Cape Cod Times
FORUM

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★ SUNDAY, JANUARY 2, 2005

Math does, in fact, make a difference in life

The precision of math helps refine how we think in a very special way.

By ARTHUR MICHELSON
SPECIAL TO THE LOS ANGELES TIMES

American middle school students don't much care that they're worse at math than their counterparts in Hong Kong and Finland. "I don't need it," my students say. "I'm gonna be a basketball star." Or a beautician, or a car mechanic, or a singer.

It's also hard to get much of a rise out of adults over the fact, released earlier this year, that the United States ranked 28th out of 41 countries whose middle school students' math skills were tested by the Organization for Economic Cooperation and Development. So what if we're tied with Latvia, while nations such as Japan and South Korea leave us in the dust? After all, when was the last time you used algebra?

But math is not just about computing quadratic equations, knowing geometric proofs or balancing a checkbook. And it's not just about training Americans to become scientists.

It has implicit value. It is about discipline, precision, thoroughness and meticulous analysis. It helps you see patterns, develops your logic skills, teaches you to concentrate and to separate truth from falsehood. These are abilities and qualities that distinguish successful people.

Math helps you make wise financial decisions, but also informs you so you can avoid false claims from advertisers, politicians and others. It helps you determine risk. Some examples:

■ If a fair coin is tossed and eight heads come up in a row, most adults would gamble that the next toss would come up tails. But a coin has no memory. There is always a 50-50 chance. See you at the casino?

■ If you have no sense of big numbers, you can't evaluate the consequences of how government spends your money. Why should we worry? Let our kids deal with it. ...

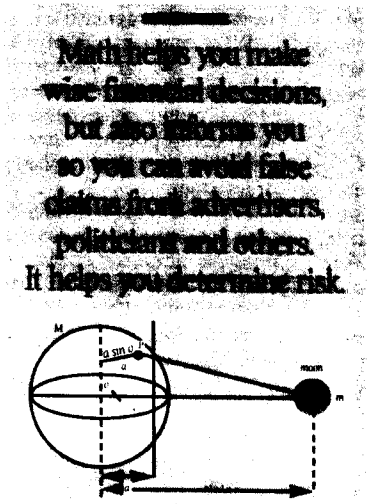
■ Enormous amounts of money are spent on quack medicine. Many people will reject sound scientific studies on drugs or nutrition if the results don't fit their preconceived notions, yet they might leap to action after reading news stories on the results of small, inconclusive or poorly run studies.

■ After an airplane crash, studies show that people are more likely to drive than take a plane in spite of the fact that they are much more likely to be killed or injured while driving. Planes are not like copycat criminals. A plane is not more likely to crash just because another recently did. In fact, the most dangerous time to drive is probably right after a plane crash because so many more people are on the road.

The precision of math, like poetry, gets to the heart of things. It can increase our awareness.

Consider the Fibonacci series, in which each number is the sum of the preceding two, (0, 1, 1, 2, 3, 5, 8, 13...). Comparing each successive pair yields a relationship known as the Golden Ratio, which often shows up in nature and art. It's the mathematical

Please see MATH /E-5



Math: Proofs rest in nature

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underpinning of what we consider beautiful. You'll find it in the design of the Parthenon and the Mona Lisa, as well as in human proportion; for instance, in the size of the hand compared with the forearm and the forearm to the entire arm.

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> Stephen Hawking's editor

warned him that for every mathematical formula he wrote in a book, he would lose much of his audience. Yet more than a little is lost by dumbing things down.

It is not possible to really understand science and the scientific method without understanding math. A rainbow is even more beautiful and amazing when we understand it. So is a lightning bolt, an ant or ourselves.

Math gives us a powerful tool to understand our universe. I don't wish to overstate: Poetry, music, literature and the fine and performing arts are also gateways to beauty. Nothing we study is a waste. But the precision of math helps refine how we think in a very special way.

How do we revitalize the learning of math? I don't have the big answer. I teach middle school and try to find an answer one child at a time. When I can get one to say, "Wow, that's tight," I feel the joy of a small victory.

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