



**Subject:** Mathematics

**Lead Teacher:** Mr Heighway

**Year:** 9

**Curriculum organisation**  
 The students are placed in sets following their performance in assessments throughout year 8 – a set A , a set B and two parallel ability set Cs. Each group of 30 students are taught for three hours per week.

Overview of Topics & Key Information					How will your child be learning?
Term	Unit(s) of Work	Key Enquiry Questions	Key Content/ Terminology	Skills developed	
Autumn Term	<ul style="list-style-type: none"> <li>• Number properties</li> <li>• Algebra</li> <li>• Linear equations</li> <li>• Angles</li> <li>• Sequences</li> </ul>	<ul style="list-style-type: none"> <li>• What are prime numbers?</li> <li>• What does product of prime numbers mean?</li> <li>• Create as many different factor trees as possible for 24. Use each of them to write 24 as a product of its prime factors. What do you notice?</li> <li>• What methods can be used to find the least common multiple (LCM) and highest common factor (HCF) of two whole numbers? Which is the most efficient method?</li> <li>• Find two numbers given the LCM and HCF. How many solutions can you find?</li> <li>• What is the difference between an equation and an identity?</li> <li>• How do you simplify an expression?</li> <li>• Which of the following expressions are equivalent? What does equivalence mean?</li> <li>• How do you solve an equation?</li> <li>• Do all equations have a solution? Give an example of an equation with two solutions.</li> <li>• What angle facts do you know?</li> <li>• How do we know angles in a triangle add to 180°?</li> <li>• How do we find the missing angle in a polygon?</li> <li>• What would be the 100<sup>th</sup> term for a given sequence? Is there an easier way of finding these unknown terms?</li> <li>• How can we use the nth term rule to decide if a given number is a term in the sequence?</li> </ul>	<ul style="list-style-type: none"> <li>• Prime numbers, product, factors, factorisation, factor tree, HCF, LCM</li> <li>• Expressions, equations, identities, expand, factorise, terms, formulae</li> <li>• Equations, rearrangements, elimination, solution</li> <li>• Angles, parallel, corresponding, alternate, allied, polygons, regular, irregular, interior, exterior, bearings</li> <li>• Position-to- term, term-to-term, finite, infinite, ascending, descending, square, cube, triangular, arithmetic, quadratic, geometric</li> </ul>	<ul style="list-style-type: none"> <li>• Drawing factor trees; express a whole number as a product of its prime factors; find the LCM and HCF of two whole numbers</li> <li>• Collecting like terms; multiplying and dividing terms; expanding single, double and triple brackets; factorising expressions by recognising common factors; use algebra to solve problems in different contexts; rearrange formulae to change the subject</li> <li>• Form and solve linear equations</li> <li>• Calculate missing angles in regular and irregular polygons</li> <li>• Recognise special types of sequences; find terms in a sequence using the position-to-term rule and term-to-term rule; find the nth term rule and be able to use it for an arithmetic sequence, quadratic sequence and a geometric sequence</li> </ul>	<ul style="list-style-type: none"> <li>• Whole class discussion</li> <li>• Pair work</li> <li>• Problem-solving tasks</li> <li>• Independent work</li> <li>• Group work</li> <li>• Investigations</li> </ul>

<p>Spring Term</p>	<ul style="list-style-type: none"> <li>• Decimals</li> <li>• Fractions</li> <li>• Percentages</li> <li>• Straight line graphs</li> <li>• Transformations</li> <li>• Pythagoras</li> <li>• Trigonometry</li> <li>• Ratio and proportion</li> </ul>	<ul style="list-style-type: none"> <li>• How do we prove if a fraction is a terminating or recurring decimal?</li> <li>• Is it always, sometimes or never true that a fraction with a denominator that is a prime number will terminate?</li> <li>• People often round <math>\frac{1}{3}</math> to 0.3 and <math>\frac{2}{3}</math> to 0.7. In which case is the percentage error greater?</li> <li>• A line has equation <math>3x - 2y + 4 = 0</math>. Determine the coordinate of the point it intercepts the <math>x</math>-axis and the gradient.</li> <li>• A line goes through the point (9,10) and is perpendicular to another line with equation <math>y = 3x + 2</math>. What is the equation of the line?</li> <li>• What single transformation maps A onto B?</li> <li>• How can we prove that a triangle is a right-angle triangle?</li> <li>• A square has a diagonal measurement of 130cm. What is the length of one side?</li> <li>• The ratio of boys to girls is 5:7. There are 8 more girls than boys. How many boys are there?</li> <li>• Can you draw graphs for direct proportion or inverse proportion?</li> </ul>	<ul style="list-style-type: none"> <li>• Decimal, recurring, terminating, fraction, improper, mixed, equivalent, multiples, factors, numerator, denominator, percentage increase, decrease, change, reverse, depreciation, simple interest, compound interest</li> <li>• Linear, quadratic, cubic, reciprocal, gradient, y-intercept, parallel, perpendicular, parabola, coordinate, axes, equation, formulae, function</li> <li>• Transformations, reflection, rotation, translation, enlargement, Image, object, centre, clockwise, Anti-clockwise, vector, scale factor</li> <li>• Pythagoras' theorem, trigonometry, right angle, hypotenuse, adjacent, opposite, ratio, sine, cosine, tangent, elevation, depression, diagonal, plane, square, square root</li> <li>• Ratio, share, proportion, direct, indirect, inverse, square, cube, square root, cube root, constant</li> </ul>	<ul style="list-style-type: none"> <li>• Adding, subtracting, multiplying and dividing with fractions and decimals</li> <li>• Converting between fractions, decimals and percentages; convert a fraction to a recurring decimal and vice versa</li> <li>• Calculate a percentage of a quantity; increase or decrease a quantity by a given percentage; percentage change; find the original value</li> <li>• Plot and draw graphs of linear functions; interpret and analyse information presented in these</li> <li>• Find the equation of a given line, gradient and distance between two points; find the equation of parallel and perpendicular lines</li> <li>• Reflect, rotate, translate and enlarge a given shape, perform a combination of transformations; recognise and fully describe transformations</li> <li>• Use Pythagoras to find the unknown side in a right-angle triangle; use trigonometry to find an unknown side or angle in a right-angle triangle; use this to solve 3d problems</li> <li>• Simplify a ratio; share quantities in a given ratio, combining or splitting ratios, problem solving with ratios; formulate equations and solve problems involving quantity in direct proportion or inverse proportion</li> </ul>	
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<p>Summer Term</p>	<ul style="list-style-type: none"> <li>• Simultaneous equations</li> <li>• Indices</li> <li>• Surds</li> <li>• Standard form</li> <li>• Construction and Loci</li> <li>• Units and measures</li> </ul>	<ul style="list-style-type: none"> <li>• Two numbers have a sum of 34 and a difference of 12, what are they?</li> <li>• Write <math>32 \times 16</math> as a power of 2.</li> <li>• Evaluate <math>8^{\frac{2}{3}}</math>.</li> <li>• Work out the value of n in <math>40 = 5 \times 2^n</math>.</li> <li>• Write 51080 in standard form.</li> <li>• Write <math>3.74 \times 10^{-6}</math> as an ordinary number.</li> <li>• How would you add, subtract, multiply and divide with numbers in standard form, no calculator allowed?</li> <li>• Simplify <math>\sqrt{8}</math>.</li> <li>• Prove that the square root of 45 lies between 6 and 7.</li> <li>• Expand and simplify <math>(\sqrt{3} + 2)(\sqrt{3} - 1)</math>.</li> <li>• How can we construct an angle of <math>90^\circ</math>, <math>45^\circ</math>, <math>30^\circ</math> and <math>60^\circ</math> using only a compass, ruler and pencil?</li> <li>• Convert 147kg into pounds.</li> <li>• A brick has volume <math>840 \text{ cm}^3</math> and mass 2058g. Find the density of the brick in <math>\text{kg/m}^3</math>.</li> <li>• How can I find the bearing of A to B if I know the bearing of B from A?</li> <li>• A boat travels 9km due south and then 7km due east. What bearing must it travel to return directly to base?</li> </ul>	<ul style="list-style-type: none"> <li>• Equation, formula, simultaneous, variable, substitute, rearrange, simplify, expand, factorise, brackets, linear eliminate, term, coefficient.</li> <li>• Index, base, power, inverse, reciprocal, numerator, denominator</li> <li>• Surds, rational, irrational, brackets, rationalise</li> <li>• Power, base, standard form</li> <li>• Construction, loci, equidistant, bisect, perpendicular, parallel, mid-point, bearing, scale drawing</li> <li>• Speed, distance, time, density, mass, volume, pressure, force, area, units, average, capacity</li> </ul>	<ul style="list-style-type: none"> <li>• Set up and solve a pair of simultaneous equations using elimination, substitution and graphical methods</li> <li>• Use index laws to simplify and calculate the value of an expression involving multiplication and division of integer powers, fractional and negative powers, powers of powers</li> <li>• Use surds in exact calculations without a calculator; simplify expressions with surds, including rationalising denominators</li> <li>• Convert large and small numbers into standard form and vice versa; add, subtract, multiply and divide numbers in standard form without a calculator</li> <li>• Construct a perpendicular to a given line from/at a given point, perpendicular bisector of a line segment and an angle bisector; use this to find and describe regions satisfying a combination of loci</li> <li>• Use and convert standard units of measurements for length, area, volume/capacity, mass, time and money</li> <li>• Use and convert compound units e.g. for speed, rates of pay, density, pressure; apply compound measures formulae</li> <li>• Find and calculate bearings and draw accurate scale drawings using bearings</li> </ul>	
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Equipment needed for lessons	How will learning and progress be assessed?
<ul style="list-style-type: none"> <li>• Standard school stationery (Pencil, Blue/Black Pen, Green Pen, Rubber, Sharpener, Ruler, Whiteboard pen)</li> <li>• Exercise book</li> <li>• Scientific Calculator</li> <li>• Pair of Compasses</li> <li>• Protractor</li> </ul>	<ul style="list-style-type: none"> <li>• End of half term tests</li> <li>• Formal assessment week</li> <li>• Peer and self-assessment</li> <li>• Homework tasks</li> <li>• Retrieval practice activities</li> </ul>
Extension & Enrichment opportunities	What can you do to support your child?
<ul style="list-style-type: none"> <li>• Intermediate mathematics challenge</li> <li>• Mathematics team challenge</li> <li>• KS4 Puzzle and problem-solving lunchtime club</li> <li>• Puzzle of the week</li> <li>• House mathematics competition</li> </ul>	<ul style="list-style-type: none"> <li>• Several websites are very useful that include videos, questions and worked through examples, these are: <a href="http://mymaths.co.uk">mymaths.co.uk</a>, <a href="http://corbettmaths.com">corbettmaths.com</a>, <a href="http://mathsgenie.co.uk">mathsgenie.co.uk</a> and <a href="http://drfrostmaths.com">drfrostmaths.com</a></li> <li>• Encourage regular revision</li> </ul>
Inclusion	Inclusion within Y9 Maths
<ul style="list-style-type: none"> <li>• Teachers follow student passports to ensure that the needs of all students with SEND are met.</li> <li>• Work is enlarged to the necessary size for visually impaired students.</li> <li>• Teachers will ensure that classrooms are quiet learning environments where possible and will dim lights to support students with sensory needs.</li> <li>• Students have the use of laptop if they have a SEND need whereby use of a laptop supports them.</li> <li>• Hearing impaired students are supported through use of a radio aid and teachers ensure that students can lip read at all times during lessons.</li> <li>• Dyslexic students are encouraged to use coloured overlays when they are required to read long passages.</li> <li>• Use of dyslexic friendly fonts and coloured backgrounds used in PowerPoints/resources.</li> <li>• Students with ADHD are given movement breaks, fidget toys and lessons are 'chunked' to aid concentration.</li> <li>• Students are seated according to their needs, students work with the SENDCo to decide upon this.</li> </ul>	<ul style="list-style-type: none"> <li>• Equipment is adapted wherever necessary to accommodate the needs of students with SEND</li> <li>• Where necessary, pupils are given frequent one to one tutorials to revisit previous topics and methods taught to support their understanding</li> <li>• Pupils are provided with online resources to help with learning outside of the classroom and homework, such as videos and worked examples</li> <li>• Students have access to spare mathematical equipment to help with organisation</li> </ul>

**If you have any questions about this Learning Overview, please contact the named Teacher above.**