

Expressing one number as a
percentage of another number

Writing one number as a percentage of another number is a common, everyday necessity. For example, it's used for calculating percentage scores on tests or working out costs on a project.

Example

There are 20 children in the class and 10 children are having dinners. What percentage of the class is that?

A Maths test is out of 20 marks. A student takes this test and scores 18 marks. What percentage score did the student get?

To answer this question, first write the score as a fraction. 18 marks out of 20 can be shown as the fraction $18/20$ (18 out of 20).

Percentages are 'per hundred', so to get a percentage answer the denominator must be 100.

$$\frac{18}{20} \xrightarrow{\times 5} \frac{90}{100} = 90\%$$

So 18 out of 20 marks is 90% of the marks.

FRACTIONS PERCENTAGES

$$\frac{2}{50} \xrightarrow{\times 2} \frac{4}{100} = 4\%$$

Make the denominator 100. Whatever you multiply the denominator by to make 100, you need to multiply the numerator by the same number

FRACTIONS PERCENTAGES

EXAMPLES:

$$\frac{6}{25} \xrightarrow{\times 4} \frac{24}{100} = 24\%$$

Make the denominator 100. Whatever you multiply the denominator by to make 100, you need to multiply the numerator by the same number

What if you can't make the denominator 100?

Example

Find 23 as a percentage of 80.

$$\frac{23}{80}$$

If using a calculator, you can calculate one number as a percentage of another by dividing the numerator by the denominator and multiplying by 100.

$$\begin{aligned} 23 \div 80 &= 0.2875 \\ &= 0.29 \text{ (2dp)} \end{aligned}$$

$$0.29 \times 100 = 29\%.$$

What if you can't make the denominator 100?

Example

There are 30 children in Mr Morgan's class. 18 are girls. What percentage of the class are girls?

$$\frac{18}{30}$$

If using a calculator, you can calculate one number as a percentage of another by dividing the numerator by the denominator and multiplying by 100.

$$18 \div 30 = 0.6$$

$$0.6 \times 100 = 60\%.$$

Example

A snack that weighs 40 g has 18 g of carbohydrates, 12 g of fat and 10 g of protein. What percentage of carbohydrates does the snack contain?

$$\frac{18}{40} \quad \text{Carbohydrates}$$

$$\frac{12}{40} \quad \text{Fat}$$

$$\frac{10}{40} \quad \text{Protein}$$

$$18 \div 40 = 0.45$$

$$12 \div 40 = 0.30$$

$$10 \div 40 = 0.25$$

$$0.45 \times 100 = 45\%.$$

$$0.30 \times 100 = 30\%.$$

$$0.25 \times 100 = 25\%.$$

Example

There are 69,814 people living in Blaenau Gwent. 5,316 of the population speak Welsh. What percentage of Blaenau Gwent speak welsh?

$$\frac{5316}{69,814}$$

If using a calculator, you can calculate one number as a percentage of another by dividing the numerator by the denominator and multiplying by 100.

$$5,316 \div 69,814 = 0.0761451858$$
$$= 0.08 \text{ (2dp)}$$

$$0.08 \times 100 = 8\%.$$

Rule for expressing a number as a percentage

1. Divide the numerator by the denominator.
2. Then multiply the answer by 100 to change the decimal into a percentage.