UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the May/June 2012 question paper

for the guidance of teachers

0580 MATHEMATICS

0580/33 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
soi seen or implied

Qu.	Answers	Mark	Part Mark
1 (a) (i)	–4	**1**	
(ii)	–4 –3 –1 2 5	**1**	
(iii)	8	**1**	allow –8
(b) (i)	1305	**1**	
(ii)	3 (h) 35 (m) cao	**1**	
(c)	488 km/h	**1** **1**	
2 (a)	1, 2, 4, 7, 14, 28	**2**	1 for four or five correct or 1 × 28 and 2 × 14 and 4 × 7
(b)	24	**1**	
(c)	5832	**1**	
(d)	(p =) 2 (q =) 5	**1** **1**	
(e) (i)	56	**2**	**M1** for a method to achieve this such as prime factors, $8 = 2^3$ and $14 = 2 \times 7$ or another multiple of 56, or two trials
(ii)	08 56	**1ft**	accept 8 56 (am)
(iii)	$84a + 36c$ final answer	**2**	**B1** for either $84a$ or $36c$

3	**(a)**	quadrilateral	**1**	
	(b)	obtuse	**1**	
	(c)	23.6–24.4	**2**	**M1** for 11.8 – 12.2
	(d)	31–35	**1**	
	(e)	construction of perpendicular bisector of *EH* part circle centre *H* radius 7 cm indication of region	**5**	**B1** for two pairs of arcs, same radius, centres *E* and *H* **B1** for bisector within 2mm of correct one, ± 2° of correct angle **B1** for part circle centre *H* **B1** for radius 7 cm **B1ft** for an indication of the region, ft dependent on at least **B2** from above
	(f)	6135.36 or 6135.4 or 6135 or 6140	**2**	**M1** for 33.2 × 16.8 × 11
4	**(a)**	107.52	**3**	**M1** 2×24 + 3×16 or 96 **M1** for their 96 × 1.12 oe
	(b)	28.8(0)	**2**	**M1** for 24 × 1.2(0) oe
	(c)	14	**3**	**B1** for 42(c) or ($ 0).42 **M1** for their $\frac{42}{300}$ oe (× 100) or $\frac{0.42}{3}$ (× 100) alt. method : **M1** $\frac{3.42}{3}$ (× 100) or $\frac{342}{300}$ (× 100) **M1** their 114 – 100
5	**(a)**	two correct ruled lines	**1,1**	**SC1** correct but freehand or fully correct with one extra line
	(b)	correct square shaded	**1**	
	(c)	correct enlargement	**2**	1 for a correct side
	(d) **(i)**	1, –5	**1**	
	(ii)	correct reflection	**1**	
	(iii)	correct translation	**2**	**B1** for either direction e.g. 1 to the right or 3 down **SC1** for complete correct 3 left and 1 up triangle
	(iv)	rotation, (centre) (0,0) angle 180	**3**	1 for rotation, 1 for (centre) (0,0), 1 for angle 180

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6	**(a)**	3 : 4 cao	**1**	
	(b)	168	**2**	**M1** 420 ÷ (2 + 3) or 84 seen
	(c)	300 ÷ 20 = 15	**2**	if 0 scored **SC1** for $\frac{250 / 260 / 270 / 300}{20 / 23 / 25}$ or 15 ww
	(d)	68.5(2)	**2**	**M1** for 46.3 × 1.48, 68.53 or 68.524
	(e) (i)	64.5	**1**	
	(ii)	1805	**1**	
7	**(a)**	four points correctly plotted	**2**	**M1** for three points correctly plotted
	(b)	positive	**1**	ignore extras like 'strong'
	(c) (i)	54.8	**2**	**M1** for their sum (548) ÷ 10
	(ii)	46	**1**	
	(iii)	A **and** it has a lower mean	**1ft**	allow any correct reason using appropriate information from the table and ft their mean
	(d) (i)	correct ruled line	**1**	at A = 40 allow 44–48 at A = 70 allow 70–78
	(ii)	correct reading from their line	**1ft**	read from their ruled line
	(e)	3	**1ft**	
8	**(a)**	(20) 13 (8) 5 4 5 (8) 13 (20)	**3**	**B2** for 4 correct **B1** for 2 or 3 correct or a correct substitution seen
	(b)	correctly plotting 9 points and connecting with a smooth curved line	**4**	**P3** for correctly plotting 9 points, **P2** for correctly plotting 7 or 8 points and **P1** for 5 or 6 points **C1** for a smooth curve
	(c) (i)	correct line of symmetry cao	**1**	
	(ii)	$x = 1$	**1ft**	ft their line
	(d) (i)	correct line	**1**	
	(ii)	–1.9 to –1.7 and 3.7 to 3.9	**1ft,1ft**	**SC1** for correct co-ordinates
	(e) (i)	–3 cao	**1**	
	(ii)	(0,6) cao	**1**	
	(iii)	$y = c - 3x$	**1**	c can be any number except 6
	(f)	$12x - 9$ or $3(4x - 3)$	**2**	**B1** for $6x + 3$, $-12 + 6x$, $12x$ or -9

9	**(a) (i)**	60	**1**	
	(ii)	30	**1ft**	ft their (i) ÷ 2
	(b)	8 (cm)	**1**	
	(c)	$\cos 30 = \frac{x}{8}$ or $8^2 = x^2 + 4^2$	**M1ft**	ft their angle *AOM* or *AB*
		6.928.....	**A1**	
	(d)	27.7(2) cao	**2**	**M1** $\frac{1}{2}\times$ their (b) × 6.93 soi
	(e)	34.7–34.9	**4**	**M1** (circle) = $\pi \times 8^2$ soi **M1** (hexagon) = 6 × their (d) soi **M1**dep their circle – their hexagon
10	**(a)**	correct pattern	**1**	
	(b) (i)	22	**1**	
	(ii)	add 4	**1**	must have 4 with a direction, accept plus 4
	(c)	$4n + 2$ or $4(n – 1) + 6$ oe	**2**	**B1** for $4n + j$ or $kn + 2$ ($k \neq 0$) seen
	(d)	15 cao	**2**	**M1** their (c) = 62 or multiple additions or subtractions