

Year 13 Maths - Pure and Statistics Teacher

| Topic | | Ref | Ex |
|--------------------------------|---|--------------|------------|
| Algebraic manipulation | Using Partial Fractions <ul style="list-style-type: none"> Review of simplifying algebraic fractions Use and apply models that involve quadratic functions, expressing as partial fractions | P4.1 | 1B,C,D,E,F |
| | Secant, cosecant and cotangent <ul style="list-style-type: none"> 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 |
| Trigonometric Functions | Using sec, cosec and cot <ul style="list-style-type: none"> 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 <ul style="list-style-type: none"> Prove and use $\sec^2 x \equiv 1 + \tan^2 x$ and $\operatorname{cosec}^2 x \equiv 1 + \cot^2 x$. | P5.5 | P6D |
| | Inverse Trigonometric Functions <ul style="list-style-type: none"> Understand and use inverse trig functions arcsin, arccos and arctan and their domain and ranges. Be able to sketch their graphs. | P5.4 | P6E |
| | Expanding $(1 + x)^n$ <ul style="list-style-type: none"> Expand $(1 + x)^n$ for any rational constant n Determine the range of values for which it is valid | P4.1 | P4A |
| Binomial expansion | Expanding $(a + bx)^n$ <ul style="list-style-type: none"> Expand $(a + bx)^n$ for any rational constant n Determine the range of values for which it is valid | P4.1 | P4B, 4C |
| | Parametric Equations <ul style="list-style-type: none"> Convert parametric equations into Cartesian form by substitution. Convert parametric equations into Cartesian form using trigonometric identities. | P3.3 | P8A P8B |
| Parametric Equations | Curve Sketching <ul style="list-style-type: none"> Be able to sketch curves defined parametrically. | P3.3 | P8C |
| | Coordinate Geometry <ul style="list-style-type: none"> Solve coordinate geometry problems involving parametric equations. | P3.3 | P8D |
| | Modelling <ul style="list-style-type: none"> Use parametric equations to model real life situations. | P3.4 | P8E |
| | Assessment 1 | | |

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| Further Trigonometry | Addition Formulae <ul style="list-style-type: none"> 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 <ul style="list-style-type: none"> Understand and use the double angle formula $\sin 2A$, $\cos 2A$ and $\tan 2A$. | P5.6 | P7C |
| | Solving Trigonometric Equations <ul style="list-style-type: none"> Use the addition and double angle formulae to help solve trigonometric equations | P5.6 | P7D |
| | (R, α) method <ul style="list-style-type: none"> Write expressions of the form $a\cos\alpha \pm b\sin\alpha$ in the forms $R\cos(\Theta \pm \alpha)$ or $R\sin(\Theta \pm \alpha)$. Use this form to solve equations and find maximum and minimum values of such functions. | P5.6 | P7E |
| | Proving Trigonometric Identities <ul style="list-style-type: none"> Use known trigonometric identities to prove other trigonometric identities. | P5.8 | P7F |
| | Modelling with Trigonometric Functions <ul style="list-style-type: none"> Use trigonometric functions to model real-life situations, | P5.9 | P7G |
| Sequences and Series | Arithmetic Sequences <ul style="list-style-type: none"> 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 <ul style="list-style-type: none"> 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 <ul style="list-style-type: none"> Use and understand sigma \sum notation to describe series | P4.3 | P3F |
| | Recurrence Relations <ul style="list-style-type: none"> 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 <ul style="list-style-type: none"> Model real-life situations with sequences and series. | P4.6 | P3I |
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| Assessment 2 | | | |

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| Topic | | Ref | Ex |
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| Functions | The modulus function $$ <ul style="list-style-type: none"> Understand and use the modulus function $y = f(x)$. Sketch graphs of modulus functions of the form $y = f(x)$ or $y = f(x)$. Use graphs to solve equations and inequalities involving the modulus function. | P2.7 | P2A P2E |
| | Function definition <ul style="list-style-type: none"> Understand mappings and functions Use domain and range to define a function. | P2.8 | P2B |
| | Composite Functions <ul style="list-style-type: none"> Combine two or more functions to make a composite function. Find the domain and range for composite functions. | P2.8 | P2C |
| | Inverse Functions <ul style="list-style-type: none"> Know how to find the inverse of a function both algebraically and graphically. State the domain and range for an inverse function. | P2.8 | P2D |
| | Combining Transformations <ul style="list-style-type: none"> Apply a combination of two (or more) transformations to the same curve. Transform the modulus function $$. | P2.9 | P2F P2G |
| Pure Mock Exam | | | |
| Numerical Methods | Locating Roots <ul style="list-style-type: none"> Locate roots of $f(x) = 0$ by considering change of sign. Understand how change of sign methods can fail. | P9.1 | P10A |
| | Iteration <ul style="list-style-type: none"> 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 <ul style="list-style-type: none"> 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 <ul style="list-style-type: none"> Use numerical methods to solve problems in context.. | P9.5 | P10D |
| Regression and Correlation | Exponential Models <ul style="list-style-type: none"> 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 <ul style="list-style-type: none"> Understand and calculate the PMCC. | A2.2 A5.1 | A1B |
| | Hypothesis Test <ul style="list-style-type: none"> Carry out a hypothesis test for zero correlation. | A5.1 | A1C |

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| Assessment 3 | | | |
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| Topic | | Ref | Ex |
| Conditional Probability | Set Notation <ul style="list-style-type: none"> • Understand set notation in probability. | A3.1 | A2A |
| | Conditional Probability <ul style="list-style-type: none"> • Understand what is meant by conditional probability. • Solve conditional probability problems using two way tables and Venn diagrams. | A3.2 | A2B A2C |
| | Probability formulae <ul style="list-style-type: none"> • Understand and use the conditional probability formulae to solve problems. | A3.2 | A2D |
| | Tree diagrams <ul style="list-style-type: none"> • Solve conditional probability using tree diagrams. | A3.2 | A2E |
| Normal Distribution | Definition <ul style="list-style-type: none"> • Understand the normal distribution and the characteristics of a normal distribution curve. | A4.2 | A3A |
| | Finding probabilities for given normal distributions <ul style="list-style-type: none"> • Find probabilities for a normal distribution using the normal cumulative distribution function on a calculator. | A4.2 | A3B |
| | The Inverse Normal Distribution Function <ul style="list-style-type: none"> • 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 <ul style="list-style-type: none"> • 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 <ul style="list-style-type: none"> • Find unknown means and/or standard deviations for a normal distribution | A4.2 | A3E |
| | Approximating a binomial distribution <ul style="list-style-type: none"> • Approximate a binomial distribution using a normal distribution | A4.2 | A3F |
| | Hypothesis Testing <ul style="list-style-type: none"> • Carry out a hypothesis test for the mean of a normal distribution. | A4.2 A4.3 | A3G |
| Applied Mock Exam | | | |