

Overview

The Mathematics department at the College is looking forward to welcoming you in September. A-level Mathematics is rewarding, stimulating and great for the CV. However, to make the best possible progress from the start of the course it is vital to be well prepared. To help you get ready for your A-level studies, we have put together a wide range of resources for you to explore over the next few months. These will help you with the transition from GCSE to A-level and cover many interesting aspects and applications of Mathematics.

Online Resources

Summer Preparation - <https://www.bsfc.ac.uk/maths/SummerPreparation>

This is a course produced by the Mathematics teachers at the College, which covers many of the key algebra skills from GCSE Maths that you need to be proficient in when taking the step up to A-level. There is a booklet to download and a series of teaching videos to guide you through the questions. For A-level Maths we use similar videos to provide support for our homework assignments, so it is also an opportunity to experience what these are like.

GCSE to A-level Resources - <https://amsp.org.uk/resource/gcse-alevel-transition-resources>

These resources are from the Advanced Mathematics Support Program and are designed to help bridge the gap from GCSE to A-level Mathematics. There are a range of different topics to explore such as surds, indices and completing the square which will help you prepare for September.

Activities

Here are 10 questions to try, that you should be able to do based on your knowledge of GCSE maths. They focus on essential algebra skills which are needed at A-level:

1. Expand and simplify $(2x - 3)(4x + 7)$
2. Factorise $x^2 + 6x + 8$
3. Solve the equation $x^2 - 8x + 12 = 0$ by factorising first
4. Factorise $x^2 - 25$
5. Solve the equation $3x^2 - 2x = 0$ by factorising first
6. a) Simplify the surd $\sqrt{8}$; b) Use the $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ to solve $2x^2 + 8x + 7 = 0$
7. Evaluate: a) $\frac{5}{3} \times \frac{12}{25}$, leaving the answer in its simplest form; b) $\frac{2}{3} + \frac{1}{4}$; c) $4 \times \frac{2}{3}$
8. Solve these simultaneous equations:
$$\begin{aligned} 3x + 4y &= 2 \\ 5x - 6y &= 16 \end{aligned}$$
9. Factorise $3x^2 + 11x + 6$
10. Solve the equation $4x^2 + 27x - 7 = 0$ by factorising first

The solutions to these questions are available online here:
www.bsfc.ac.uk/maths/solutions

Videos & Podcasts

- <https://ed.ted.com/lessons?category=mathematics> Videos from TED on a huge range of mathematical subjects, from quick puzzles to more in-depth talks
- <https://www.numberphile.com> Lots of interesting maths videos and podcasts
- <https://www.bbc.co.uk/programmes/p00cl73s/episodes/player> Simon Singh's Numbers: a series of podcasts on mathematical concepts
- <https://www.bbc.co.uk/programmes/p003hyf5> Discussion on the mysteries of prime numbers with Melvyn Bragg.
- <https://www.bbc.co.uk/programmes/b00srz5b/episodes/downloads> Marcus du Sautoy – A Brief History of Mathematics: series exploring famous mathematicians and their discoveries.

Suggested Reading

There are many excellent popular books that explore Mathematics – here are some we have read and enjoyed:

- 'Mathematics: A Very Short Introduction' by Timothy Gowers
- 'Why Do Buses Come in Threes? The Hidden Mathematics of Everyday Life' by Rob Eastaway
- 'How Not to be Wrong' by Jordan Ellenberg
- 'Fermat's Last Theorem' by Simon Singh
- 'Alex's Adventures in Numberland' by Alex Bellos
- 'Professor Stewart's Hoard of Mathematical Treasures' by Ian Stewart

Film & TV

These films and TV shows all feature different areas of Mathematics, from cryptography to game theory!

- Proof (2005) - Story of a Mathematical genius who leaves behind a mystery.
- A Beautiful Mind (2001) - Russell Crowe starts as the brilliant mathematician John Nash.
- The Imitation Game (2014) – How the Enigma code was cracked in World War 2.
- X + Y (2015) - Heart-warming tale of a teenage maths prodigy.
- Numb3rs – TV series about a consultant who uses Mathematics to solve crimes.

Course Specifications

A Level - [Download AQA Maths Specification](#)