

# Subject Overview Mathematics – Year 9 Advance

The year 9 curriculum is designed to give students the opportunity to extend their skills from year 7 and 8, and progress to the more advanced abstract skills and problem solving within geometry, number and algebra. This will ensure that students are truly ready to start their GCSE journey in year 10.

|                       | Half Term 1                                                                                                                                                                                                            | Half Term 2                                                                                                                                                                                                                                  | Half Term 3                                                                                                                                                                                                                                                              | Half Term 4                                                                                                                                                                                                                                                | Half Term 5                                                                                                                                                                                                                                                                                                                            | Half Term 6                                                                                                                                                                                                                                                                                                                                                        |
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| Knowledge & Skills    | <b>U1 Area &amp; Volume (15 Lessons)</b><br>Calculate the area of 2D shapes including circles. Find the surface area and volume of 3D prisms. Use proportion tables to explore compound units like density & pressure. | <b>AP1 Assessment</b> <ul style="list-style-type: none"> <li>Area &amp; perimeter of 2D shapes inc. circles.</li> <li>Volume of prisms</li> <li>Density &amp; Pressure</li> <li>Repeated % Change</li> <li>Percentage profit/loss</li> </ul> | <b>U5 Advance Number (15 Lessons)</b><br>Explore rational/irrational numbers & recurring & terminating decimals. Evaluate & apply index laws with negative &/or fractional powers. + – × ÷ standard form. Calculate with surds, including rationalising the denominator. | <b>Checkpoint 2</b> <ul style="list-style-type: none"> <li>Manipulating Surds</li> <li>Recurring Decimals</li> <li>Standard Form</li> <li>Linear Sequences</li> <li>Quadratic Sequences</li> <li>Geometric Sequences</li> <li>Iterative process</li> </ul> | <b>AP2 Assessment</b> <ul style="list-style-type: none"> <li>AP1 Assessment Topics</li> <li>Checkpoint 1 &amp; 2 topics</li> <li>Drawing linear graphs</li> <li>Finding <math>y=mx+c</math>.</li> <li>Identify parallel or perpendicular lines</li> <li>Sampling techniques</li> <li>Organising data</li> <li>Combined Mean</li> </ul> | <b>U10 Ratio (5 Lessons)</b><br>Move fluently between ratio and fractions. Solve a range of problems using ratio. Begin to form & solve equations from ratio problems.                                                                                                                                                                                             |
|                       | <b>U2 Percentages (11 Lessons)</b><br>Solve a of contextual problems including repeated percentage change. Understanding simple & compound interest.                                                                   | <b>U4 Simplify &amp; Solve (15 Lessons)</b><br>Build algebraic fluency by expanding & simplifying quadratics & cubic. Factorise quadratics. Form & solve linear equations from problems & explore changing the subject of formulae.          | <b>U6 Sequences (9 Lessons)</b><br>Explore a range of linear, quadratic & geometric sequences. Use iterative processes to generate a sequence.                                                                                                                           | <b>U7 Linear Graphs (10 Lessons)</b><br>Draw the graph of a linear equation & equation of a line from its graph. Identify parallel & perpendicular lines.                                                                                                  | <b>U8 Analysing Data (6 Lessons)</b><br>Continued from HT4                                                                                                                                                                                                                                                                             | <b>U11 Triangles (12 Lessons)</b><br>Use a combination of Pythagoras and trigonometry to solve a range of geometric problems in 2D.                                                                                                                                                                                                                                |
| Beyond The Curriculum | <b>U3 Proportion (10 Lessons)</b><br>Use proportion tables to solve problems with best value, exchange rates, recipe problems, conversion graphs, maps scales & similar 2D shapes & corresponding lengths.             | <b>Checkpoint 1</b> <ul style="list-style-type: none"> <li>Expand &amp; factorise</li> <li>Form &amp; solve equations</li> <li>Simplify algebraic fractions</li> <li>Exchange rates, best value problems, recipe</li> </ul>                  |                                                                                                                                                                                                                                                                          | <b>U8 Analysing Data (6 Lessons)</b><br>Hypothesise & learn sampling techniques. Collect &, graphically display data, calculate statistics, analyse and evaluate findings.                                                                                 | <b>U9 Angles &amp; Reasonings (10 Lessons)</b><br>Know and use formal geometric notation to articulate reasoning solving angle problems with parallel lines polygons.                                                                                                                                                                  | <b>Checkpoint 3</b> <ul style="list-style-type: none"> <li>Angles &amp; parallel lines</li> <li>Bearings, maps &amp; scale</li> <li>Angles &amp; polygons</li> <li>Ratio problem solving</li> <li>Sub-dividing ratio</li> <li>Equations &amp; Ratio</li> <li>Pythagoras' Theorem</li> <li>Trigonometry SOH, CAH TOA</li> <li>Exact Trigonometric values</li> </ul> |
|                       | <b>Alex's Adventures in Number land</b><br><b>By Alex Bellos</b><br>A global adventure, revealing how maths shapes our world.                                                                                          | <b>UKMT Maths Challenge</b><br>Inspire mathematical reasoning and problem-solving. Compete with local schools to find the best. Ask your teacher about it.                                                                                   | <b>The Code Book</b><br><b>By Simon Singh</b><br>Explore the sequences of logic & patterns that underpin encryption. Discover how this shaped secret communication throughout history.                                                                                   | <b>Gapminder Tools Website</b><br>Unlock the world's data Visualize trends, debunk myths, and see global stats come alive.                                                                                                                                 | <b>Duke of Edinburgh</b><br>Help others, work in a team, learn new skills & learn to navigate using maps & bearings. Sign up in Y9 to start in Y10.                                                                                                                                                                                    | <b>YouTube</b><br><b>Triangles are everywhere</b><br>Explanation of what trigonometry is & its wide application.                                                                                                                                                                                                                                                   |
|                       | <b>Calderdale Industrial Museum (Halifax)</b><br>You may visit to explore the industrial past, where engineering calculations powered a revolution.                                                                    | <b>National Coal Mining Museum (Wakefield)</b><br>You may visit & descend underground. Discover miners' stories, coal's history, and the vital maths behind their work.                                                                      | <b>YouTube</b><br><b>Codes Hidden in Nature</b><br>Alan Turing's mathematical code explains how animals like zebras, leopards & giraffes get their unique patterns.                                                                                                      | <b>How Not to Be Wrong</b><br><b>By Jordan Ellenberg</b><br>Shows how maths is awesome! It shows how numbers secretly run <i>everything</i> in your life.                                                                                                  | <b>Maths City (Leeds)</b><br>You may visit to explore angles & geometric reasoning through interactive exhibits, encouraging logical thought and spatial understanding.                                                                                                                                                                | <b>Trig River Challenge</b><br><b>By NCwit.org</b><br>Engineer a solution! Determine a 'pretend river's' width using clever angles, string, and measurement. Use all your knowledge of trigonometry & Pythagoras to help.                                                                                                                                          |

# Subject Overview Mathematics – Year 9 Core

The year 9 curriculum is designed to give students the opportunity to consolidate and extend their skills from year 7 and 8, whilst learning how to apply their skills to a range of real-life contexts. This will ensure that students are truly ready to start their GCSE journey in year 10.

|                       | Half Term 1                                                                                                                                                  | Half Term 2                                                                                                                                                                                                                                                                                                                                                           | Half Term 3                                                                                                                                                                                                                                                                                                            | Half Term 4                                                                                                                                                                       | Half Term 5                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Half Term 6                                                                                                                                                                                                                                                                             |
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| Knowledge & Skills    | <b>U1 Number Problems (16 Lessons)</b><br>Solve a range of abstract and contextual problems using negatives, powers, roots and standard form.                | <div> <b>AP1 Assessment</b> <ul style="list-style-type: none"> <li>• Rounding &amp; truncating</li> <li>• Product of Primes</li> <li>• HCF &amp; LCM</li> </ul> </div> <b>U4 Equations (9 Lessons)</b><br>Confidently form expressions, equations or formulae from a context. Use manipulation skills to simplify expressions, solve equations or rearrange formulae. | <b>U5 Fractions (7 Lessons)</b><br>Continued from HT2                                                                                                                                                                                                                                                                  | <b>U18 Area &amp; Perimeter (13 Lessons)</b><br>HT3 Continued                                                                                                                     | <b>U8 Percentages (5 Lessons)</b><br>Continued from HT4                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>U10 Linear Graphs (6 Lessons)</b><br>Continued from HT5                                                                                                                                                                                                                              |
|                       | <b>U2 Representing Number (12 Lessons)</b><br>Use factors & multiples of integers, as well as rounding to estimate solutions to contextual problems.         | <b>U5 Fractions (7 Lessons)</b><br>Solve a range of contextual problems using all the calculating with fractions skills $+$ $-$ $\times$ $\div$                                                                                                                                                                                                                       | <b>U6 Ratio &amp; Proportion (10 Lessons)</b><br>Consolidate fluency with ratio skills from Y7 & 8 and apply to more complex contexts.                                                                                                                                                                                 | <b>U8 Percentages (7 Lessons)</b><br>Solve contextual problems involving the full range of percentage skills – both with, and without a calculator.                               | <div> <b>AP2 Assessment</b> <ul style="list-style-type: none"> <li>• AP1 Assessment topics</li> <li>• Checkpoint 1 &amp; 2 topics</li> <li>• Perimeter of 2D shapes</li> <li>• Area of 2D shapes</li> <li>• Area &amp; perimeter - circles</li> <li>• Percentage calculation</li> <li>• Repeated % change</li> </ul> </div> <b>U9 Sequences (6 Lessons)</b><br>Form and solve equations with unknown quantities on both sides. Begin to solve simple quadratic equations. | <b>U11 Analysing Data (12 Lessons)</b><br>Hypothesise, collect data, calculate statistics, analyse and present data, evaluate findings. Apply this principle to real data                                                                                                               |
|                       | <b>U3 Expressions (8 Lessons)</b><br>Use a wide variety of algebraic manipulation skills to solve a mix of abstract and contextual problems.                 | <div> <b>Checkpoint 1</b> <ul style="list-style-type: none"> <li>• Write, expand, simplify &amp; factorise expression</li> <li>• Substitution</li> <li>• Form &amp; solve equations</li> <li>• Manipulate formulae</li> </ul> </div>                                                                                                                                  | <div> <b>Checkpoint 2</b> <ul style="list-style-type: none"> <li>• Compare &amp; order fractions</li> <li>• Fraction calculations</li> <li>• Calculator with fractions</li> <li>• Simplifying ratio</li> <li>• Fractions &amp; ratio</li> <li>• Ratio problem solving</li> <li>• Best value problems</li> </ul> </div> |                                                                                                                                                                                   | <b>U10 Linear Graphs (10 Lessons)</b><br>Solve problems by applying knowledge of abstract linear graphs to real life contexts involving rates that may be described graphically                                                                                                                                                                                                                                                                                           | <div> <b>Checkpoint 3</b> <ul style="list-style-type: none"> <li>• Linear Sequences</li> <li>• Continuing quadratic sequences</li> <li>• Plotting coordinates</li> <li>• straight line graphs</li> <li>• Understanding gradients</li> <li>• Finding equation of lines</li> </ul> </div> |
| Beyond The Curriculum | <a href="#">Alex's Adventures in Numberland</a><br>A global adventure, revealing how maths shapes our world.                                                 | <b>Rastrick Art Club</b><br>Join & explore fractal art and discover the amazing images that can be created using mathematics                                                                                                                                                                                                                                          | <b>Ratio Rumble</b><br>A puzzle game that will use of your ratio skills.                                                                                                                                                                                                                                               | <b>National Coal Mining Museum (Wakefield)</b><br>You may visit & choose to descend underground. Discover miners' stories, coal's history, and the vital maths behind their work. | <b>The Imitation Game (Film)</b><br>Alan Turing uses maths to crack a code to help end WW2.                                                                                                                                                                                                                                                                                                                                                                               | <b>Gapminder Tools Website</b><br>Unlock the world's data Visualize trends, debunk myths, and see global stats come alive.                                                                                                                                                              |
|                       | <a href="#">Calderdale Industrial Museum (Halifax)</a><br>You may visit to explore the industrial past, where engineering calculations powered a revolution. | <b>The Number Devil By Hans Enzenburger</b><br>A boy's dreams reveal how solving equations unlocks numerical wonders.                                                                                                                                                                                                                                                 | <b>Play Civilization VI</b><br>(Switch, PS5, XBOX, PC)<br>You may try this great game designed to help you build a greatest empire. Makes great use of proportional thinking.                                                                                                                                          |                                                                                                                                                                                   | <b>YouTube Codes Hidden in Nature</b><br>Alan Turing's mathematical code explains how animals like zebras, leopards & giraffes get their unique patterns.                                                                                                                                                                                                                                                                                                                 | <b>Pythagoras in Real Life You Tube</b><br>A cool video exploring the many uses of the theorem in real life.                                                                                                                                                                            |

# Subject Overview Mathematics – Year 9 Building a Mathematician

Students will delve deeper into core mathematical concepts. They will continue to explore these ideas within the context of the real world, tackling multi-step problems that reflect practical applications. This approach provides a richer and more relevant learning experience.

|                               | Half Term 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Half Term 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Half Term 3                                                                                                                                                                                                                                                                                                                             | Half Term 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Half Term 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Half Term 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
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| <b>Knowledge &amp; Skills</b> | <b>U1 Representing Number (6 Lessons)</b><br>Students explore problems that require the understanding of place value & types of numbers.<br><br><b>U2 Four Operations (9 Lessons)</b><br>Students apply four operations to solve multi-step real-world problems effectively.<br><br><b>U3 Directed Numbers (10 Lessons)</b><br>Confidently use their skills to $+$ $-$ $\times$ $\div$ directed numbers to real world problems.<br><br><b>U4 Ordering Operations (4 Lessons)</b><br>Apply and communicate the order of operations effectively when solving real-world problems.<br><br><b>U5 HCF, LCM &amp; Rounding (2 Lessons)</b><br>Solve problems involving prime, square, and cube numbers; identify prime factors, HCF, LCM; understand rounding. | <div> <b>AP1 Assessment</b> <ul style="list-style-type: none"> <li>• Powers &amp; roots</li> <li>• Ordering decimals</li> <li>• <math>+</math> <math>-</math> <math>\times</math> <math>\div</math> numbers</li> <li>• <math>+</math> <math>-</math> <math>\times</math> <math>\div</math> directed numbers</li> </ul> </div><br><b>U5 HCF, LCM &amp; Rounding (5 Lessons)</b><br>See HT2 for details<br><br><b>U6 FDP Equivalence (9 Lessons)</b><br>Solve problems comparing fractions, decimals, and percentages.<br><br><b>U7 Percentages (8 Lessons)</b><br>Solve real-life problems for percentage amounts, increases, or decreases.<br><br><div> <b>Checkpoint 1</b> <ul style="list-style-type: none"> <li>• Prime Factors</li> <li>• HCF &amp; LCM</li> <li>• Comparing fraction, decimals &amp; percentage</li> </ul> </div> | <b>U7 Percentages (1 Lessons)</b><br>Continued from HT2<br><br><b>U8 Fraction Calculations (11 Lessons)</b><br>Apply four operations with fractions to real-world problems<br><br><b>U9 Simplify &amp; Solve (7 Lessons)</b><br>Building on Year 8 algebra, explore real-world formulae and solve equations with unknowns on both sides | <b>U9 Simplify &amp; Solve (5 Lessons)</b><br>Continued from HT3<br><br><div> <b>Checkpoint 2</b> <ul style="list-style-type: none"> <li>• % of an amount, increase &amp; decrease</li> <li>• <math>+</math> <math>-</math> <math>\times</math> <math>\div</math> fractions</li> <li>• Simplify expressions</li> <li>• Expand brackets</li> <li>• Factorise expressions</li> <li>• Linear Equations</li> <li>• Substitution into formulae</li> </ul> </div><br><b>U10 Indices (7 Lessons)</b><br>Apply index laws to expressions & number problems; evaluate positive and negative powers.<br><br><b>U11 Ratio (7 Lessons)</b><br>Simplify and divide amounts using ratio in complex real-life contexts. | <b>U11 Ratio (3 Lessons)</b><br>Continued from HT4<br><br><div> <b>AP2 Assessment</b> <ul style="list-style-type: none"> <li>• AP1 Assessment topics</li> <li>• Checkpoint 1 &amp; 2 Topics</li> <li>• Index rules</li> <li>• Simplifying ratio</li> <li>• Sharing by ratio</li> </ul> </div><br><b>U12 Proportion (9 Lessons)</b><br>Use proportion tables and unitary method for real-life problems like exchange rates, best value & recipe problems<br><br><b>U13 Angles &amp; Reasoning (7 Lessons)</b><br>Solve multi-step angle problems and develop formal reasoning skills. | <b>U14 Measurements (5 Lessons)</b><br>Solve problems with metric unit conversion. Convert between different units of time.<br><br><b>U15 Area &amp; Perimeter (9 Lessons)</b><br>Explore contextual problems involving area and perimeter of 2D and compounded shapes.<br><br><div> <b>Checkpoint 3</b> <ul style="list-style-type: none"> <li>• Best value</li> <li>• Exchange rates</li> <li>• Angle problems</li> <li>• Metric conversion</li> <li>• Time conversion</li> </ul> </div><br><b>U16 Probability (8 Lessons)</b><br>Students explore writing probability of outcomes, using tools like frequency trees and space diagrams for combined events. |
|                               | <b>Beyond The Curriculum</b><br><b>Rastrick D&amp;G Club</b><br>Join & manage character stats (HP, strength, etc.) and in-game currency. reinforces place value and different number types<br><br><b>Countdown Game</b><br>An online game that makes use of your number skills with all four operations.                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>Rastrick Textiles Club</b><br>Join & compare percentage blends in fabrics and see how it effects the materials.<br><br><b>Football Manager Game</b><br>Available for IOS & Android. Try your hand at managing a team by looking at the stats & finances to win trophies.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>Rastrick Gardening Club</b><br>Join & use fractions to mix soils and grow incredible plants.<br><br><b>Human Resource Machine</b><br>A game for IOS & Android. Understand how coding works. Makes use of ordering operation & logical thought.                                                                                       | <b>Rastrick Art Club</b><br>Join to create amazing art: draw models to scale & mix colours proportionally to create new exciting colours.<br><br><b>Rastrick Coding Club</b><br>Join & write fun computer programmes, making use of your algebra & logic skills.                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>Rastrick Food Club</b><br>Join to make delicious food & scaling recipes for different group sizes.<br><br><b>Duke of Edinburgh</b><br>Join to help others, work in a team, learn new skills & how to navigate using maps & bearings. Programme ran in school & open to Y9+.                                                                                                                                                                                                                                                                                                       | <b>Rastrick Pokémon Club</b><br>Join to unlock the secret maths to predict packs, build unbeatable decks, & dominate every game.<br><br><b>The vile vendor (Game)</b><br>Beat the Vile Vendor! Use probability to win tricky deals.                                                                                                                                                                                                                                                                                                                                                                                                                            |