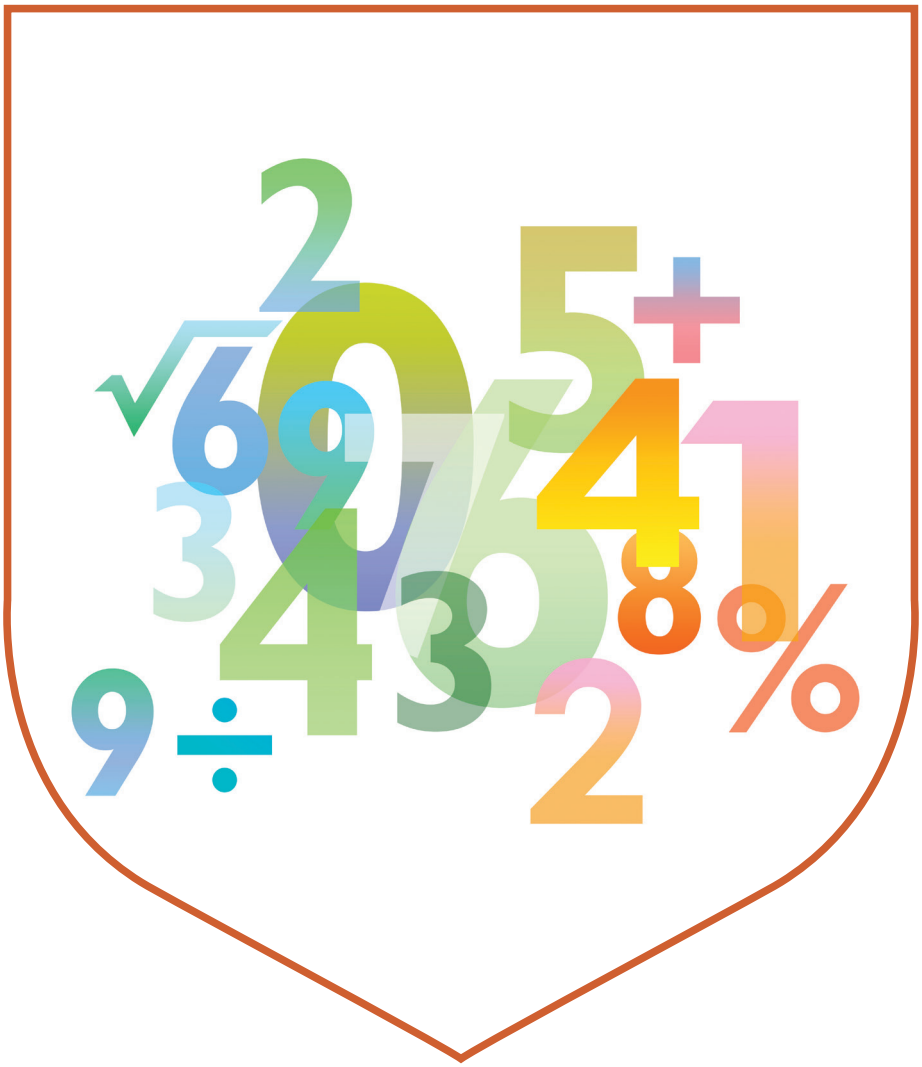
CAMBRIDGE
International Education

Syllabus

Cambridge O Level Mathematics (Syllabus A) 4021 for centres in Mauritius

Use this syllabus for exams in 2028, 2029 and 2030.
Exams are available in the November series.



Version 1

For the purposes of screen readers, any mention in this document of Cambridge IGCSE refers to Cambridge International General Certificate of Secondary Education.

Cambridge Pathway

Why choose Cambridge?

We work with schools worldwide to build an education that shapes knowledge, understanding and skills. Together, we give learners the confidence they need to thrive and make a positive impact in a changing world.

As part of the University of Cambridge, we offer a globally trusted and flexible framework for education from age 3 to 19, informed by research, experience, and listening to educators.

With recognised qualifications, high-quality resources, comprehensive support and valuable insights, we help schools prepare every student for the opportunities and challenges ahead.

Qualifications that are recognised and valued worldwide

From the world's top-ranked universities to local higher education institutions, Cambridge qualifications open doors to a world of opportunities.

Setting a global standard

With over 160 years of experience in delivering fair, valid and reliable assessments to students worldwide, we offer a global, recognised performance standard for international education.

Your path, your way

Schools can adapt our curriculum, high-quality teaching and learning resources and flexible assessments to their local context. Our aligned offer helps Cambridge schools support every learner to reach their potential and thrive.

Learning with lasting impact

Cambridge learners build subject knowledge and conceptual understanding, and develop a broad range of skills, learning habits and attributes to help make them ready for the world.

Improving learning outcomes through data-led insight and action

Our trusted baseline and diagnostic assessments, together with our insights and evaluation service, help schools turn data into knowledge and actionable insights, to inform teaching decisions and improve learner outcomes.

Bringing together a community of experts

We bring together the collective knowledge of experts and our diverse community of educators worldwide, supporting them to learn from one another and share ideas and information.

Tackling the climate crisis together

We believe that education is key to tackling the climate crisis. Together with Cambridge schools, we can empower young people with the skills and knowledge to take action on climate change, helping them be ready for the world.

School feedback: 'We think the Cambridge curriculum is superb preparation for university.'

Feedback from: Christoph Guttentag, Dean of Undergraduate Admissions, Duke University, USA

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Important: Changes to this syllabus

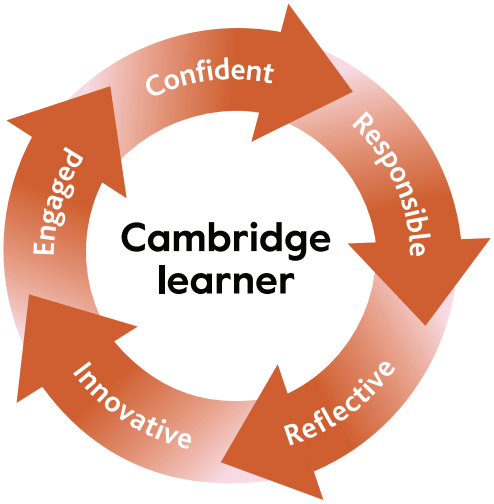
The latest syllabus is version 1, published September 2025. There are no significant changes which affect teaching.

Any textbooks endorsed to support the syllabus for examination from 2025 are still suitable for use with this syllabus.

1 Why choose this syllabus?

Key benefits

Cambridge O Level is typically for 14 to 16 year olds and is an internationally recognised qualification. It has been designed especially for an international market and is sensitive to the needs of different countries. Cambridge O Level is designed for learners whose first language may not be English, and this is acknowledged throughout the examination process.



Our programmes promote a thorough knowledge and understanding of a subject and help to develop the skills learners need for their next steps in education or employment.

Cambridge O Level Mathematics (Syllabus A) supports learners in building competency, confidence and fluency in their use of techniques and mathematical understanding. Learners develop a feel for quantity, patterns and relationships, as well as developing reasoning, problem-solving and analytical skills in a variety of abstract and real-life contexts.

Cambridge O Level Mathematics (Syllabus A) provides a strong foundation of mathematical knowledge both for candidates studying mathematics at a higher level and those who will require mathematics to support skills in other subjects.

Our approach in Cambridge O Level Mathematics encourages learners to be:

confident, in using mathematical language and techniques to ask questions, explore ideas and communicate

responsible, by taking ownership of their learning, and applying their mathematical knowledge and skills so that they can reason, problem solve and work collaboratively

reflective, by making connections within mathematics and across other subjects, and in evaluating methods and checking solutions

innovative, by applying their knowledge and understanding to solve unfamiliar problems creatively, flexibly and efficiently

engaged, by the beauty, patterns and structure of mathematics, becoming curious to learn about its many applications in society and the economy.

School feedback: 'Cambridge O Level has helped me develop thinking and analytical skills which will go a long way in helping me with advanced studies.'

Feedback from: Kamal Khan Virk, former student at Beaconhouse Garden Town Secondary School, Pakistan, who went on to study Actuarial Science at the London School of Economics

Qualifications that are recognised and valued worldwide

Cambridge qualifications prepare and equip learners with the skills they need to thrive at university and beyond. The world's best higher education institutions recognise our qualifications and value the critical thinking skills, independent research abilities and deep subject knowledge that Cambridge learners bring.

Our expertise in curriculum, teaching and learning, and assessment is the basis for the recognition of our programmes and qualifications around the world. The combination of knowledge and skills in Cambridge O Level Mathematics gives learners a solid foundation for further study.

Many universities require a combination of Cambridge International AS & A Levels and Cambridge O Levels or equivalent to meet their entry requirements.

Learn more at **www.cambridgeinternational.org/recognition**

Supporting teachers

Support materials

We believe education works best when teaching and learning are closely aligned to the curriculum, resources and assessment. Our high-quality teaching support helps to maximise teaching time and enables teachers to engage learners of all backgrounds and abilities.

We aim to provide the following support for each Cambridge qualification:

- Syllabus
- Specimen question papers and mark schemes
- Specimen paper answers
- Schemes of Work
- Example candidate responses
- Past papers and mark schemes
- Principal examiner reports for teachers

These resources are available on the School Support Hub at **www.cambridgeinternational.org/support**, our secure online site for Cambridge teachers (username and password required). If you do not have access, speak to the School Support coordinator at your school.

This O Level syllabus shares content with other mathematics syllabuses. Go to **www.cambridgeinternational.org/support** (username and password required) for IGCSE™ Mathematics (0580). If you do not have access, speak to the School Support coordinator at your school.

Endorsed resources

We work with a range of publishers to provide a choice of high-quality resources to help teachers plan and deliver Cambridge programmes and qualifications. All Cambridge endorsed resources have been through a detailed quality assurance process to make sure they closely reflect the syllabus and provide a high level of support for teachers and learners.

Training

We offer a range of support activities for teachers to ensure they have the relevant knowledge and skills to deliver our qualifications.

2 Syllabus overview

Aims

The aims describe the purposes of a course based on this syllabus.

Students following a course based on this syllabus will:

- develop a positive attitude towards mathematics in a way that encourages enjoyment, establishes confidence and promotes enquiry and further learning
- develop a feel for number and understand the significance of the results obtained
- apply their mathematical knowledge and skills to their own lives and the world around them
- use creativity and resilience to analyse and solve problems
- communicate mathematics clearly
- develop the ability to reason logically, make inferences and draw conclusions
- develop fluency so that they can appreciate the interdependence of, and connections between, different areas of mathematics
- acquire a foundation for further study in mathematics and other subjects.

We are an education organisation and politically neutral. The contents of this syllabus, examination papers and associated materials do not endorse any political view. We endeavour to treat all aspects of the exam process neutrally.

Content overview

All candidates study the following topics:

1 Number
2 Algebra and graphs
3 Coordinate geometry
4 Geometry
5 Mensuration
6 Trigonometry
7 Transformations and vectors
8 Probability
9 Statistics

The subject content is organised by topic and is **not** presented in a teaching order. This content structure allows flexibility for teachers to plan delivery in a way that is appropriate for their learners. Learners are expected to use techniques listed in the content and apply them to solve problems with or without the use of a calculator, as appropriate.

This O Level syllabus shares content with other mathematics syllabuses. For further support see the School Support Hub for IGCSE Mathematics (0580). Textbooks endorsed to support IGCSE Mathematics (0580) are suitable for use with this syllabus.

Assessment overview

All candidates take two components. Candidates will be eligible for grades C to E.

Candidates should have a scientific calculator for Paper 2. Calculators are **not** allowed for Paper 1.

Please see the *Cambridge Handbook* at **www.cambridgeinternational.org/eoguide** for guidance on use of calculators in the examinations.

All candidates take:	
Paper 1	1 hour 30 minutes
Non-calculator	50%
80 marks	
Structured and unstructured questions	
Use of a calculator is **not** allowed	
Externally assessed	

and:	
Paper 2	1 hour 30 minutes
Calculator	50%
80 marks	
Structured and unstructured questions	
A scientific calculator is required	
Externally assessed	

Information on availability is in the **Before you start** section.

Assessment objectives

The assessment objectives (AOs) are:

AO1 Knowledge and understanding of mathematical techniques

Candidates should be able to:

- recall and apply mathematical knowledge and techniques
- carry out routine procedures in mathematical and everyday situations
- understand and use mathematical notation and terminology
- perform calculations with and without a calculator
- organise, process, present and understand information in written form, tables, graphs and diagrams
- estimate, approximate and work to degrees of accuracy appropriate to the context and convert between equivalent numerical forms
- understand and use measurement systems in everyday use
- measure and draw using geometrical instruments to an appropriate degree of accuracy
- recognise and use spatial relationships in two and three dimensions.

AO2 Analyse, interpret and communicate mathematically

Candidates should be able to:

- analyse a problem and identify a suitable strategy to solve it, including using a combination of processes where appropriate
- make connections between different areas of mathematics
- recognise patterns in a variety of situations and make and justify generalisations
- make logical inferences and draw conclusions from mathematical data or results
- communicate methods and results in a clear and logical form
- interpret information in different forms and change from one form of representation to another.

Weighting for assessment objectives

The approximate weightings allocated to each of the assessment objectives (AOs) are summarised below.

Assessment objectives as a percentage of the qualification

Assessment objective	**Weighting in O Level %**
AO1 Knowledge and understanding of mathematical techniques	60–70
AO2 Analyse, interpret and communicate mathematically	30–40
Total	100

Assessment objectives as a percentage of each component

Assessment objective	**Weighting in components %**	
	Paper 1	**Paper 2**
AO1 Knowledge and understanding of mathematical techniques	60–70	60–70
AO2 Analyse, interpret and communicate mathematically	30–40	30–40
Total	100	100

3 Subject content

This syllabus gives you the flexibility to design a course that will interest, challenge and engage your learners. Where appropriate you are responsible for selecting resources and examples to support your learners' study. These should be appropriate for the learners' age, cultural background and learning context as well as complying with your school policies and local legal requirements.

Learners should pursue an integrated course that allows them to fully develop their skills and understanding both with and without the use of a calculator.

A List of formulas is provided on page 2 of the examination papers for candidates to refer to during the examinations. Please note that not all required formulas are given; the 'Notes and examples' column of the subject content will indicate where a formula is given in the examination papers and when a formula is **not** given, i.e. knowledge of a formula is required.

Subject content

1 Number

1.1 Types of number	Notes and examples
Identify and use: • natural numbers • integers (positive, zero and negative) • prime numbers • square numbers • cube numbers • common factors • common multiples • rational and irrational numbers • reciprocals.	Example tasks include: • convert between numbers and words, e.g. six billion is 6 000 000 000 10 007 is ten thousand and seven • express 72 as a product of its prime factors • find the highest common factor (HCF) of two numbers • find the lowest common multiple (LCM) of two numbers.

continued

1 **Number** continued

1.2 Sets	Notes and examples
Understand and use set language, notation and Venn diagrams to describe sets.	Venn diagrams are limited to two sets. The following set notation will be used: • $\mathrm{n}(A)$ Number of elements in set A • A' Complement of set A • $\mathscr{E}$ Universal set • $A \cup B$ Union of A and B • $A \cap B$ Intersection of A and B. Example definition of sets: $A = \{x: x \text{ is a natural number}\}$ $B = \{a, b, c, ...\}$ $C = \{x: a \leqslant x \leqslant b\}$.

1.3 Powers and roots	Notes and examples
Calculate with the following: • squares • square roots • cubes • cube roots • other powers and roots of numbers.	Includes recall of squares and their corresponding roots from 1 to 15, and recall of cubes and their corresponding roots of 1, 2, 3, 4, 5 and 10, e.g.: • Write down the value of $\sqrt{169}$. • Work out $5^2 \times \sqrt[3]{8}$.

1.4 Fractions, decimals and percentages	Notes and examples
1 Use the language and notation of the following in appropriate contexts: • proper fractions • improper fractions • mixed numbers • decimals • percentages.	Candidates are expected to be able to write fractions in their simplest form. Candidates are **not** expected to use recurring decimal notation.
2 Recognise equivalence and convert between these forms.	Candidates are **not** expected to demonstrate the conversion of a recurring decimal to a fraction and vice versa.

1.5 Ordering	Notes and examples
Order quantities by magnitude and demonstrate familiarity with the symbols =, ≠, >, < , ⩾ and ⩽.	

continued

1 **Number** continued

1.6 The four operations	Notes and examples
Use the four operations for calculations with integers, fractions and decimals, including correct ordering of operations and use of brackets.	Includes: • negative numbers • improper fractions • mixed numbers • practical situations, e.g. temperature changes.

1.7 Indices I	Notes and examples
1 Understand and use indices (positive, zero and negative integers).	e.g. find the value of 7^{-2}.
2 Understand and use the rules of indices.	e.g. find the value of $2^{-3} \times 2^4$, $(2^3)^2$, $2^3 \div 2^4$.

1.8 Standard form	Notes and examples
1 Use the standard form $A \times 10^n$ where n is a positive or negative integer and $1 \leqslant A < 10$.	
2 Convert numbers into and out of standard form.	
3 Calculate with values in standard form.	Candidates are expected to calculate with standard form only on Paper 3.

1.9 Estimation	Notes and examples
1 Round values to a specified degree of accuracy.	Includes decimal places and significant figures.
2 Make estimates for calculations involving numbers, quantities and measurements.	e.g. write 5764 correct to the nearest thousand. e.g. by writing each number correct to 1 significant figure, estimate the value of $\frac{41.3}{9.79 \times 0.765}$.
3 Round answers to a reasonable degree of accuracy in the context of a given problem.	

1.10 Limits of accuracy	Notes and examples
Give upper and lower bounds for data rounded to a specified accuracy.	e.g. write down the upper bound of a length measured correct to the nearest metre. Candidates are **not** expected to find the bounds of the results of calculations which have used data rounded to a specified accuracy.

continued

1 **Number** continued

1.11 Ratio and proportion	Notes and examples
Understand and use ratio and proportion to:	
• give ratios in their simplest form	e.g. 20 : 30 : 40 in its simplest form is 2 : 3 : 4.
• divide a quantity in a given ratio	
• use proportional reasoning and ratios in context.	e.g. adapt recipes; use map scales; determine best value.

1.12 Rates	Notes and examples
1 Use common measures of rate.	e.g. calculate with: • hourly rates of pay • exchange rates between currencies • flow rates • fuel consumption.
2 Apply other measures of rate.	e.g. calculate with: • pressure • density • population density. Required formulas will be given in the question.
3 Solve problems involving average speed.	Knowledge of speed/distance/time formula is required. e.g. A cyclist travels 45 km in 3 hours 45 minutes. What is their average speed? Notation used will be, e.g. m/s (metres per second), g/cm^3 (grams per cubic centimetre).

1.13 Percentages	Notes and examples
1 Calculate a given percentage of a quantity.	
2 Express one quantity as a percentage of another.	
3 Calculate percentage increase or decrease.	
4 Calculate with simple and compound interest.	Formulas are **not** given. Percentage calculations may include: • deposit • discount • profit and loss (as an amount or a percentage) • earnings • percentages over 100%.

continued

1 **Number** continued

1.14 Using a calculator	Notes and examples
1 Use a calculator efficiently.	e.g. know not to round values within a calculation and to only round the final answer.
2 Enter values appropriately on a calculator.	e.g. enter 2 hours 30 minutes as 2.5 hours or 2° 30’ 0’’.
3 Interpret the calculator display appropriately.	e.g. in money 4.8 means $4.80; in time 3.25 means 3 hours 15 minutes.

1.15 Time	Notes and examples
1 Calculate with time: seconds (s), minutes (min), hours (h), days, weeks, months, years, including the relationship between units.	1 year = 365 days.
2 Calculate times in terms of the 24-hour and 12-hour clock.	In the 24-hour clock, for example, 3.15 a.m. will be denoted by 03 15 and 3.15 p.m. by 15 15.
3 Read clocks and timetables.	Includes problems involving time zones, local times and time differences.

1.16 Money	Notes and examples
1 Calculate with money.	
2 Convert from one currency to another.	

2 Algebra and graphs

2.1 Introduction to algebra	Notes and examples
1 Know that letters can be used to represent generalised numbers.	
2 Substitute numbers into expressions and formulas.	

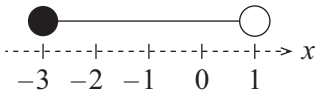
2.2 Algebraic manipulation	Notes and examples
1 Simplify expressions by collecting like terms.	Simplify means give the answer in its simplest form, e.g. $2a + 3b + 5a - 9b = 7a - 6b$.
2 Expand products of algebraic expressions.	e.g. expand $3x(2x - 4y)$. Includes products of two brackets involving one variable, e.g. expand $(2x + 1)(x - 4)$.
3 Factorise by extracting common factors.	Factorise means factorise fully, e.g. $9x^2 + 15xy = 3x(3x + 5y)$.

2.3 Indices II	Notes and examples
1 Understand and use indices (positive, zero and negative).	e.g. $2^x = 32$. Find the value of x.
2 Understand and use the rules of indices.	e.g. simplify: • $(5x^3)^2$ • $12a^5 \div 3a^{-2}$ • $6x^7y^4 \times 5x^{-5}y$. Knowledge of logarithms is **not** required.

2.4 Equations	Notes and examples
1 Construct simple expressions, equations and formulas.	e.g. write an expression for a number that is 2 more than n. Includes constructing linear simultaneous equations.
2 Solve linear equations in one unknown.	Examples include: • $3x + 4 = 10$ • $5 - 2x = 3(x + 7)$.
3 Solve simultaneous linear equations in two unknowns.	
4 Change the subject of simple formulas.	e.g. change the subject of formulas where: • the subject only appears once • there is **not** a power or root of the subject.

continued

2 Algebra and graphs continued

2.5 Inequalities	Notes and examples
Represent and interpret inequalities, including on a number line.	When representing and interpreting inequalities on a number line: • open circles should be used to represent strict inequalities ($<$, $>$) • closed circles should be used to represent inclusive inequalities ($\leqslant$, $\geqslant$) e.g. $-3 \leqslant x < 1$ 

2.6 Sequences	Notes and examples
1 Continue a given number sequence or pattern.	e.g. write the next two terms in this sequence: $1, 3, 6, 10, 15, \ldots, \ldots$
2 Recognise patterns in sequences, including the term-to-term rule, and relationships between different sequences.	
3 Find and use the nth term of the following sequences:	
(a) linear	
(b) simple quadratic	e.g. find the nth term of $2, 5, 10, 17$
(c) simple cubic.	

2.7 Graphs in practical situations	Notes and examples
1 Use and interpret graphs in practical situations including travel graphs and conversion graphs.	e.g. interpret the gradient of a straight-line graph as a rate of change.
2 Draw graphs from given data.	e.g. draw a distance–time graph to represent a journey.

continued

2 Algebra and graphs continued

2.8 Graphs of functions	Notes and examples
1 Construct tables of values, and draw, recognise and interpret graphs for functions of the following forms: • $ax + b$ • $\pm x^2 + ax + b$ • $\frac{a}{x}\ (x \neq 0)$ where a and b are integer constants.	
2 Solve associated equations graphically, including finding and interpreting roots by graphical methods.	e.g. find the intersection of a line and a curve.

2.9 Sketching curves	Notes and examples
Recognise, sketch and interpret graphs of the following functions:	
(a) linear	
(b) quadratic.	Knowledge of symmetry and roots is required. Knowledge of turning points is **not** required.

3 Coordinate geometry

3.1 Coordinates	Notes and examples
Use and interpret Cartesian coordinates in two dimensions.	

3.2 Drawing linear graphs	Notes and examples
Draw straight-line graphs for linear equations.	Equations will be given in the form $y = mx + c$ (e.g. $y = –2x + 5$), unless a table of values is given.

3.3 Gradient of linear graphs	Notes and examples
Find the gradient of a straight line.	From a grid only.

3.4 Equations of linear graphs	Notes and examples
Interpret and obtain the equation of a straight-line graph in the form $y = mx + c$.	Questions may: • use and request lines in the forms $y = mx + c$ $x = k$ • involve finding the equation when the graph is given • ask for the gradient or y-intercept of a graph from an equation, e.g. find the gradient and y-intercept of the graph with the equation $y = 6x + 3$. Candidates are expected to give equations of a line in a fully simplified form.

3.5 Parallel lines	Notes and examples
Find the gradient and equation of a straight line parallel to a given line.	e.g. find the equation of the line parallel to $y = 4x – 1$ that passes through $(1, –3)$.

4 Geometry

4.1 Geometrical terms	Notes and examples
1 Use and interpret the following geometrical terms: • point • vertex • line • parallel • perpendicular • bearing • right angle • acute, obtuse and reflex angles • interior and exterior angles • similar • congruent • scale factor.	Candidates are **not** expected to show that two shapes are congruent.
2 Use and interpret the vocabulary of: • triangles • special quadrilaterals • polygons • nets • simple solids.	Includes the following terms: Triangles: • equilateral • isosceles • scalene • right-angled. Quadrilaterals: • square • rectangle • kite • rhombus • parallelogram • trapezium. Polygons: • regular and irregular polygons • pentagon • hexagon • octagon • decagon.

continued

4 **Geometry** continued

4.1 **Geometrical terms** continued	**Notes and examples**
	Simple solids: • cube • cuboid • prism • cylinder • pyramid • cone • sphere (term 'hemisphere' **not** required) • face • surface • edge.
3 Use and interpret the vocabulary of a circle.	Includes the following terms: • centre • radius (plural radii) • diameter • circumference • semicircle • chord • tangent • arc • sector • segment.

4.2 **Geometrical constructions**	**Notes and examples**
1 Measure and draw lines and angles.	A ruler should be used for all straight edges. Constructions of perpendicular bisectors and angle bisectors are **not** required.
2 Construct a triangle, given the lengths of all sides, using a ruler and pair of compasses only.	e.g. construct a rhombus by drawing two triangles. Construction arcs must be shown.
3 Draw, use and interpret nets.	Examples include: • draw nets of cubes, cuboids, prisms and pyramids • use measurements from nets to calculate volumes and surface areas.

continued

4 **Geometry** continued

4.3 Scale drawings	Notes and examples
1 Draw and interpret scale drawings.	A ruler must be used for all straight edges.
2 Use and interpret three-figure bearings.	Bearings are measured clockwise from north (000° to 360°). e.g. find the bearing of A from B if the bearing of B from A is 025°. Includes an understanding of the terms north, east, south and west. e.g. point D is due east of point C.

4.4 Similarity	Notes and examples
Calculate lengths of similar shapes.	

4.5 Symmetry	Notes and examples
Recognise line symmetry and order of rotational symmetry in two dimensions.	Includes properties of triangles, quadrilaterals and polygons directly related to their symmetries.

4.6 Angles	Notes and examples
1 Calculate unknown angles and give simple explanations using the following geometrical properties: • sum of angles at a point = 360° • sum of angles at a point on a straight line = 180° • vertically opposite angles are equal • angle sum of a triangle = 180° and angle sum of a quadrilateral = 360°.	Knowledge of three-letter notation for angles is required, e.g. angle ABC. Candidates are expected to use the correct geometrical terminology when giving reasons for answers.
2 Calculate unknown angles and give geometric explanations for angles formed within parallel lines: • corresponding angles are equal • alternate angles are equal • co-interior angles sum to 180° (supplementary).	
3 Know and use angle properties of regular polygons.	Includes exterior and interior angles, and angle sum.

4.7 Circle theorems	Notes and examples
Calculate unknown angles and give explanations using the following geometrical properties of circles: • angle in a semicircle = 90° • angle between tangent and radius = 90°.	Candidates will be expected to use the geometrical properties listed in the syllabus when giving reasons for answers.

5 Mensuration

5.1 Units of measure	Notes and examples
Use metric units of mass, length, area, volume and capacity in practical situations and convert quantities into larger or smaller units.	Units include: • mm, cm, m, km • mm^2, cm^2, m^2, km^2 • mm^3, cm^3, m^3 • ml, l • g, kg. Conversion between units includes: • between different units of area, e.g. $cm^2 \leftrightarrow m^2$ • between units of volume and capacity, e.g. $m^3 \leftrightarrow$ litres.

5.2 Area and perimeter	Notes and examples
Carry out calculations involving the perimeter and area of a rectangle, triangle, parallelogram and trapezium.	Except for area of a triangle, formulas are **not** given.

5.3 Circles, arcs and sectors	Notes and examples
1 Carry out calculations involving the circumference and area of a circle. 2 Carry out calculations involving arc length and sector area as fractions of the circumference and area of a circle, where the sector angle is a factor of 360°.	Answers may be asked for in terms of π. Formulas are given in the List of formulas.

5.4 Surface area and volume	Notes and examples
Carry out calculations and solve problems involving the surface area and volume of a: • cuboid • prism • cylinder • sphere • pyramid • cone.	Answers may be asked for in terms of π. The following formulas are given in the List of formulas: • curved surface area of a cylinder • curved surface area of a cone • surface area of a sphere • volume of a prism • volume of a pyramid • volume of a cylinder • volume of a cone • volume of a sphere. The term prism refers to any solid with a uniform cross-section, e.g. a cylindrical sector.

continued

5 **Mensuration** continued

5.5 Compound shapes and parts of shapes	Notes and examples
1 Carry out calculations and solve problems involving perimeters and areas of: • compound shapes • parts of shapes.	Answers may be asked for in terms of π.
2 Carry out calculations and solve problems involving surface areas and volumes of: • compound solids • parts of solids.	e.g. find the volume of half of a sphere.

6 Trigonometry

6.1 Pythagoras' theorem	Notes and examples
Know and use Pythagoras' theorem.	

6.2 Right-angled triangles	
1 Know and use the sine, cosine and tangent ratios for acute angles in calculations involving sides and angles of a right-angled triangle.	Angles will be given in degrees and answers should be written in degrees, with decimals correct to one decimal place.
2 Solve problems in two dimensions using Pythagoras' theorem and trigonometry.	Knowledge of bearings may be required.

7 Transformations and vectors

7.1 Transformations	Notes and examples
Recognise, describe and draw the following transformations: 1 Reflection of a shape in a vertical or horizontal line. 2 Rotation of a shape about the origin, vertices or midpoints of edges of the shape, through multiples of 90°. 3 Enlargement of a shape from a centre by a scale factor. 4 Translation of a shape by a vector $\begin{pmatrix} x \\ y \end{pmatrix}$.	Questions will **not** involve combinations of transformations. A ruler must be used for all straight edges. Positive and fractional scale factors only.

8 Probability

8.1 Introduction to probability	Notes and examples
1 Understand and use the probability scale from 0 to 1.	Probability notation is **not** required. Probabilities should be given as a fraction, decimal or percentage. Problems may require using information from tables, graphs or Venn diagrams (limited to two sets).
2 Calculate the probability of a single event.	
3 Understand that the probability of an event not occurring = 1 – the probability of the event occurring.	e.g. The probability that a counter is blue is 0.8. What is the probability that it is not blue?

8.2 Relative and expected frequencies	Notes and examples
1 Understand relative frequency as an estimate of probability.	e.g. use results of experiments with a spinner to estimate the probability of a given outcome.
2 Calculate expected frequencies.	e.g. use probability to estimate an expected value from a population. Includes understanding what is meant by fair, bias and random.

8.3 Probability of combined events	Notes and examples
Calculate the probability of combined events using, where appropriate:	Combined events will only be with replacement.
• sample space diagrams	
• Venn diagrams	Venn diagrams will be limited to two sets.
• tree diagrams.	In tree diagrams, outcomes will be written at the end of the branches and probabilities by the side of the branches.

9 Statistics

9.1 Classifying statistical data	Notes and examples
Classify and tabulate statistical data.	e.g. tally tables, two-way tables.

9.2 Interpreting statistical data	Notes and examples
1 Read, interpret and draw inferences from tables and statistical diagrams.	
2 Compare sets of data using tables, graphs and statistical measures.	e.g. compare averages and ranges between two data sets.
3 Appreciate restrictions on drawing conclusions from given data.	

9.3 Averages and range	Notes and examples
Calculate the mean, median, mode and range for individual data and distinguish between the purposes for which these are used.	Data may be in a list or frequency table, but will not be grouped.

9.4 Statistical charts and diagrams	Notes and examples
Draw and interpret: (a) bar charts (b) pie charts (c) pictograms (d) stem-and-leaf diagrams (e) simple frequency distributions.	Includes composite (stacked) and dual (side-by-side) bar charts. Stem-and-leaf diagrams should have ordered data with a key.

9.5 Scatter diagrams	Notes and examples
1 Draw and interpret scatter diagrams.	Plotted points should be clearly marked, for example as small crosses (×).
2 Understand what is meant by positive, negative and zero correlation.	
3 Draw by eye, interpret and use a straight line of best fit.	A line of best fit: • should be a single ruled line drawn by inspection • should extend across the full data set • does not need to coincide exactly with any of the points but there should be a roughly even distribution of points either side of the line over its entire length.

Faculty feedback: 'Understanding how and why our climate is changing and providing the knowledge and skills to explore the challenges plays a key role in every student's education.'

Feedback from: Dr Amy Munro-Faure, Head of Education and Student Engagement of Cambridge Zero

4 Details of the assessment

All candidates take **two** components.

Both papers assess AO1 Knowledge and understanding of mathematical techniques and AO2 Analyse, interpret and communicate mathematically.

Both papers consist of structured and unstructured questions. Structured questions contain parts, e.g. (a), (b), (c)(i), etc., and unstructured questions do not.

Questions may assess more than one topic from the subject content.

For all papers, candidates write their answers on the question paper. They must show all necessary working in the spaces provided.

Additional materials for exams

For both papers, candidates should have the following geometrical instruments:

- a pair of compasses
- a protractor
- a ruler.

Tracing paper may be used as an additional material for both papers. Candidates cannot bring their own tracing paper but may request it during the examination.

Candidates should have a scientific calculator for Paper 2; one with trigonometric functions is strongly recommended. Algebraic or graphical calculators are **not** permitted. Please see the *Cambridge Handbook* at **www.cambridgeinternational.org/eoguide** for guidance on use of calculators in the examinations. Calculators are **not** allowed for Paper 1.

The Additional materials list for exams is updated before each series. You can view the list for the relevant series and year on our website in the Phase 4 – Before the exams section of the *Cambridge Exams Officer's Guide* at **www.cambridgeinternational.org/eoguide**

Paper 1 – Non-calculator

Written paper, 1 hour 30 minutes, 80 marks

Use of a calculator is **not** allowed.

Candidates answer **all** questions.

This paper consists of questions based on the subject content, except for 1.14 Using a calculator.

This paper will be weighted at 50% of the total qualification.

This is a compulsory component for candidates.

This written paper is an externally set assessment, marked by Cambridge.

Paper 2 – Calculator

Written paper, 1 hour 30 minutes, 80 marks

A scientific calculator is required.

Candidates answer **all** questions.

This paper consists of questions based on the subject content.

Candidates should give non-exact numerical answers correct to 3 significant figures, or 1 decimal place for angles in degrees, unless a different level of accuracy is specified in the question.

To earn accuracy marks, candidates should avoid rounding figures until they have their final answer. Where candidates need to use a final answer in later parts of the question, they should use the value of the final answer **before** it was rounded.

Candidates should use the value of π from their calculator or the value of 3.142.

This paper will be weighted at 50% of the total qualification.

This is a compulsory component for candidates.

This written paper is an externally set assessment, marked by Cambridge.

List of formulas

This list of formulas will be included on page 2 of Paper 1 and Paper 2.

Area, A, of triangle, base b, height h.	$A = \frac{1}{2}bh$
Area, A, of circle of radius r.	$A = \pi r^2$
Circumference, C, of circle of radius r.	$C = 2\pi r$
Curved surface area, A, of cylinder of radius r, height h.	$A = 2\pi rh$
Curved surface area, A, of cone of radius r, sloping edge l.	$A = \pi rl$
Surface area, A, of sphere of radius r.	$A = 4\pi r^2$
Volume, V, of prism, cross-sectional area A, length l.	$V = Al$
Volume, V, of pyramid, base area A, height h.	$V = \frac{1}{3}Ah$
Volume, V, of cylinder of radius r, height h.	$V = \pi r^2 h$
Volume, V, of cone of radius r, height h.	$V = \frac{1}{3}\pi r^2 h$
Volume, V, of sphere of radius r.	$V = \frac{4}{3}\pi r^3$

Mathematical conventions

Mathematics is a universal language where there are some similarities and differences around the world. The guidance below outlines the conventions used in Cambridge examinations and we encourage candidates to follow these conventions.

Working with graphs

- A **plot** of a graph should have points clearly marked, for example as small crosses (×), and **must**:
  - be drawn on graph or squared paper
  - cover a given range of values by calculating the coordinates of points and connecting them appropriately (where values are given, it will include enough points to determine a curve; where a table of values is not provided, the candidate must decide on the appropriate number of points required to determine the curve)
  - have each point plotted to an accuracy of within half of the smallest square on the grid.
- A **sketch** of a graph does not have to be accurate or to scale, nor does it need to be on graph or squared paper, but it **must**:
  - be drawn freehand
  - show the most important features, e.g. x-intercepts, y-intercepts, turning points, symmetry, with coordinates or values marked on the axes, where appropriate
  - have labelled axes, e.g. with x and y
  - interact with the axes appropriately, e.g. by intersecting or by tending towards
  - fall within the correct quadrants
  - show the correct long-term behaviour.
- Graphs should extend as far as possible across any given grid, within any constraints of the domain.
- Where graphs of functions are:
  - linear, they should be ruled
  - non-linear, the points should be joined with a smooth curve.
- A tangent to a curve should touch the curve at the required point and be in contact with the curve for the minimum possible distance. It should not cross the curve at the point where it is a tangent.
- Values should be read off a graph to an accuracy of within half of the smallest square on the grid.

Communicating mathematically

- If candidates are asked to show their working, they cannot gain full marks without clearly communicating their method, even if their final answer is correct.
- A numerical answer should not be given as a combination of fractions and decimals, e.g. $\frac{1}{0.2}$ is **not** acceptable.

Accuracy

- Answers are expected to be given in their simplest form unless the question states otherwise.
- Where a question asks for 'exact values' the answer may need to be given in terms of π or in surd form, depending on the question.
- Where answers are not exact values, they should be given to three significant figures unless a different accuracy is defined in the question.
- Answers that are exact to four or five significant figures should **not** be rounded unless the question states otherwise.
- In order to obtain an answer correct to an appropriate degree of accuracy, a higher degree of accuracy will often be needed within the working.
- If a question asks to prove or show a given answer to a specified degree of accuracy, candidates must show full working, intermediate answers and the final answer to at least one degree of accuracy more than that asked for.

Command words

Command words and their meanings help candidates know what is expected from them in the exams. The table below includes command words used in the assessment for this syllabus. The use of the command word will relate to the subject context.

Command word	What it means
Calculate	work out from given facts, figures or information
Construct	make an accurate drawing
Determine	establish with certainty
Describe	state the points of a topic / give characteristics and main features
Explain	set out purposes or reasons / make the relationships between things clear / say why and/or how and support with relevant evidence
Give	produce an answer from a given source or recall/memory
Plot	mark point(s) on a graph
Show (that)	provide structured evidence that leads to a given result
Sketch	make a simple freehand drawing showing the key features, taking care over proportions
State	express in clear terms
Work out	calculate from given facts, figures or information with or without the use of a calculator
Write	give an answer in a specific form
Write down	give an answer without significant working

5 What else you need to know

This section is an overview of other information you need to know about this syllabus. It will help to share the administrative information with your exams officer so they know when you will need their support.

Before you start

Previous study

We recommend that learners starting this course should have studied a mathematics curriculum such as the Cambridge Lower Secondary programme or equivalent national educational framework.

Guided learning hours

We design Cambridge O Level syllabuses to require about 130 guided learning hours for each subject. This is for guidance only. The number of hours a learner needs to achieve the qualification may vary according to each school and the learners' previous experience of the subject.

Availability and timetables

You can enter candidates in the November exam series.

Check you are using the syllabus for the year the candidate is taking the exam.

Private candidates can enter for this syllabus. For more information, please refer to the *Cambridge Guide to Making Entries*.

Combining with other syllabuses

Candidates can take this syllabus alongside other Cambridge International syllabuses in a single exam series. The only exceptions are:

- Cambridge O Level Mathematics (4029)
- Cambridge IGCSE Mathematics (0580)
- Cambridge IGCSE International Mathematics (0607)
- syllabuses with the same title at the same level.

Cambridge O Level, Cambridge IGCSE and Cambridge IGCSE (9–1) syllabuses are at the same level.

Making entries

Exam administration

To keep our exams secure, we produce question papers for different areas of the world, known as administrative zones. We allocate all Cambridge schools to an administrative zone determined by their location. Each zone has a specific timetable.

Some of our syllabuses offer candidates different assessment options. An entry option code is used to identify the components the candidate will take relevant to the administrative zone and the available assessment options. Please refer to the *Cambridge Guide to Making Entries* for the relevant series for the correct entry option code.

Retakes

Candidates can retake the whole qualification as many times as they want to.

Learn more about retake entries, including definitions and information on entry deadlines, at **www.cambridgeinternational.org/retakes**

To confirm what entry options are available for this syllabus, refer to the *Cambridge Guide to Making Entries* for the relevant series. Regulations for carrying forward component marks can be found in the *Cambridge Handbook* for the relevant year of assessment at **www.cambridgeinternational.org/eoguide**

Language

This syllabus and the related assessment materials are available in English only.

Accessibility and equality

Syllabus and assessment design

At Cambridge we recognise that our candidates have highly diverse socio-economic, cultural and linguistic backgrounds, and may also have a variety of protected characteristics. Protected characteristics include special educational needs and disability (SEND), religion and belief, and characteristics related to gender and identity.

We follow accessible design principles to make our syllabuses and assessment materials as accessible and inclusive as possible. We review language accessibility, visual resources, question layout and the contexts used in questions. Using this approach means that we give all candidates the fairest possible opportunity to demonstrate their knowledge, skills and understanding.

Access arrangements

Our design principles aim to make sure our assessment materials are accessible for all candidates. To further minimise barriers faced by candidates with SEND, illness or injury, we offer a range of access arrangements and modified papers. This is the principal way in which we comply with our duty to make 'reasonable adjustments', as guided by the UK Equality Act 2010.

Important:

Requested access arrangements should be based on evidence of the candidate's barrier to taking an assessment and should also reflect their normal way of working. For Cambridge to approve an access arrangement, we need to agree that it constitutes a reasonable adjustment and does not affect the security or integrity of the assessment. This is explained in section 1.3 of the *Cambridge Handbook* **www.cambridgeinternational.org/eoguide**

Applying for access arrangements

- Details of our standard access arrangements and modified question papers are available in section 1.3 of the *Cambridge Handbook* **www.cambridgeinternational.org/eoguide**
- Centres are expected to check the availability of access arrangements and modified question papers at the start of the course. Check the *Cambridge Handbook*, the assessment objectives listed in the syllabus document and, where applicable, any access arrangement restrictions listed in the syllabus document.
- Contact us at the start of the course to find out if we can approve an access arrangement that is not listed in the *Cambridge Handbook*.
- All applications should be made by the deadlines published in the *Cambridge Handbook*.

After the exam

Grading and reporting

Grades C, D or E indicate the standard a candidate achieved at Cambridge O Level.

C is the highest and E is the lowest. 'Ungraded' means that the candidate's performance did not meet the standard required for grade E. 'Ungraded' is reported on the statement of results but not on the certificate.

In specific circumstances your candidates may see one of the following letters on their statement of results:

- Q (PENDING)
- X (NO RESULT).

These letters do not appear on the certificate.

On the statement of results, Cambridge O Level is shown as GENERAL CERTIFICATE OF EDUCATION ORDINARY LEVEL.

On certificates, Cambridge O Level is shown as General Certificate of Education.

How students and teachers can use the grades

Assessment at Cambridge O Level has two purposes:

1 to measure learning and achievement

The assessment confirms achievement and performance in relation to the knowledge, understanding and skills specified in the syllabus.

2 to show likely future success

The outcomes help predict which students are well prepared for or likely to be successful in a particular course or career.

The outcomes help students choose the most suitable course or career.

Changes to this syllabus for 2028, 2029 and 2030

The syllabus has been updated. This is version 1, published September 2025.

You must read the whole syllabus before planning your teaching programme. We review our syllabuses regularly to make sure they continue to meet the needs of our schools. In updating this syllabus, we have made it easier for teachers and students to understand, keeping the familiar features that teachers and schools value.

There are no significant changes which affect teaching.

Any textbooks endorsed to support the syllabus for examination from 2025 are still suitable for use with this syllabus.

Syllabuses and specimen materials represent the final authority on the content and structure of all of our assessments.

Quality management

We are committed to providing exceptional quality. In line with this commitment, our quality management system for the provision of international education programmes and qualifications for students aged 5 to 19 is independently certified as meeting the internationally recognised standard, ISO 9001:2015.
Learn more at **www.cambridgeinternational.org/about-us/our-standards/**

We are committed to making our documents accessible in accordance with the WCAG 2.1 Standard. We are always looking to improve the accessibility of our documents. If you find any problems or you think we are not meeting accessibility requirements, contact us at **info@cambridgeinternational.org** with the subject heading: Digital accessibility. If you need this document in a different format, contact us and supply your name, email address and requirements and we will respond within 15 working days.

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