

8300

GCSE MATHEMATICS

Foundation and Higher tier – Questions by Topic

Statistics

Interpreting frequency tables with grouped data

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



Q1.

The table shows information about the times for 100 people to complete a task.

Time, t , (minutes)	Frequency
$0 < t \leq 5$	17
$5 < t \leq 10$	28
$10 < t \leq 15$	33
$15 < t \leq 20$	22

The shortest time was 2 minutes 50 seconds.

- (a) The shortest time was 2 minutes 50 seconds.
Work out the greatest possible range of times.

(2)

- (b) Jack says,
“The median time is exactly 10 minutes.”
Give a reason why he **must** be incorrect.

(1)

(Total 3 marks)

Q2.

The table shows information about the times for 100 people to complete a task.

Time, t , (minutes)	Frequency
$0 < t \leq 5$	17
$5 < t \leq 10$	28
$10 < t \leq 15$	33
$15 < t \leq 20$	22

The shortest time was 3 minutes 40 seconds.

- (a) Work out the **greatest** possible range of times.

(2)

- (b) Jack says,
“The median time is exactly 10 minutes.”
Give a reason why he **must** be incorrect.

(1)

(Total 3 marks)

Q3.

Katy records the number of cars using a drive-through each hour for 24 hours.
Here are the results.

36 20 37 53 42 41 24 18 39 35 40 47
38 17 23 18 13 35 10 7 6 18 31 57

Katy makes this tally and frequency chart to put the data into groups.

Number of cars	Tally	Frequency
0 to 10		
10 to 20		
20 to 30		
30 to 40		
40 to 50		

Make **two** criticisms of Katy’s tally and frequency chart.
You do **not** need to complete the chart.

(Total 2 marks)

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



Q4.

Here is some information about the time spent on social media by 50 people.

Time, t minutes	Number of people
$0 < t \leq 15$	2
$15 < t \leq 30$	9
$30 < t \leq 45$	31
$45 < t \leq 60$	8

Circle the number of people who spent more than 30 minutes.

9

11

31

39

(Total 1 mark)

Q5.

In a sport, injury time is added time played at the end of a match.

The table shows the injury time, t (minutes) played in 380 matches.

Injury time, t (minutes)	Frequency
$0 < t \leq 2$	59
$2 < t \leq 4$	158
$4 < t \leq 6$	106
$6 < t \leq 8$	45
$8 < t \leq 10$	12

(a) Circle the **two** words that describe the data.

continuous

discrete

grouped

ungrouped

(1)

(b) Which class interval contains the median?

You **must** show your working.

(2)

(c) What percentage of the matches had **more than** 6 minutes of injury time?

(2)

(Total 5 marks)

Q6.

The times that 60 customers waited at a supermarket checkout are shown.

Time, t (minutes)	Frequency
$0 \leq t < 2$	18
$2 \leq t < 4$	10
$4 \leq t < 6$	16
$6 \leq t < 8$	12
$8 \leq t < 10$	4

(a) Write down the class interval that contains the median.

(1)

(b) The manager of the supermarket says,

“Over 90% of our customers wait less than eight minutes.”

Does the data support this statement?

Yes

☐

No

☐

You **must** show your working.

(2)

(Total 3 marks)

Q7.

The pay of 100 students with Saturday jobs was recorded.

Pay (£x)	Number of students
$0 < x \leq 10$	2
$10 < x \leq 20$	44
$20 < x \leq 30$	41
$30 < x \leq 40$	1
$40 < x \leq 50$	2
$50 < x \leq 60$	4
$60 < x \leq 100$	6
Total = 100	

(a) How many were paid more than £30?

(1)

(b) How many were paid £5 or less?

Circle your answer.

0

1

2

Cannot tell

(1)

(c) Work out the class interval that contains the median.

(1)

(Total 3 marks)

Q8.

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		

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

(3)

(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

(1)

(Total 4 marks)

Q9.

The table summarises the amounts spent, £A, by customers in a shop in one hour.

Amount spent, £A	Number of customers		
$0 < A \leq 10$	18		
$10 < A \leq 20$	15		
$20 < A \leq 30$	7		
More than 30	0		

- (a) Work out an estimate of the mean amount spent per customer in one hour.

(4)

- (b) Using the till receipts, the manager works out the actual mean amount spent for each group.

Amount spent, £A	Number of customers	Actual mean amount spent
$0 < A \leq 10$	18	£4.50
$10 < A \leq 20$	15	£15.00
$20 < A \leq 30$	7	£23.40

Without further calculation, decide whether the actual mean of the 40 customers will be different from the estimated mean in part (a). Tick a box.

☐

Higher

☐

Lower

☐

The same

Give a reason for your answer.

(2)

(Total 6 marks)

Q10.

A 10 km race took place.

Information about the times achieved by women are in the table.

Time (minutes)	Midpoint	Number of women	
$50 \leq m < 60$		1	
$60 \leq m < 80$		6	
$80 \leq x < 100$		13	
		Total = 20	

The mean time achieved by **men** was 81 minutes.

Compare the mean times achieved by men and women.

(Total 4 marks)

Q11.

80 patients gave information about how long they waited to see the doctor.

Time, T, (minutes)	Frequency		
$0 \leq T < 10$	5		
$10 \leq T < 20$	22		
$20 \leq T < 30$	28		
$30 \leq T < 40$	21		
$40 \leq T < 50$	4		

- (a) Work out an estimate of the mean time that the patients waited.

(4)

- (b) The doctor says, “70% of our patients wait less than 30 minutes to be seen.”

Is she correct?

You **must** show your working.

(3)

(Total 7 marks)

Q12.

The table shows the waiting time, T , of people at a health centre.

Time waited, T	Number of people		
$0 < T \leq 10$	42		
$10 < T \leq 20$	30		
$20 < T \leq 30$	8		
More than 30	0		

- (a) Work out an estimate of the mean time waited per person.
- (b) On a different day the waiting times were recorded for a different group of 80 people.

(4)

Time waited, T	Number of people
$0 < T \leq 10$	35
$10 < T \leq 20$	33
$20 < T \leq 30$	12

Without further calculation, decide whether the estimated mean for this group of people will be different from the estimated mean in part (a).

Tick a box.

☐

Higher

☐

Lower

☐

The same

Give a reason for your answer.

(2)**(Total 6 marks)****Q13.**

A company has 123 employees.

Information about their hourly rates of pay is shown in the table.

Hourly rate, $\pounds p$	Number of employees
$10 \leq p < 14$	66
$14 \leq p < 20$	32
$20 \leq p < 40$	15
$40 \leq p < 100$	10
Total = 123	

The owner of the company uses the data to make two statements.

Statement A

“Over 30% of employees have an hourly rate that is more than $\pounds 17$ ”

Statement B

“The average hourly rate of pay is more than $\pounds 20$ ”

- (a) Show working that supports **Statement A**.
- (b) Why might **Statement A not** be true?
- (c) Work out an estimate of the mean to support **Statement B**.
- (d) Why is the mean **not** the best average to represent the data?

(3)**(1)****(3)****(1)****(Total 8 marks)**

Q14.

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)

Q15.

This table shows information about the weights of 200 rabbits.

Weight, w (grams)	Frequency	Midpoint	
$60 < w \leq 70$	101	65	
$70 < w \leq 80$	64	75	
$80 < w \leq 90$	25	85	
$90 < w \leq 100$	10	95	
	Total = 200		

- (a) Tick whether each statement is true or false

You can use the table to calculate the exact median.

True

False

You can use the table to work out the weight of the heaviest rabbit.

(1)

- (b) Calculate an estimate of the mean weight of the 200 rabbits.

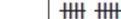
(3)

- (c) Here are the weights, in grams, of 10 more rabbits.

76.2	89.4	93.1	99.7	86.8	79.2	82.6	91.9	88.0	95.4
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Complete the table with:

- tallies for these 10 rabbits
- the frequencies for all 210 rabbits.

Weight, w (grams)	Tally	Frequency
$60 < w \leq 70$		
$70 < w \leq 80$		
$80 < w \leq 90$		
$90 < w \leq 100$		
		Total = 210

(2)

- (d) Which **two** of these diagrams could you use to represent this grouped data?

Circle your answers.

stem-and-leaf

frequency polygon

scatter graph

histogram

(1)

(Total 7 marks)

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

Q16.

100 people were asked about the distance they travel from home to work.
The table shows information about the results.

Distance, d (miles)	Frequency
$0 \leq d < 5$	21
$5 \leq d < 10$	24
$10 \leq d < 20$	37
$20 \leq d < 40$	18

- (a) Write down the **greatest** possible number of people who work from home.

(1)

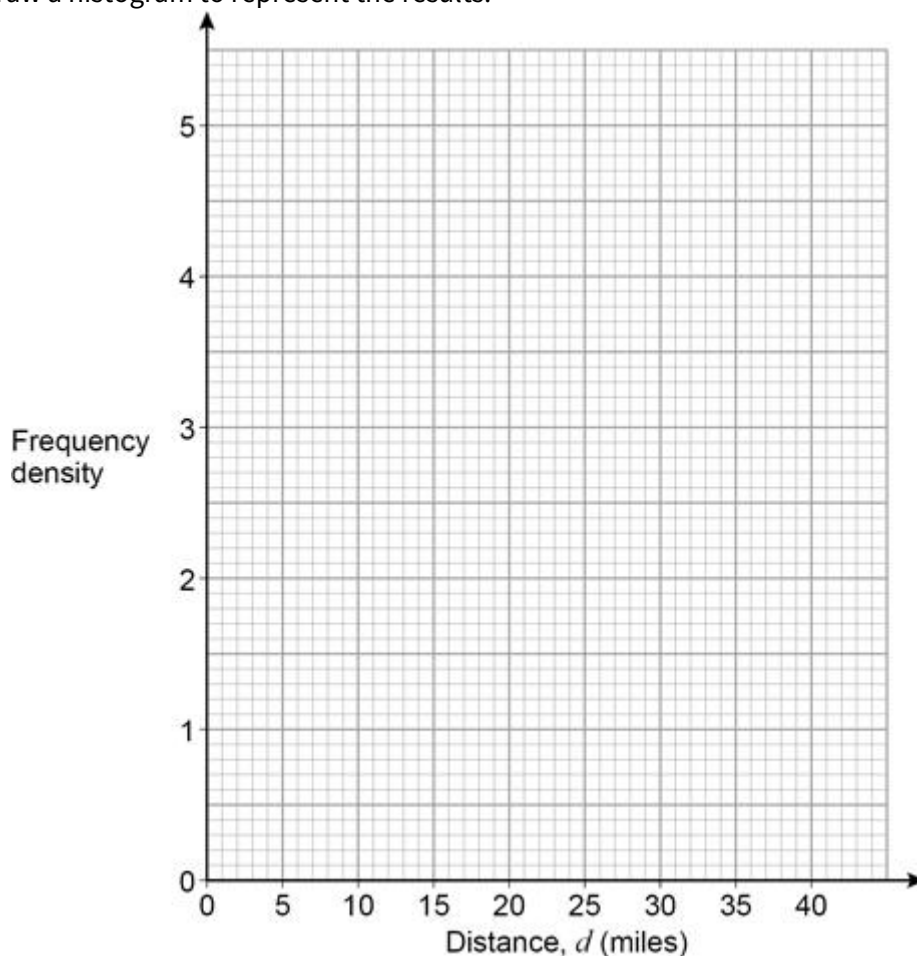
- (b) One person is chosen at random.
Work out the probability that the person travels **at least** 10 miles.

(1)

- (c) The table is repeated.

Distance, d (miles)	Frequency
$0 \leq d < 5$	21
$5 \leq d < 10$	24
$10 \leq d < 20$	37
$20 \leq d < 40$	18

Draw a histogram to represent the results.



(3)

(Total 5 marks)

Q17.

The ages of 100 people who entered a theme park one day were recorded.

Age (years)	Number of people
$0 < a \leq 15$	12
$15 < a \leq 30$	35
$30 < a \leq 45$	28
$45 < a \leq 70$	21
$70 < a$	4

- (a) There is a special offer:

18 years and under are free

Over 18s pay £36

On average 8000 people visit the theme park each day.

Estimate the total amount of money taken each day.

(3)

- (b) Jane says,

“12% of people entering the theme park are under 15 years of age.”

Explain why she might be wrong.

(1)

(Total 4 marks)