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## How much math do we really need?

By G.V. Ramanathan

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Twenty-seven years have passed since the publication of the report "[A Nation at Risk](#)," which warned of dire consequences if we did not reform our educational system. This report, not unlike the Sputnik scare of the 1950s, offered tremendous opportunities to universities and colleges to create and sell mathematics education programs.

Unfortunately, the marketing of math has become similar to the marketing of creams to whiten teeth, gels to grow hair and regimens to build a beautiful body.

There are three steps to this kind of aggressive marketing. The first is to convince people that white teeth, a full head of hair and a sculpted physique are essential to a good life. The second is to embarrass those who do not possess them. The third is to make people think that, since a good life is their right, they must buy these products.

So it is with math education. A lot of effort and money has been spent to make mathematics seem essential to everybody's daily life. There are even calculus textbooks showing how to calculate -- I am not making this up and in fact I taught from such a book -- the rate at which the fluid level in a martini glass will go down, assuming, of course, that one sips differentially. Elementary math books have to be stuffed with such contrived applications; otherwise they won't be published.

You can see attempts at embarrassing the public in popular books written by mathematicians bemoaning the innumeracy of common folk and how it is supposed to be costing billions; books about how mathematicians have a more clever way of reading the newspaper than the masses; and studies purportedly showing how much dumber our kids are than those in Europe and Asia.

As for the third, even people who used to proudly proclaim their mathematical innocence do not wish to abridge the rights of their children to a good life. They now participate in family math and send the kids to math camps, convinced that the path to good citizenship is through math.

We need to ask two questions. First, how effective are these educational creams and gels? With generous government grants over the past 25 years, countless courses and conferences have been invented and books written on how to teach teachers to teach.

But where is the evidence that these efforts have helped students? A [2008 review by the Education Department](#) found that the nation is at "greater risk now" than it was in 1983, and the National Assessment of Educational Progress math scores for 17-year-olds have remained stagnant since the 1980s.

The second question is more fundamental: How much math do you really need in everyday life? Ask yourself that -- and also the next 10 people you meet, say, your plumber, your lawyer, your grocer, your mechanic, your physician or even a math teacher.

Unlike literature, history, politics and music, math has little relevance to everyday life. That courses such as "Quantitative Reasoning" improve critical thinking is an unsubstantiated myth. All the mathematics one needs in real life can be learned in early years without much fuss. Most adults have no contact with math at work, nor do they curl up with an algebra book for relaxation.

Those who do love math and science have been doing very well. Our graduate schools are the best in the world. This "nation at risk" has produced about 140 Nobel laureates since 1983 (about as many as before 1983).

As for the rest, there is no obligation to love math any more than grammar, composition, curfew or washing up after dinner. Why create a need to make it palatable to all and spend taxpayers' money on pointless endeavors without demonstrable results or accountability?

We survived the "New Math" of the 1960s. We will probably survive this math evangelism as well -- thanks to the irrelevance of pedagogical innovation.

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How much math do you need to know to deal with string theory? It depends. The basics should be comprehensible to anyone with a background in advanced QFT (Quantum Field Theory), which itself requires a background in relativistic Quantum Mechanics which again requires a background in non-relativistic QM and tensor calculus. So that's™s maths, maths and some more maths. But nothing crazy hard. As for advanced string theory, you do need to know some advanced (and by that, I mean actually hard) mathematics stuff like differential geometry, algebraic topology, group theory, knot theory and category . how does math explain god, and yes we do need it even though its mind numbing it is or could help one day. May 4, 2010 9:08pm. SaintJude 44 posts.Â Good movement requires more than balance, you need an awareness of your surrounding only possible with spatial reasoning. Simplistic example is football/soccer, you need to know more than just how to move your body, you need to know where your teammates are, the opposing team is, predict their paths and actions and react accordingly on the fly. Athletics, even in single man sports, requires a great deal of spatial reasoning and one of the easiest way of improving spatial reasoning is with math (it also gives you number sense, an invaluable life skill). \* \*