Key Stage 3 (Years 7, 8 & 9)

At Key Stage 3 (KS3), teaching is primarily based on the National Curriculum programmes of study. The curriculum content covers Number, Algebra, Ratio, Proportion and Rates of Change, Geometry and Measures, Probability and Statistics.

Students are expected to apply their knowledge in a variety of contexts and develop effective skills of mathematical communication, both verbally and in written work. Our focus at KS3 is about setting firm foundations for GCSE and beyond.

In Year 7 students are taught in their form groups; for Mathematics from Years 8 to 11 students are set by ability and the curriculum is adapted to suit the needs of the learners with the pace and content designed to allow each student to achieve their potential.

Summary of KS3 Mathematics curriculum content

Year 7
• Arithmetic • Angles • Fractions & Decimals • Handling Data & Pie Charts • Algebra • Coordinates • Money, Time & Measurement • Area & Volume • Types of Numbers, Factors & Multiples • Percentages, Ratio & FDP • Probability

Year 8
• Arithmetic & Directed Numbers • Fractions • Angles & Parallel Lines • Powers & Roots and Pythagoras' Theorem • Mensuration (inc Circles) • Transformation • Algebra • Graphs • Percentages & Ratio • Indices & Standard Form • Handling Data

Year 9
• Decimals, Fractions & Standard Form • Equations & Inequalities • Graphs • Congruence, Similarity and Circle Theorems • Handling Data • Trigonometry • Quadratics • Probability

GCSE Mathematics - Key Stage 4 (Years 10 & 11)

At Key Stage 4 (KS4), we follow the Edexcel GCSE curriculum for Mathematics. The GCSE Mathematics curriculum spirals cumulatively from the KS3 curriculum. Students are ready to sit the GCSE Mathematics examinations at either Higher or Foundation tier at the end of Year 11.

Students learn to use and apply standard mathematical techniques, reason, interpret and communicate mathematically and solve problems within Mathematics and other contexts. Students are taught in one of eight sets, allocated according to achievement at KS3 and reviewed periodically throughout the year and changes made where appropriate.

The GCSE Mathematics curriculum covers Number, Algebra, Ratio, Proportion and Rates of Change, Geometry and Measures, Probability and Statistics.

The qualification consists of three equally-weighted written examination papers at either Foundation or Higher tier. Paper 1 is a non-calculator assessment and a calculator is allowed for Paper 2 and Paper 3. Each paper is 1 hour and 30 minutes long. Each paper has 80 marks. The content outlined for each tier will be assessed across all three papers. The topics indicated in bold apply to the Higher tier only.

Summary of GCSE Mathematics curriculum content

1. Number	**2. Algebra**	**3. Ratio, proportion & rates of change**
Written methods of arithmetic Order of operations Directed numbers Types of Number Powers and Roots Surds Standard Form Estimating	Simplifying algebraic expressions Brackets Substitution Solving equations Inequalities Sequences Formulae Graphs **Iteration** **Functions** **Algebraic Proof** **Transformations of graphs** **Equation of a circle**	Fractions Decimals Percentages Ratio FDP & Ratios Proportion
4. Geometry and measures	**5. Probability**	**6. Statistics**
Angles Pythagoras' Theorem Trigonometry (SOHCAHTOA) Mensuration Symmetry 3-D shapes Constructions & Loci Transformations Vectors **Sine and cosine rules** **Circle theorems**	The probability scale Listing outcomes Tree diagrams Conditional probability Venn diagrams **Mutually exclusive and independent events**	Collecting Data Representing Data Analysing Data Interpreting Results **Cumulative frequency graphs & boxplots** **Histograms** **Sampling**

A Level Mathematics - Key Stage 5 (Years 12 & 13)

A Level Mathematics

Examination Board: PEARSON EDEXCEL 9MA0

Pure Mathematics 1	**Pure Mathematics 2**
● Proof ● Algebra and functions – indices and surds, quadratics, simultaneous equations, inequalities, functions ● Coordinate geometry in the (x,y) plane – straight lines, the circle ● Sequences and series – binomial expansion ● Trigonometry – simple identities and equations ● Exponentials and logarithms ● Differentiation – first and second derivatives, tangents and normals ● Integration – definite and indefinite integration ● Vectors	● Proof ● Algebra and functions – algebraic division, composite and inverse functions, partial fractions ● Coordinate geometry in the (x,y) plane – parametric equations ● Sequences and series – binomial expansion for rational powers, sigma notation, arithmetic and geometric series ● Trigonometry – radian measure, exact values, reciprocal ratios, further identities and equations ● Differentiation – trigonometric functions, product and quotient rules, parametric differentiation ● Integration – area under a curve, substitution and integration by parts, simple first order DE ● Numerical methods – roots of an equation, iterative methods, trapezium rule ● Vectors – three dimensions
Statistics and Mechanics	
Section A: Statistics ● Statistical sampling ● Data presentation and interpretation ● Probability ● Statistical distributions ● Statistical hypothesis testing	**Section B: Mechanics** ● Quantities and units in Mechanics ● Kinematics ● Forces and Newton's laws ● Moments ● Projectiles

Assessment

- ➢ The course will be examined by three papers, each 2 hours long, each worth 100 marks.
- ➢ Papers 1 and 2 will assess the Pure Mathematics content and Paper 3 will assess the Statistics and Mechanics parts of the course.
- ➢ There are no longer any optional elements of the A Level Mathematics course; all students will follow the same course content.

A Level Further Mathematics

Examination Board: PEARSON EDEXCEL 9FM0

Students who choose to take Further Mathematics will study both A Level Mathematics and A Level Further Mathematics. The course is designed so that the A Level Mathematics content is studied in Year 12 and the A Level Further Mathematics course is studied in Year 13. To ensure sufficient lesson time, the course runs across two of the option blocks. Students can therefore choose two further subjects from the remaining two option blocks.

Students who choose to study Further Mathematics will complete the Mathematics course, as described above, in addition to the following Further Mathematics content.

Paper 1: Core Pure Mathematics 1	**Paper 2: Core Pure Mathematics 2**
• Proof • Complex numbers – modulus and argument, conjugates, Argand diagrams, simple loci • Matrices – add, subtract and multiply, transformations, determinants, inverse matrices • Further algebra and functions – roots of polynomials, series formulae • Further calculus – volumes of revolution • Further vectors – equation of a straight line and plane, scalar product	• Complex numbers – de Moivre's theorem, exponential form, complex roots • Further algebra and functions – method of differences, Maclaurin series • Further calculus – improper integrals, mean value of a function, inverse trigonometric functions • Polar coordinates • Hyperbolic functions • Differential equations – first and second order, simple harmonic motion, damped harmonic motion
Paper 3: Further Statistics 1	**Paper 4: Further Mechanics 1**
• Discrete random variables • Poisson distribution • Geometric and negative binomial distributions • Central limit theorem • Hypothesis testing • Chi squared tests • Probability generating functions	• Momentum and impulse • Work, energy and power • Elastic strings and springs • Elastic collisions in one dimension • Elastic collisions in two dimensions

Assessment

All public examinations in both A Level Mathematics and A Level Further Mathematics will be taken at the end of Year 13. These will be comprised of:

- Mathematics A Level: three 2 hour papers each worth 100 marks (see description above).
- Further Mathematics A Level: four 1.5 hour papers, each worth 75 marks, with 50% pure content and 50% applied.

SMSC in Mathematics

Spiritual development in Mathematics encourages students to develop a sense of curiosity and an appreciation for the beauty and patterns found in the subject. Opportunities are taken to notice the elegance of mathematical concepts and how they connect both within the Mathematics curriculum and to the wider world. The problem-solving nature of Mathematics allows students to develop perseverance and inner-resilience as they work through challenges and explore more abstract ideas.

Moral development is promoted by encouraging students to represent data honestly and accurately, fostering integrity in the interpretation and presentation of statistical information. As students progress through KS4 & 5 there is an increasing emphasis on the importance of identifying and avoiding bias, helping students develop a critical awareness of how data can be manipulated or misused in real-world contexts.

Social development is promoted through collaborative problem-solving, investigations, and peer support. Through class discussions, students work together to explore mathematical concepts, explain reasoning, and share different approaches to tasks. These interactions help build communication, cooperation, and the ability to listen and respond constructively. Working in a mathematical context also encourages respect for the ideas and contributions of others, and supports the development of confidence and self-discipline when presenting and justifying solutions.

Cultural development in Mathematics is supported through an appreciation of the subject's origins and developments. Through the KS3 Diversity in Mathematics tasks students learn about the contributions of mathematicians from a wide range of cultures and civilisations; ranging from Ancient Egypt to modern Europe.

Examples of Spiritual, Moral, Social and Cultural development in Mathematics at Parmiter's include:

- Exploring the beauty and symmetry in geometric patterns or nature, encouraging awe and appreciation.
- Discussing the ethical implications of data handling in real-life situations such as public health or media reporting (particularly in KS5 statistics)
- Working collaboratively on mathematical investigations, developing teamwork and communication skills.
- Learning about the historical contributions of mathematicians from different cultures and how these have shaped modern mathematics.
- Considering global contexts and applications such as population growth or financial literacy to understand maths in everyday life.
- Reflecting on persistence and logical thinking as students overcome challenging problems and develop personal resilience.