CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge International General Certificate of Secondary Education

MARK SCHEME for the October/November 2015 series

0607 CAMBRIDGE INTERNATIONAL MATHEMATICS

0607/31 Paper 3 (Core), maximum raw mark 96

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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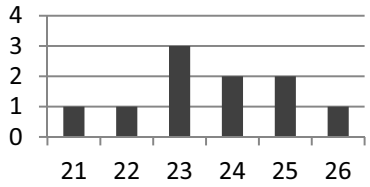
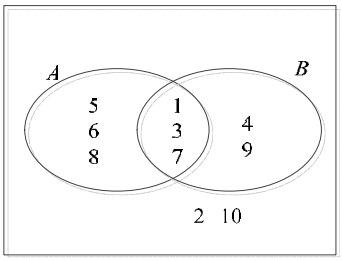
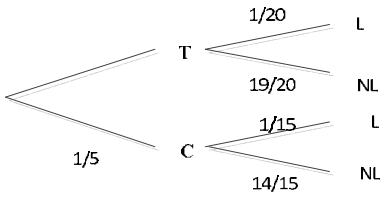
CAMBRIDGE
International Examinations

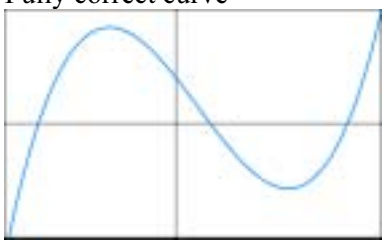
Abbreviations

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

1 **(a)**	2, 3, 6, 9	**1**	
(b) **(i)**	26	**1**	
(ii)	300.763	**1**	
(iii)	12.8 or 12.76…	**2**	**B1** for 37.4 seen
(c) **(i)**	807.54 cao	**1**	
(ii)	807.5 cao	**1**	
(iii)	810 cao	**1**	
(iv)	800 cao	**1**	
2	$a = 48$ $b = 44$ $c = 44$ $d = 88$	**1** **1** **1 FT** **1 FT**	 **FT** *their* **(b)** **FT** 180 – 48 – *their* 44 or 180 – *their* **(a)** + *their* **(b)**
3 **(a)**	36	**2**	**M1** for 25 or 4 seen
(b)	17.8 or 17.77…	**3**	**M2** for $\frac{5300-4500}{4500}\times 100$ oe or **M1** for $\frac{5300-4500}{4500}$ or $\frac{5300}{4500}\times 100$
4 **(a)** **(i)**	19.2	**1**	
(ii)	18.4	**1**	
(b)	0.5 0.4	**1** **1**	If 0 scored **SC1** if reversed
(c)	64 64	**1** **1**	
(d)	147.2[0]	**2 FT**	**M1** for *their* 64 × [0].95 and *their* 64 × 1.35 oe

5	**(a) (i)**	5	**1**	
	(ii)	23	**1**	
	(iii)	23.5 oe	**1**	
	(iv)	23.6	**1**	
	(b)		**2**	**B1** for 4 correct bars
6	**(a)**	150	**1**	
	(b)	300	**1 FT**	**FT** *their* **(a)** × 2
	(c)	[0].65	**2**	**M1** for 2 × 1.45 + [0].7[0] or better
	(d)	[0].75	**1**	
7	**(a)**	$F + 2M$	**2**	**B1** for $2M$ seen
	(b)	15	**2 FT**	**M1** for correct substitution in *their* formula
	(c)	9	**2 FT**	**M1** for correct substitution in *their* formula
8	**(a)**		**2**	**B1** for 2 correct regions
	(b) (i)	1 3 7	**1 FT**	
	(ii)	2 10	**1 FT**	
	(iii)	4 9	**1 FT**	
	(c) (i)	$\frac{5}{10}$ oe	**1**	
	(ii)	$\frac{3}{10}$ oe	**1**	
	(iii)	$\frac{4}{10}$ oe	**1**	

9	**(a)**	33 46	**1** **1**	
	(b)	$n^2 - 3$	**3**	**B2** for $n^2 \pm k$ or **M1** for finding second differences or any quadratic
10	**(a)**		**3**	**B1** for each branch
	(b)	$\frac{4}{100}$ oe	**2**	**M1FT** for $\frac{4}{5} \times \textit{their} \frac{1}{20}$
	(c)	$\frac{71}{75}$ or 0.947 or 0.9466…	**3**	**M2** for $\frac{4}{5} \times \textit{their}\ \frac{19}{20} + \textit{their}\ \left(\frac{1}{5} \times \frac{14}{15}\right)$ or **M1** for $\frac{4}{5} \times \textit{their}\ \frac{19}{20}$ or $\textit{their}\ \left(\frac{1}{5} \times \frac{14}{15}\right)$
11	**(a)**	Vertices at (3, 1) (3, 2) (4, 2) (4, 4) (5, 4) (5, 1)	**2**	If 0 scored **SC1** for reflection in $y = 1$ or $x = 0$
	(b)	Vertices at (–5, –2) (–3, –1) (–4, –1) (–4, 1) (–5, –1) (–3, –2)	**2**	If 0 scored **SC1** for translation of $\begin{pmatrix} -2 \\ k \end{pmatrix}$ or $\begin{pmatrix} k \\ -3 \end{pmatrix}$ or $\begin{pmatrix} -3 \\ -2 \end{pmatrix}$
	(c)	Vertices at (1, –1) (1, –2) (2, –2) (3, –1) (2, –4) (3, –4)	**2**	If 0 scored **SC1** for any rotation about (0, 0) or a rotation of 180°
12	**(a)**	Points plotted correctly	**2**	**B1** for each point
	(b)	(5, 0)	**2**	**B1** for each co-ordinate If 0 scored **SC1** for (0, 5)
	(c)	8.49	**3**	**M1** for $\sqrt{6^2 + 6^2}$ or better **A1** for 8.485 to 8.486
	(d)	-1	**2**	**M1** for $\frac{\text{rise}}{\text{run}}$
	(e)	$y = -x + 5$ oe	**2 FT**	**M1** for $[y =] -x + k$ or $x + y = k$ **FT** from **(d)**

13	**(a)**	72	**1**	
	(b)	108	**2**	**M1** for $\frac{2(180 - \textit{their } 72)}{2}$ or $180 - \frac{360}{5}$ oe or **B1** for 54
	(c)	4.13 or 4.129…	**2 FT**	**M1** for $\tan 54 = \frac{r}{3}$ oe **FT** $\frac{\textit{their}\text{ angle in }(\mathbf{a})}{2}$ or $\frac{\text{angle in }(\mathbf{b})}{2}$
	(d)	61.9 – 62.[0]	**3 FT**	**M2** for $\left(\frac{1}{2} \times 6 \times \textit{their } 4.13\right) \times 5$ or **M1** for $\frac{1}{2} \times 6 \times \textit{their } 4.13$
14	**(a)**	Fully correct curve 	**2**	**B1** for correct cubic shape (maximum then minimum)
	(b) (i)	(–4, 0) (1, 0) (5,0)	**2**	**B1** for 2 correct
	(ii)	(0, 10)	**1**	
	(iii)	(3.27, –14.3) or (3.270.., –14.28 to –14.27)	**2**	**B1** for each co-ordinate