

An Introduction to A-Level Mathematics

What is A-level Mathematics?

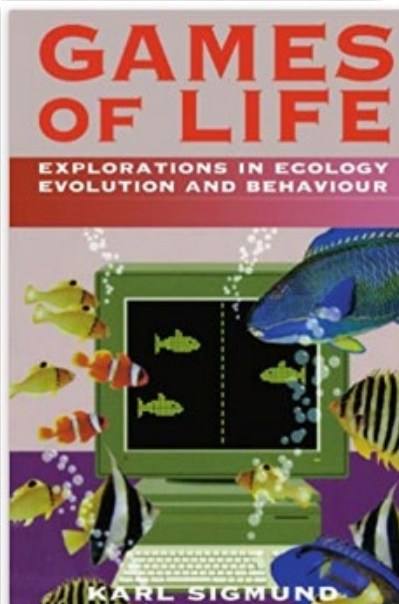
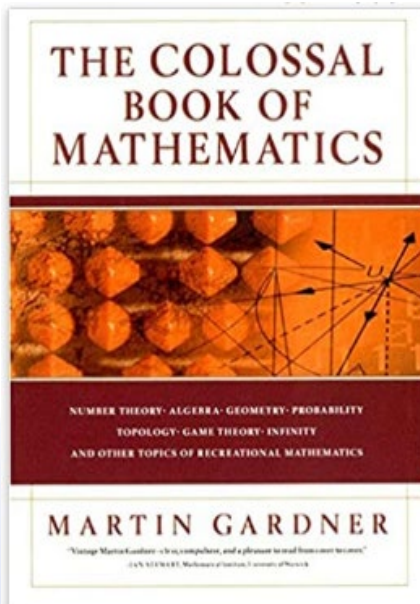
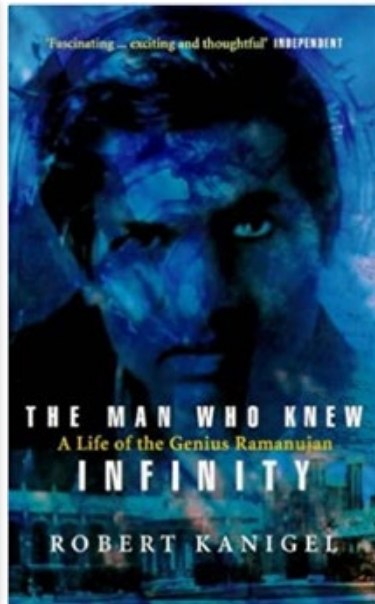
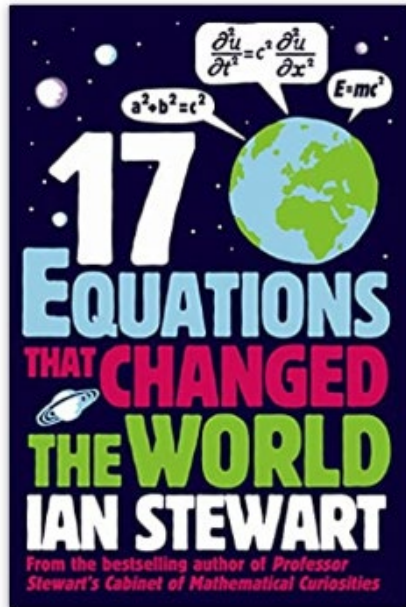
This pack contains a programme of activities and resources to prepare you to start an A-level in Mathematics in September. It is aimed to be used now and throughout the remainder of the summer term and over the summer holidays to ensure you are ready to start your course in September.

If you need any clarification or find another amazing resource, do get in touch!

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Read Maths Based Books

These books are all popular books about Mathematics and great for extending your knowledge and understanding.



<https://www.theguardian.com/books/2012/jan/18/ian-stewart-top-10-popular-mathematics>

These are numerous books you could read. There are great books available on audible, kindle too. Choose anyone that takes your fancy! Write a book review on it and hand this to your teacher in September.

TED Talks

Download the TED talk app to your device. It's brilliant!!!

https://www.ted.com/playlists/189/math_talks_to_blow_your_mind

If these links don't work, you will find these easily with a google search using TED talk and the name of the speaker.

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Effective Practice

Effective practice in lessons is an essential skill for A-level Maths. Mathematics has a formal method of explaining your reasoning and the way in which you do your Maths is very important at A-level as the course is the first step to showing **professional** mathematical competence.

This is the stage where you can no longer impress examiners with the ability to do Maths in your head, which is a very impressive skill, but it is not the skill that is emphasised in A-level Math, and that is the **professional** part. You will be trained to write down clear and logical mathematical workings so that other people in a team could follow what you've done and double-check your work to make sure the team doesn't have any errors.

While you are in class it is important to show you can write down the procedure you used to arrive at the correct answer.

We start learning Mathematical Proofs and this is the style examiners want to see in all of your work.

There are few examples at Study Well

<https://studywell.com/maths/pure-maths/proof/proof-by-deduction/>

Below is an example from the above website.

Prove that $x^2 - 4x + 9$ is always positive.

Hide Solution

By completing the square $x^2 - 4x + 9$ can be written as $(x - 2)^2 + 5$. Note that $(x - 2)^2$ is positive for any x as it is a square number. Subsequently, adding 5 will retain its positivity.

Mastery in Maths is about Making Mistakes

Part of effective practice is pushing yourself into the difficult questions, and for some students this level is going to be the first time they are really challenged by Maths.

A-level Maths really pushes problem solving ability and that's really difficult for many people. Part of your job is to be OK with messing up. Below is a Ted Talk about the right type of mindset for A-level Maths.



<https://www.youtube.com/watch?v=3icoSeGqQtY>

Making mistakes forces your brain to become mentally tough while also making you think about a question holistically rather than just as right or wrong.

Topics to Research

Pure Mathematics (66%)
methods and techniques which underpin the study of all other areas of mathematics, such as, proof, algebra, trigonometry, calculus, and vectors.

Pure Mathematics

This is most of the course and covers a very wide array of topics. This is the groundwork for moving on to higher levels of mathematics at university and is a key steppingstone to the next level.

Below is the list of TED talks for “Math talks to blow your mind”

https://www.ted.com/playlists/189/math_talks_to_blow_your_mind

Statistics (17%)
working with data from a sample to make inferences about a population, probability calculations, modelling real life data using statistical distributions and hypothesis testing.

Statistics

One of the fastest growing sectors in the job market is that of Data Science.

<https://www.prospects.ac.uk/job-profiles/data-scientist>

Statistics is used in almost every professional job you can think of and if you're good at it you will make yourself a very valuable part of any team.

Being trained in Statistics is one of the most highly sought worker skills today.

Mechanics (17%)
the study of the physical world, modelling the motion of objects and the forces acting on them.

Mechanics

This subject material is also covered in Physics and relies heavily on Mathematical Modelling which is another highly sought-after skill in today's professional world.

Below is a link explaining why:

https://www.youtube.com/watch?time_continue=10&v=-uCwgZUz51o&feature=emb_logo

Here is a free course you can sign up to if you're interested in this topic.

<https://www.edx.org/course/mathematical-modelling-basics>



Online Learning Courses

A Massive Open Online Course (MOOC) is an interactive step-by-step course aimed at reaching an unlimited number of participants worldwide to create a community of lifelong learners. There are many different MOOC providers that cover a huge variety of different subject and topic interests.

Typically, a MOOC will involve 2-3 hours study per week for 6 weeks or so. MOOCs are free of charge. All required course materials will be provided for you online, which is also 100% free! Each course is open to anyone with internet access across the world and all you need is your wonderful brain!

Here is a site that you may wish to try:

<https://www.edx.org/course/subject/math>

Follow the course learning instructions & complete all tasks, keep a record of what you do and save all work as evidence of your learning.

LEARNING
IS A TREASURE THAT WILL
FOLLOW ITS OWNER
EVERYWHERE.

Chinese Proverbs
InspirationBoost.com

Good luck!