TYPES OF MARK

Most of the marks (those without prefixes, and 'B' marks) are given for accurate results, drawings or statements.

- **M** marks are given for a correct method.
- **B** marks are given for a correct statement or step.
- **A** marks are given for an accurate answer following a correct method.

ABBREVIATIONS

a.r.t.	Anything rounding to
b.o.d.	Benefit of the doubt has been given to the candidate
c.a.o.	Correct answer **only** (i.e. no 'follow through')
e.e.o.	Each error or omission
o.e.	Or equivalent
SC	Special case
s.o.i.	Seen or implied
ww	Without working
www	Without wrong working
$\surd$	Work followed through after an error: no further error made
$\frac{\surd}{\surd}$	Work followed through and another error found

CAMBRIDGE
INTERNATIONAL EXAMINATIONS

June 2003

INTERNATIONAL GCSE

MARK SCHEME

MAXIMUM MARK: 56

SYLLABUS/COMPONENT: 0580/01, 0581/01

MATHEMATICS

Paper 1 (Core)

UNIVERSITY of CAMBRIDGE
Local Examinations Syndicate

* indicates that it is necessary to look in the working following a wrong answer.

1	**(a)** 19.55249(345) **(b)** 19.55	1 1 √	
2	**(a)** 3.3 to 3.7 **(b)** - 0.9	1 1 √	Allow negative values 2.6 - I(a)I
3	**(a)** $\frac{33}{50}$ 67% 0.68 **(b)** $\frac{17}{25}$	1 1	Allow 0.66, 0.67, 0.68 o.e.
4	42	2*	**M1** 72 ÷ 12
5	781000	2*	**M1** for 550 000 x 1.42
6	366	2*	**M1** for "97.60" x 3.75
7	$\frac{4}{9}$	2*	**M1** for $\frac{9}{4}$ or 0.44..... , $2\frac{1}{4}$, $\frac{2}{3}$, $\frac{2}{3}^2$
8	**(a)** - 30 c.a.o. **(b)** v(4u – 3)	1 1	 c.a.o.
9	$\frac{1}{2}$	3*	**M1** 6 – 3x **M1** x + 3x = 6 – 4
10	**(a)** 0.004 **(b)** 4 x 10^{-3}	2* 1 √	**M1** figs 2 : 500000 or figs 4 in answer
11	a = 3, b = -1	3*	**M1** adding **or** x 2nd equation by 3 and subtracting **A1 A1** o.e. (Rearrange **and** substitute scores M1) Working essential if only one answer is correct
12	**(a)** 88 c.a.o. **(b)** 85.5, 86.5	1 1, 1	Not 88.0 **B1** both correct and reversed
13	**(a)** 20 05 **(b) (i)** 0.4 **(ii)** 24	1 2* 1 √	Allow 20:05, 8.05**pm**. Not 20.5 or 20h5m **M1** 30 ÷ 75 (i) × 60

14	**(a)** $\frac{3+4}{6} = \frac{7}{6}$ **(b)** $\frac{6}{5} \times \frac{7}{4} = \frac{21}{10}$	2* 2*	**M1** for first term o.e. **M1** for improper fractions
15	**(a) (i)** 28 **(ii)** 176 **(b)** pyramid	2* 2 √ 1	**M1** for ½ x 8 x 7 **M1** for 4 x (i) + 8^2 **A1** √
16	**(a)** 90 **(b)** 7.71 **(c)** 113	1 2* 2*	**M1** sin40 = PB/12 or $\frac{12}{\sin(a)} = \frac{PB}{\sin 40}$ **M1** π x 6^2
17	**(a)** 9.59 **(b)** 210	2* 3*	**M1** $8.3^2 + 4.8^2$ **M1** tan x = $\frac{4.8}{8.3}$ **M1** 180 + x at P If sin or cos used then allow √ from **(a)**. NO marks for scale drawing
18	**(a) (i)** 35 **(ii)** 25 **(b)** similar **(c)** 11(.0)	1 1 √ 1 2*	60 – (i) **M1** $\frac{16.6}{8.3} = \frac{CX}{5.5}$ o.e. Not 11.1 or **M1** for $\frac{16.6}{\sin 120} = \frac{CX}{\sin 35}$
	TOTAL	**56**	

CAMBRIDGE
INTERNATIONAL EXAMINATIONS

June 2003

INTERNATIONAL GCSE

MARK SCHEME

MAXIMUM MARK: 70

SYLLABUS/COMPONENT: 0580/02, 0581/02

MATHEMATICS

Paper 2 (Extended)

UNIVERSITY of CAMBRIDGE
Local Examinations Syndicate

Question Number	Mark Scheme	Part Marks	Notes	Question Total
1	0.049 < 5% < 5/98 o.e.	2	M1 for *figs* 51… seen after 0, SC1 for 2 correct entries	2
2 (a)	7.85 to 8(.00…)	1		
(b)	56.25 to 57.5(0)	1		2
3	194(.4)	2	M1 for 54 × 3600/1000 or SC1 for *figs* 194….seen	2
4	$\begin{pmatrix}-4\\-7\end{pmatrix}$ c.a.o.	1 1		2
5	38	2	M1 for 665/(17 + 18) s.o.i. by equivalent complete method	2
6	201.25	2	allow 201 or 201.3 in ans. space if 201.25 seen M1 for 17.5 × 11.5 s.o.i.	2
7	4 < x <6	2	SC1 for either one after 0, M1 for 8<2x<12 s.o.i.	2
8	±11 – ±1331 14 196 – -7 49 –	3	2 for 4 or 5 correct 1 for 2 or 3 correct	3
				17
9 (a)	$\frac{1}{6}$ or 0.16(…..) or 0.17	1		
(b)	art 9.5(°)	2	M1 for correct use of tan o.e.	3
10	$\frac{x+11}{(x-3)(x+4)}$ o.e.	3	M1 for denom. $(x-3)(x+4)$ o.e. M1 for $2(x+4)-(x-3)$ o.e.	3
11	integer $\sqrt{(112/7)}$ rational nos. 2.6 4/17 irrational no. $\sqrt{12}$	1 1 1 1	accept $\sqrt{16}$ or 4 accept 0.235 accept 3.46	4
12 (a)	18	2	M1 for $2p + 3p + 90 = 180$ o.e. or SC1 for 36 or 54 seen www.	
(b)	30	2	M1 for $q + 5q = 180$ o.e. or SC1 for 150 seen	4
				14

13 (a)	100	1		
(b)	1200 √	1	√ for (12 × *their* a)	
(c)	10 < *x* < 30 ht 30 mm 60 < *x* < 100 ht 22 mm	1 1		4
14 (a)	10 17 4 –6 –9 0	2	SC1 if 4 or 5 correct	
(b)	$\frac{1}{2}\begin{pmatrix}-2 & -4\\ 3 & 5\end{pmatrix}$ oe	2	1 for $\frac{1}{2}$ s.o.i., 1 for k$\begin{pmatrix}-2 & -4\\ 3 & 5\end{pmatrix}$ s.o.i.	4
15 (a)	50.3	2	M1 for $\frac{(7087000-4714900)}{4714900}$ o.e. must be recognisable complete correct method	
(b) (i)	4710000 or 4.71×10^6	1		
(ii)	7.087×10^6	1	accept 7.09×10^6, ignore superfluous zeros	4
16 (a)	24.7	2	M1 for 80 × sin 18° seen	
(b)	46.2	2	M1 for 3(4 + 11.4) o.e. (no MRs) 3 × 3.8 does not imply 11.4	4
				16
17 (a)	Correct shear ±1mm	2	M1 for shear with either axis invariant	
(b) (i)	Correct stretch ±1mm	2	M1 for stretch with either axis invariant	
(ii)	$\begin{pmatrix}1 & 0\\ 0 & 3\end{pmatrix}$ cao	1		5
18 (a)	1:1000	1		
(b) (i)	accurate perp bisector of AD, with two pairs of arcs	2	SC1 if accurate but no arcs SC1 if accurate arcs but no line	
(ii)	accurate bisector of <BCD, with two pairs of arcs	2	SC1 if accurate but no arcs SC1 if accurate arcs but no line	
	T marked in correct position	1	Indep.	6
				11

19 (a)	correct demonstration	2	M1 for $20x + 80y$ seen	
(b)	$x + 2y = 120$ o.e. fully simplified	2	M1 for $25x + 50y = 3000$ seen condone inequality signs for method mark. Ignore $	
(c)	straight line thr. (120,0) and (0,60)	1√	√ from *their b)*. Line must be complete , and be on given grid	
	60 cars, 30 trucks	1	also allow 80,20; 100,10; 120,0 or points on the correct section of the line ($60 \leq x \leq 120$)	6
				6
20 (a)	art 0.1, 0.3, 0.6, 1, 1.7 and 3	3	SC2 for 4 or 5 correct SC1 for 2 or 3 correct	
(b)	correct curve drawn	2	P1 for correct or √ 6 or 7 points correctly plotted ±1mm	
(c)	$1.6 \leq x < 1.65$	1		6
				6

TOTAL MARKS 70

CAMBRIDGE
INTERNATIONAL EXAMINATIONS

June 2003

INTERNATIONAL GCSE

MARK SCHEME

MAXIMUM MARK: 104

SYLLABUS/COMPONENT: 0580/03, 0581/03

MATHEMATICS

Paper 3 (Core)

UNIVERSITY of CAMBRIDGE
Local Examinations Syndicate

1	**(a)**	7	**1**	
	(b)	42	**1**	
	(c) (i)	9	**1**	
	(ii)	8	**2**	**M1** for evidence of idea of mid-value
	(iii)	8.3	**3**	**M1** for 4 x 5 + 7 x 6……+ 3 x 12 or 415 **M1** (dep) for ÷ 50
	(d)	5cm	**2**	**M1** for 1cm to 2 students o.e.
	(e)	36^{o}	**2**	**M1** for $\frac{5}{50}$ x 360
	(f)	$7.5(0)	**2**	**M1** ÷ 3
	(g)	22	**2**	**M1** for $\frac{11}{50}$ (x 100) **SC1** for $\frac{19}{50}$ (x 100) = 38%
	(h) (i)	$\frac{6}{50}$	**1**	Accept equivalent fractions, decimals or percentages
	(ii)	$\frac{14}{50}$	**1**	
	(iii)	1	**1**	
				19
2	**(a)**	120, …….24, 20	**1, 1, 1**	
	(b)	7 correctly plotted points f.t. correct curve	**P3** **C1**	Deduct 1 for each error (±1mm) Must be a reasonable hyperbola
	(c)	1.6 to 1.8	**1**	Accept f.t.
	(d)	120, ……..0	**2**	
	(e)	Straight line through 4 points	**L2**	**L1** if short or not ruled **SC1** for √ if all straight lines
	(f)	(1.2 – 1.4, 92 – 96) (4.6 – 4.8, 24 - 26)	**1** **1**	Accept f.t.
	(g)	-20	**2**	**SC1** for 20 **or** **M1** for rise/run seen (numerical attempt)
				16

3	**(a) (i)**	175 cents	**1**	
	(ii)	25*b* cents	**1**	
	(iii)	\$1.75	**1 or** √	
	(iv)	$\$\frac{b}{4}$ (allow $\frac{25b}{100}$) (0.25b)	**1 or** √	If involves b
	(b) (i)	$\frac{T}{n}$	**1**	
	(ii)	The cost of one bar	**1**	
	(c) (i)	4.5(0)	**1**	
	(ii)	4.2(0)	**2**	**M1** for (36 – 6.60)/7
	(iii)	$\frac{y}{x}$	**1**	
	(iv)	$\frac{y-7}{x-1}$	**2**	**B1** for $y-7$ or $x-1$ seen
				12
4	**(a) (i)**	*P* with vertices (4, 11), (2, 11), (2, 12)	**2**	**SC1** if translated by $\begin{pmatrix}3\\4\end{pmatrix}$, $\begin{pmatrix}4\\-3\end{pmatrix}$ etc.
	(ii)	*Q* with vertices (9, 7), (11, 7), (11, 8)	**2**	**SC1** if reflected in $y = 8$ or √ from *P*
	(iii)	*R* with vertices (7, 7), (7, 5), (6, 5)	**2**	**SC1** if 90° clockwise from *A* or √ from *Q*
	(iv)	*S* with vertices (7, 7), (3, 7), (3, 9)	**2**	**SC1** if different scale factor about *A* or enlargement of triangle *T* s.f. 2 about *B* or *C*
	(b) (i)	Translation $\begin{pmatrix}3\\-4\end{pmatrix}$	**1** **1**	
	(ii)	Enlargement Scale factor 1/2 centre *A*	**1** **1** **1**	
	(c) (i)	90° (anti-clockwise)	**1**	Accept 270° clockwise
	(ii)	(3, 3)	**2**	**B1** for 1 correct
				16

5	**(a) (i)**	Accurate and with arcs	**2**	**B1** without arcs or inaccurate
	(ii)	Accurate quarter-circle r = 5	**2**	**SC1** for r > 4.8 or < 5.2 with compass or correct r but freehand
	(b)	Correct region shaded	**1 or** √	If convinced
	(c) (i)	45° correct 12cm correct	**1** **1**	± 2° ± 1mm
	(ii)	Reasonable tangent	**1**	Must be ruled ±5°
	(iii)	6.8 to 7.2	**1**	Accept f.t. ±0.1
				9
6	**(a)**	3 x 1 x 1.5 + 9 x 1 o.e.	**2**	**M1** for appropriate strategy **M1** (dep.) for correct numbers used
	(b)	3780	**3**	**M1** for volume is area x length, 13.5 x 2.8 or 37.8 **B1** for 280 seen
	(c) (i)	1.92	**2**	**M1** for 2 x 1.2 x 0.8
	(ii)	1 920 000 f.t.	**2**	**M1** for (their) (i) x 10^6 or 200 x 120 x 80
	(iii)	507 f.t.	**2**	**M1** for (c) (ii) ÷ (b) or 507· ... or 508
	(d)	One vertical line drawn	**1**	Within ± 0.2cm of the centre
	(e)	(order) 1 or no symmetry	**1**	
				13
7	**(a) (i)**	84°	**1**	
	(ii)	22°	**1**	
	(b)	11	**1**	Accept 10.8 → 11, 10min 48sec → 11min
	(c)	16°	**1**	
	(d) (i)	32, (16), 8, 4	**3**	**B1** for each
	(ii)	Halving o.e.	**1**	
	(e)	20°	**1**	Allow answer >20 and <22
				9

8	**(a)**	3 new lines from the vertex to the base	**2**	
	(b)	6, 7, $n + 2$	**3**	**B1** for each
	(c)	15, 21, 55	**3**	**B1** for each
	(d)	12	**2**	**SC1** for 10 or 11
				10

CAMBRIDGE
INTERNATIONAL EXAMINATIONS

June 2003

INTERNATIONAL GCSE

MARK SCHEME

MAXIMUM MARK: 130

SYLLABUS/COMPONENT: 0580/04, 0581/04

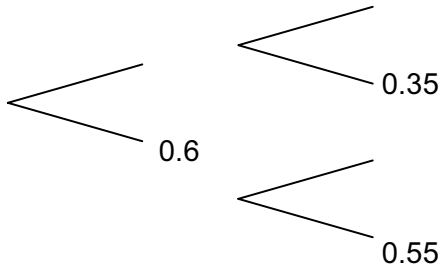
MATHEMATICS

Paper 4 (Extended)

UNIVERSITY of CAMBRIDGE
Local Examinations Syndicate

Marks in brackets are totals for questions or part questions.

1	**(a)**	**($) 3490**	B1 (1)	
	(b)	$16n + 1570 = 4018$ o.e. $\boldsymbol{n = 153}$ c.a.o.	M1 A1 (2)	 ww2
	(c)	$x + y = 319$ o.e. $10x + 16y = 3784$ o.e. Correct method s.o.i. x = **220** y = **99**	B1 B1 M1 A1 A1 (5)	 e.g. $1^{st} \times 10$ **and** subtraction. Condone **arith**. error (available on wrong eqtns provided coefficients not equal.) or 220 \$10 tickets or 99 \$16 tickets (ww Correct answer ⇒ M1)
	(d)	$0.85 \times \$16$ o.e. **($)13.6(0)** c.a.o.	M1 A1 (2)	[$16 – 0,15 × $16] ww2
	(e)	$\frac{100}{125} \times \$10$ o.e. **($)8**	M1 A1 (2)	 ww2
		TOTAL	**12**	
2	**(a)**	$120^2 = 77^2 + 55^2 – 2.55.77\cos x$ $\cos x = \frac{77^2 + 55^2 - 120^2}{2.55.77}$ or $-\frac{5446}{8470} = \cos x = -0.64(29752)$ s.o.i. (-0.643) x = **130(.0)**	M1 M1 A1 A1 (4)	Implied by next line Implied by correct answer which rounds to 130° Scale drawing ⇒ M0. ww ⇒ **SC2**
	(b)	$\sin y = \frac{55 \sin 45^o}{60}$ $\sin y = 0.648$ (1812) s.o.i. y = **40.4**	M2 A1 A1 (4)	If not scored, allow M1 for correct **implicit** eqtn Implied by answer 40° after some working Accept **more** accuracy but not less. www4 (40.39° – 40.41°; 40°ww ⇒ **SC2**)
	(c)	**(i)** **225°** **(ii)*** **275°**	B2 B2 √ (4)	Correct method seen OR answer 222-224°, allow Sc1 √ 405° – their x (provided < 360°). Answer 291-293°, allow **SC1**
		TOTAL	**12**	

3	**(a)**		B1 B1 B1 (3)	Accept percentages or fractions but not ratios
	(b)	**(i)** 0.4 × 0.65 ONLY **0.26** c.a.o. **(ii)* Either** 0.4 × 0.35√ **or** 0.6√ × 0.45 0.4 × 0.35√ + 0.6√ × 0.45 ONLY **0.41** c.a.o. **(iii)* Either** 1 – (.6√ × .55√) **or** .26 + .14√ + .27√ **0.67** c.a.o.	M1 A1 M1 M1 A1 M1 A1 (7)	 www2 Accepting their √ values for M marks www3 www2
	(c)	**(i)** **18** c.a.o. **(ii)** 12 ÷ (his 18 + 6) o.e. **30** c.a.o.	B1 M1 A1 (3)	 **SC1** for 34.3 after 18 in **(c) (i)**
	(d)	**(i)** **22.5** **(ii)*** Realises probability "STOP. STOP" **0.33**	B1 M1 dep. A1√ (3)	Accept 22min 30sec Implied by correct answer after correct work. Dep. On 18 and 22.5 (approx.) √1 – their **(b) (iii)** or (their 0.6) × (their 0.55)
		TOTAL	**16**	
4	**(a)**	Scales correct 9 points correctly plotted (1mm) Reasonable curve through 9 points	S1 P3 C1√ (5)	$-4 \leqslant x \leqslant 4$ and $-8 \leqslant y \leqslant 8$ Allow P2 for 7 or 8 correct, P1 for 5 or 6 correct √ provided shape maintained, curvature OK and not ruled
	(b)	**$-3.6 \leqslant x \leqslant -3.3$, $x = 0$, $3.3 \leqslant x \leqslant 3.6$**	B2 (2)	Allow B1 for 1 correct non-zero solution; condone (-3.5, 0) (answers must be in range and correct for their graph)
	(c)	Line from (-4, -3) to (4, 5), and ruled	B2 (2)	If B0, allow B1 for gradient 1 **or** intercept 1 on single line
	(d)	g(1) = **2** fg(1) = **-8** $g^{-1}(4)$ = **3** **$3.75 \leqslant x \leqslant 3.9$**	B1 B1 B1 B1 (4)	Not (1, 2) Lost if *y*-coordinate given. Answer must be OK for their graph

	(e)	Tangent drawn at $x = 3$ on curve Vert./Horiz. using scale Answer in range 5-10 and OK for theirs	B1 M1 A1 (3)	Not chord or daylight Dep. on reasonable approx to tangent used at $x = 3$ (N.B. Gradient = 4.5 + y-value of tangent at $x = 4$)
		TOTAL	**16**	
5	**(a)**	½ 10.10.sin60° o.e. **43.3 cm² or 25 $\sqrt{3}$**	M1 A1 (2)	Any **complete** method including $\sqrt{15.5.5.5}$ ww2
	(b)	$2\pi r = 10$ s.o.i. **r = 1.59** (15494cm)	M1 A1 (2)	Accept $\pi D = 10$ ww2
	(c)	**(i) Tetrahedron** or **Triangular Pyramid** 4 (his **(a)**) * **173**(.2cm²) **or 100 $\sqrt{3}$** **(ii) Cylinder** Uses π (any r)$^2 \times 10$ ONLY Uses π (his **(b)**)$^2 \times 10$ **Correct or √ in range 79.35-79.65cm³** **(iii) Cone** h, 10, r Appreciates hypotenuse = 10 $h = \sqrt{10^2 - (his(b))^2}$ **9.87**(25362cm)	B1 M1 √A1 (3) B1 M1 M1 dep. A1 (4) B1 M1 M1 A1 (4)	If not his **(a)** then correct Δ area method needed √4 **(a)** to 3s.f. Accept circular (based) prism Not $2\pi r^2 10$ or any other modifications Implies M2 Accept circular/round (based) pyramid e.g. right-angled Δ drawn or cos $x = \frac{\ldots}{10}$
		TOTAL	**15**	
6	**(a)**	**$2x(x + 4)(x + 1)$ (cm³)** **$2x^3 + 10x^2 + 8x$ (cm³)**	B1 B1 (2)	Must see this. Ignore further correct work.

	(b)	**$2x - 2$, $x + 2$, x** Internal volume = $2x^3 + 2x^2 - 4x$ Wood = his **(a)** – his(Int. Vol.) **Correctly** simplifies to $8x^2 + 12x$	B3 B1 M1 A1 (6)	B1 each correct answer, any order but in this form (Both could be wrong) **No** errors
	(c)	**(i)** $8x^2 + 12x = 1980$ $2x^2 + 3x - 495 = 0$ }	B1 (1)	No error seen. Needs = 0
		$\frac{p \pm \sqrt{q}}{r}$ form $\Rightarrow p$ = -3 **and** r = 4 **or** 2×2	B1	Alt. method B2 $(x - 15)(2x + 33)$ or **SC1** for sign error(s) in brackets
		$\Downarrow$ $\Rightarrow$ $q = 3^2 - 4.2 - 495$	B1	Or q = 3969 or $\sqrt{q}$ = 63. Allow for $p \mp \frac{\sqrt{q}}{r}$
		$\Rightarrow$ x = **15** www	B1	If factorising method used, answers only score if correct and from correct bracket
		$\Rightarrow$ x = -16.5 **or** $-33/2$ www	B1 (4)	
		(ii) Uses +ve answer	B1	Rejects –ve solution explicitly or implicitly
		* **30** by **19** by **16**	√B1 (2)	√2(his), (his) + 4, (his) +1
		TOTAL	**15**	
7	**(a)**	**(i)** $\overrightarrow{OS}$ = **3a** www	B1	
		(ii) $\overrightarrow{AB}$ = **b – a** www	B1	
		(iii) $\overrightarrow{CD}$ = **a** www	B1	
		(iv) $\overrightarrow{OR}$ = **2a + 2b** www	B2	If B0, allow **SC1** for correct but unsimplified seen
		(v) $\overrightarrow{CF}$ = **2a – 2b** www	B2 (7)	If B0, allow **SC1** for correct but unsimplified seen
	(b)	**(i)** **|b| = 5** **(ii)** **|a – b| = 5** www	B1 B1 (2)	

	(c)	**(i)** **Enlargement**, S.F. **3**, Centre *0*	B2	Allow **SC1** for Enlargement **or** (S.F. 3 and Centre *0*)
		(ii) **Reflection** In line **CF** o.e.	M1 A1 (4)	} **SC1** for 'Mirrored in CF' o.e.
	(d)	**(i)** **6** c.a.o.	B1	
		(ii) **60°**	B1 (2)	
		TOTAL	**15**	
8	**(a)**	**(i)** **$60-80**	B1	
		(ii) Midpoints **10, 30, 50, 70, 90 + 120**	M1	Needs at least 4 correct s.o.i.
		Σfx attempted (12880)	M1*	Dep. on previous M1 or their midpoints $\pm$ 0.5
		$\Sigma fx \div 200$	M1	Dep. on M1*
		Final answer **$64.40** c.a.o.	A1 (5)	Needs 2 d.p., www4 (64.4 ⇒ M3 AO)
	(b)	**(i)** (≤)20, (≤)40, (≤)60, (≤)80, (≤)100, (≤)140	B1	Not for $\frac{20-40}{42}$ type
		10, 42, 90, 144, 180, 200	B1	
		(ii) Scales correct and labelled or used to 140 and 200	S1	Vert. 20cm ≡ 200 and Horiz. ≡ 14cm 140. Reversed axes SO
		6 plots correct (20, 10) → (140, 200)	P2	P1 for 4 or 5 correct. 1mm accuracy
		Graph from (0, 0), line or curve	C1 (6)	Through all 6 points. Dep. on P1
	(c)	**(i)** Median **($)63-64**	B1	All answers in **(c)** must also be correct for their graph (1mm)
		(ii) U.Q. **($)82-84**	B1	
		(iii) IQR **($)38-41**	B1	
		(iv) Using $75 reading on Cum. Freq. Graph –	M1	e.g. answer 130 implies this
		67 or 68 or 69 or 70 or 71 or 72	A1 (5)	Must be integer answer and OK for their graph
		TOTAL	**16**	
9	**(a)**	Diagram 1 ⇒ **25%** c.a.o.	B1	For whole section reversed **(a)** or **(b)**, treat as MR-1 per section
		Diagram 2 ⇒ **12½%** o.e.	B2	For Diagrams 2-4 **accept** non% equivalents
		Diagram 3 ⇒ **37½%** o.e.	B2	Also in each case if 2 not scored, allow **SC1** if correct idea seen (e.g. ½*h* ÷4*h* for Diagram 2)
		Diagram 4 ⇒ **60%** o.e.	B2 (7)	

	(b)	Diagram 5 $\Rightarrow$ **1/9** o.e. **fraction** Diagram 6 $\Rightarrow$ **1/25** o.e. Diagram 7 $\Rightarrow$ **5/9** o.e.	B1 B2 B3 (6)	In Diagrams 6 and 7, accept non-fraction equivalents. If B0, allow **SC1** for $(\pi)5^2$ seen If B0, allow **SC1** for $(k\pi)2^2$ **and SC1** for $(k\pi)3^2$ seen ($k = 1$ or $x/360$) N.B. 4π must be from $\pi 2^2$ and not $2\pi 2$
		TOTAL	**13**	
		FINAL TOTAL	**130**	