CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the May/June 2013 series

0444 MATHEMATICS (US)

0444/31 Paper 3, 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
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
soi seen or implied

Qu.	Answers	Mark	Part Mark
1 (a) (i)	1, 2, 11, 22	2	**B1** for just three of these Or 3 correct with 1 extra Or all four and up to 2 extras Or 1 × 22 and 2 × 11
(ii)	39	1	
(b) (i)	2, 17, 19	2	**B1** for just two of these or all three and an extra one
(ii)	1 or 27	1	
(c) (i)	3.5×10^{-3}	1	
(ii)	4.2×10^{4}	2	**M1** for 42 000 oe
2 (a) (i)	750	1	
(ii)	11, 11.5 or 12	1ft	
(iii)	300	1	
(iv)	1000	1	
(b) (i)	13 02	1	
(ii)	10 26	1	
(c) (i)	16 24	2	**B1** for 1 (h) 36 or 2 (h) 16 or 3 (h) 49 or 96 or 136 or 229 or 4.24(pm) soi.
(ii)	40 cao	2	**M1** for 64 ÷ their time (eg. 1 (h) 36 (m))
(iii)	12 32	1	
3 (a)	29	1	
(b)	42	1	
(c)	[r =] 66 and [s =] 114	1, 1ft	ft is s = 180 – their r
(d)	50	1	
(e)	56	2	**M1** for either angle at A or B indicated as 90 soi

4 (a) (i)	one correct line	**1**	
(ii)	only two correct lines	**2**	**B1** for either correct line with at most one inc
(b)	correct square	**1**	
(c) (i)	correct reflection	**2**	**B1** for reflection in $x = k$ or $y = 4$
(ii)	correct translation	**2**	**B1** for 5 left or 4 down **SC** for translation of $\begin{pmatrix} -4 \\ -5 \end{pmatrix}$
(iii)	correct rotation	**2**	**B1** for a correct rotation about the wrong centre
(d) (i)	rotation centre (0, 0) angle 90° [anti clockwise]	**1** **1** **1**	
(ii)	translation $\begin{pmatrix} -6 \\ 3 \end{pmatrix}$	**1** **1**	
5 (a) (i)	140	**1**	If 0 scored **SC1** for their total = 240
(ii)	100	**1**	**B1 ft** for correct sectors drawn **B1** for correct labelling consistent with table
(b) (i)	40	**1**	
(ii)	29.5	**2**	**M1** for (attempt to add) ÷ 12
(iii)	$\frac{7}{12}$ oe	**1**	isw
6 (a)	4 points plotted correctly	**2**	**B1** for 3 points plotted correctly
(b)	negative	**1**	
(c)	correct ruled line	**1**	
(d)	22.4 – 22.8	**1ft**	ft from their **(c)** if ruled and negative gradient

7 (a) (i)	$\begin{matrix} & x+12 \\ x-34 & x-22 \end{matrix}$	**1, 1, 1**	in each part allow correct unsimplified t
(ii)	$x + 12 = 3(x - 22)$	**1ft**	accept $x + 12 = 3x - 66$ or $\frac{(x+12)}{3} = x - 22$
	39 cao	**3**	**M1** for their $3x - 66$ seen **M1** for correctly collecting terms from $ax + b = cx + d$ $a, b, c, d \neq 0$
(b)	$\frac{8}{-3}$	**3**	**M1** for correct method to eliminate one variable **A1** for x or y correct.
8 (a)	86.3	**2**	**M1** for $[BC =] \sqrt{27^2 + 82^2}$ or $\sqrt{729 + 6724}$ or $\sqrt{7453}$
(b)	090 cao	**1**	
(c) (i)	71.8	**2**	**M1** for $[x =] (82 \div 27)$ or better oe
(ii)	108.2 or 108	**1ft**	
(d) (i)	1107	**2**	**M1** for $27 \times 82 \div 2$ or better, imp by 1110
(ii)	9 298 800	**1ft**	
9 (a)	31 200	**2**	**M1** for $(43\,680 \div 7) \times 5$ or 6240×5
(b)	16 800	**3**	**M2** for $15\,000 + 15\,000 \times 0.04 \times 3$ oe or **M1** for $15\,000 \times 0.04 \times 3$ oe, imp by 1800
(c)	63	**2**	**M1** for $450 \times [0].14$ oe
(d) (i)	11 800	**2**	**M1** for $600 + 0.35 \times 32\,000$ or better
(ii)	12 900	**2**	**M1** for $100 + 4 \times 32\,000 \div 10$ or better
10 (a) (i)	2 and 2 12	**1** **1**	all in correct places
(ii)	7 points correctly plotted	**3ft**	**P2ft** for 5 or 6 points correctly plotted **P1ft** for 3 or 4 points correctly plotted
	correct curve through 7 points	**1**	
(iii)	correct line	**1**	must be ruled and continuous
(iv)	2.6 – 2.8	**1ft**	ft their curve and their line
(b) (i)	$\frac{2}{3}$	**1**	
(ii)	$y = \frac{2}{3}x + c$	**1**	c not –5

(c)	$[y =] 2x - 3$	**3**	**M2** for $y = 2x + p$ Or **M1** for attempt at gradient i.e $\frac{\text{rise}}{\text{run}}$ **B1** for $y = qx - 3 \quad q \neq 0$
11 (a)	113 or 113.09 to 113.112	**2**	**M1** for $\pi \times 6^2$ or better
(b)	185 or 186 or 185.76 or 185.328 to 185.42	**4**	**M1** for their **(a)** × 6 soi **M1** for 24 × 36 soi, imp by 864 **M1** for their (24 × 36) – their (their **(a)** × 6) ft their **(a)** for **M3**