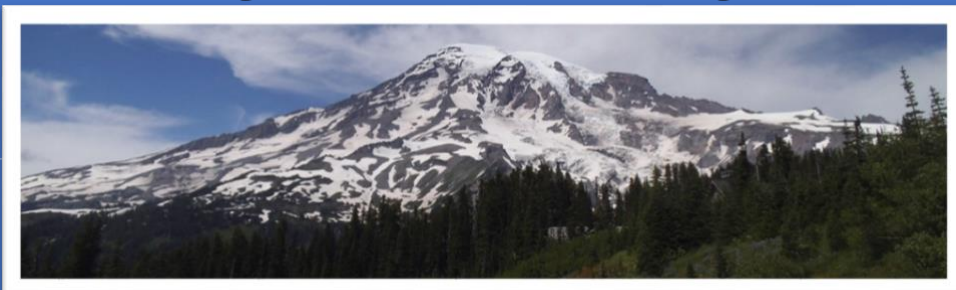


# Puget Soundings



Save the Date! PSCTM's next in-person dinner on May 8, 2023 will feature **Anita Lenges** and **Anita Garcia-Morales** speaking on the topic of Racial Equity. Stay tuned for much more info!

March 4, 2023

Happy Pi Day!

Editor: Joyce Frost  
(frostjoycee@gmail.com)

**Anita Lenges** began teaching math, chemistry, and Physics in the Peace Corp in Kenya, followed by 10 years teaching JH math, then a Masters in Math Ed, PhD in Math Ed and Critical Social Justice, UW Excellence in Teaching award, Post Doc in preparing teachers for diverse urban schools, Evergreen State faculty, and now UW Clinical Professor working with K-12 math teachers, coaches, principals, and district leaders to support ambitious equitable math teaching.

**Anita Garcia Morales** - Racing 2 Excellence & Social Justice (R2E), Co-founder [anitgm@r2esj.org](mailto:anitgm@r2esj.org)  
Class Action Senior Trainer  
<http://www.classism.org/> **Courage & Renewal Circle of Trust Facilitator**  
<http://www.couragerenewal.org/>  
Positive Discipline Parent & Educator  
Certified Trainer, Personal Parenting coach

## Greetings fellow PSCTM members!

Happy March! It's that time of year where everyone gets excited for one of our favorite math holidays...Pi Day!

### Why is Pi Day so much fun?

**The fashion.** I love wearing my pi flip flops, earrings, & t-shirt.

**The food.** Indulging in a sweet or savory slice of a round treat.

**The jokes.** The creative puns bring a smile to my face and brighten everyone's day.

**The competitions.** Who doesn't enjoy watching people try and recite as many digits as possible of pi?

But the best thing about Pi Day? Sharing the love of mathematics. Pi Day unites people around a math holiday. People who do not naturally find the joy in mathematics see something special. When someone stops to ask about the symbol on your shirt, or a young student asks, "What's Pi Day?" it's our chance to share the joy of our celebration.

We are all mathematicians, but not everyone believes that about themselves. Sharing your joy for mathematics may inspire someone to see themselves as a math person too. Have a happy Pi Day holiday.

**Traci Cotton, PSCTM President**



Jane Bissonnette - Past President, Secretary, Joyce Frost - Program, Newsletter, Jane Hunter - Newsletter, Art Mabbott - Treasurer, NCTM Rep, Joe Frost - Web Page, Laura Beckett, Maryke Haynes - Equity, Angela Ensminger - Membership/Social Media,



## Save the date for our Spring 2023 PSCTM Dinner featuring Anita Lenges and Anita Gonzales Morales Monday, May 8, 2023 from 5 – 7:30 pm at Bishop Blanchet HS



Some of our PSCTM members remember Anita from her work with a multi-district Puget Sound area grant called, *Creating a Community of Math Learners*. She is also a member of the Seattle Peace Chorus – singing for a just and peaceful world.

Anita Lenges



*Anita's experience being the perpetual immigrant student in class and sensing the "otherness" to which her family and ethnic group were subjected to were what shaped Anita's racial, class, and cultural lens. The common thread that runs through all that Anita does is her focus on **Social Justice and Racial Equity**.*

Anita Gonzales Morales

Dear PSCTM members,

I am very excited to begin my journey as PSCTM President Elect preparing next year to lead this group of fabulous Math educators. I have been teaching for over 30 years in different capacities and have been a middle school Math specialist for the past 14 years. We are so lucky to have this Math community to bounce ideas, share resources and develop connections across the various different schools we serve.

Recently, my own 8th grade Math teacher passed away. Listening to her memorial service, so many people spoke of the influence she had on their lives and their careers. I am sure she never knew how many people she had inspired who still carry the joy of learning and mathematics that she instilled in them so many years ago. It is a reminder that we never know the impact we are making on our students every day! Those seeds you plant tomorrow will be the flowers that bloom in the spring!

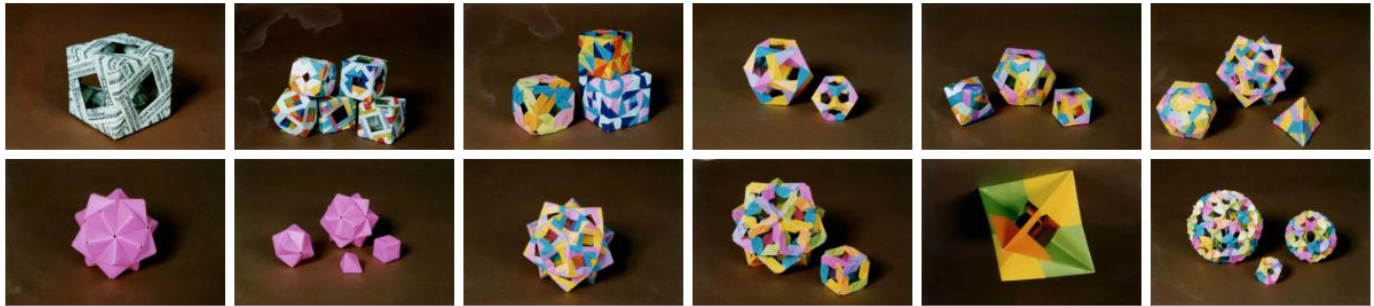
Angela Ensminger, PSCTM President - Elect



Angela's students really enjoyed creating Rona's origami book as an end of semester project to showcase their Math and Art course projects!







## Rona Gurkewitz: My 50 Year Journey with Origami, Math and Polyhedra

Wow! How great it was to be back having dinner together and doing math in person! Rona entertained us with origami history and personal origami tidbits on her journey to becoming an origami writer and enthusiast.

Rona became interested in origami after meeting origami pioneer [Lillian Oppenheimer](#) at a dinner party and becoming a regular visitor to Oppenheimer's origami get-togethers. Rona has written several books on origami, exhibited works at international origami shows, supplied a piece for the set design of the premiere of the [Rajiv Joseph](#) play *Animals Out of Paper*, and has made modular origami quilts as well as polyhedra. With retired mechanical engineer Bennett Arnstein, Gurkewitz is the coauthor of:

- *3D Geometric Origami: Modular Origami Polyhedra* (Dover, 1996)
- *Multimodular Origami Polyhedra: Archimedean, Buckyballs and Duality* (Dover, 2002)<sup>1</sup>
- *Beginner's Book of Modular Origami Polyhedra: The Platonic Solids* (Dover, 2008)

With Arnstein and Lewis Simon, she is a coauthor of the second edition of the book *Modular Origami Polyhedra* (Dover, 1999), extended from the first edition by Arnstein and Simon.

50 years ago, a special tradition was started at the American Museum of Natural History in New York City - a holiday tree on 5<sup>th</sup> Avenue that is decorated each year with origami ornaments. Rona had her first ornament on the holiday tree the year she turned 30.

*"The Origami Holiday Tree is an annual event produced by [OrigamiUSA](#) at the American Museum of Natural History. Each year, OrigamiUSA and our team of volunteers design and produce a stunning tree in the main hall of the Museum, decorated with thousands of origami figures folded and sent in by members and origami aficionados from around the world. This gorgeous spectacle has been an institution in New York City for 50 years and is a linchpin of the relationship between OrigamiUSA and the Museum of Natural History."* Click the link to see beautiful examples from the [Holiday Tree Galleries](#).

Rona shared her special origami booklet - I have included the instructions from her PowerPoint on the next page. If you would like the actual PowerPoint, email me at: [frostjoycee@gmail.com](mailto:frostjoycee@gmail.com) Her PowerPoint was so popular, that I had 2-3 teachers email me early the next morning to request a copy of the PowerPoint to use later in the week with their students.

### Four Theorems for Children to Discover When Making a Modular Origami Book

Rona Gurkewitz  
Professor Emerita  
Western Connecticut State University  
Advisory Board  
Seattle Universal Math Museum (SUMM)



In addition to Rona's Origami booklet with the great PowerPoint instructions, Rona also shared some additional Origami Resources.

At the dinner, she mentioned the new **February 2023 National Geographic Magazine article entitled; *The Future is Folded*.**

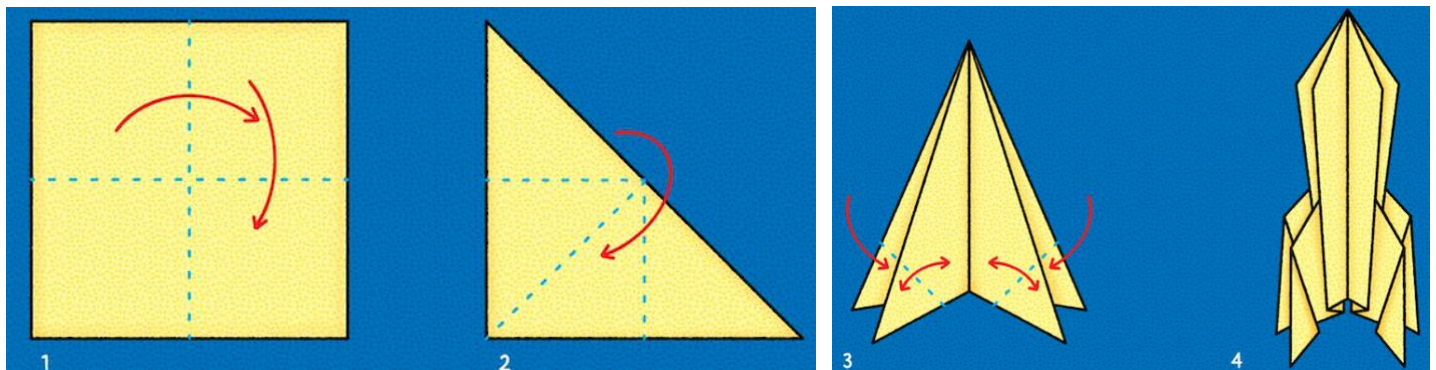
Several of us downloaded it right then from the King County Public Library (or Seattle Public Library). You will enjoy reading this great article – check it out!

### [Stilride introduces 3-D printing to “industrial origami” manufacturing arsenal – Feb 16, 2023](#)

*“STILRIDE, the Swedish startup known for its origami-inspired approach to electromobility design and manufacturing, is joining forces with French-Swedish robotics company ADAXIS to introduce 3D printing capabilities to its suite of sustainable manufacturing tech. STILRIDE’s technology, called [STILFOLD](#), involves the use of robotic arms to fold steel over curves to form light and strong new structures, using minimal component parts. The technology is currently being used to build the chassis of a sustainable steel electric motorbike called the Sport Utility Scooter One (SUS1) which is built using 70% fewer components than traditional plastic models.”*

### [Folding Paper Can Smooth Out Problems](#)

*The art of origami provides ways to solve equations and design gear for outer space*



### [Dan Finkel Blog: Family Math Night Resources](#)

*“In addition to the [Math for Love Family Math Night Planning Document](#) and [Math Games Shortlist Handout](#), the games and activities are my list of ideal offerings for a Family Math Night. The planning document has video support for many, along with suggested grade and materials needed for each activity.”*

- [1 3 4 6 Puzzle](#)
- [1-2 Nim on a Ten Frame Handout](#)
- [Beat the Tax Collector](#)
- [Blockout Board for Family Math Night](#)
- [Box the Numbers](#)
- [Broken Calculators – Whole Numbers](#)
- [Diffy Squares 2023](#)

- [Don't Break the Bank 2023](#)
- [Dots and Boxes 3 by 3](#)
- [Dots and Boxes 4 by 4](#)
- [Hexagon Challenge](#)
- [Pig Handout](#)
- Polka Loop Puzzle (see [video](#))

# Rona's PowerPoint (a summary)

## Making a Modular Origami Book

Start with 10 sheets of paper, all same size, squares ok

- Spine (red): 1 sheet
- Front and Back covers (blue): 2 sheets
- Inside pages (yellow): 3 sheets (one less sheet than connector sheets)
- Connectors (orange): 4 sheets (one more sheet than inside page sheets)



## Making a Modular Origami Book

### Step 1: Folding (All Sheets)

- Fold all sheets as shown below: (red spine, blue covers, yellow inside pages and orange connectors)
- No center crease made, result: rectangle half original paper size



## Making a Modular Origami Book

### Step 2: Folding (Covers and Inside Pages)

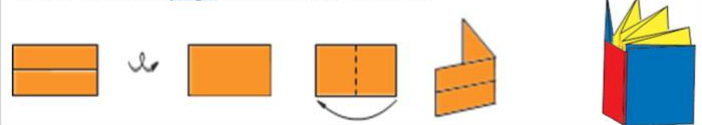
- For the covers (blue) and inside pages (yellow), with the seam side up, fold the short edges together. The folds will be closed and the seams won't show.
- A short edge of a connector or the spine can be inserted into a short edge of a cover or inside page.



## Making a Modular Origami Book

### Step 3: Folding (Connectors)

- Seam side down fold the short edges of the connectors (orange) together.
- Each short edge of a connector will be inserted into a short edge of a cover or inside page so seams won't show.



## Making a Modular Origami Book

### Step 4: Setting Up for Assembly

Arrange the modules for assembly in two lines, left to right.

- Top: four connectors (orange)
- Bottom: front cover (blue), three inside pages sheets (yellow) and back cover (blue)

How does the number of connector (orange) sheets compare to the number of cover (blue) and inside page (yellow) sheets



## Making a Modular Origami Book

### Step 5: Assembly (Covers and Inside Pages)

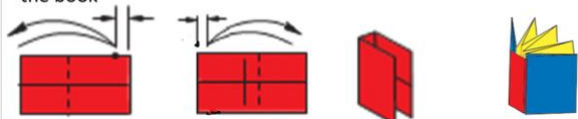
- Slide the left half of the first connector (orange) into the right half of the front cover (blue). Continue to get an accordion zig-zag stack.
- Squish it and note its thickness. That is the thickness of the book.



## Making a Modular Origami Book

### Step 6: Folding the Spine

- Fold the left short edge to the right edge leaving a gap the thickness of the book. Unfold. The fold is to the left of the spine back
- Fold the right short edge to the left edge leaving the same size gap. Unfold. The fold is to the right of the spine back
- The spine's back is centered, without a center crease and is as thick as the book



## Making a Modular Origami Book

### Step 7: Finishing Assembly (Putting the Book Together)

- With the inside of the spine facing the back of the stack, slide the spine's short edges into front and back cover's short edges and squish.



Finished Book



## OPINION: Can we please stop talking about so-called learning loss?

Let's focus on where our students are and what they most need next. Jo Boaler, January 30, 2023

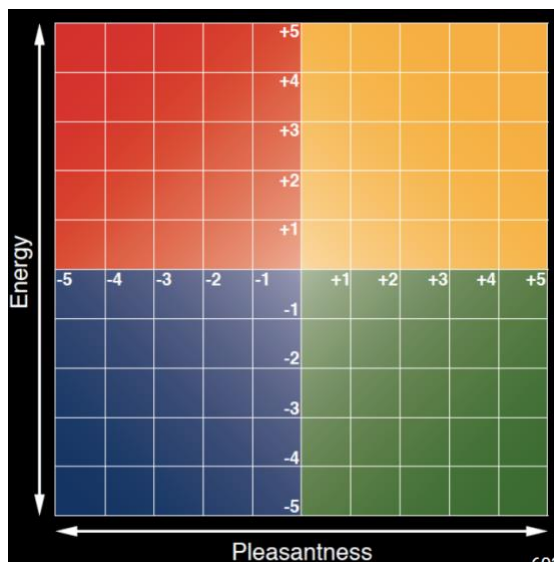
Here is a summary in Jo Boaler's own words:

*I am sure you have seen many headlines about students' declining math scores and supposed "learning loss." In a new op-ed, I argue that students are always learning, and that teachers were heroic in the pandemic. The op-ed includes data showing that students continued to learn a lot and that any declines in standardized test scores were not due to their changed learning mode, because teachers went to "superhuman" lengths to continue engaging their students. Here is an excerpt:*

*"Rather than knee-jerk reactions to the declines in standardized test performance, the pandemic should prompt a much-needed educational reset. My suggestion is that such a reset start with a careful and broad consideration of where our students are, what they most need and what they really learned during the pandemic."*

## Post Pandemic and SEL Learning in Math Class – Can it be done? - **Jane Hunter**

Let's face it, just the thought of a math lesson can induce anxiety in many of our students. Now that we are recovering and in a post-pandemic world, how do we handle this increased level of stress and anxiety? District are requiring **Socio-Emotional Learning (SEL)** in all classes. How can a sane teacher incorporate these lessons into classroom sessions? Don't panic! Here are some simple and very useful strategies: [Mood Meter - Emotional Check In](#)



Mood Meter

enraged	panicked	stressed	jittery	shocked	surprised	upbeat	festive	exhilarated	ecstatic
livid	furious	frustrated	tense	stunned	hyper	cheerful	motivated	inspired	elated
fuming	frightened	angry	nervous	restless	energized	lively	enthusiastic	optimistic	excited
anxious	apprehensive	worried	irritated	annoyed	pleased	happy	focused	proud	thrilled
repulsed	troubled	concerned	uneasy	peevish	pleasant	joyful	hopeful	playful	blissful
disgusted	glum	disappointed	down	apathetic	at ease	easy going	content	loving	fulfilled
pessimistic	morose	discouraged	sad	bored	calm	secure	satisfied	grateful	touched
alienated	miserable	lonely	disheartened	tired	relaxed	chill	restful	blessed	balanced
despondent	depressed	sullen	exhausted	fatigued	mellow	thoughtful	peaceful	comfy	carefree
despair	hopeless	desolate	spent	drained	sleepy	complacent	tranquil	cozy	serene

Source: Prospect Elementary

I introduced the idea to my classes early on - that how we feel emotionally affects how we are able to be successful in class. It also helps me, as the teacher, gauge how well lessons will work or can best be delivered. (And it's a review of the coordinate system, too 😊.)

I always start with myself ... today, I'm not as energetic as yesterday but I'm feeling pretty happy so... (3, -1) or content. Sometimes I ask kids to just share a coordinate, other days we only have time to check in with a quick color. It takes 5 to 8 minutes at the start but is well worth it.

[Math Teacher Lounge: The Podcast](#) – I've gotten great ideas listening to these women.

Socio- Emotional Learning **can** happen successfully in your math class. But it can also change how you teach and how well your students learn. For years we have wanted to help students verbalize what they are thinking. Now is the perfect time to help them and help us as well.

**MATH TEACHER LOUNGE**

WINTER WRAP-UP | EPISODE 1

Problem-solving and facilitating classroom discussions

**FAWN NGUYEN**  
Specialist,  
Math Advance Team  
Amplify Desmos Math

**CHRISTY THOMPSON**  
Literacy Coach  
and Author

**KASSIA OMOHUNDRO WEDOKIND**  
Math Coach  
and Author

**Receive Clock Hours for PSCTM events!**

For attending one or more PSCTM events: Fall 2022, Winter or Spring 2023, you can receive 1 ½ clock hours per presentation. Email [art@mabbott.org](mailto:art@mabbott.org) after the event.

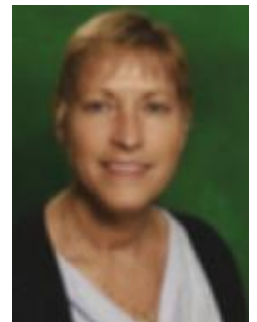
**PSCTM's Clock Hour process:**

- Request clock hours for any one of the events
- Art will send you an evaluation form
- Complete evaluation form and email to Art
- Art will send you the clock hour form for the event
- Complete clock hour form and keep for your records. (*Email Art if you have questions*)

*Follow PSCTM on social media! Share your lesson ideas, news with us, too! @PSCTM*

**Math Fun - Jane Bissonnette**

This game will work at any age for any topic. Tape math questions to a plastic ball (beach ball size) using masking tape. Play hot potato by having the students pass or toss the ball around until the music stops. Whoever has the ball when the music stops must pick the math questions that they have their hand on, peel it off the ball and answer it. An alternative is to have the students work as partners to solve the problem.

***Southern Teachers Agency presents: Top 10 Reasons to be a Math Teacher***

- 10 You know all the angles
- 9 Life always adds up
- 8 You know all the pi jokes
- 7 Irrational is not so bad
- 6 Infinity and beyond ... been there, done that
- 5 It's okay to be obtuse
- 4 You always knew your raise would be an imaginary number
- 3 You can do the math
- 2 You believe in a Higher Power
- 1 You've got the best pickup line: "What's your sine?"

**Congratulations to our new PSCTM officers!**

**Angela Ensminger, President Elect**

**Joyce Frost, Program and Communications**

*"Many who have had an opportunity of knowing any more about mathematics confuse it with arithmetic and consider it an arid science. In reality, however, it is a science which requires a great amount of imagination." – Sofia Kovalevskaya*

*"What is imagination?...It is a God-like, a noble faculty. It renders earth tolerable; it teaches us to live, in the tone of the eternal." – Ada Lovelace*

## Approximations of $\pi$ – currently 100 trillion digits... **Joe Frost**

The ratio of the circumference of a circle to the diameter of a circle has been an important figure for at least 4,000 years. According to Petr Beckmann in his book *A History of Pi*, the Babylonians used a value of  $\pi = 3 \frac{1}{8}$  (3.125), though their exact method of discovering that is not known. Also, it is not known if the mathematicians who arrived at that number were Babylonians, Hittites, Sumerians, Chaldeans, or Assyrians, but for purposes of generalization, the common practice is to call them Babylonians. The Egyptians, meanwhile, were using a value for  $\pi$  based on the belief that the area of a circle with a diameter of 9 units was the same as the area of a square with a side of 8 units,

$$\begin{aligned}\pi(D/2)^2 &= S^2 \\ \pi(9/2)^2 &= 8^2 \\ \pi &= 8^2 \times 2^2 / 9^2 \\ \pi &\approx 3.1604\end{aligned}$$

Archimedes of Syracuse, who was killed by a Roman soldier in 212 BC, found upper and lower bounds for  $\pi$  by calculating the perimeter of a polygon inscribed outside a circle and one inside the circle, reasoning that the perimeter of the circle had to be between those two lengths. He settled for the approximation of  $3 \frac{1}{7}$  (3.14285714).

The Roman engineer Pollio Vetruvius, writing in 15 BC, used a value of  $\pi = 3 \frac{1}{8}$  (3.125) as the accepted value for applied mathematics of the time.

In 130 AD in China, Hou Han Shu used 3.1622 in his calculations, which is suspiciously close to  $\sqrt{10}$ .

In 264 AD, Liu Hui used a method of inscribed polygons to find a value of  $\pi = 3.14159$ .

Writings by the Indian mathematician Aryabhata from about 500 AD use  $\pi = 3 \frac{177}{1250}$  (3.1416), which is a much better approximation than anything in the West.

The Arab mathematician Muhammed al Khwarizmi, from whose name the word 'algorithm' derives, calculated the value of 3.1416 in about 800 AD through repeated use of Archimedes' algorithm.

Part of the title of one of Al Khwarizmi's books, "al Jabr," was Latinized into Algebra.

Archimedes' approximation was not bettered in European mathematics until, over 1400 years after his death, the Italian, Fibonacci, used Archimedes' method to calculate a better approximation, 3.141818.

The discovery of logarithms and decimal fractions in the 15<sup>th</sup> century greatly facilitated numerical calculations. Using these new tools,  $\pi$  was known to 30 decimal places by the end of the 16<sup>th</sup> century and to 140 places by the end of the 18<sup>th</sup> century. William Jones introduced the convention of using the Greek letter  $\pi$  in 1706, and Leonhard Euler popularized it in 1737.

By the end of the 19<sup>th</sup> century  $\pi$  had been calculated to 707 places (though an error in the 528<sup>th</sup> digit wasn't caught until 1945), and in 1946 the largest number of digits of  $\pi$  calculated by hand stood at 620.

In 1947, machines took over and 710 digits were calculated using a desk calculator.

In 1949, an electronic computer was used to calculate 2037 digits.

The number of digits has continued to rise exponentially. Computer scientists now use algorithms to calculate  $\pi$  as a means of ranking the speed of supercomputer clusters. Japanese mathematician Yasumasu Kanada set new records a number of times between 1995 and 2002, reaching a peak of over 1 trillion digits. In 2022, the Seattle-based Google computer scientist Emma Haruka Iwao set the current record for number of digits by calculating  $\pi$  to 100 trillion digits.

**A recent Seattle Times article stated that, "For the first time ever, kids of color make up the majority of students enrolled in Washington public schools." How does that change what we should be teaching and how we teach?**

***Why was the mermaid kicked out of math class?***

*Because she came to class in an Algae-bra.*

**Elizabeth Wilson Jr.** High Math Teacher, St Mary Magdalen Catholic School



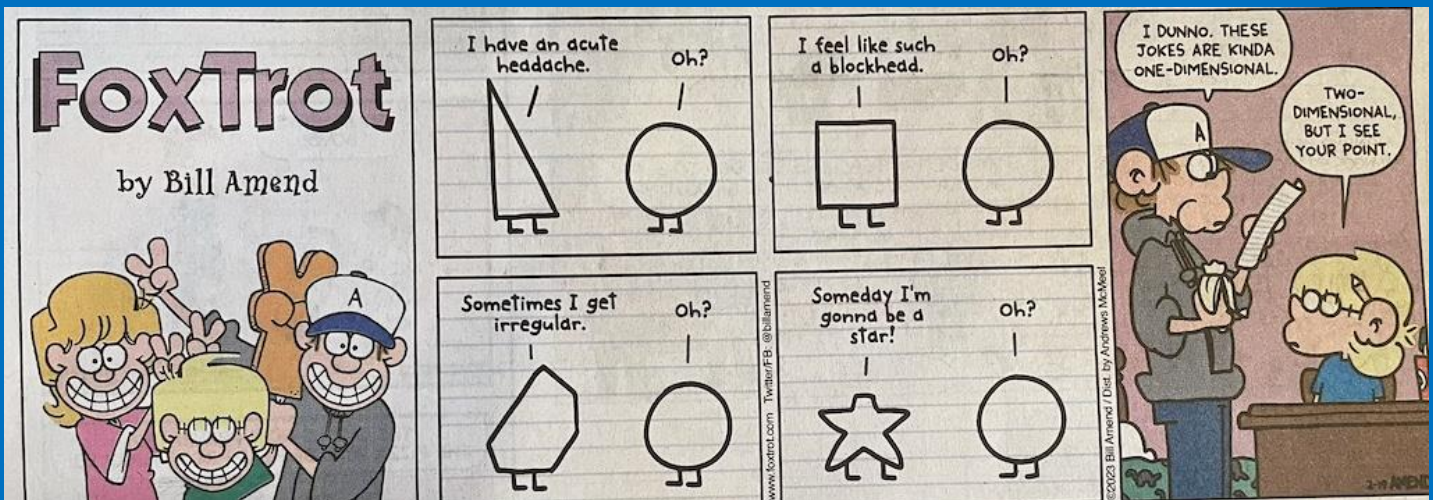


**Joseph Mullins**  
@josephmullins

Today, nobody showed up to my 8.15am class.

0 students of about 40. Sitting in the empty room, I email them, trying to disguise my hurt feelings.

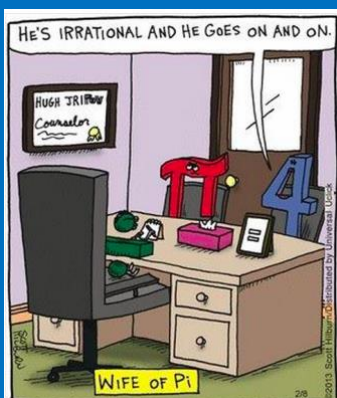
2 mins later, I get a reply: "Professor, we think you might be in the wrong room." So anyway off I go to live in a hole forever.



There's a fine line between a numerator and a denominator.

Only a fraction of people will find this funny.

**Dear Maths,**  
I am tired of finding your x. Just move on buddy, she's gone.



**π DAY**  
INSPIRES ME TO MAKE  
**IRRATIONAL**  
BUT, WELL-ROUNDED  
DECISIONS

What did Pi say when someone asked if it could explain what Pi Day was again?

"I don't want to repeat myself..."

## **Pi Day is coming up March 14<sup>th</sup>! Let's Celebrate!**

Here is a short list of websites with lots of great Pi Day activities for all ages!

### [37 Mathtastic Pi Day Activities for the Classroom](#)

### [40 Math Jokes That'll Make "Sum" of Your Students LOL](#)

### [An Insider's Guide to Celebrating Pi \( \$\pi\$ \) Day](#)

*"Every year on March 14—Albert Einstein's birthday—number lovers can raise a piece of pie to Pi ( $\pi$ ) Day, an international celebration of one of math's most famous constants: the irrational, never-ending number  $\pi$ , pronounced pi (3.14159 . . .). Exploratorium physicist [Larry Shaw](#) invented the playful celebration in 1988, and Congress declared it an official U.S. national holiday in 2009."*

### [Mensa for Kids: Pi Day Fun](#)

*"In honor of this international celebration, we've put together 3 math lessons and 14 math activities for you to enjoy."*

### [11 Fun Pi Day Activities for High School Students](#)

*"Consider taking a break from the traditional lesson plan and incorporating some fun Pi Day activities for high school students into your curriculum on or around March 14."*

### [20 Engaging Middle School Pi Day Activities](#)

*"Whether you're looking for something exciting, a delicious treat, or an art project, you've come to the right place!"*

### [Celebrate Pi Day with NCTM](#)

*"We've gathered our best pi-related activities from each of our publications and resources that will suit your grade level."*

### [Make Pi Day a Piece of Cake with these 30 Activities!](#)

### [Pi in the Sky Activities: NASA Jet Propulsion Laboratory](#)

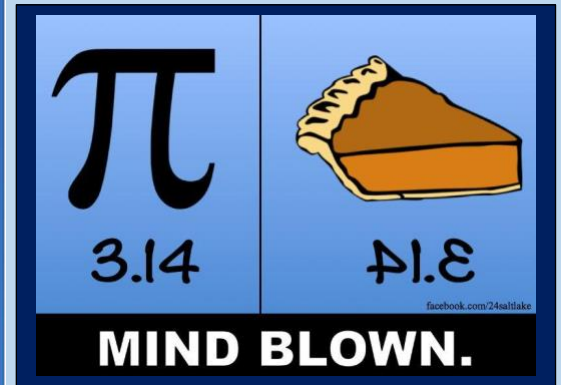
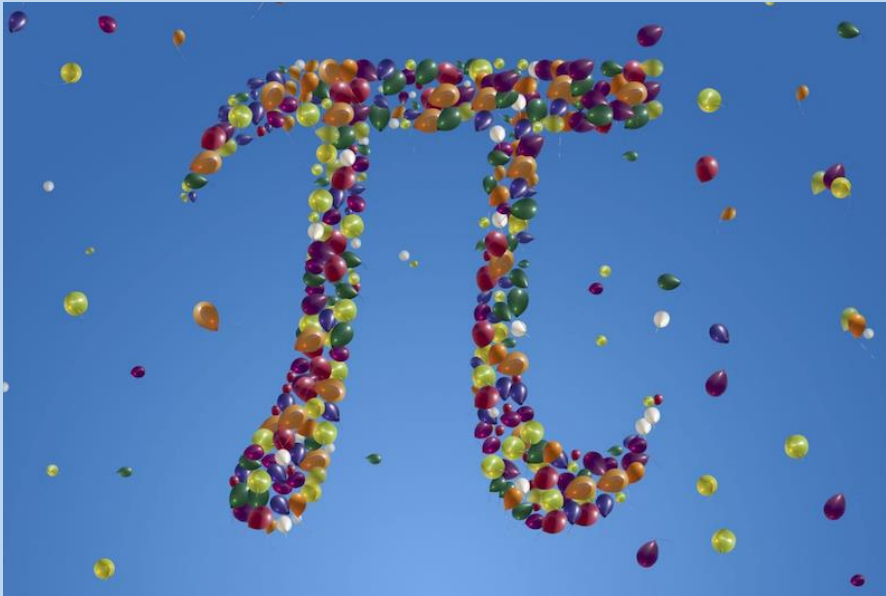
*"Bring the wonder of space to your students. Explore our universe of science, technology, engineering and math activities and resources."*

### [3.1415 Ways to Celebrate Pi Day](#)

*"Any day is a better day with a little  $\pi$  (pi). Let's celebrate Pi Day with some fun, meaningful activities that show students how the mathematical constant shows up in real life."*

### [Pi Day Top 5 for Geometry Teachers](#)

*"We list our Top 5 Favorite Pi Day videos, websites, and activities. We also give you a bunch of Free Pi Day Worksheets from our curriculum."*



### **30 Best Pi Day Jokes** *“Like pi, we could go on forever with this silly math humor.”*

What do you call it when someone gets a huge tattoo of pi on their face?

An irrational decision...

What do you call two guys who love math?

Algebros...

What do you call a number that can't stay in one place?

A roamin' numeral...

Why didn't the quarter roll down the hill with his buddy the dime?

Because it had more cents...

What do you get when you take the sun and divide its circumference by its diameter?

Pi in the sky...

Why did pi fail its driving test?

Because it didn't know when to stop...

Why is it tragic that parallel lines have so much in common?

Because they'll never meet...

Why did the triangle feel sorry for the circle?

Because it's pointless...

What did one math book say to the other?

Leave me alone – I've got my own problems...

### **Seattle Universal Math Museum Celebrates Pi Day!**

#### **March 14: Virtual Pi Day with SUMM**

Join us for a virtual evening of mathy activities and finding  $\pi$  in all the circles around us on Tuesday, March 14, International Pi Day! Don't miss this opportunity to celebrate the mathematical constant and support Seattle's future math museum. This one-hour activity is for ages 6+ and will start at tau o'clock (6:28pm).

[Register for Virtual Pi Day with SUMM](#)