

THE MATH MYTH

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The **math myth** is the myth that the future of the American economy is dependent upon the masses having higher mathematics skills. This myth goes back to at least Sputnik, when the Russians were going to surpass us because they were better in math and science. It returned in the late 80's when the Germans and Japanese were going to surpass us because they were better in math and science. It's occurring again now because the Indians and Chinese are better than us in math and science.

I find it difficult to find anyone who uses more than Excel and eighth grade level mathematics (=arithmetic, and a little bit of algebra, statistics and programming). In the summer of 2007 I taught an advanced geometry course and had two students in the class who had been engineers and one who had been an actuary. They claimed never to have used anything beyond Excel and eighth grade level mathematics; never a trig function or even a log or exponential function! There is in fact a deskilling going on in our

economy, where even the ability to make change is about to disappear as an important skill.

Vivek Wadhwa has described how there's no shortage of scientists and engineers (see:

http://www.businessweek.com/print/smallbiz/content/oct2007/sb20071025_827398.htm

I've been concerned with what skills those who are working as scientists and engineers actually use. I find that the vast majority of scientists, engineers and actuaries only use Excel and eighth grade level mathematics. This suggests that most jobs that currently require advanced technical degrees are using that requirement simply as a filter. In particular, I'm working on documenting the following:

Math Myth Conjecture: If one restricts one's attention to the hardest cases, namely, graduates of top engineering schools such as MIT, RPI, Cal. Tech., Georgia Tech., etc., then the percent of such individuals holding engineering as opposed to management, financial or other positions, and using more than Excel and eighth grade level mathematics (arithmetic, a little bit of algebra, a little bit of statistics, and a little bit of programming) is less than 25% and possibly less than 10%.

This is a conjecture that desperately needs resolving with solid statistics and in-depth interviews. If it holds up, the educational implications **should** be revolutionary. In particular, it undermines the **legitimacy** of requiring higher mathematics of **all** students.

Such mathematics is actually **needed** by only a minute fraction of the workforce.

There are two counter-arguments. The first is that higher mathematics is central to a serious higher education. This argument I agree with. Any Harvard undergraduate majoring in philosophy would certainly want to be able to understand Roger Penrose's book ***The Road to Reality***. Unfortunately, that type of student is only a minute fraction of higher education. It is both unreasonable and unworkable to insist that all students get such training.

The second argument is the one I always hear around the mathematics department: ***mathematics helps you to think clearly***. I have a very low opinion of this self-serving nonsense. In sports there is the concept of ***the specificity of skills: if you want to improve your racquetball game, don't practice squash!*** I believe the same holds true for intellectual skills. In any case, the case for transference of mathematical skills is unsettled. Moreover, mathematics is of little use in most problems of ordinary life. For example, mathematics could be of help in computing the costs of having children; but is useless in computing the benefits!