



GCSE Mathematics Year 10 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

Fractions Equivalent Fractions Mixed numbers Ordering fractions Adding and subtracting fractions Multiplying and dividing fractions Fractions and decimals Fraction problems

Algebra and Sequences Collecting like terms Expanding brackets Factorising Term to term rules Position to term rules Finding a position to term rule

Area and Perimeter Rectangles and triangles Quadrilaterals Circumference of a circle Area of a circle Arcs and Sectors of circles Area and perimeter problems

Number Negative numbers Decimals, add, subtract multiply and divide Order of operations Rounding – decimal places Rounding – Significant figures Estimating answers Rounding errors

Angles May be done before or after the Work Package Angle properties Triangles Parallel and intersecting lines Quadrilaterals Interior and exterior angles Symmetry Angles and 2D shape problems

Term 2

Multiples, Factors, Powers and Roots. Squares, cubes and roots Indices Laws of indices Standard form Multiples and factors Prime numbers LCM and HCF

Measuring and Speed Reading scales Converting metric units Converting units – area and volume Metric and imperial units Estimating in real life Speed, distance, time Density, mass, volume Pressure, force, area Distance time graphs

Ratio Ratios and simplifying Using ratios Dividing in a given ratio Ratio problems

Equations Solving equations, two step, unknown on both sides, brackets, negatives. Writing your own equations Solving inequalities Simultaneous equations Solving quadratic equations Equation and inequality problems

Term 3

Percentages Percentage of amounts Percentages, fractions and decimals Percentage increase and decrease Compound growth and decay Percentage problems

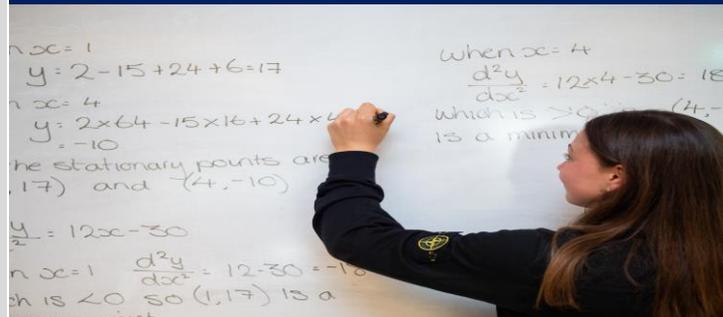
Probability Calculating probabilities Listing outcomes Probability from experiments The AND/OR rules Tree diagrams Sets and Venn diagrams

3D Shapes Nets Plans and elevations Isometric drawings Volume Surface area 3D Shape Problems

Collecting Data Using different types of data Data collection sheets and questionnaires Sampling and bias

Some Knowledge and Skills gained:-

- To reduce a fraction to its simplest form by cancelling common factors
- Multiply whole numbers by fractions
- Convert between fractions and decimals
- Expand single brackets
- To be able to find the perimeter of rectangles and triangles
- To find the circumference given the diameter or radius
- To be able to add and subtract multiply and divide negative numbers
- Recognise opposite angles and use this to find missing angles. Use knowledge of parallelograms, kites, rhombuses and trapeziums to find missing angles
- Use a conversion factor to change between metric and imperial units
- Simplify ratios that have different units
- Change between fractions, decimals and percentages
- Find the probability of an event happening
- Find the volume of cubes and cuboids
- Draw a shape from its plan and elevations

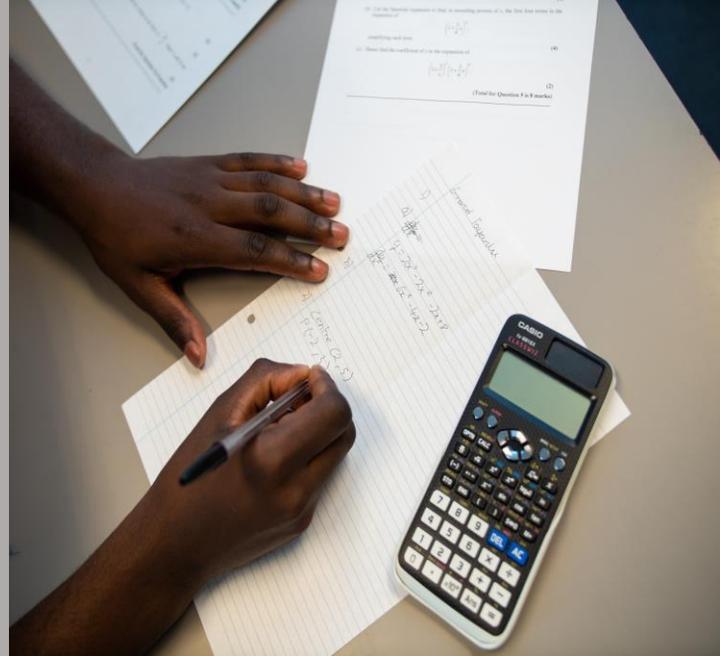


How will we assess learning?

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



"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.