



Fractions and percentages

'PER CENT' means 'OUT OF 100'.

You can write a percentage as a fraction with denominator 100. $73\% = \frac{73}{100}$ ↗ Numerator
↘ Denominator

1 To find a fraction of an amount:

Divide by the denominator

Multiply by the numerator

$\frac{2}{5}$ of 90 kg:

$$90 \text{ kg} \div 5 = 18 \text{ kg}$$

$$18 \text{ kg} \times 2 = 36 \text{ kg}$$

2 To write one quantity as a percentage of another:

Divide the first quantity by the second quantity

Multiply by 100

7 out of 20:

$$\frac{7}{20} \times 100 = 35\%$$

3 To find a percentage of an amount:

Divide the percentage by 100

Multiply by the amount

45% of 200 g:

$$\frac{45}{100} \times 200 \text{ g} = 90 \text{ g}$$

Worked example

grade D

In a year group of 96 students, 60 owned a bicycle.
Express 60 as a percentage of 96

$$60 \div 96 = 0.625$$

$$0.625 \times 100 = 62.5$$

62.5% of the students owned a bicycle.

Non-calculator: $\frac{60}{96} = \frac{5}{8} = 0.625$
 $= 62.5\%$

Check it!

$$62.5\% \text{ of } 96 = \frac{62.5}{100} \times 96 = 60 \checkmark$$

Worked example

grade C

120 students each chose one PE activity.

$\frac{1}{5}$ of the students chose swimming.

$\frac{3}{8}$ of the students chose tennis.

All the rest of these students chose cricket.

How many students chose cricket?

$$\frac{1}{5} \text{ of } 120: 120 \div 5 = 24$$

$$\frac{3}{8} \text{ of } 120: 120 \div 8 = 15; 15 \times 3 = 45$$

$$120 - 24 - 45 = 51$$

51 students chose cricket.

Non-calculator methods

You might have to calculate percentages on your NON-CALCULATOR paper. You can use multiples of 1% and 10% to calculate percentages without a calculator.

Work out 12.5% of £600.

$$10\% \text{ of } £600 \text{ is } £60 \quad 600 \div 10 = 60$$

$$1\% \text{ of } £600 \text{ is } £6 \quad 600 \div 100 = 6$$

$$0.5\% \text{ of } £600 \text{ is } £3 \quad 6 \div 2 = 3$$

So, 12.5% of £600 is

$$£60 + £6 + £6 + £3 = £75$$

Now try this

A choir has 56 members. 35 of the members are female.

(a) Work out 35 out of 56 as a percentage.

(2 marks)

40% of the 35 female members wear glasses.

(b) Write the number of female members who wear glasses as a fraction of the

56 members. Give your answer in its simplest form.

(2 marks)

grade D