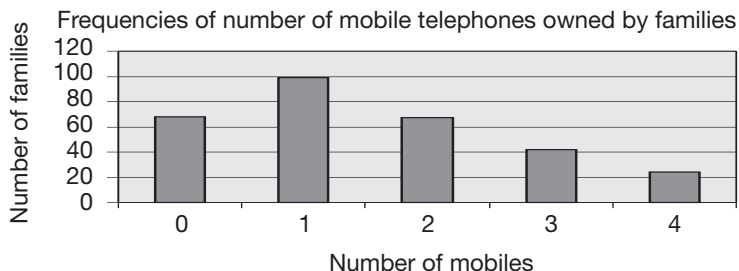# Check-Up

37

Modes

a) A school with pupils coming from 600 families does a survey of how many children there are in these families. They discover that the modal number of children is 3. Which of the following statements must be true?

i) At least 300 of the families have 3 children.

ii) There are more families with 3 children than any other number of children.

iii) The number of families with 2 children is less than the number with 3 children.

iv) There is a total of 1800 children in the 600 families.

Frequencies of number of mobile telephones owned by families

b) The graph above shows the number of families of pupils in a school owning various numbers of mobile telephones (0, 1, 2, 3, 4). What is the modal number of mobiles owned by these families?

Answers to check-up 37

a) ii) and iii) are true.   b) The mode is 1 mobile.

Discussion and explanation of check-up 37

If you have a set of values of some variable, the *mode* is the value that occurs most frequently. In other words, it is the most common value. It might help to connect the term with the French expression, *à la mode*, meaning 'fashionable'. In example (a) the variable is the number of children in the family. To say that 'the modal number of children per family is 3' means, therefore, that this is the most common type of family – in the sense of occurring most frequently (not a comment on their social behaviour!). So the mode of 3 means that there are more families with 3 children than there are families with any other number of children. The mode or modal value is another kind of average: one value that can in some way represent the whole set of values and enable us to make comparisons with other sets. The mode of 3 here, for example, suggests that this is an unusual population, since the modal number of children for most samples of UK families is 2. This is a good example of the use of a mode. It is most appropriate to use the mode when you are dealing with a fairly large population (in this case, the 600 families of children at the school) and discussing a variable that does not take many different values (in this case, the number of children per family).

Example (b) is another good example of the appropriate use of the mode, since there is a fairly large population (300 families) and a variable taking only five values (0, 1, 2, 3 or 4 mobiles). The modal value from the graph is easily spotted: it's the value of the variable with the highest frequency – the tallest column on the graph – i.e. 1 mobile.

The idea of a mode can also be used when there is a larger number of values of the variable, but where the data has been grouped, as in the table below. This shows the distribution of the marks out of 100 in a teacher-designed test for a year group of 90 pupils, but the results have been grouped into intervals, 0–9, 10–19, 20–29, 30–39, and so on. Note that the intervals are equal, each one covering a range of 10 marks. A quick glance at this table shows that the *modal interval* is the range 30-39. The teacher might have hoped to design a test with the modal range of scores in the sixties rather than the thirties – and might therefore use this simple observation of the modal interval to consider whether this test was actually appropriate for these pupils.

Marks	0–9	10–19	20–29	30–39	40–49	50–59	60–69	70–79	80–89	90–99
No. of Pupils	0	3	10	36	19	16	4	2	0	0

Summary of key ideas

◆ Given a set of values of a variable, the mode is the value that occurs most frequently.

◆ The mode is another kind of average, a representative figure for the whole set that may enable comparisons to be made with other sets.

◆ The mode is useful for a fairly large population where the variable being considered takes only a small number of values.

◆ The idea of the mode can be extended to sets where the data has been grouped into intervals – the interval with the highest frequency is called the modal interval.

Further practice

37.1 The graph shows the percentages of pupils in a school achieving various levels (2, 3, 4, 5, 6) in the Key Stage 2 mathematics test. Which level is the mode?

Percentage of pupils achieving various levels in KS2 mathematics
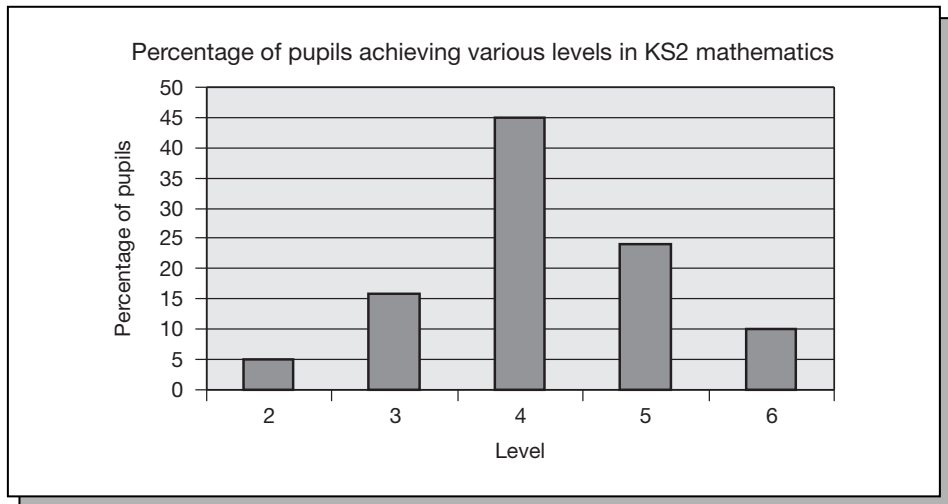
37.2 In Further Practice question 36.2, what was the modal level achieved by the pupils in the Key Stage 3 English assessment?

37.3 The table below shows the frequencies of various amounts of pocket money given weekly to pupils in a Year 5 class, grouped in intervals of £2. Which is the modal interval?

Amount	£0.00–1.99	£2.00–3.99	£4.00–5.99	£6.00–7.99	£8.00–9.99
No. of pupils	2	8	12	3	1