Year 10 Higher Scheme of Learning

Autumn Term

We begin the GCSE course by exploring different calculation methods to ensure students are numerically fluent before they embark upon the higher level of problem solving engrained in the GCSE. We then move on to consider indices, roots, reciprocals and hierarchy of operations; again focussing on numerical fluency and conventional notation so that these skills can be revisited in the context of richer problem solving. The final tranche of this unit explores the practice of presenting numbers in standard form and the use of surds to calculate with irrational numbers; this is deliberately placed early on in the year to cement these skills before students revisit them in the context of Pythagoras and when using trigonometric ratios.

We then move onto algebra; manipulating algebraic expressions, rearranging and solving equations. There is time to consolidate topics covered in Key Stage 3 before students move on to develop deeper algebraic skills; for example factorisation where more than one variable is involved. Developing this deeper algebraic fluency is essential in ensuring students are equipped to deal with the next topic; sequences. Students are given the opportunity to practice using their higher level algebraic proficiency in the context of both arithmetic and geometric sequences.

In the latter part of the autumn term we move onto statistics; providing students with the opportunity to explore the modern world in the context of data. Students consider how data can be represented and interpreted using a variety of different statistical models. This topic raises questions about how to use numerical methods to demonstrate real life situations and leads fittingly onto our unit on proportion. Students have a brief opportunity to recap skills learned at Key Stage 3 before moving on to consider percentages greater than 100; fractions in the context of recurring decimals; and the relationship between fractions and ratio.

Spring Term

We begin the spring term with a fresh look at geometry – the first time this topic area appears at Key Stage 4. Students revisit the angle properties of a variety of shapes but this time using their honed algebraic confidence to prove well known angle facts. Students then move onto Pythagoras' theorem and trigonometry, applying their understanding of surds and proportion developed in the autumn term to explore exact trigonometric values.

We then move onto coordinate geometry and graphs, beginning with a recap of linear graphs before utilising students' higher level algebraic understanding to consider equations of parallel and perpendicular lines. This leads nicely onto quadratic, cubic and reciprocal graphs; those students aiming for the highest grades will also go onto consider the equation of a circle.

Summer Term

The summer term begins by exploring perimeter and area in the context of various shapes (including circles) but with renewed vigour on exploring the proof behind formulae students will have previously encountered at Key Stage 3. This deeper understanding of geometry sets students up well to explore the properties of 3D shapes, with the addition of cones and spheres to add greater challenge to the topic. Students then move on to the higher level topic of numerical bounds. This

follows on from area and perimeter to allow students to consider upper and lower bounds in the context of real-life situations using measurements.

In the latter part of the Summer term students refresh their knowledge on transformations before we focus on the power of a pair of compasses in relation to constructions and loci. Finally, students end the year with a focussed look at quadratic equations and inequalities. This topic presents numerous opportunities for challenge and ensures that students finish the year recognising the mathematical advances they have made.