What to read up on?

University of Warwick, Before year 1

This is a document that is evolving. If you have any suggestions, please email me at my Warwick email-address:

b.sewell@warwick.ac.uk

and I'll do my best!

These are suggestions for an incoming Warwick student for them to Google, and at least look over and try (however unsuccessfully!) to understand before they come to Warwick. The reason why these are here is because these ideas can be hard to grasp, and often maths courses are structured to be way too fast; in general you are under a lot of time pressure to understand ideas quickly and be able to use them. Moreover, if you don't succeed in getting these down, you can be missing out on the ideas fundamental to the rest of your degree!

Thus the reason why these are here: to take the edge off you by giving you the time to discover these ideas in your own time and space. I sincerely believe that even just looking at these can loosen the ***culture shock!*** commonly experienced in a maths degree, Year 1, and thereby give you a happier time.

I have vaguely ordered them from most essential to least essential, based off of mine and my students' experiences.

Enjoy!

1. Epsilon - delta definition of Continuity ($\boldsymbol{\varepsilon - \delta}$).

2. Definition of a Group.

3. Universal Quantifiers (∀, ∃); Negating Statements with Universal Quantifiers.

4. Principle of Contraposition and Proof by Contradiction.

If you're in Paris, you're in France. If you're not in France, you're not in Paris.

5. Differential equations: linear homogeneous ODE's with constant coefficients.

$$i.e \quad a_n \frac{d^n y}{dx^n} + a_{n-1} \frac{d^{n-1} y}{dx^{n-1}} + \cdots + a_1 \frac{dy}{dx} + a_0 y = 0 \quad (a_i \text{ constants}).$$