



Cambridge IGCSE™

CANDIDATE
NAME

CENTRE
NUMBER

--	--	--	--	--

CANDIDATE
NUMBER

--	--	--	--



STATISTICS

0479/02

Paper 2

For examination from 2027

SPECIMEN PAPER

2 hours 15 minutes

You must answer on the question paper.

You will need: Calculator Ruler
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. Do **not** use correction fluid or tape.
- 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.

1 A researcher conducted a survey of shoppers in a city centre.

The first question was: 'What mode of transport did you use to get to the city centre today?'
 The second question was: 'What distance have you travelled to get to the city centre today?'

For each question, use statistical language to describe fully the type of data that the researcher collected.

mode of transport
 distance travelled [3]

2 A teacher wants to find out what the students in a class think about a new textbook. The teacher gives a questionnaire about the textbook to a sample of 30 students in the class.

(a) Define the population in this situation.
 [1]

(b) The students are each given a number from 01 to 30.

(i) Use the random number table to select a simple random sample of **size 6**.
 Start on the left of the table.

47 21 15 74 21 84 09 10 28 53 02 68 27 36

..... [2]

(ii) Use this random number table to help select a systematic sample of **size 6**.
 Start on the left of the table.

52 04 91 23 86 30 19 47 07 72 00 24 56 08

..... [3]

- 3 Raashida and Takala count the number of characters in the last 12 text messages that each of them has sent.
Here are the results.

messages sent by Raashida						messages sent by Takala					
18	29	14	34	23	11	33	29	12	28	1	65
4	22	23	18	13	10	2	9	17	13	9	40
mean = 18.25 characters						mean = 21.5 characters					

- (a) Draw a back-to-back stem-and-leaf diagram for these data.

[5]

- (b) Takala compares the means and says that her messages are longer than Raashida's.

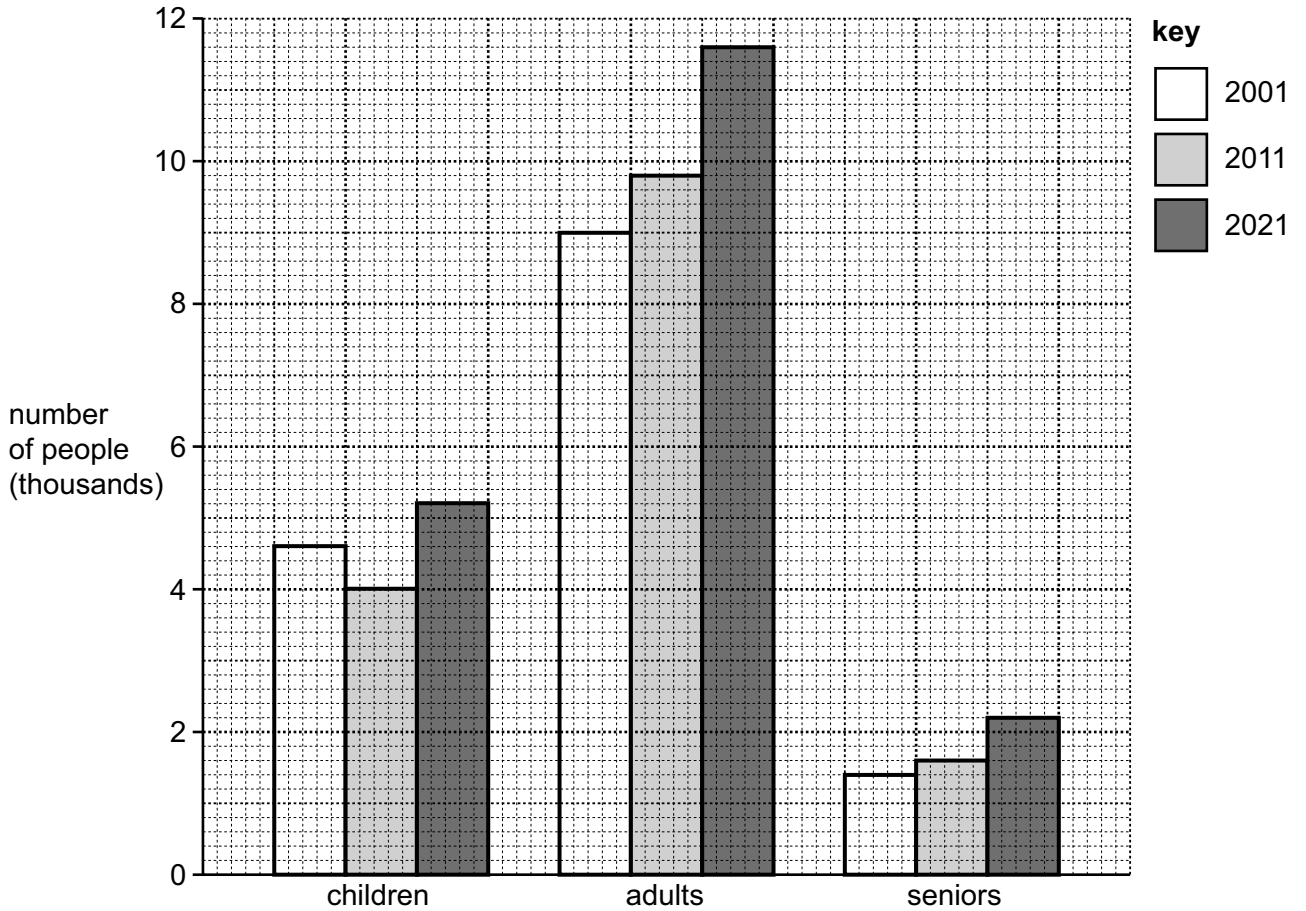
Use your stem-and-leaf diagram to comment on whether or not you think Takala is correct.

.....

.....

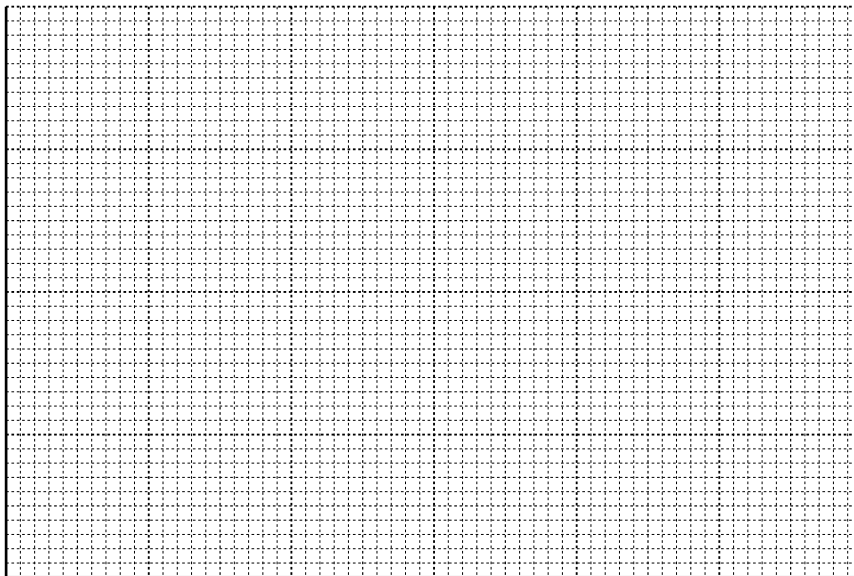
..... [2]

- 4 The population of a town is counted every ten years. The population is divided into three age groups: children, adults and seniors.



Azeeb claims that ‘there has been a steady increase in the overall population of this town in the period 2001–2021’.

- (a) Use the information in the chart to draw a sectional bar chart on the grid to help show whether or not Azeeb’s claim is correct.



[4]

(b) Use the sectional bar chart to comment on whether or not you think that Azeeb's claim has been shown to be correct.

.....
.....
..... [2]

5 A class takes a test. The marks, x , are such that

$$\text{mean of } x = 66 \qquad \Sigma x = 2046 \qquad \Sigma x^2 = 138\,776$$

(a) Show that the standard deviation of the marks for the class is 11.0, correct to three significant figures.

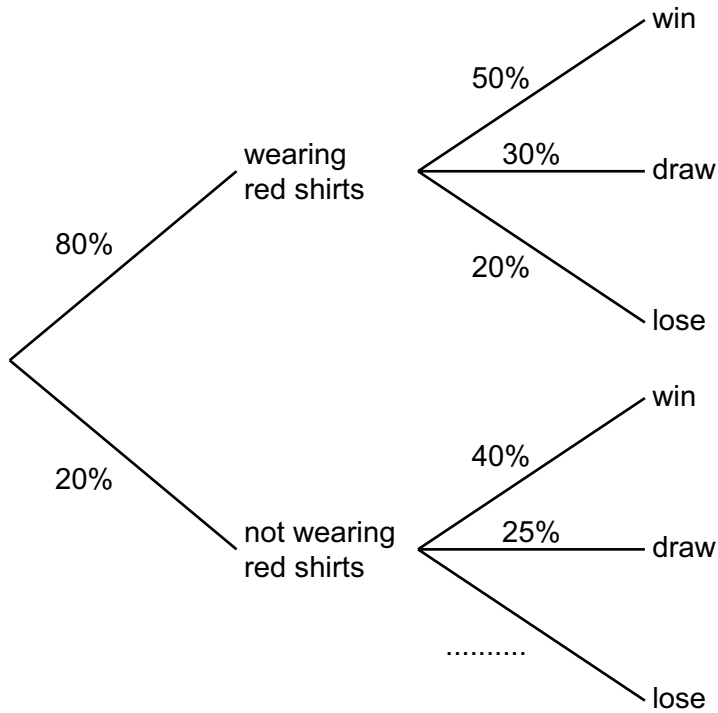
[4]

(b) The marks are to be scaled so that they have a mean of 60 and a standard deviation of 15. Find the mark that will remain unchanged by this scaling.

..... [2]

- 6 A team plays 80% of its matches wearing red shirts.

The team may win, draw or lose a match, with probabilities that depend on whether they are wearing red shirts or not. The tree diagram shows some of these probabilities.



- (a) Complete the tree diagram to show the probability of the team losing if they are not wearing red shirts. [1]

The team will score 3 points if they win, 1 point if they draw and 0 points if they lose.

- (b) Calculate the expected number of points scored per match for this team.

..... [4]

- 7 The table shows the frequency distribution of a discrete variable V .
 V has a mean of 2.96 and a standard deviation of 0.82.

V	1	2	3	4
frequency	p	q	r	s

- (a) The tables show the frequency distributions of the discrete variables W and X .
 Find the mean and standard deviation of W and of X .

W	10	11	12	13
frequency	p	q	r	s

mean

standard deviation

X	10	20	30	40
frequency	p	q	r	s

mean

standard deviation

[4]

- (b) The continuous variable Y represents measurements in centimetres. The table shows the frequency distribution of values of Y rounded to the nearest centimetre.

Y	10–14	15–19	20–24	25–29
frequency	p	q	r	s

- (i) For the 15–19 class, find the lower class boundary, the upper class boundary, the mid-point and the class width.

lower class boundary

upper class boundary

mid-point

class width

[2]

- (ii) Find an estimate for the mean and the standard deviation of the continuous variable Y .

mean

standard deviation

[2]

8 Data has been collected from 80 cars.

The fuel consumption, c , measured in litres per 100 kilometres ($l/100$ km), was found for each of these 80 cars. The table summarises the results.

fuel consumption, c , ($l/100$ km)	cumulative frequency
$c < 7.0$	7
$c < 10.0$	22
$c < 10.5$	45
$c < 11.0$	60
$c < 12.0$	73
$c < 14.0$	80

(a) Use linear interpolation to calculate an estimate for the percentage of these cars that have a fuel consumption of more than 9 $l/100$ km.

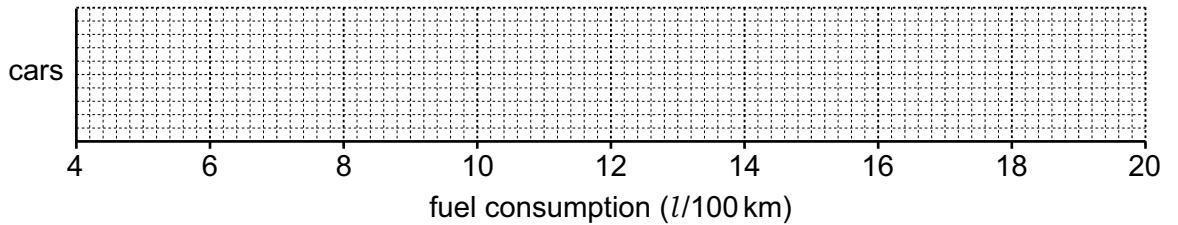
..... [4]

(b) Use linear interpolation to calculate an estimate for the median of the fuel consumptions of these 80 cars.

..... $l/100$ km [4]

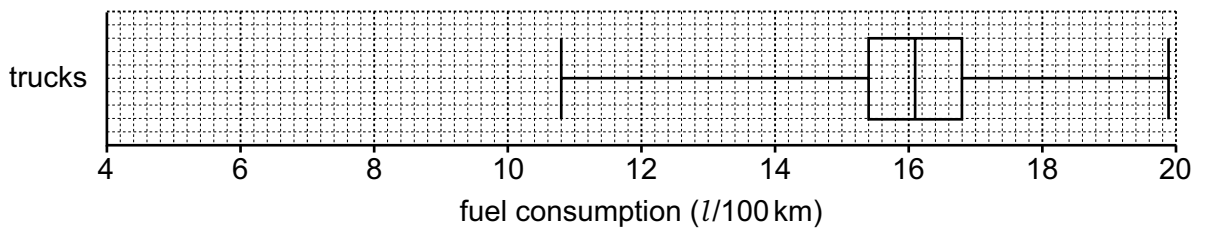
(c) For these 80 cars, the lowest fuel consumption was 4.6 l/100 km, the range was 9.1 l/100 km, the upper quartile was 11.0 l/100 km and the interquartile range was 1.4 l/100 km.

(i) Use your answer to 8(b) and this information about the cars to draw a box-and-whisker diagram on the grid.



[3]

(ii) The fuel consumptions of 80 trucks were also found. The box-and-whisker diagram summarises the results.



Use the box-and-whisker diagrams to make two comparisons between the fuel consumptions for the cars and the fuel consumptions for the trucks.

- 1
-
- 2
-

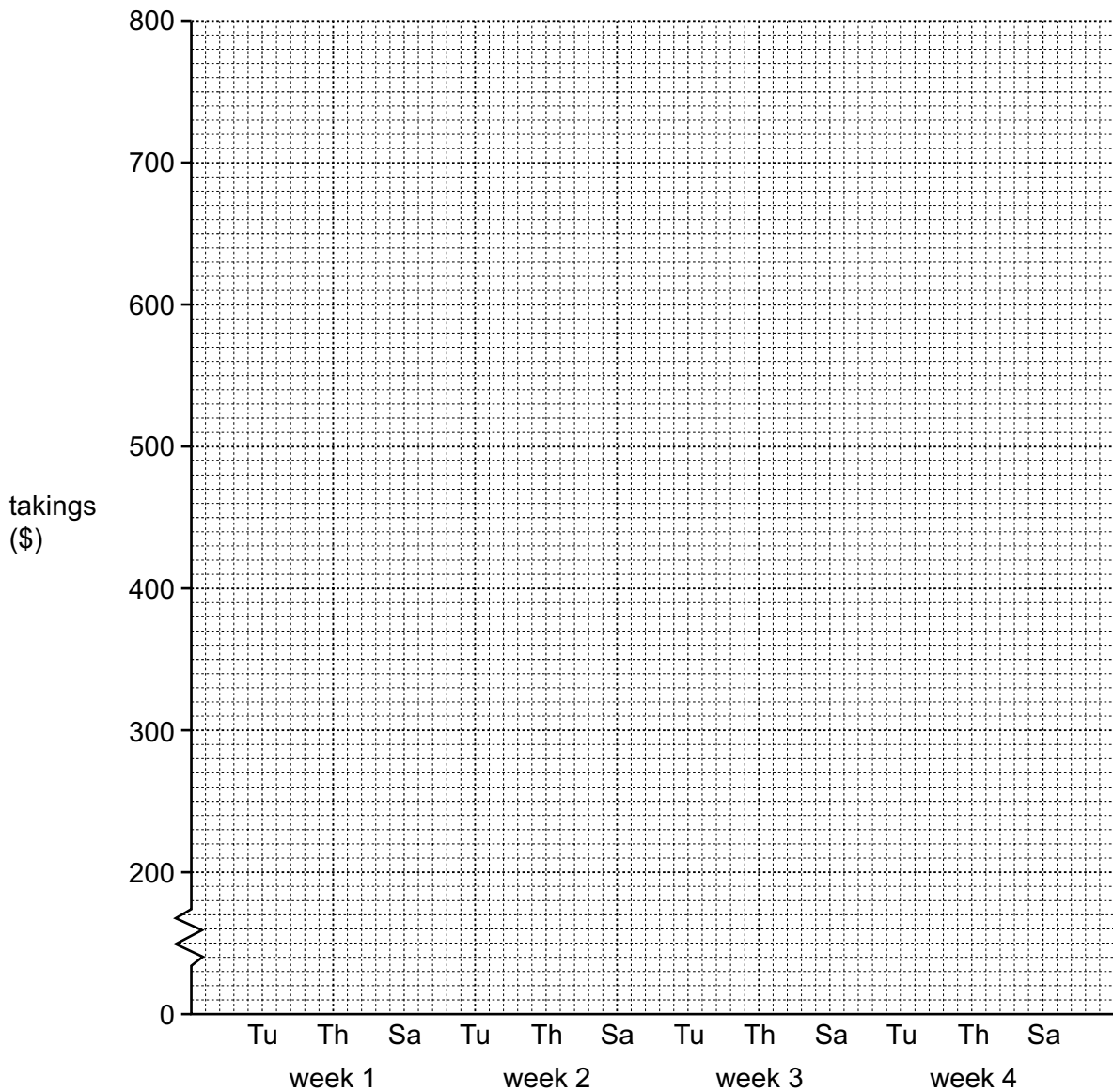
[2]

- 9 A market worker sells clothes on three days each week: Tuesday (Tu), Thursday (Th) and Saturday (Sa).

The takings over a three-week period are shown in the table in dollars (\$).

	Tuesday (Tu)	Thursday (Th)	Saturday (Sa)
week 1	320	351	721
week 2	298	343	709
week 3	308	312	691

- (a) Plot a time series graph for this information on the grid.



[3]

- (b) Calculate all the 3-point moving average values.
Write the values in the appropriate cells of the table.

	Tuesday (Tu)	Thursday (Th)	Saturday (Sa)
week 1			
week 2			
week 3			

[3]

- (c) Use the original data and your moving average values to calculate the seasonal component for Thursday (Th).

..... [3]

- (d) Plot the moving average values on the grid on page 10.
Draw an appropriate trend line on the grid. [3]

- (e) Use your trend line and your answer to 9(c) to estimate the takings on the Thursday (Th) of Week 4.

..... [2]

- (f) State an assumption that you have made in reaching your answer to 9(e).

.....
..... [1]

- 10 A cinema manager divides their total expenditure into four categories: licensing, wages, electricity and other.

The expenditure for each category in 2018 is shown.

licensing	\$22 000
wages	\$36 000
electricity	\$ 8 000
other	\$10 000

- (a) Some of the price relatives for 2021 and 2022 are shown in the table. The base year is 2018.

	2021	2022
licensing	107	113
wages	111	108
electricity	100
other	102

Explain what the 100 in the table means.

.....

.....

..... [2]

- (b) To find an estimate for the expenditure in 2021, the manager does the following calculation:

$$\text{mean price relative for 2021} = \frac{107 + 111 + 100 + 102}{4} = 105$$

$$\text{estimate for expenditure in 2021} = \$76\,000 \times \frac{105}{100} = \$79\,800$$

Explain why this is **not** likely to be a good estimate for the total expenditure in 2021.

.....

.....

..... [2]

- (c) The cost of electricity increased from \$0.12 per unit in 2018 to \$0.15 per unit in 2022. Costs in the category 'other' decreased by 1% between 2018 and 2022.

Use this information to complete the table in **10(a)**.

[3]

- (d) (i) Calculate a weighted aggregate cost index for 2022. Use expenditure in 2018 for weights and take 2018 as the base year.
Give your answer correct to one decimal place.

..... [3]

- (ii) Use your answer to **10(d)(i)** to calculate an estimate for the total expenditure in 2022.

..... [3]

- (e) Later, a review of the expenditure in 2022 showed that an estimate calculated using the method in **10(d)** was inaccurate.

The manager considered some possible explanations.

- A The weights had changed between 2018 and 2022.
- B The average wage had increased by 8% between 2018 and 2022.
- C The number of employees had increased between 2018 and 2022.
- D The cost of licensing had increased by 13% between 2018 and 2022.

- (i) Write down which **two** explanations are **not** possible explanations for the inaccurate estimate.

..... [1]

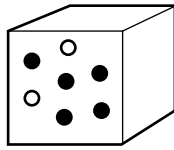
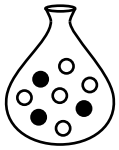
- (ii) Give a reason for your answer to **10(e)(i)**.

.....

.....

..... [1]

11 There are two containers, a bag and a box.



The bag contains 3 black counters and 5 white counters.
 The box contains 5 black counters and 2 white counters.

(a) A counter is selected at random from each container.

Some of the possible events are listed.

- A A black counter is selected from the bag.
- B A white counter is selected from the box.
- C Both counters selected are black.
- D Both counters selected are white.

From this list, state all the possible pairs of mutually exclusive events and all the possible pairs of independent events.

Pairs of mutually exclusive events

Pairs of independent events

[3]

(b) Find:

(i) $P(A \cap D)$

..... [1]

(ii) $P(A \cap B)$

..... [2]

(iii) $P(B \cup C)$.

..... [3]

(c) The counters are returned to their original containers, as shown on page 14.

Three counters are selected at random and removed from the bag.

Find the probability that exactly one of the selected counters is white.

..... [3]

(d) The counters are now returned to the bag, as shown on page 14.

Three counters are selected at random from the bag and placed in the box. Then two counters are selected at random from the box and placed in the bag.

Find the probability that the bag and the box each contain counters of just one colour at the end of this process.

Give your answer as a fraction in its lowest terms.

..... [4]

BLANK PAGE

Permission to reproduce items where third-party owned material protected by copyright is included has been sought and cleared where possible. Every reasonable effort has been made by the publisher (Cambridge University Press & Assessment) to trace copyright holders, but if any items requiring clearance have unwittingly been included, the publisher will be pleased to make amends at the earliest possible opportunity.

Cambridge International Education is the name of our awarding body and a part of Cambridge University Press & Assessment, which is a department of the University of Cambridge.