Please check the examination details below before entering your candidate information

Candidate surname	Other names

Centre Number | Candidate Number

Pearson Edexcel Level 1/Level 2 GCSE (9–1)

Monday 19 June 2023

Afternoon (Time: 1 hour 30 minutes)

Paper reference **1ST0/2F**

Statistics
PAPER 2
Foundation Tier

You must have:
Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser, scientific calculator.

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
  – *there may be more space than you need.*
- Scientific calculators may be used.
- You must **show all your working out** with **your answer clearly identified** at the **end of your solution**.

Information

- The total mark for this paper is 80.
- The marks for **each** question are shown in brackets
  – *use this as a guide as to how much time to spend on each question.*

Advice

- Read each question carefully before you start to answer it.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ▶

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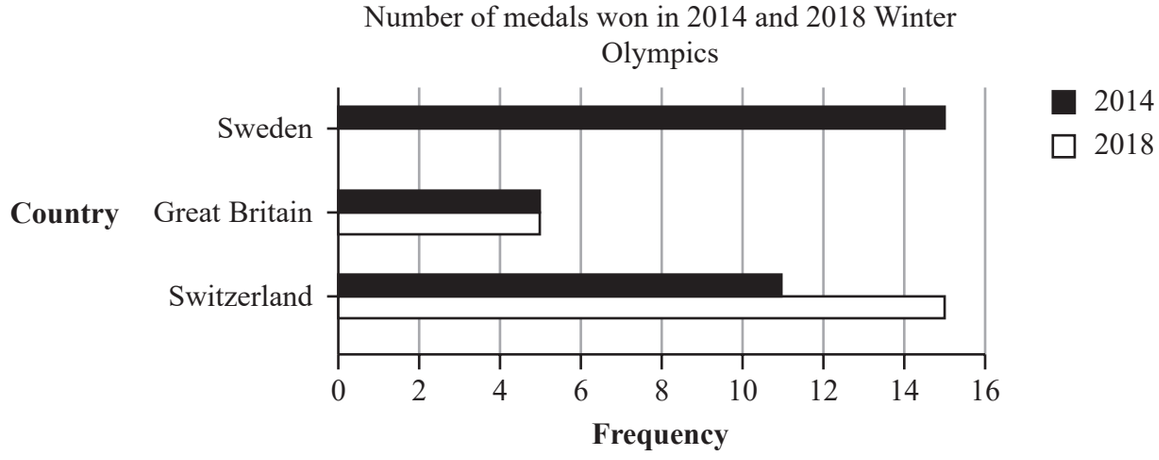
Pearson

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 The incomplete comparative bar chart shows the total number of medals won by three of the countries that took part in the 2014 and 2018 Winter Olympics.



(Source: *www.statista.com*)

The total number of medals won by Sweden in the 2018 Winter Olympics was 14

(a) Complete the comparative bar chart for Sweden.

(1)

(b) Work out how many more medals were won by Sweden than Great Britain in the 2014 Winter Olympics.

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(2)

(c) Compare the total number of medals won by Sweden, Great Britain and Switzerland in the 2014 Winter Olympics.

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(2)

Thomas says that the data displayed in the comparative bar chart is quantitative data.

(d) Explain what is meant by quantitative data.

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(1)

(Total for Question 1 is 6 marks)

2 Norbert asked each of the students in his class to name their favourite fruit from Apple, Banana, Orange or Pear.

The results are shown below.

Banana Orange Apple Banana Pear Apple

Apple Banana Orange Pear Apple Banana Apple

Apple Apple Orange Apple Pear Banana Banana

(a) Fill in the tally chart for this information **and** complete the frequency column.

Fruit	Tally	Frequency
Apple		
Banana		
Orange		
Pear		

(2)

(b) How many students are in the class?

.....

(1)

One of the students is chosen at random.

(c) Find the probability that this student's favourite fruit is Orange.

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(1)

(d) Compare the number of students whose favourite fruit is Apple to the number of students whose favourite fruit is Pear.

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(1)

Norbert decides to find the favourite fruit that is the mode.

(e) Explain why the mode is an appropriate average for Norbert to find for this type of data.

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(1)

(f) Give one advantage of the tally chart over the raw data.

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(1)

Norbert wants to draw a diagram to represent his results.

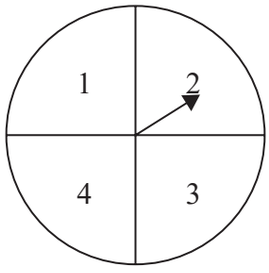
(g) Circle the type of diagram from the list below that is most suitable for him to draw.

Scatter diagram Bar chart Line graph Time series

(1)

(Total for Question 2 is 8 marks)

3 Keshav has a spinner with equal sections numbered 1, 2, 3 and 4



To investigate whether or not the spinner is biased towards the number 1 he spins the spinner 40 times.

(a) Explain what is meant by 'biased towards the number 1'

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(1)

Here is information about Keshav's results.

Number	Frequency
1	24
2	6
3	5
4	5

Keshav says the results show that the spinner is biased.

(b) Discuss whether or not the information in the table supports what Keshav says.

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(2)

(c) What could Keshav do to help improve the accuracy of his investigation?

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(1)

(Total for Question 3 is 4 marks)

4 Rose is investigating the number of brothers and sisters that students in her secondary school have.

To investigate this she asks 10 students in Year 8 and 10 students in Year 11 how many brothers and sisters they each have.

(a) Assess Rose's method for her data collection.

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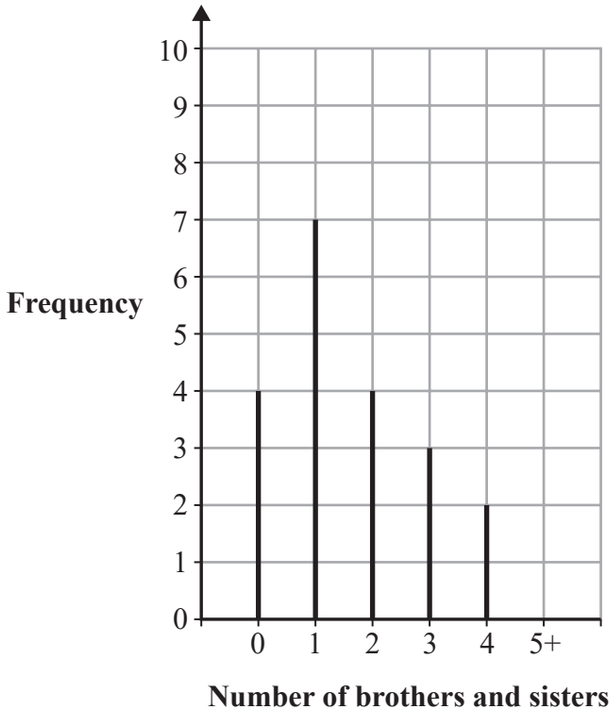
(1)

The vertical line graph shows the data that she collected.



(b) How many students have 2 or more brothers and sisters?

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(2)

(c) Write down the mode.

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(1)

Rose uses her vertical line graph to conclude that no student in her school has 5 or more brothers or sisters.

(d) Assess whether or not Rose's conclusion is appropriate.

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(1)

(Total for Question 4 is 5 marks)

5 Linzi is the owner of a coffee shop and makes afternoon teas for customers.
The customers have an option of egg or ham sandwiches and an option of plain or fruit scones.
The incomplete two-way table shows information about the number of afternoon teas she makes one Saturday.

	Fruit scone	**Plain scone**	**Total**
Ham sandwich	35		41
Egg sandwich	20	19	
Total		25	80

(a) Complete the two-way table.

(2)

One of the customers is chosen at random.

(b) Write down the probability that this customer

(i) ordered a plain scone,

.....

(1)

(ii) ordered an egg sandwich and a fruit scone,

.....

(1)

(iii) did **not** order a ham sandwich.

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(2)

Linzi needs to place an order for scones for the next Saturday.

(c) Use the information in the table to help her decide if she should order more fruit scones than plain scones.
Give a reason for your answer.

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(2)

(Total for Question 5 is 8 marks)

6 Connie is going to write a report on the difference in total rainfall between London and Aberdeen in 2019

She collects secondary data to investigate this.

This question must be answered with a cross in a box ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

(a) What should Connie include in her report?

☒ source of the data ☒ her telephone number ☒ her age ☒ name of her school

(1)

(b) Describe one way that she could obtain this secondary data.

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(1)

The table shows the total rainfall, in cm, for each month in 2019 in London.

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Total rainfall (cm)	5.9	4.6	3.7	3.6	4.0	3.9	4.7	5.9	5.4	7.1	7.2	6.5

(Source: *en.climate-data.org*)

The mean monthly rainfall in Aberdeen in 2019 is 6.2 cm.

Connie considers the data in the table and concludes that the mean monthly rainfall for Aberdeen in 2019 is greater than the mean monthly rainfall in London in 2019

(c) Is Connie correct?
You must show how you get your answer.

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(3)

(Total for Question 6 is 5 marks)

7 A theme park in Staffordshire has around 30 000 visitors per day.

(Source: *www.statista.com*)

Navine is a manager at the theme park. Navine is investigating what visitors think about the theme park.
He is going to do a survey of visitors at the theme park.

Navine decides to question
30 people aged under 18 and
30 people aged 18 and over
as they leave the theme park one day.

He plans to ask them face to face what their favourite ride was.

(a) Name this sampling method.

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(1)

(b) Describe the population for this survey.

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(1)

(c) Assess Navine's plan to get the opinions of the people who have visited the theme park.

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(3)

(Total for Question 7 is 5 marks)

8 A Science teacher wants to know the effects of revision on a student's performance in an exam. She decides to carry out an experimental test on a group of 15 students to find out the effects of any revision.

(a) Describe one way the teacher could carry out an experimental test.

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(2)

(b) Give one reason why the results of this experimental test could be unreliable.

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(1)

(Total for Question 8 is 3 marks)

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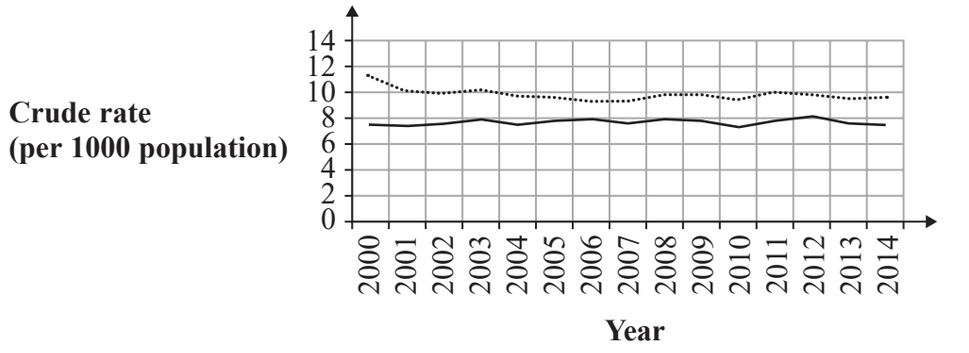
9 The graph below shows the crude birth rate and crude death rate for Malta from 2000 to 2014

Birth rate and death rate in Malta from 2000 to 2014



(Source: *www.indexmundi.com/*)

Using the information from the graph above Lottie concludes

"The total population of Malta has increased between 2000 and 2014"

(a) Explain how the graph can be used to support Lottie's conclusion.

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(1)

(b) Give one reason why Lottie's conclusion might **not** be correct.

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(1)

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In 2015, the population of Malta was 445 053
In the same year there were 4398 births in Malta.

(c) Using the formula below, work out the crude birth rate in Malta in 2015
Give your answer correct to 1 decimal place.

$$\text{crude birth rate} = \frac{\text{number of births} \times 1000}{\text{total population}}$$

.....

(2)

(Total for Question 9 is 4 marks)

10 Sam used the internet to collect the times, in minutes, it took for 50 cyclists to compete in a hill climb competition. He used a group frequency table to record the results he collected.

(a) (i) Give one advantage of using grouped data rather than raw data.

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.....

(1)

(ii) Give one disadvantage of using grouped data rather than raw data.

.....

.....

(1)

Sam used this grouped frequency table to show the results for the hill climb.

Time (t minutes)	Frequency
$11 \leqslant t < 12$	2
$12 \leqslant t < 13$	25
$13 \leqslant t < 14$	15
$14 \leqslant t < 15$	4
$15 \leqslant t < 16$	1
$16 \leqslant t < 17$	1
$17 \leqslant t < 18$	1

(Source: *cyclinguphill.com*)

Before Sam collected the data he did not know what the longest time would be.
The longest time in the hill climb was 28.3 minutes.

(b) Explain why this table cannot be used to show the data for all 50 riders.

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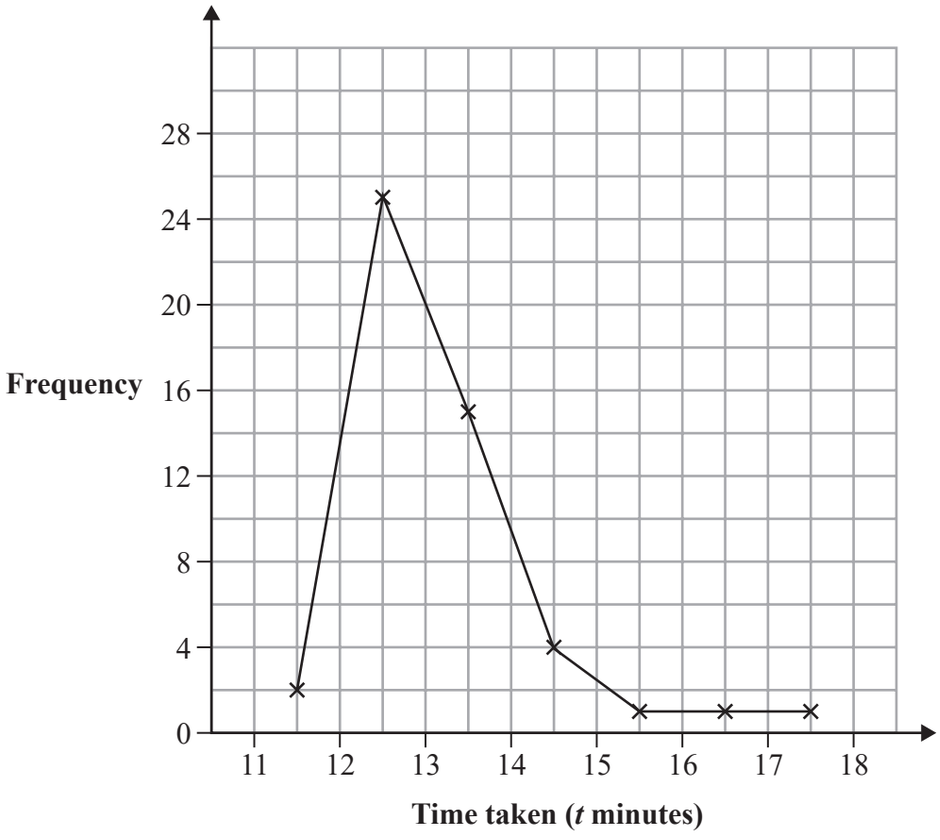
(1)

Sam drew this frequency polygon for the hill climb results.



Sam decided not to include the value of 28.3 minutes on his frequency polygon.

(c) Suggest a reason why Sam's decision might be appropriate.

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(1)

(d) (i) Describe the skew of the distribution.

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(1)

(ii) Interpret the skew of the distribution in context.

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(1)

(Total for Question 10 is 6 marks)

11 Grace asked a sample of 60 people in her town if they had ever visited France or Spain.

17 people visited both France and Spain
23 people visited Spain only
33 people visited France

(a) Draw a Venn diagram to represent this information.

(5)

Grace says

- more than half of the people in her sample have visited France
- therefore more than half of the people in her town have visited France

(b) Discuss the validity of each of Grace's comments.

(3)

(Total for Question 11 is 8 marks)

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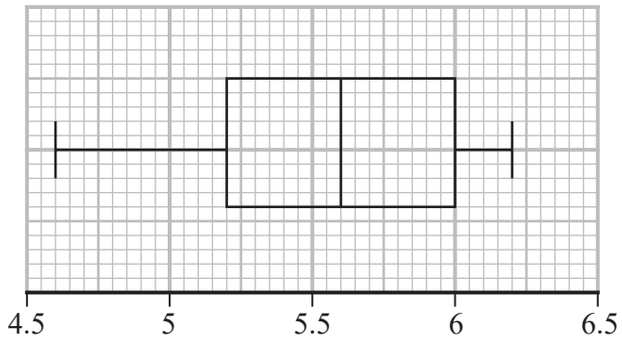
12 Logan is investigating the heights of male adult giraffes and the heights of female adult giraffes.

He records the height, in metres, of each of a sample of male adult giraffes and the height, in metres, of each of a sample of female adult giraffes.

He draws the box plot below for the recorded heights of the male adult giraffes.



Male adult giraffe height (metres)

The table gives information about the recorded heights of the female adult giraffes.

Summary statistic	Mean	Median	Minimum	Maximum	Lower quartile	Upper quartile
Height (metres)	4.8	4.9	3.9	5.9	4.2	5.4

Logan makes the following two conclusions.

1. Male adult giraffes are generally taller than female adult giraffes.
2. The heights of the female adult giraffes are more consistent than the heights of the male adult giraffes.

Assess Logan's two conclusions.
You should show clearly the values of any statistics you use in your answer.

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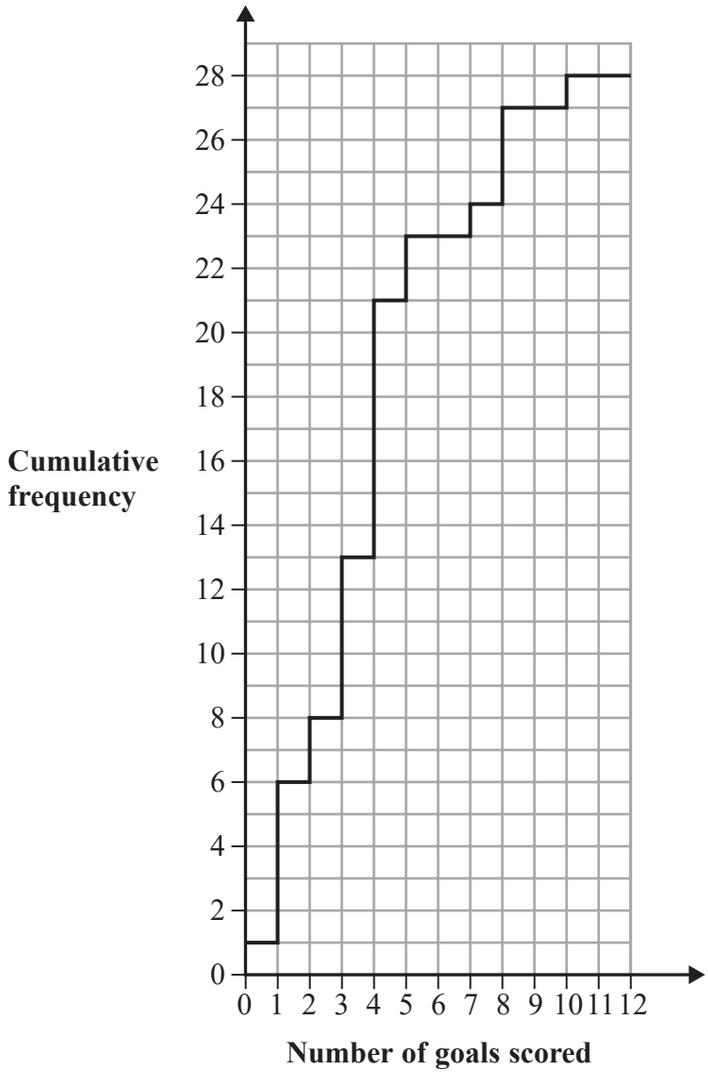
(Total for Question 12 is 5 marks)

13 The cumulative frequency step polygon shows information about the number of goals scored in each of 28 matches played by the German women's national football team.



(Source: *www.worldfootball.net/teams/deutschland-frauen-team/*)

(a) Give a reason why a cumulative frequency step polygon is used to represent this information rather than a cumulative frequency curve.

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(1)

(b) Find the mode of the number of goals scored.

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(1)

(c) Find the number of these matches where

(i) exactly 6 goals were scored,

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(1)

(ii) more than 6 goals were scored.

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(2)

In 24 matches fewer than n goals were scored.

(d) Find the value of n

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(1)

Klara tries to calculate the interquartile range of the number of goals scored.

She gets an answer of 14

(e) Explain how you know that her answer is incorrect.

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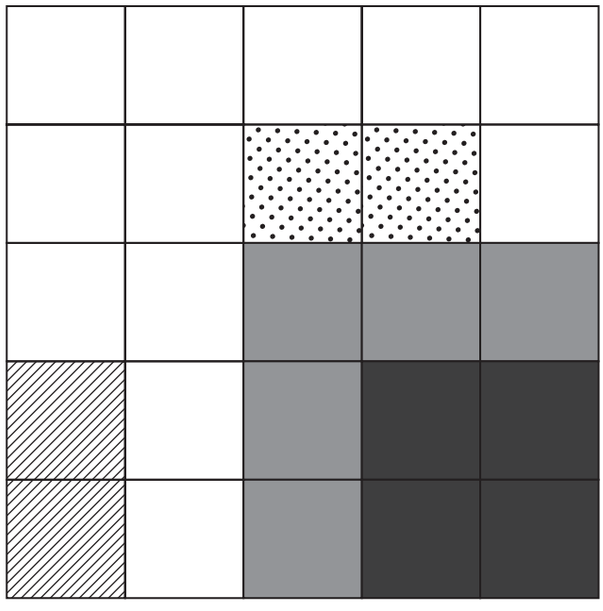
(1)

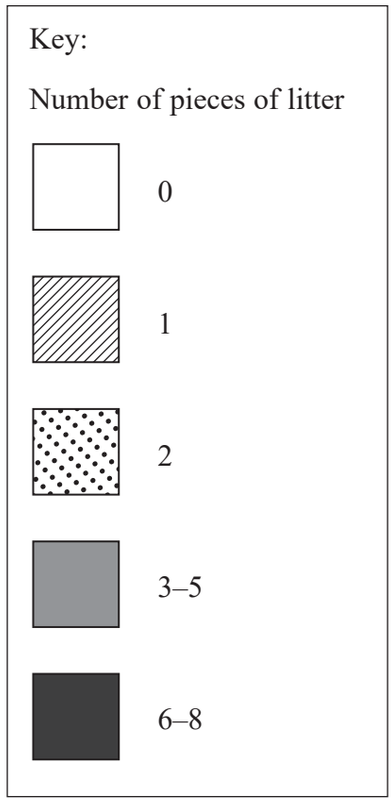
(Total for Question 13 is 7 marks)

14 The choropleth map below represents a park that has been divided into 25 squares of equal area.

Arthur has collected data about litter in the park.

The number of pieces of litter collected in each square on one Saturday morning is shown.





(a) Use the information in the choropleth map to calculate an estimate of the total number of pieces of litter that were collected that day.

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(3)

Arthur works in this park. He has been asked to decide where a new bin should be placed in the park to help reduce the amount of litter. He concludes that the new bin should be placed in the corner of the park represented by the bottom right of the choropleth map.

(b) Assess the validity of Arthur's conclusion with reference to the choropleth map.

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(2)

Ian suggests that the method Arthur used to collect his data is not suitable to reach a reliable conclusion.

(c) Assess whether Ian's suggestion is correct.
Give a reason for your answer.

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(1)

(Total for Question 14 is 6 marks)

TOTAL FOR PAPER IS 80 MARKS

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