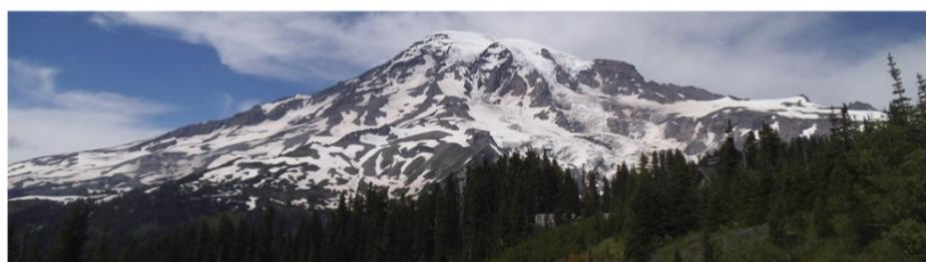




Puget Soundings



Save the date for our Winter Dinner,
February 26, 2024 – join us on Zoom!

Puget Soundings Newsletter: December 11, 2023 Happy Break!

Editor: Joyce Frost
(frostjoycee@gmail.com)

Save these Dates!

2024 PSCTM

Dinner

Presentations

Winter Dinner

– on Zoom

February 26, 2024

Spring Dinner

– in person

May 13, 2024

2024 Board Meetings:

- January 22nd
- March 11th
- April 15th
- June 10th

Happy Holidays PSCTM members!

The long cold nights will be starting to lessen soon as we approach the winter solstice. I know I look forward to longer days (and maybe a January snow day!) after the holidays. Until then, enjoy your winter break with family and friends and give yourself some time to recharge after the business of the holidays.

Two big events are happening in February! Our winter event is on Monday, February 26 and will be available on Zoom. More information to follow soon! Our Spring presentation will be again in person.

Also, in February, the National Council of Teaching of Mathematics (NCTM) is hosting a regional conference in Seattle from February 7-9. This is a fantastic opportunity right in our own backyard. You have the chance to hear great speakers and network with teachers from all over the country (and hear me speak!)

Finally, have you considered joining our board? We are looking for new board members to help bring these wonderful programs to you. We meet about once a month, have dinner and make plans! Come to a board meeting and see what it is all about! Have a wonderful holiday season.

Angela Ensminger, PSCTM President



PSCTM Board: Jane Bissonnette - Secretary, Joyce Frost – Program, Newsletter, Jane Hunter - Newsletter, Art Mabbott – Treasurer, NCTM Rep, Joe Frost - Web Page, Angela Ensminger – President





Fall 2023 PSCTM Dinner, October 23, 2023: Recap
Dean Willis, Lake Washington HS Math Teacher
“Using Chat GPT to personalize word problems and projects and make them more relevant to students”.

*Artificial Intelligence has finally made its way into the classroom. Its most popular form is **Chat GPT**. Whether we like it or not AI is here to stay. As teachers, we should familiarize ourselves with this technology to enhance the skills we already have. How do we use all of its features to their full potential? Why is a writing tool like Chat GPT important in a Math classroom? What parts of the lesson planning process can Chat GPT handle? Dean has already used Chat GPT in his classrooms multiple times this year. With some basic rules to follow you can use it too, regardless of what you teach.*

Dean is in his 7th year teaching math, all but 1 of which were at Lake Washington High School where he currently teaches Algebra 1 and Algebra 2 Honors. When he finished his Masters in Curriculum and Instruction in 2021, his biggest passion became helping students make connections between math and the real world. In his class, story problems and projects are not just words around a familiar equation but problems that require research and critical thinking.

For our dinner presentation, Dean put together a set of suggestions for anyone interested in giving Chat GPT a try with their classes!

He especially emphasized that you think of it mainly as a writing tool.

Start by making an account with Open AI and open a new chat.

Here are four general rules to help in using Chat GPT

- 1) Be as specific as possible
 - Chat GPT can work with a lot of random context
 - Use Who, What, Where, When, Why
- 2) Play to Chat GPT's writing strengths
 - Focus on the writing and generate text multiple times over
 - Solving problems isn't the best way to use Chat GPT
 - You can use it as google
 - Any time you want to generate something, ask it to generate multiple iterations
- 3) Give it examples
 - Your text book may be a good place to start for examples to feed Chat GPT
 - You can also copy/paste an example of the type of answer you are looking for
 - Copy/paste the standard you want Chat GPT to consider
- 4) Chat GPT remembers, so start small
 - I always start with a small task, and lead into a larger task
 - I have Chat GPT generate a story problem before generating a project idea

Dean followed this with terrific examples of how he asked Chat GPT questions and what to say.

"I am an Algebra 2 Honors teacher, and we have a project where we learn about solving quadratic equations by building catapults out of popsicle sticks and tracking how they launch a jellybean. The point of this project, and quadratic equations in general, is to find the maximum height and distance of an object that was launched, thrown, or dropped before it hits the ground. However, I want to start giving project options so students can have multiple projects to choose from. What are some similar project ideas, so each student is doing something unique?"

Here is an Algebra 1 example:

"I am an Algebra 1 teacher, and right now I am teaching my students about writing linear equations. I am trying to use more real-world examples so that my students understand the real-life application of linear equations. Here is a story problem from the textbook: 'A recording studio charges musicians an initial fee of \$50 to record an album. Studio time costs an additional \$75 per hour. Write a linear model that represents the total cost of recording an album as a function of studio time (in hours). Is it less expensive to purchase 12 hours of recording time at the studio or a \$750 music software program that you can use to record on your own computer? Explain.' Write 5 more story problems similar to the one above that involve writing linear equations."

Chat GPT's response:

Sure! Here are five more story problems involving writing linear equations.

- 1) A car rental agency charges a flat fee of \$30 for renting a car, plus an additional \$.25 per mile driven. Write a linear model that represents the total cost of renting a car as a function of the number of miles driven. Is it cheaper to rent a car for 100 miles or take a taxi that charges \$1.50 per mile. Explain.

For Algebra 1, here is an example of a recent project

- Budget a Recipe: An idea that came from Chat GPT
- Students defined their y-intercept from kitchen tools
- Students defined their slope as ingredients
- Use a shopping list generated by chat GPT so students know how much each item costs

Dean suggests some other ways to use Chat GPT:

- Use Chat CPT as Google
- Ask it to write Analogies
- Ask it to give real word examples of Content
- Ask it to translate paragraphs of text!

I asked Chat GPT to give me some Math Christmas jokes! What do you think?

- 1) Why was the equal sign so humble during the holidays?
Because it knew it wasn't less than or greater than anyone else!
- 2) What do you get if you cross a snowman and a dog? *Frostbite!*
- 3) Why did Santa's helper see the doctor? *Because he had low 'elf' esteem!*

Okay – these are the best of the bunch. (They got way worse from there...)

PSCT Board Invitation - During the early part of my math teaching career, I was not active in any professional math organizations and certainly did not know what I was missing. That all changed when I took a summer workshop through the University of Washington's Northwest Mathematics Interaction. Soon after, I started going to Puget Sound Council of Teachers of Mathematics events and I felt like I had found my people. At the dinners, I started networking and meeting other passionate math teachers in the region. I was surrounded by creativity and innovation. It was truly a career changing experience. Serving on the PSCTM board has further broadened those experiences and has definitely enhanced my teaching and professional horizon. I encourage you to consider joining the PSCTM board. Give it a try! – *Joyce Frost*

Receive Clock Hours for PSCTM events!

For attending one or more PSCTM events, you can receive 1.5 clock hours per presentation. Earn clock hours for Fall (October 23, 2023), Winter (February 26, 2024) and/or Spring (May 13, 2024). Our treasurer, Art Mabbott, will have details at each of our presentations.

Email him (art@mabbott.org) for details!

Follow PSCTM on social media!

Share your lesson ideas, news with us, too! @PSCTM

**Math Fun! Holiday Math Riddles – Jane Bissonnette****1) Christmas Ornaments**

Nick has a box of ornaments to decorate his tree each year.

- All of them are blue, except six
- All of them are green, except six
- All of them are red, except six

How many of each colored ornament does Nick have?

**2) Buddy and Henry**

Buddy and Henry were both born on Christmas Eve. When Buddy was 6 years old, Henry was half his age. Buddy turns 100 years old this Christmas Eve. How old is Henry going to be?

**3) How much for hot cocoa?**

At the holiday market, the total cost for a cup of hot cocoa and a cookie is \$1.80. If a cup of cocoa costs one dollar more than a cookie, how much does a cup of cocoa cost?

**4) Holiday Spending Spree**

Dasher spent half as much as Prancer did on holiday presents this year and Cupid spent three times more than Dasher. If the total spent between the three of them was \$720, how much did they each spend on gifts?

**5) How many total squares are in this diagram? (Hint: some squares are overlapping.)**

Answers: 1) Nick has 9 ornaments in total. Three of each color.

2) When Buddy is 100, Henry will be 97.

3) Hot cocoa costs \$1.40 and a cookie costs \$0.40.

4) Dasher spent \$120, Prancer spent \$240, and Cupid spent \$360.

5) There are 14 total squares. (15 if you count the square at the center of the wreath.)



Delectable Sweets with Equally Delectable Packaging: How Are These Made?

Joyce Frost

62nd NWMC, Saturday, Oct. 14, 2023

Lake Washington SD Math Teacher/Coach, Retired

frostjoycee@gmail.com

62nd NWMC – **Joyce Frost**

Several of our PSCTM members presented sessions/workshops at Portland Northwest Mathematics Conference. I am happy to share some of the interesting projects that I introduced at my workshop. I hope you and your students find these as intriguing as I and my students do! Encourage your students to watch for interesting packaging at this time of the year! Perhaps one of your students will be inspired to study to become a Packaging Engineer. I often wish that I had known of this career...

What is a Packaging Engineer?

Packaging engineers **design, develop, and specify containers** for all types of goods, such as food, clothing, medicine, housewares, toys, electronics, appliances, and computers. A packaging designer needs a background in **graphic design** and understanding of the fundamentals of manufacturing & industrial design.

What Does a Packaging Engineer Do?

A Packaging Engineer plans and implements packaging designs to ensure product integrity and **appeal**.



Chocolate Truffles (Frangos) – (about 50- 80 pieces)

Melt 12 oz. chocolate chips in the microwave for 2 minutes or less

Blend the following ingredients in a mixing bowl until smooth.

- 1/2 cup butter or margarine (softened)
- 2 tsp. vanilla
- 1 1/2 cups powdered sugar
- 2 raw eggs (or egg substitute for safety)
- 1 tsp. extract (mint, orange, almond, etc.)

Place the mixed ingredients in the refrigerator for about 15 minutes to chill.

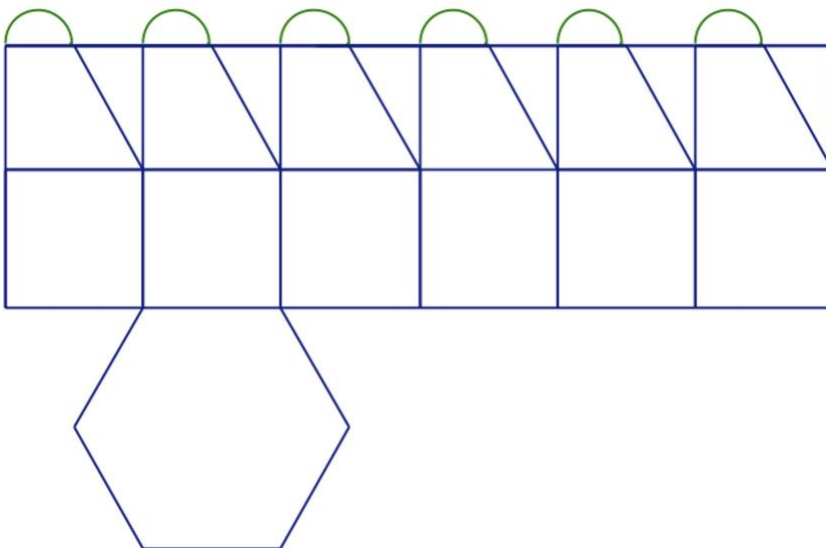
Mix chocolate mixture and chilled mixture together.

Wait for desired consistency. Spoon onto waxed paper.

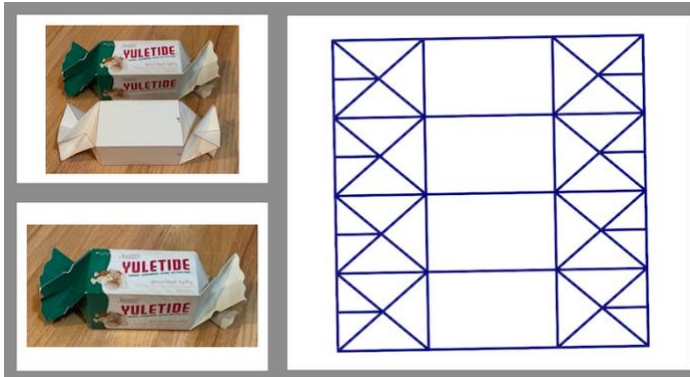
Enjoy!

4 ounce Frango box (square faces) 1.3 oz Frango mini (rectangular faces)

Recipe for the truffles to go into the box!



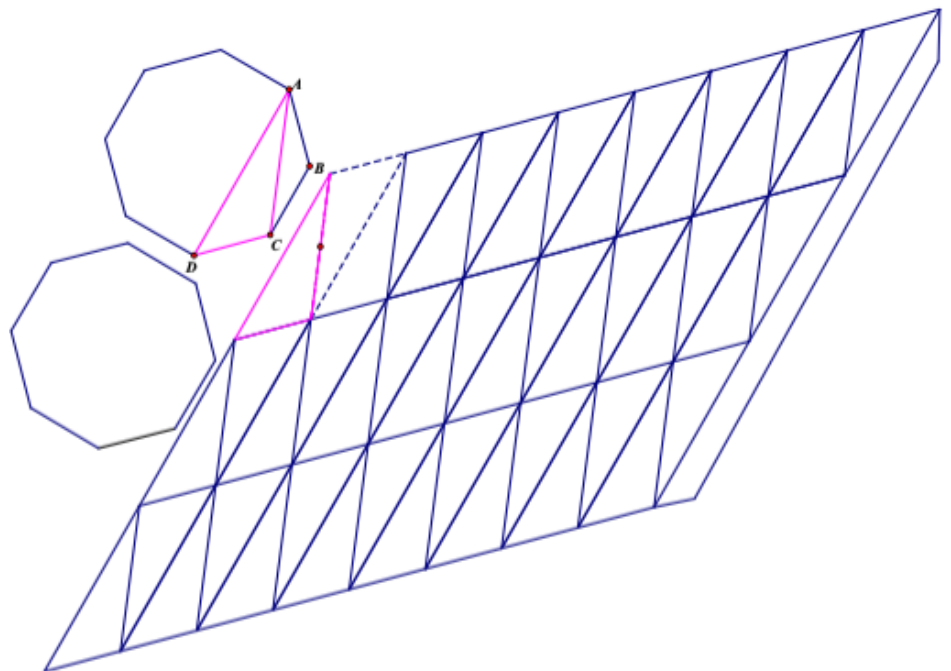
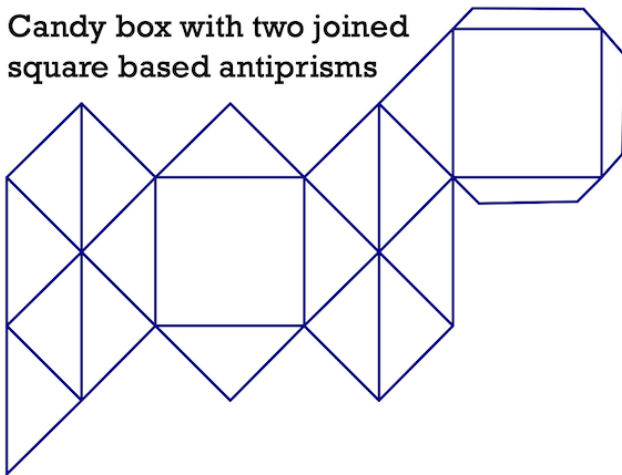
Net for 4 oz box (great compass practice!) Notice that given the edge length for the regular hexagon, all other measurements can be derived from this length. The diagonal line segments connect the top right of each of the six squares to the midpoint of the top of each of the rectangles. **The diagonals** are the same length as the hexagonal edge lengths. Bisect the top segment once more to get the center of the constructed half circle.



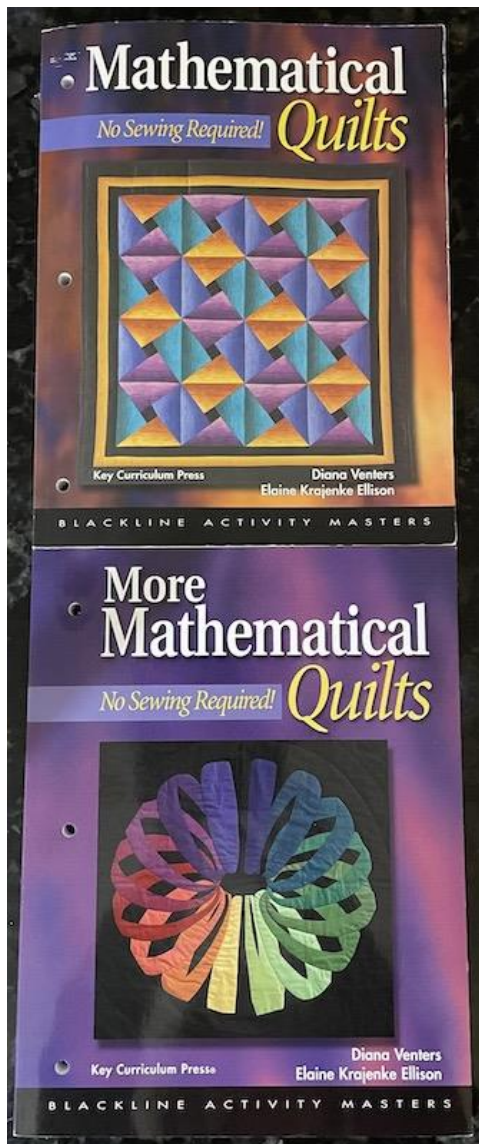
Twisted end Cookie box from a square piece of cardstock.

Box using two squares to create an antiprism

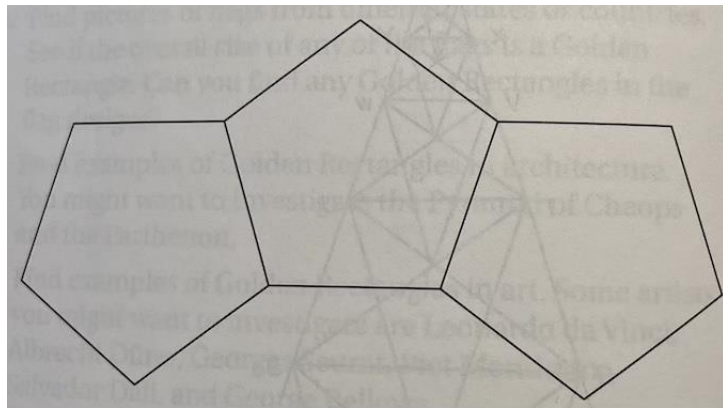
Candy box with two joined square based antiprisms



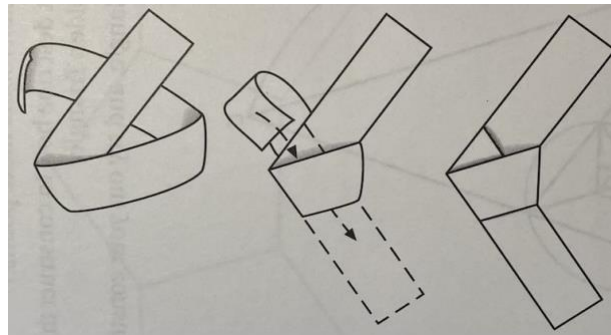
Collapsible “beverage” container built from two regular octagons and triangles (midpoint rotation to create pairs and then continued translation). The triangles consist of the edge length of a side and two diagonals of the octagon connecting two vertices (A to C) and a diagonal connecting two other vertices (A to D).



At a math conference about 20 years ago, I was privileged to hear the authors of these two books speak about their work and admire several of their quilts. It appears that these books are still available online, although some may be used copies. Here is an example of a fun activity from *Mathematical Quilts* that I enjoyed using with my high school students. **Joyce Frost**

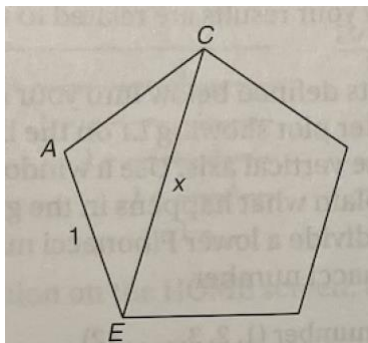
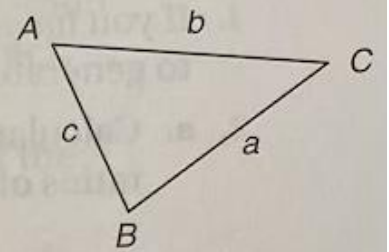


How many regular pentagons do you need to make a complete ring?



Did you know that you can tie a pretty accurate regular pentagon using a strip of paper or ribbon? 10 of these make a very nice wreath!

You can often use the Law of Sines to find the measure of unknown angles or sides in a triangle. The Law of Sines states that for any triangle ABC , $\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$. For the pentagon shown here, use the Law of Sines to show that $\frac{CE}{AE} \approx \text{Golden Ratio}$.



Using the Law of Sines, you can illustrate the Golden Ratio found in the ratio of the diagonal (CE) to the edge length (AE) in a regular pentagon. What a great introduction to the Law of Sines!

Activity 15

Because $AE = 1$ and $CE = x$, the Law of Sines gives the relationship $\frac{\sin 72^\circ}{x} = \frac{\sin 36^\circ}{1}$. Solving for x , you get $\frac{0.9510565}{x} = \frac{0.5877853}{1}$. Therefore, $x = 1.6180338$, and the Golden Ratio is approximately 1.618034.

Compound Interest, Like It or Not – Joe Frost

There is an aphorism that says, “Those who understand compound interest earn it, those who don’t, pay it.” Joyce’s first year algebra students created a poster of compound interest, where each student would make a poster with an example of an amount to set aside each month, an interest rate, annual vs daily vs continuously compounding interest, the term (years) to compound the investment, and a goal to save towards. The immediate goal was to teach them to use the principles of compound interest, but the secondary goal was to show them the dramatic power of compound interest.

Real life isn’t so simple. We can’t always take advantage of compound interest, but when we can, the benefits can be surprising. Take, for example, the purchase of a new car. According to BECU, the average price of a new car this year is \$48,000; typical car loans are for 6.99% and a typical down payment is \$10,000. Rounding slightly, a five year \$38,000 loan at 6.99% interest would yield a \$750 per month car payment. The actual amount of the interest paid over the life of the loan would be \$7130. (The exact numbers can be found using the BECU car loan calculator <https://www.becu.org/loans-and-mortgages/auto>).

You can cut the cost by around \$3440 by taking advantage of compound interest. Instead of buying the car and making your payments for 60 months, you can make your payments to a 5% money market account for 12 months before buying the car and use the accumulated amount to decrease your loan amount. The loan for the new balance is for \$28,790 (with the \$9210 from the money market) and payments of \$570/month. If you continue making \$750 payments until the loan is paid off, you pay it off months earlier than in the first scenario. The interest gained in that first year is only \$210, but the interest avoided in the year before the actual loan is \$2615. Adding the interest earned and the interest avoided by overpaying each month, you cut the total interest paid to \$3890. You can model this using the prepayment calculator at: <https://www.360financialliteracy.org/Calculators/Auto-Loan-Early-Payoff>.

If you can plan two years ahead, you can make the \$750/month car payments into a money market account for 24 months and have a total of roughly \$18900 to use to reduce your loan. The total interest you pay is \$1640, and you finish paying for the car in only 4 years and 5 months. Taking it to the next level, making the payments into a money market for 3 years before purchasing the car will leave a loan of \$8900 and save you a full year of car payments.

	Buy now, pay later	12 months prepayment	24 months prepayment	36 months prepayment
Interest earned	0	210	890	2065
Interest paid	7132	3890	1640	250
# payments	60	56	53	49
Out of pocket total	45132	41,682	39750	36750

A nice side effect of starting your payments early is that you can try living with the car payments with no penalty if you can’t make one. If it turns out that you were optimistic about what you could manage, you can reduce the “payment” without talking to the bank. Joyce tried a related trick. She heard a financial advisor on Oprah suggest that if you want to know whether you can live on your retirement benefits, try it first. Pretend like the only income you have is the amount of your retirement benefit and put the remainder of your paycheck into a separate (interest paying) account. After a few months you’ll know whether living on that is realistic, and after a year you can be sure, as well as having some extra savings to spend celebrating retirement.

IN THE NEWS

Just a few days ago there was an article in the Seattle Times about the [Center for an Informed Public](#) (founded in 2019) at the University of Washington. I find it fascinating that our local university has such a center. Even better that it was co-founded by ex-professional basketball player Kate Starbird, who played for the Seattle Storm as well as other teams. What an amazing local resource for teachers and students to help fight disinformation. I highly recommend reading both of these articles. The first one is an opinion piece in the Seattle Times written by Kate Starbird. The second article gives more of the background of the center and its work.

[UW misinformation researchers will not buckle under political attacks](#)

Kate Starbird (a former professional basketball player) is a co-founder of the University of Washington's [Center for an Informed Public](#), which formed in 2019 around a shared mission of resisting strategic misinformation, promoting an informed society, and strengthening democratic discourse. She's an associate professor in the Department of Human Centered Design & Engineering.

"Recently, one focus of our team has been election rumors. We work both in real-time and long after the fact to understand how misleading information about voting emerges (often through misinterpretations or mischaracterizations), is amplified and spread online, and ultimately undermines trust in election processes and results. In 2020, we participated in a nonpartisan collaboration with researchers at the Stanford Internet Observatory, Graphika and the DFRLab that tracked election rumors in real-time."

"We are not going to "solve" these problems with a single new platform policy, design feature or educational initiative. It will require all of the above and more. It's going to take researchers, platform designers, educators, journalists, policymakers, and members of the public to keep working from our different perspectives to reduce online deception and manipulation. "

[Attacked by conservatives, UW misinformation researcher gears up for 2024](#)

Dec. 10, 2023 at 6:00 am Updated Dec. 10, 2023 at 6:00 am

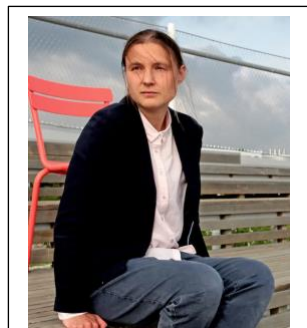
[Meet the Ukrainian Number Theorist Who Won Math's Highest Honor](#)

Did you know that for only the second time in history, the prestigious Fields Metal has been awarded to a woman?

"With her homeland mired in war, the sphere-packing number theorist Maryna Viazovska has become the second woman to win a Fields Medal in the award's history. In late February, 2022, just weeks after Maryna Viazovska learned she had won a Fields Medal—the highest honor for a mathematician—Russian tanks and war planes began their assault on Ukraine, her homeland, and Kyiv, her hometown. Viazovska no longer lived in Ukraine, but her family was still there."

"At the ceremony, the IMU cited Viazovska's many mathematical accomplishments, in particular her proof that an arrangement called the E_8 lattice is the densest packing of spheres in eight dimensions."

You will enjoy reading this intriguing article about Maryna Viazovska and her work. I also enjoyed the pictures of Maryna with her 13 year old son and 2 year old daughter. I was pleased to see that she was heavily involved in Math Olympiad teams during her high school years. – **Joyce Frost**



The Power of Starting at the End and Working Backwards – *Jane Hunter*

My mom was a librarian and would often read the endings of novels before she chose to read the actual book. I was horrified by this and made her swear to never tell me the end. These last few years, however, I find myself doing that in math! In Algebra and Advanced Algebra, I start with the solutions by teaching them how to use the power of the Desmos calculator.

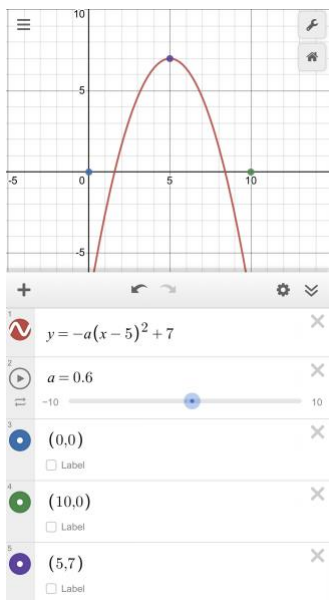
I have promised them that I would eventually show them how to do each step by hand. At first, I felt that I was jumping off the deep end. Why would they ever want to learn math if I showed them how to find and visualize the answers in advance? Surprisingly, over these past three years I have had no complaints as I slowly teach them the math behind the answers they can now easily find. The math just makes more sense to them.

They know the shapes of absolute value and quadratic functions; so, of course, there can be two answers or even no answer at all! My students are visual learners, so I have gotten few complaints as I teach completing the square using tiles. Using the tiles, they catch when I make a mistake as it doesn't match my Desmos answer! We are now solving the problems first and then checking the completed work against Desmos. When students ask if they have the right answer, I smile and reply, "I don't know; check it on Desmos." They can also graph the left and right sides of an equation to check where they intersect and determine if their work is correct.

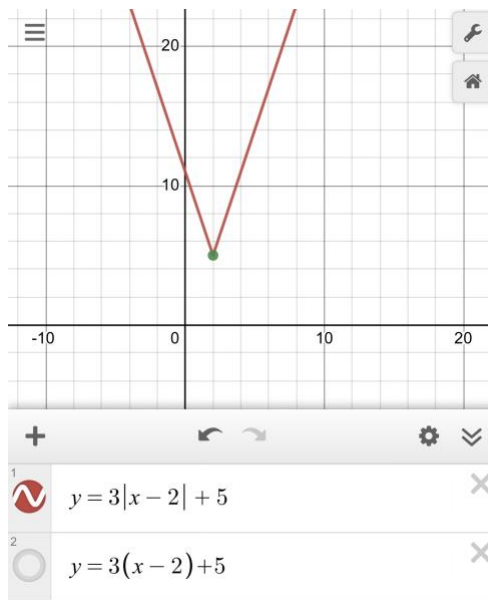
I find my students approaching problems from a variety of viewpoints. What does it look like? What are they asking for? What type of answers are reasonable? These are questions that I used to beg them to consider as they memorized how to solve a particular problem. Given the visuals of tiles, models, and Desmos, they can step outside the box with their mathematical thought processes. And the types of real life problems that I can give them has grown as well. We are no longer concerned only with "nice" factorable problems with whole number answers. Who cares about nice answers when you can create a slider to estimate the leading coefficient? If Joey (A) trips sending his sandwich 10 feet across the room beaming his friend Jarod in the head with the sandwich as it reaches a height of 7 feet on its arch to his forehead, how high up is his forehead? Who cares if the numbers are nice? They get pretty competitive as they try to figure this out.

In Algebra 1, since exploring parent graphs on Desmos first, kids have had no problems realizing the slope of a line as simply the vertical pull, and the y intercept as the vertical shift. (B & C) One student explained to another, "Remember, if you add a number on to any graph, it just moves it up." The other student nodded and started graphing lines. Point slope form naturally flowed from this. It is how they visualized the parent graph patterns on Desmos using transformations. My students made the connections immediately.

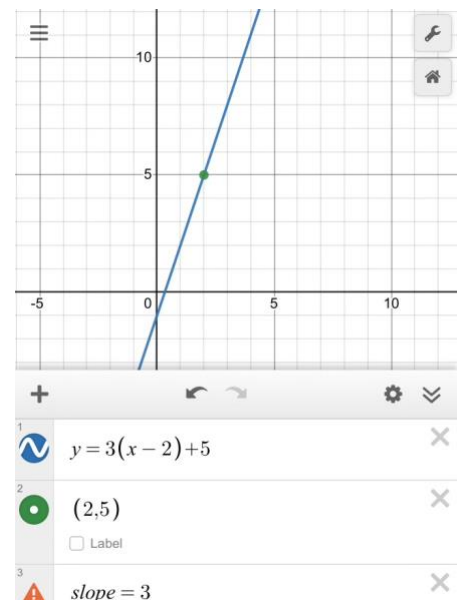
So, take a chance! Put aside the old graphing calculators, dive in, and start using Desmos with your students. You are giving them a tool they will use even after they graduate. I think you will find it incredibly rewarding.



A



B



C

Preview for my NCTM 30 minute Burst! – [Angela Ensminger](#)

At the February NCTM regional meeting, I will be speaking about an elective I teach called Art in Math. Once a week, I meet with a group of students to work on math inspired art projects. This December, we have been working on different platonic solid inspired ornaments as well as some Christmas tree scenes based on half circles. If you would like templates of any of these, just email me at aensminger@stmadophie.org.

**NCTM Regional Early-Bird Registration Ends Wednesday**

Only a couple of days remain to save when you register for NCTM's [2024 Regional Conference & Exposition](#), February 7–9 in Seattle.

Save up to 15% off onsite rates when you register by 11:59 PM ET on Wednesday, December 13. *Full conference and daily rates are available.*

***New!* View the Conference Program**

This year's conference program features more than 250 sessions, providing you with actionable tools and resources to implement in your classroom. Explore the program and create a personalized schedule that maximizes your learning experience.

[View all sessions](#) | [Search sessions](#)

Use the [search session](#) feature to easily search by keyword or speaker. Or, use the “category” dropdown on the search screen to view sessions by grade-band, topic, or content level, helping you quickly locate the presentations that are most relevant.

**REGISTER
TODAY**

The 5th Wave

By Rich Tennant



"Okay, ma'am, I'm going to ask you to walk a straight line; then I'm going to ask you to bisect that line with a perpendicular line that slopes to the equation $y = 3x + 5$."

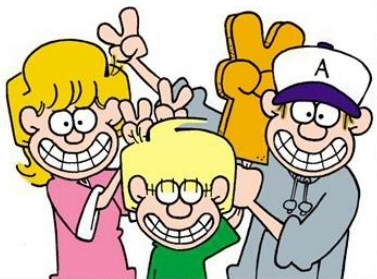
Free WiFi Available!

Solve this for WiFi
password:

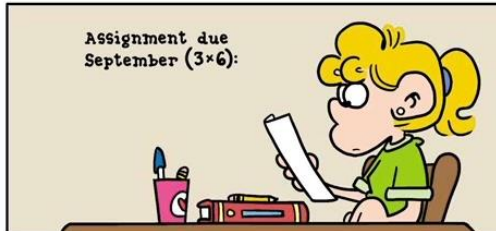
$$f(x) = a_0 + \sum_{n=1}^{\infty} \left(a_n \cos \frac{n\pi x}{L} + b_n \sin \frac{n\pi x}{L} \right)$$

FoxTrot

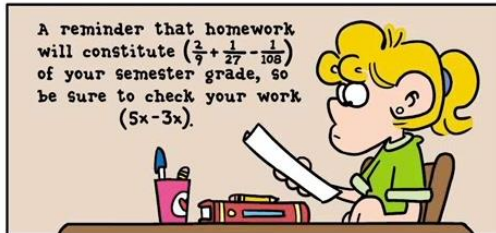
by Bill Amend



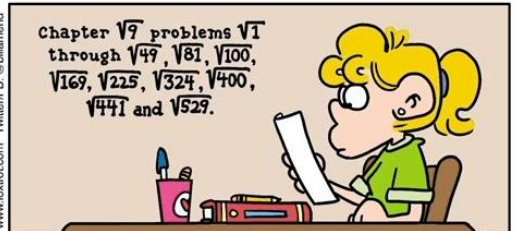
Assignment due
September (3x6):



A reminder that homework
will constitute $\left(\frac{2}{9} + \frac{1}{27} - \frac{1}{108}\right)$
of your semester grade, so
be sure to check your work
($5x - 3x$).



Chapter $\sqrt{9}$ problems $\sqrt{1}$
through $\sqrt{49}$, $\sqrt{81}$, $\sqrt{100}$,
 $\sqrt{169}$, $\sqrt{225}$, $\sqrt{324}$, $\sqrt{400}$,
 $\sqrt{441}$ and $\sqrt{529}$.



I HAVE THE
DORKIEST
MATH
TEACHER.

YOU
MISPRONOUNCED
"COOLEST."



AMEND 9-17



Adam Cerious @Browtweaten · 5h

just got back from this year's FibonacciCon and
it was as big as the last two put together