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.

Cambridge will not enter into discussions about these mark schemes.

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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) ÷ (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 ×] 3 × 5 × 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

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>	**1**	
	(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** *their* **(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 $(2\times5+2\times8+5\times8)\times2$ oe or **SC1** for correct area of *their* net, if it has 6 rectangles
	(iii)	80	**2**	**M1** for $8\times5\times2$
		cm^3	**1**	
	(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 – *their* angle marked on diagram provided *their* angle is less than 149
	(c) **(i)**	Isosceles	**1**	
	(ii)	68	**1**	
	(iii)	127	**1FT**	**FT** is 360 – 165 – *their* **(c)(ii)** or 195 – *their* **(c)(ii)**
	(d) **(i)**	28	**2**	**M1** for 90 marked at *A* or for 180 – (90 + 62) or 90 + 62 or 90 – 62
	(ii)	Chord	**1**	

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 $\frac{\textit{their}\ 65}{100}\times 1.2\times 1000$ 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

	(d)	**(i)**	470	**1**	
		(ii)	$4m + 3t = 370$	**2**	**B1** for $4m + 3t$ seen
		(iii)	Correct working and [m] 40 [t] 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 (09 20, 16) to (09 24, 16) Straight line from (*their* 09 24, 16) to (*their* 09 24 + 12, 0)	**1** **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)		12 45 [pm]	**2**	**M1** for 3 × 75 soi or **SC1** for answer 14 00 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**	

	(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 $\frac{rise}{run}$ using a triangle or co-ordinates allowing one slip
	(b)	–0.5, –1, –2, –8, 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	**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
		Arc 4 cm from C	**1**	
		Correct region shaded	**1FT**	**1FT** dep on an attempt to draw 2 arcs