Cambridge Assessment International Education
Cambridge International General Certificate of Secondary Education

CAMBRIDGE INTERNATIONAL MATHEMATICS **0607/42**

Paper 4 (Extended) **May/June 2018**

MARK SCHEME

Maximum Mark: 120

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.

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Generic Marking Principles

These general marking principles must be applied by all examiners when marking candidate answers. They should be applied alongside the specific content of the mark scheme or generic level descriptors for a question. Each question paper and mark scheme will also comply with these marking principles.

GENERIC MARKING PRINCIPLE 1:

Marks must be awarded in line with:

- the specific content of the mark scheme or the generic level descriptors for the question
- the specific skills defined in the mark scheme or in the generic level descriptors for the question
- the standard of response required by a candidate as exemplified by the standardisation scripts.

GENERIC MARKING PRINCIPLE 2:

Marks awarded are always **whole marks** (not half marks, or other fractions).

GENERIC MARKING PRINCIPLE 3:

Marks must be awarded **positively**:

- marks are awarded for correct/valid answers, as defined in the mark scheme. However, credit is given for valid answers which go beyond the scope of the syllabus and mark scheme, referring to your Team Leader as appropriate
- marks are awarded when candidates clearly demonstrate what they know and can do
- marks are not deducted for errors
- marks are not deducted for omissions
- answers should only be judged on the quality of spelling, punctuation and grammar when these features are specifically assessed by the question as indicated by the mark scheme. The meaning, however, should be unambiguous.

GENERIC MARKING PRINCIPLE 4:

Rules must be applied consistently e.g. in situations where candidates have not followed instructions or in the application of generic level descriptors.

GENERIC MARKING PRINCIPLE 5:

Marks should be awarded using the full range of marks defined in the mark scheme for the question (however; the use of the full mark range may be limited according to the quality of the candidate responses seen).

GENERIC MARKING PRINCIPLE 6:

Marks awarded are based solely on the requirements as defined in the mark scheme. Marks should not be awarded with grade thresholds or grade descriptors in mind.

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MARK SCHEME NOTES

The following notes are intended to aid interpretation of mark schemes in general, but individual mark schemes may include marks awarded for specific reasons outside the scope of these notes.

Types of mark

M Method marks, awarded for a valid method applied to the problem.

A Accuracy mark, awarded for a correct answer or intermediate step correctly obtained. For accuracy marks to be given, the associated Method mark must be earned or implied.

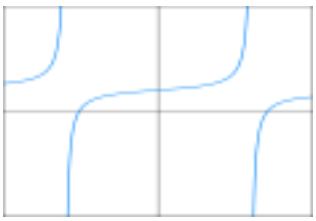
B Mark for a correct result or statement independent of Method marks.

When a part of a question has two or more 'method' steps, the M marks are in principle independent unless the scheme specifically says otherwise; and similarly where there are several B marks allocated. The notation '**dep**' is used to indicate that a particular M or B mark is dependent on an earlier mark in the scheme.

Abbreviations

awrt	answers which round to
cao	correct answer only
dep	dependent
FT	follow through after error
isw	ignore subsequent working
nfww	not from wrong working
oe	or equivalent
rot	rounded or truncated
SC	Special Case
soi	seen or implied

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Question	Answer	Marks	Partial Marks
1(a)	0.744 or 0.7437 to 0.7438	**1**	
1(b)(i)	130.5 final answer	**1**	
1(b)(ii)	100 [.00] final answer	**1**	
1(c)	17.66	**2**	**M1** for 0.23×76.8 oe
1(d)	1000	**3**	**M2** for $\frac{8-3}{3+4+6+8}\times 4200$ oe or **M1** for $\frac{4200}{3+4+6+8}$ [×3 or 8] oe
1(e)	Any irrational number less than 10	**1**	e.g. π, $\sqrt{12}$, e ; and not with decimal or fractional equivalent
1(f)	$2.29[1]\times 10^{-1}$ final answer	**2**	**B1** for figs 229[1]
2(a)	Correct sketch 	**3**	**B1** for each branch
2(b)	$y=1,\quad x=3,\quad x=-3$	**3**	**B1** for each
2(c)	–2.87 or –2.874 to –2.873 1.15 or 1.149 to 1.150 2.72 or 2.723 to 2.724	**3**	**B1** for each If 0 scored **SC1** for –2.9, 1.1 and 2.7
3(a)(i)	$8\sqrt{x}$ oe	**2**	**M1** for $y=k\sqrt{x}$
3(a)(ii)	16	**1**	
3(a)(iii)	$\frac{y^2}{64}$ or $\left(\frac{y}{8}\right)^2$ or $\frac{y^2}{8^2}$	**2**	**FT** only if wrong k, k numeric and $k\neq 1$ **M1** for $\frac{y}{their\ k}=\sqrt{x}$ or $y^2=\left(their\ k\sqrt{x}\right)^2$ $k\neq 1$ or better **SC1** for answer $\frac{y^2}{k^2}$ or $\left(\frac{y}{k}\right)^2$

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Question	Answer	Marks	Partial Marks
3(b)	2	**3**	**M2** for $p=\frac{12}{q+2}$ oe or $p=\frac{12}{4+2}$ oe or **M1** for $p=\frac{k}{q+2}$ OR **M2** for $p=\frac{3(2+2)}{4+2}$ or **M1** for $p(4+2)=3(2+2)$
4(a)(i)	198	**2**	**M1** for 3 or more 50, 120, 160, 215, 275 soi
4(a)(ii)	$\frac{306}{9900}$ oe or 0.0309 or 0.030 90 to 0.030 91	**2**	**M1** for $\frac{18}{100}\times\frac{17}{99}$
4(a)(iii)	$\frac{2850}{6642}$ oe or 0.429 or 0.4290 to 0.4291	**3**	**M2** for $\frac{57}{82}\times\frac{25}{81}+\frac{25}{82}\times\frac{57}{81}$ oe or **M1** for $\frac{57}{82}\times\frac{25}{81}$ or $\frac{25}{82}\times\frac{57}{81}$
4(b)(i)	0.04, 0.35, 0.55, 0.5, 0.5	**2**	**B1** for 3 correct
4(b)(ii)	Correct histogram	**4**	**FT** *their* fully completed table in **(b)(i)** with linear scale **B1** for suitable scale (must include all heights) **B1** for correct column widths **B2FT** for columns with all heights correct or **B1FT** for 3 or 4 columns with correct heights
5(a)	20	**2**	**M1** for $16^2+(30-18)^2$
5(b)	36.9 or 36.86 to 36.87	**2**	**M1** for $\tan[\ ]=\frac{18}{24}$ oe
5(c)	100	**3**	**M2** for $2\times(\textit{their}\ \textbf{(a)}+\sqrt{18^2+24^2})$ oe or **M1** for 18^2+24^2 or $RS = 30$ or $PQ = 30$ seen
5(d)	576	**3**	**M2** for $(40\times30)-2\times(0.5\times18\times24)-2\times(0.5\times16\times12)$ oe or **M1** for any correct and relevant area
5(e)	Correct explanation	**2**	**B1** for partial explanation e.g. ratio of two sides the same, with names or numbers given.
6(a)	Correct triangle. (–6, –1), (–4, –1), (–6, 3)	**2**	**B1** for $\begin{pmatrix}-7\\k\end{pmatrix}$ or $\begin{pmatrix}k\\-3\end{pmatrix}$

Question	Answer	Marks	Partial Marks
6(b)	Correct triangle. (–1, 4), (–1, 6), (–5, 4)	**2**	**B1** for correct rotation about any centre or for correct centre but 90^o clockwise
6(c)	Rotation 90^o clockwise oe [Centre] (–6, 4)	**3**	**B1** for each
6(d)	Correct triangle. (3, –1), (7, –1), (7, –9)	**2**	**B1** for correct enlargement with wrong centre
6(e)	Enlargement [centre] (3, 1) [SF] –0.5	**2**	**B1** for each
7(a)	90	**2**	**M1** for $55 + 5k$, $k = 7$ or 8
7(b)	11	**2**	**M1** for $55 + 5(n – 1) = 105$ or better or $\frac{105 - 55[+5]}{5}$ soi by 10
7(c)	82.5	**2**	**M1** for $\frac{42}{28} = \frac{[\ ]}{55}$ oe
7(d)(i)	$28 + 2a = 44$ oe or $44 – 28$ oe seen	**M1**	
	$2a = 16$ or $\frac{44 - 28}{2}$ oe[= 8]	**A1**	
7(d)(ii)	56 900 or 56 900 to 56 920	**2**	**M1** for $\frac{\pi}{3} \times (3 \times 14^2 + 3 \times 14 \times 8 + 8^2)$ [× 55]
7(d)(iii)	192 000 or 192 000 to 192 200	**3**	**M2** for $their\textbf{(d)(ii)} \times \left(\frac{42}{28}\right)^3$ or **M1** for $\left(\frac{42}{28}\right)^3$ or $\left(\frac{28}{42}\right)^3$ OR **M2** for $\frac{\pi}{3} \times their\textbf{(c)} \times \left(3 \times 21^2 + 3 \times (8 \times 1.5) \times 21 + (8 \times 1.5)^2\right)$ or **B1** for $a = 12$
7(d)(iv)	$[h =] \frac{3V}{\pi(3r^2 + 3ar + a^2)}$	**2**	**M1** for $3V = \pi h\left(3r^2 + 3ar + a^2\right)$ or $\frac{V}{\pi\left(3r^2 + 3ar + a^2\right)} = \frac{h}{3}$ or $\pi h = \frac{3V}{3r^2 + 3ar + a^2}$
8(a)	[Angle between] tangent and radius/diameter	**1**	
8(b)(i)	108	**2**	**M1** for $ADO = 36$ soi

Question	Answer	Marks	Partial Marks
8(b)(ii)	54	**2**	**M1** for $\frac{\textit{their}\textbf{(b)(i)}}{2}$ or 90 – 36 or $\frac{180-72}{2}$
8(b)(iii)	90	**1**	
8(b)(iv)	18	**1**	
8(b)(v)	48	**1**	
9(a)	$[\cos A] = \frac{11^2 + 9.1^2 - 8.2^2}{2\times 11\times 9.1}$	**M2**	**M1** for $8.2^2 = 11^2 + 9.1^2 - 2\times 11\times 9.1\times \cos[\ ]$
	46.98 to 46.99	**A1**	
9(b)	$[\sin B =] \frac{11}{8.2}\times \sin 47.0$	**M2**	**M1** for $\frac{8.2}{\sin 47} = \frac{11}{\sin B}$
	78.8 or 78.74 to 78.84	**A1**	If 0 scored then **SC1** for correct answer from cosine rule or other method
9(c)	36.6 or 36.54 to 36.60…	**2**	**M1** for $0.5\times 9.1\times 11\times \sin 47.0$ or **M1** for $0.5\times 9.1\times 8.2\times \sin(\textit{their}\textbf{(b)})$ or **M1** for 0.5 × 8.2 × 11 × sin (180 – 47 – *their* **(b)**)
9(d)	6.65 or 6.66 or 6.647 to 6.656…	**2**	**M1** for $9.1\times \sin 47.0$ oe or $\textit{their}\textbf{(c)} \div (0.5\times 11)$
10(a)(i)	Points correctly plotted	**3**	**B2** for 5 or 6 correct points **B1** for 3 or 4 correct points
10(a)(ii)	Positive	**1**	
10(b)(i)	17.1 or 17.09…	**1**	
10(b)(ii)	21.2	**1**	
10(c)(i)	$y = 14.2 + 0.411x$	**2**	**B1** for 14.2 + kx or a + 0.411x If 0 scored, **SC1** for 14 + 0.41x
10(c)(ii)	22.4 or 22.39 to 22.42	**1**	**FT** *their* **(c)(i)**
10(c)(iii)	cm/ml oe	**1**	
11(a)(i)	–1	**1**	
11(a)(ii)	4	**2**	**M1** for 2x – 7 = 1 or better
11(b)	$\frac{x+7}{2}$ oe	**2**	**M1** for y + 7 = 2x or $\frac{y}{2} = x - \frac{7}{2}$ or x = 2y – 7 Allow f(x) for y

Question	Answer	Marks	Partial Marks
11(c)(i)	$2\sqrt{x}-7$ final answer	**1**	Allow $x^{\frac{1}{2}}$ for $\sqrt{x}$
11(c)(ii)	36	**3**	**M2 for** $\sqrt{x}=\frac{5+7}{2}$ or better e.g. $\sqrt{x}=6$ or **M1** for $2\sqrt{x}-7=5$ or *their* **(c)(i)** = 5
11(d)(i)	$\frac{1}{\sqrt{2x-7}}$ oe final answer	**2**	**M1** for $\sqrt{2x-7}$ If 0 scored **SC1** for answer $\frac{1}{\textit{their}\textbf{(c)(i)}}$
11(d)(ii)	$x>3.5$	**2**	**M1** for $2x-7>0$

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