The English Martyrs Catholic School and Sixth Form College

Year 13 Further Maths	Module 1	Module 2	Module 3
Topic Theme and Intent	Students cover all of the Core topics in Module 1 and then focus on Decision and Further Statistics after the Year 13 Prep exams.	Year 13 Prep exams take place in early January. Module 2 focuses on completing Decision and Further Statistics.	Students cover all of the content in Module 1 and 2. Module 3 focuses on practicing exam techniques and going through past papers.
Knowledge	• Integrate standard functions, function in the form f(ax+b), integrate by substitution, by parts and using the reverse chain rule. • Solve basic differential equations. • Know how to simplify an expression and write it in its real and imaginary form. • Use the roots of polynomial method to find missing roots of an equation (cubic-quartic). Show these roots on the Argand Diagram. • Use the exponential definition of the hyperbolic functions (sinh, cosh, tanh).	• Solve hyperbolic equations • Solve first order differential equations • How to draw a planar graph • Use Floyd's algorithm to find the shortest path between every pair of vertices. • Explain the differences between the classical and practical travelling salesman problems • Use a minimum spanning tree method to find a lower/upper bound • Understand and use slack and surplus variables	• Students will revise all content covered in Modules 1 and 2 as well as the stand alone topics from Year 12 which often occur on exam papers (Vectors, Proof by Induction, Matrices).
Skills	• Apply and adapt the standard integration rules to the question • Spot when to apply the reverse chain rule • Determine what to use as your variable when integrating by substitution. Use trial and error for this process to find the most efficient substitution	• Check roots of polynomial using calculator. • Use and understand probability generating functions for standard distributions, to find the mean and variance of a function and to find the sum of independent variables.	• Know when to use integration by parts and which variable to label as u/v. Set this out clearly. • Apply the central limit theorem to other distributions.
Literacy Links	**Reading Skills** Understand when to use integration by parts, substitution or reverse chain rule by scanning the question. **Writing Skills** Making sure to add the constant of integration.	**Reading Skills** Know when to solve by separating the variable or using the integrating factor depending on how the question is given (Differential Equations) **Writing Skills** General Solution =Complimentary Function + Particular Integral, set this out clearly.	**Reading Skills** Do as many past papers as possible in this term so that students are used to the style of question and which topics repeat year on year. **Writing Skills** Study markschemes so that students know which key words need to be included in their answers.
Essential Vocabulary	Complimentary Function, Particular Integral, Auxiliary Equation, Perpendicular, Plane, Integrating Factor, General Solution, Boundary, Conditions, Arbitrary constant, Integrate, Infinity,	Planar, algorithm, node, distribution, vertex, spanning tree, slack, surplus, probability generating function, bound, maximise/minimise, size, power, error, linear programming, goodness of fit,	variance, mean, null and alternative hypothesis, one/two wailed test, cricital, actual significance level, Roots, plane, vector, perpendicular distance, acute

Disciplinary Reading **Reading for Pleasure**