Year 13 Maths - Pure and Statistics Teacher

Topic		Ref	Ex
Binomial expansion	**Expanding $(1 + x)^n$** • Expand $(1 + x)^n$ for any rational constant n • Determine the range of values for which it is valid	P4.1	P4A
	Expanding $(a + bx)^n$ • Expand $(a + bx)^n$ for any rational constant n • Determine the range of values for which it is valid	P4.1	P4B
	Using Partial Fractions • Use and apply models that involve quadratic functions	P4.1	P4C
Trigonometric Functions	**Secant, cosecant and cotangent** • Understand the definition of secant, cosecant and cotangent and their relationship to cosine, sine and tangent. • Understand the graphs of sec, cosec and cot and their domain and ranges.	P5.4	P6A P6B
	Using sec, cosec and cot • Simplify expressions involving sec, cosec and cot. • Prove identities involving sec, cosec and cot. • Solve equations involving sec, cosec and cot.	P5.4 P5.8	P6C
	Trigonometric Identities • Prove and use $\sec^2 x \equiv 1 + \tan^2 x$ and $\csc^2 x \equiv 1 + \cot^2 x$.	P5.5	P6D
	Inverse Trigonometric Functions • Understand and use inverse trig functions arcsin, arccos and arctan and their domain and ranges. • Be able to sketch their graphs.	P5.4	P6E
Parametric Equations	**Parametric Equations** • Convert parametric equations into Cartesian form by substitution. • Convert parametric equations into Cartesian form using trigonometric identities.	P3.3	P8A P8B
	Curve Sketching • Be able to sketch curves defined parametrically.	P3.3	P8C
	Coordinate Geometry • Solve coordinate geometry problems involving parametric equations.	P3.3	P8D
	Modelling • Use parametric equations to model real life situations.	P3.4	P8E
Assessment 1			

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Topic		Ref	Ex
Further Trigonometry	**Addition Formulae** • Prove and use the addition formulae for sin(A + B), cos(A + B) and tan(A + B). • Use the addition formulae to find exact values of trigonometric functions of different angles.	P5.6	P7A P7B
	Double angle Formulae • Understand and use the double angle formula sin2A, cos2A and tan2A.	P5.6	P7C
	Solving Trigonometric Equations • Use the addition and double angle formulae to help solve trigonometric equations	P5.6	P7D
	(R, α) method • Write expressions of the form acosα ± bsinα in the forms Rcos (Θ ± α) or Rsin (Θ ± α). • Use this form to solve equations and find maximum and minimum values of such functions.	P5.6	P7E
	Proving Trigonometric Identities • Use known trigonometric identities to prove other trigonometric identities.	P5.8	P7F
	Modelling with Trigonometric Functions • Use trigonometric functions to model real-life situations,	P5.9	P7G
Sequences and Series	**Arithmetic Sequences** • Find the nth term of an arithmetic sequence. • Understand the difference between a sequence and a series. • Prove and use the formula for the sum of the first n terms of an arithmetic series.	P4.4	P3A P3B
	Geometric Sequences • Find the nth term of a geometric sequence. • Prove and use the formula for the sum of a finite geometric series. • Prove and use the formula for the sum to infinity of a convergent geometric series.	P4.5	P3C P3D P3E
	Sigma notation • Use and understand sigma $\sum$ notation to describe series	P4.3	P3F
	Recurrence Relations • Generate sequences from recurrence relations of the form $u_{n+1} = F(u_n)$. • Be able to recognise increasing, decreasing and periodic sequences written as a recurrence relation.	P4.2	P3G P3H
	Modelling with Series • Model real-life situations with sequences and series.	P4.6	P3I
Assessment 2			

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Topic		Ref	Ex
Functions	**The modulus function | |** • Understand and use the modulus function y = |f(x)|. • Sketch graphs of modulus functions of the form y=|f(x)| or y=f(|x|). • Use graphs to solve equations and inequalities involving the modulus function.	P2.7	P2A P2E
	Function definition • Understand mappings and functions • Use domain and range to define a function.	P2.8	P2B
	Composite Functions • Combine two or more functions to make a composite function. • Find the domain and range for composite functions.	P2.8	P2C
	Inverse Functions • Know how to find the inverse of a function both algebraically and graphically. • State the domain and range for an inverse function.	P2.8	P2D
	Combining Transformations • Apply a combination of two (or more) transformations to the same curve. • Transform the modulus function | |.	P2.9	P2F P2G
Numerical Methods	**Locating Roots** • Locate roots of f(x) = 0 by considering change of sign. • Understand how change of sign methods can fail.	P9.1	P10A
	Iteration • Use iteration to find an approximation to the root of the equation f(x) = 0. • Rearrange an equation into an iterative formula. • Understand convergence in geometrical terms by drawing cobweb and staircase diagrams.	P9.2	P10B
	Newton-Raphson • Use the Newton-Raphson method to find an approximation to the root of the equation f(x) = 0. • Understand geometrically what the method is doing and how this method can fail.	P9.3	P10C
	Applications to modelling • Use numerical methods to solve problems in context..	P9.5	P10D
Regression and Correlation	**Exponential Models** • Understand exponential models in bivariate data. • Use a change of variable to estimate coefficients in an exponential model $y = ax^n$ or $y = kb^x$.	A2.2	A1A
	Product Moment Correlation Coefficient • Understand and calculate the PMCC.	A2.2 A5.1	A1B
	Hypothesis Test • Carry out a hypothesis test for zero correlation.	A5.1	A1C
Assessment 3			

Year 13 Maths - Pure and Statistics Teacher

Topic		Ref	Ex
Conditional Probability	**Set Notation** • Understand set notation in probability.	A3.1	A2A
	Conditional Probability • Understand what is meant by conditional probability. • Solve conditional probability problems using two way tables and Venn diagrams.	A3.2	A2B A2C
	Probability formulae • Understand and use the conditional probability formulae to solve problems.	A3.2	A2D
	Tree diagrams • Solve conditional probability using tree diagrams.	A3.2	A2E
Normal Distribution	**Definition** • Understand the normal distribution and the characteristics of a normal distribution curve.	A4.2	A3A
	Finding probabilities for given normal distributions • Find probabilities for a normal distribution using the normal cumulative distribution function on a calculator.	A4.2	A3B
	The Inverse Normal Distribution Function • Calculate a value for a given probability for a normal distribution using the inverse normal distribution function on a calculator. i.e. find b such that $P(X<b)=p$.	A4.2	A3C
	The Standard Normal Distribution • Know that the standard normal distribution has mean 0 and standard deviation 1. • Standardise normally distributed random variables by coding the data to model the standard normal distribution.	A4.2	A3D
	Finding the mean or standard deviation • Find unknown means and/or standard deviations for a normal distribution	A4.2	A3E
	Approximating a binomial distribution • Approximate a binomial distribution using a normal distribution	A4.2	A3F
	Hypothesis Testing • Carry out a hypothesis test for the mean of a normal distribution.	A4.2 A4.3	A3G
Assessment 4			