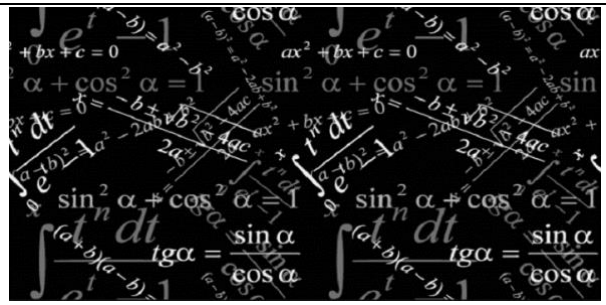
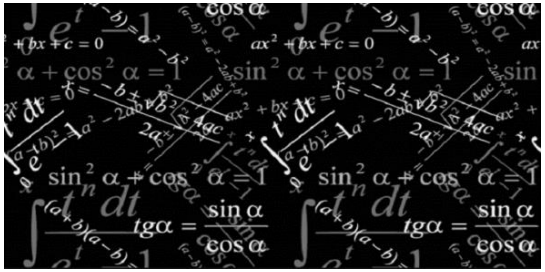
St Richard Reynolds Catholic High School

SUBJECT: Pure Mathematics YEAR GROUP: 12 **TOPICS COVERED:** **Algebra, Trigonometry, Calculus and Vectors**	
PROGRAMME OF STUDY	**METHOD OF ASSESSMENT**
Autumn Term: **<u>Algebra</u>** • Index laws • Surds (simplifying and rationalising) • Solving quadratic equations (factorising, completing the square & formula) • Quadratic graphs (use of the discriminant). • Linear and quadratic simultaneous equations • Linear and quadratic inequalities • Graphing inequalities/regions **<u>Graphs and transformations</u>** • Cubic graphs • Quartic graphs • Reciprocal graphs • Translating graphs • Transforming functions • $y = mx + c$ – including parallel/perpendicular	• End of Chapter Assessments • Homework set on Google classroom • End of Term Test

Circles • Midpoints and perpendicular bisectors • Equation of a circle • Intersections of straight lines • Use tangent and chord properties • Circles and triangles **Algebra** • Algebraic fractions • Dividing polynomials • Factor Theorem • Mathematical proof **Binomial Expansion** • Pascal's triangle • Factorial notation • Binomial expansion and estimation **Trigonometric Ratios** • The Cosine rule • The Sine rule • Graphs of sine, cosine and tangent • Transforming trigonometric graphs **Trigonometric Identities and Equations** • Angles in all four quadrants • Exact values of trigonometrical ratios • Trigonometric identities • Trigonometric equations.	
Spring Term: **Vectors** • Vectors • Representing vectors • Magnitude and direction • Position vectors • Solving geometric problems	

Differentiation • Gradients of curves • Finding the derivative • Differentiating x^n • Differentiating quadratics • Differentiating functions with two or more terms • Gradients, tangents and normal • Increasing and decreasing functions • Second order derivatives • Stationary points • Sketch gradient functions **Integration** • Integrating x^n • Indefinite integrals • Finding functions • Definite integrals • Areas under curves • Areas under the x-axis • Areas between curves and lines.	• End of Chapter Assessments • Homework set on Google classroom • End of Term Test
Summer Term: **Exponentials and Logarithms** • Exponential functions • $y = e^x$ • Exponential modelling • Logarithms • Laws of logarithms • Solving equations using logarithms • Working with natural logarithms • Logarithms and non-linear data.	• End of Chapter Assessments • Homework set on Google classroom • End of Term Test
Key Skills: **Mathematical argument, language and proof, mathematical problem solving and mathematical modelling.**	

St Richard Reynolds Catholic High School

SUBJECT: Applied Mathematics YEAR GROUP: 12 **TOPICS COVERED:** **Statistics & Mechanics**	
PROGRAMME OF STUDY	**METHOD OF ASSESSMENT**
Autumn Term: **<u>Data Collection</u>** • Population and samples • Sampling • Non-random sampling • Types of data • Large data set **<u>Modelling in Mechanics</u>** • Constructing a model • Modelling assumptions • Quantities and units • Working with vectors.	• End of Chapter Assessments • Homework set on Google classroom • End of Term Test
Spring Term: **<u>Measures of Location and Spread</u>** • Measures of central tendency • Other measures of location • Measures of spread • Variance and standard deviation • Coding	

Representations of Data • Outliers • Box plots • Cumulative frequency • Histograms • Comparing data **Correlation** • Correlation • Linear regression **Probability** • Calculating probabilities • Venn diagrams • Mutually exclusive and independent events • Tree diagrams **Constant Acceleration** • Displacement- time graphs • Velocity-time graphs • Constant acceleration formulae 1 & 2 • Vertical motion under gravity **Forces and Motion** • Force diagrams • Forces as vectors • Forces and acceleration • Motion in 2D • Connected particles • Pulleys.	• End of Chapter Assessments • Homework set on Google classroom • End of Term Test
Summer Term: **Statistical Distributions** • Probability distributions • The binomial distribution • Cumulative probabilities • Laws of logarithms • Solving equations using logarithms • Working with natural logarithms • Logarithms and non-linear data	• End of Chapter Assessments

Hypothesis Testing • Hypothesis testing • Finding critical values • One-tailed tests • Two-tailed tests **Variable Acceleration** • Functions of time • Using differentiation • Maxima and minima problems	• Homework set on Google classroom • End of Term Test
Key Skills: **Mathematical argument, language and proof, mathematical problem solving and mathematical modelling.**	