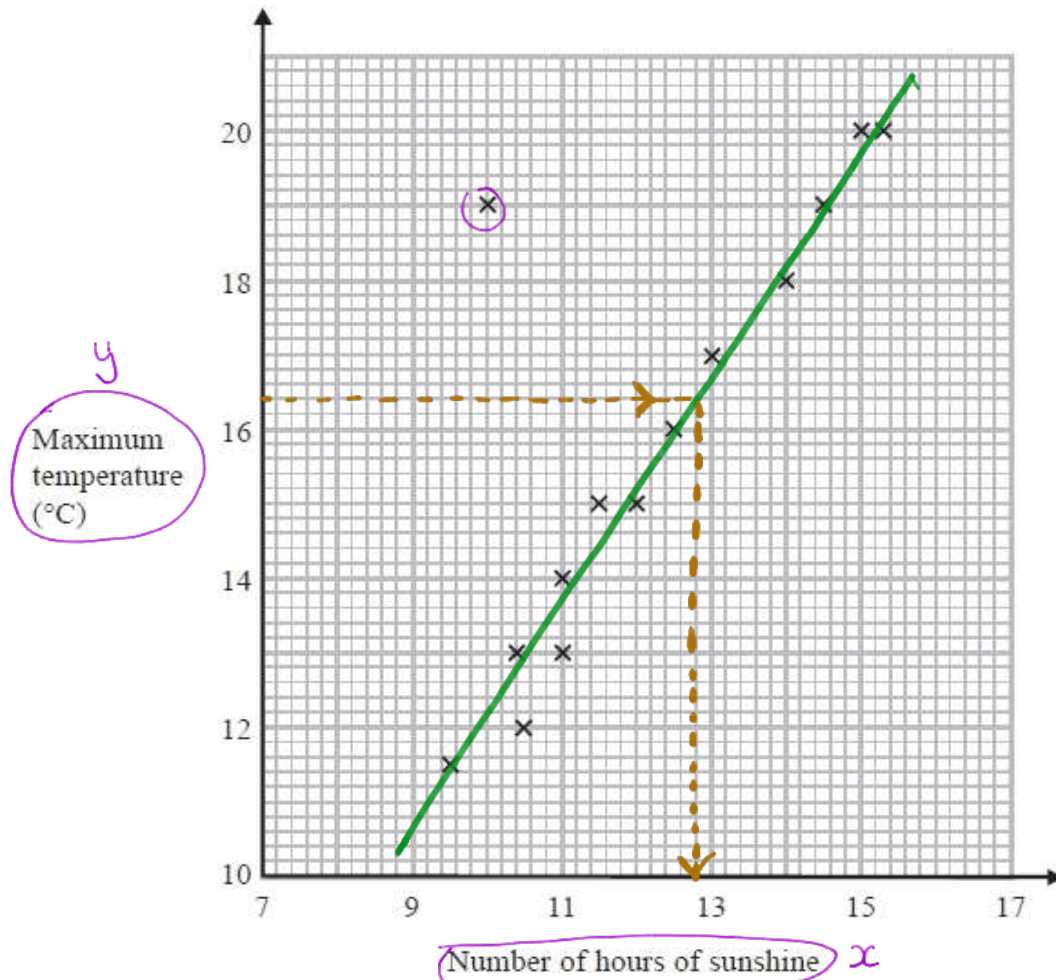


FULL MODEL ANSWERS

Q1. NON-CALCULATOR

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



(a) One of the points is an outlier. Write down the coordinates of this point.

(..... $\frac{10}{x}$, $\frac{19}{y}$ )
(1)

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

positive, negative, or none? Positive
(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.

Draw a "line of best fit" 12.8 hours
using a pencil and ruler
(2)

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

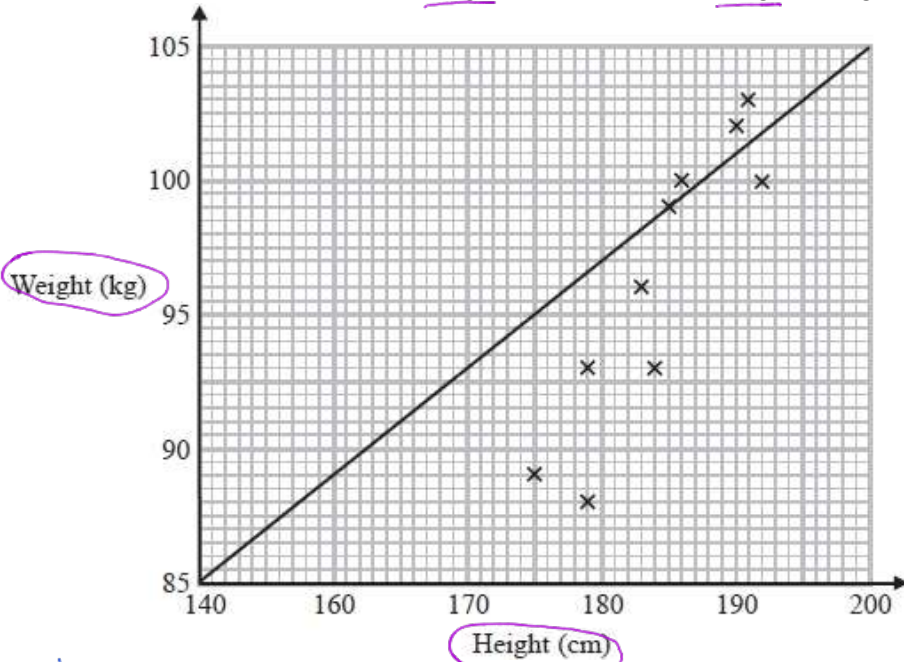
(d) Does the scatter graph support what the weatherman says? Give a reason for your answer.

Yes there is a positive correlation between temperature
and hours of sunshine, generally.
(1)

(Total for question = 5 marks)

Q2. CALCULATOR ALLOWED

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.

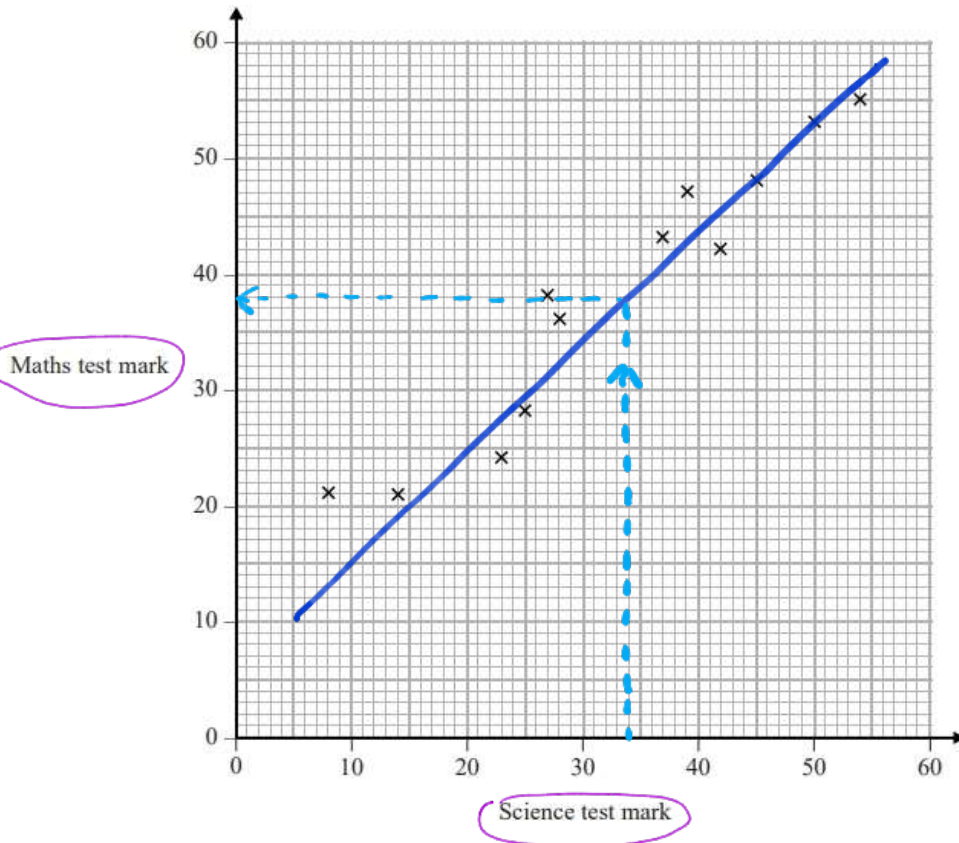
Write down two things that are wrong with his answer.

look carefully

- 1 Line of best fit doesn't follow the plotted points. It is drawn simply from corner to corner.
- 2 The Height axis isn't scaled consistently. It initially increases by 20, but then by 10.

(Total for question = 2 marks)

Q3. CALCULATOR ALLOWED



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.

Draw a "line of best fit" using a pencil and ruler.

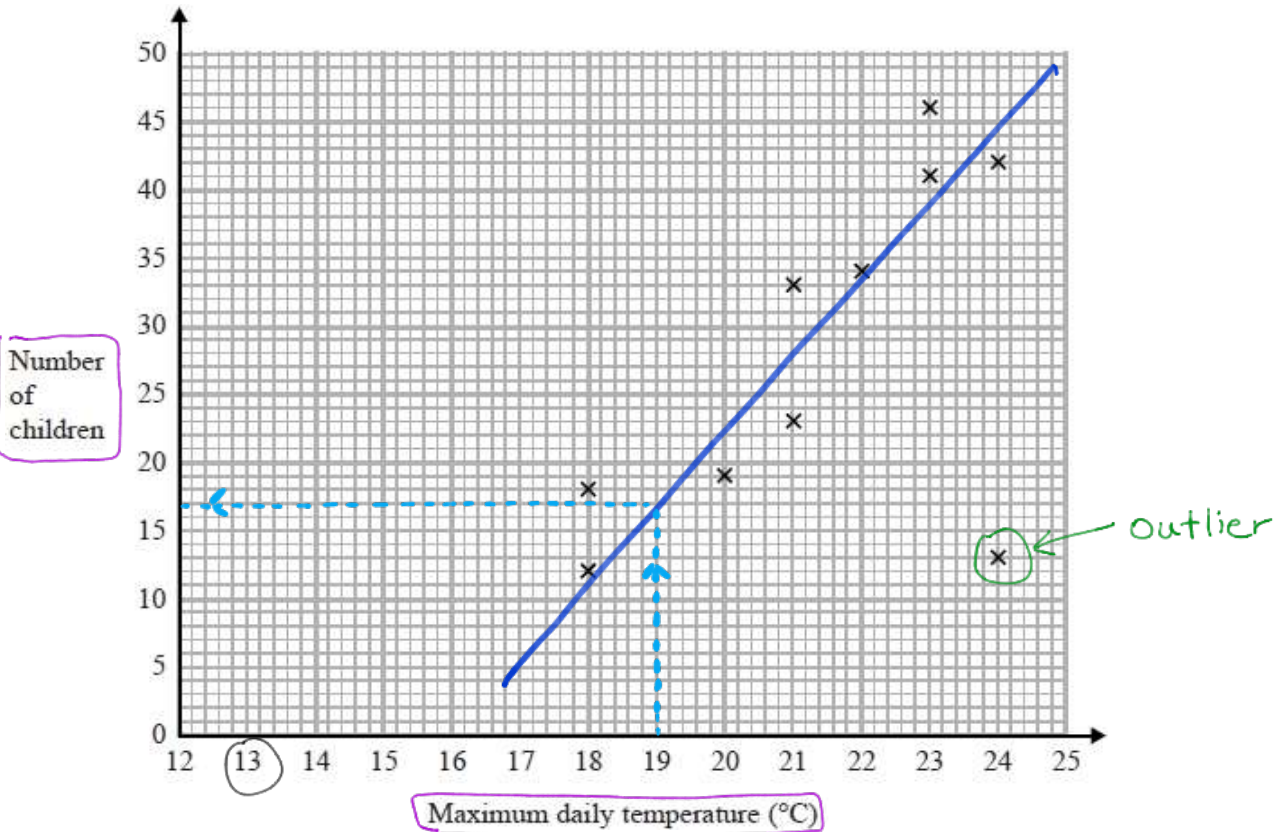
38

(Total for question = 2 marks)

Q4. CALCULATOR ALLOWED

Jean records the maximum daily temperature each day for 10 days.
She also records the number of children going to a paddling pool for each of these days.

She draws this scatter graph for her information.



Jean's information for one of these days is an outlier on the scatter graph.

(a) Give a possible reason for this.

The paddling pool may have been closed for part of the day.

(1)

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

Positive, negative or none.

Positive

(1)

On the 11th day, the maximum daily temperature was 19°C.

(c) Write down an estimate for the number of children going to the paddling pool on the 11th day.

Draw a line of best fit using a pencil and ruler

17

(1)

It would not be sensible to use the scatter graph to predict the number of children going to the paddling pool on a day when the maximum daily temperature was 13°C.

(d) Give a reason why.

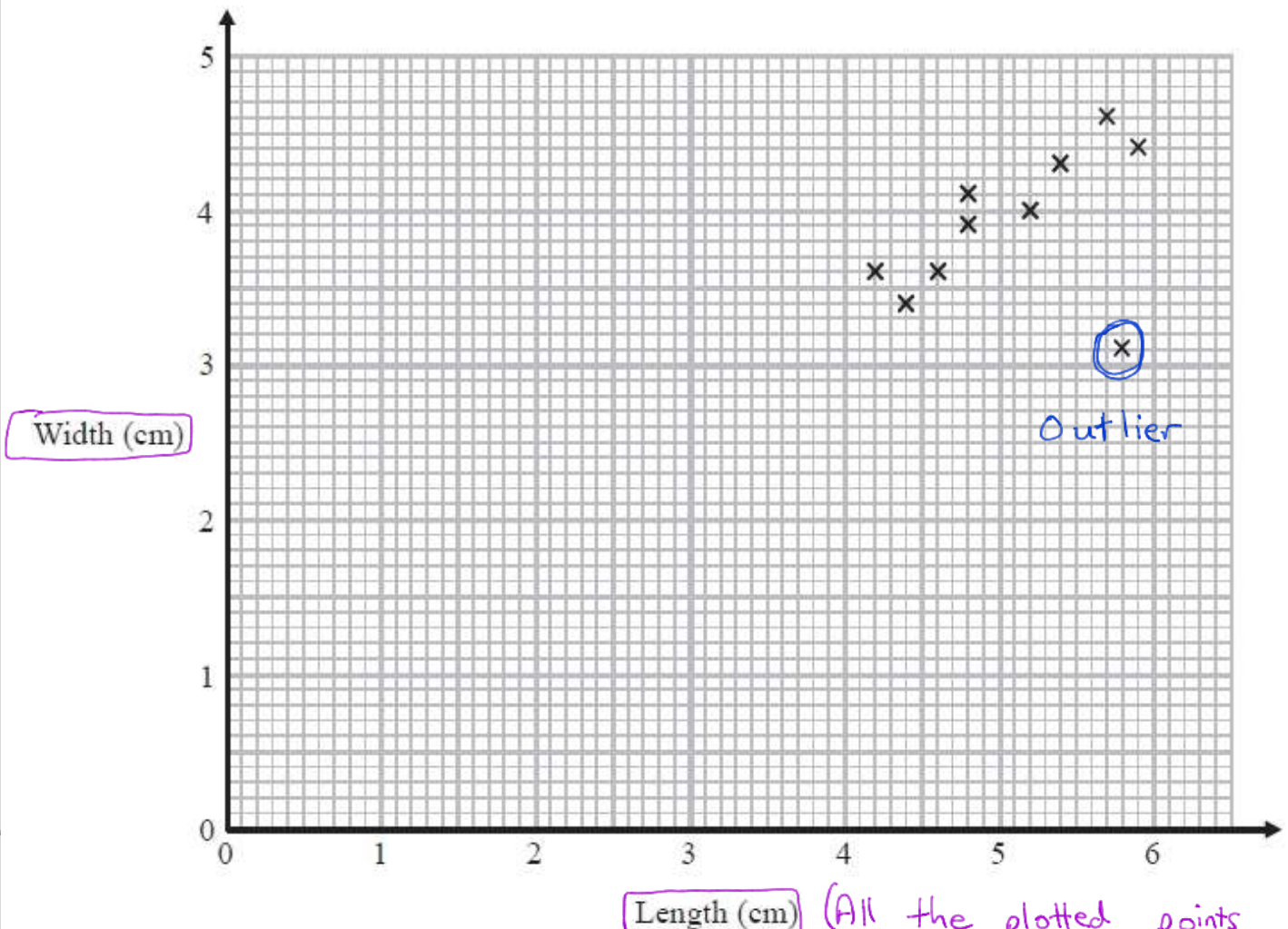
13°C is not in the data range of the plotted points. The line of best fit is based on 18°C to 24°C

(1)

(Total for question = 4 marks)

Q5. CALCULATOR ALLOWED

Katie measured the length and the width of each of 10 pine cones from the same tree. She used her results to draw this scatter graph.



- (a) Describe one improvement Katie can make to her scatter graph. *(All the plotted points are bunched up)*
- Adjust the scaling of both axes so that there isn't so much wasted space.*

(1)

The point representing the results for one of the pine cones is an outlier.

- (b) Explain how the results for this pine cone differ from the results for the other pine cones. *(Describe the length and width)*
- Despite having a length of nearly 6cm, the width is ≈ 3 cm and should be 4.5cm.*

(1)

(Total for question = 2 marks)

Q6. CALCULATOR ALLOWED

The scatter diagram shows information about 10 students.

For each student, it shows the number of hours spent revising and the mark the student achieved in a Spanish test.

One of the points is an outlier.

(a) Write down the coordinates of the outlier. (x, y)

$(4, 10)$

(1)

For all the other points

(b) (i) draw the line of best fit,

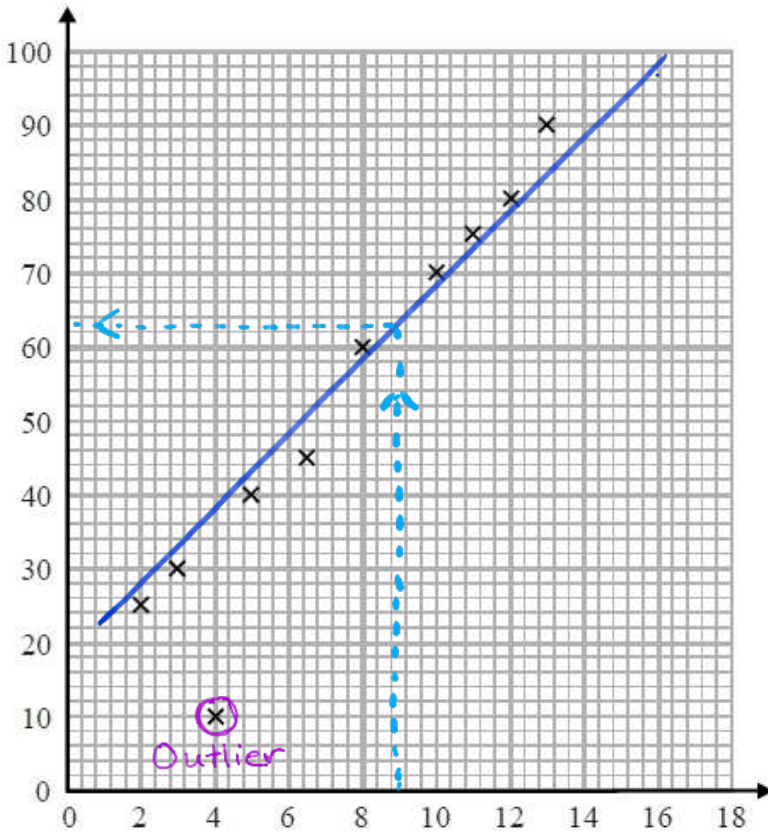
(ii) describe the correlation.

Not just the "type" of correlation.

(2)

Mark

y



Hours spent revising x

Positive correlation. The greater the time spent revising, the greater the marks.

(1)

A different student revised for 9 hours.

(c) Estimate the mark this student got

Use your line of best fit

63

(1)

The Spanish test was marked out of 100

Lucia says "I can see from the graph that had I revised for 18 hours I would have got full marks."

(d) Comment on what Lucia says.

Is 18 hours in the data range?

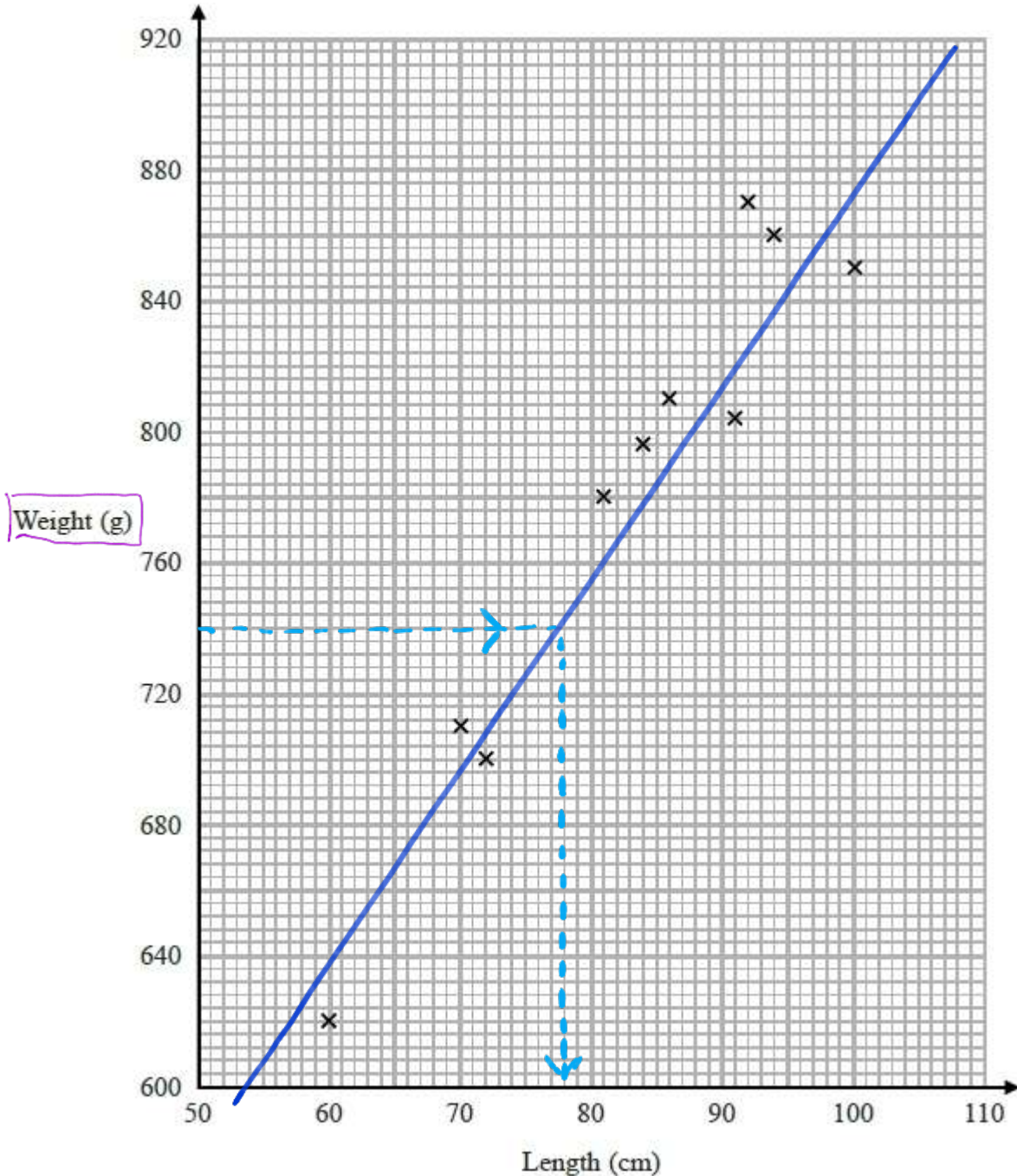
The line of best fit is based on the data range (upto 13 hours). It will be inaccurate to extrapolate to 18 hours.

(Total for question is 5 marks)

Q7. CALCULATOR ALLOWED

The scatter graph shows information about 10 adult snakes of the same type.

It shows the length and weight of each snake.



An adult snake of this type has a weight of 740 g.

(a) Use the scatter graph to estimate the length of this snake.

Draw a line of best fit using a pencil and ruler 78 cm (2)

Steven wants to estimate the weight of an adult snake of length 110 cm.

He says he will draw a line of best fit and read off the weight at 110 cm.

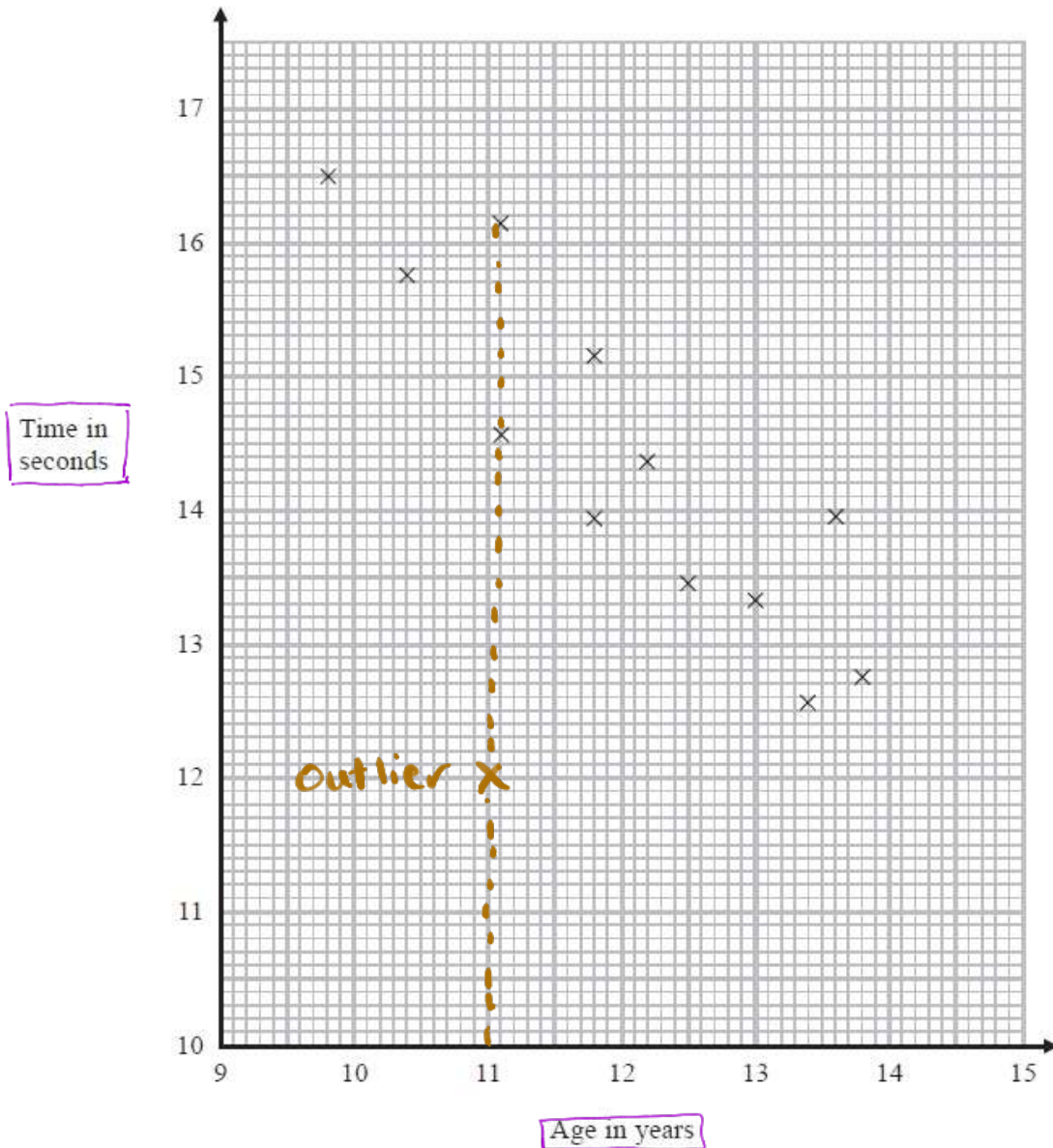
(b) Explain what is wrong with his method.

The plotted data has a longest length of 100cm. 110cm is not in the data range so it would be inaccurate to extrapolate beyond 100cm. (1)

(Total for question = 3 marks)

Q8. CALCULATOR ALLOWED

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.

Positive, negative or none Negative (1)

(b) 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. Explain why.

Other 11 year olds have a much higher time. Kristina would not exactly fit the relationship. (1)

Debbie is 15 years old. Debbie says "The scatter diagram shows I should take less than 12 seconds to run 100 metres."

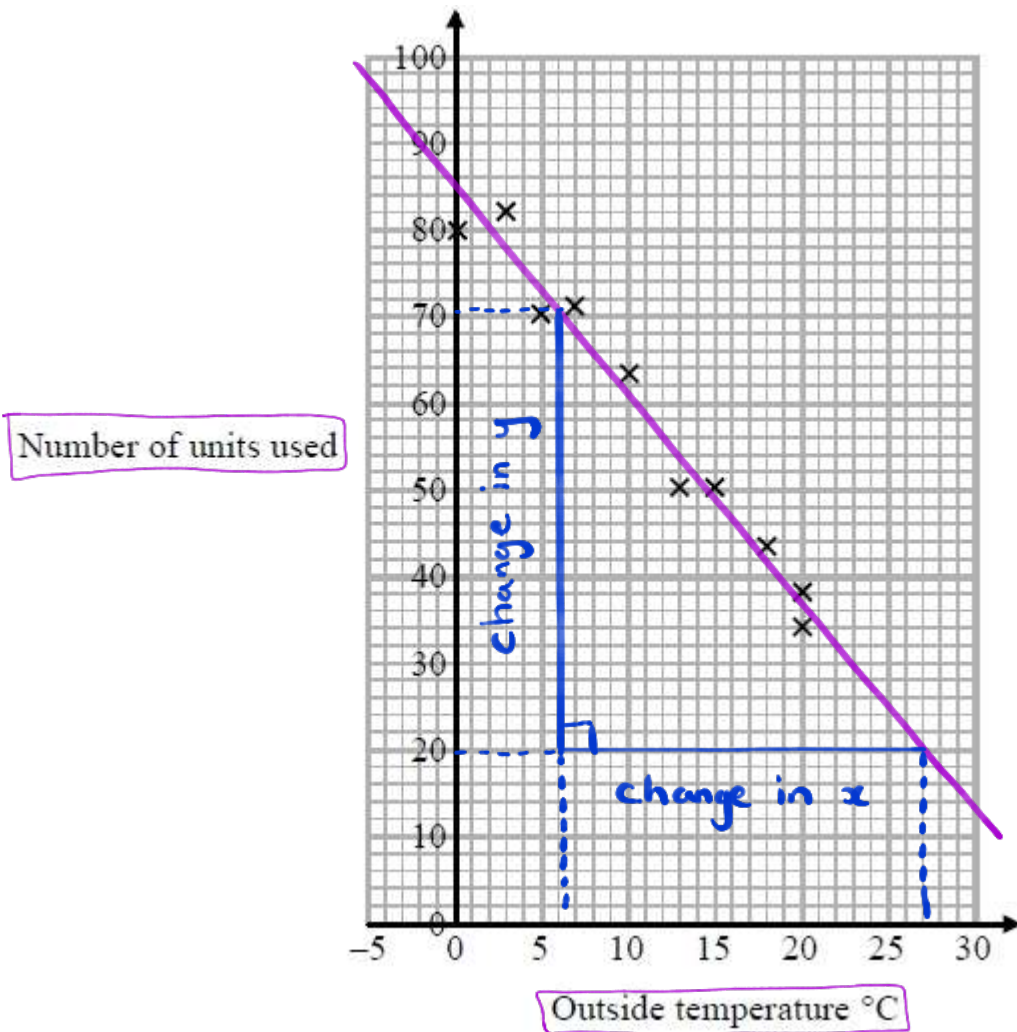
(c) Comment on what Debbie says.

The scatter diagram only has data from 10 to 14 year olds. Extrapolating beyond that data range may be inaccurate. (1)

(Total for question = 3 marks)

Q9. CALCULATOR ALLOWED

In a survey, the outside temperature and the number of units of electricity used for heating were recorded for ten homes. The scatter diagram shows this information.



Molly says, "On average the number of units of electricity used for heating decreases by 4 units for each °C increase in outside temperature."

(a) Is Molly right? Show how you get your answer.

Draw a line of best fit and find the gradient

$$\begin{aligned} \text{Gradient} &= \frac{\text{change in } y}{\text{change in } x} \\ &= \frac{71-20}{6-27} \\ &= -2.4 \end{aligned}$$

She is wrong, it decreases by 2.4 units per °C.

(3)

(b) You should not use a line of best fit to predict the number of units of electricity used for heating when the outside temperature is 30°C. *Look at the data range*

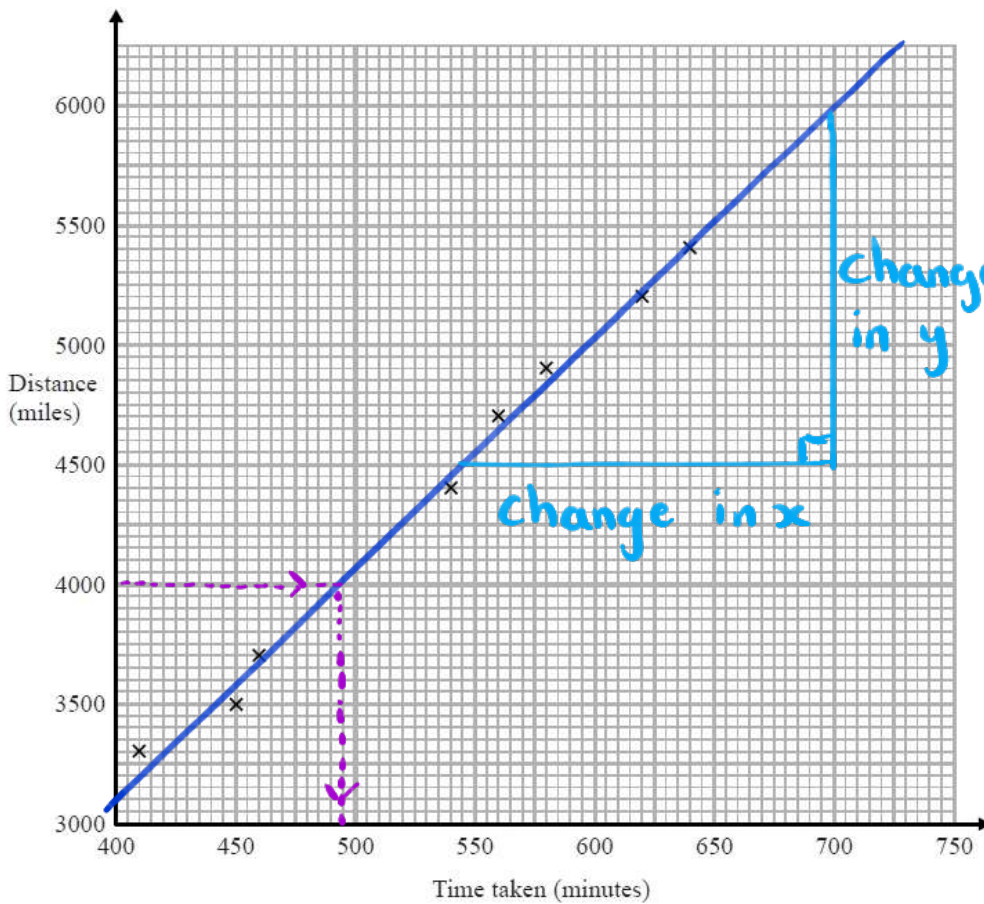
Give one reason why.

The line of best fit is based on temperature upto 20°C - it would be inaccurate.

(1)

(Total for question = 4 marks)

Q10. CALCULATOR ALLOWED



Oliver records the distance from London to each of eight cities in the USA.

He also records the time taken to fly from London to each of these cities.

The scatter graph shows this information.

Chicago is a city in the USA. Chicago is 4000 miles from London.

(a) (i) By drawing a line of best fit, find an estimate for the time taken to fly from London to Chicago.

..... 495 minutes
(2)

(ii) Why is your answer to part (i) only an estimate?

The flight may not exactly fit the relationship predicted by the other flights.

(b) (i) Calculate the gradient of your line of best fit.

$$\begin{aligned} \text{Gradient} &= \frac{\text{change in } y}{\text{change in } x} & (1) \\ &= \frac{6000 - 4500}{700 - 545} \\ &= 9.7 & (2) \end{aligned}$$

(ii) Give an interpretation of the gradient of your line of best fit. $\frac{y}{x} = \frac{\text{Distance}}{\text{Time}}$

The average speed is 9.7 miles per minute.

(1)
(Total for question = 6 marks)