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.

**Overview**

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 formula \(x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}\) to solve \(2x^2 + 8x + 7 = 0\)
7. Evaluate: a) \(\frac{5 \times 12}{3} \frac{25}{25}\), 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: \[
\begin{align*}
3x + 4y &= 2 \\
5x - 6y &= 16
\end{align*}
\]
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](http://www.bsfc.ac.uk/maths/solutions)
There are many excellent popular books that explore Mathematics – here are some we have read and enjoyed:

- ‘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

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.
- The Imitation Game (2014) – How the Enigma code was cracked in World War 2.
- Numb3rs – TV series about a consultant who uses Mathematics to solve crimes.

Winner
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