

NOTICIAS de TODOS

News from TODOS: Mathematics for All

Funding provided by Pearson Scott Foresman and Pearson Prentice Hall

Fall 2006

Volume 2, Number 2

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The mission of TODOS: Mathematics for ALL is to advocate for an equitable and high quality mathematics education for all students, in particular Latino/Hispanic student, by advancing the professional growth and equity awareness of educators.

Improving the Teaching and Learning Culture of Mathematics for Immigrant Children by Guillermo Mendieta

A few years ago, I made the decision to go on a hunger strike to try to reverse the Los Angeles Unified School District's decision to eliminate all NCTM aligned curricula. The district's own data indicated that such curricula had significantly increased the percentage of Latino and African American students who successfully completed the college preparatory course sequence. Scores of activists, researchers, teachers and students spoke and wrote to the board about how their decision was going to deny tens-of-thousands of minorities access to college. They told the board that since the difference between the income of college and non-college graduates is around \$15,000 per year, this decision was going to rob minority communities in Los Angeles of billions of dollars in future income. However, decisions about teaching and learning, like for most things, are often not made based on knowledge, on research or even on the best interest of students. Decisions are made based on politics; who has the power, who knows who, and who is well-connected.

Today we find ourselves in a similar, and perhaps worse situation. This time, the issue is not just about deciding between hands-on learning and the back-to-basics curricula. Today we are facing a nation-wide anti-immigrant movement that has added fuel to the fire of most educational policy decisions. Unfortunately, as always, the most vulnerable, the ones without power or the vote, the children of the poor, the children of minority parents, are the ones that suffer the long-term consequences of the bad educational policies that spring from elitist and xenophobic political rhetoric.

Imagine yourself as an immigrant child in this country. Every day, on TV, radio, and in the newspapers, you see and hear authority figures refer to immigrants as undesirable, criminals, and worse. You hear them say immigrants should be denied health care and education. As a child, you don't hear or understand the nuances about immigration law. All you hear is that you are not wanted, that you are a criminal, that you are undesirable. Now picture yourself going to school and trying to learn in the middle of this hostile environment. What should the school do to help you learn, to help you feel safe and to help you trust enough to take the types of risks that learning requires of you? As I thought about these issues, Herbert Kohl's book, *I Won't Learn From You* came to mind. Like Mr. Kohl, I have come across hundreds of Latino students who will actively resist learning, who will not give a teacher the pleasure of learning from them if they do not feel respected.

There are so many different issues and challenges intrinsically woven and spinning seemingly out of control for teachers working with immigrant students, there is not enough room to address them in this article. However, given my background as a math educator and as an advocate for minority students, I would like to offer four suggestions that would help schools in general, and math teachers in particular, create a more supportive and effective learning environment for their immigrant students.

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Carey Bolster (left) presents the Iris Carl award to Guillermo Mendieta at the TODOS Business Meeting at the 2006 NCTM annual meeting in St. Louis.

1. Learn and Discuss The Specific Challenges Facing Immigrant Children With The Entire School Staff.

Regardless of the judgments anyone might make about the decisions made by the parents of immigrant children, most people would agree that immigrant children are facing a multitude of challenges and pressures that impact the schools' teaching and learning culture. A staff that knows and understands the challenges immigrant children face, from the perspective of their students, will be better able to connect, support, and create the type of relationships and learning environment that are needed to improve teaching and learning.

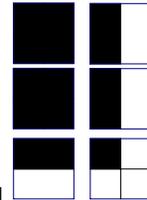
2. **Focus In-Depth On Three To Four Key Standards Or Main Concepts Throughout The Year While Making Connections With Other Strands.** Researchers have pointed out that the curriculum in countries where students perform well on international comparison tests, such as Japan, is an inch wide but a mile deep, while the curriculum in the U.S. is a mile long and an inch deep. Disadvantaged students in general and ELL students in particular are particularly vulnerable to the prevailing "coverage driven curriculum" that emphasizes superficial coverage of material at the expense of in-depth teaching. Kindergarten teachers might focus on number representations and patterns, 1st grade teachers might focus on addition and subtraction, and fifth grade teachers might focus on fractions, ratios and percents, etc.

3. Help Teachers Learn To Use Effective Multiple Representations In Their Teaching.

Focusing on fewer concepts should not mean giving more symbolic representations to students. The most important and effective teaching strategies in mathematics are the use of effective multiple representations, the translations among them, and the transformations within them.

4. **Use Model-Generative Academic Language To Teach Mathematical Concepts.** The language we use when teaching a mathematical concept with ELL students can either open-up or obscure the ideas we are trying to represent. Teachers should learn to use language that carries with it a mental model of the ideas or processes involved. For example, when teaching how to multiply $1\frac{1}{2} \times 2\frac{1}{2}$, a teacher might read and talk about this exercise in the following ways:

- a) One and half groups of two and half each
 b) Two and half repeated one and a half times
 c) One group of $2\frac{1}{2}$ combined with half of $2\frac{1}{2}$



Associating such language with a pictorial example will help students generate a mental model of how to work out such problems in the future.

Conclusion

The challenges faced by immigrant children and their teachers are being magnified by the anti-immigrant rhetoric wave sweeping the country. Schools that want to be more effective in helping immigrant children learn should help teachers learn more about the specific challenges faced by immigrant children. The schools' professional development should focus on how to effectively emphasize a handful of key concepts at each grade level, and on how to use multiple representations and model-generative language.

Guillermo Mendieta is the author of *Pictorial Mathematics: An Engaging Visual Approach to the Teaching and Learning of Mathematics*. For more information and strategies to improve the teaching and learning of mathematics for minority students, including his top ten suggestions for the effective teaching of mathematics visit www.PictorialMath.com.

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Vol. 2, No. 2

Editors: Michael Matthews, Cynthia Anhalt,
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Subject: TODOS NOTICIAS

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President's Corner



TODOS: Mathematics and Equity

An Update by Miriam A. Leiva

It is not “To Dos” but rather the Spanish word **todos** or **all**. TODOS: Mathematics for All, a national affiliate of NCTM, is a young organization that has accomplished much in its short history. It has an ambitious agenda in the area of mathematics and equity:

The mission of TODOS: Mathematics for ALL is to advocate for an equitable and high quality mathematics education for all students, in particular Latino/Hispanic students, by increasing the equity awareness of educators and their ability to foster students' proficiency in rigorous and coherent mathematics

In the recent months, we have been involved in various activities that address our role as advocates for teachers and their students. In this article, I discuss these initiatives and the progress made in implementing them.

The NEA Initiative:

TODOS received a generous grant from the National Education Association for projects that address **Closing the Achievement Gap**. One such project, led by the Research and Publications Committee and Chairman Rick Kitchen, has brought together scholars, teachers, and researchers to plan, develop, and publish the first TODOS Monograph in 2007. Kitchen, professor at the University of New Mexico and co-PI in CEMELA (**Center for the Mathematics Education of Latinos/as**) will serve as the Monograph Editor and

with Associate Editor, Ed Silver, professor at the University of Michigan.

The TODOS Monograph guidelines states that: “The focus of the monograph will be on what we have learned about the underachievement of Hispanic-Latino students in mathematics, often analyzed in terms of the “achievement gap” between Hispanic-Latino, and White and Asian-American students in mathematics. The monograph will inform the education community and policy makers about instructional approaches and intervention strategies being implemented in PreK-12 schools to foster greater achievement and advancement of Hispanic-Latino students in mathematics. Hence, an explicit goal of this monograph is to promote and inform the education community about approaches to increase student achievement and learning for all students, particularly Hispanic-Latino students. Another objective of the monograph is to offer theoretical, conceptual, and historical analyses of key issues associated with the underachievement of Hispanic-Latino students in U. S. schools. Rather than framing the achievement of Hispanic-Latino students in ways that focus our attention only on low performance or that classify students into rigid categories (race, class, etc.) based solely on scores on high stakes tests, the monograph will offer novel analyses that promote the learning and advancement of Hispanic-Latino students in mathematics.” (TODOS Monograph Guidelines, August, 2006.)

The TODOS Monograph Editorial Panel is seeking manuscripts for this refereed publication, with a submission deadline of January 15, 2007. For more information contact kitchen@unm.edu.

Program Strands at Conferences

TODOS has been invited by various national, regional and state conferences to hold a TODOS Program Strand. Since 2004, TODOS has held a Conference Within a Conference, CWAC, at the National Council of Supervisors of Mathematics annual conference. CWACs are being held at various conferences including national and regional meetings of the National Council of Teachers of Mathematics, as well as at conferences such as CAMT in Texas, CMC in California, the Greater San Diego Council of Teachers of Mathematics, and others.

Supporting Members/Teachers:

To support the speakers in these conference strands, TODOS has established a **Speaker Fund** so that selected members may receive travel funds. Another program, the **Duke Energy Foundation Travel Awards funds** travel for teacher-recipients to travel to the NCTM and NCSM national meetings in the spring. We also have established and make awards to fund

(Leiva, continued)

teachers' programs through the **TODOS Professional Development Awards.**

In 2005-2006 several teachers were able to participate in programs, conferences and other learning opportunities through these funds. The various awards have been given to teachers who work with Latino students, Native Americans, English Language Learners, African American Students, and others: ALL = TODOS.

Student Awards

To help recognize, encourage, and promote student excellence, TODOS has established a **Student Award Program** with funding from Houghton Mifflin Publishing Company and CASIO, Inc. TODOS members have nominated students, who apply with a process that include essays.

Applications are reviewed by a national panel. This program has been in place for the past two years, and currently TODOS has extended it to recognize students regionally. For example, this year TODOS had receptions at CAMT in Houston and at the Phoenix NCTM conference where students, their families, teachers, supervisors and superintendents were recognized. The students are honored with certificates and gifts from CASIO and Houghton Mifflin.



Nora Torrez-Martinez presenting a TODOS student award to Jenny Vasquez at CAMT, 2006

Connecting and Informing Members: TODOS has very active electronic communication via email and the website. Currently we are following the National Mathematics Panel and other current issues such as the NCTM Curriculum Focus Points. We invite the reader to visit www.todos-math.org to receive further information on the organization.

I have given an overview of some of the important activities of TODOS. How do these fit within our mission? To summarize, I will conclude by connecting to the **TODOS Goals.**

1. To improve educators' knowledge and ability to implement an equitable, rigorous, and coherent mathematics program that incorporates the role that language and culture play in learning

mathematics: Conferences; Publications; Materials for members.

2. To develop and support leaders who continue to carry out the mission of TODOS. Professional Development; active participation in TODOS activities and governance.
3. To promote the generation and dissemination of knowledge about equitable and high quality mathematics education. TODOS Monograph: Closing the Achievement Gap; Communication; Conferences; Publications for members
4. To inform the public and influence educational policies in ways that enable students to become mathematically proficient. Participation in national forums such as the National Mathematics Panel where TODOS was invited to make two presentations; work with other organizations to further our mission.

TODOS is committed to these goals and we are making progress in implementing them. Join us in our efforts to open the doors of mathematics to all students, in particular Hispanic-Latinos, Native Americans, Second Language Learners, and other underserved students.

Mark Driscoll's Presentation to the NMP on Behalf of TODOS and NCSM

Given on September 14, 2006 by Mark J. Driscoll to the National Mathematics Panel:

I am Mark Driscoll, from Education Development Center, representing both TODOS and the National Council of Supervisors of Mathematics (NCSM). I am a member of both organizations and Editor of the NCSM Journal of Mathematics Education Leadership. On behalf of both, let me say that we are very grateful to the National Mathematics Panel for inviting us to be represented here today.

My remarks pertain to the Panel's category of interest, "Learning Processes," with implications for the "Instructional Practices" subgroup. Specifically, on behalf of TODOS and NCSM, I want to call your attention to the issue of enhancing the mathematical success of English Language Learners (ELLs), and to the associated issue of galvanizing mathematics education leadership in this regard.

In the past three decades, the number of U.S. children living in households where the native language is not English more than doubled from 9% to 19% (Firestone et al, 2006). The total

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number of students labeled as "Limited English Proficiency" is 9.6% of the student population, or 4.5 million (Abedi, 2004). Many of these children are taught mathematics in English, which adds a considerable learning hurdle for them. In these remarks, I will cite some research results and promising practices that give shape to an imperative, yet a hope-filled imperative, regarding our helping ELLs become more successful in mathematics.

In brief, we believe it imperative to teach ELLs the academic language of mathematics, not as vocabulary drill, but in the context of working on mathematics tasks that are challenging and have high cognitive demand. We also believe it imperative for national leaders to encourage and support district and school leaders in building teachers' capacities to teach ELLs in this way.

I said these are hope-filled imperatives, because results, tools, and practices already exist that can help transform ELLs' experience in mathematics classrooms. We lack coherent programs for scaling up their use, and that requires galvanized leadership. Let me elaborate.

Consider first the results of the QUASAR project from the 1990's (Silver & Stein, 1996; Silver et al, 1995). QUASAR, a five-year intervention in six middle schools serving poor communities, was both a school demonstration project and a complex research study of educational change and improvement. One strand focused on types of classroom mathematics tasks and on the nature of student engagement with tasks (Henningsen & Stein, 1997). The researchers distinguished tasks according to cognitive demand. They noted that different mathematics tasks make different levels of cognitive demand and that the cognitive demand of a task can change during a lesson, depending on what teachers and students do in implementing them.

Using extensive classroom observation and analysis, along with a project-developed Cognitive Assessment Instrument, the study concluded that student learning gains were greatest in classrooms in which instructional tasks consistently encouraged high-level student thinking and reasoning (e.g., conjecturing, justifying, interpreting), and least in classrooms in which instructional tasks were consistently procedural in nature. In brief, the project led to the conclusion that, in order to foster all students' success in mathematics, teachers must support students' cognitive activity by providing a regular diet of work on meaningful tasks for which neither the complexity nor the cognitive demand is reduced--i.e., tasks that involve 'doing mathematics.'

For ELLs, the phrase "meaningful tasks" takes on even more complexity because of the role of academic language. This provides a pointed challenge to teachers and administrators. Particularly because of current testing demands, many are tempted to address ELL needs by separating language work from mathematics work, with strategies such as vocabulary drills (Firestone et al, 2006). Often, this lack of integration of language and content development results in a lack of active engagement by ELLs in the mathematical work being done in their classrooms (Brenner, 1998).

However, despite the added challenge of academic language, there is no need to cease heeding the QUASAR message, as evidenced in the story of one 5th-grade teacher, whose work has been studied by Chval and Khisty (Chval & Khisty, 2001; Khisty & Chval, 2002). Sarah (a pseudonym) teaches in a school that is nearly 100% Latino in one of the poorest neighborhoods in a large urban school district in the Mid-West. In the focal year of the study, the average child entered her classroom half a year behind the expected 4.8 in the ITBS, with only five of the 24 students performing at the 4.8 level or above. After just eight months in Sarah's classroom, her students outperformed the other fifth-graders in her school, as well as other fifth-graders in her district, and 15 of the 24 (62.5%) performed at the 5.8 level or above. This success was typical of Sarah in other years.

In tracing the roots of this success, Chval and Khisty document a consistent use by Sarah of writing assignments and classroom discourse related to challenging mathematics problems, used as occasions for clarifying--not simplifying--mathematical language. To get a flavor for how such discourse works, consider the following brief interaction between Sarah and her students (p. 23 of Chval & Khisty, 2001; a similar exchange is recorded on p. 8 of Khisty & Chval, 2002). It is the first week of school and the children have been engaged in a challenging geometry problem. The word "congruent" has been introduced:

Sarah: Look at that word everyone. Congruent. What does that mean?

Student: Like another copy.

Sarah: An exact copy. Because here, look here is the circle. Is this circle congruent to that circle?

Chorus: No.

Sarah: No, they're not exact copies. They're similar, they're both circles, but they're not exact copies.

Of course, Sarah is but a case of one. However, we believe that scaling up success like hers is possible, if our leaders--at national, district, and school

(Driscoll, continued on page 6)

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levels--act to increase attention in teacher education to the importance of:

1. integrating content and academic language development in classroom instruction. (See, for example, the framework and tools in Garrison et. al, 2006).
2. attending to cognitive demand in the mathematical work done by all students, but especially by ELLs. (See, for example, the framework and tools in Stein et al, 2000)
3. creating learning environments that use multimodal mathematical communication--speaking, writing, diagramming, etc--to reinforce the learning of mathematical language.

A quick example can elaborate the third bullet. Along with several colleagues, I am currently involved in an effort by New York City's Office of English Language Learners to solve a problem through the professional development and collaborative efforts of teachers, coaches, and administrators. The problem: In the city, there is an unexplained achievement gap in mathematics between ELLs and others. The participants: middle-school teams comprising assistant principals, math coaches, and ESL specialists. The goal of the effort: From lesson preparation to interacting with students in the classroom to analyzing student work, each school team will be more effective in understanding evidence of difficulty with academic language as well as evidence of difficulty with mathematical concepts, and will inform the teaching and support of ELLs accordingly.

A core activity in this effort has been the gathering and analysis by the school teams of student work on challenging mathematics problems. We have chosen to use problems primarily from a project (Fostering Geometric Thinking in the Middle Grades, NSF EHR-0353409. Education Development Center, Newton, MA., 2004-2008) that is currently field testing professional development materials focused on geometric thinking. We believe that suitable geometry problems invite multimodal mathematical communication, especially when the student work being gathered is in the form of newsprint presentations by small groups of students.

For example, one of the problems pertains to geometric dissections and first asks solvers to cut up a given parallelogram and rearrange all the pieces to make a rectangle. Then, it tells them: "In a sequence of pictures, show where you decided to cut and how you rearranged the pieces." Next, "Describe in words where you decided to cut and how you rearranged the pieces." And, ultimately, "Will your method allow you to transform any parallelogram into a rectangle?" The transitions

from pictorial to verbal explanations and from specific cases to mathematical generalization provide teachers ample opportunities to clarify and develop mathematical language for students. During the coming year, we hope to determine how significant such opportunities are in creating effective learning environments for ELLs. Thank you for your time and attention.

Mark Driscoll, mdriscoll@edc.org

Co-Director of the Center for Leadership and Learning Communities at Education Development Center (EDC), has directed a range of teacher enhancement, leadership, and materials development projects at EDC. Currently, he co-directs the project, Fostering Geometric Thinking in the Middle Grades, which will produce teacher professional development materials as well as a multimedia book. He also serves as Editor of Mathematics Education Leadership, the journal of the National Council of Supervisors of Mathematics.

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Educators of Native American Students

By Rich Sgarlotti

EONAS, is a loosely knit sub group of TODOS for educators who work in Bureau of Indian Affairs schools, Tribal schools, and public schools with significant numbers of Native American students. There have been approximately 75 people who have attended EONAS sessions or receptions at NCTM conferences. The reception at the most recent conference in St. Louis was sponsored by the National Indian School Board Association (NISBA). Although the group has met only at the past three national NCTM meetings, there are plans to set up a website, bulletin board, and/or listserv in the very near future for EONAS members.

The term "members" is misleading since there are no dues, no formal officers, and no membership list.

The electronic communication formats will enable those with similar interests to more easily communicate concerns, ideas, lessons, and other matters of mathematics education in Indian country.

There is also interest by EONAS members in the work of the North American Study Group on Ethnomathematics. There is much interest in the study of mathematics developed by Native Americans or use of mathematics to explain patterns, number systems, architecture, and many other aspects of Native culture. EONAS members have also participated in NASGE sessions and meetings. The liaison person from EONAS to TODOS is Rich Sgarlotti, Ed.S., former mathematics teacher and current projects coordinator at the Hannahville Indian School in Upper Michigan. His special interest is integrating Native culture into the mathematics classroom, and he is the editor and major contributor to the NISBA volume "Creating A Sacred Place for Students In Mathematics". He has also worked extensively with the American Indian Science and Engineering Society (AISES). Persons interested in EONAS can contact Sgarlotti at richs@hvl.bia.edu.

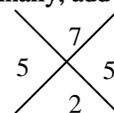
Cultural differences in written mathematics

By Michael Matthews

When I taught HS algebra, I found that I needed to pay attention to verbal and *written* cues from my students. Often, my students had written conventions different from standard U.S. ones. For example, in some Hispanic speaking countries, \$5,42 is equivalent \$5.42.

I found that downplaying "the non-U.S. way" was counterproductive. Yet, at times, my students made errors using different written algorithms. Learning how these algorithms worked was part of the job.

Once, I ran across a unique product-checking algorithm from a Mexican student. The student said to do the following steps. Say $47 \times 52 = 2,444$ is your problem. First, you add the digits of one factor and put this sum in the top of a big X. If the sum is a multi-digit #, then add the digits of this sum and so on until it's a single digit answer. $5+2=7$. Second, do it again with the other factor and put it on bottom part of the X. $4+7=11$, a two digit #, so it goes to $1+1=2$. Now, you find the product of the sums found in steps 1 and 2. Put this number on the right side of the X. In our example $7 \times 2 = 14$, a two digit number so it becomes $1+4$ or 5 . Finally, add up the digits of the original product and put this sum of the left side of the X. Here $2+4+4+4 = 14$ which becomes 5 . If the right and left side have the same number then the original answer is



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correct. False OKs occur rarely.

In conclusion, I encourage you to become aware of how your new students are writing their mathematics. It will make a difference for them and you might learn something too.

Michael Matthews, an assistant professor of mathematics at the University of Nebraska at Omaha, works with preservice teachers' mathematical content knowledge.
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Announcements

TODOS Elections for President-Elect and Member-at-Large

by Ed Dickey, Chair of TODOS Nominations and Elections Committee

The Nominations and Elections Committee is CALLING for NOMINEES for the office of President-Elect and a Member-at-Large of TODOS. Please survey potential nominees for approval and acceptance of nomination. Self-nominations are also acceptable. Descriptions of these two positions are provided below. Send the two-page nominating form by e-mail to elections@todos-math.org or by fax to 803-777-3193 no later than November 17, 2006. Nomination forms can be retrieved at <http://www.todos-math.org/elections.html>

Candidates for the office of President-Elect should be committed to holding the position for one year, commencing April 2007, and assuming the office of President in April 2008 for two years.

Candidates for the office of Member-at-Large should be committed to holding the position for the entire term of three years, commencing April 2007.

11th annual ICME conference

Monterrey, Mexico, July 6-13, 2008.
 There's still plenty of time to make the sessions at the Eleventh International Congress on Mathematical Education the most fruitful ever. This major event in the life of the international mathematics education community is being held by the quadrennial International Congress on Mathematical Education, ICME. Put this on your calendar now—don't miss this opportunity.

The new Discussion Forum for TODOS

By Suzanne Alejandre

TODOS has recently set up a threaded discussion at the Math Forum @ Drexel¹. Viewing/posting are restricted to subscribers.

In October, the first post was made on the Discussion. Everyone who had been pre-registered automatically received that post in their email. That first post was informational only. It contained instructions for entering and using Discussions.

As we get this system up and running, we'll need your help so that all TODOS members are registered. To help in this coordination we sent a message using our list-serv. If you received that email message but not the first Discussion email, this was meant to alert you to let us know that you have not yet been registered.

Our webmaster, Suzanne Alejandre, will answer questions online as this new feature is implemented. If you are going to attend the CMC-South conference in Palm Springs, November 3-4, stop by the TODOS booth in the Exhibit Hall! Suzanne will be there to answer questions.

Why have a TODOS Discussion?

The list-servs that TODOS has including [<members@todos-math.org>](mailto:members@todos-math.org) and also the recently created [<nmp@todos-math.org>](mailto:nmp@todos-math.org) have been the means for discussing ideas, issues, concerns, etc. within the TODOS community. We will continue to use the list-servs. However, because Discussions on the web are powered with a database, members can:

- *search robustly: in addition to keywords, find specific discussants, messages by date, or even search within a specific category of discussions
- * post attachments over the web
- * get alerts of posts ("watches") from the discussants or specific categories of discussions you select
- * format and spell-check before posting online
- * preview your post before you actually post it
- * edit your post if has not been replied to yet
- * use a personal Control Panel to choose how many discussion threads to list on one page, show you the messages you've written, display or hide your e-mail address, and much more
- * get a feed of updates using Really Simple Syndication, a time-saving, automated way to collect only the news you want over the web

¹The Forum began in 1992 with funding from the National Science Foundation as an online center for discussing math education. From that emphasis on building online community, we've grown to offer many more services and resources; and today, thanks to Drexel University, we're proud to continue supporting our communities with this new discussion area.