

**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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<b>Page 2</b>	<b>Mark Scheme: Teachers' version</b>	<b>Syllabus</b>	<b>Paper</b>
	<b>IGCSE – May/June 2012</b>	<b>0580</b>	<b>33</b>

### 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
<b>1</b>	<b>(a) (i)</b> -4	<b>1</b>	allow -8
	<b>(ii)</b> -4 -3 -1 2 5	<b>1</b>	
	<b>(iii)</b> 8	<b>1</b>	
	<b>(b) (i)</b> 1305	<b>1</b>	
	<b>(ii)</b> 3 (h) 35 (m) cao	<b>1</b>	
	<b>(c)</b> 488 km/h	<b>1</b> <b>1</b>	
<b>2</b>	<b>(a)</b> 1, 2, 4, 7, 14, 28	<b>2</b>	1 for four or five correct or $1 \times 28$ and $2 \times 14$ and $4 \times 7$  <b>M1</b> 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  accept 8 56 (am)  <b>B1</b> for either $84a$ or $36c$
	<b>(b)</b> 24	<b>1</b>	
	<b>(c)</b> 5832	<b>1</b>	
	<b>(d)</b> ( $p =$ ) 2 ( $q =$ ) 5	<b>1</b> <b>1</b>	
	<b>(e) (i)</b> 56	<b>2</b>	
	<b>(ii)</b> 08 56	<b>1ft</b>	
	<b>(iii)</b> $84a + 36c$ final answer	<b>2</b>	

Page 3	Mark Scheme: Teachers' version	Syllabus	Paper
	IGCSE – May/June 2012	0580	33

3	(a)	quadrilateral	1		
	(b)	obtuse	1		
	(c)	23.6–24.4	2	<b>M1</b> 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	<b>B1</b> for two pairs of arcs, same radius, centres $E$ and $H$ <b>B1</b> for bisector within 2mm of correct one, $\pm 2^\circ$ of correct angle <b>B1</b> for part circle centre $H$ <b>B1</b> for radius 7 cm <b>B1ft</b> for an indication of the region, ft dependent on at least <b>B2</b> from above	
	(f)	6135.36 or 6135.4 or 6135 or 6140	2	<b>M1</b> for $33.2 \times 16.8 \times 11$	
4	(a)	107.52	3	<b>M1</b> $2 \times 24 + 3 \times 16$ or 96 <b>M1</b> for their $96 \times 1.12$ oe	
	(b)	28.8(0)	2	<b>M1</b> for $24 \times 1.2(0)$ oe	
	(c)	14	3	<b>B1</b> for 42(c) or (\$ 0).42 <b>M1</b> for their $\frac{42}{300}$ oe ( $\times 100$ ) or $\frac{0.42}{3}$ ( $\times 100$ )  alt. method : <b>M1</b> $\frac{3.42}{3}$ ( $\times 100$ ) or $\frac{342}{300}$ ( $\times 100$ ) <b>M1</b> their 114 – 100	
5	(a)	two correct ruled lines	1,1	<b>SC1</b> 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	<b>B1</b> for either direction e.g. 1 to the right or 3 down <b>SC1</b> 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		

Page 4	Mark Scheme: Teachers' version	Syllabus	Paper
	IGCSE – May/June 2012	0580	33

6	(a)	3 : 4 cao	1	
	(b)	168	2	<b>M1</b> $420 \div (2 + 3)$ or 84 seen
	(c)	$300 \div 20 = 15$	2	if 0 scored <b>SC1</b> for $\frac{250/260/270/300}{20/23/25}$ or 15 ww
	(d)	68.5(2)	2	<b>M1</b> for $46.3 \times 1.48$ , 68.53 or 68.524
	(e) (i)	64.5	1	
	(ii)	1805	1	
7	(a)	four points correctly plotted	2	<b>M1</b> for three points correctly plotted
	(b)	positive	1	ignore extras like 'strong'
	(c) (i)	54.8	2	<b>M1</b> for their sum $(548) \div 10$
	(ii)	46	1	
	(iii)	A <b>and</b> 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	<b>B2</b> for 4 correct <b>B1</b> for 2 or 3 correct or a correct substitution seen
	(b)	correctly plotting 9 points and connecting with a smooth curved line	4	<b>P3</b> for correctly plotting 9 points, <b>P2</b> for correctly plotting 7 or 8 points and <b>P1</b> for 5 or 6 points <b>C1</b> 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	<b>SC1</b> 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	<b>B1</b> for $6x + 3$ , $-12 + 6x$ , $12x$ or $-9$	

<b>Page 5</b>	<b>Mark Scheme: Teachers' version</b>	<b>Syllabus</b>	<b>Paper</b>
	<b>IGCSE – May/June 2012</b>	<b>0580</b>	<b>33</b>

<b>9</b>	<b>(a) (i)</b>	60	<b>1</b>	
	<b>(ii)</b>	30	<b>1ft</b>	ft their (i) ÷ 2
	<b>(b)</b>	8 (cm)	<b>1</b>	
	<b>(c)</b>	$\cos 30 = \frac{x}{8}$ or $8^2 = x^2 + 4^2$ 6.928.....	<b>M1ft</b>	ft their angle <i>AOM</i> or <i>AB</i>
	<b>(d)</b>	27.7(2) cao	<b>A1</b> <b>2</b>	<b>M1</b> $\frac{1}{2} \times$ their (b) $\times$ 6.93 soi
	<b>(e)</b>	34.7–34.9	<b>4</b>	<b>M1</b> (circle) = $\pi \times 8^2$ soi <b>M1</b> (hexagon) = $6 \times$ their (d) soi <b>M1dep</b> their circle – their hexagon
<b>10</b>	<b>(a)</b>	correct pattern	<b>1</b>	
	<b>(b) (i)</b>	22	<b>1</b>	
	<b>(ii)</b>	add 4	<b>1</b>	must have 4 with a direction, accept plus 4
	<b>(c)</b>	$4n + 2$ or $4(n - 1) + 6$ oe	<b>2</b>	<b>B1</b> for $4n + j$ or $kn + 2$ ( $k \neq 0$ ) seen
	<b>(d)</b>	15 cao	<b>2</b>	<b>M1</b> their (c) = 62 or multiple additions or subtractions