



Year 12 Mathematics Curriculum Pathway Map

AS PURE & STATISTICS (2 x 100-minutes per fortnight)			AS PURE & MECHANICS (3 x 100-minutes per fortnight)		
	TOPIC/PROGRAMME OF STUDY	Resources		TOPIC/PROGRAMME OF STUDY	Resources
01	P1-Ch5-StraightLineGraphs-Lesson 1 (1) Finding gradients of a line joining a pair of points (2) Understand the link between the equation of a line, its gradient and its intercept	PM1 Ex 5A PM1 Ex 5B Geogebra – exploring the gradient, p90. Nrich Gradient match	01	<u>Bridging GCSE to A Level Lesson (Assessment in fourth lesson)</u> <ul style="list-style-type: none"> Multiply and Divide Integer Powers Expand a single term over brackets and collect like terms Expand the product of two or three expressions Factorise linear, quadratic and simple cubic expressions 	PM1 Ex 1A PM1 Ex 1B PM1 Ex 1B PM1 Ex 1C
02	P1-Ch5-StraightLineGraphs-Lesson 2 (1) Finding the equation of a line given a) The gradient and one point on the line b) Two points on the line	PM1 Ex 5C Geogebra – equation of a line p94	02	<u>Bridging GCSE to A Level Lesson (Assessment in fourth lesson)</u> <ul style="list-style-type: none"> Revise laws of indices Index Equations and converting bases Rearranging expressions in the form kx^n 	PM1 Ex 1D
03	P1-Ch5-StraightLineGraphs-Lesson 3 (1) Find the point of intersection of a pair of straight lines (2) Know and use rules for parallel and perpendicular gradients	PM1 Ex 5E PM1 Ex 5F Geogebra – graphical soln to p95 Ex 8 Geogebra – vary lines and solution. P98 Nrich Negatively triangular	03	<u>Bridging GCSE to A Level Lesson (Assessment in fourth lesson)</u> <ul style="list-style-type: none"> Simplify and use rules of surds Rationalise denominators 	PM1 Ex 1E PM1 Ex 1F Mixed Ex 1

04	<p>P1-Ch5-StraightLineGraphs-Lesson 4</p> <p>(1) Solve length and area problems on coordinate grids</p> <p>(2) Use straight line graphs to construct mathematical models. Students should be familiar with finding the relationship between 2 variables and expressing this using the proportion symbol, or using an equation involving a constant. This can be extended to straight line graphs through the origin, with a gradient of k. Students should be able to calculate and interpret the gradient.</p> <p>1 of 3) S01 Coordinate Geometry Formative Assignment / Solutions</p>	<p>PM1 Ex 5G</p> <p>Geogebra – graphical solution to p101 Ex 14</p> <p>PM1 Ex 5H</p>		<p><u>Bridging GCSE to A Level Assessment</u></p> <p>P1-Ch2-Quadratics-Lesson 1 Then, completing the square.</p>	<p>PM1 Ex2D</p>
05	<p>S1-Ch123-Data-Lesson 1</p> <p>(1) Population and Samples. Understand definitions such as population, census, sampling units and be able to state the advantages and disadvantages of sample vs census</p> <p>(2) Types of random sampling. Understand the differences between simple random, systematic and stratified sampling techniques (advantages and disadvantages)</p> <p>(3) Types of non random sampling. Understand the differences between quota and opportunity sampling (advantages and disadvantages)</p>	<p>SM1 Ex 1A</p> <p>SM1 Ex 1B</p> <p>SM1 Ex 1C Sampling techniques</p>		<p>P1-Ch2-Quadratics Lesson 2</p> <p>(a) Read and use f(x) notation when working with functions Be familiar with finding roots from functions, including quadratic equations with a function in the unknown</p> <p>(b) Sketch the graph of a quadratic function finding the turning point where necessary. Note – students must be able to complete the square for graphs such as $y = 4x - 2x^2 - 3$</p>	<p>PM1 Ex 2E</p> <p>PM1 Ex 2F</p> <p>Geogebra – completed square and graph</p> <p>Nrich Which quadratic?</p>
06	<p>S1-Ch123-Data-Lesson 2</p> <p>(1) Types of Data. Understand the terms quantitative and qualitative, continuous and discrete. Know when to use a frequency table, grouped or ungrouped. Understand about the terms class boundaries, mid points and class width.</p> <p>(2) Revise Cumulative frequency graphs or set as homework / ninth lesson activity</p>	<p>SM1 Ex 1D</p> <p>SM1 Ex 3C</p>		<p>P1-Ch2-Quadratics Lesson 3</p> <p>(a) Know and be able to use the discriminant of a quadratic function, including the conditions for real and repeated roots</p> <p>(b) Modelling with quadratics, e.g. projectiles</p>	<p>PM1 Ex 2G</p> <p>Geogebra – exploring the discriminant p31 Nrich Direct logic</p> <p>PM1 Ex 2H Mixed Ex 2</p>

			<p>Notes on this topic</p> <p>Links to</p> <p>(a) Proof by deduction, e.g. complete the square to prove that $n^2 - 6n + 10$ is positive for all values of n. Disproof by counter-example, e.g. show that the statement "$n^2 - n + 1$ is a prime number for all values of $n \in \mathbb{N}$" is untrue.</p> <p>1 of 3 M01 Quadratic Theory Formative Assessment / Solutions</p>	
07	<p>S1-Ch123-Data-Lesson 3</p> <p>3 of 3 AOF S01 Coordinate Geometry 1 SQ</p> <p>(1) Measures of location (mean, median and mode). Both formulae for means discussed</p> <p>(2) Variance and Standard Deviation. Students are expected to know that S_{xx} is a summary statistic, useful in many calculations, including the variance, ie S_{xx}/n.</p> <p>NB The first of the two assessed homeworks can be set at this point.</p>	<p>SM1 Ex 2A</p> <p>SM1 Ex 2B</p> <p>SM1 Ex 2E</p>	<p>P1-Ch3-Equations&Inequalities Lesson 1</p> <p>(a) Solve linear simultaneous equations using elimination or substitution Solve simultaneous equations ; one linear and one quadratic Ensure students practise examples of worded problems where the equations need to be set up. Investigate when simultaneous equations cannot be solved or only give rise to one solution.</p> <p>(b) Interpret algebraic solutions of equations graphically</p>	<p>PM1 Ex 3A</p> <p>PM1 Ex 3B</p> <p>Nrich Direct logic</p> <p>PM1 Ex 3C</p> <p>Geogebra – 3 resources available to review.</p>
			<p>P1-Ch3-Equations&Inequalities Lesson 2</p> <p>(a) Remind students of how to solve linear inequalities</p> <p>(b) Solve quadratic inequalities Problems involving finding k using the discriminant and solving $\frac{3}{x} > 6$.</p> <p>Note – students need to know how to express solutions through correct use of “and” and “or” OR through set notation.</p> <p>Note – students must make clear how they have obtained their answer</p>	<p>PM1 Ex 3D</p> <p>PM1 Ex 3E</p> <p>MEI Categorising quadratic inequalities</p>
			<p>P1-Ch3-Equations&Inequalities Lesson 3</p> <p>(a) Interpret inequalities graphically</p>	<p>PM1 Ex 3F Q2, Q3 a,c,f</p> <p>PM1 Ex 3G Q1,3, 5 to 8</p> <p>Mixed Ex 3</p>

				(b) Represent linear and quadratic inequalities graphically using shading and correctly dotted and solid lines.	Geogebra –shading regions p54
				1 of 3) M02 Equations and Inequalities Formative Assignment / Solutions	
				P1-Ch11-Vectors Lesson 1 3 of 3) AOF Quadratic Theory LSC <ul style="list-style-type: none"> To be able to use vectors in 2D and to use column vectors. To be able to carry out arithmetic operations on vectors. Students should understand the triangle and parallelogram laws of vector addition. 	PM1 Ex 11A PM1 Ex 11B Geogebra –two resources to review Nrich Vector walk
			09		
08	S1-Ch123-Data-Lesson 4 (1) Interpolation of median, quartiles and percentiles, interquartile and inter-percentile ranges Linear Coding 502a Data – Measures of Spread & Location Formative Assignment / Solutions	SM1 Ex 2C SM1Ex 2D		Y12 HT1 Summative Assessment 2023-24 / Solutions TOPICS: Algebra & Surds Coordinate Geometry Quadratic Theory Equations and Inequalities	
			10		
09	S1-Ch123-Data-Lesson 5 (Laptops or computer room) (1) introduce students to the Large Data Set. Explain what is available in the data-set and the limitations, such as missing data. Explain how this will be assessed. Set a couple of tasks that will begin the process of familiarisation. Further activities on the large data set. Set additional tasks to be completed (2) Complete process by explaining clearly how this is likely to be tested in the exam, i.e a knowledge only of the type of data is useful to avoid confusion in the exam. Try exam style questions from textbook.	SM1 Ex 2F Investigation 2 (see large data set folder in schemes of work). Suggested...Investigation 2a parts 1-4, 8-10 and inverstigation 2b parts 1-7, 9-10.		P1-Ch11-Vectors Lesson 2 <ul style="list-style-type: none"> To be able to calculate the magnitude and direction of a vector from component form. Students to be familiar with i and j notation. To be able to understand and use position vectors and relative position vectors 	PM1 Ex 11C Geogebra –magnitude p239 PM1 Ex 11D
			11		
10	S1-Ch123-Data-Lesson 6 (1) Outliers. Understand the difference between legitimate outliers and clear anomalies. Understand the concept of cleaning the data (removing the anomalies)	SM1 Ex 1E		P1-Ch11-Vectors Lesson 3 3 of 3) AOF Equations and Inequalities LSC	PM1 Ex 11E
			12		

	Box and Whisker Plots Data Comparisons. Discuss and model good analysis			(a) Use vectors to solve geometric problems. Use the ratio theorem to find the position vector of a point C dividing AB in a given ratio. (a) Modelling with vectors Use vectors to solve problems in context with particular reference to velocity, displacement and force along with associated magnitudes of those.	PM1 Ex 11F SM1 Ex 8D
11	S1-Ch123-Data-Lesson 7 Histograms and Frequency Polygons	SM1 Ex 3A SM1 Ex 3B Geogebra –p44 Nrich Boxplot match SM1 Ex 3D MEI Histogram reconstruction SM1 Ex 3E		M1-Ch9-ConstantAcceleration Lesson 1 (a) Introduction to modelling. Solving simple problems based on displacement models / functions (b) Introduction to modelling assumptions, and their impact on the problem (c) Knowledge of the SI units used. Base units and derived units. A basic understanding of the nature of forces involved in AS maths	SM1 Ex 8A SM1 Ex 8B (covered verbally or through discussion) SM1 Ex 8C (covered verbally or through discussion)
12	S1-Ch123-Data-Lesson 8 (1) Correlation. Understand the terms bivariate data, scatter diagram, dependent and independent, explanatory and response variables and causal relationship. Linear Regression. Understand the concept of a least squares line of regression, rather than being able to calculate a and b. Be able to use a given regression line and interpret it. Be able to describe the gradient in context and understand the principle and issues of interpolation and extrapolation. Mixed exam practise S02b Data – Representation of Data Formative Assignment / Solutions	SM1 Ex 4A SM1 Ex 4B Geogebra –regression line and anomalies p64 Mixed exercises 1-4, choose key questions		M1-Ch9-ConstantAcceleration Lesson 2 (a) Displacement Time Graphs. Students to be able to find the average speed and velocity and make links to the gradient of the lines. (b) Velocity Time Graphs. Students to understand that the area under the graph represents displacement and the gradient of the graph represents acceleration. To include harder problems, such as multiple vehicles, over-taking etc.	SM1 Ex 9A SM1 Ex 9B Q1-7 Geogebra –p134 SM1 Ex 9B Q8 Oxford Ex 7.2B Q4,5
13	P1-Ch4-Graphs&Transformations-Lesson 1 (a) Sketch cubic graphs.	PM1 Ex 4A Geogebra –roots of cubic equations p60		M1-Ch9-ConstantAcceleration Lesson 3 (a) Constant acceleration formulae. Define the letters used in the formulae. Derive formulae from	SM1 Ex 9D (Ex9C only uses 2 formulae so 9D more appropriate)

<p>These will be either already factorised or easily simplified. Repeated roots need to be explicitly covered.</p> <p>Students should also be able to find an equation when given a sketch on which all intersections with the axes are given</p> <p>(b) Sketch quartic graphs</p> <p>Once again repeated roots are to be explicitly covered. Discuss the shape of a quartic graph and why.</p>	<p>MEI Equations of cubic curves</p> <p>PM1 Ex 4B</p> <p>Geogebra –roots of quartic equations p60</p>		<p>definitions, graphs and substitution (calculus covered later).</p>	
		16	<p>M1-Ch9-ConstantAcceleration Lesson 4</p> <p>Using constant acceleration formulae for problems involving vertical motion. Students to understand the meaning of g and that it varies by small amounts in different locations. To understand that the problem is affected by the assumption of air resistance. Discuss the consistency of accuracy over rounding when approximating with g. Students to have knowledge of terms such as time of flight and speed of projection.</p> <p>M04 Constant Acceleration Formative Assignment / Solutions</p>	<p>SM1 Ex 9D (Ex9C only uses 2 formulae so 9D more appropriate)</p>
		17	<p>P1-Ch12-Differentiations Lesson 1</p> <p>(a) Introduce gradients on curves and using tangents and numerical approaches to estimate those gradients</p> <p>(b) Understand the gradient of a tangent as a limit and its interpretation as a rate of change. Find the derivative, from first principles, for small positive integer powers of x.</p> <p>Students should be aware of notation $\frac{dy}{dx}$ and $f'(x)$.</p> <p>Students can use either δx or h notation when using first principles.</p>	<p>PM1 Ex 12A</p> <p>Geogebra –explore gradient of chord p257</p> <p>PM1 Ex 12B</p>
		18	<p>P1-Ch12-Differentiation Lesson 2</p> <p>(a) Use the standard derivative of kx^n to find the derivatives of a variety of simple polynomial functions. Summation of terms. Division and expansion may also be necessary in that process.</p>	<p>PM1 Ex 12C, Ex 12D, PM1 Ex 12E</p>

14	<p>P1-Ch4-Graphs&Transformations-Lesson 2</p> <p>(c) Reciprocal graphs in the form $y = \frac{a}{x}$ and $y = \frac{a}{x^2}$</p> <p>(d) Using intersection points of graphs to solve equations</p>	<p>PM1 Ex 4C Geogebra –explore reciprocals PM1 Ex 4D</p>	19	<p>Y12 HT2 Summative Assessment 2023-24 / Solutions</p> <p>2023-24 Topics: Data Vectors Constant Acceleration</p>	
15	<p>P1-Ch4-Graphs&Transformations-Lesson 3</p> <p>(a) Understand the effect of simple transformations on the graph of $y = f(x)$. Translations</p> <p>(b) Stretches and reflections Students should be able to sketch graphs such as $y = (x - 3)^2 + 2$ and $y = \frac{2}{x-3} + 2$</p> <p>1 of 3) S03 Graphs & Transformations Formative Assignment / Solutions</p>	<p>PM1 Ex 4E PM1 Ex 4F Geogebra –two resources to review</p> <p>PM1 Ex 4G Mixed Ex 4</p>	20	<p>P1-Ch12-Differentiation Lesson 3</p> <p>(a) Use the derivative to solve problems involving gradients, tangents and normals.</p> <p>(b) To be able to identify increasing and decreasing functions</p>	<p>PM1 Ex 12F Geogebra –p269 Ex 11</p> <p>PM1 Ex 12G Geogebra –p271</p>
16	<p>P1-Ch7-AlgebraicMethods-Lesson 1</p> <p>(a) Divide a polynomial by a linear expression using long division</p> <p>(b) To be able to use the factor theorem to factorise a cubic expression, leading to solutions of equations and sketching cubics</p> <p><i>Note. Since all problems will involve dividing a cubic by a linear expression, consider showing students how to divide by inspection.</i></p>	<p>PM1 Ex 7B</p> <p>PM1 Ex 7C</p>	21	<p>P1-Ch12-Differentiation Lesson 4</p> <p>(a) Introduce Second order derivatives</p> <p>Find stationary points of functions and determine their nature</p>	<p>PM1 Ex 12H</p> <p>PM1 Ex 12I Geogebra –exploring st points using gradient. Nrich Turning to calculus Nrich Calculus analogies</p>
17	<p>P1-Ch7-AlgebraicMethods-Lesson 2</p> <p>(a) Mathematical Proof (1) Understand and be able to use the structure of mathematical proof, proceeding from given assumptions through a series of logical steps to a conclusion.</p> <p>(b) Mathematical Proof (2) Understand and be able to use methods of proof, including proof by deduction, proof by exhaustion and disproof by counter-example.</p>	<p>PM1 Ex 7D Nrich Iff</p> <p>PM1 Ex 7E Mixed Ex 7</p>	22	<p>P1-Ch12-Differentiation Lesson 5</p> <p>(a) Model real life situations with differentiation with particular reference to problems involving max/mins.</p> <p>(b) The above bullet point is likely to require around 90 mins allowing 30 mins for mixed examination style questions including coordinate geometry problem solving.</p>	<p>PM1 Ex 12K</p> <p>Mixed Ex 12</p>

	S04 Algebra Methods Formative Assignment / Solutions			1 of 3) M05 Differentiation Formative Assignment / Solutions	
18	<p>P1-Ch9-TrigRatios-Lesson 1</p> <p>3 of 3) AOF S03 Graphs & Transformations LSC</p> <p>(b) Understand and use the cosine rule to find sides and angles in triangles. Encourage students to write out the formula clearly</p> <p>(c) Understand and use the sine rule to find sides and angles in triangles. Encourage students to write out the formula clearly.</p> <p>Understand and deal with problems involving the ambiguous case</p>	<p>PM1 Ex 9A Nrich Cosines rule</p> <p>PM1 Ex 9B</p> <p>PM1 Ex 9C</p> <p>Geogebra –step by step soln to p189 ex 10</p>	23	<p>P1-Ch6-Circles Lesson 1</p> <p>(a) Finding mid-points and using within circle problems Find the equation of a perpendicular bisector to a line segment</p> <p>(b) Know how to find the equation of a circle Link to translations and Pythagoras theorem. Use of completing the square for finding the centre and radius from the expanded form</p>	<p>PM1 Ex 6A</p> <p>PM1 Ex 6B</p> <p>PM1 Ex 6C</p> <p>Geogebra – explore graph p117 Nrich Finding circles</p>
19	<p>P1-Ch9-TrigRatios-Lesson 2</p> <p>(a) Solving problems involving triangles using</p> <ul style="list-style-type: none"> - The formula for the area of a triangle - Mixed problems involving topics such as bearings. <p>Note ; discuss the importance of accuracy throughout this lesson due to the multiple step problems. Answers must be correct to the stated accuracy level.</p> <p>(b) Sketch the graphs of sine, cosine and tangent functions</p> <ul style="list-style-type: none"> - Students should understand and be able to use the definitions of sine, cosine and tangent for all arguments. Students should be shown the x and y coordinates of points on the unit circle (revise special angles in this lesson) 	<p>PM1 Ex 9D PM1 Ex 9E</p> <p>PM1 Ex 10A Q3,4 PM1 Ex 10B</p>	24	<p>P1-Ch6-Circles Lesson 2</p> <p>(a) Intersections of straight lines and circles Discuss graphical interpretation and algebraic solutions</p> <p>(b) Use of tangent and chord properties to solve problems in coordinate geometry. For example, students should be able to find the equation of a tangent using the perpendicular property of a tangent and radius.</p>	<p>PM1 Ex 6D</p> <p>Geogebra –number of intersections p121</p> <p>PM1 Ex 6E</p> <p>Geogebra –circle theorems p123</p>

				<p>P1-Ch6-Circles Lesson 3</p> <p>(a) Further problems involving circles For example, students might be expected to use the fact that the angle in a semi-circle is 90 degrees. In addition, students would be expected to be able to find the equation of the circumcircle of a triangle with given vertices.</p> <p>1 of 3 M06 Circles Formative Assignment / Solutions</p>	<p>PM1 Ex 6F Mixed Ex 6</p> <p>Geogebra –explore circumcircle p130</p>
			25	<p>P1-Ch13-Integration Lesson 1</p> <p>3 of 3 A0F M05 Differentiation LSC</p> <p>(a) Integration as the reverse process of differentiation, eg find y given $\frac{dy}{dx}$ for x^n</p> <p>(b) Integrate a greater variety of polynomials. Division and expansion may be necessary.</p>	<p>PM1 Ex 13A Nrich Integration matcher</p> <p>PM1 Ex 13B Nrich Integral chasing</p>
20	<p>P1-Ch9-TrigRatios-Lesson 3</p> <p>(b) Students should be confident with the sine, cosine and tangent graphs, the symmetry, periodicity and equations of asymptotes.</p> <p>(c) Transforming trigonometric graphs</p> <p>1 of 3 S05 Trigonometric Ratios Formative Assignment / Solutions</p>	<p>PM1 Ex 9F</p> <p>PM1 Ex 9G Mixed Ex 9</p> <p>Geogebra –explore transformations p197 Nrich Tangled trig graphs</p>	26	<p>Y12 HT3 Summative Assessment 2023-24 / Solutions</p> <p>Graphs Differentiation Polynomials and Proof Circles</p>	
21	<p>P1-Ch10-TrigIdentities&Equations Lesson 1</p> <p>(a) Know and use the relationships $\tan \theta \equiv \frac{\sin \theta}{\cos \theta}$ and $\sin^2 \theta + \cos^2 \theta \equiv 1$. Use identities to simplify expressions, prove new identities and to find the value of a trigonometric ratio if given another.</p>	PM1 Ex 10C	27	<p>P1-Ch13-Integration Lesson 2</p> <p>(c) Find f(x), given the gradient function and a point on the curve</p> <p>(d) Evaluate definite integrals Students should be made aware at this point of the Fundamental Theorem of Calculus</p>	<p>PM1 Ex 13C Geogebra –explore impact of c p294</p> <p>PM1 Ex 13D</p>

	(b) Solve simple trigonometric equations of the form $\sin \theta = k$, $\cos \theta = k$ and $\tan \theta = k$, within a given interval. Use the identity $\tan \theta \equiv \sin \theta / \cos \theta$ if necessary.	PM1 Ex 10D			
22	P1-Ch10-TrigIdentities&Equations Lesson 2 (a) Solve more complicated trigonometric equations of the form $\sin n\theta = k$ and $\sin(\theta + \alpha) = k$ and equivalent forms involving cos and tan. (b) Solve trigonometric equations that produce quadratics	PM1 Ex 10E PM1 Ex 10F	28	P1-Ch13-Integration Lesson 3 3 of 3 AOF M06 Circles LSC (e) Area under a curve (f) Area under the x axis Discuss the implication of a negative answer to encourage students' reasoning skills. (g)	PM1 Ex 13E PM1 Ex 13F
23	P1-Ch10-TrigIdentities&Equations Lesson 3 (a) Further practice of examination standard questions 506 Trigonometric Identities Formative Assignment / Solutions	Mixed Ex 10 Q8-16, 19,20	29	P12-Ch13-Integration Lesson 4 (h) Areas between curves and lines (a) Further exam practice 1 of 3 M07 Integration Formative Assignment / Solutions	PM1 Ex 13G Mixed Ex 13
24	P1-Ch8-BinomialExpansion Lesson 1 3 of 3 AOF 505 Trigonometric Ratios LSC (d) Use Pascal's triangle to identify binomial coefficients and use them to expand simple binomial expressions. (e) Use combinations and factorial notation	PM1 Ex 8A Nrich Spinners PM1 Ex 8B	30	P1-Ch14-Exponentials&Logarithms Lesson 1 (a) Sketching exponential functions Students should know and be able to use the function a^x and its graph, where a is positive and not equal to 1. Discuss with students why a must be positive. Discuss the shape of the graph when $0 < a < 1$ and link this to the transformation of graphs. Introduce $y = e^x$ Students must a) Know and use e^x and its graph b) Be able to differentiate e^{kx} and understand why this result is important c) Sketch graphs of the form $y = e^{ax+b} + c$ using rules of indices to simplify first (b) Exponential growth and decline models Students must understand, through proportionality, why the exponential model is suitable in many applications	PM1 Ex 14A Nrich How fast does it grow? PM1 Ex 14B Geogebra –exponential graphs and gradient function PM1 Ex 14C Geogebra –

			31	<p>P1-Ch14-Exponentials&Logarithms Lesson 2</p> <p>(a) Recognise the relationship between exponents and logarithms as inverse functions. Understand the definition of $\log_a x$ and why $a > 0$ and $x > 0$</p> <p>(b) Understand and use the laws of logarithms Solve log equations using laws of logarithms</p>	<p>PM1 Ex 14D</p> <p>PM1 Ex 14E</p>
			32	<p>P1-Ch14-Exponentials&Logarithms Lesson 3</p> <p>(a) Solve exponential equations using logarithms Includes quadratics as a function of a^x</p> <p>(b) Describe and use the natural logarithm function Students should understand why the functions are inverse and should have a knowledge of the $y = \ln x$ graph. Use the inverse functions to solve equations</p>	<p>PM1 Ex 14F Nrich Log lattice</p> <p>PM1 Ex 14G</p>
25	<p>P1-Ch8-BinomialExpansion Lesson 2</p> <p>(a) Use the binomial expansion to expand brackets. Discuss the formula for the expansion of $(a + b)^n$</p> <p>(b) Practise finding individual coefficients in a binomial expansion</p>	<p>PM1 Ex 8C</p> <p>PM1 Ex 8D</p>	33	<p>Y12 HT4 Summative Assessment 2023-24 / Solutions</p> <p>2023-24 Topics:</p> <p>Trigonometric Ratios</p> <p>Integration</p> <p>Trigonometric Equations and Identities</p>	
26	<p>P1-Ch8-BinomialExpansion Lesson 3</p> <p>(b) Make approximations using the binomial expansion.</p> <p>(c) Practise examination style questions</p> <p>M07 Binomial Expansion Formative Assignment / Solutions</p>	<p>PM1 Ex 8E Geogebra – approximations p168</p> <p>Mixed Ex 8</p>	34	<p>P1-Ch14-Exponentials&Logarithms Lesson 4</p> <p>(c) Use logarithmic graphs to estimate parameters in relationships in the form $y = ax^n$ and $y = kb^x$ given data for x and y.</p> <p>M08 Exponentials and Logarithms Formative Assignment / Solutions</p>	<p>PM1 Ex 14H</p> <p>Mixed Ex 14</p>
27	<p>S1-Ch6-StatisticalDistributions Lesson 1</p> <p>(b) Probability Distributions. Students to understand the notation used for probability “mass” functions. To be able to write in table, function and graph</p>	<p>SM1 Ex 6A</p>	35	<p>M1-Ch11-VariableAcceleration Lesson 1</p> <p>3 of 3 AOF M07 Integration LSC</p> <p>(i) Displacement and velocity as functions of time. Students to start by working on problems where the functions are given (so calculus not needed initially). Make the graphical link of velocity time</p>	<p>SM1 Ex11A Geogebra –p183 MEI Motion graphs</p>

	<p>form. Knowledge of a discrete uniform distribution also required.</p> <p>(c) Introduce Binomial distribution. Students to understand the requirements for a binomial distribution such as a fixed number of trials etc, to understand the notation used including the meaning of the index and parameter. Use of the formula for $P(X=r)$ for binomial distribution. Use Geogebra to show the distribution graphically.</p>	<p>SM1 Ex 6B</p> <p>MEI Binomial experiment</p>		<p>graphs involving variable acceleration to previous work on constant acceleration.</p> <p>(j) Problems involving differential calculus. Link problems to graphs, gradients and rates of change.</p>	<p>SM1 Ex 11B</p>
28	<p>S1-Ch6-StatisticalDistributions Lesson 2</p> <p>(c) Cumulative probabilities for the binomial distribution. Use of the tables and the calculator? Students to practise and gain understanding of how to deal with terms such as, “up to”, “less than”, “at least”, etc.</p> <p>508 Binomial Distribution DRVs Formative Assignment / Solutions</p>	<p>SM1 Ex 6C</p> <p>Geogebra –graphical distribution p93</p>	36	<p>M1-Ch11-VariableAcceleration Lesson 2</p> <p>Problems involving maximums and minimums. Link to gradients and graphs.</p>	<p>SM1 Ex 11C</p>
	REVISION		37	<p>M1-Ch11-VariableAcceleration Lesson 3</p> <p>(k) Problems involving integral calculus. Link problems to graphs, areas and displacement.</p> <p>Deriving constant acceleration formulae and linked formulae using calculus.</p>	<p>SM1 Ex 11D</p> <p>SM1 Ex 11E</p>
	REVISION		38	<p>M1-Ch10-Forces&Motion Lesson 1</p> <p>(l) Newton’s first law, the nature of forces including weight, tension, thrust, normal reaction. Practising forces diagrams.</p> <p>(m) Working with forces. Finding resultant forces acting horizontally and vertically using force diagrams. Working with basic static problems.</p> <p>(n) Finding resultant forces in two dimensions working with <u>i</u> and <u>j</u> notation.</p>	<p>SM1 Ex 10A Q1-7</p> <p>Rayner Red M1 Ex 3A/3B</p> <p>Oxford Ex 8.1A Q1-5</p> <p>PHET Forces and motion basics</p> <p>SM1 Ex 10B</p>

			39	M1-Ch10-Forces&Motion Lesson 2	
			40	M1-Ch10-Forces&Motion Lesson 3	
			41	S1-Ch7-HypothesisTesting Lesson 1 (d) Students to begin to gain an understanding of the concept of a hypothesis test. They must understand the terms population parameter, test statistic, null and alternative hypotheses, one or two-tailed tests and significance levels. (e) Students to gain a greater understanding of critical regions. Show the binomial distribution graphically, using Geogebra, and discuss the critical values. Discuss the actual significance levels, and what the level means, ie the probability of incorrectly rejecting the null hypothesis.	SM1 Ex 7A https://www.geogebra.org/m/AwbT6ufm SM1 Ex 7B (Ignore questions 5-7) Hodder Ex 18.2 p401 Geogebra –critical values, p103 MEI Matching critical regions
			42	S1-Ch7-HypothesisTesting Lesson 2 (o) Structuring and completing a one-tailed hypothesis test for a binomial distribution. Both methods should be discussed, ie testing the observed value, or investigating the critical region. Ensure students are clear on how to draw a conclusion and how to communicate that. (p) Structuring and completing a two-tailed hypothesis test for a binomial distribution. Discuss briefly how to find an expected outcome in a binomial distribution, in order to make it easier to establish which tail to investigate when looking at critical regions. 509 Discrete Hypothesis Testing Formative Assignment / Solutions	SM1 Ex 7C (Ignore question 7) SM1 Ex 7D
				REVISION	
				Year 12 AS Mock Exam Pure Paper 1	
				Year 12 AS Mock Exam Pure Paper 2	
	START YEAR 13 COURSE HERE			START YEAR 13 COURSE HERE	