



# Cambridge International AS & A Level

CANDIDATE  
NAME

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CENTRE  
NUMBER

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CANDIDATE  
NUMBER

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## THINKING SKILLS

9694/12

Paper 1 Problem Solving

May/June 2020

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 most questions, full marks will be awarded for a correct answer without any working. In some questions, however, you will not be awarded full marks if working needed to support an answer is not shown.

## 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. Blank pages are indicated.

- 1 The journey from Fred's home to his caravan is a total distance of 150 km. Fred is travelling to his caravan this weekend. He expects to be able to travel at an average speed of 90 km/h, but has decided to visit a friend who lives along his route at a point 90 km from Fred's house. He needs to arrive at the caravan by 21:00 and will leave home at 17:00.

What is the longest amount of time that he can spend visiting his friend?

[2]

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- 2 The following table shows the distribution of cats and dogs amongst the 80 households of Pluvial Avenue:

	0 cats	1 cat	2 cats	3 cats
0 dogs	5	7	9	2
1 dog	9	8	8	2
2 dogs	4	5	9	4
3 dogs	2	1	3	2

How many of Pluvial Avenue's cats share their home with at least one dog?

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3 Rebecca posted a parcel that weighed 3 kg last week and was charged \$1.20 for the postage. She assumes that the price for postage is a fixed amount for each 100 g. This week she needs to post a parcel that weighs 4 kg.

(a) How much would Rebecca expect to pay to post the parcel? [1]

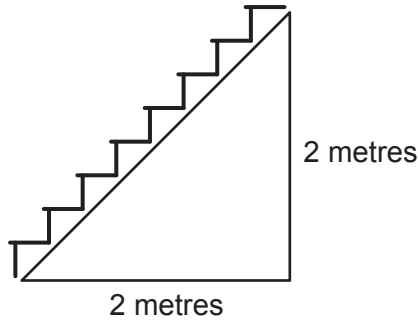
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In fact it will cost Rebecca \$1.40 to post the parcel. This is because the price is calculated as a fixed charge for posting a parcel with a weight of up to 1 kg and then an additional amount for each 100 g above 1 kg that the parcel weighs.

(b) How much would it cost to post a parcel weighing 0.5 kg? [2]

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- 4 In Malika's house, there is a triangular space underneath the staircase, where she wants to put up some shelves.



She considers putting up three shelves, which would divide the 2 metre height evenly into four equal gaps. She wants each shelf to be as long as possible.

- (a) What is the total length of shelving that Malika needs? [1]

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Malika looks in her garage and finds that she has 4 metres of shelving. She still wants to divide the 2 metre height evenly.

- (b) What is the maximum number of shelves that she can put up? State their lengths. [2]

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- 6 There are six rides at a small amusement park in Bolandia. Entry to each ride requires tokens, as shown in the following table.

<i>Ride</i>	<i>Number of tokens required</i>
Ghost Train	3
Teacups	2
Chair	1
Dipper	2
Big Drop	6
Water Train	5

Tokens cost \$3 each, or can be bought in packs of 5 for \$12 or packs of 10 for \$20.

- (a) Jane wants to go on each ride exactly twice. What is the least possible cost? [2]

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Milly buys 15 tokens and she will use them all. She is too scared to go on the Dipper, but she must go on the Teacups. She will not go on any ride more than three times.

- (b) (i) What is the greatest number of rides that Milly can go on? State how this is achieved. [1]

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- (ii) What is the least number of rides that Milly can go on? Give an example of how this could be achieved. [1]

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The owners of the amusement park introduce a Family Ticket. This allows two adults to have one go on each of four different rides and for two children to have one go on each of the six different rides and for the children to have an extra go on their favourite ride. The owners will set the price for a Family Ticket so that, whatever rides the family chooses to use it for, it would not have been cheaper to buy the tokens.

(c) What is the maximum price that could be set for the Family Ticket? [3]

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- 9 The costs of tickets for entry to the Hathaway theatre are shown in the following table.

<i>Type of ticket</i>	<i>Price of ticket</i>
Adult	\$40
Child (under 16 years old)	\$25
Special (2 adults and 2 children)	\$120
Small group (up to 6 people)	\$205
Large group (up to 10 people)	\$320

Jim and Gill Beber are taking their five sons to the Hathaway theatre to celebrate Jim's birthday. The ages of the sons are 18, 16, 15, 12 and 10 years.

- (a) What is the least cost that the Beber family will have to pay for their tickets? [2]

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The Beber family plan to visit the theatre on the same day in a year's time. They know that the ticket prices will remain unchanged.

- (b) How much more will they need to pay for their tickets next year? [2]

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A local school is taking a group to the Hathaway theatre. The group consists of 4 teachers and 25 students, of whom 10 are under 16 years old.

(c) What is the least cost that the group will need to pay for their tickets? [2]

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There has been a mistake and one of the students is 16 and not 15 years old.

(d) Explain why this will make no difference to the least total cost of the tickets. [1]

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- 11 Four friends are having a competition. In each round of the competition two of the friends play a game against each other. In each game a total of 25 points are scored between the two players. The player with the higher score is the winner of that game. Each friend will play this game a total of three times, once against each of the others.

The table below summarises the results in the competition so far, after each of the friends has played two games.

<i>Name</i>	<i>Games Won</i>	<i>Games Lost</i>	<i>Total Points Scored</i>
Alex	2	0	38
Janet	1	1	27
Gemma	1	1	21
Richard	0	2	14

Alex won his first game against Richard. The result was 22 – 3.

- (a) What was the result of Alex’s second game? [1]

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- (b) Explain how it can be deduced that Alex won against Janet in his second game. [2]

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- (c) What would the results in the final games need to be for there to be more than two players tied on the same highest total score? [2]

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- 12 Alton and Basing are two villages 6 km apart joined by a straight stretch of road. Jane and Katy are two friends who are training for a cycling marathon. Jane lives in Alton and Katy lives in Basing, and they decide to use the road between their villages for their training.

Last Saturday at 13:00 Jane left Alton and cycled towards Basing and Katy left Basing and cycled towards Alton. Each time either cyclist reached one of the villages, she turned around and cycled back along the road to the other village. Jane cycled at a constant speed of 15 km/h and Katy cycled at a constant speed of 9 km/h.

- (a) How far from Alton was Jane at 14:00? [1]

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- (b) How far from Alton were Jane and Katy when they passed each other for the first time? [2]

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At 14:30, Jane decides to stop for a break.

(c) How many minutes does she have to wait for Katy to arrive at the same place? [3]

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