

Check-Up

9

Expressing a percentage in fraction notation

Data from the DfES about the proportions of secondary schools with various percentages of pupils for whom English is an additional language is given in this table.

% of pupils for whom English is an additional language	% of total schools
20% and over	10%
10–19%	4%
5–9%	5%
1–4%	18%
below 1%	63%

- a) Rewrite each of the percentages given in the right-hand column using fraction notation.
- b) A total of 1042 secondary schools out of 18224 had 40% and over pupils in this category. Approximately what percentage of schools is this (to the nearest 1%)? Now express this result in fraction notation.

Answers to check-up 9

$$\text{a) } 10\% = \frac{1}{10} \quad 4\% = \frac{1}{25} \quad 5\% = \frac{1}{20} \quad 18\% = \frac{9}{50} \quad 63\% = \frac{63}{100}.$$

$$\text{b) } 1042 \div 18224 = 0.05717734855 = 0.06 \text{ approximately} = 6\% = \frac{3}{50}.$$

Discussion and explanation of check-up 9

This check-up focuses on the reverse process of expressing proportions as percentages.

Most people know that 10% is also $\frac{1}{10}$ (one-tenth). This is because 10% means '10 in 100', which is equivalent to '1 in 10'. But, of course, this is a special case. For example, 4% is not '1 in 4' and 6% is not $\frac{1}{6}$!

The proportion 4% is '4 in 100', which, expressed in fraction notation, is $\frac{4}{100}$. Cancelling 4, because this is a factor of both 4 and 100, this simplifies to $\frac{1}{25}$.

Similarly, $5\% = \frac{5}{100} = \frac{1}{20}$ (cancelling 5) and $18\% = \frac{18}{100} = \frac{9}{50}$ (cancelling 2).

These proportions could also be expressed as '1 in 20' and '9 in 50'.

The proportion 63% is '63 in 100'. Written in fraction notation this would be $\frac{63}{100}$. This cannot be simplified further because 63 and 100 have no factors in common.

In example (b) the proportion 1042 out of 18224 is found to be equal to the decimal number 0.05717734855, using a calculator. Using the ideas in Check-up 3, moving the figures two places to the left, this is equivalent to 5.717734855%. This is approximately 6% to the nearest whole percent. Then, $6\% = \frac{6}{100} = \frac{3}{50}$ (cancelling 2). So we could say that 'about 6 schools in 100' or 'about 3 schools in 50' have 40% or more pupils with English as an additional language.

You should be able to recall instantly common equivalences between fractions and percentages, such as $20\% = \frac{1}{5}$, $5\% = \frac{1}{20}$ and $25\% = \frac{1}{4}$.

Summary of key ideas

- ◆ A proportion can be expressed as a percentage, in decimal notation or in fraction notation.
- ◆ For example, these all represent the same proportion: '45 in 100', 45%, 0.45, $\frac{45}{100}$.
- ◆ The fraction version may then be simplified by cancelling common factors: for example, $\frac{45}{100} = \frac{9}{20}$ (cancelling 5).

Further practice

% of pupils eligible for FSM	% of schools
more than 50%	5%
36–50%	10%
21–35%	18%
9–20%	30%
8% and below	37%

- 9.1** The table shows the percentages of all primary schools with Key Stage 2 pupils that have various proportions of pupils known to be eligible for free schools meals (FSM). Express in fraction notation all the percentages given in the right-hand column.
- 9.2** One rate of Value-Added Tax (VAT) is 17.5% (or $17\frac{1}{2}\%$). Express this as a fraction.
- 9.3** A secondary school reports that about $87\frac{1}{2}\%$ of the Year 11 pupils are going on to sixth form studies and only $12\frac{1}{2}\%$ are not. Express these statements using fraction notation. Because together they represent the whole cohort, the sum of the two percentages here must be 100%. What must be the sum of the two fractions?