Sparx Maths

Crossover Workbook 6

Statistics

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In this series of six workbooks, there are a range of questions from key crossover topics that appear in both the GCSE Foundation and Higher tier papers.

Each workbook will focus on a particular strand of maths.

Workbook 6 will cover **Statistics** topics.

The contents of Workbooks 1-6 are shown below.

1 Number

- Fractions
- Factors, multiples and primes
- Percentage change
- Standard form
- Error intervals

2 Algebra

- Solving linear equations
- Linear inequalities
- Index laws
- Linear simultaneous equations
- Linear graphs and coordinates
- Quadratic graphs and equations

3 Ratio & Proportion

- Ratio
- Speed
- Density and pressure
- Proportion

4 Geometry

- Area
- Volume
- Angles
- Pythagoras' theorem
- Trigonometry
- Transformations

5 Probability

- Calculating probabilities
- Expected outcomes
- Tree diagrams
- Set notation

6 Statistics

- Averages
- Averages with grouped data
- Sampling
- Scatter graphs
- Frequency polygons

This workbook is split into two sections:

- **Introduce** questions are fluency questions on each topic to practise the key concepts.
- **Deepen** mixed topic questions are more challenging reasoning and problem solving questions.

Use the list below to keep track of your progress in each topic. If you use Sparx Maths you can find even more questions by searching for the Sparx topic codes in Independent Learning.

	Sparx topic codes	Teacher comment
Averages	U717 U569	
Averages with grouped data	U877	
Sampling	U162	
Scatter graphs	U199 U277 U128	
Frequency polygons	U840	

Calculators may be used in all questions

Q1

Four number cards are shown below.
The median is 8
The range is 10

What are the missing numbers?

Answer: ..... and .....

Q2

The mean of three numbers is 8
Two of the numbers are shown below.

What is the missing number?

Answer: .....

Q3 The median of the following list is 12

$2x$ $3x$ $5x$ $8x$

a) Find the value of x

Answer: $x =$ .....

b) Work out the value of the mean.

Answer: .....

Q4 Amelia asked 20 of her friends how old they were.
Her results are shown in the table below.

What was the median age?

Age (years)	Frequency
11	3
12	4
13	2
14	4
15	5
16	2

Answer: .....

Q1 The table below shows information about the distances cycled by 25 members of a cycling club last week.

Distance cycled (d km)	Frequency
$0 < d \leq 50$	6
$50 < d \leq 100$	8
$100 < d \leq 150$	2
$150 < d \leq 200$	9

a) Write down the modal class interval.

Answer: .....

b) Find the class interval that contains the median.

Answer: .....

c) Calculate an estimate for the mean distance cycled.

Answer: ..... km

Q1

Arya is ordering food for a work event and needs to know how many meals to order. 800 people will be attending the event.

Arya asked 40 people which meal they preferred and recorded it in the table below.

Type of meal	Number
Vegan	8
Vegetarian	9
Chicken	13
Beef	10

a) Estimate the number of vegetarian meals she should order.

Answer: .....

b) What assumption are you making to calculate the estimate?

Answer: .....

.....

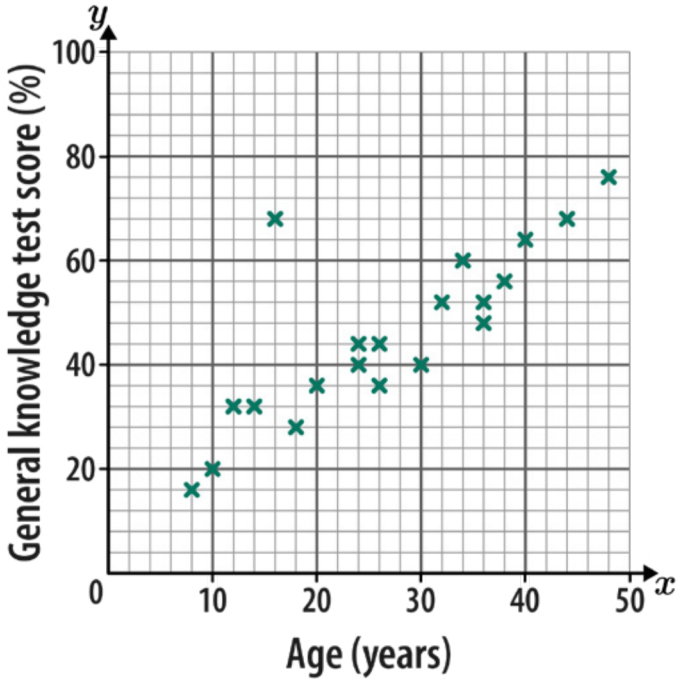
Q2

In a gym survey, 20 out of 45 members asked say they drink coffee.
The gym has 1600 members.

Estimate how many members of the gym drink coffee.

Answer: .....

Q1 The scatter graph shows information about the age and general knowledge test score of 20 people.



Another person takes the general knowledge test.
They were 42 years old and got a score of 60%.

a) Show this information on the scatter graph.

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

c) What type of correlation does the scatter graph show?

Answer: .....

One of the points is an outlier.

d) Write down the coordinates of this point.

Answer: (..... , ...)

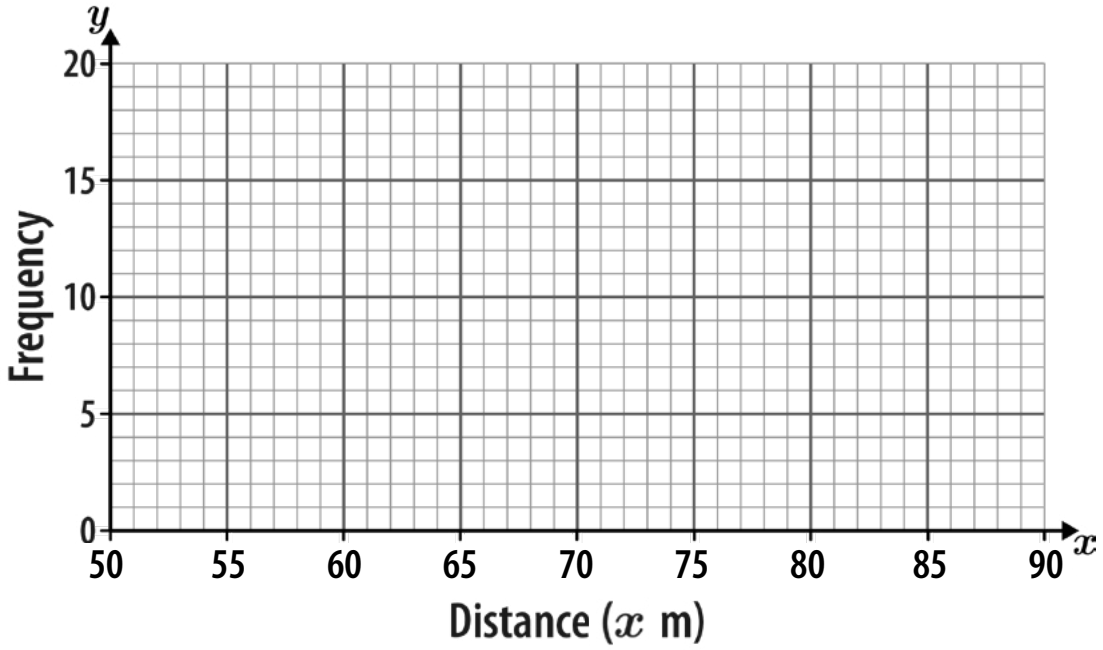
e) Estimate the test score of a person who is 22 years old.

Answer: ..... %

Q1 This table shows information about the hammer throws in a competition.

Distance (x m)	Frequency
$50 < x \leq 60$	8
$60 < x \leq 70$	11
$70 < x \leq 80$	18
$80 < x \leq 90$	2

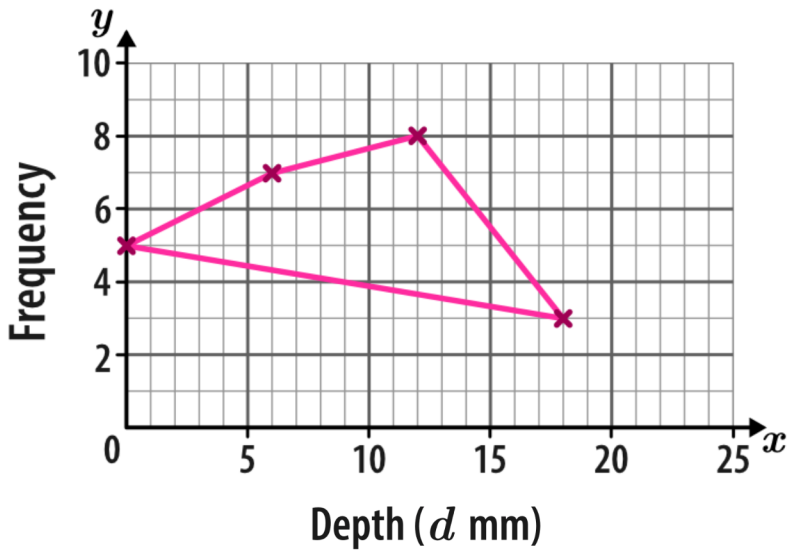
On the grid, draw a frequency polygon for this information.



Q2 The table shows the amount of rainfall that fell, in a day, across 23 towns in Devon.

Depth (d mm)	Frequency
$0 < x \leq 6$	5
$6 < x \leq 12$	7
$12 < x \leq 18$	8
$18 < x \leq 24$	3

Chris has drawn a frequency polygon for the information in the table.



Write down two things that are wrong with the frequency polygon.

Answer: 1. .....

.....

.....

2. .....

.....

.....

Q1

Karim plans to survey 20 supermarket employees.

He wants the proportion of employees from each department to be the same in the sample as in the supermarket.

The number of employees in each department in the supermarket is given in the table.

Department	People
Fresh food	50
Frozen food	30
Bakery	40
Other	80

How many employees from the frozen food department should be in his sample?

Answer: .....

Q2

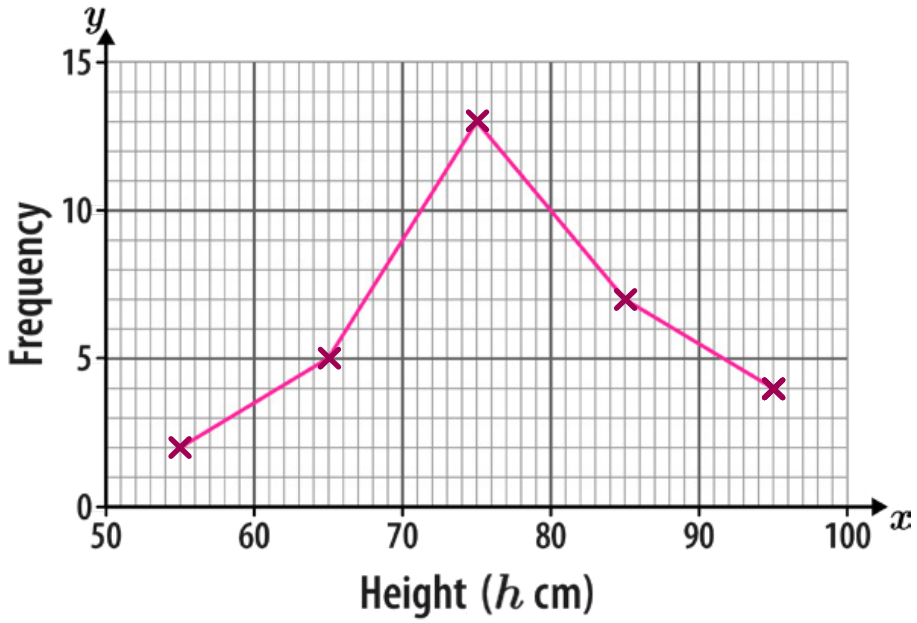
A badminton club has 3 adult members and 7 junior members.

Last week, the mean number of matches played by the adults was 10 and the mean number played by the juniors was 12

What was the overall mean number of matches played?

Answer: .....

Q3 The frequency polygon below gives some information about the height of some newly planted trees.



a) What is the frequency of the modal class interval?

Answer: .....

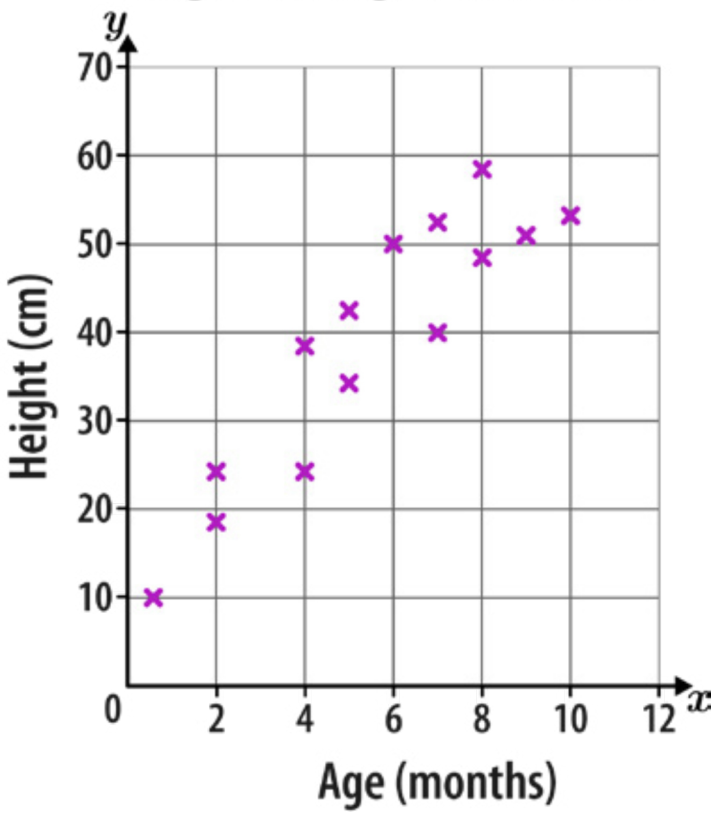
b) What is the modal class interval?

Answer: .....

c) What proportion of trees are over 80cm tall?

Answer: .....

Q4 The scatter graph shows the heights and ages of some Labrador dogs.



a) Describe the relationship between the age and the height of the Labrador dogs.

Answer: .....

.....

.....

Jenny's dog is 8 months old and 15 cm tall.

b) Is it likely that Jenny's dog is a Labrador?

Explain your answer.

Answer: .....

.....

.....

Q5 There are 6 units in an exam course.

Each unit is marked out of 100

To get a grade A, the mean mark of all 6 units must be at least 80

Tom has taken 5 units and his mean mark is 78

To get a grade A, how many marks must he get on the last unit?

Answer: .....

Q6 A council sends a questionnaire to its residents.

Each questionnaire costs 60p to print and post.

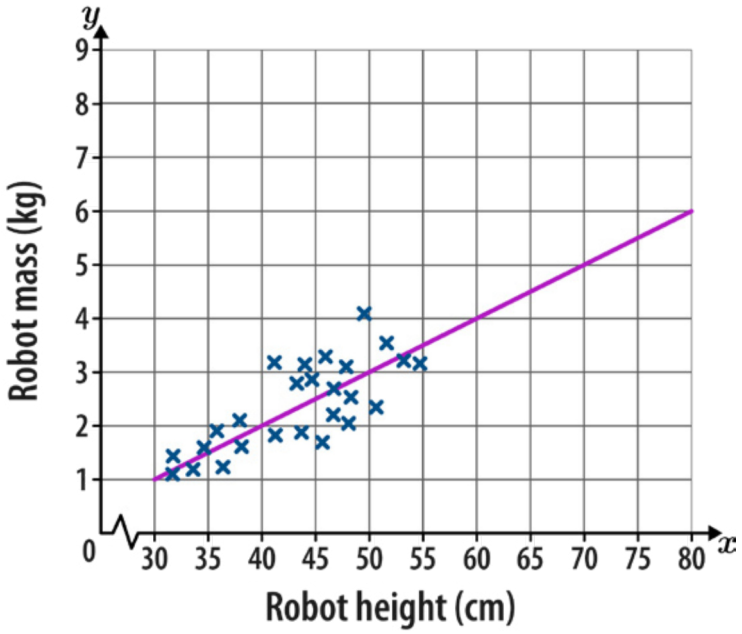
The council expects 10% of the questionnaires to be returned.

Estimate how much it will cost for the council to get 170 responses.

Answer: £ .....

Q7 The scatter graph shows information about some robots entered into a competition.

It shows each robot's height and mass.



It would not be sensible to use the scatter graph to predict the mass of a robot that has a height of 70 cm.

a) Give a reason why.

Answer: .....

.....

.....

b) Calculate the gradient of the line of best fit.

Answer: .....

Q8

Tiffany recorded the number of items bought by different people in a shop.

Her results are shown in the table below.

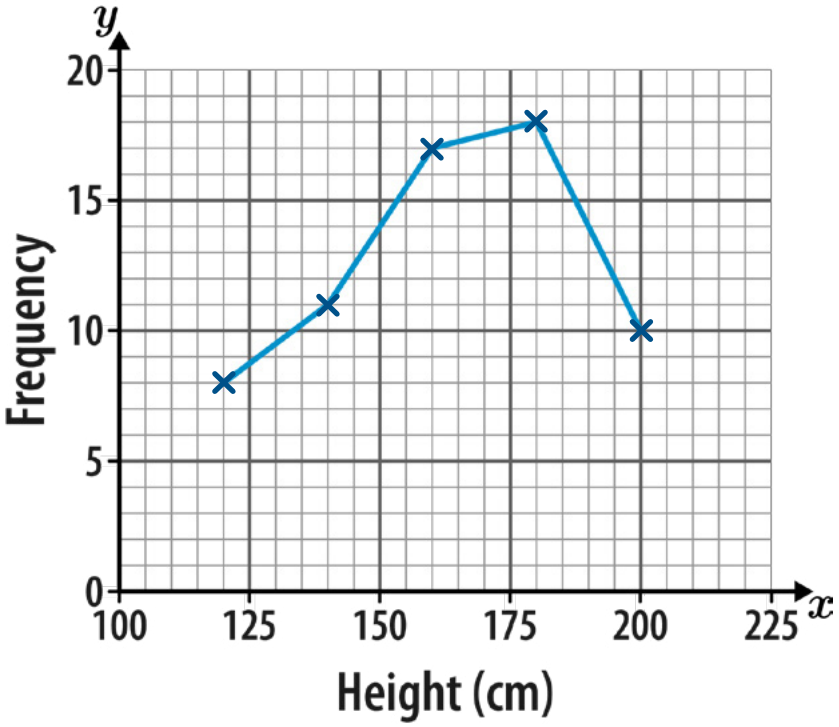
Number of items bought	Frequency
1	2
2	8
3	5
4	?
5	3

Calculate the missing value in the table if the mean number of items bought was 3

Answer: .....

Q9 The frequency polygon shows information about the heights of the members of a badminton club.

Calculate an estimate for the mean height.
Give your answer to 1 decimal place.



Answer: ..... cm

Q10 The table shows information about the delivery times of orders at a takeaway in a week.

Delivery time (t minutes)	Frequency
$10 < t \leq 20$	19
$20 < t \leq 30$	20
$30 < t \leq 40$	
$40 < t \leq 50$	

There were 48 orders in total.

There were twice as many deliveries in the interval $30 < t \leq 40$ as there were in the interval $40 < t \leq 50$

a) Complete the table.

b) Work out an estimate for the mean delivery time.
Give your answer to one decimal place.

Answer: ..... minutes

The takeaway gives a refund if a delivery takes longer than 30 minutes.

c) Work out the percentage of deliveries that received a refund.
Give your answer to the nearest whole number.

Answer: ..... %

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