

CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge International General Certificate of Secondary Education

MARK SCHEME for the October/November 2015 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
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)	21 000 000	1	
(b)	1, 3, 7, 21	2	M1 for 3 correct and one incorrect (or missing) or for 4 correct and one extra
(c)	$\frac{21}{100}$	1	
(d)	$(210 + 21) \div (2.1 + 21)$	1	
(e)	23 29	1 1	If zero scored SC1 for any two other prime numbers greater than 21
(f)	2100	1	
(g)	436 or 436.4...	1	
(h)	21	1	
(i)	1	1	
(j)	2.1×10^{-3}	1	
(k)	105	2	M1 for $[1 \times] 3 \times 5 \times 7$ or $105k$ or for [1], 3, 7 and [1], 3, 5 seen or for [1], 3, 5, 7 (maybe in a table) or for listing multiples of 15 and 21 to at least 105 with not more than one error

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2	(a)	<table><tr><td>O</td><td>X</td><td>X</td><td>X</td><td>X</td></tr><tr><td>O</td><td>O</td><td>X</td><td>X</td><td>X</td></tr><tr><td>O</td><td>O</td><td>O</td><td>X</td><td>X</td></tr><tr><td>O</td><td>O</td><td>O</td><td>O</td><td>X</td></tr><tr><td>O</td><td>O</td><td>O</td><td>O</td><td>O</td></tr></table>	O	X	X	X	X	O	O	X	X	X	O	O	O	X	X	O	O	O	O	X	O	O	O	O	O	1	
	O	X	X	X	X																								
	O	O	X	X	X																								
	O	O	O	X	X																								
	O	O	O	O	X																								
	O	O	O	O	O																								
(b)	10, 6, 16 15, 10, 25	2	M1 for 4 or 5 correct numbers or for one correct row																										
(c)	n^2	1																											
(d)	529	1FT	FT <i>their</i> (c) if algebraic expression																										
(e)	Add on 2, then 3, then 4 etc. oe	1																											
3	(a) (i)	Correct net	1																										
	(ii)	132	2	M1 for $(2 \times 5 + 2 \times 8 + 5 \times 8) \times 2$ oe or SC1 for correct area of <i>their</i> net, if it has 6 rectangles																									
	(iii)	80 cm ³	2 1	M1 for $8 \times 5 \times 2$																									
	(b)	3, 4, 5	2	M1 for any 3 integers with a product of 60 or M1 for any 3 numbers with a product of 60 , satisfying 2 of the conditions																									
4	(a)	132	1																										
	(b)	124	2	M1 for $180 - 155$ soi by 25 or for $360 - 120 - 91 - \textit{their}$ angle marked on diagram provided <i>their</i> angle is less than 149																									
	(c) (i)	Isosceles	1																										
	(ii)	68	1																										
	(iii)	127	1FT	FT is $360 - 165 - \textit{their}$ (c)(ii) or $195 - \textit{their}$ (c)(ii)																									
	(d) (i)	28	2	M1 for 90 marked at <i>A</i> or for $180 - (90 + 62)$ or $90 + 62$ or $90 - 62$																									
	(ii)	Chord	1																										

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5	(a) (i)	55 Tennis Hockey Gymnastics , Hockey	1 1 1 1	
	(ii)	30	3	M2 for $\frac{120}{(80-60)} \times 5$ or M1 for $\frac{(80-60)}{5}$ or M1 for $\frac{5}{(80-60)}$ or M1 for $\frac{120}{(80-60)}$
	(b) (i)	$\frac{7}{10}$ oe	1	
	(ii)	4 points correctly plotted	2	B1 for 3 correct points
	(iii)	No [because] no correlation oe	1	
6	(a) (i)	60, 24, 96	3	M2 for $\frac{180}{(5+2+8)} \times k$ where k is 5, 2 or 8 or better or M1 for $\frac{180}{(5+2+8)}$ or better If zero scored SC1 for all correct answers in incorrect order
	(ii)	74.5 75.5	1 1	SC1 for both answers correct but reversed
	(b) (i)	65	1	
	(ii)	780	2	M1FT for $\frac{\text{their } 65}{100} \times 1.2 \times 1000$ or $\frac{156}{240} \times 1.2 \times 1000$ oe If zero scored SC1 for figs 78
	(iii)	324	2	M1 for 240×1.35 oe
	(c)	$\frac{7k}{40k}$	2	M1 for $\left(1 - \frac{3}{10}\right) \div 4$ oe

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	(d) (i)	470	1	
	(ii)	$4m + 3t = 370$	2	B1 for $4m + 3t$ seen
	(iii)	Correct working and [<i>m</i>] 40 [<i>t</i>] 70	4	M1FT for correctly equating one set of coefficients M1FT for correct method to eliminate one variable A1 for $m = 40$ A1 for $t = 70$ If zero scored SC1 for either: 2 correct answers given or 2 values satisfying one of their original equations
7	(a) (i)	10	1	
	(ii)	48	3	M2 for $\frac{16}{20} \times 60$ oe or M1 for $\frac{16}{20}$ oe If zero scored SC1 for $\frac{16}{18} \times 60$ or 53.3...
	(b) (i)	Straight line (0920, 16) to (0924, 16)	1	
		Straight line from (their 0924, 16) to (their 0924 + 12, 0)	1FT	
	(ii)	22.2 or 22.22...	2	M1 for $\frac{80 \times 1000}{60 \times 60}$ oe If zero scored SC1 for $\frac{\text{figs } 8}{\text{figs } 36}$ or figs 222
	(c)	1245 [pm]	2	M1 for 3×75 soi or SC1 for answer 1400 or 2 pm
8	(a) (i)	Enlargement [Centre] (1, 8) [Scale factor] 3	1 1 1	
	(ii)	Rotation [Centre] (0, 0) oe 180°	1 1 1	
	(iii)	Translation $\begin{pmatrix} -5 \\ -2 \end{pmatrix}$	1 1	

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(b)	Correct reflection drawn	2	B1 for reflection in $x = k$ If zero scored SC1 for reflection in $y = 5$
9 (a)	$[y =] 2x + 4$	3	B2 for $2x + c$ or $kx + 4$ $k \neq 0$ or M1 for gradient $= \pm \frac{2k}{k}$ or attempt at $\frac{\text{rise}}{\text{run}}$ using a triangle or co-ordinates allowing one slip
(b)	$-0.5, -1, -2, -8, 2, 1, 0.5$	3	B2 for any 6 or 7 correct or B1 for any 4 or 5 correct
(c)	Correct curve	4	B3FT for 11 or 12 points correctly plotted B2FT for 9 or 10 points correctly plotted B1FT for 7 or 8 points correctly plotted
10 (a) (i)	Correct ruled perpendicular bisector drawn with 2 pairs of arcs	2	B1 for correct ruled line drawn with some or no or incorrect arcs or B1 for 2 correct pairs of arcs
(ii)	Correct ruled angle bisector drawn with 2 pairs of arcs	2	B1 for correct ruled line drawn with some or no or incorrect arcs or B1 for 2 correct pairs of arcs
(b)	Arc 5 cm from D Arc 4 cm from C	1 1	Arcs must be continuous and fit for purpose If 0, 0 scored, SC1 for either 5 cm arc from D at least touching DC and DE or for 4 cm arc from C at least touching DC and BC
	Correct region shaded	1FT	1FT dep on an attempt to draw 2 arcs