



Cambridge International AS & A Level

CANDIDATE
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THINKING SKILLS

9694/12

Paper 1 Problem Solving

May/June 2025

1 hour 30 minutes

You must answer on the question paper.

No additional materials are needed.

INSTRUCTIONS

- Answer **all** questions.
- Use a black or dark blue pen.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen or correction fluid.
- Do **not** write on any bar codes.
- You may use a calculator.
- 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 **16** pages. Any blank pages are indicated.



- 1 At *Pandora's Pizza Place* all pizzas have the traditional cheese and tomato base and customers may add as many toppings as they wish.

The toppings available to choose from are:

chicken, garlic, ham, mushrooms, olives, onions, pepperoni, pineapple, prawns, salami, sweetcorn and tuna

	Regular	Large
Cheese and tomato base	\$6.50	\$8.50
Toppings	\$0.80 each	\$1.20 each

Regular pizzas can only have regular size toppings and large pizzas can only have large size toppings.

Sally has ordered a large pizza with ham, mushrooms, onions and pepperoni.

- (a) How much will Sally pay for her pizza? [1]

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Gary always orders a regular pizza and has as many toppings as he can afford. Today he has a maximum of \$12.00 to spend.

- (b) How many toppings will Gary have on his pizza today? [1]

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2 Jo and Sam have separate alarm clocks, both set to wake them up at 07:00. Each clock has a 'snooze' button; pressing this button when the alarm sounds causes the alarm to sound again a fixed number of minutes later. On Jo's clock, this is 9 minutes later; on Sam's clock, it is 6 minutes later.

- (a) If each snooze button is pushed whenever the relevant alarm sounds, when will both alarms next sound together? [1]

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Sam's alarm is changed to sound at 07:15. Both snooze buttons are again pushed when their alarms sound.

- (b) When will the alarms now first sound together? [1]

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- 3 Cecily is given a list of six book titles. Information about these books is given in the table.

<i>Book Title</i>	<i>Number of pages</i>	<i>Topic</i>
Kings of Spain	358	History
The Ancient Greeks	324	Philosophy
George Washington	418	Politics
Being a Politician	480	Politics
The French Revolution	270	History
Early Settlements	502	History

Before her university course starts, Cecily must read three of these books: at least one book must be History and at least one book must be Politics.

Cecily can read up to 40 pages each day. She needs to finish the three books by the end of 30th September.

What is the latest date on which Cecily must begin her reading? [3]

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- 4 In Jemima's kitchen shop, blue bowls cost \$8, green bowls cost \$7 and yellow bowls cost \$5. Jemima does not sell any other kinds of bowls and does not offer any discounts on multiple purchases.

Sam spent \$30 buying bowls.

- (a) State the **three** possible combinations of bowls which Sam could have bought. [2]

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Helen spent \$35 buying five bowls.

- (b) State the **two** possible combinations of bowls which Helen could have bought. [2]

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Boris spent \$42 buying bowls.

- (c) What is the maximum number of bowls Boris could have bought? [1]

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- 5 In an unusual Triathlon competition, six competitors each take part in Swim, Cycle and Run events. All competitors start the Swim event at the same time. All competitors start the Cycle event exactly 2 minutes after the slowest competitor finishes the Swim event. All competitors start the Run event exactly 2 minutes after the slowest competitor finishes the Cycle event.

The times, in minutes, for each competitor for the three events are recorded and shown in the table.

<i>Competitor</i>	<i>Swim time</i>	<i>Cycle time</i>	<i>Run time</i>
Charles	20.4	36.5	14.8
Edward	24.5	32.4	17.1
George	19.7	40.6	15.8
James	22.9	32.5	15.7
Richard	25.6	34.2	16.3
William	18.2	38.8	18.9

- (a) How long did William have to wait between completing his Swim event and starting the Cycle event? [1]

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- (b) How long did Edward have to wait in total between events? [1]

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- (c) How long was it between the start of the Swim event and the end of the Run event? [1]

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Points are awarded to the competitors for each of the three events: 10 points for 1st, 8 points for 2nd, 5 points for 3rd, 3 points for 4th, 2 points for 5th and 1 point for 6th.

(d) Which competitor had the most points in total, and how many points did he have? [2]

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6 I need to choose a 4-digit PIN for my new bank card.

My daughter's date of birth is 09/12/14, so, to help me remember my PIN, I want the first and second digits to add up to 9, the second and third digits to add up to 12 and the third and fourth digits to add up to 14.

List all the 4-digit PINs that would satisfy my requirements. [3]

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7 In Lateralia, all roads join towns in straight lines.

Parker is travelling between Anglina and Bramly. He doesn't have a map and doesn't know how far the distance is between the towns.

Parker comes across a signpost, but one digit cannot be read. Later on, he comes across a second signpost, but this also has one digit that cannot be read.



What is the distance between Anglina and Bramly?

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- 8 Toni and Kevin are inviting 1200 people to their wedding. They decide to write out invitation cards by hand and put them into envelopes.

Toni takes 25 seconds to write an invitation and 15 seconds to put an invitation into an envelope. Kevin takes 40 seconds to write an invitation and 20 seconds to put an invitation into an envelope.

They both write invitations and put them into envelopes for 3 hours.

- (a) How many invitations in envelopes are complete after this time? [2]

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Kevin now says that his hand hurts from so much writing. So, for the next 3 hours, Toni only writes invitations and Kevin only puts them into envelopes.

- (b) (i) How many additional invitations in envelopes are complete after this time? [2]

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- (ii) In total, how much time does Kevin spend waiting during these 3 hours? [1]

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- 9 In the TV quiz show *Dodeka* each contestant is asked 10 questions. Questions 1 and 2 are worth 1 point each, questions 3 and 4 are worth 2 points each, questions 5 and 6 are worth 3 points each, questions 7 and 8 are worth 4 points each and questions 9 and 10 are worth 5 points each.

Each time a question is answered correctly, the contestant selects a square on a 4×4 grid to place the points value of the question into before receiving the next question. The squares on the grid are lettered, as shown below, for identification purposes.

A	B	C	D
E	F	G	H
I	J	K	L
M	N	O	P

A contestant's score is the sum of all the numbers in the grid plus a bonus of 12 points for each full row or column that adds up to 12.

Below is a summary of Judy's progress.

Question	Answer	Square Selected
1	correct	K
2	correct	H
3	correct	G
4	incorrect	–
5	correct	L
6	correct	J
7	incorrect	–
8	correct	O
9	correct	I
10	incorrect	–

- (a) Complete Judy's grid below and state her score,

[2]

A	B	C	D
E	F	G	H
I	J	K	L
M	N	O	P

Score





(b) What is the maximum total that any contestant can score?

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Ian has answered his first five questions correctly and he is aiming to score the maximum possible total. This is his grid at present:

A	3	C	D
E	2	G	H
1	J	K	2
M	N	O	1

(c) On the grid below, show how Ian could score the maximum if he answers all of his questions correctly. [2]

A	3	C	D
E	2	G	H
1	J	K	2
M	N	O	1

(d) What is the greatest total score still available for a contestant who has answered all of the first four questions incorrectly? Explain your answer. [2]

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- 10 Fiona's three children all have a bowl of cereal for breakfast every morning. Julia only eats the chocolate-covered cereal and Karl only eats the sugar-covered cereal. Peter likes both types of cereal and chooses one each morning. Each child has 30 g of cereal for their breakfast each day.

Yesterday all of the cereal was used up so Fiona bought a 750 g box of the chocolate-covered cereal and a 1000 g box of the sugar-covered cereal.

- (a) What is the smallest possible number of days on which there could be enough cereal available for all three children to have their breakfast? [1]

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Fiona tells Peter to choose his cereal for breakfast so that there is enough cereal available for as many days as possible before she needs to buy any more.

- (b) What is the maximum number of times that Peter could have the sugar-covered cereal? [2]

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11 All the books on sale in the second-hand bookshop Rainbow Books are colour-coded red, yellow, green or blue, priced as follows:

- Red books are \$15 each.
- Yellow books are \$12 each.
- Green books are \$10 each.
- Blue books are \$8 each.

Last week the shop had two special offers:

20% off any two books with the same colour code, bought together.

50% off any three books with the same colour code, bought together.

I bought 2 red books, 5 yellow books, 3 green books and 2 blue books and made the best possible use of the special offers.

(a) How much did I pay for my twelve books last week? [2]

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This week the special offers are:

20% off any two books with different colour codes, bought together.

50% off any three books with different colour codes, bought together.

(b) What is the lowest amount I could have paid for my twelve books if I had bought them this week instead of last week? [3]

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- 12 Douglas is in charge of naming the icebergs which come from the 'D' quadrant of Antarctica. He is proposing a new system for assigning names. Names will only be given to 'large' icebergs – those with an area of at least 10 km^2 .

Icebergs will be given sequential numbers within the quadrant, e.g. D27. If an iceberg splits into two large pieces, the larger piece retains its previous 'name' and the new piece gets the next available letter. (If both pieces are the same size, which of them gets which name is chosen at random.) So D27 would split into D27 and D27a, and then if either of those split into large enough pieces, the new one would be D27b.

- (a) If D34f is 14 km^2 , what is the smallest that D34 could have been? [2]

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- (b) If D42 is 246 km^2 , what is the largest that D42c could be? [2]

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- 13 Patricia is organising a conference. Each person attending the conference will attend four talks, one in each of the four available sessions. The table shows the maximum number of people who could attend each of the talks.

Session	Maximum numbers for each talk			
A	50	40	40	30
B	50	50	30	
C	60	60	30	30
D	40	40	40	30

- (a) What is the maximum number of people that could attend the conference? [1]

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Patricia decides to change the sessions that some of the talks will take place in, so that she can increase the total number of people who could attend the conference and attend four talks. There are plenty of rooms available, so she can have any number of talks taking place in each session.

- (b) What is the maximum number of people that could attend the conference once the talks have been moved? [2]

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