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CAMBRIDGE
International Education

Cambridge IGCSE™

MATHEMATICS **0580/21**

Paper 2 (Extended) **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.

This document consists of **17** printed pages.

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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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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	Guidance
1	1	**1**		
2	3	**2**	**M1** for $7x = 25 - 4$ or better	
3	130	**2**	**B1** for 25 or 100 or 30 or **M1** for $4 \times 5^2 + 3 \times 10$	
4	30	**2**	**M1** for $6 = \frac{1}{12}(6 + 6 + 2L)$ oe	Allow better for **M1**, e.g. $12 \times 6 - 6 - 6$, $72 - 6 - 6$ $[= 60]$. Condone 60 as answer for M1 provided working seen.
5(a)	July	**1**		
5(b)	12	**2**	**B1** for correct vertical scale soi (minor gridlines every 3) or **M1** for $9 \div 3$	e.g. May swimming = 18 M1 may be implied by reference to one row horizontally being 3.
6	$x = 5$ $y = 7$	**2**	**B1** for $x = 5$ **B1** for $y = 7$	

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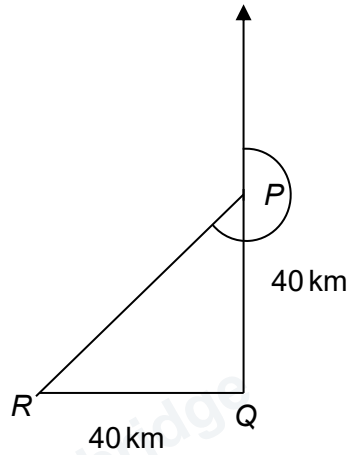
Question	Answer	Marks	Partial Marks	Guidance
7	225	**2**	**B1** for *QPR* or *QRP* = 45 or the bearing of *P* from *R* is 45 or for indicating correct bearing on diagram	May be on diagram May be implied by $180 + \textit{their}\ RPQ$ or $360 - \textit{their}\ 135$ Do not allow more than one bearing marked. 
8(a)	(0.5, 6) oe	**2**	**B1** for $(a, 6),\ a \neq 0.5$ or for $(0.5, b),\ b \neq 2,6$	
8(b)	$\begin{pmatrix} -1 \\ -4 \end{pmatrix}$	**2**	**B1** for $\begin{pmatrix} k \\ -4 \end{pmatrix}$ or $\begin{pmatrix} -1 \\ k \end{pmatrix}$ or $\begin{pmatrix} 1 \\ 4 \end{pmatrix}$	For B1, condone the vector with a fraction line.
8(c)	2	**4**	**B1** for $4 = [0^2 + a \times 0 +]\ b$ soi oe **B2** for $a = 3$ soi or **M1** for $8 = 1^2 + a[\times 1] + b$ oe or better e.g. with *their b* **M1** for $c = (-2)^2 + a(-2) + b$ oe or better e.g. with *their a* and *their b* Maximum of 3 marks if answer incorrect.	Implied by $y = x^2 + ax + 4$ Implied by e.g. $y = x^2 + 3x + 4$

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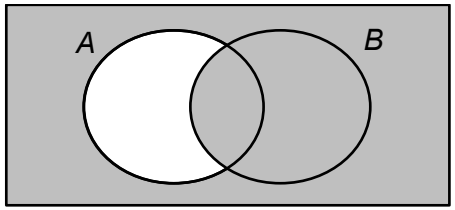
Question	Answer	Marks	Partial Marks	Guidance
9		**1**		
10(a)	56	**1**		Allow answer $2^3 \times 7$ isw.
10(b)	$2^8 \times 3^8 \times 5^3 \times c^4$	**2**	**B1** for $2^6 \times 3^8 \times 5^2 \times c^4$ or for [20 =] $2^2 \times 5$ oe or **M1** for correct factor tree/diagram/list/table for 20	Allow B1 for the inclusion of 1 with correct factors.
11(a)	$2n + 1$ oe final answer	**3**	**B2** for $3n - 4$ for sequence C or **B1** for $3n + j$ or $kn - 4$, $k \neq 0$ for sequence C, or **M1** for *their* nth term $-(n - 5)$ OR **B2** for 5, 7, 9 for sequence A or **B1** for –3, –2, –1 for sequence B	$3n - 4 - (n - 5)$ scores 3 marks. *their* nth term must be equivalent to the form $an + b$.
11(b)(i)	16	**1**		
11(b)(ii)	2^{n-2} oe final answer	**2**	**B1** for [c ×] 2^{an+k}, $a > 0$ or for $[c \times]\left(\frac{1}{2}\right)^{k-an}$, $a > 0$	For 2 marks (or 1 if spoilt) equivalents include $\frac{2^n}{4}$, $\frac{1}{2}(2)^{n-1}$, $\left(\frac{1}{2}\right)^{2-n}$. Allow other variables for n. Condone e.g. $n = 2^{n-2}$

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Question	Answer	Marks	Partial Marks	Guidance
12	–5	**2**	**M1** for $\frac{20-10}{3-5}$ oe	M1 for $\frac{-5}{1}, -\frac{10}{2}$ etc.
13(a)	0.71124 cao	**2**	**B1** for 0.92424[…] or answer 0.7112….	Working via fractions can gain full marks if correct answer reached, or B1 for decimals as shown. B1 for answer $0.711\dot{2}\dot{4}$
13(b)	$\frac{61}{90}$ oe fraction	**2**	**M1** for 67.77… – 6.77… oe	oe e.g. 6.77… – 0.67… implied by $\frac{6.1}{9}$
14(a)(i)	2.5	**1**		Accept answers that round to 2.5. Accept 2 hours 30 minutes. Do not accept 2:30 or 2.30.
14(a)(ii)	1.2	**2**	**B1** for [LQ =] 1.8 or [UQ =] 3	Values may be written on diagram for B1. Allow B1 if 1.8 or 3 given as answer. B0 for 3 coming from $4.5-1.5$. Accept 1 hour 12 minutes. Do not accept 1:12 or 1.12; these would imply B1.
14(b)	11, 27	**2**	**B1** for each	
15	6	**4**	**M3** for $\frac{k}{4} = \frac{135}{360} \times 4$ oe OR **M1** for $\frac{90}{360} \times \pi \times t^2$ oe **M1** for $\frac{135}{360} \times \pi \times (2t)^2$ oe	For M3, π and t^2 should have been cancelled. Ignore inclusion of k for first two M marks $\frac{1}{4}\pi t^2$. $\frac{3}{8} \times \pi \times 4t^2$, $\frac{3}{2}\pi t^2$
16	$3x^2 + 13ax + 4a^2$ final answer	**2**	**B1** for three correct terms from $3x^2 + ax + 12ax + 4a^2$	$13ax$ counts as two correct terms.

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Question	Answer	Marks	Partial Marks	Guidance
17(a)	Shape drawn at (0, 7), (–4, 9), (–6, 5), (–2, 5)	**2**	**B1** for reflection in $x = k$ or in $y = 1$ or for three correct vertices	Note: reflection in $y = 1$ has coordinates (2, –5), (4, –3), (8, –3), (6, –7).
17(b)	Enlargement $-\frac{1}{2}$ (2, –1)	**3**	**B1** for each	Do not allow dilation or reduction. If more than one transformation, award 0 marks. Treat extra properties as choice. Condone $2,-1$ and 'origin $2,-1$'. Do not treat centre as a column vector as an additional transformation.
18	$\frac{1}{2}$ oe	**2**	**B1** for $\sin 60 = \frac{\sqrt{3}}{2}$ or $\tan 30 = \frac{1}{\sqrt{3}}$ oe	isw simplification of fraction not containing surds. B1 for e.g. $\frac{\sqrt{3}}{2\sqrt{3}}$ or for $\frac{\sqrt{3}}{2} \times a$ or for $b \times \frac{1}{\sqrt{3}}$ Do not pick B1 out of a table of values.
19	[a =] 5 [b =] –2	**2**	**B1** for each	
20	4	**4**	**B3** for $\frac{1}{9}$ and 36 or $3^{-2} \times 3^2 \times 2^2$ or **B2** for $\frac{1}{9}$ or 36 or $3^{-2} \times 6^2$ or $2^2 \times 3^2$ or **B1** for $\frac{1}{3^2}$ or 6^2	
21(a)	108	**1**		
21(b)	168	**3**	**M2** for [2×] (2 × 6 + 2 × 9 + 6 × 9) or **M1** for 2 × 6 or 2 × 9 or 6 × 9	

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Question	Answer	Marks	Partial Marks	Guidance
21(c)	11	**3**	**M2** for $2^2 + 6^2 + 9^2$ oe or better or **M1** for $2^2 + 6^2$ or $2^2 + 9^2$ or $6^2 + 9^2$ oe or better	M2 for 121 or $\sqrt{121}$ M1 for 40 or $\sqrt{40}$ or 85 or $\sqrt{85}$ or 117 or $\sqrt{117}$
21(d)	$\frac{6}{11}$	**2**	**FT** $\frac{6}{\textit{their}\ \textbf{(c)}}$ **M1** for recognising correct angle	Do not isw. May be on diagram. M1 implied by $\sin^{-1}\left(\frac{6}{\textit{their}\ \textbf{(c)}}\right)$ or $\sin\left(\frac{6}{\textit{their}\ \textbf{(c)}}\right)$
22	7 6 10	**3**	**B2** for 2 correct or **B1** for 1 correct or **M1** for [2], 3.5, 3 and 5 oe seen [FDs]	Allow e.g. $\frac{35}{10}$, $\frac{45}{15}$ and $\frac{25}{5}$ for M1.
23	7.5 oe	**3**	**M2** for $h = \sqrt[3]{\frac{27}{64}} \times 10$ oe or $\frac{10}{h} = \frac{4}{3}$ oe or **M1** for $\sqrt[3]{\frac{27}{64}}$ or $\sqrt[3]{\frac{64}{27}}$ oe or better or for $\left(\frac{10}{h}\right)^3 = \frac{64}{27}$ or $\left(\frac{h}{10}\right)^3 = \frac{27}{64}$	oe e.g. $\frac{30}{4}$, $h = \frac{3}{4} \times 10$, $10 \div \frac{4}{3}$, $10 \div \sqrt[3]{\frac{64}{27}}$, $10 \times \sqrt[3]{\frac{27}{64}}$, $\sqrt[3]{1000 \times \frac{27}{64}}$ e.g. M1 for [L]SF = $\frac{3}{4}$ or 0.75 but not just $\frac{3}{4}$ or 0.75 e.g. $h^3 = \frac{27}{64} \times 10^3$

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Question	Answer	Marks	Partial Marks	Guidance
24(a)	(0, 7) (4, –25)	**6**	**B2** for $3x^2 - 12x$ or **M1** for intention to find derivative soi by $3x^2 + kx$ or $kx^2 - 12x$ or $3x^2 - 12x + 7$ **M1** for setting *their* $\frac{dy}{dx} = 0$ or stating $\frac{dy}{dx} = 0$ **M1** for correct method to solve *their* quadratic, e.g. [3]$x(x - 4)$ oe or $\frac{--12 \pm \sqrt{(-12)^2 - 4(3)(0)}}{2(3)}$ oe **B1** for (4, –25) or for $x = 0$ and $x = 4$ soi	isw second derivative. Condone poor notation for derivative. e.g. B2 for $y = 3x^2 - 12x$, similarly for M1. *their* $\frac{dy}{dx}$ must not be second derivative. $x(3x - 12)$

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Question	Answer	Marks	Partial Marks	Guidance
24(b)	A correct sketch with (0, 7) maximum stated (4, –25) minimum stated 	**3**	**B2** for a correct sketch with (0, 7) maximum stated or (4, –25) minimum stated or for a correct sketch with appropriate points labelled as maximum and minimum or for a correct sketch with (0, 7) and (4, –25) marked at the maximum and minimum points or **M1** for reasonable sketch of any cubic or **B1** for a sketch not of cubic shape with identification of local maximum at (0,7) and a local minimum at (4,-25)	For M1, cubic may be positive or negative. Cubic should have only two turning points. Ignore position of any horizontal and / or vertical axes drawn. 0 marks if no sketch drawn.
25(a)(i)	$5\mathbf{n} - \mathbf{m}$	**1**		
25(a)(ii)	$2\mathbf{n} - \frac{1}{5}\mathbf{m}$ or $\frac{1}{5}(10\mathbf{n} - \mathbf{m})$	**3**	**M2** for $\frac{1}{5}\mathbf{m} + \frac{2}{5}$*their* $(5\mathbf{n} - \mathbf{m})$ oe or **M1** for a correct route or for $\overrightarrow{BQ} = \frac{2}{5}$*their* $(5\mathbf{n} - \mathbf{m})$ or for $\overrightarrow{CQ} = -\frac{3}{5}$*their* $(5\mathbf{n} - \mathbf{m})$	$-\frac{4}{5}\mathbf{m} + 5\mathbf{n} - \frac{3}{5}$*their* $(5\mathbf{n} - \mathbf{m})$ e.g. $PB + BQ$ Condone a mix of notation or $\overrightarrow{QC}$ or $\overrightarrow{QB}$ correct for M1.

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Question	Answer	Marks	Partial Marks	Guidance
25(b)	$\overrightarrow{QD} = 6\mathbf{n} - \frac{3}{5}\mathbf{m}$ oe or $\overrightarrow{PD} = 8\mathbf{n} - \frac{4}{5}\mathbf{m}$ oe	**B1**		Allow unsimplified
	For showing any two of $\overrightarrow{QD}$, $\overrightarrow{PD}$ and $\overrightarrow{PQ}$ share a common factor, e.g. $\overrightarrow{QD} = 3(2\mathbf{n} - \frac{1}{5}\mathbf{m})$ or $\overrightarrow{PD} = 4(2\mathbf{n} - \frac{1}{5}\mathbf{m})$	**B1**		Other pairs with common factors are acceptable e.g. $\overrightarrow{PQ} = 2\mathbf{n} - \frac{1}{5}\mathbf{m}$ and $\overrightarrow{QD} = 3(2\mathbf{n} - \frac{1}{5}\mathbf{m})$ $\overrightarrow{PD} = \frac{4}{5}(10\mathbf{n} - \mathbf{m})$ and $\overrightarrow{PQ} = \frac{1}{5}(10\mathbf{n} - \mathbf{m})$ If factorisation not shown, allow correct vectors in terms of **m** and **n** followed by a correct relationship, e.g. $\overrightarrow{QD} = \frac{3}{4}\overrightarrow{PD}$, $4\overrightarrow{QD} = 3\overrightarrow{PD}$, $\overrightarrow{QD} : \overrightarrow{PD} = 3 : 4$, $\frac{\overrightarrow{QD}}{\overrightarrow{PD}} = \frac{3}{4}$ $\overrightarrow{PQ} = \frac{1}{4}\overrightarrow{PD}$, $4\overrightarrow{PQ} = \overrightarrow{PD}$, $\overrightarrow{PQ} : \overrightarrow{PD} = 1 : 4$, $\frac{\overrightarrow{PQ}}{\overrightarrow{PD}} = \frac{1}{4}$ $\overrightarrow{QD} = 3\overrightarrow{PQ}$, $\frac{1}{3}\overrightarrow{QD} = \overrightarrow{PQ}$, $\overrightarrow{QD} : \overrightarrow{PQ} = 3 : 1$, $\frac{\overrightarrow{QD}}{\overrightarrow{PQ}} = 3$
25(b)	A correct conclusion, e.g. $\overrightarrow{QD}$ is a multiple of/is parallel to $\overrightarrow{PQ}$ and they have a common point *Q,* so they are collinear oe	**B1**		e.g. with common point *P* if $\overrightarrow{PQ}$ and $\overrightarrow{PD}$ used, or with common point *D* if $\overrightarrow{QD}$ and $\overrightarrow{PD}$ used. Allow without vector arrows for all B1 marks in **25(b)**.

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Question	Answer	Marks	Partial Marks	Guidance
26(a)	$11-7\sqrt{2}$ cao	**3**	**B2** for $11+3\sqrt{2}-5\sqrt{8}$ OR **M1** for $15+3\sqrt{2}-5\sqrt{8}-\sqrt{2\times 8}$ oe with at least three terms correct. **M1** for $\sqrt{8}=2\sqrt{2}$ soi	11 or $-7\sqrt{2}$ each count as two terms correct e.g. $5\sqrt{8}=10\sqrt{2}$
26(b)	[k =] 1.9 oe	**4**	**B3** for $\frac{19}{2\sqrt{5}}$ oe or **M3** for $\frac{7\sqrt{5}}{10}+\frac{12\sqrt{5}}{10}$ oe rational common denominator OR **B1** for $\sqrt{\frac{49}{20}}$ or better **M1** for $\frac{7}{2\sqrt{5}}$ and $\frac{12}{2\sqrt{5}}$ oe common denominator (not rational) or $\frac{7\sqrt{5}}{10}$ and $\frac{6\sqrt{5}}{5}$ oe rational denominator	B3 for answer $1.9\sqrt{5}$ or better for M3, e.g. $\frac{7}{2}+6=5k$ Note: the root symbol should extend below the fraction line. or better for B1 e.g. $\frac{7}{2\sqrt{5}}$, $\frac{7}{\sqrt{20}}$ oe e.g. $\frac{7}{\sqrt{20}}$ and $\frac{12}{\sqrt{20}}$, $7+12=\left(k\sqrt{5}\right)\left(2\sqrt{5}\right)$ oe e.g. $\frac{7\sqrt{5}}{10}$ and $\frac{6\sqrt{20}}{10}$

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