Chhetri Academy

chhetriacademy.com

GCSE MATHS

Statistics

Edexcel 1MA1 | Subtopic collection Topic 60

Scatter graphs and correlation

Higher tier

Past paper question booklet

37	2009-2024	Higher
question groups	available papers	tier

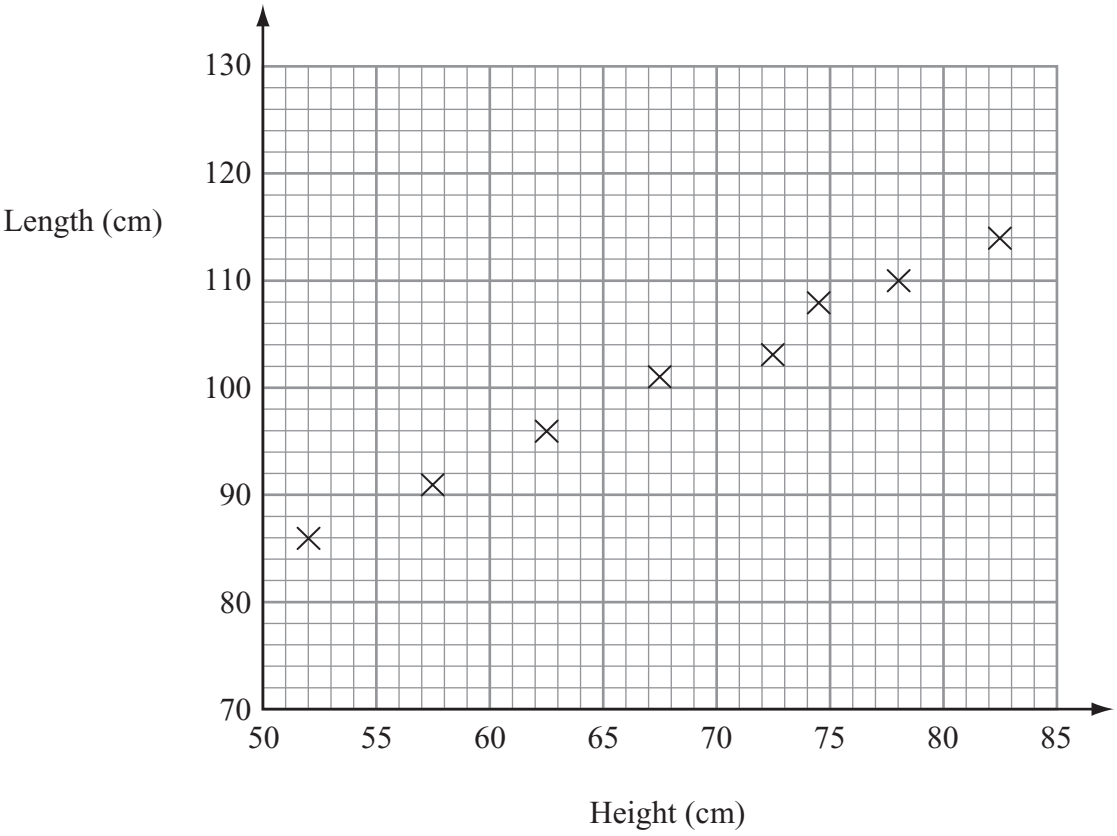
Before you begin

1. Show working and use units where appropriate.
2. Use extra paper if you need more space.
3. Print at actual size (100%) for measurement questions.

Name _____ **Date** _____

Whole questions are retained for context; some parts cover other points. Legacy sources are labelled.

4. The scatter graph shows information about eight sheep.
It shows the height and the length of each sheep.



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

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 sheep.

.....

(1)

The height of a sheep is 76 cm.

(c) Estimate the length of this sheep.

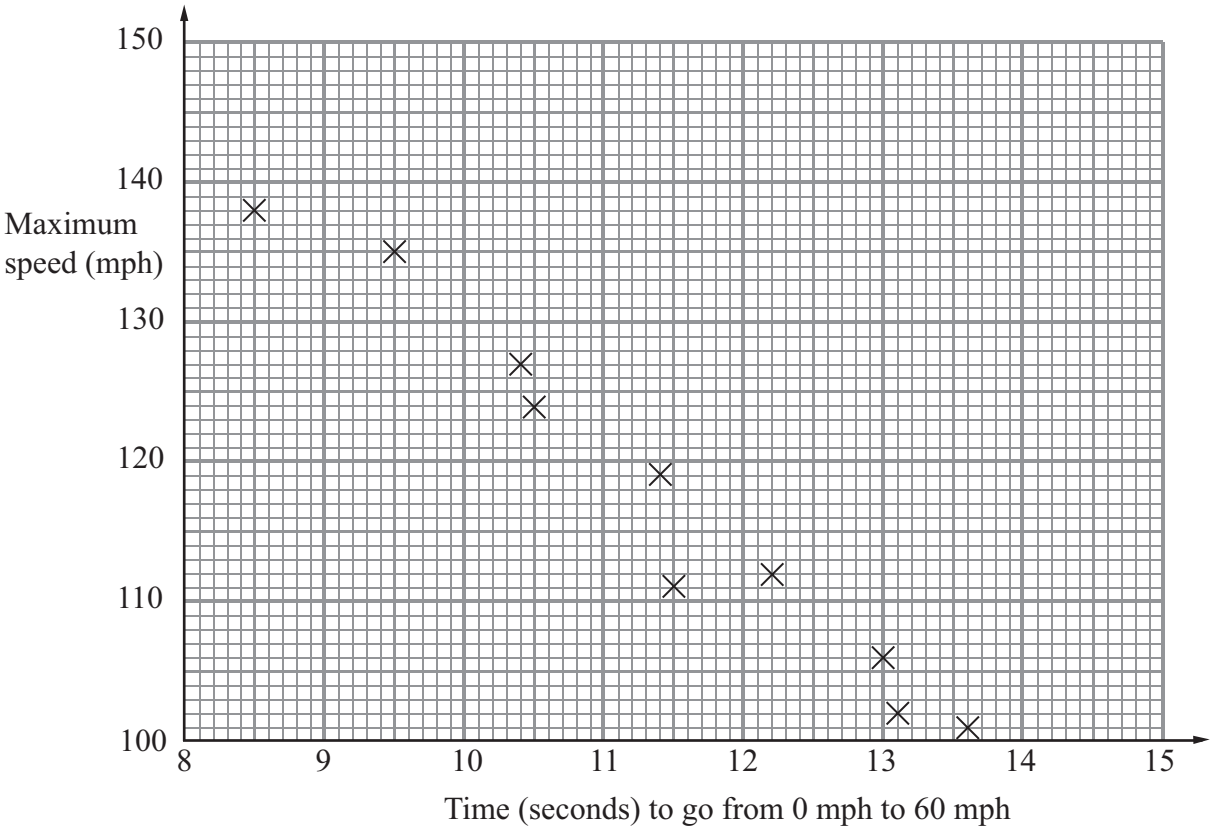
.....cm

(2)

(Total 4 marks)

Q4

11. 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?

.....
(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.

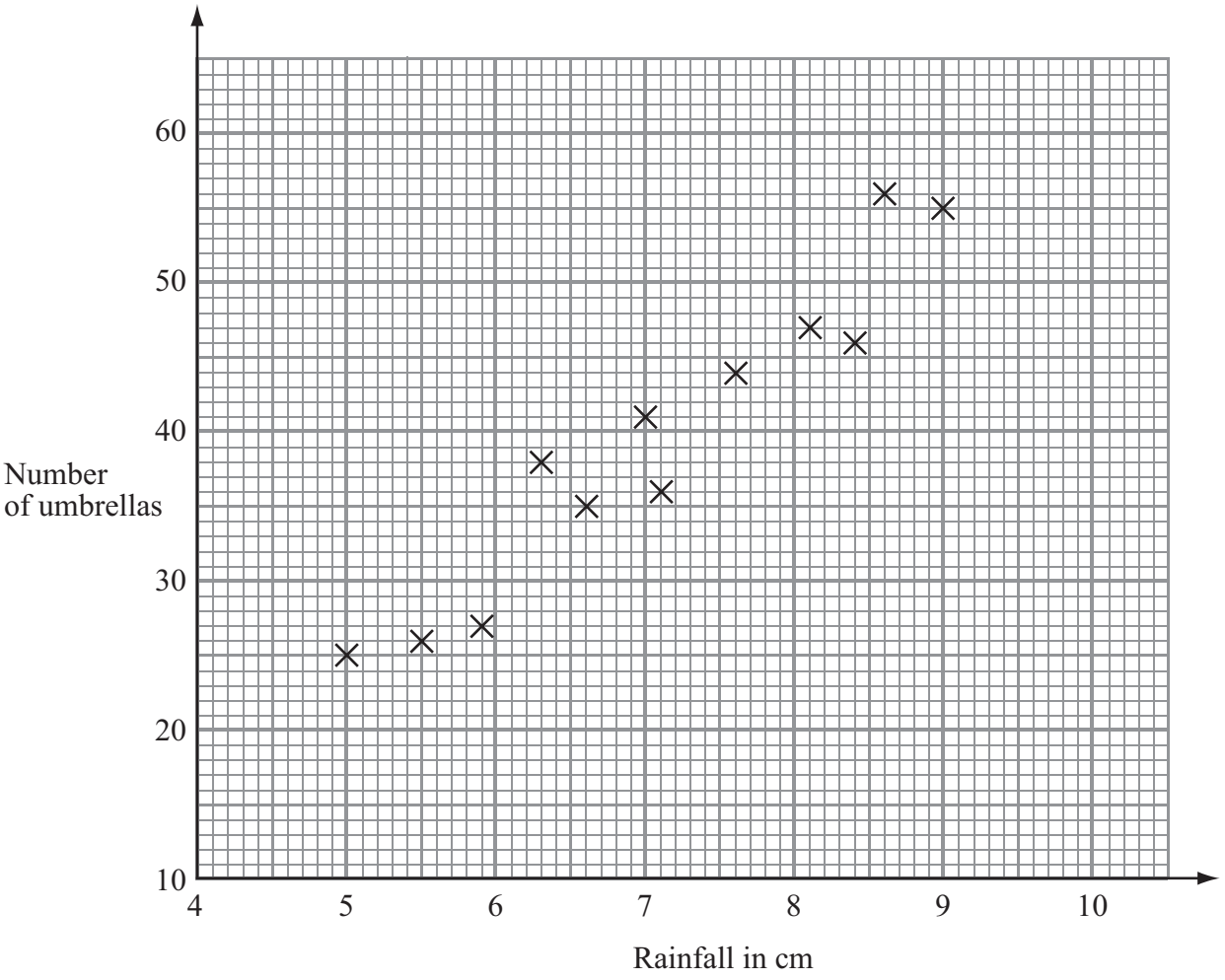
..... mph
(2)

Q11

(Total 3 marks)

2. Mr Wither 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 Wither sold 32 umbrellas.

(a) Show this information on the scatter graph.

(1)

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

.....

(1)

In February of this year, Mr Wither sold 40 umbrellas.

(c) Estimate the rainfall for February.

..... cm

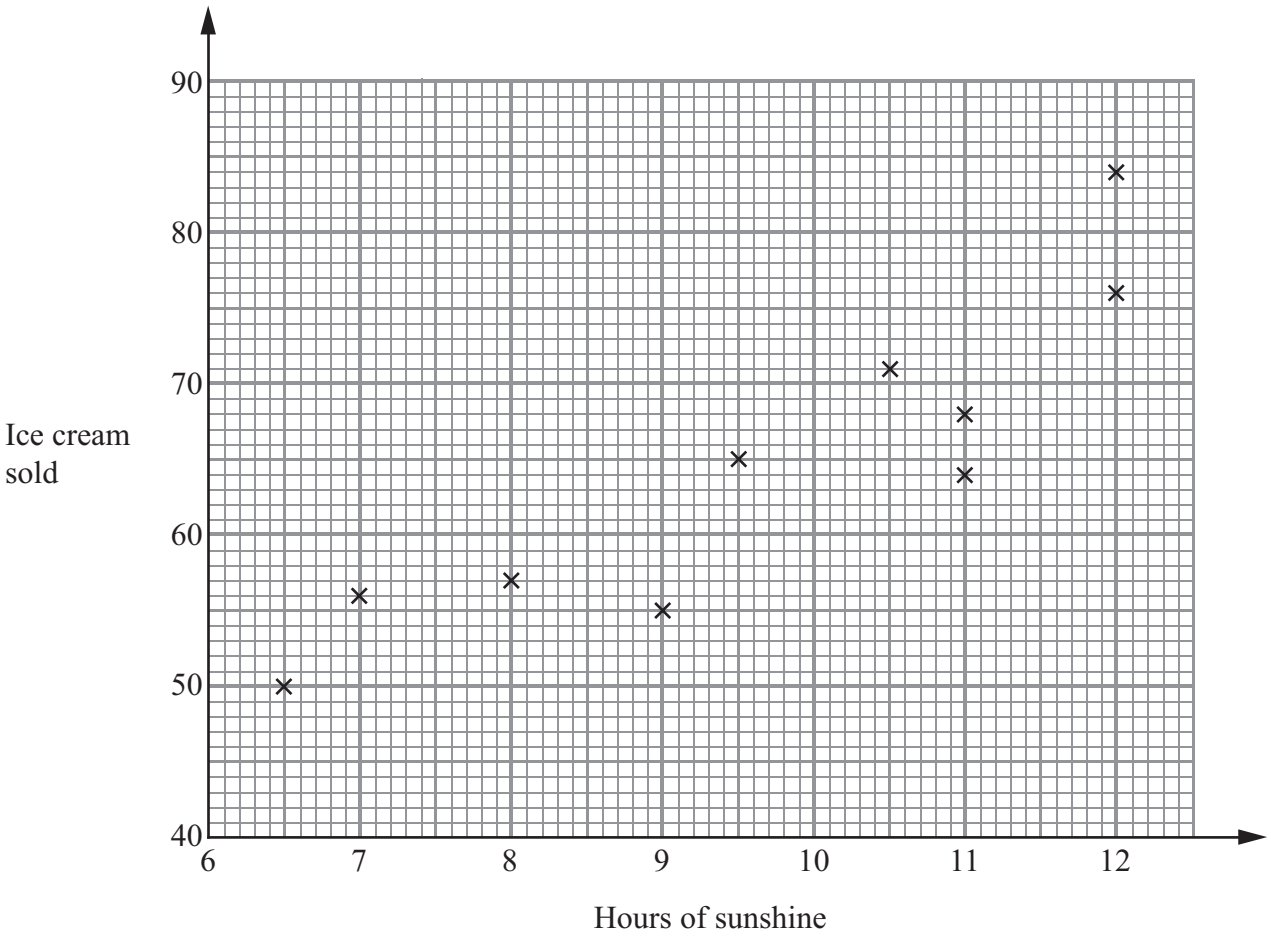
(2)

(Total 4 marks)

Q2

2 A beach cafe sells ice creams.
Each day the manager records the number of hours of sunshine and the number of ice creams sold.

The scatter graph shows this information.



On another day there were 11.5 hours of sunshine and 73 ice creams sold.

(a) Show this information on the scatter graph.

(1)

(b) Describe the relationship between the number of hours of sunshine and the number of ice creams sold.

.....

.....

(1)

One day had 10 hours of sunshine.

(c) Estimate how many ice creams were sold.

.....

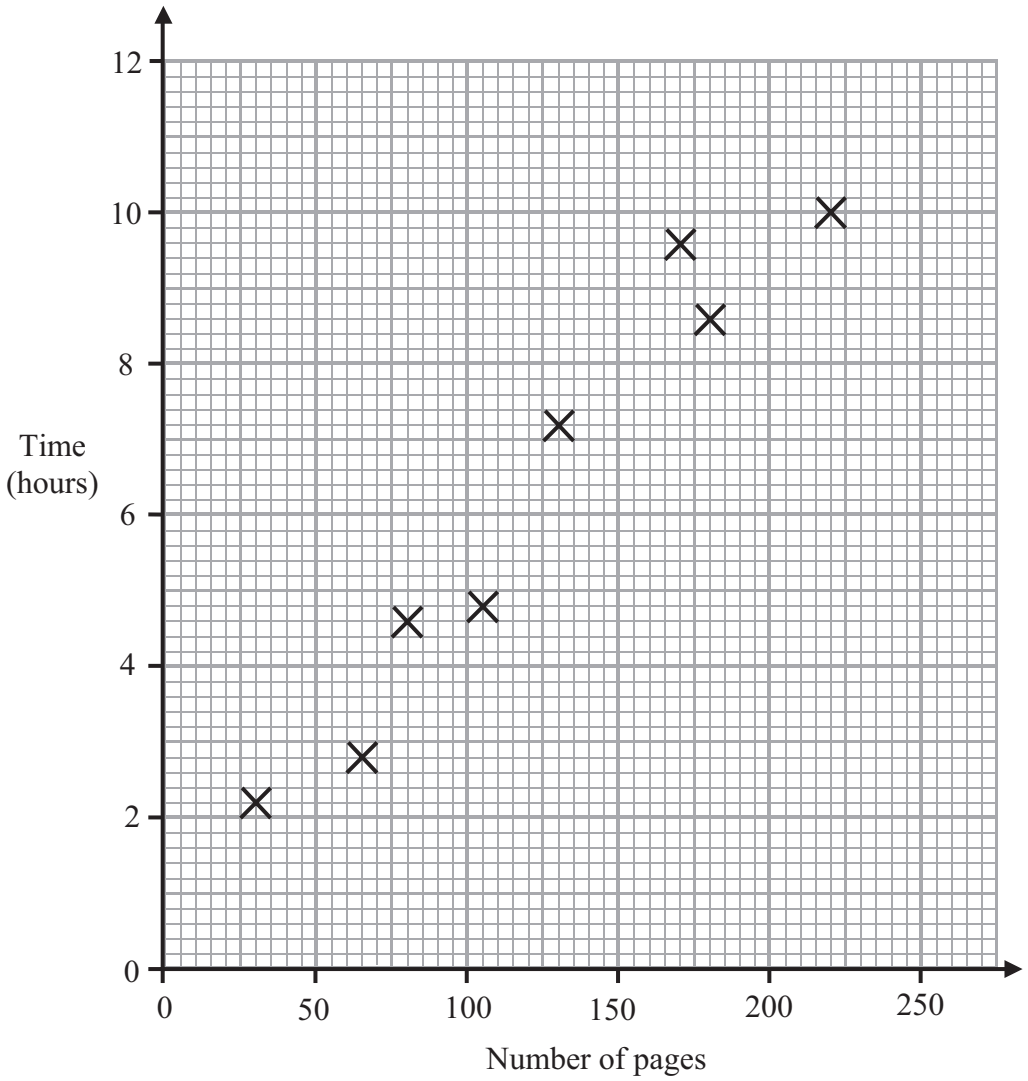
(2)

(Total for Question 2 is 4 marks)

2. Harriet 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 Harriet takes to read it.

.....

(1)

Harriet reads another book.
The book has 150 pages.

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

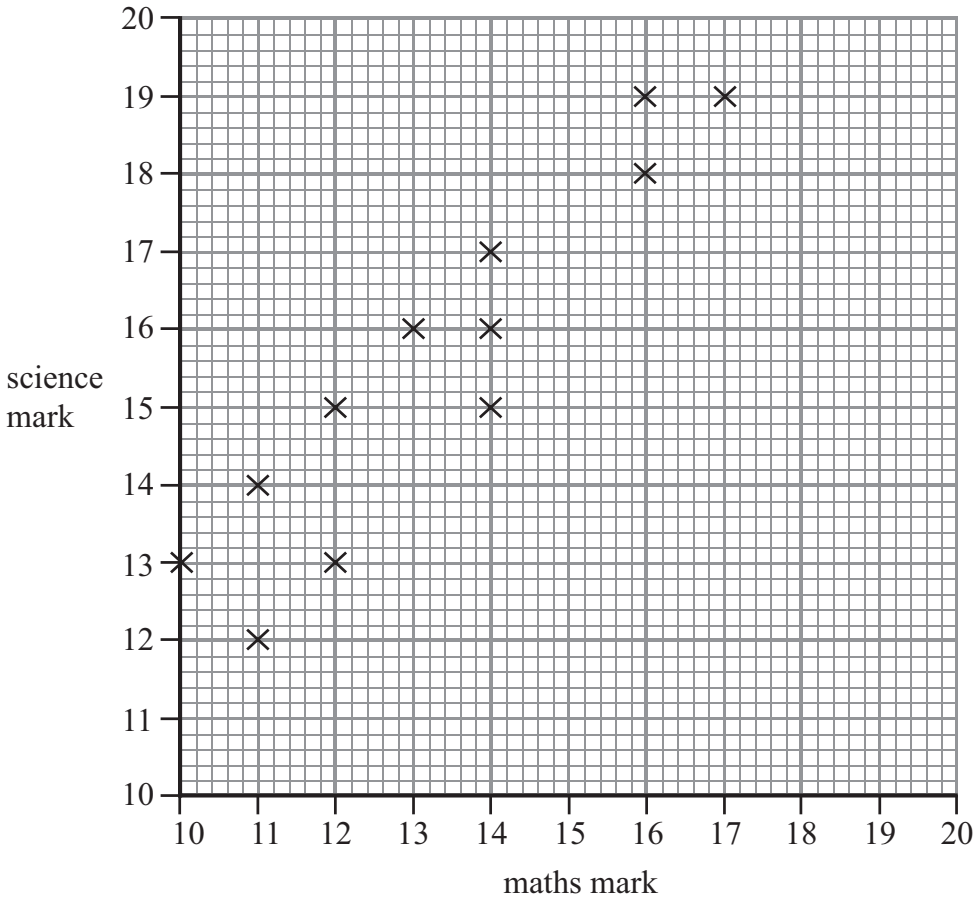
..... hours

(2)

(Total 3 marks)

Q2

2 Mr Kent's students did a maths test and a science test.
The scatter graph shows the marks of 12 of these students.



The table shows the marks of two more students.

Name	maths	science
Masood	12	14
Nimer	17	20

(a) Show this information on the scatter graph.

(1)

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

.....

(1)

David did the maths test.
He was absent for the science test.

David's mark in the maths test was 15

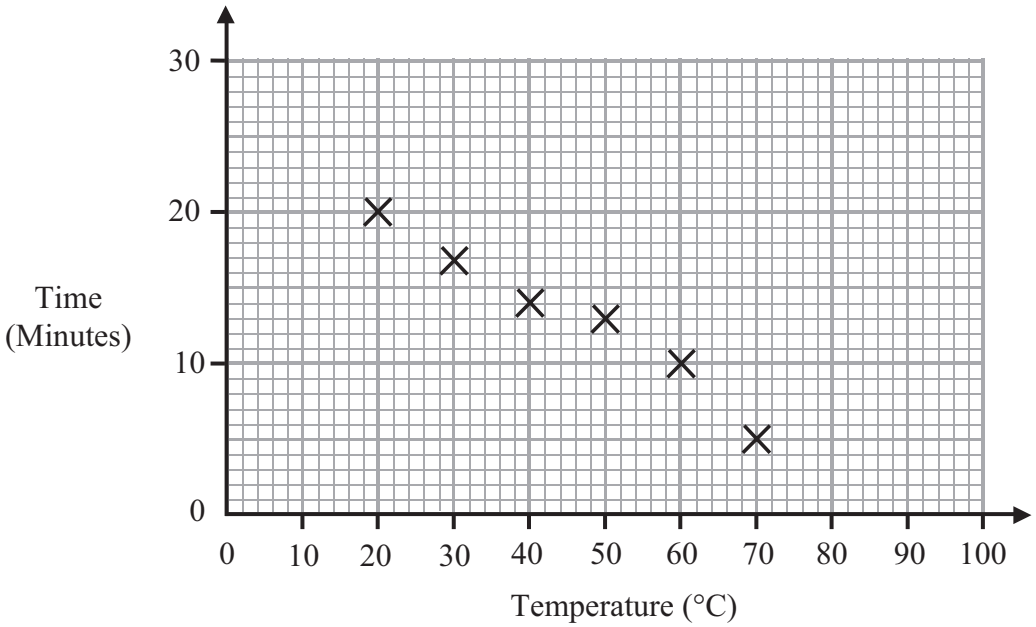
(c) Estimate a science mark for David.

.....

(2)

(Total for Question 2 is 4 marks)

11. Suzy did an experiment to study the times, in minutes, it took 1 cm ice cubes to melt at different temperatures.
Some information about her results is given in the scatter graph.



The table shows information from two more experiments.

Temperature (°C)	15	55
Time (Minutes)	22	15

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

(1)

(b) Describe the relationship between the temperature and the time it takes a 1 cm ice cube to melt.

.....

(1)

(c) Find an estimate for the time it takes a 1 cm ice cube to melt when the temperature is 25 °C.

..... minutes

(2)

Suzy's data cannot be used to predict how long it will take a 1 cm ice cube to melt when the temperature is 100 °C.

(d) Explain why.

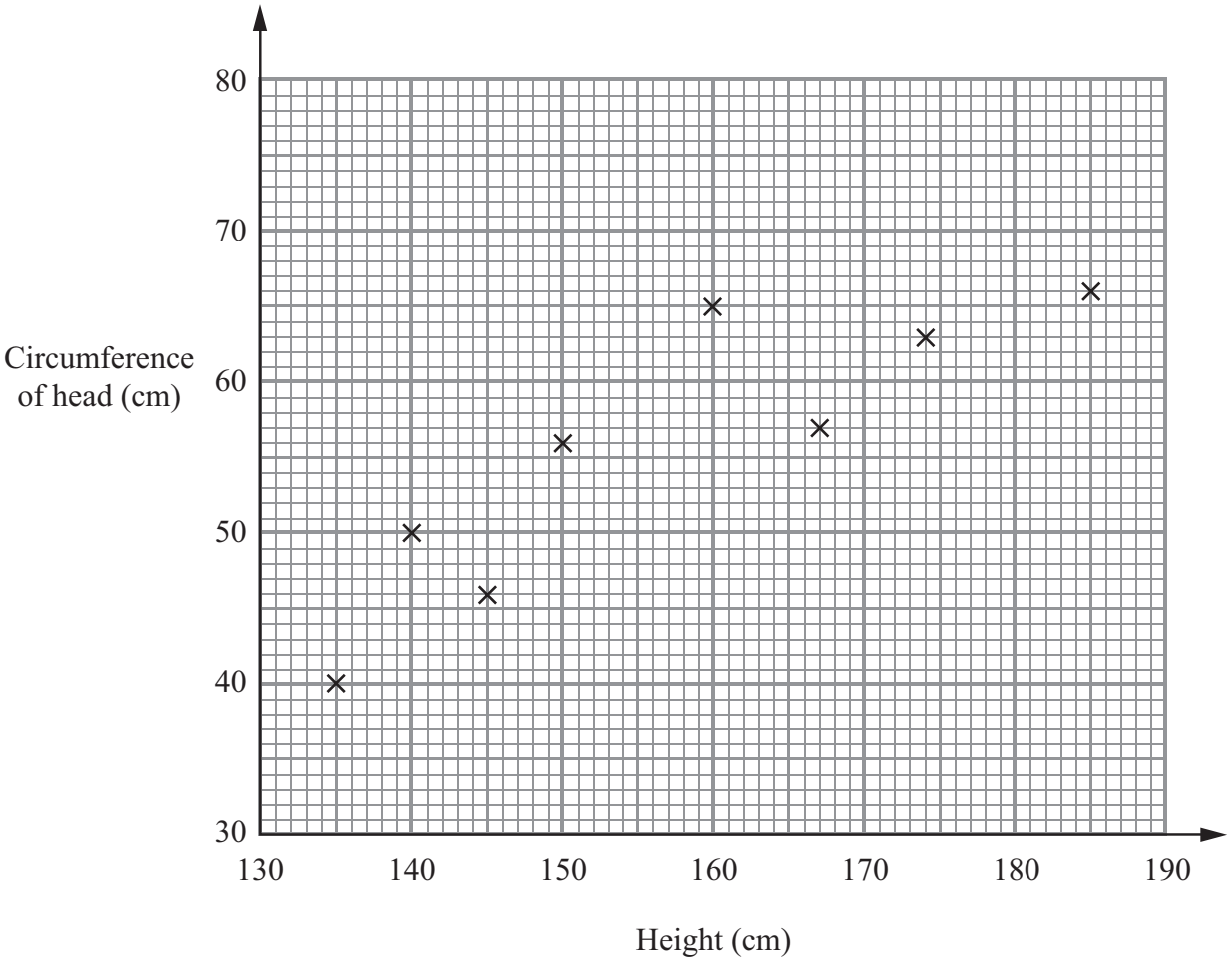
.....

(1)

Q11

(Total 5 marks)

5 The scatter graph shows information about 8 people.
It shows each person's height and the circumference of their head.



The table gives this information for 2 other people.

Height (cm)	180	170
Circumference of head (cm)	72	65

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

(1)

(b) Describe the correlation.

.....

(1)

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

(1)

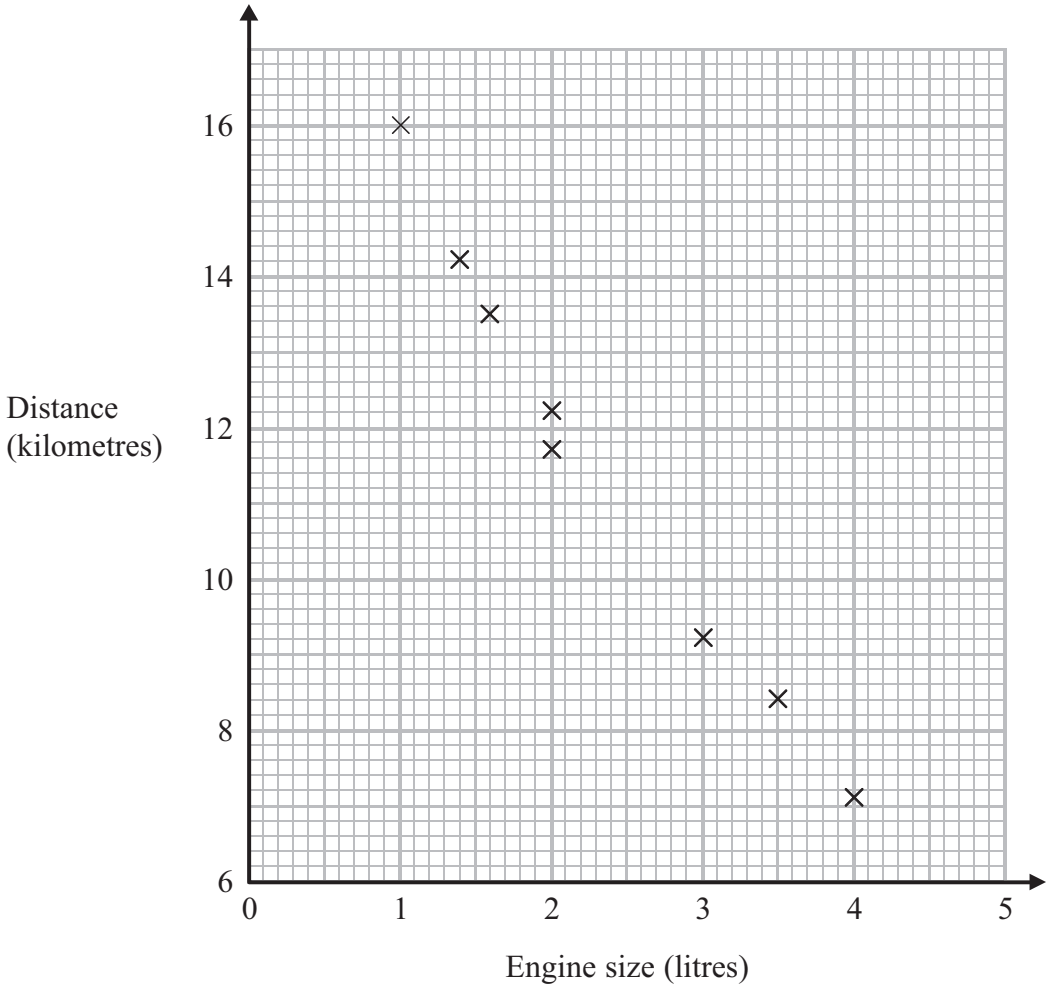
(d) Estimate the circumference of the head of a person who is 156 cm tall.

..... cm

(1)

(Total for Question 5 is 4 marks)

7 The scatter graph shows some information about 8 cars.
For each car it shows the engine size, in litres, and the distance, in kilometres, the car travels on one litre of petrol.



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

.....

(1)

A different car of the same type has an engine size of 2.5 litres.

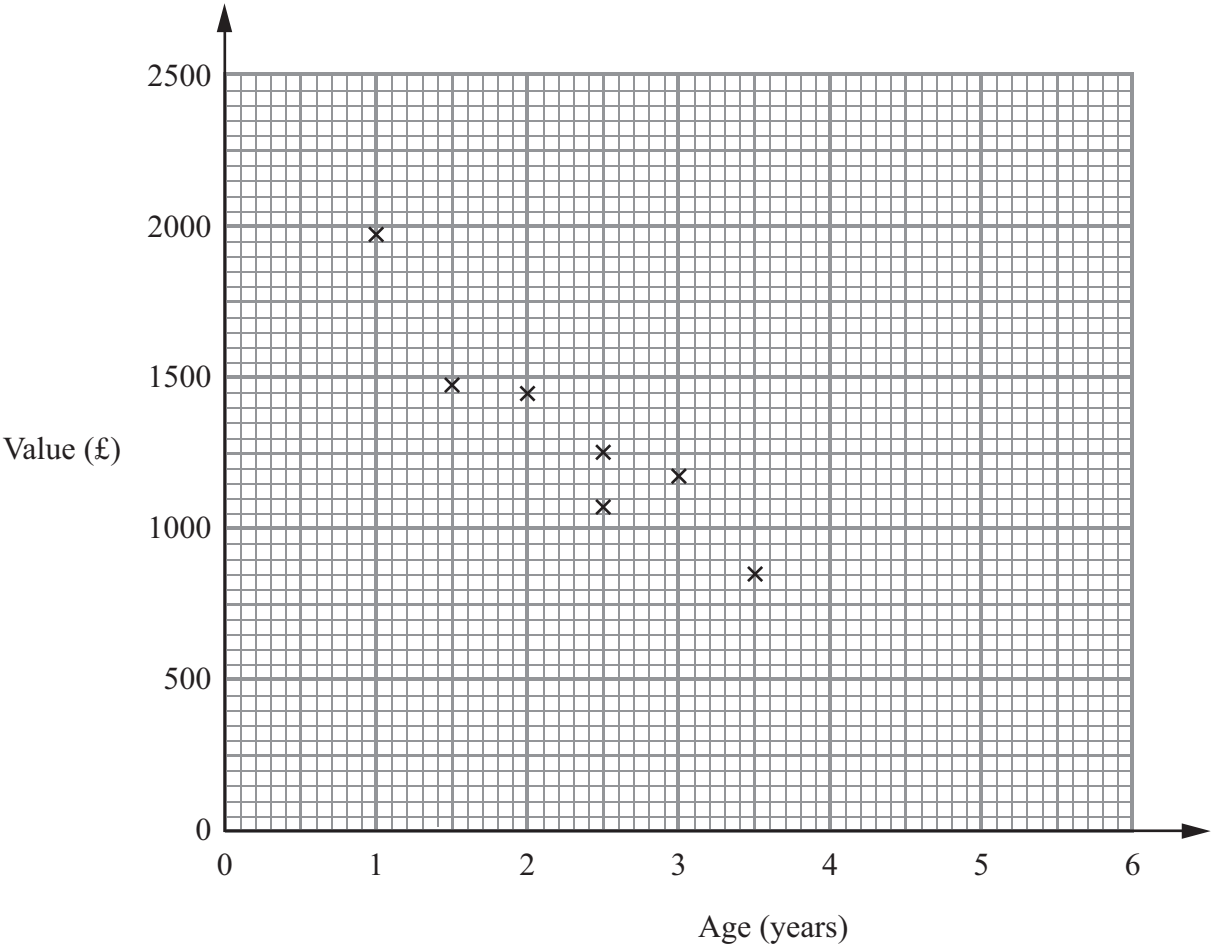
(b) Estimate the distance travelled on one litre of petrol by this car.

..... kilometres

(2)

(Total for Question 7 is 3 marks)

3 The scatter graph shows information about the ages and values of seven Varley motor scooters.



Another Varley motor scooter is 5 years old.
It has a value of £300

(a) Show this information on the scatter graph.

(1)

(b) Describe the relationship between the age and the value of Varley motor scooters.

.....

.....

(1)

A Varley motor scooter is 4 years old.

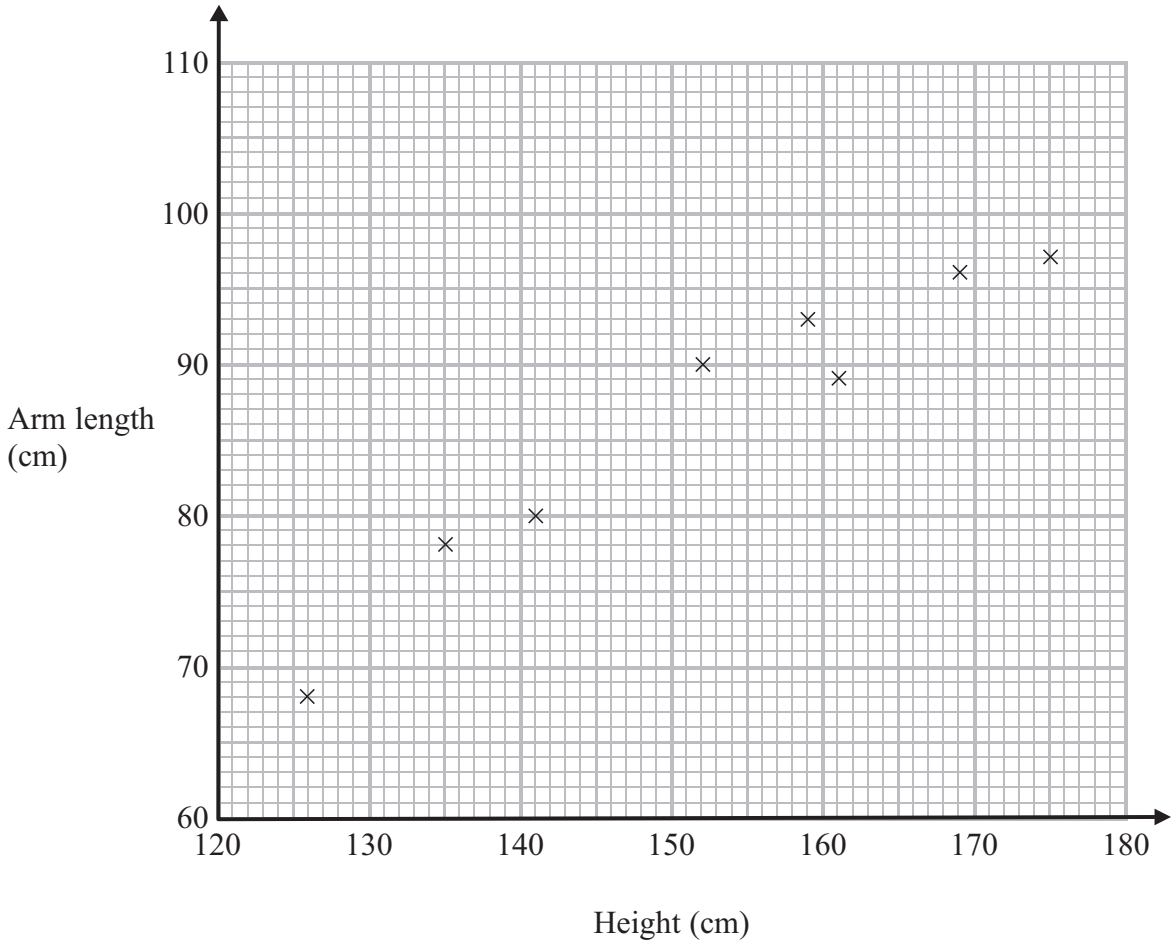
(c) Estimate its value.

£ .....

(2)

(Total for Question 3 is 4 marks)

2 The scatter graph shows information about the height and the arm length of each of 8 students in Year 11



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

.....

(1)

A different student in Year 11 has a height of 148 cm.

(b) Estimate the arm length of this student.

.....cm

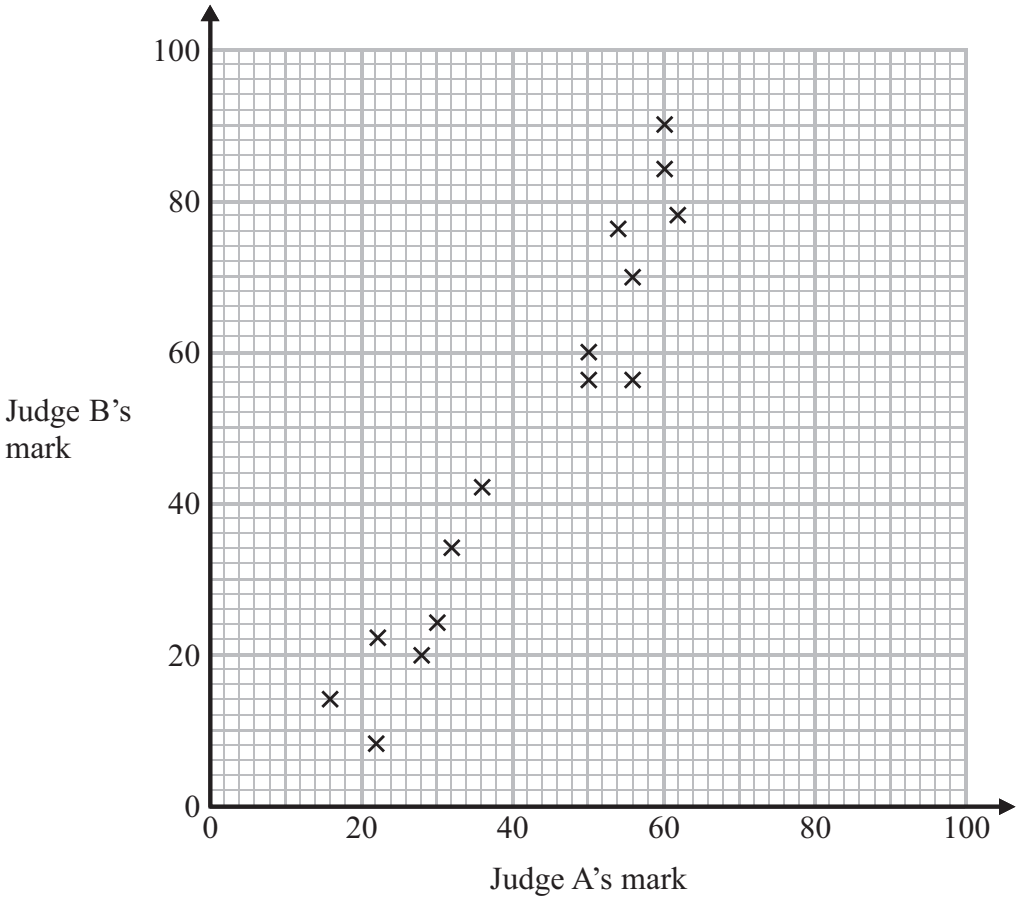
(2)

(Total for Question 2 is 3 marks)

5 Some children took part in a piano competition.

Each child was given a mark from Judge A and from Judge B.

The scatter graph below shows some of this information.



(a) Describe the correlation.

.....

(1)

Judge A gives 44 marks to another child.

(b) Use the scatter graph to estimate Judge B's mark for this child.

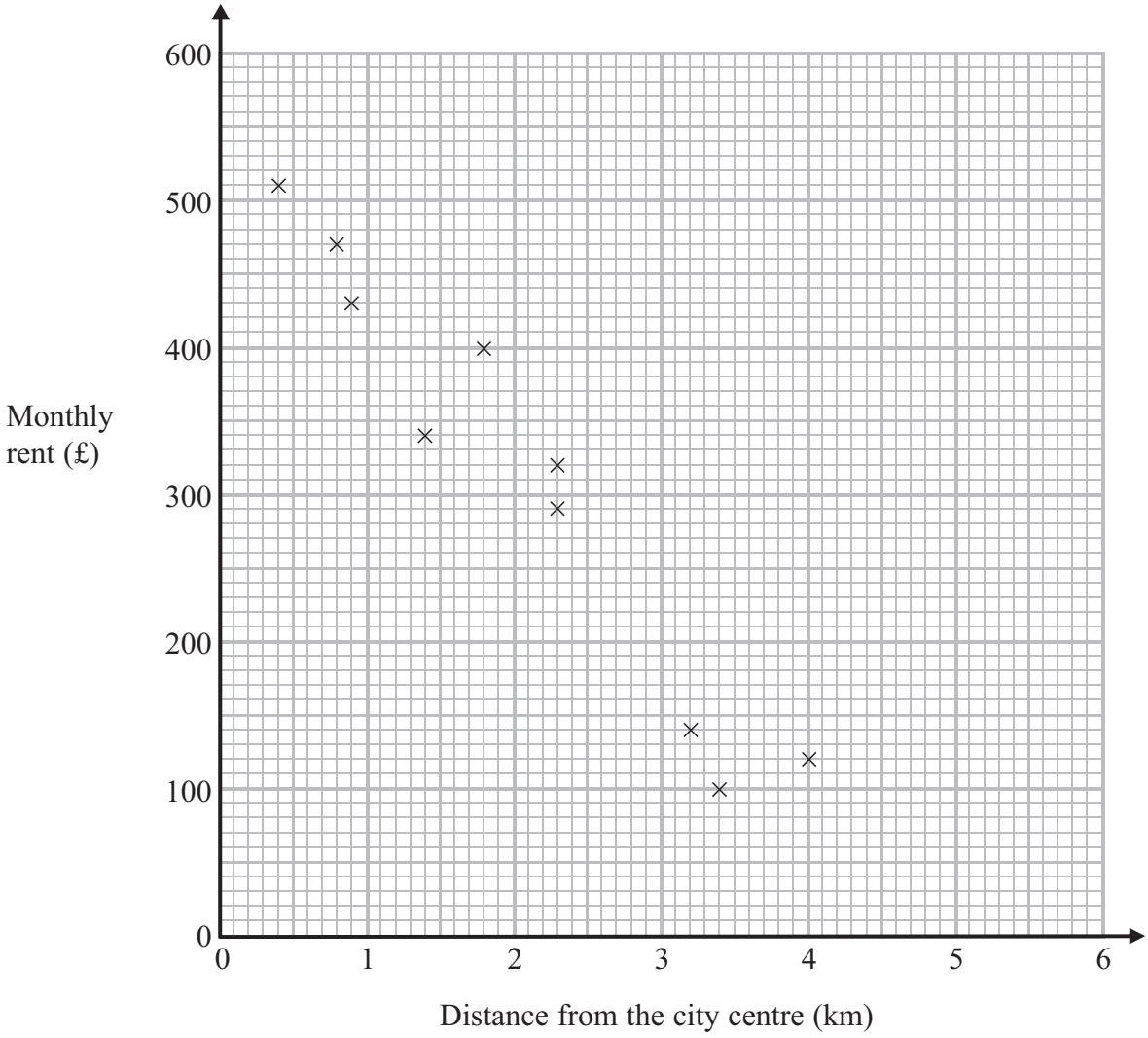
..... marks

(2)

(Total for Question 5 is 3 marks)

2 The scatter graph shows information about 10 apartments in a city.

The graph shows the distance from the city centre and the monthly rent of each apartment.



The table shows the distance from the city centre and the monthly rent for two other apartments.

Distance from the city centre (km)	2	3.1
Monthly rent (£)	250	190

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

(1)

(b) Describe the relationship between the distance from the city centre and the monthly rent.

.....

.....

(1)

An apartment is 2.8 km from the city centre.

(c) Find an estimate for the monthly rent for this apartment.

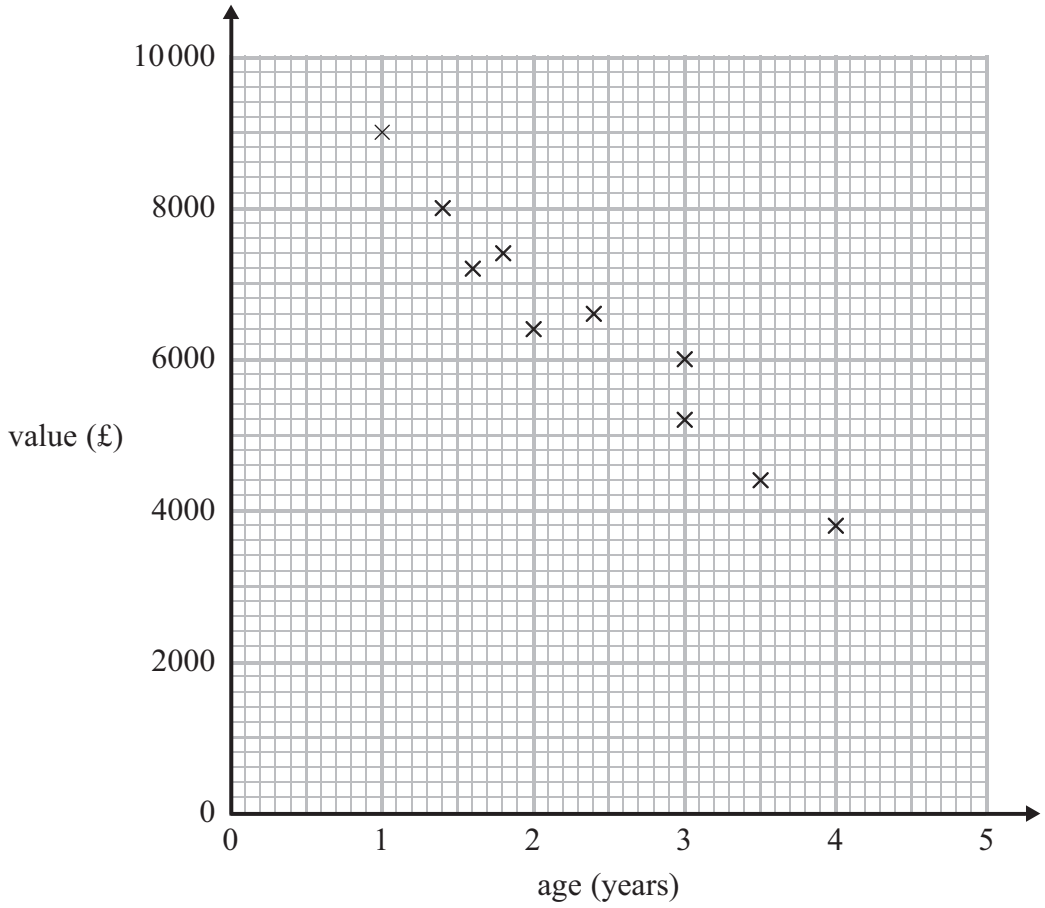
£ .....

(2)

(Total for Question 2 is 4 marks)

3 The scatter graph shows some information about 10 cars, of the same type and make.

The graph shows the age (years) and the value (£) of each car.



The table shows the age and the value of two other cars of the same type and make.

age (years)	1	3.5
value (£)	8200	5000

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

(1)

(b) Describe the relationship between the age and the value of the cars.

.....

.....

(1)

A car of the same type and make is $2\frac{1}{2}$ years old.

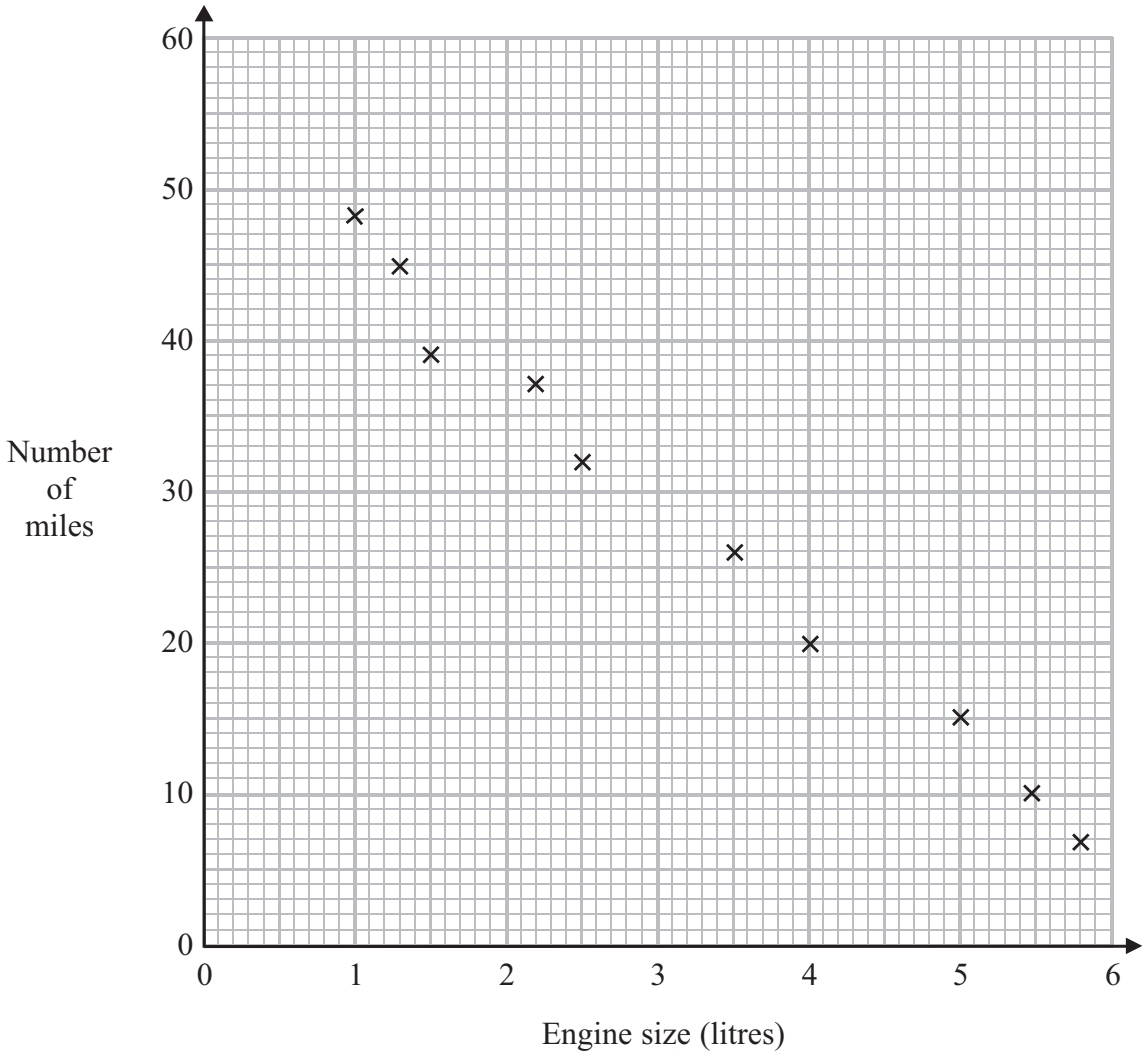
(c) Estimate the value of the car.

£.....

(2)

(Total for Question 3 is 4 marks)

3 A car company records the number of miles cars of different engine sizes, in litres, travel using one gallon of fuel.
The scatter graph shows this information.



Another car has an engine size of 1.8 litres and travels 42 miles using one gallon of fuel.

(a) Plot this information on the scatter graph.

(1)

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

.....

(1)

(c) Draw a line of best fit.

(1)

A car has an engine size of 2.8 litres.

(d) Find an estimate for the number of miles this car travels using one gallon of fuel.

..... miles

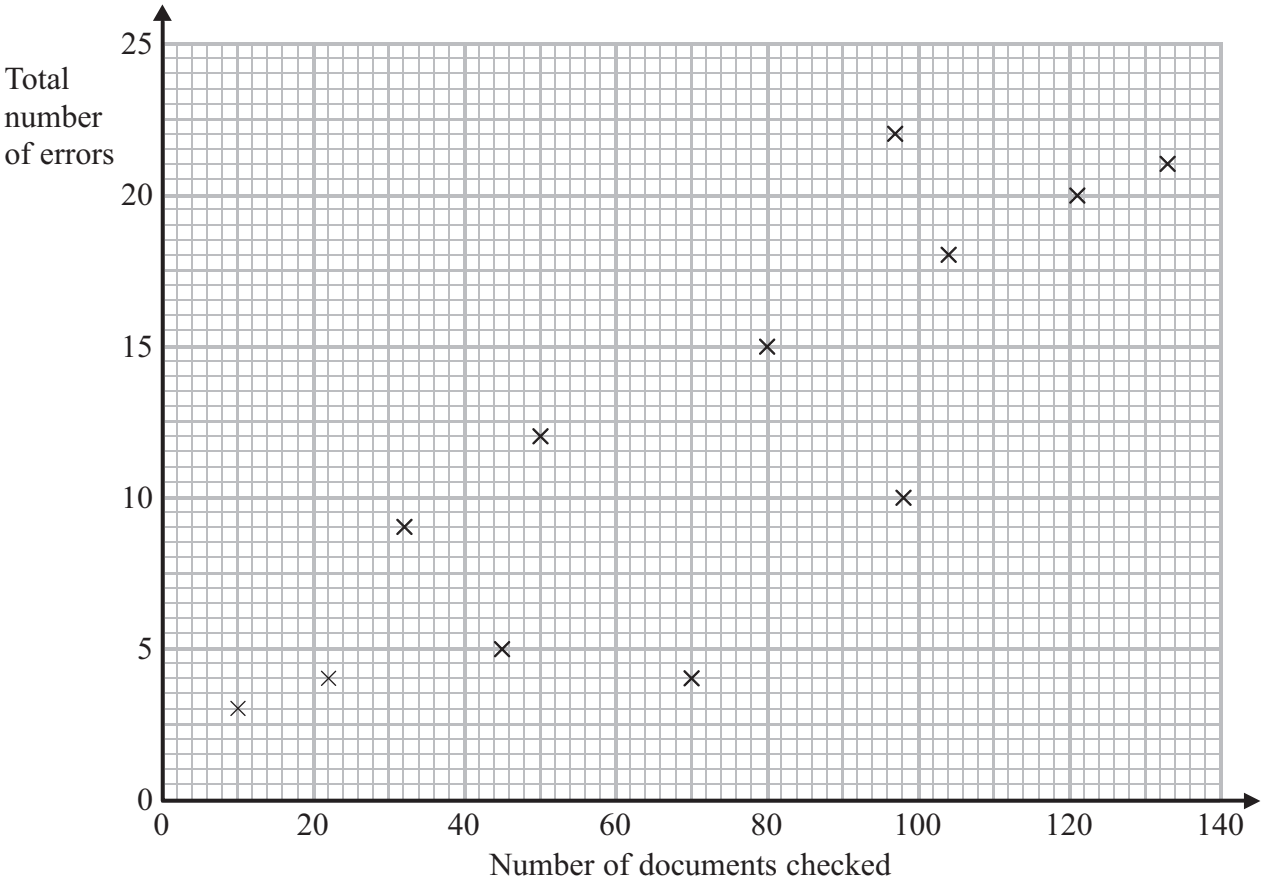
(1)

(Total for Question 3 is 4 marks)

2 A publisher checks documents for errors.

He records the number of documents that are checked each day.
He also records the total number of errors in the documents each day.

The scatter graph shows this information.



On another day 90 documents are checked.
There is a total of 17 errors.

(a) Show this information on the scatter graph.

(1)

(b) Describe the correlation between the number of documents checked and the total number of errors.

.....

(1)

One day 110 documents are checked.

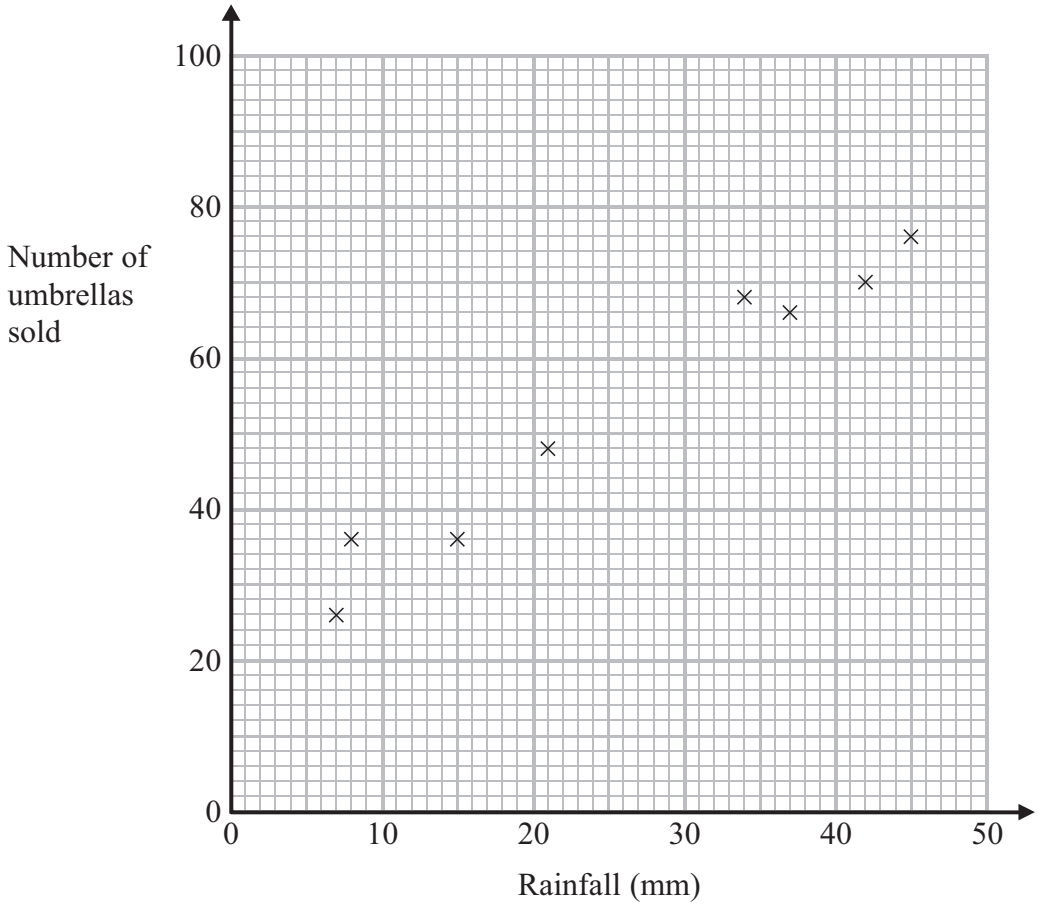
(c) Estimate the total number of errors in these documents.

.....

(2)

(Total for Question 2 is 4 marks)

5 The scatter graph gives information about the rainfall (mm) and the number of umbrellas sold in a shop for each of eight months last year.



(a) Describe the relationship between the rainfall and the number of umbrellas sold.

.....

.....

(1)

In a different month, the rainfall was 28 mm.

(b) Estimate the number of umbrellas sold in the shop that month.

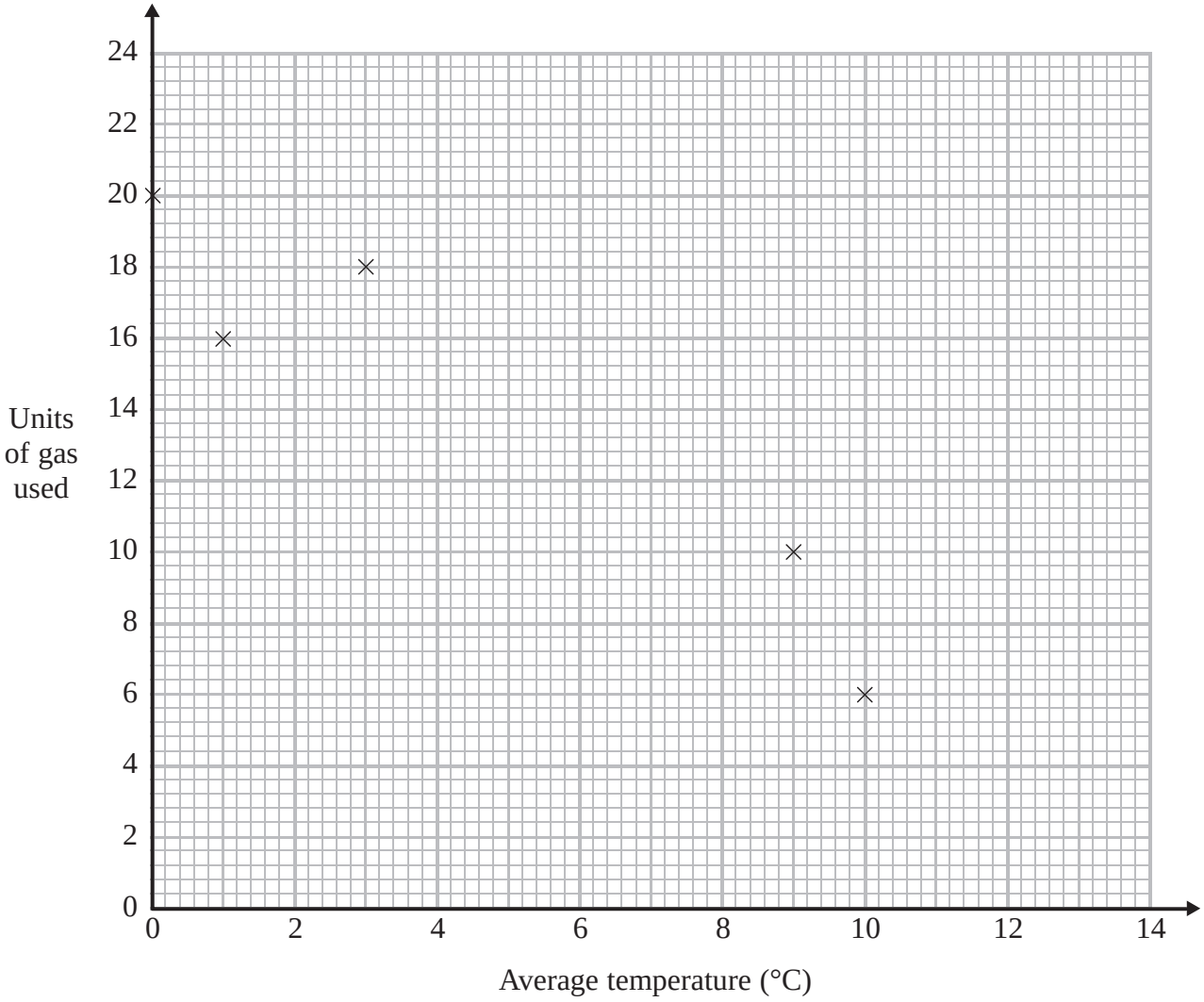
.....

(2)

(Total for Question 5 is 3 marks)

2 The table shows the average temperature on each of seven days and the number of units of gas used to heat a house on these days.

Average temperature (°C)	0	1	3	9	10	12	13
Units of gas used	20	16	18	10	6	6	2



(a) Complete the scatter graph to show the information in the table.
The first 5 points have been plotted for you.

(1)

(b) Describe the relationship between the average temperature and the number of units of gas used.

.....

.....

(1)

(c) Estimate the average temperature on a day when 12 units of gas are used.

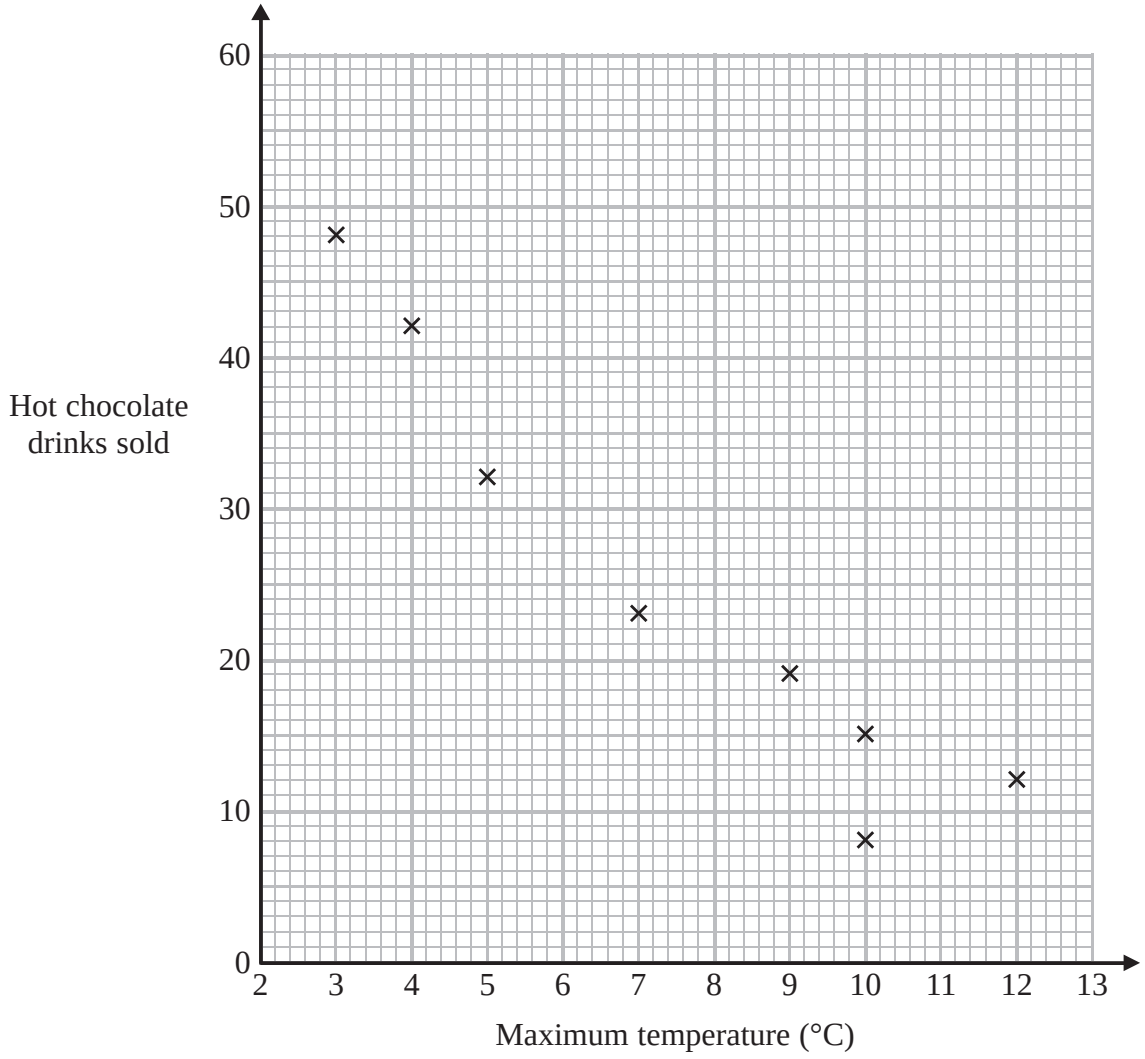
..... °C

(2)

(Total for Question 2 is 4 marks)

2 Carlos has a cafe in Clacton.
Each day, he records the maximum temperature in degrees Celsius (°C) in Clacton and the number of hot chocolate drinks sold.

The scatter graph shows this information.



On another day the maximum temperature was 6 °C and 35 hot chocolate drinks were sold.

(a) Show this information on the scatter graph.

(1)

(b) Describe the relationship between the maximum temperature and the number of hot chocolate drinks sold.

.....

.....

(1)

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

(1)

One day the maximum temperature was 8 °C.

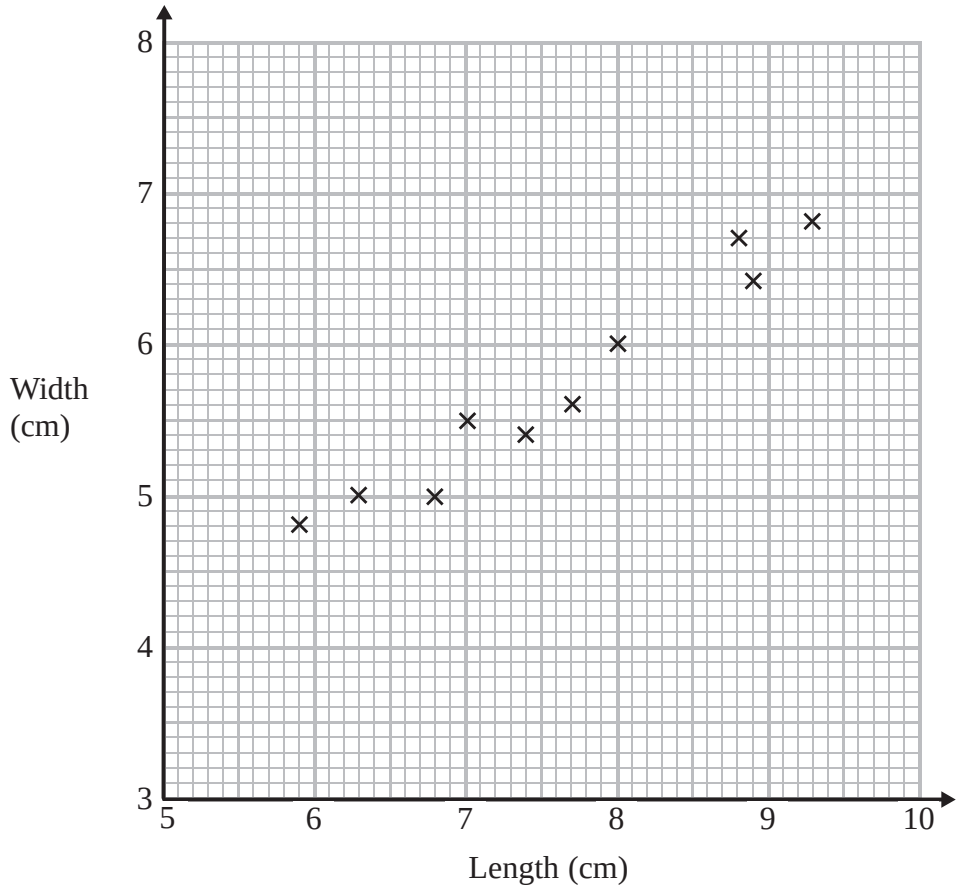
(d) Use your line of best fit to estimate how many hot chocolate drinks were sold.

.....

(1)

(Total for Question 2 is 4 marks)

2 The scatter graph shows some information about ten pine cones from the same tree.
It shows the length and the width of each pine cone.



(a) Describe the relationship between the length and the width of a pine cone.

.....

.....

(1)

Another pine cone from this tree has a length of 8.4 cm.

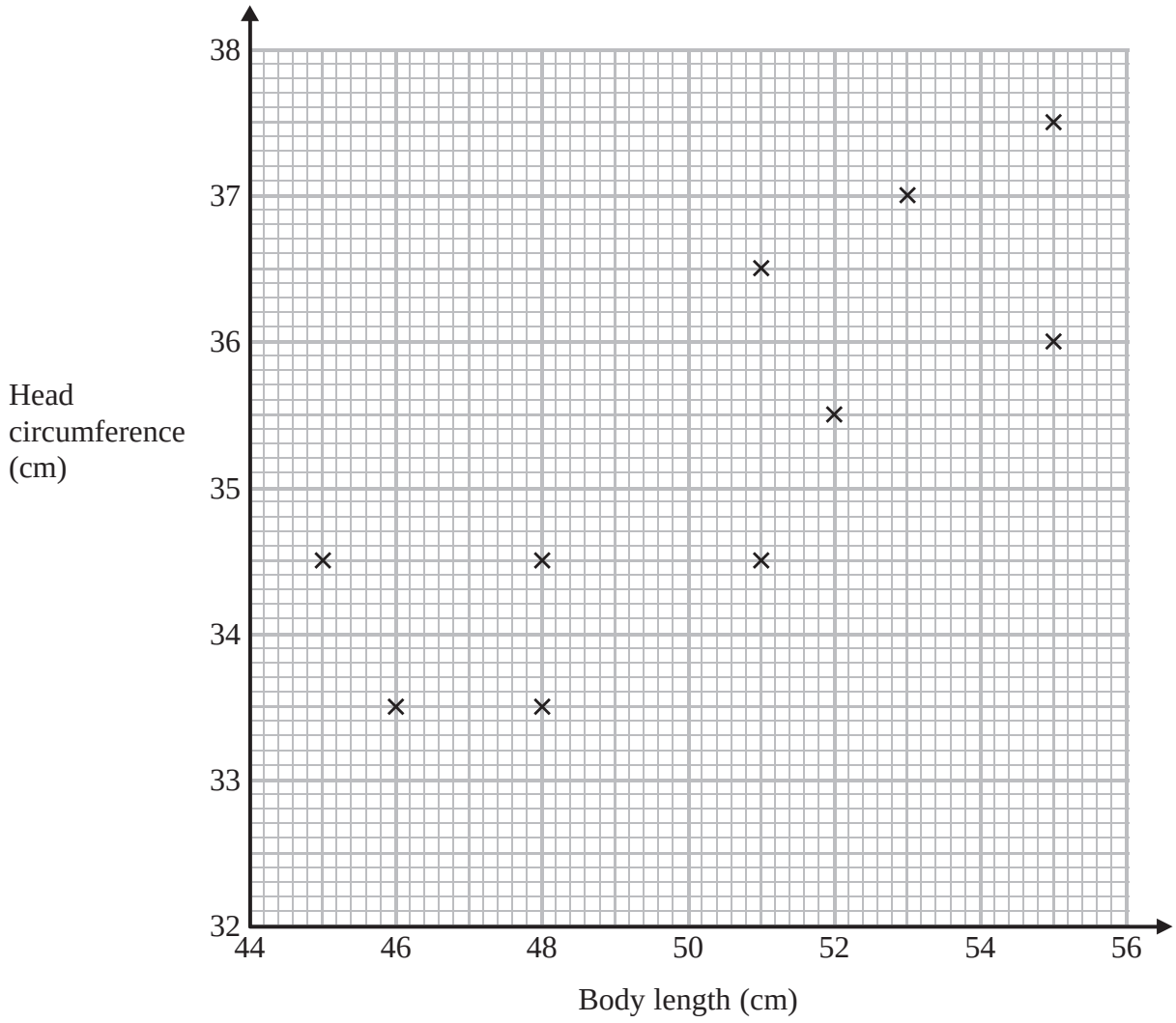
(b) Estimate the width of this pine cone.

.....cm

(2)

(Total for Question 2 is 3 marks)

9 The scatter graph shows information about 10 newborn babies.
It shows each baby's body length and head circumference.



Another baby has a body length of 47 cm and head circumference 34 cm.

(a) Show this information on the scatter graph.

(1)

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

.....

(1)

A baby has head circumference 35 cm.

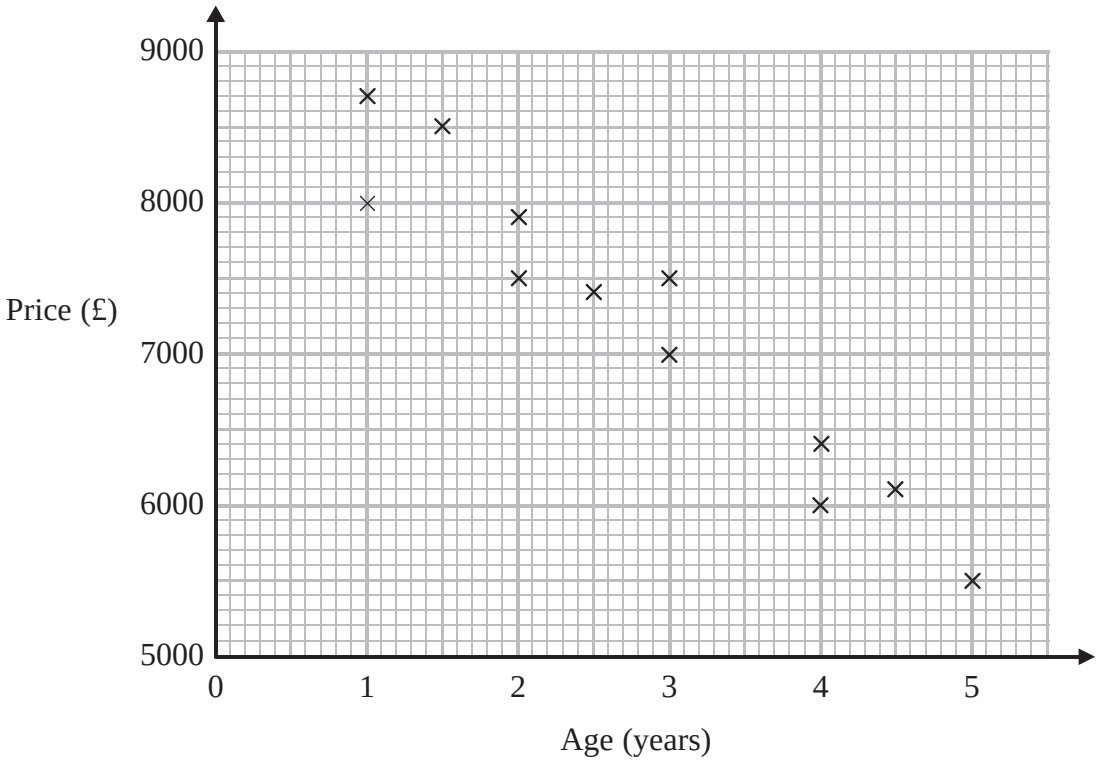
(c) Estimate the body length of this baby.

..... cm

(2)

(Total for Question 9 is 4 marks)

6 The scatter graph shows information about the age and the price of each of 12 cars of the same model.



(a) Describe the relationship between the age of a car and its price.

.....

.....

(1)

A different car of the same model is $3\frac{1}{2}$ years old.

(b) Estimate the price of this car.

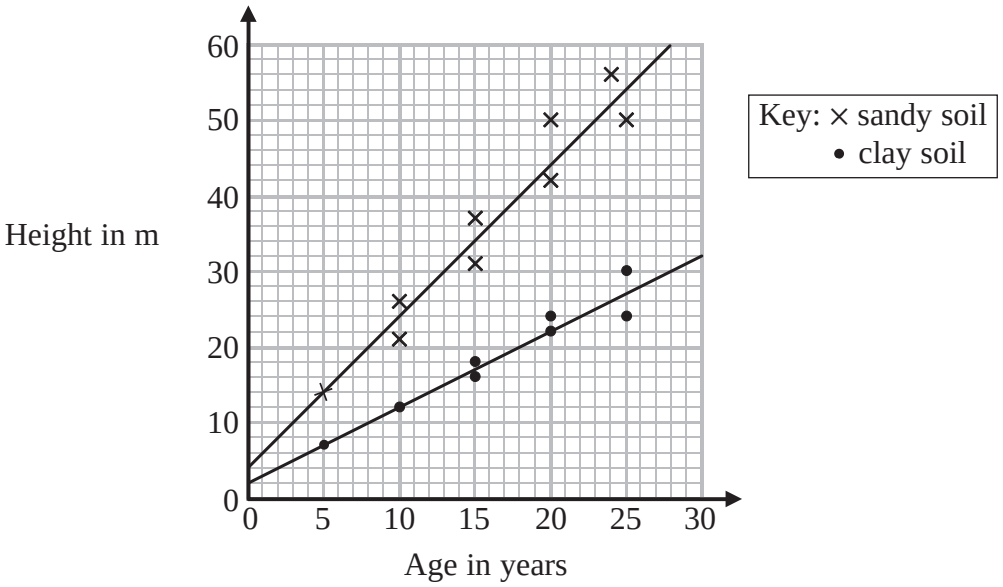
£.....

(2)

(Total for Question 6 is 3 marks)

2 Bill wants to compare the heights of pine trees growing in sandy soil with the heights of pine trees growing in clay soil.

The scatter diagram gives some information about the heights and the ages of some pine trees.



(a) Describe the relationship between the height of pine trees and the age of pine trees growing in sandy soil.

.....

(1)

A pine tree growing in clay soil is 18 years old.

(b) Find an estimate for the height of this tree.

.....m

(1)

A pine tree is growing in sandy soil.

(c) Work out an estimate for how much the height of this tree increases in a year.

.....m

(2)

(d) Compare the rate of increase of the height of trees growing in clay soil with the rate of increase of the height of trees growing in sandy soil.

.....

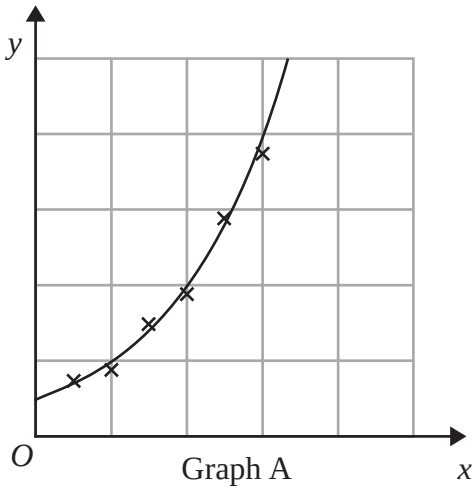
.....

(2)

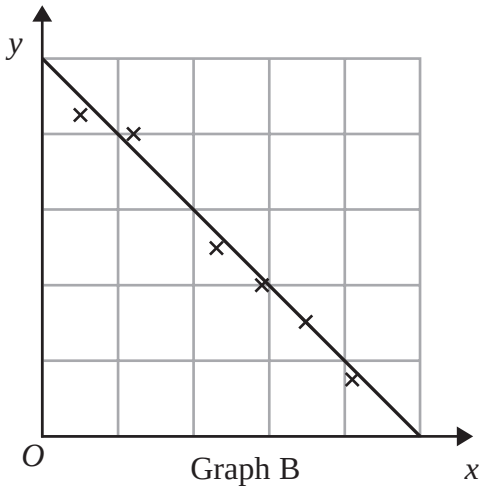
(Total for Question 2 is 6 marks)

11 Here are some graphs that show relationships.

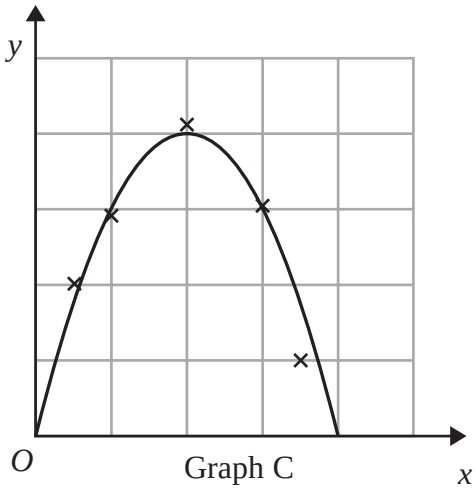
A curve or line of best fit has been drawn on each graph.



Graph A



Graph B



Graph C

The equation of each graph is one of the equations in the following list.

$y = 10 - 2x$ $y = 2^x$ $y = 2x - 10$ $y = 8x - 2x^2$ $y = 3x^2$

Give the equation of each graph.

Graph A.....

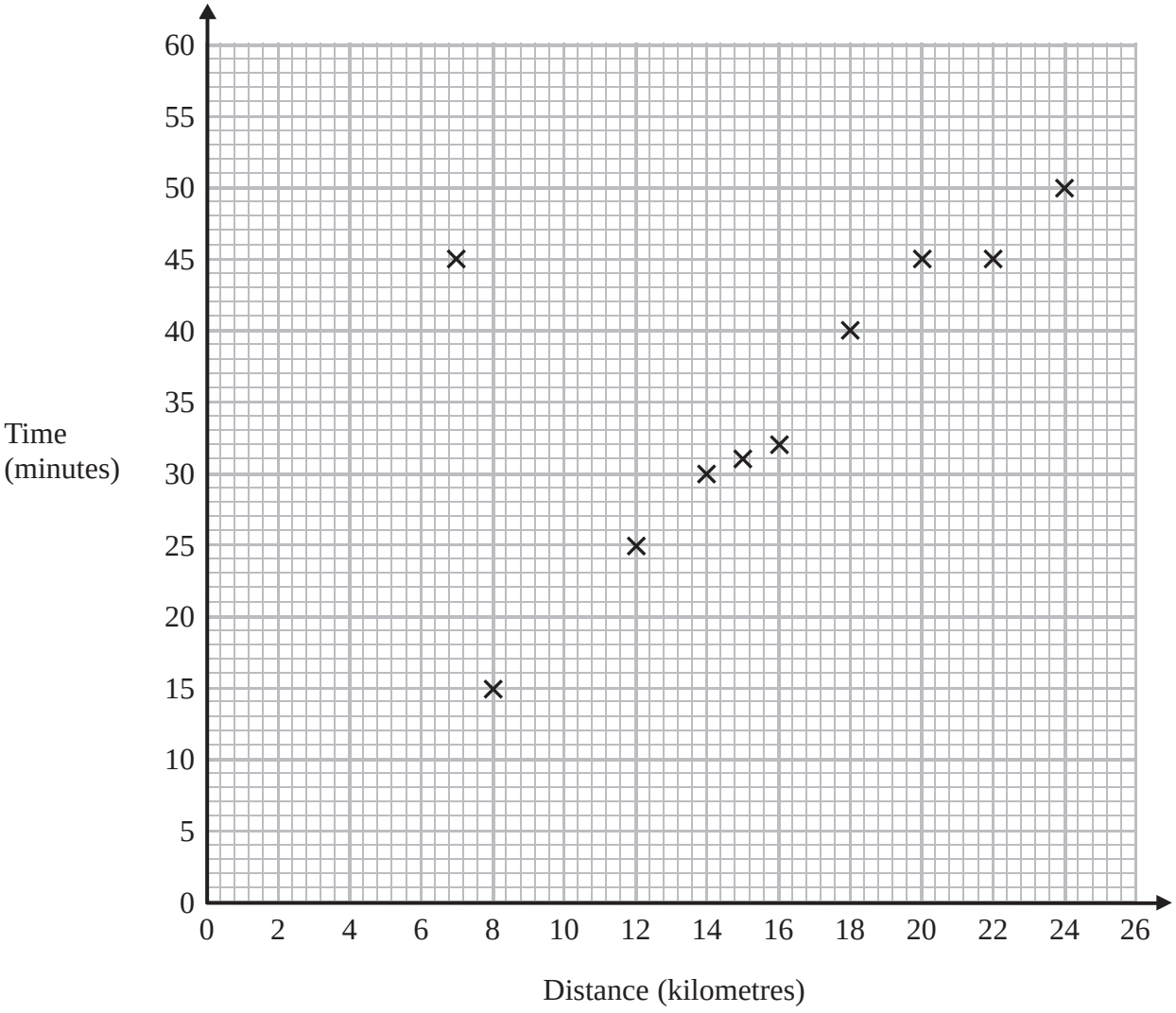
Graph B.....

Graph C.....

(Total for Question 11 is 3 marks)

2 A delivery driver records for each delivery the distance he drives and the time taken.

The scatter graph shows this information.



For another delivery he drives 22 kilometres and takes 50 minutes.

(a) Show this information on the scatter graph.

(1)

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

.....

(1)

The driver has to drive a distance of 10 km for his next delivery.

(c) Estimate the time taken for this delivery.

..... minutes
(2)

During one of the deliveries, the driver was delayed by road works.

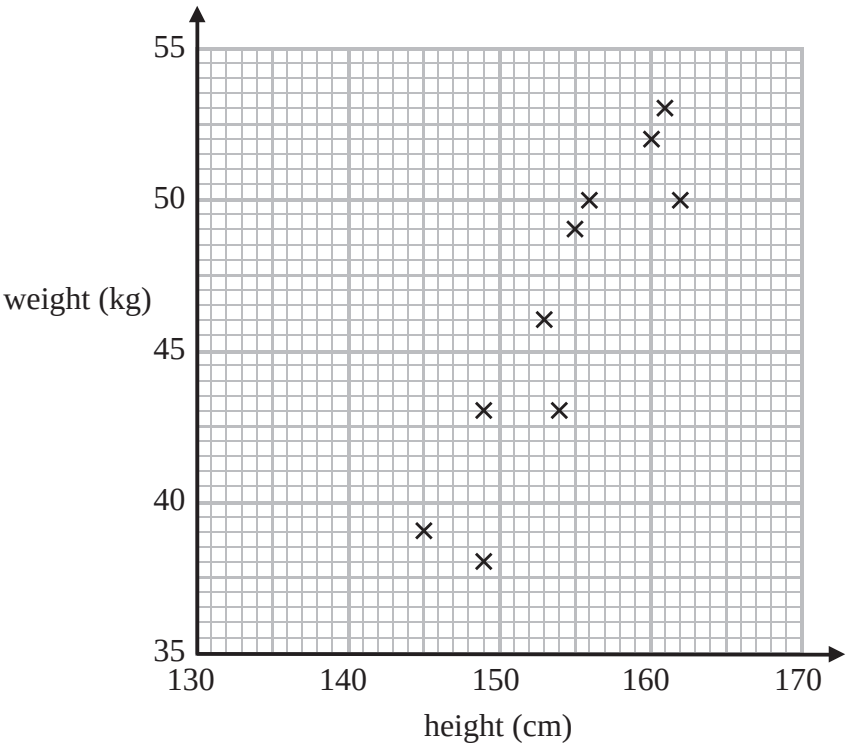
(d) Using the graph write down the time taken for this delivery.

..... minutes
(1)

(Total for Question 2 is 5 marks)

2 Leon recorded the height, in cm, and the weight, in kg, of each of ten students.

The scatter graph shows information about his results.



A different student has a height of 146 cm and a weight of 41 kg.

(a) Plot this information on the scatter graph.

(1)

(b) Describe the relationship between the height and the weight of these students.

.....

(1)

A student has a weight of 47.5 kg.

(c) Use the scatter graph to estimate the height of this student.

.....cm

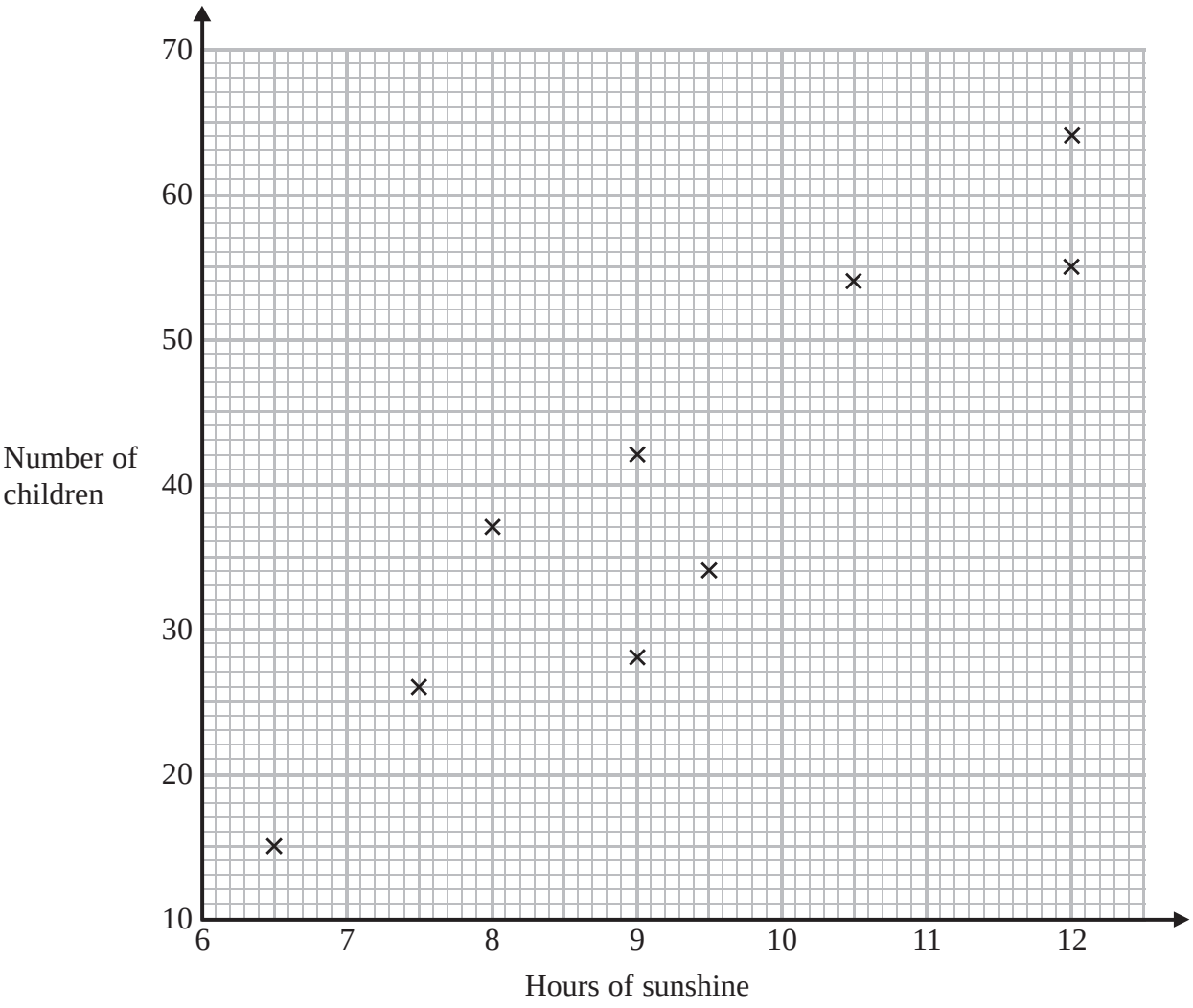
(2)

(Total for Question 2 is 4 marks)

2 Sally looks after a children's paddling pool in a park.

Each day, Sally records the number of hours of sunshine and the number of children who use the paddling pool.

The scatter graph shows this information.



(a) Describe the correlation between the number of children who use the paddling pool and the number of hours of sunshine.

.....

(1)

One day there were 10 hours of sunshine.

(b) Estimate how many children used the paddling pool.

.....

(2)

On another day, there were 6.5 hours of sunshine and 45 children used the pool.

(c) (i) Show this information on the scatter graph.

This point is isolated on the scatter graph.

(ii) Explain what may have happened on this day.

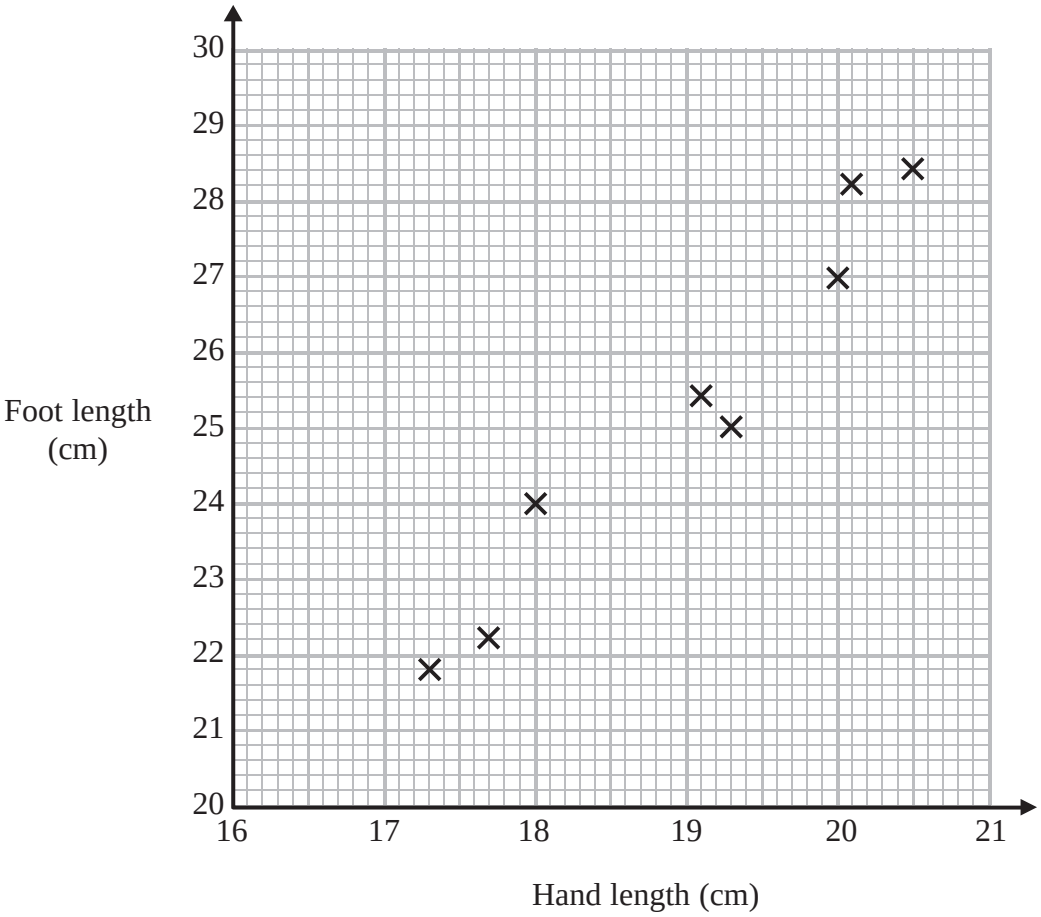
.....

.....

(2)

(Total for Question 2 is 5 marks)

3 The scatter graph gives information about the hand length and the foot length of each of 8 people.



(a) Describe the relationship between the hand length and the foot length of these people.

.....

.....

(1)

Toby has a hand length of 18.5 cm.

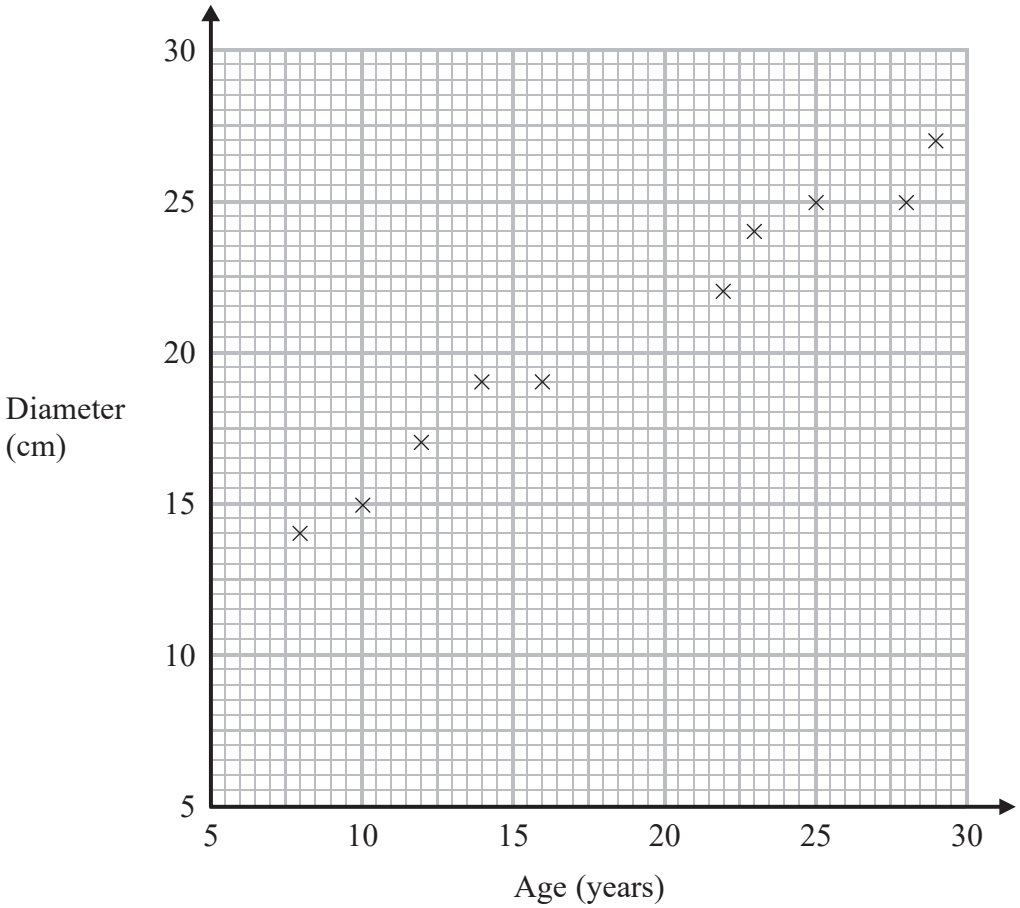
(b) Find an estimate for Toby's foot length.

..... cm

(2)

(Total for Question 3 is 3 marks)

4 The scatter graph shows information about ten trees of the same type.
It shows the age and the diameter of the trunk of each tree.



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

.....

(1)

Another tree of the same type has a trunk with diameter 21 cm.

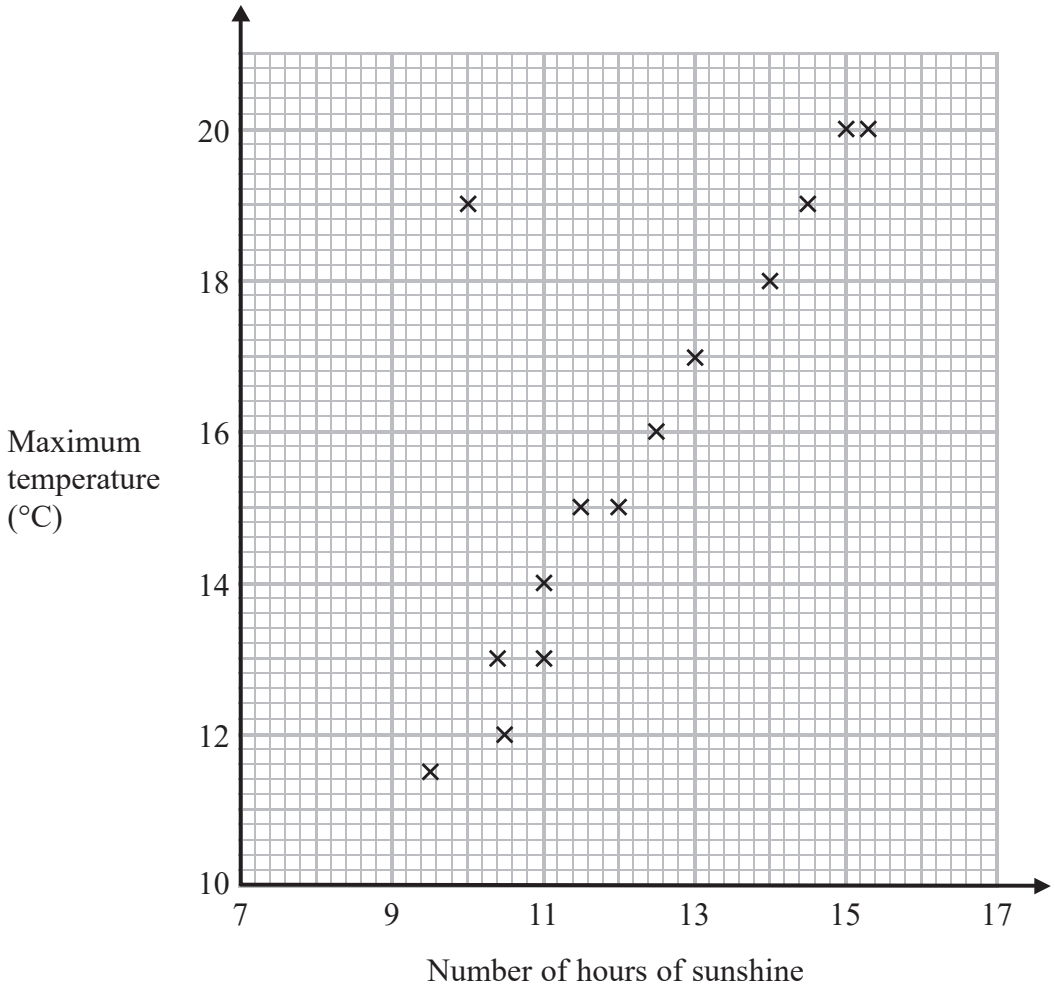
(b) Estimate the age of this tree.

..... years

(2)

(Total for Question 4 is 3 marks)

1 The scatter graph shows the maximum temperature and the number of hours of sunshine in fourteen British towns on one day.



One of the points is an outlier.

(a) Write down the coordinates of this point.

(..... , ...)

(1)

(b) For all the other points write down the type of correlation.

.....

(1)

On the same day, in another British town, the maximum temperature was 16.4 °C.

(c) Estimate the number of hours of sunshine in this town on this day.

..... hours

(2)

A weatherman says,

"Temperatures are higher on days when there is more sunshine."

(d) Does the scatter graph support what the weatherman says?
Give a reason for your answer.

.....

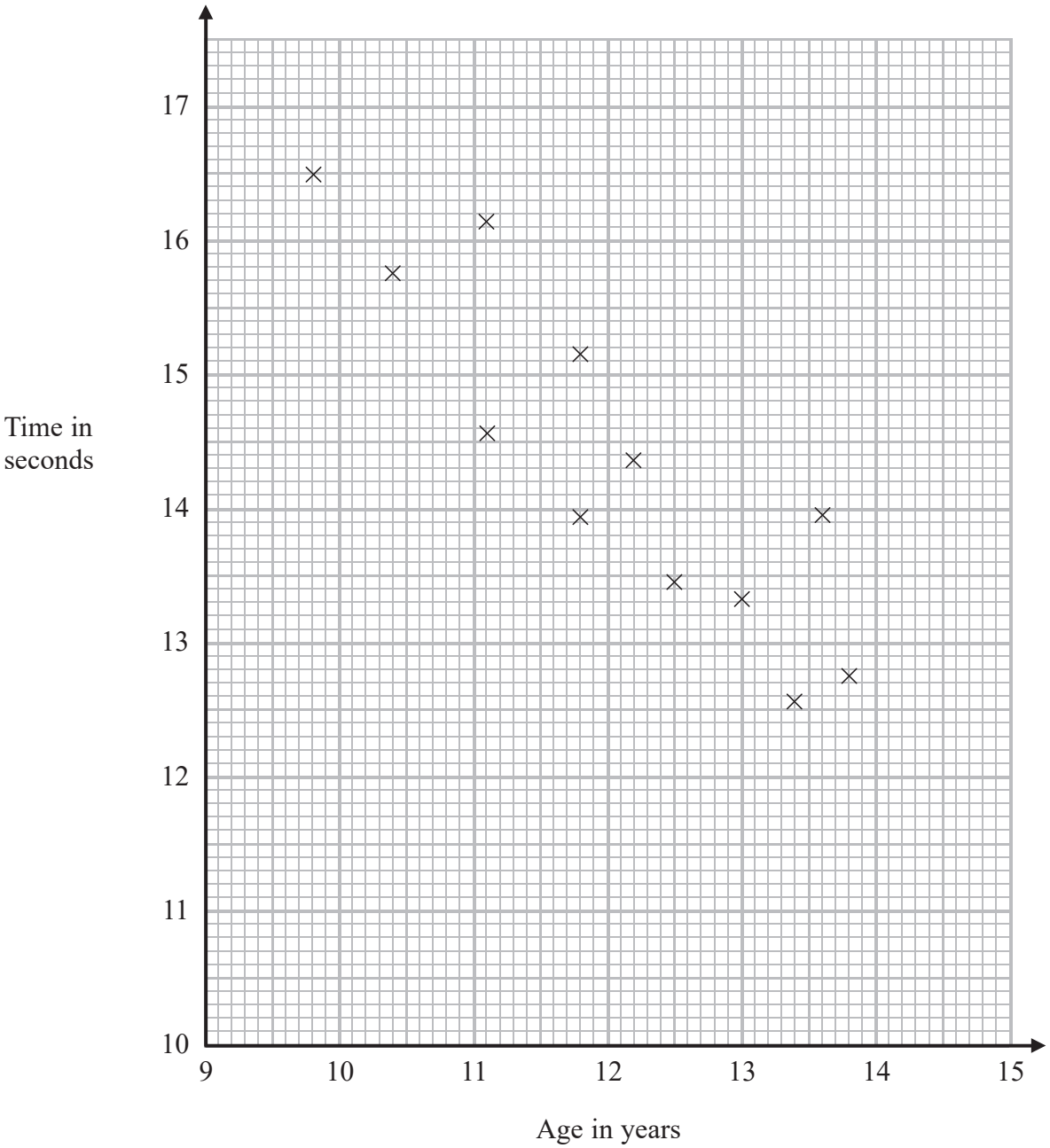
.....

(1)

(Total for Question 1 is 5 marks)

1 The scatter diagram shows information about 12 girls.

It shows the age of each girl and the best time she takes to run 100 metres.



(a) Write down the type of correlation.

.....

(1)

Kristina is 11 years old.
Her best time to run 100 metres is 12 seconds.

The point representing this information would be an outlier on the scatter diagram.

(b) Explain why.

.....

.....

(1)

Debbie is 15 years old.
Debbie says,

"The scatter diagram shows I should take less than 12 seconds to run 100 metres."

(c) Comment on what Debbie says.

.....

.....

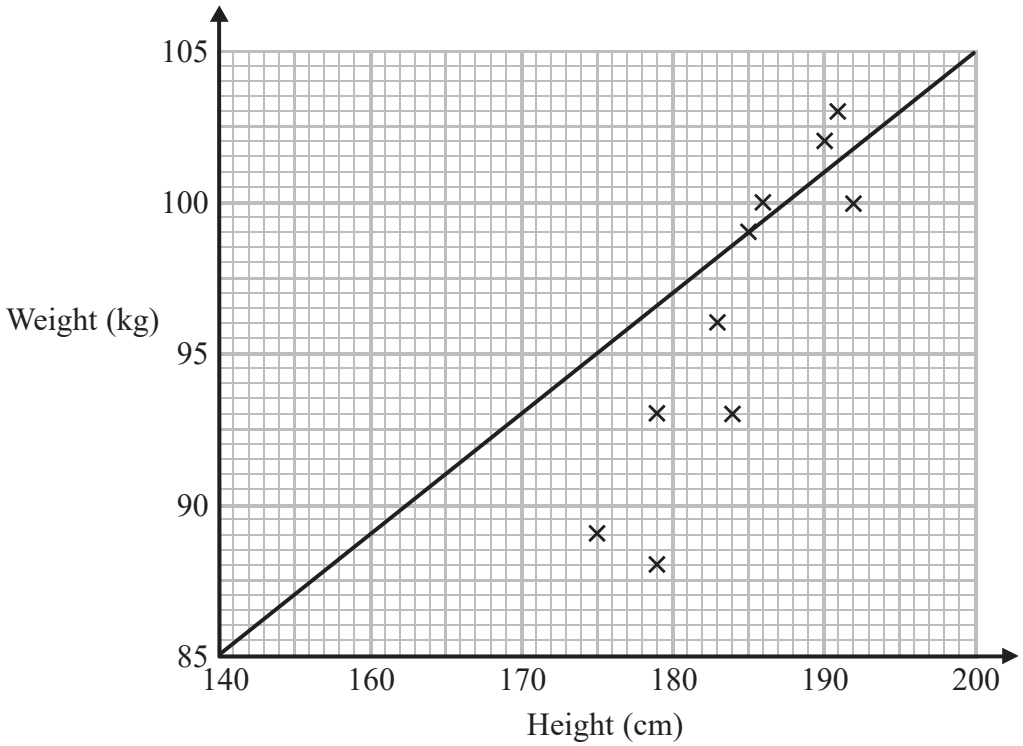
(1)

(Total for Question 1 is 3 marks)

2 Sean has information about the height, in cm, and the weight, in kg, of each of ten rugby players.

He is asked to draw a scatter graph and a line of best fit for this information.

Here is his answer.



Sean has plotted the points accurately.

Write down two things that are wrong with his answer.

1 .....

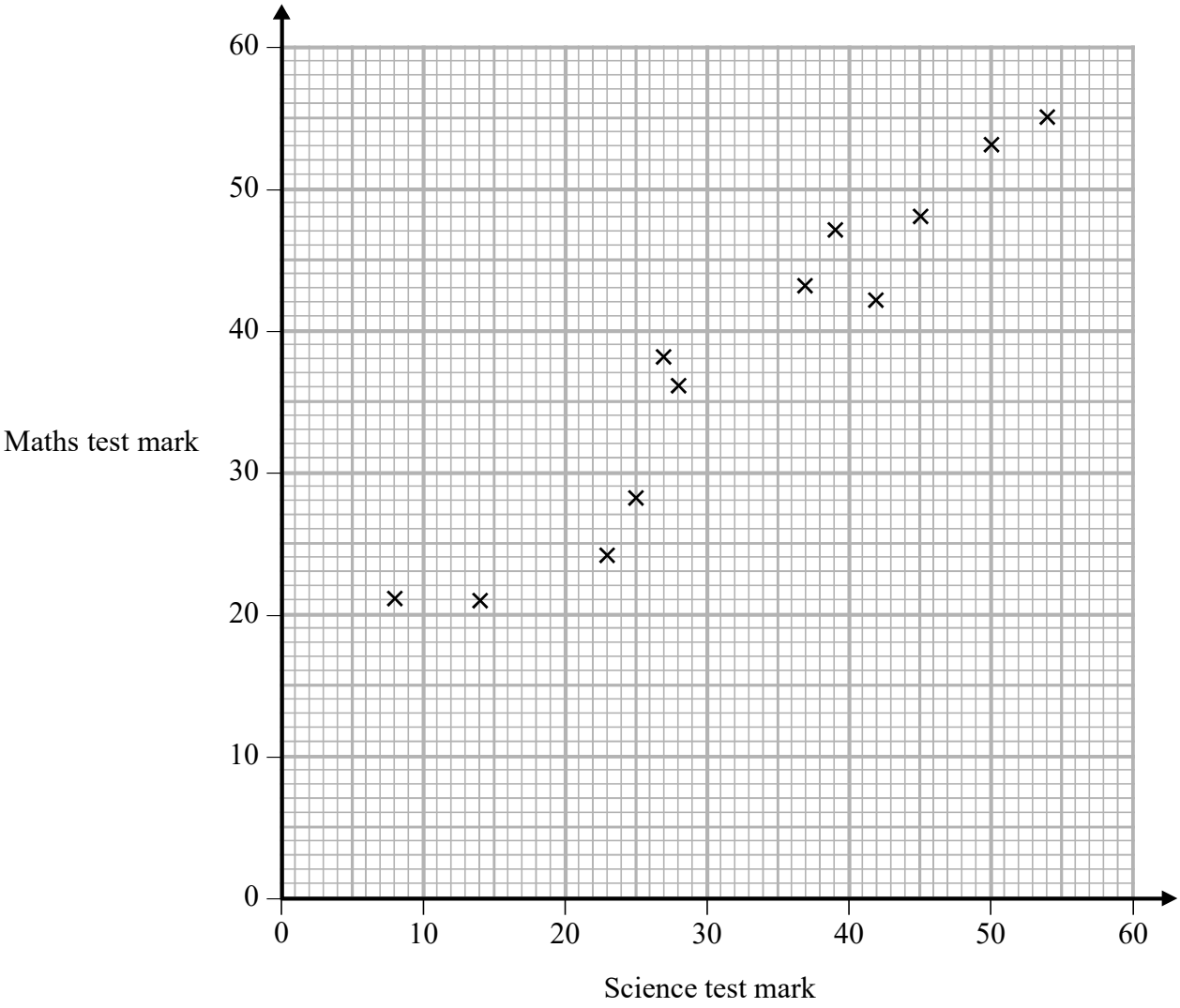
.....

2 .....

.....

(Total for Question 2 is 2 marks)

3 The scatter graph shows information about the marks a group of students got in a Science test and in a Maths test.



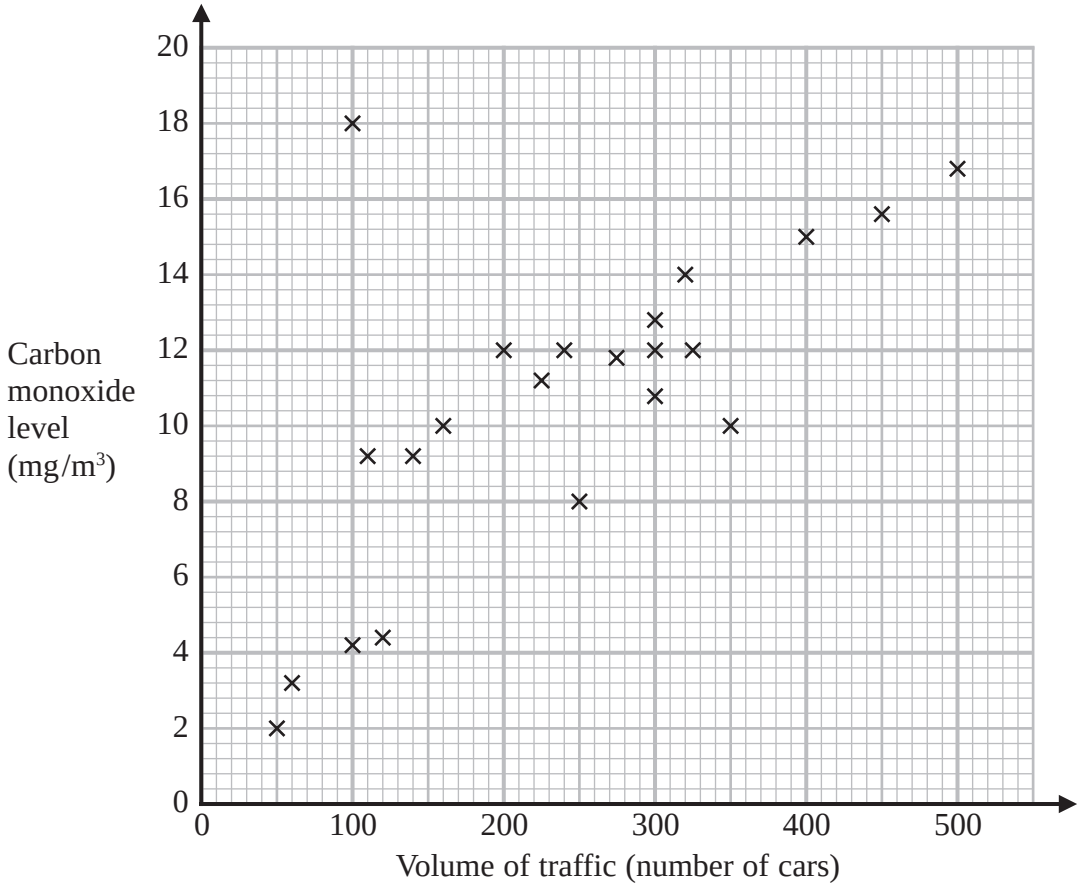
Jamie got a mark of 34 in the Science test.

Using the scatter graph, find an estimate for Jamie's mark in the Maths test.

.....

(Total for Question 3 is 2 marks)

1 The scatter graph shows information about the volume of traffic and the carbon monoxide level at a point on a road each day for 22 days.



One point is an outlier.

(a) Write down the coordinates of this point.

(..... , ...)

(1)

For another day, 370 cars pass the point on the road.

(b) Estimate the carbon monoxide level for this day.

..... mg/m³

(2)

Alfie says,

"Because there is an outlier, there is no correlation."

(c) Is Alfie correct?
You must give a reason for your answer.

.....

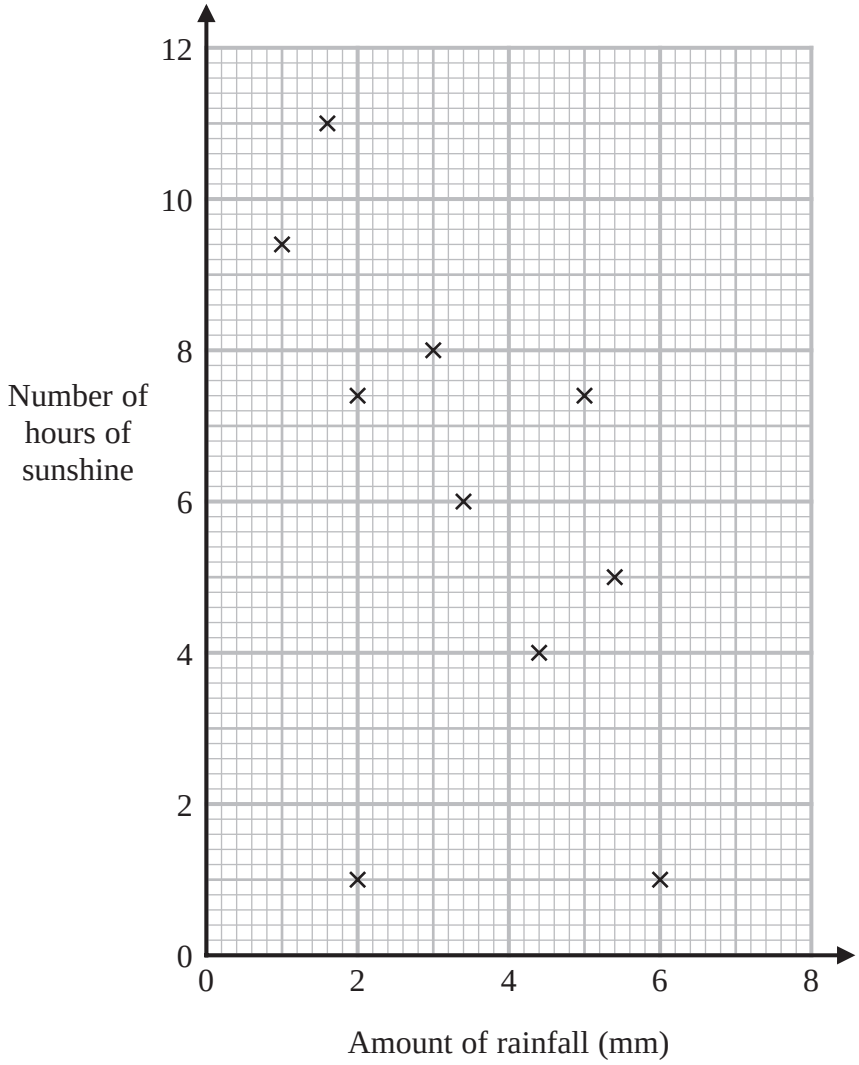
.....

.....

(1)

(Total for Question 1 is 4 marks)

1 The scatter graph shows information about the amount of rainfall, in mm, and the number of hours of sunshine for each of ten English towns on the same day.



One of the points is an outlier.

(a) Write down the coordinates of this point.

(..... , ...)

(1)

(b) Ignoring the outlier, describe the relationship between the amount of rainfall and the number of hours of sunshine.

.....

.....

.....

(1)

On the same day in another English town there were 7 hours of sunshine.

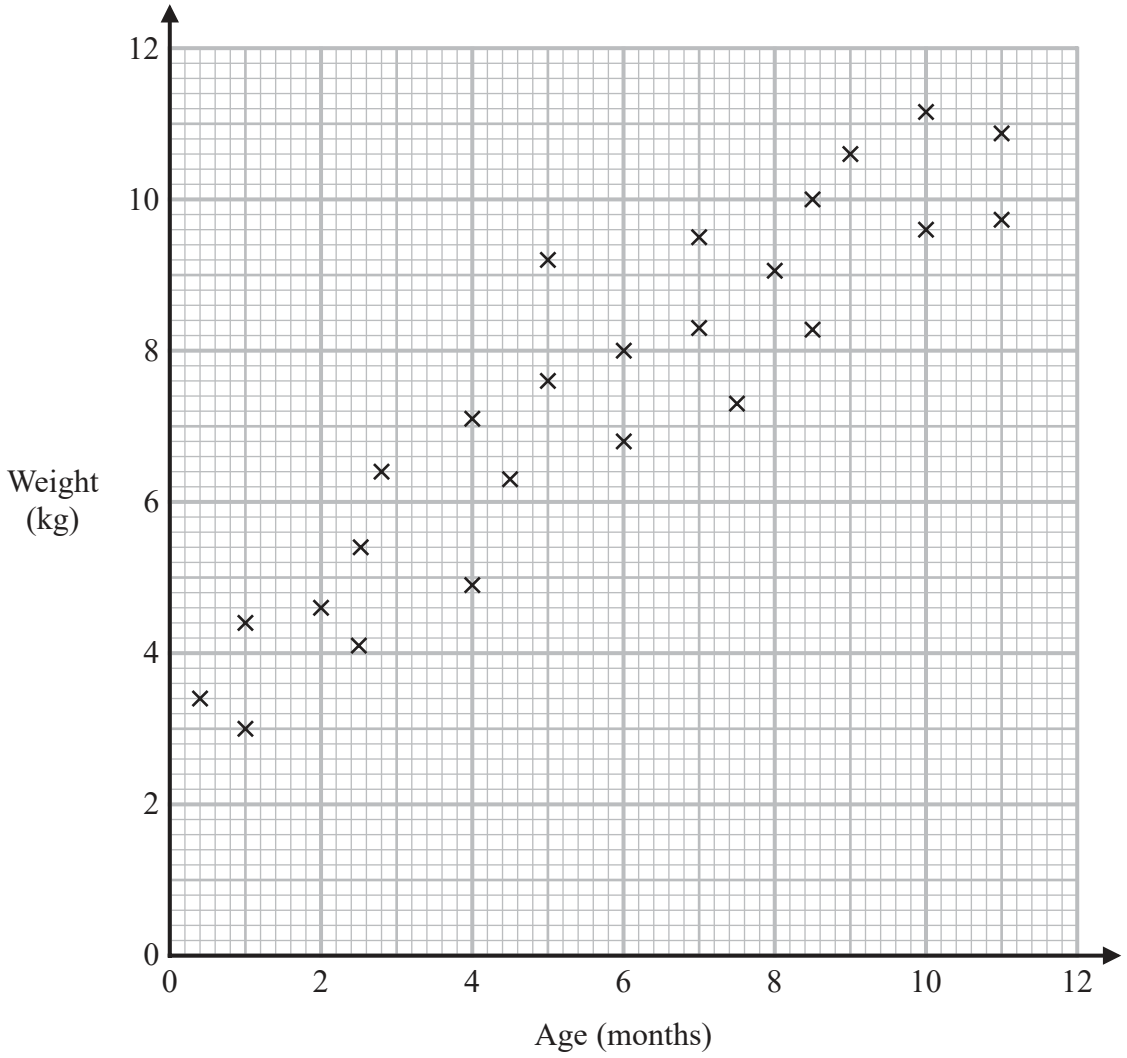
(c) Using the scatter graph, estimate the amount of rainfall in this town on this day.

..... mm

(2)

(Total for Question 1 is 4 marks)

6 The scatter graph shows information about the ages and weights of some babies.



(a) Describe the relationship between the age and the weight of the babies.

.....

.....

.....

(1)

Another baby has a weight of 5.8 kg

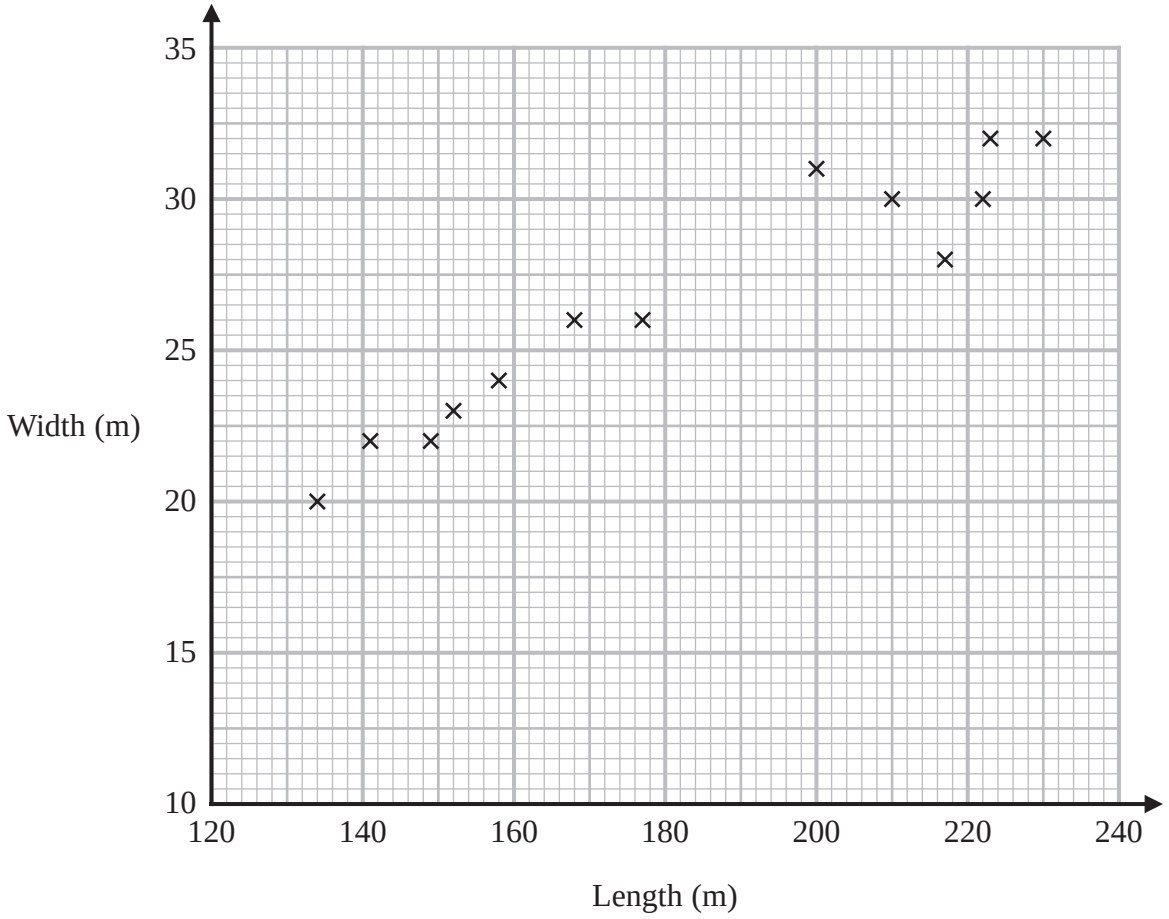
(b) Using the scatter graph, find an estimate for the age of this baby.

..... months

(2)

(Total for Question 6 is 3 marks)

2 The scatter graph shows information about some ships.
It shows the length and the width of each ship.



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

.....

(1)

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

(1)

A different ship has a length of 194 metres.

(c) Use your line of best fit to find an estimate for the width of this ship.

..... metres

(1)

(Total for Question 2 is 3 marks)