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 to Collin Carbano for the interesting 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.

Jim Fife
Vice Chair for Services
jfife@ets.org

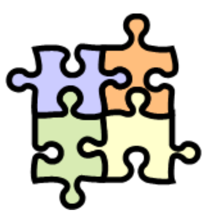
Inside this issue:

Joint Mathematics Meetings—Baltimore Meetings

The 2014 Joint Mathematics Meetings were held in Baltimore in January. Close to 6,500 mathematicians attending the meetings. Over 2,500 talks were presented, ranging in length from 10 minutes to a hour. Some of the highlights included Andrew Blake's Gibbs Lecture on machines that can see, Eitan Grinspun's Gerald and Judith Porter Lecture on the mathematics behind visual effects in movies, Helaman and Claire Ferguson's invited address "Mathematics in stone and bronze", Michael Starbird's invited address on effective thinking and mathematics, and, of course, William Noel's lecture (jointly sponsored by the BIG SIGMAA and the HOM SIGMAA) on the restoration efforts of the Archimedes Palimpsest.

In addition to Dr. Noel's lecture, there were two contributed paper sessions sponsored by the BIG SIGMAA. Carla Martin summarized the presentations recently in an article in *MAA FOCUS*.

Next year the Joint Meetings will be in San Antonio, where the average high temperature in January is 63°F. If you live in the colder parts of the country (and you anticipate a winter in 2015 like the winter in 2014), then there's nothing quite like a pleasant January evening stroll along San Antonio's Riverwalk. There will also be plenty of exciting talks at the San Antonio meetings; keep checking the MAA website for details. If you'd like to give a talk at the BIG SIGMAA contributed paper session, the deadline for submissions is September 16.



The Puzzle Corner

The sum of the reciprocals of two real numbers is -1 and the sum of their cubes is 4. What are the two numbers?

See the solution on page 4.

Two Limericks

There was a young woman from Bath
Who tried to learn music and math.
But her quavers would quiver
And equations would give her
A fit, till she found her own path.

A man in an ivory tower
Dreamed of pi to the 200th power.
(This is apt to occur
When you mix a liqueur
With clams at a very late hour.)

from the Internet

Seeing Pine Trees by Caleb Emmons

a	a
poet	mathematician
seeing	seeing
pine trees	pine trees
investigates	investigates
puzzle bark questions	puzzled by patterns
fingertips, palm	in growth, bark, history
live needles fingered	he counts, diagrams
like a lover's beard	weighs forces:
dead lodged in bare feet's	earth draws down 9.8 m/s^2
prick of consciousness	sun draws up, roots draw in
amber sap, yellow pollen	needles burst forth to maximize area
chews pine nut or brews a yellow needle tea	pine cones burrow golden spirals in his brain
maybe he has a book, or knows the names	maybe he has a book, or knows the names
feels them roll like rounded river stones	oracular names which spell their
or thump like hollow wood	meanings in themselves
ponderosa, *bristlecone*, *jeffrey*, or *sugar pine*	geotropism, phototropism, morphogenesis, or phyllotaxis
then in verse he feels his life among the trees	then in equation he feels his life among the trees
drawing inside out & outside in	drawing inside out & outside in
he	he
begins	begins
"a poet	"let φ
seeing	be the
pine	positive root
trees...."	of $x^2 - x - 1 = 0$...."

Emmons, Caleb (2011). "Seeing Pine Trees," *Journal of Humanistic Mathematics*, Vol. 1, No. 1, p. 153

DOI: 10.5642/jhummath.201101.11 Available at: http://scholarship.claremont.edu/jhm/vol1/iss1/11

Mathematical Quotations

I have had my results for a long time: but I do not yet know how I am to arrive at them.

— Karl Friedrich Gauss

"Since the mathematicians have invaded the theory of relativity I do not understand it myself any more."

— Albert Einstein

"It is the story that matters not just the ending."

— Paul Lockhart

It's like asking why is Ludwig van Beethoven's Ninth Symphony beautiful. If you don't see why, someone can't tell you. I know numbers are beautiful. If they aren't beautiful, nothing is."

— Paul Erdos

Converting a Table to a List in Excel

Have you ever had a table in Excel that you wanted to convert into a list, perhaps because you wanted to order the entries or perform some other analysis? Here's a way to do that quickly.

Assume that the table is in Sheet 1 of your spreadsheet. The column headers are in Row 1 and the row headers are in Column A. The table itself begins in cell B2. Let

R = number of rows in the table,
C = number of columns in the table, and
$N = RC$.

We will convert the table to a list in Sheet 2. In sheet 2, do the following:

In cell A2, select the ROWS function. For the argument, select the table in sheet 1 (without headers).

In cell A3, select the COLUMNS function. For the argument, select the table in sheet 1 (without headers).

In cell A4, type "`=a2*a3`".

Type the following headers in Row 1, beginning in cell B1:

Index
Row #
Column #
Row H
Column H
Entry

In column B, under **Index**, enter the numbers from 1 to N by entering 1 in cell A2, 2 in cell A3, and then using the drag handle to fill in the rest of the numbers. N is the number in cell A4.

To calculate what should go in columns C and D, we divide the index i by the number of columns C; the entry in column C, r, is 1 more than the quotient, and the entry in column D, c, is the remainder. That is, r and c are related to i and C by the equation

$$i/C = r - 1 + c/C$$

We can obtain r by rounding i up to the nearest multiple of C and then dividing by C; this can be accomplished in Excel with the CEILING function. Therefore,

In cell C2, type "`=ceiling(b2,$a$3)/$a$3`".

In cell D2, type "`=b2+$a$3*(1-c2)`".

In cell E2, select the INDEX function. For the first argument, select the array of row headers ($$) for the table in sheet 1 (the entries in the first column); for the second argument select C2; leave the third argument blank.

In cell F2, select the INDEX function. For the first argument, select the array of column headers ($$) for the table in sheet 1 (the entries in the first row); leave the second argument blank; for the third argument, select D2.

In cell G2, select the INDEX function. For the first argument, select the table ($$) in sheet 1 (without the headers); for the second argument, select C2; for the third argument, select D2.

Extend columns C – G to the end.

Geometry by Rita Dove

I prove a theorem and the house expands:
the windows jerk free to hover near the ceiling,
the ceiling floats away with a sigh.

As the walls clear themselves of everything
but transparency, the scent of carnations
leaves with them. I am out in the open

and above the windows have hinged into butterflies,
sunlight glinting where they've intersected.
They are going to some point true and unproven.

Golden Plants by Carlin Carbono

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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.

Solution to the Puzzle Corner

The sum of the reciprocals of two real numbers is -1 and the sum of their cubes is 4. What are the two numbers?

Let the numbers be x and y. Then

$$\frac{1}{x}+\frac{1}{y}=-1 \tag{1}$$

and

$$x^3+y^3=4. \tag{2}$$

From (1) we have

$$x+y=-xy. \tag{3}$$

Factoring $x^3+y^3=(x+y)(x^2-xy+y^2)$ and combining with (3), equation (2) becomes

$$(x+y)\left((x+y)^2-3xy\right)=4. \tag{4}$$

Let $a=x+y$; then $xy=-a$ by (3) and substituting a into (4) yields $a\left(a^2+3a\right)=4$ or $(a-1)(a+2)^2=0$. It follows that $a=1$ or $a=-2$.

If $a=1$, then $x+y=1$ and $xy=-1$, so that $x(1-x)=-1$, or $x^2-x-1=0$. From this it follows that $x=\left(1+\sqrt{5}\right)/2$ and $y=\left(1-\sqrt{5}\right)/2$ (or *vice versa*).

On the other hand, if $a=-2$, then $x+y=-2$ and $xy=2$, so that $x(-2-x)=2$ or $x^2+2x+2=0$. This equation has no real solutions. Thus $\left(1+\sqrt{5}\right)/2\approx 1.61803$ and $\left(1-\sqrt{5}\right)/2\approx -0.61803$ are the only two real numbers for which the sum of their reciprocals is - 1 and the sum of their cubes is 4.