN IRELAND GENERAL CERTIFICATE OF SECONDARY EDUCATION (GCSE)
AND NORTHERN IRELAND GENERAL CERTIFICATE OF EDUCATION (GCE)**

MARK SCHEMES (2010)

Foreword

Introduction

Mark Schemes are published to assist teachers and students in their preparation for examinations. Through the mark schemes teachers and students will be able to see what examiners are looking for in response to questions and exactly where the marks have been awarded. The publishing of the mark schemes may help to show that examiners are not concerned about finding out what a student does not know but rather with rewarding students for what they do know.

The Purpose of Mark Schemes

Examination papers are set and revised by teams of examiners and revisers appointed by the Council. The teams of examiners and revisers include experienced teachers who are familiar with the level and standards expected of 16- and 18-year-old students in schools and colleges. The job of the examiners is to set the questions and the mark schemes; and the job of the revisers is to review the questions and mark schemes commenting on a large range of issues about which they must be satisfied before the question papers and mark schemes are finalised.

The questions and the mark schemes are developed in association with each other so that the issues of differentiation and positive achievement can be addressed right from the start. Mark schemes therefore are regarded as a part of an integral process which begins with the setting of questions and ends with the marking of the examination.

The main purpose of the mark scheme is to provide a uniform basis for the marking process so that all the markers are following exactly the same instructions and making the same judgements in so far as this is possible. Before marking begins a standardising meeting is held where all the markers are briefed using the mark scheme and samples of the students' work in the form of scripts. Consideration is also given at this stage to any comments on the operational papers received from teachers and their organisations. During this meeting, and up to and including the end of the marking, there is provision for amendments to be made to the mark scheme. What is published represents this final form of the mark scheme.

It is important to recognise that in some cases there may well be other correct responses which are equally acceptable to those published: the mark scheme can only cover those responses which emerged in the examination. There may also be instances where certain judgements may have to be left to the experience of the examiner, for example, where there is no absolute correct response – all teachers will be familiar with making such judgements.

The Council hopes that the mark schemes will be viewed and used in a constructive way as a further support to the teaching and learning processes.

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General Certificate of Secondary Education
2010

Mathematics

Module N1 Paper 1
(With calculator)
Foundation Tier

[GMN11]

TUESDAY 1 JUNE

9.15 am – 10.00 am

**MARK
SCHEME**

GCSE MATHEMATICS 2010

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			AVAILABLE MARKS
1	(a)  means 5 votes	A1	4
	(b) 18 votes	A1	
	(c) $2\frac{3}{5}$ drawn	MA1	
	(d) $35 + 18 + 13 + 12 = 78$	MA1	
2	Isosceles triangle	A1	4
	Rectangle	A1	
	Trapezium	A1	
	Rhombus	A1	
3	(a) 1133	M1, A1	5
	(b) (i) 8413	A2 (Allow A1 for 8431)	
	(ii) 13	A1	
4	(a) (5, 3)	A1	3
	(b) correct point	A1	
	(c) correct line	A1	
5	(a) 1, 2, 3, 4, 6, 8, 12, 24	A2 (Allow A1 for 5 correct)	3
	(b) 5	A1	
6	(a) (i) Their sales have increased	A1	4
	(ii) No vertical scale	A1	
	(b) 5, 8, 8, 10, 11, 12, 14, 14, 16, 16, 20, 24	M1	
	Median = 13	A1	
7	(a) -4	A1	2
	(b) 14	A1	

		AVAILABLE MARKS
8	Team A: 80% of $60 = \frac{4}{5} \times 60 = 48$ Team B: $\frac{1}{2}$ of $60 = 30$ Team B could win by either answering all the remaining 20 questions correctly while Team A do not answer any more than 1 of their remaining 20 questions correctly or answering 19 of the remaining questions while Team A do not answer any of their remaining 20 questions correctly. (or similar explanation)	M1, A1 A2 4
9	(a) Area = 8×5 = 40 cm^2 (b) Perimeter = $8 + 5 + 8 + 5 = 26 \text{ cm}$ (c) (i) $1058^\circ \pm 2^\circ$ (ii) $122^\circ \pm 2^\circ$	MA1 A1 MA1 A1 A1 5
10	(a) Modal Age = 33 (b) 12 (c) 6 ladies are above 41 years	A1 A1 MA1, MA1 4
11	$7x = 42$ $x = 6$	MA1 MA1 2
12	$41 + 90 = 131$ $180 - 131 = 49$	MA1 MA1 2
13	$\frac{2}{50}$ = $\frac{1}{25}$	MA1 A1 2
Total		44



General Certificate of Secondary Education
2010

Mathematics

Module N1 Paper 2
(With calculator)
Foundation Tier

[GMN12]

TUESDAY 1 JUNE

10.30 am – 11.15 am

**MARK
SCHEME**

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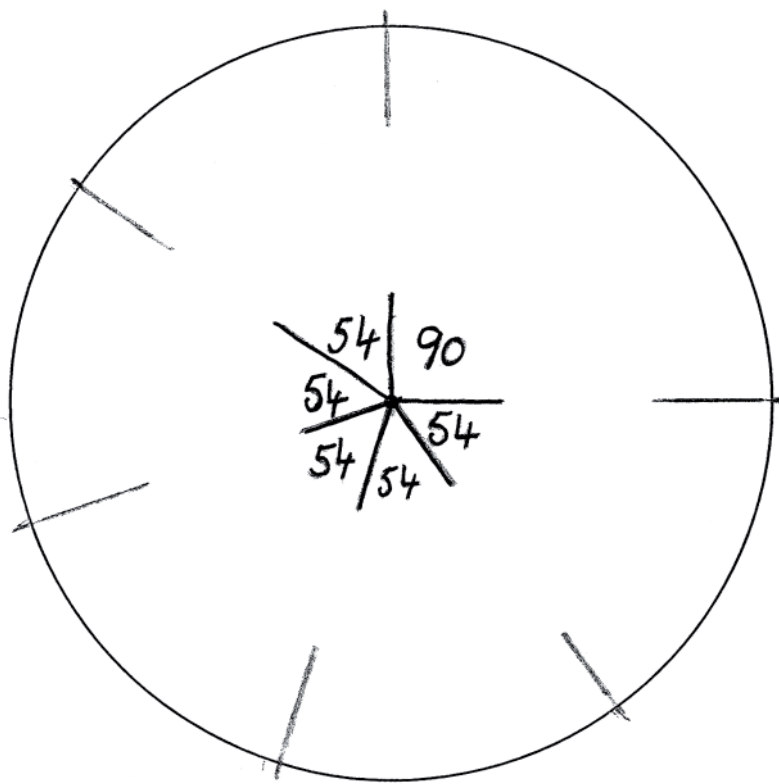
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			AVAILABLE MARKS
1	(a) 6000146	A1	
	(b) twenty thousand four hundred and one	A1	
	(c) 0.3	A1	
	The others are all equivalent to $\frac{3}{5}$ (or 0.6 or 60%)	A1	4
2	(a) Line graph drawn (4 points – MA1; Line connecting points MA1)		
	(b) 2.65	MA1	
	(c) Week 5 because there was a decrease in weight	A1	4
3	(a) metres	A1	
	(b) grammes	A1	
	(c) litres	A1	3
4	41	A1	
	984	A1	
	864	A1	3
5	(a) correct shape	A1	
	(b) 28, 34	A1	
	(c) add 6	A1	
	(d) 76	M1, A1	5
6	(a) 93	MA1	
	(b) 48	A1	2
7	6 rectangles	A1	
	3 pairs	A1	
	Correct measurements	A1	3

			AVAILABLE MARKS
8	Joan is correct	A1	
	<ul style="list-style-type: none"> In Mary's triangle the shaded part is much greater than the other two equal unshaded parts; therefore it cannot be one third of the complete triangle In Joan's triangle the unshaded parts can be split to make two parts equal to the shaded part; therefore the shaded part is one third of the complete triangle. or equivalent correct explanation. 	A2	3
9	(a) (i) Range = 4 seconds	A1	
	(ii) $\frac{119}{10} = 11.9$ seconds	MA1, MA1, A1	
	(b) $\frac{360^\circ}{40} = 9^\circ$	A1	
	Angles 108° 90° 54° 108°	A1	
	Correct pie chart drawn – see overlay	A2	8
10	Volume = $35 \times 42 \times 60$	MA1	
	= $88\,200 \text{ cm}^3$	A1 A1 units	3
11	$\pounds 119.90 - \pounds 35 = \pounds 84.90$	MA1	
	$\pounds 84.90 \div \pounds 7.50$	M1	
	= 11.32	A1	
	12 weeks	A1	4
12	$2x - 5y$	A1, A1	2
Total			44

GCSE MATHEMATICS SUMMER 2010
MODULE N1-2
OVERLAY QUESTION 9





General Certificate of Secondary Education
2010

Mathematics

Module N2 Paper 1
(Non-calculator)
Foundation Tier

[GMN21]

TUESDAY 1 JUNE

9.15 am – 10.00 am

**MARK
SCHEME**

GCSE MATHEMATICS 2010

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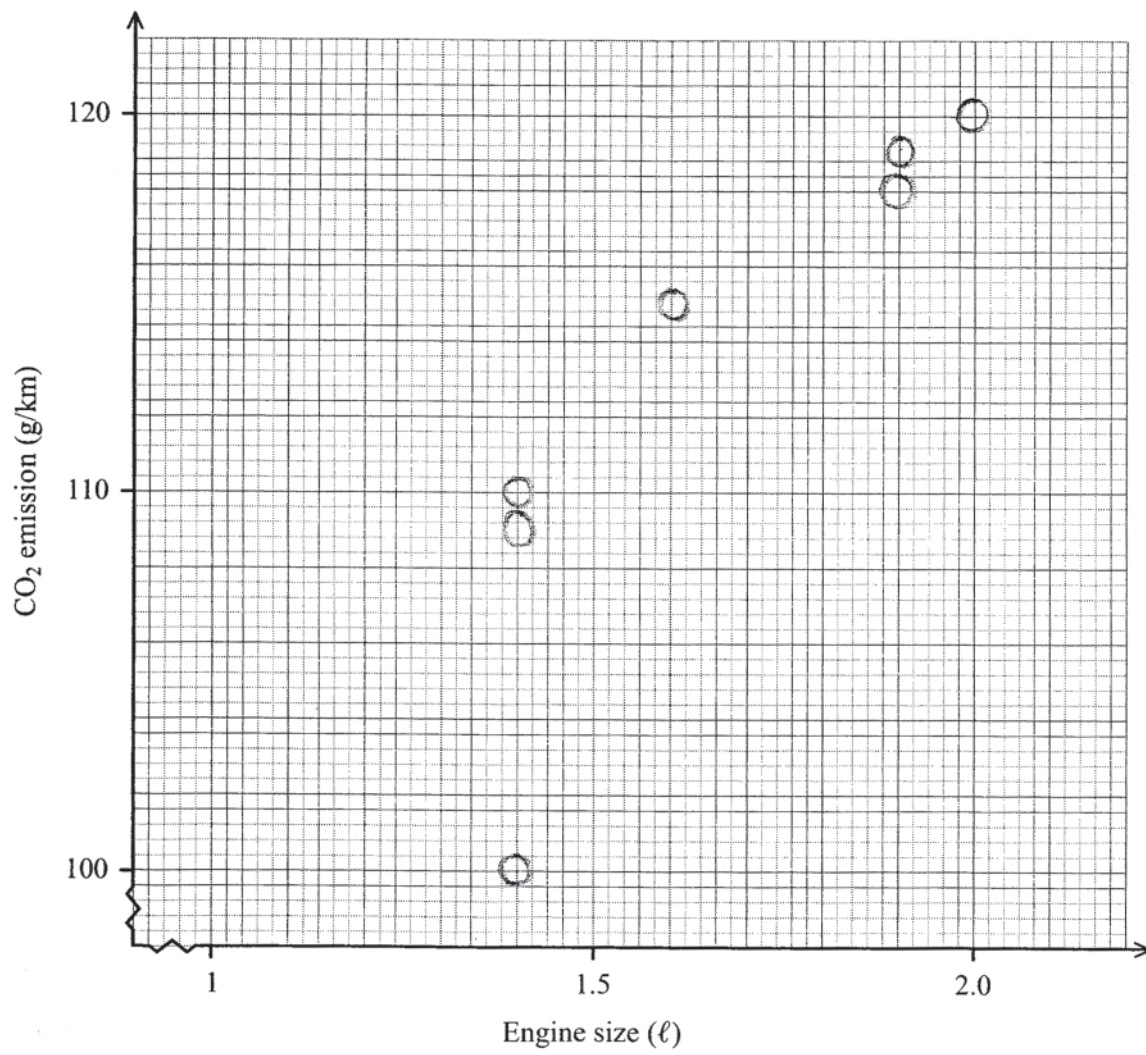
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			AVAILABLE MARKS
1	(a) Modal age = 33	A1	4
	(b) 12	A1	
	(c) 6 ladies are above 41 years	MA1, MA1	
2	(a) $7x = 42$	MA1	3
	$x = 6$	MA1	
	(b) $x = 28$	MA1	
3	(a) $41 + 90 = 131$	MA1	4
	$180 - 131 = 49$	MA1	
	(b) $180 - 114 = 66$	MA1	
	$\frac{66}{2} = 33$	MA1	
4	(a) $\frac{2}{50}$	MA1	6
	$= \frac{1}{25}$	A1	
	(b) $\frac{13}{15} - \frac{6}{15}$	MA1	
	$= \frac{7}{15}$	A1	
	(c) $8 \times 36 = 288$	MA2	
	(for one correct index value follow calculation to allow MA1)		
5	(a) See overlay 7 Points correct (4 Points – MA1)	MA2	5
	(b) Seat (Ibiza 1.4)	A1	
	(c) Line drawn correctly	A1	
	(d) Correct reading from line	MA1	

			AVAILABLE MARKS
6	$\frac{9}{30}$	MA1	
	$\frac{9}{30} \times 100$	M1	
	= 30%	A1	3
7	(a) 3, 6, 11 (allow A1 for 2 correct)	A2	
	(b) $4n - 2$	MA1, A1	
	(c) $5(2b + 3)$	MA1	5
8	(a) $2.6 \times 100 \times 100$	MA1	
	= 26000	A1	
	(b) 13.5	A1	3
9	(a) $54 = 2 \times 3 \times 3 \times 3$	MA1	
	$60 = 2 \times 2 \times 3 \times 5$	MA1	
	LCM = $2 \times 2 \times 3 \times 3 \times 3 \times 5 = 540$	MA1	
	(b) $2 \times 3 = 6$	MA1	4
10	$4x + 8x + 128 = 500$ (or equivalent)	M1, A1	
	$12x = 372$	MA1	
	$x = 31$	MA1	4
11	£475	MA1	
	£340	MA1	
	£525	MA1	3
Total			44

GCSE MATHEMATICS SUMMER 2010
MODULE N2-1
OVERLAY QUESTION 5





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**

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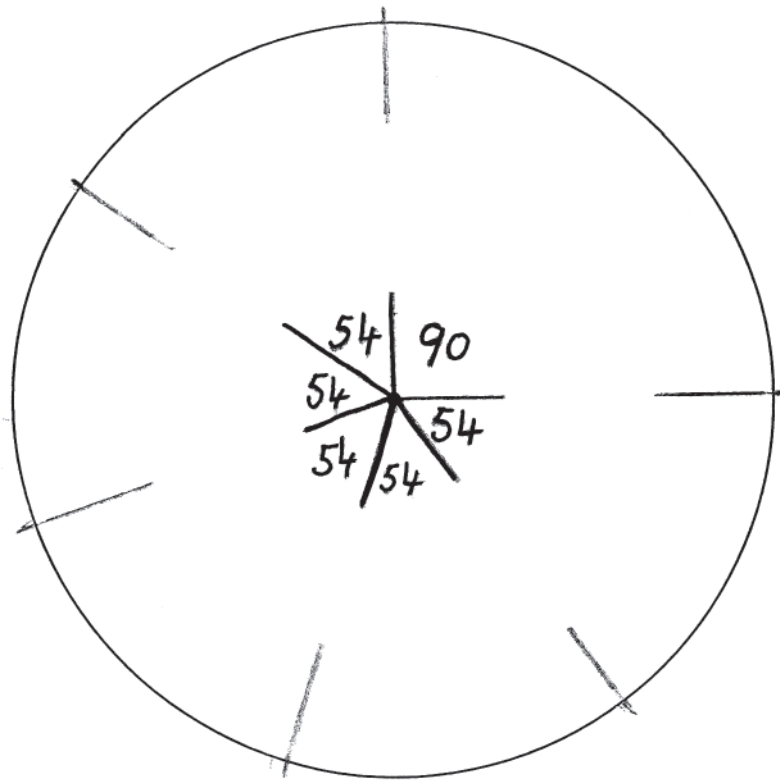
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			AVAILABLE MARKS
1	74186.995 74000	MA1 A1	2
2	$360^\circ / 40 = 9^\circ$ Angles $108^\circ, 90^\circ, 54^\circ, 108^\circ$ Correct pie chart drawn – see overlay	A1 A1 A2	4
3	(a) $35 \times 42 \times 60$ $= 88200 \text{ cm}^3$ (b) $88200 / (35 \times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

		AVAILABLE MARKS
10 (a)	(1, 2)	A1, A1
(b)	$360 \div 20 = 18$	M1, A1
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
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
13	Curved part = $\pi \times 7.5 = 23.56\dots$	MA1, A1
	Straight part = 15 $23.56\dots + 15 = 38.6$	MA1
		Total
		44

GCSE MATHEMATICS SUMMER 2010
MODULE N2-2
OVERLAY QUESTION 2





General Certificate of Secondary Education
2010

Mathematics

Module N5 Paper 1
(Non-calculator)
Foundation Tier

[GMN51]

MONDAY 7 JUNE

1.30 pm – 2.30 pm

**MARK
SCHEME**

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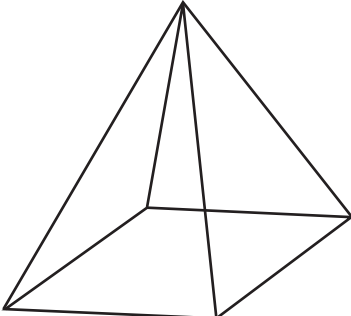
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1	(a)	3.4	A1	4
	(b)	Arrow correctly drawn at 32.35	A1	
	(c) (i)	4.4	A1	
(ii)	Arrow correctly drawn at 2.6	MA1		
2	(a)		A1	3
	(b) (i)	cube	A1	
	(ii)	cuboid	A1	
3	(a)	certain	A1	4
	(b)	unlikely	A1	
	(c)	likely	A1	
	(d)	impossible	A1	
4	(a) (i)	5	A1	10
	(ii)	300×4 $= 1200$	MA1 A1	
	(b)	$70 \div 9 \cong 8$	M1, A1	
	(c)	$2 \times 3 + 2 \times 5 = 16$ $16 \times \text{£}7.00 = \text{£}112$	M1, A1 MA1	
	(d) (i)	8	A1	
	(ii)	- 7	A1	

			AVAILABLE MARKS
5	Equilateral triangle	A1	1
6	(a) correct points, line	A2, A1	
	(b) (i) 45 ± 1	A1	
	(ii) 41 ± 1	A1	5
7	(a) 5×2.2 = 11	MA1	
	(b) $\frac{100}{4} \times 7$ = 175	MA1 A1	
	(c) $60 \times \frac{8}{5}$ = 96	MA1 A1	5
8	(a) (i) 11	A1	
	(ii) 5	A1	
	(b) – and \times	A1	
	(c) $5 \times (6 - 2) + 2$	A1	4
9	10	A1	
	24	A1	2
10	No, with example provided e.g. $1 + 2 + 3 = 6$ which is even	M1, A1	2
11	(a) (i) $27/30$	M1, A1	
	(ii) $2/29$	A1	
	(b) No, $27/30$ is 90%	A1	4

			AVAILABLE MARKS
12	$\frac{15(2-10)}{6}$	MA1	3
	$\frac{-120}{6}$	MA1	
	-20	A1	
13	(a) Correct line Three points correct	M1 A1	4
	(b) Correct rotation Three points correct	M1 A1	
14	(a) 30240	A1	3
	(b) False with a given example True with a given example	A1 A1	
15	$2 + 6 \rightarrow \frac{6}{8}$		2
	$2 + 7 \rightarrow \frac{7}{9}$		
	$2 + 8 \rightarrow \frac{8}{10} = \frac{4}{5}$	M1	
	Answer 3	A1	
Total			56



General Certificate of Secondary Education
2010

Mathematics

Module N5 Paper 2
(With calculator)
Foundation Tier

[GMN52]

MONDAY 7 JUNE

2.45 pm – 3.45 pm

**MARK
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			AVAILABLE MARKS						
1	(a) line	A1	5						
	(b) reflection (allow [A1], wrong line)	A2							
	(c) (i) square	A1							
	(ii) square	A1							
2	(a) C 52 mph	A1, A1	6						
	(b) A 850 l	A1, A1							
	(c) B 37.6°C	A1, A1							
3	(a) Black	A1	3						
	(b) 1 or 3	A1							
	(c) 4	A1							
4	52 × 1.30 = 67.60 extra £12.80	M1, A1 MA1	3						
5	(a) <table border="1" data-bbox="233 1247 600 1368"> <tr> <td>6</td> <td>0</td> <td>2</td> </tr> <tr> <td>6</td> <td>3</td> <td>2</td> </tr> </table>	6	0	2	6	3	2	A6	9
	6	0	2						
	6	3	2						
(b) Horizontal line in correct position Vertical line in correct position	A1 A1								
(c) shaded square	A1								
6	(a) Impossible	A1	3						
	(b) Possible	A1							
	(c) Impossible	A1							

			AVAILABLE MARKS	
7	(a)	$250 + 50 \times 6$ 550	MA1 A1	7
	(b)	480	A1	
	(c)	number of payments (months)	A1	
	(d)	$800 - 380 = 420$ $420 \div 6$ 70	MA1 M1 A1	
8	(a)	Table of paired outcomes	24 pairs MA2 (18 pairs MA1)	4
	(b)	11/24	MA2	
9	(a)	$47500 \div 1.25$ = £38000	M1 A1	5
	(b)	$42000 - 5000 = 37000$ 22% of 37000 = £8140 $42000 - 8140 = £33860$	MA1 MA1 MA1	
	10	always odd	A1	
		$2n$ is always even, therefore $2n + 3$ is always odd and 5 (or an odd) times an odd number is always odd or $10n + 15$, $10n$ is even and even + 15 is always odd	A1	2
11		Area = $\frac{1}{2} (7.1 + 9.6) \times 4.3$	MA1	3
		= 35.905	A1	
		Answer 36 or 35.9	A1	
12		$99 \div 15 = 6.6$	MA1	2
		$6.6 \times 4 = 26.4$	MA1	

13 (a) 21, 6

(b) See overlay
correct points
smooth curve

A2

A1

A1

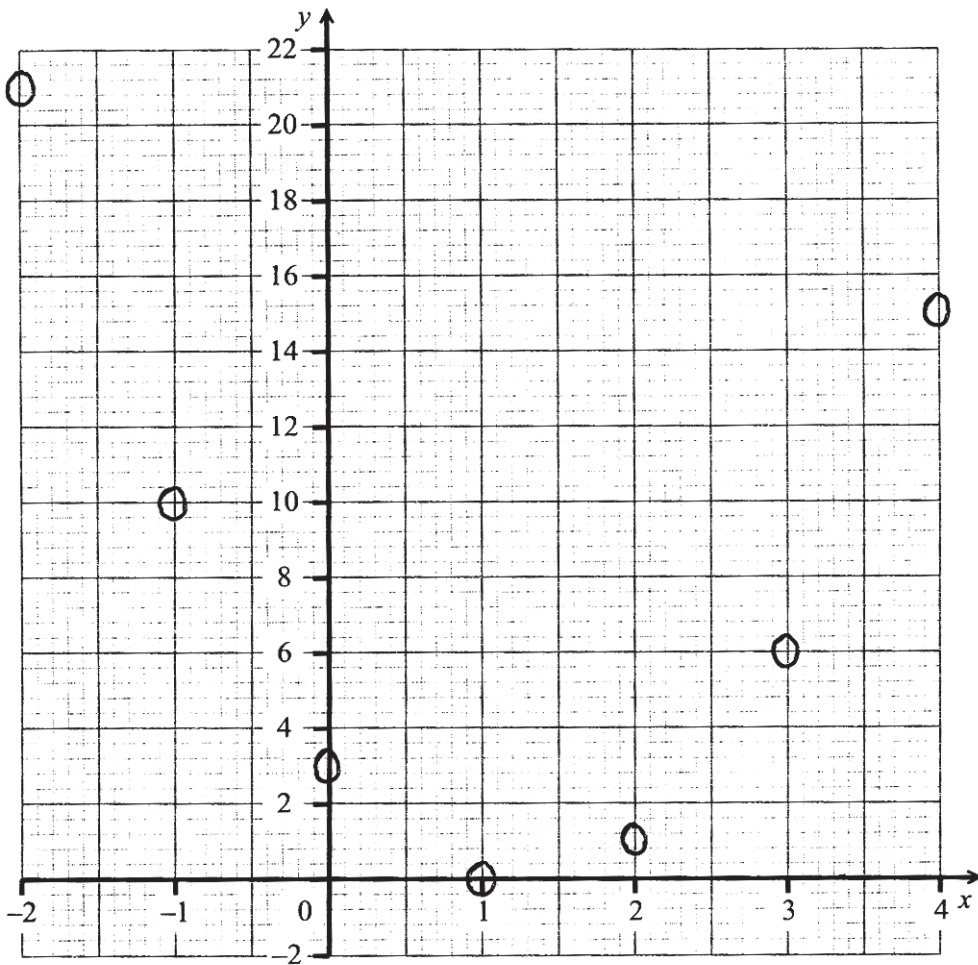
Total

AVAILABLE
MARKS

4

56

GCSE MATHEMATICS SUMMER 2010
MODULE N5-2
OVERLAY QUESTION 13





General Certificate of Secondary Education
2010

Mathematics

Module N3 Paper 1
(Non-calculator)
Higher Tier

[GMN31]

TUESDAY 1 JUNE

9.15 am – 10.15 am

**MARK
SCHEME**

GCSE MATHEMATICS 2010

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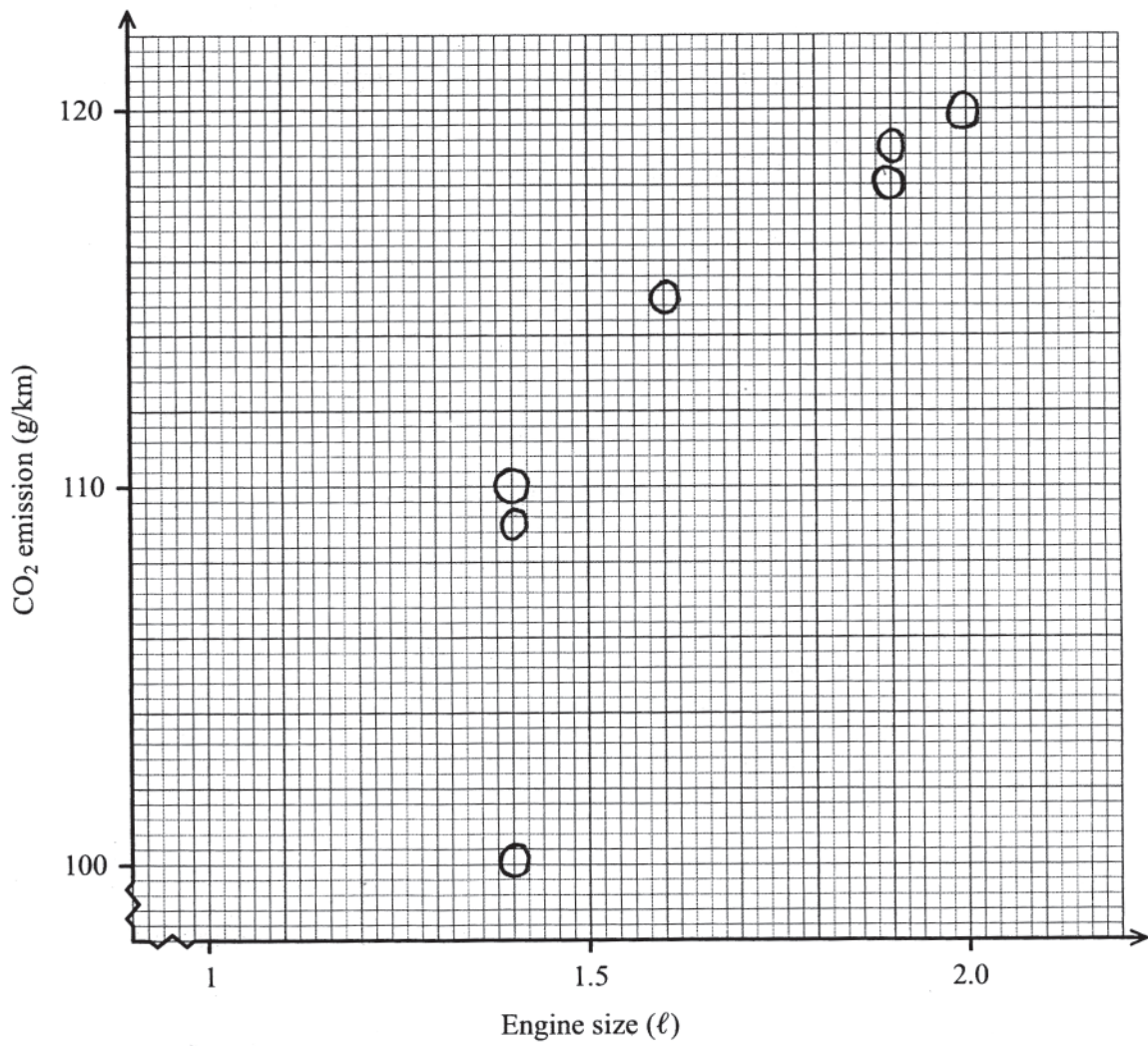
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			AVAILABLE MARKS
1	(a) See overlay 7 Points correct (allow MA1 for 4 points correct)	MA2	
	(b) Seat (Ibiza 1.4)	A1	
	(c) Line drawn correctly	A1	
	(d) Correct reading from line	MA1	5
2	$\frac{9}{30}$	MA1	
	$\frac{9}{30} \times 100$	M1	
	= 30%	A1	3
3	(a) 3, 6, 11 (allow A1 for 2 correct)	A2	
	(b) $4n - 2$	MA1, A1	4
4	(a) $2.6 \times 100 \times 100$	MA1	
	= 26000	A1	
	(b) 13.5	A1	3
5	(a) $AOB = 360/8$	MA1	
	= 45	A1	
	(b) $ABO = (180 - 45)/2 = 67.5$	MA1	
	So $ABC = 2 \times 67.5 = 135$	MA1	4
6	$x^2 - x + 7x - 7$	MA1	
	$x^2 + 6x - 7$	MA1	2
7	$54 = 2 \times 3 \times 3 \times 3$	MA1	
	$60 = 2 \times 2 \times 3 \times 5$	MA1	
	$LCM = 2 \times 2 \times 3 \times 3 \times 3 \times 5 = 540$	MA1	3

			AVAILABLE MARKS
8	$4x + 8x + 128 = 500$ (or equivalent)	M1, A1	4
	$12x = 372$	MA1	
	$x = 31$	MA1	
9	£475	MA1	3
	£340	MA1	
	£525	MA1	
10	$\frac{4x + 3 + 12x - 10}{10} = \frac{65}{10}$ or $\frac{13}{2}$	MA1	4
	$4x + 3 + 12x - 10 = 65$	MA1	
	$16x = 72$	MA1	
	$x = \frac{9}{2}$	MA1	
11	(a) gradient = $(9 - 1)/(2 - 0) = 4$	M1, A1	6
	$y = 4x + 1$	MA1	
	(b) Length = $\sqrt{5^2 + 12^2}$	M1, A1	
	$= \sqrt{(25 + 144)} = \sqrt{169} = 13$	A1	
12	$\frac{49}{8} \div \frac{7}{3}$	MA1	3
	$\frac{49}{8} \times \frac{3}{7} = \frac{21}{8}$ (or equivalent)	MA1	
	$2 \frac{5}{8}$	A1	
Total			44

GCSE MATHEMATICS SUMMER 2010
MODULE N3-1
OVERLAY QUESTION 1





General Certificate of Secondary Education
2010

Mathematics

Module N3 Paper 2
(With calculator)
Higher Tier

[GMN32]

TUESDAY 1 JUNE

10.30 am – 11.30 am

**MARK
SCHEME**

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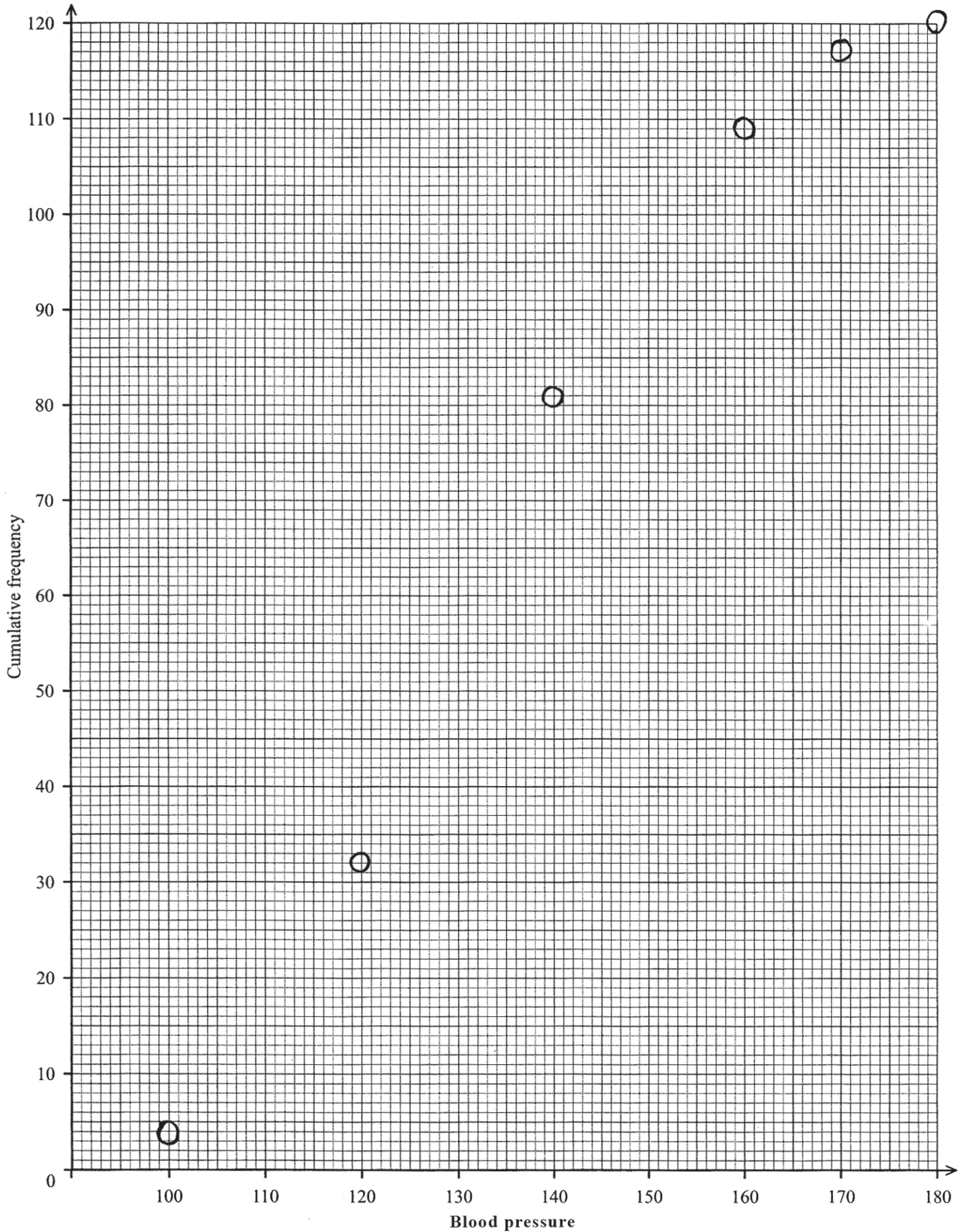
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			AVAILABLE MARKS
1	one correct point second correct point correct line	MA1 A1 A1	3
2	axes, labels frequency diagram	A1 A2	3
3	Ventra – £3.84 } Viva – £3.20 }	1st value correct 2nd value correct	M1, A1 MA1
	Viva is better	MA1	4
4	Square and Rhombus	A1, A2	3
5	(a) $5x - 14 = 3x + 38$	A1	
	(b) $5x - 3x = 38 + 14$	MA1	
	$2x = 52$	MA1	
	$x = 26$	A1	4
6	(1, 2)	A1, A1	2
7	(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
8	(a) $£1.28 - £1.04 = 24$ pence	MA1	
	(b) It is less because the inter-quartile range for England is 10	A1	2

			AVAILABLE MARKS
9	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
10	Curved part = $\pi \times 7.5 = 23.56\dots$	MA1, A1	
	Straight part = 15 $23.56\dots + 15 = 38.6$ cm	MA1	
		A1 units	4
11	(a) (4) 32, 81, 109, 117, 120	A1	
	(b) See overlay 6 points correct (allow MA1 for 4 points correct) curve	MA2 MA1	
	(c) $4 + (120 - \text{correct reading from graph})$ = number retested	M1, A1	6
12	$\sin 62^\circ = AC/25$	MA1	
	$25 \sin 62^\circ = AC$	MA1	
	$AC = 22.07(368\dots)$	A1	3
13	$115\% = \text{£}49.22$	MA1	
	$100\% = \frac{49.22}{115} \times 100$	M1	
	$\text{£}42.80$	A1	3
		Total	44

GCSE MATHEMATICS SUMMER 2010
MODULE N3-2
OVERLAYS QUESTION 11





General Certificate of Secondary Education
2010

Mathematics

Module N4 Paper 1
(Non-calculator)
Higher Tier

[GMN41]

TUESDAY 1 JUNE

9.15 am – 10.15 am

**MARK
SCHEME**

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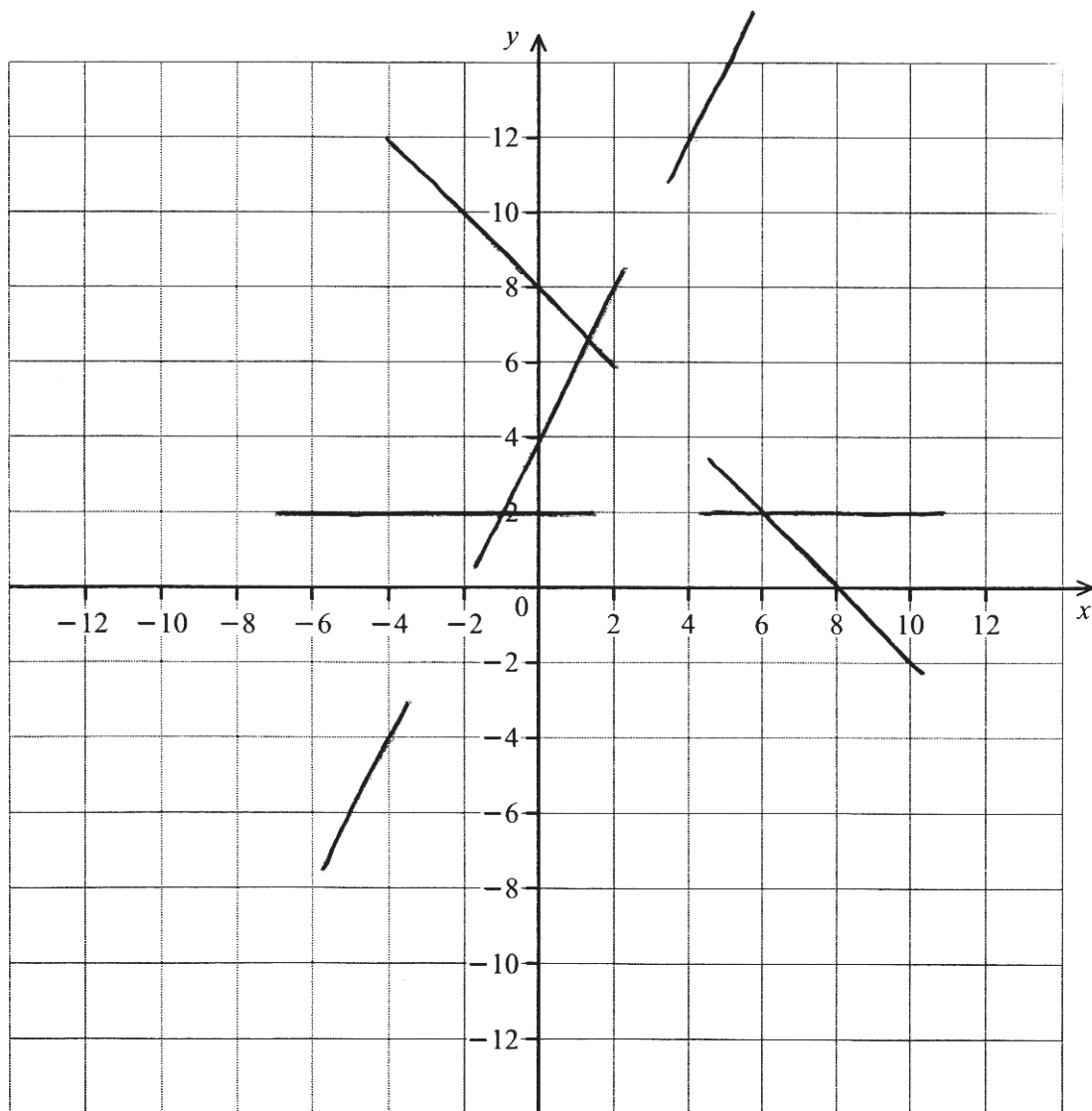
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			AVAILABLE MARKS
1	$\frac{4x + 3 + 12x - 10}{10} = \frac{65}{10}$ or $\frac{13}{2}$	MA1	4
	$4x + 3 + 12x - 10 = 65$	MA1	
	$16x = 72$	MA1	
	$x = \frac{9}{2}$	MA1	
2	(a) gradient = $(9 - 1)/(2 - 0) = 4$	M1, A1	8
	$y = 4x + 1$	MA1	
	(b) Length = $\sqrt{5^2 + 12^2}$	M1, A1	
	$= \sqrt{(25 + 144)} = \sqrt{169} = 13$	A1	
	(c) $y = -\frac{1}{5}x + 2$	A1, A1	
3	(a) (i) 0	A1	4
	(ii) -4	A1	
	(b) $\frac{1}{(\sqrt[4]{16})^3}$	MA1	
	$= \frac{1}{8}$	A1	
4	(a) See overlay correct side of $y = 2x + 4$ correct side of $y = 8 - x$ correct side of $y = 2$	MA1 MA1 MA1	6
	(b) (i) -1	MA1	
	(ii) $(6, 2)$ 22	MA1 A1	
5	Least $20 \times 2.55 = 51$	MA1	2
	Greatest $20 \times 2.65 = 53$	MA1	

			AVAILABLE MARKS
6	Angle AOC = $2 \times$ angle ABC (angle at centre twice angle at circumference) Reflex angle AOC = $2 \times$ angle ADC (same reason)	MA1	
	AOC + reflex AOC = $360^\circ = 2(ABC + ADC)$	MA1	
	So $ABC + ADC = 180^\circ$	A1	3
7	(a) $0.1 < \text{decimal} < 0.11111 \dots$ or $\frac{1}{10} < \text{fraction} < \frac{1}{9}$ such as $\frac{19}{180}$	A1	
	(b) suitable value e.g. $\sqrt{85}, \sqrt{99}, 3\pi$	A1	2
8	Central section correct	MA1	
	Both outer sections correct	MA1	2
9	(a) Same number of workers in each supermarket will result in mean being £180	A1	
	A different number of workers will not produce this mean	A1	
	(b) (i) The 14 selected could be all boys or all girls	A2	
	(ii) Suitable method	A2	6
10	$x^2 + 2(2x - 9)^2 = 243$	MA1	
	$x^2 + 2(4x^2 - 36x + 81) = 243$	MA1	
	$9x^2 - 72x - 81 = 0$ or $x^2 - 8x - 9 = 0$	A1	
	$9(x - 9)(x + 1) = 0$ or $(x - 9)(x + 1) = 0$	MA2	
	$x = 9$ and $y = 9$	MA1	
	$x = -1$ and $y = -11$	MA1	7
	Total		44

GCSE MATHEMATICS SUMMER 2010
MODULE N4-1
OVERLAYS QUESTION 4





General Certificate of Secondary Education
2010

Mathematics

Module N4 Paper 2
(With calculator)
Higher Tier

[GMN42]

TUESDAY 1 JUNE

10.30 am – 11.30 am

**MARK
SCHEME**

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			AVAILABLE MARKS
1	(a) Cumulative Number of Men (4) 32, 81, 109, 117, 120	A1	
	(b) See overlay 6 points correct (allow MA1 for 4 points correct) curve	MA2 MA1	
	(c) Reading from graph	M1, A1	
	(d) $4 + (120 - \text{correct reading from graph}) = \text{number retested}$	M1, A1	8
2	(a) $\pounds 1.28 - \pounds 1.04 = 24$ pence	MA1	
	(b) It is less because the inter-quartile range for England is 10	A1	2
3	Suitable reason	A1	1
4	$115\% = \pounds 49.22$ $100\% = \frac{49.22}{115} \times 100$ $\pounds 42.80$	MA1 M1 A1	3
5	$30 \times 8 = 240 \text{ cm}^3$	M1, A1, A1(units)	3
6	(a) $\sin 62^\circ = AC/25$ $25 \sin 62^\circ = AC$ $AC = 22.07(368\dots)$	MA1 MA1 A1	
	(b) $DC^2 = 15^2 + 22.07^2 - 2(15)(22.07) \cos 38^\circ$ $= 190.34298$ $DC = 13.796$	MA1 MA1 A1	6

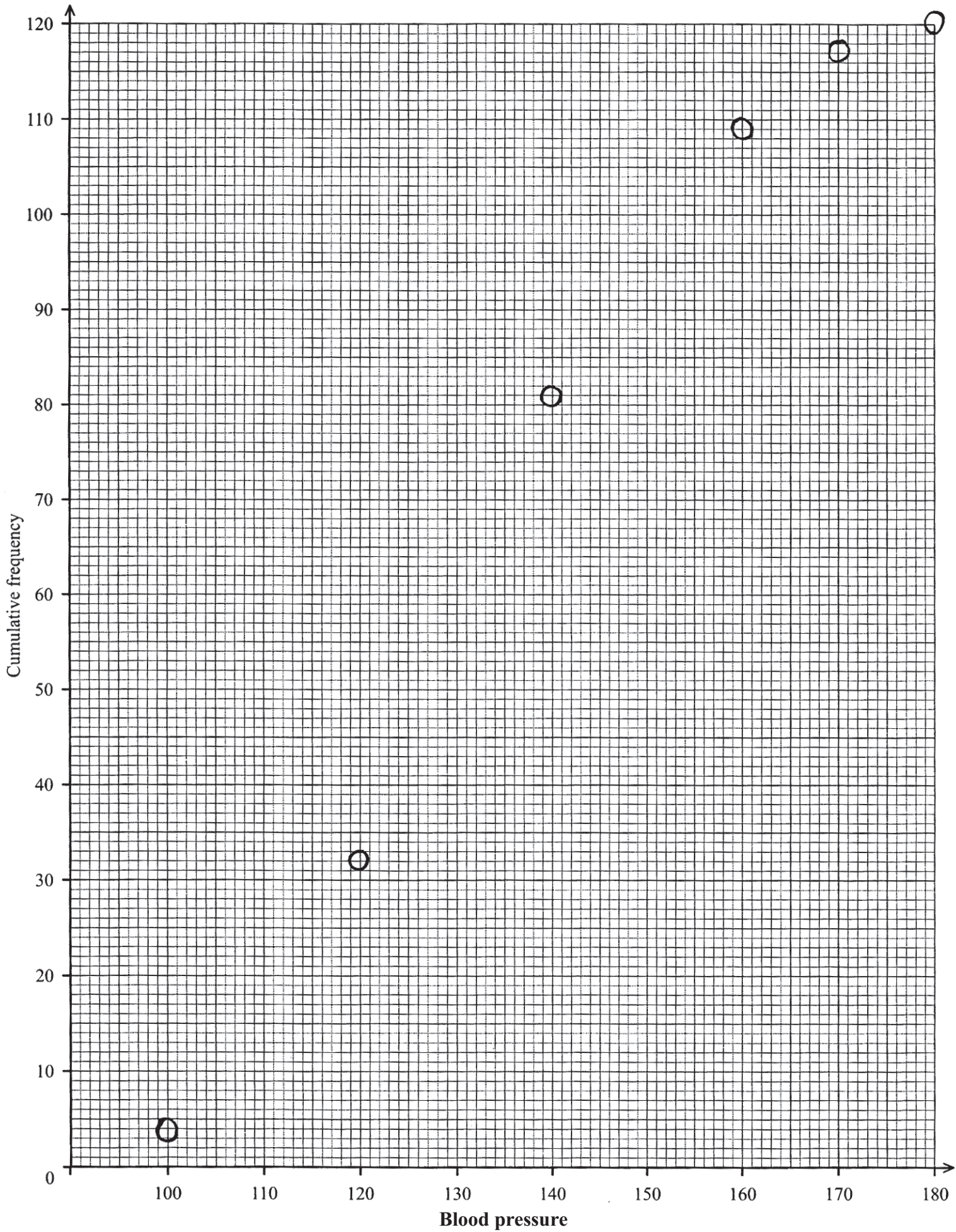
		AVAILABLE MARKS	
7	(a) $10 \times 3 + 15 \times 0.4$ $= 30 + 6$ $= 36$	MA1	
		A1	
(b)	$20 \times 1.3 + 20 \times 2.4 + 5 \times 2 = 84$	MA1	
	$\frac{1}{3}$ of 84 = 28	MA1	
(c) (i)	$\frac{5}{30} = \frac{1}{6}$	MA1	
	$\frac{1}{6}$ of 120 = 20	A1	
(ii)	$\frac{1}{6}$ of 48 = 8	MA1	7
8	(a) $6x^2 - 15xy + 8xy - 20y^2$	M1, A1	
	$6x^2 - 7xy - 20y^2$	MA1	
(b)	$\frac{x(x+3)}{2(x^2-9)}$	MA1	
	$\frac{x(x+3)}{2(x+3)(x-3)}$	MA1	
(c)	$\frac{x}{2(x-3)}$	MA1	
	$(4x-3y)(2x-y)$	MA2	8
9	Angle required CPR	M1	
	$PR^2 = 9^2 + 7^2$		
	$PR = \sqrt{130}$	MA1	
	$\text{Tan CPR} = \frac{4}{\sqrt{130}}$		
	CPR = 19.33	MA1	3

- 10** e.g. to prove irrational – length π and breadth 2π : perimeter 6π
 e.g. to prove rational – length π and breadth $6 - \pi$: perimeter 12

A1
 A2
Total

AVAILABLE MARKS	
	3
	44

GCSE MATHEMATICS SUMMER 2010
MODULE N4-2
OVERLAY QUESTION 1





General Certificate of Secondary Education
2010

Mathematics

Module N6 Paper 1
(Non-calculator)
Higher Tier

[GMN61]

MONDAY 7 JUNE

1.30 pm – 2.45 pm

**MARK
SCHEME**

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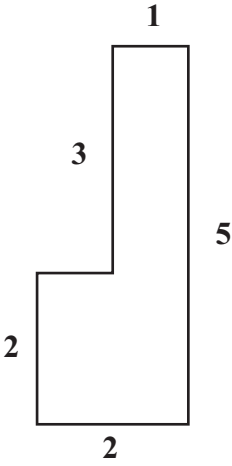
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When the candidate misreads a question in such a way as to make the question easier only a proportion of the marks will be available (based on the professional judgement of the examiner).

			AVAILABLE MARKS
1	$0.35 + 0.2 + 0.2 = 0.75$	MA1	2
	$1 - 0.75 = 0.25$	MA1	
2	$\frac{15(2 - 10)}{6}$	MA1	3
	$\frac{-120}{6}$	MA1	
	-20	A1	
3	(a) $\frac{8 \times 20}{6 - 4}$	MA1	4
	80	A1	
	(b) (i) 30240	A1	
	(ii) 3.6	A1	
4		M1, A1	2
5	(a) 40 km/h	M1, A1	7
	(b) 8 am and 8.30 am	A1	
	(c) Line through (8.10 am, 30) and (8.40 am, 5 km)	MA2	
	Point of intersection 8.25 am (± 1 min)	MA1 A1	

			AVAILABLE MARKS
6	(a) Correct translation	MA1	5
	(b) Correct line Three points correct	A1 A1	
	(c) Correct rotation Three points correct	M1 A1	
7	(a) $x = 7 - y$	M1, A1	5
	(b) (i) p^7	A1	
	(ii) $\frac{1}{p^6}$ or p^{-6}	A1	
	(iii) p^8	A1	
8	$\frac{18}{100} \times 4500 = 810$	M1, A1	2
9	(a) False with a given example	A1	2
	(b) True with a given example	A1	
10	$8 \times 5 \times 10$	MA2	3
	400	A1	
11	(a) $2.56 \times 10^{10} \div (1.28 \times 10^8)$	M1	4
	200	A1	
	(b) (i) 1.28	MA1	
	(ii) a and b must be numbers that add up to 3	MA1	

			AVAILABLE MARKS
12 (a)	$\frac{2}{3}$		
	$\frac{1}{3}$		
	$\frac{1}{2}$		
	$\frac{2}{5}$		
	$\frac{1}{2}$		
		A2	
(b)	$\frac{2}{5} \times \frac{1}{2} = \frac{2}{10} \left(\frac{1}{5}\right)$	MA1, A1	4
13	Area = $\pi \times 6^2 \times \frac{110}{360}$	MA1	
	= $11\pi \text{ cm}^2$	MA1	2
14 (a)	$-3\mathbf{h} + 2\mathbf{g}$	MA1	
(b)	$1.5\mathbf{h} + \mathbf{g}$	MA1	
(c)	$0.75\mathbf{h} + 0.5\mathbf{g} + 1.5\mathbf{h} - \mathbf{g}$	MA1	
	$2.25\mathbf{h} - 0.5\mathbf{g}$	A1	4
15 (a)	$1000x = 342.424242\dots$		
	$10x = 3.424242\dots$	MA1	
	$990x = 339$		
	$x = \frac{339}{990} = \left(\frac{113}{330}\right)$	MA1	
(b)	$3 - 4\sqrt{3} - 4\sqrt{3} + 16$	MA1	
	$19 - 8\sqrt{3}$	A1	4

$$16 \quad P(WW) = \frac{n}{4} \times \frac{n-1}{3} = \frac{1}{2}$$

$$n(n-1) = 6$$

$$n^2 - n - 6 = 0$$

$$(n-3)(n+2) = 0$$

$$n = 3$$

Answer 0

MA2

MA1

Total

AVAILABLE
MARKS

3

56



General Certificate of Secondary Education
2010

Mathematics

Module N6 Paper 2
(With calculator)
Higher Tier

[GMN62]

MONDAY 7 JUNE

3.00 pm – 4.15 pm

**MARK
SCHEME**

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.

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.

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			AVAILABLE MARKS
1	(a) See overlay Correct scale factor 6 points correct	MA1 A2	6
	(b) $210/60 = 3.5$ 3 hours 30 minutes	M1, A1 A1	
2	(a) 0.3204	A1	4
	(b) 0.5, - 0.5	A1	
	(c) always odd $2n$ is always even, therefore $2n + 3$ is always odd and 5 (or an odd) times an odd number is always odd or $10n + 15$, $10n$ is even and even +15 is always odd	A1	
3	(a) one plane drawn	A1	2
	(b) second plane drawn	A1	
4	$42000 - 5000 = 37000$ 22% of 37000 = £8140 $42000 - 8140 = £33860$	MA1 MA1 MA1	3
5	The total percentage is 106% instead of 100%	A1	1
6	Area of trapezium = $\frac{1}{2} (26 + 36) \times 14 = 434 \text{ cm}^2$	M1, A1	3
	Area of rectangle = $36 \times 28 = 1008$		
	Total area = 1442	MA1	
7	See overlay Circle radius 5 cm centre S	MA1	3
	Bisector of ST drawn	MA1	
	Correct region shaded	MA1	
8	(a) 21, 6	A1, A1	4
	(b) See overlay correct points smooth curve	A1 A1	

9 $99 \div 15 = 6.6$
 $6.6 \times 4 = 26.4 \text{ km}$

MA1
 MA1

2

10 $4x \leq 5$

MA1

$x \leq \frac{5}{4}$

MA1

2

11 Volume = $60 \times 43 = 2580$

MA1

Density = $\frac{1400}{2580}$ or 0.542635....

MA1

= 0.54 or 0.543 or 0.5

A1

3

12 (a) (i)

	0.45
	0.53
	0.42
502	

MA2

(ii) George because his relative frequency is furthest away from 0.5

A1

(b) C

A1

4

13 (a) $S = kT^3$

$54 = k \times 6^3$

MA1

$k = \frac{54}{216} = \frac{1}{4}$

$S = \frac{T^3}{4}$

MA1

(b) $128 = \frac{T^3}{4}$

MA1

$T = 8$

MA1

4

14 Curved Area = $\pi dh = \pi \times 14 \times 32$

MA1

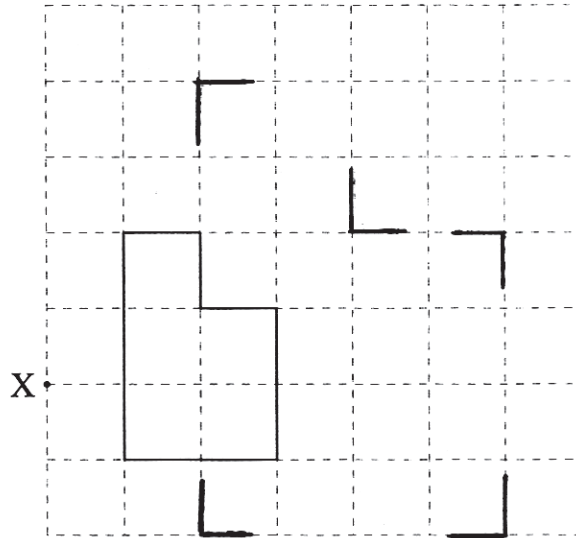
= 1407.433(509...) cm²

MA1

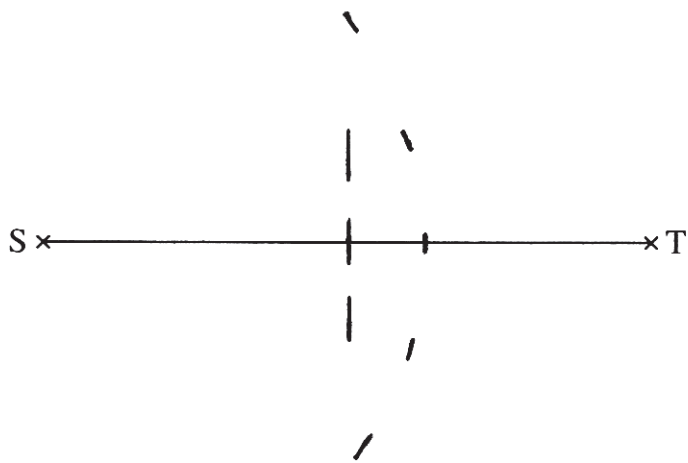
2

		AVAILABLE MARKS
15	$7xy - 14 = 5y + 2x$	MA1
	$7xy - 2x = 5y + 14$	MA1
	$x(7y - 2) = 5y + 14$	MA1
	$x = \frac{5y + 14}{7y - 2}$	A1
16	$\frac{12}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}} = 4\sqrt{3}$	M1, A1
17	$\frac{6}{18} \times \frac{6}{17} + \frac{6}{18} \times \frac{6}{17}$	MA1, MA1
	$= \frac{4}{17}$	A1
18	$2\pi x^2 + 2\pi x \times 3x = 4\pi r^2$	M1, A1
	$8\pi x^2 = 4\pi r^2$ or $2x^2 = r^2$	A1
	$r = \sqrt{2x}$ or $\sqrt{2x^2}$	A1
Total		56

**GCSE MATHEMATICS SUMMER 2010
MODULE N6-2
OVERLAY QUESTION 1**



GCSE MATHEMATICS SUMMER 2010
MODULE N6-2
OVERLAY QUESTION 7



GCSE MATHEMATICS SUMMER 2010
MODULE N6-2
OVERLAY QUESTION 8

