CWM NEWSLETTER

ISSUE 13, JULY 2025

Editorial To The Thirteenth Issue

Dear Readers,

Welcome to the 13th edition of the International Mathematical Union Committee for Women in Mathematics newsletter. We apologize for the delay in bringing you this issue, but we're excited to share that it's packed with wonderful news and inspiring content.

To begin, we're delighted to share that $(WM)^2$ — the World Meeting for Women in Mathematics — has been approved as a satellite event of the ICM 2026! The event will take place on July 22, 2026, in Philadelphia, USA, and promises a full day of research presentations, community building, and thought-provoking discussions aimed at advancing gender equity in mathematics.

We are also pleased to announce the results of the CWM Call 2025, which drew 61 applications from across the globe. Thirteen exceptional projects have been selected for support. These projects demonstrate the diversity, creativity, and commitment of women mathematicians worldwide, and we are proud to be part of their realization.

Another major highlight of this year has been the May 12 – A Global Celebration of Women in Mathematics, which continues to grow in reach and impact. In its seventh year, the celebration honored the birthday of Maryam Mirzakhani and inspired over 210 events in 61 countries, ranging from local lectures to global film screenings and lively panel discussions.

This issue also features a powerful and thought-provoking article by C. Kenneth Fan, President and Founder of Girls' Angle, titled "The Mathematical Brilliance We Are Losing and What We Can Do About It?", which originated from the Girls and Mathematics Panel at World Women in Mathematics 2022.

We hope you enjoy reading, and as always, thank you for being part of this growing and vibrant community.

Ekin Özman

NEWS FROM CWM

Results of CWM call 2025

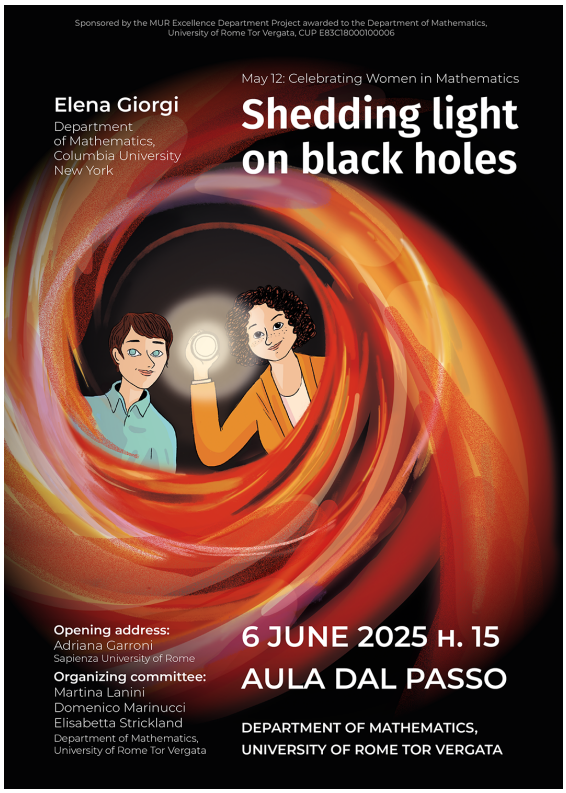
The CWM called for proposals for initiatives to support women in mathematics taking place from March 2025 to February 2026. The CWM 2025 call received 61 applications, of which 13 are being supported. Some of the selected projects aim to support continental and regional networks for women in mathematics, such as activities led by the African Women in Mathematics Association (AWMA), the Meeting of Women in Mathematics in Central Africa in Congo, and the establishment of the Arab Women in Mathematics Network. CWM is also supporting research workshops aimed at establishing research networks for women in Brazil, Indonesia, Mexico, and Nigeria. Additionally, CWM is supporting networking activities for women in mathematics in Argentina, India, Kenya, Nigeria, and Zimbabwe, as well as a math camp for young women in Iran. Depending on the nature of the project, CWM funding is directed toward infrastructure, travel expenses, and accommodation support for women participants from developing countries.

More details on each of these projects can be found here.

May 12, 2025 - A Global Celebration of Women in Mathematics

In 2018, during the first World Meeting for Women in Mathematics - $(WM)^2$, the Women's Committee of the Iranian Mathematical Society proposed to make May 12 a celebration day for women in mathematics, honouring the birthday of Maryam Mirzakhani. This proposal was approved by the participants of $(WM)^2$. The call for action has sparked an overwhelming response, and "May 12 - Celebrating Women in Mathematics" has become a prominent global initiative for women in mathematics, spearheading important debates and reflections about the gender gap in

mathematics, and encouraging solutions and initiatives to improve the current situation. CWM is proud to sponsor this initiative.



In 2025, "May 12 - Celebrating Women in Mathematics" was once again a lively celebration of women in mathematics all over the world, inspiring women, honouring their achievements in mathematics, and encouraging an open, welcoming, and inclusive work environment for everybody. The impact of the initiative has grown since last year, with a significant increase in the number of events registered on the interactive May 12 website as well as in the number of participating countries. As of May 19, 2025, there were more than 210 events registered on the May 12 website from 61 different countries, distributed as follows:

-**Africa:** Algeria, Burkina Faso, Cameroon, Egypt, Morocco, Nigeria, Senegal, South Africa, Tunisia.

-**Americas**: Argentina, Barbados, Bolivia, Brazil, Canada, Chile, Colombia, Ecuador, Mexico, Panama, Peru, San Domingo, United States.

-**Asia and Oceania:** Australia, Brunei, China, India, Indonesia, Iran, Japan, Kazakhstan, Nepal, Oman, Philippines, South Korea, Turkey, United Arab Emirates, Uzbekistan.

-Europe: Austria, Belgium, Croatia, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Malta, Moldova, Netherlands, Norway, Portugal, Serbia, Slovakia, Slovenia, Spain,Sweden, Switzerland, Ukraine, United Kingdom.

In Italy, eighteen events were declared! We illustrate these many activities with the beautiful poster authored by Claudia Flandoli for the lecture of Elena Giorgi in University Roma Tor Vergata. In this 7th edition of the May 12 initiative, arrangements were made with Zala Films and director George Csicsery to offer free screenings of three documentaries: *Journeys of Black Mathematicians: Forging Resilience, Journeys of Black Mathematicians: Creating Pathways*, and *Secrets of the Surface: The Mathematical Vision of Maryam Mirzakhani* between May 1 and May 20. Translations and subtitles were created through the May 12 network by Marie-Francoise Roy (French), Mojgan Mahmoudi (Persian), Andrea Jimenez (Spanish), Christina Brech, Manuela da Silva Souzan Juliana Fernandes da Silva, Irene Castro Pereira (Portuguese), Dilber Kocak(Turkish) and installed by Zala Films.

About 250 requests for collective or individual screenings of the films have been received, adding 11 countries to those celebrating May 12: Burundi, Congo - Brazzaville, Costa Rica, Côte d'Ivoire, Cuba, Georgia, New Zealand, Niger, Romania, Trinidad and Tobago, Uruguay.

To take just an example illustrating the collective screenings, a projection of the three documentaries of the May 12 campaign in 2025 was organized by the LAMI of Université Joseph KI-ZERBO in Burkina Faso in association with the math club of the students. A lively discussion followed. The students were very interested by the life and work of Maryam Mirakhani and discovered many afro-american mthematicians characters they had never heard about through Journeys of Black Mathematicians.

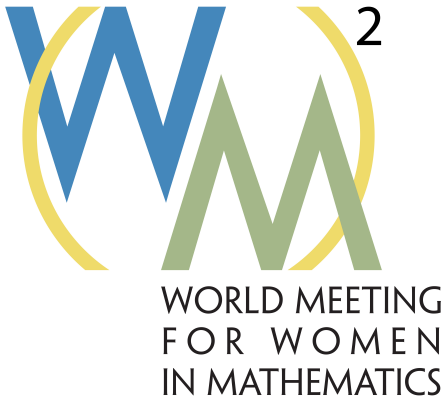
The May 12 initiative is coordinated by a group including representatives from the CWM of the International Mathematical Union, the European Women in Mathematics, the Association for Women in Mathematics, the African Women in Mathematics Association, the Asian and Oceanian Women in Mathematics, CGD-UMALCA (Comisión de Género y Diversidad de la Unión Matemática de América Latina y el Caribe) and the Women's Committee of the Iranian Mathematical Society.

Exciting News: $(WM)^2$ Approved as a Satellite Event of ICM 2026!

We're thrilled to announce that the III World Meeting for Women in Mathematics — $(WM)^2$ has been approved as a satellite event of the ICM 2026!

Date: July 22, 2026
Location: Pennsylvania Convention Center, Philadelphia, USA

$(WM)^2$ will take place the day before the ICM 2026 and promises a vibrant day of mathematical excellence, community building, and dialogue. The program will feature invited research talks, a public lecture, a poster session, and meaningful discussions on advancing the participation and



visibility of women in mathematics worldwide.

This third edition of $(WM)^2$ is organized by the CWM, with the support of the ICM 2026 Local Organizing Committee and the Association for Women in Mathematics (AWM). Building on the success of previous editions in Rio de Janeiro (2018) and online (2022), the 2026 event will offer an inclusive and welcoming space for mathematical exchange and reflection.

We are also pleased to share that the ICM 2026 Travel Support Program will cover travel dates that include July 22, ensuring that grantees from developing countries can arrive in time to fully participate in $(WM)^2$.

We warmly invite all members of the global mathematical community to join us in Philadelphia for this inspiring event. Stay tuned for updates and details at worldwomeninmaths.org, where the new event page will be launched soon.

Let's come together to celebrate and strengthen the presence of women in mathematics!

Call for Input: SCGES Survey on Participation in Scientific Organizations

The Standing Committee for Gender Equality in Science (SCGES), in collaboration with the InterAcademy Partnership (IAP) and the International Science Council (ISC), has launched a global qualitative survey to better understand how scientists experience participation in scientific organizations.

The survey explores participation, leadership, inclusion, and barriers within scientific organizations. Your insights will help shape concrete recommendations to foster more equitable and inclusive participation across the scientific community. It is intended for scientists of all genders who are actively involved in scientific organizations—including academies, disciplinary unions, professional societies, and young academies.

If this applies to you, you can share your experiences by completing the survey and invite colleagues from your organization to contribute. The current deadline is July6, but it will likely be extended by about a month.

You can read the old issues and subscribe the CWM newsletter here.
https://www.mathunion.org/cwm/about/cwm-newsletter

NEWS FROM CWM AMBASSADORS

CWM Ambassador Jaqueline Mesquita appointed president of the UMALCA

CWM Ambassador Jaqueline Mesquita from Brazil has been appointed President of the Mathematical Union for Latin America and the Caribbean (UMALCA). She is the second woman and the youngest person ever to hold this position. The CWM congratulates Jaqueline on this remarkable achievement.

New logo of the AOWM

The Asian Oceanian Women in Mathematics (AOWM) has announced its new logo. The final design was created following a logo competition and combines ideas from the selected proposals. The new logo and further information about the competition can be found on the AOWM website.

National Medal of Science for Ingrid Daubechies

Ingrid Daubechies, James B. Duke Distinguished Professor Emerita of Mathematics, received the National Medal of Science from the US president in 2025. She is being honored for her pioneering work on signal processing. More information is here.

You can read the old issues and subscribe the CWM newsletter here.

https://www.mathunion.org/cwm/about/cwm-newsletter

OTHER NEWS AND ANNOUNCEMENTS

- 2026 AWM-AMS Emmy Noether Lecturer is announced

The Association for Women in Mathematics and the American Mathematical Society are pleased to announce that Monica Vişan, Professor of Mathematics at the University of California, Los Angeles (UCLA), will be the 2026 AWM-AMS Emmy Noether Lecturer. The Noether Lecture will be delivered at the Joint Mathematics meetings, to be held in Washington, DC, January 4 – 7, 2026. Here is the press release.

- 2025 Etta Zuber Falconer Lecturer is announced

The Association for Women in Mathematics and the Mathematical Association of America are pleased to announce that the 2025 Etta Zuber Falconer Lecturer will be Olivia Prosper Feldman, Associate Professor, University of Tennessee. The Falconer Lecture will be delivered at the MAA MathFest, to be held in Sacramento, CA, from August 6 – 9, 2025. Here is the press release.

- 2025-2026 Ruth I. Michler Memorial Prize is announced

The Association for Women in Mathematics is pleased to announce that the 2025-2026 Ruth I. Michler Memorial Prize has been awarded to Ling Xiao, Associate Professor of mathematics at the University of Connecticut. Xiao has been selected to receive the Michler Prize for her research accomplishments in geometric analysis and partial differential equations. Professor Xiao will spend an upcoming semester visiting Cornell. Here is the press release.

- 2025 Sonia Kovalevsky Lecturer is announced

The Association for Women in Mathematics and the Society for Industrial and Applied Mathematics have announced that Professor Yongjie Jessica Zhang will be the 2025 Sonia Kovalevsky Lecturer. The Kovalevsky Lecture will be delivered at the 2025 SIAM/CAIMS Annual Meeting taking place in Montréal, Québec, Canada, July 28 - August 1, 2025. Press release can be found here. The Kovalevsky Lecture honors Sonia Kovalevsky (1850–1891), the most widely known Russian mathematician of the late 19th century.

The Mathematical Brilliance We Are Losing and What We Can do About It?

Girls and Mathematics Panel, World Women in Mathematics 2022

by C. Kenneth Fan, President and Founder, Girls' Angle

[1]Don't think, "What nifty math should I teach these girls and how should I teach it?"
Instead, think, "I can't wait to find out what math these girls will teach me!"

Introduction

Too many girls who like math are lost to the leaky pipeline, a long-established metaphor for the loss of girls and women from mathematics. In the United States, this loss starts around 5th grade and continues into the professional ranks.[2]

Academics suggest various theories to explain the leaky pipeline: some say there are fewer women who are able to perform at the top levels of mathematics (the "variability" hypothesis); others say that women are simply less interested in mathematics (the "people versus things" hypothesis). I dispute both. When my understanding of how to work with girls improved, it became crystal clear that many girls not only enjoy math, but are fabulous at it.

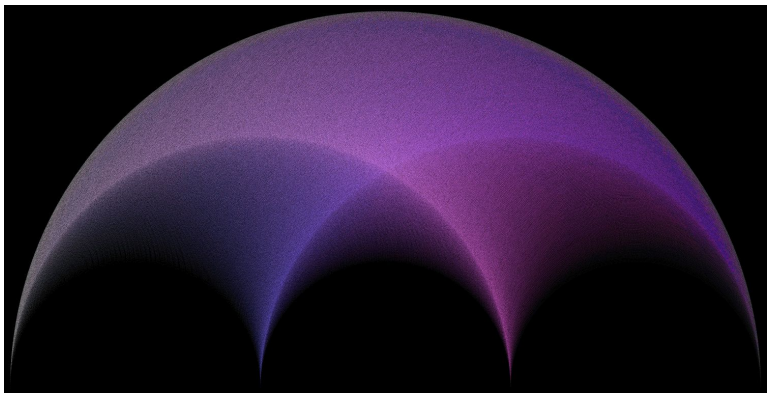
Math education in the US has remained essentially unchanged for decades. The familiar algebra, geometry, trigonometry, precalculus, calculus regimen found in nearly all US high schools seems unalterable and the math competition is the principal way of detecting superlative mathematical talent. If girls and boys are equally interested in and skilled at math, might the leaky pipeline, at the K12 level, be a consequence of the way math education is handled?

Girls' Angle: A Math Club for Girls

[1] This article is part of the volume of the proceedings of (WM)^2 2022

[2] According to the Report on the 2016-17 New Doctorate Recipients and Fall 2017 Department Profile Report of the American Mathematical Society, in the US, women represent 38% of undergraduate math degrees, 29% of new PhDs, 17% of tenure-eligible faculty ranks, and 12% of full professor positions at PhD granting institutions.

In 2007, suspecting that the status quo is responsible for the leaky pipeline, I created Girls' Angle with the aim of finding and implementing effective ways of handling math education for girls. We abandoned the practice of requiring homework in order to learn how to handle math so that girls would opt to do it on their own. By honing in on what worked, the way we handled math education evolved away from common math educational practice to enabling the girls themselves to direct both what they think about and how they wish to think about it.



Where you can go by taking 3 unit steps each with a nonnegative vertical component, as explored by Milena and Miriam. See Umbrellas, Part 1 in the Girls' Angle Bulletin, volume 12, Number 1.

The Key

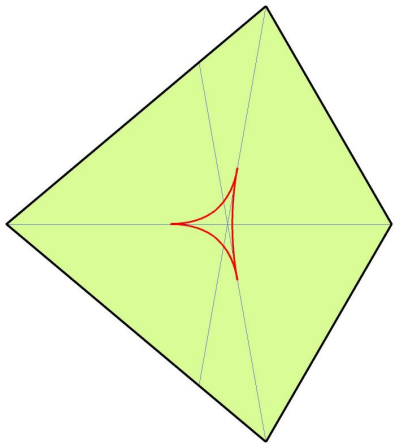
Although math education at Girls' Angle looks quite different from the status quo, the differences all stem from the following key change in attitude: Stop thinking, "What nifty math should I teach these girls and how should I teach it?" Instead, think, "I can't wait to find out what math these girls are going to teach me!"

Perhaps the most controversial consequence of this psychological shift in attitude is that it makes curricula and textbooks a secondary consideration, for it is not possible to allow girls to direct the course of their math education if one insists on adhering to a predetermined mathematical agenda. And, indeed, most of the projects we see at Girls' Angle fall outside of or are out of sync with the standard curriculum.

The attitude shift also implies that teachers should listen more and talk less. Don't give answers—give encouragement. Have faith that girls are capable of creating mathematics. Creating math requires uninterrupted thinking time, so one must curb that urge to teach cool math even if it relates to what the girls are doing. When students get stuck, instead of guiding them to an answer, focus on teaching the process of doing mathematics by offering suggestions that any mathematician would think of even when they do not know the answer. If you find that difficult, just remember that whenever you think you are guiding the student to some place interesting, you may also be guiding them away from something potentially more interesting. A side benefit of listening more is that it is an unobtrusive way to better understand your students' relationship to mathematics.

A crucial skill that mentors must have is the ability to detect mathematics in the utterances of their students, which are often ill-expressed. If the students don't

pick up on the math, the mentor must underscore their thoughts to ensure that student ideas are not lost. To illustrate, at an earlier date, before we had fully adopted the key shift in attitude, one of our mentors posed Chvatal's art gallery problem to the girls: Given a polygon-shaped museum, what is the minimum number of guards required to ensure that every bit of gallery wall is in the line of sight of some guard? Teesa, an 8th grader, observed, "it depends on how far the guards can see." The typical teacher response is a corrective clarification: "Oh, in this problem, you can assume the guards see infinitely far." However, remarks like Teesa's are a way that girls inform us what they wish to study. So we responded, "Wonderful thought! How does the number of guards depend on how far the guards can see?" Teesa abandoned polygonal museums to understand the circular museum. She discovered that as the seeing-distance drops from infinity, the number of guards required jumps from 1 to 3, skipping 2. This led her to ask: What museum shape results in the biggest jump in required number of guards as the seeing-distance decreases? In effect, Teesa had forged a path for herself into geometry. For her, the right time to do geometry was that very moment, not a year or two later, when the curriculum would catch up.



One of the quadrilaterals found by Milena Harned from Perimeter Bisectors, Cusps, and Kites in the International Journal of Geometry, Volume 10, Number 4

Letting Girls Lead: Practical Matters

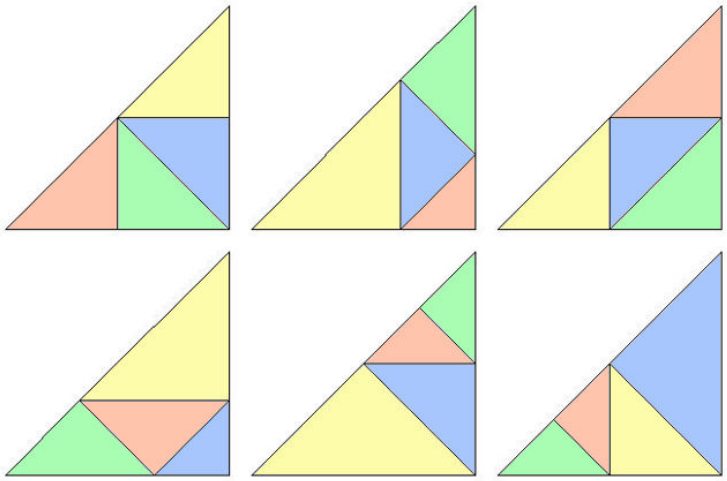
To enable girls to lead, it usually doesn't work to ask a 10-year-old, "what math would you like to think about?" The likely response would be a popular term she's heard, such as "fractals."

Instead, provide a comfortable environment where the girls feel free to converse about whatever they wish, and listen very carefully for hints of mathematics. Encourage participants to elaborate on their ideas. Eventually, a math question will emerge. If the girls spontaneously seek an answer, that's a strong indication that it is the right math for them.

Our first interaction with Viola, a 5th grader, illustrates the process. We began by simply asking her what she likes to do. She said that she likes to read fictional stories with talking animals. We asked, "If you were to write such a story, what animal would you feature?" She said, "gorillas." We asked, "What would the plot be?" She invented a story where one gorilla thwarted a rival by making him slip on a banana peel. This back and forth led to her "gorilla slippage problem":

> Banana peels are thrown at a gorilla. Each peel sticks to the end of a limb, with each limb equally likely. The gorilla slips if at least one banana peel is stuck to each foot, or banana peels are stuck to three different limbs. If N peels are thrown, what is the probability that the gorilla slip?

Although this question is suitable for a college probability course, when a student's need to know becomes personal, its learning potential is astounding. Viola had no prior exposure to mathematical probability, but because she invented the question, she was highly motivated, and her enthusiasm attracted four other members on the quest to solve it. Together, they solved Viola's problem and couched their solution within a story with talking gorillas! (See "The Saga of Fran and Fred," Girls' Angle Bulletin, Volume 14, Number 2, pages 21–26.)



From "*A Tiling Problem*" by Emily Caputo, Sophie Harteveldt, and Alina Patwari, Volume 17, Number 1 of the Girls' Angle Bulletin, Volume 17, Number 1

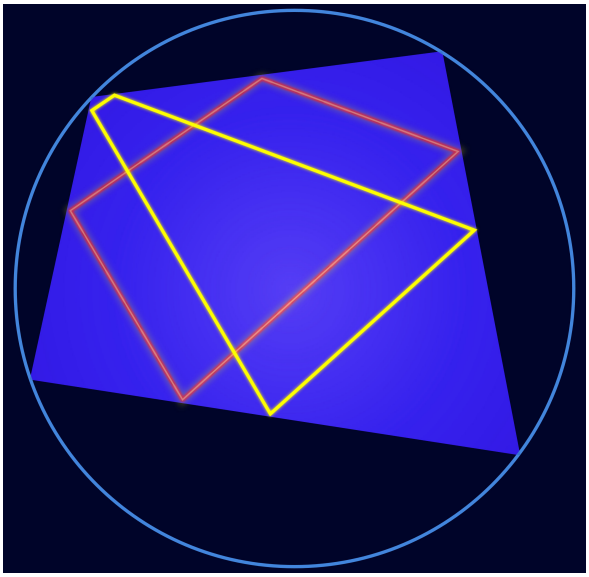
Because math is so interconnected, these girl-created investigations inevitably spread into many areas of math. The girls end up studying a larger swath of math than contained in the standard curriculum and in less time. Because the girls figure out so much on their own, they become their own best teachers. As they progress, they need less supervision and can quickly fill any perceived holes in their education. Some become excellent mentors before they go to college.

Examples of Girls' Mathematical Discoveries

By embracing the key psychological shift in attitude, Girls' Angle became a village of mathematical discovery. Due to space limitations, here are but three examples of math the girls have done that show some of the many benefits of this approach.

Symmetries of a Cube

Two 7th graders, Isabel and Liliana, had just worked out all the subgroups of the symmetry group of the square (in their own lingo). They asked me, "What should we do next?" All I said was, "I don't know... what do you think?" And off they went, exploring the symmetries of a cube. They decided to start by finding all the symmetries. To record their findings, they created a graphical notation that quickly proved unwieldy. So they invented a different one: Labeling the vertices of one face 1, 2, 3, 4, and the remaining vertices A, B, C, D, they indicated a symmetry by writing a permutation of these symbols to indicate where each vertex would go. They found about 30 symmetries, but suspected more. They decided to compose symmetries hoping to find new ones. As they became composition whizzes, it dawned on them that once they knew where 1, 2, and 3 go, the other vertices' destinations were forced, so they shortened their notation by more than half. This all happened without so-called "scaffolding" or prompting, only encouragement to follow through on their thoughts. And then they had a wonderful insight: Their very own notation gave them a clean way to compute the total number of symmetries!



A closed billiard circuit in a quadrilateral that Katherine Knox studied in Billiard Circuits in Quadrilaterals, Volume 130, Number 8 of the American Mathematical Monthly.

In a traditional approach, even if inquiry-based, the teacher typically sets up the problem and provides the students with notation. But notation, like manipulatives, has a lot of thought built in, depriving students of a creative opportunity. Here, Isabel and Liliana created the notation from scratch, which gave them a deeper understanding of the interplay between notation and ideas, and an elegant solution to their initial problem.

Plate Removal

When the girls lead, they sometimes venture into new math. For example, a 7th grader named Milena and an 11th grader named Miriam wondered how many ways there are to remove plates from two stacks of plates, where, on any given move, one can remove any number of plates from the same stack. Their journey culminated in the discovery of a family of monic polynomials with integer coefficients. The triangle

of coefficients wasn't in the On-line Encyclopedia of Integer Sequences, so we added it.[3] Because neither stack is special, these polynomials enjoy an intriguing functional relationship that essentially characterizes them. It is conjectured that all of the coefficients are nonnegative integers, but this remains unproven.

Milena's Theorem

A year later, the then 8th-grade Milena wondered about which quadrilaterals have the property that their angle bisectors are also perimeter bisectors. She discovered that in addition to rhombi, kites with 3 congruent acute angles also enjoy this property, a fact that the ancient geometers missed—understandably because she found it by studying the envelope of perimeter bisectors. She explains her ideas in her first professional, peer-reviewed publication in the International Journal of Geometry, Volume 10, Number 4, pages 85–106.

Conclusion

Instead of teaching math to girls, enable them to do mathematics just as professional mathematicians do. As a teacher, you never know what to expect, and it makes teaching fun. You will learn a lot of math from the girls, and, as Milena's publication proves, so will the world.[4]

C. Kenneth Fan is a mathematician and math educator. He earned his undergraduate degree in mathematics from Harvard and completed his PhD at MIT under the supervision of George Lusztig. He was a Benjamin Peirce Assistant Professor at Harvard. He has contributed mathematical research in algebraic combinatorics, particularly in representation theory of Lie algebras. Passionate about fostering a love for math, Ken founded Girls' Angle in 2007—a nonprofit dedicated to supporting and empowering girls in mathematics.

[3] https://oeis.org/A289329

[4] After this presentation, another Girls' Angle member, Katherine Knox, discovered and proved a theorem while still in middle school which was published in the *American Mathematical Monthly* on August 2, 2023.