6.5 Averages and Range

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20 Stephen has a biased 5-sided spinner.
He spins the spinner 80 times.
His score each time is the number that the spinner lands on.

The table shows information about his scores.

Number on spinner	Frequency
1	5
2	12
3	16
4	32
5	15

(a) Find Stephen's median score.

.....

(2)

(b) Work out Stephen's mean score.

.....

(3)

Stephen is going to spin the spinner once more.

(c) Use the information in the table to find an estimate for the probability that the spinner will land on an even number.

.....

(2)

6 Here is a list of 7 numbers.

4 3 5 14 16 4 10

(a) Write down the mode.

.....

(1)

(b) Find the range.

.....

(2)

(c) Work out the mean.

.....

(2)

21

The table gives information about the number of minutes Palina used her mobile phone each day in November.

Number of minutes (m)	Frequency
$0 \leqslant m < 10$	3
$10 \leqslant m < 20$	16
$20 \leqslant m < 30$	6
$30 \leqslant m < 40$	4
$40 \leqslant m < 50$	1

(c) Work out an estimate for the total number of minutes Palina used her mobile phone in November.

..... minutes

(3)

9 Here are the lengths, in mm, of 10 snails a scientist found in a forest.

18 22 31 31 41 26 27 47 34 23

(a) (i) Work out the median length.

..... mm

(2)

(ii) What percentage of the 10 snails have a length greater than the median length?

..... %

(1)

(b) Work out the mean length.

..... mm

(2)

The scientist finds a snail in a field.
This snail has a length that is longer than any of the 10 snails he found in the forest.

The lengths of the 11 snails have a range of 32 mm.

(c) Work out the length of the snail the scientist finds in the field.

..... mm

(2)

16 The table gives information about the number of goals scored in each of 40 European Championship football matches.

Number of goals scored	Frequency
0	1
1	8
2	12
3	15
4	4

(a) Write down the modal number of goals scored.

.....

(1)

(b) Find the total number of goals scored.

.....

(2)

Francois has a recording of each of the 40 matches.
He is going to choose at random one of these matches to watch.

(c) Work out the probability that in this match more than 2 goals were scored.

.....

(2)

15 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

(a) Write down the modal class.

.....

(1)

(b) Work out an estimate for the mean weight of the parcels.

..... kg

(4)

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

There are 28 students in Class A and 32 students in Class B.
The mean score for all the students in both classes is 72.6
The mean score for the students in Class A is 75

(a) Work out the mean score for the students in Class B.

(4)

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

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

(3)

18 The table gives information about the times, in hours, some students spent doing sport one week.

Time (T hours)	Frequency
$0 < T \leqslant 2$	5
$2 < T \leqslant 4$	9
$4 < T \leqslant 6$	24
$6 < T \leqslant 8$	40
$8 < T \leqslant 10$	7

Calculate an estimate for the mean time these students spent doing sport.
Give your answer in hours, correct to 1 decimal place.

..... hours

9 The table shows information about the number of goals scored by a football team in each of 20 matches.

Number of goals scored	Frequency
0	6
1	5
2	7
3	1
4	0
5	1

(a) Write down the mode of the number of goals scored.

.....

(1)

(b) Find the median number of goals scored.

.....

(2)

(c) Work out the total number of goals scored.

.....

(2)

5 The table shows information about the number of gold medals won by each of 8 countries at the 2016 Olympics.

Country	Number of gold medals
China	26
France	10
Germany	17
Great Britain and Northern Ireland	27
Japan	12
Russia	19
South Korea	9
United States	46

(a) Work out the range of the number of gold medals.

(1)

(b) Work out the median number of gold medals.

(2)

(c) Work out the mean number of gold medals.

(2)

16 The table shows information about the number of birds each of 40 people counted in their garden one morning.

Number of birds	Frequency
1 – 5	5
6 – 10	10
11 – 15	16
16 – 20	9

(a) Write down the modal class.

(1)

(b) Work out an estimate for the mean number of birds.

(4)

19 a, a, b and 40 are four numbers.

a is the least number.
40 is the greatest number.

The range of the four numbers is 14
The median of the four numbers is 30

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

$a =$

$b =$

(Total for Question 19 is 3 marks)

26 There are 12 boys and 8 girls in a class.
The boys and the girls have some coins.

The mean number of coins that the boys have is 5.5
The girls have a total of 18 coins.

Work out the mean number of coins the 20 children have.

(Total for Question 26 is 3 marks)

15 The table gives information about the number of days that 100 cars were in an airport car park.

Number of days (d)	Frequency
$0 < d \leqslant 4$	16
$4 < d \leqslant 8$	18
$8 < d \leqslant 12$	19
$12 < d \leqslant 16$	27
$16 < d \leqslant 20$	20

(a) Write down the modal class.

(1)

(b) Work out an estimate for the mean number of days.

days

(4)

7 Here are the shoe sizes of 11 people.

7 8 4 4 4 10 5 7 7 4 4

(a) Write down the mode.

.....

(1)

(b) Work out the range.

.....

(2)

(c) Find the median.

.....

(2)

Clark works in a shoe shop.

On Tuesday morning he sold some pairs of shoes.
The mean price of the pairs of shoes was £34

On Tuesday afternoon he sold only two pairs of shoes.
The prices of these pairs of shoes were £31 and £49

(d) Is the mean price of all the pairs of shoes Clark sold on Tuesday more or less than £34?
You must give a reason for your answer.

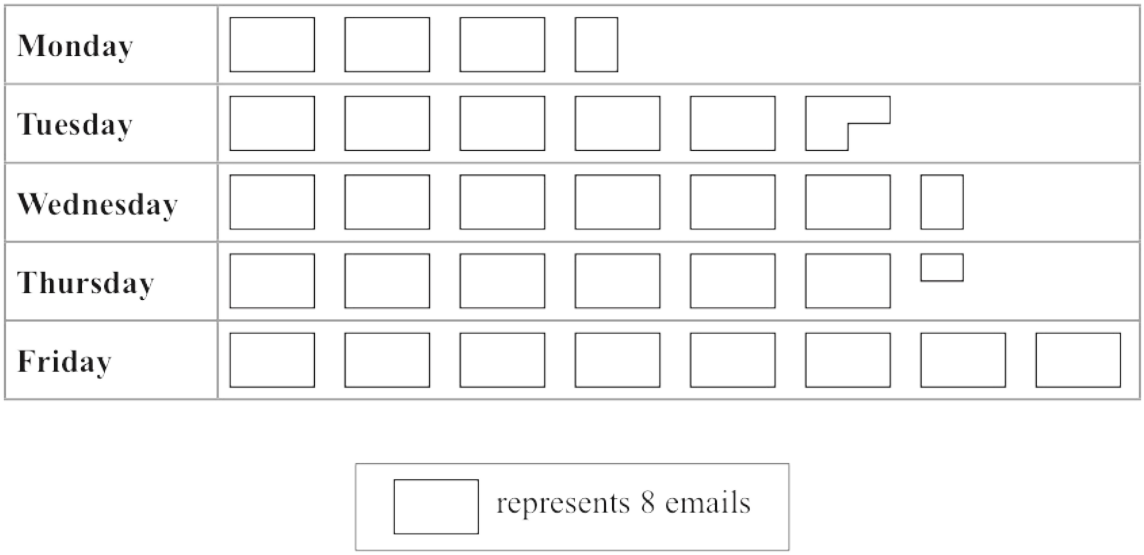
.....

.....

.....

(1)

10 The pictogram gives information about the number of emails Sami sent on each of five days last week.



Work out the mean number of emails Sami sent on these 5 days.

.....

(Total for Question 10 is 4 marks)

13 The table shows information about the heights, in cm, of 48 sunflowers in a garden centre.

Height of sunflower (h cm)	Frequency
$90 < h \leqslant 100$	8
$100 < h \leqslant 110$	12
$110 < h \leqslant 120$	15
$120 < h \leqslant 130$	10
$130 < h \leqslant 140$	3

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

..... cm

(Total for Question 13 is 4 marks)

18 30 students in a class sat a Mathematics test.
The mean mark in the test for the 30 students was 26.8

13 of the 30 students in the class are boys.
The mean mark in the test for the boys was 25

Find the mean mark in the test for the girls.
Give your answer correct to 3 significant figures.

.....

(Total for Question 18 is 3 marks)

21 There are 10 people in a lift.
These 10 people have a mean weight of 79.2 kg.

3 of these people get out of the lift.
These 3 people have a mean weight of 68 kg.

Work out the mean weight of the 7 people left in the lift.

.....kg

(Total for Question 21 is 3 marks)

12 Ravina counts the number of matches in each of 40 boxes of matches.
The table shows information about her results.

Number of matches	Frequency
21	13
22	8
23	8
24	6
25	5

(a) Find the median of the numbers of matches in the boxes.

(2)

(b) Work out the mean number of matches.

(3)

21 There are some ice lollies in a freezer.

The flavour of each ice lolly is banana or strawberry or mint or chocolate.

Julius takes at random an ice lolly from the freezer.

The table shows the probabilities that the flavour of the ice lolly that Julius takes is banana or strawberry or chocolate.

Flavour	banana	strawberry	mint	chocolate
Probability	0.35	0.32		0.12

Work out the probability that the flavour of the ice lolly that Julius takes is either strawberry or mint.

.....

(Total for Question 21 is 3 marks)

17 The table shows information about the weights, in kilograms, of 40 babies.

Weight (w kg)	Frequency
$2 < w \leqslant 3$	12
$3 < w \leqslant 4$	16
$4 < w \leqslant 5$	9
$5 < w \leqslant 6$	2
$6 < w \leqslant 7$	1

(a) Write down the modal class.

.....

(1)

(b) Work out an estimate for the mean weight of the 40 babies.

..... kg

(4)

One of the 40 babies is going to be chosen at random.

(c) Find the probability that this baby has a weight of more than 5 kg.

.....

(2)

9

Heidi records the number of packets of pens sold in her shop to each customer last Friday.
The table shows information about her results.

Number of packets	Frequency
1	14
2	17
3	15
4	12
5	9

(b) Write down the mode of the number of packets.

.....

(1)

(c) Work out the total number of packets of pens sold last Friday.

.....

(2)

2 At 6 pm, the temperature in Victoria's garden was 5 °C.
By midnight, the temperature in Victoria's garden had fallen by 9 °C.

(a) Work out the temperature in Victoria's garden at midnight.

..... °C
(2)

Here is a list of 7 temperatures.

4 °C −6 °C 4 °C 0 °C −1 °C −7 °C −5 °C

(b) For the 7 temperatures in the list,

(i) write down the mode,

..... °C
(1)

(ii) find the median.

..... °C
(2)

22 5 children are playing on a trampoline.
The mean weight of the 5 children is 28 kg.

2 of the children get off the trampoline.
The mean weight of these 2 children is 26.5 kg.

Work out the mean weight of the 3 children who remain on the trampoline.

..... kg

(Total for Question 22 is 3 marks)

2 Egor rolled a dice 24 times.
Here are his results.

2	3	5	4	6	2
1	3	3	5	1	3
3	5	5	6	2	5
4	3	4	3	3	4

(a) Complete the frequency table for Egor's results.

Number on dice	Tally	Frequency
1		
2		
3		
4		
5		
6		

(2)

(b) Write down the mode of the numbers that Egor rolled.

.....

(1)

Egor thinks the dice he rolled is biased.

(c) Give a reason why the results could show that the dice is biased.

.....

.....

.....

(1)

10 Here are four different numbers written in order of size.

3 6 m n

The range of the four numbers is 13
The median of the four numbers is 8.5

Find the value of m and the value of n.

$m =$ .....

$n =$ .....

(Total for Question 10 is 2 marks)

16 The table gives information about the amount of money, in £, that Fiona spent in a grocery store each week during 2019

Amount spent (£x)	Frequency
$0 \leqslant x < 20$	5
$20 \leqslant x < 40$	11
$40 \leqslant x < 60$	8
$60 \leqslant x < 80$	19
$80 \leqslant x < 100$	9

Work out an estimate for the total amount of money that Fiona spent in the grocery store during 2019

£.....

(Total for Question 16 is 3 marks)

17 Here is a list of six numbers written in order of size.

4 7 x 10 y y

The numbers have

a median of 9
a mean of 11

Find the value of x and the value of y.

$x =$ .....

$y =$ .....

(Total for Question 17 is 4 marks)

3 Paula asks 16 members of her class the number of pets they each have.
Here are her results.

1	2	2	4	0	1	2	1
3	3	4	1	1	0	3	2

(a) Complete the frequency table for her results.

Number of pets	Tally	Frequency
0		
1		
2		
3		
4		

(2)

(b) Write down the mode for the number of pets.

.....

(1)

(c) Work out the range for the number of pets.

.....

(1)

16 The table shows information about the lengths of time, in minutes, 120 customers spent in a supermarket.

Length of time (L minutes)	**Frequency**
$20 < L \leqslant 30$	6
$30 < L \leqslant 40$	26
$40 < L \leqslant 50$	31
$50 < L \leqslant 60$	40
$60 < L \leqslant 70$	17

(a) Write down the modal class.

.....

(1)

(b) Work out an estimate for the mean length of time spent by the 120 customers in the supermarket.

..... minutes

(4)

18 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

(a) Write down the modal class.

.....

(1)

(b) Work out an estimate for the mean speed of the motorbikes as they pass under the bridge.
Give your answer correct to 3 significant figures.

..... kilometres per hour

(4)

16 Ava writes down five whole numbers.

For these five numbers

the median is 7

the mode is 8

the range is 5

Find a possible value for each of the five numbers that Ava writes down.

21 There are 5 cocoa pods in a bag.
The mean weight of the 5 cocoa pods is 398 grams.

A sixth cocoa pod is put into the bag.
The mean weight of the 6 cocoa pods is 401 grams.

Work out the weight of the sixth cocoa pod that is put into the bag.

..... grams

(Total for Question 21 is 3 marks)

7 Cate asked the 60 members of a leisure centre how many times they had each visited the leisure centre last week.

The table gives information about her results.

Number of visits	Frequency
0	4
1	12
2	17
3	20
4	7

(a) Write down the mode of the number of visits.

.....

(1)

Cate is going to draw a pie chart for the information in the table.

(b) Work out the size of the angle in the pie chart for the sector representing 1 visit.

.....°

(2)

35% of the 60 members are aged 50 or over.

(c) Work out how many of the members are aged 50 or over.

.....

(2)

17 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.

$a =$ .....

$b =$ .....

$c =$ .....

5 The table shows the temperature recorded in Amsterdam at 6 am on each of five days.

Day	Monday	Tuesday	Wednesday	Thursday	Friday
Temperature (°C)	–5	–1	4	3	–6

(a) What is the range of the temperatures in the table?

..... °C

(2)

(b) What is the median of the temperatures in the table?

..... °C

(2)

21 A mathematics teacher at a school asked a group of students how far, in kilometres, each student had travelled to get to school that day.

The table gives information about their answers.

Distance travelled (d km)	Number of students
$0 < d \leqslant 2$	x
$2 < d \leqslant 4$	11
$4 < d \leqslant 6$	8
$6 < d \leqslant 8$	6
$8 < d \leqslant 10$	5

The teacher calculated that an estimate for the mean distance travelled by the whole group of students was 4.25 km.

Work out the value of x.
Show your working clearly.

$x =$ .....

(Total for Question 21 is 4 marks)

9 The table shows information about the number of pieces of homework each student in Year 11 received last week.

Number of pieces of homework	Frequency
3	4
4	8
5	10
6	12
7	4

(a) Work out the range of the number of pieces of homework.

.....

(2)

(b) Write down the mode of the number of pieces of homework.

.....

(1)

(c) Work out the mean number of pieces of homework.
Give your answer correct to one decimal place.

.....

(3)

19 The table gives information about the amounts of money, in euros, that 70 of Anjali's friends spent last Saturday.

Money spent (S euros)	Frequency
$0 < S \leqslant 8$	6
$8 < S \leqslant 16$	14
$16 < S \leqslant 24$	19
$24 < S \leqslant 32$	25
$32 < S \leqslant 40$	6

(b) Work out an estimate for the mean amount of money spent by Anjali's friends last Saturday.
Give your answer correct to 2 decimal places.

..... euros

(4)

20 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.

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

(3)

A basketball team plays 6 games.
After playing 5 games, the team has a mean score of 21 points per game.
After playing 6 games, the team has a mean score of 23 points per game.

(b) Work out the number of points the team scored in its 6th game.

(3)

24 The frequency table gives information about the number of points scored by a player.

Number of points	Frequency
0	13
1	17
2	8
3	x
4	11

The mean number of points scored is 2

Work out the value of x

$x =$ .....

(Total for Question 24 is 4 marks)

11 The table shows information about the number of eggs laid by each of 36 hens in one week.

Number of eggs	Frequency
0	5
1	5
2	3
3	10
4	7
5	6

Work out the mean number of eggs laid.

.....

(Total for Question 11 is 3 marks)

19 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.

.....

.....

.....

(Total for Question 19 is 4 marks)

4 Here are the salaries, in thousands of dollars, of seven people.

21 28 29 32 34 34 39

(a) Find the mode of the salaries.

..... thousand dollars

(1)

(b) Find the range of the salaries.

..... thousand dollars

(1)

12 The table gives information about the number of gold stars won by each of 25 students in class 7T last week.

Number of gold stars	Number of students
0	6
1	5
2	4
3	7
4	3

(a) Work out the mean number of gold stars won.

.....

(3)

A student in class 8R is to be chosen at random.

The probability that this student won at least one gold star last week is 0.39

(b) Work out the probability that this student did **not** win at least one gold star last week.

.....

(1)

17 Here are some integers where $a < b < c < d$

$$a \quad b \quad c \quad d \quad d \quad d$$

The mode of the integers is 9
The median of the integers is 8
The range of the integers is 4

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

$a =$ .....

$b =$ .....

$c =$ .....

$d =$ .....

(Total for Question 17 is 3 marks)

28 Larry is a delivery man.

He has 7 parcels to deliver.
The mean weight of the 7 parcels is 2.7 kg

Larry delivers 3 of the parcels.
Each of these 3 parcels has a weight of W kg

The mean weight of the other 4 parcels is 3.3 kg

Work out the value of W

$W =$ .....

(Total for Question 28 is 3 marks)

19 Here are five cards.

Each card has a number written on it.

15	7	–2	23	x

The mean of the five numbers is 12

Work out the value of x

$x =$ .....

(Total for Question 19 is 3 marks)

16 The table shows information about the number of mobile phones owned by each of 40 families.

Number of mobile phones	Frequency
0	1
1	5
2	12
3	9
4	11
5	2

For the information in the table,

(a) write down the mode,

.....

(1)

(b) work out the mean.

.....

(3)

20 Alberto, Bill, Candela and Diana are four friends.

Here is some information about the height of each of these friends.

Alberto's height is 158 cm.
Bill's height is 175 cm.
Candela's height is greater than Diana's height.

The median height of these four friends is 160 cm.
The range of the heights of these four friends is 21 cm.

Work out Candela's height and Diana's height.

Candela ..... cm

Diana ..... cm

(Total for Question 20 is 3 marks)

16 80 students entered a dancing competition.

The table gives information about the length of time, in minutes, for which each student spent dancing.

Time (m)	Frequency
$0 < m \leqslant 12$	11
$12 < m \leqslant 24$	25
$24 < m \leqslant 36$	23
$36 < m \leqslant 48$	15
$48 < m \leqslant 60$	6

Work out an estimate for the mean length of time the students spent dancing.

..... minutes

(Total for Question 16 is 4 marks)

10 The frequency table shows information about the number of cookies made by each of the 21 people in a cookery class.

Number of cookies made	Frequency
10	1
11	7
12	2
13	5
14	4
15	2

(a) Write down the mode of the number of cookies made.

.....

(1)

(b) Find the median number of cookies made.

.....

(2)

(c) Find the total number of cookies made by the 21 people in the cookery class.

.....

(2)

15 The table shows information about the frame size, in cm, of 60 bicycles sold in a shop.

Frame size (S cm)	Frequency
$30 < S \leqslant 36$	4
$36 < S \leqslant 42$	14
$42 < S \leqslant 48$	18
$48 < S \leqslant 54$	19
$54 < S \leqslant 60$	5

(a) Write down the modal class.

.....

(1)

(b) Work out an estimate for the mean frame size.

..... cm

(4)

17 Here is a list of six numbers written in order of size.

x 5 y z 10 12

The numbers have

a range of 9
a median of 8
a mode of 10

Find the value of x, the value of y and the value of z

$x =$ .....

$y =$ .....

$z =$ .....

(Total for Question 17 is 3 marks)

22 60 students sat a Mathematics exam.

The mean mark for the 32 students in Class A was 55
The mean mark for the 28 students in Class B was 52

Find the mean mark for all 60 students.

.....

(Total for Question 22 is 3 marks)

12 Pam plays netball for her school team.

Here are the numbers of goals she scored in the last 8 games.
The numbers of goals are written in order of size.

1 1 2 2 3 6 x 14

(a) Find the range of the number of goals Pam scored.

.....

(1)

(b) Find the median number of goals Pam scored.

.....

(1)

The mean number of goals Pam scored in the 8 games is 5

(c) Work out the value of x

$x =$ .....

(3)

17 The table gives information about the number of minutes that Abby spent walking each day in September.

Number of minutes (M)	Frequency
$0 < M \leqslant 30$	5
$30 < M \leqslant 60$	6
$60 < M \leqslant 90$	8
$90 < M \leqslant 120$	9
$120 < M \leqslant 150$	2

Work out an estimate for the total number of minutes that Abby spent walking in September.

..... minutes

(Total for Question 17 is 3 marks)

26 Team **A** and Team **B** take part in a quiz league.

After 11 rounds, Team **A** has a mean score per round of 17
After 9 rounds, Team **B** has a mean score per round of 18

Both teams take part in a further round.
After this round, both teams have a mean score per round of 18.5

In the further round, Team **A** scored more points than Team **B**.

How many more?

.....

(Total for Question 26 is 4 marks)

10 The table gives information about the number of rewards gained by each of 50 students last term.

Number of rewards	Frequency
0	3
1	9
2	15
3	18
4	4
5	1

(a) Write down the mode of the number of rewards.

.....

(1)

(b) Work out the mean number of rewards.

.....

(3)

One of these students is chosen at random.

(c) Find the probability that this student gained more than 2 rewards.

.....

(2)

17 The table shows information about the lengths, in minutes, of 50 telephone calls.

Length of telephone call (m minutes)	**Frequency**
$0 < m \leqslant 5$	8
$5 < m \leqslant 10$	2
$10 < m \leqslant 15$	6
$15 < m \leqslant 20$	4
$20 < m \leqslant 25$	12
$25 < m \leqslant 30$	18

(a) Write down the modal class.

.....

(1)

(b) Work out an estimate for the total length, in minutes, of these telephone calls.

..... minutes

(3)

24 The mean number of goals scored by a hockey team in 8 matches is 6
The team plays 2 more matches and scores k goals in each match.
The mean number of goals scored by the hockey team in the 10 matches is 7

Work out the value of k

$k =$ .....

(Total for Question 24 is 3 marks)