UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS International General Certificate of Secondary Education

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for the guidance of teachers

0580 MATHEMATICS

0580/43

Paper 4 (Extended), maximum raw mark 130

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P	age 2	Mark Scheme: Teachers' version	Syllabus
		IGCSE – October/November 2010	0580
Abbre	viations		
cao	correct answer	only	
cso	correct solutior	only	
dep	dependent		
ft	follow through	after error	
isw	ignore subsequ	ent working	
oe	or equivalent	C	
SC	Special Case		
www	without wrong	working	
art	anything round		
soi	seen or implied	•	

Qu.	Answers	Mark	Part Marks
1	(a) $200 \div 10 \times 3$ oe $200 \div 10 \times 2$ oe	M1 M1	
	(b) 65	2	M1 for $\frac{39}{60} \times 100$ oe 35 is M0
	(c) 46	3	M2 for 36.80 ÷ 0.8 oe or M1 for 80% = 36.80 oe
	(d) 0.6(0)	3	M2 for $5(x + 12) + 2x = 64.2$ oe or $(64.2 - 5 \times 12) \div 7$ or $5x + 2(x - 12) = 64.2$ oe or $(64.2 + 2 \times 12) \div 7$ or M1 for $y = x + 12$ and $5y + 2x = 64.2$ or $y = x - 12$ and $5x + 2y = 64.2$ After M0, SC1 for $k(x \pm 12)$ seen
2	(a) $(\cos Q =) \frac{4^2 + 4.5^2 - 7^2}{2 \times 4 \times 4.5}$ o.e. 110.74	M2 E2	M1 for $7^2 = 4^2 + 4.5^2 - 2 \times 4 \times 4.5 \times \cos(Q)$ If E0 then A1 for $-0.354(1)$
	(b) $(RS =) \frac{7 \sin 40}{\sin 85}$ 4.516	M2 E1	M1 for $\frac{RS}{\sin 40} = \frac{7}{\sin 85}$ o.e. Can be implied by second M
	(c) Angle $R = 55^{\circ}$ $0.5 \times 7 \times 4.52 \times \sin(\text{their 55})$ o.e. $0.5 \times 4 \times 4.5 \times \sin 110.7$ o.e. Triangle <i>PRS</i> + Triangle <i>PQR</i> 21.4 (21.36 - 21.42)	B1 M1 M1 M1 A1	(May be seen on diagram) (12.95 - 13.0) their 55 is (180 - 40 - 85) (8.418 - 8.42) (s = 7.75) Dependent on M1, M1 www 5

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Page 3		Mark Scheme: Teachers' version IGCSE – October/November 2010	
3 (a) $5x^2$	-x or x(5x-1)	2	rsionSyllabus20100580M1 for $x^2 + 3x$ or $4x^2 - 4x$ correctB1 for 27 or for x^9 M1 for any correct partially factorised
(b) 27 <i>x</i>	ç9	2	B1 for 27 or for x^9
(c) (i)	$7x^{7}(1+2x^{7})$	2	M1 for any correct partially factorised expression or $7x^7(1 +)$
(ii)	(y+w)(x+2a)	2	M1 for $x(y + w) + 2a(y + w)$ or y(x + 2a) + w(x + 2a)
(iii) $(2x+7)(2x-7)$	1	y(x + 2a) + w(x + 2a)
(d) _	$\frac{5 \pm \sqrt{5^2 - 4(2)(1)}}{2(2)}$ oe	2	In square root B1 for $5^2 - 4(2)(1)$ or better (17) If in form $\frac{p + \sqrt{q}}{r}$ or $\frac{p - \sqrt{q}}{r}$
			B1 for $p = -5$ and $r = 2(2)$
$-2. \\ -0.$		1 1	SC1 for -2.3 or -2.281 to -2.280 and -0.2 or -0.220 to -0.219
(a) (i)	$\begin{pmatrix} 25\\ 43 \end{pmatrix}$	1 1	If 0, 0 then SC1 for 25 and 43 seen
(ii)	(16)	2	B1 for 16 without brackets
(iii	$\frac{1}{-2}\begin{pmatrix} 5 & -3\\ -4 & 2 \end{pmatrix}$ isw	2	B1 for determinant = -2
	or $\begin{pmatrix} -\frac{5}{2} & \frac{3}{2} \\ 2 & -1 \end{pmatrix}$		or B1 for $k \begin{pmatrix} 5 & -3 \\ -4 & 2 \end{pmatrix}$
(b) Re:	flection only	1	If more than one transformation given – no
x-a	xis oe	1	marks available independent
(c) $\begin{pmatrix} 0 \\ 1 \end{pmatrix}$	$\begin{pmatrix} -1 \\ 0 \end{pmatrix}$	2	B1 for one correct column

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	Page 4	Mark Scheme: Teachers' version Syllabu			Syllabus 7.0 r	
	raye 4	IGCSE – October/November 2010			0580	
					°C.	
5	(ii) X	Accurate perpendicular bisector, with 2 pairs of arcs, of <i>CD</i> . Accurate angle bisector, with two pairs of arcs, of angle <i>A</i> .	2 2		Syllabus 0580 the without arcs. the without arcs. at least SC1 in (i) and (ii) and	1000
	(b) SHO	P written in correct region	S 1	Dependent on intersection	at least SC1 in (i) and (ii) and	
		Arc, centre <i>B</i> , radius 5cm, reaching across <i>ABCD</i> .	1	Allow good f	reehand	
	(ii) <i>I</i>	Area outside their arc centre <i>B</i> and outside SHOP shaded	1ft	dep on S1		
6				better) throug i.s.w. incorrec forms	on, %, dec equivalents (3sf or hout but not ratio or words ct cancelling/conversion to other for 2 sf answers	
	(a) (i) 3	33	1			
		$\frac{243}{3125}$ (0.07776)	2	Accept 0.077	8. M1 for $\left(\frac{3}{5}\right)^5$ oe	
		$\frac{2}{5}, \frac{3}{4}, \frac{1}{8}, \frac{7}{8}$	3		$1\frac{3}{4}$ B1 for $\frac{1}{8}$ B1 for $\frac{7}{8}$	
		$\frac{1}{20}$ (0.05) cao	2	M1 for their	5 0	
	(iii)	$\frac{1}{5}$ (0.2) ft	2ft	ft $\frac{3}{20}$ + their	(b)(ii) or M1 for $\frac{3}{5} \times \frac{1}{4}$	
7	(a) -5.4 3.7		1 1			
	(b) 8 point	nts correctly plotted ft	P3	P3ft their tab		
	Smooth cubic curve through all 8 points		C1		7 points. P1ft for 4 or 5 points if shape not affected.	
	(c) −2, –4	4, 4	2	B1 for 2 corre	ect	
	Two	nts correctly plotted ft separate smooth branches of ngular hyperbola	P2 C1		5 or 6 points ough all 7 points, only ft if shape nd no contact with either axis.	
	(ii) <i>i</i>	$-2.9 \le x \le -2.8$ $2.05 \le x \le 2.15$ a = 10 b = -40	1 1 1 1	Not with <i>y</i> co	ordinates	

Page 5		5	Mark Scheme: Tea			Syllabus Syllabus
			IGCSE – October/N	lovembei	r 2010	0580 ²⁰ 3Can
8	(a)	(i)	396 (395.6 - 396)	4	M1 for $\frac{2}{3} \times \frac{1}{3}$ $\pi \times 3^2 \times 12$,	Syllabus 0580 $\pi \times 3^3$ and M1 (independent) for ent on M2) for adding
		(ii)	3.13 (3.125 – 3.128) ft	2ft	M1 (depende 126 π implies ft their (i) × 7	s M3
		(iii)	144 (144 – 144.4) ft	2ft	ft $15 \times 6 \times 6$ M1 for 6×6	- their (a)(i)
	(b)	(i)	311 (310.8 – 311.1)	5	$\pi \times 6 \times 12$ and M1 (depended)	4×3^2 and M1 (independent) for ad M1 for $\pi \times 3^2$, ent on M3) for adding.
		(ii)	3.50 (3.496 to 3.50) ft	2ft		
)	(a)	(i)	$\begin{pmatrix} 9\\5 \end{pmatrix}$	1		
		(ii)	$\begin{pmatrix} 4\\7 \end{pmatrix}$	1	If 0, SC1 for	$\overrightarrow{CB} = \begin{pmatrix} 5\\ -2 \end{pmatrix}$ seen
			\overrightarrow{BA} or $-\overrightarrow{AB}$	1		ated as a vector is not enough.
			10.3 (10.29 – 10.30)	2	M1 for (their	$(9)^2 + (\text{their 5})^2$
	(b)		2 u	1	1	
		(ii)	$\frac{1}{2}(\mathbf{t}-\mathbf{u})$ oe	2	M1 for $\frac{1}{2}$ (the set of the	heir $\overrightarrow{BA} + \overrightarrow{AD} + \overrightarrow{DC}$) or equivalent
					in terms of t	for \overrightarrow{BM} , along obtainable vectors and u rrect unsimplified answer
		(iii)	$\frac{3}{2}\mathbf{u} + \frac{1}{2}\mathbf{t}$ oe ft	2ft	or $\mathbf{t} + \mathbf{u} - \mathbf{the}$	their (ii) simplified fir (b)(ii) simplified ct (or ft) unsimplified (i) + (ii) fir (b)(ii)

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Page 6	Mark Scheme: Teachers' version	Syllabus
	IGCSE – October/November 2010	0580
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10	(a)		, 8, 10, 11, 16 8, 8, 8, 10, 10, 16	5	Mark answer spaces only or clearly indicat lists. Allow numbers in any order but must be lists of 6 integers B4 for either correct list If not B4 then
			, , ,		lists of 6 integers B4 for either correct list If not B4 then B1 for a series with mode 8 and B1 for a series with median 9 and B1 for a series with sum 60
	(b)	(i)	$(30 \times 65 + 35 \times 85 + 40 \times 95 + 40 \times 110 + 15 \times 135) \div 160$	4	M1 for mid-values soi (allow 1 error/omission) and M1 for use of $\sum fx$ with x in correct interval including both boundaries allow one further error/omission and M1 (dependent on second M) for \div 160
		(ii)	94.7 (94.68 – 94.69) Heights of 4, 2, 0.5 with correct interval widths	4	www 4 B3 for 2 correct or B2 for 1 correct or B1 for all three freq. densities correct but no/incorrect graph
11	(a)	30 42 71	42 56 97	4	B3 for 2 correct rows or B2 for 1 correct row or B1 for any term in column 5 correct
	(b)	(i) (ii)	2550 30	1 1	
	(c)	(<i>n</i> +	1) $(n+2)$ oe final ans	1	
	(d)	(i)	$2n^2 + pn + 1 = t$ Uses a value of <i>n</i> up to 6 and a matching <i>t</i> from the table e.g. puts $n = 3$ and $t = 31$ $2 \times 3^2 + 3p + 1 = 31$ M1	2	Correct solution shown with 1 intermediate step to $p = 4$ E1
			OR Use $p = 4$ to get $2n^2 + 4n + 1 = 31$ and simplifies to 3 term eqn M1		Solve correctly to get $n = 3$ E1
			OR both $2 \times 9 + 4 \times 3 + 1 (= 31)$ M1 with one part evaluated OR		Conclusion e.g. $31 = 31$ E1
		/ •• `	n(n+1) + (n+1)(n+2) - 1 or better M1		Correct simplification to $2n^2 + 4n + 1$ E1
		(ii) (iii)		1 3	M1 for $2n^2 + 4n + 1 = 337$ and M1 for $(n - 12)(n + 14)$ or correct expression for <i>n</i> using formula
	(e)	I –	A+D-1 oe	1	