math circles

abstracts

Teachers Circle: Exploring Cyclic Patterns

Session 1: V. Bohme/N. Carlson
10:00—11:30, PSA 107

Session 2: M. Loe/O. Ortega
11:30—12:30, PSA 107

Session 3: C. Shakiban
2:15—3:45, PSA 107

Teachers will explore cyclic number patterns and present their solution methods.

Audience: School Teachers

Linguistics Challenge

Session 1: E. Galaktionova
10:00—11:30, PSA 104

Session 2: R. Brown
11:30—12:30, PSA 108

Session 3: R. MukerjeeChakraborty
2:15—3:45, PSA 109

Can you restore missing parts of an ancient Babylonian inscription? How about writing a few words in Tenji - Japanese equivalent of Braille? Or helping to create a finite state automata which can distinguish words in Rotokas, a language spoken on the island of Bougainville off the coast of New Guinea? No knowledge of linguistics or languages is required; just use your reasoning skills and common sense.

Audience: Grades 7 - 12.
Number: Limited to 35 students per session.

Big—and Bigger

Session 1: R. & E. Kaplan
10:00—11:30, PSA 304

Session 2: M. Fenn
11:30—12:30, PSA 304

Session 3: C. Wernimont
2:15—3:45, PSA 104

Audience: 9-11 year-olds
Number: maximum of 12 per session

How to Solve the Cubic

Session 1: J. Wood
10:00—11:30, PSA 106

Session 2: B. Braun
11:30—12:30, PSA 106

Session 3: L. Almocera/B. Wiegers
2:15—3:45, PSA 113

Learn the cubic formula! Participants in this session will solve related problems and special cases, which will form the basis for the general solution. Participants should know the quadratic formula, completing the square, and how to graph parabolas.

Audience: Grades 7—12.
Number: Maximum 20 students per session.

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Variations on the Locker Problem

Session 1: E. Johnston
10:00—11:30, PSA 108

Session 2: K. Colley
11:30—12:30, PSA 102

Session 3: M. Eso
2:15—3:45, PSA 108

The "Locker Problem" has long been a favorite of students and teachers: A long corridor has 10000 (initially closed) lockers along one wall. Ten thousand students walk the corridor one at a time. As the k-th student walks, she stops at each of lockers k, 2k, 3k, 4k,...and opens the locker if it is closed, and closes it if it is open. After all students have gone, which lockers are open? We will explore several variations on this problem: What if some students are ill and does not participate? What if we want only certain lockers open when we are done?

Audience: Grades 7 - 12.
Number: Maximum of 20 students per session.

Intersection Math

Session 1: J. Tanton
10:00—11:30, PSA 102

Session 2: G. Meda
11:30—12:30, PSA 111

Session 3: J. Carter
2:15—3:45, PSA 111

What's four times three? Twelve you might think – but no more! In a new, weird, fun-filled, and action-packed system of arithmetic worthy of much mathematical investigation four times three is eighteen, the square root of one-hundred is five, and two times five is ten. (Hang on. That's not weird!)

Let's spend time together working out 5716 x 8945. Geometry will reveal all!

Audience: This activity is suitable for all ages.

Coins in Twoland

Session 1: J. Zucker
10:00—11:30, PSA 203

Session 2: B. Kroschel
11:30—12:30, PSA 203

Session 3: P. Dejarlais
2:15—3:45, PSA 203

In Twoland, coins are worth 1, 2, 4, 8, 16, ... What happens when towns enact laws that restrict how many of each coin you are allowed to use in a single purchase?

Audience: This activity is suitable for all ages.

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Exploding Dots

Session 1: H. Reiter
10:00—11:30, PSA 109

Session 2: E. Hickey
11:30—12:30, PSA 109

Session 3: C. Daniels
2:15—3:45, PSA 102

Exploding Dots is an alternative method for examining place value. We'll look at some exotic methods of representing numbers and see a few applications. Some methods make use of antidots and some require black holes.

Conway's Rational Tangles

Session 1: T. Davis
10:00—11:30, PSA 111

Session 2: S. Polster
11:30—12:30, PSA 104

Session 3: S. Smithback
2:15—3:45, PSA 304

Four people, holding the ends of two ropes, perform a sort of square dance that causes the ropes to tangle. We discover a method to assign a rational number to each tangle that is related to the Euclidean algorithm, among other things.

Audience: The session is suitable for any student who understands how to do arithmetic with positive and negative fractions.

Triangle Inequality: A Simple Property That Leads to a Range of Problems

Session 1: A. Burago
10:00—11:30, PSA 113

Session 2: N. Dastrage
11:30—12:30, PSA 113

Session 3: M. Thomas
2:15—3:45, PSA 106

Triangle inequality is the easiest and most well-known geometric inequality.
This simple inequality generates a set of exciting problems that range in difficulty from problems accessible to a 10 years-old to problems interesting and challenging for a high school student. None of them requires advanced geometric knowledge. However, all of them exercise creativity, visual thinking and teach you to think out of the box. This is going to be a problem-solving session with some visual demonstrations. The problems difficulty will increase towards the end of the session.

Audience: Grades 6—12.

math circles

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Math Circle for Elementary School Students

Session 1, 2 & 3: M. Saul/R. Rajagopal/J. Brodsky

10:00—11:30, PSA 303 11:30—12:30, PSA 303 2:15—3:45, PSA 303

This workshop will consist of a complete math circle experience for students in grades 3-6. The object is to find activities that do more than 'bring down' mathematics from the upper grades. Activities for students in grades 3-6 can foreshadow the mathematics to come. They can help build the cognitive infrastructure that will be useful in acquiring the next set of mathematical skills and concepts. Activities for this age can also explore areas of mathematics that will not be reached in the school curriculum at all. And this all can be done in an engaging and relaxing context.

Audience: Grades 3-6, and spectators who want to learn about this work.
Number: 10 is optimal; more can be accommodated.

keynote speaker

Mathemagics

Do you like card tricks? I'd like you to believe that I possess magical powers. Sadly, however, I don't. Instead, I have to rely on mathematics. So do cryptographers, coding theorists, and many others. It's surprisingly useful! Some like to say it has applications in magic. I prefer to think it's the mathematics itself that is the magic. What do you think?

Glenn Hurlbert
March 13, 2010
Life Sciences Building, E-Wing, Room 104
4:00 PM

Dr. Hurlbert is an Associate Professor in the School of Mathematical & Statistical Sciences, Visiting Fellow with Barrett, The Honors College at Arizona State University and 2008 Nominee for the Professor of the Year Award.

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