The BIG SIGMAA News

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Business, Industry, and Government Special Interest Group of the Mathematical Association of America

Special points of interest:

Thanks as always to Collin Carbano for the interesting and beautiful artwork.

If you would like to contribute an article, a poem, a puzzle, or anything else to future issues of the BIG SIGMAA newsletter, please let me know.

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In this issue

BIG Events in San Antonio in January

The 2015 edition of the Joint Mathematics Meetings was held in San Antonio from January 10 through January 13, with over 6,000 attendees. While the weather was possibly not up to San Antonio's usual standard, the mathematics talks were informative and enjoyable and, at time, amusing. Jordan Ellenberg's talk on issues with the Massachusetts's lottery (among other things) was particularly interesting, and Ronald Graham's impromptu Gibbs lecture on mathematics and computers was memorable. (The planned Gibbs lecturer, Daniel Spielman, became ill at the last minute.)

The BIG SIGMAA contributed paper session was on Sunday afternoon. Nine speakers talked about their experiences in using mathematics in government or industry work. Many of the talks involved the use of mathematical models to represent real-world phenomena, including the flight of a missile, vapor intrusion from ground water contaminants, a particular person's likelihood to be a terrorist, long-term trends in crime rates with seasonal adjustments, and the occurrence of potholes. Elizabeth Bouzarth from Furman University described how a class trip to Walt Disney World provided a setting for students to learn about a variety of business problems that involve applications of mathematics, including the traveling salesman problem, issues with resource allocation, and factors involved in setting training schedules for cruise ship staff.

The BIG SIGMAA guest lecture was on Sunday evening. Dr. Kyle Myers from the FDA talked about mathematical challenges associated with medical imaging and new computer-aided diagnosis algorithms for

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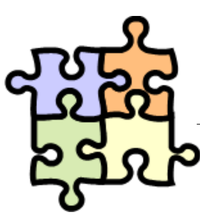
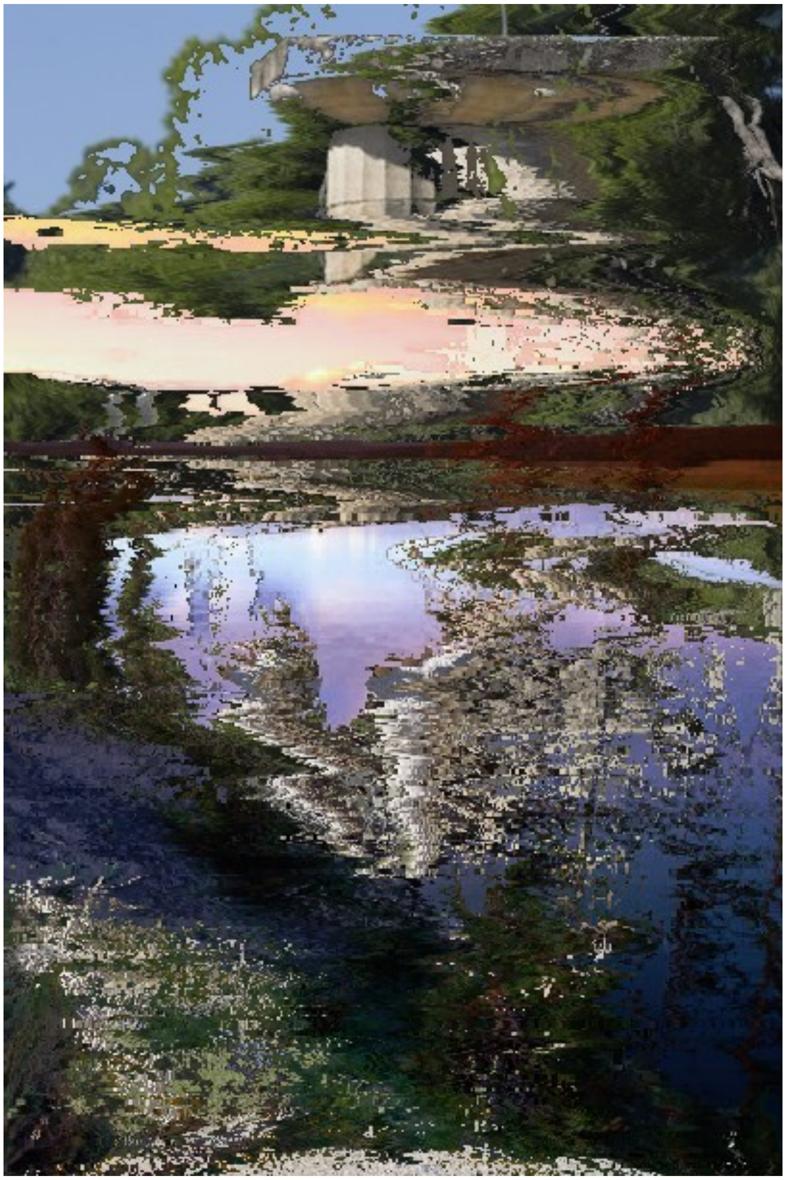


The Puzzle Corner

This is a well-known problem from the internet:

Find prime numbers x, y, and z such that $x^2 + y^3 = z^4$, or else prove that such numbers do not exist.

Solution on page 4.



Temple of Sets Collin Carbano

E = MC²

Morris Bishop

What was our trust, we trust not,
What was our faith, we doubt;
Whether we must or not
We may debate about.
The soul, perhaps, is a gust of gas
And wrong is a form of right-
But we know that Energy equals Mass
By the Square of the Speed of Light.

What we have known, we know not,
What we have proved, abjure.
Life is a tangled bowknot,
But one thing still is sure.
Come, little lad; come, little lass,
Your docile creed recite:
"We know that Energy equals Mass
By the Square of the Speed of Light."

A mathematician I know
Thought coffee was key to the show.
He turned it to theorems
With magical serums
And when he was done said "Just so!"

BIG Events in San Antonio (continued)

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image interpretation. A well-attended reception followed her talk.

Planning is underway for the 2016 meetings, to be held in Seattle from January 6 through January 9. The list of invited speakers can be found on the JMM website http://jointmathematicsmeetings.org/jmm . There will also be AMS Special Sessions and MAA Contributed Paper Sessions. The BIG SIGMAA contributed paper session will be on Friday afternoon. If you would like to present a paper to the BIG SIGMAA session or any other session, you need to submit an abstract by September 22. Just go to the JMM website, click the link *MAA Call for Contributed Papers*, and follow the instructions at the bottom of the page.

Mathematical Quotations

Alice laughed: “There’s no use trying,” she said; “one can’t believe impossible things.”

“I daresay you haven’t had much practice,” said the Queen. “When I was younger, I always did it for half an hour a day. Why, sometimes I’ve believed as many as six impossible things before breakfast.”

Lewis Carroll

We used to think that if we knew one, we knew two, because one and one are two. We are finding that we must learn a great deal more about ‘and’.

Sir Arthur Eddington

Since the mathematicians have invaded the theory of relativity, I do not understand it myself anymore.

Albert Einstein

Mathematics is the science which uses easy words for hard ideas.

E Kasner and J Newman

Business, Industry, and Government Special Interest Group of the Mathematical Association of America

Allen Butler, Chair
Gregory Coxson, Vice Chair for Membership
Carla D. Martin, Vice Chair for Programs
James H. Fife, Vice Chair for Services
Thomas Hoft, Secretary/Treasurer

sigmaa.maa.org/big

from the MAA Website:

BIG SIGMAA serves as a unifying link between business, industry, and government mathematicians, academic mathematicians, and mathematics students. The SIGMAA provides resources and a forum for MAA members who share an interest in mathematics used in business, industry, and government, aids in professional development, helps build partnerships between industry and academics, and increases awareness of opportunities for mathematicians in business, industry, and government.

Puzzle Corner Solution

If x, y, and z are integers such that $x^2 + y^3 = z^4$, then at least one of the integers must be even. Since in our problem x, y, and z are prime, it follows that at least one of them must equal 2.

If $z = 2$, then our equation becomes $x^2 + y^3 = 16$, which is easily seen to have no solutions for which x and y are prime.

If $x = 2$, then our equation becomes $4 + y^3 = z^4$, or $y^3 = z^4 - 4 = (z^2 - 2)(z^2 + 2)$. Since y is prime, it follows that $y = z^2 - 2$ and $y^2 = z^2 + 2$. Eliminating the z^2, we have $y^2 - y - 4 = 0$, which has no integer solutions.

Finally, if $y = 2$, our equation becomes $x^2 + 8 = z^4$, or $z^4 - x^2 = 8$, or $(z^2 - x)(z^2 + x) = 8$. Since $z^2 - x$ and $z^2 + x$ are integers, it follows that $z^2 - x = 2$ and $z^2 + x = 4$. This system of equations has as its unique solution $x = 1$ and $z^2 = 3$.

Hence there are no prime numbers x, y, and z such that $x^2 + y^3 = z^4$.