St. Olaf Mathematics Department

Math Mess

Department of Mathematics
St. Olaf College
Northfield, MN 55057

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This Week's Mathematics Colloquium

Title: A Voyager from the Fourth Dimension
Speaker: Paul Humke
Time: Thursday, Nov 1st, 2 p.m.
Place: SC 182

This Week's Colloquium

When speaking about THE FOURTH DIMENSION Paul Humke is invariably asked:
"How do you know this is what the 4th dimension really looks like?"

His answer is:
"I know because a linear algebra group and I used the computer to make a four dimensional world and then used the computer monitor as a window to view it."

"In fact, there is nothing magical or new in what we did (it is only elementary linear algebra), but there is a bit of magic in what you'll see."

A picture of a 4-d cube can be found at the bottom of Humke's homepage:
www.stolaf.edu/people/humke

Paul Humke came to St. Olaf *n* years ago as a Visiting Associate Professor, and found he couldn't leave. His 1972 Ph.D. is from the University of Wisconsin and he continues an active research career in real analysis. He also serves as the North American Director of the Budapest Semesters in Mathematics program and is a managing editor for the research journal, Real Analysis Exchange.

Congratulations!

Kudos to the following students, who have been selected for memberships to the MAA and AMS by the mathematics department:
MAA - Brett Werner, Anisa Xhafka, Cory Dingels, Beth Speich, Lynne Peeples, Peter Sprangers

AMS - Chris Brav, Jason Grimm, Eric Weinhandl, Jeremy Strief

Game Night

All are invited to Game Night this Friday! We will be playing some games which may be part of next spring's Games Tournamaent, including Indoor Hex and it's variations, but this will be an informal event. Other larger-scale games such as Cosmic Encounter, Settlers of Catan, or Unexploded Cow are also possibilities. The Games will take place in SC 184 starting at 7pm.

Practice Session

If you are looking for some practice for the NCS Problem Solving contest Nov 10, David Molnar will be holding a practice session Wednesday (Halloween) from 6-8 p.m. in SC 130.

Fun Website

If you'd like to try your hand at some more fun mazes such as the ones that have been appearing in the hallway outside the Math Office, try checking out www.logicmazes.com.

Last Week's Solution

Last week's problem: Prove that the equation $x^4+y^4+z^4-2y^2z^2-2z^2x^2-2x^2y^2=24$ has no solutions in integers (x,y,z).

Solution: Here's **Jerad Parish**'s solution to last week's problem. It was also correctly solved by **Jason Saccomano**.

The equation $x^4+y^4+z^4-2y^2z^2-2z^2x^2-2x^2y^2$ can be factored into
$(x + y + z) (x + y - z) (x - y + z) (x - y - z)$.

Since this has to equal 24 (an even number), up to three of these factors can be odd. Furthermore, there is no combination of 4 even factors that multiply to 24 (since 24's prime factorization is 2 * 2 * 2 * 3). Therefore 1, 2, or 3 of the factors must be odd.

If x, y, and z are all even then all of the factors are also even. If ONE of x, y, z are odd then all of the factors are odd. If TWO of x, y, z are odd then all of the factors are even again. Finally, if x, y, and z are all odd then all of the factors are odd.

Since the factors must be all odd or all even (with x, y, and z integers), there is no way that they can multiply to 24, and therefore the original equation has no solution in integers.

Problem of the Week

Let n be a positive integer. Is it possible for 6n distinct straight lines to be situated so as to have at least $6n^2-3n$ points where exactly three of these lines intersect and at least 6n+1 points where exactly two of these lines intersect? Of course, justify your answer.

*** Please submit all solutions to Cliff Corzatt (corzatt@stolaf.edu) by noon on Friday.

If you would like to receive a copy of the Math Mess in your P.O. Box weekly, please e-mail Donna Brakke at brakke@stolaf.edu.

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