

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**

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
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	(ii) 20.7(2...)	2	M1 for $9121 \div 6.515$
			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	Line can be labelled on diagram Centre could be labelled on diagram	
	(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	(ii) Correct enlargement, (0, 0), factor 4	2	SC1 for reflection in x-axis
			2	SC1 for any enlargement centre (0, 0) or factor 4

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4	<p>(a) (i) 214 (213.6...) (ii) 20.6 or (20.55 – 20.56)</p> <p>(b) (i) (0)44 ((0)44.4...) (ii) 224 (224.4...) (iii) 335</p>	<p>2 2</p> <p>1ft 1ft 2</p>	<p>M1 for $75^2 + 200^2$ M1 for $\tan = 75/200$ or $\sin = 75/\text{their (i)}$ or $\cos = 200/\text{their (i)}$</p> <p>B1 65 – their (a)(ii) if < 65 180 + their (b)(i) B1 for 65 below B or 25 above B, may be on diagram</p>
5	<p>(a) (i) Accurate perpendicular bisector of AB with arcs (ii) Accurate bisector of angle ADC</p> <p>(b) Ruled line 2 cm from and parallel to BC</p> <p>(c) Correct region shaded cao</p>	<p>2 2 2 1</p>	<p>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</p> <p>SC1 if not ruled</p> <p>Dependent on at least SC1 in (a)(i), (a)(ii) and (b)</p>
6	<p>(a) (i) 60 (ii) 1200</p> <p>(b) (i) 10.2</p> <p>(ii) 23.05</p>	<p>2 1ft 2ft 2ft</p>	<p>M1 for full method for area with correct values ft their (i) $\times 20$</p> <p>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</p>
7	<p>(a) $2d - 9$</p> <p>(b) 8.4(0)</p> <p>(c) 0.6(0)</p>	<p>2 2 1ft</p>	<p>SC1 for $9 - 2d$</p> <p>M1 for their (a) = 7.8(0)</p> <p>ft their (b) – 7.80, only if positive</p>
8	<p>(a) 35.3 art</p> <p>(b) $\sqrt{\frac{5A}{\pi}}$</p> <p>(c) 2.76 art cao</p>	<p>2 3 2</p>	<p>M1 for substituting $r = 7.5$ in formula</p> <p>M1 for correctly multiplying by 5 M1 for correctly dividing by π M1 for correctly taking a square root</p> <p>M1 for substituting 4.8 in their (b) or if working backwards from original formula, substituting and reaching $r^2 = 5 \times 4.8 \div \pi$</p>

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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 2 1, 1 1, 1</p>	<p>B1 for $2n \pm k$ or $jn - 1$ ($j \neq 0$)</p>