

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)

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Thursday 13 June 2019

Afternoon (Time: 1 hour 30 minutes)

Paper Reference **1ST0/1F**

Statistics

Paper 1

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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Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 A bag contains 8 coloured beads.

There are

- 4 blue beads,
- 2 red beads,
- 1 green bead,
- 1 yellow bead.

A bead is picked at random from the bag.

(a) Underline the word from the list below that best describes the likelihood that the bead is green.

impossible certain evens unlikely likely

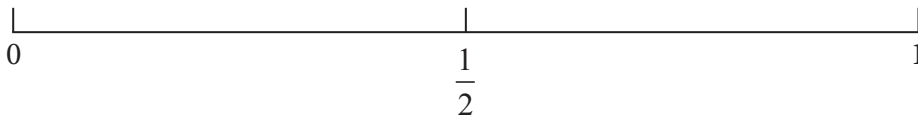
(1)

(b) Beads of which two colours are equally likely to be picked?

..... and

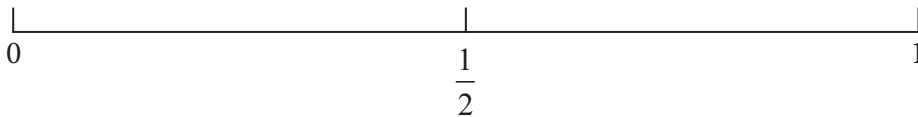
(1)

(c) On the probability scale below, mark with a cross (×) the probability that the bead is blue.



(1)

(d) On the probability scale below, mark with a cross (×) the probability that the bead is black.



(1)

(Total for Question 1 is 4 marks)

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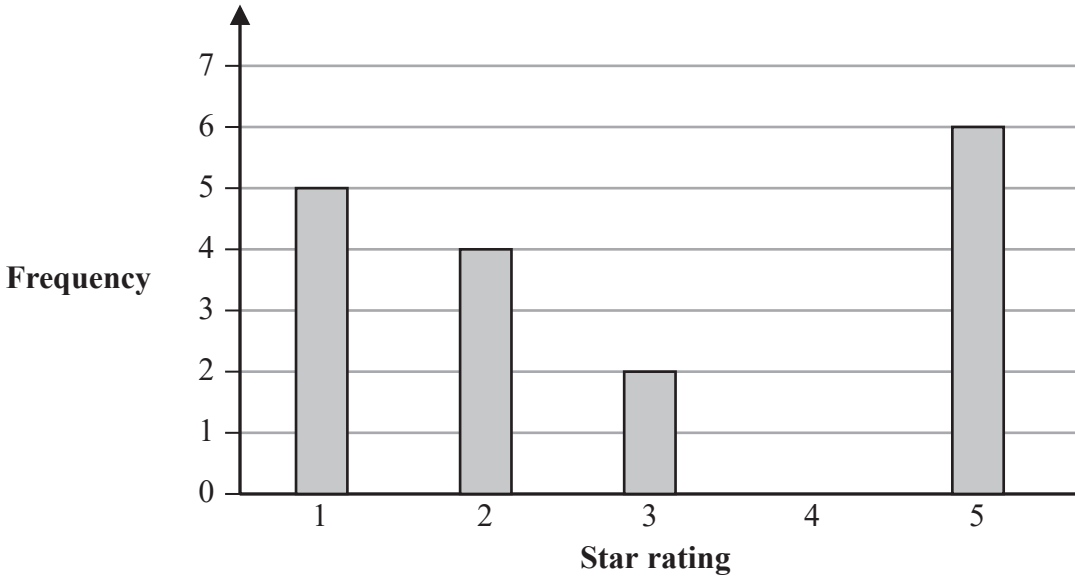
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2 Andrew has collected data about the ratings given to a particular television by 20 people.

Each person has given the television a rating from 1-star to 5-star.
The lowest rating is 1-star and the highest rating is 5-star.

The incomplete bar chart gives the number of 1-star ratings, of 2-star ratings, of 3-star ratings and of 5-star ratings.



(Source: www.amazon.co.uk)

3 people gave the television a 4-star rating.

(a) Complete the bar chart.

(1)

More people gave the television a 1-star rating than a 3-star rating.

(b) How many more?

(1)

Andrew thinks that the bar chart shows that this is a good television to buy as most people gave it a 5-star rating.

(c) Explain why Andrew might **not** be right.

(1)

(Total for Question 2 is 3 marks)



3 Lena is researching information about the numbers of British Oscar winners.

Here are her results, giving the number of British Oscar winners for each of the years 1981 to 2010

7 10 1 5 4 11 5 3 8 3
 3 4 3 4 5 4 3 9 7 6
 4 4 3 2 4 1 6 6 2 4

(Source: *www.theguardian.com*)

Lena found the data in a newspaper.

(a) Correctly complete the following sentence.

Because Lena found the data in a newspaper, the data is data. (1)

(b) Fill in the tally chart for Lena's results **and** complete the frequency column.

| Number of British Oscar winners | Tally | Frequency |
|---------------------------------|-------|-----------|
| 1 or 2 | | |
| 3 or 4 | | |
| 5 or 6 | | |
| 7 or 8 | | |
| 9 or 10 | | |
| 11 or 12 | | |

(2)

(c) Write down the modal group.

..... (1)



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(d) Work out the total number of years between 1981 and 2010 for which there were fewer than 7 British Oscar winners.

.....
(2)

(e) Suggest a suitable diagram that could be used for Lena's results.

.....
(1)

(Total for Question 3 is 7 marks)



4 Here are the weights, in kilograms, of 10 dogs.

9.2 4.3 68.2 12.3 6.5 10.6 14.2 16.0 9.1 8.5

(a) Work out the range.

..... kg
(2)

(b) Work out the median.

..... kg
(2)

The median is more appropriate than the mean to summarise the data.

(c) Explain why.

.....
.....
(1)

(Total for Question 4 is 5 marks)



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5 Jane collected data about the earnings of the 10 highest earning male tennis players and the 10 highest earning female tennis players.

Jane plans to use a scatter diagram to compare the earnings of the male tennis players with the earnings of the female tennis players.

(a) Discuss whether or not a scatter diagram would be a suitable diagram to use.

.....
..... (2)

Jane collected her data from the internet.

(b) Suggest a possible reason why it might **not** be possible to collect primary data in this case.

.....
..... (1)

(Total for Question 5 is 3 marks)



6 Inez is going to open a takeaway restaurant in her town.

She asks 100 people,

“What is your favourite type of takeaway?”

(a) Design a data collection sheet for Inez to record the answers to her question.

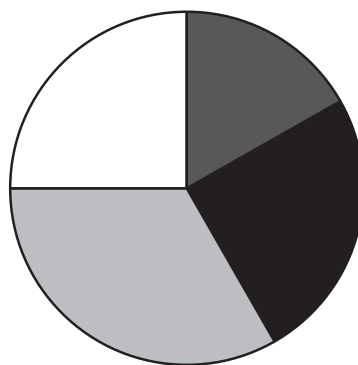
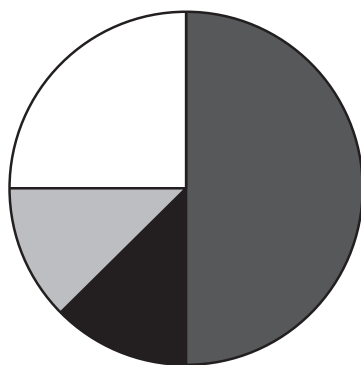
(2)

Joe runs an Italian restaurant in a different town.

Each pie chart below shows information about the type of main meal ordered by customers one evening in Joe’s restaurant.

Male customers

Female customers



-  Pizza
-  Pasta
-  Salad
-  Meat



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(b) Write down the most popular type of main meal ordered by female customers that evening.

.....
(1)

For male customers, one type of main meal was ordered half as many times as pizza.

(c) Write down this type of main meal.

.....
(1)

Hannah says that the number of male customers who ordered meat was the same as the number of female customers who ordered meat.

(d) Explain whether or not the information given in the two pie charts can be used to support this claim.

.....
.....
.....
.....
(2)

(Total for Question 6 is 6 marks)



7 Mike owns a shop.

He wants to collect information about the types of games liked by people in his town.

The following list gives the information he is going to collect about people's favourite board games.

- type of game
- average playing time
- minimum number of players

(a) From this list, write down the information that is

(i) categorical data,

..... (1)

(ii) discrete data.

..... (1)

Mike is planning to send a questionnaire to some of his customers.

He wants to select the customers by using systematic sampling.

Mike has a list of all of his 200 customers.

(b) Explain how Mike can select a systematic sample of 20 people from his list of customers.

.....

.....

.....

.....

.....

..... (2)

(Total for Question 7 is 4 marks)



8 Suresh is a secondary school student.

He wants to find out how many days off school each teacher has had in the last year.

Suresh plans to find out this information by using his school's employee records.

(a) Give one potential problem with Suresh's data collection plan.

(1)

Ami and Tia work in a primary school.

Ami and Tia are investigating the numbers of days that people working for their school have been absent due to illness.

The table gives information about the number of days that each of 30 people working for the primary school have been absent due to illness in the last year.

| | | | | | | | | | |
|-----------------------|---|---|---|---|---|---|---|---|---|
| Number of days | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Frequency | 6 | 5 | 5 | 3 | 5 | 2 | 0 | 3 | 1 |

Ami and Tia want to work out the average number of days absent due to illness.

Ami's method is $\frac{0 + 1 + 2 + 3 + 4 + 5 + 6 + 7 + 8}{9}$

Tia's method is $\frac{0 \times 6 + 1 \times 5 + 2 \times 5 + 3 \times 3 + 4 \times 5 + 5 \times 2 + 6 \times 0 + 7 \times 3 + 8 \times 1}{30}$

(b) Which of these two methods is correct, Ami's or Tia's?

You must give a reason for your answer.

(2)

(c) Find the median number of days absent due to illness.

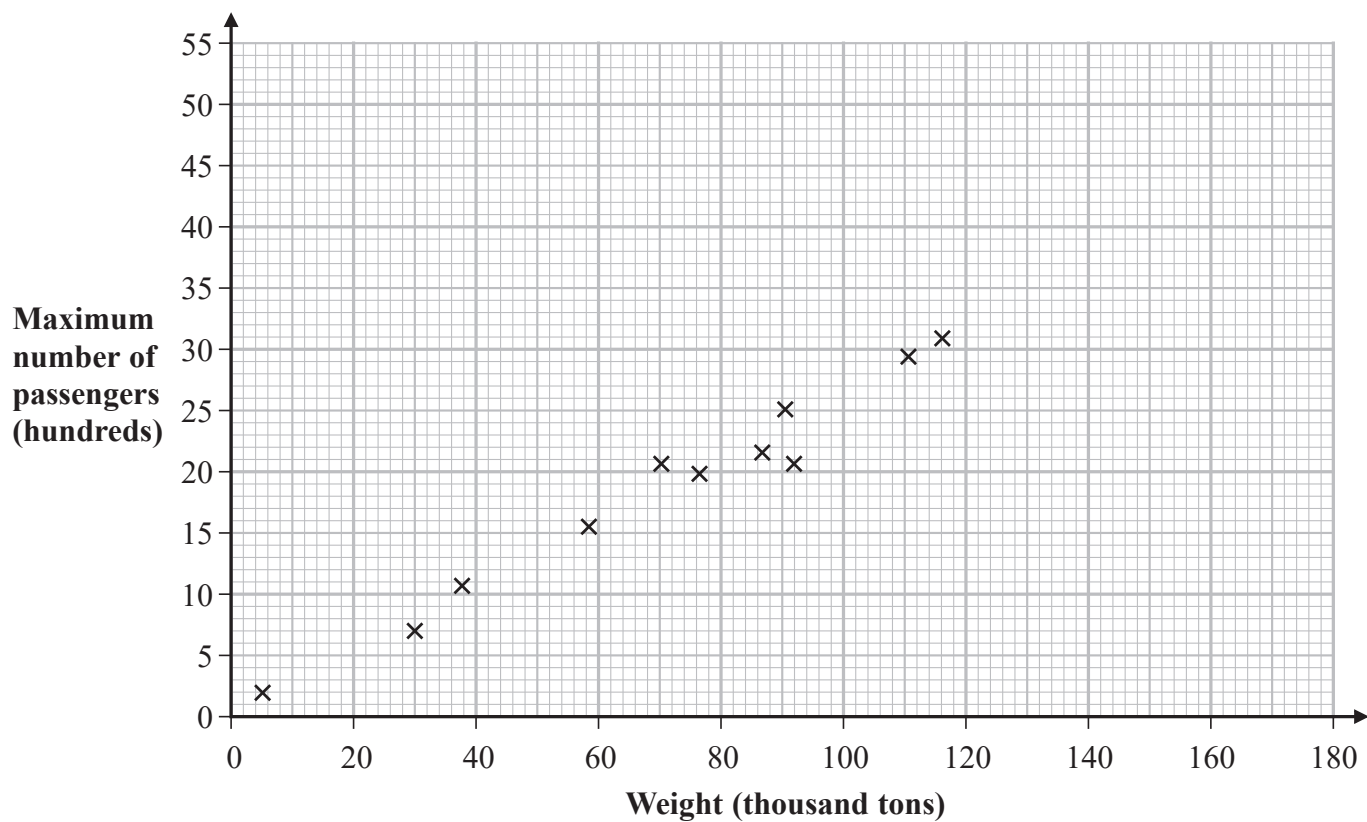
(2)

(Total for Question 8 is 5 marks)



9 Naomi recorded the weight, in thousands of tons, and the maximum number of passengers, in hundreds, for 11 cruise ships.

Naomi drew the scatter diagram below for her results.



(Source: www.stat.ufl.edu)

One of the 11 cruise ships has a weight of 116 000 tons.

(a) For this ship, write down its maximum number of passengers.

..... hundred
(1)

(b) Draw a line of best fit on the scatter diagram.

(1)



(c) Describe and interpret the type of correlation shown by the scatter diagram.

.....

.....

.....

(3)

A new cruise ship is being built.
The ship will have a weight of 170 000 tons.

Naomi plans to use the line of best fit on her scatter diagram to predict the maximum number of passengers for the new cruise ship.

(d) Explain whether or not it is appropriate to use the line of best fit to make her prediction.

.....

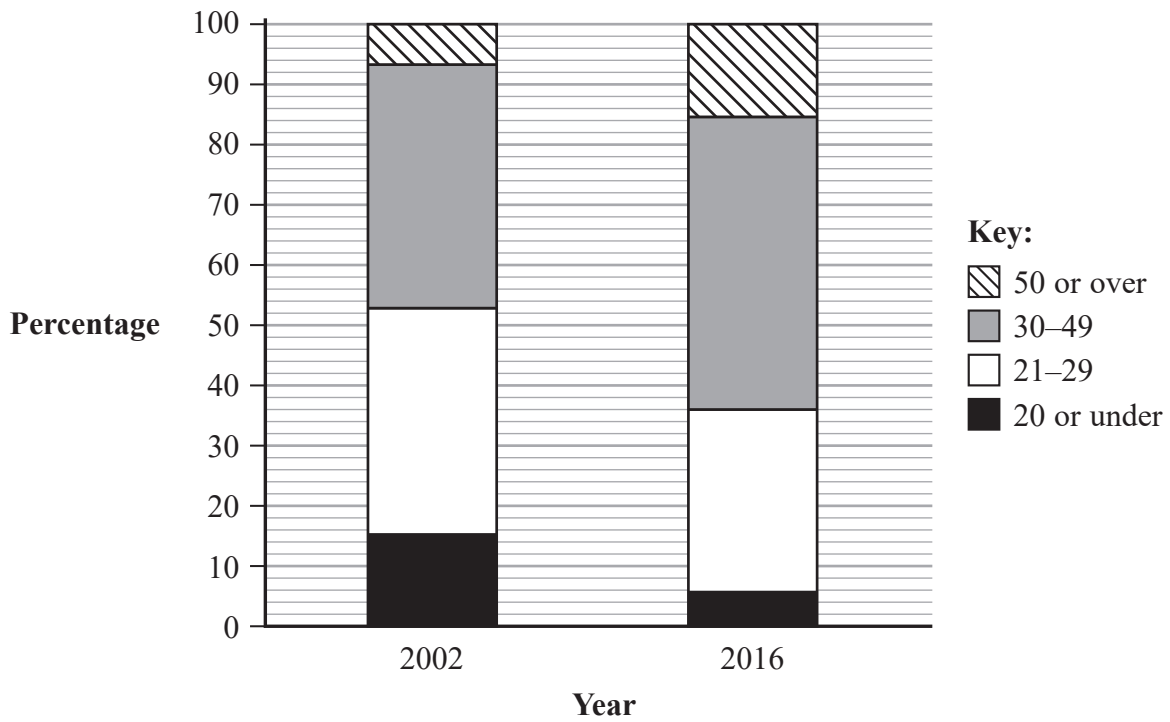
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(2)

(Total for Question 9 is 7 marks)



10 The percentage composite bar chart shows information about the ages of the listeners to a radio station in the UK in 2002 and in 2016



(a) Find the percentage of the listeners in 2016 who are aged 21–29

.....%

(2)

Martha says that the percentage composite bar charts show that there were less listeners aged 30–49 in 2002 than in 2016

Martha's conclusion may **not** be correct.

(b) Explain why.

.....

.....

.....

(1)

(Total for Question 10 is 3 marks)

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11 The diagram represents a children’s playground that has been divided into 20 squares of equal area.

In the playground there are some children and some play equipment only.

The number of children in each square at 11 am one Saturday is shown below.

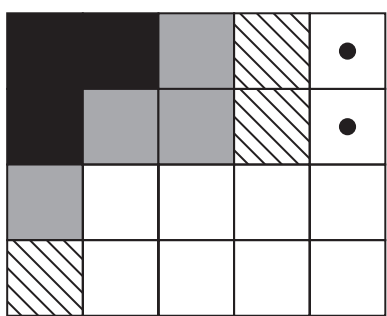
Number of children

| | | | | |
|----|----|---|---|---|
| 11 | 10 | 7 | 5 | 0 |
| 9 | 7 | 6 | 3 | 1 |
| 8 | 4 | 3 | 1 | 1 |
| 5 | 4 | 2 | 0 | 1 |

Key:

| | |
|---|----------------------------------|
| 9 | means 9 children in this square. |
|---|----------------------------------|

(a) Use the information above to complete this choropleth map.



Key:

Number of children

| | |
|---|-----------|
| | 9 or more |
| | 6–8 |
| | 3–5 |
| ● | 0–2 |

(2)

Grace concludes that there is likely to be more play equipment in that part of the playground represented by the squares in the top left hand corner of the choropleth map than elsewhere in the playground.

(b) Assess the validity of Grace’s conclusion with reference to the choropleth map.

.....

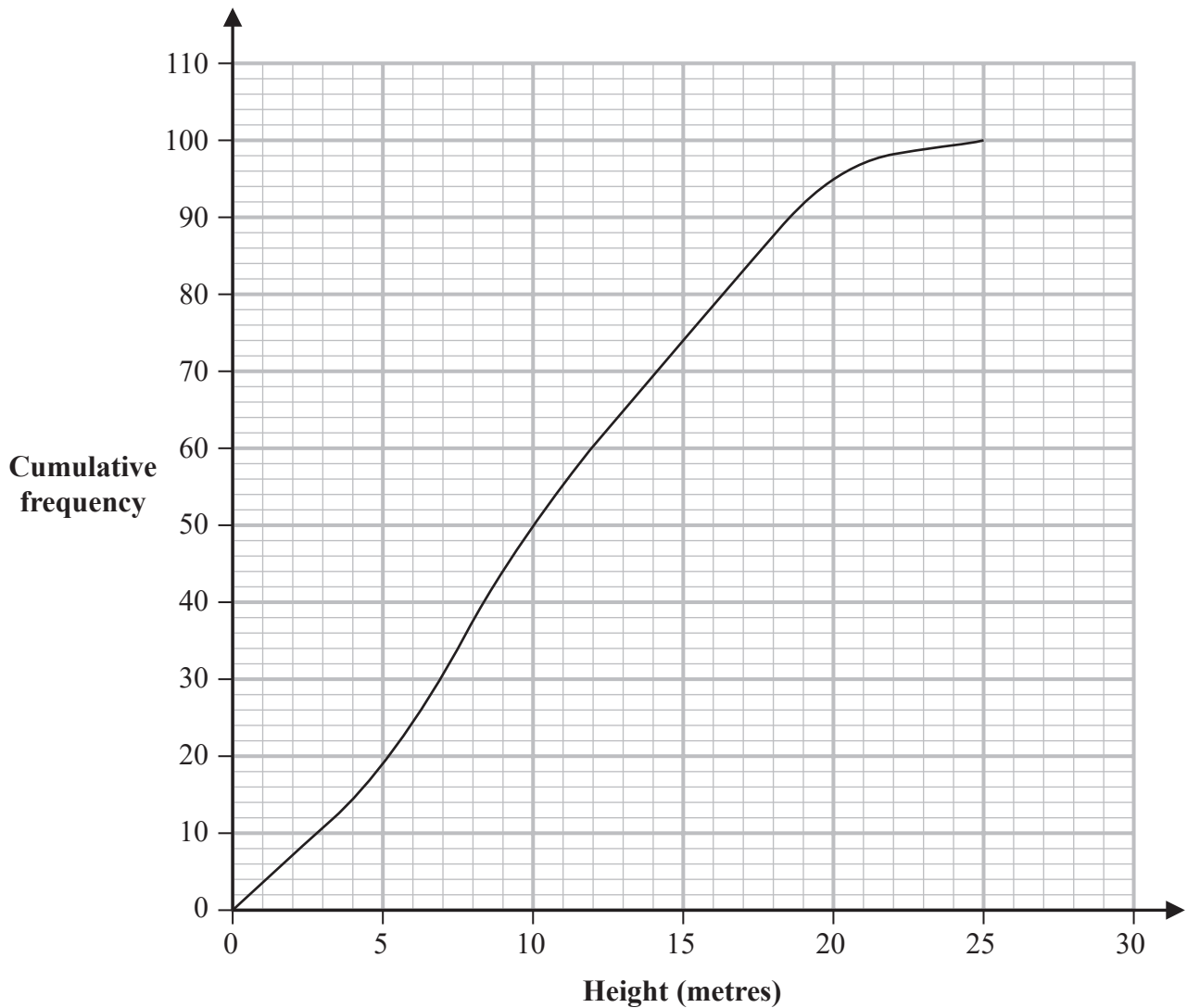
.....

(1)

(Total for Question 11 is 3 marks)



- 12 The cumulative frequency diagram gives information about the heights, in metres, of a sample of 100 oak trees in Camden, London.



(Source: opendata.camden.gov.uk)

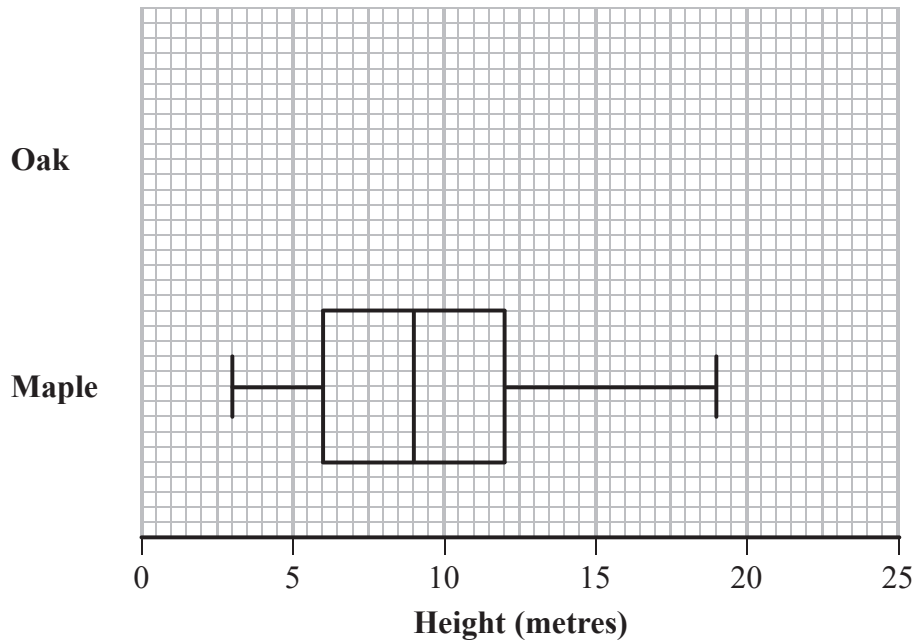
- (a) Using the cumulative frequency diagram, complete the table below for the heights of these 100 trees.

| Lower quartile | Median | Upper quartile |
|----------------|--------|----------------|
| | | |

(2)



The box plot shows information about the heights, in metres, of a sample of maple trees in Camden, London.



For the sample of oak trees
 the least height is 2.0 m
 the greatest height is 22.3 m

(b) On the grid above, draw a box plot for the heights of the sample of oak trees.

(2)

(c) Compare the two distributions of heights.

Give **three** comparisons and interpret one of these comparisons.

(4)

(Total for Question 12 is 8 marks)



- 13 The table gives information about the numbers of students from different types of schools who applied to Cambridge University in 2016

| Type of school | Applications in 2016 | | |
|--------------------|----------------------|--------|-------|
| | Gender | | Total |
| | Male | Female | |
| Maintained | 3674 | 2899 | 6573 |
| Independent | 1510 | 1268 | 2778 |
| Other and Overseas | 300 | 312 | 612 |
| Total | 5484 | 4479 | 9963 |

(Source: www.cam.ac.uk)

Richard is going to take a sample of 200 of these students stratified by gender.

- (a) Work out how many female students there should be in this sample.

.....
(2)

- (b) Describe a situation when it would **not** be appropriate to take a sample stratified by gender.

.....
(1)

Richard could have used a different category for his stratified sample.

- (c) What is this different category?

.....
(1)



A student is to be chosen at random from the 9963 students.

F is the event that the student chosen is female.

I is the event that the student chosen is from an independent school.

M is the event that the student chosen is from a maintained school.

(d) Explain why the event F and the event I are **not** mutually exclusive.

.....
.....
(1)

(e) Find $P(I \text{ or } M)$.

.....
(2)

(Total for Question 13 is 7 marks)



14 Diana is a journalist working for a local newspaper.

She is writing a newspaper article about how house prices in the local area have changed.

Diana has house price data for 1996 and for 2016

She plans to include in her article the median house price for 1996 and the median house price for 2016

Mika thinks that Diana should also include in her article the interquartile range of house prices for 1996 and the interquartile range of house prices for 2016

(a) Give one reason why including the interquartile ranges in the article would be appropriate.

.....
..... (1)

(b) Give one reason why including the interquartile ranges in the article would **not** be appropriate.

.....
..... (1)

(Total for Question 14 is 2 marks)



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15 A driving school has 40 cars.

The cars are either petrol cars or diesel cars.

The cars have either a manual gearbox or an automatic gearbox.

16 of the cars have an automatic gearbox.

10 of the petrol cars have an automatic gearbox.

There are 30 petrol cars.

One of the petrol cars is to be picked at random.

One of the diesel cars is to be picked at random.

Derek says,

“The probability that the petrol car has a manual gearbox is greater than the probability that the diesel car has a manual gearbox”.

Is he correct?

You must show working and justify your answer.

(Total for Question 15 is 5 marks)



16 In 2016, the population of New Zealand was 4 660 833
 In the same year, there were 59 430 births in New Zealand.

(Source: *www.worldometers.info* and *www.stats.govt.nz*)

(a) Using the formula below, work out the crude birth rate for New Zealand in 2016

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

Give your answer correct to 1 decimal place.

.....
(2)

The crude birth rate for Albania in 2015 was 12
 The crude birth rate for Bolivia in 2015 was 24

(Source: *data.worldbank.org*)

Louise says,

“There were twice as many births in Bolivia as in Albania in 2015”

(b) State what must be true about the populations of Albania and Bolivia for Louise to be correct.

.....

(1)

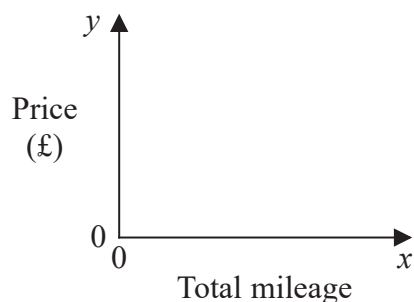
(Total for Question 16 is 3 marks)



17 Mark is investigating how the total mileage, x miles, of a car affects its price, $\pounds y$

He has collected information about two models of car, model A and model B. He found the total mileage and the price of each of ten cars for each model. He used his information to draw two scatter diagrams, one for each model.

Here is a sketch of the axes he used for each scatter diagram.



On each scatter diagram, Mark drew a line of best fit. For each line he calculated its gradient and found its intercept on the y -axis.

Here are his results.

| Model | Gradient of line of best fit | Intercept of line of best fit on the y -axis |
|-------|------------------------------|--|
| A | -0.135 | 13 500 |
| B | -0.105 | 20 500 |

Interpret and compare these results in context.

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(Total for Question 17 is 5 marks)

TOTAL FOR PAPER IS 80 MARKS



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