

**MARK SCHEME for the October/November 2010 question paper
for the guidance of teachers**

0581 MATHEMATICS

0581/33

Paper 3 (Core), maximum raw mark 104

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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	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	45 or 81	2ft	ft their 9 or their 5 M1 for their 9 or their $5 \div 40 \times 360$
	(ii) Correct angles of 81° and 45°	1ft	Correct or ft 126 – their first angle
		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

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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 (ii) Accurate bisector of angle <i>ADC</i>	2 2	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
	(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 (ii) 23.05	2ft 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 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 $r^2 = 5 \times 4.8 \div \pi$

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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) $36 - n^2$ (iii) $\frac{1}{6} - \frac{1}{n}$</p>	<p>1 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>