

Averages, Ranges & Data

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

Easy (11 questions)	/41
Medium (10 questions)	/35
Hard (11 questions)	/44
Total Marks	/120

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Easy Questions

- 1 Sophie wants to find out how often people go to the cinema.

She gives a questionnaire to all the women leaving a cinema.

Her sample is biased.

State **two** possible reasons why.

(2 marks)

- 2 The table below shows the number of goals a team scored in 46 matches.

Goals Scored	Frequency
0	7
1	18
2	13
3	6
4	2
5 or more	0

Find the **mean** number of goals scored per match.

(3 marks)

3 James and Susan are playing a game where points are scored.

Their points for 6 attempts at the game are shown below.

James	4	4	6	5	7	3
Susan	1	8	9	10	2	3

(i) Who had the most consistent score?

Give a reason for your answer.

[2]

(ii) Who had the highest mean score over the 6 attempts?

You must show your working.

[3]

(5 marks)

4 Here are the weekly wages, in dollars, of the ten workers in an office.

280	200	175	1180	95	182	238	256	194	250
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i) Find the median.

\$ [2]

ii) Calculate the mean.

\$ [2]

iii) For this office, explain why the mean is not a suitable average.

[1]

(5 marks)

- 5** The table shows the maximum power, kW, and the time taken, in seconds, to accelerate from 0 to 100 km/h for each of 10 cars.

Maximum power (kW)	77	52	103	55	44	51	85	135	90	110
Time (seconds)	12.5	14.9	9.0	12.1	14.4	12.9	10.0	7.1	11.0	9.4

i) Find the range of the times.

..... s [1]

ii) Find the median maximum power.

..... kW [2]
(3 marks)

6 Dina has a set of 12 cards. These are the numbers on the cards.

3	4	1	3	2	1	3	4	2	2	1	3
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Work out

i) the median,

[2]

ii) the mode,

[1]

iii) the mean,

[2]

iv) the range.

[1]

(6 marks)

7 (a)

27	14	8	93	32	55	14	38	73	47
----	----	---	----	----	----	----	----	----	----

From this list of numbers, find the median.

(2 marks)

(b)

27	14	8	93	32	55	14	38	73	47
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From this list of numbers, find the range.

(1 mark)

8 (a) These are the number of texts sent one day by each of 10 students.

18	13	15	8	9	17	12	8	6	14
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Write down the mode.

(1 mark)

(b) Calculate the mean.

(2 marks)

9 (a) Emma records the number of letters in each word in a sentence.

7	1	5	4	2	4	5	3	3	1	2	4
---	---	---	---	---	---	---	---	---	---	---	---

Find

i) the median,

[2]

ii) the mode,

[1]

iii) the range.

[1]

(4 marks)

(b) Jack records the number of letters in 25 words.

Number of letters in a word	Number of words
1	3
2	1
3	5
4	8
5	6
6	2

i) Calculate the mean.

[3]

ii) Priti picks one of Jack's words at random.

Find the probability that this word has 4 or more letters.

[2]

(5 marks)

- 10** At Donville station the number of tickets sold each day is recorded for seven days.

104	18	72	31	27	45	60
-----	----	----	----	----	----	----

Find

i) the range,

[1]

ii) the median,

[2]

iii) the mean.

[2]

(1 mark)

- 11** The table shows the different methods of travel for 20 people going to work.

Method of travel	Frequency
Car	10
Walk	5
Bike	3
Bus	2

Which type of average, mean, median or mode, can be used for this information?

(1 mark)

Medium Questions

- 1 A factory which produces bicycles is planning to make four different models; **A**, **B**, **C**, and **D**.

60 people are asked which of the four models they would be most likely to buy.

The table shows information about the results.

Bicycle Model	Number of people
A	17
B	11
C	24
D	8

The factory is going to make 20 000 bicycles next year.

- (i) Work out how many model **C** bicycles the factory should make next year.

[2]

- (ii) Explain why your answer to part (i) may be inaccurate.

[1]

(3 marks)

2 The table below shows the number of goals a team scored in 45 matches.

Goals Scored	Frequency
0	7
1	18
2	13
3	6
4	1
5 or more	0

Find the **median** number of goals scored per game.

(1 mark)

3 Daniel asked 50 students how many minutes they each took to get to school.

Time taken (t minutes)	Frequency		
$0 < t \leq 10$	8		
$10 < t \leq 20$	21		
$20 < t \leq 30$	11		
$30 < t \leq 40$	10		

Work out an estimate for the **mean** number of minutes taken by the 50 students.

(4 marks)

- 4 The table shows the temperature, in $^{\circ}\text{C}$, at midday on the first day of each month during one year in a city.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
9	11	15	19	23.5	27.5	29	28	25	19.5	14.5	10

Calculate the mean of these temperatures.

..... $^{\circ}\text{C}$

(2 marks)

- 5 Helena has a set of cards.
She takes one card at random and records the number shown.
She does this 50 times.
The results are shown in the table.

Number on card	Frequency
1	8
2	11
3	10
4	9
5	12

Calculate the mean of her results.

(3 marks)

- 6 Joel spins a fair five sides spinner numbered 2, 3, 4, 5, 6.

The table shows the results of his first 20 spins.

Number	2	3	4	5	6
Frequency	3	2	6	4	5

i) Write down the mode.

[1]

ii) Calculate the mean.

[3]

Joel wants to draw a pie chart to show the results in the table.

iiia) Show that the sector angle for the number 2 is 54° .

[1]

iiib) Find the sector angle for the number 6.

[2]

(7 marks)

7 The table shows the number of bananas bought by the last 50 customers at a store.

Number of bananas bought	Frequency
0	14
1	0
2	2
3	5
4	11
5	8
6	10

i) Find the range.

[1]

ii) Work out the median.

[1]

iii) Calculate the mean.

[3]

(3 marks)

- 8** The number of people in each of 150 cars entering the leisure centre car park is recorded.
The table shows the results.

Number of people	1	2	3	4	5
Frequency	44	43	30	25	8

i) Write down the mode.

[1]

ii) Calculate the mean.

[3]

(4 marks)

- 9 (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)

10 (a) Here is a list of numbers.

32 26 7 18 7 32 25

Peter says the mode is 7.

Peter is not correct.

What is wrong with Peter's answer?

(1 mark)

(b) Work out the range of the numbers in the list.

(1 mark)

(c) Work out the mean of the numbers in the list.

(2 marks)

Hard Questions

- 1 Ken wants to find investigate the opinion of students in his school, which has 5 year groups.

The table gives information about the number of students in each year group in Ken's school.

Year group	Number of students
First year	170
Second year	162
Third year	155
Fourth year	168
Fifth year	140

- (i) State the population in this situation.

[1]

- (ii) State one reason why Ken should consider surveying **a sample**.

[1]

- (iii) State one reason why Ken should consider surveying **the population**.

[1]

- (iv) Ken decides to take a survey of 30 students.

Calculate how many students from Fifth year should be in his sample for it to be representative of the population.

[3]

(6 marks)

- 2 The table shows information about the number of hours that 110 children spent playing video games last week.

Number of hours (h)	Frequency
$0 < h \leq 2$	12
$2 < h \leq 4$	15
$4 < h \leq 6$	28
$6 < h \leq 8$	30
$8 < h \leq 10$	20
$10 < h \leq 12$	5

Jamie is trying to calculate an estimate for the mean number of hours that the 110 children played video games for last week.

His working is shown below.

Number of hours (h)	Frequency	Midpoint	Frequency $\times$ Midpoint
$0 < h \leq 2$	12	1	12
$2 < h \leq 4$	15	3	45
$4 < h \leq 6$	28	5	140
$6 < h \leq 8$	30	7	210
$8 < h \leq 10$	20	9	180
$10 < h \leq 12$	5	11	55
Total	110	36	642

$$\text{Mean} = \frac{642}{36} = 17.8 \text{ hrs}$$

Jamie has made 1 mistake in his calculation.

Describe the mistake and correct it to **find the correct estimated value of the mean**.

(2 marks)

- 3 The table gives information about the weights, in kg, of 36 packages being loaded on to a delivery truck.

Weight (w kg)	Frequency
$0 < w \leq 10$	12
$10 < w \leq 15$	14
$15 < w \leq 20$	7
$20 < w \leq 35$	3

- (i) Calculate an estimate for the mean weight of the packages.

[4]

- (ii) Explain why your answer to part (i) will only be an estimate.

[1]

- (iii) On a different delivery truck, there are 50 packages.

Using the data in the table, estimate the number of these packages that weigh between 0 and 10 kg.

[2]

(7 marks)

- 4 Ning has a spinner numbered 1 to 6.
She spins it 50 times and her results are shown in the table.

Number on spinner	Frequency
1	15
2	12
3	9
4	5
5	2
6	7

- i) Write down the mode.

[1]

- ii) Find the median.

[1]

iii) Work out the mean.

[3]

(5 marks)

5 The mean of seven numbers is 16.

Six of these numbers are 12, 20, 19, 10, 21 and 13.

Find the seventh number.

(2 marks)

6 Six students bring an apple to school one day.

The list shows the mass of each apple, correct to the nearest gram.

82	94	78	103	88	82
----	----	----	-----	----	----

Find

ia) the mode,

..... g [1]

ib) the range,

..... g [1]

ic) the median.

..... g [2]

ii) Another student, Toni, also brings an apple to school.
The mean mass of the 7 apples is 89g.

Work out the mass of Toni's apple.

..... g [3]

(2 marks)

7 The mean of three numbers is 150.

The numbers are 361, $2n$ and $(n - 1)$.

Find the value of n .

$n =$

(3 marks)

8 Five numbers have a mean of 9.4 .

Four of the numbers are 3, 5, 10 and 12.

Work out the range of the five numbers.

(4 marks)

- 9 The number of examinations that each of 196 candidates takes is recorded in the table.

Number of examinations	5	6	7	8
Number of candidates	27	42	63	64

- i) Write down the range.

[1]

- ii) Find the median.

[1]

- iii) Calculate the mean.

[3]

- iv) A candidate is selected at random.

Find the probability that the candidate takes fewer than 8 examinations.

[2]

(7 marks)

- 10** The table shows information about the heights of 80 plants.

Height(h cm)	Frequency
$10 < h \leq 20$	7
$20 < h \leq 30$	13
$30 < h \leq 40$	14
$40 < h \leq 50$	12
$50 < h \leq 60$	16
$60 < h \leq 70$	18

Find the class interval that contains the median.

(1 mark)

- 11** 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)