



GCSE Mathematics Year 10

Mathematics teachers are striving for all students to develop an interest in studying the subject at a higher level. Students will be encouraged to explore the links between mathematics and other fields of study. Students will develop an awareness of the relevance of mathematics to the world of work and to situations in society in general.

Mathematics knows no races or geographic boundaries; for mathematics, the cultural world is one country.
David Hilbert

Students will Learn:-

Term 1

Angles and circle theorems

All students will cover – Angle properties, angles in triangles and quadrilaterals. Angles in parallel lines. Interior and exterior angles. Lines of symmetry and rotational symmetry. Identifying parts of a circle.

Students aiming for the higher tier also need to cover – the above plus Circle theorems.

Probability

All students will cover – Calculating probabilities, listing outcomes. Frequency tree and Tree diagrams. Sets and Venn diagrams.

Students aiming for the higher tier also need to cover – the above plus Conditional probability.

Solving equations

All students will cover – solving equations and inequalities

Students aiming for the higher tier also need to cover – the above plus, rearranging equations, algebraic fractions, indices and surds.

Fractions, decimals and percentages

All students will cover – Using equivalent fractions and mixed numbers, changing between decimals fractions and percentages. The four operations with fractions. Percentages of amounts and percentage increase/decrease.

Students aiming for the higher tier also need to cover – the above plus, reverse percentages and compound percentage.

Term 2

Direct and inverse proportion

All students will cover – Simplifying ratios, using ratios to find missing values. Using fractions with ratio. Dividing in a given ratio. Direct and inverse proportion.

Students aiming for the higher tier also need to cover – the above plus, using the constant of proportion

Vectors

All students will cover – Using column vectors, adding and subtracting vectors, translation.

Students aiming for the higher tier also need to cover – the above plus, using vectors to solve geometry problems including using midpoints and ratios.

Pythagoras and Trigonometry

All students will cover – congruence and similarity, Pythagoras' theorem, Trigonometry and using isosceles triangles.

Students aiming for the higher tier also need to cover – the above plus, Sine and Cosine rules, 3D trigonometry, graphs and exact values.

Developing algebraic thinking

All students will cover – Expanding and factorising

Students aiming for the higher tier also need to cover – the above plus, Solving quadratic equations by using the formula and completing the square.

Term 3

Compound measures

All students will cover – Converting units, compound measures and distance-time graphs.

Students aiming for the higher tier also need to cover – the above plus velocity-time graphs and area under the graph.

Functions

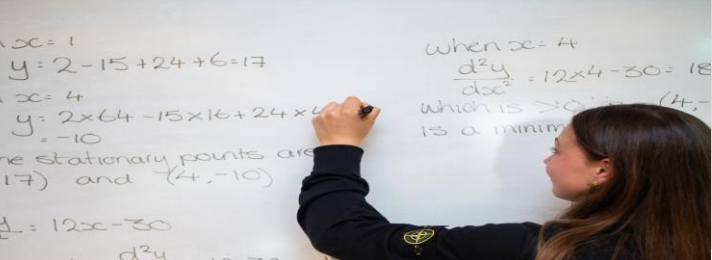
All students will cover – Straight line graphs, Transformations

Students aiming for the higher tier also need to cover – the above plus composite functions and inverse functions.

Other graphs

All students will cover – Drawing graphs and quadratic graphs, real life graphs. Solving simultaneous equations graphically.

Students aiming for the higher tier also need to cover – the above plus Cubic, reciprocal, exponential, circle and trig graphs, Gradients of curves and equations of tangents.



How will we assess learning?

- Homework book exercises
- Mathswatch
- Exam style questions
- Understanding of key vocabulary
- Past Papers



Key Vocabulary?

- Common denominator, reciprocal
- Index, index notation Variable, expression, term, product, expanding, binomial
- Event, outcome, equally likely, random, mutually exclusive, independent events, dependent events, relative frequency, conditional.
- Plan, elevation, net, isometric grid
- Line of symmetry, scale factor, rotation, enlargement, translation
- Consecutive, term, term-to-term rule, arithmetic sequence, **geometric** sequence, position-to-term rule
- Primary, secondary, qualitative, quantitative, discrete, continuous, population sample, representative
- Circumference, sector, arc, congruence, similar, scale factor
- Pythagorean triple, hypotenuse, sine, cosine, tangent.
- Roots, solution, simultaneous equation
- Exchange rates, proportion
- Perpendicular, locus (loci), bisect
- Gradient, y-intercept, x-intercept, parallel, perpendicular, number line, inequality
- Circumference, arc, sector, segment, tangent, chord

International Opportunities

Within the curriculum

- History of fractions <https://nrich.maths.org/2515> Tasks for fraction https://nrich.maths.org/public/topic.php?group_id=2&code=19
- Al-Khwarizmi Born 830AD Developed Algebra Muslim mathematician and astronomer whose major works introduced Hindu-Arabic numerals and the concepts of algebra into European mathematics. Fibonacci sequence – The magic of Fibonacci numbers Arthur Benjamin – TED talk Sequence within voting systems – resource within the international folder.
- Leonhard Euler 1707 – 1783 A Swiss mathematician who developed notation including the use of π . Srinivasa Ramanujan 1887-1920 An Indian mathematician who discovered the formula for π Using circles to estimate areas of fields.
<http://www.agritechtalk.org/Uno%20How%20Visit%201%20part%201.html>
- Use temperatures of the states of America in international folder. The number of Significant figures used for different data changes depending on how accurate you need to be. John Napier 1550-1617 standardised the use of the decimal point.
- Thales c.636 – c.546BC A Greek philosopher found that angles at the base of an isosceles triangle are equal. Euclid born 300BC A Greek mathematician who was the 'founder of geometry' proved the exterior angles theory.
- Standard form – km between planets. Euclid born 300BC A Greek mathematician who was the 'founder of geometry' found an algorithm for finding HCF and LCM.
- Singaporean bar modelling method Al -ge -bra is Arabic.
- Baye's theorem <https://www.mathsisfun.com/data/bayes-theorem.html> Thomas Bayes 1702 – 1761 English Statistician. Abraham de Moivre h mathematician 1667 – 1754 developed game theory and actuarial mathematics.

"Pure Mathematics is, in its way, the poetry of logical ideas." Albert Einstein