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# The Holy Trinity Church of England Secondary School



# Maths – Curriculum Guide

#### WHOLE SCHOOL CURRICULUM INTENT STATEMENT

#### **Curriculum Intent:**

- As a Church of England School we are committed to the belief that every child is a child of God – uniquely blessed with individual gifts and talents. The intention of our curriculum is to provide opportunities for all students to flourish, drawing out their individual potential and developing them as fully integrated human beings. Our curriculum reflects our Christian ethos and is designed to be challenging, fulfilling, enjoyable and successful for all, regardless of academic or social barriers.
- The curriculum is designed with the intention of being rich and balanced, giving a breadth of opportunity at Key Stage 3 supporting the development of the skills needed to succeed at Key Stage 4 and Key Stage 5. Key Stage 4 has a core which includes RS GCSE for all, alongside both academic and vocational courses. Key Stage 5 provides appropriate pathways for the majority of students to progress to, and allows students to prepare for further study and the world of work. Alongside this, students are provided with a broad enrichment and work-related offer that stimulates their aspirations as global citizens resilient in the face of difficulty, skillful when faced with new challenges, confident to step out into the unknown and assured of their individual self-worth and of the unique gifts that they each have to bring to the world.

## We review our curriculum on a yearly basis and consider the following principles. We believe our curriculum should:

- Embody the school vision which is to be a centre of excellence for learning, inspired by Christian values, where every person in our school community fulfils their potential.
- Provide a broad and balanced range of subjects, including those that are creative and practical, at all Key Stages.
- Include opportunities in a range of both academic and vocational courses at Key Stages 4&5.
- Ensure Religious Studies sits alongside Maths, English and Science as a Core subject which every student will take up to GCSE level.

- Ensure that every student has the opportunity to develop their character through a variety of experiences within REACH, PE, and the Creative Arts.
- Be coherent and sequential so that new knowledge and skill builds on what has been taught, both within an individual subject and across the wider curriculum.
- Be informed by educational research e.g. Growth Mindset (Carol Dweck) and Feedback Loop (John Hattie).
- Acknowledge our contextual needs by giving a high priority to increasing students' mastery of functional literacy, vocabulary and numeracy to maximise students' opportunities for future learning and employment.
- Provide opportunities for learning outside of the classroom. At KS<sub>3</sub> this is being embedded through the concept of a 'Passport'; a collection of co-curricular experiences that every student will have experienced.
- Make explicit links to future career pathways alongside a programme of advice and guidance based on the Gatsby benchmarks to prepare students for life and work.
- Ensure effective transitions at all key stages; from Year 6 to Year 7, Year 9 to Year 10 and Year 11 to Year 12.
- Meet statutory National Curriculum expectations.

#### Whole School Curriculum Principles:

- Our curriculum is structured in a logical and chronological manner.
- Leaders carefully plan to ensure that appropriate knowledge and skills build upon what has been taught previously and are carefully developed before application into more challenging and complex situations, appropriate to the different curricular end points. These skills are recognised as the 'big ideas' within each subject area.
- Knowledge is considered as a 'big idea' within all subject areas. We are developing our understanding of cognitive psychology to enable students to maximise their learning potential. This is best seen through the regular opportunities provided within subject areas to revisit knowledge acquired to enable improved retention and recall.
- Our curriculum runs within a two-week timetable made up of 50 periods a fortnight, with 5 x 1 hour lessons plus assembly and Tutor time every day.
- Each day begins at 8.45am with registrations, assemblies and a period of reflection and students are dismissed from this regular timetable at 3.10pm.
- There are a range of additional activities such as study studio and numerous co-curricular opportunities which take place after this time on a daily basis.

#### Whole School Learning Principles:

- Progress at Holy Trinity is informed by 'Accelerated Learning' which emphasises efficiency by engaging learners in order to speed up the process of learning. It enables students to commit knowledge to their long-term memory and develop and refine their skills and performance over time.
- This in turn supports the OFSTED definition of learning; "Learning is defined as an alteration in long-term memory. If nothing has altered in long-term memory nothing has been learned".

#### Maths Intent Statement:

#### Our vision:

- To promote the enjoyment and understanding of Mathematics making links to other areas of the curriculum and everyday life.
- To make all students fluent and confident in Mathematics allowing them to be ready for their next stage.

Our curriculum is built with our students in mind, focusing on a progressive curriculum that builds on prior knowledge. We teach for understanding, allowing time to assess, reflect and improve.

#### Intent:

Our curriculum is currently split into KS3 and KS4. The curriculum has clear progression throughout with year 7 and 8 focussing on mastering the core skills needed to be successful at GCSE. In year 9 we begin to explore the relevant skills for GCSE whilst ensuring a strong foundation of key knowledge and skills in Maths.

The Aoi assessment criteria: recall and use knowledge underpins the GCSE and ensuring students are efficient and fluent in these areas ensure they can build upon this in years 10-11. Year 7 and 8 focuses on Core Skills that underpin both foundation and higher GCSE. The Core skills have been developed from the White Rose Scheme and current maths colleagues, which aims to develop deep understanding, confidence and competence in Maths. In year 9 we continue to focus on the core skills, with a focus on making sure students have a firm foundation to allow them to move forward We expect that where students struggle, teachers adjust the curriculum appropriately to ensure that the students can access mathematical concepts at a varying pace. At the top end, we aim to provide opportunities for students to go deeper into their understanding rather than accelerate through the curriculum. There is a range of intervention programmes within this key stage, which some students follow to help bridge the gaps in their learning.

Years 10-11 is built following on from the teachings of Core Skills in years 7,8 and 9 and feed into a Higher and Foundation scheme of work. Both build upon prior knowledge and give time to retrieval practice to ensure core skills have been learnt. The intent is to:

- Develop fluent knowledge and skills, extending them into other areas of Mathematics.
- Develop Mathematical reasoning and apply to problem solving .

Problem-solving is at the heart of the new curriculum and opportunities to develop problem solving and reasoning skills in maths are embedded within each unit of work. Once the scheme of work has been completed in Year 11, their teachers will decide on areas to review and extend using assessment. The focus within the KS5 curriculum is for students to extend their knowledge and make logical and reasoned decisions when solving problems both within pure mathematics and in a variety of contexts.

Use of problem-solving resources such as 'underground mathematics', 'Step' and 'MAT' questions throughout the lesson encourages the love of maths and ultimately improves individual's ability. The impact of deeper understanding can/will improve the overall ALP and prepare students for the next step. On one hand A level Mathematics deals with highly abstract topics which require considerable imagination combined with the discipline of 'proof'. On the other hand, mathematics underpins virtually all the practical developments in science, IT and economics which have formed our modern world.

#### Curriculum Aim:

- The overall curriculum aim of the Mathematics team is to deliver a broad curriculum that allows students to master key concepts and apply them to solve increasingly complex problems.
- In addition, we want learners to enjoy their learning, which should allow them to progress and reach their potential.
- We want students to be able to understand the benefits of maths in everyday life.

**Curriculum Principles:** 

- The curriculum is designed to meet the requirements of the national curriculum for Mathematics.
- Each of the aspects of Number, Algebra, Ratio & Proportion, Geometry & Measure, Probability and Statistics are featured and links between them highlighted.

Key Stage 3

- Years 7&8 are designated as the 'Preparation stage'.
- The curriculum in Year 7 and 8 is designed around mastery principles. Whilst in year 9 we are exploring the skills needed at GCSE and ensuring there is a strong foundation to prepare students for studying a more granular curriculum in Year 10 to 11.
- Timescales and topic groupings are designed to be allowed to be explored over an extended period so that variation and depth can be used to ensure students are fluent in their mathematics.

- At the end of Year 7 students should be fluent and confident with essential number skills and able to transfer the key arithmetic methods into other contexts. They will have started introducing algebra in a variety of circumstances.
- At the end of Year 8 students should be similarly confident and fluent in the skills required to master algebraic manipulation.

#### Key Stage 4:

- The curriculum from Years 10-11 covers the mathematics GCSE content which all students are expected to follow.
- The GCSE course is split into two possible routes: Higher tier enables students to achieve a grade 4 – 9. Foundation tier enables students to achieve a grade 1- 5. All students will be placed onto a route dependent on their individual target grades and mathematical performance over KS<sub>3</sub>.
- The GCSE curriculum is split into various units that cover Algebra, Number, Shape Space and Measures, Data Handling and Ratio & Proportion. Each unit is covered in great depth, including real life applications and exam question practise.
- There are 20 units to cover on the Foundation route and 19 units to cover on the Higher route. Topics have been sequenced with progression and interleaving in mind. Topics are started with retrieval of key knowledge, and this is built upon, developed, and applied to problem-solving tasks. These topics are assessed using GCSE questions and time is given to reflect and improve.
- After each unit students are expected to complete a unit test to track their progress and understanding of that topic. Directed improvement and reflection time is then spent during the subsequent lesson.
- At the end of each term students will complete a periodic assessment covering the units learnt over that term but also bringing in elements of previously learnt units. This is to help us track progress but also helps us to prepare students for exam-style assessments, revision and enhance knowledge recall of key topics.
- The GCSE content starts at the end of Year 9 and is completed by the first term in Year 11. This then allows students time during the remainder of year 11 for structured in class revision consisting of exam techniques, exam practise, exam style questions and knowledge recall.

#### Key Stage 5:

Students studying Mathematics develop powers of logical thinking, analysis and problem solving. They encouraged to understand mathematics and mathematical processes in a way that promotes confidence and fosters enjoyment of the subject. The course will extend the range of mathematical skills and techniques and help them to understand how different areas of mathematics are related.

#### Studying A Level maths:

- will support the study of other A levels
- develop key employability skills such as problem-solving, logical reasoning, communication and resilience
- is excellent preparation for a wide range of university courses and careers
- leads to versatile qualifications that are well-respected by employers
- Quantitative skills are required in a wide range of occupations and activities, embracing not only the mathematical and physical sciences but also the social sciences, the humanities and the creative arts.
- Mathematics is now intrinsic to some aspects of the creative arts... and learned societies argue that students across the sciences, social sciences and humanities need significant quantitative skills, and these should be a central component of their education
- According to research by UCL, students with an A level in Mathematics are more likely to attend a Russell Group university.
- Any student applying to study a degree in a STEM subject should also consider taking Further Mathematics to at least AS level alongside A level Mathematics.

#### Studying A Level Further maths:

- It is a challenging qualification, which both extends and deepens your knowledge and understanding beyond the standard A level Mathematics. Students who do it often say it is their favourite subject.
- Students who take Further Mathematics find that the additional time spent studying mathematics boosts their marks in single A level Mathematics.

#### Mathematical studies :

- consolidate and build mathematical understanding
- foster the ability to think mathematically and apply maths in unfamiliar situations
- support students' learning in other subjects requiring quantitative skills

• prepare students for the real-life mathematical demands of further study and employment

#### **Curriculum Overview for Year 7:**

Year 7 - Maths			
Key topics		Assessment	
Autumn 1:		Preparation:	
Number sense	Number lines, ordering numbers,		
	rounding, adding, subtracting,	Century	
	integers and negative number.	ClassCharts	
	order of operations	tasks	
		Othor	
		other assessments:	
		Mastery	
		questions after	
Autumn 2		every topic	
Fypressions	Simplifying expressions	Preparation:	
and equations	substituting into expressions	Century	
		Century	
Measures	Working with time, converting	ClassCharts	
	units, estimating and measuring	tasks	
		Other	
		assessments:	
		Mastery	
		after every	
		topic	
		Periodic	
Spring 1:		assessment Preparation:	
Factors.	Factors, primes, multiples, HCF, LCM,		
multiples and	prime factor decomposition	Century	
primes	Equivalent fractions, simplifying	century	
Fractions	fractions, ordering fractions,	ClassCharts	
	converting between improper	tasks	
	fractions and mixed numbers, adding		
	and subtracting fractions	Other	
2D shapes	Droportion commetry perimeter	assessments:	
	and area of rectangles triangles	after every	
	and compound shapes, reading	topic	
	and plotting coordinates, problem		
	solving		
Spring 2:		Preparation:	
		. i spai acioli.	

Equations and brackets	Solving one-step and two-step equations, expanding and factorising into single brackets	Century ClassCharts tasks
Angles	Types, estimating, measuring and drawing angles, angles on a line, angles at a point, angles in a triangle, vertically opposite angles	Other assessments: Topic test after every topic Periodic assessment
Summer 1: Handling data and statistical diagrams	Working out mean, mode, median and range, interpreting and drawing tally charts, pictograms and bar charts, averages from frequency tables	Preparation: Century ClassCharts tasks
Fractions, decimals and percentages	Reciprocals, multiplying and dividing fractions, fractions of amounts, converting between fractions, decimals and percentages, expressing numbers as percentages	Other assessments: Topic test after every topic
Summer 2:		Preparation:
Probability	Using probability scale, probabilities as fractions, decimals and percentages, working out probabilities, drawing sample space diagrams	Century ClassCharts tasks
Proportion	Solving proportion problems	Other assessments: Topic test after every topic Periodic assessment End of year exam
Suggestions for indeper Century BBC bitesize Oak Academy	ndent study and home support:	

KEY SKILLS		
Literacy:	Numeracy:	Other:
<ul> <li>The key focus is</li> <li>Spelling key terms correctly</li> <li>Use of mathematical language</li> </ul>	www.mathsisfun.com/definitions/ www.nationalnumeracy.org.uk/why- numeracy-important www.skillsyouneed.com/numeracy- skills.html	Independent learning

#### **Curriculum Overview for Year 8:**

	Year 8 - Maths	
Key topics		Assessment
Autumn 1: Percentages and Fractions	Adding and subtracting mixed numbers, multiplying mixed numbers, dividing mixed numbers, percentage of amounts, percentage change	Preparation: Century ClassCharts
Money and Ratio	Unitary method, best buy, special offers, simplifying ratio, ration in the form 1:n, sharing ratio, drawing and interpreting scale diagrams	tasks Other assessments: Mastery questions after every topic
Autumn 2: Indices and Venn Diagrams	Rules of indices, simplifying expressions involving indices, drawing venn diagrams, probability form venn diagrams, HCF and LCM using prime factor decomposition	Preparation: Century ClassCharts tasks
Equations Area	Understand notation, solving two-step equations, substitution, forming and solving equations, solving equations with unknown on both sides Area of parallelograms, area of trapezium, converting units of area, parts of a circle, area of a circle, circumference of a circle	Other assessments: Mastery questions after every topic Periodic assessment

Spring 1:		Preparation:
Sequences	Term to term rules, using nth term, finding nth term, pattern sequences	Century ClassCharts tasks
Rounding and Standard form	Rounding to decimal places, rounding to significant figures, estimating calculations, standard form with large and small numbers	Other assessments:
Coordinates and linear graphs	Calculating midpoints, problems involving coordinates, plotting horizontal and vertical lines, plotting straight line graphs, equation of a straight line	after every topic
Spring 2:		Preparation:
Transformations	Translation, reflection	Century
3D shapes, Surface area and Volume	Properties of 3D shapes, nets of 3D shapes, surface area from nets, surface area of cubes, cuboids and prisms, volume of cubes, cuboids and prisms, converting	ClassCharts tasks
	units of length	Other assessments: Topic test after every topic Periodic assessment
Summer 1:		Preparation:
Angles	Angles on a straight line, angles in a triangle, angles in quadrilaterals, angles in parallel lines, angles in polygons	Century ClassCharts
Statistical diagrams	Pie charts - drawing and interpreting, drawing and interpreting line graphs, drawing and interpreting stem-and-leaf diagrams. Averages from diagrams	<b>Other</b> <b>assessments:</b> Topic test after every topic
Summer 2:		Preparation:

Inequalities and Brackets Algebraic fractions Recurring decimals	Reading and drawing inequalities on a number line, solving inequalities, expanding double brackets simplifying algebraic fractions Recurring decimal notation, converting fractions to recurring decimals	Century ClassCharts tasks Other assessments: Topic test after every topic Periodic assessment End of year exam
Suggestions for independent Century BBC bitesize Oak Academy	endent study and home support:	
Literacy:	Numeracy:	Other:
The key focus is <ul> <li>Spelling key terms</li> <li>correctly</li> </ul> <li>Use of mathematical language</li>	www.mathsisfun.com/definitions/ www.nationalnumeracy.org.uk/why- numeracy-important www.skillsyouneed.com/numeracy- skills.html	Independent learning

#### Curriculum Overview for Year 9:

Year 9 - Maths		
Key topics		Assessmen t
Autumn 1:		Preparation:
Number, powers, decimals, HCF and LCM, roots and rounding	order positive and negative integers, decimals and fractions; use the symbols =, $\neq$ , <, >, $\leq$ , $\geq$ , apply the four operations to integers (positive and negative), decimals and fractions and mixed numbers, understand place value	Maths Genie and Century ClassCharts tasks
	understand order of and inverse operations (including indices and roots), use the concepts and vocabulary of prime numbers, factors (divisors), multiples, highest common factor, lowest	Other assessments: Topic test after every topic

	common multiple, prime factorisation, round and estimate to a degree of accuracy.	
Autumn 2:		Preparation:
Expressions, equations, formulae, inequalities and sequences	Collecting like terms, writing expressions, substitution, expanding and factorizing, solving equations, forming and solving, substitution, rearranging formulae, inequalities on a number line, solving inequalities.	Maths Genie and Century ClassCharts tasks
Averages,	continuing sequences, nth term, special sequences, quadratic sequences	<b>Other</b> assessments: Topic test
Drawing and interpreting graphs, tables and charts	Work out and compare mean, median, mode and range, draw pictograms, bar charts, stem and leaf, pie charts, two ways tables and interpret the charts	after every topic Periodic assessment
Spring 1:		Preparation:
Fractions, decimals, percentages and ratio	apply the four operations to fractions and mixed numbers, order fractions, interpret fractions and percentages as operators, express one quantity as a fraction of another, define percentage as 'number of parts per hundred'; interpret percentages, convert a percentage to fraction or decimal, percentages of amounts, work with percentages greater than 100%; problem solve percentage change, including increase/ decrease, original value and simple interest, Understand and express the division of a quantity into a of number parts as a ratio; Write ratios in their simplest form; Share a quantity in a given ratio including three-part ratios; Write ratios in form 1 : $m$ or $m$ : 1; Express a multiplicative relationship between two quantities as a ratio or a fraction.	Maths Genie and Century ClassCharts tasks Other assessments: Topic test after every topic
Spring 2:		Preparation:
		Maths Genie and Century ClassCharts tasks

Summer 1: Area, perimeter, volume, Angles, polygons and parallel lines	Convert unit of length, perimeter, area of rectangles, triangles, parallelograms, trapezium and compound shapes, surface area, volume Properties of angles, angles at a point, in a triangle, on a straight line, in quadrilateral, parallel lines and polygons	Other assessments: Topic test after every topic Periodic assessment Preparation: Maths Genie and Century ClassCharts tasks Other assessments: Topic test after every topic End of year exam
Summer 2: Plans and elevations, transformations , construction and bearings	Scale drawings, plans and elevations, symmetry Reflections, rotations, translations, enlargements, combined Constructing bisectors, perpendicular lines and triangles, Drawing loci and regions Measuring and drawing bearings	Preparation: Maths Genie and Century ClassCharts tasks Other assessments: Topic test after every topic Periodic assessment
Suggestions for independe Maths Genie and Century BBC bitesize	ent study and home support:	
Literacy: The key focus is • Spelling key terms correctly • Use of mathematical language	Numeracy: <u>www.mathsisfun.com/definitions/</u> <u>www.nationalnumeracy.org.uk/wh</u> <u>y-numeracy-important</u> <u>www.skillsyouneed.com/numeracy</u> <u>-skills.html</u>	Uther:

#### Curriculum Overview for Year 10:

Year 10 - Mathematics GCSE Foundation			
Exam Board & course title/code	Unit	Date of Exam	% of Total Exam
Edexcel 1MA1 Mathematics	1MA1/1F, 1MA1/2F and 1MA1/1F	Summ er - Year 11	100%
Key topics	Course content		Assessme nt
Autumn 1: Fractions, decimals, percentag e and ratio	Decimal multiplier, compound interest, repeated percentage change, rounding, errors and bounds, compound measures - speed distance time, mass density volume, pressure force area		Preparation: Maths Genie and Century ClassCharts tasks
Real life graphs and straight- line graphs	Coordinate geometry, conversion graphs, distance time graphs, horizontal and vertical lines, plotting a line, equation of a line, rearranging, gradient from a line and coordinates, midpoint		Other assessments: Topic test after every topic
Autumn 2: Data cycle, comparing averages including from tables	Collecting data, averages from ungro table, averages from grouped table, comparing data, drawing frequency polygon, draw and interpret scatter s	ouped graphs	Preparation: Maths Genie and Century ClassCharts tasks Other assessments: Topic test

Spring 1:		after every topic Periodic assessme nt
Spring 1: Pythagora S	Calculate the length of missing side in a right-angle triangle, length of a line segment and problem solving	Maths Genie and Century ClassCharts tasks
Standard form and index laws	Use index laws to solve problems, write a number in standard form, write a number from standard from to ordinary number, multiply and divide standard form	Other assessments: Topic test after every topic
Spring 2: Probability	Listing outcomes, sample space diagrams, probability in tables, estimating probabilities, tree diagrams, frequency trees, venn diagrams Solving equations 1/2step, unknowns on	Preparation: Maths Genie and Century ClassCharts tasks
Equations	both sides, forming and solving, expanding double brackets and factorsing double brackets	Other assessments: Topic test after every topic Periodic assessme nt
Summer 1: Circles, cones and spheres	Parts of a circle, area of a circle, circumference of a circle, arc lengths, sector area, volume and surface area of a cylinder, sphere, cone and pyramid	Preparation: Maths Genie and Century ClassCharts tasks

			Other assessments: Topic test after every topic Periodic assessme nt
Summer 2:			Preparation:
Proportion	Best buy, unitary method, direct pro , value for money, inverse proportion constant of proportion	portion n,	Maths Genie and Century ClassCharts tasks
			Other assessments: Topic test after every topic End of year exam
Suggestions for inc	ependent study and home support:		
GCSE Bitesize, Maths Genie and C KEY SKILLS	entury		
Literacy:	Numeracy:	Other:	
The key focus is • Spelling key terms correctly • Use of mathemati cal language	www.mathsisfun.com/definitio ns/ www.nationalnumeracy.org.uk /why-numeracy-important www.skillsyouneed.com/nume racy-skills.html	Independent	learning

	Year 10 - Mathematics GCSE Higher		
Exam Board & course title/code	Unit	Date of Exam	% of Total Exam
Edexcel 1MA1 Mathematics	1MA1/1H, 1MA1/2H and 1MA1/1H	Sum mer - Year 11	100%
Key topics	Course content		Assessm ent
Autumn 1: Fractions, decimals, percentage and ratio	Decimal multiplier, compound inter repeated percentage change, roun errors and bounds, compound mea speed distance time, mass density pressure force area	erest, ding, sures - volume,	Preparation : Maths Genie and Century ClassCharts tasks
Real life graphs and straight-line graphs	Coordinate geometry, conversion graphs, distance time graphs, horizontal and vertical lines, plotting a line, equation of a line, rearranging, gradient from a line and coordinates, midpoint		Other assessments : Topic test after every topic
Autumn 2: Data cycle, comparing averages including from tables	Collecting data, averages from ungrouped table, averages from gr table, comparing data, drawing frequency polygon, draw and inter scatter graphs	ouped pret	Preparation : Maths Genie and Century ClassCharts tasks Other assessments : Topic test after every topic

		Periodic
		assessm
Spring 1:		ent
Pythagoras and Trigonometry lines	Use Pythagoras to calculate missing lengths in triangles, line segments and problem solving, know the exact trig values, calculate missing angles and lengths,	Maths Genie and Century ClassCharts
Standard from, indices	Use index laws to solve problems, write a number in standard form, write a number from	tasks
laws and surds	laws and surds surds standard from to ordinary number, add, subtract, multiply and divide standard form, simplify surds, rationalize the denominator	Other assessments : Topic test after every topic
Spring 2:		Preparation
Quadratics, graphs and simultaneous equations	Factorise quadratics, solve quadratic equations, plotting quadratics, sketching quadratics, completing the square, using the quadratic formula, solving simultaneous equations, forming and solving simultaneous equations, solving quadratic simultaneous equations	: Maths Genie and Century ClassCharts tasks Other assessments : Topic test after every topic Periodic assessm
Summer 1: Circles, cones and spheres and circle theorems	Parts of a circle, area of a circle, circumference of a circle, arc lengths, sector area, volume and surface area of a cylinder, sphere, cone and pyramid, working backwards and frustrum, equations of a circle, circle theorems, circle and tangets	Preparation Maths Genie and Century ClassCharts tasks Other assessments : Topic test after

Summor 2:			every topic Periodic assessm ent
Summer 2.			:
Proportion	Best buy, unitary method, direct proportion , value for money, inverse proportion, constant of proportion		Maths Genie and Century ClassCharts tasks
			Other assessments : Topic test after every topic End of year exam
Suggestions for indeper	ndent study and home support:		
GCSE Bitesize, Maths Genie and Centur	rs <i>1</i>		
KEY SKILLS	i y		
Literacy:	Numeracy:	Other:	
<ul> <li>The key focus is</li> <li>Spelling key terms correctly</li> <li>Use of mathematical language</li> </ul>	www.mathsisfun.com/defini tions/ www.nationalnumeracy.org. uk/why-numeracy-important www.skillsyouneed.com/nu meracy-skills.html	Independent	learning

#### **Curriculum Overview for Year 11:**

Year 11 - Mathematics GCSE Foundation			
Exam Board & course title/code	Unit	Date of Exam	% of Total Exam
Edexcel 1MA1 Mathematics	1MA1/1F, 1MA1/2F and 1MA1/1F	Summ er - Year 11	100%
Key topics	Course content		Assessme nt
Autumn 1: Similarity and congruence in 2D and Vectors	Use the basic congruence criteria f (SSS, SAS, ASA and RHS); Solve and involving congruence; Identify shape similar; including all circles or polygons with equal number Understand similarity of triangles a plane shapes, use this to make inferences, and solve angle prob similarity; Identify the scale fac enlargement of a shape as the r lengths of two corresponding sides; the effect of enlargement on po shapes; Solve problems to find miss in similar shapes; Know that scale including bearings and maps are 'sin real-life examples. Understand and notation in relation to vectors; represent information graphically givectors; Identify two column vector parallel; Calculate using column v represent graphically, the sum of to the difference of two vectors an multiple of a vector.	e basic congruence criteria for triangles SAS, ASA and RHS); Solve angle problems ing congruence; Identify shapes which are ; including all circles or all regular ins with equal number of sides; tand similarity of triangles and of other shapes, use this to make geometric ces, and solve angle problems using ity; Identify the scale factor of an ement of a shape as the ratio of the s of two corresponding sides; Understand fect of enlargement on perimeter of ; Solve problems to find missing lengths lar shapes; Know that scale diagrams, ing bearings and maps are 'similar' to the e examples. Understand and use column in relation to vectors; Be able to ent information graphically given column s; Identify two column vectors which are l; Calculate using column vectors, and ent graphically, the sum of two vectors, fference of two vectors and a scalar	
Autumn 2:			<b>Preparation:</b> Maths Genie
Rearrangin g equations, graphs of	Know the difference between an equ an identity and use and understand ≠ symbol; Change the subject of a f involving the use of square roots and	ation and the formula d squares;	and Century ClassCharts tasks
cubic and reciprocal and simultaneo us equations	Answer 'show that' questions using consecutive integers $(n, n + 1)$ , squares $a^2$ , $b^2$ , even numbers $2n$ , and odd numbers $2n + 1$ ; Solve problems involving inverse proportion using graphs, and read values from graphs; Find the equation of the line through two given points; Recognise, sketch and interpret graphs of		

	simple cubic functions; Recognise, s interpret graphs of the reciprocal fun- with $x \neq 0$ ; Use graphical representa- inverse proportion to solve problems context; identify and interpret the g from an equation $ax + by = c$ ; Write simultaneous equations to represent situation; Solve simultaneous equation (linear/linear) algebraically and	ketch and nction $y = \frac{1}{x}$ ations of a in radient a ons	
	representing a real-life situation, gra and algebraically, and interpret the the context of the problem;	aphically solution in	
Spring 1:		1	Preparation:
Structured revision		(	Other assessments
Spring 2:			Preparation:
Structured revision		(	Other assessments
Summer 1:		1	Preparation:
Structured		I	Past papers
revision		(	Other assessments
Suggestions for inde	ependent study and home support:		
GCSE Bitesize, Maths Genie and Ce KEY SKILLS	ntury		
Literacy:	Numeracy:	Other:	
The key focus is • Spelling key terms correctly • Use of mathemati cal language	www.mathsisfun.com/definitio ns/ www.nationalnumeracy.org.uk /why-numeracy-important www.skillsyouneed.com/nume racy-skills.html	Independent le	earning

Year 11 - Mathematics GCSE Higher			
Exam Board & course title/code	Unit	Date of Exam	% of Total Exam
Edexcel 1MA1 Mathematics	1MA1/1H, 1MA1/2H and 1MA1/1H	Summer - Year 11	100%
Key topics Key topics	Course content Course content		Assessmen t Assessme
Autumn 1:			Preparation:
Vectors & Geometric proof	Understand and use vector nor including column notation, and and interpret vectors as displa plane with an associated direc Understand that 2 <b>a</b> is parallel its length, and that <b>a</b> is parallel	tation, d understand cement in the tion. to <b>a</b> and twice el to – <b>a</b> in the	Maths Genie and Century ClassCharts tasks
	opposite direction. Represent combinations of vectors and so in the plane pictorially. Calcula two vectors, the difference of and a scalar multiple of a vect column vectors (including alge Find the length of a vector usin Theorem. Calculate the result vectors. Solve geometric prob where vectors are divided in a Produce geometrical proofs to are collinear and vectors/lines	vectors, calar multiples ate the sum of two vectors or using braic terms). ng Pythagoras' ant of two blems in 2D given ratio. prove points are parallel.	Other assessments: Topic test after every topic
Direct and inverse proportion	Recognise and interpret graphs and inverse proportion; I proportion from a table of comparing ratios of x squared and $x$ cubed relat statements of proportionality proportional to the square, power of another quantity; S equations to solve word and involving direct proportion; Use $y = kx$ to solve direct propo- including questions where stud then use $k$ to find another problems involving inverse p graphs by plotting and reading proportionality; Solve problems involves in	s showing direct identify direct of values, by values, for ionships; Write for quantities cube or other Set up and use other problems, lents find <i>k</i> , and r value; Solve roportion using ng values from volving inverse	

	solve word and other problems involving	
	direct proportion or inverse proportion.	
Autumn 2: UNIT 19: Reciprocal and exponential graphs, Gradient and area under graphs	direct proportion or inverse proportion. Recognise, sketch and interpret graphs of the reciprocal function $y = \frac{1}{x}$ with $x \neq 0$ ; State the value of $x$ for which the equation is not defined; Recognise, sketch and interpret graphs of exponential functions $y = k^x$ for positive values of $k$ and integer values of $x$ ; Use calculators to explore exponential growth and decay; Set up, solve and interpret the answers in growth and decay problems; Interpret and analyse transformations of graphs of functions and write the functions algebraically, e.g. write the equation of $f(x)$ + $a$ , or $f(x - a)$ : apply to the graph of $y =$ f(x) the transformations $y = -f(x)$ , $y = f(-x)for linear, quadratic, cubic functions; apply tothe graph of y = f(x) the transformations y =f(x) + a$ , $y = f(x + a)for linear, quadratic, cubic functions;Estimate area under a quadratic or othergraph by dividing it into trapezia; Interpretthe gradient of linear or non-linear graphs,and estimate the gradient of a quadratic ornon-linear graph at a given point by sketchingthe tangent and finding its gradient; Interpretthe gradient of non-linear graph in curveddistance-time and velocity-time graphs; fora non-linear distance-time graph, estimate thespeed at one point in time, from the tangent,and the average speed over several secondsby finding the gradient of the chord; for a non-linear velocity-time graph, estimate theacceleration at one point in time, from thetangent, and the average acceleration overseveral seconds by finding the gradient ofthe chord; Interpret the gradient of a linearor non-linear graph in real-life contexts; Interpretthe rate of change of graphs of containersfilling and emptying; Interpret the rate ofchange of unit price in price graphs.$	Preparation: Maths Genie and Century ClassCharts tasks Other assessments: Topic test after every topic
Spring 1:		Preparation:

Structured revision			Other assessments
Spring 2:			Preparation:
Structured revision			
			Other assessments
Summer 1:			Preparation:
Structured			Past papers
revision			Other assessments
Suggestions for indep	pendent study and home support:		
GCSE Bitesize, Maths Genie and Cen	tury		
KEY SKILLS			
Literacy:	Numeracy:	Other:	
<ul> <li>The key focus is</li> <li>Spelling key terms correctly</li> <li>Use of mathematic al language</li> </ul>	www.mathsisfun.com/definitions / www.nationalnumeracy.org.uk/w hy-numeracy-important www.skillsyouneed.com/numerac y-skills.html	Indepe	ndent learning

#### **Curriculum Overview for Year 12:**

	Year 12 - Mather	matics GCE		
Exam Board & course title/code	Unit	Date of Exam	% of Total Exam	
8MAQ (AS)	Pure		62 5%	
	Mechanics & Statistics		37.5%	
Key topics	Course con	itent	Assessment	
Autumn 1: Algebra and functions	Unit 1: Algebra and functions(Chapter Understand and use indices for all exponents Use and manipul including rational denominator. Work with quadrati and their discriminant of a function, includ conditions for repeated roots.Com square Solution of quadratic including solving equations in a func- unknown. Solve simultaneous e two variables by elim by substitution, inc linear and one quadra Solve linear and inequalities in a sing and interpret such graphically inequalities with br fractions. Express solutions correct use of 'and' through set notation	the laws of rational ate surds, ising the c functions graphs.The quadratic ing the real and pleting the c equations, quadratic tion of the equations in hination and cluding one tic equation. quadratic gle variable inequalities including rackets and through and 'or', or h.	Pure (AS)	15

	Represent linear and quadratic inequalities such as $y > x + 1$ and $y > ax2 + bx + c$ graphically.	
	Manipulate polynomials algebraically, including expanding brackets and collecting like terms, factorisation and simple algebraic division; use of the factor theorem.	
	Understand and use graphs of functions; sketch curves defined by simple equations including polynomials $y = x/a$ and $y = a/x^2$	
	(including their vertical and horizontal asymptotes)	
	Interpret algebraic solution of equations graphically; use intersection points of graphs to solve equations.	
	Understand and use proportional relationships and their graphs."	
	Understand the effect of simple transformations on the graph of y = f(x), including sketching associated graphs: $y = af(x)$ , $y =$ f(x) + a, $y = f(x + a)$ , $y = f(ax)$	
Coordinate geometry in the (x, y) plane	Unit2: Coordinate geometry in the (x, y) plane(Chapter 5-6)	
	Understand and use the equation of a straight line, including the forms $y - y_1 = m(x - x_1)$ and $ax + by$ + c = o;" Gradient conditions for two straight lines to be parallel or perpendicular. Be able to use straight line models in a variety of	

	Understand and use the coordinate geometry of the circle including using the equation of a circle in the form $(x - a)^{2} + (y - b)^{2} = r^{2}$ Completing the square to find the centre and radius of a circle; use of the following properties: • the angle in a semicircle is a right angle • the perpendicular from the centre to a chord bisects the chord • the radius of a circle at a given point on its circumference is perpendicular to the tangent to the circle at that point		
Autumn 2: Further Algebra Trigonometry	Unit 3: Further algebra(Chapter 7-8) Understand and use the structure of mathematical proof, proceeding from given assumptions through a series of logical steps to a conclusion; use methods of proof, including:Proof by deduction, Proof by exhaustion, Disproof by counter example. Understand and use the binomial expansion of (a+ bx)^n for positive integer n; the notations n! and nCr link to binomial probabilities. Unit 4: Trigonometry(Chapter 9-10) Understand and use the definitions of sine, cosine and tangent for all arguments; the sine and cosine rules; the area of a triangle in the form 1/2 ab sin C Understand and use the sine, cosine and tangent functions; their graphs, symmetries and periodicity. Understand and use tan $\theta$ =sin $\theta$ / cos $\theta$ Understand and use sin^2 $\theta$ + cos^2 $\theta$ = 1	Preparation: Assessed Homework Tasks, Exam questions, Online Section Tests Other assessments: End of Unit closed Book Tests Closed book periodic tests	

	Solve simple trigonometric equations in a given interval, including quadratic equations in sin, cos and tan and equations involving multiples of the unknown angle.	
Vectors 2D	Unit 5: Vectors (2D) (Chapter 11) Use vectors in two dimensions. Calculate the magnitude and direction of a vector and convert between component form and magnitude/direction form. Add vectors diagrammatically and perform the algebraic operations of vector addition and multiplication by scalars, and understand their geometrical interpretations. Understand and use position vectors; calculate the distance between two points represented by position vectors. Use vectors to solve problems in pure mathematics and in context, (including forces).	
Spring 1:		Preparation:
Differentiation	Unit 6: Differentiation (Chapter 12) Understand and use the derivative of f(x) as the gradient of the tangent to the graph of y = f(x) at a general point (x, y); the gradient of the tangent as a limit; interpretation as a rate of change sketching the gradient function for a given curve Second derivatives differentiation from first principles for small positive integer powers of x Understand and use the second derivative as the rate of change of gradient. Differentiate x^ n, for rational values of n, and related constant multiples, sums and differences. Apply differentiation to find gradients, tangents and normals, maxima and minima and stationary points.	Assessed Homework Tasks, Exam questions, Online Section Tests Other assessments: End of Unit closed Book Tests Closed book periodic tests

	Identify where functions are increasing	
	or decreasing.	
Integration	Unit 7: Integration(Chapter 13)	
incegration	Know and use the Fundamental	
	Theorem of Calculus.	
	Integrate x n (excluding $n = -1$ ) and	
	related sums, differences and constant	
	multiples.	
	Evaluate definite integrals: use a definite	
	integral to find the area under a curve	
	Unit 8: Evnonentials and	
	logarithms(Chanter 14)	
	$V_{\text{pow}}$ and use the function $2\Delta x$ and	
	its graph where a is positive	
	Know and was the function alward	
	the graph	
	Ke south at the south is at a factor	
	Know that the gradient of erkx is	
	equal to kerkx and hence understand	
	in many applications	
	Know and use the definition of logax	
	as the inverse of anx, where a is	
	positive and $x > 0$	
	Know and use the function lnx and its	
	graph	
	Know and use lnx as the inverse	
	function of e^x"	
	Understand and use the laws of	
	logarithms:	
	$\log ax + \log ay = \log a(xy)$	
	$\log ax - \log ay = \log a (x/y)$	
	klogax = logax^k (including, for	
	example, $k = -1$ and $k = -1/2$ )	
	Solve equations of the form $a^x = b$	
	Use logarithmic graphs to estimate	
	parameters in relationships of the	
	form $y = ax^n$ and $y = kb^n$ , given	
	data for x and y	
	Understand and use exponential	
	growth and decay: use in modelling	
	(examples may include the use of e in	
	continuous compound interest.	
	radioactive decay, drug concentration	
	decay, exponential growth as a model	

	for population growth); consideration of limitations and refinements of exponential models	
Spring 2: Statistical sampling	Unit 1: Statistical sampling(Chapter1) Understand and use the terms 'population' and 'sample'. Use samples to make informal inferences about the population. Understand and use sampling techniques, including simple random sampling and opportunity sampling. Select or critique sampling techniques in the context of solving a statistical problem, including understanding that different samples can lead to different conclusions about the population.	Preparation: Assessed Homework Tasks, Exam questions, Online Section Tests Other assessments: End of Unit closed Book Tests Closed book
Data presentation and Interpretation	Unit 2a: Data presentation and interpretation(Chapter2-3) Interpret diagrams for single-variable data, including understanding that area in a histogram represents frequency Connect to probability distributions. Interpret scatter diagrams and regression lines for bivariate data, including recognition of scatter diagrams that include distinct sections of the population (calculations involving regression lines are excluded). Understand informal interpretation of correlation. Understand that correlation does not imply causation.	periodic tests
Quantities and Units in Mechanics	Unit 6: Quantities and units in mechanics(Chapter8) Understand and use fundamental quantities and units in the S.I. system: length, time, mass. Understand and use derived quantities and units: velocity, acceleration, force, weight.	
Kinematics	Unit 7a: Kinematics 1 (constant acceleration) (Chapter9) Understand and use the language of kinematics: position; displacement; distance travelled; velocity; speed; acceleration	

	Understand use and interpret graphs in	
	kinematics for motion in a straight line	
	displacement against time and	
	interpretation of anodionate value it.	
	interpretation of gradient; velocity	
	against time and interpretation of	
	gradient and area under the graph.	
	Understand, use and derive the	
	formulae for constant acceleration for	
	motion in a straight line.	
Data	Unit 2b: Data presentation and	
presentation	interpretation(Chapter3-4)	
and	Interpret measures of central tendency	
interpretation	and variation, extending to standard	
	deviation.	
	Be able to calculate standard deviation	
	including from summary statistics	
	Recognise and interpret possible outliers in	
	data sets and statistical diagrams	
	Select or critique data presentation	
	techniques in the context of a statistical	
	problem.	
	Be able to clean data, including dealing with	
	missing data, errors and outliers.	
Kinematics	Unit 7b: Kinematics 1 (constant	
Kinematics	acceleration)	
	Use calculus in kinematics for motion	
	in a straight line	
	Unit a: Probability(Chapters)	
Probability	Understand and use mutually exclusive and	
	independent events when calculating	
	probabilities.	
	Link to discrete and continuous	
	distributions.	
Forces and	Unit 8a: Forces & Newton's	
Newton's laws	l <mark>aws(Chapter10)</mark>	
	Understand the concept of a force;	
	understand and use Newton's first law.	
	Understand and use Newton's second	
	law for motion in a straight line	
	(restricted to forces in two	
	cases of forces given as 2-D vectors)	
	Linit Oh, Eorges Q. Nouter's	
	bug(Chapters - DEVICION)	
	aws(Chapterio+ KEVISION)	
	Understand and use weight and	
	motion in a straight line under gravity;	
	gravitational acceleration, g, and its	
1	accuracy.	

	Understand and use Newton's third law; equilibrium of forces on a particle and motion in a straight line; application to problems involving smooth pulleys and connected particles.	Descrition
Statistical distributions	(Chapter6) Understand and use simple, discrete probability distributions (calculation of mean and variance of discrete random variables is excluded), including the binomial distribution, as a model; calculate probabilities using the binomial distribution.	Assessed Homework Tasks, Exam questions, Online Section Tests Other
Hypothesis testing	Unit 5a: Statistical hypothesis testing(Chapter7) Understand and apply the language of statistical hypothesis testing, developed through a binomial model: null hypothesis, alternative hypothesis, significance level, test statistic, 1-tail test, 2-tail test, critical value, critical region, acceptance region, p-value Unit 5b: Statistical hypothesis testing(Chapter7+ revision) Conduct a statistical hypothesis test for the proportion in the binomial distribution and interpret the results in context. Understand that a sample is being used to make an inference about the population and appreciate that the significance level is the probability of incorrectly rejecting the null hypothesis. Unit 9: Kinematics 2 (variable acceleration) (Chapter11) Functions of time, using differentiation and integration, constant acceleration formulae, Maxima and Minima problems. Full As papers/Revisions	assessments: End of Unit closed Book Tests Closed book periodic tests
Summer 2: Proof	Formal examination (AS level) Year 2 content Unit 1: Proof (Chapter1)	Preparation: Assessed Homework Tasks, Exam questions,
	Understand and use the structure of mathematical proof, proceeding from given assumptions through a series of logical	Online Section Tests

Functions and modelling			Oth an
Proof by deduction Proof by contradiction (including proof of the irrationality of 2 and the infinity of primes, and application to 		steps to a conclusion; use methods of proof,	Other
Functions and modelling Functions and modelling Functions and application to previous and application to unfamiliar proofs) Unit 2: Algebraic and partial fractions (Chaptern) Understand and use the laws of indices for all rational exponents. Use and manipulate surds, including rationalising the denominator. Manipulate polynomials algebraically, including expanding brackets and collecting like terms, factorisation and simple algebraic division; use of the factor theorem. Simplify rational expressions, including by factorising and cancelling, and algebraic division (by linear expressions only). Decompose rational functions into partial fractions (denominators not more complicated than squared linear terms and with no more than 3 terms, numerators constant or linear). Functions and modelling Functions of quadratic functions and their graphs. The discriminant of a quadratic function, including the conditions for real and repeated roots. Completing the square. Solution of quadratic equations in a function of the unknown. Solve simultaneous equations in two variables by elimination and by substitution, including one linear and one quadratic equation. Solve simultaneous equations in two variables by elimination and by substitution, including one linear and one quadratic equation. Solve linear and quadratic inequalities in a single variable and interpret such inequalities graphically, including inequalities with brackets and fractions.		Including:	assessments.
Proof by contradictionDisproof by contradictionClosed BookProof by contradiction(including proof of the irrationality of 2 and the infinity of primes, and application to unfamiliar proofs)Closed book periodic tests including PPEUnit 2: Algebraic and partial fractions (Chapter)Understand and use the laws of indices for all rational exponents. Use and manipulate surds, including rational exponents. Use and manipulate surds, including rational exponents. Use and manipulate surds, including rational exponents. Use and manipulate polynomials algebraically, including expanding brackets and collecting like terms, factorisation and simple algebraic division; use of the factor theorem. Simplify rational expressions, including by factorising and cancelling, and algebraic division (by linear expressions only). Decompose rational functions into partial fractions (denominators not more complicated than squared linear terms and with no more than 3 terms, numerators constant or linear).Functions and modellingUnit 3: Functions and modelling Chapters) Work with quadratic functions and their graphs. The discriminant of a quadratic function, including the conditions for real and repeated roots. Completing the square. Solution of quadratic equations in a function, including one linear and one quadratic equations in two variables by elimination and by substitution, including one linear and one quadratic equation. Solve linear and quadratic inequalities in a single variable and interpret such inequalities graphically, including inequalities with brackets and fractions.		Proof by deduction	End of Unit
Algebraic fractionsDisproof by contracticion (including proof of the irrationality of 2 and the infinity of primes, and application to unfamiliar proofs)TestsUnit 2: Algebraic and partial fractions (Chapters)Unit 2: Algebraic and partial fractions (Chapters)TestsUnit 3: Algebraic and partial fractions (Chapters)Unit 2: Algebraic and partial fractions (Chapters)TestsUnderstand and use the laws of indices for all rational symphotesTestsTestsUnderstand and use the laws of indices for all rationalising the denominator. 		Proof by exhaustion	closed Book
Proof by contractionClosed book periodic tests including proof of the irrationality of 2 and the infinity of primes, and application to unfamiliar proofs)Closed book periodic tests including PPEAlgebraic fractionsUnit 2: Algebraic and partial fractions (Chapter1)Closed book periodic tests including PPEUnderstand and use the laws of indices for all rational exponents. Use and manipulate surds, including rational exponents. Use and manipulate surds, including rational exponents. Use and manipulate surds, including by factorising and cancelling, and algebraic division (use of the factor theorem. Simplify rational expressions, including by factorising and cancelling, and algebraic division (by linear expressions only). Decompose rational functions into partial fractions (denominators not more complicated than squared linear terms and with no more than 3 terms, numerators constant or linear).Functions and modellingUnit 3: Functions and modelling(Chapter2)Work with quadratic functions and their graphs. The discriminant of a quadratic function, including the conditions for real and repeated roots. Completing the square. Solution of quadratic equations including solving quadratic equations in a function of the unknown. Solve simultaneous equations in two variables by elimination and by substitution, including one linear and one quadratic equation. Solve linear and quadratic inequalities in a single variable and interpret such inequalities graphically, including inequalities with brackets and fractions.		Disproof by counter example	Tests
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Algebraic fractions       Unit z: Algebraic and partial fractions (Chapter)         Understand and use the laws of indices for all rational exponents.       Use and manipulate surds, including rationalising the denominator.         Manipulate polynomials algebraically, including expanding brackets and collecting like terms, factorisation and simple algebraic division; use of the factor theorem.         Simplify rational expressions, including by factorising and cancelling, and algebraic division (by linear expressions only).         Decompose rational functions into partial fractions (denominators not more complicated than squared linear terms and with no more than 3 terms, numerators constant or linear).         Functions and modelling       Unit 3: Functions and modelling(Chapter2)         Work with quadratic functions and their graphs.       The discriminant of a quadratic function, including the conditions for real and repeated roots.         Completing the square.       Solution of quadratic equations including solving quadratic equations in a function of the unknown.         Solve simultaneous equations in two variables by elimination and by substitution, including one linear and one quadratic equation.         Solve linear and quadratic inequalities in a single variable and interpret such inequalities graphically, including inequalities with brackets and fractions.		the infinity of primes, and application to	including PPE
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algebraic division; use of the factor theorem.Simplify rational expressions, including by factorising and cancelling, and algebraic division (by linear expressions only). Decompose rational functions into partial fractions (denominators not more complicated than squared linear terms and with no more than 3 terms, numerators constant or linear).Functions and modellingFunctions and modelling (Chapter2)Work with quadratic functions and their graphs. The discriminant of a quadratic function, including the conditions for real and repeated roots. Completing the square. Solution of quadratic equations including solving quadratic equations in a function of the unknown. Solve simultaneous equations in two variables by elimination and by substitution, including one linear and one quadratic equation. Solve linear and quadratic inequalities in a single variable and interpret such inequalities graphically, including inequalities with brackets and fractions.		like terms, factorisation and simple	
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Functions and modelling Functions and repeated roots. Function of quadratic function, including the square. Solution of quadratic equations including solving quadratic equations in a function of the unknown. Solve simultaneous equations in two variables by elimination and by substitution, including one linear and one quadratic equation. Solve linear and quadratic inequalities in a single variable and interpret such inequalities graphically, including inequalities with brackets and fractions.		Decompose rational functions into partial	
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Functions and modellingUnit 3: Functions and modelling(Chapter2)Work with quadratic functions and their graphs. The discriminant of a quadratic function, including the conditions for real and repeated roots. Completing the square. Solution of quadratic equations including solving quadratic equations in a function of the unknown. Solve simultaneous equations in two variables by elimination and by substitution, including one linear and one quadratic equation. Solve linear and quadratic inequalities in a single variable and interpret such inequalities graphically, including inequalities with brackets and fractions.		complicated than squared linear terms and	
Functions and modelling Unit 3: Functions and modelling(Chapter2) Work with quadratic functions and their graphs. The discriminant of a quadratic function, including the conditions for real and repeated roots. Completing the square. Solution of quadratic equations including solving quadratic equations in a function of the unknown. Solve simultaneous equations in two variables by elimination and by substitution, including one linear and one quadratic equation. Solve linear and quadratic inequalities in a single variable and interpret such inequalities graphically, including inequalities with brackets and fractions.		with no more than 3 terms, numerators	
Functions and modellingUnit 3: Functions and modelling(Chapter2)Work with quadratic functions and their graphs. The discriminant of a quadratic function, including the conditions for real and repeated roots. Completing the square. Solution of quadratic equations including solving quadratic equations in a function of the unknown. Solve simultaneous equations in two variables by elimination and by substitution, including one linear and one quadratic equation. Solve linear and quadratic inequalities in a single variable and interpret such inequalities graphically, including inequalities with brackets and fractions.		constant or linear).	
modellingmodelling(Chapter2)Work with quadratic functions and their graphs.The discriminant of a quadratic function, including the conditions for real and repeated roots.Completing the square.Solution of quadratic equations including solving quadratic equations in a function of the unknown.Solve simultaneous equations in two variables by elimination and by 	Functions and	Unit 3: Functions and	
Work with quadratic functions and their graphs.The discriminant of a quadratic function, including the conditions for real and repeated roots.Completing the square.Solution of quadratic equations including solving quadratic equations in a function of the unknown.Solve simultaneous equations in two variables by elimination and by substitution, including one linear and one quadratic equation.Solve linear and quadratic inequalities in a single variable and interpret such inequalities graphically, including inequalities with brackets and fractions.	modelling	modelling(Chapter2)	
graphs. The discriminant of a quadratic function, including the conditions for real and repeated roots. Completing the square. Solution of quadratic equations including solving quadratic equations in a function of the unknown. Solve simultaneous equations in two variables by elimination and by substitution, including one linear and one quadratic equation. Solve linear and quadratic inequalities in a single variable and interpret such inequalities graphically, including inequalities with brackets and fractions.		Work with guadratic functions and their	
The discriminant of a quadratic function, including the conditions for real and repeated roots. Completing the square. Solution of quadratic equations including solving quadratic equations in a function of the unknown. Solve simultaneous equations in two variables by elimination and by substitution, including one linear and one quadratic equation. Solve linear and quadratic inequalities in a single variable and interpret such inequalities graphically, including inequalities with brackets and fractions.		graphs.	
including the conditions for real and repeated roots. Completing the square. Solution of quadratic equations including solving quadratic equations in a function of the unknown. Solve simultaneous equations in two variables by elimination and by substitution, including one linear and one quadratic equation. Solve linear and quadratic inequalities in a single variable and interpret such inequalities graphically, including inequalities with brackets and fractions.		The discriminant of a guadratic function	
repeated roots. Completing the square. Solution of quadratic equations including solving quadratic equations in a function of the unknown. Solve simultaneous equations in two variables by elimination and by substitution, including one linear and one quadratic equation. Solve linear and quadratic inequalities in a single variable and interpret such inequalities graphically, including inequalities with brackets and fractions.		including the conditions for real and	
Completing the square. Solution of quadratic equations including solving quadratic equations in a function of the unknown. Solve simultaneous equations in two variables by elimination and by substitution, including one linear and one quadratic equation. Solve linear and quadratic inequalities in a single variable and interpret such inequalities graphically, including inequalities with brackets and fractions.		reported roots	
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<ul> <li>including solving quadratic equations in</li> <li>a function of the unknown.</li> <li>Solve simultaneous equations in two</li> <li>variables by elimination and by</li> <li>substitution, including one linear and</li> <li>one quadratic equation.</li> <li>Solve linear and quadratic inequalities in</li> <li>a single variable and interpret such</li> <li>inequalities graphically,</li> <li>including inequalities with brackets and</li> <li>fractions.</li> </ul>		Solution of quadratic equations	
a function of the unknown. Solve simultaneous equations in two variables by elimination and by substitution, including one linear and one quadratic equation. Solve linear and quadratic inequalities in a single variable and interpret such inequalities graphically, including inequalities with brackets and fractions.		including solving quadratic equations in	
Solve simultaneous equations in two variables by elimination and by substitution, including one linear and one quadratic equation. Solve linear and quadratic inequalities in a single variable and interpret such inequalities graphically, including inequalities with brackets and fractions.		a function of the unknown.	
variables by elimination and by substitution, including one linear and one quadratic equation. Solve linear and quadratic inequalities in a single variable and interpret such inequalities graphically, including inequalities with brackets and fractions.		Solve simultaneous equations in two	
substitution, including one linear and one quadratic equation. Solve linear and quadratic inequalities in a single variable and interpret such inequalities graphically, including inequalities with brackets and fractions.		variables by elimination and by	
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one quadratic equation. Solve linear and quadratic inequalities in a single variable and interpret such inequalities graphically, including inequalities with brackets and fractions.		substitution, including one linear and	
Solve linear and quadratic inequalities in a single variable and interpret such inequalities graphically, including inequalities with brackets and fractions.		one quadratic equation.	
a single variable and interpret such inequalities graphically, including inequalities with brackets and fractions.		Solve linear and quadratic inequalities in	
inequalities graphically, including inequalities with brackets and fractions.		a single variable and interpret such	
including inequalities with brackets and fractions.		inequalities graphically,	
fractions.		including inequalities with brackets and	
		fractions	

	Express solutions through correct use of	
	(and and (or) or through set notation	
	Represent linear and quadratic	
	inequalities such as $y > x + 1$ and $y > ax2$	
	+ bx + c graphically."	
	Understand and use graphs of functions;	
	sketch curves defined by simple	
	equations including polynomials	
	The modulus of a linear function.	
	$y = a/x$ and $y = 2/ax^2$	
	(including their vertical and horizontal	
	asymptotes)	
	Interpret algebraic solution of equations	
	graphically; use intersection points of	
	graphs to solve equations.	
	Understand and use proportional	
	relationships and their graphs."	
	Understand and use composite	
	functions: inverse functions and their	
	graphs.	
	Understand the effect of simple	
	transformations on the graph of $v = f(x)$ .	
	including sketching	
	associated graphs:	
	v = af(x), v = f(x) + a.	
	y = f(x + a), y = f(ax)	
	and combinations of these	
	transformations"	
	Use of functions in modelling including	
	consideration of limitations and	
	refinements of the models	
	Unit 4: Sories and	
Series and	sequences (Chaptera)	
sequences	Work with sequences including those	
	given by a formula for the nth term	
	and those generated by a simple	
	relation of the form $xn + 1 = f(xn)$ ;	
	increasing sequences; decreasing	
	sequences; periodic sequences.	
	Understand and use sigma notation for	
	Sums of series.	
	sequences and series including the	
	formulae for nth term and the sum to	
	n terms	

	Understand and work w sequences and series, in formulae for the nth te of a finite geometric ser infinity of a convergent series, including the use modulus notation Use sequences and seri	vith geometric ncluding the rm and the sum ries; the sum to geometric e of  r  < 1; es in modelling.	
Suggestions for independent study and home support: Uplearn Integral Maths Exam Solutions Course Textbook issued through the Library Variety of PowerPoints on Student Shared Area			
KEY SKILLS Literacy:	Numeracy:	Other: Communication Presentation Team work Independent skills Research development Time management	

Year 12 - Further Mathematics GCE				
Exam Board & course title/code	Unit	Date of Exam	% of Total Exam	
Pearson Edexcel - GCE As Level Further Maths (8FM0)	Core Pure Maths 1 (Both)		25% (50% AS)	
	Core Pure Maths 2 (A Level only) Statistics 1		25% 25% (AS & A	
	Maths Paper 2B Further Pure 1 Paper 2B		Level) 25% (AS & A Level)	
Key topics	Course cor	ntent	Assessment	
Autumn 1:	Unit I. Complex numbers Solve any quadratic equicoefficients. Solve cubic or quartic equicoefficients." Add, subtract, multiply complex numbers in the with x and y real. Understand and use the part' and 'imaginary part' and 'imaginary part' Understand and use the conjugate. Know that non-real roce equations with real coefficients. Use and interpret Argan Unit 2a-b: Matrices Add, subtract and muticonformable matrices Multiply a matrix by a Understand and use z identity matrices Use matrices to represent transformations in 2-1 Successive transformation Find invariant points linear transformation Calculate determinant 3 × 3 matrices and interfactors, including the orientation	bers (part 1) uation with real equations with and divide e form x + iy e terms 'real rrt'." e complex ots of polynomial efficients occur and diagrams. ditiply s. a scalar. zero and sent linear D. ations. is in 3-D. and lines for a ts of: 2 × 2 and erpret as scale effect on	Preparation: Assessed Homework Tasks, Exam questions, Online Section Tests Other assessments: End of Unit closed Book Tests Closed book periodic tests	

	Understand and use singular and non-singular matrices. Properties of inverse matrices. Calculate and use the inverse of non-singular 2 × 2 matrices and 3 × 3 matrices. Solve three linear simultaneous equations in three variables by use of the inverse matrix. Interpret geometrically the solution and failure of solution of three simultaneous linear equations. Unit 1: Discrete random variables (Chapter 1) Calculation of the mean and variance of discrete probability distributions. Extension of expected value function to include E(g(X)).	
Autumn 2:	Unit 2: Complex numbers (part 2) Convert between the Cartesian form and the modulus-argument form of a complex number. Knowledge of radians is assumed. "Multiply and divide complex numbers in modulus argument form. Construct and interpret simple loci in the argand diagram such as Iz- r I>r and arg $(z - a) = \theta$ Knowledge of radians is assumed. Unit 4: Series Sums of natural numbers Sum of squares and cubes Unit 2: Poisson distributions (Chapter2) The Poisson distribution. The additive property of Poisson distributions." The mean and variance of the binomial distribution. The use of the Poisson distribution as an approximation to the binomial distribution. Extend ideas of hypothesis tests to test for the mean of a Poisson distribution	Preparation: Assessed Homework Tasks, Exam questions, Online Section Tests Other assessments: End of Unit closed Book Tests Closed book periodic tests
Spring 1:	Unit 5: Algebra and functions Understand and use the relationship between roots and coefficients of polynomial equations up to quartic equations.	Preparation: Assessed Homework Tasks,

	Form a polynomial equation whose roots are a linear transformation of the roots of a given polynomial equation (of at least cubic degree). Understand and use formulae for the sums of integers, squares and cubes and use these to sum other series. Unit 0: Proof Construct proofs using mathematical induction. Contexts include sums of series, divisibility and powers of matrices. Unit 3: Hypothesis testing (Chapter 4) Extend ideas of hypothesis tests to test for the mean of a Poisson distribution Find Critical regions for a Poisson distribution.	Exam questions, Online Section Tests Other assessments: End of Unit closed Book Tests Closed book periodic tests
Spring 2:	Unit 7: Vector Understand and use the vector and Cartesian forms of an equation of a straight line in 3-D. 2 Understand and use the vector and Cartesian forms of the equation of a plane. Calculate the scalar product and use it to express the equation of a plane, and to calculate the angle between two lines, the angle between a line and a plane. Check whether vectors are perpendicular by using the scalar product. Find the intersection of a line and a plane. Calculate the perpendicular distance between two lines, from a point to a line and from a point to a plane. Unit 4: Chi-squared test (Chapter 6) Goodness of fit tests and Contingency Tables. The null and alternative hypotheses. The use of $\sum_{i=1}^{n} \frac{(O_i - E_i)^2}{E_i}$ approximate $\chi^2$ statistic. Degrees of freedom.	Preparation: Assessed Homework Tasks, Exam questions, Online Section Tests Other assessments: End of Unit closed Book Tests Closed book p eriodic tests

Summer 1:	Unit 1a-b: Coordinate systems Cartesian equations for the parabola and rectangular hyperbola Parametric equations for the parabola and rectangular hyperbola. Unit 1c: Coordinate systems The focus-directrix property of the parabola. Tangents and normals to these curves. Simple loci problems Unit 2: Inequalities The manipulation and solution of algebraic inequalities and inequations. Unit 3a-b: Further Trigonometry The t-formulae Applications of t-formulae to trigonometric identities		Preparation: Assessed Homework Tasks, Exam questions, Online Section Tests Other assessments: End of Unit closed Book Tests Closed book periodic tests
Summer 2:	Unit 3c: Further Trigonometry Applications of t-formulae to solve trigonometric equationsUnit 4: Further Vectors The vector product a x b of two vectors. Applications of the vector product. The scalar triple product a.bx c Unit 5: Numerical methods Numerical solution of first order and second order differential equations.		Preparation: Assessed Homework Tasks, Exam questions, Online Section Tests Other assessments: End of Unit closed Book Tests Closed book periodic tests including PPE
Suggestions for indep Integral Maths Exam Solutions Course Textbook issu Variety of PowerPoin KEY SKILLS Literacy:	endent study and hom ed through the Library its on Student Shared A Numeracy:	other: Other: Communication Presentation Team work Independent skills Research developm Time management	nent

Year 12 - Mathematical Studies				
Exam Board & course title/code	Unit	Date of Exam	% of Total Exam	
AQA L3 Certificate in Mathematical Studies	Paper 1 Paper 2B	Summ er - Year 12/13	100%	
Key topics	Course content		Assessme	
Autumn 1: Analysis of Data	Data and sampling, measures of spre and whisker plot, cumulative frequen graphs, histograms	ad, box ncy	Preparation: ClassCharts tasks	
Critical Path Analysis	Networks and algorithms, activity ne early and late times, critical activitie gantt charts	tworks, es,	newspapers	
			Other assessments: Topic test after every topic	
Autumn 2: Analysis of Data	Data and sampling, measures of spre and whisker plot, cumulative frequer graphs, histograms	ad, box ncy	Preparation: ClassCharts tasks Looking at newspapers	
Critical Analysis	Selectivity of data, sampling, mislead data, analysis of models	ding		
			Other assessments: Topic test after every topic	
Spring 1: Cost-Benefit Analysis	Cost benefit principle, control measu and uncertainty, insurance myths	ıres	Preparation: ClassCharts	
Modelling &	Standard form Estimation		tasks Looking at newspapers	
Estimation	Standard form, Estimation		Other assessments:	

Spring 2: Personal Finance	Budgeting, income tax, controlling dept, annual percentage rate, mortgages, savings and investments, mortgages, savings and investments, VAT, exchange rates and inflation	Topic test after every topic <b>Preparation:</b> ClassCharts tasks Looking at newspapers	
Expectation	Venn diagrams, probability, tree diagrams, expected value, conditional probability	Other assessments: Topic test after every topic	
Summer 1: Paper 1 Preliminary Material Paper 2 Preliminary Material	Look at the preliminary material and work through possible questions that are related to it	Preparation: ClassCharts tasks Looking at newspapers Other assessments: Topic test after every topic	
Summer 2:		Preparation: ClassCharts tasks Looking at newspapers Other assessments: Topic test after every topic End of year exam	
Suggestions for independent study and home support:			
Maths Genie and Ce	entury	PC 45	

Looking at news paper articles		
KEY SKILLS		
Literacy:	Numeracy:	Other:
The key focus is • Spelling key terms correctly • Use of mathemati cal language	www.mathsisfun.com/definitio ns/ www.nationalnumeracy.org.uk /why-numeracy-important www.skillsyouneed.com/nume racy-skills.html	

#### Curriculum Overview for Year 13:

	Year 13 - Mather	matics GCE	
Exam Board & course title/code EDEXEL	Unit	Date of Exam	% of Total Exam
9MAO (A Level)	Pure		$33\frac{1}{3}\%$
	Pure		$33\frac{1}{3}\%$
	Statistics & Mechanics		$33\frac{1}{3}\%$
Key topics	Course con	ltent	Assessment
Autumn 1:	Unit 5: The binomia theorem(Chapter4) Understand and use t expansion of (a + bx)/ integer n; the notatio to binomial probabilit Extend to any rational r use for approximation; the expansion is valid for (proof not required)	he binomial In for positive Ins n! and nCr link ties. In, including its be aware that for Ibx/al < 1	Preparation: Assessed Homework Tasks, Exam questions, Online Section Tests Other assessments: End of Unit
	Unit 6: Trigonometri Understand and use t sine, cosine and tange arguments; the sine and cosine ru triangle in the form 1 Work with radian me use for arc length and Understand and use t angle approximations tangent sin $\theta \approx \theta$ cos $\theta \approx 1-\theta^2/2$ , tan $\theta \approx \theta$ Where $\theta$ Understand and use t tangent functions; the symmetries and period Know and use exact w for 0, $\pi/6$ , $\pi/4$ , $\pi/3$ , $\pi$ thereof, and exact va 0, $\pi/6$ , $\pi/4$ , $\pi/3$ and $\pi$ thereof.	ry (Chapter5-7) the definitions of ent for all ules; the area of a /2 ab sinC easure, including d area of sector. the standard small of sine, cosine and is in radians. the sine, cosine and eir graphs, odicity. values of sin and cos /2, $\pi$ and multiples lues of tan for and multiples	closed Book Tests Closed book periodic tests

		1
	Understand and use the definitions of secant, cosecant and cotangent and of arcsin, arccos and arctan; their relationships to sine, cosine and tangent; understanding of their graphs; their ranges and domains. Understand and use $\tan\theta = \sin\theta/\cos\theta$ Understand and use $\tan\theta = \sin\theta/\cos\theta$ Understand and use $\sin2\theta + \cos2\theta = 1$ $\sec2\theta = 1 + \tan2\theta$ and $\csc2\theta = 1 + \cot2\theta''$ Understand and use double angle formulae; use of formulae for sin (A ± B), cos (A ± B), and tan (A ± B), understand geometrical proofs of these formulae. Understand and use expressions for acos $\theta + b\sin\theta$ in the equivalent forms of r cos ( $\theta \pm \alpha$ ) or rsin ( $\theta \pm \alpha$ )''Solve simple trigonometric equations in a given interval, including quadratic equations in sin, cos and tan and equations involving multiples of the unknown angle. Construct proofs involving trigonometric functions and identities. Use trigonometric functions to solve problems in context, including problems involving vectors, kinematics and forces.	
Autumn 2:	Unit 7: Parametric equations(Chapter8)Understand and use the parametric equations of curves and conversion between Cartesian and parametric forms.Use parametric equations in modelling in a variety of contexts.Unit 8: Differentiation(Chapter9)Apply differentiation to find gradients, tangents and normals maxima and minima and stationary points.points of inflection Identify where functions are increasing or decreasing.Differentiate using the product rule, the quotient rule and the chain rule, including problems involving	Preparation: Assessed Homework Tasks, Exam questions, Online Section Tests Other assessments: End of Unit closed Book Tests Closed book periodic tests

	connected rates of change and inverse functions. Differentiate simple functions and relations defined implicitly or parametrically, for first derivative only. Construct simple differential equations in pure mathematics and in context, (contexts may include kinematics, population growth and modelling the relationship between price and demand).	
Spring 1:	Unit 9: Numerical methods - see Integration (part 2) for the trapezium rule(Chapterio) Locate roots of f(x) = 0 by considering changes of sign of f(x) in an interval of x on which f(x) is sufficiently well behaved. Understand how change of sign methods can fail. Solve equations approximately using simple iterative methods; be able to draw associated cobweb and staircase diagrams. Solve equations using the Newton- Raphson method and other recurrence relations of the form $xn+1=g(xn)$ Understand how such methods can fail. Understand how such methods can fail. Understand how such methods can fail. Understand and use numerical integration of functions, including the use of the trapezium rule and estimating the approximate area under a curve and limits that it must lie between. Use numerical methods to solve problems in context. Unit 10: Integration (part 1) (Chapterii) Know and use the Fundamental Theorem of Calculus Integrate x^n (excluding n = -1) and related sums, differences and constant multiples. Integrate e^kx, $1/x$ , sinkx , cos kx and related sums, differences and constant multiples. Evaluate definite integrals; use a definite integral to find the area under a curve and the area between two curves	Preparation: Assessed Homework Tasks, Exam questions, Online Section Tests Other assessments: End of Unit closed Book Tests Closed book periodic tests including PPE

Understand and use integration as the limit of a sum.	
I la 't a la ta anati a (a anta)	
(Chapter11+ revision)	
Carry out simple cases of integration	
by substitution and integration by parts: understand these methods as	
the inverse processes of the chain and	
product rules respectively	
(Integration by substitution includes	
limited to cases where one	
substitution will lead to a function	
which can be integrated; integration	
application of the method but	
excludes reduction formulae.)	
Integrate using partial fractions that	
Evaluate the analytical solution of	
simple first order differential	
equations with separable variables,	
(Separation of variables may require	
factorisation involving a common	
factor.)	
Interpret the solution of a differential equation in the context of solving a	
problem, including identifying	
limitations of the solution; includes	
links to kinematics.	
Use vectors in two dimensions and	
in three dimensions	
direction of a vector and convert	
between component form and magnitude/direction form.	
Add vectors diagrammatically and	
vector addition and multiplication	
by scalars, and understand their	
Understand and use position	
vectors; calculate the distance	
position vectors.	

	Use vectors to solve problems in pure mathematics and in context (including forces).	
Spring 2:	Unit 1: Regression and correlation(Chapter1) Interpret scatter diagrams and regression lines for bivariate data, including recognition of scatter diagrams which include distinct sections of the population (calculations involving regression lines are excluded). Understand informal interpretation of correlation. Understand that correlation does not imply causation.	Preparation: Assessed Homework Tasks, Exam questions, Online Section Tests Other assessments: End of Unit Open Book Tests
	Unit 4: Moments(Chapter4) Understand and use moments in simple static contexts.	Closed book periodic tests
	Unit 2: Probability(Chapter2) Understand and use mutually exclusive and independent events when calculating probabilities. Link to discrete and continuous distributions. Understand and use conditional probability, including the use of tree diagrams, Venn diagrams, two-way tables. Understand and use the conditional probability formula $P(A B) = P(A \cap B) / P(B)^{"}$ Modelling with probability, including critiquing assumptions made and the likely effect of more realistic assumptions.	
	Understand and use Newton's third law; equilibrium of forces on a particle and motion in a straight line (restricted to forces in two perpendicular directions or simple cases of forces given as 2-D vectors); application to problems involving smooth pulleys and connected particles; resolving forces in 2 dimensions; equilibrium of a particle under coplanar forces	

	Understand and use addition of forces; resultant forces; dynamics for motion in a plane. Understand and use the F ≤ µR model for friction; coefficient of friction; motion of a body on a rough surface; limiting friction and statics. Unit 3a: The Normal distribution(Chapter3) Understand and use simple, discrete probability distributions (calculation of mean and variance of discrete random variables is excluded), including the binomial distribution, as a model; calculate probabilities using the binomial distribution.	
Summer 1:	Unit 6: Applications of kinematics (Chapter6) Horizontal projection, vertical and horizontal components, projection at any angle, projectile motion formulae Unit 3b: The Normal distribution(Chapter3) Understand and use the Normal distribution as a model; find probabilities using the Normal distribution Link to histograms, mean, standard deviation, points of inflection and the binomial distribution. Unit 7: Applications of forces(Chapter7) Static particles, modelling with statics, static and friction particles, static rigid bodies, dynamic and inclined planes, connected particles Unit 3c: The Normal distribution(Chapter3 + revision) Select an appropriate probability distribution for a context, with appropriate reasoning, including recognising when the binomial or Normal model may not be appropriate. Conduct a statistical hypothesis test for the mean of a Normal distribution with known, given or assumed variance and interpret the results in context.	Preparation: Assessed Homework Tasks, Exam questions, Online Section Tests Other assessments: End of Unit closed Book Tests Closed book periodic tests

	Unit 8: Further kine Revision (A level) Vectors in kinematics methods with projecti acceleration in one din differentiating and int vectors.	matics(Chapter8) , vector iles, variable mension, regrating	
Summer 2:	Formal examination (. Exam Leave	<mark>A level)</mark>	
Suggestions for indep Uplearn Integral Maths Exam Solutions Course Textbook issu Variety of PowerPoin KEY SKILLS	endent study and hom ed through the Library ts on Student Shared A	e support: , Area	
Literacy:	Numeracy:	Other: Communication Presentation Team work Independent skills Research developme Time management	ent

Year 13 - Further Mathematics GCE				
Exam Board & course title/code	Unit	Date of Exam	% of Total Exam	
Pearson Edexcel - GCE A Level Further Maths (9FM0)	Core Pure Maths 1 (Both)		25% (50% AS)	
	Core Pure Maths 2 (A Level only) Statistics1 Maths Paper 3B Further Pure 1		25% 25% (AS & A Level) 25% (AS & A	
Key topics	Paper 3A	tent	Level) Assessment	
Key topics Autumn 1:	Course con Unit a Complex number Understand de Moivre' to find multiple angle for series. Know and use the definition of the finit of the n distinct number for r $\neq$ o and know that vertices of a regular new Argand diagram Use complex roots of the geometric problems. Unit 2: Hyperbolic functions of the invest and tanh x, including and ranges, and be abbin their graphs. Differentiate and interpretion of the invest functions and the invest of the i	Solutions and the second sec	Assessment Preparation: Assessed Homework Tasks, Exam questions, Online Section Tests Other assessments: End of Unit Open Book Tests Closed book periodic tests	

	Understand and use polar coordinates and be able to convert between polar and Cartesian coordinates.	
Autumn 2:	Unit 3b: Polar coordinates Sketch curves with r given as a function of θ, including use of trigonometric functions. Find the area enclosed by a polar curve. Unit 4: Further algebra and functions (series) Understand and use the method of	Preparation: Assessed Homework Tasks, Exam questions, Online Section Tests Other
	differences for summation of series including use of partial fractions. Find the Maclaurin series of a function including the general term. Recognise and use the Maclaurin series for e^x, ln(1+ x), sin x, cos x and (1+ x)^n, and be aware of the range of values of x for which they are valid (proof not required). Unit sa-c. Further calculus	End of Unit Open Book Tests Closed book periodic tests
	Evaluate improper integrals where either the integrand is undefined at a value in the range of integration or the range of integration extends to infinity. Understand and evaluate the mean value of a function.	
	Integrate using partial fractions Differentiate inverse trigonometric functions Integrate functions of the form and be able to choose trigonometric substitutions to integrate associated functions.	
Spring 1:	Unit 7: Coordinate systems (part 2) Cartesian and parametric equations for the parabola and rectangular hyperbola, ellipse and hyperbola. The focus-directrix properties of the parabola, ellipse and hyperbola, including the eccentricity.	Preparation: Assessed Homework Tasks, Exam questions, Online Section Tests
	Unit 8: Inequalities (part 2) The manipulation and solution of algebraic inequalities and inequations, including those involving the modulus sign.	Other assessments: End of Unit Open Book
	Unit 9: Further numerical methods Simpson's rule. Unit 6a, Differential equations	Tests Closed book periodic tests

	· · ·	
	Find and use an integrating factor to	
	solve differential equations of form	
	dy/dx + P(x)y = Q(x)	
	and recognise when it is appropriate to	
	do so.	
	Find both general and particular	
	solutions to differential equations.	
	Use differential equations in modelling	
	in kinematics and in other contexts	
	Solve differential equations of form y"	
	solve unrefericial equations of form y	
	+ ay + by = 0 where a and b are	
	constants by using the auxiliary	
	equation.	
	Solve differential equations of form y	
	"+ a y '+b y = f(x) where a and b are	
	constants by solving the homogeneous	
	case and adding a particular integral to	
	the complementary function (in cases	
	where f(x) is a polynomial, exponential	
	or trigonometric function).	
	Unit 6b-c: Differential equations	
	Understand and use the relationship	
	between the cases when the	
	discriminant of the auxiliary equation is	
	nositive zero and negative and the	
	form of colution of the differential	
	form of solution of the differential	
	equation.	
	Solve the equation for simple harmonic	
	motion and relate	
	the solution to the motion.	
	Model damped oscillations using	
	second order differential equations	
	and interpret their solutions.	
	Analyse and interpret models of	
	situations with one independent	
	variable and two dependent variables	
	as a pair of coupled first order	
	simultaneous equations and be able to	
	solve them, for example predator-prev	
	models.	
Spring 2:	Unit 10: Further calculus	Preparation:
r 0	Derivation and use of Taylor series	Assessed
	Use of series expansions to find limits	Homework
	Leibnitz's theorem	Tasks,
	L'Hospital's Pule	Exam questions.
	The Majorstross substitution for	Online Section
	interveterstrass substitution for	Tests
	Integration.	
	Unit II: Further vectors:	Other
	Applications of vectors to three dimensional	assessments:
	geometry involving points, lines and planes.	
		End of Unit
	Unit 10a: Critical path analysis (part	Open Book
	2)	Tests
	l	1

	Unit 12: Further differential equations	Closed book periodic tests
	series solution of differential equations.	
	means of a given substitution.	
Summer 1:	Unit 5: Geometric and negative Binomial distributions Geometric and negative binomial distributions. Mean and variance of a geometric distribution with parameter p Mean and variance of negative binomial distribution with $P(X = x) = {x-1 \choose r-1} p^r (1-p)^{(x-r)}$ Unit6: Hypothesis testing Extend hypothesis testing Extend hypothesis testing to test for the parameter p of a geometric distribution. Unit7: Central limit theorem Applications of the Central Limit Theorem to other distributions. Unit 8: Chi-squared tests Apply goodness of fit tests to geometric distributions. Unit 9: Probability generating functions Definitions, derivations and applications. Use of the probability generating function for the negative binomial, geometric, binomial and Poisson distributions." Use to find the mean and variance. Probability generating function of the sum of independent random variables.	Preparation: Assessed Homework Tasks, Exam questions, Online Section Tests Other assessments: End of Unit Open Book Tests Closed book periodic tests
	Type I and Type II errors. Size and Power of Test.	
Summer 2:	The power function. Exam Leave	Preparation:
Summer 2.		Assessed Homework Tasks, Exam questions, Online Section Tests

		(	Other		
		c	15585511181115.		
		E	End of Unit		
			Jpen Book Fosts		
		F	periodic tests		
		İ	ncluding PPE		
Suggestions for inde	ependent study and hon	ne support:			
Integral Maths					
Exam Solutions					
Course Textbook iss	ued through the Librar	y			
Variety of PowerPoi	ints on Student Shared .	Area			
KEY SKILLS					
Literacy:	Numeracy:	Other:			
	Communication				
		Presentation			
		Team work			
		Independent skills			
		Research development			
		Time management			

#### Subject Assessment Reporting and Recording:

#### **Marking Policy**

Maths marking will be subdivided into formative and summative marking opportunities with agreed feedback points where the teacher will use PIA. There will also be identified self and peer marking opportunities with self and peer PIA process to develop reflective and critical learners and be able to evaluate their own and others work effectively over the key stages.

## The Maths department will achieve these aims by planning the following types of assessment into their schemes of work:

- Formative/diagnostic what do students need to do to improve?
- Summative recording of overall achievement/attainment at critical points, e.g. end of topic tests, Teacher assessments at end of KS3, KS4 & KS5.

As a result of these assessments, teachers will adjust their subsequent lesson planning.

#### Teachers will record marks on the tracking sheets in order to:

- Monitor progress over time.
- Provide accurate historic information for students/parents/other teachers.

• Provide evidence to support reporting and target setting.

In order to support these aims, teachers will access from SIMs baseline data, attendance and other information such as SEND, EAL, PP and High Achievers in order to inform their planning and teaching.

#### **KEY RESPONSIBILITIES**

#### The responsibilities of teachers

- Plan a range of differentiated tasks (including homework tasks) that will be used to give feedback and to monitor students progress
- Plan opportunities for students to act on the feedback (e.g. doing corrections when marked work is returned at the start of the lesson when they get their books back, doing specific tasks as part of a DIRT lesson)
- Encourage students to become independent learners by giving them access to answers so that students can check their work and develop a culture of 'book, buddy, board, boss' for correcting and improving work
- Regularly check books to monitor the work being done to ensure that significant errors or misconceptions and any specific questions raised by students in their self-assessment comments are picked up and addressed.
- Monitor the completion of homework tasks keeping a systematic record of the work done including topic and date set this can be done using electronic or paper methods.
- Complete and use summative assessments as detailed in the schemes of work for each Key Stage, analysing the results to monitor progress against target grades and identify students needing additional support/challenge.
- Report progress as required by the school reporting cycle

#### The responsibilities of students

- Engage with and participate in all assessment/feedback opportunities to assess their progress and develop their skills in understanding what they need to do to improve
- Mark their work regularly, using green pen, when completing tasks using the answers provided, reviewing and correcting any errors.

- Become more independent in their learning by following the culture of 'book, buddy, board, boss' when working on tasks.
- Read and always act on written feedback, usually in green pen by completing the short task set by the teacher on their PIA sheet
- Complete the tracker sheet at the front of their books for all assessments completed.

#### Assessments year 7 and 8

- All KS<sub>3</sub> topics will have an end of topic test, with an agreed mark scheme and grade boundaries set, these are closed book assessments. Students are to mark these to allow them to see the mark scheme and where marks are awarded. These will be recorded as a mark on the tracking sheet which is given to the student as a GCSE grade. PIA sheets will be completed, enabling direction to appropriate DIRT work.
- Periodic assessments will take place roughly every term, these are closed book assessments. They are to be marked by the teacher and a PIA sheet completed. The marks will be recorded on pupil progress and students will receive a grade.
- End of term tests will be two papers based on the work that they have done during the year. There will be a calculator paper and a non-calculator paper.
- All assessments will have a PIA sheet completed to go with them

#### Assessments year 9-11

- All KS4 topics will have an end of topic test, with an agreed mark scheme and grade boundaries set. These are closed book assessments. Students are to mark these to allow them to see the mark scheme and where marks are awarded. These will be recorded as a mark on pupil progress which is given to the student as a GCSE grade. These grades will relate to the specific topic they have done.
- Periodic assessments will take place roughly every term, these are closed book assessments. They are to be marked by the teacher and a PIA sheet completed. The marks will be recorded on the tracking sheets and students will receive a grade. This grade will be for the topics that are on the periodic.
- End of term tests will be two papers based on the work that they have done during the year for year 9 and 10. There will be a calculator paper and a non-calculator paper. In Year 11 there are two mock exams (usually December and March) using papers set by the exam board. All of these assessments reflect the style of the new GCSE exam papers. These assessments are all 'closed' book assessments.
- All assessments will have a PIA sheet completed to go with them

#### Assessments Key Stage 5

For A-level Maths and Further Mathematics there will be an assessed homework task (open book) and one formal written assessment (closed book) per topic. They will also have periodic assessments throughout the year to monitor **progress on the topics**. In Year 12 they will be sitting the AS paper at the end of the year (2 papers) and in Year 13 there will be mock exams. These will follow the pattern of the final examination with three papers – Pure, Pure and Statistics, Pure and Mechanics. The Core Maths course will include regular topic tests and an end of Year 12 exam. All results will be recorded on pupil progres. The GCSE re-take course will also include regular topic tests and mock exams. Students will maintain their own ring binder/ book; Maths teachers will not mark the folders but all marked worked should be kept in the folder.

#### HOMEWORK

All tasks should be set using Show My Homework.

When setting tasks staff should take into account the time guidelines given in the staff handbook for different year groups - Key Stages 3 and 4 1.5 hours of homework per fortnight, Key Stage 5 9 hours of homework per fortnight (plus independent study).

#### Key Stages 3 and 4

All students are set homework tasks once a week.

#### One of these will be a task from Century.

Feedback is provided by the website but teachers will need to review the results to check progress and plan any necessary intervention.

### The other homework task can be worksheet based/teacher directed/vocabulary based/revision/review.

- all the tasks set need to be monitored and acknowledged in some way e.g. for revision/review tasks students must be able to demonstrate that they have spent the necessary time on the task
  - the tasks can be marked in lessons, with verbal feedback/discussion of common issues and teacher intervention as appropriate either with individuals, small groups or the whole class
  - students can mark some tasks and make a comment on their progress with the task identifying aspects they need to improve on during a DIRT lesson

It is important that homework tasks are suited to meet the needs of different groups and, when appropriate, the above pattern can be varied in discussion with the Head of Department.

#### Key Stage 5

- For all sixth form courses the general rule is that students can expect to be set homework every lesson.
- All students will be expected to complete the online assessments on the Integral website as part of their homework tasks.
- A variety of homework tasks will be set including online tasks on Integral, textbook exercises, revision tasks, and exam style questions. For A-level Maths and Further Maths, for each topic, one of the tasks will be an 'open-book' assessed homework.
- Some of these tasks will be marked during lessons and students will also have access to mark schemes and/or worked solutions for some tasks to enable them to do self-assessments. The integral online tasks are marked by the website and, if students get a sufficiently high mark, worked solutions can be accessed to help them correct any errors made in the work. Assessed homework tasks are marked by teachers using a PIA sheet.

#### Marking and feedback in practice

Written feedback in Maths uses the PIA format at all Key Stages. PIA feedback is given for all assessments. There also needs to be regular feedback in students' books. This can be given on a particular piece of classwork or homework.

This can be done using handwritten comments or using a PIA sheets. Whichever format is used the following must be clearly shown:

- **Positive** The teacher must include a positive piece of feedback about a piece of work. These comments should celebrate areas of success and progress with a topic. For example, comments such as 'well set out', 'really clear methods' can acknowledge that care has been taken with the work. For some students it is important to acknowledge that they have persevered with a challenging topic or that they have made progress with some of the key ideas.
- **Improvement** The teacher needs to give the student advice about how to improve their work. These comments need to be specific and constructive focusing on the maths content.

Sometimes, this advice can be shown most clearly within the body of the work e.g. correcting a particular error or showing how to set out a method correctly. In this case, it is not necessary to repeat this on the PIA sheet instead a brief comment drawing attention can be given.

There may be occasions when a task shows both that a student has a full understanding of a topic and all the necessary detail has been included. In this case, whatever level a student is working at, it should be possible to identify the next mathematical step that a student can take which can then reflect in the action task they are given, enabling them to make further progress in their learning.

Action – The student needs to perform an action/task to demonstrate that they have taken on board the advice and are actively seeking to improve the piece of work. The action should be a clear task that will enable students to check that they have now understood the concept/method enabling them to make further progress in their learning.

This can include asking students to:

- correct some of their solutions using the teacher's corrections to help them

- complete one or several similar questions given on the board or on their sheet

- complete a particular task/work on a topic during a DIRT lesson
- use a video clip on Maths Genie and Century to review a concept/method

PIA sheets are not required for every piece of work but there should be evidence that other tasks (both classwork and homework) have been monitored and errors/misconceptions addressed. This can include:

- Students checking and marking their answers regularly during lesson using green pen and doing corrections
- The teacher checking answers during the lesson, giving verbal feedback and intervening appropriately with individuals, small groups or the whole class
- The use of marking codes (appendix).

Teachers should mark in either red or purple pen (or a similar colour) with students using green pen when checking their work or acting on the feedback given. In a DIRT lesson green pen should be used for the title but the main work can be done in blue/black pen.

#### **Frequency of Marking**

At Key Stages 3 and 4 it is expected that staff will mark work using PIA feedback as follows each term:

Teacher	7 periods a fortnight	Teacher	NA
А	6 a term	В	
	6 periods a fortnight		1 periods a fortnight
	5 a term		2 a term (one each half-
			term)
	5 periods a fortnight		2 period a fortnight
	4 a term		2 a term

4 periods a fortnight	3 period a fortnight
3 a term	3 a term

Appendix:

#### Holy Trinity Church of England School

#### Whole School Marking Codes

The following correction symbols are to be used across the school to identify specific features of students' work. Other subject specific symbols, deemed appropriate by the teacher, may also be used. The codes work alongside meaningful teacher comments which are positive, formative and inform students of how their work can be improved.

Where appropriate, staff should insist on correction; misspelt subject specific words are considered a priority and corrections should be recorded by students on their work in green pen.

Over correction is best avoided as this can be discouraging; instead teachers should use the codes to identify specific learning needs.

#### Three Year Data Overview:

Breakdown of subject cohort

Year group	Total	% of PP	% of SEND	% of male	% of female	% of HA
	students	students	students	students	students	students
7	210	27%	19%	52%	48%	25%
8	210	29%	21%	52%	48%	27%

9	208	28%	23%	47%	53%	28%
10	210	23%	25%	48%	52%	28%
11	210	22%	25%	45%	55%	30%
12 Maths Further Maths						
Mathematical Studies	18	11%	0%	61%	39%	11%
Studies	2	o%	o%	50%	50%	100%
	5	40%	40%	80%	30%	0%
13 Maths						
Further Maths	25	0%	0%	72%	28%	76%
	3	o%	0%	67%	33%	100%

#### Past 3 years results

Year 11

	2018	2019	2020	2021
Cohort number	204	198	207	212
% above target	13%	15%	20%	28%
% on target	26%	23%	34%	35%
% below target	62%	62%	45%	37%

Year 13

	2018	2019	2020	2021
Cohort number				
Maths Further Maths	14	26	19	18
Mathematical Studies	1	4	1	2
	0	4	4	3
% above target Maths				
Further Maths	0%	27%	16%	67%
Mathematical Studies	0%	75%	о%	50%
	n/a	25%	100%	100%
% on target				
Maths Further Maths	21%	12%	26%	11%
Mathematical Studies	100%	0%	100%	0%
	n/a	o%	o%	o%

% below target				
Maths Further Maths	79%	62%	58%	22%
Mathematical Studies	0%	25%	o%	50%
Studies	n/a	75%	0%	0%