CAMBRIDGE
International Education

Cambridge O Level

MATHEMATICS SYLLABUS D **4024/13**

Paper 1 **May/June 2026**

MARK SCHEME

Maximum Mark: 100

Published

This mark scheme contains the instructions and marking guidance that our examiners used to mark candidate responses for this component.

Before they start marking, examiners complete a standardisation process. They review a range of candidate responses and discuss the mark scheme in detail to agree which answers can and cannot be accepted. Examiners award marks where it is clear that candidate responses have met the requirements of the mark scheme. These requirements may vary between different components or different versions of the same component, depending on the exact requirements of the question and the candidate responses seen during the standardisation process.

Sometimes, our mark schemes may allow marks to be awarded to responses which contain elements that are factually incorrect or for content not covered by the syllabus. We do this in response to the demands of a specific question to support candidates and make sure that our assessments are fair. However, these allowances should not be used as a guide for teaching and learning.

We cannot discuss the mark scheme with schools, and we recommend that schools read the mark scheme together with the assessment material and the Principal Examiner Report for Teachers.

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General marking principles

All examiners must apply these marking principles when marking candidate responses.

1	Examiners must award marks for each response in line with: • the specific **content** defined in the mark scheme • the specific **skills** defined in the mark scheme or in the level descriptions • the **standard of response** required as exemplified by the standardisation scripts.
2	Examiners must award **whole marks** (not half marks, or other fractions).
3	Examiners must award marks **positively**. This means that: • marks are not deducted for errors or omissions • marks are awarded for correct/valid answers as defined in the mark scheme and also for **other valid answers** which go beyond the scope of the syllabus and mark scheme referring to your team leader as appropriate • the quality of spelling, punctuation and grammar are judged **only** when the mark scheme indicates that these features are **specifically assessed** in the question. However, the meaning of all responses must be unambiguous.
4	Examiners must **consistently** apply the requirements of the mark scheme and any rules for what to do when candidates have not followed instructions correctly.
5	Examiners must use the **full range of marks** defined in the mark scheme, unless limited by the quality of the candidate responses seen.
6	Examiners must award marks according to the mark scheme and **must not** award marks with grade thresholds or grade descriptions in mind.

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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.

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Annotations guidance for centres

Examiners use a system of annotations as a shorthand for communicating their marking decisions to one another. Examiners are trained during the standardisation process on how and when to use annotations. The purpose of annotations is to inform the standardisation and monitoring processes and guide the supervising examiners when they are checking the work of examiners within their team. The meaning of annotations and how they are used is specific to each component and is understood by all examiners who mark the component.

We publish annotations in our mark schemes to help centres understand the annotations they may see on copies of scripts. Note that there may not be a direct correlation between the number of annotations on a script and the mark awarded. Similarly, the use of an annotation may not be an indication of the quality of the response.

The annotations listed below were available to examiners marking this component in this series.

Annotations

Annotation	Meaning
	More information required
	Accuracy mark awarded zero
	Accuracy mark awarded one
	Accuracy mark awarded two
	Accuracy mark awarded three
	Independent mark awarded zero
	Independent mark awarded one
	Independent mark awarded two
	Independent mark awarded three
	Benefit of the doubt

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Annotation	Meaning
C	Communication mark
✗	Incorrect
FT	Follow through
Highlighter	Highlight a key point in the working
ISW	Ignore subsequent work
M0	Method mark awarded zero
M1	Method mark awarded one
M2	Method mark awarded two
M3	Method mark awarded three
MR	Misread
O	Omission
Off-page comment	Allows comments to be entered at the bottom of the RM marking window and then displayed when the associated question item is navigated to.
On-page comment	Allows comments to be entered in speech bubbles on the candidate response.
Pre	Premature rounding/approximation
SC	Special case
SEEN	Indicates that work/page has been seen
TE	Transcription error

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Annotation	Meaning
	Correct
	Correct answer from incorrect working

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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	Marks	Partial Marks	Guidance
1(a)	2 300 000	**1**		Accept 2.3×10^6
1(b)	1, 3, 5, 9, 15, 45	**2**	**B1** for 4 correct factors with no incorrect factors or for 6 correct factors and one incorrect	Accept 1×45, 3×15, 5×9 as answer for B1
2(a)(i)	scalene	**1**		Condone incorrect spelling in **2(a)** and **2(b)** if intention is clear
2(a)(ii)	obtuse	**1**		
2(b)	chord	**1**		
3(a)	4	**1**		
3(b)	9	**2**	**M1** for $\frac{3+4+4+4+6+6+7+8+8+40}{10}$ oe or **B1** for 90 seen	Condone one error or omission in addition for M1 Must see attempt to add if total ≠ 90
3(c)	6	**2**	**M1** for middle pair 6, 6 identified or for correctly ordered list of first 6 or last 6 numbers	3, 4, 4, 4, 6, 6, 7, 8, 8, 40 Allow B1 if ordered list seen below given list

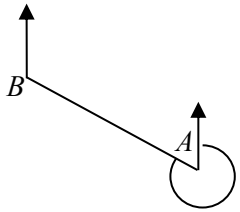
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Question	Answer	Marks	Partial Marks	Guidance
3(d)	Correct explanation e.g. 9 values are below the mean oe or 40 is an outlier oe	**1**		Ignore irrelevant comments Award 0 if any incorrect comments
4	$4x + 9y$ final answer	**2**	**B1** for $4x$ or $9y$ in final answer or for $4x + 9y$ seen	
5(a)	14, 17	**1**		
5(b)	4, 7, 12	**2**	**B1** for two correct	
6	300	**3**	**M2** for $\frac{60}{3-1}\times(1+3+6)$ oe or **M1** for $\frac{60}{3-1}\times k$ where k is 1, 3 or 6 or $x + 60 = 3x$ oe or $\frac{3t}{10}-\frac{t}{10} = 60$ oe	M1 implied by 1 part = 30 soi
7(a)	33	**2**	**B1** for 3 seen or answer 27	
7(b)	$\frac{9}{20}$ cao	**3**	**B2** for $\frac{9k}{20k}$ or **M1** for correct use of common denominator e.g. $\frac{15}{20}$ and $\frac{6}{20}$	Allow one incorrect numerator but both denominators must be the same
8	253	**2**	**M1** for $360 - (42 + 65)$ oe or **B1** for one of 42, 65, 138 or 115 correctly identified at R or answer 107	Implied by 107 as obtuse angle at R

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Question	Answer	Marks	Partial Marks	Guidance
9(a)	360	**3**	**B2** for [interest =] 60 or **M2** for $300+\frac{300\times4\times5}{100}$ oe or **M1** for $\frac{300\times4[\times5]}{100}$ oe	Condone answer 60 for B2 M1 implied by 12 [× 5] but M0 for 12 × k where $k \neq 5$. Compound interest scores 0
9(b)	20	**2**	**M1** for $\frac{500-400}{500}[\times100]$ oe or $[100-]\frac{400}{500}\times100$ oe	M1 maybe implied by 0.2 or 80
10	$\frac{39}{2}$ oe nfww	**5**	**B3** for $\sqrt{39}$ or **M2** for 8^2-5^2 or **M1** for $BD^2 + 5^2 = 8^2$ **M1dep** for $\frac{1}{2}\times their\sqrt{39}\times their\sqrt{39}$ dependent on at least M1 earned	Isw conversion of $\frac{39}{2}$ to mixed number or decimal M0 if other areas added
11(a)	342	**2**	**M1** for 360 – (180 – 162) or 180 + 162 or answer −18 or indication of correct angle on a sketch	Diagram e.g. 
11(b)	[1:] 200 000	**2**	**M1** for 1 cm = 2 km or better or one correct conversion of 10 cm or 20 km to a common unit	e.g. 0.1 m : 20 000 m

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Question	Answer	Marks	Partial Marks	Guidance
12(a)	6.3×10^{-4} cao	**1**		
12(b)(i)	$4.9 \times 10^{2x+1}$ cao	**2**	**M1** for 49×10^{2x} seen	
12(b)(ii)	1.4×10^{-2x} cao	**2**	**M1** for answer 1.4×10^{k} or $A \times 10^{-2x}$, $1 \leq A < 10$	
13(a)	Correctly equating one set of coefficients or for making x or y the subject of one equation	**M1**		Allow one arithmetic error in either M1 if equating coefficients e.g. $15x - 6y = 57$ and $4x - 6y = 2$ Rearrangement needs to be correct to earn this M1
	Correct method to eliminate one variable	**M1**		Substitution of *their* rearrangement can earn this M1. M0 M1 is possible
	$[x =]$ 5	**A1**		
	$[y =]$ 3	**A1**	If **A0** scored **SC1** for 2 values satisfying one of the original equations	
13(b)	$(6x + 5)(x - 1)$	**M2**	**M1** for $(ax + c)(bx + d)$ where $ab = 6$ and $cd = -5$ or where $ab = 6$ and $ad + cb = -1$ or for correct partial factors $6x(x - 1) + 5(x - 1)$ or $x(6x + 5) - 1(6x + 5)$	Ignore other methods
	$-\frac{5}{6}$ and 1	**B1**		Accept equivalents for $-\frac{5}{6}$ Isw conversion of a correct fraction to a decimal Allow M2B1 for correct solutions after correct partial factors seen

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Question	Answer	Marks	Partial Marks	Guidance
14(a)	Rotation 90 clockwise oe [centre] (2, 1)	**3**	**B1** for each	Extra transformation spoils marks, extra properties treat as choice Accept –90, +270 or 270 [anticlockwise] Condone omission of coordinate brackets or e.g. origin (2, 1) Do not accept centre given as a column vector but do not treat as additional transformation
14(b)(i)	$y = 4$	**1**		
14(b)(ii)	(−3, 5) and (–2, 5)	**2**	**B1** for one correct or for correct vertices shown on diagram	
15(a)	30	**1**		
15(b)	30	**1**		
15(c)	93	**2**	**FT** 180 −(30 + *their* **15(b)** + 27) correctly evaluated **M1** for 180 −(30 + *their* **15(b)** + 27) oe or **B1** for $\angle PTA = 123$ or $\angle TCA = 57$ or 27 + *their* **15(b)** correctly evaluated	123 −*their* **15(b)** correctly evaluated *Their* **15(b)** must be less than 90 for any marks in this part
15(d)	87	**1**	**FT** 180 −*their* 93 correctly evaluated	No FT from *their* **15(c)** = 90
16	E C A	**3**	**B1** for each in correct position	

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Question	Answer	Marks	Partial Marks	Guidance
17	Correct histogram with vertical axis correctly scaled	**4**	**B1** for 2 cm = 5 units labelled as scale **B3** for 4 correct blocks or **B2** for 3 correct blocks or **B1** for 2 correct blocks or for correct frequency densities 4, 9, 20, 16, 2.5 soi	Minimum is 20 labelled Condone good freehand Blocks must touch correct horizontal line for majority of interval for 4, 9, 20,16 and 2.5 Condone omission of vertical line at 6 only Ignore inclusion of frequency polygon Check for frequency density calculations by the table e.g. $\frac{4}{1}$, $\frac{9}{1}$, $\frac{10}{0.5}$, $\frac{8}{0.5}$, $\frac{5}{2}$ Allow one error or omission for frequency densities
18	$\frac{7a-4}{1+a}$ oe final answer	**4**	**M1** for $a(7-x) = x + 4$ **M1** for expanding bracket correctly **M1** for isolating terms in x **M1** for factorising and dividing to final answer Max **M3** if final answer incorrect	Fraction cleared correctly $7a - ax = x + 4$ $7a - 4 = x + ax$ $x = \frac{7a-4}{1+a}$
19	$\frac{1}{4}x + \frac{27}{4}$ oe final answer	**4**	**M1** for [gradient L =] $\frac{7--1}{1-3}$ oe **M1** for [gradient N =] $-\frac{1}{\textit{their gradient of } L}$ **M1** for $7 = (\textit{their } m) \times 1 + c$ oe or $y - 7 = \textit{their } m\,(x - 1)$ oe	$= -4$ $\frac{1}{4}$ *Their* $m \neq$ *their* gradient L

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Question	Answer	Marks	Partial Marks	Guidance
20	210	**3**	**M2** for $\frac{360-x}{360}\times 2\pi\times 9=\frac{15}{2}\pi$ oe OR **M1** for $\frac{k}{360}\times 2\pi\times 9=\frac{15}{2}\pi$ oe **M1** dep for 360 – *their k*	Allow substitution of values for π for method marks M1 implied by 150
21(a)	$\frac{x^6}{125}$ final answer	**2**	**B1** for answer $\frac{x^6}{k}$ or $\frac{x^k}{125}$ or $\frac{125}{x^6}$, k numerical and $\neq 0$	$\frac{5^{-3}}{x^{-6}}$ scores 0
21(b)	6 nfww	**3**	**M2** for $2^{3x}=2^{2x+6}$ or better or **M1** for 2^{3x} or $2^{2(x+3)}$ or 2^{2x+6} or $2^x=4^3$	e.g. $2^x=2^6$ or $3x=2x+6$
22(a)	$4\sqrt{2}$ cao	**2**	**B1** for $7\sqrt{2}$ or $3\sqrt{2}$	
22(b)	$\frac{5\left(3-\sqrt{7}\right)}{2}$ or $\frac{15-5\sqrt{7}}{2}$ final answer	**3**	**M1** for $\times\frac{3-\sqrt{7}}{3-\sqrt{7}}$ or $\frac{\sqrt{7}-3}{\sqrt{7}-3}$ **B1** for $9-3\sqrt{7}+3\sqrt{7}-7$ or $-9-3\sqrt{7}+3\sqrt{7}+7$	Accept simplified answers with all signs changed for 3 marks
23(a)	**b** −3**a** final answer	**1**		

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Question	Answer	Marks	Partial Marks	Guidance
23(b)	$\frac{9\mathbf{a}}{5}+\frac{2\mathbf{b}}{5}$ or $\frac{1}{5}(9\mathbf{a}+2\mathbf{b})$ final answer	**3**	**M2** for correct unsimplified answer or $\overrightarrow{AX}=\frac{2}{5}their(\mathbf{b}-3\mathbf{a})$ oe seen or $\overrightarrow{BX}=\frac{3}{5}their(3\mathbf{a}-\mathbf{b})$ oe seen or **M1** for correct route for $\overrightarrow{OX}$ soi	Allow any equivalent two-term expression as final answer for 3 marks Allow correct FT expression for $\overrightarrow{XA}$ or $\overrightarrow{XB}$ e.g. $\overrightarrow{OX}=\overrightarrow{OA}+\overrightarrow{AX}$ Accept mixed notation for route e.g. $3\mathbf{a}+\overrightarrow{AX}$ Do not allow e.g. *XA* for *AX*
24	$\frac{x^2-3x-14}{(x+1)(x-4)}$ or $\frac{x^2-3x-14}{x^2-3x-4}$ final answer	**4**	**B1** for common denominator $(x + 1)(x -4)$ oe isw **B1** for $(x + 3)(x -4) -2(x + 1)$ or better seen **B1** for $x^2 + 3x -4x -12$ or $-2x -2$ seen	For 4 marks allow any simplified equivalent Ignore any subsequent cancelling for B marks For all B marks accept in two separate fractions with common denominator

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