

# Cambridge IGCSE™

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**CAMBRIDGE INTERNATIONAL MATHEMATICS****0607/61**

Paper 6 (Extended)

**May/June 2025**

MARK SCHEME

Maximum Mark: 50

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**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 May/June 2025 series for most Cambridge IGCSE, Cambridge International A and AS Level components, and some Cambridge O Level components.

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This document consists of **12** printed pages.

**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.

**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.


















**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**

<b>Annotation</b>	<b>Meaning</b>
	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
	Communication mark
	Incorrect
	Follow through
Highlighter	Highlight a key point in the working
	Ignore subsequent work
	Method mark awarded zero
	Method mark awarded one
	Method mark awarded two

Annotation	Meaning
	Method mark awarded three
	Misread
	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.
	Premature rounding/approximation
	Special case
	Indicates that work/page has been seen
	Transcription error
	Correct
	Correct answer from incorrect working

**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**

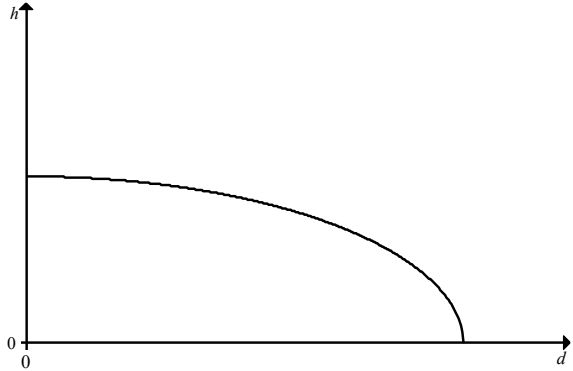
awrt	answers which round to
cao	correct answer only
dep	dependent
FT	follow through after error
isw	ignore subsequent working
nfwf	not from wrong working
oe	or equivalent
rot	rounded or truncated
SC	Special Case
soi	seen or implied

Question	Answer	Marks	Partial Marks																																																			
Investigation: Products of pairs																																																						
1(a)	<table><tr><td colspan="4" rowspan="2">Sequence</td><td rowspan="2">Increase</td><td colspan="2">Product of</td><td>Product difference</td></tr><tr><td>Inside pair</td><td>Outside pair</td><td></td></tr><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>1</td><td>6</td><td>4</td><td>2</td></tr><tr><td>6</td><td>8</td><td>10</td><td>12</td><td>2</td><td>80</td><td>72</td><td>8</td></tr><tr><td>7.2</td><td>10.2</td><td>13.2</td><td>16.2</td><td>3</td><td>134.64</td><td>116.64</td><td>18</td></tr><tr><td>88</td><td>92</td><td>96</td><td>100</td><td>4</td><td>8832</td><td>8800</td><td>32</td></tr><tr><td>70</td><td>75</td><td>80</td><td>85</td><td>5</td><td>6000</td><td>5950</td><td>50</td></tr></table>	Sequence				Increase	Product of		Product difference	Inside pair	Outside pair		1	2	3	4	1	6	4	2	6	8	10	12	2	80	72	8	7.2	10.2	13.2	16.2	3	134.64	116.64	18	88	92	96	100	4	8832	8800	32	70	75	80	85	5	6000	5950	50	4	B1 for each row
	Sequence						Increase	Product of		Product difference																																												
					Inside pair	Outside pair																																																
	1	2	3	4	1	6	4	2																																														
	6	8	10	12	2	80	72	8																																														
	7.2	10.2	13.2	16.2	3	134.64	116.64	18																																														
	88	92	96	100	4	8832	8800	32																																														
70	75	80	85	5	6000	5950	50																																															
One calculation to justify the required terms of a sequence  or multiplication of a correct pair or subtraction of ( <i>their</i> ) outer and ( <i>their</i> ) inner pairs or in row three: $116.64 + 18 = 134.64$ or for last row: $\sqrt{6000}$ or $n^2 + 5n - 6000 [= 0]$ or correct use of quadratic formula or sketches for $y = x(x + 5)$ and $y = 6000$ or sketch of $y = x^2 + 5x - 6000$							C1																																															
1(b)(i)	72 in row 6	1																																																				
	Three of the differences 6, 10, 14, 18, 22 seen or calculation of product difference for <i>their</i> 4-term sequence with increase 6	C1																																																				
1(b)(ii)	$2n^2$ oe mark final answer	1																																																				
	Three common second differences of 4 seen or square numbers 1, 4, 9, [16] seen	C1																																																				
1(b)(iii)	$2 \times 11^2$	C1	FT <i>their</i> algebraic expression																																																			
	242	1																																																				
1(b)(iv)	Any 4-term sequence with increase of 11 and 2nd term $\times$ 3rd term – 1st term $\times$ 4th term = 242	1																																																				

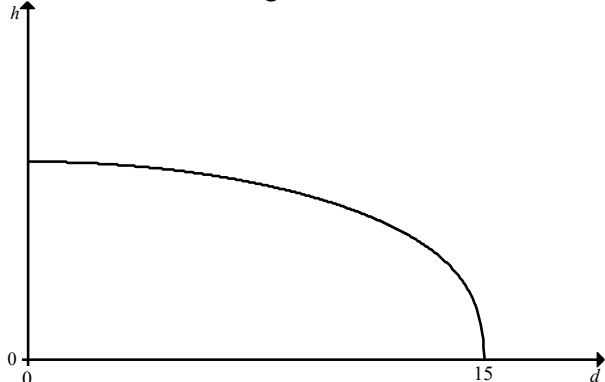
Question	Answer	Marks	Partial Marks										
2(a)(i)	<table><tr><th>Increase, <math>n</math></th><th>Product difference</th></tr><tr><td>1</td><td>1</td></tr><tr><td>2</td><td>4</td></tr><tr><td>3</td><td>9</td></tr><tr><td>4</td><td>16</td></tr></table>	Increase, $n$	Product difference	1	1	2	4	3	9	4	16	1	
	Increase, $n$	Product difference											
	1	1											
	2	4											
	3	9											
	4	16											
One 3-term sequence seen and products and difference shown													
C1													
2(a)(ii)	$n^2$ oe mark final answer	1											
2(b)(i)	<table><tr><th>Increase, <math>n</math></th><th>Product difference</th></tr><tr><td>1</td><td>3</td></tr><tr><td>2</td><td>12</td></tr><tr><td>3</td><td>27</td></tr><tr><td>4</td><td>48</td></tr></table>	Increase, $n$	Product difference	1	3	2	12	3	27	4	48	1	
	Increase, $n$	Product difference											
	1	3											
	2	12											
	3	27											
	4	48											
Two 5-term sequences seen from a sequence with increase of 2, a sequence with increase of 3, a sequence with increase of 4  and for one sequence, products and difference shown													
C2													
C1 for one 5-term sequence seen and products and difference shown													
2(b)(ii)	12	1											
2(c)(i)	$4n^2$ oe in row 4	1											
2(c)(ii)	$(x - 2)n^2$ oe	1											



Question	Answer	Marks	Partial Marks
2(d)	Sketches of $y = (x - 2)x^2$ and $y = 1859$ or sketch of $y = x^3 - 2x^2 - 1859$ or table of values or $\sqrt[3]{1859}$	<b>C1</b>	
	$[x =]$ or $[n =]$ 13	<b>1</b>	
	1st term + $(\text{their}13 - 1) \times \text{their}13$ or sequence written out or expression for $n$ th term for <i>their</i> sequence	<b>C1</b>	<b>FT</b> <i>their</i> 13 providing it is a stated integer such that $11 \leq n \leq 15$
	Correct first and last terms	<b>1</b>	<b>FT</b> <i>their</i> 13 providing it is a stated integer such that $11 \leq n \leq 15$
Modelling: Crossed poles			
3(a)(i)	$[P] QZ$ or $[P] QY$	<b>1</b>	
3(a)(ii)	$\frac{h}{a}$	<b>1</b>	
3(b)(i)	8	<b>1</b>	
3(b)(ii)	$d^2 + 8^2 = 10^2$ or better or $\left(\frac{1}{2}d\right)^2 + 4^2 = 5^2$ or better	<b>C1</b>	<b>FT</b> <i>their</i> 8 providing $4 < \text{their } 8 < 10$ or <i>their</i> 5 providing $4 < \text{their } 5 < 10$ and <i>their</i> 5 is not 8
	6	<b>1</b>	
3(c)(i)	$h^2 + \left(\frac{1}{2}d\right)^2 = 5^2$ oe or $(2h)^2 + d^2 = 10^2$ oe or $a^2 + d^2 = 10^2$ oe <b>and</b> $\frac{\frac{1}{2}d}{d} = \frac{h}{a}$ oe stated or used at some point	<b>M1</b>	
	Correct completion to given answer $h = \frac{1}{2}\sqrt{100 - d^2}$	<b>A1</b>	

Question	Answer	Marks	Partial Marks
3(c)(ii)	<p>Correct sketch</p> 	1	Correct shape, meeting both axes
	Correct indication of scale for both axes	C1	
3(d)(i)	Valid description: The poles are lying on the ground oe	1	
3(d)(ii)	Valid reason: There is no crossing point or There is no gap between the <b>posts</b> or The <b>poles</b> are vertical oe	1	
4(a)	$h = \frac{1}{2}\sqrt{225 - d^2}$ mark final answer	1	

Question	Answer	Marks	Partial Marks
4(b)	<p>Sketch of <math>h = \frac{1}{2}\sqrt{225 - d^2}</math> and <math>h = 6</math> and point of intersection indicated on diagram or graphs labelled</p> <p>or sketch of <math>h = \frac{1}{2}\sqrt{225 - d^2} - 6</math> and point of intersection with the <math>d</math>-axis indicated on diagram or graph labelled</p> <p>OR</p> <p><math>6 = \frac{1}{2}\sqrt{225 - d^2}</math> or <math>12 = \sqrt{225 - d^2}</math> and rearrangement to <math>d^2 = 225 - 12^2</math> or <math>\sqrt{225 - 12^2}</math></p> <p>or rearrangement of model <math>h = \frac{1}{2}\sqrt{225 - d^2}</math> to <math>d^2 = 225 - (2h)^2</math></p> <p>or <math>[d =]\sqrt{225 - (2h)^2}</math> and substitution of <math>h = 6</math></p> <p>OR</p> <p>diagram with 6 and 12 marked or <math>6 \times 2</math> and <math>d^2 = 225 - 12^2</math> or <math>\sqrt{15^2 - 12^2}</math></p> <p>or diagram with 6 and 7.5 marked or <math>15 \div 2</math> and <math>\left(\frac{1}{2}d\right)^2 = 7.5^2 - 6^2</math> or <math>\sqrt{7.5^2 - 6^2}</math></p> <p>OR</p> <p><math>\sqrt{7.5^2 - 6^2}</math> and <math>4.5 \times 2</math> or <math>6 \times 2</math> and <math>\sqrt{15^2 - 12^2}</math></p>	C2	<p>C1 for sketch of <math>h = \frac{1}{2}\sqrt{225 - d^2}</math> or <math>h = \frac{1}{2}\sqrt{225 - d^2} - 6</math></p> <p>OR</p> <p>C1 for correct substitution of <math>h = 6</math> into <math>h = \frac{1}{2}\sqrt{225 - d^2}</math> or <math>2h = \sqrt{225 - d^2}</math> or <i>their</i> model in terms of <math>h</math> and <math>d</math> in 4(a) or rearrangement of model <math>h = \frac{1}{2}\sqrt{k - d^2}</math> to <math>d^2 = k - (2h)^2</math> or <math>[d =]\sqrt{k - (2h)^2}</math> where <math>k</math> is a positive constant</p> <p>OR</p> <p>C1 for either diagram or <math>6 \times 2</math> or <math>15 \div 2</math> or <math>d^2 = 225 - 12^2</math> or <math>\sqrt{15^2 - 12^2}</math> or <math>\left(\frac{1}{2}d\right)^2 = 7.5^2 - 6^2</math> or <math>\sqrt{7.5^2 - 6^2}</math></p> <p>OR</p> <p>C1 for <math>\sqrt{7.5^2 - 6^2}</math> or <math>4.5 \times 2</math> or <math>6 \times 2</math> or <math>\sqrt{15^2 - 12^2}</math></p>
	9 [m]	1	
5(a)(i)	$\frac{h}{b}$ $\frac{h}{c}$	1	

Question	Answer	Marks	Partial Marks
5(a)(ii)	$\left[ \frac{h}{b} + \frac{h}{c} \right] \frac{x}{d} + \frac{d-x}{d}$ and correct completion to 1	1	dep on (a)(i) correct
5(a)(iii)	$b^2 + d^2 = 20^2$ oe $c^2 + d^2 = 15^2$ oe	M2	M1 for each equation or for $b = \sqrt{20^2 - d^2}$ and $c = \sqrt{15^2 - d^2}$
	$b = \sqrt{400 - d^2}$ and $c = \sqrt{225 - d^2}$ or $\frac{h}{\sqrt{20^2 - d^2}} + \frac{h}{\sqrt{15^2 - d^2}} = 1$ leading to $\frac{h}{\sqrt{400 - d^2}} + \frac{h}{\sqrt{225 - d^2}} = 1$	A1	
5(a)(iv)	$\frac{h\sqrt{225 - d^2} + h\sqrt{400 - d^2}}{\sqrt{400 - d^2}\sqrt{225 - d^2}} = 1$ or $h \left( \frac{1}{\sqrt{400 - d^2}} + \frac{1}{\sqrt{225 - d^2}} \right) = 1$ and $h \left( \frac{\sqrt{225 - d^2} + \sqrt{400 - d^2}}{\sqrt{400 - d^2}\sqrt{225 - d^2}} \right) = 1$  OR $h\sqrt{225 - d^2} + h\sqrt{400 - d^2} = \sqrt{400 - d^2}\sqrt{225 - d^2}$  leading to given answer $h = \frac{\sqrt{400 - d^2}\sqrt{225 - d^2}}{\sqrt{225 - d^2} + \sqrt{400 - d^2}}$	1	
5(a)(v)	Correct sketch meeting $d$ axis at 15 	1	
5(b)(i)	7.5[0] m	1	
5(b)(ii)	18.3 [m] 12.7 [m]	2	B1 for each