

Course  
Transition

# Bridging the Gap

*from School to College*













Warlingham  
Sixth Form College

Year 11 > Year 12 Transition  
Summer Term 2021  
A Level Mathematics



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# COURSE OVERVIEW

The aims of the course are:

- To extend your range of mathematical skills and techniques
- To be able to use mathematical knowledge to make logical and reasoned decisions in solving problems in a variety of contexts
- To be able to apply mathematics in other fields of study and be aware of the relevance of mathematics to the world of work and to situations in society in general
- To be able to communicate your mathematical understanding to others
- To be able to use technology such as calculators and computers effectively and recognise when their use may be appropriate

## Assessment Format

The course is split into three papers as described below.

Paper 1: Pure Mathematics including Algebraic methods, co-ordinate geometry, sequences and series, trigonometry, exponentials, calculus, vectors, logarithms and numerical methods.

Paper 2: Pure Mathematics, as for Paper 1. Any topic from the Pure Mathematics content may appear on either paper.

Paper 3: Statistics and Mechanics including Probability, binomial and normal distribution, hypothesis testing and using large data sets in statistics. Studying Quantities and units in mechanics, kinematics, moments, forces and Newton's laws.

Calculators may be used in all examinations. We recommend use of a graphics calculator, which can be purchased through the College.



# OUR EXPECTATIONS

## College Expectations for Academic Success

The College will work closely with all students and parents to create a purposeful, creative and stimulating environment in which students are encouraged to fully develop - both academically and personally.

We will expect you to take responsibility for your own behaviour and learning. The current College Committee along with the student body have discussed and agreed that students should commit to:

- Ensuring academic success through regular attendance and punctuality at all required registrations, lessons, supervised study lessons and Inspire Periods. Attendance which drops below 95% reduces Key Stage 5 performance by at least one grade, so it is taken very seriously.
- Completing all set tasks on time to the best of your ability, making full use of study periods and homework to enable you to meet all deadlines.
- Using study time effectively by bringing all required equipment and resources with you and making full and regular use of the College study rooms and LRC, respecting the need for silent studying conditions.
- Working closely with all your teachers to develop an effective working relationship based on mutual respect and discussing your work with them on a regular basis and meeting targets set.
- Developing your skills as an independent, self-evaluative learner and work closely with your tutor in monitoring and discussing your academic progress. As an independent learner, if you miss a lesson, it is your own responsibility to find the teacher and catch up with the work missed.
- Organising your work efficiently and effectively into folders for each subject, making full use of individual subject expectations and using Cornell Notes daily to ensure work in your folders is relevant and meaningful.
- Keeping mobile phones out-of-sight in all classrooms and during assemblies so that lessons are not disturbed and/or important information is missed.
- Attending all parents' evenings and arrange appointments with your teachers to discuss your progress and work.

## Course-specific Expectations for Academic Success

- Arrive at lessons on time.
- If you are not able to attend the lesson, then please see the teacher in advance and collect the work from the teacher.
- If you are off sick, you must email the teacher concerned and request the missed work.



# OUR EXPECTATIONS

- Bring all equipment to lessons (including a calculator and your textbook).
- Complete the assessed work each week. Copies of all homeworks are available in the student resources folder and on SharePoint. Your homework book must be handed in each week without fail. If you do not hand your work in, you will need to stay behind on a Monday or Wednesday after school to complete it.
- If your test scores are below your target grade, you will be required to repeat the work.
- In addition to your set homework, you should also aim to complete additional questions from the exercises covered in the lessons. This will ensure your understanding of the topics.
- Green pen any areas for development weekly.
- Use [mathsgenie](#) / [drfrostmaths](#) / [mymaths](#) / [t1maths.com](#) to improve your understanding of the topics taught and attend after-school sessions for additional help as required.

Failure to complete these expectations will lead to letters being sent home and telephone calls made.



# USING CORNELL NOTES

The Cornell Notes system is a note-taking system devised by Walter Pauk, an education professor at Cornell University. It is a proven method that establishes a more effective learning process.

It is designed to help the user think and reflect upon the notes they have made as well as making them more useful for revision purposes.

Please [click here](#) to watch a video that explains how to take Cornell Notes properly.

There is an additional video that shows how Cornell Notes can be applied to Mathematics. Please [click here](#) for additional information and to watch it.

Try to use this method when making revision notes on the topics on the next page. See my example below.

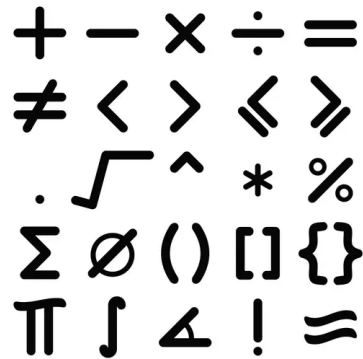
Negative and fractional indices		28/4/20
$a^{\frac{1}{m}} = \sqrt[m]{a}$	<p>Example <math>5^{\frac{1}{3}} = \sqrt[3]{5}</math></p> $x^{\frac{1}{4}} = \sqrt[4]{x}$ <p>If a power is a fraction, the denominator determines the root</p>	
$a^{\frac{n}{m}} = (\sqrt[m]{a})^n$	<p>Example <math>64^{\frac{2}{3}} = (\sqrt[3]{64})^2 = 4^2 = 16</math></p> $x^{\frac{3}{4}} = (\sqrt[4]{x})^3$ <p>If a power is a fraction, the denominator determines the root and the numerator becomes the power.</p> <p>It is usually easier to deal with the root first, but they can be done in any order eg <math>\sqrt[3]{64^2} = \sqrt[3]{4096} = 16</math></p>	
$a^{-m} = \frac{1}{a^m}$	<p>Example <math>5^{-2} = \frac{1}{5^2} = \frac{1}{25}</math></p> $x^{-4} = \frac{1}{x^4}$ <p>Cover up method: cover up the - sign. What is left goes as the denominator.</p>	
<p>Summary: - means 1 over, top number of the fraction is the power, bottom number of fraction is the root.</p>		



# REVIEW / REVISE

A Level Mathematics requires a sound understanding of the following topics:

- Fractions
- Expanding Brackets
- Linear Equations
- Linear Inequalities
- Simultaneous Equations
- Solving Quadratic Equations
- Changing the subject of a formula
- Indices
- Surds
- Functions



Please see the induction booklet for worked examples of all the topics listed above, along with questions for you to attempt. Answers are also provided so you can check your work. Mymaths links are signposted for additional assistance within the booklet. Please [click here](#) to view the Induction booklet.

Of course, you can also use [hegartymaths](#) or [mathsgenie](#) to watch videos or to do additional work on these topics. You should try to make Cornell notes to help you revise.

In addition to the topics above, you could also revise the work covered at GCSE on

- Trigonometry
- Graphs (quadratic, cubic, reciprocal)
- Vectors





# WATCH

Below are just a few links to videos and lectures that show how the world of mathematics links to everything around us.

We hope you enjoy watching some of these.

## Suggested viewing to prepare for A level Mathematics

Hegarty Maths live lessons – preparing for A Level Mathematics

[Hegarty Live Maths](#)



You could make Cornell notes while watching these videos.

## Enrichment viewing to enhance your understanding of Mathematics within the wider world

BBC Documentary – [The story of maths](#)

BBC Series – The mysterious world of maths (3 episodes)

[Episode 1](#)

[Episode 2](#)

[Episode 3](#)

RI Christmas lectures (7 lectures)

[Secrets and Lies](#)

[The Num8er my5teries](#)

[Arrows of Time](#)

[The Magical Maze](#)

[From Magna Carta to Microchip](#)

[Mathematics into Pictures](#)

[Gulliver's Travels](#)

Gresham College lectures

[World Changing Equations](#)







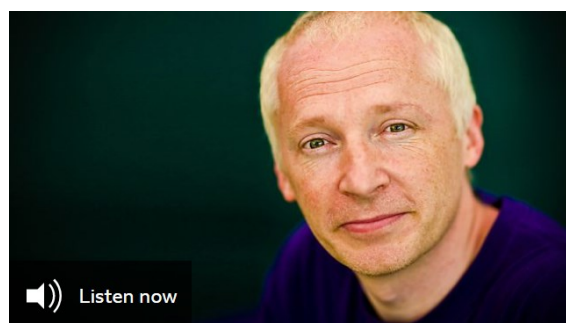
## LISTEN TO

Below are links to podcasts about the history of mathematics as well as interviews with mathematicians. These are enrichment activities and not essential to the A level Mathematics course, but they may help you to decide on whether you might like to study Mathematics at University and give you an idea as to potential careers for Mathematicians.

We hope you enjoy listening to some of these.

BBC podcasts—A brief history of mathematics (10 episodes in all)

[Click here](#)



My favourite theorem podcasts (50+ episodes)

[Click here](#)

**(Gauss-Bonnet):** Let  $M$  be a compact 2-dimensional Riemannian manifold with boundary  $\partial M$ . Let  $K$  be the Gaussian curvature of  $M$  and  $k_g$  be the geodesic curvature of  $\partial M$ . Then

**Kevin Knudson**  
MATHEMATICIAN

$$\int_M K \, dA + \int_{\partial M} k_g \, ds = 2\pi\chi(M).$$



# READ

Additional resources that may help you to prepare for A level Mathematics. These are not compulsory.

*Headstart to A Level Maths* (CGP)

*Bridging GCSE and A level Maths* by Mark Rowland

Below are some interesting reads around Mathematics. These are enrichment opportunities, and though not compulsory, we would recommend everyone reads at least one of them.

*Alex's Adventures in Numberland* by Alex Bellos

*Cabinet of Mathematical Curiosities* by Ian Stewart

*The Num8er My5teries* by Marcus du Sautoy

*How Many Socks Make a Pair?: Surprisingly Interesting Maths* by Rob Eastway

*The Curious Incident of the Dog in the Night-time* by Mark Haddon

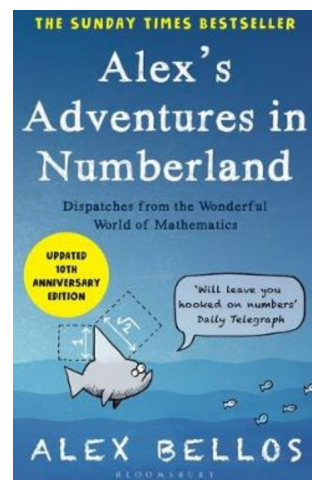
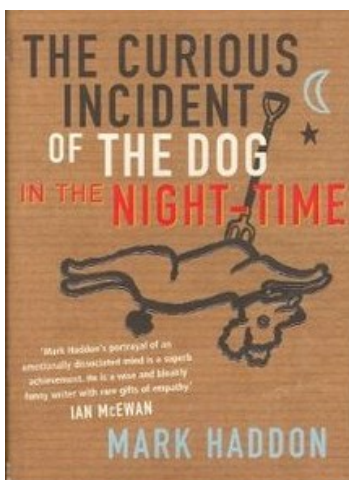
*The Penguin Dictionary of Curious & Interesting Numbers* by David Wells

*The Calculus Wars* by Jason Socrates Bardi

*The Code Book* by Simon Singh

*50 Mathematical Ideas You Really Need to Know* by Tony Crilly

*Fermat's Last Theorem* by Simon Singh





# RESEARCH

Why not enrol on one of these online courses?

[Flexagons](#)

[Recreational Maths](#)

The screenshot shows the FutureLearn website interface. At the top left is the FutureLearn logo. To its right are navigation links: "Subjects", "Courses", and "Using FutureLearn". On the right side of the navigation bar is a search box labeled "Search online courses" with a magnifying glass icon and a "Sign in" button. Below the navigation bar is a banner for "Maths Courses" with a purple and blue background. The banner text reads: "Join online maths courses to build your problem solving and analytical skills, and understand the language of mathematics." At the bottom of the banner is a link: "< See more in Science, Engineering & Maths".





# COMPLETE

## Compulsory

Please complete the exercises in the induction booklet and the test at the end of the booklet. You will be tested in September on the content of that booklet. Please [click here](#).

Additional bridging the gap between GCSE and A Level tests are available by [clicking here](#).

## Enrichment

Why not download a game to test your mathematical skills?

[Bridge It](#)

[Sumaze 2](#)

You could attempt some Senior Maths Challenge questions:

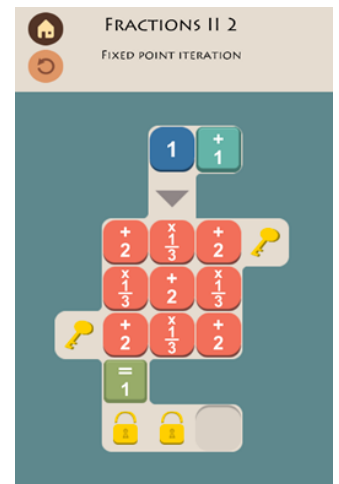
[Click here](#)



**SENIOR MATHEMATICAL CHALLENGE**

You could attempt some Nrich questions:

[Click here](#)



**NRICH maths**



# APPENDICES / RESOURCES

## Class Textbooks

Pearson Edexcel AS and A level Mathematics Pure Mathematics Year 1 / AS

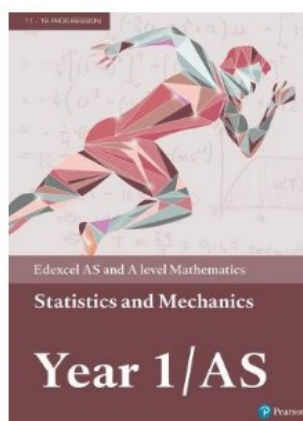
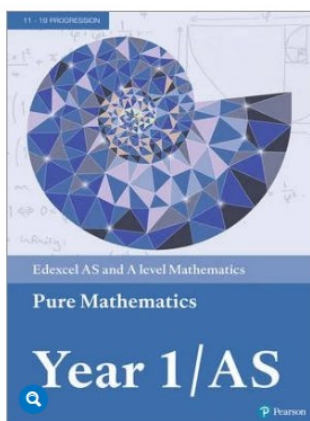
Pearson Edexcel AS and A level Mathematics Statistics and Mechanics Year 1 / AS

Pearson Edexcel A level Mathematics Pure Mathematics Year 2

Pearson Edexcel AS and A level Mathematics Statistics and Mechanics Year 2

These will be available to buy from the school if you want your own copy to keep or to borrow from the school for a small deposit.

They are also available online for free through the [pearsonactivelearn website](https://www.pearsonactivelearn.com).



## Recommended Calculator

Casio FX9750GII (Graphics calculator)

Casio FX9860GII (Graphics calculator with additional features)

Casio FX-991EX (Calculator with statistics functions required at A level)

Any of these three calculators are suitable for A level Mathematics. As a minimum, you will need a calculator with statistical functions, but a graphical calculator is highly desirable. If you can stretch to the FX9860GII you will find it does have better features such as surd form, but it is more expensive.

