

Cambridge International AS & A Level

THINKING SKILLS

9694/31

Paper 3 Problem Analysis and Solution

October/November 2025

MARK SCHEME

Maximum Mark: 50

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

This document consists of **8** 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.












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
	Correct item
	Incorrect item
	Individual mark of partial credit
	Double mark of partial credit
	Essential element of answer/working missing
	Judged to be not good enough to earn the relevant credit
	Benefit of doubt
	Correct follow through
	Transcription error
	Special case
	Working seen but no credit awarded; blank page checked
Highlighter	Use anywhere it is helpful to clarify the marking

NOTES FOR MARKERS**Working**

Where a final answer is underlined in the mark scheme, full marks are awarded for a correct answer, regardless of whether there is any supporting working, unless an exception is noted in the mark scheme.

Supporting working is **not** needed to gain full marks, unless otherwise stated in the mark scheme.

If working clearly shows, beyond any doubt, that a correct answer derives purely from incorrect reasoning, that answer may be invalidated, unless otherwise stated in the mark scheme.

For partial credit, the evidence needed to award the mark will usually be shown on its own line in the mark scheme, or else will be defined in italic text.

For explanations and verbal justifications, apply the principle of ‘words to that effect’.

Units

Unless required by the question or mark scheme, units such as \$ do not need to be seen to award the marks.

Incorrectly labelled work

If the candidate has labelled their work with the wrong Question/part number, highlight the label(s) and add a comment to flag it. This will help avoid confusion for anyone checking the script later on.

No response

If there is any attempt at a solution award 0 marks not NR. ‘–’ or ‘?’ constitute no attempt at a solution.

Abbreviations

The following abbreviations may be used in a mark scheme:

AG	answer given (on question paper)
awrt	answer which rounds to
dep	mark depends on earlier, asterisked (*), mark
ft	follow through (from earlier error)
oe	or equivalent
SC	special case
soi	seen or implied

Question	Answer	Marks
1(a)(i)	February	1
1(a)(ii)	13 payments in 12 months, so at least one month must have two payments	1
1(b)(i)	5 weeks after 4 would give <u>25%</u> increase	1
1(b)(ii)	$53 - 48 =$ <u>5</u> times	1
1(c)	\$5400 per annum = \$450 per month, so \$400 monthly income [1] $12 \times \$50 =$ <u>\$600</u>	2
1(d)	\$500	1
1(e)	Take benefit in 11 months and pay rest of income in the other month [1] Maximum benefit per month is \$150 (at \$200 income) [1] $11 \times \$150 =$ <u>\$1650</u> [1]	3

Question	Answer	Marks
2(a)	Points awarded are $3 \times (10 + 20 + 30 + 50) = 330$ Biggest deduction for 2 questions is $0 - 30 - 50 - 70 = (-)150$ [1] So least possible total is $330 - 150 = 180$ [1] AG	2
2(b)	2 correct, 2 incorrect and 1 pass	1
2(c)	<u>65, 25</u> from (4, 0, 1) and (2, 3, 0) <u>40, 0</u> from (3, 1, 1) and (1, 4, 0) <u>30, -10</u> from (3, 0, 2) and (1, 3, 1) <u>0, -40</u> from (1, 4, 0) and (1, 0, 4) <i>2 marks for 3 correct with at most one incorrect</i> <i>OR</i> <i>2 marks for a list of 4 containing only correct pairs of scores or pairs of scores in which one player answered no questions correctly:</i> 15, -25 from (2,2,1) and (0,5,0), 5, -35 from (2,1,2) and (0,4,1), -5, -45 from (2, 0, 3) and (0, 3, 2), -25, -65 from (0,5,0) and (0,1,4), -35, -75 from (0,4,1) and (0,0,5) <i>OR</i> <i>1 mark for 2 correct or finding vectors (-2, +3, -1) or (0, +4, -4)</i>	3
2(d)(i)	<u>Alexa (3, 2, 0)</u> <u>Betty (3, 2, 0)</u> <u>Charlie (3, 0, 2)</u> <u>Damon (4, 1, 0)</u> <i>1 mark for any pair from AC, AD, BC, BD, CD correct</i>	2

Question	Answer	Marks
2(d)(ii)	If Charlie had given <u>answers</u> (even if incorrect) <u>to the two questions</u> he passed, then he would have at least 30 points more, so a total of at least 300, which is more than 285	1
2(e)	8 Hard questions, one with Double and one with Triple, so $6 \times 2 + 4 + 6 = 22$ AG	1
2(f)	Highest: scores in first 5 questions 1, 2, 1, 2, 1 (7) then Hard Double (4), Easy (1), Hard Triple (6), total 18 [1] Lowest: Valid example for questions 1-5, e.g. 3, 4, 0, 0, 0 or 3, 2, 2, 0, 0 then Hard (2), Easy (1), Hard (2), total 12 [1] <i>SC: 1 mark for 12 and 18 with no/incorrect example given</i>	2
2(g)	<ul style="list-style-type: none"> • Alexa must have answered her last three questions correctly to score 16 with one of them tripled. • Therefore she answered <i>at most</i> 2 questions incorrectly. • The <i>only</i> possibility is that Damon scores 6, 4 and 0 from his final three questions. • This means that he must have answered 3 questions incorrectly. <p><i>3 marks for all four steps in the reasoning given. 2 marks for any two given. 1 mark for any one given</i></p>	3

Question	Answer	Marks
3(a)	$5/6 \times 30 = \underline{25}$ km	1
3(b)(i)	10 minutes passed and SatNav thinks it should have taken 5 minutes [1] So half the speed limit: <u>15 km/h</u> OR 45 minutes to go = 22.5 km left [1] 2.5 km travelled in 10 minutes = <u>15 km/h</u>	2
3(b)(ii)	<u>11:40</u>	1
3(c)	Mike takes 10 minutes to accomplish a distance that the SatNav thinks should take 12 minutes [1] 10 km in 12 minutes = <u>50 km/h</u>	2
3(d)	A further 63 minutes at the maximum speed of 60 km/h [1] plus 10 km already travelled makes a maximum total distance of <u>73 km</u>	2
3(e)	Assuming a speed for Mike – say, 60 km/h: The total distance would be 90 km, of which Mike has driven 9 km 9 km in 15 minutes for the HD journeys is 36 km/h [1] which is <u>3/5</u> of 60 km/h oe OR $10/15 \times 9/10 = \underline{3/5}$ <i>1 mark for either fraction correct in a product of two fractions</i> OR $(90 - 81)/(115 - 100) = \underline{3/5}$ <i>1 mark for correct numerator or denominator</i>	2

Question	Answer	Marks
4(a)	George has 5 counters in his tray once the counters have been placed. After the first card has been applied, this will increase to 10 counters. [1] The second card will be applied and double this to 20 counters. The final card will not be applied, so he will return the 1 counter to his tray. [1]	2
4(b)	Rachel has 6 counters in her tray once the counters have been placed. After the first card has been applied, this will increase to 12 counters, and once the final card has been applied it will increase to <u>17</u> counters.	1
4(c)(i)	George would have two more / 23 counters	1
4(c)(ii)	George would have 15 counters [1] Rachel would have 15 counters [1]	2
4(d)(i)	George cannot have placed more counters than Rachel on the first position, as he would have to have more than 24 counters at the end of the round in that case [1]	1
4(d)(ii)	To get 24 counters, he must have gained 5 and lost 2 [1] From the given information, he must have placed at least 1 in each position So <u>1</u> and <u>1</u>	2
4(e)(i)	Score $(8 + 5) \times 2 = 26$ [1] <i>Any example with the following features (where Player 1 achieves the maximum possible):</i> Player 1 adds no counters to 'Your opponent loses 5 counters' and Player 2 does not apply the 'Your opponent loses 5 counters' card [1] Player 1 adds 1 counter to 'Add 5 counters to your tray', in an earlier position than 1 counter added to 'Double the number of counters in your tray' card [1]	3
4(e)(ii)	<i>Any example in which 5 counters are allocated by the player who ends on 0 counters with the following features:</i> For each position where counters are allocated, the opponent has not allocated more counters (so no counters are returned to the tray) [1] The player adds no counters to 'You gain 5 counters' [1] The player adds no counters to the Double card [1] OR The opponent will apply the 'Your opponent loses 5 counters' card before the player applies the Double card [1] <i>SC: 1 mark for an example in which no counters are allocated to 'Add 5' or to 'Double'</i>	3