

Mean, Median, Mode and Range

In this unit, you will find out how to calculate statistical quantities which summarise the important characteristics of data.

The *mean*, *median* and *mode* are three different ways of describing the average.

- To find the *mean*, add up all the numbers and divide by the number of numbers.
- To find the *median*, place all the numbers in order and select the middle number.
- The *mode* is the number which appears most often.
- The *range* gives an idea of how the data are spread out and is the difference between the smallest and largest values.

Exercises

1. Find the mean, median, mode and range of each set of numbers below.
 - (a) 3, 4, 7, 3, 5, 2, 6, 10
 - (b) 8, 10, 12, 14, 7, 16, 5, 7, 9, 11
 - (c) 17, 18, 16, 17, 17, 14, 22, 15, 16, 17, 14, 12
 - (d) 108, 99, 112, 111, 108
 - (e) 64, 66, 65, 61, 67, 61, 57
 - (f) 21, 30, 22, 16, 24, 28, 16, 17
2. Twenty students were asked their shoe sizes. The results are given below.

8,	6,	7,	6,	5,	$4\frac{1}{2}$,	$7\frac{1}{2}$,	$6\frac{1}{2}$,	$8\frac{1}{2}$,	10
7,	5,	$5\frac{1}{2}$	8,	9,	7,	5,	6,	$8\frac{1}{2}$	6

For this data, find

- (a) the mean
 - (b) the median
 - (c) the mode
 - (d) the range.
3. Eight people work in an office. They are paid hourly rates of
£12, £15, £15, £14, £13, £14, £13, £13
 - (a) Find
 - (i) the mean
 - (ii) the median
 - (iii) the mode.
 - (b) Which average would you use if you wanted to claim that the staff were:
 - (i) well paid
 - (ii) badly paid?
 - (c) What is the range?
 4. Two people work in a factory making parts for cars. The table shows how many complete parts they make in one week.

Worker	Mon	Tue	Wed	Thu	Fri
Rachel	20	21	22	20	21
John	30	15	12	36	28

- (a) Find the mean and range for Rachel and John.
- (b) Who is more consistent?
- (c) Who makes the most parts in a week?

5. A gardener buys 10 packets of seeds from two different companies. Each pack contains 20 seeds and he records the number of plants which grow from each pack.

<i>Company A</i>	20	5	20	20	20	6	20	20	20	8
<i>Company B</i>	17	18	15	16	18	18	17	15	17	18

- (a) Find the mean, median and mode for each company's seeds.
- (b) Which company does the mode suggest is best?
- (c) Which company does the mean suggest is best?
- (d) Find the range for each company's seeds.
6. Lionel takes four tests and scores the following marks.
- 65, 72, 58, 77
- (a) What are his median and mean scores?
- (b) If he scores 70 in his next test, does his mean score increase or decrease? Find his new mean score.
- (c) Which has increased most, his mean score or his median score?
7. David keeps a record of the number of fish he catches over a number of fishing trips. His records are:
- 1, 0, 2, 0, 0, 0, 12, 0, 2, 0, 0, 1, 18, 0, 2, 0, 1.
- (a) Why does he object to talking about the mode and median of the number of fish caught?
- (b) What are the mean and range of the data?
- (c) David's friend, Evan also goes fishing. The mode of the number of fish he has caught is also 0 and his range is 15.
What is the largest number of fish that Evan has caught?
8. A petrol station owner records the number of cars which visit his premises on 10 days. The numbers are:
- 204, 310, 279, 314, 257, 302, 232, 261, 308, 217
- (a) Find the mean number of cars per day.
- (b) The owner hopes that the mean will increase if he includes the number of cars on the next day. If 252 cars use the petrol station on the next day, will the mean increase or decrease?
9. The students in a class state how many children there are in their family. The numbers they state are given below.
- 1, 2, 1, 3, 2, 1, 2, 4, 2, 2, 1, 3, 1, 2,
2, 2, 1, 1, 7, 3, 1, 2, 1, 2, 2, 1, 2, 3
- (a) Find the mean, median and mode for this data.
- (b) Which is the most sensible average to use in this case?
10. In a singing contest, the scores awarded by eight judges were:
- 5.9 6.7 6.8 6.5 6.7 8.2 6.1 6.3
- (i) Using the eight scores, determine:
- (a) the mean
- (b) the median
- (c) the mode
- (ii) Only six scores are to be used. Which two scores may be omitted to leave the value of the **median** the same?