



Year Group: **Year 13**

This is the plan for the taught curriculum during achievement period: **Two (Jan-May)**

### **Brief summary of the topic/work being covered during this period**

#### **Half terms 3 and 4:**

##### **Substantive knowledge**

- Integrating standard functions, using trigonometric identities, Reverse chain rule, integration by substitution and by parts
- Partial fractions
- The trapezium rule
- Solving differential equations
- Locating roots, Iteration, The Newton-Raphson Method and applications to modelling
- Linear regression and the PMCC
- The normal distribution and hypothesis testing
- Moments and resulting moments, Equilibrium, Centres of mass, tilting and Moments in 2D
- Forces and moments, forces and friction
- Displacement, Velocity, Acceleration
- Horizontal and Vertical motion under gravity
- Vectors in kinematics, Projectiles, horizontal projections, horizontal and vertical components

##### **Disciplinary knowledge**

The Spring term of Year 13 sees the final topics of Pure Mathematics, and the completion of the applied content, again split between two members of staff:

1. Further Integration (inspection, substitution, by parts, differential equations)
2. Numerical Methods
3. Regression and Correlation
4. Hypothesis Testing with a Normal Distribution
5. Moments
6. Resolving Forces
7. Kinematics

#### **Half term 5:**

Having finished all content, the remainder of this period will be spent on regular assessment and review to find individual areas for development and areas to work on as a class to improve understanding.

### **Prior knowledge needed for this unit/topic from previous teaching**

1. Students will need a good foundation in year 1 calculus and high level algebraic manipulation in order to develop this knowledge into the more complex functions being integrated in year 2.
2. Students will need a good ability to manipulate algebra and understanding of functions.
3. Students will need prior knowledge of scatter diagrams and correlation. Regression is touched on in year 1 and then developed here.
4. Students need a good grasp of hypothesis testing from year 1 (Binomial) in order to fully understand the additional challenges of the Normal Distribution.
- 5-7. All topics at year 2 Mechanics are a development of the topics taught in year 1, so it is expected students will have a good and full understanding of the year 1 content before starting these topics.

### **Rationale for students studying this unit/topic**

The scheme of work is sequenced with all the Pure Maths content covered first during the first half of the year. This is to allow all students more revision and exam practice time on the complex algebraic manipulation and calculus questions, but also to allow students to meet key techniques in maths first, before building on these in Further Maths, for those studying both. It also allows students extended periods of revision for their year 1 applied content before building on this later on in the year at the end of the taught course.

### **Key concepts/ideas that are taught to students in this unit/topic, including any anticipated gaps in knowledge and plan to overcome these**

None of the topics taught during this period are new to students – they are all building on and developing concepts taught last academic year, and all equally important to each other for success. As such, teachers will take some time at the beginning of each topic to assess memory of previous content and cover any gaps in knowledge, specific to their class. The AS Level assessment students will sit towards the middle of this term will also aid teachers in identifying any gaps before starting a topic, to ensure maximum progress is made on the second year content.

### **New key terminology students will be taught during this topic/unit**

#### **Tier 3**

Newton-Raphson, Integration by parts, Differential Equations, “normal” distribution

### **Plan for Assessment**

- Students will be assessed regular throughout the achievement period through weekly homework tasks and formative class assessment.
- Two full A Level papers are scheduled between January and the Easter break for each teacher (two pure and one for each of the applied sections), allowing early identification of areas of weakness and planning for intervention.
- Following the Easter break, students will commence fortnightly testing with each teacher throughout their period of intense revision. This allows students and staff to identify areas of strength and areas for development; allowing students to focus their individual revision, and teachers to plan effectively the revision for their groups.