CAMBRIDGE
International Education

Cambridge International AS & A Level

THINKING SKILLS **9694/33**

Paper 3 Problem Analysis and Solution **May/June 2026**

2 hours

You must answer on the enclosed answer booklet.

You will need: Answer booklet (enclosed)
Calculator

INSTRUCTIONS

- Answer **all** questions.
- Follow the instructions on the front cover of the answer booklet. If you need additional answer paper, ask the invigilator for a continuation booklet.
- You should use a calculator where appropriate.
- Show your working.
  Where a final answer is incorrect or missing, you may still be awarded marks for correct steps towards a solution.
  In some questions, if you do not show your working, full marks will not be awarded.

INFORMATION

- The total mark for this paper is 50.
- The number of marks for each question or part question is shown in brackets [ ].

This document has **12** pages. Any blank pages are indicated.

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1 George manages an office and has four employees who all work each day from Monday to Friday. A few weeks ago he changed the way in which he pays his employees.

Previously they were each paid \$150 per week. In the new system they have a basic pay of \$100 per week, but are able to earn a bonus each week based on the number of targets that they meet that week.

Every day each employee has two targets, each worth 2 points.
Each employee also scores 1 point for each day on which they arrive at work on time.

At the end of each week George calculates a whole number of dollars to be awarded for each point earned. This whole number of dollars is the largest amount possible so that the total awarded in bonuses that week does not exceed \$250.

(a) Last week, all 4 employees arrived on time every day and they all completed all of their targets.

Show that each employee still received \$150 for last week's work. [2]

The numbers of points that each employee has scored so far this week are shown in the table.

employee	Mon	Tue	Wed	Thu	Fri	total
Anne	3	4	4	3		14
Billy	1	5	5	3		14
Carole	3	3	4	5		15
Dylan	4	4	4	4		16

(b) Which employee has arrived on time every day so far this week? [1]

(c) **(i)** What is the smallest bonus that Anne might get at the end of this week? [2]

(ii) What is the largest bonus that Anne might get at the end of this week? [2]

The employees agree that they will manage their work so that the number of points earned in a week means that the full \$250 is awarded in bonuses.

(d) Explain why the four employees will not all get the same bonus in any given week. [1]

The employees agree that, in any given week, three of them should get the same bonus and the other should get a lower amount for their bonus. They will take it in turns to be the one who earns the lower bonus.

(e) What is the smallest total number of points the employees could earn to meet their requirements? [2]

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Turn over

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2 ‘Entharo’ is a sport in which two opposing teams attempt to score goals. It is played on an indoor court. Each team has 8 players, but only 5 from each team can be on the court at any time.

An entharo match has a single period of play with a maximum playing time of 50 minutes. The game finishes as soon as one team scores its tenth goal, or when the timer at the side of the court shows 50 minutes, whichever is sooner. At the end of the game, the team with the most goals wins, or the match is drawn if both teams have scored the same number of goals.

Each team can call ‘change’ a maximum of three times during a match. Whenever ‘change’ is called, the timer stops and there is a break in play for 2 minutes. During a ‘change break’, the team that made the call must change one or two of its players on the court. The other team may also change one or two of its players, but does not have to. Players cannot be changed at any other times.

(a) What is the latest time that an entharo match beginning at 19:00 can finish? [1]

Twelve teams compete in the Jemston Entharo League. In this league, the winning team gains 5 points if it has scored 10 goals or 4 points if it has scored fewer than 10 goals. Both teams gain 2 points for a drawn match. League placings for teams with the same number of points are decided by the total number of goals scored.

Yesterday ten of the teams played their fifth match of the current season. The match scores, and the league table after these matches, are shown below.

Garnets	6	–	Diamonds	8
Jaspers	7	–	Emeralds	7
Opals	9	–	Amethysts	10
Sapphires	4	–	Citrines	6
Zircons	9	–	Topazes	5

team	played	won	goals scored	points
Emeralds	5	4	45	21
Zircons	5	4	38	19
Opals	5	4	31	16
Amethysts	5	2	36	14
Diamonds	5	2	33	11
Rubies	4	2	27	9
Pearls	4	2	25	8
Garnets	5	1	28	7
Jaspers	5	1	25	6
Citrines	5	1	24	6
Sapphires	5	1	22	4
Topazes	5	1	20	4

(b) Which team won for the first time this season yesterday? [1]

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The Opals scored only 2 goals in their first match of the season. Since then they have scored more goals in each successive match than in the previous one.

(c) How many goals did the Opals score in each of their matches? [2]

(d) **(i)** Explain how the result of yesterday's match and the league table, together, show that the Emeralds have scored 10 goals in three of their five matches. [2]

(ii) Explain how the result of yesterday's match and the league table, together, show that the Amethysts have scored 10 goals in two of their five matches. [2]

(e) Deduce from the league table how many matches in total have been drawn so far this season. [2]

The match between the Rubies and the Pearls is in progress now. The Rubies have just called their final 'change', with the Pearls leading by 9 goals to 8 and the timer showing that exactly 6 minutes of playing time remain.

The players on court at the start of the match were as follows:

Rubies – Finch, Lytton, Nash, Piper and Walsh
Pearls – Aday, Carr, Dean, Kaplan and Singer

The table below details the changes made at the previous change breaks.

timer display (min:sec)	**score (Rubies first)**	**change called by**	**changes made**	
			Rubies	Pearls
07:30	1 – 2	Rubies	Lytton replaced by Rose Nash replaced by Wax	Kaplan replaced by Grey
15:50	4 – 2	Pearls	Piper replaced by Murray	Aday replaced by Buck Dean replaced by Joplin
22:00	5 – 4	Pearls	Finch replaced by Nash Walsh replaced by Piper	Carr replaced by Aday Singer replaced by Kaplan
31:45	6 – 7	Rubies	Murray replaced by Lytton Rose replaced by Walsh	Joplin replaced by Dean Kaplan replaced by Carr
36:15	8 – 8	Pearls	Piper replaced by Finch Wax replaced by Murray	Buck replaced by Kaplan Grey replaced by Singer

(f) Name the player who has played all but 6 minutes 10 seconds of the match so far. [1]

(g) What is the total amount of playing time that Kaplan has been on the court for so far? [2]

Kaplan scored the first goal of the match. All the Pearls' other goals so far have been scored by Dean and Joplin.

(h) How many goals has Dean scored? Explain your answer. [2]

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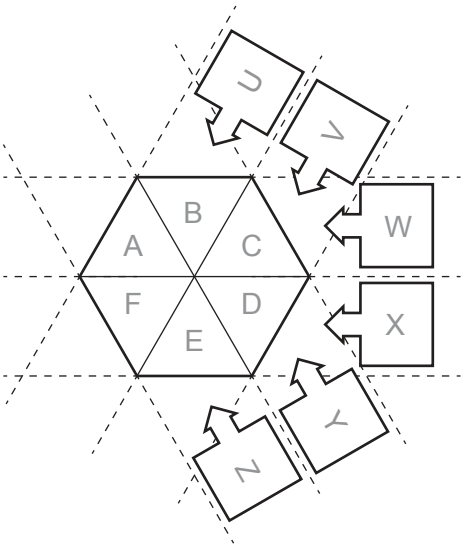
3 Amelie is designing puzzles to help her nephew with his skills at adding and subtracting small numbers. Each puzzle is a hexagon divided into six triangular cells, with six boxes around the right-hand side.

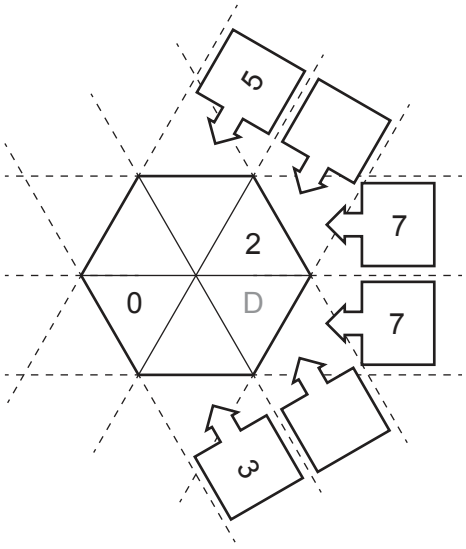


Each puzzle starts with numbers given in some of the cells and/or boxes.

In any completed puzzle, each box must contain the sum of the numbers in the three triangular cells indicated by its arrow. For example, box Y must contain the sum of the numbers in cells B, C and D.

Only positive whole numbers or zero can be used. They may appear more than once.

(a) Here is one of Amelie's puzzles.



(i) Give one way of completing this puzzle. [1]

(ii) Give all the possible values that cell D could take when this puzzle is complete. [2]

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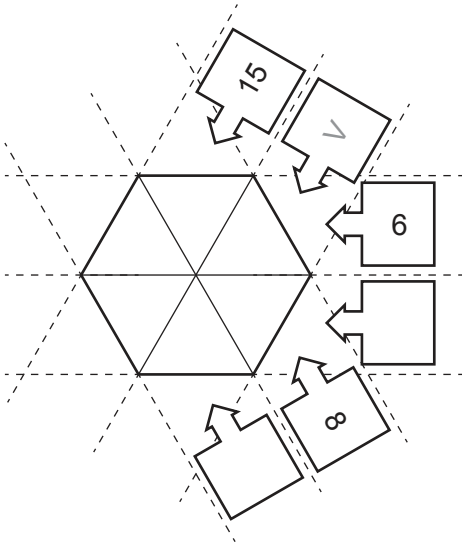
(b) Amelie is thinking about puzzles that would **not** be possible to complete. She considers puzzles where the only numbers given at the start are in boxes U, W and X, and none of them is zero.

(i) Give an example of such a puzzle that would **not** be possible to complete. [1]

(ii) If box U contains 12 and box W contains 5, what numbers in box X would make the puzzle **not** possible to complete? [1]

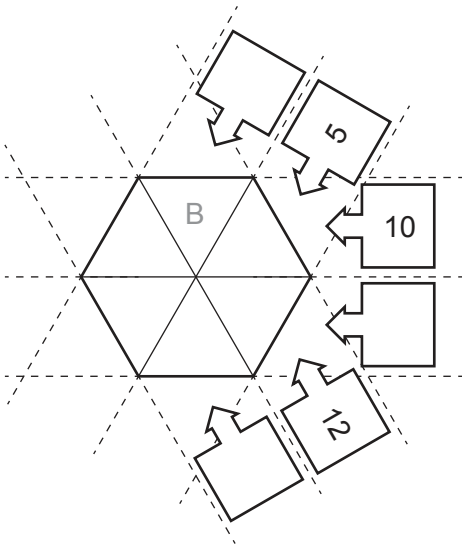
(c) Amelie is thinking about puzzles where numbers in boxes U, V, W and Y are given at the start. She has already chosen numbers for boxes U, W and Y.



(i) What is the smallest number that could be given in box V so that the puzzle is possible to complete? Explain your answer. [2]

(ii) Explain why there is no (theoretical) limit to how large the number given in box V could be. [1]

(d) For another puzzle, Amelie is deciding what number to give in cell B at the start.



List all the numbers that could be given in cell B which would enable this puzzle to be completed. [2]

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4 Leona designs and constructs patios for new houses. A patio is an area of paving stones with a number of pots of plants standing on it.

'Everglades' is a development of 50 new houses. Each house will have a patio measuring 10 metres by 3 metres. Leona will use square (paving) stones each measuring 0.5 metres by 0.5 metres to cover the patio area.

(a) Show that Leona will use a total of 6000 stones for the patios in Everglades. [1]

The stones that Leona will use are available in three colours: red, grey, and cream. They can be bought in batches of 100, 500 and 1000 of the same colour, costing \$200, \$900 and \$1600 respectively.

Leona decides on the following colours for 40 of the 50 houses:

10 houses: all red stones
10 houses: all grey stones
10 houses: equal numbers of red, grey and cream stones per house
10 houses: equal numbers of red and cream stones per house.

She is undecided about the remaining 10 houses, except that their patios should all be the same.

(b) Suppose that these 10 houses have all cream stones.

What is the smallest possible total cost of the stones for all 50 houses? [3]

(c) Suppose instead that the 10 remaining houses have a combination of all three colours. Leona will choose the number of each colour so that the total cost of the stones for all 50 houses will be as small as possible.

What is this smallest total cost? State the number of each colour for the remaining 10 houses that will give this. [2]

Leona decides to use just two colours for the remaining 10 houses, as this will minimise the total cost of the stones.

(d) What numbers of which colours of stones for the remaining 10 houses give the minimum total cost? [1]

Each of the 50 houses will have 2 pots of plants standing on its patio. The plants come in two sizes, small or large. Large plants take up twice as much space as small plants. Each pot will contain the equivalent of 10 small plants: for example, 4 large and 2 small plants.

- Each pot costs \$20
- Small plants cost \$5 each
- Large plants cost \$8 each
- There is a special offer: 'Any 3 plants of the same size for the cost of 2'

(e) What is the smallest possible cost for one pot of plants? [2]

Leona decides that all 50 houses will have identical pots of plants such that the **total** cost is minimised.

(f) What is the smallest possible total cost for all the pots of plants? [3]

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Leona employs her nephew Lenny to construct the patios and prepare the pots of plants. She pays him $150 per day and he works 8 hours per day. It takes him 6 hours to construct one patio and 12 minutes to prepare one pot of plants. Leona will direct and supervise the work.

The developer of Everglades offers to pay Leona $25 000 to pay for the materials and complete the patio work.

Leona wants to make an income for herself of at least $50 per day.

(g) Should Leona accept the developer's offer? [3]

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