



- 1** Here are the numbers of goals a netball team scored in 9 matches.

14 9 17 12 9 20 11 9 16

Work out

- the mode
- the median
- the mean
- the range

(4 marks)

put them in order

9, 9, 9, 11, 12, 14, 16, 17, 20

a) most common

mode = 9

b) middle (5th) value

median = 12

c)

$$9 + 9 + 9 + 11 + 12 + 14 + 16 + 17 + 20 = 117$$

$$117 \div 9 = 13$$

mean = 13

d)

$$20 - 9 = 11$$

range = 11

2

The table shows the shoe sizes of the students in a year group.

Shoe size	Frequency
4	5
5	9
6	12
7	8
8	6

- Write down the modal shoe size.
- Work out the number of students in the year group.
- Work out how many students have a shoe size of 7 or larger.

(3 marks)

The mode is the shoe size with the highest frequency: size 6
(frequency 12)

$$\text{Total students} = 5 + 9 + 12 + 8 + 6 = 40$$

$$\text{Size 7 or larger} = 8 + 6 = 14$$

3

The table shows the number of children in each of 20 families.

Number of children	Frequency
0	3
1	8
2	6
3	3

Work out the mean number of children per family.

(3 marks)

$$\text{Total children} = (0 \times 3) + (1 \times 8) + (2 \times 6) + (3 \times 3) = 0 + 8 + 12 + 9 = 29$$

$$\text{Total families} = 20$$

$$\text{Mean} = 29 \div 20 = 1.45$$

1.45

4

The table shows the number of pets owned by each of the 25 pupils in class 8B.

Number of pets	Frequency
0	6
1	8
2	5
3	4
4	2

- Work out the median number of pets.
- Work out the mean number of pets.
- Work out the range.

(4 marks)

a) 25 values, so the 13th is the middle

1st to 6th are 0

7th to 14th are 1

median = 1

b) number $\times$ frequency

$$0 \times 6 = 0$$

$$1 \times 8 = 8$$

$$2 \times 5 = 10$$

$$3 \times 4 = 12$$

$$4 \times 2 = 8$$

$$\text{total} = 38$$

$$38 \div 25 = 1.52$$

mean = 1.52

c)

$$4 - 0 = 4$$

range = 4

5

The table shows information about the time, t minutes, that 30 customers waited at a garage.

Time (t minutes)	Frequency
$0 < t \leq 10$	4
$10 < t \leq 20$	9
$20 < t \leq 30$	12
$30 < t \leq 40$	5

Work out an estimate for the mean waiting time.

(3 marks)

The individual measurements are unknown. Represent each class by its midpoint, halfway between its boundaries, then multiply by its frequency to estimate that class's total. Divide the sum of these totals by the total frequency

Use the midpoints 5, 15, 25 and 35

$$(5 \times 4) + (15 \times 9) + (25 \times 12) + (35 \times 5) = 20 + 135 + 300 + 175 = 630$$

$$\text{Estimated mean} = 630 \div 30 = 21 \text{ minutes}$$

21 minutes

6

Year 8 grew 30 sunflowers. The table shows information about their heights, h cm.

Height (h cm)	Frequency
$0 < h \leq 50$	3
$50 < h \leq 100$	7
$100 < h \leq 150$	12
$150 < h \leq 200$	8

- Write down the modal class.
- Write down the class interval that contains the median.
- Work out an estimate for the mean height. Give your answer to 1 decimal place.

(4 marks)

a) highest frequency is 12

$$100 < h \leq 150$$

b) median is between the 15th and 16th

$$3 + 7 = 10$$

$$10 + 12 = 22$$

$$100 < h \leq 150$$

c) midpoint $\times$ frequency

$$25 \times 3 = 75$$

$$75 \times 7 = 525$$

$$125 \times 12 = 1500$$

$$175 \times 8 = 1400$$

$$\text{total} = 3500$$

$$3500 \div 30 = 116.66...$$

$$116.7 \text{ cm}$$

7

Class 8R did a spelling test. Their mean score was 34 and the range was 18.

Here are the scores of the 6 pupils in a small group from class 8T.

28 41 35 30 39 37

- Work out the mean and the range of the 8T scores.
- Make two comparisons between the scores of 8R and the scores of the 8T group.

(4 marks)

a)

$$28 + 41 + 35 + 30 + 39 + 37 = 210$$

$$210 \div 6 = 35$$

$$41 - 28 = 13$$

mean 35, range 13

b) compare the average and the spread

$35 > 34$, so 8T did better on average

$13 < 18$, so 8T were more consistent

8T higher mean and smaller range

8

Here is the weekly pocket money of 7 friends.

£5 £6 £6 £6 £8 £9 £30

- Work out the mean.
- Work out the median.
- Zak says, "The mean is the best average to show how much pocket money these friends usually get." Explain why Zak is wrong.

(4 marks)

a)

$$5 + 6 + 6 + 6 + 8 + 9 + 30 = 70$$

$$70 \div 7 = 10$$

£10

b) middle (4th) value

£6

c)

£30 is an extreme value

it pulls the mean up to £10

6 of the 7 friends get less than £10

median (£6) is more typical

9

The mean of 8 numbers is 12.

The mean of 5 of these numbers is 9.

Work out the mean of the other 3 numbers.

(3 marks)

Total of all 8 numbers

$$8 \times 12 = 96$$

Total of the 5 numbers

$$5 \times 9 = 45$$

Total of the other 3 numbers

$$96 - 45 = 51$$

Mean

$$51 \text{ divided by } 3 = 17$$

17

10

Freya plays six rounds of a quiz. Her mean score for the six rounds is 15.

Here are her scores for the first five rounds.

12 18 9 21 14

Work out her score in the sixth round.

(4 marks)

Total of all six scores

$$6 \times 15 = 90$$

Total of the first five scores

$$12 + 18 + 9 + 21 + 14 = 74$$

Sixth score

$$90 - 74 = 16$$

16

11

The table shows the number of items bought by each of 40 customers at a corner shop.

Number of items	Frequency
1	12
2	15
3	9
4	4

- a. Work out the mean number of items bought per customer.
 b. Kai says, "The mode is 15." Explain the mistake Kai has made.

(4 marks)

$$\text{Total items} = (1 \times 12) + (2 \times 15) + (3 \times 9) + (4 \times 4) = 12 + 30 + 27 + 16 = 85$$

$$\text{Mean} = 85 \div 40 = 2.125$$

The mode is the number of items with the highest frequency, so the mode is 2, not 15

12

The table shows information about the lengths, l cm, of 40 courgettes grown on an allotment.

Length (l cm)	Frequency
$10 < l \leq 20$	6
$20 < l \leq 30$	11
$30 < l \leq 40$	13
$40 < l \leq 50$	10

- a. Write down the class interval that contains the median.
 b. Work out an estimate for the mean length.

(4 marks)

The individual measurements are unknown. Represent each class by its midpoint, halfway between its boundaries, then multiply by its frequency to estimate that class's total. Divide the sum of these totals by the total frequency

Cumulative frequencies: 6, 17, 30, 40. The median lies between the 20th and 21st values, which are in the class $30 < l \leq 40$

Use midpoints 15, 25, 35, 45

$$(15 \times 6) + (25 \times 11) + (35 \times 13) + (45 \times 10) = 90 + 275 + 455 + 450 = 1270$$

$$\text{Estimated mean} = 1270 \div 40 = 31.75 \text{ cm}$$