Christ's College Guildford

Principal: Sarah Hatch. BA (Hons), QTS, PGC, NPQH
www.christscollege.surrey.sch.uk

Subject: Mathematics

Year Group: KS4 Extension

Curriculum Intent:
Students are encouraged to think deeply, challenge their understanding and ask questions. Our aim is to encourage and develop independent thinkers with the mathematical skills and confidence to take on the challenges of everyday life.

Our three key principles are to:
1. Develop fluency:
 We recognise the importance of having a deep understanding, as many students will miss out on the opportunity to master mathematics if simply learning new procedures and processes. We enable students to develop their own understanding through consolidating key learning and developing that into a fluency of the subject. Students should be able to explain why as well as how something happens.

2. Reason mathematically:
It is essential that students get the opportunity to develop their mathematical reasoning both in and outside of the classroom to fully master the subject. We want students who think like mathematicians rather than people who simply do the maths. Students should have the opportunity to explore how and why maths works through the wide variety of mathematical topics through questioning, experimentation, exploring and creating their own theories to guide their own mathematical learning journey.

3. Solve problems:
We believe that students of all abilities should be able to problem solve in order to be successful in the wider world. Students should have the opportunity to develop their own problem solving skills to analyse, evaluate and structure answers to a wide range of problems. This should include using formal mathematical knowledge to interpret problems, model/predict solutions and select appropriate methods and techniques to apply to unfamiliar or non-routine problems.

College Values:
How does you curriculum link to the core values of love, co-operation, stewardship, respect and service
The Christ's College Mathematics department aims to ensure all students have the opportunity to make the best progress they are able to in Mathematics.

Students are encouraged to work cooperatively with each other to support the development of their understanding in lessons. Following the College behaviour policy, we encourage students to take responsibility for their learning through respecting others views and being tolerant of other viewpoints to further foster the community feeling.

When visiting our department you will see staff upholding and embracing the College values of love, cooperation, stewardship, respect and service as well as students being encouraged to do the same.

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LGC Chair: Mr Stuart Zissman

The Good Shepherd Trust
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Knowledge and Skills:

We follow the Edexcel 1MA1 GCSE Mathematics exam specification. All topics focus on our 3 key principles of fluency, reasoning and problem solving. In addition to the KS4 Core content, some students will also cover the following:

Number - Use of the product rule for counting; estimating powers and rules of positive numbers; calculating with fractional indices; manipulating surds & rationalising the denominator; converting recurring decimals to fractions & vice versa; use of upper & lower bounds.

Algebra - Use and manipulate algebraic fractions; expanding 2 or more brackets; factorising quadratics; algebraic proof; use of functions; identify & plot perpendicular lines; identify & interpret roots, intercepts & turning points of quadratic functions, deduce roots algebraically & find turning point by completing the square; recognise, sketch & interpret exponential graphs & trigonometric functions (eg. y=sin x); sketch translations & reflections of given functions; calculate or estimate gradients of graphs & areas under graphs (inc quadratic & other non-linear graphs); interpret velocity-time graphs and graphs; recognise & use the equation of a circle with centre and the origin as well as finding the equation of a tangent to a circle at a given point; solving equations by completing the square and using the quadratic formula; solving linear/non-linear simultaneous equations; use of iteration to estimate solutions; solving quadratic inequalities in one variable & representing the solution set using set notation and on a graph; finding the nth term of quadratic sequences.

Ratio, Proportion & Rates of Change - Use the formula to solve direct and indirect proportion problems; interpret the gradient at a point on a curve using the instantaneous rate of change; apply the concepts of average & instantaneous rate of change in numerical, algebraic & graphical contexts; work with general iterative processes such as growth & decay problems.

Geometry & Measures - Use of negative scale factors in enlargements; describe changes & invariances achieved by combined transformations; apply and prove the standard circle theorems involving angles, radii, tangents & chords and use them to prove related results; using trigonometry (SOHCAHTOA) in 3D; know and apply the sine and cosine rules; know how to find the area of a triangle when given 2 sides and the included angle; use vectors to construct geometrical arguments and proof.

Probability - Calculate and interpret conditional probabilities using 2-way tables, tree diagrams & Venn diagrams

Statistics - Construct & interpret diagrams for grouped discrete and continuous data (inc. histograms of equal & unequal class widths, cumulative frequency graphs & box plots and the interquartile range).

Assessment:

Students will be assessed during lessons both verbally and with the work they complete. More formal assessments will take place in the form of end of topic and term assessments.

Assessments will incorporate a range of Assessment Objectives:
AO1 - using and applying standard mathematical techniques
AO2 - reasoning, interpreting and communicating mathematically

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AO3 - solving problems in mathematics and in other contexts

There will also be formal mock examinations during the year.

Homework:

In mathematics all homework will be set via Hegarty Maths on a weekly basis. This will be set at least 1 month after the content was taught in class so as to support the departmental focus of improving students' retrieval practice.

Cultural Capital:

Students are encouraged to attend the Maths Clinic where they can see further advice and guidance about their learning. We also engage in the UK Intermediate Maths Challenge as well as attending competitions with other local schools in the county as well as having the opportunity to participate in the National Cipher Competition, in which we have had great success in previous years.

Students are able to use Hegarty Maths to further develop their mathematical understanding through the use of Memri and Fix Up 5 (FU5) tasks. These aim to support knowledge retention through focussing on questions that students have either gotten correct (Memri) or incorrect (FU5) previously and brings them back in mixed up tasks.

Students are also encouraged to use sites like https://corbettmaths.com/ and https://keshmaths.com/gcse-maths-takeaway-3/ to practice exam style questions by topic. These sites also include worked solutions and videos on each topic.