Cambridge Assessment International Education

Cambridge O Level

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

STATISTICS **4040/13**

Paper 1 **October/November 2025**

2 hours 15 minutes

You must answer on the question paper.

You will need: Calculator
Pair of compasses
Protractor

INSTRUCTIONS

- Answer **all** questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- 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 should use a calculator where appropriate.
- You must show all necessary working clearly.

INFORMATION

- The total mark for this paper is 100.
- 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 Eight terms used in statistical analysis are

variance,
survey,
bias,
median,
correlation,
trend,
quartile,
and census.

Complete each of the following statements by inserting an appropriate term from the list.

(a) A measure of central tendency for a set of data is the ..... [1]

(b) A measure of dispersion for a set of data is the ..... [1]

(c) Information is collected on every item of a population when a ..... is conducted. [1]

(d) Random sampling is a sampling method which has no ..... [1]

2 A college rules committee has 8 members who are teachers and 8 members who are students. The numbers of attendees for the last 10 meetings of the committee were as follows.

Number of teachers	7	8	8	6	6	3	8	4	7	5
Number of students	8	6	7	6	7	6	2	7	5	4

Find

(a) the mode of the number of teacher attendees,

..... [1]

(b) the range of the number of student attendees,

..... [1]

(c) the median of the total number of attendees.

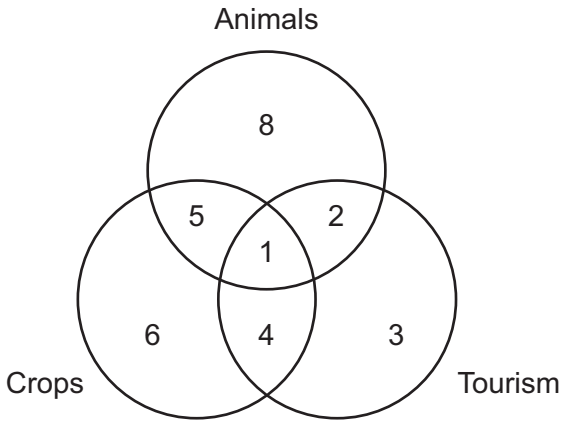
..... [3]

Meetings were cancelled when fewer than half of the teacher members or fewer than half of the student members attended.

(d) Find the median of the total number of attendees at the meetings which were **not** cancelled.

..... [2]

3 The landowners in a particular region of a country use their land for various purposes. The diagram shows the number who use it for one or more of animals, crops and tourism.



(a) Find the number of landowners who use their land for

(i) crops,

..... [1]

(ii) animals or tourism or both,

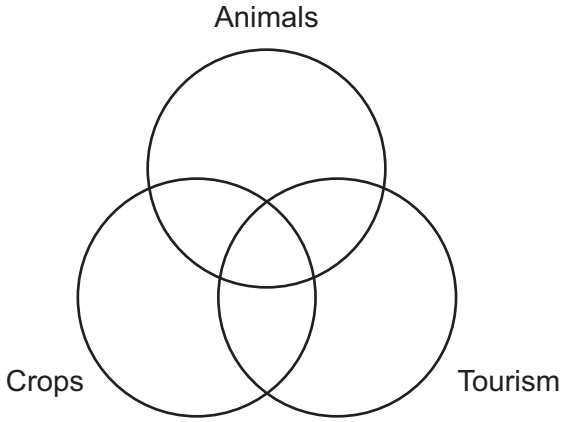
..... [1]

(iii) crops and tourism but not animals.

..... [1]

Later the landowners make changes:
- Three who previously used their land for animals only now also use their land for tourism.
- Two who previously used their land for animals and crops but not tourism now also use their land for tourism.
- One who previously used his land for crops and tourism but not animals now stops using his land for tourism.

(b) Complete the diagram for the landowners after these changes.



[3]

4 Kayla is learning to play the guitar. She has learnt five chords: A, C, D, F and G.

She identifies 15 songs containing three or more of these chords, as shown in the table.

Chords in song	C F G	C D G	C D F G	A C D G	A C D F G
Number of songs	4	5	2	3	1

For practice she selects one of these songs at random.

Find the probability that the song selected

(a) contains 4 chords,

..... [1]

(b) contains the chord A,

..... [1]

(c) contains the chord D, given that the song contains 3 chords.

..... [1]

Later Kayla selects two songs at random.
She finds the chord F the most difficult to play.

(d) Find the probability that one song contains the chord F and the other does not.

..... [3]

5 In this question the death rate of a population is defined as the number of deaths per thousand of the population.

During the year 2023 there were 180 deaths in a particular town. At the start of the year the population had been 19 250.

(a) Calculate the crude death rate for the town in 2023.

..... [2]

The table gives more information on the town's population and deaths in 2023, together with the standard population of the region in which the town is situated.

Age group	*Population*	*Age group death rate*	*Standard population* (%)
Under 25	3500	2.00	18
25–49	8000	4.25	42
50–69	5000	10.20	26
Over 69	2750	32.00	14

(b) Calculate the number of deaths in the 'over 69' group.

..... [2]

(c) Calculate the standardised death rate for the town in 2023.

..... [3]

(d) What can you conclude about the population of a town where crude and standardised rates are the same?

.....

.....

..... [1]

6 Hashim owns a café inside a shopping centre. One day he asks his first 30 customers how many visits they made to the shopping centre in the previous month, and on these occasions how many visits they made to his café. His results are shown in the two-way table.

		Number of visits to shopping centre					
		0	1	2	3	4	5
Number of visits to café	0	1	0	0	1	2	2
	1	0	1	1	1	2	4
	2	0	0	3	2	2	3
	3	0	0	0	2	1	2

For example, there were 4 people who made 5 visits to the shopping centre and 1 visit to the café.

(a) Explain why the first column of data **must** contain at least three zeros.

.....

..... [1]

(b) Find the number of these people who made

(i) 2 visits to the café,

..... [1]

(ii) more than 3 visits to the shopping centre.

..... [1]

(c) Find the total number of visits made to the café by these people.

..... [2]

(d) Assume that on any visit to the shopping centre no person visited the café more than once.

Find the number of these people who visited the café every time they visited the shopping centre.

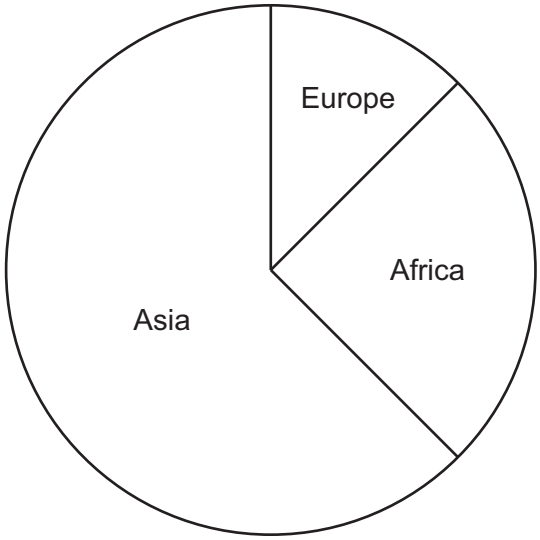
..... [1]

(e) Give a reason why it would have been difficult for Hashim to obtain a simple random sample in this situation.

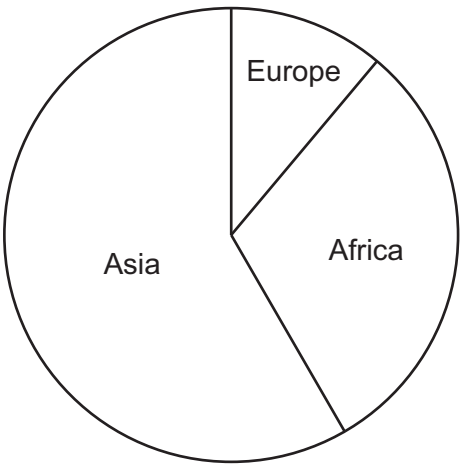
.....

..... [1]

7 Most of the footwear sold in a particular country is imported. The values of the footwear imported from various regions of the world in 2020 and 2024 are shown in the comparative pie charts.



2020



2024

The chart for 2020 represents footwear with a total value of 245 million dollars.

(a) Find the value of the footwear imported

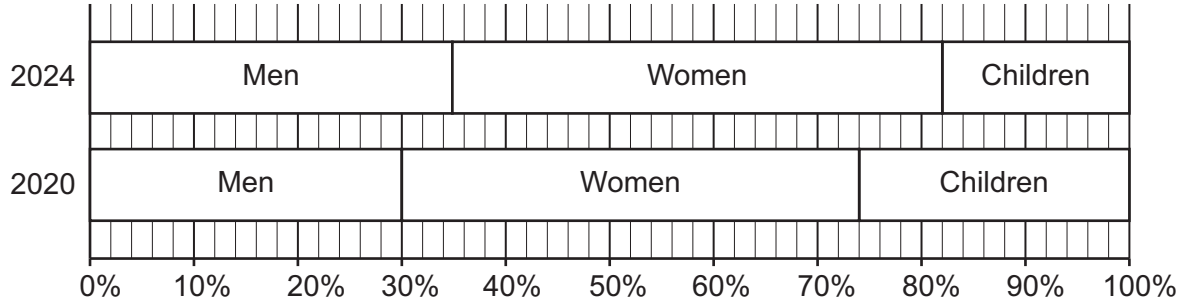
(i) in 2020 from Africa,

..... million dollars [2]

(ii) in 2024 from Asia.

..... million dollars [4]

The percentages of the value of imported footwear for men, women and children in these two years are shown in the percentage bar chart.



(b) Find the value of children's footwear imported in 2020.

..... million dollars [2]

(c) Find the decrease, from 2020 to 2024, in the value of women's footwear imported.

..... million dollars [3]

In 2020, of the value of imported footwear for men, 15% was from Europe.

(d) What percentage was this of the value of all footwear imported from Europe in 2020?

..... [4]

8 A town council provides a charging point in the town for electric vehicles.
The table summarises the charging times for 56 vehicles which used it.

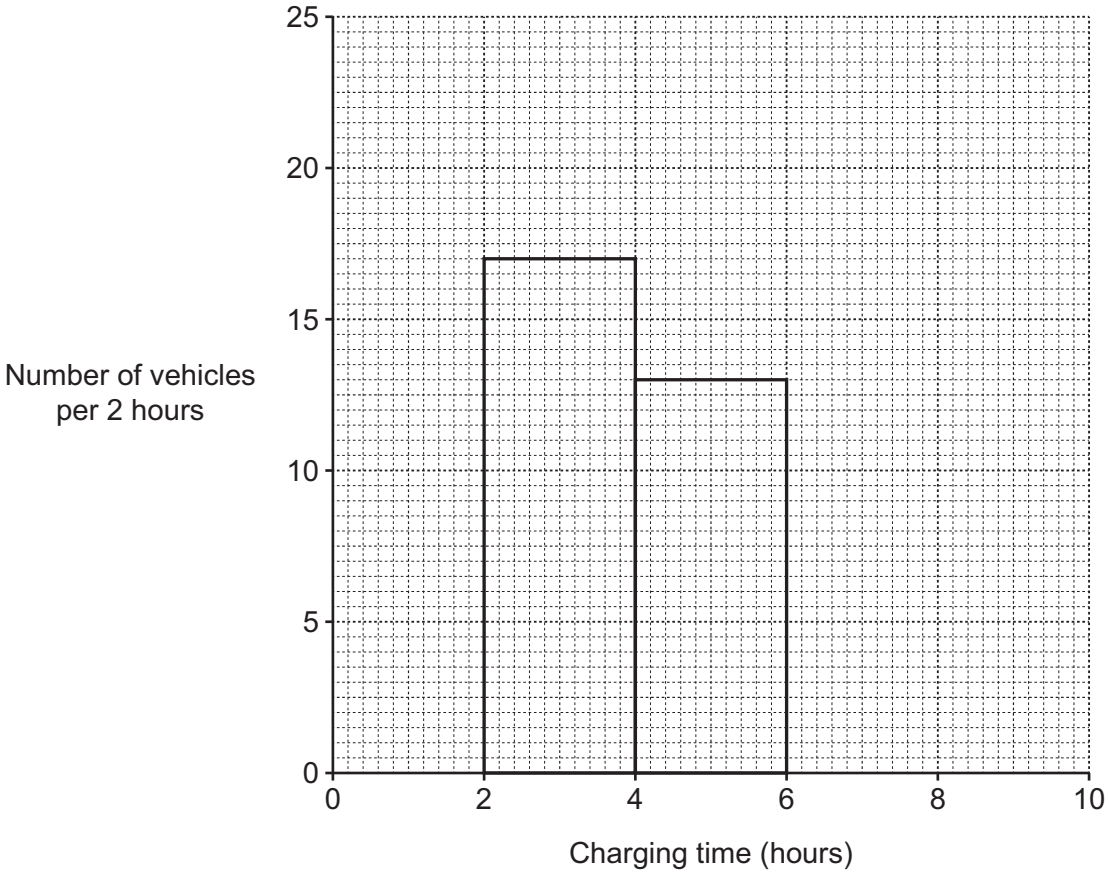
Charging time (hours)	*Number of vehicles*	
0 – under 1	4	
1 – under 2	12	
2 – under 4	17	
4 – under 6	13	
6 – under 10	10	

(a) Estimate the mean and standard deviation of these charging times.
Give your answers to 3 significant figures.

Mean ..... hours

Standard deviation ..... hours
[7]

(b) On the grid draw a histogram to illustrate the data in the table on page 10. The rectangles representing the '2 – under 4' and '4 – under 6' classes have already been drawn for you.



[3]

The data were collected over a 15-day period.

(c) Estimate the percentage of the time that the charging point was used during these 15 days.

..... [3]

Vehicle owners paid $6 per hour of charging time.

(d) Estimate the amount of money collected per day, on average, by the town council over this period.

..... [2]

(e) Explain why your answers to **(c)** and **(d)** can only be estimates, and not exact values.

.....

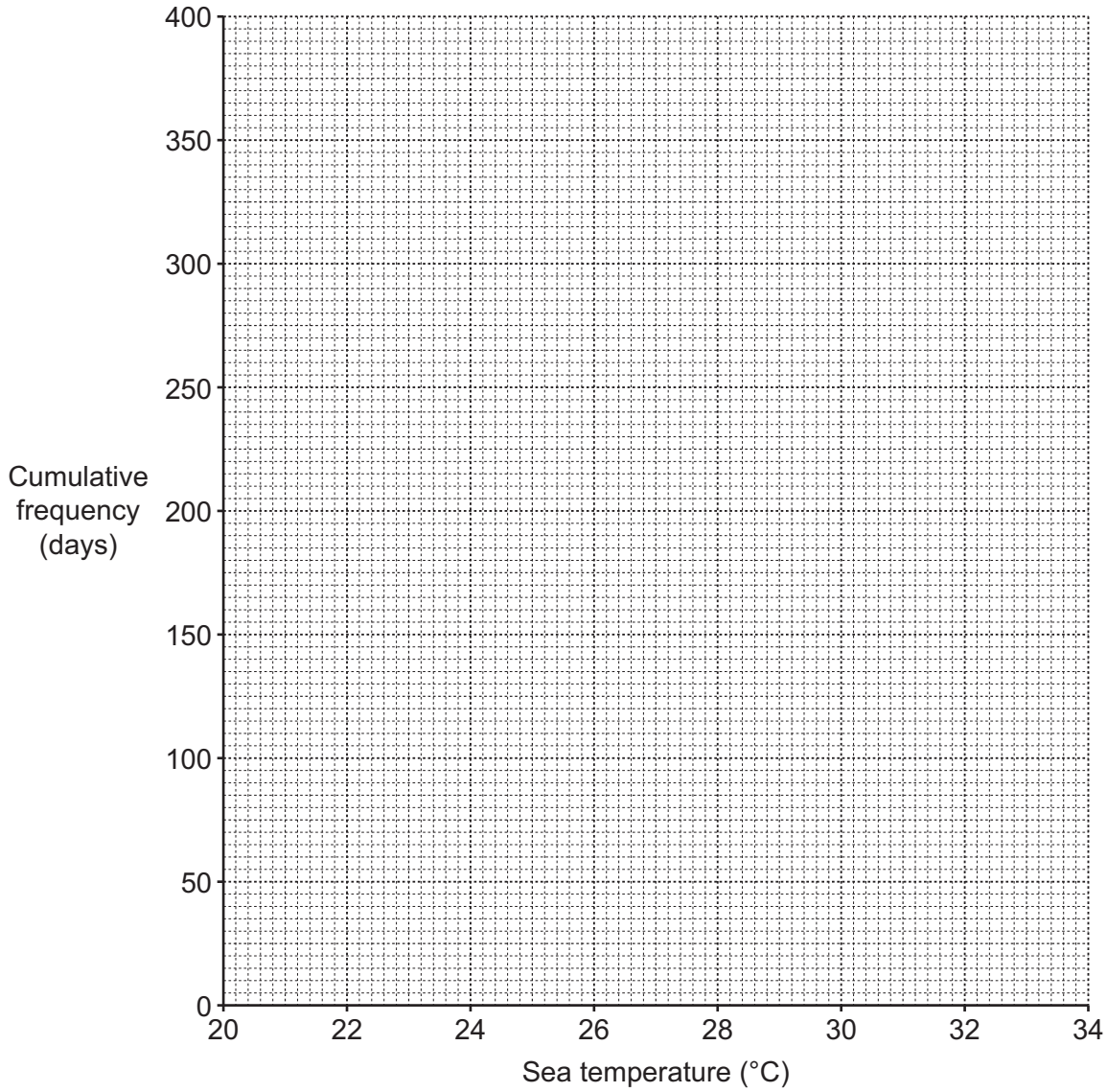
..... [1]

9 At a coastal town the sea temperature at mid-day was measured every day throughout the year 2024. The table summarises the results.

Sea temperature (°C)	*Number of days*	*Cumulative frequency*
20 – under 22	24	
22 – under 24	41	
24 – under 26	67	
26 – under 28	90	
28 – under 30	76	
30 – under 32	48	
32 – under 34	20	

(a) Complete the cumulative frequency column in the table. [1]

(b) On the grid below, draw a cumulative frequency **polygon** for the sea temperatures at mid-day.



[3]

(c) Use the graph to estimate, for these sea temperatures,

(i) the median,

..... [1]

(ii) the interquartile range, given that the upper quartile is 29.4°C.

..... [3]

A scientist predicts that coastal sea temperatures will increase by 0.15 °C every ten years because of climate change.

(d) Using this prediction,

(i) estimate the median of the sea temperatures at mid-day in 2084,

..... [2]

(ii) estimate the number of days in 2084 when the sea temperature at mid-day will be 30°C or more.

..... [2]

(e) Explain why the interquartile range will be the same in 2084 as it was in 2024.

.....

..... [2]

Another method of estimating the measures in **(c)** would have been to use linear interpolation.

(f) Explain why, in this particular case, you would expect to obtain the same values as those obtained from the graph. You are **not** required to calculate the measures by this method.

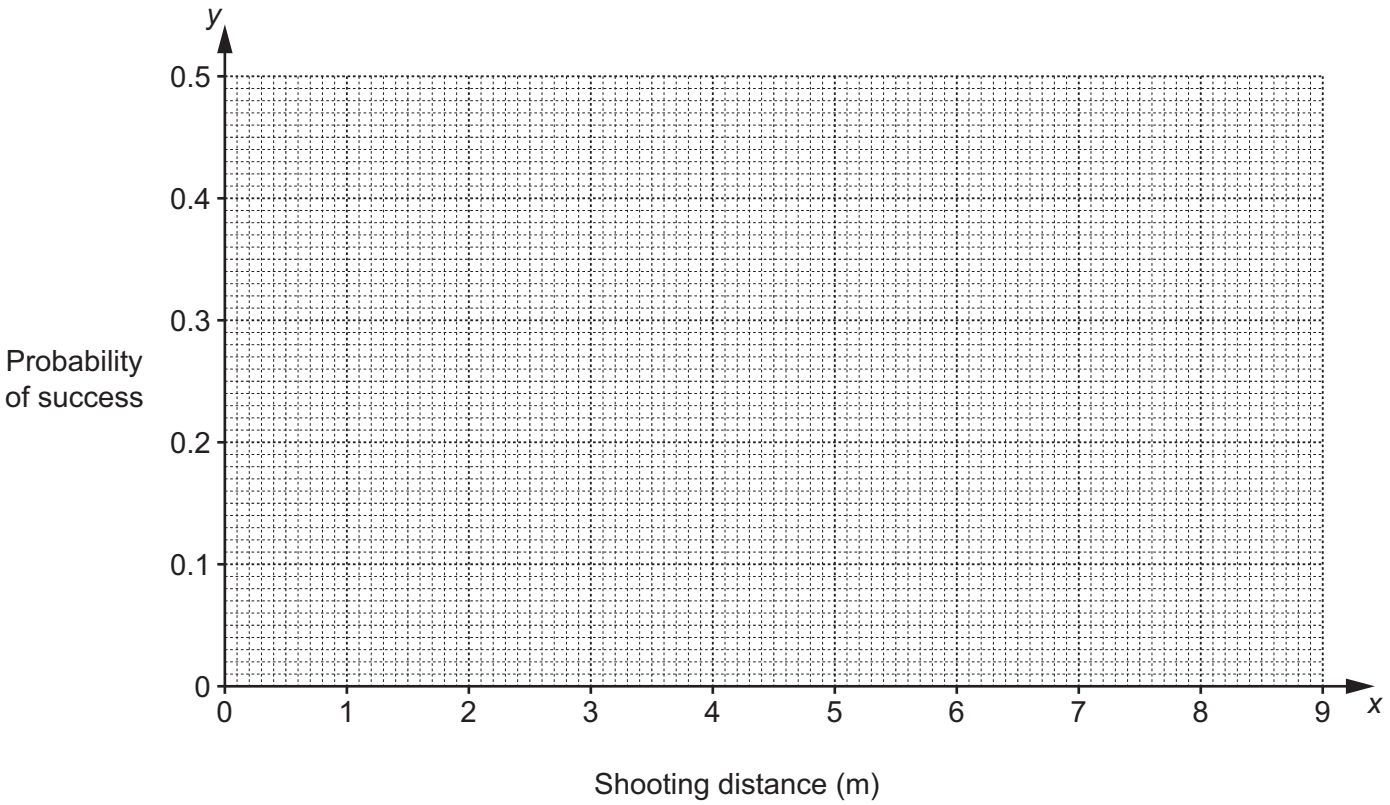
.....

..... [1]

10 The coach of a basketball team studies video recordings of her team's matches. She assesses the probability of a player making a successful shot, in open play, when shooting from different distances. Her results are shown in the table.

Shooting distance, x (m)	2	3	4	5	6	7	8	9
Probability of success, y	0.45	0.38	0.35	0.30	0.29	0.24	0.23	0.20

(a) Plot the data on the grid below.



[2]

The data have an overall mean of (5.5, 0.305) and a lower semi-average of (3.5, 0.37).

(b) Find the upper semi-average and plot this and the two given averages on your graph.

..... [3]

(c) Use your plotted averages to draw a line of best fit, and find its equation in the form $y = mx + c$.

..... [4]

In open play, three points are awarded for a successful shot from a distance of more than 7 m and two points for a successful shot from a distance of 7 m or less.

(d) Estimate the points scored by a player, in open play, for 20 shots made

(i) from a distance of 5.5 m,

..... [3]

(ii) from a distance of 10.5 m.

..... [3]

(e) Explain which of the two values found in **(d)** will be the better estimate.

.....

..... [1]

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