

Y12 – Y13 A-Level Further Maths Summer Project

- **Task:** You need to design posters for Further Pure Core Maths, Mechanics and Statistics
- These posters should display key concepts on the Y12 topics and include examples on how to apply these to exam questions.
- The poster should be designed in a manner that another student would find it useful for revision.
- This task will help you revise for examinations on Y12 content that will take place in September
- The topics and skills listed below are ones which should definitely appear on your posters.

Further Pure Core Maths Essential Topics and Skills

Inverting a matrix	Solving sim eqn using a matrix
Interpret a sim eqn solution geometrically	Find the coefficients of a new cubic using root relationships involving α, β, γ
Sketch loci in the Argand diagram	Shade regions satisfying the intersection two loci
Identify the intersection between a half line (from argument) and a circle	Find the acute angle between a plane and a line
Find the shortest distance between a point and a line	Describe the transformation given by a matrix
Form a matrix that performs a given transformation	Find invariant points for a given transformation
Prove series summation formulae using the standard results	Solve equations using summation formulae
Problems involving cubics with complex roots	Use the positioning and geometry of the roots in the Argand diagram
Proof by induction of statements involving matrices	Proof by induction of divisibility results
Interpret and evaluate a mathematical model	Apply volumes of revolution to a mathematical model

Further Stats Essential Topics and Skills

Conduct a Hypothesis Test for the mean of a Poisson distribution	Use Poisson to approximate Binomial distributions
Apply Poisson PD and CD	Discrete random variable distributions
Expectation and variance of a discrete random variable	Chi-squared testing using contingency tables

Further Mechanics Essential Topics and Skills

Calculations involving freefall and impulse following a bounce	Kinetic energy loss following a bounce
Application of work energy principle on a mass moving up a slope	Resolve forces and calculate speeds on a slope
Evaluate a model	Calculations involving power of a vehicle moving up a slope
Calculate and use the coefficient of restitution	Problems involving successive impacts