

KNOWLEDGE CHECK

22

USING A CALCULATOR TO EXPRESS A PROPORTION AS A PERCENTAGE

A local authority survey of the length of the upper primary taught week (in hours, rounded to one decimal place) in its primary schools produced the data shown in the table below. Fill in the total number of schools involved and then, using a calculator, the percentages of schools in each band, giving these to one decimal place. How many schools are falling short of the recommended 23.5 teaching-hours per week? What percentage of schools is this?

Weekly teaching-hours	20.5– 21.4	21.5– 22.4	22.5– 23.4	23.5– 24.4	24.5– 25.4	25.5– 26.4	26.5– 27.4	Total
Number of schools	2	8	63	169	87	11	1	
Percentage of schools								

ANSWERS TO KNOWLEDGE CHECK 22

The total number of schools is 341.

The percentages are: 0.6%, 2.3%, 18.5%, 49.6%, 25.5%, 3.2%, 0.3%.

73 schools (21.4%) fall short of the recommended 23.5 hours.

DISCUSSION AND EXPLANATION OF KNOWLEDGE CHECK 22

In Knowledge Check 18 and 19 we saw how to change proportions to percentages, using mental and informal methods. The proportions involved in this knowledge check are too complicated to calculate as percentages mentally, because 341 is not easily related to 100 or any multiples of 100. So it makes sense to use a calculator.

There are 63 schools in the 22.5-23.4 hours band, out of the total of 341 schools. To express this proportion as a decimal, we simply have to calculate $63 \div 341$. My calculator gives me the result 0.18475073314. In Knowledge Check 20 we saw that to change a decimal to an equivalent percentage all we have to do is to move the figures two places to the left. This gives us the proportion of schools in this band as 18.475073314%. Clearly, there are too many figures here and it is suggested that we round the results to one decimal place. Since the figure following the 18.4 is greater than 5, we round up to 18.5%. Notice that moving the figures two places to the left is equivalent to multiplying by 100. So, you could enter this key sequence on your calculator: $63 \div 341 \times 100$. You might consider, however, whether getting the calculator to multiply by 100 for you is just a little lazy!

All the other percentages are worked out in the same way. For example, 11 out of 341 is calculated using $11 \div 341 = 0.03225806452 = 3.225806452\% = 3.2\%$ to one decimal place.

Notice particularly that some of the percentages here are less than 1%. The one school in the highest band represents only 0.29325513196% of all the schools, which rounds to 0.3%. This means '0.3 in 100', which is equivalent to '3 in 1000'. This result indicates why it was a good idea to round the percentages to at least one decimal place. If we had been rounding to the nearest whole percent, this would have been recorded as 0%.

SUMMARY OF KEY IDEAS

- To change a fraction to a percentage, using a calculator:
 - divide the numerator by the denominator, to produce a decimal answer
 - then move the figures two places to the left in relation to the decimal point (or, to put it another way, multiply by 100)
 - and finally, round the answer to an appropriate number of figures.



FURTHER PRACTICE

22.1 The following table shows the number of days that five children (A, B, C, D, E) were absent out of 190 days. Using a calculator where necessary, fill in the percentage of absences for each child, correct to one decimal place.

Child...	A	B	C	D	E
Number of days absent	38	23	19	5	1
Percentage of absences					