

The BIG SIGMAA News

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

BIG Events in San Antonio in January

Special points of interest:

Thanks again 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 In January mathematicians of the world will be converging on warm and sunny (we hope!) San Antonio. The Joint Mathematics Meetings will be held January 10 - 13 at the San Antonio Convention Center on the famous San Antonio Riverwalk. JMM claims to be the largest mathematical meeting in the world; last year nearly 6,500 mathematicians attended the meetings in Baltimore. This year there's an exciting lineup of invited speakers and, of course, lots of interesting sessions of shorter talks. You can find the details on the JMM website (http://jointmathematicsmeetings.org/ meetings/national/jmm2015/2168 intro), including short biographies of the invited speakers.

The BIG SIGMAA will have a BIG presence at the meetings, as always. The BIG contributed paper session will be on Sunday afternoon, January 11, from 1:00 to 4:15. Ten speakers will talk about a variety of topics; here is the list of speakers and the titles of their papers (where papers have multiple authors, I've just listed the principle author.)

- Thomas Höft, *Noise removal in Fourier transform profilometry*
- Michelle Ghrist, *The Adventures of an* Academic Working as an Analyst for the Air Force
- Stephanie Fitchett, Is my indoor air affected by vapor intrusion? If so, is it dangerous?
- William P. Fox, Ranking terrorists as targets using a hybrid AHP-TOPSIS methodology

Erik Bates, Long-term crime forecasting (Continued on page 3)

Inside this issue:

Centers of Attraction by Collin Carbano	2
Two Fibs	2
Mathematical Quota-	2
Box-and-Whisker	3
Puzzle Corner Solu- tion	4



The Puzzle Corner

Seve !

What is the smallest positive integer with the following properties?

When divided by 2, its remainder is 1. When divided by 3, its remainder is 2. When divided by 4, its remainder is 3. When divided by 5, its remainder is 4. When divided by 6, its remainder is 5. When divided by 7, its remainder is 6. When divided by 8, its remainder is 7. When divided by 9, its remainder is 8. When divided by 10, its remainder is 9.

Solution on page 4.

The BIG SIGMAA News

Page 2



Two Fibs

A *fib* is a six- to eight-line poem in which the number of syllables in each line form the Fibonacci sequence 1-1-2-3-5-8-13-21. The name is due to Gregory Pincus, a Los Angeles writer, who kindled (or rekindled) interest in fibs after he composed one for his blog. Here are two mathematics-related fibs.

A

math person is one who sees patterns in life and organizes them into a vast array of structures that show us their meaning.

I sit inside on a cold winter's day and do mathematics for fun and drink tea and eat donuts that I turn into coffee cups.

Centers of Attraction by Carlin Carbono

Mathematical Quotations

If I were again beginning my studies, I would follow the advice of Plato and start with mathematics.

—Galileo Galilei

Do not worry about your difficulties in Mathematics. I can assure you mine are still greater.

-Albert Einstein

Mathematics as an expression of the human mind reflects the active will, the contemplative reason, and the desire for aesthetic perfection. Its basic elements are logic and intuition, analysis and construction, generality and individuality.

-Richard Courant

Everyone knows what a curve is, until he has studied enough mathematics to become confused through the countless number of possible exceptions.

—Felix Klein

The definition of a good mathematical problem is the mathematics it generates rather than the problem itself.

-Andrew Wiles

Mathematics may be defined as the subject in which we never know what we are talking about, nor whether what we are saying is true.

-Bertrand Russell

God exists since mathematics is consistent, and the Devil exists since we cannot prove it.

—Andre Weil

If you listen to the great Beatle records, the earliest ones where the lyrics are incredibly simple. Why are they still beautiful? Well, they're beautifully sung, beautifully played, and the mathematics in them is elegant. They retain their elegance.

-Bruce Springsteen

The Theory of Groups is a branch of mathematics in which one does something to something and then compares the result with the result obtained from doing the same thing to something else, or something else to the same thing.

—James Newman

Mathematicians are like Frenchmen: whatever you say to them they translate into their own language and forthwith it is something entirely different.

- Johann Wolfgang von Goethe

BIG Events in San Antonio in January (continued)

(Continued from page 1)

and setting crime reduction targets

Candice Rockell Gerster, The Future of Image/ Video Feature Detection

Adam H. Fuller. Math in the Citv

Omayra Ortega, Methodologies for Statistical Analysis of the Effects of Drug Use on Hidden Populations

James H. Fife, Automated Scoring of Graphs

Elizabeth L Bouzarth, Math and the Mouse: Explorations of Mathematics and Science at Walt Disney World

Abstracts of all these talks are available on the JMM

website.

Late Sunday afternoon, Dr. Kyle Myers, from the Center for Devices and Radiological Health (US Food and Drug Administration) will present the BIG SIGMAA guest lecture; the title of her talk will be Mathematical challenges in the evaluation of medical imaging. After her talk there will be a reception, followed by the annual BIG SIGMAA business meeting. All BIG SIGMAA members are encouraged to attend the business meeting.

You can register in advance for the meetings until December 23, and you can register and reserve housing until December 17, but it's best to register before November 18. If you do, the meeting program and your meeting badge will be mailed to you before the meetings and you'll have a better chance of obtaining the hotel of your choice.

We hope as many BIG SIGMAA members as possible can attend the meetings. San Antonio can be a great place to visit in January (especially if you live in a cold climate) and you can easily turn the trip into a short vacation.

Box-and-Whisker Plots in Excel 2007

While the method is not straightforward, it's possible to construct box-and-whisker plots in Excel. The following instructions assume that you want to create box-andwhisker plots for from one to five sets of data. The data are in the first five columns of the worksheet, with headers in the first row. The instructions can be modified if there are more than five sets of data.

- 1 In cell F1, enter a new header: Quartile. Under the **Ouartile** header enter the following row headers: 0, 1, 2, 3, 4, Min, Q1, Med, Q3, Max.
- Beginning in cell G1, copy the head-2 ers from the data table.
- 3 In cell G2 select the QUARTILE function. For the first argument, select the array A\$2:A\$x, where x is the length of the longest of the data columns. For the second argument select the cell \$F2.
- 4. Extend down four rows (through cell G6).
- 5. In cell G7, enter "=g3-g2".
- In cell G8, enter "=g3". 6.

- In cell G9, enter "=g4-g3" 7.
- Extend cell G9 down two rows 8 (through cell G11), so that, for example, cell G11 contains "=G6-G5".
- 9. Extend the array G2:G11 to the right to the end of the table.
- 10. Using the Control key, select the headers in the new table (including Quartile) and rows 8-10 (including the row headers Q1, Med, and Q3).
- 11. Click the Insert tab. In the Charts section of the Insert ribbon, click Column, then click Stacked column (the second option).
- 12. The column chart should contain one column for each column of data. If necessary, click the Design tab, and in the Data section of the Design ribbon click Switch Row/Column.
- 13. In the chart, select the Q1 series. Click the Layout tab, and in the Analysis section of the Layout ribbon click Error Bars. Select More Error Bars Options.
- 14. The Format Error Bars window

will display, with the Vertical Error Bars option selected. In the Display section, select Minus. In the Error Amount section, select Custom and click the Specify Value button.

- 15. The Custom Error Bars window will display. Leave the Positive Error Value as it is. In the Negative Error Value field, click the .
 - button.
- 16. Select the cells in row 7 of the new table (the row labeled Min). (Do not select the row header.) In the Custom Error Bars window click

the button, then click OK. In the Format Error Bars window, click Close.

- 17. In the chart, select the Q3 series. Click the Layout tab, and in the Analysis section of the Layout ribbon click Error Bars. Select More Error Bars Options.
- 18. The Format Error Bars window

(Continued on page 4)

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

Business + Industry + Government Special Interest Group of the MAA 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.

Box-and-Whisker Plots in Excel 2007 (continued)

(Continued from page 3)

will display, with the Vertical Error Bars option selected. In the Display section, select Plus. In the Error Amount section, select Custom and click the Specify Value button.

 The Custom Error Bars window will display. Leave the Negative Error Value as it is. In the Positive Error

Value field, click the button.

Select the cells in row 11 of the new table (the cells labeled Max). In the Custom Error Bars window click the

button, then click **OK**. In the **Format Error Bars** window, click **Close**.

21. In the chart, select the Q1 series. Right -click on the series and select Format

Data Series.

- 22. The Format Data Series window will display. Select the Fill option and select No fill. Select the Border Color option and select No line. Click Close.
- 23. In the chart, select the **Med** series. Right-click on the series and select **Format Data Series**.
- 24. The Format Data Series window will display. Select the Fill option and select No fill. Select the Border Color option and select Solid line. For Color select black. Click Close.
- 25. Repeat steps 23 and 24 for the Q3 series.
- 26. Select the Legend and delete.
- 27. Select the Gridlines and delete.

- 28. If you want to add a title to the chart, click the Layout tab, then in the Labels section of the Layout ribbon click Chart Title and then select Above Chart. Enter the desired title.
- 29. If you want to add axis labels, click the **Layout** tab, then in the **Labels** section of the Layout ribbon click **Axis Titles**.
 - a. To add a title to the horizontal axis, click **Primary horizontal axis title** and then select **Title Below Axis**. Enter the desired title and format as appropriate.
 - b. To add a title to the vertical axis, click **Primary vertical axis title** and then select **Rotated Title**. Enter the desired title.
- 30. If desired, format the chart as appropriate.

Puzzle Corner Solution

The puzzle can be solved by brute force, of course, but here is a more interesting solution.

Let x be the number. Then $x = 2q_1 + 1$ for some integer q_1 , and hence

 $x + 1 = 2q_1 + 2 = 2(q_1 + 1).$

Thus x + 1 is a multiple of 2. Similarly,

 $x = 3q_2 + 2$ for some integer q_2 , and hence

$$x + 1 = 3q_2 + 3 = 3(q_2 + 1).$$

Thus x + 1 is a multiple of 3. In the same way, x + 1 is a multiple of 4, 5, 6, 7, 8, 9, and 10.

Since x + 1 is the smallest such number, it follows that

x + 1 = LCM(2,3,4,5,6,7,8,9,10)= 23×32×5×7 = 2520.

Therefore
$$x = 2520 - 1 = 2519$$
.