

**Public School Math in Atlantic Canada
Preparing the Scientists, Health Professionals and Engineers of Tomorrow**

A Letter to the Editors of Atlantic Canada Newspapers

by

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A few weeks ago, more than 800 young men and women in Atlantic Canada who had intended to take a university calculus course this fall were prevented from doing so because they failed a placement test requiring a knowledge of rudimentary mathematical skills. Students required to take calculus at the post-secondary level are generally those who desire a career in business, engineering, health, science or some other field where high quantitative skills are a necessity. Students who fail or are denied entry to calculus face difficult choices, including delays in academic progress, extra costs, and even revision of career choices.

For years across our region, failure rates in first year calculus courses have been too high (roughly 25% on average). These failures carry a high cost for the individuals involved and for society at large. In response to this sad state, many universities are now diverting expensive resources from their core mandate toward remedial programs that seem inappropriate at institutions of “higher learning.” One can only guess at the long term costs to society which loses future engineers, business leaders, medical doctors, scientists.

The current trend in high school mathematics education, which now emphasizes a general, “user friendly” approach to mathematics, is already having a strong influence in our region. The “new curriculum” which is working its way through the system was the subject of a much-publicized document by the Atlantic Provinces Council on the Sciences (APICS) last spring. (This document is available at www.math.mun.ca/apics/hscurr4.pdf.)

While we recognize the rationale behind the new approach, we remain concerned that care be taken to prepare properly the engineers and scientists of tomorrow. A mathematics curriculum must give students a solid basic training in algebra and geometry, training which includes conceptual understanding and demands technical proficiency. You can't learn mathematics without a lot of practice and repetitive tasks: like musicians and athletes who train every day, Canada's future scientists, engineers and computer hot-shots need to practise too.

We acknowledge that provincial departments of education, curriculum designers and high school teachers face huge challenges. Opinions on what should be taught and by what methods are by no means uniform. Classes are large; student abilities are diverse; some classes are disrupted by behavioural problems; some students face home problems that dwarf academic concerns.

Nevertheless, all participants in the educational process, including students and parents, have responsibilities. How much homework is assigned and how much is done on a regular basis? If a student has no math homework, even at the junior high level, there is already a problem. If students, without thinking, reach for a calculator to answer even the simplest of arithmetical questions ($1/2+1/3?$), there is a problem. Compare what you are being taught with what your next door neighbour who is going to college says you should know and if there is a difference, ask why!

The APICS Mathematics and Statistics Committee is ready at all times to help improve educational achievement levels in this region. University professors are always ready to participate on curriculum

committees which, unfortunately, sometimes contain no mathematicians. University professors have repeatedly demonstrated their desire to contribute to curriculum round table discussions, when and if invited to do so.

In addition to the report we prepared last spring, our Committee has prepared a booklet outlining the concepts and skills required for success in first year calculus (www.math.mun.ca/apics/calculus/). We know of no better indication that a curriculum is doing its job and of the likelihood of success in post-high school mathematics than demonstrated competence with the topics highlighted in this booklet. With humility, we also suggest that this booklet might be used as a reminder to teachers and curriculum designers of the things students are expected to know when they enter math courses at the post-secondary level.

Over a short period of time, with hard work, dedicated teachers, supportive parents and additional attention to curriculum issues, placement tests could disappear and failure rates in math courses could drop dramatically. Imagine thousands of our young people, marching confidently through all their college mathematics courses, instead of being cheated by circumstances beyond their control. Bring on the day!