Cambridge Assessment International Education

Cambridge International AS & A Level

CANDIDATE NAME

CENTRE NUMBER | | | | | |

CANDIDATE NUMBER | | | | |

5812434770

THINKING SKILLS **9694/11**

Paper 1 Problem Solving **October/November 2021**

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.

1 Jane has booked a flight for her holiday tomorrow which departs at 17:30. Passengers are able to enter the airport from 4 hours before the scheduled departure time of the flight and must arrive at least 2 hours before the scheduled departure time.

Jane will be taking the train to the airport. Trains leave the station near Jane's home at 05:20 and every 30 minutes after that. It takes 45 minutes for the train to reach the airport.

At what time does the latest train that Jane could take leave the station near her home? [2]

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2 Suzy makes and sells two types of cakes. The prices for which she sells her cakes are shown in the table.

	Single	Pack of 4	Pack of 6
Cupcake	\$0.80	–	\$4.50
Muffin	\$1.00	\$3.60	–

Jen buys 10 cupcakes and 10 muffins.

(a) What is the least possible amount that Jen could pay? [1]

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Keira wants to buy 18 cakes for her employees. At least 9 of the cakes must be cupcakes and at least 7 of the cakes must be muffins.

(b) What is the least possible amount that Keira could pay? [2]

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It costs Suzy $0.60 to make one muffin.

(c) Last Saturday Suzy sold 120 muffins.

(i) What was the greatest profit that Suzy could have made on the sale of these muffins? [1]

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(ii) What was the least profit that Suzy could have made on the sale of these muffins? [1]

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3 An electronic notice board, measuring 3 m × 2 m, is mounted on a square wall with sides 6 m × 6 m. Pablo must paint all of the wall not covered by the notice board.

A litre of paint covers 2.80 m^2 of wall. Paint can be bought in 1 litre cans costing \$10 each or 2.5 litre cans costing \$20 each.

What is the least that Pablo can spend on paint that allows him to complete his painting job? [3]

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4 Harriet and Kevin are playing a game. There are a total of 11 rounds in the game and at the end of each round only one of the players will score some points. In each round the number of points scored is equal to the number of the round, so 1 point is scored in round 1, 2 points in round 2 and so on.

Harriet and Kevin have played a total of 8 rounds. Harriet has scored a total of 19 points.

(a) How many points has Kevin scored? [1]

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(b) What is the minimum number of rounds that Harriet can have won so far? [1]

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(c) What is the smallest difference that there could be between Harriet's and Kevin's scores when they have finished all 11 rounds of the game they are currently playing? [2]

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5 FlyYou airlines discount their tickets to Timbuktu by up to 80% of the full price of $100. Tickets are sold starting at $20 for the first twenty; then the thirty $50 tickets start to sell, and so on. The number of tickets in each band is shown in the table below.

Price	$20	$50	$70	$80	$90	$100
Number of tickets	20	30	50	80	100	100

The airline will make a profit if the total value of tickets sold is more than $20 000.

How many tickets will have to be sold for the airline to make a profit? [3]

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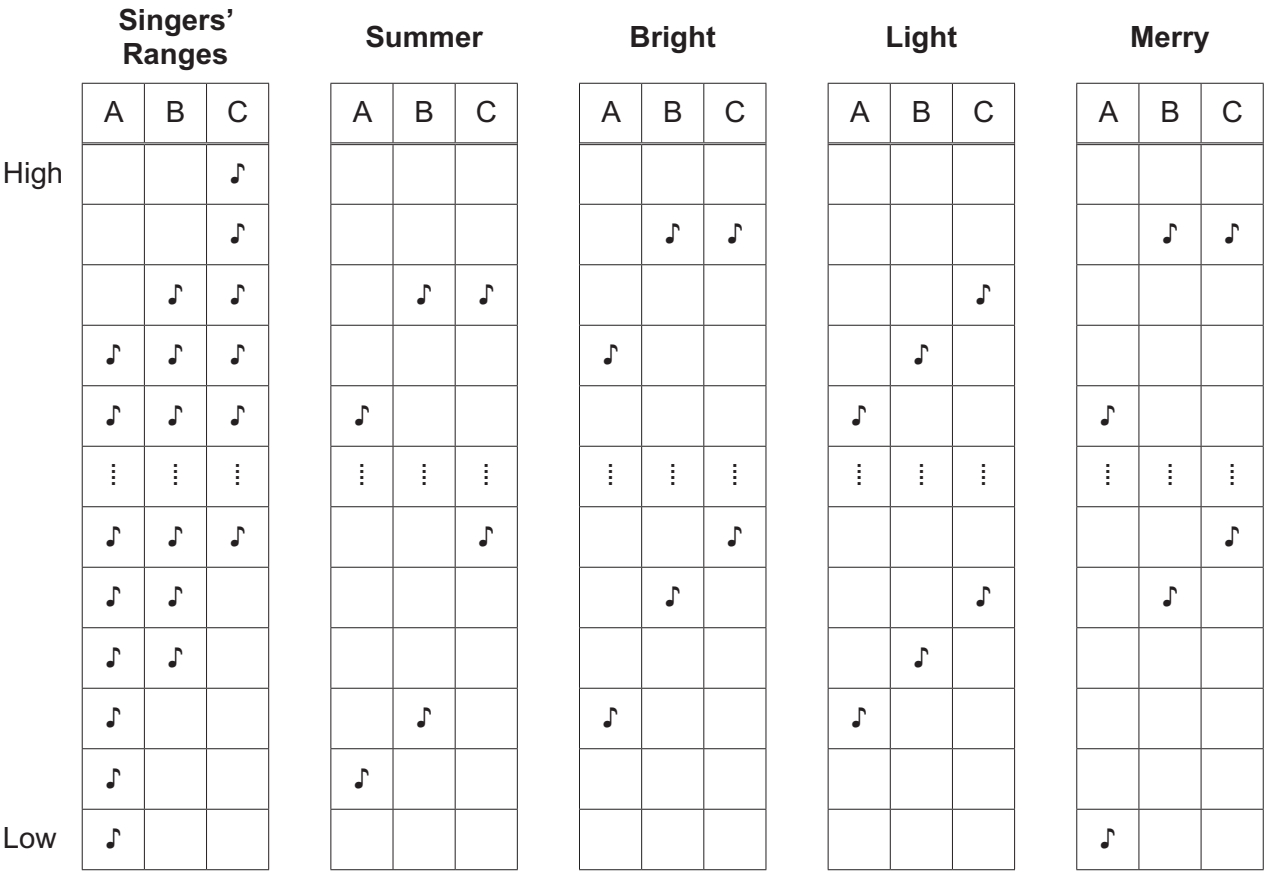
6 Each of the three singers (A, B and C) in a trio has a different range of notes they can sing. They want to sing one of four songs (Summer, Bright, Light, and Merry). The diagram shows the ranges of the singers and the highest and lowest notes that each singer is required to sing in each of the four songs.



Each song has at least one note that is too high or low for someone. However, the songs can be transposed up or down one or two notes, i.e. all the notes for all the singers are moved the same amount in the same direction.

Which song can they sing and by how many notes must it be moved? [2]

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7 There are four hotels in Kateland. The charges per person and the available facilities at each hotel are given in the table below. These charges apply for any 24-hour period from midday.

Hotel	*Bed and breakfast*	*Dinner*	*Wi-Fi*	*Gym*	*Pool*	*Car parking*
Argyle	$100	$20	$2.50	$3	$2	$10
Banton	$90	$25	$4.00	$2	Free	$12
City	$105	$25	$1.50	No gym	No pool	Free
Devon	$120	$22	Free	$5	Free	$8

Mo and Harry are staying in Kateland for five nights from Monday to Friday inclusive. They will require dinner, bed and breakfast, and Wi-Fi. They will use the pool each morning, but will not use the gym or the car park. They wish to stay in either the Argyle or the Banton.

(a) Which hotel would be cheaper, and by how much? [2]

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To attract customers, the Devon hotel introduces three special offers: the total charge for stays of 2, 3, or 4 consecutive nights will be discounted by 10%, 15%, and 25% respectively. These offers can be combined, so for example a 5-night stay can be charged as a 3-night stay and a 2-night stay.

Flo will stay at the Devon for six nights next week, from Wednesday to Monday inclusive. She will have dinner, bed and breakfast, but she will not use the gym. She will park her car in the hotel car park.

(b) What is the least possible charge for her stay? [2]

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These offers are very popular, particularly for stays which include Saturday night. The manager of the Devon sees an opportunity to make more profit if he excludes Saturdays from the offers, and instead increases all the prices for Saturday by 20%.

(c) What is the least possible charge that Flo would now have to pay for her stay? [2]

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8 Stella sells dance costumes. White costumes are priced at $10 each and all other colours are priced at $12 each.

She has a special offer: 4 costumes of the same colour for the price of 3.

The Belle dance group has 14 members and is performing in a show. Its costumes are bought from Stella.

For the first dance, the dancers will all wear red costumes.

(a) What is the least possible total cost of these 14 costumes? [1]

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For the second dance, 4 dancers must wear white costumes and 7 dancers must wear blue costumes. The other 3 dancers may wear white or blue costumes.

(b) What is the least possible total cost of these 14 costumes? [2]

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Stella decides to change her prices: she removes the special offer, and reduces the price of each costume. White costumes will be priced at $3 less than any other colour costume.

A customer buying 100 white and 200 blue costumes will pay the same total price now as they would have done before the change in pricing.

(c) What is the new price for a blue costume? [3]

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9 In the sport of *Burgy*, points are scored either by getting a *snootch* giving 7 points, or getting a *coff* giving 5 points. The local newspaper produced this table of how teams in a local league were performing after each team had played 4 games.

Team	*Played*	*Won*	*Lost*	*Total points scored*	*Total points conceded*
Epsilon	4	4	0	67	36
Alpha	4	3	1	37	50
Beta	4	2	2	61	51
Gamma	4	2	2	57	47
Delta	4	1	3	42	28
Zeta	4	0	4	23	76

Unfortunately, there is a misprint in one (but only one) of the numbers in the table.

(a) Which number has been misprinted? [2]

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(b) What should this number have been? [2]

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10 Tom needs to buy some gifts to give to the guests at an event that he is organising. All of the guests will receive the same gift and he has identified four different stores from which he can buy the gifts. The prices available at each of the stores and the different special offers that are available are summarised in the table below.

Store	*Price each*	*Special offers*
A	$2.00	10% off purchases of 60 or more
B	$1.90	None
C	$2.20	20% off purchases of 80 or more
D	$2.00	Set of 20 for $35

Tom is going to buy exactly one gift for every guest at the event. He has worked out that it will be cheaper to buy the gifts from store A than from any other store.

At least how many guests are attending the event? [4]

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11 The only values of coins that are in use in the country where Max lives are worth 1¢, 2¢, 5¢, 25¢ and $1. Max always pays exactly for any purchase that he makes, if he can. If not, he makes the smallest amount of money greater than the price he can with the coins that he has and pays with this.

This morning Max had 6 coins. He bought an item from the local shop worth 19¢. He was given his change for his purchase using the smallest number of coins possible. He then had a total of 10 coins.

(a) Explain how we can be certain that Max must have paid with a $1 coin. [2]

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The next item that Max bought cost 32¢, but he had to pay using two 25¢ coins.

(b) How much money did Max have left once he had received his change? [3]

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12 One cup of tea, 3 cups of coffee and 2 cakes cost $15.75. One cup of tea, 2 cups of coffee and 1 cake cost $10.00.

(a) What is the cost of 1 cup of coffee and 1 cake? [1]

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(b) What is the cost of 3 cups of tea, 5 cups of coffee and 2 cakes? [2]

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[Turn over for Question 13]

13 Four friends go to a gym which has four different exercise machines. Bambi, Cherry and Dolly all do 8 minutes of continuous exercise on each machine. Abigail does 10 minutes on three of the machines but only 2 minutes on the other machine. They start at the same time and there can only be one person on any particular machine at any time.

What is the shortest possible time in which all four friends can complete their exercise routines? [3]

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