

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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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	M1 for $(3 + 5 + 8 + 10 + 10)/5$ or $36/5$	
	(ii)	10		
	(iii)	8		
	(iv)	7		
	(v)	Mode		
	(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 M1 for $4.2/84 \times 1000$ or better SC1 for figs ‘5’ or 4200 seen if M0 then M1 for $84/(2 + 7 + 3)$ or better and / or SC1 3 correct answers in wrong order.
	(ii)	$m + 4$	1	
	(b) (i)	$m + 3m + m + 4 = 84$ oe isw	1ft	
	(ii)	16	2	
	(c)	50	2	
	(d)	[Shireen =] 14 [Nazaneen =] 49 [Karly =] 21	1 1 1	

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

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5	(a) (i)	Perpendicular bisector with 2 sets of correct arcs	2	B1 correct line with some or no arcs Ft is intersection of their bisector with DE B1 correct line with some or no arcs
	(ii)	M labelled	1ft	
	(iii)	Angle bisector with 2 sets of correct arcs	2	
	(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	

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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)	(2.5cao, -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 $\frac{4}{40} [\times 60] \quad \text{oe}$
	(b) (i)	Line from (1450,4) to (1510,4)	1	
		Line from (1510,4) to (1530,0)	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
		Positive	1	
	(c) (iii)	Correct ruled line	1	
(c) (iv)	$12 < \text{Ans} < 16$	1ft		

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9	(a) (i)	53.2[0]	3	<p>SC2 for 60.80 M2 for $2 \times (6 + 4 \times 2) + 3 \times (3.60 \times 1.20)$ 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</p>
	(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	<p>M1ft for $\frac{2400}{\text{their bi}}$ both in cm or $\frac{24}{\text{their bi}}$ both in m or SC1 for figs '119.....'</p>
(c)	11.6	3	<p>M1 for $\frac{360}{9} \times 29$ or better, implied by 1160 and M1 indep for 'their 1160' / 100 soi or 0.29 seen</p>	
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	<p>M1 for correct method to eliminate one variable. A1 for x or y correct.</p>	