

Further Maths A-Level Bridging Work

Congratulations on choosing to study Maths beyond GCSE.

Many students say that they find the initial transition from GCSE to A level challenging. This set of bridging work has been put together to help you with the transition, by focussing on the key skills that will be used across the whole spectrum of AS and A level Mathematics. The main objective is to develop and deepen your understanding of topics you already know. By September, you want to be fluent in a number of aspects of GCSE work. You will find the course easier, enjoy it more and be more confident if you are on top of the skills in this bridging work.

We will test you early in the course to check how well you understand these topics, so it is important that you have completed the work before the start of term in September. If you do not meet the required standard, you will need to attend compulsory intervention sessions to prepare for a retest on these basic skills.

A level Maths and A level Further Maths are NOT easy options. They require a lot of self-motivation, determination and independent study. We recommend that you do a minimum of 5 hours of work outside the classroom each week. You will need to enjoy challenge, be willing to accept that a question has 'gone wrong' and be prepared to have another attempt (and maybe another).

A level Further Maths is designed to further expand on the mathematical skills you will learn in A level Maths as well as introducing completely new techniques to prepare you for a career with a mathematical or scientific basis. It is an interesting and challenging course that develops logic and reasoning skills.

To study A-level Maths and Further Maths you will need a calculator with some extra functionality. We recommend the [Casio fx-991 CW](#). Graphical calculators such as the [Casio CG100](#) have additional advantages that may help you throughout the Further Maths course. If you are eligible for financial support to purchase the calculator, please get in touch.

If you have any questions about the following work or the course in general, please contact: Ms Mercer mmercerc@cws.coombewoodschool.uk or Mr Woods gwoods@cws.coombewoodschool.uk.

Bridging work

Essential Skills bridging work:

You will need to set up an account with AMSP (scroll down to see how to do this).

One of the most popular choices at A level is Mathematics; however, the transition from GCSE to A level remains a challenge for many students.

The Essential skills transition materials have been designed by the Advanced Mathematics Support Programme (AMSP) for students to work through and complete independently. Completion of these GCSE to AS/A level transition resources will help you to develop fluency in the fundamental techniques and the key mathematical concepts that underpin A level Mathematics.

It is therefore vitally important that you are fluent and confident in applying these essential skills, so that you can be successful in making the transition to the academic standard required at A level.


Review, recall, and consolidation are important factors in the transition process, and overarching skills that are transferable across key topics are vital to developing a depth of understanding. Consequently, these resources focus on the following essential skills from the Higher tier GCSE curriculum and how they are applied across a number of key topics at AS and A level.


There are sets of resources for the following areas of mathematics:



- Integers
- Geometry
- Surds and Indices
- Coordinate geometry
- Algebraic manipulation
- Trigonometry
- Completing the square

Each set should provide about 3 hours of work. If you really get engaged by the enrichment activities, you may want to spend longer than this. Each set also includes either written worked solutions, video solutions or links to websites.

Each of the areas contains:

 skills checks

 a chance to practise and explore

  some extra ideas that you may want to investigate further

How it is designed to be used

The course is designed for you to work through by yourselves without input from a teacher over the Summer between Years 11 and 12. You can continue to access the resources and work through the topics for support at the start of Year 12. Each of the seven topics is structured in the following way:

- Chapters containing videos and activities
- An assessment – scores will appear on a certificate of completion
- Going deeper – optional material to give students a head-start at A level

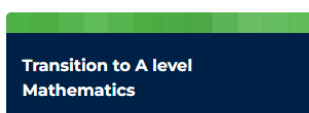
How to access it

This course is totally free and is hosted by Integral. It requires an individual login to gain access and to allow progress to be tracked.

To set up an account, you will need to register.

Click [here](#) to register for your free account.

Once registered, follow the prompts on the home screen, clicking on the following course:



Assessment and Certification

Before attempting the assessment, ensure that you have thoroughly worked through all the provided resources and feel completely confident with the material. Remember, you only get one chance at each assessment, so do not proceed until you have completed all the associated activities.

After finishing the assessment, you will be able to print or download a certificate of completion, which will also display your score. You must bring all seven certificates to your first or second lesson in September. If you are unable to print your certificates at home, email them to your teacher. Your teacher will provide their email address during the first lesson in September.

Useful websites if you need more help with the work

www.corbettmaths.com

www.mathsgenie.co.uk

www.physicsandmathstutor.com

Additional task

Researching sorting algorithms

<https://nrich.maths.org/8192>

Follow the instructions on the link. Make notes on each algorithm mentioned, ready to explain any one of them in the first lesson.

Make notes on the 5 questions given by trying each algorithm with a small set of cards where you put the cards into various orders (e.g. try the algorithms when the cards are randomly shuffled, and then less randomly shuffled). Think about how you should record your results and how you should analyse what you notice. Take time thinking about the following questions and make detailed notes of your findings, ready to discuss in the first lesson.

- On average, which algorithm did you find to be quickest?
 - You will need to consider what you mean by 'quickest'.
- What is the 'worst-case scenario' for each algorithm?
- How long would it take in the worst case?
- Which would you choose if you had to keep the cards in a pile rather than laying them out?
- Which would you choose if you only had a limited amount of desk space to arrange the cards on?

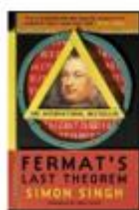
Maths beyond the curriculum

Radio/Podcasts/Videos/Documentaries:

- BBC Maths documentaries
 - The History of Maths <https://www.bbc.co.uk/programmes/b00dxjls>
 - Hannah Fry's Mysterious World of Maths <https://www.bbc.co.uk/programmes/b0bn9dth>
- Ted talks – Maths Playlist https://www.ted.com/playlists/189/math_talks_to_blow_your_mind
- BBC Four In Our Time – Maths podcast <https://www.bbc.co.uk/programmes/p00545hk>
- Numberphile YouTube channel <https://www.youtube.com/c/numberphile/videos>
- Eddie Woo YouTube channel: <https://www.youtube.com/user/misterwootube>
- The Guardian Monday Puzzle: <https://www.theguardian.com/science/series/alex-bellos-monday-puzzle>

Books:

Here is a list of popular Maths books that are not specifically related to the course but you may enjoy reading:



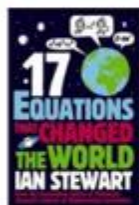
Fermat's Last Theorem - Simon Singh



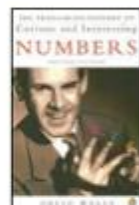
Does God Play Dice - Ian Stewart



A Beautiful Mind - Sylvia Nasar



17 Equations that Changed the World – Ian Stewart



The Penguin Book of Curious and Interesting Numbers - David Wells



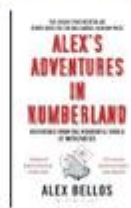
The Man Who Loved Only Numbers – Paul Hoffman



The Code Book - Simon Singh



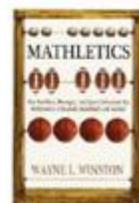
1089 And All That - David Acheson



Alex's Adventures in Numberland – Alex Bellos



Uncle Petros and Goldbach's Conjecture - Apostolos Doxiadis



Mathletics – Wayne L. Winston



The Great Mathematical Problems – Ian Stewart