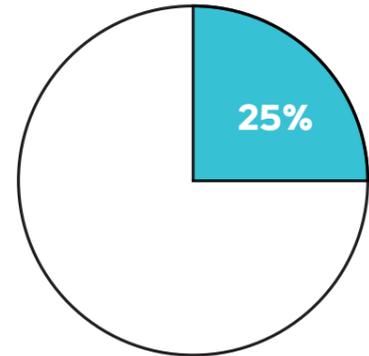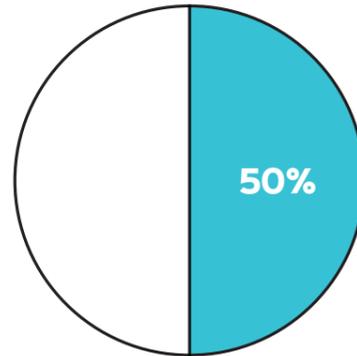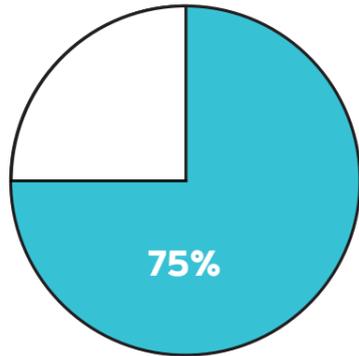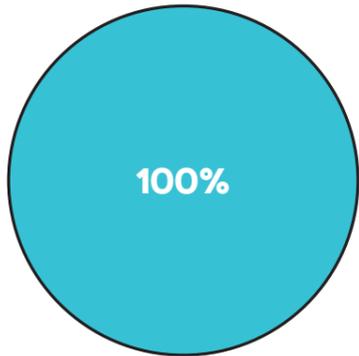# What is a percentage?

A **percentage** is a **portion** of a whole.
It is a number expressed **as a part out of 100**.
It is denoted using the percent sign: **%**

Why use percentages?

Percentages are another way of writing a fraction or a decimal. They can be used to make comparisons easier.

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Rewarding Learning

Percentages as a portion

100%	75%	50%	25%

Simple percentages

50% = ½ → Divide by 2
25% = ¼ → Divide by 4
20% = ⅕ → Divide by 5
10% = ⅒ → Divide by 10

Using simple percentages

50% of 40 → 50% = ½ → ½ of 40 = **20** (divide 40 by 2)
25% of 40 → 25% = ¼ → ¼ of 40 = **10** (divide 40 by 4)
20% of 40 → 20% = ⅕ → ⅕ of 40 = **8** (divide 40 by 5)
10% of 40 → 10% = ⅒ → ⅒ of 40 = **4** (divide 40 by 10)

Percentages as a fraction

All percentages can be written as a **fraction**.

% – Replace the 'o' on the top of the symbol with the percentage number and replace the 'o' on the bottom of the symbol with 100

Example, 17% = $^{17}/100$

Calculate 17% of £55

17% = 17/100

Divide by the bottom, multiply by the top

£55 ÷ 100 × 17 = £9.35

Calculating percentages of amounts

← →

Percentages as a decimal

All percentages can be written as a **decimal.**

As a percentage is out of one hundred, we can write the percentage whole number as hundredths (two decimal places)

Example, 17% = 0.17

Calculate 17% of £55

17% = 0.17

Multiply the value by 0.17

£55 × 0.17 = £9.35

Calculating one number as a percentage of another

A pupil gets 30 marks out of 75 marks in their History test.

What percentage did they get?

First, **write the marks as a fraction** -----> $\dfrac{30}{75} × 100 =$ **40%**

Then, **multiply by 100**

%

Shops will advertise percentage discounts during sales, and **banks** will use them to advertise interest rates on savings, loans and mortgages.

Level 4

Understand and use simple percentages.

Level 5

Calculate percentages of quantities, including money. Find one number as the percentage of another.

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Calculating a percentage change

To find the percentage change, you need to **find the change** that has taken place first.

This can be either **an increase or a decrease.**

$$\% \text{ change} = \frac{\text{change}}{\text{original amount}} \times 100$$

Example

The cost of electricity rises from 15p/unit to 18p/unit.
What is the **percentage increase?**
The increase is **18p**/unit – **15p**/unit = **3p**/unit

$$\% \text{ increase} = \frac{3}{15} \times 100 = \textbf{20\%}$$

increase

original amount

Example

The weight of sugar in a cake is reduced from 300g to 195g.
What is the **percentage decrease?**
The decrease is **300g** – **195g** = **105g**

$$\% \text{ decrease} = \frac{105}{300} \times 100 = \textbf{35\%}$$

decrease

original amount

Calculating the original amount using a percentage change

If the percentage is an **increase** then **add it to 100%**.

If the percentage is a **decrease** then **subtract it from 100%**.

Divide new amount by new percentage to calculate original amount.

Example

The number of tickets on sale for a concert rises to 9200 after a **15% increase**.
How many tickets were originally for sale?

15% increase = 100% + 15% = **115%**

New percentage

9200 ÷ 1.15 = **8000 tickets**

New amount   Original amount

Example

A pair of headphones costs £67.50 after a **55% price reduction**.
What was the original price of the headphones?

55% decrease = 100% – 55% = **45%**

New percentage

£67.50 ÷ 0.45 = **£150**

New amount   Original amount

Shops will advertise percentage discounts during sales, and **banks** will use them to advertise interest rates on savings, loans and mortgages.

Level 6

Calculate percentage increase/decrease in relevant contexts.

Level 7

Calculate the original quantity given the result of a percentage change.