



# **Cambridge International AS & A Level**

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## **THINKING SKILLS**

**9694/11**

Paper 1 Problem Solving

**October/November 2023**

### **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 October/November 2023 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 **9** 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 descriptors 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.

**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.

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'.

**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:

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

**Annotations**

Where the answer is underlined in the mark scheme, and a candidate's correct final answer is both clear and clearly identified (encircled, underlined etc.), it is not necessary to annotate that item; nor is it necessary to annotate when there is No Response.

Where there is a response that scores 0, either SEEN should be used, or some other annotation(s) to indicate why no marks can be awarded (Caret, TE, NGE, Cross).

Partial credit should be indicated with a 1 (or, occasionally, a 2) at the point at which that mark has been earned.

The highlighter should be used anywhere it is helpful to clarify the marking.

	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
<b>Highlight</b>	Use anywhere it is helpful to clarify the marking

Question	Answer	Marks
1(a)	Visit 5	1
1(b)	Visits 1–3	1

Question	Answer	Marks
2(a)	Split into 3 or 4 groups each of size between 11 and 20 (e.g. 15, 15, 16 or 11, 11, 11, 13) means charge for each person is \$20, giving total of $\$46 \times 12 = \$552$	1
2(b)	Least total is achieved with one group of 8 adults and 3 children and two groups containing 11–20 children summing to 35 Charge $11 \times \$12 (= \$132) + 35 \times \$10 (= \$350)$ Total charge $\$132 + \$350 = \$482$  <i>1 mark for any one of: correct set of groups \$132 seen \$350 seen final answer \$500 (groups of 18, 20 and 8)</i>	2

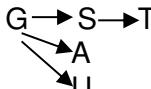
Question	Answer	Marks
3(a)	<u>4 boxes of 7 and 6 boxes of 12</u>	1
3(b)	<u>5 boxes of 7 and 3 boxes of 12</u>	1
3(c)	Yes. 6 boxes of 12 (72 chairs) cost \$240, which is less than \$245	1

Question	Answer	Marks
4(a)	103 g, 123 g and 135 g 107 g, 123 g and 128 g 107 g, 114 g and 140 g  <i>1 mark for 2 combinations correct in a list of no more than four</i>	2
4(b)	<u>128 g</u>	1

Question	Answer	Marks
5(a)(i)	William	1
5(a)(ii)	James and Simon	1
5(b)	Mark, Tony, Pete [1] Totals for others are Donald – 51, Frank – 51, James – 27, Simon – 39, William – 51 Frank [1] has the highest Skill rating	2
5(c)	<u>James has lower scores in all three ratings than Donald, Mark, Simon and William</u> , [so his overall score must be lower than the overall scores of all 4 of these players]  <i>1 mark for any two of the four players identified</i> <i>OR</i> <i>1 mark for James has second lowest score in all 3 categories</i>	2

Question	Answer	Marks
6(a)	$30/8 = 3$	1
6(b)	24 callers [8, 3, 2] 30 callers [10, 3, 3] 60 callers [20, 7, 6] 80 callers [26, 10, 8] <i>1 mark for any one of these sets</i> 120 callers [40, 15, 12] [1] received 67 prizes The 126th caller would have received the 69th prize, So <u>125</u>  <i>OR</i>  <i>1 mark for any correct set of prizes for any specified number of callers greater than 49</i> <i>1 mark for any correct set of prizes for any specified number of callers between 120 and 130</i> <u>125</u>	3
6(c)	Number of callers: $7 \times 10 \times 10 = 700$ 700 pens $700/5=140$ baseball caps $700/10=70$ T-shirts <i>1 mark for any two quantities</i> +10% <u>770 pens, 154 baseball caps, 77 T-shirts</u>	2

Question	Answer	Marks
7(a)	<p>The entry cannot have been before 14:00 because \$6.44 is not a multiple of 6¢ [1]</p> <p>Number of minutes charged for = <math>(894 - 150) \div 4</math> = <u>186 minutes / 3 hours 6 minutes</u></p>	2
7(b)	<p>Entry at 13:56 would have cost <math>\\$2.50 + (81 \times 6\text{¢}) = \\$7.36 / 736\text{¢}</math> Entry at 14:03 cost <math>\\$1.50 + (74 \times 4\text{¢}) = \\$4.46 / 446\text{¢}</math> <i>1 mark for either</i> Reduction was <u><math>\\$2.90 / 290\text{¢}</math></u></p> <p><i>OR</i></p> <p>Cost of entry was \$1.00 less AND 14:03 to 15:17 cost \$1.48 less 13:56 to 14:03 would have cost 42¢ / \$0.42 <i>1 mark for either</i> Total reduction was <u><math>\\$2.90 / 290\text{¢}</math></u></p>	2

Question	Answer	Marks
8(a)	 <p><i>1 mark for GST</i> <i>1 mark for GA and GU</i></p>	2
8(b)	<p><u>B</u></p> <p><i>1 mark for correct tree for O or D</i></p>	2

Question	Answer	Marks
9	<p>In 3 minutes 20 seconds I walk <math>(200 \times 1.5) = 300\text{ m}</math> [1]</p> <p>He runs <math>(480 - 300) = 180\text{ m}</math> back to me (from the west gate) [1]</p> <p>The total distance he covers is <math>(600 + 180 + 180) = \underline{960\text{ m}}</math></p>	3

Question	Answer	Marks
10(a)	<p><u>4–10 June 2034</u> inclusive</p> <p><i>1 mark for working out the total of their ages on any particular date after 10th June 2017</i></p> <p><i>1 mark for any date within the correct range</i></p> <p><i>OR</i></p> <p><i>2 marks for ages 45, 39, 16</i></p> <p><i>SC: If 0 scored, award 1 mark for 2034</i></p>	3
10(b)	Yes, because they could celebrate 99 years on any date between 25 May and 3 June 2034 (inclusive) [and this is 10 days, which is more than the 7 days available for 100 years]	1

Question	Answer	Marks
11(a)(i)	<u>11</u>	1
11(a)(ii)	<u>12</u>	1
11(b)	<p>14 incorrect answers will reduce the starting score of 40 by 42 [1]</p> <p>1 additional correct and incorrect answer makes the overall reduction 40</p> <p>1 more correct answer requires 2 incorrect answers to reduce the final score to 0</p> <p><u>2</u></p> <p><i>Trial and error method:</i></p> <p><i>Score calculated for any number of correct answers, with the rest incorrect [1]</i></p> <p><i>Calculations shown for both 2 and 3 correct answers to show that 2 is possible, but 3 is not [1]</i></p>	2
11(c)	<p>If the round is not chosen: <math>20 + 2 \times 3 - 13 \times 1 = 13</math> points [1]</p> <p>If the round is chosen: <math>40 + 2 \times 5 - 13 \times 3 = 11</math> points</p> <p><u>2</u></p>	2

Question	Answer	Marks
11(d)	<p>Each correct answer scores 2 additional points when scoring is boosted and each incorrect answer loses 2 additional points when scoring is boosted, providing that the total score does not drop below 0</p> <p>3 correct and 17 incorrect scores: 4 points on boosted system 12 points on regular system</p> <p>2 correct and 17 incorrect scores: 0 points on boosted system 9 points on regular system</p> <p><u>9 points lost</u></p> <p><i>1 mark for any example calculated correctly for both systems (except 2 correct and 13 incorrect)</i> <i>OR</i> <i>2 marks for any example calculated correctly for both systems including at least 14 more incorrect answers than correct</i></p>	3

Question	Answer	Marks
12	<p>Since there are 12 Qs: There are 4 Qs that are Ms [1] There are 48 Ms There are 24 Ms that are Ws There are 120 Ws [1] There are 4 Ws that are Qs <math>4/12 = \frac{1}{3}</math> oe</p>	3