

**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

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Page 2	Mark Scheme: Teachers' version	Syllabus	Paper
	IGCSE – October/November 2010	0580	33

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	M1 for evidence of finding mid-value of 20 pieces of data M1 for evidence of $\sum fx$ then M1dep for $\div 40$
	(ii) 2.5	2	
	(iii) 2.6	3	
(c) (i) 81 or 45	2ft	ft their 9 or their 5 M1 for their 9 or their $5 \div 40 \times 360$	
	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	M1 for distance \div time (any units) and M1 for $55 \div 60$ oe
	(ii) 251 (250.9...)	3	
	(b) (i) 1400	2	M1 for $9121 \div 6.515$
	(ii) 20.7(2...)	1	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
	(iii) 91	2	
	3	(a) (i) Translation $\begin{pmatrix} -5 \\ 3 \end{pmatrix}$	1, 1
(ii) Reflection in line $y = 4$		1, 1	
(iii) Rotation, (2, 2.5), 180° or half-turn		1, 1, 1	
(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

Page 3	Mark Scheme: Teachers' version	Syllabus	Paper
	IGCSE – October/November 2010	0580	33

4	(a) (i) 214 (213.6...) (ii) 20.6 or (20.55 – 20.56)	2 2	M1 for $75^2 + 200^2$ M1 for $\tan = 75/200$ or $\sin = 75/\text{their (i)}$ or $\cos = 200/\text{their (i)}$
	(b) (i) (0)44 ((0)44.4...) (ii) 224 (224.4...) (iii) 335	1ft 1ft 2	B1 65 – their (a)(ii) if < 65 180 + their (b)(i) B1 for 65 below <i>B</i> or 25 above <i>B</i> , may be on diagram
5	(a) (i) Accurate perpendicular bisector of <i>AB</i> with arcs	2	SC1 if accurate without arcs or accurate bisector of wrong side with arcs
	(ii) Accurate bisector of angle <i>ADC</i>	2	SC1 if accurate without arcs or accurate bisector of wrong angle with arcs
	(b) Ruled line 2 cm from and parallel to <i>BC</i>	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 (ii) 1200	2 1ft	M1 for full method for area with correct values ft their (i) $\times 20$
	(b) (i) 10.2	2ft	SC1 for figs 102 or M1 for (a)(ii) $\times 8.5 \div 1000$ ft their (a)(ii) $\times 8.5 \div 1000$ and SC in same way
	(ii) 23.05	2ft	ft their (b)(i) $\times 2.26$ M1 for 23.052 or 23.1 or (b)(i) $\times 2.26$ 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) $\sqrt{\frac{5A}{\pi}}$	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 $r^2 = 5 \times 4.8 \div \pi$

Page 4	Mark Scheme: Teachers' version	Syllabus	Paper
	IGCSE – October/November 2010	0580	33

9	<p>(a) (i) 8, 3 (ii) 5 points correctly plotted Smooth curve through their 5 points (iii) $3.4 \leq x \leq 3.6$</p> <p>(b) (i) 3, 2, 1.5 (ii) 8 points correctly plotted Smooth branch of rectangular hyperbola through 12 points</p> <p>(c) $(1 < x \leq 1.2, 10.6 \leq y < 11)$ $(2.6 \leq x < 3, 4.2 \leq y \leq 4.5)$</p>	<p>1, 1 2ft 1 1ft 1, 1, 1 2ft 1 1ft 1ft</p>	<p>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</p>
10	<p>(a) $360 \div 8 (= 45)$ Then $180 - \text{their } 45 (= 135)$</p> <p>(b) (i) 45 (ii) 90</p> <p>(c) (i) 35.99 to 36.(0) (ii) 695 to 696.4</p>	<p>1 1dep 1 1 2 3ft</p>	<p>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</p>
11	<p>(a) (i) $5 + 8 (= 13)$ (ii) 12, 19 10, 17 7, 9 3, 6 4, 5 3, 2</p> <p>(b) (i) 11 $2n - 1$ (ii) $36 \quad n^2$ (iii) $\frac{1}{6} \quad \frac{1}{n}$</p>	<p>1 1 1 1 1 1 1 1 2 1, 1 1, 1</p>	<p>B1 for $2n \pm k$ or $jn - 1$ ($j \neq 0$)</p>