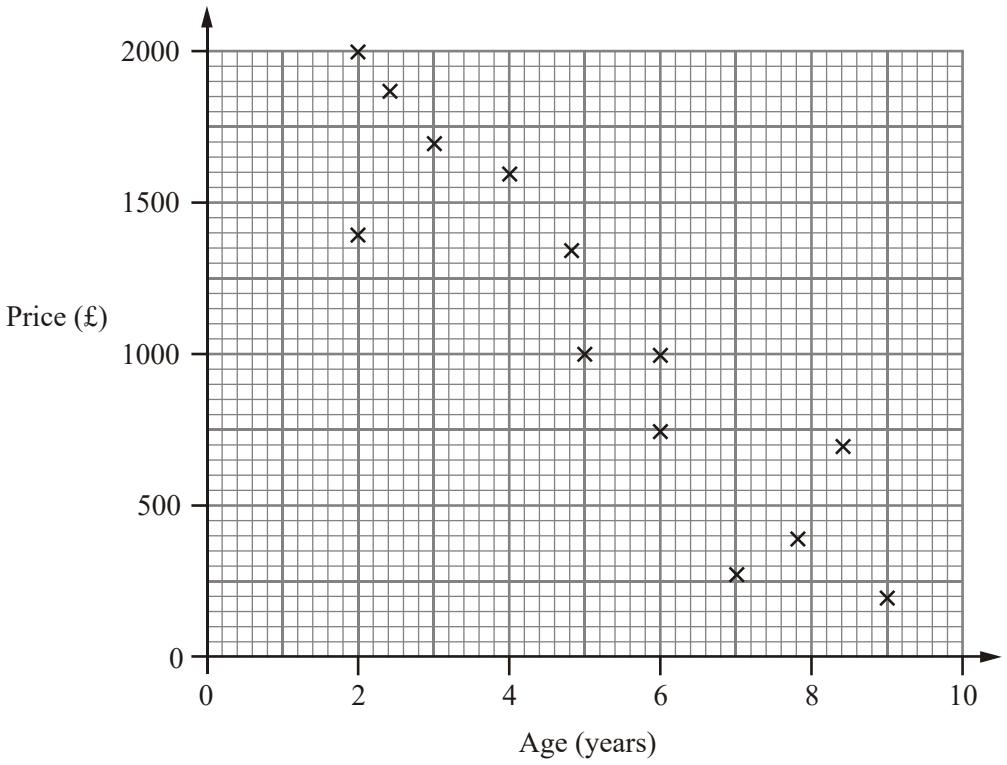
1. A garage sells motorcycles.
The scatter graph shows information about the price and age of the motorcycles.



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

.....

(1)

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

(1)

Mae buys a motorcycle from this garage for £1500

(c) Use your line of best fit to estimate the age of the motorcycle.

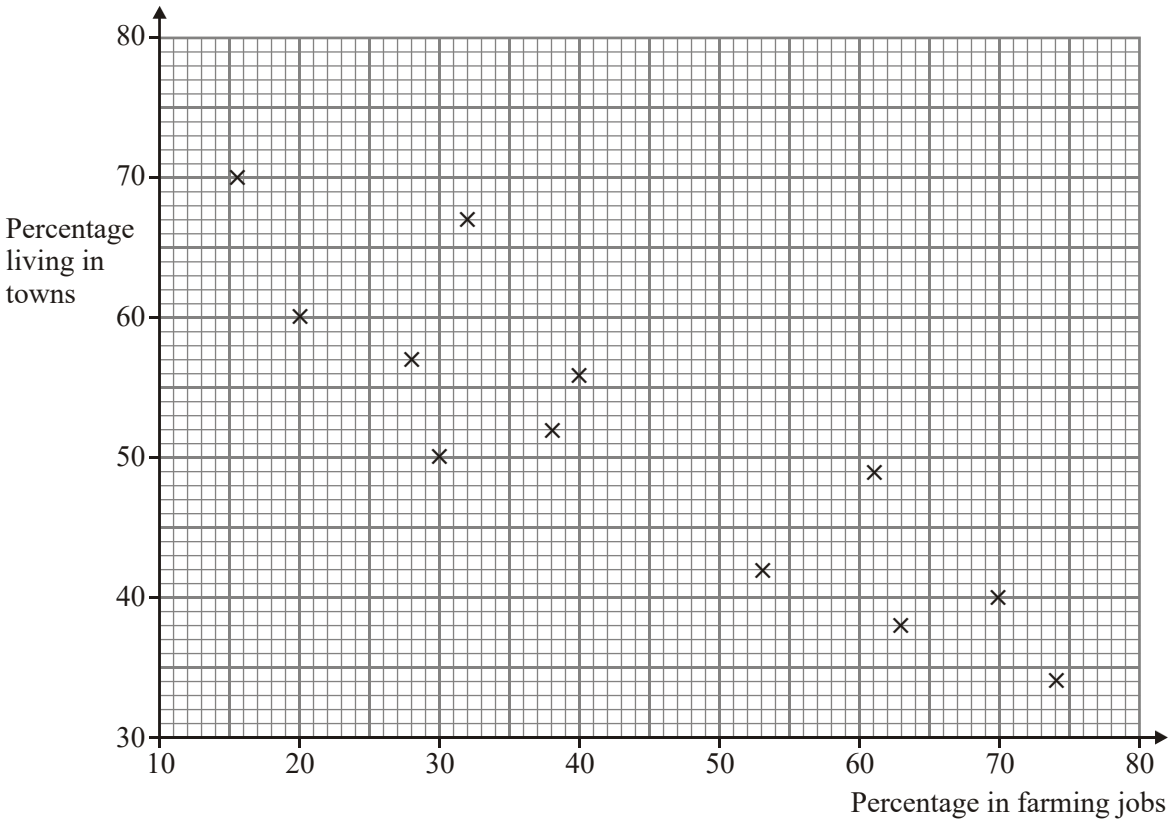
..... years

(1)

(Total 3 marks)

2. The scatter graph shows information about 12 countries.

For each country, it shows the percentage of the population in farming jobs and the percentage of the population living in towns.



(a) Describe the relationship between the percentage of the population in farming jobs and the percentage of the population living in towns.

……

……

(1)

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

(1)

In Mathsland, the percentage of the population in farming jobs is 35%.

(c) Use your line of best fit to estimate the percentage of Mathsland's population living in towns.

…… %

(1)

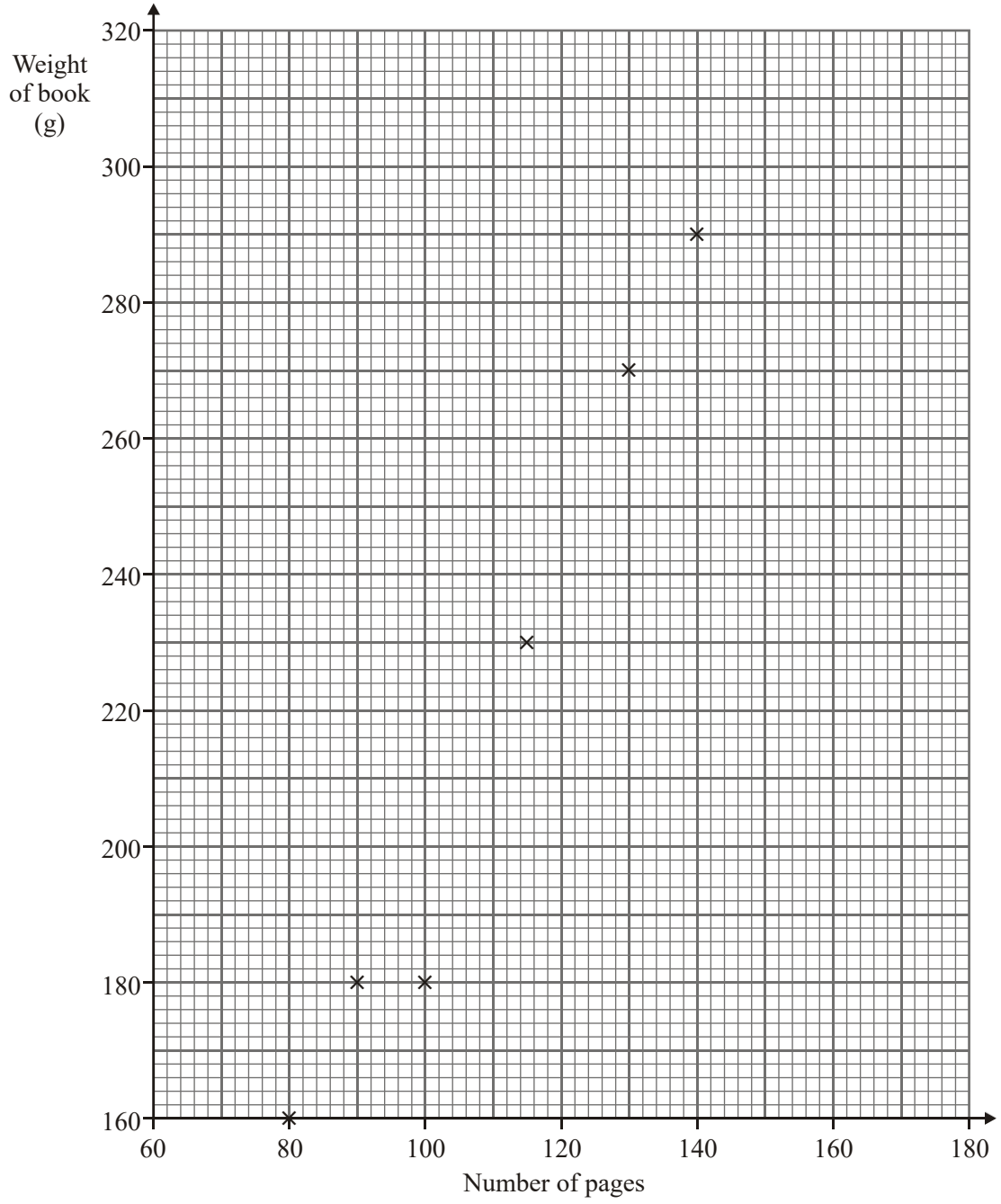
(Total 3 marks)

3. The table shows the number of pages and the weight, in grams, for each of 10 books.

Number of pages	80	130	100	140	115	90	160	140	105	150
Weight (g)	160	270	180	290	230	180	320	270	210	300

(a) Complete the scatter graph to show the information in the table.
The first 6 points in the table have been plotted for you.

(1)



(b) For these books, describe the relationship between the number of pages and the weight of a book.

.....

.....

(1)

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

(1)

(d) Use your line of best fit to estimate

(i) the number of pages in a book of weight 280 g,

..... pages

(ii) the weight of a book with 120 pages.

..... g

(2)

(Total 5 marks)

4. Pablo is an artist.
The scatter graph, below, gives information about the area and the cost of some of his pictures.

The table shows the area and the cost of another three of his pictures.

Area (cm^2)	2000	2900	3260
Cost (£)	1150	1250	1500

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

(1)

(b) Describe the relationship between the area of a picture and its cost.

.....

.....

(1)

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

(1)

(d) Use your line of best fit to find an estimate of the cost of a picture with an area of 2500 cm^2.

£.....

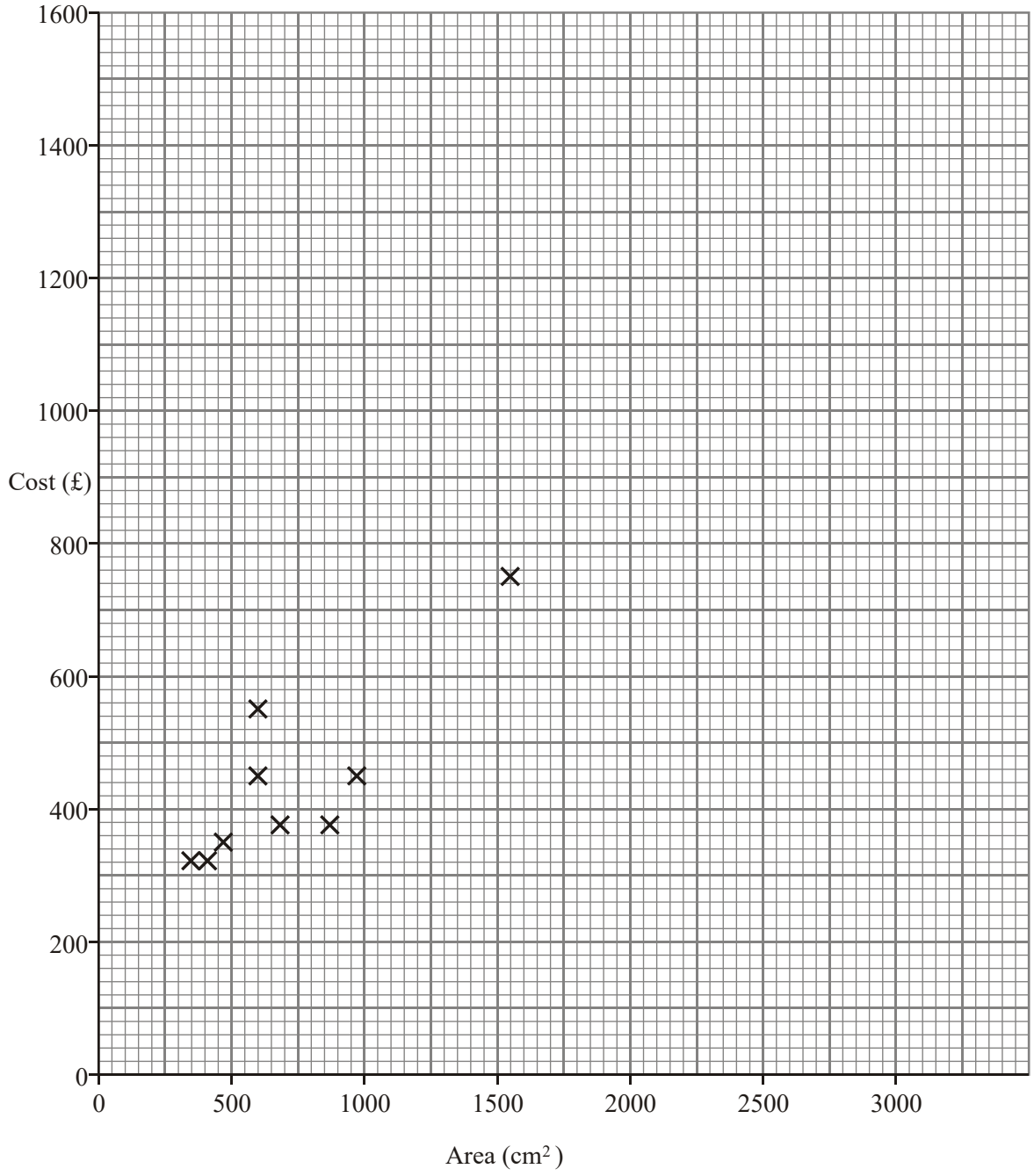
(1)

All Pablo's pictures are rectangles.
One of his pictures costs £1000.
Its length is 48 cm.

(e) Use your line of best fit to find an estimate for the width of the picture.

..... cm

(2)



(Total 6 marks)

5. Pablo is an artist.

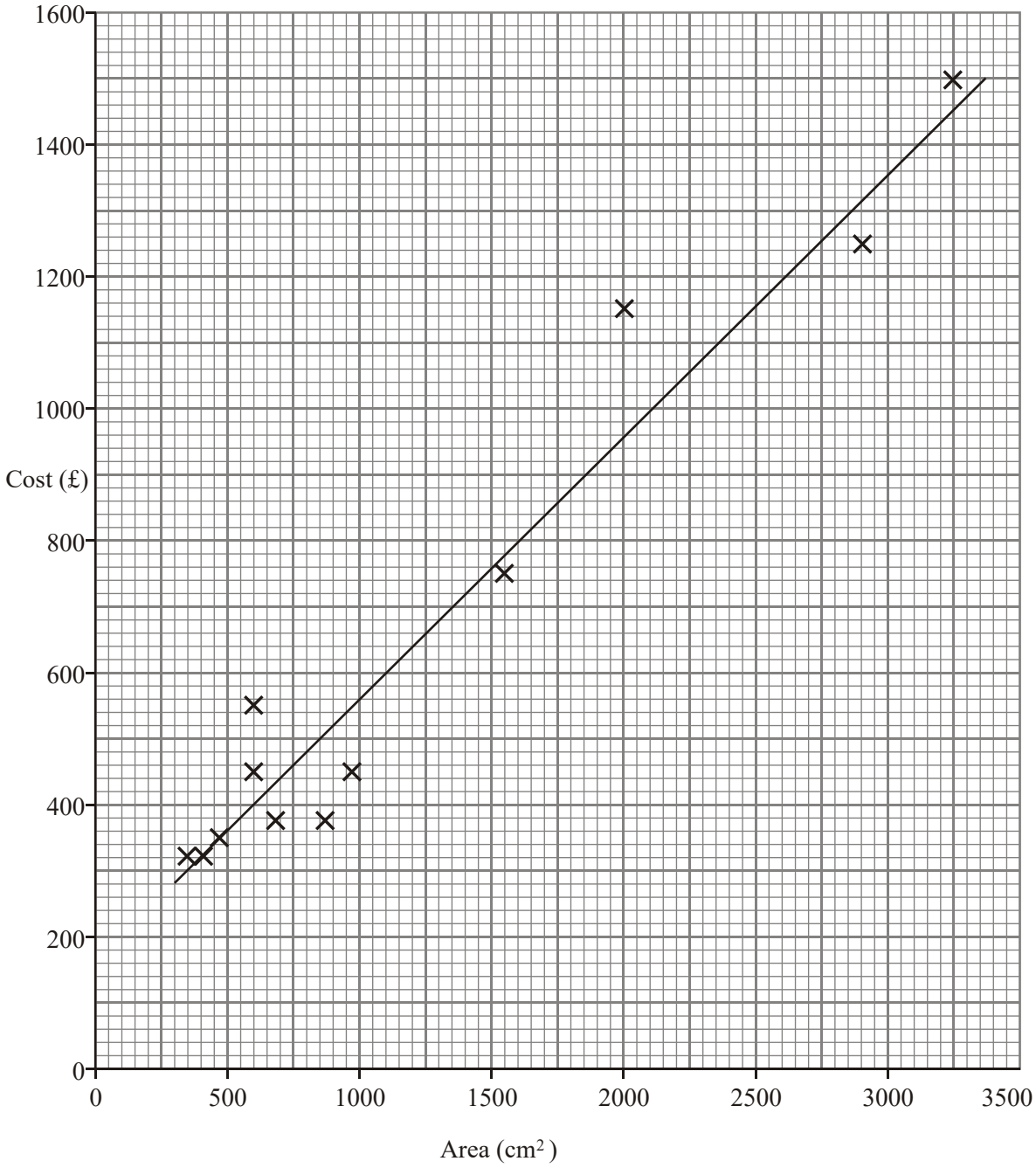
The scatter graph, below, gives information about the area and the cost of some of his pictures.

The line of best fit has been drawn on the graph.

All Pablo's pictures are rectangles.
One of his pictures costs £1000.
Its length is 48 cm.

Use the line of best fit to estimate the width of the picture.

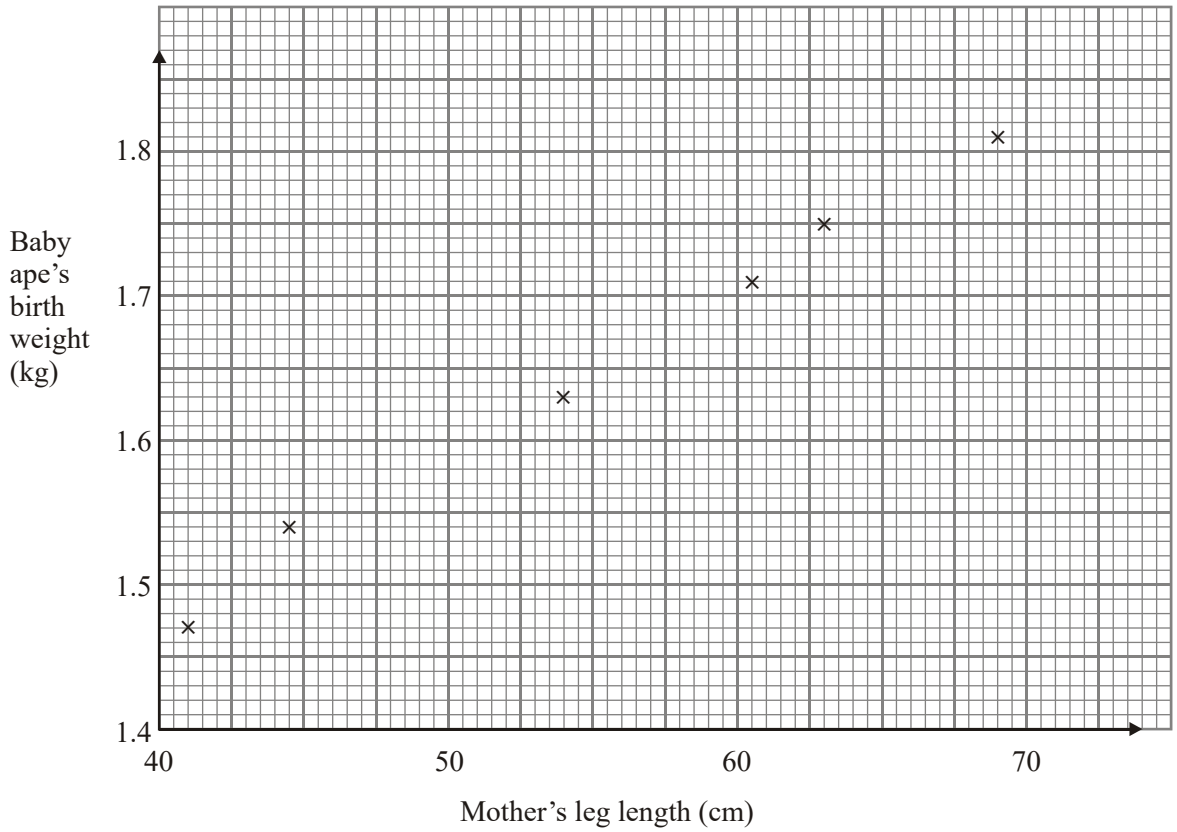
..... cm



(Total 2 marks)

6. The scatter graph shows some information about six new-born baby apes.

For each baby ape, it shows the mother's leg length and the baby ape's birth weight.



The table shows the mother's leg length and the birth weight of two more baby apes.

Mother's leg length (cm)	50	65
Baby ape's birth weight (kg)	1.6	1.75

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

(1)

(b) Describe the **correlation** between a mother's leg length and her baby ape's birth weight.

……

(1)

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

(1)

A mother's leg length is 55 cm.

(d) Use your line of best fit to estimate the birth weight of her baby ape.

……kg

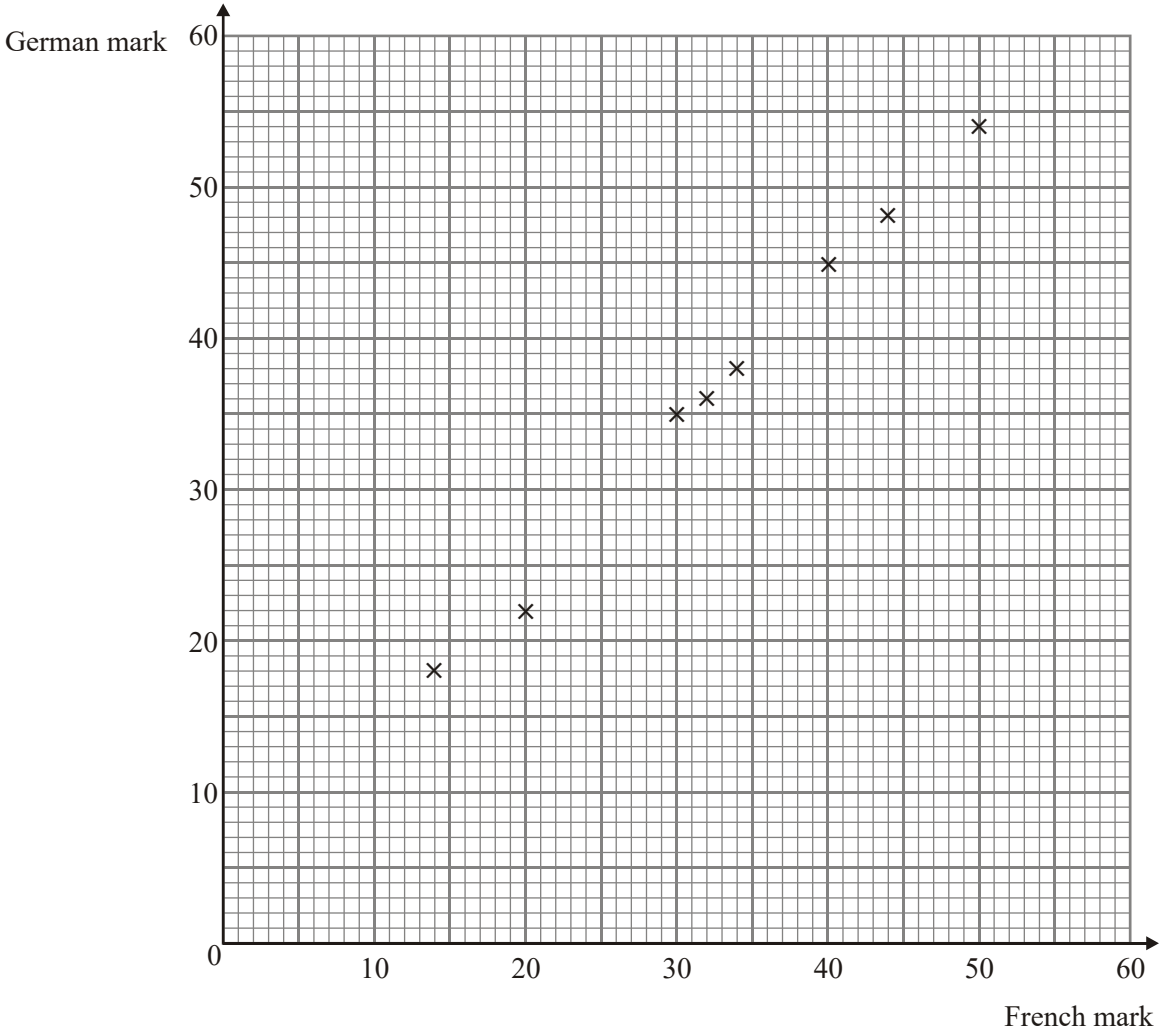
(1)

(Total 4 marks)

7. 10 students each took a French test and a German test.
The table shows their marks.

French marks	44	30	40	50	14	20	32	34	20	45
German marks	48	35	45	54	18	22	36	38	25	50

(a) Complete the scatter graph to show the information in the table.
The first 8 points in the table have been plotted for you.



(1)

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

.....

(1)

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

(1)

(d) Use your line of best fit to estimate

(i) the German mark for a student with a French mark of 26,

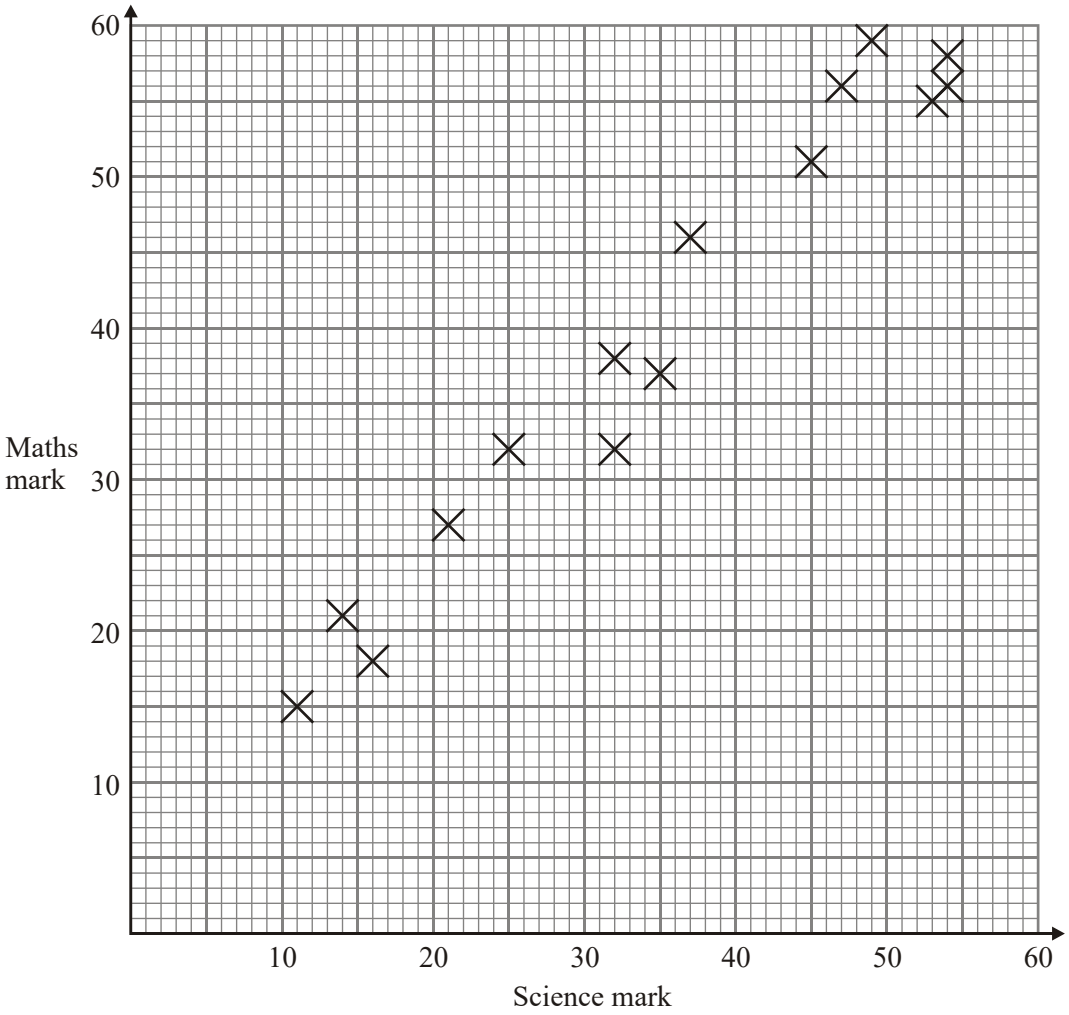
.....

(ii) the French mark for a student with a German mark of 43.

.....

(2)
(Total 5 marks)

8. The scatter graph shows the Science mark and the Maths mark for 15 students.



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

……

(1)

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

(1)

Sophie's Science mark was 42.

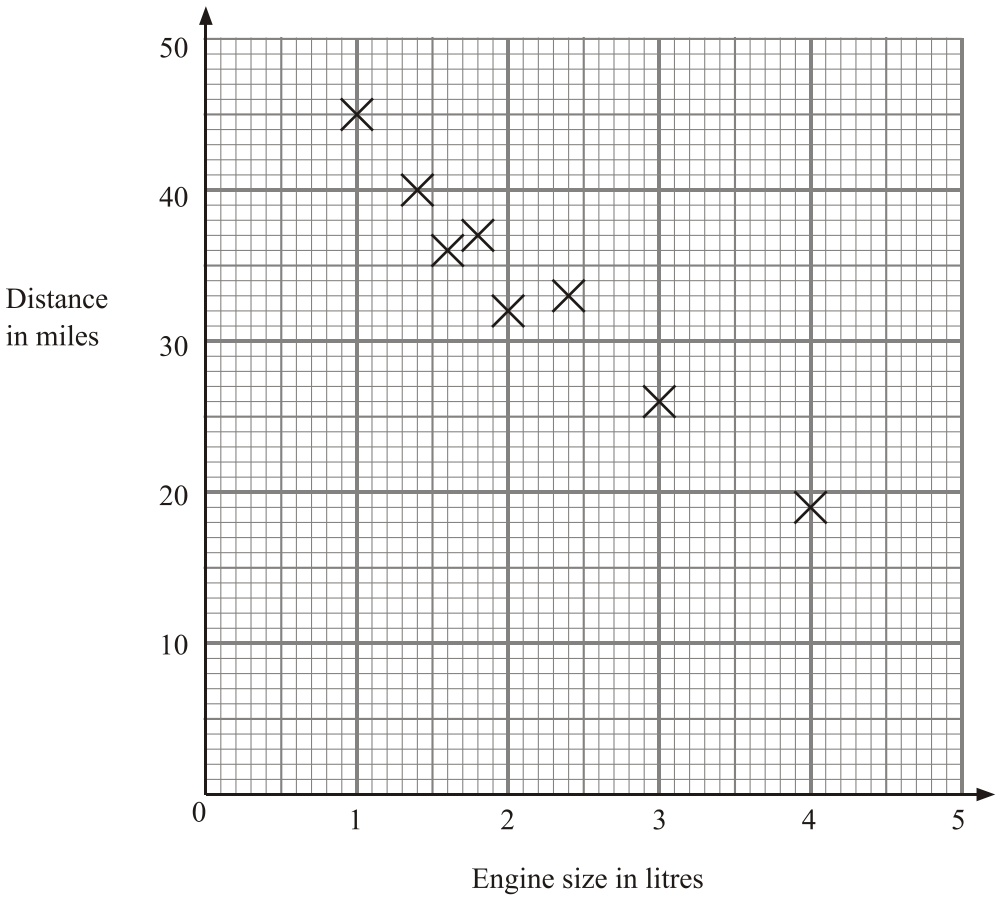
(c) Use your line of best fit to estimate Sophie's Maths mark.

……

(1)

(Total 3 marks)

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



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

.....

(1)

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

(1)

(c) Use your line of best fit to estimate

(i) the distance travelled on one gallon of petrol by a car with an engine size of 3.5 litres,

..... miles

(ii) the engine size of a car that travels a distance of 28 miles on one gallon of petrol.

..... litres

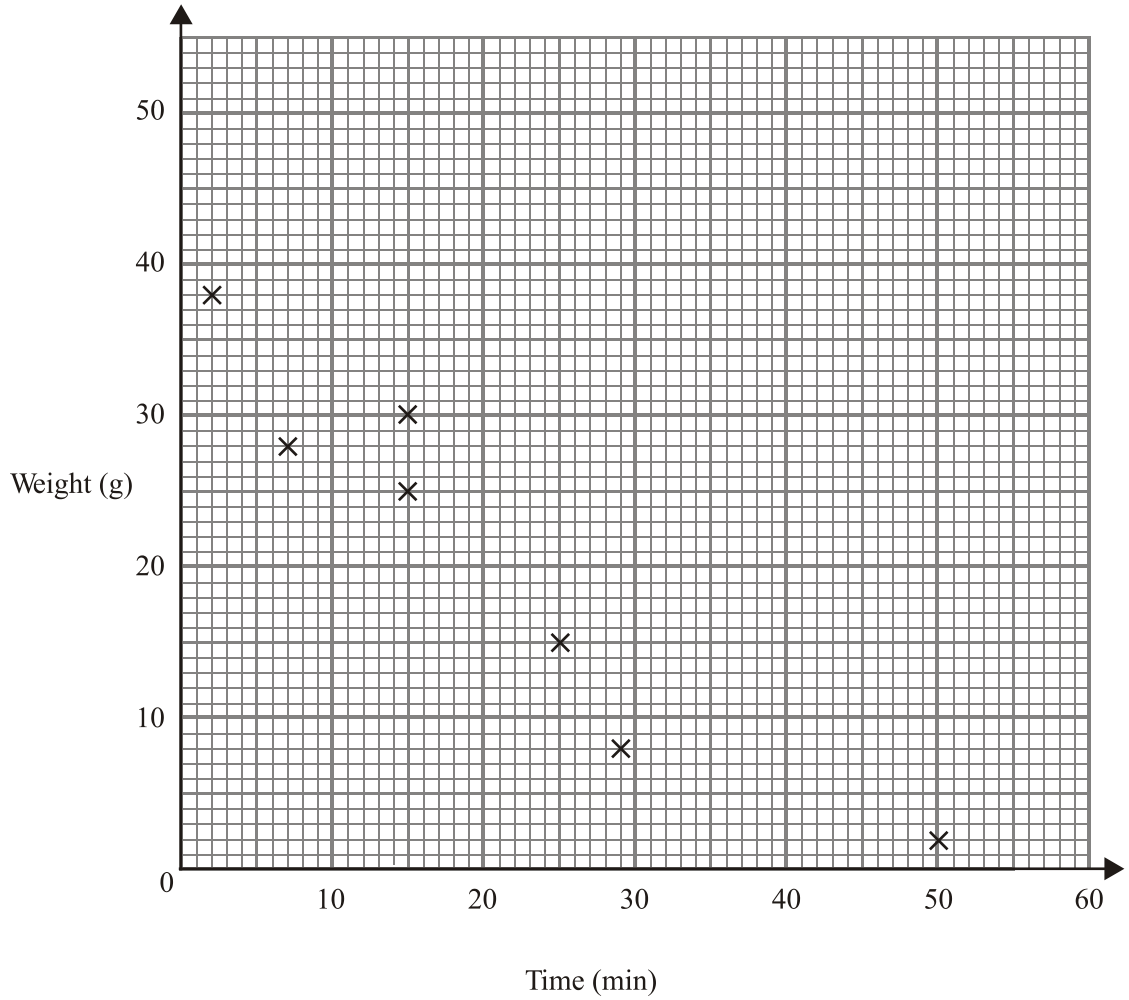
(2)

(Total 4 marks)

10. Identical candles were lit.
The table shows, for ten of these candles, the number of minutes each candle burnt before it went out and the weight left of each candle when it went out.

Time (min)	29	15	25	50	2	15	7	30	35	35
Weight (g)	8	25	15	2	38	30	28	20	15	12

(a) Complete the scatter graph. The first 7 points have been plotted for you.



(1)

(b) Describe the **correlation** between the time and the weight.

.....

(1)

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

(1)

A candle burnt for 20 minutes.

(d) (i) Use your line of best fit to estimate the weight of this candle when it went out.

..... g

Another candle had a weight of 10 g when it went out.

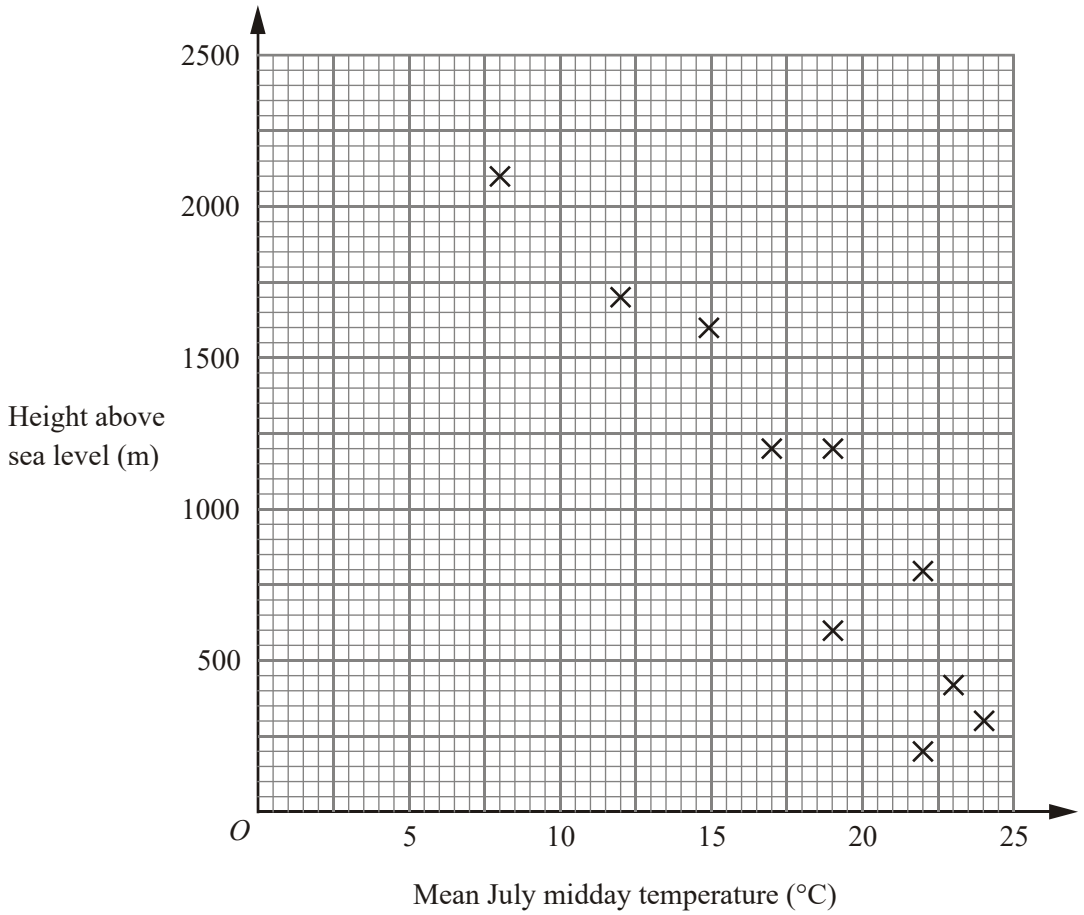
(ii) Use your line of best fit to estimate the number of minutes this candle burnt before it went out.

..... min

(2)

(Total 5 marks)

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



The table shows this information for two more weather stations.

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

(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 on the scatter graph.

(1)

A weather station is 1800 metres above sea level.

(d) Estimate the mean July midday temperature for this weather station.

..... °C

(1)

At another weather station the mean July midday temperature is 18°C.

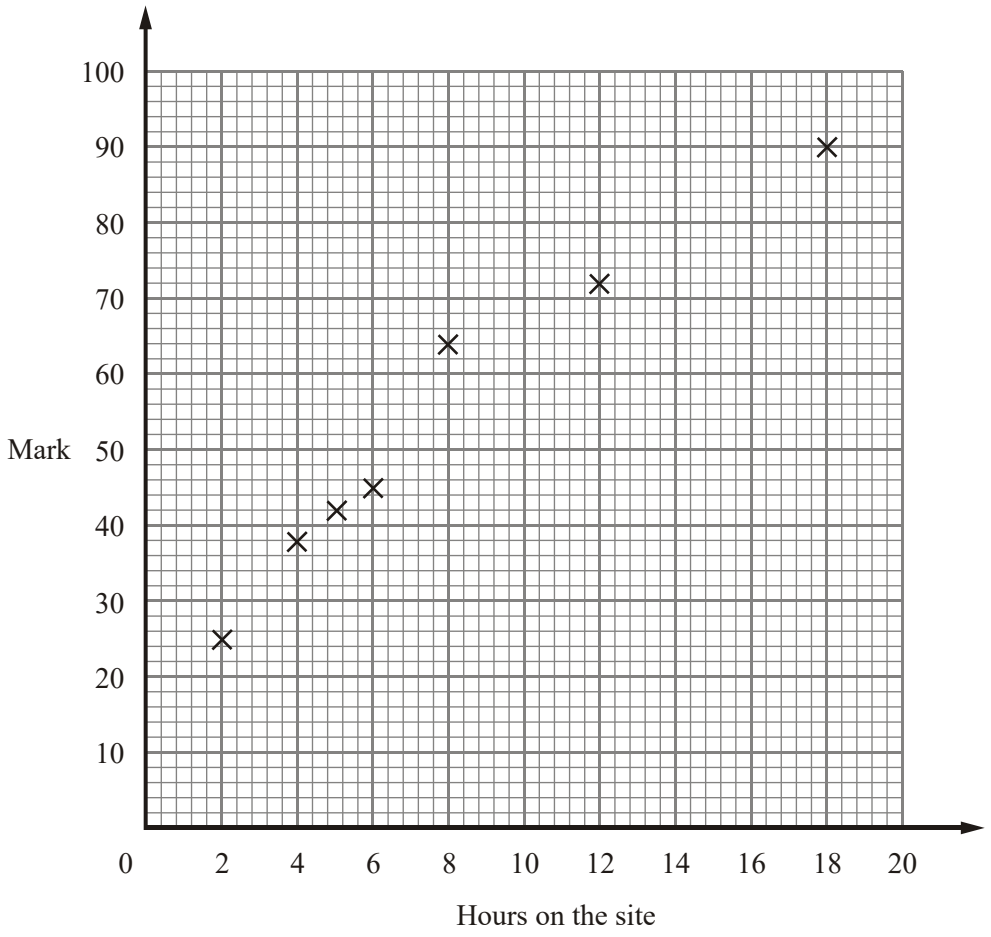
(e) Estimate the height above sea level of this weather station.

..... m

(1)

(Total 5 marks)

12. Some students revised for a mathematics exam.
They used an internet revision site.
The scatter graph shows the times seven students spent on the internet revision site and the marks the students got in the mathematics exam.



Here is the information for 3 more students.

Hours on the site	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?

.....

(1)

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

(1)

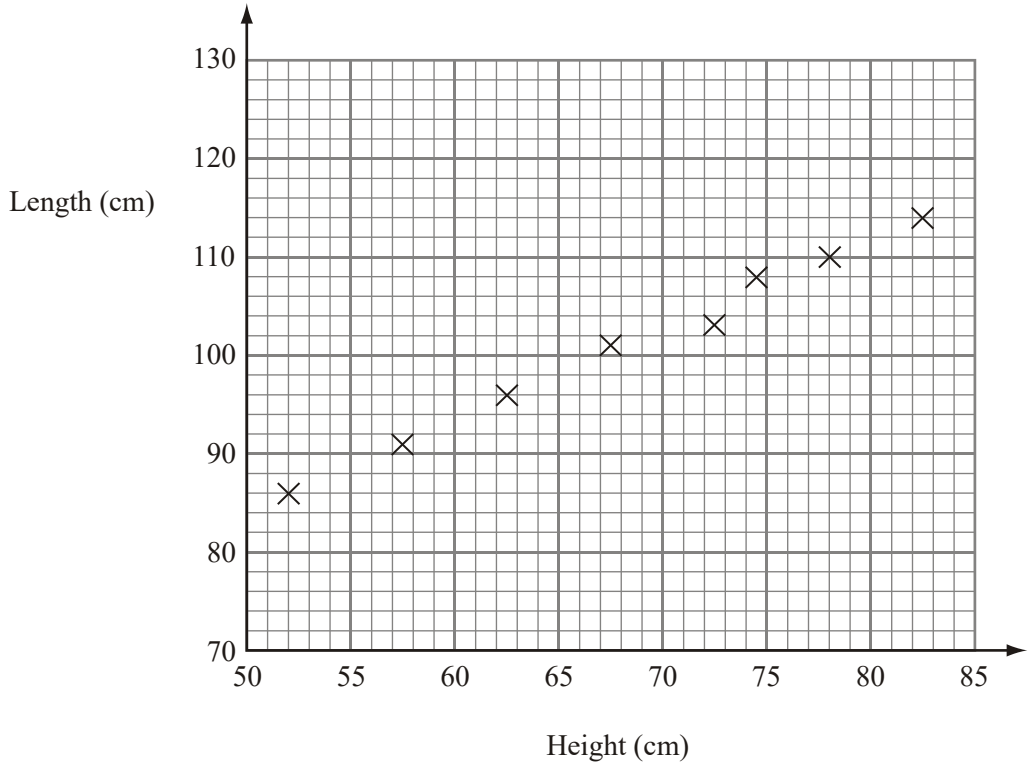
A student spent 11 hours on the internet revision site.

(d) Use the line of best fit to estimate this student's mathematics exam mark.

.....

(1)
(Total 4 marks)

13. 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.

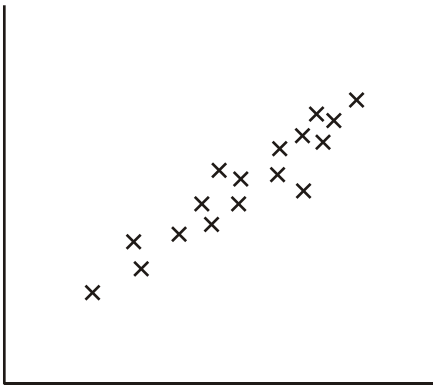
(c) Estimate the length of this sheep.

.....cm

(2)

(Total 4 marks)

14. Here is a scatter graph. One axis is labelled "Height".



Height

(a) For this graph, state the type of correlation.

……

(1)

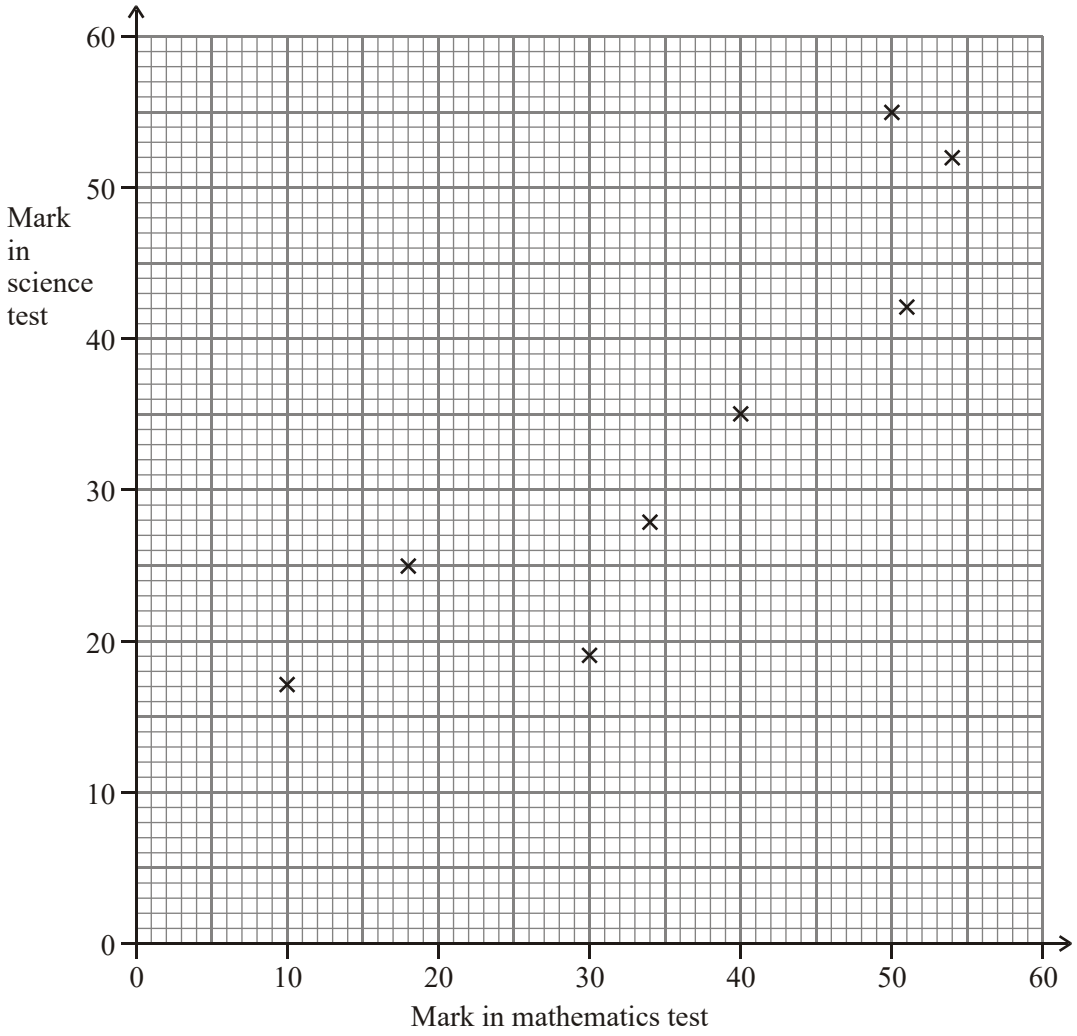
(b) From the list below, choose the most appropriate label for the other axis.

length of hair number of sisters length of legs GCSE French mark

……

(1)
(Total 2 marks)

15. Some students took a mathematics test and a science test.
The scatter graph shows information about the test marks of eight students.



The table shows the test marks of four more students.

Mark in mathematics test	14	25	50	58
Mark in science test	21	23	38	51

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

(2)

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

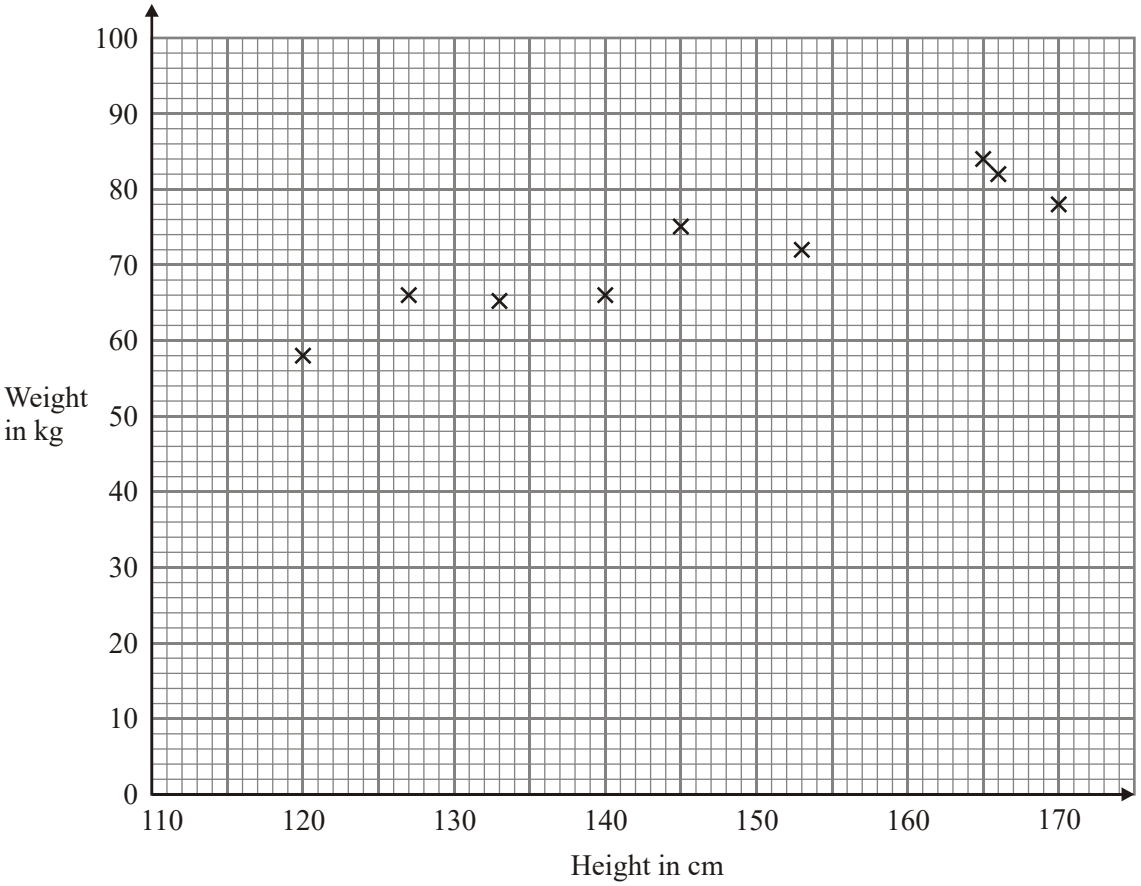
(1)

(c) Draw the **correlation** between the marks in the mathematics test and the marks in the science test.

…….

(1)
(Total 4 marks)

16. The scatter graph shows information about the height and the weight for nine students.



The table shows the height and the weight for three more students.

Height in cm	135	155	170
Weight in kg	70	75	85

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

(1)

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

.....

(1)

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

The weight of another student is 80 kg.

(1)

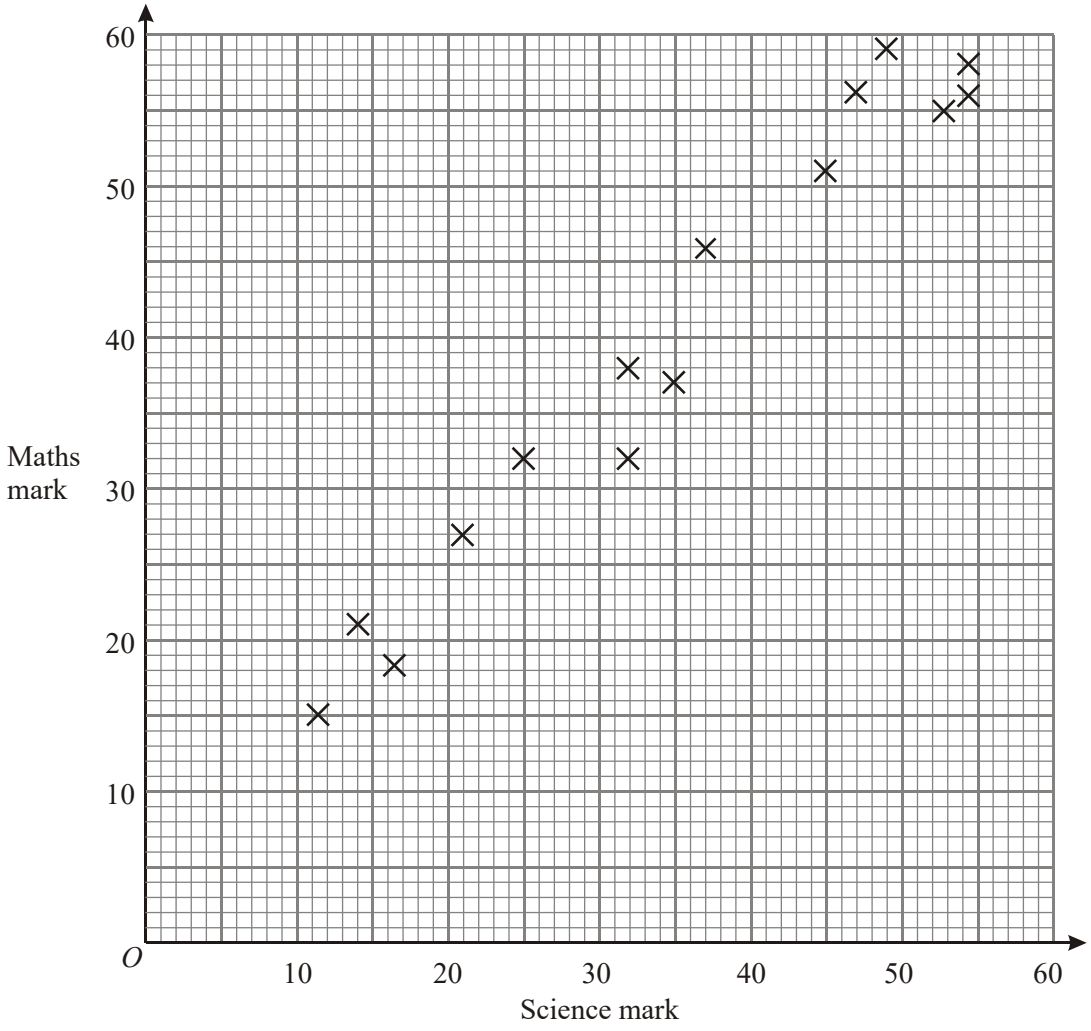
(d) Use your line of best fit to estimate the height of this student.

.....cm

(1)

(Total 4 marks)

17. The scatter graph shows the Science mark and the Maths mark for 15 students.



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

…….

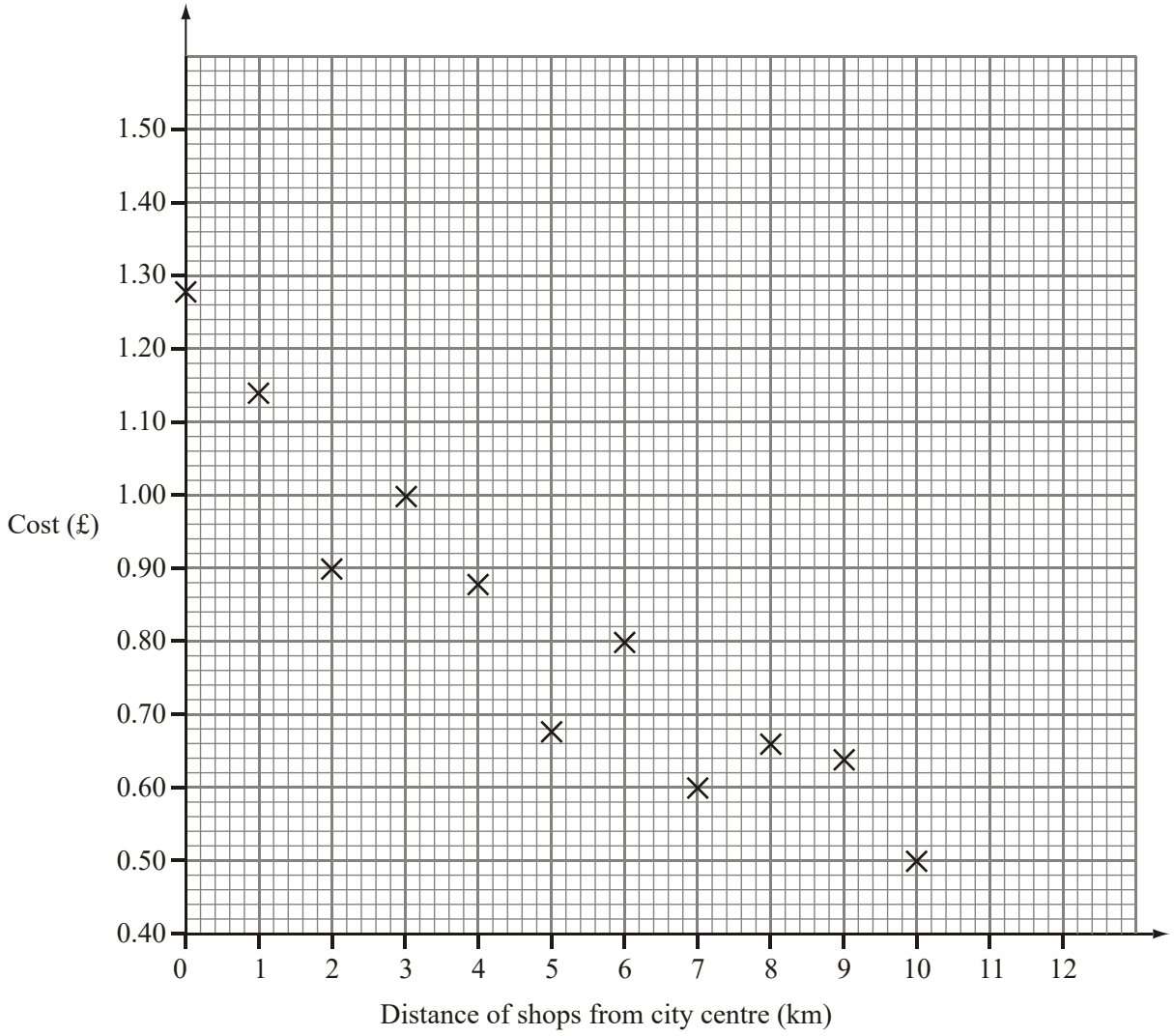
(1)

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

(1)
(Total 2 marks)

18. A one litre bottle of Holborn water costs £1.28 in shops in a city centre.
Shops outside the city centre also sell one litre bottles of Holborn water.

The scatter graph shows information about the costs of these bottles.



(a) Describe the relationship between the cost of a bottle of water and the distance of the shop from the city centre.

.....

.....

(1)

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

(1)

Sam buys a bottle of water in a shop 4.5 km from the city centre.

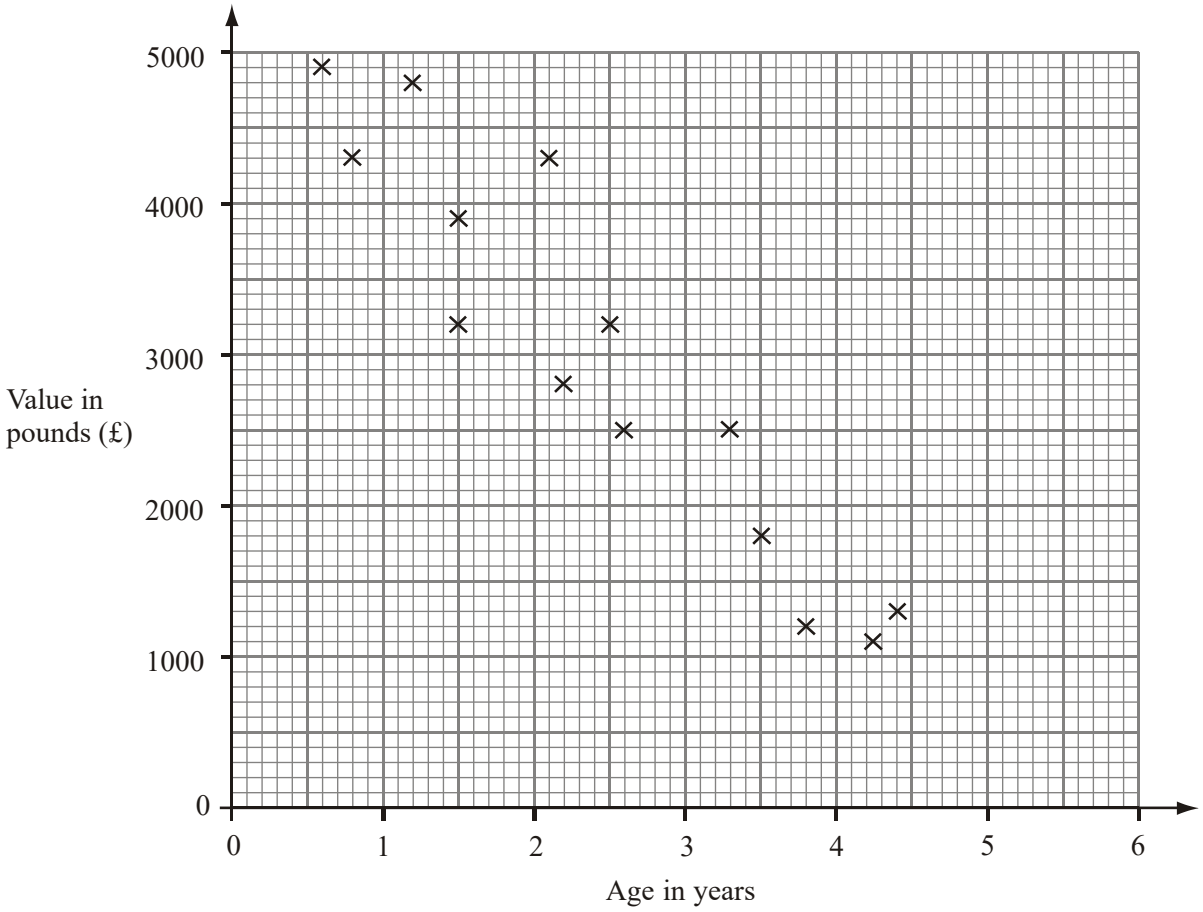
(c) Use your line of best fit to estimate the cost of this bottle of water.

£ .....

(1)

(Total 3 marks)

19. The scatter graph shows some information about the ages and values of fourteen cars.
The cars are the same make and type.



(a) Describe the relationship between the age of a car and its value in pounds.

.....

.....

(1)

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

(1)

A car is 3 years old.

(c) Use your line of best fit to find an estimate of its value.

£ .....

(1)

A car has a value of £3500

(d) Use your line of best fit to find an estimate of its age.

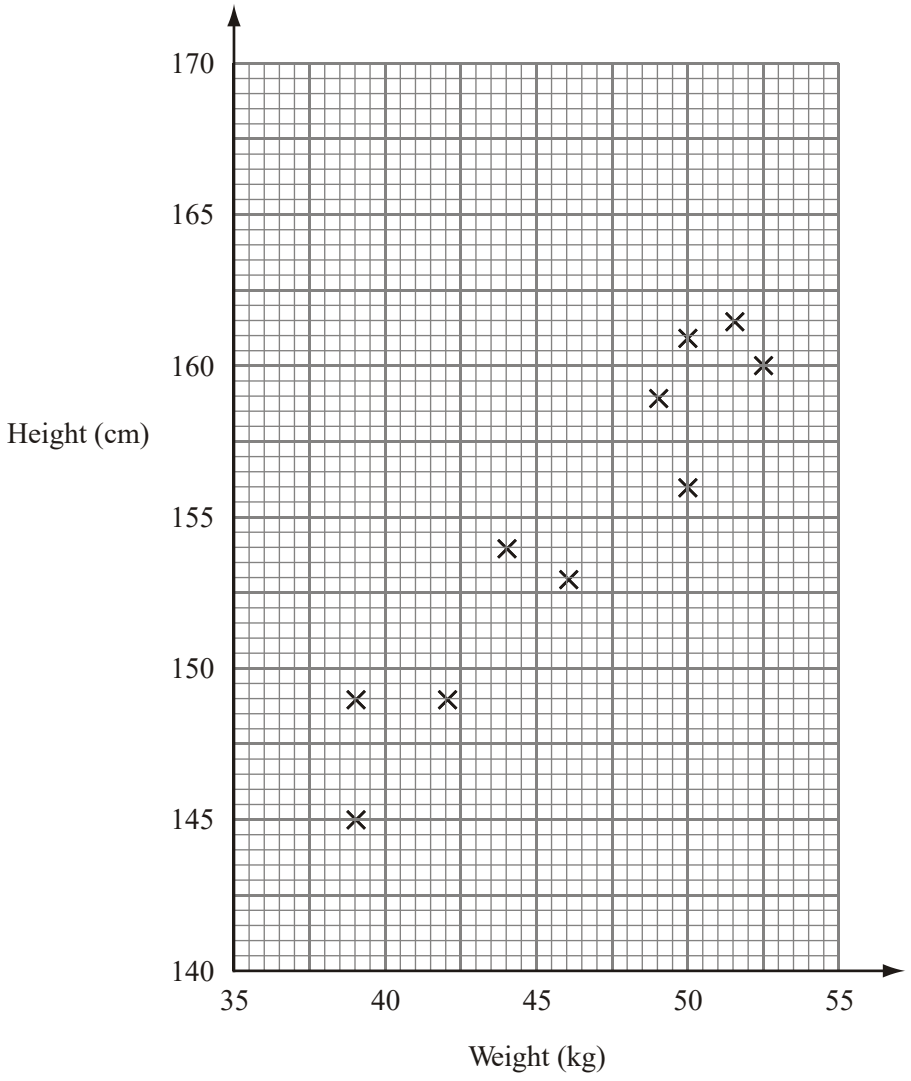
..... years

(1)

(Total 4 marks)

20. Jake recorded the weight, in kg, and the height, in cm, of each of ten children.

The scatter graph shows information about his results.



(a) Describe the relationship between the weight and the height of these children.

.....

.....

(1)

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

(1)

(c) Use your line of best fit to estimate the height of a child whose weight is 47 kg.

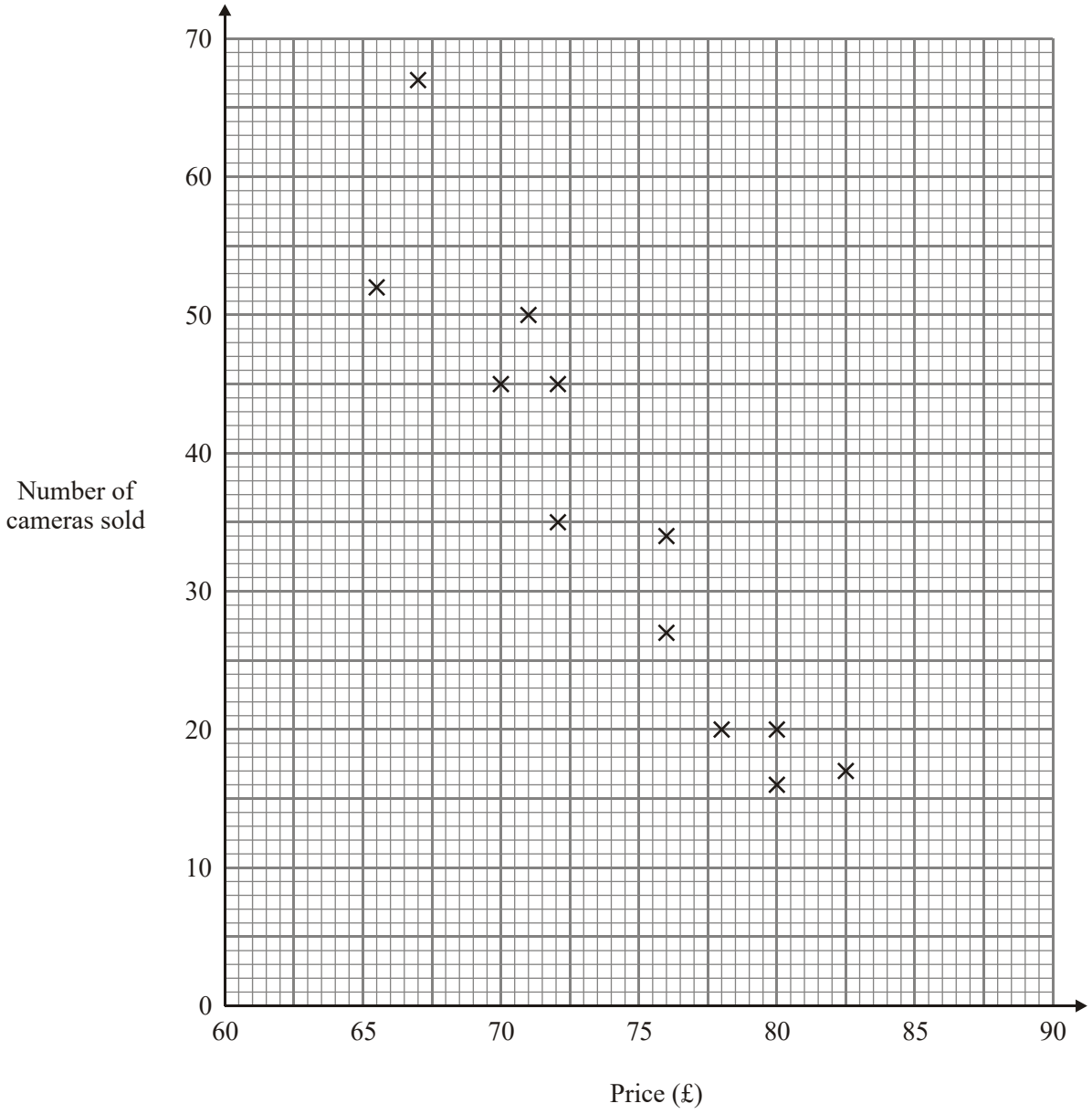
..... cm

(1)

(Total 3 marks)

21. A superstore sells the Clicapic digital camera.
The price of the camera changes each week.
Each week the manager records the price of the camera and the number of cameras sold that week.

The scatter graph shows this information.



(a) Describe the relationship between the price of the camera and the number of cameras sold.

.....

.....

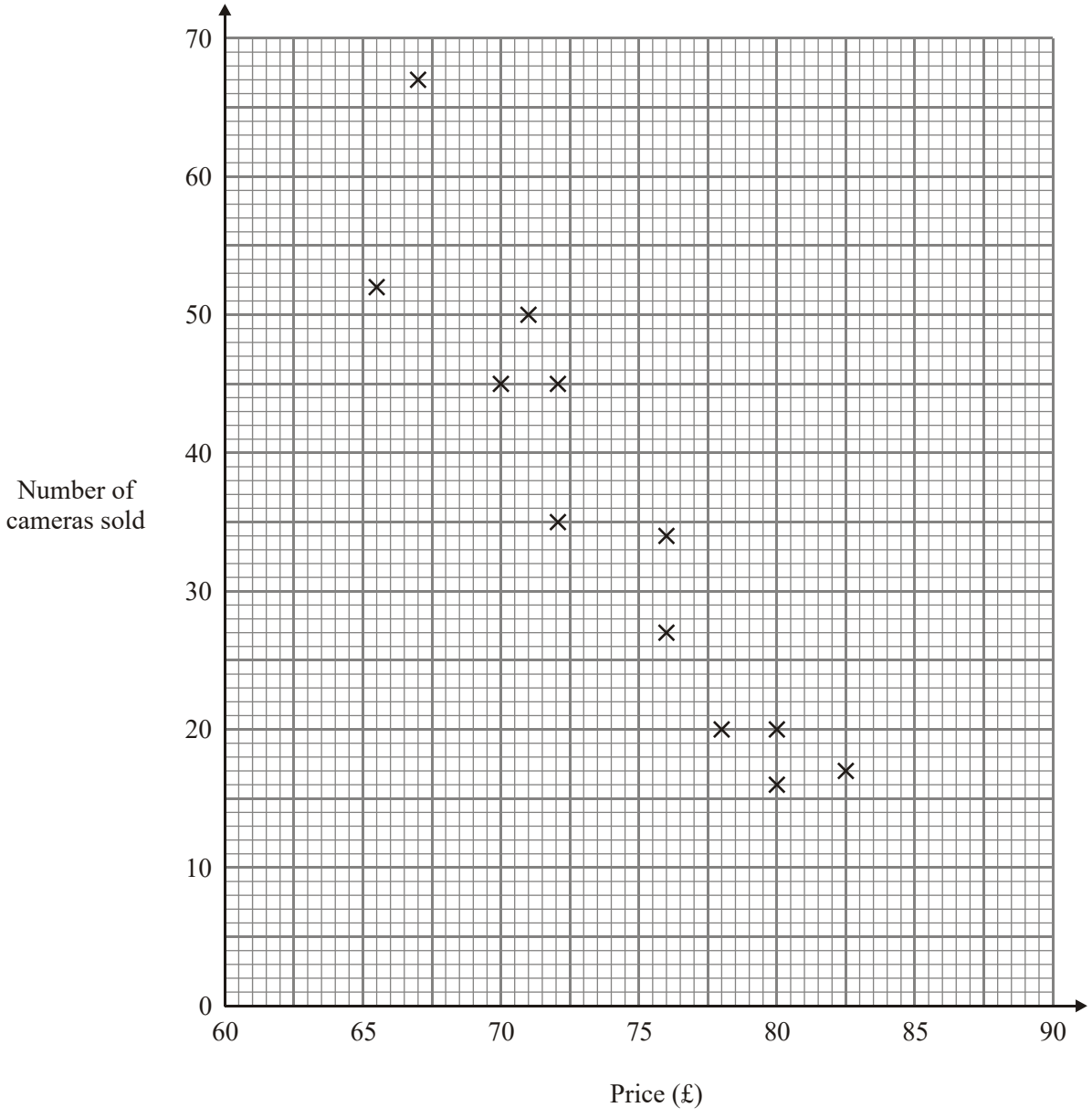
(1)

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

(1)
(Total 2 marks)

22. A superstore sells the Clicapic digital camera.
The price of the camera changes each week.
Each week the manager records the price of the camera and the number of cameras sold that week.

The scatter graph shows this information.



The table shows the prices and the numbers of Clicapic cameras sold during another 4 weeks.

Price (£)	67	70	75	80
Number of cameras sold	50	50	40	25

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

(2)

(b) Describe the relationship between the price of the camera and the number of cameras sold.

.....

.....

(1)

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

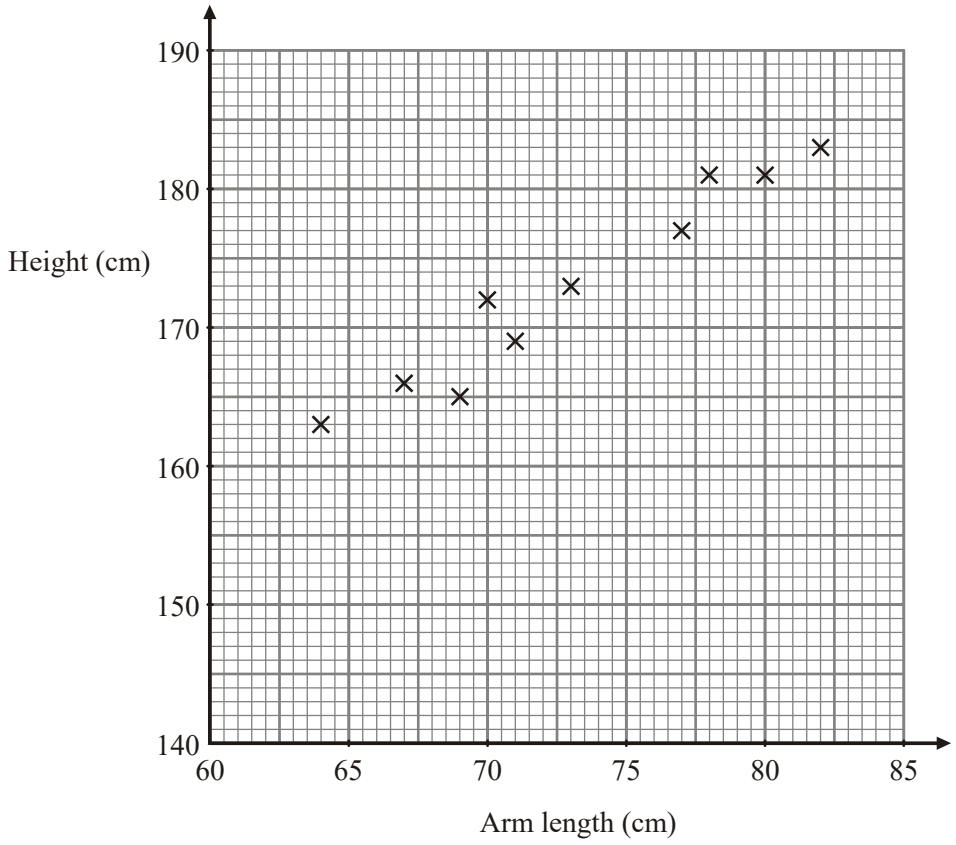
(1)

(d) Use your line of best fit to estimate how many cameras are sold in a week when the price is £74

.....

(1)
(Total 5 marks)

23. The scatter graph shows some information about 10 students.
It shows the arm length and the height of each student.



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

.....

(1)

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

(1)

Another student has an arm length of 75 cm.

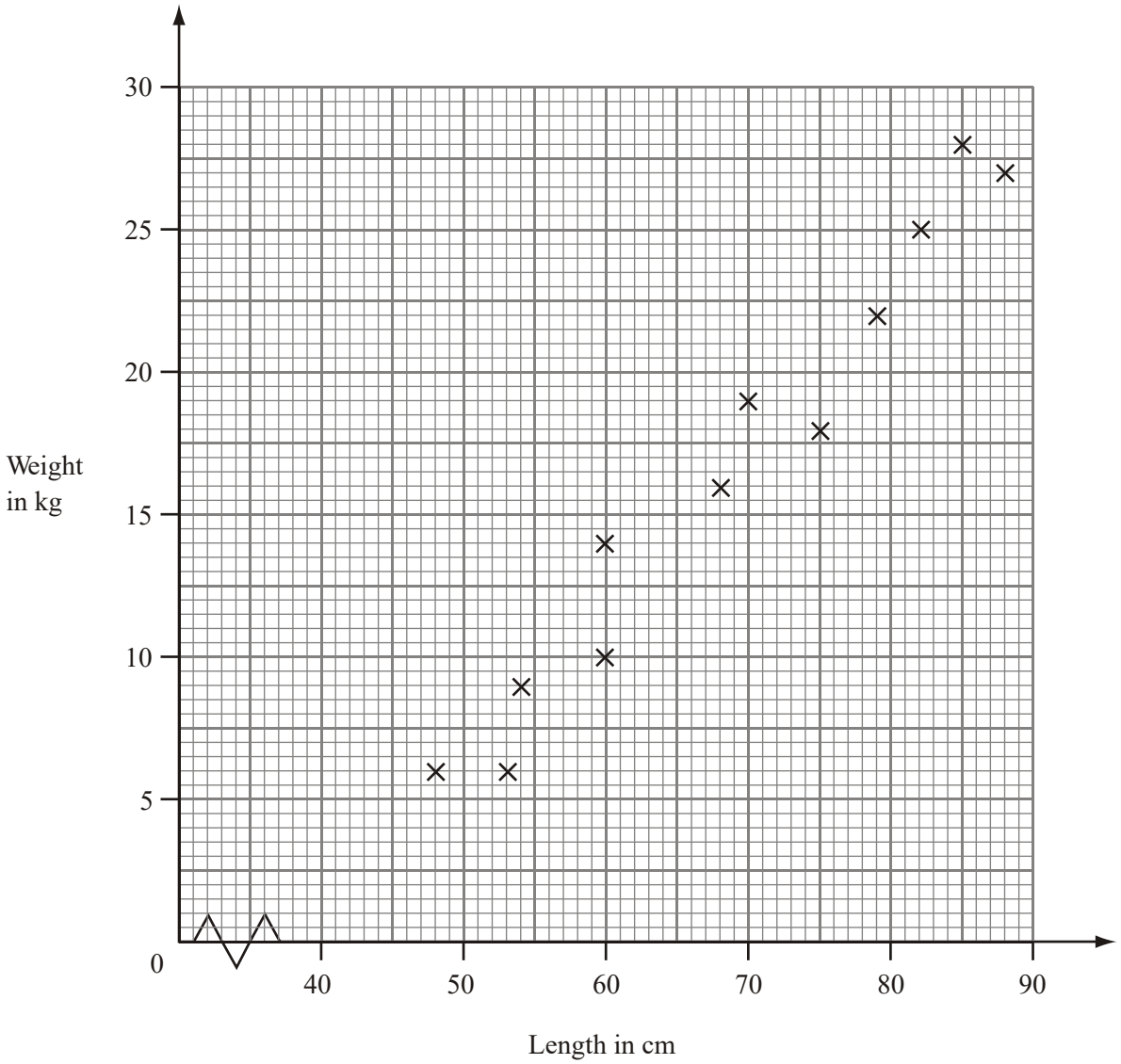
(c) Use your line of best fit to estimate the height of this student.

..... cm

(1)

(Total 3 marks)

24. Sanji goes fishing for pike.
The scatter graph shows information about the weights and the lengths of some of the pike Sanji caught.



(a) Describe the relationship between the weight and the length of these pike.

.....

(1)

Sanji also caught a pike of weight 24 kg and length 78 cm.

(b) Show this information on the scatter graph.

(1)

A pike has a length of 65 cm.

(c) Estimate the weight of this pike.

..... kg

(2)

(Total 4 marks)

01. (a) Negative 1

B1

(b) Line of best fit 1

B1 for line between (3, 1300) and (3, 1700) to (8, 250) and (8, 650)

(c) Estimate 1

B1 for 2.4 – 4.2 inclusive or f.t. from £1500 to line and down (± 1 square) 0

[3]

02. (a) Negative **or** as urban goes up, farming goes down 1

B1 cao oe

(b) Line within tolerance. 1

B1 for line within overlay lines, at least 10cm in length

(c) 35° farming 1

B1 ft ±½ dep on single straight line with negative gradient

[3]

03. (a) Plots 1

B1 cao

(b) description 1

B1 dynamic relationship or "positive" (correlation)

(c) line of best fit 1

Line within overlay region, and to the extent of.

(d) (i) reading 2

280 g →

B1 ft from single straight line of positive gradient (± 1/2 square)

(ii) reading

120 pages →

B1 ft from single straight line of positive gradient (± 1/2 square)

[5]

04. (a) Correct plots 1

B1 cao ± 1 for full square tolerance

(b) Description 1

B1 description of relationship or correlation

(c) LOBF 1

B1 between verticals: (3000, 1300),(3000, 1500) and (500, 200),(500, 400)

(d) (£1170) 1

B1 ft from lobf dep on a single straight line segment of positive gradient ± 1 full square (± 20)

(e) (43cm) 2

Read off at £1000 (2080) and then – 48

B2 for answers in the range 36 – 49
or M1 read off and – 48, ft from lobf dep on a single straight line segment of positive gradient ± 1 full square (± 20).
A1 ft or 36cm – 49cm

[6]

05. 43cm 2

Read off at £1000 (2100) and then – 48

M1 read off (2000-2200) and – by 48
A1 43.7cm - 44.8cm

[2]

06. (a) Points plotted 1

B1 ± 1 full (2 mm) square

(b) positive 1

B1 cao

(c) Line of best fit 1

B1 Must pass through (42.5, 1.45), (42.5, 1.55) AND (67.5, 1.75), (67.5, 1.85)

(d) ~1.65 1

B1 ft from single line segment with positive gradient ± 1 full (2 mm) square

[4]

07. (a) *B1 two points ± 1 full square tolerance* 1

(b) Positive 1

B1 for Positive; ignore "strong" etc

(c) *B1 for line of best fit which passes across (50, 50), (50, 60) and (20, 20), (20, 30)* 1

(d) French 26 → 29 – 32 2

B1 29–32 or ft (dep on a single straight line of positive gradient) ± 1 full square

German 43 → 38 – 41

B1 38 – 41 or ft (dep on a single straight line of positive gradient) ± 1 full square

[5]

08. (a) Positive 1

B1 for positive

(b) *B1 for correct line within (50, 50), (50, 60) and (10, 10), (10, 20)* 1
Do not accept line joining (10, 10) to (50, 50)

(c) approx 47 1

B1 ft for a single line segment with positive gradient ± 1 full (2mm) square

[3]

09. (a) negative 1

B1 cao

(b) line of best fit 1

B1 straight line passing between (4, 15) and (4, 20) and between (1, 40) and (1, 45)

(c) (i) ~22 2

B1 ft from single line segment with negative gradient ± 1 full (2mm) square

(ii) ~2.8

B1 ft from single line segment with negative gradient ± 1 full (2mm) square

[4]

10. (a) Points 1

B1 all three points ±1 full square

(b) Negative 1

B1 Negative (ignore additional descriptors unless contradictory)

(c) lobf 1

B1 A single straight line drawn to cross between (5, 30), (5, 40) and (40, 0), (40, 15); accept freehand if considered to be straight.

(d) (i) 18 – 25

B1 18g – 25g inclusive or if not in this range ft ±1 square dep on single straight line with negative gradient.

(ii) 30 – 40 2

B1 30 – 40 min inclusive or if not in this range ft ±1 square dep on single straight line with negative gradient

[5]

11. (a) Points plotted 1

B1 points plotted ±1 full smallest square tolerance.

(b) Negative 1

B1

(c) lobf 1

B1 lobf that goes between (8, 2000) and (8, 2400) and between (24, 0) and (24, 500)

(d) 11-13 1

B1 11-13 or ft (tol ± 1 square) from single straight line segment with a negative gradient

(e) 850-1150 1

B1 850-1150 or ft (tol ± 1 square)) from single straight line segment with a negative gradient

[5]

12. (a) 3 plotted correctly 1

B1 ± 1square

(b) Positive 1

B1 for positive (correlation)

(c) LOBF 1

B1 for line within guidelines; line goes from between (2, 18) and (2, 32) to between (16, 78) and (16, 90)

(d) 62 – 67 1

B1 for 62 – 67 OR ft from a single straight line graph of positive gradient ± 1 square

[4]

13. (a) (65, 100), (80, 110) plotted 1

B1 for plotting both points (65, 100), (80, 110) correctly (tolerance one square); ignore any additional plots given.

(b) positive (correlation) 1

B1 for positive (correlation) or length increases with height oe

(c) 105 – 110 2

M1 for a single line segment with positive gradient that could be used as a line of best fit or a vertical line from 76
A1 for given answer in the range 105 – 110

[4]

14. (a) Positive 1

B1 cao

(b) length of legs 1

B1 cao

[2]

15. (a) Points plotted 2

B2 for 4 points plotted correctly
(B1 for 2 or 3 points plotted correctly)

(b) Line drawn 1

B1 for line within overlay extending from 20 to 50 on the maths axis

(c) Positive 1

B1 for positive correlation

[4]

16. (a) plots (135, 70), (155, 75),(170, 85) 1

B1

(b) positive 1
B1

(c) line of best fit 1
B1 for line passing between (170, 90) – (170, 70) and (120, 50) – (120, 70) and at least 2 points on each side of the line

(d) reading at 80 down 1
B1 ft from "line of best fit" ± ½ square

[4]

17. (a) Positive 1
B1 for positive

(b) *B1 for correct line within (50, 50), (50, 60), (10, 10) (10, 20)* 1
Do not accept line joining (10, 10) to (50, 50)

[2]

18. (a) Cost is less the further you are from the city centre 1
B1 for decrease in cost with increase in distance. Accept negative correlation

(b) Line between (1, 1.00), (1, 1.20) and (9, 0.45), (9, 0.64) inc 1
B1 for a straight line within guidelines with at least 2 points on either side of the line

(c) Their reading for 4.5 km 1
B1ft for a reading for the cost (± 1 square) from "line of best fit" at 4.5 ± 0.1
(dep on a straight line of negative gradient in (b))

[3]

19. (a) Description 1
B1 for e.g. the older the car, the less its value, Negative correlation

(b) Line of best fit 1
B1 for line (1, 4200 to 4700) to (4, 1000 to 1600)

(c) Estimate at 3 yrs 1

B1 ft from their line ± ½ square
If no line drawn accept value in range 2200 – 2500

(d) Estimate at £3500 1

B1 ft from their line ± ½ square
If no line drawn accept value in range 1.8 to 2.1 inc

[4]

20. (a) height increases with weight 1

B1 for increase in height with weight
(accept positive correlation)

(b) line of best fit drawn (overlay) 1

B1 for line between (40,145) and (40, 150) and between (50, 156) and (50, 161)

(c) 1

B1if 152.5 – 157.5 seen or ft from their line dependent on positive gradient

[3]

21. (a) As the price increases the number of cameras sold decreases. 1

B1 for decrease in number sold with increase in price oe
(accept negative correlation)

(b) Line of best fit 1

B1 for line within given limits passing between (70, 40) & (70, 55) and between (80, 15) & (80, 30)

[2]

22. (a) (67, 50), (70, 50), (75, 40), (80, 25) 2

B2 for 4 points plotted correctly (allow ±2 mm tolerance)
(B1 for 2 or 3 points plotted correctly)

(b) As the price increases the number of cameras sold decreases 1

B1 for decrease in number sold with price.
(accept negative correlation)

(c) line of best fit 1

B1 for line within given limits passing between (70, 40) & (70, 55) and between (80, 15) & (80, 30)

(d) 35 – 39 1

B1 for 35 – 39 or ft their line of best fit from 74 (allow ±2 mm tolerance)

[5]

23. (a) Positive 1

B1 cao (Accept +ve)

(b) Line of best fit 1

B1 for a straight line passing between (65, 160) and (65, 166) and between (80, 178) and (80, 184)

(c) 173 – 176 1

B1 for 173 – 176 or ft from a single line segment with positive gradient ± 1 full (2mm) square

[3]

24. (a) Positive correlation, or the heavier the pike the longer it is. 1

B1 for positive correlation, or the heavier the pike the longer it is. (or equivalent) B0 for positive (relationship)

(b) Point plotted correctly 1

B1 for a correct plot ±1 square

(c) 12-17 kg 2

B2 for an answer in the range 12 to 17 kg inclusive
OR
M1 for drawing a line of best fit or vertical line drawn from 65 cm
A1 for an answer in the range 12 to 17 kg or ft from "line of best fit"

[4]

01. Just over half of candidates correctly stated that the type of correlation was negative to gain the mark available in part (a). The most common incorrect answer was "positive" but a significant minority of candidates did not answer this part of the question. Candidates are to be congratulated on their ability to draw suitable lines of best fit in their responses to part (b) of the question. The ability of students to carry out this procedure continues to improve.

Candidates could usually give an acceptable estimate for the age of a motorcycle costing £1500. Answers rounded down or up to a whole number of years were accepted in this context.

02. A surprising number of candidates found difficulty in finding the relationship, preferring to describe a single point, or making speculative statements about people living in towns and on farms. Nearly all candidates drew a single straight line (of negative gradient) as a line of best fit, and then went on to use this to accurately read off a value.

03. **Paper 2**

There was wide variation in the success achieved on this question. The points were often plotted accurately; if one error was made it was usually with (105, 210), which was frequently plotted at (110, 210).
"Positive" was accepted as a description of the relationship, as were statements like "As the number of pages increases, so does the weight." Statements such as "Books with a large number of pages are heavy" were not accepted.
Most of those who drew a line of best fit used it successfully to answer the final part.

Paper 4

Most candidates scored the mark for plotting, the only one causing a problem was (105, 210). Few candidates were unable to give an appropriate description for the relationship. The line of best fit was also well drawn by most candidates. The only common error here was in starting their line of best fit from the bottom corner (60, 160), or attempts to put in a free-hand line. There was some mis-reading of the scale, but in this question most candidates took care to be accurate in taking readings, many drawing in lines to assist them, which did help. Overall a well-answered question.

04. Candidates clearly felt on more familiar territory with this question: over $^{2}/_{3}$ of candidates gained all the marks in parts (b), (c) and (d). Candidates who failed to get the mark for a line of best fit clearly did not understand what was needed, drawing the line well away from the given points (plotting in (a) was not a distracter) or not drawing a single line at all. It was pleasing to find so many candidates accurately reading off the line using the correct scale. Unfortunately many of these seemed unable to use the scale correctly in part (a), and therefore lost the mark for incorrect plotting. In part (e) the common error was to find candidates merely writing down the value from the graph, without dividing by the given value of 48. Again, trial and improvement methods were common, where candidates tried various multiples of 48 without doing a division.

05. Candidates were expected to use the given line of best fit to estimate the area of a picture costing £ l 000. They then had to divide the estimated area by 48 in order to find the length of other side of the rectangular picture. Most candidates were clear on what was required and achieved an answer in the required range.

06. **Specification A**

Foundation Tier

A large number of candidates plotted the points accurately in part (a). If one error were made, it was usually with (65, 1.75). In part (b), candidates were more likely to describe the relationship than the correlation; this received no credit. The term "positive" was required. In part (c), there were many lines of best fit which were within the permitted tolerance but there were also many curves and zig-zags joining all the points. Although, in this case, an acceptable line of best fit could pass through the origin, candidates should not assume that a line of best must do this.

Intermediate Tier

This as a well answered question. Most were able to plot the points correctly, the most common error caused by plotting (65, 1.75) incorrectly. In part (b) some candidates described a relationship rather than the correlation. The quality of the lines of best fit was very good this year, with far fewer attempting to connect the points together, though a significant minority continue to want to draw the line from the origin. Most candidates could also read off from their line quite accurately in part (d), the only common error was reading off from 52.5 rather than 55.

Specification B

The two points were usually plotted accurately although it was not uncommon to see the point (65, 1.75) plotted at the point (62.5, 1.75) in part (a).
In part (b) many candidates described the relationship between the two variables instead of commenting on the correlation.
Lines of best fit were usually within guidelines. Lines starting at the point (40, 1.4) was the major reason for loss of the mark in part (c). There was evidence in this part of the question that some candidates did not have access to a ruler.
Use of the line of best fit was generally good, however it was not uncommon for a leg length of 52.5 cm to be used instead of 55 cm, showing a lack of care with the scale on the horizontal axis.

07. Most candidates gained the marks in parts (a) to (c). Points were rarely plotted incorrectly, the first mark being lost mainly by those who failed to attempt to plot the points at all. Lines of best fit were good, with few merely joining the points together. Many read from their graphs accurately, the only common error being to read from a German mark of 26 instead of a French mark of 26.

08. Foundation Tier

Candidates obviously understood the concept of correlation from their handling data coursework and 57% of them were able to draw the line of best fit on their graph. However only 23% understood it was positive correlation and only 34% could read off from their line of best fit.

Intermediate Tier

All three parts of this question were answered very well. In part (a) the majority of candidates identified the correlation as positive but there were a variety of incorrect responses, including 'good', 'strong' and even 'negative'. Despite the relatively small space in which to respond, some described the relationship between the Maths mark and the Science mark. Most candidates drew an acceptable line of best fit in part (b) although some lines were too short. A common error in part (c) was to give the Science mark corresponding to a Maths mark of 42. Some candidates showed a correct method but were careless in reading the scale, writing 37 or 57, for example, instead of 47.

09. This question was answered well. The majority of candidates showed awareness that 'positive' or 'negative' is required when describing correlation and that a straight line is required when drawing the line of best fit. The most common error in part (a) was to identify the correlation as positive. In part (b), the lines of best fit were generally well drawn with a ruler and within the bounds required. Some were outside the bounds because candidates drew the line to go through one of the corners of the grid. Most candidates were able to read accurately from their line of best fit in part (c). Some misread the vertical scale, giving, for example, 20.4 instead of 24

10. Foundation Tier

This question was quite well attempted by candidates of all abilities. It provided the opportunity even for weaker candidates to gain an easy mark for plotting the three points in part (a). Unfortunately, some candidates had apparently not seen the demand and did not plot any points. A good proportion of candidates were able to correctly describe the correlation and the line of best fit was well attempted with most candidates drawing the line within the tolerance allowed. Most candidates were able to give reasonable estimates for the weight and number of minutes requested in part (d) of the question.

Intermediate Tier

Most plotted the points, but it was surprising that a significant minority failed to attempt to plot the points, and moved straight on to the line of best fit. In part (b) "Negative" was prevalent; describing the relationship rather than stating the correlation did not earn the mark. There were fewer occasions where candidates merely joined the points for the line of best fit, and fewer curves. Some lost marks through failing to draw lines that were long enough, or giving lines that were well outside the range of points.

Part (d) was well answered, but probably because the sampling on the axes was simple in this question.

11. There was a lot of careless plotting where the point at $x = 22$ was plotted wrongly at $x = 21$. Most candidates knew this was negative correlation although a few tried to give a description. The line of best fit was generally well drawn although in some cases it was too short. Most candidates knew and could apply the technique of reading off values from the diagram.

12. **Foundation**

In part (a) the plotting was generally good with many scoring the available mark. Those that did not, tended to plot the first point incorrectly.

There was a mixed response to part (b). Although 'positive' was often seen, many described the correlation in terms of a relationship rather than stating the type of correlation.

Many drew straight lines in part (c) and most of these fell within the guidelines. Those that failed to score often went through the origin or were more or less steep than what was required. Zigzag lines were produced by the weaker candidates showing a real lack of understanding of what was required.

The reading of the exam mark from 11 hours in (d) was often well done although quite a few candidates did leave this blank.

Higher

A standard scatter graph which was attempted successfully by most candidates. There were a few errors in plotting but most knew it was a positive correlation, although occasionally candidates offered 'increase' or chose to describe the change in mark as the hours increased. Most lines of best fit were well within the allowed tolerance and produced acceptable estimates for part (d).

13. Most candidates gained marks in this question. Plotting was done in part (a) with relative ease, but the descriptions in part (b) sometimes lost marks because they were not general enough: commenting on a single point will not earn the mark. In part (c) candidates were expected to make a reasonable estimate which in many cases gained marks, with or without a line of best fit. In some cases it was cleat the candidate was filing to see their answer within the context of the problem, for example giving an answer less than 70.

14. There was a good level of knowledge shown in this question, with the majority of candidates recognising positive correlation. In part (b) the correct answer was the most common one seen, but a significant number of candidates gave one of the other answers.

15. The scatter diagram was not well handled with very few candidates scoring all four marks. The plotting of points in part (a) was badly done by a significant number of candidates along with a lack of accuracy in placing the points despite the straightforward scale on the axes. Many confused the axes plotting the mathematics test mark vertically. Many candidates did not understand the concept of a line of best fit and joined all the points with a zigzag line. Recognition of a positive correlation was rare with the answer line frequently left blank or a complex description given which did not relate to the question being asked.

16. The points generally plotted well with ¾ of the candidates scoring the available mark. In part (b) candidates mostly described the relationship as 'taller are heavier' with only a fifth of the candidates understanding that the scatter graph showed a positive correlation. Over half the candidates were not able to draw a reasonable line of best fit. Many joined all the points with straight lines or curves. These candidates very often described the correlation in part (b) as 'zigzag'.

Most candidates attempted part (d) but even when the correct line was drawn in at 80 to their line of best fit, candidates found it very difficult to read down accurately. However nearly a third of the candidates were able to score the mark from correctly reading the value from their (straight) line of best fit.

17. This question was answered well with the majority of candidates correctly describing the correlation in part (a), although there was a variety of spelling alternatives for "positive". In part (b) the line of best fit was usually accurately drawn. Many assumed that the line started at the point (0, 0) and lost the mark if their line was not within acceptable tolerance. Freehand drawn lines often failed to score.

18. Over 70% of the candidates recognised that the further you went from the city centre, the cheaper the cost of the water or the closer you were to the city centre the dearer the water became, enabling them to score the available mark. Some candidates only mentioned the extremes such as 'if you are far from the city centre the water does not cost a lot' which does not demonstrate the continuity of the relationship. Candidates should be made aware that just using the word 'negative' to describe the relationship is not sufficient. However 'negative correlation' would have scored the mark.

Many candidates were able to draw a satisfactory line of best fit but there were still many zigzag lines that joined all the points seen. Often candidates did not use their line of best fit to estimate the cost of a bottle 4.5 km from the city centre with a wide variety of incorrect responses seen. If their line was used, the reading of 4.5 on the x-axis was generally good, but candidates struggled to read their value from the y-axis accurately and interpret the unit required. Nearly 40% of the candidates scored both marks in parts (b) and (c) with at least 73% scoring at least 1 mark.

19. The idea of a line of best fit appeared to be well understood in the majority or cases with most candidates being able to draw one to the required degree of accuracy. 94% of candidates were able to describe the relationship with only a few contradicting themselves. Occasionally negative on its own seen, and negative relationship, and sometimes positive. Taking an estimate from the line of best fit was also well handled apart from the fact that there was a tendency to 'round' the result so that the value for age in years would be an integer value.

20. **Foundation**

Almost a half of the candidates scored full marks on this question.

Parts (a) and (b) of this question were well done with a good proportion of candidates able to express the relationship between height and weight in words or describe the relationship as "positive correlation". Some candidates gave "positive" or "positive relationship" as their answer. This was insufficient. Lines of best fit were usually drawn within the acceptable tolerance and only a small number of candidates joined the points. Part (c) was quite well answered though many candidates appeared not to have fully understood the vertical scale on the graph and gave 158 cm as their answer when 156.5 was indicated by marks they had made on the graph.

Higher

All parts of this question were very well done with 87% of candidates scoring all three marks. There were some candidates who didn't understand the concept of a 'line of best fit' and instead, joined the points in part (b). A few candidates gave only 2 digits (e.g. 55) as their answer to part (c) of this question.

21. In part (a), many candidates were able to write down an acceptable description of the relationship between the price and the number of cameras sold. A common error here was to just comment on the extreme values, e.g. 'the expensive cameras didn't sell very well', or to describe the correlation as simply "negative". In part (b), many candidates were able to draw a suitable line of best fit within the required limits, but it was clear that a significant number of candidates were not equipped with a ruler. Candidates should be advised to bring the appropriate equipment to this examination.

A common error here was to join the points with line segments, or to draw a line with positive gradient (usually through the origin).

22. This question was answered well by the majority of candidates, but a significant number of candidates had difficulty in interpreting the horizontal scale.

A common error in part (a) was to plot the point (67, 50) at (66, 50) or at (68, 50).

In part (b), many candidates were able to write down an acceptable description of the relationship between the price and the number of cameras sold. A common error here was to just comment on the extreme values, e.g. 'the expensive cameras didn't sell very well', or to describe the correlation as simply "negative". In part (c), most candidates were able to draw a suitable line of best fit within the required limits. In part (d), a common error was to read the graph at £72 or at £74.50, rather than at £74.

23. Foundation

It was pleasing to see that over 36% scored all 3 marks on the last question on this section with a further 31% scoring 2 marks. Many did not realise that the word 'positive' was required in (a) but this did not put them off answering the rest of the question. Some unusual descriptions were seen but to describe the correlation as a "line of misfit" was perhaps taking things a little too far.

The most common error was in part (b) where many candidates felt the line of best fit had to go through the origin (60, 140) although they could still pick up the mark in (c) for an accurate reading from their line of best fit. It is also important that the line of best fit should be of sufficient length to cover the range of the given points; in some cases it was short of this length by a considerable amount. Merely joining up the points with a series of zigzag lines was never going to satisfy the requirement of a line of best fit.

Higher

This question was also well done by the candidates on the Higher Tier with nearly 95% of the candidates scoring 2 or 3 marks. The most common error was in part (b) where many candidates felt the line of best fit had to go through the origin (60, 140) although they could still pick up the mark in (c) for an accurate reading from their line of best fit.

24. Foundation

This question was well understood with most candidates (90%) gaining the mark for positive correlation or for an explanation of how the weight increased as the length increased. In part (b) fewer candidates (18%) gained the mark for plotting the given point on the grid correctly as they could not read the scale correctly but in part (c) 30% of candidates gained the two marks for an answer in the range 12 to 17 kg inclusive. 32% of candidates did gain a mark for showing a line of best fit or attempting to draw a vertical line at 65kg.

Higher

This question was well understood with most candidates (70%) gaining full marks. Candidates lost marks for writing positive rather than positive correlation and there were a few ambiguous uses of the word 'bigger', without defining what was bigger. In part (b) candidates lost the mark for plotting the given point on the grid correctly with the scale on the *y* axis providing the most trouble, but in part (c) almost all candidates gained the two marks for an answer in the range 12 to 17 kg inclusive and those that did not gained a mark for showing a line of best fit or attempting to draw a vertical line at 65kg Only 1% of candidates failed to score any marks at all in this question.