UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the October/November 2009 question paper

for the guidance of teachers

0581 MATHEMATICS

0581/03   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.

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Qn			Answers	Mark	Notes
1	**(a)**	**(i)**	1/5	1	Accept 0.2 or 20<u>%</u>
		(ii)	2/5	1	Accept 0.4 or 40<u>%</u>
		(iii)	0	1	Accept 0/5 or 0<u>%</u>
	(b)	**(i)**	6	1	cao
		(ii)	1	1	cao
		(iii)	2.6 (0) www	3	M1 for $1 \times 8 + 2 \times 4 + 3 \times 5 + 4 \times$ their **(b) (i)** $+ 5 \times 2$ M1 dep for $\div 25$ or their 25
		(iv)	heights 8, 4, 5, , 2 6 or ft height for their **(b) (i)**	2 1 ft	SC1 for one error, or small gaps
2	**(a)**	**(i)**	15.7 art	2	M1 for $2 \times \pi \times 2.5$
		(ii)	19.6 art	2	M1 for $\pi \times 2.5^2$
		(iii)	14.6 art	2	M1 for $\pi \times (2.5 + 0.8)^2$
	(b)		Within range 7840 to 7860	2 ft	M1 for their **(a) (ii)** $\times 0.4 \times 1000$
	(c)		31	3 ft	M1 for their **(b)** $\div 250$ soi A1 ft for 31.4 art W1 for their answer correctly rounded
3	**(a)**	**(i)**	4.5	2	M1 for $15 \times 3 / (7+3)$
		(ii)	3	1 ft	Their **(a) (i)** $\div 2$ and rounded up
	(b)	**(i)**	8.14	3	M1 for $100 - 12$ soi M1 for $9.25 \times$ their $88 / 100$
		(ii)	32.56	1 ft	$4 \times$ their **(b) (i)**
		(iii)	46.25	1	cao
		(iv)	8.75(6…) or 8.76	3	M1 for (their **(ii)** + their **(iii)**) soi 2nd M1 dep for $\div (4 + 5)$ soi

4	(a)	(i)	Isosceles	1	Condone spelling
		(ii)	*DNC*	1	Condone order of letters
		(iii)	70°	1	cao
	(b)	(i)	49.4° or 49°24′ art	2	M1 for inv tan (7/6)
		(ii)	9.22 art	2	M1 for $\sqrt{(6^2 + 7^2)}$ soi (e.g. $\sqrt{85}$)
	(c)		12.2 art	3	M2 for 7/sin35
	(d)		42.8(4....) or 42.85	2 ft	M1 for 2 × [their **(b) (ii)** + their **(c)**] oe
5	(a)		2 –6 2	1, 1, 1	
	(b)		seven points correctly plotted smooth correct curve through 7 correct points	P3ft C1	5 or 6 P2ft, 3 or 4 P1ft
	(c)	(i)	(–2, –7)	1	cao
		(ii)	–4.6 to –4.75 and 0.6 to 0.75	1 1	cao cao
	(d)	(i)	correct point marked	1	Condone lack of label
		(ii)	<u>ruled</u> line from their *A* to their (0, –3)	1	<u>Continuous</u> line of this minimum length
		(iii)	–4 / 2 oe	2	M1 for attempt at gradient or SC1 for 2 oe or –1 oe from correct line
		(iv)	$y = –2x – 3$ oe	2	SC1 for $y = kx – 3$ oe or $y = –2x + k$ oe or $y =$ their **(d) (iii)**$x + k$ oe

6	(a)		$x + 4$	1	
	(b)		$3x$	1	
	(c)	(i)	$x + x + 4 + 3x$ $5x + 4$	M1 ft A1 cao	soi ft is $x + $ (a) + (b) $5x + 4$ www scores both marks
		(ii)	Their **c (i)** $\div 3 = 28$ or their **c (i)** $= 28 \times 3$	1	
		(iii)	$(x =)$ 16	2	M1 for $5x = 84 - 4$ or $5x = 80$ or $x = 80/5$
	(d)		48 or $3 \times$ their x	1 ft	Ft is $3 \times$ **(c) (iii)**
	(e)		84%	2	M1 for $63 / 75 \times 100$
7	(a)		4	1	cao
	(b)		4 correct lines drawn, accept reasonable freehand	2	SC1 for 2 correct lines
	(c)		2600	3	M1 for 2800×1.75 or 4900 M1 for their $4900 - 2300$
	(d)		3100.40	2	M1 for 2300×1.348
	(e)		5962.32	3	M2 for $5000 \times (1.092)^2$ SC1 for $5000 \times (1.92)^2$ or full equiv. or 18432

8	(a)	(i)	Correct X	2	SC1 for translation of $\begin{pmatrix} 2 \\ -7 \end{pmatrix}$
		(ii)	Correct Y	2	SC1 for rotation through 90 clockwise Or 90 anticlockwise about any point
	(b)	(i)	Correct Z_1	2	SC1 for reflection in y axis Or in any horizontal line
		(ii)	Correct Z_2	2 ft	strict ft **reflection** of their Z_1 if possible SC1 for reflection in y = 4 or any vertical line
		(iii)	Translation , $\begin{pmatrix} 8 \\ 4 \end{pmatrix}$ OR Rotation , through 180 about (4, 0)	1 , 1	W1 transformation, W1 full description SC2 for Enlargement sf = –1 coe (4, 0)
9	(a)		13 21 10 15	1 1 1 1	cao cao
	(b)		43 28	1 1	cao cao
	(c)	(i)	½ × 5 × 6 = 15 seen	1 1dep	accept ½ × 5 × (5 + 1)
		(ii)	½ × 20 × 21 = 210	1 1	accept ½ × 20 × (20 + 1) accept 210 www for both marks
	(d)		(k =) –1	2	M1 for 7 = 3² + k × 3 + 1 oe