Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

MATHEMATICS **0580/32**

Paper 3 (Core) **October/November 2016**

MARK SCHEME

Maximum Mark: 104

Published

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.

Cambridge is publishing the mark schemes for the October/November 2016 series for most Cambridge IGCSE®, Cambridge International A and AS Level components and some Cambridge O Level components.

This syllabus is approved for use in England, Wales and Northern Ireland as a Cambridge International Level 1/Level 2 Certificate.

This document consists of **6** printed pages.

CAMBRIDGE International Examinations

Abbreviations

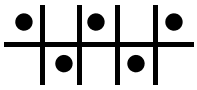
cao	correct answer only
dep	dependent
FT	follow through after error
isw	ignore subsequent working
oe	or equivalent
SC	Special Case
nfww	not from wrong working
soi	seen or implied

Question	Answer	Mark	Part marks
1 (a) (i)	12	1	
(ii)		1	
(iii)	Fantasy	1	
(iv)	$\frac{4}{50}$ oe isw	1	
(b) (i)	3	2	**M1** for 25th and 26th value or list of at least first or last 26 values
(ii)	3.1 nfww	3	**M1** for $7 \times 1 + 2 \times 14 + 3 \times 12 + 4 \times 5 + 5 \times 8 + 6 \times 4$ or better **M1 dep** for *their* $155 \div 50$
(c) (i)	$\frac{90}{360}$ oe	1	
(ii)	125	3	**B1** 150 soi **M1** for $\frac{\textit{their}150}{360} \times 300$ oe
2 (a) (i)	Octagon	1	
(ii)	2	1	
(iii)	Correct enlargement	2	**B1** for enlargement with incorrect scale factor (sf $\neq 1$) or **B1** for any four sides correct
(b) (i)	Rotation 90° clockwise oe [Centre] (0, 0) oe	**B1** **B1** **B1**	
(ii)	Correct reflection Vertices (–2, –1), (–2, –2), (–5, –2)	1	

Question	Answer	Mark	Part marks
(iii)	Correct translation Vertices (4, –2), (5, –2), (5, 1)	2	**B1** for translation $\begin{pmatrix}3\\k\end{pmatrix}$ or $\begin{pmatrix}k\\-4\end{pmatrix}$
3 (a)	2 *B* and 1 *A* selected, with at least one other combination and its value seen or 2 *B* and 1 *A* selected, with 0.625 and 0.64 seen 3.15 selected	2 1	**M1** for one correct cost for 5 litres or **B1** for 0.625 or 0.64 Independent
(b)	2	2	**M1** for [1.5 +] $\frac{1}{3} \times 1.5$ oe soi by 0.5
(c) (i)	5 : 2 : 10	2	**M1** for 500 : 200 : 1000 oe
(ii)	6.8	3	**B2** for answer 6800 or **M2** for $\frac{2}{5}\times 17$ oe or for $4 \times (0.5 + 0.2 + 1)$ or for $4 \times (500 + 200 + 1000)$ oe or **M1** for $\frac{5}{17}$ soi or for $\frac{2000}{500}$ oe soi by 4
(d)	7.79 or 7.80 or 7.794 to 7.795	2	**M1** for $300 = \pi \times 3.5^2 \times h$ or better implied by $\frac{300}{(38.4 \text{ to } 38.5)}$
(e)	755 745	2	**B1** for one correct or both values reversed
4 (a)	9, –3, –3	2	**B1** for 9 or –3 and –3
(b)	Correct curve	4	**B3FT** for 6 or 7 correctly plotted points or **B2FT** for 4 or 5 correctly plotted points or **B1FT** for 2 or 3 correctly plotted points
(c)	$x = 2.5$	1	
(d) (i)	(4, 0)	1	
(ii)	(0, 4)	1	

Question	Answer	Mark	Part marks
(e)	Ruled line through (4, 0) and (0, 4)	1	
(f)	(4.1 to 4.3, –0.1 to –0.5) (–0.1 to –0.3, 4.1 to 4.5)	2FT	**B1FT** for one correct or both x-values correct or both y-values correct
5 (a) (i)	40 to 42	2	**M1** for 8.0 to 8.4 or 80 to 84 seen
(ii)	104 to 108	1	
(iii)	D marked correctly	2	**B1** for bearing 215° **B1** for distance 6 cm
(iv)	P marked correctly with arcs	3	**B1** for arc centre C radius 5 cm **B1** for two correct pairs of intersecting arcs (for perpendicular bisector of AB) **B1** P marked in correct position
(b) (i)	0545 **[0]615** **[0]730** **[0]620** 0650 0805	3	**B1** for each
(ii)	42.9 or 42.85 to 42.86	2	**M1** for $\frac{25}{35}$ or $\frac{25}{0.583...}$ or $\frac{25}{35}\times 60$ oe
6 (a)	4 or 1	2	**B1** for 2 or 3 or 6 or 8 or 12 or 24 or 2^2 or 1^2
(b)	125	1	
(c) (i)	3.5 or $3\frac{1}{2}$	1	
(ii)	4913	1	
(iii)	0.0625 or $\frac{1}{16}$	1	
(d)	6.174	2	**M1** for $\frac{1}{2}\times 0.7\times 4.2^2$ soi by 6.17
(e) (i)	1	1	
(ii)	b^5	1	
(iii)	c^{-4} or $\frac{1}{c^4}$	1	

Question	Answer	Mark	Part marks
7 (a) (i)	122	1	
(ii)	625.86 cao	3	**M2** for 15.25 × 1.08 × 38 oe soi by 626 or 625.9 or **M1** for 15.25 × 1.08 soi by 16.47 or for 15.25 × 38 soi by 579.5 If zero scored, **SC1** for 131.76 or 5006.88
(b)	Mei 9.61 cao	3	**M1** for 425 × 1.45 **M1FT** for ±(*their* 625.86 – *their* 616.25) If zero scored, **SC1** for [€] 6.62 to 6.63
(c)	554.36	3	**M2** for 500×1.035^3 oe or **M1** for 500×1.035^k, $k \neq 1, 3$ If zero scored, **SC1** for answer of 54.36 or 54.35 or 54.4 or 54.358… 54.359
8 (a) (i)	Tangent	1	
(ii)	Chord	1	
(b) (i)	Angle [in] semicircle	1	
(ii)	20	2	**M1** for $\frac{1}{2} \times 8 \times 5$
(iii)	$[AB =]\ \sqrt{8^2 + 5^2} = 9.433\ldots$ or 9.434	**M2**	**M1** for $[AB^2 =]\ 8^2 + 5^2$
(iv)	69.8 or 69.9 or 69.84 to 69.91	2	**M1** for $\pi \times \left(\frac{9.43}{2}\right)^2$ or $\pi \times (4.72)^2$
(v)	71.3 to 71.4	2	**M1** for $\frac{\textit{their}\ \mathbf{b(iv)} - \textit{their}\ \mathbf{b(ii)}}{\textit{their}\ \mathbf{b(iv)}}$ [× 100] or $(1 - \frac{\textit{their}\ \mathbf{b(ii)}}{\textit{their}\ \mathbf{b(iv)}})$ [× 100] or [100 –] $\frac{\textit{their}\ \mathbf{b(ii)}}{\textit{their}\ \mathbf{b(iv)}} \times 100$

Question	Answer	Mark	Part marks
9 (a)		1	
(b)	4 5 11 10 13 31	4	**B1** for 11 **B1** for 31 **B2** for 4, 5, 10, 13 or **B1** for two of 4, 5, 10, 13
(c) (i)	$n + 1$ oe final answer	1	
(ii)	$3n + 1$ oe final answer	2	**B1** for $3n + k$ or $cn + 1$ $c \neq 0$
(d)	26	2	**M1FT** for *their* **c(ii)** = 76 or better or **M1** implied by answer of 25