

CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge International General Certificate of Secondary Education

MARK SCHEME for the October/November 2015 series

0580 MATHEMATICS

0580/31

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
dep	dependent
FT	follow through after error
isw	ignore subsequent working
oe	or equivalent
SC	Special Case
nfww	not from wrong working
soi	seen or implied

Question	Answer	Mark	Part marks									
1 (a) (i)	<table border="1"> <tr> <td>26</td> <td>39</td> <td>65</td> </tr> <tr> <td>44</td> <td>11</td> <td>55</td> </tr> <tr> <td>70</td> <td>50</td> <td>120</td> </tr> </table>	26	39	65	44	11	55	70	50	120	2	B1 for 3 or 4 correct
	26	39	65									
	44	11	55									
	70	50	120									
	(ii) $\frac{11}{30}$ cao	2	B1 for $\frac{44}{120}$ or $\frac{22}{60}$									
	(iii) 2 : 3 cao	2	B1FT for $2k : 3k$ where k is an integer or <i>their</i> 26 : <i>their</i> 39 or better with integer values									
(b) (i) 7.53	2	M1 for attempt at ordered list, or 7.34 and 7.72 identified										
(ii) 3.65	1											
(iii) 10.06 6.01	2	B1 for 1 correct										
2 (a) (i)	24 or 30	1										
	(ii) 25	1										
	(iii) 27	1										
	(iv) 23 or 29	1										
	(b) (i) 17	1										
	(ii) 243	1										
	(iii) 1	1										

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Question	Answer	Mark	Part marks
(iv)	0.0625 or $\frac{1}{16}$	1	
(c) (i)	$2^2 \times 3 \times 7$ or $2 \times 2 \times 3 \times 7$	2	B1 for 2, 2, 3, 7
(ii)	42	2	B1 for $2 \times 3 \times 7$ or 2 or 3 or 6 or 7 or 14 or 21 as answer or [126 =] $2 \times 3^2 \times 7$ or $2 \times 3 \times 3 \times 7$
3 (a) (i)	565.25	2	M1 for $\left(1 - \frac{5}{100}\right) \times 595$ oe
(ii)	42.75	2FT	2FT if positive difference (ie (a)(i) < 608) M1 for 38×16 (or 608) – <i>their</i> (a)(i)
(b)	9.2[0...]	2	M1 for $\left(\frac{26272 - 23854}{26272}\right) \times 100$ oe or $\left(1 - \frac{23854}{26272}\right) \times 100$ oe or $100 - \frac{23854}{26272} \times 100$ oe
(c)	5.07×10^5 cao	2	B1 for figs 507 or for $a \times 10^5$ ($a \neq 0$)
(d) (i)	120° 80°	3	B2 for one correct or M1 for $\frac{15}{45} \times 360$ or $\frac{10}{45} \times 360$ or $\frac{160}{20} \times 15$ or $\frac{160}{20} \times 10$ or better
(ii)	Pie chart correct	1FT	FT if <i>their</i> angles add to 200°
(e)	3.84×10^6	2	B1 for answer figs 384

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Question	Answer	Mark	Part marks
4 (a) (i)	$m + 5$	1	
(ii)	$2m$	1	
(iii)	$m + m + 5 + 2m = 47$ isw	1FT	FT $m + their (a)(i) + their (a)(ii) = 47$ isw or $4m + 5 = 47$ isw
(iv)	10.5 15.5 21	3	M1FT for correct first step to solve <i>their (a)(iii)</i> A1FT for $m = 10.5$
(b) (i)	Yes, [total =] 114.5 [cm]	2	M1 for $55 + 39.5 + 20$ oe or for 1145 mm
(ii)	5.5	1	
(c) (i)	102	1	
(ii)	37.5[0]	2	M1 for $25.5[0] \div 0.68$

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Question	Answer	Mark	Part marks
5	(a) (i) 4.8	2	B1 for 9.6 seen
	(ii) 137	1	
	(b) Correct length and bearing	2	B1 for $AC = 6.4$ cm B1 for correct bearing 310°
	(c) Perpendicular bisector with 2 sets of correct arcs	2	B1 for correct line with some or no or incorrect arcs or B1 for 2 sets of correct arcs
	(d) Correct area shaded	3	B2 for arc centre B radius 6 cm touching <i>their</i> bisector twice or B1 for arc centre B , with radius 6 cm but incorrect length or for arc centre B , with incorrect radius
(e) 11 03	3	M2 for $12 \div 15 \times 60$ or M1 for $12 \div 15$ soi If zero scored, SC1 for <i>their</i> time added to 10 15 correctly	
6	(a) Cylinder	1	
	(b) Cube or cuboid	1	
	(c) (i) $\sqrt{6^2 - 3^2}$ 5.19...	M2 A1	M1 for $6^2 = 3^2 + BC^2$ or $(BC^2 =) 6^2 - 3^2$
	(ii) 7.79 to 7.8	2	M1 for $0.5 \times 5.2 \times 3$
	(iii) 62.4	1FT	FT $8 \times$ <i>their</i> (c)(ii)
	(d) (i) 28	2	M1 for $0.5 \times (6 + 8) \times 4$ oe
(ii) 12	1FT	FT $336 \div$ <i>their</i> (d)(i)	

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Question	Answer	Mark	Part marks
7 (a) (i)	-2, -3, -6, 3	2	B1 for 2 or 3 correct
(ii)	Correct curves	4	B3FT for 9 or 10 correctly plotted points or B2FT for 7 or 8 correctly plotted points or B1FT for 5 or 6 correctly plotted points
(iii)	Ruled line $y = 4$	1	
(iv)	(1.4 to 1.6, 4)	1	SC1 for (4, 1.4 to 1.6) from line $x = 4$ drawn
(b) (i)	(-1, -3) plotted	1	
(ii)	Correct ruled line	1FT	FT line with gradient 2 through <i>their A</i>
(iii)	$2x - 1$	2FT	FT $2x + \textit{their}$ y -intercept for 2 marks B1 for $2x + k$ or $mx - 1$ ($m \neq 0$) or $mx + \textit{their}$ y -intercept ($m \neq 0$)

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Question	Answer	Mark	Part marks
8	(a) (i) 2	1	
	(ii) Two correct lines of symmetry drawn	2	B1 for one correct line
	(b) (i) Correct reflection	2	B1 for reflection in $x = k$ or $y = -1$
	(ii) Correct enlargement	2	B1 for correct shape, incorrect position or enlargement correct centre, incorrect scale factor
	(iii) Rotation 90° clockwise oe [Centre] (0, 0) oe	B1 B1 B1	
9	(a) $2x$ final answer	2	M1 for $6x + 4$ or $-4x - 4$
	(b) $3y(y - 2)$ final answer	2	B1 for $3(y^2 - 2y)$ or $y(3y - 6)$
	(c) $4a + 20$ or $4(a + 5)$	2	M1 for $a + 5 = \frac{b}{4}$ or $4a = b - 20$
	(d) Correct working and [$x =$] 5, [$y =$] -2	3	M1 for correctly eliminating one variable A1 for $x = 5$ A1 for $y = -2$ If zero scored, SC1 for 2 values satisfying one of the original equations SC1 if no working shown, but 2 correct answers given