CAMBRIDGE
International Education

Cambridge IGCSE™

CAMBRIDGE INTERNATIONAL MATHEMATICS **0607/43**

Paper 4 (Extended) **October/November 2024**

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.

Cambridge International will not enter into discussions about these mark schemes.

Cambridge International is publishing the mark schemes for the October/November 2024 series for most Cambridge IGCSE, Cambridge International A and AS Level components, and some Cambridge O Level components.

© Cambridge University Press & Assessment 2024

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 descriptions 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.

© Cambridge University Press & Assessment 2024

Mathematics-Specific Marking Principles

1 Unless a particular method has been specified in the question, full marks may be awarded for any correct method. However, if a calculation is required then no marks will be awarded for a scale drawing.

2 Unless specified in the question, non-integer answers may be given as fractions, decimals or in standard form. Ignore superfluous zeros, provided that the degree of accuracy is not affected.

3 Allow alternative conventions for notation if used consistently throughout the paper, e.g. commas being used as decimal points.

4 Unless otherwise indicated, marks once gained cannot subsequently be lost, e.g. wrong working following a correct form of answer is ignored (isw).

5 Where a candidate has misread a number or sign in the question and used that value consistently throughout, provided that number does not alter the difficulty or the method required, award all marks earned and deduct just 1 A or B mark for the misread.

6 Recovery within working is allowed, e.g. a notation error in the working where the following line of working makes the candidate's intent clear.

© Cambridge University Press & Assessment 2024

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.

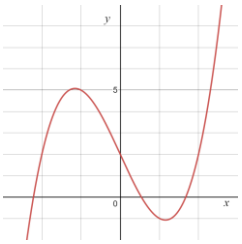
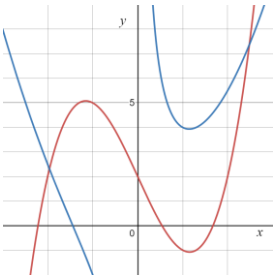
Abbreviations

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

Question	Answer	Marks	Partial Marks
1(a)	136 or 135.65 or 135.7	**2**	**M1** for midpoints soi
1(b)	10, 22, 44, 79, 93, 100	**2**	**M1** for 4 correct
1(c)	Correct cumulative frequency curve	**3**	**FT** *their* table with increasing values **B1** for 6 points with correct heights **B1** for 6 points with correct *h* values
1(d)	2, 3, 4 or 5	**2**	**FT** *their* increasing curve or polygon **B1** for reading from *their* curve at 180 soi by 95 or 96 or 97 or 98
2(a)	3.72	**2**	**M1** for $\frac{24}{100}\times 15.5$ oe
2(b)	131.61 final answer	**2**	**M1** for $\frac{100+7}{100}\times 123$ oe or **B1** for 8.61

© Cambridge University Press & Assessment 2024

Question	Answer	Marks	Partial Marks
2(c)	228	**3**	**M2** for $\frac{76}{4}\times(5+3+4)$ oe or **M1** for $\frac{76}{4}$
2(d)	24	**2**	**M1** for $300\times x+32\,800=40\,000$ oe
2(e)(i)	32500	**2**	**M1** for [...]$\left(\frac{100+0.6}{100}\right)=32\,695$ oe
2(e)(ii)	34 nfww	**4**	**B3** for 33.71… or 33.7 OR **M3** for $n\log(1+\frac{0.6}{100})=\log\frac{40\,000}{32\,695}$ oe or a good sketch indicating value between 33 and 34 or correct trials reaching 33 and 34 or **M2** for $\left(1+\frac{0.6}{100}\right)^n=\frac{40\,000}{32\,695}$ oe or suitable graph or at least three correct trials or **M1** for $32\,695\left(1+\frac{0.6}{100}\right)^n=40\,000$ oe soi or at least 2 trials with n > 1
3(a)(i)	5	**3**	**M2** for $(3-(-1))^2+(8-11)^2$ soi or **M1** for $(3-(-1))$ and $(8-11)$ soi
3(a)(ii)	(7, 5)	**2**	**B1** for each
3(a)(iii)	$y=\frac{4}{3}x+4$ oe	**4**	**M1** for gradient $AC=\frac{8-11}{3-(-1)}$ or better **M1** for perpendicular gradient = $-1\div$ *their* $-\frac{3}{4}$ **M1** for substituting (3, 8) into $y=$ *their* $mx+c$
3(b)	(3, 5)	**2**	**B1** for one correct value or **M1** for $\begin{pmatrix}3\\2\end{pmatrix}$ soi or for suitable diagram seen e.g. a correct triangle with 2 sides marked

Question	Answer	Marks	Partial Marks
4(a)	correct sketch 	**2**	**M1** for positive cubic shape
4(b)	–2.21 0.539 1.68 or –2.214… 0.5391… 1.675…	**3**	**B1** for each correct penalise 1 mark if y co-ordinates included if 0 scored **SC1** for –2.2, 0.54 and 1.7
4(c)	correct sketch 	**3**	For full marks there must be exactly one intersection in the first quadrant **B2** for both branches but joined or touching the y axis or **B1** for one correct branch on either side of y axis
4(d)	$x = 0$	**1**	
4(e)	$[-3] \leqslant x \leqslant -1.96$ or –1.959…. $0 < x \leqslant 2.48$ or 2.482…to 2.483	**4**	**B2** for $x \leqslant -1.96$ or **B1** for –1.96 seen **B2** for $0 < x \leqslant 2.48$ or **B1** for 2.48 seen
5(a)	enlargement [sf] $\frac{1}{3}$ oe [centre] (2, 2)	**2**	**B1** for scale factor **B1** enlargement and centre
5(b)(i)	image at (–5,7) (–5,8) (–7,8) (–7,9) (–8,9) (–8,7)	**2**	**B1** for rotation 90° clockwise or for correct angle with wrong centre
5(b)(ii)	image at (–4,–2) (–4,–8) (–6,–2) (–8,–6) (–6,–6) (–8,–8)	**4**	**B2** for correct translation or **B1** for translation $\begin{pmatrix}-5\\k\end{pmatrix}$ or $\begin{pmatrix}k\\-4\end{pmatrix}$ **B2** for correct enlargement of *their* translated image or **B1** for enlargement SF –2 incorrectly placed
5(c)	stretch [sf] 3 [Invariant line] $y = 10$	**3**	**B1** for each correct
6(a)	14	**1**	
6(b)	f(x) > 9	**1**	

© Cambridge University Press & Assessment 2024

Question	Answer	Marks	Partial Marks
6(c)	380	**2**	**M1** for g(19) or better or $(5x-1)^2+(5x-1)$
6(d)	$1+\sqrt[3]{x}$ oe	**2**	**M1** for $\sqrt[3]{y}=x-1$ or $x=(y-1)^3$
6(e)	$2(x-1)^2$ nfww	**3**	**M2** for $\frac{10(x-1)^3}{5(x-1)}$ or better seen Or **M1** for $5x-1-4$ or better seen
7(a)(i)	-5	**1**	
	$20-n^2$ oe	**2**	**M1** for expression involving $-n^2$ or for 2nd differences of –2 or 2 seen
7(a)(ii)	1.25 oe	**1**	
	$40\times\left(\frac{1}{2}\right)^n$ or $20\times\left(\frac{1}{2}\right)^{n-1}$ oe	**2**	**M1** for an expression involving $\left(\frac{1}{2}\right)^n$ or 2^{-n} oe
7(b)	16	**3**	**M2** $\frac{3\pm\sqrt{(-3)^2-4\times2\times(-464)}}{2\times2}$ oe or $(k-16)(2k+29)$ or for a correct sketch indicating solutions or **M1** for correct use of formula but with one error or for $2k^2-3k-464=0$ or for a correct sketch
8(a)	$E=du+f$ final answer	**2**	**M1** for $du+f$
8(b)	$\frac{x}{9}$ final answer	**2**	**M1** for correct use of common denominator eg $\frac{9x}{18}-\frac{12x}{18}+\frac{5x}{18}$
8(c)	$n>6$ final answer	**2**	**M1** for $7n-2n*21+9$ or better * can be = or any inequality
8(d)	correctly equating one set of coefficients Or correctly making x or y the subject of an equation and correct substitution	**M1**	
	$x=1.5$ $y=-4$	**A2**	**A1** for each If M0 scored **SC1** for correct substitution and evaluation to find the other variable. or **SC1** if no working shown, but 2 correct answers given.

© Cambridge University Press & Assessment 2024

Question	Answer	Marks	Partial Marks
8(e)	180	**3**	**M2** for $y = their\ \frac{5}{16}(x-3)^2$ oe OR **M1** for $y = k(x-3)^2$ **A1** for $k = \frac{5}{16}$
9(a)	$[AC] = \frac{9.9 \times \sin 110.9}{\sin 43.2}$	**M2**	**M1** for $\frac{9.9}{\sin 43.2} = \frac{AC}{\sin 110.9}$
	13.51… seen	**A1**	
9(b)	10.7 or 10.70 to 10.71…	**3**	**M2** for $[AB] = \frac{0.5 \times 13.5}{\sin(0.5 \times 78.2)}$ or **M1** for $\sin(0.5 \times 78.2) = \frac{0.5 \times 13.5}{AB}$ OR **M2** for $[AB] = \frac{13.5 \times \sin \frac{1}{2}(180 - 78.2)}{\sin 78.2}$ or **M1** for $\frac{13.5}{\sin 78.2} = \frac{AB}{\sin \frac{1}{2}(180 - 78.2)}$ OR **M2** for $x^2 = \frac{13.5^2}{2 \times (1 - \cos 78.2)}$ or **M1** for $13.5^2 = x^2 + x^2 - 2 \times x \times x \times \cos 78.2$
9(c)	85.2 to 85.4	**3**	**M1** for $\frac{1}{2} \times (their\ AB)^2 \times \sin 78.2$ **M1** for $\frac{1}{2} \times 13.5 \times 9.9 \times \sin(180 - (110.9 + 43.2))$
10(a)(i)	17600 or 17570 to 17580	**4**	**M3** for $[\text{cube side}] = \sqrt[3]{\frac{3 \times 9203}{4\pi}} \times 2$ or **M2** for $[r] = \sqrt[3]{\frac{3 \times 9203}{4\pi}}$ or **M1** for $r^3 = \frac{3 \times 9203}{4\pi}$
10(a)(ii)	13.6 or 13.61…	**2**	**M1 FT** for $h \times (their\ \text{cube side})^2 = 9203$ or better
10(b)(i)	17.5 or 17.46…	**4**	**M3** for $\sqrt{(4^2 + 15^2 + 8^2)}$ or **M2** for $\sqrt{(15^2 + 8^2)}$, $\sqrt{(4^2 + 15^2)}$, $\sqrt{(4^2 + 8^2)}$ or $15^2 + 8^2 + 4^2$ or **M1** for $15^2 + 8^2$, $4^2 + 15^2$, $4^2 + 8^2$

© Cambridge University Press & Assessment 2024

Question	Answer	Marks	Partial Marks
10(b)(ii)	13.2 or 13.23 to 13.24…	**2**	**M1 FT** for $\sin[\ ]=\frac{4}{(\textit{their}\ 17.5)}$ oe or other trig
11(a)	walking	**1**	
11(b)	9	**1**	
11(c)	6	**1**	
11(d)	$\frac{11}{32}$ oe	**1**	
11(e)	$\frac{6}{91}$ oe	**3**	**M2** for $\frac{2}{14}\times\frac{3}{13}$ or $\frac{3}{14}\times\frac{2}{13}$ oe or **M1** for $\frac{k}{14}\times\frac{j}{13}$ or **B1** for $\frac{2}{14}$ or $\frac{3}{14}$ seen
11(f)	$\frac{3}{62}$ oe	**3**	**M2** for $[k\times]\ \frac{16}{32}\times\frac{6}{31}\times\frac{5}{30}$ oe where $k = 1, 2, 3$ or **M1** for $\frac{m}{32}\times\frac{n}{31}\times\frac{n-1}{30}$ oe

© Cambridge University Press & Assessment 2024