CAMBRIDGE
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Cambridge
Secondary 1

Cambridge Secondary 1 Mathematics
Curriculum outline

Cambridge Secondary 1 combines a world-class curriculum with high-quality support for teachers and integrated assessment. The curriculum is dedicated to helping schools develop learners who are confident, responsible, reflective, innovative and engaged. Cambridge Secondary 1 develops skills and understanding in English (including English as a Second Language), Mathematics and Science for learners typically aged 11–14.

The curriculum frameworks for each subject for Cambridge Secondary 1 are organised into three stages corresponding to the first three years of secondary education. They reflect the teaching target for each year group and provide comprehensive learning objectives. For Cambridge Secondary 1 Mathematics, the curriculum is presented in six content areas or 'strands'. These are further divided into 'substrands'. The six strands and substrands are:

Number
- Integers, powers and roots
- Place value, ordering and rounding
- Fractions, decimals, percentages, ratio and proportion
- Calculation

Algebra
- Expressions, equations and formulae
- Sequences, functions and graphs

Geometry
- Shapes and geometric reasoning
- Position and movement

Measure
- Length, mass and capacity
- Times and rates of change
- Area, perimeter and volume

Handling data
- Planning and collecting data
- Processing and presenting data
- Interpreting and discussing results
- Probability

Problem solving
- Using techniques and skills in solving mathematical problems
- Using understanding and strategies in solving problems.

The first five content areas are all underpinned by *Problem solving*, which provides a structure for the application of mathematical skills. Mental strategies are also a key part of the *Number* content. Together, these two areas form a progressive step preparing students for entry onto IGCSE level courses. This curriculum focuses on principles, patterns, systems, functions and relationships so that learners can apply their mathematical knowledge and develop a holistic understanding of the subject.

The Cambridge Secondary 1 Mathematics curriculum framework provides a solid foundation on which the later stages of education can be built.

Cambridge Secondary 1 Progression Tests are available to schools registered for Cambridge Secondary for stages 7-9. These tests are marked by teachers and come with full mark schemes and marking guidance. At the end of Cambridge Secondary 1, schools can also offer Cambridge Checkpoint, a diagnostic test which offers comprehensive feedback at the end of the Cambridge Secondary 1 stage.

On the following pages, you will find some examples from the Number strand and substrands.

Stage 7

Strand: Number

Integers, powers and roots

- Recognise negative numbers as positions on a number line, and in order, add and subtract positive and negative integers in context.
- Recognise multiples, factors, common factors, primes (all less than 100), making use of simple tests of divisibility; find the lowest common multiple in simple cases; use the 'sieve' for generating primes developed by Eratosthenes.
- Recognise squares of whole numbers to at least 20 x 20 and the corresponding square roots; use the notation 7^2 and $\sqrt{49}$

Place value, ordering and rounding

- Interpret decimal notation and place value; multiply and divide whole numbers and decimals by 10, 100 or 1000.
- Order decimals including measurements, changing these to the same units.
- Round whole numbers to the nearest 10,100 or 1000 and decimals, including measurements, to the nearest whole number or one decimal place.

Fractions, decimals, percentages, ratio and proportion

- Recognise the equivalence of simple fractions, decimals and percentages.
- Simplify fractions by cancelling common factors and identify equivalent fractions; change an improper fraction to a mixed number, and vice versa; convert terminating decimals to fractions, e.g. $0.23 = {}^{23}/_{100}$
- Compare two fractions by using diagrams, or by using a calculator to convert the factions to decimals e.g. ${}^{3}/_{5}$ or ${}^{13}/_{20}$
- Add and subtract two simple fractions, e.g. ${}^{1}/_{8} + {}^{9}/_{8}$, ${}^{11}/_{12} - {}^{5}/_{6}$; find fractions of quantities (whole number answers); multiply a fraction by an integer.
- Understand percentage as the number parts in every 100; use fractions and percentages to describe parts of shapes, quantities and measures.
- Calculate simple percentages of quantities (whole number answers) and express a smaller quantity as a fraction or percentage of a larger one.
- Use percentages to represent and compare different quantities.
- Use ration notation, simplify ratios and divide a quantity into two parts in a given ratio.
- Recognise the relationship between ratio and proportion.
- Use direct proportion in context; solve simple problems involving ratio and direct proportion.

Calculation

Mental strategies

- Consolidate the rapid recall of number facts, including positive integer complements to 100, multiplication facts to 10 x 10 and associated division facts.
- Use known facts and place value to multiply and divide two-digit numbers by a single-digit number, e.g. 45 x 6, 96 ÷ 6.
- Know and apply tests of divisibility by 2, 3, 5, 6, 8, 9, 10 and 100.
- Use known facts and place value to multiply simple decimals by one-digit numbers, e.g. 0.8 x 6.
- Calculate simple fractions and percentages of quantities, e.g. one quarter or 64, 20% of 50kg.
- Use the laws of arithmetic and inverse operations to simplify calculations with whole numbers and decimals.
- Use the order of operations, including brackets, to work out simple calculations.

Addition and subtraction

- Add and subtract integers and decimals, including numbers with different numbers of decimal places.

Multiplication and division

- Multiply and divide decimals with one and/or two places by single-digit numbers, e.g. 13.7 x 8, 4.35 ÷ 5.
- Know that in any division where the dividend is not a multiple of the divisor there will be a remainder, e.g. 157 ÷ 25 = 6 remainder 7. The remainder can be expressed as a fraction of the divisor, e.g. $157 \div 25 = 6\ {}^{7}/_{25}$
- Know when to round up or down after division when the context requires a whole-number answer.

Stage 9

Strand: Number

Integers, powers and roots

- Add, subtract, multiply and divide directed numbers.
- Estimate square roots and cube roots.
- Use positive, negative and zero indices and the index laws for multiplication and division of positive integer powers.

Place value, ordering and rounding

- Recognise the equivalence of 0.1, $^1/_{10}$ and 10^{-1}; multiply and divide whole numbers and decimals by 10 to the power of any positive or negative integer.
- Round numbers to a given number of decimal places or significant figures; use to give solutions to problems with an appropriate degree of accuracy.
- Use the order of operations, including brackets and powers.

Fractions, decimals, percentages, ratio and proportion

- Consolidate writing a fraction in its simplest form by cancelling common factors.
- Add, subtract, multiply and divide fractions, interpreting division as a multiplicative inverse, and cancelling common factors before multiplying or dividing.
- Solve problems involving percentage changes, choosing the correct numbers to take as 100% or as a whole, including simple problems involving personal or household finance, e.g. simple interest, discount, profit, loss and tax.
- Recognise when fractions or percentages are needed to compare different quantities
- Compare two rations; interpret and use ration in a range of contexts.
- Recognise when two quantities are directly proportional; solve problems involving proportionality, e.g. converting between different currencies.

Calculation

Mental strategies

- Extend mental methods of calculation, working with decimals, fractions, percentages and factors, using jottings where appropriate.
- Solve word problems mentally.
- Consolidate use of the rules of arithmetic and inverse operations to simplify calculations.

Multiplication and division

- Multiply by decimals, understanding where to position the decimal point by considering equivalent calculations; divide by decimals by transforming to division by an integer.
- Recognise the effects of multiplying and dividing by numbers between 0 and 1.

How can I access the full curriculum framework?

Only schools offering Cambridge Secondary 1 can access the full curriculum frameworks.

- If you are a Cambridge Secondary 1 school you can download the full curriculum framework from our password protected *Cambridge Secondary 1 site*
- If you are a Cambridge school and would like to offer Cambridge Secondary 1 complete and return our *Additional Qualification Types* form
- If you are not a Cambridge school and would like to find out more about Cambridge Secondary 1 complete our *Expression of interest* form at **www.cie.org.uk**

Learn more! For details of Cambridge Secondary 1, go to **www.cie.org.uk/secondary1** or contact our Customer Services team at **info@cie.org.uk** or call them on **+44 1223 553554**.

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