Name: _____

GCSE Statistics

Cumulative Frequency

Total marks available: 36

Total marks achieved: _____

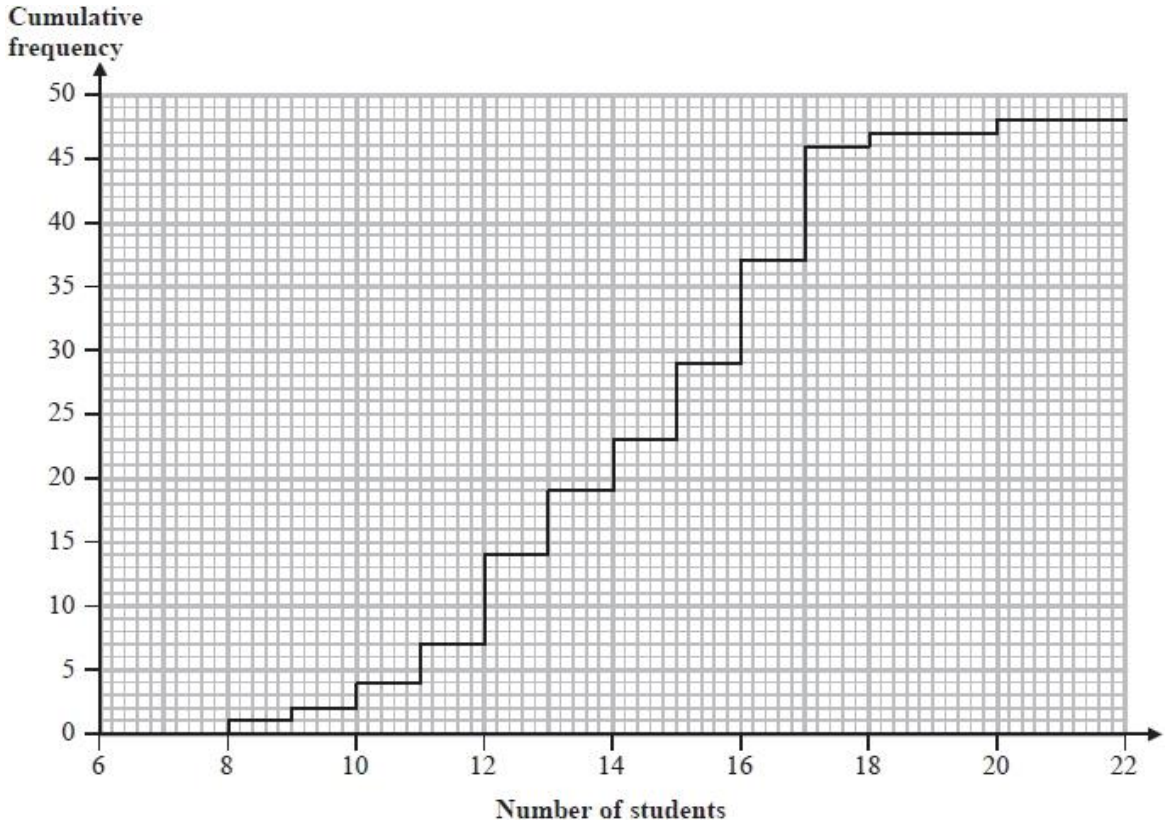
Instructions
• Use black ink or ball-point pen.
• Fill in the boxes at the top of this page with your name, centre number and candidate number.
• Answer all questions.
• Answer the questions in the spaces provided – there may be more space than you need.
• Scientific calculators may be used.
• You must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

Information
• The 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.

Q1.

The cumulative frequency step polygon shows information about the numbers of students in the 48 teaching sets in Year 12 at Pearson Academy.



(a) For the numbers of students in the teaching sets, find

(i) the median,

.....

(ii) the interquartile range,

.....

(iii) the mode.

.....

(4)

(b) Write down the number of students in the largest teaching set.

.....

(1)

(c) Find the number of teaching sets which have more than 16 students.

.....

(2)

(Total for question = 7 marks)

Q2.

The table shows information about the time taken, in minutes, by each of the Wimbledon men's singles final matches for the 30 years from 1985

Time taken (t minutes)	Frequency	Cumulative frequency
$80 \leqslant t < 120$	7	7
$120 \leqslant t < 160$	7	14
$160 \leqslant t < 200$	11	25
$200 \leqslant t < 240$	3	28
$240 \leqslant t < 280$	1	29
$280 \leqslant t < 320$	1	30

(Source: *Wimbledon.com*)

(a) Explain why the class interval which contains the median time taken is $160 \leq t < 200$

.....

.....

(1)

For the 30 years before 1985, the median time taken by the Wimbledon men's singles tennis final matches was 110 minutes.

(b) Compare the median time taken in the 30 years before 1985 with the median time taken in the 30 years from 1985

Interpret your comparison.

.....

.....

.....

(2)

(Total for question = 3 marks)

Q3.

The table shows information about the number of car journeys per person in a year that are a distance of between 0 and 50 miles.
The information is based on a sample of 382 people from the 2016 National Travel Survey.

Distance (x miles)	$0 < x \leqslant 1$	$1 < x \leqslant 2$	$2 < x \leqslant 5$	$5 < x \leqslant 10$	$10 < x \leqslant 25$	$25 < x \leqslant 50$
Frequency	24	65	131	83	62	17

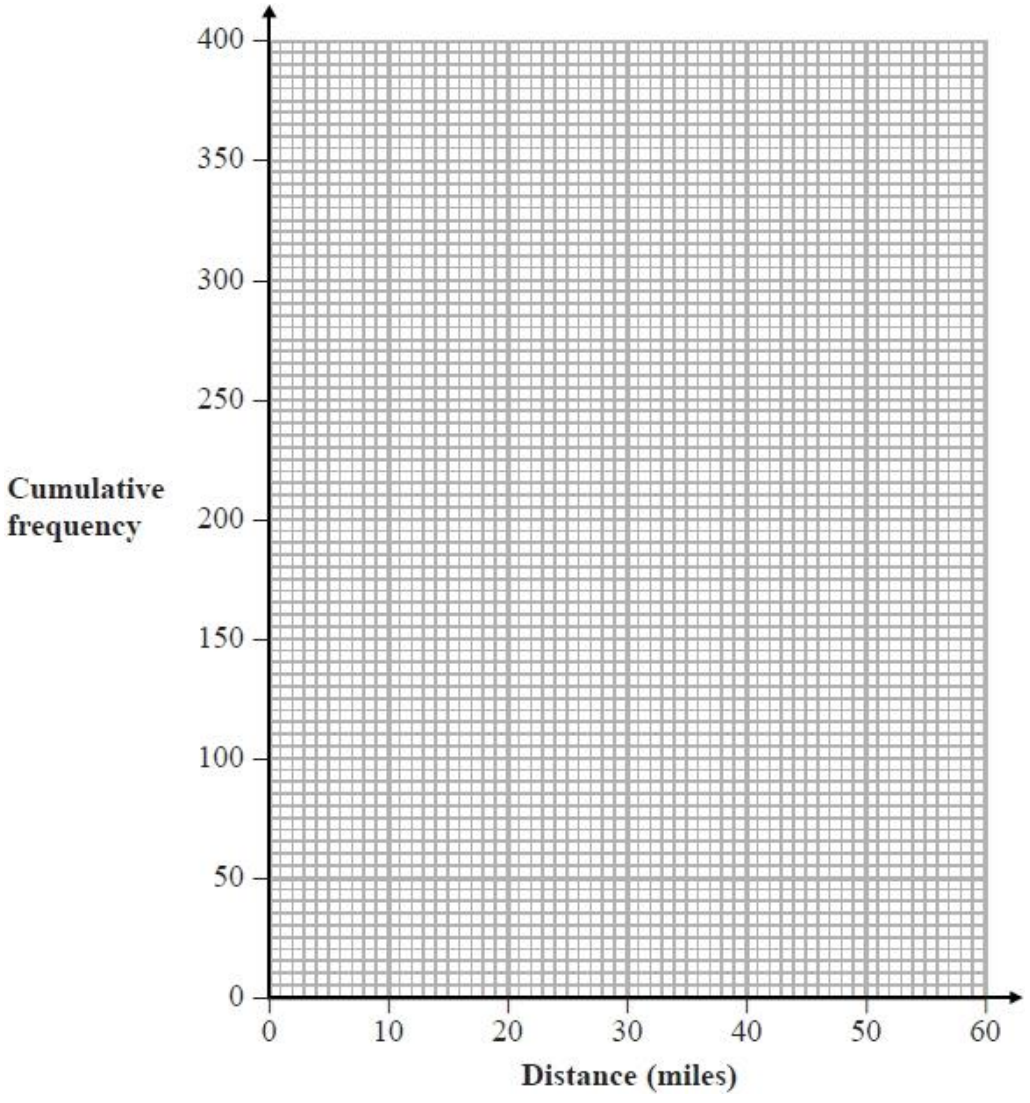
(Source: *www.gov.uk*)

(a) Complete the cumulative frequency table for the information above.

Distance (x miles)	$0 < x \leqslant 1$	$0 < x \leqslant 2$	$0 < x \leqslant 5$	$0 < x \leqslant 10$	$0 < x \leqslant 25$	$0 < x \leqslant 50$
Cumulative frequency	24					

(1)

(b) Draw a cumulative frequency diagram for this information.



(3)

In the same survey, the median distance travelled by train for a sample of people was 11.3 miles.

Hamish says,

"The information collected in the survey shows that people in these samples travel on average further by train than by car."

(c) Assess whether or not Hamish's conclusion is appropriate.

.....

.....

.....

(2)

Hamish recorded the number of passengers travelling on 250 buses.

Information about his results is shown in the cumulative frequency table below.

Number of passengers	35	36	37	38	39	40	41	42	43	44	45
Cumulative frequency	5	12	24	39	65	98	138	176	207	234	250

Hamish plans to draw a cumulative frequency step polygon for his results rather than the type of cumulative frequency diagram drawn in part (b).

(d) Explain why Hamish's plan is appropriate.

.....

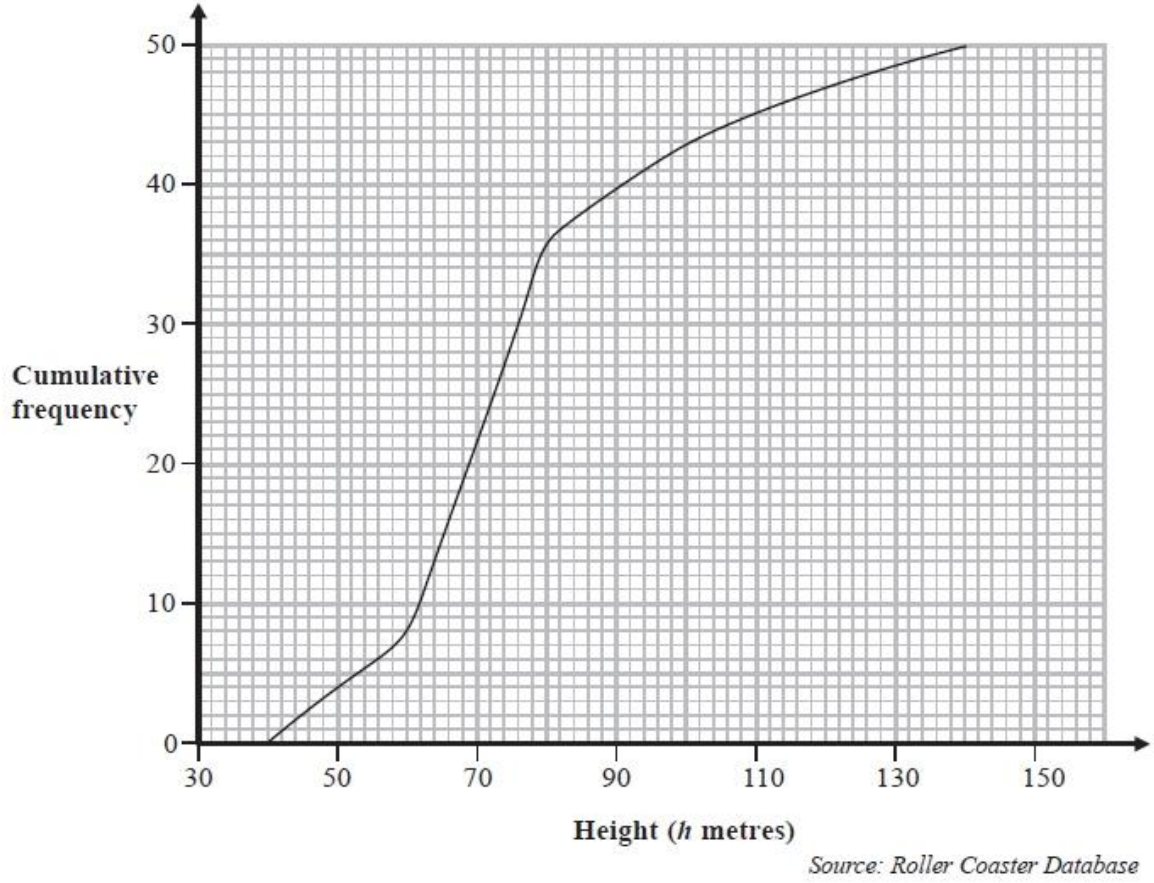
.....

(1)

(Total for question = 7 marks)

Q4.

The cumulative frequency diagram shows some information about the heights, in metres, of a random sample of 50 of the tallest roller coasters in the world.



(a) Write down the number of roller coasters with a height of 80 metres or less.

.....

(1)

(b) Work out an estimate of the number of these roller coasters with a height between 60 metres and 110 metres.

.....

(2)

A safety company is going to inspect roller coasters with a height greater than 86 metres.

(c) Calculate an estimate of the percentage of the 50 roller coasters that the safety company is going to inspect.

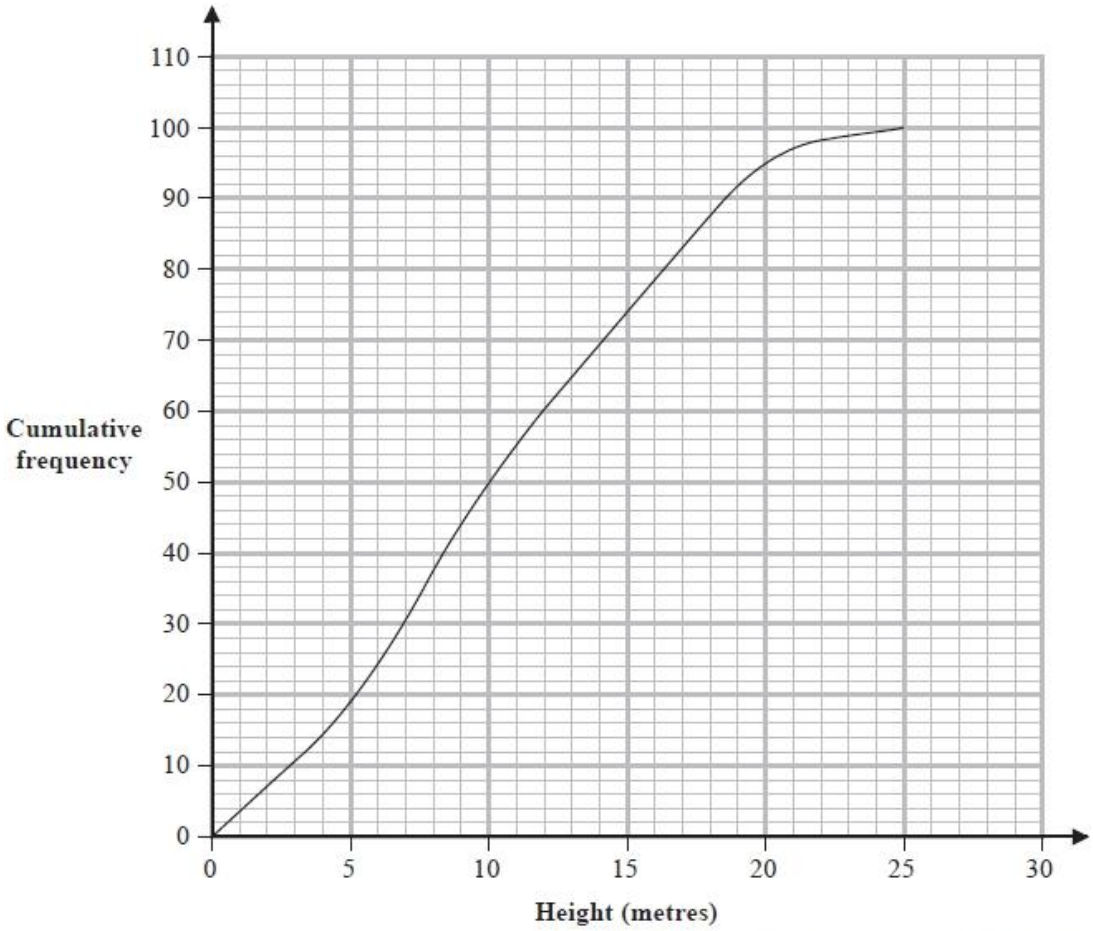
..... %

(3)

(Total for question = 6 marks)

Q5.

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*)

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

Lower quartile	Median	Upper quartile

(2)

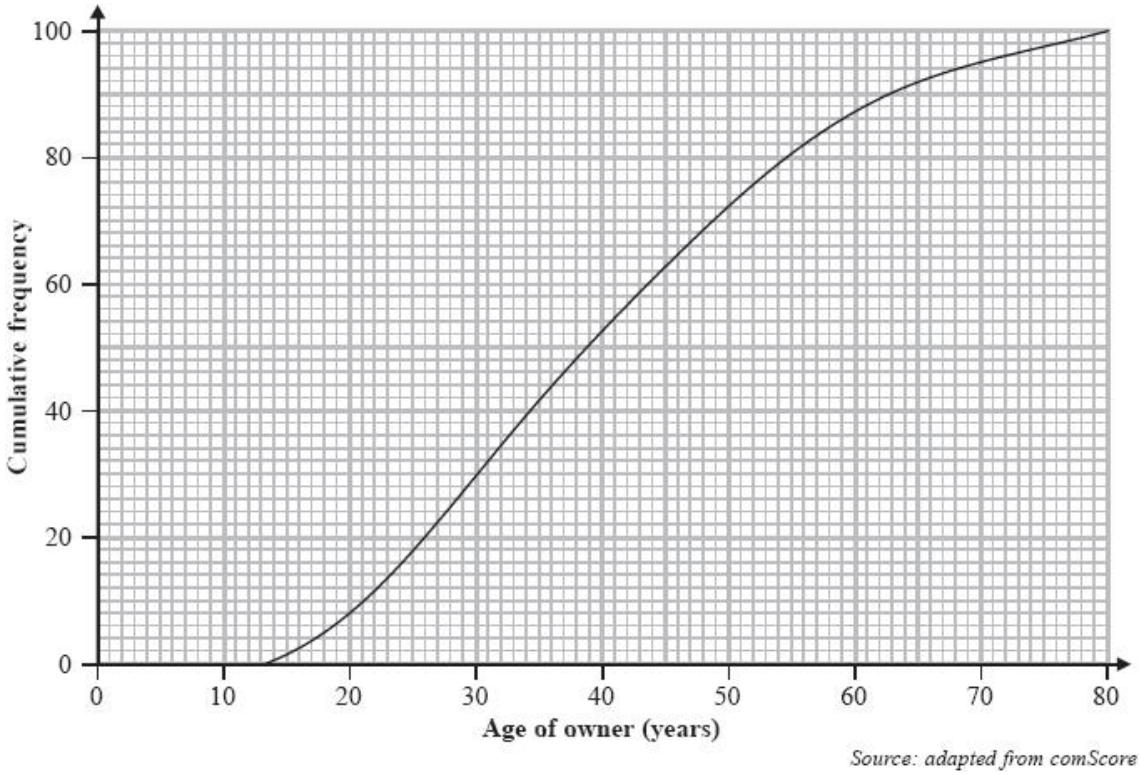
(Total for question = 2 marks)

Q6.

Kunal was investigating the ages of owners of electronic tablets.

He used information from a survey carried out in the USA in 2012 to find the age distribution for a representative 100 people.

Kunal then drew this cumulative frequency graph for his information.



Source: adapted from comScore

(a) Find the number of these electronic tablet owners that are

(i) under 30 years old,

.....

(ii) between 60 and 70 years old.

.....

(3)

Kunal wants to use this survey to predict the percentage of electronic tablet owners in the **United Kingdom** that are under 30 years old.

(b) Explain whether or not it is sensible to use the results of this survey for his prediction.

.....

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.....

.....

(2)

This table gives information, from the same 2012 USA survey, about the ages of owners of smartphones.

Median	36 years
Interquartile range	23 years

(c) Use the information from the table and from the graph to compare the ages of owners of electronic tablets with the ages of owners of smartphones in the USA.

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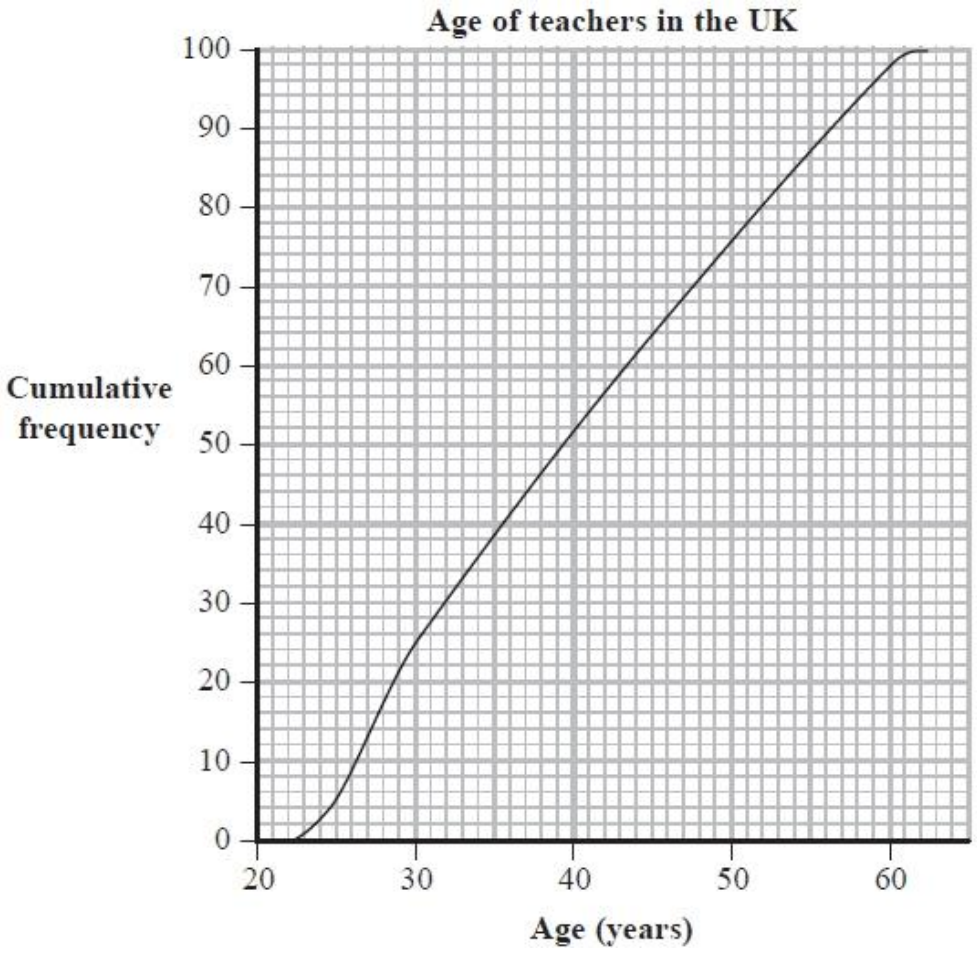
(4)

(Total for question = 9 marks)

Q7.

The cumulative frequency diagram shows the distribution of ages of a sample of 100 teachers in the UK.



Complete this table for the ages of these 100 teachers.

Lowest	Lower Quartile	Median	Upper Quartile	Highest
22				62

(2)

(Total for Question = 2 marks)