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.

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

- CIE will not enter into discussions or correspondence in connection with these mark schemes.

CIE is publishing the mark schemes for the October/November 2010 question papers for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level syllabuses and some Ordinary Level syllabuses.

UNIVERSITY of CAMBRIDGE
International Examinations

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…) **(ii)** 20.6 or (20.55 – 20.56) **(b) (i)** (0)44 ((0)44.4…) **(ii)** 224 (224.4…) **(iii)** 335	2 2 1ft 1ft 2	**M1** for $75^2 + 200^2$ **M1** for tan = 75/200 or sin = 75/their **(i)** or cos = 200/their **(i)** **B1** 65 – their **(a)(ii)** if < 65 180 + their **(b)(i)** **B1** for 65 below *B* or 25 above *B*, may be on diagram
5	**(a) (i)** Accurate perpendicular bisector of *AB* with arcs **(ii)** Accurate bisector of angle *ADC* **(b)** Ruled line 2 cm from and parallel to *BC* **(c)** Correct region shaded cao	2 2 2 1	**SC1** if accurate without arcs or accurate bisector of wrong side with arcs **SC1** if accurate without arcs or accurate bisector of wrong angle with arcs **SC1** if not ruled Dependent on at least **SC1** in **(a)(i)**, **(a)(ii)** and **(b)**
6	**(a) (i)** 60 **(ii)** 1200 **(b) (i)** 10.2 **(ii)** 23.05	2 1ft 2ft 2ft	**M1** for full method for area with correct values ft their **(i)** × 20 **SC1** for figs 102 or **M1** for **(a)(ii)** × 8.5 ÷ 1000 ft their **(a)(ii)** × 8.5 ÷ 1000 and SC in same way 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)** $2d - 9$ **(b)** 8.4(0) **(c)** 0.6(0)	2 2 1ft	**SC1** for $9 - 2d$ **M1** for their **(a)** = 7.8(0) ft their **(b)** – 7.80, **only** if positive
8	**(a)** 35.3 art **(b)** $\sqrt{\frac{5A}{\pi}}$ **(c)** 2.76 art cao	2 3 2	**M1** for substituting $r = 7.5$ in formula **M1** for correctly multiplying by 5 **M1** for correctly dividing by π **M1** for correctly taking a square root **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 **(ii)** 5 points correctly plotted Smooth curve through their 5 points **(iii)** $3.4 \leqslant x \leqslant 3.6$ **(b) (i)** 3, 2, 1.5 **(ii)** 8 points correctly plotted Smooth branch of rectangular hyperbola through 12 points **(c)** $(1 < x \leqslant 1.2, 10.6 \leqslant y < 11)$ $(2.6 \leqslant x < 3, 4.2 \leqslant y \leqslant 4.5)$	1, 1 2ft 1 1ft 1, 1, 1 2ft 1 1ft 1ft	 **P1** for 4 correct points ft ft their intersection with x-axis **B1** each **P1** for 6 or 7 points ft to same accuracy intersections of their two graphs
10	**(a)** $360 \div 8$ (= 45) Then 180 – their 45 (= 135) **(b) (i)** 45 **(ii)** 90 **(c) (i)** 35.99 to 36.(0) **(ii)** 695 to 696.4	1 1dep 1 1 2 3ft	Alt method $180 \times (8 - 2)$ Then their $1080 \div 8$ (= 135) **M1** for $0.5 \times 8.485 \times 8.485$ **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) **(ii)** 12, 19 10, 17 7, 9 3, 6 4, 5 3, 2 **(b) (i)** 11 $2n - 1$ **(ii)** 36 n^2 **(iii)** $\frac{1}{6}$ $\frac{1}{n}$	1 1 1 1 1 1 1 1 2 1, 1 1, 1	 **B1** for $2n \pm k$ or $jn - 1$ $(j \neq 0)$