

8300

GCSE MATHEMATICS

Foundation and Higher tier – Questions by Topic

Statistics

Calculating the mean, median, mode and range

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 17 you must **NOT** use a calculator.



Q1.

Here is a list of numbers:

3 4 4 5 6 7 8 11

(a) Work out the mode.

(1)

(b) Work out the mean.

(2)

(Total 3 marks)

Q2.

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)

Q3.

Five integers have

a mode of 6

a median of 8

a mean of 10

What is the **greatest** possible range of the five integers?

You **must** show your working.

(Total 3 marks)

Q4.

The table shows information about the times for 10 people to complete a task.

Time, t (minutes)	Frequency
$0 < t \leq 20$	1
$20 < t \leq 40$	6
$40 < t \leq 60$	3

These statements are about the mean and range of the actual times.

Tick the correct box for each statement.

	True	False
The mean could be less than 20 minutes	☐	☐
The mean could be more than 40 minutes	☐	☐
The mean could be less than 40 minutes	☐	☐
The range could be more than 40 minutes	☐	☐
The range could be less than 40 minutes	☐	☐
The range could be more than 60 minutes	☐	☐

(Total 4 marks)

Q5.

Each number in a list is increased by 10
Tick **one** box for each statement.

	True	False	Cannot tell
The mode is increased by 10	☐	☐	☐
The median is increased by 10	☐	☐	☐
The range is increased by 10	☐	☐	☐

(Total 3 marks)

Q6.

Here is a list of numbers.

5 6 1 3 5 5 8 4 2 2

(a) Work out the median.

(2)

(b) Work out the mean.

(2)

(Total 4 marks)

Q7.

Five integers have:

a mode of 1

a median of 2

a mean of 3

What is the greatest possible range of the five integers?

You **must** show your working.

(Total 3 marks)

Q8.

Here are five numbers.

5 9 10 7 9

(a) What is the mode?

(1)

(b) Show clearly that the median is 9.

(1)

(Total 2 marks)

Q9.

Six whole numbers have

a median of 10

a mode of 11

a range of 4

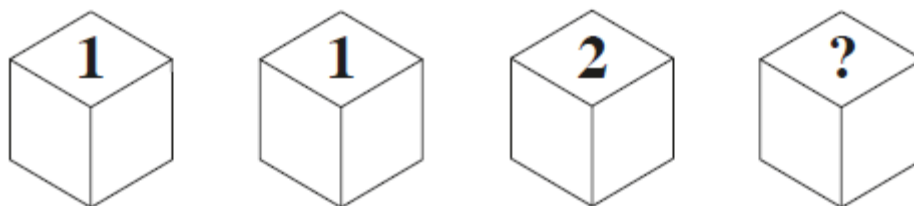
Work out a possible set of six numbers.

Write the numbers in order.

(Total 3 marks)

Q10.

- (a) The scores on four ordinary, six-sided dice are put in order.



The median of the four scores is 0.5 **less** than the mean of the four scores.
Circle the value of the fourth score.

2 3 4 5 6

- (b) The dice are rolled again.
The median of the scores is 0.5 **less** than the range.
Work out a possible set of scores.

(2)

(Total 3 marks)

Q11.

For a set of five numbers,
the mode is 8
the median is 12

Work out **one** possible set of five numbers.

(Total 2 marks)

Q12.

Here is some information about the time spent on social media by 40 women and 40 men last week.

Time spent, t (hours)	Number of women	Number of men
$2 < t \leq 5$	12	10
$5 < t \leq 8$	11	17
$8 < t \leq 11$	14	9
$11 < t \leq 14$	2	4
$14 < t \leq 17$	1	0

Tick **one** box for each statement.

	Definitely true	Might be true	Cannot be true
Three of the women spent more than 11 hours on social media.	☐	☐	☐
The range for the men is 15 hours.	☐	☐	☐
The women have a higher median than the men.	☐	☐	☐

(Total 3 marks)

Q13.

Alina and Sue play netball.

The number of goals they scored in 8 games is shown.

Alina	12	15	17	17	21	22	24	26
Sue	13	13	17	20	22	23	24	31

- (a) Complete this table.

	Range	Median
Alina		19
Sue	18	

(2)

- (b) Which player scored the more consistent number of goals?
Tick **one** box.

Alina

☐

Sue

☐

Give a reason for your answer.

(1)

(Total 3 marks)

Q14.

Complete the list of six numbers so that

the mode is 9

the median is 13

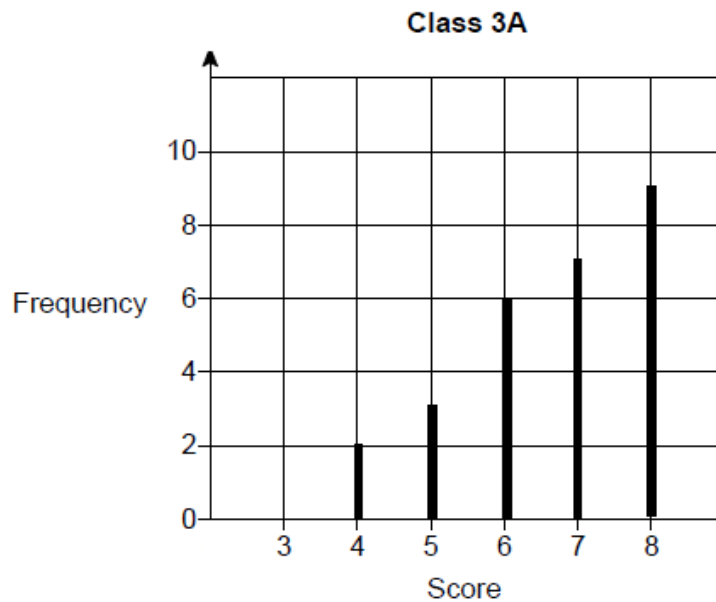
the range is 11

	9			17	
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(Total 3 marks)

Q15.

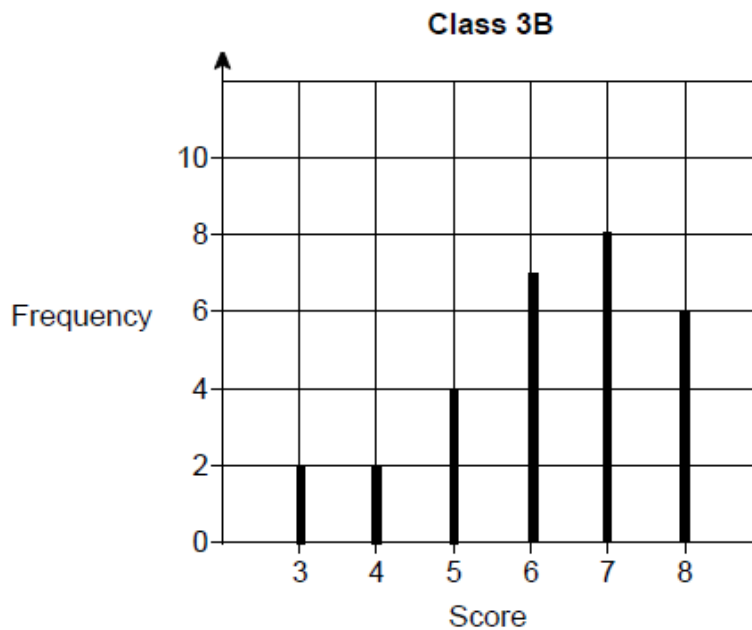
The diagram shows information about the scores of Class 3A in a spelling test.



- (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 16 to 17 are **higher** tier only.

Q16.

Here is a list of 11 whole numbers in numerical order.

The lower quartile, median, upper quartile and highest value are missing.

5	8		13	19		25	28		34	
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- median = $2 \times$ lower quartile
- upper quartile = $2.5 \times$ lower quartile
- range = $2 \times$ interquartile range

Complete the list.

(Total 2 marks)

Q17.

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)

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



Q18.

Here is a list of numbers.

3 5 5 6 7 8 9 13

(a) Write down the mode.

(1)

(b) Work out the mean.

(2)

(Total 3 marks)

Q19.

Lilly rolls four ordinary six-sided dice.

She records the numbers rolled.

The mode of the numbers is one more than the median.

Work out a possible set of four numbers she could have rolled.

(Total 2 marks)

Q20.

Here is some information about temperatures in Italy in January.

	Minimum temperature (°C)	Maximum temperature (°C)
Northern Italy	-4	5
Central Italy	5	13
Southern Italy	10	16

- (a) Which part of Italy is coldest in January? (1)
- (b) Which part of Italy has the smallest range in temperature in January?
You **must** show your working. (2)
- (c) The temperatures in a town in Italy on five days in January are
10 °C 5 °C 11 °C 7 °C 12 °C
Work out the mean temperature. (2)
- (d) Which part of Italy do you think the town in part (c) is in?
Give a reason for your answer. (1)

(Total 6 marks)

Q21.

Oscar and Erik want to find out who can solve puzzles faster.

They each solve five puzzles.

Here are Oscar's times in seconds.

10.03 9.78 10.61 12.90 10.08

The table gives information about Erik's times in seconds.

Fastest time	9.15
Slowest time	10.54
Mean of five times	10.23

The fastest and slowest times are **not** used.

The winner is the one with the lower mean of the other three times.

Who wins?

You **must** show your working.

(Total 5 marks)

Q22.

Here are nine numbers.

23 25 23 31 20 25 21 24 25

- (a) Work out the median. (2)
- (b) Write down the mode. (1)
- (Total 3 marks)**

Q23.

Chris recorded the number of runs he scored in five cricket matches.

21 20 29 22 24

- (a) Calculate the mean.

Give your answer to the nearest whole number.

(4)

- (b) Calculate the range.

(1)

Tommy also recorded the number of runs he scored in the five matches.

- (c) Tommy's mean was 30.

He says, "I scored more runs than Chris."

Use the data to comment on this statement.

(1)

- (d) Tommy's range was 75.

Chris says, "I was more consistent than Tommy."

Use the data to comment on this statement.

(1)

(Total 7 marks)

Q24.

The mean of four numbers is 6.

The median is 7.

The mode is 8.

What are the four numbers?

(Total 3 marks)

Q25.

Here is a list of numbers.

0 3 5 7 12 29

Find **three** numbers from the list with the range double the median.

Write down the values of the range and median.

(Total 3 marks)

Q26.

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)

Q27.

A, B and C are sets of three cards.

- (a) Set B has the same **total** as Set A.
Set B has the same **median** as Set A.
Complete the cards in Set B.

Set A	12	18	15
Set B	20		

(2)

- (b) Set C has the same **total** as Set A.
Set C has the same **range** as Set A.
Complete the cards in Set C.

Set A	12	18	15
Set C	17		

(2)

(Total 4 marks)

Q28.

Here is a list of numbers.

0 3 5 7 12 29

- (a) Write down **three** numbers from the list with a median of 7. (1)
- (b) Write down **three** numbers from the list with a range of 7. (1)
- (c) Find **three** numbers from the list with a mean that is a whole number. (2)
- (d) Find **three** numbers from the list with the range double the median.
Write down the values of the range and median. (3)

(Total 7 marks)

Q29.

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)

Q30.

Mrs Shah buys pepper plants.

Here are the numbers of peppers she grows from 10 plants.

10 13 11 10 12 15 13 12 11 10

(a) Work out the median.

(2)

(b) Work out the mean.

(3)

(c) Mrs Shah buys some more pepper plants.

She says,

“On average, I should get about 12 peppers from each plant.”

Give a reason why her data shows she is correct.

(1)

(Total 6 marks)

Q31.

Four numbers have a mean of 10

The median is 8

Two of the numbers are 1 and 5

Work out the other two numbers.

(Total 3 marks)

Q32.

Six positive numbers have

a mean of 10

a range of 19

Four of the numbers are 12 7 15 3

Work out the other two numbers.

(Total 3 marks)

Q33.

Here are seven numbers.

13 6 12 7 6 4 8

(a) Work out the range of the seven numbers.

Circle your answer.

5 6 7 8 9

(1)

(b) What is the mode of the seven numbers?

Circle your answer.

5 6 7 8 9

(1)

(Total 2 marks)

Q34.

Adam saved these amounts.

£124 £79.50 £122.50 £96 £85

(a) Work out the range.

(2)

(b) Matthew saved **half** as much as Adam.

Work out the **total** amount that Matthew saved.

(3)

(Total 5 marks)

Q35.

These expressions represent four numbers.
The value of the median of the expressions is 12.

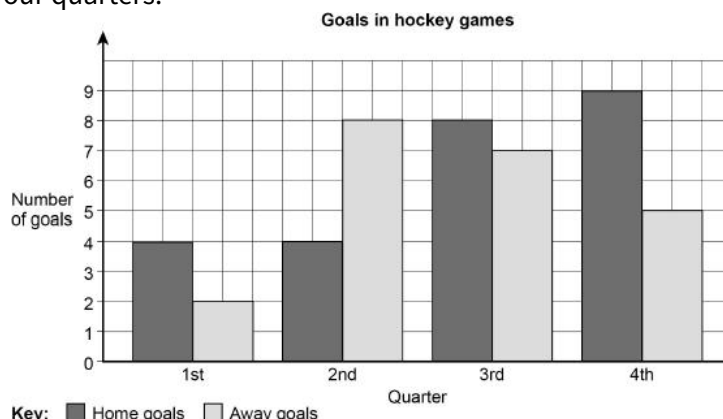
x $2x$ $6x$ $11x$

Work out the value of the mean of the expressions.

(Total 5 marks)

Q36.

Here is information about the goals scored in some hockey games.
Each game has four quarters.



(a) Which quarter was the mode for **away** goals?

Circle your answer.

1st 2nd 3rd 4th

(1)

(b) There were 10 games.

Work out the mean number of goals per game.

(2)

(c) In total, how many **more** home goals were scored than away goals?

(2)

(d) Rob says,

“More home teams **must** have won because there were more home goals.”

Is he correct?

Give a reason for your answer.

(1)

(Total 6 marks)

Q37.

The tables show two sets of data.

Set A	
Result	Frequency
2	3
3	7
4	8
5	7
6	9
7	1

Set B	
Result	Frequency
3	3
4	12
5	9
6	8

(a) Liam says, “Set A has the higher mode.”

Is he correct?

You **must** show your working.

(2)

(b) Liam says, “Set A has the larger range.”

Is he correct?

You **must** show your working.

(2)

(Total 4 marks)

Q38.

Here are eight numbers.

4 10 9 3 4 12 5 14

(a) Work out the range.

(1)

(b) Work out the median.

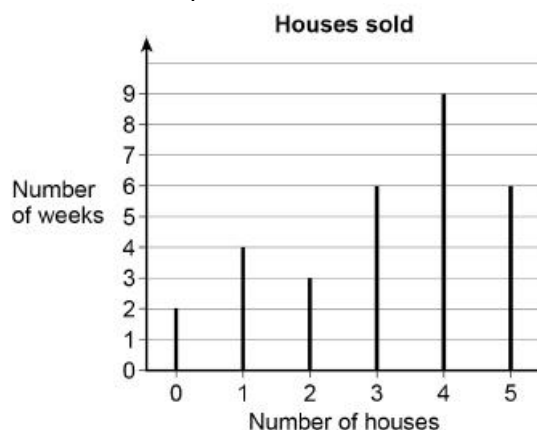
(2)

(Total 3 marks)

Q39.

A company sells houses.

The line graph shows the number sold per week for 30 weeks.



(a) Work out the range of the number of houses sold per week.

(2)

(b) Work out the median number of houses sold per week.

(2)

(c) The company sells three houses.

The prices are £185 000, £239 000 and £136 000

The company earns 2% commission on each house.

In total, how much commission does the company earn on these three houses?

(3)

(Total 7 marks)

Q40.

Eleven people play a game.

Here are their scores.

12 9 15 9 18 18 3 14 9 16 20

(a) Write down the mode.

(1)

(b) Work out the median.

(2)

(Total 3 marks)

Q41.

Here is a list of numbers

7 4 9 10 4 3 5 8

(a) Write down the mode.

(1)

(b) Work out the mean.

(2)

(Total 3 marks)

Q42.

Here is a list of numbers.

10 8 2 11 12 15 4 4

(a) Write down the mode.

(1)

(b) Work out the median.

(2)

(c) Work out the range.

(1)

(Total 4 marks)

Q43.

Here are five numbers.

14.2 15.1 16.5 16.7 18.0

(a) Work out the range.

(1)

(b) Work out the mean.

(2)

(Total 3 marks)

Q44.

Which of these is an estimate? Tick **one** box.

☐
☐
☐
☐

lowest value of **ungrouped** data

range of **ungrouped** data

modal class of **grouped** data

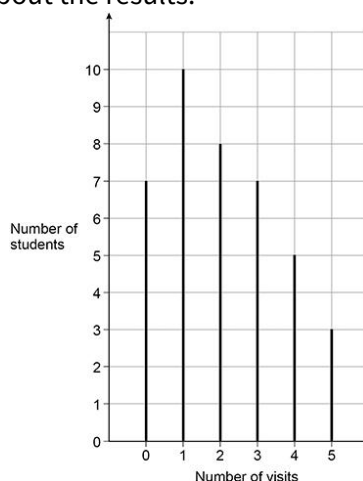
mean of **grouped** data

(Total 1 mark)

Q45.

40 students were asked the number of visits they made to a gym one week.

The chart shows information about the results.



(a) Write down the modal number of visits.

(1)

(b) Work out the mean number of visits.

Give your answer as a decimal.

(3)

(c) One of the 40 students is chosen at random.

Work out the probability that the student visited the gym **at least** once.

(2)

(Total 6 marks)

Q46.

Here are the salaries, in £, of the 6 workers in a company.

18 300 20 700 21 500 21 500 21 500 99 000

(a) Work out the mean salary.

(2)

(b) Why is the mean **not** the best average to represent the salaries?

(1)

(Total 3 marks)

Questions 47 to 48 are **higher** tier only.

Q47.

Here are seven cards.



Each card has a number on it.

For the numbers, the lower quartile is equal to the upper quartile.

(a) What does this tell you, if anything, about the value of the median?

(1)

(b) What does this tell you, if anything, about the value of the mode?

(1)

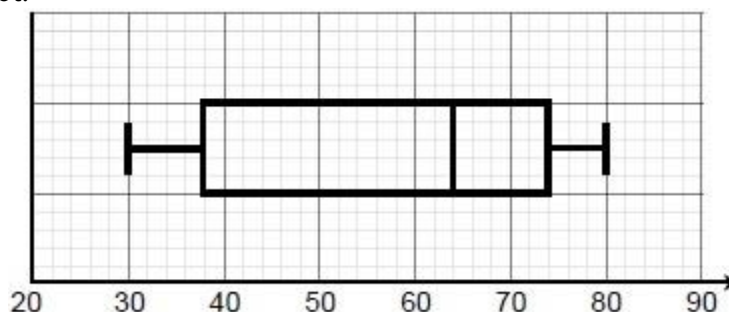
(c) What does this tell you, if anything, about the value of the mean?

(1)

(Total 3 marks)

Q48.

Here is a box plot.



(a) Work out the range.

(1)

(b) Write down the value of the median.

(1)

(c) Work out the value of the interquartile range.

(1)

(Total 3 marks)