



Cambridge IGCSE™

CAMBRIDGE INTERNATIONAL MATHEMATICS

0607/42

Paper 4 (Extended)

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MARK SCHEME

Maximum Mark: 75

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 **13** printed pages.

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.

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.

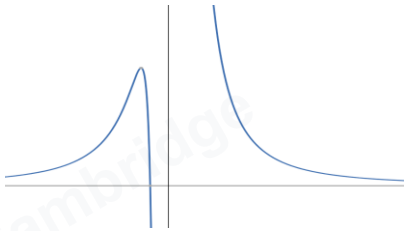
The annotations listed below were available to examiners marking this component in this series.

Annotations

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

Annotation	Meaning
C	Communication mark
X	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

Annotation	Meaning
	Correct
	Correct answer from incorrect working

Question	Answer	Marks	Partial Marks	Guidance
1	Kite or isosceles trapezium	1		
2	$7c - 2d$ final answer	2	B1 for $7c - kd$ or $jc - 2d, j \neq 0$	Allow B1 for $7c$
3	$\frac{15x}{yp}$ final answer	1		
4	$2p(p - 4t)$ final answer	2	B1 for $p(2p - 8t)$ or $2(p^2 - 4pt)$ or for correct answer seen then spoiled	Condone omission of final bracket
5(a)	Correct sketch 	3	B2 for left branch correct or for both branches correct but joined or B1 for left branch with slight error (e.g. curl back or not crossing x -axis) in shape or feathering B1 for right branch correct	Allow asymptotes of curves to touch axes but not cross Condone slight feathering and penalise feathering only once
5(b)	-0.2 or $-\frac{1}{5}$	1		Do not allow $(-0.2, 0)$
5(c)	$(-0.3, 18.5$ or 18.51 to $18.52)$	2	B1 for each	Allow $-0.300\dots$ and $\frac{500}{27}$
5(d)	$k \leq 0, k > \text{their } 18.5$	2	B1 for each If 0 scored SC1 for $0 \geq k > \text{their } 18.5$	Condone $k < 0$ but not $k \geq \text{their } 18.5$ Allow y and $f(x)$ for k but not x Condone use of 25 or -5 in their inequalities.

Question	Answer	Marks	Partial Marks	Guidance
5(e)	Translation $\begin{pmatrix} -1 \\ 0 \end{pmatrix}$	2	B1 B1	More than one transformation scores 0. Do not allow translocation. Extra properties treat as choice. Allow $\begin{pmatrix} -1 \\ 0 \end{pmatrix}$ vector in words e.g. 1 to the left Shift to the left by -1 scores 0 Do not allow in coordinate form
6(a)	12	2	B1 for answer 2 or 3 or 4 or 6 or M1 for $180 = 2 \times 2 \times 3 \times 3 \times 5$ and $96 = 2 \times 2 \times 2 \times 2 \times 2 \times 3$ or $2 \times 2 \times 3$ as final answer or two fully correct factor trees or tables	
6(b)	x^{14}	1		
7	356	2	M1 for $(...) \times \left(1 - \frac{20}{100}\right) = 284.80$ or better	e.g. $284.80 \div 0.8$ Do not accept e.g. $1 - 20\%$ unless recovered
8	10	2	B1 for $x = 36$ soi	e.g. Implied by $4x = 144$ Answer decagon, allow after 10 seen in working
9	$\frac{-(-1) \pm \sqrt{(-1)^2 - 4(3)(-3)}}{2(3)}$	M2	M1 for $\sqrt{(-1)^2 - 4(3)(-3)}$ or for $\frac{-(-1) \pm \sqrt{k}}{2(3)}$	Accept 1 for $-(-1)$ and 1 for $(-1)^2$ and 6 for $2(3)$ and $\sqrt{1+36}$ but not $\sqrt{37}$ for $\sqrt{(-1)^2 - 4(3)(-3)}$ Allow recovery from -1^2 to 1 if seen Square root sign must reach -4 Division sign must reach $\pm$ sign
	$-0.85, 1.18$	B1		Allow $-0.847...$, $1.180...$ surd answers score 0
10	$[y =] \frac{2}{x^3} \text{ oe}$	2	M1 for $\frac{1}{4} = \frac{k}{2^3}$	

Question	Answer	Marks	Partial Marks	Guidance
11(a)	-2.5 oe	1		
11(b)	$80 \times \left(-\frac{1}{2}\right)^{n-1}$ oe	2	M1 for $\dots \times \left(-\frac{1}{2}\right)^k$ or $\dots \div (-2)^k$ or $\dots \times (-2)^{-k}$ or M1 for correct answer seen then spoiled If 0 scored SC1 for answer $80 \times \left(\frac{1}{2}\right)^{n-1}$ oe or e.g. $80 \div -2^{n-1}$ i.e. correct but brackets omitted	e.g. $160 \times \left(\frac{1}{2}\right)^n \times (-1)^{n-1}$ oe is full marks e.g. $160 \times \left(\frac{1}{2}\right)^n$
12(a)	28 000	2	M1 for $\{\dots\} \times \left(1 - \frac{10}{100}\right)^2 = 22\,680$ or better	Do not allow 1 – 10% unless recovered

Question	Answer	Marks	Partial Marks	Guidance
12(b)	8 nfw	4	B3 for 7.77 or 7.772... OR or M3 for $n \log \left(1 - \frac{10}{100} \right) = \log \left(\frac{10000}{22680} \right)$ oe or good sketch indicating value between 7 and 8 or correct trials reaching 7 and 8 or M2 for $\left(1 - \frac{10}{100} \right)^n = \frac{10000}{22680}$ oe or suitable sketch with $n > 1$ or at least 3 correct trials or M1 for $22680 \times \left(1 - \frac{10}{100} \right)^n = 10000$ oe soi by at least 2 correct trials with $n > 1$ If 0 scored, SC2 for answer of 10 from using 28 000	Do not allow 1 – 10% unless recovered 1 20412 2 18370.80 3 16533.72 4 14880.348 5 13392.3132 6 12053.08188 7 10847.77369 8 9762.996323 Values to 3 sf acceptable for correct trials Use of 28 000 – must lead to answer of 8 from 9.772 for full marks
13(a)	1.86×10^{175} cao	2	B1 for 18.6×10^{174} or $k \times 10^{175}$	
13(b)	4.8×10^y cao	2	B1 for figs 48×10^k	
14	10.1 or 10.07 to 10.08	2	M1 for $\left(\frac{h}{8} \right)^3 = 2$ oe or better or $\sqrt[3]{2}$ oe seen	not $\frac{2x}{x}$ for the 2 in $\left(\frac{h}{8} \right)^3 = 2$ allow $8 \times 2^{\frac{1}{3}}$ or $2^{\frac{10}{3}}$ oe allow $8^3 = 512$, $512 \times 2 = 1024$ as oe for M1

Question	Answer	Marks	Partial Marks	Guidance
15(a)	51.1 or 51.09...	3	M1 for $\frac{1}{2} \times 4.5 \times 9 \times \sin 60$ oe M1 for $\frac{1}{2} \times 9 \times 13 \times \sin 35$	17.5370... 33.5542...
15(b)	32.9 or 32.92 to 32.93...	5	M1 for $[AB =] 9 \sin 60$ or $\sqrt{9^2 - 4.5^2}$ oe M2 for $[AD =] \sqrt{9^2 + 13^2 - 2 \times 9 \times 13 \cos 35}$ oe or M1 for $[AD^2 =] 9^2 + 13^2 - 2 \times 9 \times 13 \cos 35$ M1 dep for 4.5 + <i>their</i> AB + 13 + <i>their</i> AD dep on <i>their</i> AB and <i>their</i> AD coming from Pythagoras or trigonometry	7.79 or 7.794... May be done in stages. Allow M2 after correct substitution in cos rule and square root soi later. Implied by 7.64 or 7.636 to 7.637 58.318.... Allow if values seen in (a)
15(c)	7.37 or 7.372...	3	M2 for $\cos 35 = \frac{\text{dist}}{9}$ or better oe or $d^2 = 9^2 - (9 \sin 35)^2$ or better or M1 for recognising shortest distance	 may be on diagram – must be clear perpendicular $\frac{1}{2} \times 13 \times \text{height} = \text{their area } ADC$ or $9 \sin 35$ or 5.16 or 5.162... imply M1
16	9.47 or 9.468 to 9.469...	3	M2 for $62.6 \div \left(\frac{80}{360} \times \pi \right)$ oe or better or M1 for $\frac{80}{360} \times \pi r^2 = 62.6$ oe or better	$r^2 = 89.65$ to 89.67 or 89.7 for M2 For M2 or M1 condone use of 3.14 or $\frac{22}{7}$ for π

Question	Answer	Marks	Partial Marks	Guidance
17(a)	98.1	2	M1 for at least 3 mid-values soi	30, 75, 105, 150 210, 2325, 4725, 2550 9810
17(b)(i)	38, 83	1		
17(b)(ii)	Correct curve	2	B1 FT for 3 or 4 points correctly plotted or for reasonable increasing curve or polygon through <i>their</i> 4 points	Mark curve first accuracy $\pm \frac{1}{2}$ small square. Ignore curve to left of (first upper limit) Allow curve to imply plots. FT curve up to $\frac{1}{2}$ small square of their points. Ignore blocks, blocks alone score 0.
17(b)(iii)(a)	FT <i>their</i> median	1	dep on increasing curve or polygon	accuracy $\pm \frac{1}{2}$ small square (± 2) In all parts of (iii) do not FT a straight line
17(b)(iii)(b)	FT <i>their</i> lower quartile	1	dep on increasing curve or polygon	accuracy $\pm \frac{1}{2}$ small square (± 2)
17(b)(iii)(c)	FT <i>their</i> 70 minutes	1	dep on increasing curve or polygon	accuracy $\pm \frac{1}{2}$ small square (± 1)
17(c)	trial of $\frac{n}{100} \times \frac{n-1}{99}$ oe with $n = 7, 31, 45$ or 17 or $n^2 - n - 1980 = 0$ oe	M1		
	$90 < t \leq 120$	A1		
18(a)	60	1		
18(b)	340	1	FT $100 + 4 \times \text{their } 60$	

Question	Answer	Marks	Partial Marks	Guidance
18(c)	65.4 or 65.37 to 65.38	2	M1 for $\cos (...) = \frac{5}{12}$ oe or for recognition of angle	Height of pyramid = $\sqrt{12^2 - 5^2} = 10.908..$ for use with sine or tan May be on diagram
19	$\frac{1+w}{1-x}$ oe final answer	4	B1 for $(1-w)(1+w)$ oe B2 for $(1-w)(1-x)$ oe or B1 for $[1](1-w) - x(1-w)$ oe or $[1](1-x) - w(1-x)$ oe	$-\frac{w+1}{x-1}$ scores full marks $\frac{w+1}{-(x-1)}$ BOD full marks $1-w-x(1-w)$ is B0 $1-x-w(1-x)$ is B0