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Regulars

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A vicious circle of doom and gloom



You may start...now. (Image from freeimages.co.uk)

Just after this year's A–level results were published, I was interviewed by a radio journalist about the state of maths teaching in UK schools. But instead of the usual, boring questions – such as whether there has been a drop in standards because of grade inflation at A–level, or why the UK performs so badly in international comparisons of basic maths skills – he had an important and interesting question, one which goes to the heart of what *Plus* is about.

His question was this: there was an 18% drop in the number of people taking maths A–level this year compared to last; should we be worried? After all, does the UK really need more accountants and actuaries?

Before I reveal what I said, think what your own answer to this question would be. Here are some statistics to

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help you:

- In AS–level mathematics last year (the first year it existed), 28% of candidates failed the exam outright.
- My interviewer was correct that there was an 18% drop in the number of entries for A–level mathematics this year (a total of 53940 candidates). But 37% of those who DID take the exam this year achieved an A grade, compared to 29% last year.
- There has been a 29% drop in the number of A–level mathematics entries since 1985.
- There were 5017 entries for A–level Further Mathematics this year, a fall of 11% since last year and 58% [sic] since 1985.
- Applications to read mathematics at University are down 12% this year; actual admissions (as opposed to applications) are down 6%.
- The Department of Mathematics at Essex University is likely to be closed. Several other University mathematics departments may be under threat.
- The Ofsted report into maths teaching at secondary schools in 2000–1 concluded that "There are insufficient teachers to match the demands of the curriculum in one school in eight" (a deterioration since last year when this figure was one in ten). Furthermore, "Mathematics in one–third of schools fails to make effective use of new technologies".



The tools of the exam trade. (Image from freeimages.co.uk)

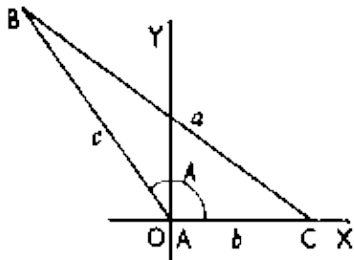
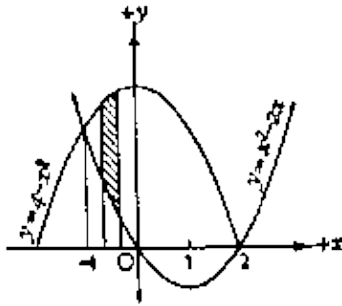
This is definitely a very gloomy picture. Maths has certainly become much less attractive as an A–level subject since 1985. But the above statistics conceal some good news. There was a low point in the number of entries for maths A–level in around 1995 (58700 candidates), and numbers have actually been climbing since then, except for a sudden drop this year. Why has this drop occurred? It seems likely that the new maths AS–level which was introduced last year made quite a few candidates realise that it wasn't the right course for them when they failed the exam. So, much of the drop is probably explained by these poor candidates not going on to take the full A–level. The large number of A grades this year in the A–level backs up this explanation.

But even this doesn't stop the overall picture looking distinctly bad. The difficulties in maths teaching reported by Ofsted explain some of the problems: if maths is being taught badly in schools (or at least in some schools), then pupils will find maths difficult and uninteresting so won't go on to study it at University (as

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evidenced by the drop in applications); and if there aren't enough students studying maths at University then there won't be enough maths specialists to become the maths teachers of the future; so the standard of maths teaching will decline. Schools can't help it if there simply aren't enough well qualified maths teachers to go around: maths graduates often have much more attractive and well-paid jobs to go to. A vicious circle indeed.

But what answer did I give to the interviewer's question: should we be worried about the drop in maths A-level entries? Does the UK really need more accountants and actuaries?



Useful after all... (Image from [DHD photo gallery](#))

Well, I didn't mention ANY of the above statistics at all. Reciting numbers and percentages on radio doesn't make any impact at all, unfortunately. Instead, I made an impassioned case for the fact that mathematics isn't simply about accountants and actuaries: maths is of huge importance to almost every area of science and commerce, and increasing the number of pupils studying maths at A-level is vital to the health of this country's economy. Most people who were listening to the radio programme wouldn't have known that maths is absolutely intrinsic to the study of engineering, physics, economics, bioinformatics (e.g., the Genome Project), geophysics, environmental studies, computing, retail management, modern medical advances, weather forecasting, finance, car and plane design, ... I could go on for ever. The computer, on which the world economy is now completely dependent, was invented and created by mathematicians.

So, it really is important that as many people as possible understand maths, or at least understand its relevance to the real world, and so we must try to maintain and increase the numbers studying maths at A-level. One of the main purposes of *Plus* is to help people understand that maths is not just an abstract subject but has real importance in the modern world.

A new AS-level, called "Use of Mathematics", has recently been introduced, though as yet it hasn't had many takers. The Government hopes that it will encourage more pupils to continue studying mathematics beyond GCSE: its purpose is to introduce pupils to some of the applications of maths without necessarily going into all the technical details. It's aimed at those who aren't intending to study maths at University level but who might well need to use it for some of their studies – biologists and economics students, for example. I applaud the introduction of this new exam in the hope that more people will learn and understand why maths is so vital.

Have you anything to say that might be of interest to *Plus* readers? E-mail plus@maths.cam.ac.uk.



Plus is part of the family of activities in the Millennium Mathematics Project, which also includes the NRICH and MOTIVATE sites.