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.

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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 × 5 + 85 × 3
(b)	50	**2**	**M1** for 750 – 120 × 5
(c) (i)	90	**2**	**M1** for 150 ÷ (3 + 2) × 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 *PQR* with arcs	**2**	**SC1** for accurate without arcs or correct mirror image with arcs
(b) (i)	Accurate perpendicular bisector of *PR* 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 *P* 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 × 90 ÷ 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 × 0) + 96 × 1 + 72 × 2 + 80 × 3 **M1** (dep) for ÷ total by 288

(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 ft their table if used i.e. $\frac{their248}{their288}$
(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 9 points
	Correct curve in two branches through at least 10 points	**C1**	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	**C1**	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 A 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

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 $2n + 1$ oe	**2** **1** **2**	**B1** for 2 correct **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, $4(n + 1)$ oe	**1, 1** **1**	