

CSEC Mathematics Exam Breakdown

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Format

The CSEC Mathematics examination assesses three core cognitive levels:

- Knowledge
- Comprehension
- Reasoning

These profiles determine how marks are distributed across the exam.

Profile	Percentage
Knowledge	30%
Comprehension	40%
Reasoning	30%

Total marks: **180**

The exam consists of two papers.

Paper 01: Multiple Choice

Duration: 1 hour 15 minutes

Questions: 60

This paper tests foundational knowledge and comprehension across all sections of the syllabus.

Content is drawn from all 10 sections:

- Computation
- Number Theory
- Consumer Arithmetic
- Sets

- Measurement
- Statistics
- Algebra
- Relations, Functions and Graphs
- Geometry and Trigonometry
- Vectors and Matrices

Each section contributes a specific number of questions based on importance.

Question Distribution

Section	Questions
Computation	6
Number Theory	4
Consumer Arithmetic	8
Sets	4
Measurement	8
Statistics	6
Algebra	9
Relations, Functions and Graphs	6
Geometry and Trigonometry	9
Total	60

Each question is worth **1 mark**.

Paper 01 Tips

- Know **definitions exactly**. Mathematics requires precision.
- **Memorise formulas** provided on the formula sheet, as well as key results not given.
- Be careful with **units and signs**: many mistakes come from careless errors.
- **Work through problems step-by-step**, even if it seems obvious.
- If unsure between options, use **estimation** to eliminate incorrect answers.
- Do not overthink. Most questions test direct application of concepts.

Paper 02: Structured and Extended Response

Duration: 2 hours 40 minutes

This is the most important paper and carries the most marks (120 total).

Section I: Compulsory Questions

90 marks

This section consists of **8 compulsory structured and problem-solving questions**.

Questions test application and reasoning across the core sections.

Mark Distribution (Section I)

Section	Marks
Sets	5
Consumer Arithmetic and Computation	10
Measurement	10
Statistics	10
Algebra	15
Relations, Functions and Graphs	10
Geometry and Trigonometry	20
Combination question/investigation	10
Total	90

Section II: Optional Questions

30 marks

This section consists of **3 optional questions**, of which **2 out of 3** must be answered.

Each question carries **15 marks**.

The three optional areas are:

- **1. Algebra and Relations, Functions and Graphs**
- **2. Measurement and Geometry and Trigonometry**

• 3. Vectors and Matrices

Paper 02 Tips

- **Show all working** for every calculation. Marks are awarded for method, not just final answers.
- Always **include units** in your answer.
- **Read each question carefully** and answer exactly what is asked.
- For structured questions, answer in the order and format requested.
- For problem-solving questions, show your reasoning step-by-step.
- If a diagram is provided, use it to guide your work.
- Manage your time: spend roughly **50 minutes on Section I** and **25 minutes on your two Section II questions**.

Syllabus Structure

The Mathematics syllabus is divided into 10 sections, each with specific objectives and content.

Section 1: Computation

Topics:

- Basic operations with real numbers (addition, subtraction, multiplication, division)
- Fractions, decimals, and percentages
- Conversion between fractions, decimals, and percentages
- Significant figures and decimal places
- Scientific notation
- Ratios, rates, and proportions
- Percentage calculations
- Arithmetic mean

Key Skills:

- Convert between different forms of numbers
- Perform accurate mental and written calculations
- Estimate values to check reasonableness
- Solve practical problems involving fractions, decimals, and percentages

Section 2: Number Theory

Topics:

- Sets of numbers (natural, whole, integers, rational, irrational, real)
- Sequences and patterns
- Factors, multiples, prime numbers
- Highest Common Factor (HCF) and Lowest Common Multiple (LCM)
- Number bases (base 2 through base 10)
- Properties of operations (commutativity, associativity, distributivity, closure)

Key Skills:

- Identify and classify numbers
- Find HCF and LCM
- Generate and describe sequences
- Work with numbers in different bases

Section 3: Consumer Arithmetic

Topics:

- Discount, profit, loss, markup, and sales tax
- Percentages in business transactions
- Hire purchase and mortgages
- Simple and compound interest
- Appreciation and depreciation
- Exchange rates and currency conversion
- Rates, taxes, utilities, invoices, salaries, wages, insurance, and investments

Key Skills:

- Calculate profit, loss, and discount
- Solve problems involving interest and investment
- Work with real-world financial scenarios
- Interpret invoices and bills

Section 4: Sets

Topics:

- Set notation and symbols
- Subsets, universal sets, empty sets, complements
- Union, intersection, and disjoint sets
- Venn diagrams
- Cardinality (number of elements)

Key Skills:

- Use set notation correctly
- Construct and interpret Venn diagrams
- Determine relationships between sets
- Apply set theory to solve problems

Section 5: Measurement

Topics:

- Perimeter and area of polygons and circles
- Arc length and sector area
- Surface area and volume of solids (prisms, cylinders, cones, spheres, pyramids)
- Unit conversion (length, area, capacity, time, speed)
- Maps and scale drawings
- Time, distance, and speed problems
- Margin of error and measurement accuracy

Key Skills:

- Calculate perimeter, area, and volume accurately
- Convert between units
- Interpret scale drawings and maps
- Use appropriate SI units
- Estimate measurement error

Section 6: Statistics

Topics:

- Types of data (discrete vs continuous, grouped vs ungrouped)
- Frequency tables and class intervals
- Statistical diagrams (pie charts, bar charts, histograms, frequency polygons, ogives)
- Measures of central tendency (mean, median, mode)
- Measures of dispersion (range, interquartile range, semi-interquartile range)
- Cumulative frequency
- Probability (theoretical and experimental)
- Making inferences from data

Key Skills:

- Construct and interpret statistical diagrams
- Calculate measures of central tendency and spread
- Read and interpret cumulative frequency curves
- Determine probability of events
- Analyse data and draw conclusions

Section 7: Algebra

Topics:

- Symbolic representation and algebraic expressions
- Directed numbers (positive and negative)
- Algebraic operations (expansion, factorisation, simplification)
- Laws of indices with integral exponents
- Linear equations and inequalities
- Simultaneous linear equations
- Quadratic equations and factorisation
- Changing the subject of a formula
- Direct and inverse variation
- Word problems involving equations

Key Skills:

- Expand and factorise algebraic expressions
- Solve linear, quadratic, and simultaneous equations

- Manipulate formulae
- Apply algebra to real-world problems
- Understand and use variation

Section 8: Relations, Functions and Graphs

Topics:

- Relations and their representations (ordered pairs, arrow diagrams, graphs, algebraic)
- Functions and functional notation
- Linear functions ($y = c$, $x = k$, $y = mx + c$)
- Gradient and intercepts
- Equation of a straight line
- Parallel and perpendicular lines
- Midpoint and distance concepts
- Systems of linear equations (graphical solution)
- Quadratic, cubic, and other non-linear functions

Key Skills:

- Distinguish between relations and functions
- Determine gradient, intercepts, and equations of lines
- Draw and interpret graphs of various functions
- Solve systems of equations graphically
- Apply functions to model real-world situations

Section 9: Geometry and Trigonometry

Topics:

- Angles and angle properties
- Triangles and their properties
- Congruence and similarity
- Transformations (reflection, rotation, translation, glide reflection, enlargement)
- Polygons and circles
- Trigonometric ratios (sine, cosine, tangent)
- Angles of elevation and depression
- Bearings
- Sine and cosine rules
- Area of triangles using trigonometry

Key Skills:

- Apply angle and triangle properties
- Identify and perform transformations
- Use trigonometric ratios to solve problems
- Calculate angles and distances in 2D shapes
- Apply trigonometry to real-world problems

Section 10: Vectors and Matrices**Topics:**

- Vector notation and magnitude
- Vector addition, subtraction, and scalar multiplication
- Position vectors
- Matrices and matrix operations (addition, subtraction, multiplication)
- Determinants and inverse matrices
- Transformations using matrices

Key Skills:

- Perform vector operations
- Add, subtract, and multiply matrices
- Find determinants and inverse matrices
- Use matrices to represent transformations
- Solve problems using vectors and matrices

How You Are Actually Tested

Mathematics assesses three main cognitive levels:

Knowledge (30%)**What it tests:**

- Recall of rules, procedures, definitions, and facts
- Simple computations
- Constructions and drawings
- Direct recall from memory

Example: "What is the formula for the area of a circle?"

Comprehension (40%)

What it tests:

- Algorithmic thinking
- Translation between mathematical representations
- Application of algorithms to familiar problems
- Use of procedures with understanding

Example: "Calculate the area of a circle with radius 5 cm."

Reasoning (30%)

What it tests:

- Translation of non-routine problems into mathematics
- Combination of multiple algorithms
- Making inferences and generalisations
- Justification and analysis

Example: "A farmer needs to fence a circular field. If the cost of fencing is \$10 per metre, and the field has an area of 100 m^2 , what will the total cost be?"

Common Mistakes

Many students lose marks on Mathematics because of these errors:

- **Not showing working:** even if the final answer is wrong, method marks are still awarded
- **Forgetting units:** always include cm, m^2 , kg, etc. in the answer
- **Careless arithmetic:** check calculations twice, especially in multi-step problems
- **Misreading the question:** read carefully and answer exactly what is asked
- **Rounding too early:** keep extra decimal places during working, round only the final answer
- **Ignoring significant figures:** match the precision of the question
- **Not using appropriate formulas:** memorise the formulas needed
- **Poor diagram interpretation:** always use diagrams provided to guide your work
- **Incomplete explanations:** for reasoning questions, justify each step
- **Running out of time:** practise time management with past papers

Study Strategy

Master Calculations

Fluency is required in:

- Arithmetic with fractions and decimals
- Percentage calculations
- Mole-like problem solving (consumer arithmetic, statistics)
- Algebraic manipulation

This is non-negotiable. Spend time drilling these skills.

Memorise Key Formulas

Know these by heart:

- Area and perimeter formulas
- Volume and surface area formulas
- Trigonometric ratios and laws
- Quadratic formula
- Mean, median, mode formulas
- Distance and gradient formulas

Practice with Structure

When solving problems:

1. **Read carefully:** identify what is given and what must be found
2. **Choose a method:** select the appropriate formula or technique
3. **Show all working:** write every step
4. **Check the answer:** does it make sense? Is the unit correct?

Use Past Papers

This is the most effective study method:

- Work through past papers under exam conditions
- Mark your work against the scheme
- Identify patterns in question types

- Focus on topics where you lose marks
- Build speed and confidence

Understand, Don't Memorise

Deep understanding includes:

- WHY a formula works
- HOW to apply it to different situations
- WHEN to use one method over another

Memorisation alone will not give you a high grade.

Group Topics by Difficulty

- Start with topics you find easier
- Build confidence
- Then tackle harder topics
- Revisit weak areas regularly

Final Insight

Mathematics is a skill-based subject. It requires:

- **Accuracy:** precision in calculation and language
- **Clarity:** clear working and logical explanation
- **Consistency:** regular practice and review

Most students lose marks because:

- Their calculations are careless
- Their explanations lack detail
- Their working is hard to follow
- They do not manage their time effectively

Fix these habits, and your grade improves immediately.

The path to success is simple: understand the concepts, practice consistently, and learn from your mistakes.