Cambridge Assessment International Education

Cambridge International AS & A Level

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

4573747831

THINKING SKILLS **9694/11**

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 Brian's birthday is on 10 January and he is having a party that day. Five days before this, he is meeting his brother for lunch and ten days after his birthday he is meeting his sister for lunch. Both of these lunch meetings are at the weekend (i.e. on Saturday or Sunday).

On which day of the week is Brian's birthday? [1]

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

2 A venue holds a concert on the last Saturday of each month. Tickets go on sale on the Sunday before the concert, with a decrease in price each day, as shown in the following table.

Day	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Ticket price	$100	$90	$80	$70	$60	$50	$40

There are 500 tickets available for each concert. Sometimes the tickets sell very quickly.

In January, 50 tickets were sold each day from Sunday to Friday and the remaining tickets were sold on the Saturday.

(a) What was the total income from the ticket sales? [1]

.....

.....

.....

.....

.....

.....

.....

.....

In February, the last available ticket was sold on the Wednesday.

(b) (i) What was the greatest possible income from the ticket sales? [1]

.....

.....

.....

.....

(ii) What was the least possible income from the ticket sales? [1]

.....

.....

.....

.....

In March, all tickets were sold by the end of the Thursday. Each day the number of tickets sold was 40 fewer than the previous day.

(c) How many tickets were sold on the Thursday? [2]

.....

.....

.....

.....

.....

.....

.....

.....

3 There are ten teams in the Rodentian Football League. During each season every team plays two matches against each of the other teams; once at home and once away from home.

Points are awarded as follows:

Win away from home	4 points
Win at home	3 points
Draw away from home	2 points
Draw at home	1 point
Loss	0 points

Two days ago the league table was as shown below.

Team	*Played*	*Won*	*Drawn*	*Lost*	*Goals scored*		*Points*
					For	*Against*	
Squirrels	9	6	2	1	18	10	24
Jerboas	9	5	3	1	21	11	22
Porcupines	9	5	2	2	17	10	22
Agoutis	9	6	0	3	19	16	20
Marmots	9	3	4	2	19	13	17
Lemmings	9	4	1	4	16	12	15
Beavers	9	2	3	4	14	17	12
Coypus	9	3	1	5	13	19	11
Hamsters	9	0	4	5	11	22	8
Gophers	9	0	2	7	6	24	3

Three matches were played yesterday afternoon and this is the updated table.

Team	*Played*	*Won*	*Drawn*	*Lost*	*Goals scored*		*Points*
					For	*Against*	
Porcupines	10	6	2	2	19	11	25
Squirrels	9	6	2	1	18	10	24
Jerboas	10	5	3	2	22	14	22
Agoutis	9	6	0	3	19	16	20
Marmots	9	3	4	2	19	13	17
Beavers	10	3	3	4	17	18	16
Lemmings	10	4	1	5	17	14	15
Coypus	10	3	2	5	14	20	12
Hamsters	9	0	4	5	11	22	8
Gophers	10	0	3	7	7	25	5

(a) What is the total number of matches that have been drawn so far this season, including yesterday's results? [1]

.....

.....

.....

.....

(b) How many matches have the Agoutis won away from home so far this season? Justify your answer. [2]

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

(c) Which team did the Porcupines beat yesterday to go to the top of the table? Justify your answer. [2]

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

4 Bill and Mary Jones will be staying in a hotel in Townsville on Friday night. The prices and facilities at the four hotels in Townsville are shown in the following table.

Hotel	*Single room, per night*		*Double room, per night*		*Gym*	*Sauna*	*Wi-Fi*
	Room only	*Breakfast included*	*Room only*	*Breakfast included*			
Plaza	$140	$150	$190	$210	Yes	Yes	Yes
Village	$90	$100	$155	$160	Yes	No	No
Garden	$150	$165	$195	$205	Yes	No	Yes
Coral	$120	$125	$175	$195	No	Yes	Yes

Bill and Mary want a double room, with breakfast included. They do not mind whether or not there is a gym or sauna, but do want Wi-Fi.

(a) Which hotel should Bill and Mary choose in order to pay the least possible for their stay? [1]

.....

.....

.....

.....

Bill and Mary's son Euan has decided to come with them to Townsville. Euan must stay in the same hotel as his parents. He wants a single room, a gym and Wi-Fi, but does not want breakfast. The Joneses will choose the cheapest hotel that meets all of their requirements.

(b) What is the least possible that the Jones family will now have to pay for their holiday? [2]

.....

.....

.....

.....

.....

.....

.....

.....

5 My 6-digit passcode for internet banking is made up of: my house number; followed by half my house number, minus one; followed by double my house number, plus one. All six digits are different.

The first number of my passcode is 2. What is my full passcode? [2]

6 When I arrived at Barnoff railway station yesterday evening I noticed that the clocks on platforms 1 and 2 were displaying different times, as follows:

Platform 1

Platform 2

A few seconds later they both changed, simultaneously, to:

After watching them both for several minutes, I concluded that the last digit of the platform 2 clock was faulty, with one element that was permanently on and one element that was permanently off.

For how many minutes altogether during each hour are the displays on both of these clocks identical? [3]

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

7 The following table gives the cost of tickets for entry into the Penguin Theme Park.

Type of ticket	*Cost*
Adult	$40
Child	$25
Family (2 adults and 2 children)	$120
Group (up to 10 people)	$350

Tickets can only be used on the day on which they are bought. Every child must be accompanied by an adult; each adult can only be responsible for one child. Last Saturday, the total money taken in ticket sales was $18 000.

(a) What was the least possible number of people that entered the park last Saturday? [1]

.....

.....

.....

(b) What was the greatest possible number of people that entered the park last Saturday? [2]

.....

.....

.....

.....

Last Monday, 279 adults and 160 children visited the park.

(c) What was the least possible amount that was taken in ticket sales last Monday? [3]

.....

.....

.....

.....

.....

.....

.....

.....

.....

8 I am on holiday in Dolbania. Five different denominations of coin are in circulation here. I know they are worth 5¢, 10¢, 25¢, 50¢ and $1, but I don't know which is which and the values are not marked on them. One of the coins has a star on it, one has a tree, one has a cat, one has a bird and one has a fish.

I visit the same cafe every morning. Normally I buy a cup of coffee and a slice of carrot cake. The cost is $3.20 and I pay with a $5 note. On the first morning I received 3 'fish' coins and 3 'cat' coins as change; on the second morning my change was 5 'fish' coins, 5 'bird' coins and 1 'star' coin.

(a) What is the value of the 'cat' coin? [2]

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

Today I had my usual cup of coffee but I ordered two slices of carrot cake. Once again I paid with a $5 note, and this time my change was a single 'cat' coin.

(b) How much does my cup of coffee cost? [1]

.....

.....

.....

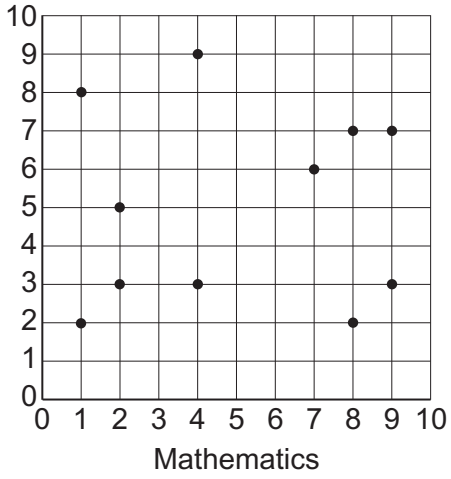
.....

.....

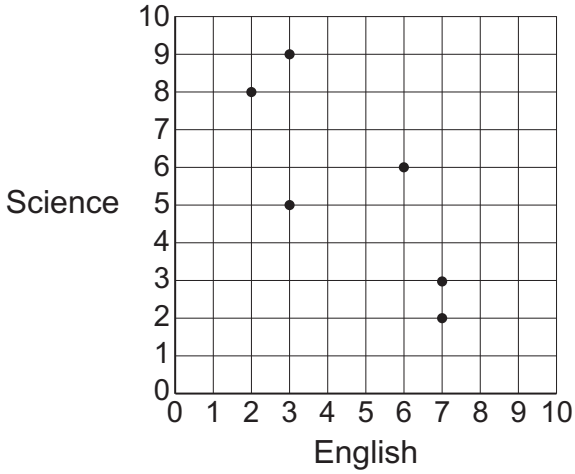
.....

.....

9 Six students sat tests in Mathematics, English and Science. Their scores in English and Science were plotted against their scores for Mathematics in a scatterplot. By mistake, the dots do not distinguish between the English and Science scores. However, each dot is plotted correctly, and no students were absent for any test.



The scatterplot showing just English and Science scores is shown below.



(a) How many students obtained a higher score in Mathematics than they did in English? State the scores in these two subjects for each of these students. [3]

.....

.....

.....

.....

.....

.....

(b) Explain why there are only 11 dots rather than 12 dots in the first scatterplot. [1]

.....

.....

10 Dave can drive from Abdet to Bentall by two routes. The old route goes in roughly a straight line while the new faster route is 26% longer. Dave's average speed on the new faster route is 40% higher than his average speed on the old route.

(a) By what percentage is Dave's journey time reduced by taking the new route compared to the old? [2]

.....

.....

.....

.....

.....

.....

.....

.....

This time saving is actually 6 minutes and Dave's average speed on the new route is 70 km per hour.

(b) How many kilometres longer is the new route than the old route? [3]

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

11 Trains run between Carrow and Dinton, which are 280 km apart.

Trains leave Carrow for Dinton on the hour and at 30 minutes past each hour. Trains leave Dinton for Carrow at 15 and 45 minutes past each hour. The journey in either direction takes 3 hours 30 minutes.

Elias catches the 12:00 train from Carrow to Dinton.

(a) What time did the first train that passes Elias leave Dinton? [1]

.....

.....

.....

.....

(b) How many trains travelling from Dinton pass Elias during his journey? [1]

.....

.....

.....

.....

All trains travel at a constant speed.

(c) How far from Carrow will the 10:00 train from Carrow be when it passes the 10:15 train from Dinton? [2]

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

12 Marian runs a small company that makes picture frames. She takes 5 hours to make one frame. Marian employs only Beth and Carrie and they make simpler types of frame. Beth takes 3 hours to make one frame and Carrie takes 4 hours to make one frame. The company has sufficient orders to ensure that there are always frames of each type to be made.

Marian, Beth and Carrie work from 09:00 to 17:00 every day of the week except Sunday. They have a lunch break each day from 12:00 to 13:00. As soon as each person finishes a frame, she starts the next one.

Marian, Beth and Carrie each started making a new frame on Monday at 09:00.

(a) How many frames has Marian completed by 17:00 on Saturday of the same week? [1]

.....

.....

.....

.....

(b) Show that, after the women have all been working for 60 hours, 47 frames have been made. [1]

.....

.....

.....

.....

(c) At what time on which day is the 20th frame completed? [3]

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

(d) (i) Who makes the 60th frame to be completed? [2]

.....

.....

.....

.....

.....

.....

.....

.....

.....

(ii) How many hours has she been working when the 60th frame is completed and how many frames has she made? [2]

.....

.....

.....

.....

.....

.....

BLANK PAGE