Write your name here

Surname	Other names

In the style of:

Edexcel GCSE

Centre Number | | | | | |

Candidate Number | | | | |

Mathematics A

Scattergraphs

Higher Tier

Past Paper Style Questions
Arranged by Topic

Paper Reference
1MA0/2H

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser, calculator. Tracing paper may be used.

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.*
- **Calculators may be used.**

Information

- The total mark for this paper is 100
- The marks for **each** question are shown in brackets
  – *use this as a guide as to how much time to spend on each question.*
- Questions labelled with an **asterisk** (*) are ones where the quality of your written communication will be assessed.

Advice

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

Turn over ▶

1. (a) Andy, Lauren and Noah are playing with a normal fair dice. They each predict the next seven throws.

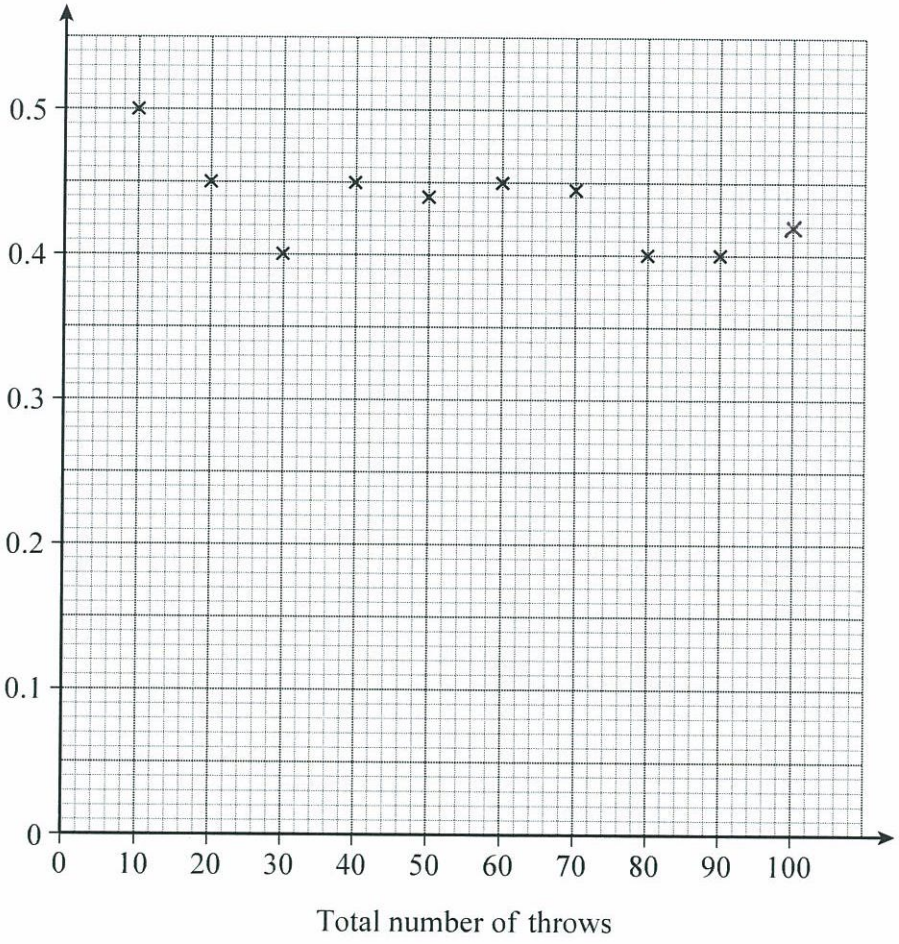
Andy	1	2	1	2	1	2	1
Lauren	3	5	2	2	4	6	1
Noah	4	4	4	4	4	4	4

Which, if any, of these predictions is the most likely?Circle your choice and explain your answer.

Andy Lauren Noah (All are equally likely)

The probability of predicting the next 7 throws in a given order on a fair dice is the same regardless of the sequence of numbers, and is given by $\left(\frac{1}{6}\right)^7$ **(2)**

(b) Nikki makes a six-sided dice.
To test the dice she throws it 100 times.
After each 10 throws she records the number of sixes thrown.
The relative frequencies for the first 90 throws are shown on the graph.



(b) (i) How many sixes were there in the first 10 throws?

$0.5 \times 10 = 5$

(1)

(ii) After 100 throws there were 42 sixes.

Calculate and plot the relative frequency of a six after 100 throws.

Relative Frequency $= \frac{42}{100} = 0.42$

(1)

(iii) How many sixes would you expect to get after 100 throws of a **fair** dice?

$E(6) = P(6) \times N$

$= \frac{1}{6} \times 100 = 17$ (to nearest integer) 17

(1)

(iv) Is Nikki's dice fair?

Tick the correct box.

☐ Yes ☑ No

Give a reason for your answer.

Conclusions drawn from a finite amount of empirical data can never be verified with 100% certainty.

However, given a relatively large sample of 100 throws and a relatively large deviation away from the expected frequency of sixes, we can be statistically confident that Nikki's dice is not fair.

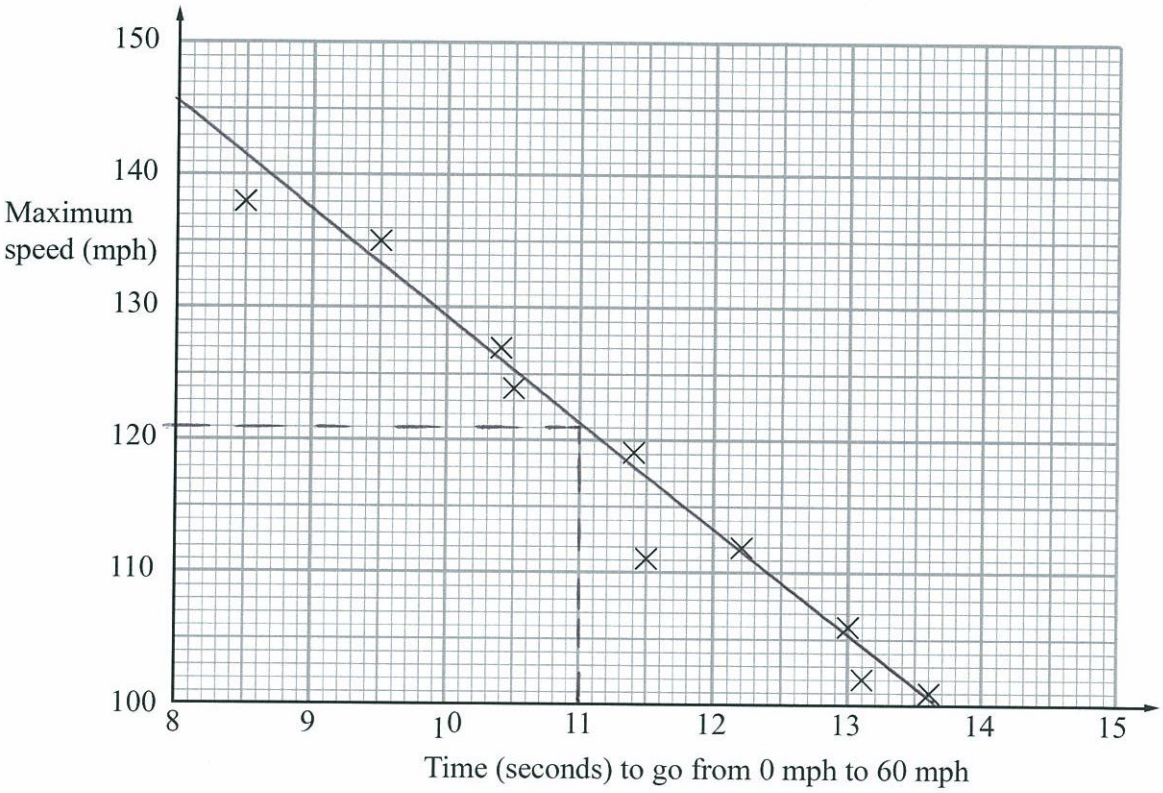
(1)

(Total 6 marks)

'When one admits that nothing is certain one must, I think, also admit that some things are much more nearly certain than others. It is much more nearly certain that we are assembled here tonight than it is that this or that political party is in the right. Certainly there are degrees of certainty, and one should be very careful to emphasise that fact, because otherwise one is landed in utter scepticism, and complete scepticism would, of course, be totally barren and completely useless.'

— Bertrand Russell.

2. The scatter graph shows some information about 10 cars.
It shows the time, in seconds, it takes each car to go from 0 mph to 60 mph.
For each car, it also shows the maximum speed, in mph.



(a) What type of correlation does this scatter graph show?

Negative correlation
.....

(1)

The time a car takes to go from 0 mph to 60 mph is 11 seconds.

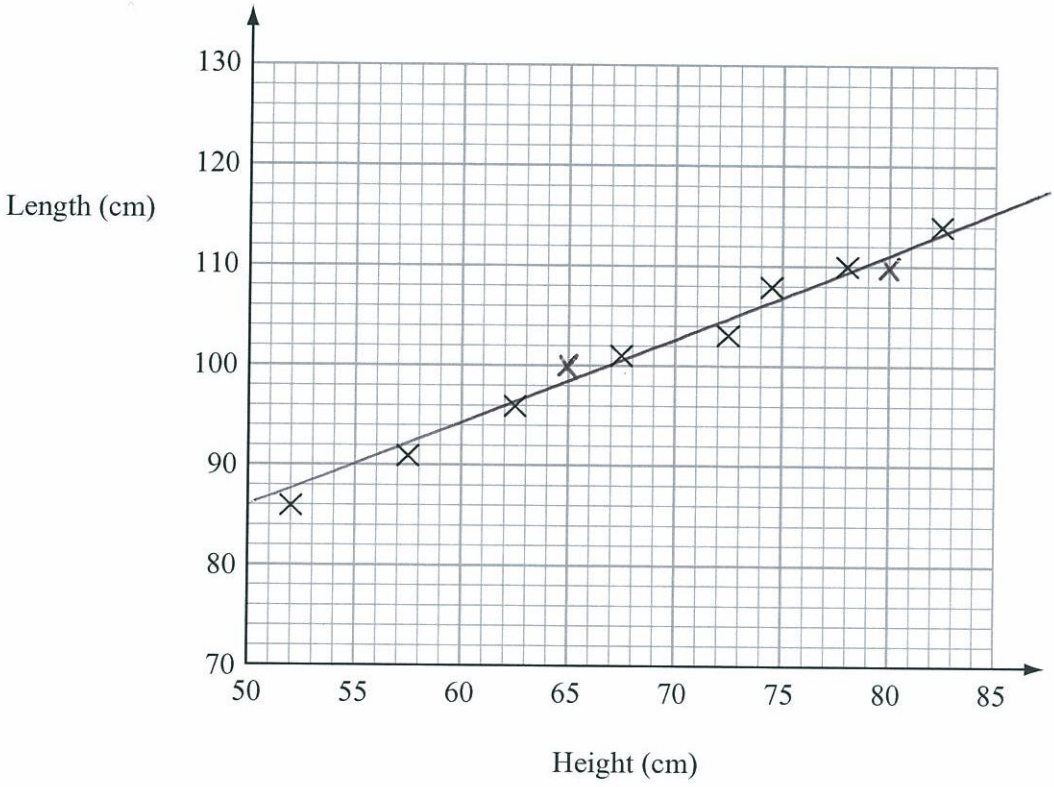
(b) Estimate the maximum speed for this car.

121 ..... mph

(2)

(Total 3 marks)

3. The scatter graph shows information about eight dogs.
It shows the height and the length of each dog.



The table gives the height and the length of two more dog.

Height (cm)	65	80
Length (cm)	100	110

(a) On the scatter graph, plot the information from the table.

(1)

(b) Describe the relationship between the height and the length of these dog.

Positive correlation

(1)

The height of a dog is 76 cm.

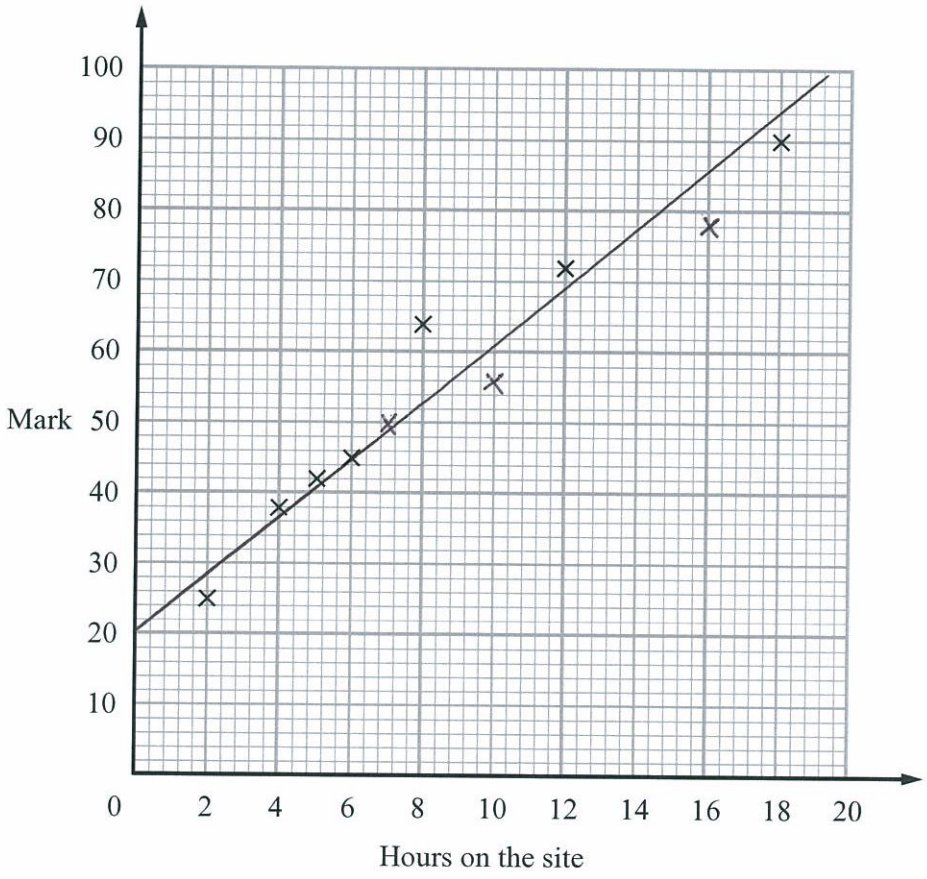
(c) Estimate the length of this dog.

108 cm

(2)

(Total 4 marks)

4. Some students revised for a mathematics exam.
They used a private tutor.
The scatter graph shows the times seven students spent wiyh the tutor and the marks the students got in the mathematics exam.



Here is the information for 3 more students.

Hours with tutor	7	10	16
Mark	50	56	78

(a) Plot this information on the scatter graph.

(1)

(b) What type of correlation does this scatter graph show?

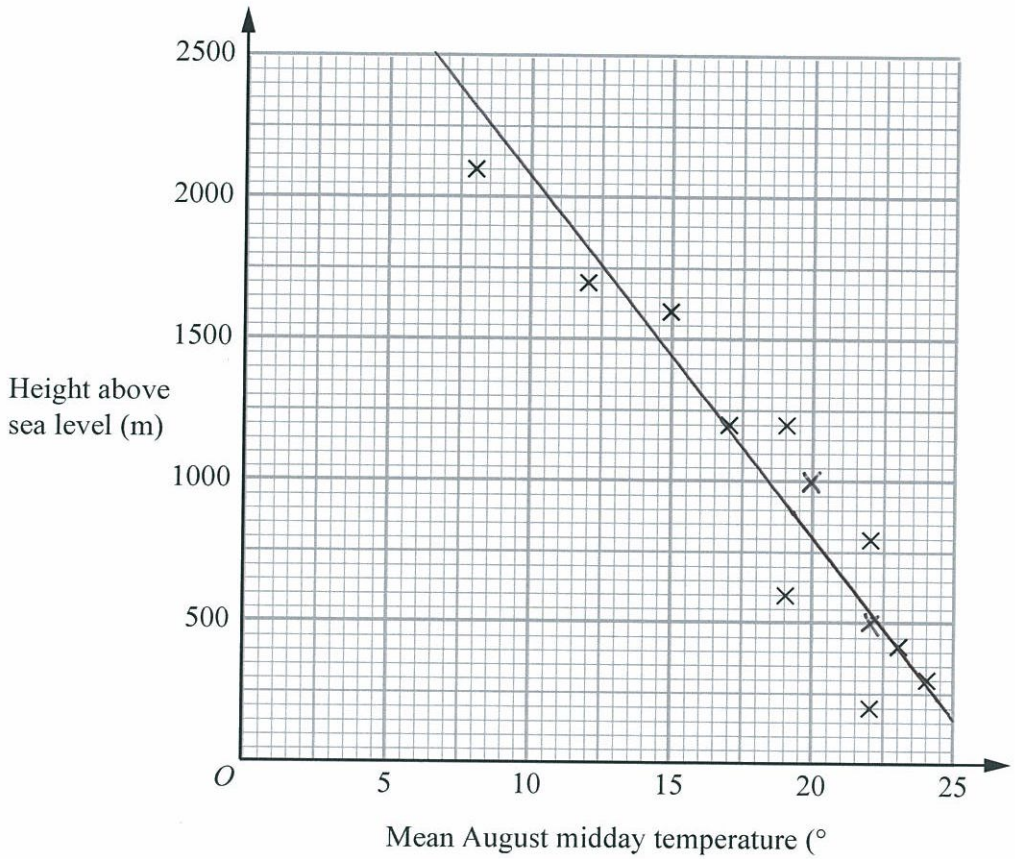
Positive correlation

(1)

(c) Draw a line of best fit on the scatter graph.

(1)

5. The scatter graph shows information for some weather stations.
It shows the height of each weather station above sea level (m) and the mean August midday temperature (°C) for that weather station.



C) The table shows this information for two more weather stations.

Height of weather station above sea level (m)	1000	500
Mean August midday temperature (°C)	20	22

(a) Plot this information on the scatter graph.

(1)

(b) What type of correlation does this scatter graph show?

Negative correlation

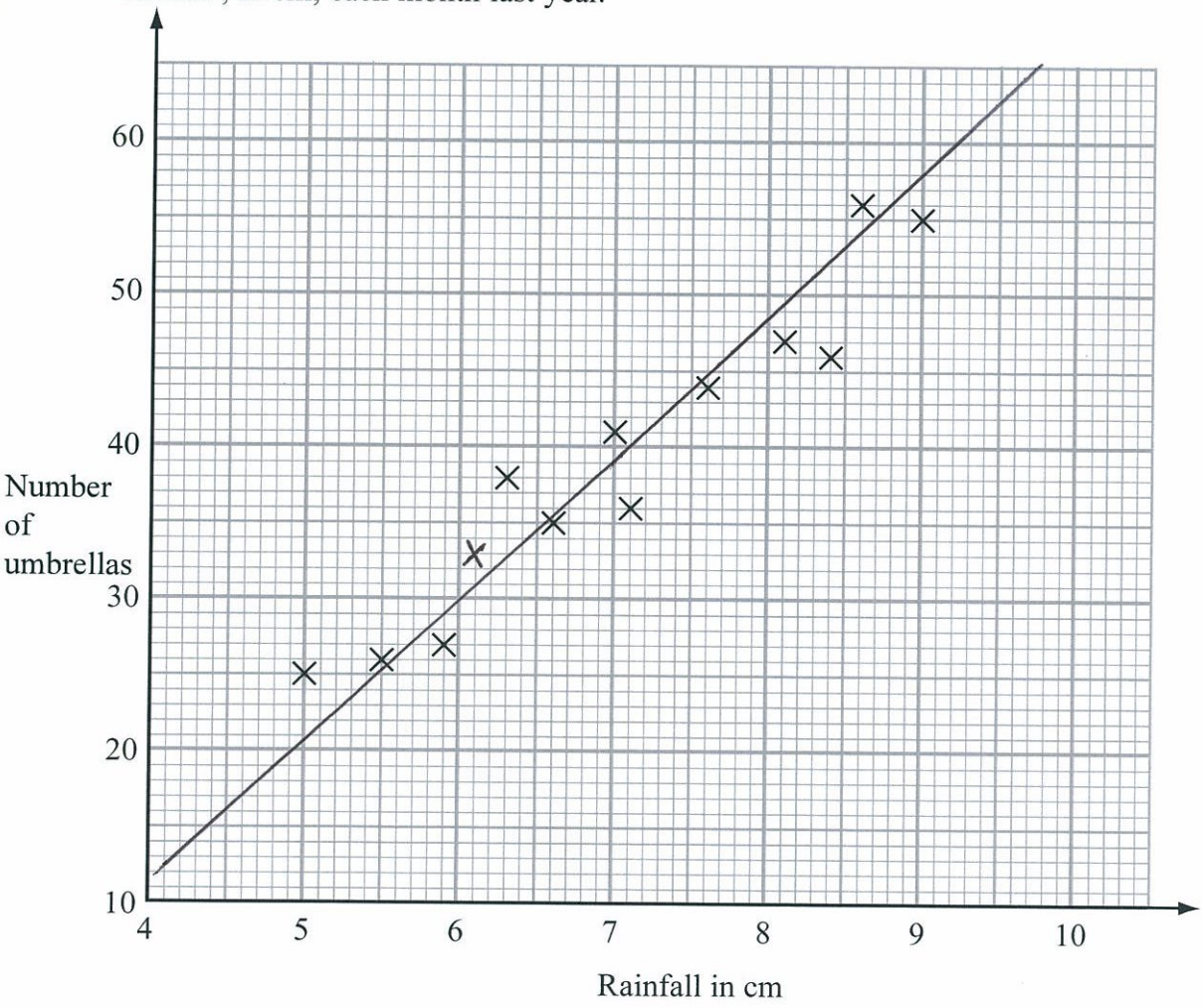
(1)

(c) Draw a line of best fit on the scatter graph.

(1)

6. Mr Davies sells umbrellas.

The scatter graph shows some information about the number of umbrellas he sold and the rainfall, in cm, each month last year.



In January of this year, the rainfall was 6.1 cm.

During January, Mr Davies sold 33 umbrellas.

(a) Show this information on the scatter graph.

(1)

(b) What type of correlation does this scatter graph show?

Positive correlation

(1)

In February of this year, Mr Davies sold 39 umbrellas.

(c) Estimate the rainfall for February.

7 cm

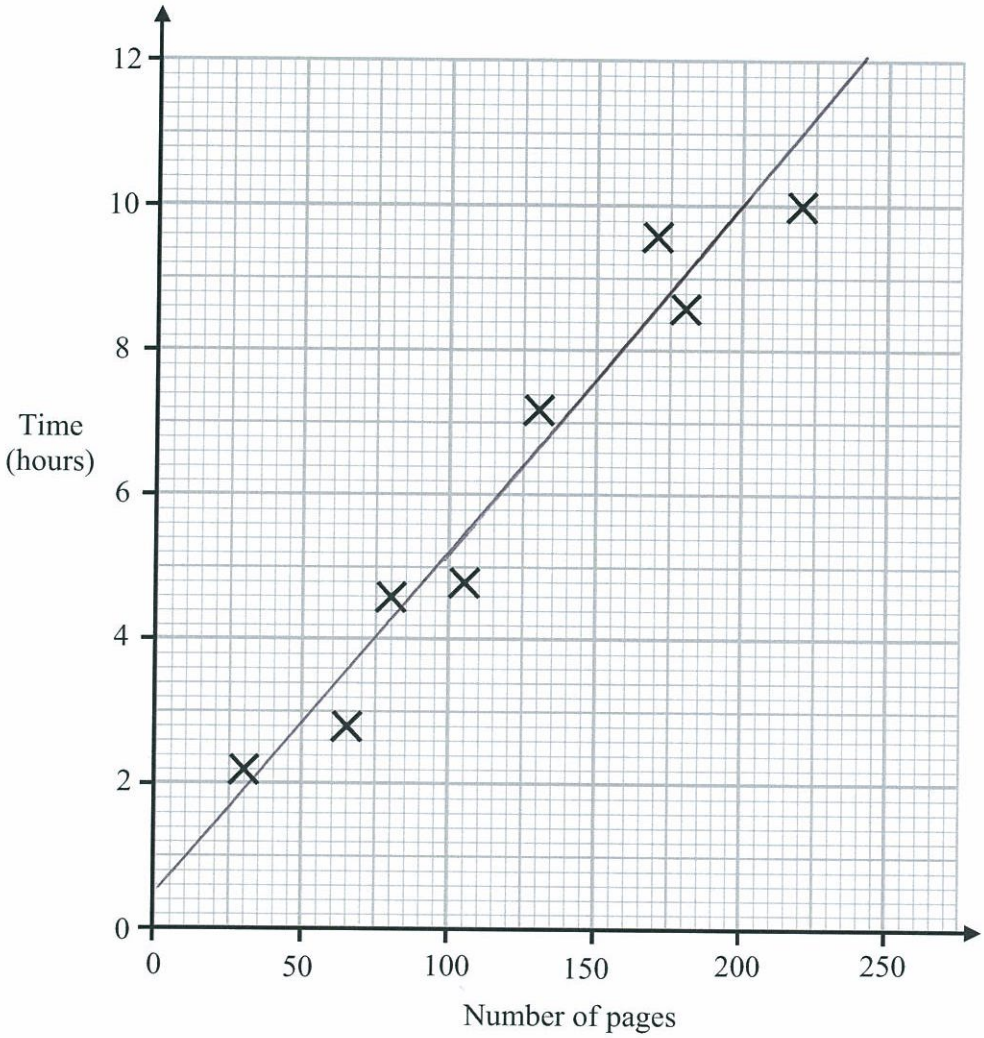
(2)

(Total 4 marks)

7. Sophie reads eight books.

For each book she recorded the number of pages and the time she takes to read it.

The scatter graph shows information about her results.



(a) Describe the relationship between the number of pages in a book and the time Sophie takes to read it.

Positive correlation

(1)

Sophie reads another book.
The book has 200 pages.

(b) Estimate the time it takes Sophie to read it.

10 hours

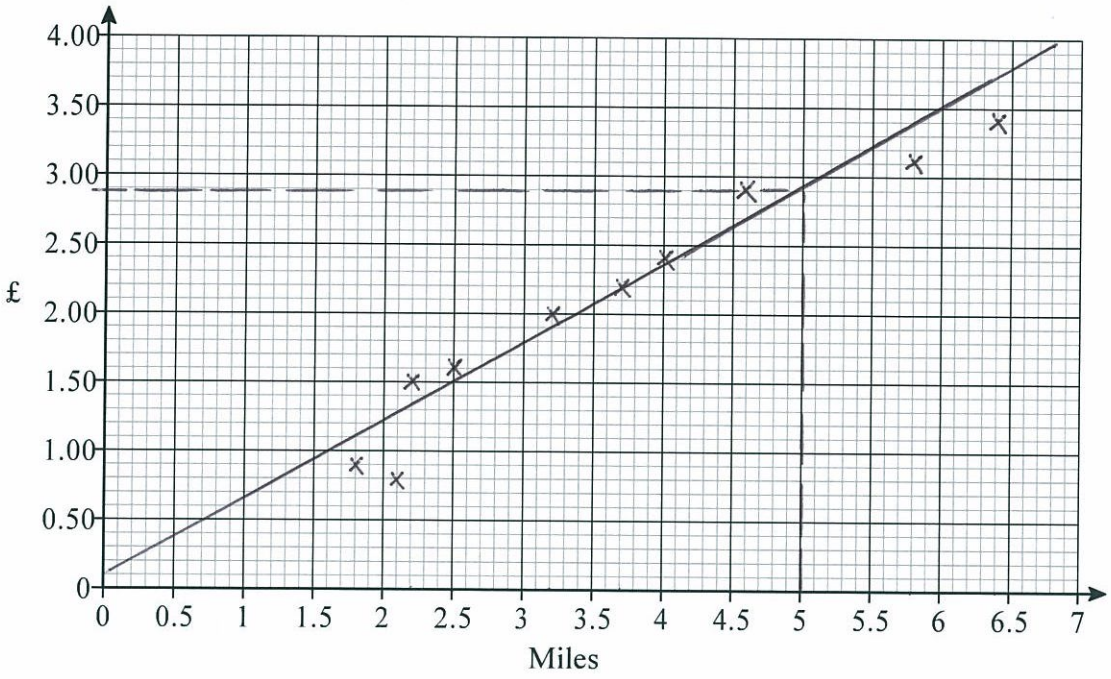
(2)

(Total 3 marks)

8. The table shows the cost and length of different tram journeys across a city.

Length of journey (miles)	1.8	2.1	2.2	2.5	3.2	3.7	4.0	4.6	5.8	6.4
Cost of journey (£)	0.90	0.80	1.50	1.60	2.00	2.20	2.40	2.90	3.10	3.40

(a) Draw a scatter diagram for the data on the grid below.



(2)

(b) Estimate the cost of tram journey of length 5 miles.
Give your answer to the nearest ten pence.

.....

£ 2.90

(2)