GCSE · Edexcel · Maths

3 hours 62 questions

Exam Questions

Averages, Ranges & Data

Mean, Median & Mode / Calculations with the Mean / Averages from Tables / Averages from Grouped Data / Range & Interquartile Range / Comparing Data Sets / Population & Sampling / Capture-Recapture

Easy (21 questions)	/55
Medium (24 questions)	/85
Hard (17 questions)	/58
Total Marks	**/198**

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Easy Questions

1 15 people were asked how long, in minutes, they had been waiting for a bus.
Here are the results.

2	3	3	4	5	6	6	8	9	10	11	13	14	15	18

Find the interquartile range of these times.

(2 marks)

2 Here is the number of goals that Henri's team scored one summer in each water polo match.

5 8 9 11 13 13 14 15 16 17 20

Find the interquartile range of the numbers of goals.
Show your working clearly.

(2 marks)

3 Twenty students took a Science test and a Maths test.

Both tests were marked out of 50

The table gives information about their results.

	Median	Interquartile range
Science	27	18
Maths	24.5	11

Use this information to compare the Science test results with the Maths test results.
Write down **two** comparisons.

(2 marks)

4 The table shows information about the weights, in kg, of 40 parcels.

Weight of parcel (p kg)	Frequency
$0 < p \leqslant 1$	19
$1 < p \leqslant 2$	12
$2 < p \leqslant 3$	5
$3 < p \leqslant 4$	2
$4 < p \leqslant 5$	2

Write down the modal class.

(1 mark)

5 The students in Class A and in Class B take the same examination.

The lowest score in Class A is 39
The range of scores for Class A is 57
The lowest score in Class B is 33
The range of scores for Class B is 60

Find the range of scores for all the students in both classes.

(3 marks)

6 The table gives information about the speeds, in kilometres per hour, of 80 motorbikes as each pass under a bridge.

Speed (s kilometres per hour)	Frequency
$40 < s \leqslant 50$	10
$50 < s \leqslant 60$	16
$60 < s \leqslant 70$	19
$70 < s \leqslant 80$	23
$80 < s \leqslant 90$	12

Write down the modal class.

(1 mark)

7 The table gives information about the length of time, in minutes, that each of 60 students took to travel to school on Monday.

Length of time (t minutes)	Frequency
$0 < t \leqslant 10$	4
$10 < t \leqslant 20$	10
$20 < t \leqslant 30$	15
$30 < t \leqslant 40$	25
$40 < t \leqslant 50$	6

Write down the modal class interval.

(1 mark)

8 15 students took an English test.
The same 15 students took a Maths test.
Both tests were marked out of 30.

For the English test results
the median was 21
the interquartile range was 14

The Maths test results are shown below.

18	18	19	20	24	25	25	26	28	28	29	29	29	30	30

Use the information above to compare the English test results with the Maths test results.

Write down **two** comparisons.

(4 marks)

9 (a) Naga states a hypothesis.

"Most people read more than 100 books a year."

She asks a sample of five people in a book club how many books they read last month. The table shows the results.

	Lynn	**Ali**	**Paul**	**Chen**	**Ruth**
Number of books	10	11	8	10	13

Show how Naga could use the data to support her hypothesis.

(2 marks)

(b) Give two reasons why this sample should **not** be used to support her hypothesis.

(2 marks)

10 (a) 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**
$0 < t \leqslant 2$	59
$2 < t \leqslant 4$	158
$4 < t \leqslant 6$	106
$6 < t \leqslant 8$	45
$8 < t \leqslant 10$	12

Circle the **two** words that describe the data.

continuous	discrete	grouped	ungrouped

(1 mark)

(b) Which class interval contains the median?

You **must** show your working.

(2 marks)

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

(2 marks)

11 (a) Kim works at an airport in the UK.
She records the number of planes landing between 10 am and 2 pm each day.
The table shows the data for the first 10 days in January.

Day	1	2	3	4	5	6	7	8	9	10
Number of planes	148	151	147	155	153	147	155	102	151	154

The airport was affected by fog on one of the days.

Which day do you think it was?
Give a reason for your answer.

(1 mark)

(b) Kim uses the data to predict how many planes will land at the airport in a year.

In her method, she

- uses an estimate of 150 planes in each 4-hour period throughout the day
- assumes the same number of planes each day.

Work out her prediction.

(3 marks)

(c) In fact,

fewer planes land in winter than in summer
fewer planes land at night than during the day.

What does this tell you about Kim's prediction?
Tick **one** box.

☐ Her prediction is too low

☐ Her prediction is too high

☐ Her prediction could be too low or too high

Give a reason for your answer.

(2 marks)

12 100 men and 100 women took a test.

Scores

	Median	**Interquartile range**	**Range**
Men	28	7.5	31
Women	30	9	37

Using this data, which statement **must** be true?
Tick **one** box.

☐ Men had a higher average score than women

☐ Men had more consistent scores than women

☐ A woman had the highest score

☐ A man had the lowest score

(1 mark)

13 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.

(2 marks)

14 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.

(3 marks)

15 A station manager looks at the information below.

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

Estimate the mean number of minutes late.

(1 mark)

16 The mean mass of a squad of 19 hockey players is 82 kg.

A player of mass 93 kg joins the squad.

Work out the mean mass of the squad now.

.....kg

(3 marks)

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

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

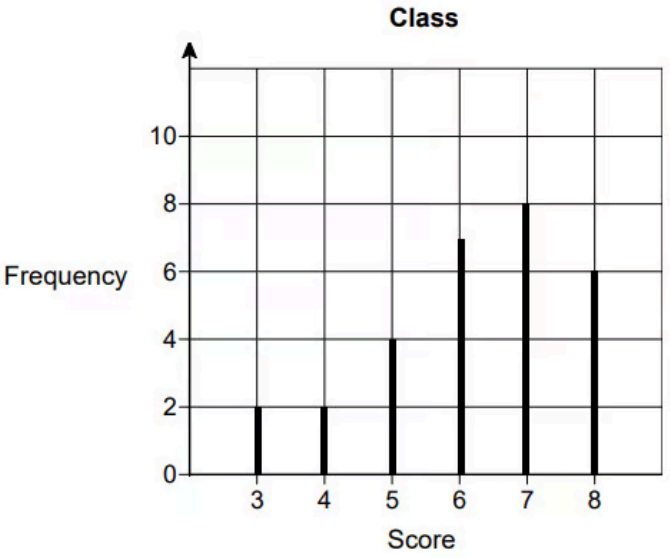
These statements are about the mean and range of the actual times.
Tick the correct box for each statement.

	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	☐	☐

(4 marks)

18 Students in a class took a spelling test.

The diagram shows information about the scores.



Lucy is one of the 29 students in the class.

Her score was the same as the **median** score for her class.
Work out her score.

(2 marks)

19 Lee wishes to find out if there is a relationship between a person's age and the time it takes them to complete a puzzle.

Lee decides to conduct an experiment.
She asks 12 people to complete the puzzle.
She records each person's age and the time taken to complete the puzzle.

Make one criticism of Lee's method.

(1 mark)

20 Ping chooses four numbers.

The mode of these four numbers is 8, the range is 7 and the mean is 11.

Find Ping's four numbers.

(3 marks)

21 Jenny played four games of golf.
For these games her modal score was 76 and her mean score was 75.
Her range of scores was 10.

What were her scores for the four games?

(4 marks)

Medium Questions

1 (a) The table gives information about the temperature, $T°\text{C}$, at noon in a town for 50 days.

Temperature ($T°\text{C}$)	**Frequency**
$8 < T \leqslant 12$	6
$12 < T \leqslant 16$	8
$16 < T \leqslant 20$	13
$20 < T \leqslant 24$	21
$24 < T \leqslant 28$	2

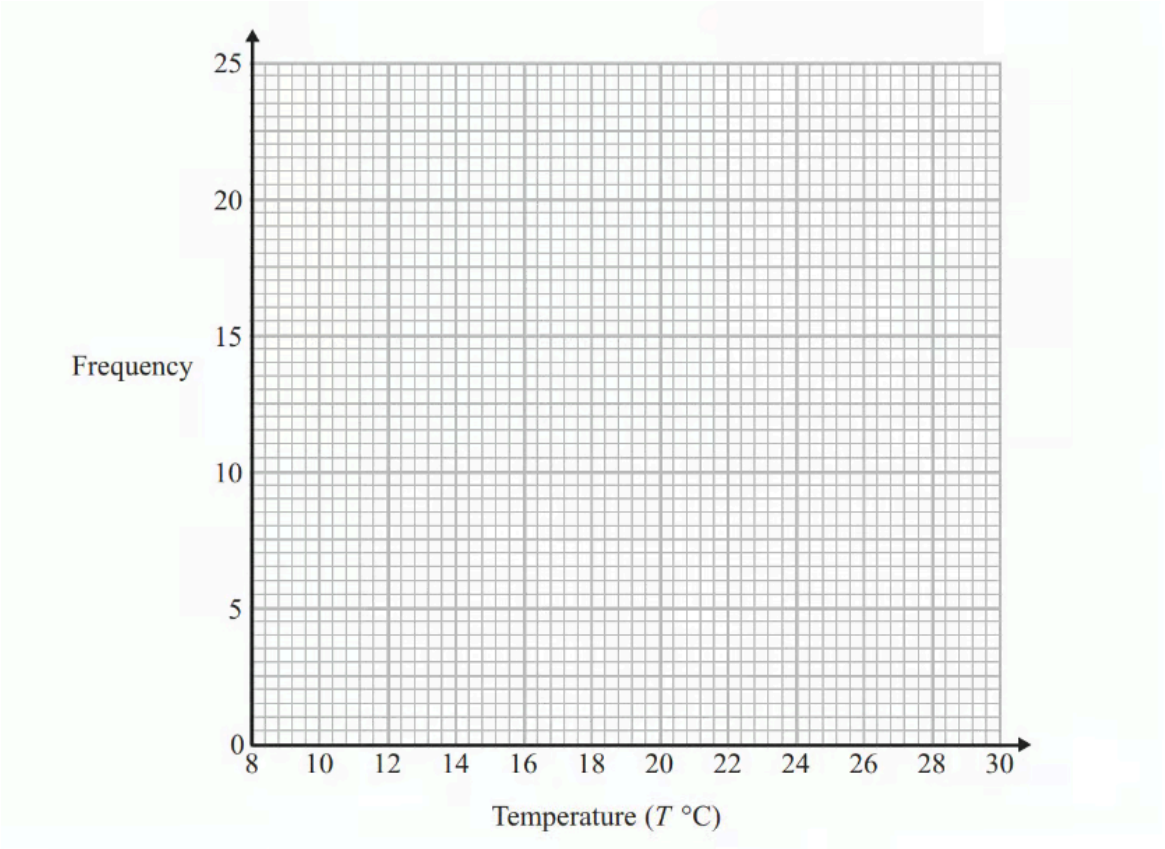
Write down the modal class interval.

(1 mark)

(b) Calculate an estimate for the mean temperature.

(4 marks)

(c) Draw a frequency polygon for the information in the table.



(2 marks)

2 Ed has 4 cards.
There is a number on each card.

12 6 15 ?

The mean of the 4 numbers on Ed's cards is 10
Work out the number on the 4th card.

(3 marks)

3 (a) The table shows some information about the dress sizes of 25 women.

Dress size	Number of women
8	2
10	9
12	8
14	6

Find the median dress size.

(1 mark)

(b) 3 of the 25 women have a shoe size of 7 Zoe says that if you choose at random one of the 25 women, the probability that she has either a shoe size of 7 or a dress size of 14 is $\frac{9}{25}$ because

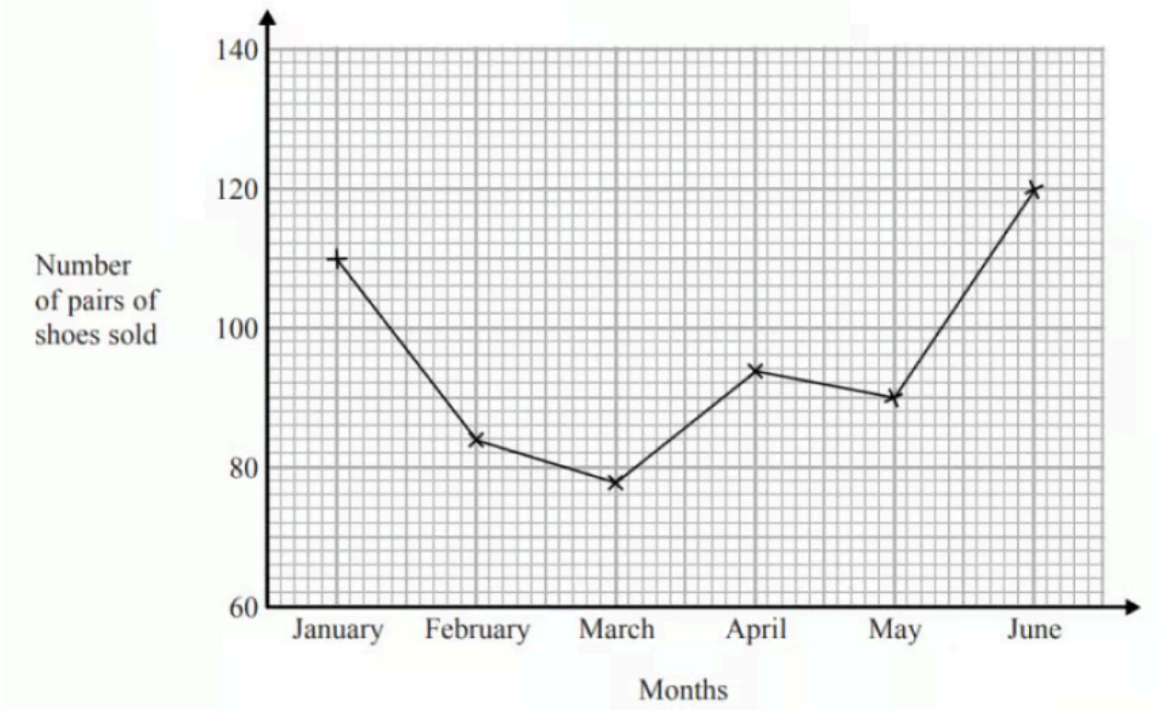
$$\frac{3}{25} + \frac{6}{25} = \frac{9}{25}$$

Is Zoe correct?
You must give a reason for your answer.

(1 mark)

4 The time-series graph gives some information about the number of pairs of shoes sold in

a shoe shop in the first six months of 2014.



The sales target for the first six months of 2014 was to sell a mean of 96 pairs of shoes per month.

Did the shoe shop meet this sales target?
You must show how you get your answer.

(3 marks)

5 (a) The stem and leaf diagram gives information about the numbers of tomatoes on 31

tomato plants.

0	8	8	9				
1	1	1	5	5			
2	1	2	2	6	7	8	8
3	0	2	5	5	7	9	
4	2	2	3	5	8	8	
5	1	1	3	4	7		

Key: 5 | 7 = 57 tomatoes

Work out the median.

(1 mark)

(b) Work out the interquartile range.

(2 marks)

6 (a) A bus company recorded the ages, in years, of the people on coach A and the people on coach B.

Here are the ages of the 23 people on coach A.

41	42	44	48	52	53	53	53	56	57	57	59
60	61	63	64	64	66	67	69	74	77	79	

Complete the table below to show information about the ages of the people on coach A.

Median	
Lower Quartile	
Upper Quartile	
Least age	41
Greatest age	79

(2 marks)

(b) Here is some information about the ages of the people on coach B.

Median	70
Lower quartile	54
Upper quartile	73
Least age	42
Greatest age	85

Richard says that the people on coach A are younger than the people on coach B.

Is Richard correct?
You must give a reason for your answer.

(1 mark)

(c) Richard says that the people on coach A vary more in age than the people on coach B.

Is Richard correct?
You must give a reason for your answer.

(1 mark)

7 Jenny has six cards.
Each card has a whole number written on it so that

the smallest number is 5
the largest number is 24
the median of the six numbers is 14
the mode of the six numbers is 8

Jenny arranges her cards so that the numbers are in order of size.

For the remaining four cards, write on each dotted line a number that could be on the card.

(3 marks)

8 Diyar recorded the distance, in kilometres, that he cycled each day for 11 days.
Here are his results.

8	10	12	13	5	23	21	7	5	16	14

Find the interquartile range of his results.

..... km

(3 marks)

9 Yusuf sat 8 examinations.
Here are his marks for 5 of the examinations.

68	72	75	77	80

For his results in all 8 examinations

the mode of his marks is 80
the median of his marks is 74
the range of his marks is 16

Find Yusuf's marks for each of the other 3 examinations.

(4 marks)

10 Given that $a < b < c$
the four whole numbers a, a, b and c have

a mode of 7
a median of 8.5
a mean of 9

Work out the value of a, the value of b and the value of c.

$a =$ .....
$b =$ .....
$c =$ .....

(4 marks)

11 (a) Sandeep sat 11 tests in January 2020
Each test was marked out of 60

Here are his test results.

45 41 35 44 38 47 47 39 37 43 42

Find the interquartile range of these test results.
Show your working clearly.

(3 marks)

(b) Sandeep also sat some tests in May 2020
Each test was marked out of 60

The median of the May 2020 test results is 42
The interquartile range of the May 2020 test results is 12

In which month, January or May, were Sandeep's test results more consistent?
Give a reason for your answer.

(1 mark)

12 Choose the expression for the range of n consecutive integers.

A. $\frac{n+1}{2}$

B. $n-1$

C. n

D. $n+1$

(1 mark)

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

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

In which class interval is the median?

A. $0 < t \leqslant 5$

B. $5 < t \leqslant 10$

C. $10 < t \leqslant 15$

D. $15 < t \leqslant 20$

(1 mark)

14 102 boys and 85 girls took a test.

The table shows information about the mean marks.

	Boys	Girls
Number of students	102	85
Mean mark	68.5	72.4

The pass mark for the test was 70
Was the mean mark for **all** of these students greater than the pass mark?
You **must** show your working.

(3 marks)

15 Here is some information about 26 houses.

a, b and c are all **different** numbers.

Number of bedrooms	Number of houses
1	7
2	a
3	b
4	c
5	8

The median number of bedrooms is 3.5
Work out a possible set of values for a, b and c.

$a =$ .....
$b =$ .....
$c =$ .....

(3 marks)

16 200 people recorded the time they spent on social media one day.

The table shows the results.

Time, t (mins)	Frequency	Midpoint	
$0 \leqslant t < 30$	24		
$30 \leqslant t < 50$	76		
$50 \leqslant t < 60$	52		
$60 \leqslant t < 90$	48		
	Total = 200		

Work out an estimate of the mean time.

.....mins

(3 marks)

17 The table shows information about the distances walked by 120 students on their way to school one week.

Distance, x (miles)	Frequency		
$0 < x \leqslant 5$	20		
$5 < x \leqslant 10$	48		
$10 < x \leqslant 15$	30		
$15 < x \leqslant 20$	22		
	Total = 120		

Work out an estimate for the mean distance.

.....miles

(3 marks)

18 (a) A shop records the time taken by its customers to complete a purchase on its website. The results from one day are summarised in this table.

Time taken (t minutes)	Number of customers		
$0 < t \leqslant 3$	6		
$3 < t \leqslant 6$	10		
$6 < t \leqslant 9$	6		
$9 < t \leqslant 12$	2		
$12 < t \leqslant 15$	1		

Calculate an estimate of the mean time taken.

..... minutes

(4 marks)

(b) Explain why it is not possible to use the information from this table to calculate the **exact** value of the mean time taken.

(1 mark)

19 The police record the speed of vehicles passing a speed checkpoint.
The speeds are recorded in the table below.

Speed (s mph)	Number of vehicles		
$0 < s \leqslant 20$	5		
$20 < s \leqslant 40$	8		
$40 < s \leqslant 50$	37		
$50 < s \leqslant 60$	47		
$60 < s \leqslant 80$	3		

i) Calculate an estimate of the mean speed of the vehicles.

..... mph [4]

ii) Explain why it is not possible to use the information from this table to calculate the **exact** value of the mean speed.

[1]

(5 marks)

20 (a) Ceri records the time taken, t minutes, to travel to school for a sample of 168 students at her Academy.

Time taken (t minutes)	Frequency
$0 < t \leqslant 10$	54
$10 < t \leqslant 20$	50
$20 < t \leqslant 40$	44
$40 < t \leqslant 80$	20

Ceri says

The longest time that any of these students took to travel to school was 80 minutes.

Is she correct?
Give a reason for your answer.

(1 mark)

(b) Ceri also claims that 25% of all of the students at this Academy took more than 30 minutes to travel to school.

i) Show how Ceri might have worked out her claim.

[2]

ii) State one assumption that Ceri has made in making her claim.

[1]

(3 marks)

21 (a) The mean weight of 5 cantaloupes is 3.6 kg.

Kafui recorded the weight of one of the cantaloupes as 5kg.

Work out the mean weight of the other 4 cantaloupes.

(3 marks)

(b) Kafui made a mistake.

The cantaloupe was in fact 8kg, not 5kg.

How does this affect your answer to part (a)?

(1 mark)

22 Here are two sets of numbers, A and B.

Set A = $\{101, 313, 72, 222\}$

Set B = $\{40, 265, 95, 180, 430, x\}$

mean of Set A : mean of Set B = 3:8

Work out the value of x.

(5 marks)

23 A shop sells 30 boxes of fruit. The number of pieces of fruit in each box is shown in the table below.

p, q and r are all different numbers.

Pieces of fruit in box	Number of boxes
4	6
5	p
6	q
7	r
8	7

The median number of pieces of fruit per box is 6.5.

Work out a possible set of values for p, q and r.

(4 marks)

24 Carra goes thrifting and rates some of the items she finds.

Carra's star rating, from 1 to 5, of some items in the charity shop are summarised below.

Star Rating	Frequency
1	6
2	29
3	7
4	x
5	13

The mean Carra's star ratings of items in the charity shop is 3.

Calculate the value of the missing frequency, x.

(4 marks)

Hard Questions

1 Hertford Juniors is a basketball team.

At the end of 10 games, their mean score is 35 points per game. At the end of 11 games, their mean score has gone down to 33 points per game.

How many points did the team score in the 11th game?

(3 marks)

2 There are 18 packets of sweets and 12 boxes of sweets in a carton.

The mean number of sweets in all the 30 packets and boxes is 14. The mean number of sweets in the 18 packets is 10.

Work out the mean number of sweets in the boxes.

(3 marks)

3 There are 15 children at a birthday party.

The mean age of the 15 children is 7 years.

9 of the 15 children are boys.
The mean age of the boys is 5 years.

Work out the mean age of the girls.

(3 marks)

4 There are 10 boys and 20 girls in a class.
The class has a test.

The mean mark for all the class is 60
The mean mark for the girls is 54

Work out the mean mark for the boys.

(3 marks)

5 Walkden Reds is a basketball team.

At the end of 11 games, their mean score was 33 points per game. At the end of 10 games, their mean score was 2 points higher.

Jordan says,

"Walkden Reds must have scored 13 points in their 11th game."

Is Jordan right?
You must show how you get your answer.

(3 marks)

6 Mr Brown gives his class a test.
The 10 girls in the class get a mean mark of 70%
The 15 boys in the class get a mean mark of 80%

Nick says that because the mean of 70 and 80 is 75 then the mean mark for the whole class in the test is 75%

Nick is not correct.
Is the correct mean mark less than or greater than 75%?
You must justify your answer.

(2 marks)

7 Bob asked each of 40 friends how many minutes they took to get to work.
The table shows some information about his results.

Time taken (m minutes)	Frequency
$0 < m \leqslant 10$	3
$10 < m \leqslant 20$	8
$20 < m \leqslant 30$	11
$30 < m \leqslant 40$	9
$40 < m \leqslant 50$	9

Work out an estimate for the mean time taken.

(4 marks)

8 Sumeet records the times, in minutes, for 40 runners to finish a half marathon. Information about these times is shown in the table.

Time (t minutes)	Frequency
$60 < t \leqslant 90$	10
$90 < t \leqslant 120$	14
$120 < t \leqslant 150$	9
$150 < t \leqslant 180$	5
$180 < t \leqslant 210$	2

Calculate an estimate for the mean time.

(4 marks)

9 The table gives information about the heights of 50 trees.

Height(h metres)	Frequency
$0 < h \leqslant 4$	8
$4 < h \leqslant 8$	21
$8 < h \leqslant 12$	12
$12 < h \leqslant 16$	7
$16 < h \leqslant 20$	2

Work out an estimate for the mean height of the trees.

(4 marks)

10 (a) The table gives information about the heights of 35 girls.

Height(h metres)	Frequency
$1.30 \leqslant h < 1.40$	11
$1.40 \leqslant h < 1.50$	9
$1.50 \leqslant h < 1.60$	7
$1.60 \leqslant h < 1.70$	6
$1.70 \leqslant h < 1.80$	2

Find the class interval that contains the median.

(1 mark)

(b) Work out an estimate for the mean height.

(4 marks)

11 (a) The table shows information about the weekly earnings of 20 people who work in a shop.

Weekly earnings(£ x)	Frequency
$150 < x \leqslant 250$	1
$250 < x \leqslant 350$	11
$350 < x \leqslant 450$	5
$450 < x \leqslant 550$	0
$550 < x \leqslant 650$	3

Work out an estimate for the mean of the weekly earnings.

(3 marks)

(b) Nadiya says,

"The mean may **not** be the best average to use to represent this information."

Do you agree with Nadiya?
You must justify your answer.

(1 mark)

12 (a) The table shows some information about the foot lengths of 40 adults.

Foot length(f cm)	Number of adults
$16 \leqslant f < 18$	3
$18 \leqslant f < 20$	6
$20 \leqslant f < 22$	10
$22 \leqslant f < 24$	12
$24 \leqslant f < 26$	9

Write down the modal class interval.

(1 mark)

(b) Calculate an estimate for the mean foot length.

(3 marks)

13 (a) Jenny works in a shop that sells belts.
The table shows information about the waist sizes of 50 customers who bought belts from the shop in May.

Belt size	Waist(w inches)	Frequency
Small	$28 < w \leqslant 32$	24
Medium	$32 < w \leq 36$	12
Large	$36 < w \leq 40$	8
Extra Large	$40 < w \leq 44$	6

Calculate an estimate for the mean waist size.

(3 marks)

(b) Belts are made in sizes Small, Medium, Large and Extra Large.

Jenny needs to order more belts in June.
The modal size of belts sold is Small.

Jenny is going to order $\frac{3}{4}$ of the belts in size Small.

The manager of the shop tells Jenny she should **not** order so many Small belts.

Who is correct, Jenny or the manager?
You must give a reason for your answer.

(2 marks)

14 Hannah is planning a day trip for 195 students.

She asks a sample of 30 students where they want to go.
Each student chooses one place.

The table shows information about her results.

Place	Number of students
Theme Park	10
Theatre	5
Sports Centre	8
Seaside	7

i) Work out how many of the 195 students you think will want to go to the Theme Park.

[2]

ii) State any assumption you made **and** explain how this may affect your answer.

[1]

(3 marks)

15 25 students in class A did a science exam.
30 students in class B did the same science exam.

The mean mark for the 25 students in class A is 67.8
The mean mark for all the 55 students is 72.0

Work out the mean mark for the students in class B.

(1 mark)

16 Here are two sets of numbers, A and B.

Set A

200	160
104	100

Set B

270	400	483
300	x	

mean of Set A : mean of Set B = 3 : 8

Work out the value of x.

(4 marks)

17 Dina spends a week studying the number of cars in a dealership's lot.

No cars are bought or sold during this week. The majority of the cars are kept in a warehouse and each week a random selection of cars are put on display.

She wants to estimate the total number of cars in the lot.

On Monday, she selects a random sample of 25 cars, puts a small sticker on each one, and returns them to the lot.

On Tuesday, she selects a new random sample of 50 cars from the lot.

She finds that 10 of the cars in this sample have stickers on them.

Estimate the total number of used cars in the lot.

Show your working clearly.

(3 marks)