

**CAMBRIDGE INTERNATIONAL EXAMINATIONS**  
International General Certificate of Secondary Education

**MARK SCHEME for the May/June 2013 series**

<b>0581 MATHEMATICS</b>	
<b>0581/32</b>	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	<b>M1</b> 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	<b>SC1</b> for bi and bii both given as decimals only i.e. 0.333(.....) and 0.708(.....)	
(c)	$45^\circ$	2	<b>M1</b> 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 $m$ <b>M1ft</b> 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		<b>M1</b> for $4.2/84 \times 1000$ or better <b>SC1</b> for figs ‘5’ or 4200 seen
	(d)	[Shireen =] 14 [Nazaneen =] 49 [Karly =] 21	1 1 1		<b>if M0 then M1</b> for $84/(2 + 7 + 3)$ or better <b>and / or</b> <b>SC1</b> 3 correct answers in wrong order.

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3	(a) (i)	6 cao	2	<b>M1</b> for 735/120 oe implied <b>or SC1</b> for figs '61....'  <b>M1</b> for 3 or 4 correct numbers  <b>B1</b> for $\frac{15}{40}$ or $\frac{3}{8}$ seen  <b>B1</b> for 6.6 - 5.5 or better <b>M1</b> for 'their 1.1' / 5.5  <b>OR</b> (an alternative method) <b>M1</b> for 6.6/5.5 <b>M1</b> for 'their 1.2' –1 oe  <b>M1</b> for 6.60/3.52, imp by 1.87 or 1.88  <b>M1</b> for 300, 50  <b>SC1</b> 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	<b>B1</b> for 5.6 to 6.0  <b>B1</b> for correct length 7.8 to 8.2 <b>B1</b> 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	<b>B1</b> 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		<b>B1</b> correct line with some or no arcs
	(iv)	Trapezium	1		
	(b) (i)	Circle centre A radius 4 cm ± 0.2 cm	1		
	(ii)	Circle centre E radius 3 cm ± 0.2 cm	1		
	(iii)	Correct region shaded	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	<b>M1</b> for $\cos[ABM] = \frac{1.2}{1.5}$ oe or better  indep  <b>M2</b> 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 <b>M1</b> for $2.5 \times 2 \times 0.9$ or $2 \times 2.5 \times 1.5$ or better  if <b>M0</b> then <b>SC1</b> for 13.41	
	(b)	36.9 or 36.87 or 36.8[6.....]	2		
	(c)	2.7 m <sup>3</sup>	1 1		
	(d)	14.2 or 14.16	3		

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7	(a)	8, 2, -2,	2	<b>B1</b> for 2 correct y values
	(b)	7 correctly plotted points	3ft	<b>P2ft</b> for 5 or 6 correctly plotted points <b>P1ft</b> 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	<b>M2</b> for $y = -2x + p$ or $y = 2x + 3$ <b>or M1</b> for $y = 2x + q$ or for attempt at rise/run even if negative not shown  <b>B1</b> for $y = kx + 3 \quad k \neq 0$	
8	(a)	6	2	<b>M1</b> for $\frac{4}{40} [\times 60] \text{ oe}$
	(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	<b>P1</b> 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><b>SC2</b> for 60.80  <b>M2</b> for <math>2 \times (6 + 4 \times 2) + 3 \times (3.6 \times 1.20)</math> or better  <b>or</b> for <math>2 \times 6 + 3 \times 3.60 + 4(2 \times 2 + 3 \times 1.20)</math> or better  <b>if M0 then B1</b> for 28 or 25.20 or 22.80 or 22.40 or 30.40 or 12 <b>and</b> 10.80 or 16 <b>and</b> 14.40 or 14 <b>and</b> 8.40 seen</p>
	(ii)	45.22	2ft	<b>M1ft</b> for 'their ai' $\times 0.85$ oe
	(b) (i)	201 or 201.06 to 201.1 or 2.01 <u>m</u>	2	<b>M1</b> for $2 \times \pi \times 32$ oe
	(ii)	11 final answer	2	<p><b>M1ft</b> for <math>\frac{2400}{\text{their bi}}</math> both in cm  <b>or</b> <math>\frac{24}{\text{their bi}}</math> both in m  <b>or SC1</b> for figs '119.....'</p>
(c)	11.6	3	<p><b>M1</b> for <math>\frac{360}{9} \times 29</math> or better, implied by 1160  <b>and M1 indep</b> for 'their 1160' / 100 soi or 0.29 seen</p>	
10	(a) (i)	12	2	<b>B1</b> for any other common factor other than 1
	(ii)	$12(2x + 3y)$ cao	1	
	(b) (i)	$10k - 4w$	2	<b>B1</b> for either $10k \pm nw$ or $qk - 4w$ $p, q \neq 0$
	(ii)	$x^{20}$	1	
	(c)	$4n + 3$ oe final answer	2	<b>B1</b> for $4n + c$ or $kn + 3$ , $k \neq 0$
(d)	$[x] = 2.5$ , $[y] = 0.5$	3	<p><b>M1</b> for correct method to eliminate one variable.  <b>A1</b> for <math>x</math> or <math>y</math> correct.</p>	