Cambridge Assessment International Education

Cambridge International AS & A Level

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

THINKING SKILLS **9694/12**

Paper 1 Problem Solving **October/November 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.

[Turn over

1 Sophie is taking part in a sponsored walk to raise money for her gymnastics club.

People can sponsor her for each kilometre walked but can specify a maximum amount they are willing to pay, or they can give a total that they will pay regardless of how many kilometres Sophie walks.

Sophie has three sponsors.

Name	*Amount per km*	*Up to a maximum*	*Total donation*
Arthur	$1	$20	
Brenda			$10
Carol	$0.50	–	

(a) How much would Sophie raise if she walked 19 km? [1]

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(b) How far would Sophie have to walk in order to raise $45? [1]

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2 Ariel, Gemma, Libby, Sage and Virat were the five finalists in a talent competition.

After all five had performed, seven judges awarded points. Each judge was instructed to award a total of 15 points. They had to award points to four of the five contestants but could not award the same number of points to two or more of them.

(a) What is the greatest number of points that a judge could have given to one contestant? [1]

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After the first six judges had awarded their points the scores were:

Ariel	15 points
Gemma	21 points
Libby	18 points
Sage	19 points
Virat	17 points

The points awarded by the seventh judge resulted in all five contestants finishing with the same number of points and having to share the first prize.

(b) How many points did the seventh judge award each of the contestants? [1]

Ariel .....

Gemma .....

Libby .....

Sage .....

Virat .....

3 My brother has a digital diary, which he keeps on a memory stick that is passcode protected. The passcode is a six-digit number. To access the memory stick he must enter the correct answer to a sum of either two or three of the passcode's digits, as instructed onscreen. For example,

'Enter the sum of the 2nd, 4th and 6th digits of your passcode.'

My brother has challenged me to work out his passcode. I have been watching his responses and making a note of them. I have observed:

- 2nd digit + 5th digit = 16
- 2nd digit + 6th digit = 12
- 1st digit + 4th digit = 10
- 2nd digit + 4th digit + 5th digit = 18
- 3rd digit + 6th digit = 8
- 1st digit + 3rd digit + 4th digit = 13

I now know his passcode.

(a) Explain how it can be deduced that the 4th digit of the passcode is 2. [1]

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(b) What is my brother's passcode? [2]

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4 Duncan has a regular job that pays him $500 a month. He also works occasionally as a teacher to earn extra money. He is paid $180 for each day of teaching that he does.

Duncan's monthly living costs are $1600.

(a) How many days of teaching must he work in a month to cover his living costs? [2]

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Duncan realises that he has not accounted for tax. He does not pay any tax on the first $1000 he earns each month, but everything over this is taxed at a rate of 20%. He still has both jobs.

(b) (i) How many days of teaching must he work each month to pay for his living costs and tax? [2]

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(ii) How much tax will he pay if he works exactly this many days? [1]

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His teaching job changes so that his teaching work is counted in half-days rather than full days. He is paid $100 for each half-day that he works.

(c) How many half-days of teaching must he work in a month to cover his living costs? [1]

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5 Four teams are taking part in a sports competition. In each event two participants from each team take part. The table shows the number of points that are awarded for each position.

Position	*Points*
1st	8
2nd	6
3rd	4
4th	2
5th	1

The participants finishing below 5th place do not score any points for their team.

There are 5 events in the competition.

(a) What is the highest total score that a team can achieve in the competition? [1]

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After the first event the difference between the team with the highest total score and the team with the lowest total score is the smallest it could possibly be.

(b) What are the total scores for the four teams? [1]

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After four of the five events have been completed the total scores for the teams are:

Red	*Green*	*Blue*	*Yellow*
24	21	21	18

(c) Explain why Red is certain to have the highest total score for the competition if one of their participants finishes 1st in the final event. [1]

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In fact, the Yellow team had the highest total score, followed by Green, then Blue. Red finished in last place. All four teams finished on different scores.

(d) Which team did each of the participants finishing in the top five positions belong to? [2]

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6 At Dave's sandwich shop, customers can choose from any of the items in the table below.

Category	*Choices*			
Bread	Rye	Sour dough	White	Wholemeal
Spread	Butter	Margarine	Hummus	Tahini
Filling	Aubergine	Chicken	Pulled pork	Salmon
Vegetable	Cucumber	Lettuce	Onion	Tomatoes
Topping	Barbecue	Cheese	Chilli	Mayonnaise

A 'standard' sandwich is made up from one item in each category.

(a) How many different standard sandwiches can be made? [1]

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Dave decides to have a simple way to price the sandwiches by allocating a number of units to each item in the sandwich: bread 2 units, spread 1 unit, filling 3 units, vegetable 1 unit, topping 1 unit.

He wants a standard sandwich to cost less than $5, but as close to $4.99 as possible.

(b) (i) What should the price of 1 unit be? [2]

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(ii) Jim buys a sandwich containing rye bread, aubergine, salmon, butter, tahini, chilli, tomatoes and lettuce.

What is the price of Jim's sandwich? [2]

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7 Gwen sells second-hand books on a market stall. The books are all priced at $6, but 3 can be bought for $15.

Yesterday Gwen had 84 customers and took a total of $981. Every customer bought either 1 book only or 3 books.

How many books did Gwen sell yesterday? [3]

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8 Eddie lives in Danes and his grandmother lives in Glames. To visit his grandmother, Eddie catches a bus from Danes to Everson, then a train from Everson to Falton and finally a ferry from Falton to Glames.

- Buses leave Danes for Everson, and Everson for Danes, at 15 and 45 minutes past each hour. The journey in either direction takes 20 minutes.
- Trains leave Everson for Falton, and Falton for Everson, at 10, 30 and 50 minutes past each hour. The journey in either direction takes 70 minutes.
- Ferries leave Falton for Glames, and Glames for Falton, at 5 and 35 minutes past each hour. The journey in either direction takes 75 minutes.

Eddie needs to allow at least 10 minutes for each of the changes at Everson and Falton.

Eddie leaves Danes on the 10:45 bus.

(a) What is the earliest time that he could arrive in Glames? [2]

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Eddie will stay with his grandmother for two days. On his return journey he will stop off in Falton to have coffee with a friend. He will allow at least 50 minutes between his ferry and train journeys. He wishes to be able to catch the 16:15 bus from Everson to Danes.

(b) What is the least amount of time that Eddie could take between leaving Glames and arriving in Danes? [3]

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9 A song book has songs numbered from 1 to 123. The three (different) songs selected for singing are put up on a board using a separate card for each digit.

How many cards of each digit are needed to ensure that all possible sets of three song numbers can be displayed? [3]

Answer:

0	*1*	*2*	*3*	*Each of 4–9*
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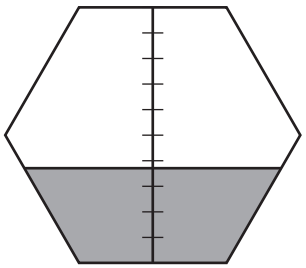
10 Michael's fuel tank is a hexagonal prism that can contain 1200 litres of fuel. The top and bottom halves of the tank are symmetrical (so the tank has a horizontal line of symmetry). He can measure the **depth**, not the volume, of the fuel.

He uses the fuel at a constant daily rate. He can specify and pay for an amount to add, but the delivery date is not specified and could be any time within 11 days of the order. He must not waste any fuel by ordering too much, and must not let the tank get empty. It was full when it was installed on day 0.

An automatic gauge records the day when the depth is a multiple of 10% of the height.



Depth	*Day*
100%	0
90%	11
80%	24
70%	39
60%	56
50%	75

(a) On which day will the depth of the fuel be 30%? [1]

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(b) Which is the last day on which he can order more fuel? [1]

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(c) What is the maximum order? [2]

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11 The Farnham Animal Park is open every day from 10:00 to 17:30. There are three special events each day which visitors may choose to attend during their visit. The timings for these events are shown in the table.

Special event	*Starting times*	*Duration*
Penguin Feeding	11:30, 13:30, 15:30	45 minutes
Sea Creatures Talk	11:15, 13:20, 15:15, 16:20	25 minutes
Train Ride Round the Park	11:00 and every hour until 16:00	70 minutes

Visitors must buy tickets for the special events in advance. They must allow at least 20 minutes between any two special events.

Mr and Mrs Lyons and their children Lenny and Leonora plan to arrive at the park at 10:30 and stay until it closes. They will attend each of the special events once.

(a) What is the earliest time by which they could have attended all three special events? [2]

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(b) What is the latest time that the Lyons family could arrive at the first of the three special events that they have chosen to attend? State the times at which they attend each event. [3]

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12 The planet of Qunes is in a mythical solar system.

- There are 6 months in a year.
- The last month of the year is Helum, which has 22 days.
- The month of Jura has 26 days.
- The shortest day is on the 4th of Mules and the longest day is on the 4th of Polij.
- The number of days from the shortest day to the longest day is the same as the number of days from the longest day to the shortest day.
- The longest day of the year is in the 4th month, which has 24 days.
- Zelum is the month after the month with the shortest day and has 26 days.
- Sirop is the month before the month with the longest day and has 25 days.

(a) What is the order of the six months? [2]

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(b) How many days are in the month of Mules? [2]

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13 Handwritten digits can sometimes be changed to others by using more ink. In Gareth's handwriting the following are possible:

From	*To*
0	6 or 9
1	7
2	3
3	8
4	9
5	6
6	8
7	9
9	8

Two or more changes are also possible, e.g. 2 changed to 3 and then to 8.

(a) What is the largest two-digit number that can be increased by changing a digit? [1]

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(b) Give an example of a sequence of two-digit numbers where each has changed from the last (up or down) and where the list is as long as possible. [2]

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