CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the May/June 2014 series

0444 MATHEMATICS (US)

0444/31 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 should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

Cambridge will not enter into discussions about these mark schemes.

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Abbreviations

cao correct answer only
dep dependent
FT follow through after error
isw ignore subsequent working
oe or equivalent
SC Special Case
nfww not from wrong working
soi seen or implied

Qu.	Answers	Mark	Part Marks
1 (a) (i)	48, 39 Subtract 9 oe	1, 1FT 1	**FT** 6^{th} term = 5^{th} term –9
(ii)	162, 486 Multiply by 3 oe	1, 1FT 1	**FT** 6^{th} term = 5^{th} term × 3
(b) (i)	$93 - 9n$ oe final answer	2	**B1** for $–9n$ + c or kn + 93, k ≠ 0
(ii)	–96 cao	2	**M1** for substitution of $n = 21$ into their **linear** expression
2 (a) (i)	Parallelolgram	1	
(ii)	0	1	
(b)	Translation	1	
	$\begin{pmatrix} 9 \\ -6 \end{pmatrix}$	1	Independent Accept 9 right, 6 down
(c) (i)	(1, 4), (4, 4), (5, 2), (2, 2)	2	**SC1** for reflection in x-axis
(ii)	(–4, –1), (–4, –4), (–2, –5), (–2, –2)	2	**SC1** for rotation 90° clockwise or correct rotation any centre
(d)	(–6, 8), (0, 8), (–8, 4), (–2, 4)	2	**SC1** for enlargement of S, scale factor 2, wrong position
(e) (i)	6	2	**M1** for 3 × 2
(ii)	4	1	
(iii)	24	1FT	**FT** *their* **(e)(i)** × *their* **(e)(ii)** or **FT** area of *their* **(d)** if a parallelogram and not congruent to S.

3 (a) (i)	25	**1**	
(ii)	26	**1**	
(iii)	21	**2**	**M1** for attempt at ordering
(iv)	20	**2**	**M1** for 300 ÷ 15 or (sum of complete list) ÷ 15
(b)	768	**2**	**M1** for 0.96 × 800 oe
(c) (i)	49.5 cao	**3**	**M1** for figs 66 × 750 soi **M1** for ÷ 1000
(ii)	69.3[0]	**1 FT**	*Their* **(c)(i)** × 1.40
(iii)	110	**3**	**M2** for $\frac{\textit{their}\,\textbf{(c)(ii)} - 33}{33} \times 100$ or **M1** for *their* **(c)(ii)** − 33 Alternative method: **M2** for $\frac{\textit{their}\,\textbf{(c)(ii)}}{33} \times 100 - 100$ Or **M1** for $\frac{\textit{their}\,\textbf{(c)(ii)}}{33}$
4 (a)	Hexagon correct with arcs. AF = 7 cm (±2 mm) EF = 8 cm (±2 mm)	**2**	**B1** for correct hexagon without arcs or one length correct with arcs. Or **B1** for two correct arcs
(b)	Hexagon	**1**	
(c) (i)	Bisector of CD with 2 pairs of arcs	**2**	**B1** for correct bisector with one pair or no arcs
(ii)	Bisector of angle ABC with 2 pairs of correct arcs.	**2**	**B1** for bisector without 2 pairs of arcs
(d) (i)	56.55 or 56.56	**2**	**M1** for $(\pi \times 6^2) \div 2$ oe
(ii)	30.85	**3**	**M1** for $(\pi \times 12) \div 2$ oe **M1** for '*their* $(\pi \times 12) \div 2$' + 12 oe

5 (a) (i)	−1, −4, −8, 8, 4, 1	**3**	1 for each symmetrical pair
(ii)	8 points correctly plotted, within ½ square.	**3FT**	**B2FT** for 6 or 7 correct Or **B1FT** for 4 or 5 correct
	2 smooth correct curves, not joined	**1**	
(iii)	2	**1**	
(b) (i)	−3 0 6	**2**	**B1** for two correct
(ii)	Correct ruled line	**1**	
(c)	1.4 to 1.6 and −3.6 to −3.4	**1FT** **1FT**	**FT** from their graph ±0.1
(d)	1.5	**1**	
6 (a) (i)	86	**1**	
(ii)	55	**1**	
(iii)	81	**1**	
(iv)	64	**1**	
(b)	$\frac{y+1}{3}$ oe final answer	**2**	**M1** for $y+1=3x$ or $\frac{y}{3}=x-\frac{1}{3}$ Or $-y-1=-3x$
7 (a) (i)	[Car angle =] 135 (± 2º) 135 ÷ 360 × 120 (= 45)	**B1** **M1**	
(ii)	$\frac{2}{3}$ or value from 0.658 to 0.675	**2**	**B1** for angles of 238° to 242° or 79 to 81 people
(b) (i)	$x + 31 + x + 17 + 2x$ [=120] or better	**3**	**B1** for $x + 17$ – seen together **B1** for $2x$
(ii)	18 cao	**3**	**M1 FT** for *their* $(4x + 48)$ [=120] or their $2x + x + x = 120 – 31 – 17$ or better. **M1FT** for *their* $(4x = 72)$ If zero **SC2** for a correct numerical solution of their equation of equivalent difficulty.

8	**(a)**	Tangent	**1**	
	(b)	**Tangent** and **radius** in a correct statement	**1**	
	(c)	8	**3**	**M2** for $\sqrt{17^2-15^2}$ or better or **M1** for $17^2 = OQ^2 + 15^2$ oe or better
	(d)	$\text{Cos}(\ldots) = \frac{15}{17}$ or $\text{Sin}(\ldots) = \frac{'8'}{17}$	**M1**	
		or Tan $(\ldots) = \frac{'8'}{15}$ or better		
		28.07… or 28.1	**A1**	
	(e)	$\frac{90-28}{2}$ oe or $(\sin^{-1}(15/17)) \div 2$	**M1**	
		31 or 30.95 or 30.96…	**A1**	
		Any 2 correct reasons from vertically opposite, angles (in a) triangle (180), isosceles	**B1**	
	(f)	8.24 Or 8.22 to 8.241	**3**	**M2** for '8' × sin ('31') × 2 or **M1** for '8' × sin ('31')
9	**(a) (i)**	$\frac{3}{3+4+8}$ **or** $\frac{180}{3+4+8}$	**M1**	
		$3 \div (15) \times 180$ or $\frac{180\times3}{15}$ (= 36)	**M1**	
	(ii)	48 [and] 96	**1, 1**	One mark for each. If zero, **SC1** for sum of both angles = 144.
	(b) (i)	Angle *BAC* = 35 (±2º) Angle *ABC* = 65 (±2º) and triangle completed	**B1** **B1**	If zero **SC1** for *AC* and *BC* reversed and triangle completed
	(ii)	4.45 cm to 4.85 cm	**1 FT**	**FT** for their shortest side
	(c)	19.6 cao	**2**	**M1** for 0.5 × 7 × 5.6
		cm^2 oe	**1**	