

## Y12 – Y13 A-Level Maths Summer Project

- **Task:** You need to design a series of posters for Pure Maths, Mechanics and Statistics (For example this could be one A3 poster on Pure, and one each on Mechanics and Stats)
- 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 to use 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.

### Pure Maths Essential Topics and Skills

Integrating functions	Application of the discriminant
Proof that a function is always greater than or less than 0	Proof/Disproof of mathematical relationships
Use of vectors in component form	Parallel and perpendicular lines
Equations involving logs	Modelling of real life situation using quadratic functions
The maxima or minima of a function	Sine and Cosine rules
Differentiation to a function modelling a real life situation	Factor theorem
The sketch of a cubic	Differentiation from first principles
Binomial expansion	Trig equations
Apply trig identities	Exponential modelling
Use of logs to plot an exponential model as a linear graph	Solve problems involving circles and coordinate geometry
Application of where a function intersects another function or an axis	Definite integrals to solve area problems

### Stats Essential Topics and Skills

Describe and interpret the correlation between variables	Interpret gradient and intercept of a regression line
Conditional probability and independence	Binomial distribution models
Hypothesis testing	Interpret box plots
Mean and standard deviation	Knowledge of the large data set
Discrete random variables	Coding

### Mechanics Essential Topics and Skills

SUVAT	Freefall under gravity
Velocity time graphs	Variable acceleration formulae
Pulley problems	Limitations of a model