

8300

GCSE MATHEMATICS

Foundation and Higher tier – Questions by Topic

Statistics

Choosing suitable averages and solving problems

v1.0

Name _____

Materials

For this paper you must have:

- Mathematical instruments

Information

- The marks for questions are shown in brackets

Advice

- In all calculations, show clearly how you work out your answer

For questions 1 to 6 you must **NOT** use a calculator.



Q1.

The table shows information about water used in a household.
The value for April is missing.

Month	Water used (m ³)
January	16.2
February	18.1
March	15.9
April	
May	17.8
June	21.0

The mean monthly water used for the six months is 18 m³
Work out the value for April.

(Total 3 marks)

Q2.

Here are two sets of cards.

Set A 4 7 6 X

Set B 2 5 1 X

X has the same value on both cards.
Each set of cards has a range of 4.
Work out the value of X.

(Total 2 marks)

Q3.

In one month, the number of hours of exercise taken by 10 people are

4 7 2 8 6 5 1 82 3 9

Which is the appropriate average to use in this situation?
Tick a box.

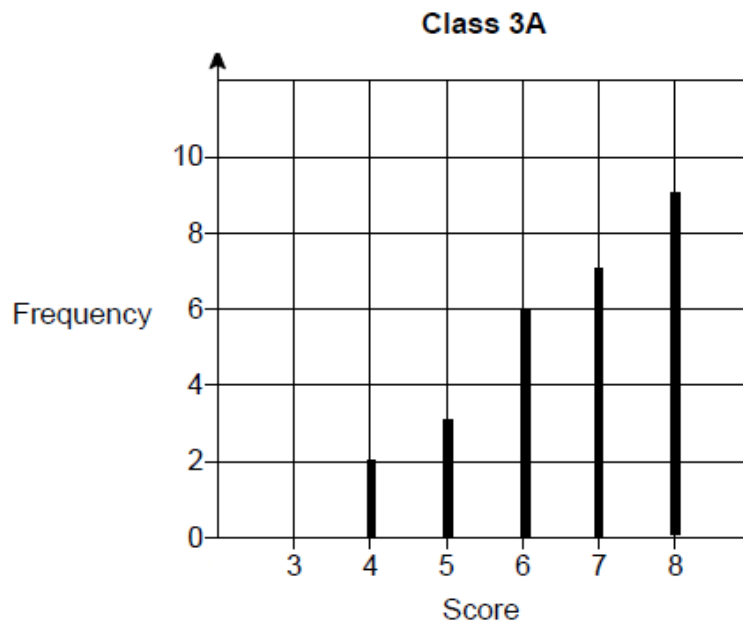
Mean ☐ Median ☐ Mode ☐

Give one reason for each of the other two averages as to why they are **not** appropriate.

(Total 2 marks)

Q4.

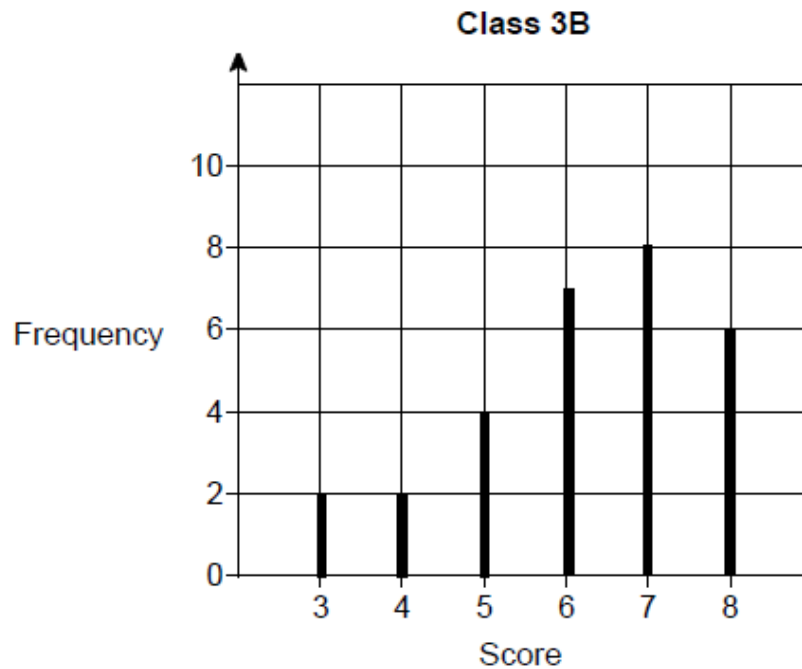
The diagram shows information about the scores of Class 3A in a spelling test.



- (a) A student is chosen at random from Class 3A.
Work out the probability that the student's score was the **mode** for the class.

(3)

The diagram shows information about the scores of Class 3B in the same test.



- (b) Show that Class 3A had more **consistent** scores than Class 3B.
Use the data from both diagrams.
- (c) Lucy is one of the 29 students in **Class 3B**.
Her score was the same as the **median** score for her class.
Work out her score.

(2)

(2)

(Total 7 marks)

Questions 5 and 6 are **higher** tier only.

Q5.

Five **whole** numbers are written in order.

4 7 x y 11

The mean and median of the five numbers are the same.

Work out the values of x and y .

(Total 3 marks)

Q6.

A small building company has 10 employees.

The table shows their monthly salaries.

Job	Number of employees	Monthly salary
Labourer	5	£1200
Driver	3	£1400
Supervisor	1	£2500
Manager	1	£13 500

(a) What is the modal monthly salary?

(1)

(b) The median monthly salary is £1300
Explain why.

(1)

(c) The mean monthly salary is £2620

Give a reason why the mean is not the best average to use for the 10 employees.

(1)

(Total 3 marks)

For the rest of the questions, you may use a calculator.



Q7.

A charity collection was made.

Information about the amounts given by men is shown in the table.

Amount, x (£)	Midpoint	Number of men	
$0 \leq x < 5$		11	
$5 \leq x < 10$		7	
$10 \leq x < 15$		2	
		Total = 20	

The mean amount given by **women** was £6.30 per person.

Compare the mean amounts given by men and women.

(Total 4 marks)

Q8.

A company pays people to visit shops and test customer service.
Paul works for this company.
His fees in October are shown.

Fee (£)	Frequency
8	10
10	18
12	7
15	4
20	1

(a) Calculate his mean fee.

(3)

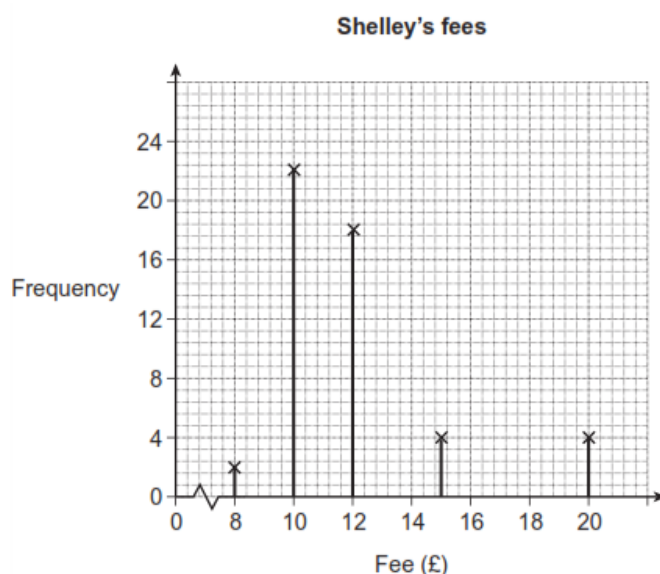
(b) Paul says that his modal fee and his median fee are both £10.
Is he correct?

Give reasons and working to show how you decide.

(2)

(c) Shelley also works for this company.

Her fees in the same month are shown.



Give **one** similarity and **one** difference in the fees of Paul and Shelley.

(2)

(Total 7 marks)

Q9.

Danni and Ed are in the same quiz team.
In each round a person can score up to 10 points.
Here are the scores for Danni.

1 1 10 2 10 1 3

The scores for Ed have a range of 3.

The mean score for Ed is 5.

(a) Compare the scores for Danni and Ed.

(5)

(b) In the final round, only one person can play.

Their team needs 9 points to win.

Who would you choose, Danni or Ed?

Give a reason for your answer.

(1)

(Total 6 marks)

Q10.

The times that 80 customers waited at a supermarket checkout are shown.

Time, t (minutes)	Frequency
$0 \leq t < 2$	32
$2 \leq t < 4$	19
$4 \leq t < 6$	20
$6 \leq t < 8$	7
$8 \leq t < 10$	2

- (a) In which class interval is the median?

Circle your answer.

$0 \leq t < 2$

$2 \leq t < 4$

$4 \leq t < 6$

$6 \leq t < 8$

(1)

- (b) The manager of the supermarket says,
“90% of our customers wait less than 6 minutes.”

Does the data support this statement?

You **must** show your working.

(1)

(Total 2 marks)

Q11.

I am thinking of three positive numbers.

The mode is 5

The median is 5

The range is 9

Work out the three numbers.

(Total 2 marks)

Q12.

Paula records the times she takes to run 30 marathons.

Time, t (minutes)	Frequency	Midpoint	
$200 < t \leq 240$	16		
$240 < t \leq 280$	4		
$280 < t \leq 320$	4		
$320 < t \leq 360$	0		
$360 < t \leq 400$	2		
$400 < t \leq 440$	0		
$440 < t \leq 480$	2		
$480 < t \leq 520$	2		

- (a) Write down the modal class.

(1)

- (b) Use midpoints to calculate an estimate of the mean time Paula takes.

(3)

- (c) Paula runs each marathon in a faster time.
Which average better represents her current performance?
Tick a box.

Modal class

☐

Mean

☐

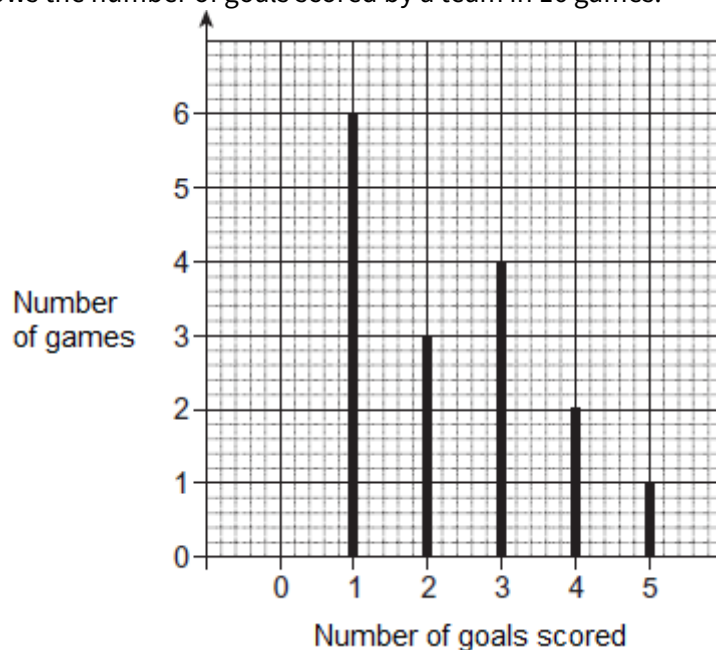
Explain your answer.

(1)

(Total 5 marks)

Q13.

The diagram shows the number of goals scored by a team in 16 games.



- (a) In the next 4 games the team did **not** score.

Complete the diagram for all 20 games.

(1)

- (b) Altogether, how many goals did the team score in the 20 games?

(2)

- (c) The team then played one extra game.

In the 21 games, they scored a mean of 2 goals per game.

How many goals did they score in the extra game?

(2)

(Total 5 marks)

Q14.

Amy raised £ n for charity.

Chris raised £18 more than Amy.

The **mean** amount raised by the two of them is £45.

Work out how much money each one of them raised.

(Total 5 marks)

Q15.

These expressions represent four numbers.

The value of the median of the expressions is 12.

x $2x$ $6x$ $11x$

Work out the value of the mean of the expressions.

(Total 5 marks)

Questions 16 and 17 are **higher** tier only.

Q16.

Here is some information about the number of books read by a group of people in 2014

One of the frequencies is missing.

Number of books	Frequency	Midpoint	
0 – 4	16	2	

5 – 9		7	
10 – 14	20	12	
15 – 19	10	17	

Midpoints are used to work out an estimate for the mean number of books read.

The answer is 8.5

Work out the missing frequency.

(Total 5 marks)

Q17.

The following data is about the same types of plants.

Some of the plants are treated with plant food.

	Mean height (cm)	Interquartile range (cm)
Untreated	30.2	12.3
Treated	35.1	10.7

Compare the untreated plants and treated plants.

(Total 2 marks)

Q18.

Here are the marks of a student in four exams.

65 80 76 69

The student takes a fifth exam.

His mean mark for the five exams is 70

Work out his mark in the **fifth** exam.

(Total 3 marks)