



GCSE Mathematics Year 11 Higher Tier

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

Graphs and Inequalities Straight line graphs Gradients Equations of a straight line graph Parallel and perpendicular lines Line segments Solving inequalities Quadratic inequalities Graphing inequalities

Circle Theorems Circle theorems

Angles and 2D Shapes Angles in parallel lines Angles in polygons

Graphs Quadratic graphs Cubic graphs Reciprocal and exponential graphs Circle graphs Trigonometric graphs Transforming graphs Real life graphs Solving simultaneous graphs Solving quadratics graphically Gradients of curves

Term 2

Functions Evaluating functions Composite functions Inverse functions

Vectors Vectors and scalars Vector geometry

Displaying Data Stem and leaf diagrams Frequency polygons Histograms Cumulative frequency diagrams Time series Scatter graphs Appropriate representation of data

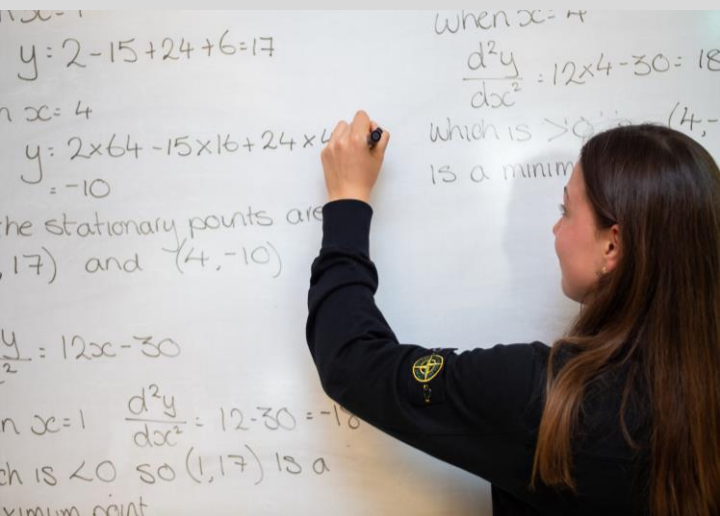
Units and Compound Measures Metric units, length, area and volume Compound measures Distance-time and velocity-time graphs

Term 3

Revision

Some Knowledge and Skills gained:-

- Recognise horizontal and vertical lines from their equations Be able to draw horizontal and vertical lines given their equations.
- Solve quadratic inequalities, representing the solution on a number line and using set notation.
- Know the different parts of a circle. Be able to apply circle theorems involving radii, tangents, semicircles and chords.
- Be able to recognise, draw and read off quadratic graphs. Be able to sketch quadratic graphs by factorising the equation. Be able to sketch quadratic graphs by completing the square.
- Know the properties of different types of angles. Be able to find missing angles in triangles. Know that the angles in a quadrilateral sum to 3600 . Be able to find missing angles in quadrilaterals. Know the properties of squares, rectangles, parallelograms and rhombuses. Know the properties of trapeziums and kites
- Understand and use set notation. Be able to list elements of a set.
- Understand and use function notation. Be able to evaluate functions
- Understand and use vector notation. Be able to multiply vectors by scalars. Be able to add and subtract vectors
- Display and interpret data in stem and leaf diagrams
- Display and interpret data on cumulative frequency diagrams.
- Convert between different metric units for length mass and volume.

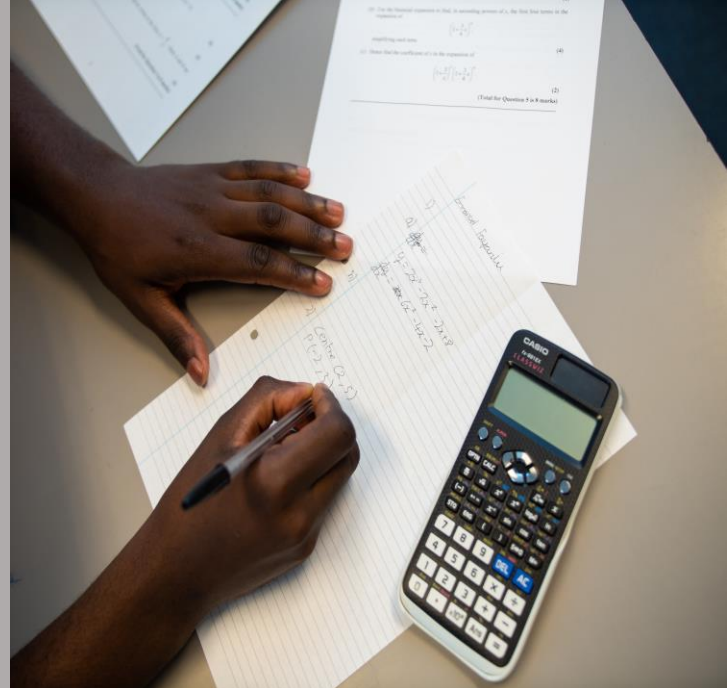


How will we assess learning?

- Homework book exercises
- Mathswatch
- Exam style questions/ Past Papers
- Problem solving book
- Understanding of key vocabulary, definitions

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



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

International Opportunities

Within the curriculum

- Use literacy rates as percentages or any other international data. History of fractions. <https://nrich.maths.org/2515> Tasks for fractions https://nrich.maths.org/public/topic.php?group_id=2&code=19
- International 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. Standard form – km between planets.
- Use international data. Baye's theorem <https://www.mathsisfun.com/data/bayestheorem.html> Thomas Bayes 1702 – 1761 English Statistician. Abraham de Moivre French mathematician 1667 – 1754 developed game theory and actuarial mathematics.
- Famous buildings – Pantheon.
- The school emblem. Flags of the world. Symmetry of buildings.
- Singaporean bar modelling method Al-ge-bra is Arabic Use science equations. Use scientific formulas, cooking formulas, mobile phones etc. Fibonacci sequence – The magic of Fibonacci numbers Arthur Benjamin – TED talk Sequence within voting systems – resource within the international folder. Pascal's triangle Sierpinsky's triangle.
- π a Greek letter 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>
- Pythagoras was a Greek mathematician c.560 – c.480BC <https://nrich.maths.org/2721>
- Bhaskara was an Indian mathematician who dealt with complicated formula with zero-digits. He was acknowledged by mathematicians in Europe in the 12th century, and thus considered by many as the man who invented the quadratic equation. Simultaneous equations in real life – in international folder
- 'M' comes from the Latin word 'modus' meaning measure (some say from the French word 'monter' - to climb). 'C' is for Cartesian plane. Cartesian plane was named by Rene Descartes.
- Thales c.636 – c.546 BC Angles at the base of an isosceles triangle are equal. Vertically opposite angles are equal. Euclid born 300BC A Greek mathematician who was the 'founder of geometry' proved the exterior angles theory.