GCSE Mathematics Year 11 Foundation 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

Analysing Data Using lists and tables Averages and range Two way tables Bar charts and pictograms Stem and leaf diagrams Pie charts Time series Scatter graphs

Pythagoras and Trigonometry Pythagoras' theorem Trigonometry – sin, cos, tan Pythagoras and trigonometry problems

Graphs Coordinates Horizontal and vertical graphs Other straight line graphs Gradients Equations of straight line graphs Quadratic graphs Graphs and equation problems Interpreting real life graph

Transformations Reflection Rotation Translations Enlargements Combinations of transformations Congruence and similarity

Term 2

Proportion Direct proportion Inverse proportion Proportion problems

Scale Drawings Scale drawings Bearings Problems Circles Lines angles and triangles Construction Loci

**Vectors** Column vectors Vector problems

Formulas Writing formulas Substituting into a formula Rearranging formulas Functions Formula and function problems

Term 3

Revision

Some Knowledge and Skills gained:-

- Mode, mean, median, range, stem and leaf, time series, scatter graph, correlation, line of best fit
- Use a duel bar chart to compare data
- Interpret a pie chart., bar chart, time series graph
- Use Pythagoras' theorem to find the hypotenuse, to find a shorter side and to solve problems
- Reflect a shape in a vertical or horizontal/diagonal line
- Enlarge a shape with a fraction as a scale factor
- Know when two shapes are congruent
- Find the gradient and intercept given the equations in the form y=mx+c
- Find missing values when items are in direct proportion
- Find missing values when items are in inverse proportion
- Construct a perpendicular bisector
- Draw vectors in lines and as a column vector Multiply vectors Add and subtract vectors
- Write a formula from a set of instructions
- Rearrange formulas, two step formulae
- Draw a quadratic graph. Use a graph to solve an equation. Find the turning point of a graph. Know whether the turning point is a max or min. Draw cubic graphs Draw a reciprocal graph
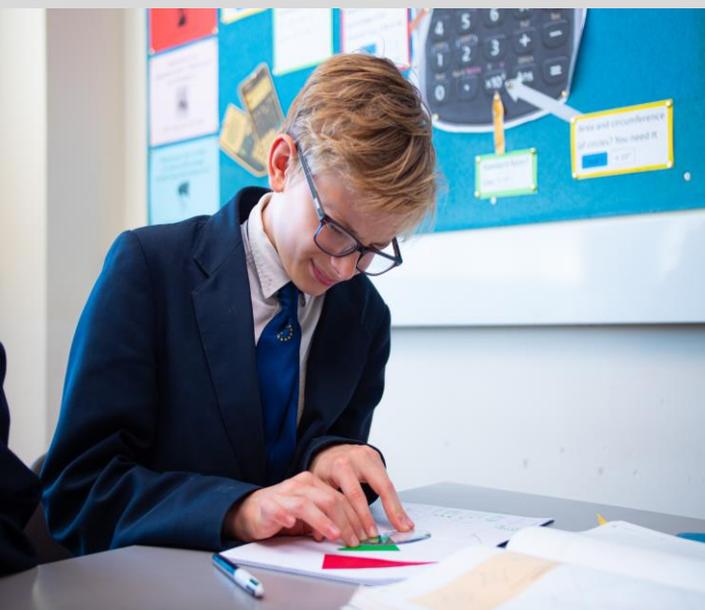
How will we assess learning?

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

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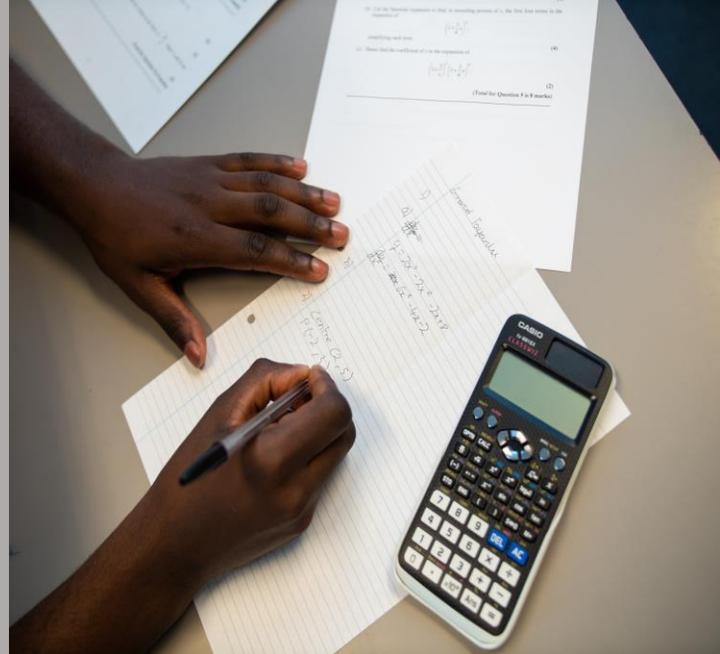
”Pure Mathematics is, in its way, the poetry of logical ideas.” Albert Einstein

International Opportunities

Within the curriculum

- 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 French mathematician 1667 – 1754 developed game theory and actuarial mathematics.