CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the May/June 2014 series

0581 MATHEMATICS

0581/31 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.

Cambridge is publishing the mark schemes for the May/June 2014 series for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level components and some Ordinary Level components.

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

Question		Answers	Mark	Part Marks
1	(a) (i)	$\frac{3}{3+4+8}$ **or** $\frac{180}{3+4+8}$	**M1**	
		$3 \div (15) \times 180$ or $\frac{180 \times 3}{15}$ (= 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 (±2°)	**B1**	
		Angle *ABC* = 65 (±2°) and triangle completed	**B1**	If zero **SC1** for *AC* and *BC* reversed and triangle completed
	(ii)	4.45cm to 4.85cm	**1 FT**	FT for their shortest side
	(c)	19.6 cao	**2**	**M1** for 0.5 × 7 × 5.6
		cm^2 oe	**1**	
2	(a) (i)	86	**1**	
	(ii)	55	**1**	
	(iii)	81	**1**	
	(iv)	64	**1**	
	(b) (i)	77	**1**	
	(ii)	120	**2**	**B1** for any other multiple of 120
	(c)	12 [days] 15 [hours]	**1,1**	

3	(a) (i)	Parallelogram	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.
4	(a) (i)	2, 4, 2, 5, 6, 3, 3	2	**B1** for 5 or 6 correct Or 7 correct tallies if frequency column blank Or 7 correct frequencies in tally column
	(ii)	70	1FT	
	(iii)	30	1	
	(iv)	∑(Frequency, f × mass, w)	M1	7 items attempted and added or sum of 25 masses
		1650 ÷ 25	B1	
	(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 $\frac{their(c)(ii)-33}{33}\times 100$ or **M1** for *their (c)(ii)* − 33 Alternative method **M2** for $\frac{their(c)(ii)}{33}\times 100 - 100$ Or **M1** for $\frac{their(c)(ii)}{33}$
5	**(a)**	Hexagon correct with arcs. *AF* = 7 cm (±2mm) *EF* = 8 cm (±2mm)	**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
	(iii)	Correct enclosed region shaded	**1FT**	Their enclosed region provided at least 1 mark in each of parts **(i)** and **(ii)**
	(d) (i)	Semi-circle radius 2.5cm (±2mm) from P and inside polygon	**2**	**SC1** for arc centre P radius 2.5cm Or for arc inside polygon centre P touching boundaries twice or any circle centre P.
	(ii)	3930 or 3926 to 3928	**2**	**M1** for $(\pi \times 50^2) \div 2$ oe
6	**(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 **B1 FT** 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**	
7	**(a) (i)**	[Car angle =] 135 (± 2°) 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)**	160c + 400f final answer	**2**	**B1** for 160c or 400f seen
	(b)	$2x - 7y$ final answer www	**2**	**B1** for $2x$ or $-7y$ or $6x - 15y$ or $-4x + 8y$ www
	(c)	$5x(xy - 4)$ final answer	**2**	**B1** for $5(x^2y - 4x)$ or $x(5xy - 20)$

	(d)	$[x=]$ 5 $[y=]$ −2	**4**	**M1** for correctly equating o of coefficients **M1** for correct method to elimina one variable **A1** for correct x or y If zero scored **SC1** for 2 values satisfying one of the original equations Alternative method **M1** for correct rearrangement of one equation $x = (7 – 4y) \div 3$ or $y = (7 – 3x) \div 4$ or $x = (26 + 3y) \div 4$ or $y = (4x – 26) \div 3$ **M1** for correct substitution in other equation $4(7 – 4y) \div 3 – 3y = 26$ $4x – 3(7 – 3x) \div 4 = 26$ $3(26 + 3y) \div 4 + 4y = 7$ $3x + 4(4x – 26) \div 3 = 7$ $(7 – 4y) \div 3 = (26 + 3y) \div 4$ $(7 – 3x) \div 4 = (4x – 26) \div 3$ **A1** for correct x or y If zero scored **SC1** for 2 values satisfying one of the original equations
9	**(a) (i)**	48, 39	**1, 1FT**	FT 6th term = 5th term −9
		Subtract 9 oe	**1**	
	(ii)	162, 486	**1, 1FT**	FT 6th term = 5th term × 3
		Multiply by 3 oe	**1**	
	(b) (i)	$93 – 9n$ oe final answer	**2**	**B1** for $−9n + c$ or $kn + 93$, $k \neq 0$
	(ii)	−96 cao	**2**	**M1** for substitution of $n = 21$ into their **linear** expression