Check-Up

22

Adding and subtracting decimals

Do not use a calculator.

a) Of the Key Stage 1 pupils who entered the special mathematics assessment at level 4 and above in the national tests in 1998, 2.12% achieved level 6, 1.63% achieved level 5 and 22.1% achieved level 4. Add these to find the total percentage of these pupils that achieved at least level 4.

b) If 0.55 m is cut off a tape of length 6 m, what length remains?

Answers to check-up 22

a) 25.85%.   b) 5.45 m.

Discussion and explanation of check-up 22

The main thing to note when adding or subtracting with decimals, using written methods, is that we can avoid most problems if we make sure that all the numbers or quantities have the same number of figures after the decimal point.

So, in (a) I would write the percentages to be added as 2.12, 1.63 and 22.10. And in (b) I would write the lengths as 0.55 m and 6.00 m. Normally, it would be good practice to present data in this way anyway, with all the numbers involved expressed to the same number of decimal places. Then, if we are adding them using a formal written method, we just make sure that we line up the decimal points:

$$
\begin{array}{r}
2.12 \\
1.63 \\
+\ 22.10 \\
\hline
25.85
\end{array}
\qquad
\begin{array}{r}
6.00 \\
-\ 0.55 \\
\hline
5.45
\end{array}
$$

You should really be able to do the calculation of 6 – 0.55 mentally. The diagram below uses what is sometimes called an 'empty number line'. This does not have a scale on it and so the sizes of the gaps between the numbers are not to scale. The diagram provides a powerful mental image. The 0.55 has been removed and we have to find the size of the gap from 0.55 to 6. We can do this using 0.6 and 1 as 'stepping-stones', giving three bits to add: 5 + 0.4 + 0.05, which equals 5.45.
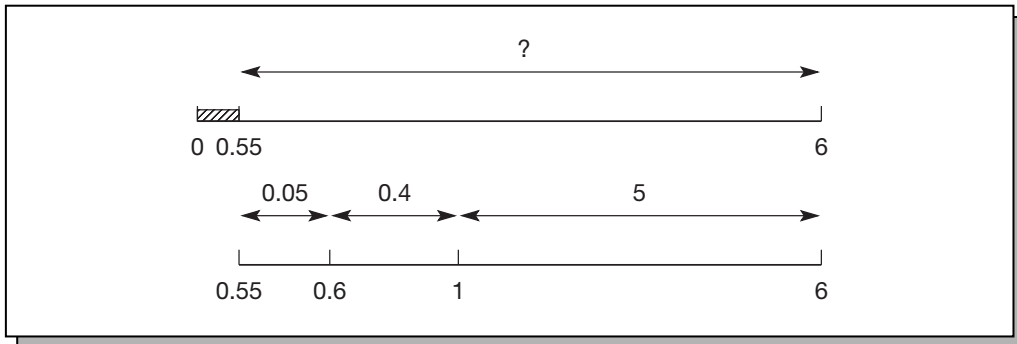
Summary of key ideas

◆   For written calculations involving addition or subtraction with decimals, write each number or quantity with the same number of figures after the decimal point.

◆   Then for formal calculations in a vertical format, ensure that the decimal points are lined up.

◆   To find differences between decimal numbers (e.g. 3.1 – 1.42) informally, use an empty number-line with appropriate numbers as stepping-stones (e.g. 1.42… 1.5… 2… 3… 3.1).

Further practice

Do not use a calculator.

22.1 In the spelling test for the Key Stage 2 English assessment one year, only 14.87% of pupils were able to spell 'particularly' correctly. What percentage failed to spell it correctly? Calculate this mentally, using an empty number-line picture to add on from 14.87 to 100.

22.2 Find the total length in metres of 2.97 m, 34 m and 1.085 m.

22.3 Find the difference between 3.62 m and 2.085 m.