UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the May/June 2011 question paper for the guidance of teachers

0581 MATHEMATICS

0581/33

Paper 3 (Core), maximum raw mark 104

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes must be read in conjunction with the question papers and the report on the examination.

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Abbreviations

cao correct answer only cso correct solution only

dep dependent

ft follow through after error isw ignore subsequent working

oe or equivalent SC Special Case

www without wrong working

	Qu.	Answers	Mark	Part Marks
1	(a)	805	2	M1 for $110 \times 5 + 85 \times 3$
	(b)	50	2	M1 for $750 - 120 \times 5$
	(c) (i)	90	2	M1 for $150 \div (3+2) \times 3$
	(ii)	5:2	3	M1 for 3 × 5 and 2 × 3 or 90ft × 5 and (150–90ft) × 3 A1 for 450 : 180 oe or 2.5:1 or 1:0.4
	(d)	6.5(0)	2	M1 for 5×1.3 oe
	(e)	10 www	3	M2 for $\frac{0.30}{3} \times 100$ oe (M1 for 0.30 or 30c)
				If M0 then SC1 for $\frac{0.3}{2.7} \times 100$ (implied by
				11.1%)
2	(a)	Accurate triangle <i>PQR</i> with arcs	2	SC1 for accurate without arcs or correct mirror image with arcs
	(b) (i)	Accurate perpendicular bisector of <i>PR</i> with arcs	2ft	SC1 ft for accurate without arcs or accurate arcs without line or accurate with arcs of other side.
	(ii)	Accurate angle bisector of angle <i>P</i> with arcs	2ft	SC1 ft for accurate without arcs or accurate arcs without line or accurate with arcs of other angle.
	(c)	Region shaded cao	1	Intended region clear
	(d)	4.5 cao	2	SC1 for figs 45 or 3.5 or 1 cm = 0.5 km
3	(a)	50	1	
	(b)	72	2	M1 for $288 \times 90 \div 360$ oe
	(c)	1	1	
	(d) (i)	40, 96, 72 ft, 80	2ft	B1 for 2 or 3 correct or SC1 for total of 288
	(ii)	1.67	3ft	ft their table M1 for $(40 \times 0) + 96 \times 1 + 72 \times 2 + 80 \times 3$ M1 (dep) for \div total by 288

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	(e) (i)	$\frac{100}{360}$ oe (0.2777 or 27.77%)	1ft	ft their table if used i.e. $\frac{their80}{their288}$
	(ii)	$\frac{310}{360}$ oe (0.8611 or 86.11%)	2ft	M1 for 120 + 90 + 100 or 96 + 72 + 80
	(11)	360	210	ft their table if used i.e. $\frac{their 248}{their 288}$
				It their table it used i.e. $\frac{1}{their288}$
	(iii)	0	1	allow 0/360 or 0/288, zero, none, impossible
	(f)	400	1ft	ft their table or their (e)(i) if either used must be an integer answer
4	(a)	1.12	2	M1 for 1.4×0.8
	(b)	224	1ft	ft (a) × 200
	(c) (i)	39.3 (39.25 to 39.28)	2	M1 for $\pi \times 0.25^2 \times 200$
	(ii)	185 (184.7 to 184.8)	1ft	ft their (b) – their (c)(i)
	(iii)	4.9 cao www 3	3ft	M1 for (c)(i) ÷ 8000 A1 for 0.00491 (0.004906 to 0.004910) ft their (c)(i)
5	(a) (i)	-1.5, 2, 1.5	2	B1 for 2 correct
	(ii)	12 correct points	P3ft	ft their table P2 for 10 or 11 points ft P1 for 8 or
		Correct curve in two branches through at least 10 points	C1	9 points must be two branches of a rectangular hyperbola between the axes
	(b) (i)	0, -1.5, -1.5, 0	2	B1 for 2 or 3 correct
	(ii)	9 correct points	P3ft	ft their table P2 for 7 or 8 points ft P1 for 5 or 6 points
		Correct curve through at least 7 points	C 1	must be close to parabola in shape
	(c)	(2.7 to 2.99, 2.01 to 2.3) cao	1, 1	
6	(a)	70	2	M1 for 180–140 or 40 at <i>A</i> oe
	(b)	108	2	M1 for 72 vertically opposite to given 72 or next to q or 108 next to 72 given
	(c)	54	1	
	(d)	68	1	
	(e) (i)	Similar	1	Allow enlarged
	(ii)	12.5	2	M1 for $\frac{XZ}{10} = \frac{10}{8}$ oe or better

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7	(a) (i)	4	2	M1 for $2x + x = 15 - 3$ or better
	(ii)	11	2	M1 for $2y - 1 = 7 \times 3$ or $\frac{2y}{3} = 7 + \frac{1}{3}$ or better
	(iii)	1.5 oe	3	M1 for $2(u-1) = 1$ A1 for $2u - 2 = 1$
	(b) (i)	p = 2q + r or $p = r + 2q$ oe	1	
	(ii)	$k = (l+m)^2$	2	SC1 for $(l+m)^2$ or for $k = \sqrt{l+m}$
	(c)	2.9 cao www 4	4	M1 for $2w$ or $3(w-1)$ M1 for $2w + 3(w-1) = 11.5$ A1 for $2w + 3w = 11.5 + 3$ or better
8	(a) (i)	Image at $(3, -1)$, $(5, -1)$, $(5, -2)$, $(3, -3)$	1	
	(ii)	Image at (6, 5), (8, 5), (8, 6), (6,7)	2	SC1 for translation by $\begin{pmatrix} 3 \\ k \end{pmatrix}$ or $\begin{pmatrix} k \\ 4 \end{pmatrix}$ or $\begin{pmatrix} -3 \\ -4 \end{pmatrix}$
	(iii)	Image at $(-3, -1)$, $(-5, -1)$, $(-5, -2)$, $(-3, -3)$	2	SC1 for 180° rotation not about (0, 0)
	(b) (i)	Reflection, $x = -1$	1, 1	Allow clearly labelled line in place of $x = -1$
	(ii)	Enlargement, (factor) 3, (centre) (6, 1)	1, 1, 1	Allow centre clearly labelled
9	(a)	Diagram drawn	1	
	(b)	7, 9, 11 21	2 1	B1 for 2 correct
		2n+1 oe	2	SC1 for $2n + or - any$ integer
	(c)	368	2ft	Must be integer for 2 marks M1 for their $2n + 1 = 737$ ft if linear
	(d)	20, 44, 4(<i>n</i> + 1) oe	1, 1 1	