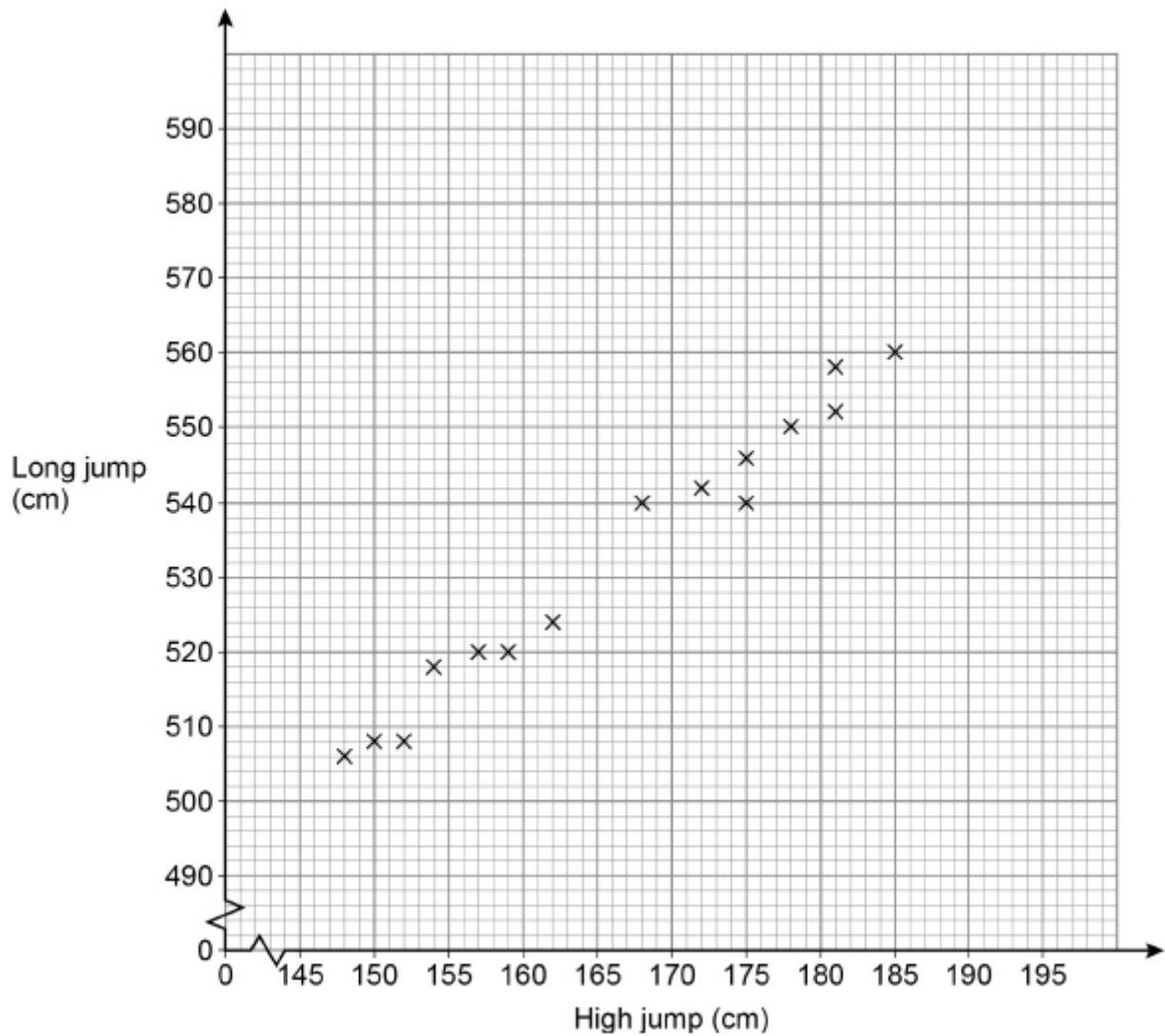# GCSE
MATHEMATICS (8300)
COMMON GRADES 4 & 5
Probability and Statistics

Total number of marks: 33 per optional item

Q25a

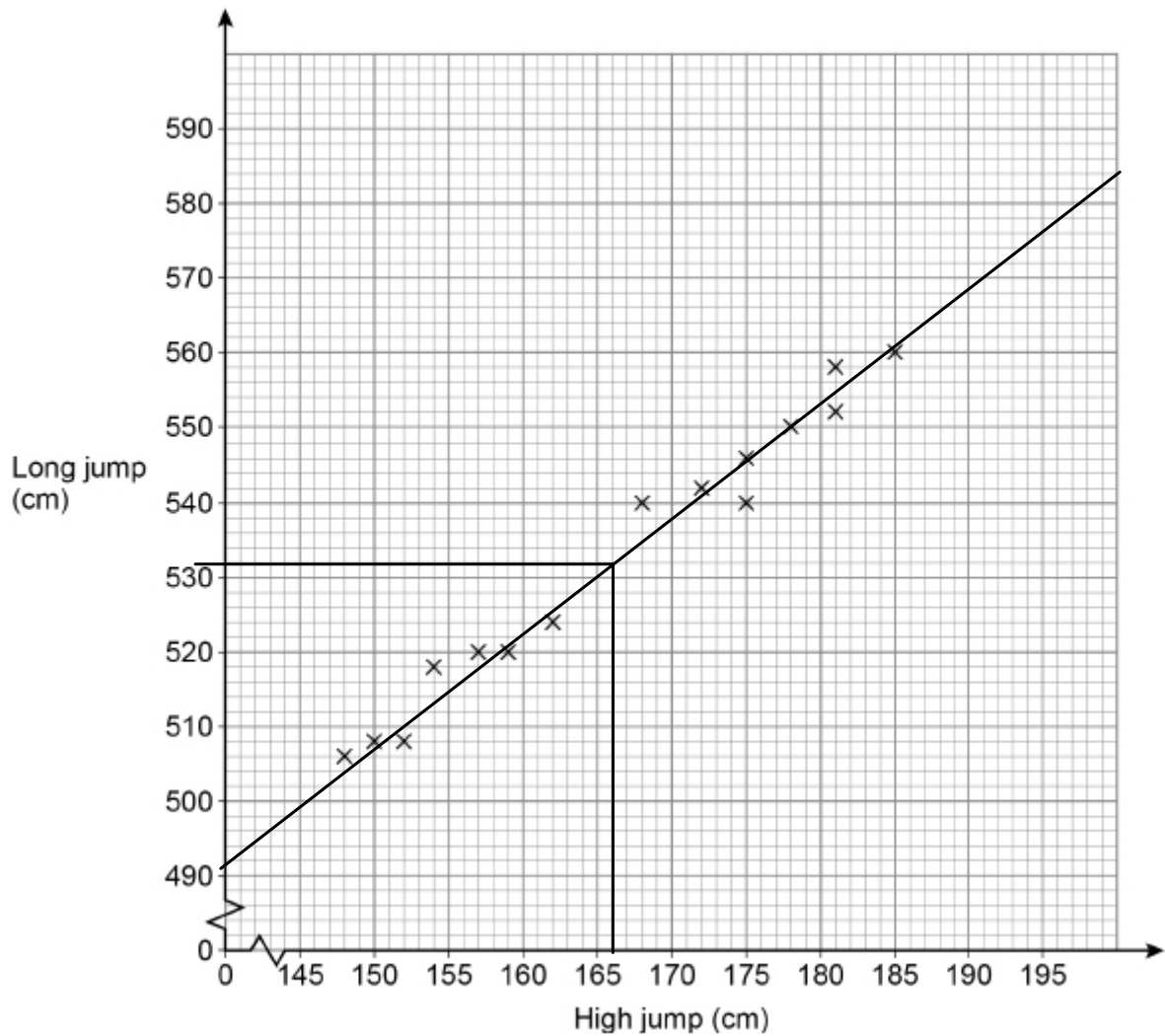The scatter graph shows the best high jump and the best long jump for 15 boys.

Long jump (cm) / High jump (cm)

(a)   Write down the type of correlation shown.

(Total 1 mark)

positive correlation

Q25b

The scatter graph shows the best high jump and the best long jump for 15 boys.
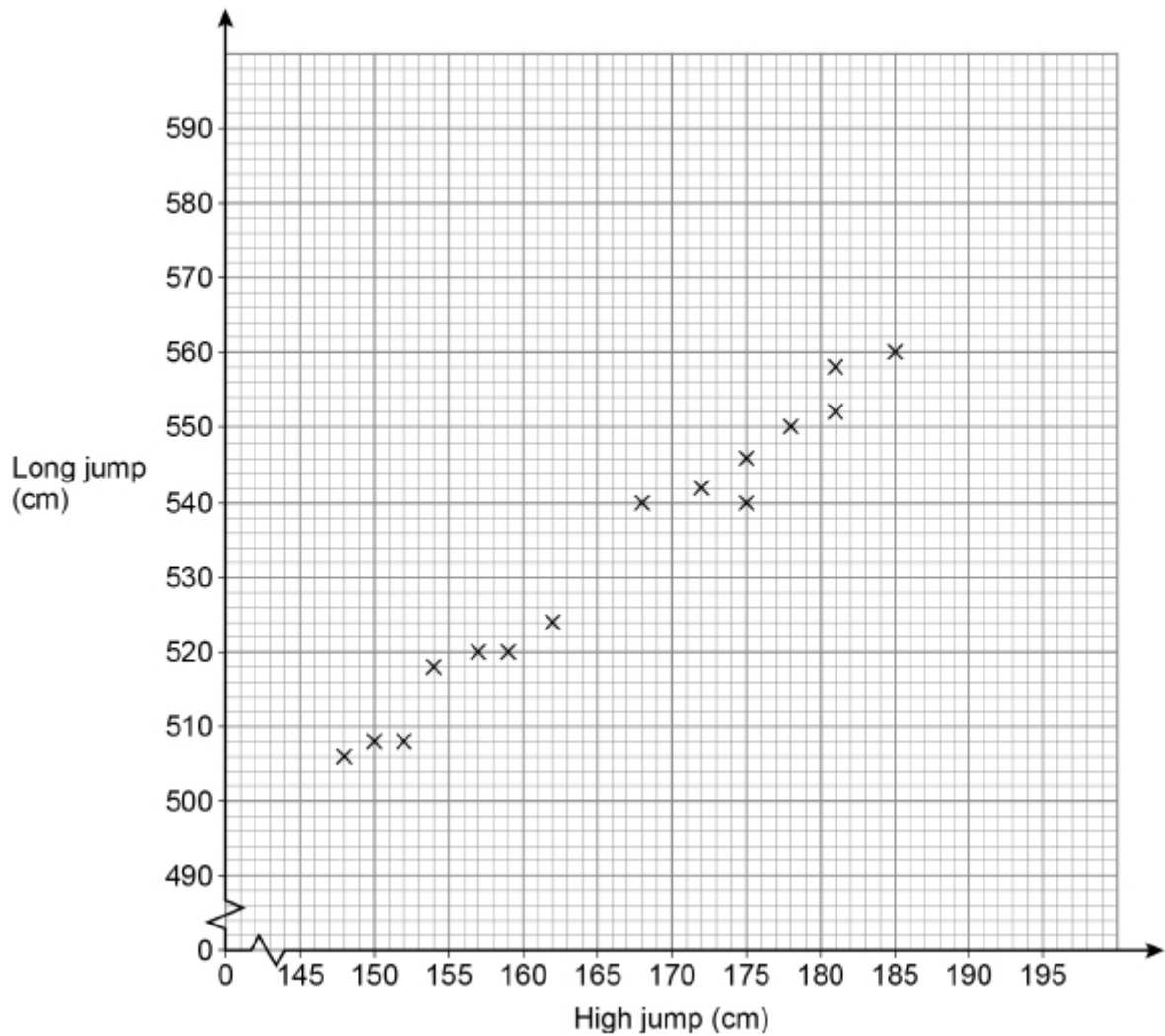

(b) Liam has a best high jump of 166 cm

Use a line of best fit to estimate his best long jump.

Answer ___532___ cm

(Total 2 marks)

Q25c

The scatter graph shows the best high jump and the best long jump for 15 boys.

(c) Another boy has a best high jump of 195 cm

Give a reason why you should **not** use a line of best fit to estimate his best long jump.

(Total 1 mark)

this value lies outside of the data points

Q7

Here is some information about the times taken by 40 people to fill in a form.

Time, t minutes	Number of people
$0 < t \le 5$	3
$5 < t \le 10$	9
$10 < t \le 15$	11
$15 < t \le 20$	17

In which class interval is the median?

Circle your answer.

$0 < t \le 5$ $5 < t \le 10$ $10 < t \le 15$ $15 < t \le 20$

(Total 1 mark)

Q18

Here are five cards.

1   5   7   9   11

One of the cards is removed.

The mean of the numbers on the remaining four cards is 6

Which card was removed?

You **must** show your working.

(Total 3 marks)

total of the cards = 1 + 5 + 7 + 9 + 11

= 33

33 − 24 = 9 ∴ card 9 was removed

mean = $\dfrac{\text{total}}{n}$

$6 = \dfrac{\text{total}}{4} \Rightarrow$ total = 6 × 4 = 24

Q22a

Here is some information about 20 trains leaving a station.

Number of minutes late, t	Number of trains	Midpoint	number of trains x midpoint
$0 \leq t < 5$	12	2.5	30
$5 \leq t < 10$	7	7.5	52.5
$10 \leq t < 15$	1	12.5	12.5
$t \geq 15$	0		0

(a) Work out an estimate of the mean number of minutes late.

Answer _____ 4.75 _____ minutes

$$\text{mean} = \frac{12.5 + 52.5 + 30}{20} = 4.75$$

(Total 3 marks)

Q22b

Here is some information about 20 trains leaving a station.

Number of minutes late, t	Number of trains	Midpoint	
$0 \leq t < 5$	12		
$5 \leq t < 10$	7		
$10 \leq t < 15$	1		
$t \geq 15$	0		

(b)   The station manager looks at the information in more detail.

Number of minutes late, t	Number of trains
$0 \leq t < 2$	12
$2 \leq t < 4$	0
$4 \leq t < 6$	7
$6 \leq t < 8$	0
$8 \leq t < 10$	0
$10 \leq t < 12$	1

He works out an estimate of the mean using this information.

How does his estimate compare with the answer to part (a)?

Tick **one** box.

☐   Higher than part (a)

☐   Same as part (a)

☑   Lower than part (a)

☐   Not possible to tell

(Total 1 mark)

Q21a

An experiment is carried out 200 times.

The possible outcomes are K, L and M.

(a) Complete the table.

Outcome	K	L	M
Frequency	84	54	62
Relative frequency	0.42	0.27	0.31

(Total 2 marks)

Q21b

An experiment is carried out 200 times.

The possible outcomes are K, L and M.

(b) Altogether, the experiment is carried out 500 times.

How many times would you expect the outcome to be K?

(Total 2 marks)

$0.42 \times 500 = 210$ times

Q14a

There are 135 passengers on a plane.

3 of the passengers in Business Class are flying for the first time.

In total, there are 15 passengers in Business Class.

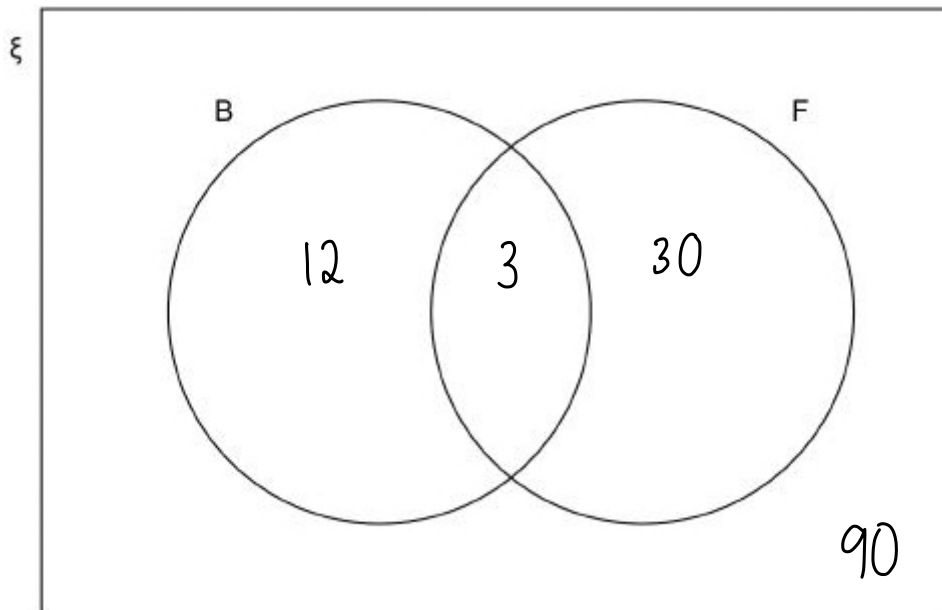$\frac{1}{4}$ of the passengers **not** in Business Class are flying for the first time.

(a) In the Venn diagram,

ξ = passengers on the plane

B = passengers in Business Class

F = passengers flying for the first time.

Complete the Venn diagram.

(Total 4 marks)

Q14b

There are 135 passengers on a plane.

3 of the passengers in Business Class are flying for the first time.

In total, there are 15 passengers in Business Class.

$\frac{1}{4}$ of the passengers **not** in Business Class are flying for the first time.

(b)   One of the passengers is chosen at random.

Write down the probability that the passenger is in Business Class.

$$\frac{15}{135} = \left(\frac{1}{9} \right)$$ **(Total 1 mark)**

Q17b

A shop sells ice creams.

Each ice cream has two scoops.

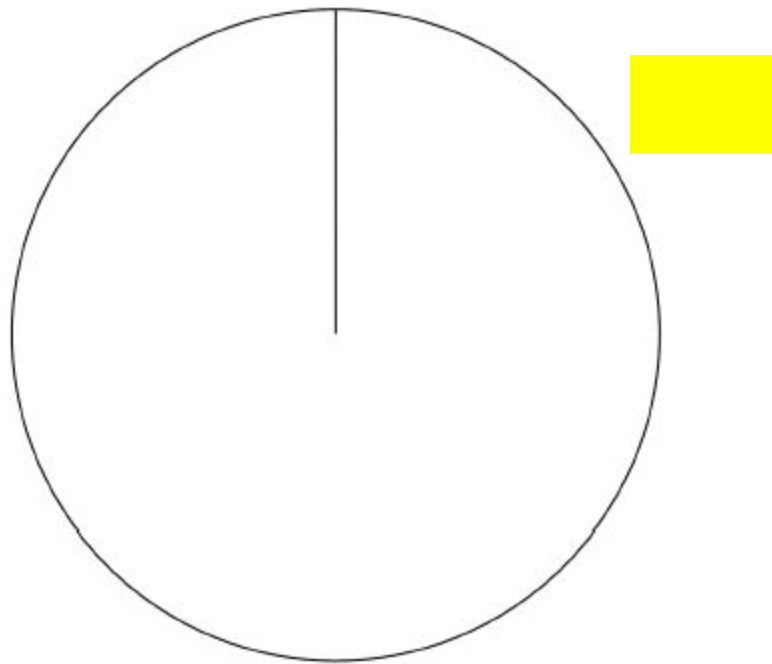The possible flavours are vanilla (V), strawberry (S), chocolate (C) and mint (M).

The two scoops can be the same flavour or different flavours.

(b)   In one hour the shop sells 180 scoops of ice cream.

The number of scoops of each flavour is shown in the table.

Flavour	Vanilla	Strawberry	Chocolate	Mint
Number of scoops	45	75	50	10

Complete the pie chart to represent the data.

(Total 4 marks)

Q2

For a biased dice, $P(6) = \dfrac{3}{5}$

Circle the probability of two sixes when the dice is rolled twice.

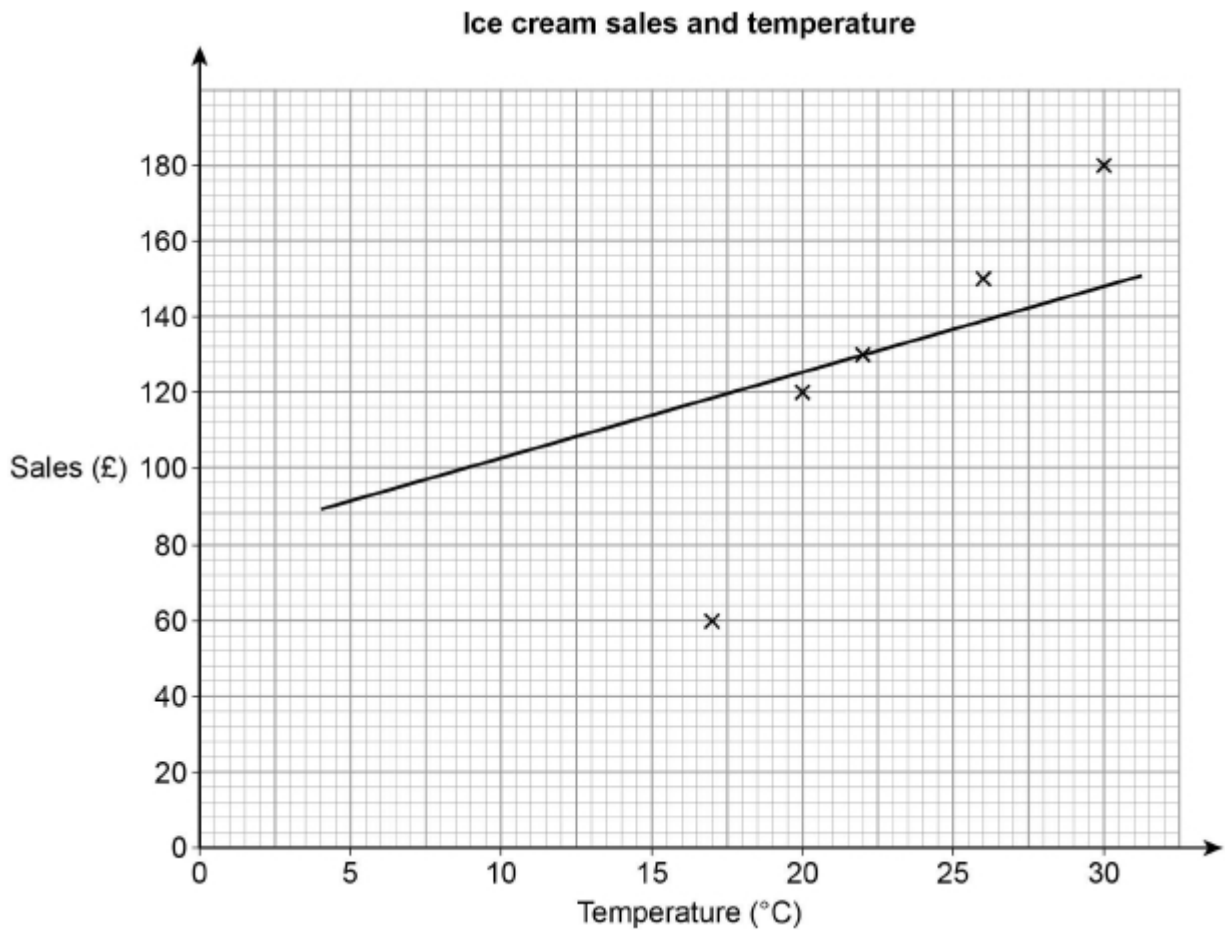$\dfrac{6}{25}$ \qquad $\dfrac{6}{10}$ \qquad $\dfrac{9}{25}$ \qquad $\dfrac{9}{5}$

(Total 1 mark)

Q12a

Lee sells ice creams.

The table shows the midday temperature and his sales for five days.

	Day 1	Day 2	Day 3	Day 4	Day 5
Temperature (°C)	30	26	17	22	20
Sales (£)	180	150	80	130	120

(a) He draws this scatter graph and line of best fit.

Ice cream sales and temperature

Write down **two** mistakes he has made.

Mistake 1

he marked the sales as £60 for temperature 17°C when it should have been £80.

Mistake 2

the line of best fit is not drawn correctly (should cross at least 3 of the data points)
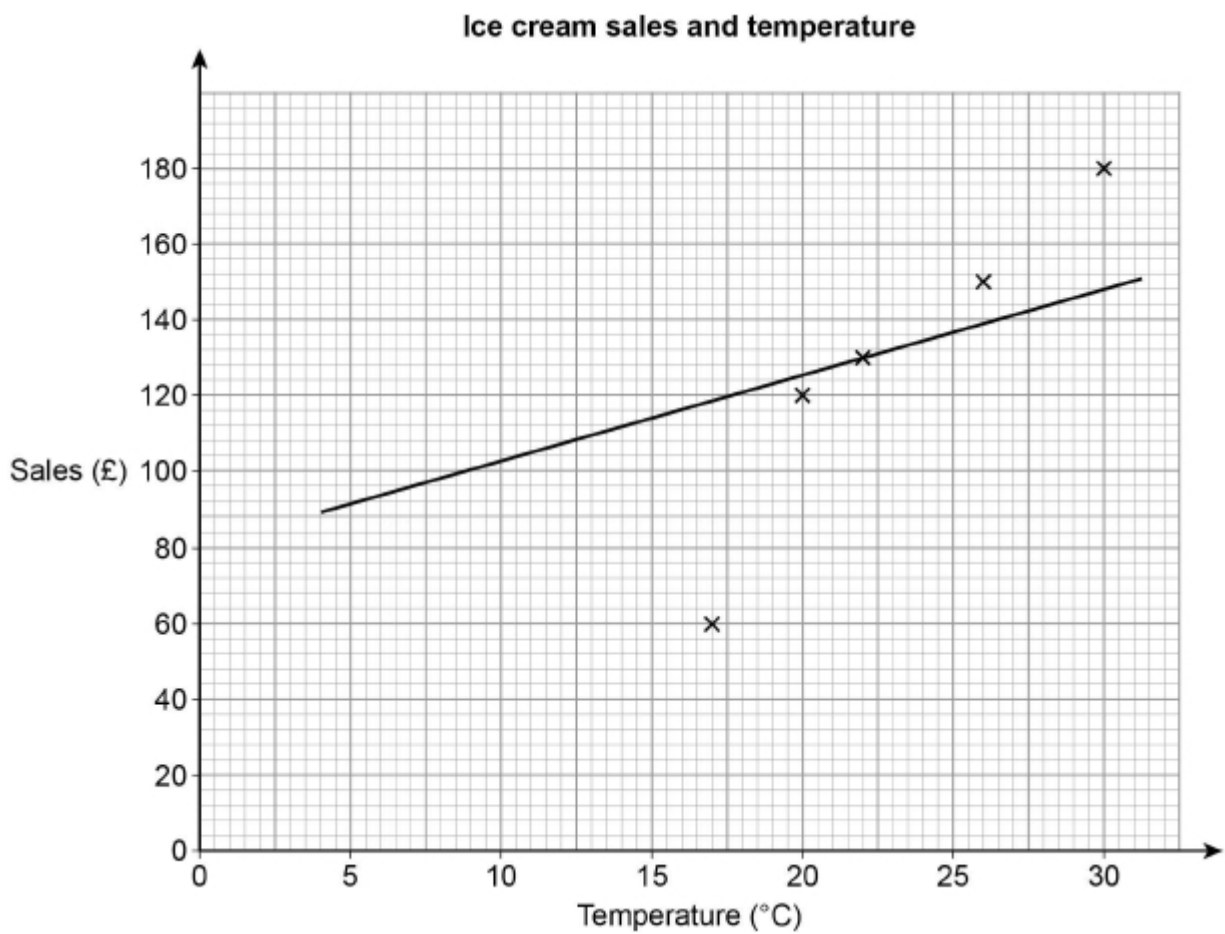
(Total 2 marks)

Q12b

Lee sells ice creams.

The table shows the midday temperature and his sales for five days.

	Day 1	Day 2	Day 3	Day 4	Day 5
Temperature (°C)	30	26	17	22	20
Sales (£)	180	150	80	130	120

He draws this scatter graph and line of best fit.

Ice cream sales and temperature

(b)   Lee wants to work out the range of the five temperatures.

His calculation is   30 − 20 = 10

Is his method correct?

Tick a box.

Yes	☐	No	✓

Give a reason to support your answer.

the range is 30 - 17 (highest - lowest temperature)

(Total 1 mark)

Q19

The following data comes from a large sample survey of the audience at a concert.

	Percentage	Mean age (years)	Age range (years)
Male	17%	20.3	6
Female	83%	25.7	28

Make **three** comparisons of males and females at the concert.

Use the headings given.

Proportion of the audience – 66% more females than males at the concert

Average age – females older on average than males by 5.4 years

Spread of ages – greater spread of ages for females than males

(Total 3 marks)

Q23

Which **one** of the following is discrete data?

Circle your answer.

Mass of a television   Time taken to deliver a television

Height of a television mast   Number of televisions sold

(Total 1 mark)