



Year Group: **Year 12**

This is the plan for the taught curriculum during achievement period: **One (Sept-Dec)**

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

The Autumn term of Key Stage 5 consists of only Pure content, and covers the majority of the Year 1 Pure maths content of the A Level specification, taught between two members of staff:

#### **Substantive knowledge**

- Surds and Indices
- Expanding and Factorising
- Quadratics
- Simultaneous Equations
- Inequalities
- Graph transformations
- Straight line Graphs
- Equation of a Circle
- Derivative of a simple function, use to solve problems involving gradients, tangents and normal
- Increasing and decreasing functions
- Second derivatives
- Stationary points
- Derive a derivative from first principles
- Exponential functions
- Logarithms
- Representing vectors, Magnitude and direction

#### **Disciplinary knowledge**

1. Algebraic Manipulation
2. Coordinate geometry (lines and circles)
3. Graphs and Transformations
4. Differentiation (including from first principles)
5. Exponential functions and graphs
6. Vectors

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

1. Strong basic algebraic manipulation skills are vital. Previous encounters with solving equations, simultaneous equations, and quadratic equations are all essential.
2. Students will have met straight-line geometry at Key Stage 4, so will need a good understanding of this to build on the A Level. They should be familiar with equations of a circle with centre at the origin, and some students who have studied GCSE Further Maths will have begun to look at circle equations with centres elsewhere.
3. Students will be familiar with translations of graphs from Key Stage 4. They will build on this with more transformation types – they should have an understanding of what these transformations are from their work on shapes, but will not have done all of them with graphs of functions.
4. Only students who studied GCSE further maths will have met any calculus previously. ALL students will need a good understanding of calculating the gradient of straight-line graphs, and strong algebraic manipulation and substitution skills.
5. Students will be expected to know what an exponential is, and what an exponential graph looks like, but not in any detail.
6. Students will have met basic vectors at GCSE and should be comfortable representing movement in column vector form, and well as linear equation form for basic geometric problems.

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

We have recently re-ordered the scheme of work to its current sequence; in order that students are meeting the basic maths content of calculus and trigonometry, before going on to develop them in Further Mathematics, for those that are studying this subject too. We also felt that it helped the weaker students to keep Pure and applied content separate and really consolidate the pure maths before moving to applied. Regular assessment throughout the year, as well as starter activities, ensures regular recap and review of earlier topics despite moving on.

There are a couple of elements of year 2 content taught during this term too, that fits in well with the year 1 content and has been found to be accessible enough to teach in year 1: Stationary points of inflection (along with other stationary point in the differentiation topic) and multiple graph transformations.

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

Students will be taught to use alternative techniques this year (such as  $y - y_1 = m(x - x_1)$  for straight-line equations, rather than the GCSE-taught  $y = mx+c$ ), that will be more beneficial and lead to more efficient strategies during the A Level course.

Students will be expected to have a Casio class wiz calculator and will be taught to use this in line with the A Level specification to support their answering of questions.

**New key terminology students will be taught during this topic/unit****Tier 3**

Scalar, Magnitude and Direction in relation to vectors, Exponential, Logarithms, Function, Calculus, Differentiation, use of  $y - y_1 = m(x - x_1)$  for equations of straight lines.

**Plan for Assessment**

- Students are expected to complete a subject knowledge task over the summer as part of their "bridging work" into the sixth form; this will be marked and assessed by one of their A Level teachers.
- Students will sit a baseline assessment at the very start of the year to identify any gaps in knowledge that must be filled before beginning each topic.
- An assessment plan is in place for Y12, which includes regular in-class assessments that build up in length as more content is covered. In the first term, they will complete six of these assessments. They offer an opportunity for students to reflect on their understanding of the content being covered, their recall of previous topics taught up to that point and act to give staff an idea of areas of individual and whole class, weakness.