

MATHS



MODEL ANSWERS

LINE OF BEST FIT THROUGH THE MEAN POINT

SCORE

/92

PERCENTAGE

%

STEM UP

- 1 The table shows the temperature and ice cream sales on 6 days.
Work out the mean temperature.

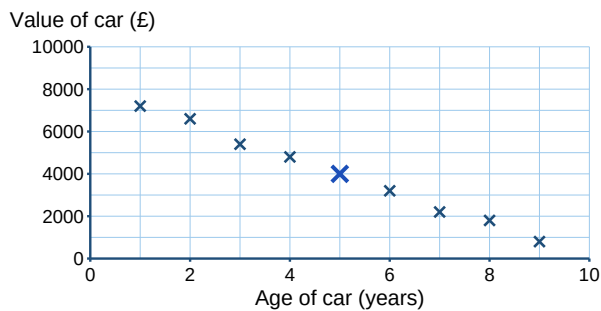
Temperature	3	7	12	17	19	26
Ice cream sales	24	46	76	110	122	162

$$(3 + 7 + 12 + 17 + 19 + 26) \div 6 = 84 \div 6 = 14$$

14

1 / 1

- 2 The scatter graph shows information about the ages and values of 8 second-hand cars.
The mean age of car is 5 years and the mean value of car is £4,000.
Plot the mean point on the scatter graph.

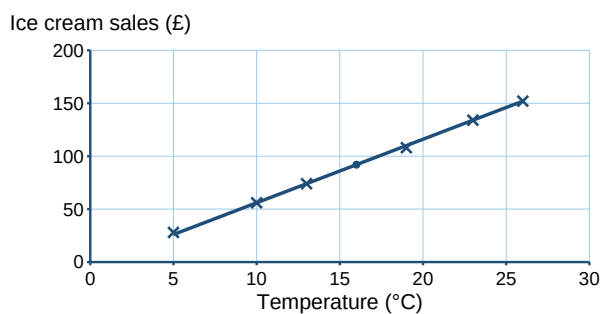


Go across to 5 on the x-axis
and up to 4000 on the y-axis,
and mark a cross

mean point plotted at (5, 4000)

1 / 1

- 3 The scatter graph shows information about the temperature and ice cream sales on 6 days.
A line of best fit has been drawn through the mean point.
Describe the correlation. Say whether it is strong or weak, and positive or negative.



The points are close to the
line and it slopes upwards

Strong positive correlation

1 / 1

- 4 The table shows the ages and values of 8 second-hand cars.
Work out the mean age of car.

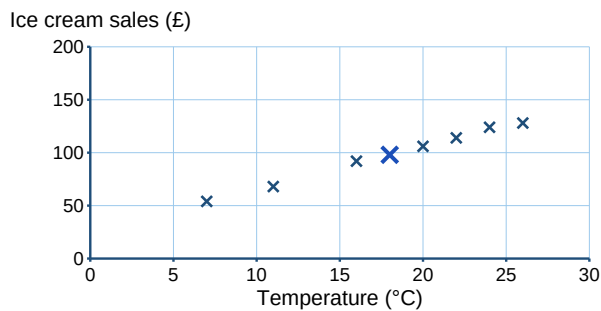
Age of car	1	2	3	4	6	7	8	9
Value of car	9,600	8,600	7,200	6,800	4,600	3,200	2,200	1,000

$$(1 + 2 + 3 + 4 + 6 + 7 + 8 + 9) \div 8 = 40 \div 8 = 5$$

5 years

1 / 1

- 5 The scatter graph shows information about the temperature and ice cream sales on 7 days.
The mean temperature is 18 and the mean ice cream sales is £98.
Plot the mean point on the scatter graph.

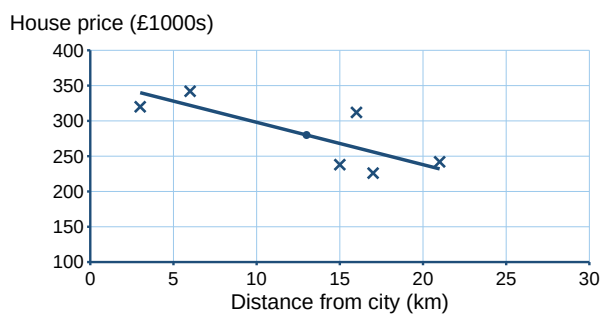


Go across to 18 on the x-axis
and up to 98 on the y-axis,
and mark a cross

mean point plotted at (18, 98)

1 / 1

- 6 The scatter graph shows information about the distances from a city and prices of 6 houses.
A line of best fit has been drawn through the mean point.
Describe the correlation. Say whether it is strong or weak, and positive or negative.



The points are spread out
around the line and it slopes
downwards

Weak negative correlation

1 / 1

- 7 The table shows the distances from a city and prices of 8 houses.
Work out the mean distance from city.

Distance from city	3	6	8	10	16	18	24	27
House price	338	344	318	282	234	218	190	156

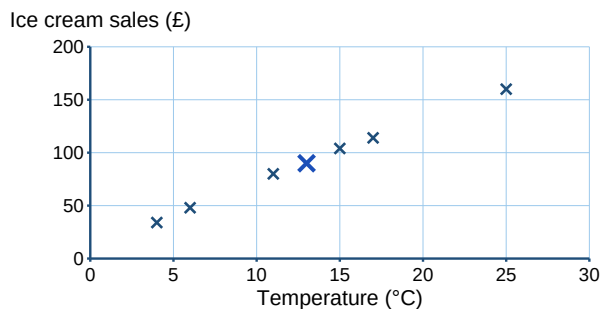
$$(3 + 6 + 8 + 10 + 16 + 18 + 24 + 27) \div 8 =$$

$$112 \div 8 = 14$$

14 km

1 / 1

- 8 The scatter graph shows information about the temperature and ice cream sales on 6 days.
The mean temperature is 13 and the mean ice cream sales is £90.
Plot the mean point on the scatter graph.

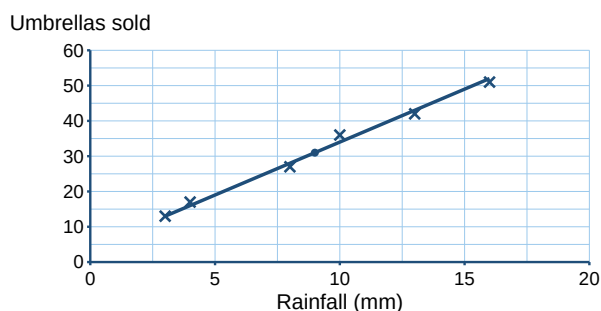


Go across to 13 on the x-axis
and up to 90 on the y-axis,
and mark a cross

mean point plotted at (13, 90)

1 / 1

- 9 The scatter graph shows information about the rainfall and umbrellas sold on 6 days.
A line of best fit has been drawn through the mean point (9, 31).
Use the line to estimate the umbrellas sold when the rainfall is 12 mm.

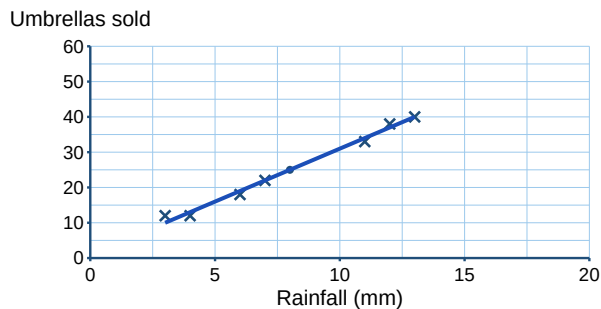


Go up from 12 on the x-axis to
the line, then across to the
y-axis: 40

40

1 / 1

- 10** The scatter graph shows information about the rainfall and umbrellas sold on 7 days. The mean point (8, 25) is shown as a dot. Draw a line of best fit that goes through the mean point.

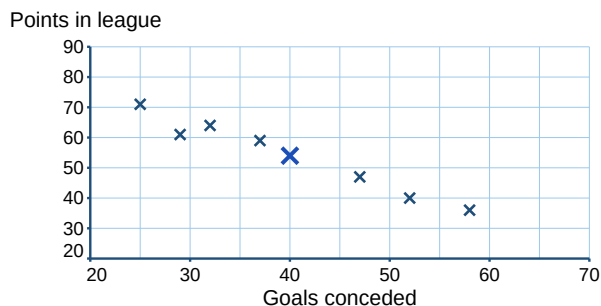


The line must pass through the dot and have about as many points above it as below it

line through (3, 10) and (13, 40)

/ 1

- 11** The scatter graph shows information about the goals conceded and points of 7 teams. The mean goals conceded is 40 and the mean points in league is 54. Plot the mean point on the scatter graph.

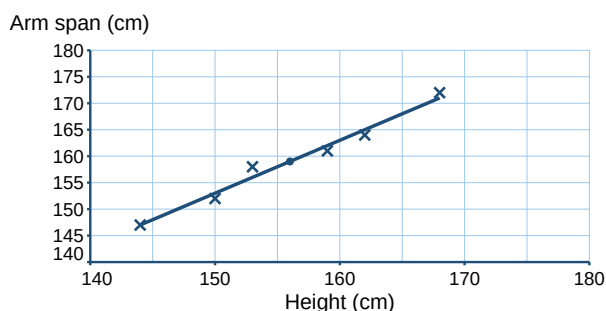


Go across to 40 on the x-axis and up to 54 on the y-axis, and mark a cross

mean point plotted at (40, 54)

/ 1

- 12** The scatter graph shows information about the heights and arm spans of 6 students. A line of best fit has been drawn through the mean point (156, 159). Use the line to estimate the arm span when the height is 163 cm.

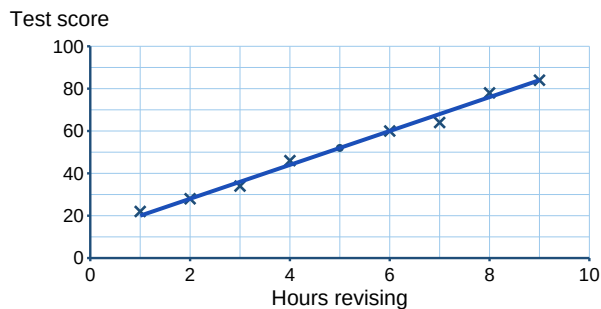


Go up from 163 on the x-axis to the line, then across to the y-axis: 166

166 cm

/ 1

- 13** The scatter graph shows information about the hours revising and test scores of 8 students. The mean point (5, 52) is shown as a dot. Draw a line of best fit that goes through the mean point.

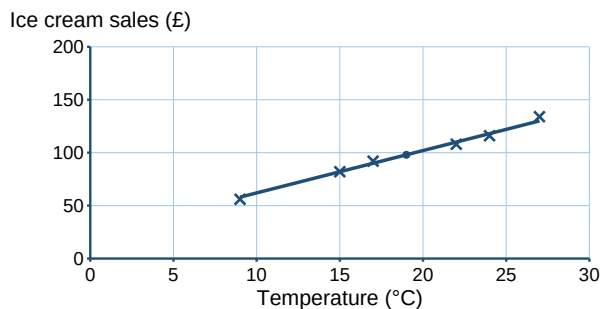


The line must pass through the dot and have about as many points above it as below it

line through (1, 20) and (9, 84)

/ 1

- 14** The scatter graph shows information about the temperature and ice cream sales on 6 days. A line of best fit has been drawn through the mean point (19, 98). Use the line to estimate the temperature when the ice cream sales is £90.

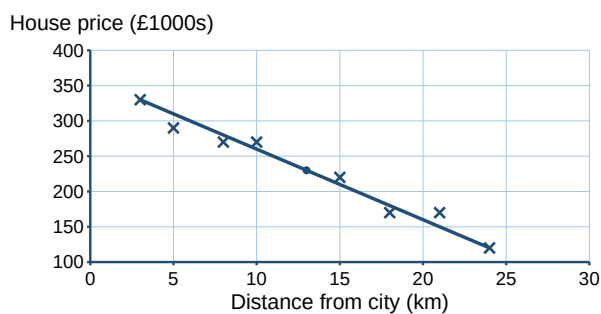


Go across from 90 on the y-axis to the line, then down to the x-axis: 17

17

/ 1

- 15** The scatter graph shows information about the distances from a city and prices of 8 houses. A line of best fit has been drawn through the mean point (13, 230). Use the line to estimate the house price when the distance from city is 18 km.



Go up from 18 on the x-axis to the line, then across to the y-axis: 180

180

/ 1

- 16** The table shows the rainfall and umbrellas sold on 6 days.
Work out the coordinates of the mean point.
The mean point is (mean of x, mean of y).

Rainfall	3	6	9	11	13	18
Umbrellas sold	6	16	27	33	38	54

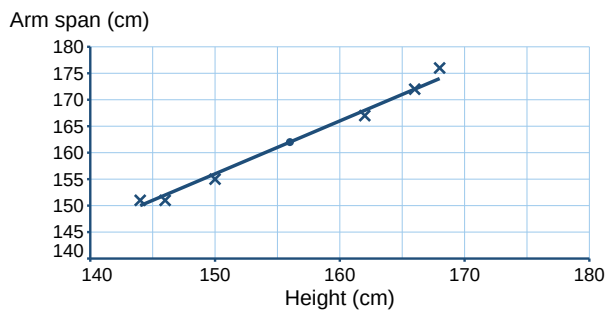
$$\text{Mean of } x = 60 \div 6 = 10$$

$$\text{mean of } y = 174 \div 6 = 29$$

(10, 29)

1 / 1

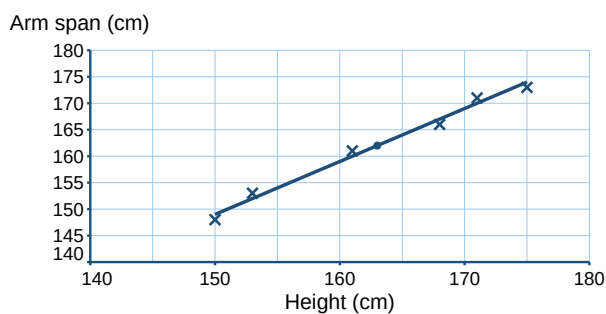
- 17** The scatter graph shows information about the heights and arm spans of 6 students.
A line of best fit has been drawn through the mean point.
Write a sentence to describe the relationship between the height and the arm span.



The higher the height, the higher the arm span tends to be (positive correlation)

1 / 1

- 18** The scatter graph shows information about the heights and arm spans of 6 students.
A line of best fit has been drawn through the mean point (163, 162).
Use the line to estimate the arm span when the height is 159 cm.

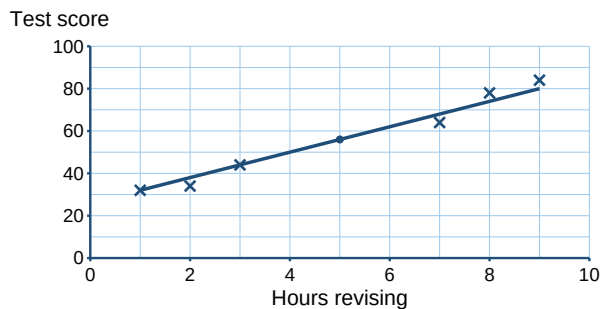


Go up from 159 on the x-axis to the line, then across to the y-axis: 158

158 cm

1 / 1

- 19 The scatter graph shows information about the hours revising and test scores of 6 students. A line of best fit has been drawn through the mean point (5, 56). Use the line to estimate the hours revising when the test score is 50 marks.

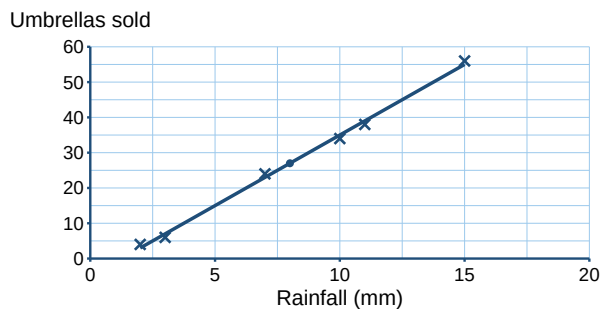


Go across from 50 on the y-axis to the line, then down to the x-axis: 4

4 hours

1 / 1

- 20 The scatter graph shows information about the rainfall and umbrellas sold on 6 days. A line of best fit has been drawn through the mean point. Write a sentence to describe the relationship between the rainfall and the umbrellas sold.



The higher the rainfall, the higher the umbrellas sold tends to be (positive correlation)

1 / 1

- 21 The table shows the hours of TV and test scores of 6 students. Work out the coordinates of the mean point. The mean point is (mean of x, mean of y).

Hours of TV	1	2	3	5	6	7
Test score	82	72	56	30	20	4

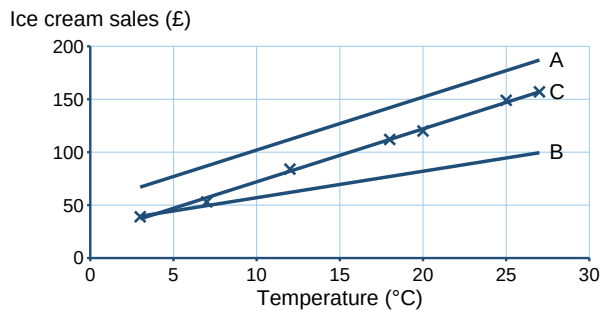
$$\text{Mean of } x = 24 \div 6 = 4$$

$$\text{mean of } y = 264 \div 6 = 44$$

(4, 44)

2 / 2

- 22 The scatter graph shows information about the temperature and ice cream sales on 7 days. Three lines A, B and C are drawn on the scatter graph. The mean point is (16, 102). Which line is the line of best fit through the mean point?

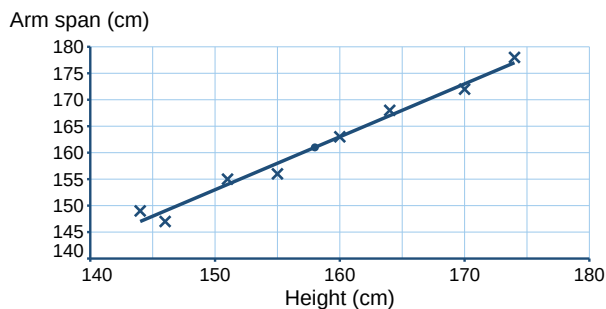


Check which line goes through (16, 102): line C passes through the point

Line C

2 / 2

- 23 The scatter graph shows information about the heights and arm spans of 8 students. A line of best fit has been drawn through the mean point. Write a sentence to describe the relationship between the height and the arm span.



The higher the height, the higher the arm span tends to be (positive correlation)

2 / 2

- 24 The table shows the ages and values of 6 second-hand cars. Work out the coordinates of the mean point. The mean point is (mean of x, mean of y).

Age of car	2	3	4	6	7	8
Value of car	7,000	6,600	6,200	5,000	4,200	3,400

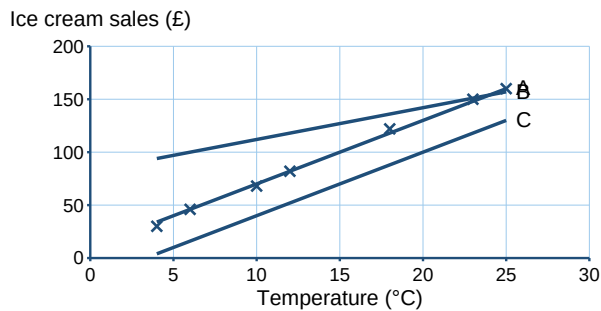
$$\text{Mean of } x = 30 \div 6 = 5$$

$$\text{mean of } y = 32,400 \div 6 = 5,400$$

(5, 5,400)

2 / 2

- 25 The scatter graph shows information about the temperature and ice cream sales on 7 days. Three lines A, B and C are drawn on the scatter graph. The mean point is (14, 94). Which line is the line of best fit through the mean point?

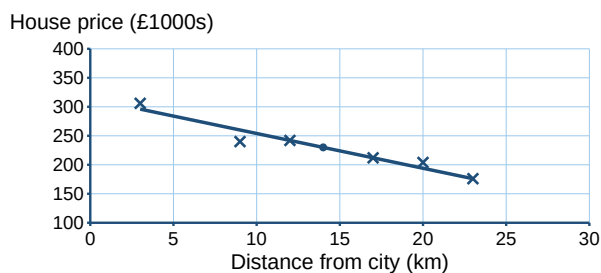


Check which line goes through (14, 94): line A passes through the point

Line A

2 / 2

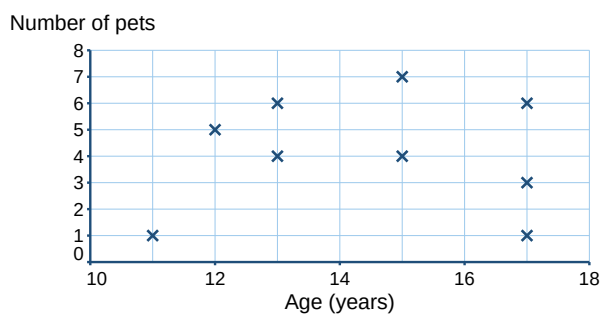
- 26 The scatter graph shows information about the distances from a city and prices of 6 houses. A line of best fit has been drawn through the mean point. Write a sentence to describe the relationship between the distance from city and the house price.



The higher the distance from city, the lower the house price tends to be (negative correlation)

2 / 2

- 27 The scatter graph shows information about the ages of 9 students and their number of pets. (a) What type of correlation does the scatter graph show? (b) Can a line of best fit through the mean point be used to estimate values? Give a reason.

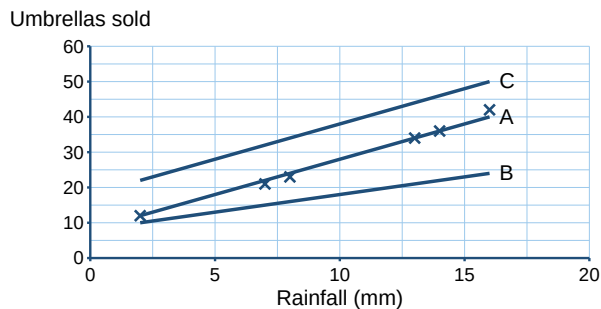


(b) No, because there is no relationship between the age and the number of pets

(a) No correlation (b) No

2 / 2

- 28 The scatter graph shows information about the rainfall and umbrellas sold on 6 days. Three lines A, B and C are drawn on the scatter graph. The mean point is (10, 28). Which line is the line of best fit through the mean point?

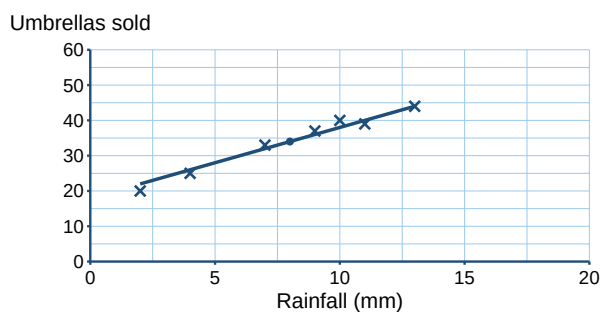


Check which line goes through (10, 28): line A passes through the point

Line A

2 / 2

- 29 The scatter graph shows information about the rainfall and umbrellas sold on 7 days. Liam says: "More rain causes more umbrellas to be sold." Does the scatter graph prove that Liam is correct? Give a reason.

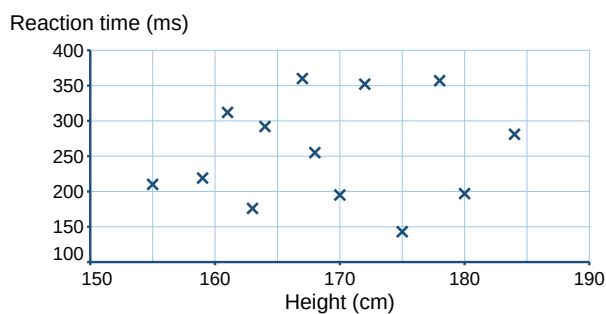


other factors could be involved

No, correlation shows a relationship but does not prove that one thing causes the other

2 / 2

- 30 The scatter graph shows information about the heights and reaction times of 13 students.
(a) What type of correlation does the scatter graph show?
(b) Can a line of best fit through the mean point be used to estimate values? Give a reason.



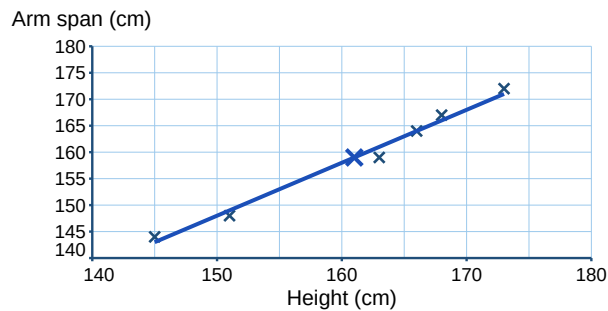
(b) No, because there is no relationship between the height and the reaction time

(a) No correlation (b) No

2 / 2

- 31 The scatter graph shows information about the heights and arm spans of 6 students. The mean point is (161, 159).

(a) Plot the mean point. (b) Draw a line of best fit through the mean point.

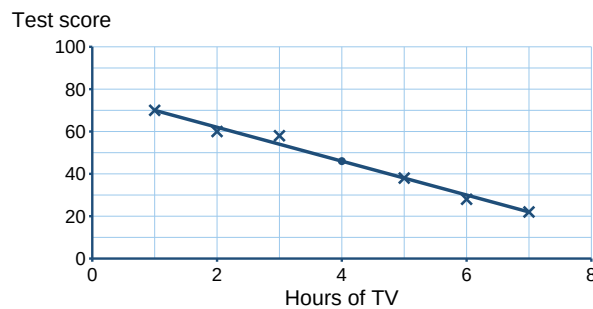


(a) mark a cross at (161, 159)
(b) draw a straight line through it following the trend of the points

(a) (161, 159) (b) line through (145, 143) and (173, 171)

2 / 2

- 32 The scatter graph shows information about the hours of TV and test scores of 6 students. Jon says: "Watching more television causes lower test scores." Does the scatter graph prove that Jon is correct? Give a reason.

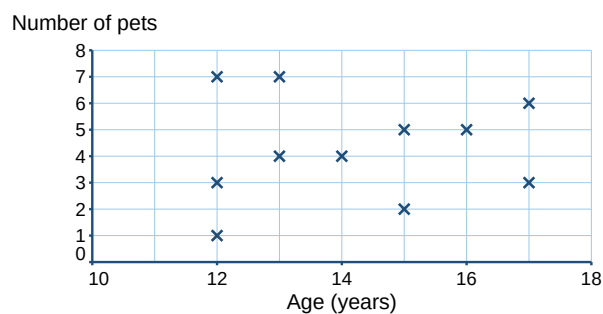


other factors could be involved

No, correlation shows a relationship but does not prove that one thing causes the other

2 / 2

- 33 The scatter graph shows information about the ages of 11 students and their number of pets. (a) What type of correlation does the scatter graph show? (b) Can a line of best fit through the mean point be used to estimate values? Give a reason.



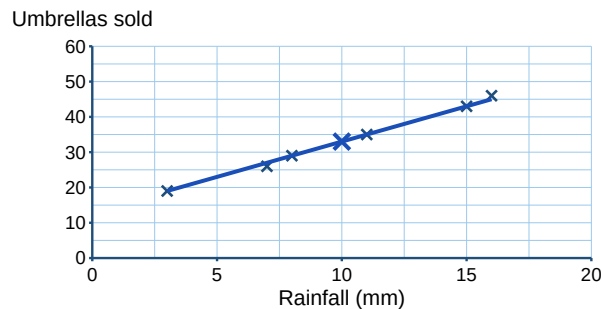
(b) No, because there is no relationship between the age and the number of pets

(a) No correlation (b) No

2 / 2

- 34 The scatter graph shows information about the rainfall and umbrellas sold on 6 days.
The mean point is (10, 33).

(a) Plot the mean point. (b) Draw a line of best fit through the mean point.

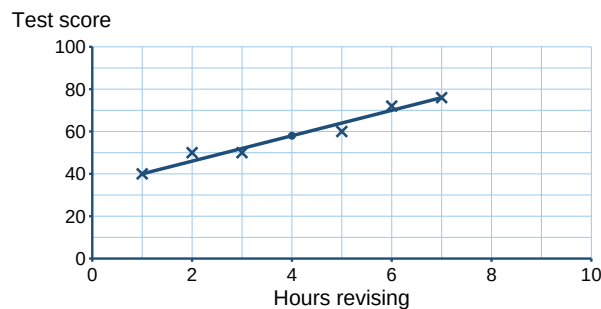


(a) mark a cross at (10, 33)
(b) draw a straight line through it following the trend of the points

(a) (10, 33) (b) line through (3, 19) and (16, 45)

2 / 2

- 35 The scatter graph shows information about the hours revising and test scores of 6 students.
Sam says: "Revising for more hours causes a higher test score."
Does the scatter graph prove that Sam is correct? Give a reason.

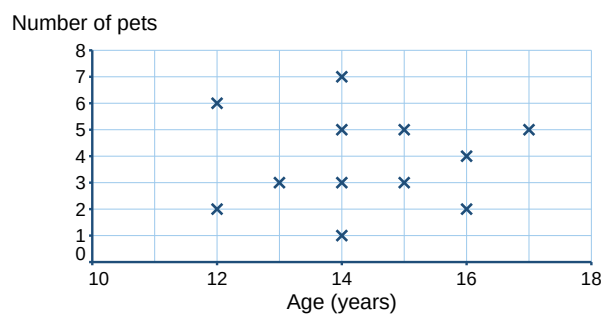


other factors could be involved

No, correlation shows a relationship but does not prove that one thing causes the other

2 / 2

- 36 The scatter graph shows information about the ages of 12 students and their number of pets.
(a) What type of correlation does the scatter graph show?
(b) Can a line of best fit through the mean point be used to estimate values? Give a reason.

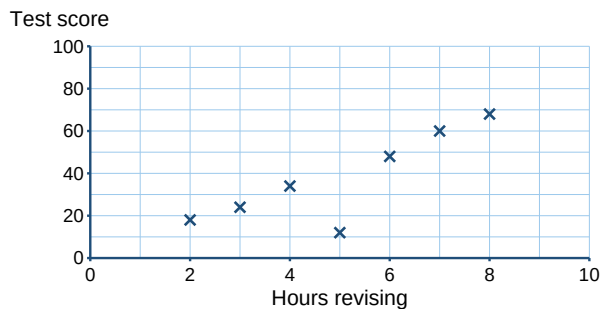


(b) No, because there is no relationship between the age and the number of pets

(a) No correlation (b) No

2 / 2

- 37 The scatter graph shows information about the hours revising and test scores of 7 students. One of the points is an outlier. (a) Write down its coordinates. (b) If the outlier is left out, does the mean of the test score values increase or decrease?

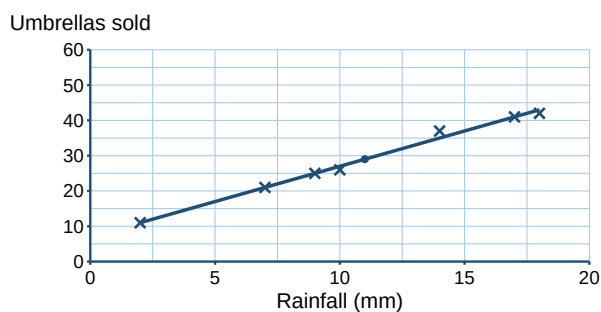


(a) the point that does not fit the pattern
(b) the outlier is below the rest of the points, so taking it out makes the mean higher

(a) (5, 12) (b) increase

2 / 2

- 38 The scatter graph shows information about the rainfall and umbrellas sold on 7 days. Elin says: "More rain causes more umbrellas to be sold." Does the scatter graph prove that Elin is correct? Give a reason.



other factors could be involved

No, correlation shows a relationship but does not prove that one thing causes the other

2 / 2

- 39 The table shows the distances from a city and prices of 6 houses. One value is missing. The mean house price is 220. Work out the missing value.

Distance from city	5	11	13	17	20	24
House price	280	244	242	208	170	?

$$\text{Total of all 6 values} = 6 \times 220 = 1,320$$

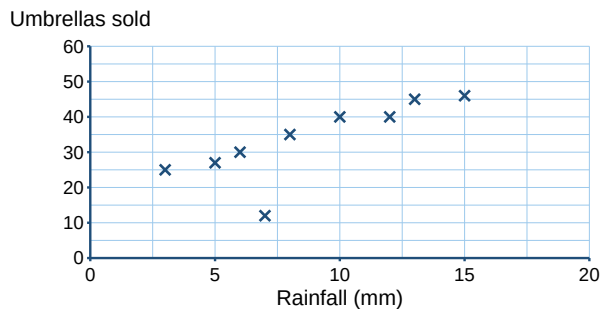
$$\text{total of the others} = 1,144$$

$$\text{missing value} = 1,320 - 1,144 = 176$$

176

3 / 3

- 40 The scatter graph shows information about the rainfall and umbrellas sold on 9 days. One of the points is an outlier. (a) Write down its coordinates. (b) If the outlier is left out, does the mean of the umbrellas sold values increase or decrease?

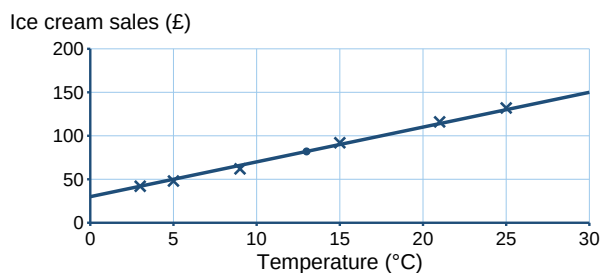


(a) the point that does not fit the pattern
 (b) the outlier is below the rest of the points, so taking it out makes the mean higher

(a) (7, 12) (b) increase

3 / 3

- 41 The scatter graph shows information about the temperature and ice cream sales on 6 days. The line of best fit goes through the mean point (13, 82). Sam estimates the ice cream sales when the temperature is 24 and when it is 28. Which estimate is more reliable? Give a reason.



The estimate for 24 is more reliable, because 24 is inside the range of the data (interpolation) but 28 is outside it (extrapolation)

The estimate for 24 is more reliable

3 / 3

- 42 The table shows the temperature and ice cream sales on 8 days. One value is missing. The mean temperature is 16. Work out the missing value.

Temperature	7	9	11	?	18	20	22	27
Ice cream sales	50	56	72	92	116	124	134	172

Total of all 8 values = $8 \times 16 = 128$

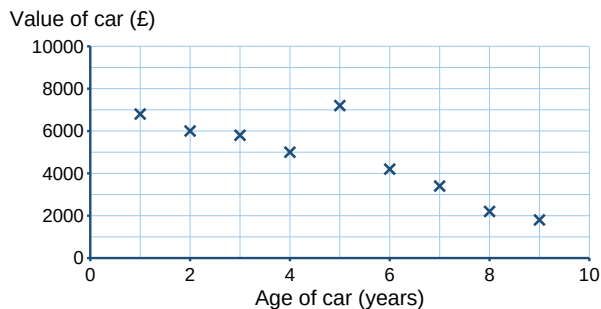
total of the others = 114

missing value = $128 - 114 = 14$

14

3 / 3

- 43 The scatter graph shows information about the ages and values of 9 second-hand cars. One of the points is an outlier. (a) Write down its coordinates. (b) If the outlier is left out, does the mean of the value of car values increase or decrease?

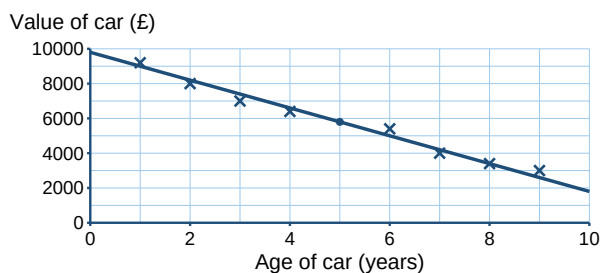


(a) the point that does not fit the pattern
(b) the outlier is above the rest of the points, so taking it out makes the mean lower

(a) (5, 7200) (b) decrease

3 / 3

- 44 The scatter graph shows information about the ages and values of 8 second-hand cars. The line of best fit goes through the mean point (5, 5800). Sam estimates the value of car when the age of car is 2 years and when it is 10 years. Which estimate is more reliable? Give a reason.



The estimate for 2 years is more reliable, because 2 is inside the range of the data (interpolation) but 10 is outside it (extrapolation)

The estimate for 2 years is more reliable

3 / 3

- 45 The table shows the ages and values of 6 second-hand cars. One value is missing. The mean age of car is 5 years. Work out the missing value.

Age of car	1	3	4	6	?	9
Value of car	7,800	6,800	6,200	4,600	4,800	3,400

Total of all 6 values = $6 \times 5 = 30$

total of the others = 23

missing value = $30 - 23 = 7$

7

3 / 3

- 46 The table shows the hours revising and test scores of 6 students. One value is missing. The mean test score is 48 marks. Work out the missing value.

Hours revising	2	3	4	6	7	8
Test score	?	24	36	56	68	82

Total of all 6 values = $6 \times 48 = 288$

total of the others = 266

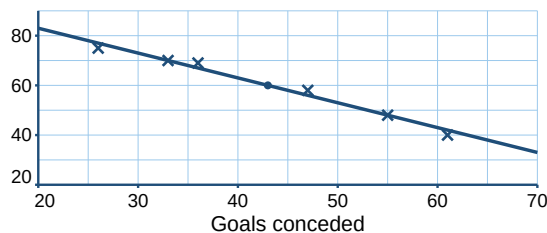
missing value = $288 - 266 = 22$

22

3 / 3

- 47 The scatter graph shows information about the goals conceded and points of 6 teams. The line of best fit goes through the mean point (43, 60). Sam estimates the points in league when the goals conceded is 45 and when it is 22. Which estimate is more reliable? Give a reason.

Points in league



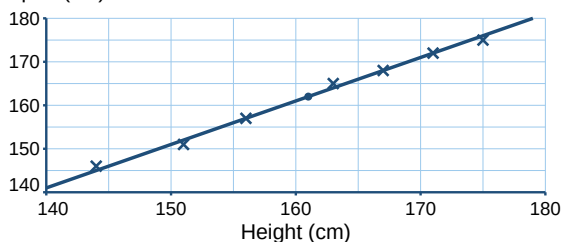
The estimate for 45 is more reliable, because 45 is inside the range of the data (interpolation) but 22 is outside it (extrapolation)

The estimate for 45 is more reliable

3 / 3

- 48 The scatter graph shows information about the heights and arm spans of 7 students. The line of best fit goes through the mean point (161, 162). Sam estimates the arm span when the height is 169 cm and when it is 178 cm. Which estimate is more reliable? Give a reason.

Arm span (cm)

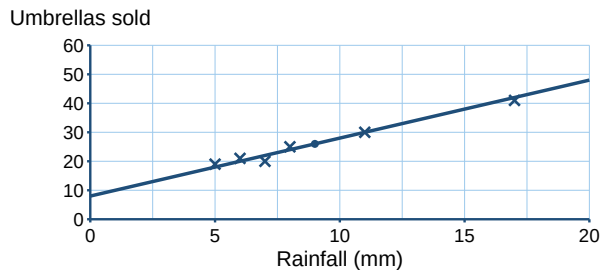


The estimate for 169 cm is more reliable, because 169 is inside the range of the data (interpolation) but 178 is outside it (extrapolation)

The estimate for 169 cm is more reliable

3 / 3

- 49 The scatter graph shows information about the rainfall and umbrellas sold on 6 days. The line of best fit goes through the mean point (9, 26). Sam estimates the umbrellas sold when the rainfall is 15 mm and when it is 19 mm. Which estimate is more reliable? Give a reason.

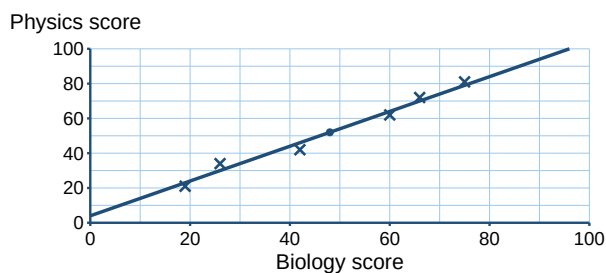


The estimate for 15 mm is more reliable, because 15 is inside the range of the data (interpolation) but 19 is outside it (extrapolation)

The estimate for 15 mm is more reliable

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- 50 The scatter graph shows information about the Biology and Physics scores of 6 students. The line of best fit goes through the mean point (48, 52). Sam estimates the Physics score when the Biology score is 29 marks and when it is 76 marks. Which estimate is more reliable? Give a reason.



The estimate for 29 marks is more reliable, because 29 is inside the range of the data (interpolation) but 76 is outside it (extrapolation)

The estimate for 29 marks is more reliable

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