Augarithms

AUGSBURG COLLEGE

Vol. 16, No.10 Visit us at augsburg.edu/math/ March 12, 2003

Colloquium Series Dates for Spring, 2003

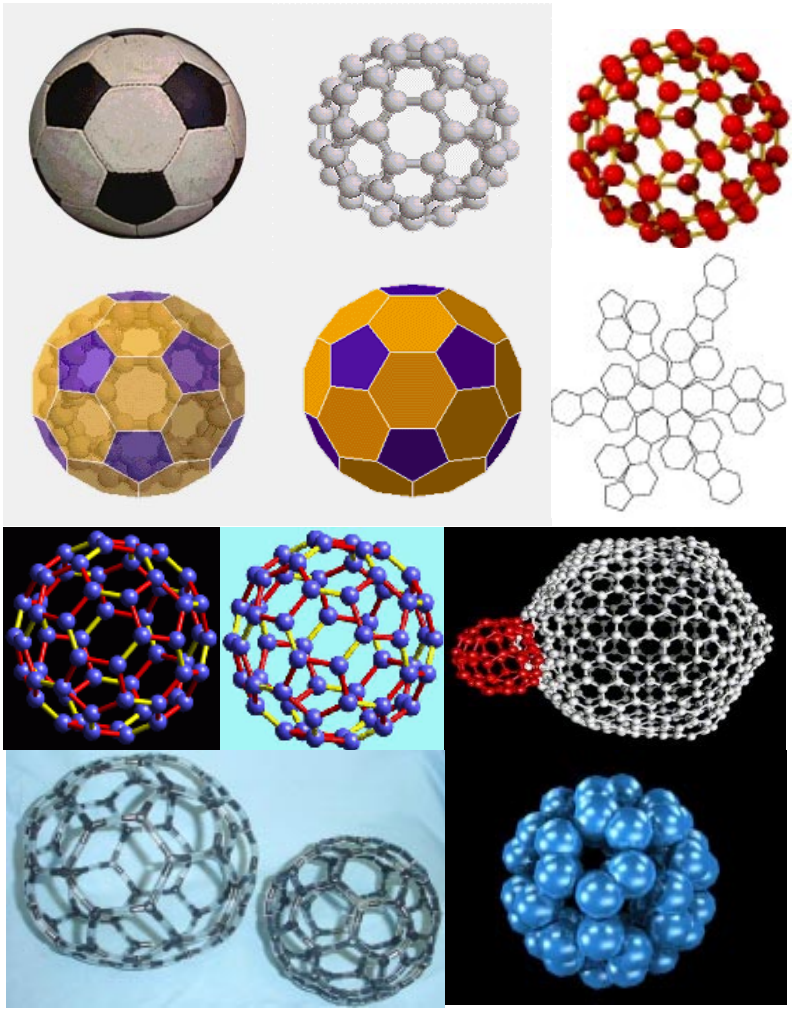
Colloquia are held on Wednesdays from 3:40 to 4:40 p.m. in Science 108. Here is the tentative schedule for 2002-2003:

Wed.	Mar.	12	Laura Chihara, Carleton College*
Wed.	Mar.	26	Nick Coult, Matt Haines, & Ken Kaminsky, Augsburg College
Wed.	Apr.	9	Augsburg Students
Wed.	Apr.	16	Augsburg Students

*This week's talk: ***Mathematics and the Buckyball***

by Laura Chihara, Carleton College

Buckminsterfullerine, or Buckyball, is a molecule made up of 60 carbon atoms. Ever since its discovery in the 1980's, chemists and physicists have been very interested in its properties and potential applications. One of Buckyball's distinctive features is its highly symmetric structure. In this talk, we will look at the Buckyball from a geometric, algebraic and combinatorial viewpoint.



Puzzle & Problem...

PUZZLE SECTION:

Last issue's elliptical billiard table puzzle awaits sovers.

week there are two puzzles:

PUZZLE 1: What is the next letter in the sequence OTTFFSSE?

PUZZLE 2: Show that two wrongs make a right, starting with O = zero.

WRONG
+ WRONG
RIGHT

PROBLEM SECTION:

Last issue's problem birthday matching problem has not, as yet produced any solvers.

Here is this week's problem:

The surface area and the volume of a given sphere are both four-digit integers times π. What is the sphere's radius?

Send your solutions to the editor at kaminsky@augsburg.edu, or drop them in the *P & P* box just inside the math suite, SCI 137.

Augarithms is available on-line at augsburg.edu/math/augarithms/. Click on the date you want to see.

Mathcartoons.com is a website of old and new math and other cartoons by your editor. Visit at mathcartoons. com, and let us know what you think.

Augarithms

The Bi-weekly Newsletter of the Department of Mathematics at Augsburg College

2211 Riverside Avenue
Minneapolis, MN 55454

Editor.....Ken Kaminsky
e-mail address.....kaminsky@augsburg.edu

From *Dictionary of Theories**

Fubini's theorem: (early 20th century)
Named after Italian analyst, algebraist and differential geometer Guido Fubini (1879-1943), this element of **MEASURE THEORY** gives conditions for the order of integration to be reversed for an iterated integral.

If $(X, \mathcal{M}, \mu)$ and $(Y, \mathcal{N}, \nu)$ are sigma finite measure spaces and f is an integrable function with respect to $\mu \times \nu$, then

$$\int f\, d(\mu\times\nu) = \int [\int f(x, y)\, d\nu(y)]\, d\mu(x)$$
$$= \int [\int f(x, y)\, d\mu(x)]\, d\nu(y).$$

This is an extension of **TONELLI'S THEOREM**.

Reference: G B Folland, *Real Analysis (New York, 1984)*
Martha Limber

*Reprinted with permission from *Dictionary of Theories*, by Jennifer Bothamley, Visible Ink, Detroit

Dallas Banker Offers $50,000 Prize for Solution of Mathematics Problem

by Allyn Jackson*

As a banker in Dallas, Texas, **Andrew Beal** has an obvious interest in numbers. But he has another interest that is not so obvious: He is interested in the mathematical theory of numbers.

An amateur mathematics enthusiast, Beal came upon a question in number theory that even the experts can't answer. The question turns out to be at the frontier of research in the field, with connections to other deep mysteries in mathematics. To spur mathematicians to solve the problem, Beal has offered a prize of $5,000 for its solution. The prize will increase by $5,000 every year up to the amount of $50,000.

Will the Beal Prize Problem become the next Fermat's Last Theorem? Indeed, it is a generalization of that famous old problem, which Pierre de Fermat proposed over 300 years ago. Like the Fermat problem, the Beal Conjecture is easily stated: If $A^x + B^y = C^z$, then A, B, and C have a common factor. (Here all the letters represent whole numbers, with x, y, and z bigger than 2. Two numbers have a "common factor" if there is a number that divides both of them evenly. For example, 12 and 63 have a common factor of 3.)

Another resemblance between the Beal Conjecture and Fermat's Last Theorem is that both had prizes established for their solutions. In 1996, after Andrew Wiles made international headlines by presenting the number theory arsenal that finally brought down Fermat's Last Theorem, he collected the Wolfskehl Prize. Established in 1908 with funds from the will of a German physician and amateur mathematician, Paul Wolfskehl, the Wolfskehl Prize enormously increased the fame of Fermat's Last Theorem by drawing thousands of entries from all over the globe.

The article, *A Generalization of Fermat's Last Theorem: The Beal Conjecture and Prize Problem*, by Professor Daniel Mauldin, appears in the December 1997 issue of the Notices of the AMS. This article provides further details about Beal's question and its role in modern number theory. See also the web site http://www.math.unt.edu/~mauldin/beal.html.

*Reprinted with permission (http://www.ams.org/new-in/math/mathnews/beal.html)

Mathematician Biography--Yang Hui

Born around 1238, **Yang Hui** was a minor Chinese official who wrote two books, dated 1261 and 1275, which use decimal fractions (in the modern form). He refers to the work of an 11th Century mathematician Jia Xian who outlined a method of extending the calculation of square and cube roots to higher roots using what is now called the Pascal triangle. This is the first Chinese account of the Pascal triangle.

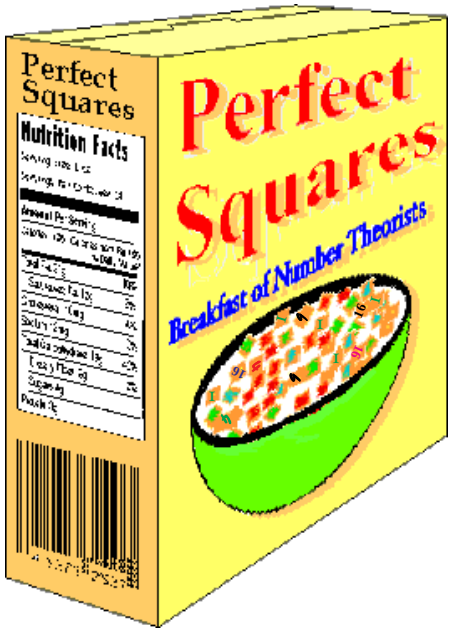
The 1275 work is called *Cheng Chu Tong Bian Ben Mo* which means Alpha and omega of variations on multiplication and division. One of the more remarkable aspects of this work is the document on mathematics education Xi Suan Gang Mu (A syllabus of mathematics) which prefaced the first chapter. Man Keung Siu writes that the syllabus:-

... is an important and unusual extant document in mathematics education in ancient China. Not only does it specify the content and the time-table of a comprehensive study program in mathematics, it also explains the rationale behind the design of such a curriculum. It emphasizes a systematic and coherent program that is based on real understanding rather than on rote learning. This program is a marked improvement on the traditional way of learning mathematics by which a student is assigned certain classical texts, to be studied one followed by the other, each for a period of one to two years!

Yang Hui died in China around 1298.

Article by: J J O'Connor and E F Robertson--reprinted with permission.

Cartoon Corner



Hey kids! Now you can eat what famous number theorists eat for breakfast. And remember, not all squares are perfect .