



1 Write down the type of correlation you would expect to see in a scatter graph of each of the following.

- The daily temperature and the number of ice creams sold at a kiosk.
- The age of a car and its value.

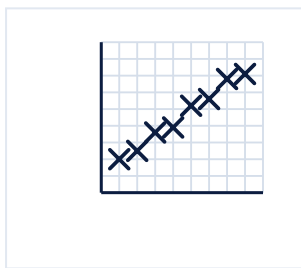
(2 marks)

As temperature rises, more ice creams are sold, so positive correlation

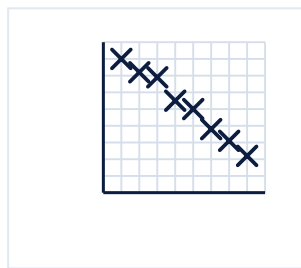
As a car gets older, its value falls, so negative correlation

2 Here are three scatter graphs.

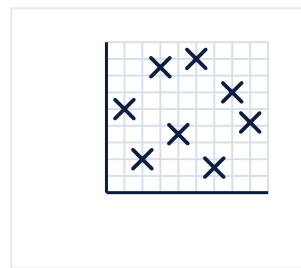
For each graph, write down the type of correlation it shows.



A



B



C

(3 marks)

A: points go up left to right

positive correlation

B: points go down left to right

negative correlation

C: no pattern

no correlation

- 3 The stem and leaf diagram shows the masses, in grams, of some tomatoes.

Stem	Leaves
2	1 4 6
3	0 2 5 8
4	3 7

Key: 2 | 1 = 21 grams

Find the range of the masses.

(2 marks)

The smallest mass is 21 grams and the largest mass is 47 grams

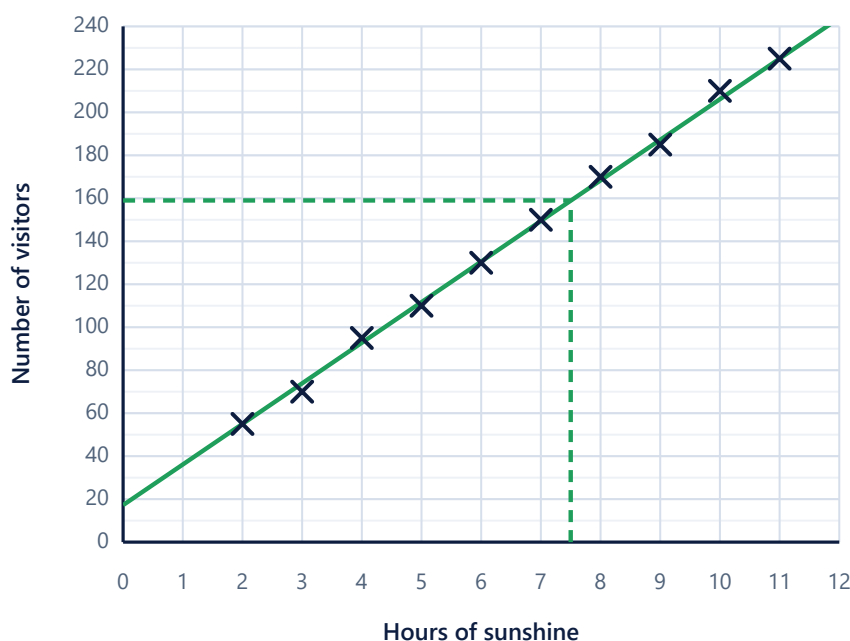
Range

$$47 - 21 = 26 \text{ grams}$$

26 grams

- 4 The scatter graph shows the number of hours of sunshine and the number of visitors to a country park on each of 10 days.

- Describe the correlation shown by the scatter graph.
- On another day there were 7.5 hours of sunshine. By drawing a line of best fit, estimate the number of visitors to the park on this day.



(3 marks)

The points rise from bottom left to top right, so the correlation is positive

Draw a line of best fit through the middle of the points

Reading up from 7.5 hours to the line and across gives roughly 160 visitors (any value from 150 to 175 with a sensible line)

5

Here are the numbers of keepy-uppies done by 14 pupils in a PE lesson.

34 12 27 41 18 25 33 9 22 38 15 29 30 44

- Draw an ordered stem and leaf diagram for these numbers. Include a key.
- Work out the median.
- Work out the range.

Stem	Leaves
0	9
1	2 5 8
2	2 5 7 9
3	0 3 4 8
4	1 4

Key: 1 | 2 = 12 keepy-uppies

(4 marks)

a) stems are the tens: 0 to 4

0	9
1	2 5 8
2	2 5 7 9
3	0 3 4 8
4	1 4

Key: 1 | 2 = 12

b) 14 values: between the 7th and 8th

7th = 27, 8th = 29

$$(27 + 29) \div 2 = 28$$

median = 28

c)

$$44 - 9 = 35$$

range = 35

6

The stem and leaf diagram shows the number of press-ups 11 students did in one minute.

Stem	Leaves
0	6 8
1	1 3 5 7 9
2	2 4 6 8

Key: 1 | 1 = 11 press-ups

- Find the median number of press-ups.
- Find the range of the number of press-ups.

(3 marks)

a) There are 11 values, so the median is the 6th value: 6, 8, 11, 13, 15, 17, ... The median is 17

b) Range

$$28 - 6 = 22$$

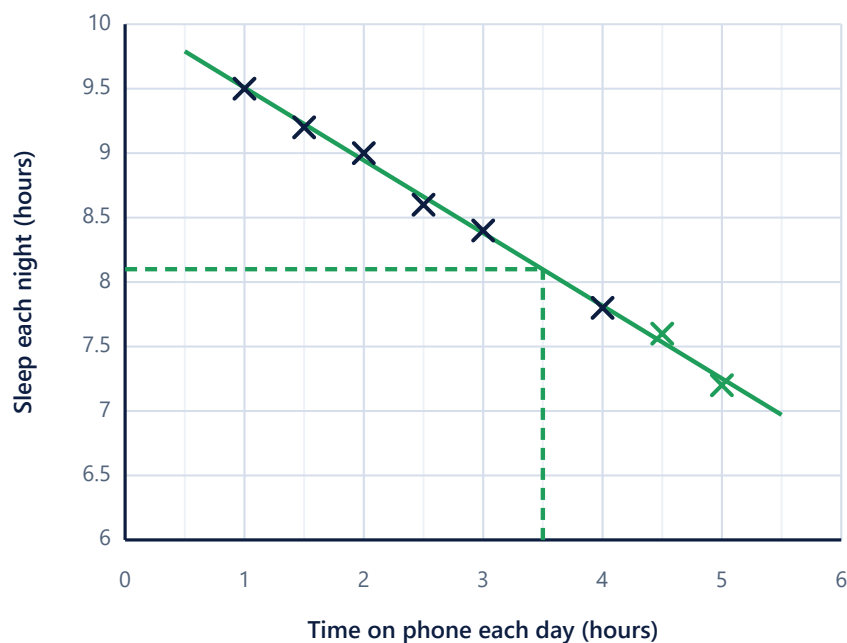
7

The table shows how long 8 pupils spend on their phones each day and how long they sleep each night.

Phone (hours)	1	1.5	2	2.5	3	4	4.5	5
Sleep (hours)	9.5	9.2	9	8.6	8.4	7.8	7.6	7.2

The first six points are plotted on the scatter graph.

- Plot the last two points.
- Describe the correlation.
- Draw a line of best fit. Use it to estimate how long a pupil who spends 3.5 hours a day on their phone sleeps.



(4 marks)

a)

plot (4.5, 7.6) and (5, 7.2)

b) more phone, less sleep

negative correlation

c) ruled line through the middle of the points

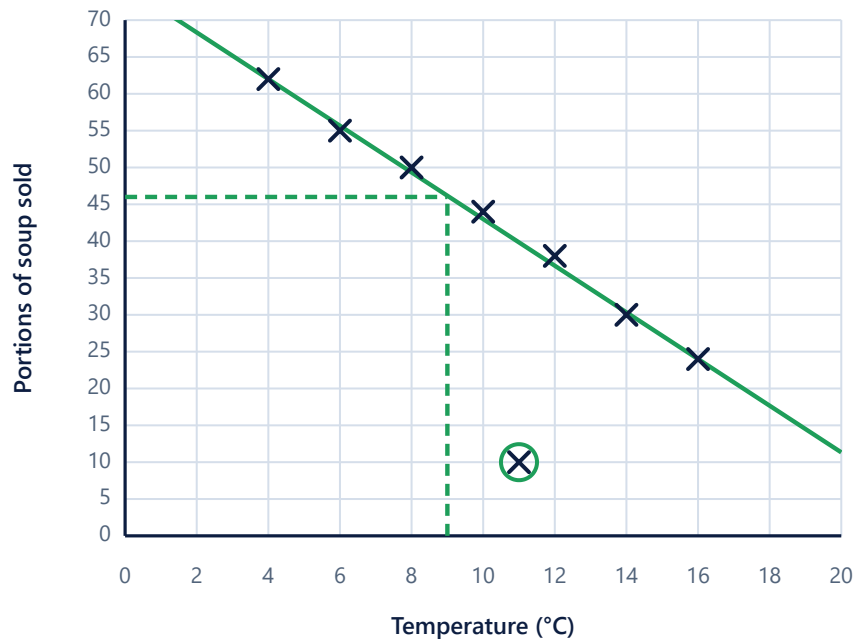
up from 3.5 to the line, across to the sleep axis

about 8.1 hours

8

The scatter graph shows the outside temperature, in $^{\circ}\text{C}$, and the number of portions of soup sold by a cafe on each of 8 days.

- One of the points is an outlier. Write down the coordinates of this point.
- Ignoring the outlier, use the graph to estimate the number of portions of soup sold on a day when the outside temperature is 9°C .



(3 marks)

The general trend is negative, with points falling steadily as temperature rises; the point (11, 10) lies far below this trend, so it is the outlier

Draw a line of best fit through the remaining points

Reading from 9°C to the line gives roughly 47 portions (accept 44 to 50)

9

The stem and leaf diagram shows the scores of 15 pupils in a times tables quiz.

Stem	Leaves
1	5 8 8
2	0 3 6 6 6 9
3	1 2 4 7
4	0 5

Key: $2 \mid 3 = 23$

Work out

- the mode
- the median
- the mean

(3 marks)

a) most common

mode = 26

b) 15 scores, so the 8th

15, 18, 18, 20, 23, 26, 26, 26

median = 26

c) add each row

$$15 + 18 + 18 = 51$$

$$20 + 23 + 26 + 26 + 26 + 29 = 150$$

$$31 + 32 + 34 + 37 = 134$$

$$40 + 45 = 85$$

$$51 + 150 + 134 + 85 = 420$$

$$420 \div 15 = 28$$

mean = 28

10

11 pupils from Year 7 and 11 pupils from Year 8 each solved a puzzle. The back-to-back stem and leaf diagram shows their times, in seconds.

Year 7	Stem	Year 8
8 5 2	1	1 3 4 6 9
7 4 4 1	2	0 2 5 6
8 3 0	3	1 5
1	4	

Key: 2 | 1 | 3 means 12 seconds for Year 7 and 13 seconds for Year 8

- Work out the median and the range for each year group.
- Make two comparisons between the times of the two year groups.

(4 marks)

a) 11 values each, so the 6th is the median

Year 7: 12, 15, 18, 21, 24, 24, 27, 30, 33, 38, 41

median = 24

range = $41 - 12 = 29$

Year 8: 11, 13, 14, 16, 19, 20, 22, 25, 26, 31, 35

median = 20

range = $35 - 11 = 24$

Y7: 24 s, 29 s Y8: 20 s, 24 s

b) Lower time is faster

$20 < 24$, so Year 8 were faster on average

$24 < 29$, so Year 8 were more consistent

Year 8 faster and more consistent

11

The stem and leaf diagram shows the times, in minutes, that 15 students in Class A took to finish a puzzle.

Stem	Leaves
2	1 4 8
3	0 2 3 5 7 9
4	2 4 6 8
5	0 3

Key: 2 | 1 = 21 minutes

For Class B, the median time was 38 minutes and the range of the times was 15 minutes.

- Find the median time for Class A.
- Find the range of the times for Class A.
- Compare the times of Class A with the times of Class B.

(4 marks)

a) There are 15 values, so the median is the 8th value: 21, 24, 28, 30, 32, 33, 35, 37, ... The median is 37 minutes

b) Range

$$53 - 21 = 32 \text{ minutes}$$

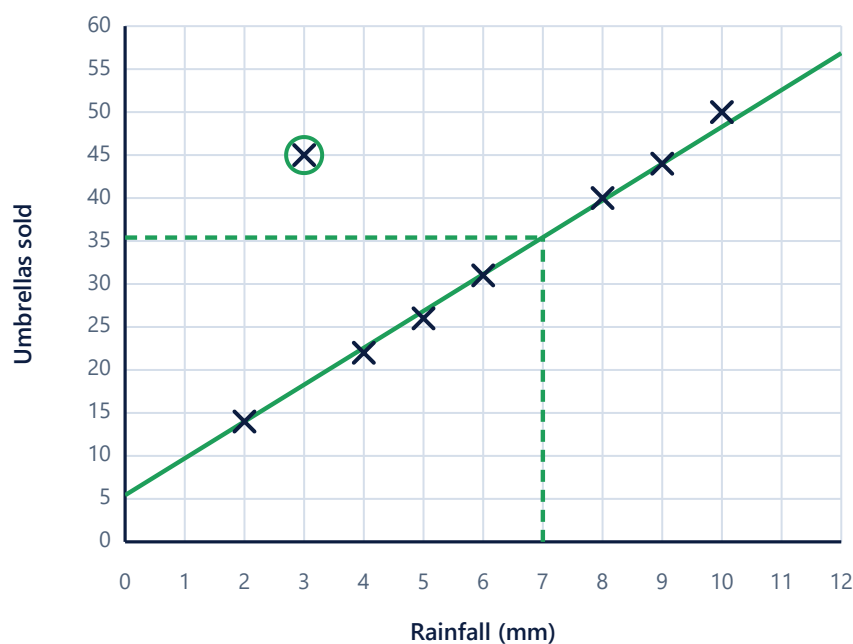
c) Class A's median (37) is lower than Class B's (38), so on average Class A finished slightly faster

Class A's range (32) is larger than Class B's (15), so Class B's times were more consistent

12

The scatter graph shows the rainfall, in mm, and the number of umbrellas sold at a market stall on each of 8 days.

- Describe the correlation shown by the graph.
- One point is an outlier. Circle this point and write down its coordinates.
- Ignoring the outlier, estimate the number of umbrellas sold on a day with 7 mm of rainfall.



(4 marks)

Sales rise as rainfall rises, so the correlation is positive

The point (3, 45) lies far above the trend of the other points, so it is the outlier

A line of best fit through the other points gives about 35 umbrellas at 7 mm (accept 32 to 38)