



Cambridge International AS & A Level

THINKING SKILLS

9694/12

Paper 1 Problem Solving

May/June 2021

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 May/June 2021 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 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:

AG	answer given (on question paper)
awrt	answer which rounds to
FT	follow through (from earlier error)
oe	or equivalent
SC	special case
soi	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 that this helps to identify the precise piece of the working to which another stamp pertains (or an inexplicit correct answer).

	Correct item
	Incorrect item
	Individual mark of partial credit
	Double mark of partial credit
	Essential element of answer/working missing
	Correct follow through
	Transcription error
	Judged to be not good enough to earn the relevant credit
	Benefit of doubt
	Working seen but no credit awarded; blank page checked
Highlight	Identifies the part of the working to which another stamp pertains

Question	Answer	Marks
1(a)	<u>Abraham, Luke and Peter</u> [2] <i>1 mark for any one of these omitted or any one additional one</i>	2
1(b)	<u>Luke</u>	1

Question	Answer	Marks
2	The total cost of the ingredients at the other store is $\\$1.75 + \\$5.50 + \\$2.25 = \\9.50 Kelly sells at 90% of $\\$9.50 = \\8.55 [1] $\\$8.55 - \\$1.70 - \\$2.00 = \\4.85 OR The total cost of the ingredients at the other store is $\\$1.75 + \\$5.50 + \\$2.25 = \\9.50 Kelly therefore needs the total cost of ingredients at her shop to be $\\$0.95$ less. [1] She is selling pasta at $\\$0.05$ less than the other store and sauce at $\\$0.25$ less than the other store, so the beef mince needs to be $\\$0.65$ less. <u>$\\$4.85$</u>	2

Question	Answer	Marks
3	<u>3774</u> <i>1 mark for any code (other than 0000) that satisfies conditions 1 and 2:</i> 1224, 2448, 2550, 4998 OR <i>1 mark for any code that satisfies conditions 1 and 3:</i> 1938, 2856, 3468, 4386, 4692	2

Question	Answer	Marks
4(a)(i)	Towards West Head It was the 10:15 departure from East Point (which arrived at West Head at 10:27). oe	1
4(a)(ii)	The walk took $(7.2 \div 4) \times 60 = 108$ minutes, so she arrived at East Point at 12:07. Award 1 mark for 108 (minutes) or 12:07. She was passed by the 10:15, 10:30, 10:45, 11:00, 11:15, 11:30 and 11:45 departures, so <u>7</u> times.	2
4(b)	The next departure from East Point was at 15:45, arriving back at West Head 12 minutes later at <u>15:57</u> .	1

Question	Answer	Marks
5(a)	<u>Oscar</u>	1
5(b)	Any amount between \$147 and \$153 (inclusive). <i>Award 1 mark for an answer between \$127 and \$133 (inclusive).</i>	2

Question	Answer	Marks
6(a)	<u>Susan</u> was the most popular girl's name in Kevin's year.	1
6(b)	Total $194 - 130$ shown = 64 [1] Each used at most 9 times, so $64/9$ rounded up to <u>8</u> . <i>Award 1 mark for (their 64)/9</i>	2

Question	Answer	Marks
7(a)	<u>\$15 400</u> <i>1 mark for sight of \$7200 (for 12 wins) or \$200 (for 2 goals against Wingfield)</i>	2
7(b)	\$1000 for 4th place AND \$3600 for 6 wins [1] 4 goals v Tilney and at least 1 goal in each of the other 5 wins, so a maximum of 11 goals scored in drawn and lost matches. [1] Maximum possible prize money is $(\$1000 + \$3600 + 5 \times \$200 =)$ <u>\$5600</u>	3

Question	Answer	Marks
8(a)	Equal amounts of red and white paint are needed [1] Area of red paint = $60/2 = 30 \text{ m}^2$; Number of tins needed = <u>3</u> <i>Award 1 mark for attempt to calculate amounts stripe by stripe, with at least three of the mixed stripes calculated correctly.</i>	2
8(b)	Each stripe is $6 \times 2.5 = 15 \text{ m}^2$ Second stripe needs 12 m^2 red and 3 m^2 white [1] Third stripe needs 7.5 m^2 red and 7.5 m^2 white: total red = 34.5 m^2 AND total white = 25.5 m^2 [1] so <u>3 tins of red and 3 tins of white.</u>	3
8(c)	Total areas of red and white, in m^2 , are 64.5 and 175.5 This needs <u>6 tins of red paint and 15 tins of white paint.</u> <i>Award 1 mark for 15 tins of white OR 175.5 (m^2 white).</i>	2

Question	Answer	Marks
9(a)	<u>1 gold, 2 silver and 10 bronze</u>	1
9(b)(i)	Credits required for the six rides are 8 4 4 2 2 2 \$20 pack (GGGSSB) covers 8(GS) 4(G) 4(G) 2(S) 2(B?) 2(??) oe leaving 3B required, so cost is \$23 Cost without pack = \$22, so No <i>2 marks for correct judgment with three Bs required (or \$23) and \$22 seen</i> <i>1 mark for either how 3 gold and 2 silver are used or \$23 or three Bs required</i>	2
9(b)(ii)	With one \$10 pack (SSSBBB): Covers 8(SSBB) + 4(SB) leaving a further 10 credits for 4 2 2 2 costing \$10, so total cost \$20 Saving of (\$22 – \$20) = \$2, so Yes <i>2 marks for correct judgment with ten more Bs (oe) required and \$20 seen</i> <i>1 mark for a correct distribution of the tokens or \$20 or ten more Bs (oe) required</i> OR With two \$10 packs (SSSSSSBBBBBB): Covers all credits, for example 8(SSBB) 4(SB) 4(SB) 2(S) 2(S) 2(BB) or 8(SSS) 4(SB) 4(SB) 2(BB) 2(BB) 2(S), so total cost \$20 Saving of (\$22 – \$20) = \$2, so Yes <i>2 marks for correct judgment with a correct distribution of the tokens and \$20 seen</i> <i>1 mark for a correct distribution of the tokens</i> OR 8(SSS) 4(SS) 4(SB) 2(BB) 2(BB) 2(B?) with 1 extra B, total cost \$21, so Yes <i>2 marks for correct judgment with distribution of the tokens and \$21 seen</i> <i>1 mark for a correct distribution of the tokens or \$21</i>	2

Question	Answer	Marks
10(a)	<u>8</u> <i>Award 1 mark for 4 white bowls.</i>	2
10(b)	<u>6</u>	1

Question	Answer	Marks
11	Cost of 2000 booklets is \$80 AND cost of 1500 booklets is \$65 [1] but they need to be delivered one day earlier [1] costing \$5, so \$70 Saving is $\\$80 - (\\$65 + \\$5) = \\10 OR The saving will be the cost of 500 booklets that no longer need to be ordered (at 3¢ each), which is $500 \times 3¢ = \\$15$. [1] However, he will need to pay for delivery one day earlier [1] (the order will take one day less than the original order, but it is placed two days later). The overall saving will be $\\$15 - \\$5 = \\$10$.	3

Question	Answer	Marks
12	The minute hand takes 50% longer to move from 6 up to 12 than it does to move from 12 down to 6, so it takes 24 minutes from 12 down to 6 OR 36 minutes from 6 up to 12. [1] In the 6 minutes from 24 minutes past to half past the hour (correct time) the minute hand of the clock will move up through 5 minutes, so at 09:30 (correct time) the clock will display <u>09:35</u>.	2

Question	Answer	Marks
13(a)(i)	$10 \times (10-3) \times 2 = \underline{140}$	1
13(a)(ii)	$(10-(2 \times 3))^2 = \underline{16}$	1
13(b)(i)	$2 \times 4 = \underline{8}$	1
13(b)(ii)	4 [1] The ones immediately above and below and those to either side. [1]	2
13(c)	There is one position where the ship points to the miss, and four at right angles. [1] The good positions are the adjacent squares to his first shot that are not opposite his second shot, [1] and each of these is included in 3 of the 5 positions. <u>3/5</u> oe	3