UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the October/November 2010 question paper

for the guidance of teachers

0580 MATHEMATICS

0580/33   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
art   anything rounding to
soi   seen or implied

Qu.	Answers	Mark	Part Marks
1	**(a)** 10, 9, 5, 5, 1	3	**B2** for 4 correct, **B1** for 3 correct
	(b) **(i)** 2	1	
	(ii) 2.5	2	**M1** for evidence of finding mid-value of 20 pieces of data
	(iii) 2.6	3	**M1** for evidence of $\sum fx$ then **M1dep** for ÷ 40
	(c) **(i)** 81 or 45	2ft	ft their 9 or their 5 **M1** for their 9 or their 5 ÷ 40 × 360
	45 or 81	1ft	Correct or ft 126 – their first angle
	(ii) Correct angles of 81° and 45°	1ft	ft only if add up to 126
2	**(a)** **(i)** 18 30 oe	1	
	(ii) 251 (250.9…)	3	**M1** for distance ÷ time (any units) and **M1** for 55 ÷ 60 oe
	(b) **(i)** 1400	2	**M1** for 9121 ÷ 6.515
	(ii) 20.7(2…)	1	
	(iii) 91	2	**B1** for 90.89 or 90.9 or 90.8 or 610 × 0.149 or **B1** (indep) for correct rounding to integer if from a decimal
3	**(a)** **(i)** Translation $\begin{pmatrix} -5 \\ 3 \end{pmatrix}$	1, 1	
	(ii) Reflection in line $y = 4$	1, 1	Line can be labelled on diagram
	(iii) Rotation, (2, 2.5), 180° or half-turn	1, 1, 1	Centre could be labelled on diagram
	(b) **(i)** Correct reflection in y-axis	2	**SC1** for reflection in x-axis
	(ii) Correct enlargement, (0, 0), factor 4	2	**SC1** for any enlargement centre (0, 0) or factor 4

4	(a)	(i)	214 (213.6…)	2	**M1** for $75^2 + 200^2$
		(ii)	20.6 or (20.55 – 20.56)	2	**M1** for tan = 75/200 or sin = 75/their **(i)** or cos = 200/their **(i)**
	(b)	(i)	(0)44 ((0)44.4…)	1ft	**B1** 65 – their **(a)(ii)** if < 65
		(ii)	224 (224.4…)	1ft	180 + their **(b)(i)**
		(iii)	335	2	**B1** for 65 below *B* or 25 above *B*, may be on diagram
5	(a)	(i)	Accurate perpendicular bisector of *AB* with arcs	2	**SC1** if accurate without arcs or accurate bisector of wrong side with arcs
		(ii)	Accurate bisector of angle *ADC*	2	**SC1** if accurate without arcs or accurate bisector of wrong angle with arcs
	(b)		Ruled line 2 cm from and parallel to *BC*	2	**SC1** if not ruled
	(c)		Correct region shaded cao	1	Dependent on at least **SC1** in **(a)(i)**, **(a)(ii)** and **(b)**
6	(a)	(i)	60	2	**M1** for full method for area with correct values
		(ii)	1200	1ft	ft their **(i)** × 20
	(b)	(i)	10.2	2ft	**SC1** for figs 102 or **M1** for **(a)(ii)** × 8.5 ÷ 1000 ft their **(a)(ii)** × 8.5 ÷ 1000 and SC in same way
		(ii)	23.05	2ft	ft their **(b)(i)** × 2.26 **M1** for 23.052 or 23.1 or **(b)(i)** × 2.26 or **B1ind** for correctly rounding to 2 dp an answer with more than 2 dp
7	(a)		$2d – 9$	2	**SC1** for $9 – 2d$
	(b)		8.4(0)	2	**M1** for their **(a)** = 7.8(0)
	(c)		0.6(0)	1ft	ft their **(b)** – 7.80, **only** if positive
8	(a)		35.3 art	2	**M1** for substituting $r = 7.5$ in formula
	(b)		$\sqrt{\dfrac{5A}{\pi}}$	3	**M1** for correctly multiplying by 5 **M1** for correctly dividing by π **M1** for correctly taking a square root
	(c)		2.76 art cao	2	**M1** for substituting 4.8 in their **(b)** or if working backwards from original formula, substituting and reaching $r^2 = 5 \times 4.8 \div \pi$

9	(a)	(i)	8, 3	1, 1	
		(ii)	5 points correctly plotted	2ft	**P1** for 4 correct points ft
			Smooth curve through their 5 points	1	
		(iii)	$3.4 \leqslant x \leqslant 3.6$	1ft	ft their intersection with x-axis
	(b)	(i)	3, 2, 1.5	1, 1, 1	**B1** each
		(ii)	8 points correctly plotted	2ft	**P1** for 6 or 7 points
			Smooth branch of rectangular hyperbola through 12 points	1	
	(c)		$(1 < x \leqslant 1.2, 10.6 \leqslant y < 11)$	1ft	ft to same accuracy intersections of their two
			$(2.6 \leqslant x < 3, 4.2 \leqslant y \leqslant 4.5)$	1ft	graphs
10	(a)		$360 \div 8 \ (= 45)$	1	Alt method $180 \times (8 – 2)$
			Then $180 –$ their $45 \ (= 135)$	1dep	Then their $1080 \div 8 \ (= 135)$
	(b)	(i)	45	1	
		(ii)	90	1	
	(c)	(i)	35.99 to 36.(0)	2	**M1** for $0.5 \times 8.485 \times 8.485$
		(ii)	695 to 696.4	3ft	**M1** for $(12 + 8.485 + 8.485)^2$
					M1ind for correct collection of area with or without values indicated
11	(a)	(i)	$5 + 8 \ (= 13)$	1	
		(ii)	12, 19	1	
			10, 17	1	
			7, 9	1	
			3, 6	1	
			4, 5	1	
			3, 2	1	
	(b)	(i)	11	1	
			$2n – 1$	2	**B1** for $2n \pm k$ or $jn – 1 \ (j \neq 0)$
		(ii)	36 n^2	1, 1	
		(iii)	$\dfrac{1}{6}$ $\dfrac{1}{n}$	1, 1	