

MARK SCHEME for the May/June 2013 series

0580 MATHEMATICS

0580/32

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.

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Page 2	Mark Scheme	Syllabus	Paper
	IGCSE – May/June 2013	0580	32

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 Marks	
1	(a) (i) 7.2 oe	2	M1 for $(3 + 5 + 8 + 10 + 10)/5$ or $36/5$	
	(ii) 10	1		
	(iii) 8	1		
	(iv) 7	1		
	(v) Mode	1		
	(b) (i) $\frac{8}{24}$ oe	1		Must be a fraction
	(ii) $\frac{17}{24}$	1		SC1 for bi and bii both given as decimals only i.e. 0.333(.....) and 0.708(.....)
(c) 45°	2	M1 for $360 \times 3/24$ or better seen		
2	(a) (i) $3m$	1	ft $m + (a)(i) + (a)(ii) = 84$ if and only if (a)(i) and (a)(ii) are both in terms of m M1ft for “5” $m = “80”$ i.e. $pm = q$ (could be seen in bi) May be implied by a correct answer	
	(ii) $m + 4$	1		
	(b) (i) $m + 3m + m + 4 = 84$ oe isw	1ft		
	(ii) 16	2		
	(c) 50	2		M1 for $4.2/84 \times 1000$ or better SC1 for figs ‘5’ or 4200 seen
	(d) [Shireen =] 14 [Nazaneen =] 49 [Karly =] 21	1 1 1		if M0 then M1 for $84/(2 + 7 + 3)$ or better and / or SC1 3 correct answers in wrong order.

Page 3	Mark Scheme	Syllabus	Paper
	IGCSE – May/June 2013	0580	32

3	(a) (i)	6 cao	2	M1 for 735/120 oe implied by 6.125 or SC1 for figs ‘61....’
	(ii)	47.5	1	
	(b) (i)	55 ---- 70 ---- 25 90 120 ---- ---	2	M1 for 3 or 4 correct numbers
	(ii)	$\frac{3}{8}$ cao	2	B1 for $\frac{15}{40}$ or $\frac{3}{8}$ seen
	(c) (i)	20	3	B1 for 6.6 - 5.5 or better M1 for ‘their 1.1’ / 5.5 OR (an alternative method) M1 for 6.6/5.5 M1 for ‘their 1.2’ –1 oe
	(ii)	1.875 cao	2	M1 for 6.60/3.52, imp by 1.87 or 1.88
4	(d) (i)	300, 50	1	
	(ii)	45000	1	SC1 43200
4	(a)	56 to 60	2	B1 for 5.6 to 6.0
	(b)	[0]35 to [0]39	1	
	(c)	Correct length and bearing	2	B1 for correct length 7.8 to 8.2 B1 for correct bearing 302° to 306°

Page 4	Mark Scheme	Syllabus	Paper
	IGCSE – May/June 2013	0580	32

5	(a) (i)	Perpendicular bisector with 2 sets of correct arcs	2	B1 correct line with some or no arcs	
	(ii)	M labelled	1ft		Ft is intersection of their bisector with DE
	(iii)	Angle bisector with 2 sets of correct arcs	2		B1 correct line with some or no arcs
	(iv)	Trapezium	1		
	(b) (i)	Circle centre A radius 4 cm \pm 0.2 cm	1		
	(ii)	Circle centre E radius 3 cm \pm 0.2 cm	1		
	(iii)	Correct region shaded cao	1		
6	(a)	$AM^2 + 1.2^2 = 1.5^2$ or $[AM^2] = 1.5^2 - 1.2^2$ [AM=] $\sqrt{(1.5^2 - 1.2^2)}$ or $\sqrt{(2.25 - 1.44)}$ or $\sqrt{0.81}$	M1 M1dep	M1 for $\cos[ABM] = \frac{1.2}{1.5}$ oe or better indep M2 for $2 \times 0.5 \times 2 \times 0.9 \times 1.2$ $+ 2.5 \times 2 \times 0.9$ $+ 2 \times 2.5 \times 1.5$ or better or M1 for $2.5 \times 2 \times 0.9$ or $2 \times 2.5 \times 1.5$ or better if M0 then SC1 for 13.41	
	(b)	36.9 or 36.87 or 36.8[6.....]	2		
	(c)	2.7 m^3	1 1		
	(d)	14.2 or 14.16	3		

Page 5	Mark Scheme	Syllabus	Paper
	IGCSE – May/June 2013	0580	32

7	(a)	8, 2, -2,	2	B1 for 2 correct y values
	(b)	7 correctly plotted points	3ft	P2ft for 5 or 6 correctly plotted points P1ft for 3 or 4 correctly plotted points
		Correct smooth curve going below $y = -4$ at lowest point	1	
	(c) (i)	(2.5ca0, -4.25)	1	
		$y = -1$ drawn	1	must be ruled and continuous
	(c) (iii)	0.5 to 0.9, 4.1 to 4.5	1ft, 1ft	ft is the x coordinates of the intersection of their line and their curve
	(d)	(-5, 2)	1	
(e)	$[y] = -2x + 3$	3	M2 for $y = -2x + p$ or $y = 2x + 3$ or M1 for $y = 2x + q$ or for attempt at rise/run even if negative not shown B1 for $y = kx + 3 \quad k \neq 0$	
8	(a)	6	2	M1 for $\frac{4}{40} [\times 60]$ oe
	(b) (i)	Line from (1450,4) to (1510,4) Line from (1510,4) to (1530,0)	1 1ft	Ft is (their 1510,4) to (their 1510 + 20,0)
		(b) (ii)	1530	1ft
	(c) (i)	4 points plotted correctly	2	P1 for 3 correct
		(ii)	Positive	1
	(c) (iii)	Correct ruled line	1	
	(c) (iv)	$12 < \text{Ans} < 16$	1ft	

Page 6	Mark Scheme	Syllabus	Paper
	IGCSE – May/June 2013	0580	32

9	(a) (i)	53.2[0]	3	SC2 for 60.80 M2 for $2 \times (6 + 4 \times 2) + 3 \times (3.60 + 4 \times 1.20)$ or better or for $2 \times 6 + 3 \times 3.60 + 4(2 \times 2 + 3 \times 1.20)$ or better if M0 then B1 for 28 or 25.20 or 22.80 or 22.40 or 30.40 or 12 and 10.80 or 16 and 14.40 or 14 and 8.40 seen
	(ii)	45.22	2ft	M1ft for ‘their ai’ $\times 0.85$ oe
	(b) (i)	201 or 201.06 to 201.1 or 2.01 <u>m</u>	2	M1 for $2 \times \pi \times 32$ oe
	(ii)	11 final answer	2	M1ft for $\frac{2400}{\text{their bi}}$ both in cm or $\frac{24}{\text{their bi}}$ both in m or SC1 for figs ‘119.....’
(c)	11.6	3	M1 for $\frac{360}{9} \times 29$ or better, implied by 1160 and M1 indep for ‘their 1160’ / 100 soi or 0.29 seen	
10	(a) (i)	12	2	B1 for any other common factor other than 1
	(ii)	$12(2x + 3y)$ cao	1	
	(b) (i)	$10k - 4w$	2	B1 for either $10k \pm nw$ or $qk - 4w$ $p, q \neq 0$
	(ii)	x^{20}	1	
	(c)	$4n + 3$ oe final answer	2	B1 for $4n + c$ or $kn + 3$, $k \neq 0$
(d)	$[x] = 2.5$, $[y] = 0.5$	3	M1 for correct method to eliminate one variable. A1 for x or y correct.	