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(T a l k i n g L e a f)

South Dakota Council Teachers of Mathematics Newsletter

Presidential Ponderings

Greetings my fellow South Dakota Mathematicians,

There is an ancient Chinese Proverb that says something like “May you live in interesting times.” I don’t know about you, but I have had about enough interesting over the past decade. We just weathered the pandemic a few years ago and now we are being inundated with how to deal with AI in the classrooms. Our Education Secretary, Dr. Graves, just promoted a new curriculum for our guidance counselors to be used in schools, South Dakota Sturdy, to help our students have more grit and not be so fragile. Our NCTM president asks us to help students find their identity as mathematicians. And through it all, you are asked to try to get students to master linear equations, quadratic equations, rational functions, functions, polynomials, factoring, and the list goes on. At first glance, this may seem to be pulling us in different directions. However, I propose that all these can possibly work together. As we teach our students to have grit in working on math problems, they will get better and hopefully gain that mathematical identity we want them to have. Maybe, we can also use AI to assist us in the endeavor. I will be the first to admit, I haven’t figured out how to do all of this yet, but I do not hit the panic button any more with all these new inventions anymore. When I started in education there was fear that VCR recordings could replace teaching because we could just tape one great teacher and play that in the schools and we could save money by not having so many teachers. Does that sound ridiculous to you as well? Well, here we are 30 years later and the same notions are being passed around about AI in the classrooms. My bet is that it will largely end up like it did with all other technology; we will find a way to use it as a tool to help us in our teaching, but it will not replace any of us.



Having said all the above, I encourage each of you to attend our STEM-ED conference coming up in February. There will be great sessions on helping us address many of the concepts mentioned above. This coming year we have [Howie Hua](#) and [April Strom](#) lined up for speakers. It promises to be another great conference. Be sure to register early and get the discount from this [link](#)!

I hope to see many of you in Huron.

Sincerely,

Dan VanPeursem
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Fall 2024-2025

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Calendar Reminders

<i>Conference Speaker Proposal Deadline</i>	Oct. 15
<i>Joint Conference Early Bird Registration Deadline</i>	Dec. 1
<i>Joint Conference Pre-Registration Deadline</i>	Jan. 10
<i>2025 SD StemEd Conference</i>	Feb. 6-8



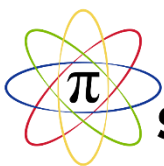
Higher Ed Viewpoint

In September, I attended the NCTM Annual Conference in Chicago. At the conference, I presented a workshop on using the ideas from Peter Liljedahl's book "Building Thinking Classrooms (BTC)" to teach Calculus. Before I started the workshop, I counted at least 70 people in attendance at my session, with more people coming in as the workshop progressed. In

addition, several other sessions were led by teachers who have been implementing BTC in their classrooms. The energy and interest from the teachers at my session were contagious. Everyone wanted to hear about how this changed how I teach, how the students were learning, and the impact on student achievement. Interacting with teachers excited about finding new ways to improve how students learn and how we as teachers can teach is always inspiring. Professional development is not just about learning the next new thing but about sharing best practices for our students with others. While BTC ideas have been successful with my calculus class, other teachers use other techniques to help their students learn math. Many of these teachers are willing to share their experiences with others at conferences, workshops, and other professional development opportunities.



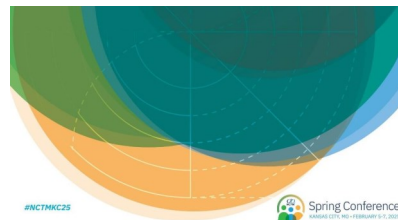
"The energy and interest from teachers at my session were contagious."



SD STEM Ed

There are two upcoming conferences, with both local and national speakers, available. If you are interested in learning more about BTC, sessions will be available at the SD STEM Ed conference in February, including one of my preservice mathematics education students who will talk about his experiences with BTC and April Strom, an expert in using BTC from Arizona. You will also hear from other teachers from South Dakota about the fantastic things they are doing in their classrooms.

Another conference available this spring is the NCTM Spring Conference. I will take a group of SDSU preservice teachers to this conference and, once again, share my experiences with BTC.



Professional development focused on improving instruction in mathematics and science is invaluable. Whenever you can participate, you will come away from the experience motivated, excited, and with a renewed sense of purpose for improving instruction for all your students.

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Mark's Thoughts - Desmos Update

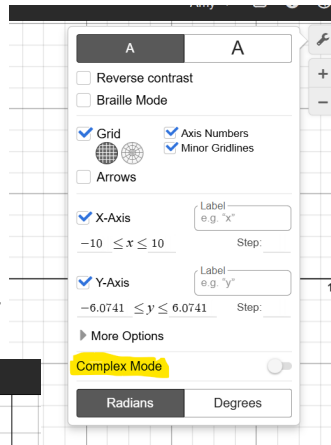
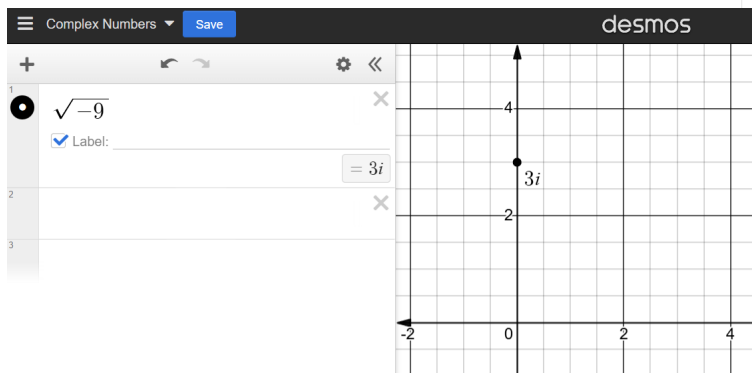
Hello!

In the last issue, I highlighted some recent updates to Mathigon. It turns out that Desmos Studio (www.desmos.com) also recently rolled out some exciting updates. I've spent a very limited time exploring these new updates, but here is a countdown of three of my favorites.

Favorite Update #3: Complex Numbers

Desmos Studio's most recent update is a Complex Number mode. To activate complex numbers, go into the settings gear tool and toggle on "Complex Mode".

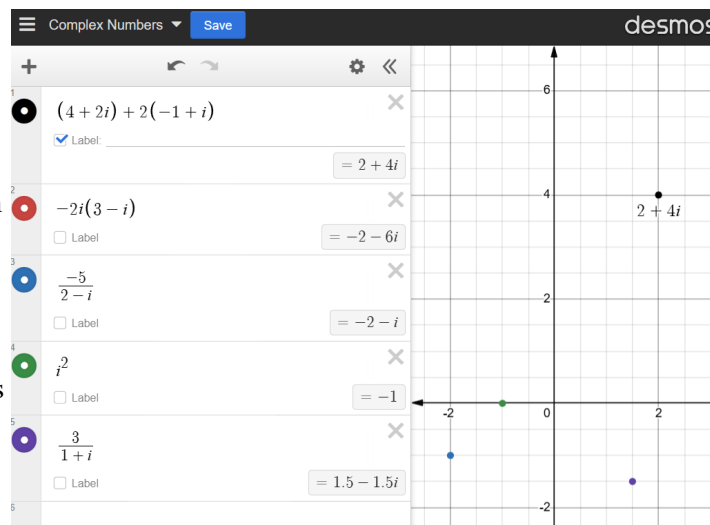
Once Complex Mode is active, Desmos will evaluate square roots of negative numbers. In addition, Complex Mode changes the graph into a complex plane (x -axis is the real axis, y -axis is the complex axis). As you can see below, Complex Mode plots the number $3i$.



"Desmos Studio has recently rolled out some exciting updates."

Favorite Update #2: Complex Numbers Operations

In Algebra 2 & beyond, students perform operations with complex numbers. Complex Number mode handles most of these operations effectively. [Note: I wish Complex Number mode would be able to express rational numbers as fractions. Expect that update to arrive soon.]



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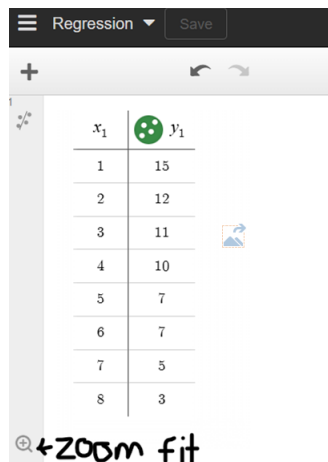
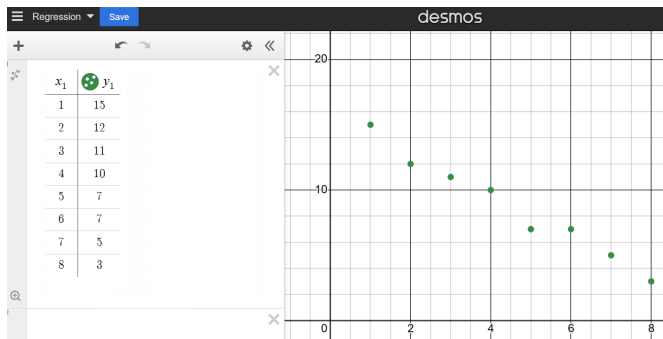


Mark's Thoughts (*continued*)

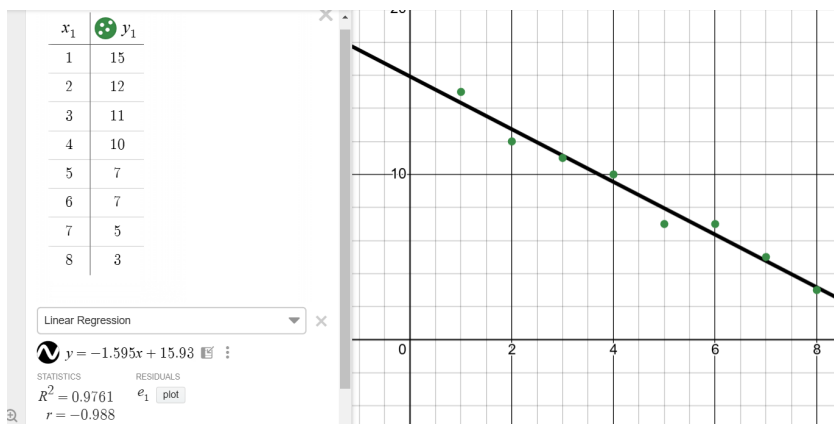
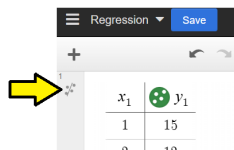
Favorite Update #1: Regression Update

Desmos Studio has always been able to perform regression analysis, but it was a bit cumbersome and tricky to do. A recent update makes using regression models much simpler and more efficient.

Begin with a table of values. {I recommend you press the magnifying glass button to have Desmos change the graph window to fit your data.}

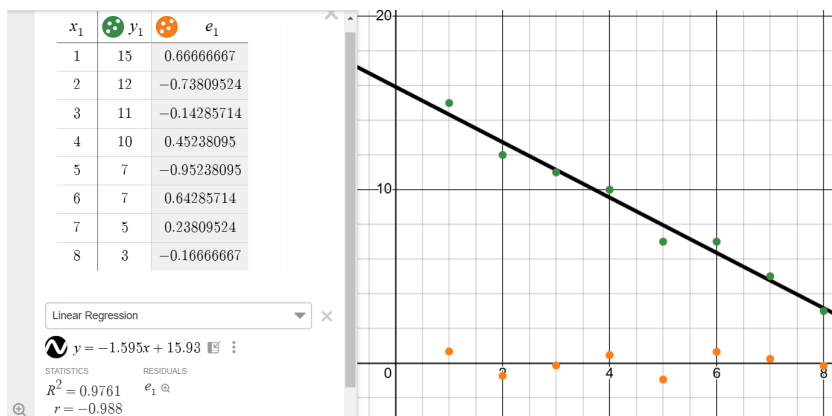


Then, to begin using the regression features, press the new icon located in the top left of the screen (below the “+” button).



Pressing the regression icon generates a regression model, outputs the regression equation, provides the coefficient of determination (R^2), and calculates the correlation coefficient (r) [when using linear regression].

It also provides the ability to create the residual plot [by clicking the “plot” button under “Residuals”. (Note: You can also zoom into the residual plot by clicking the magnifying glass icon under “Residuals”).

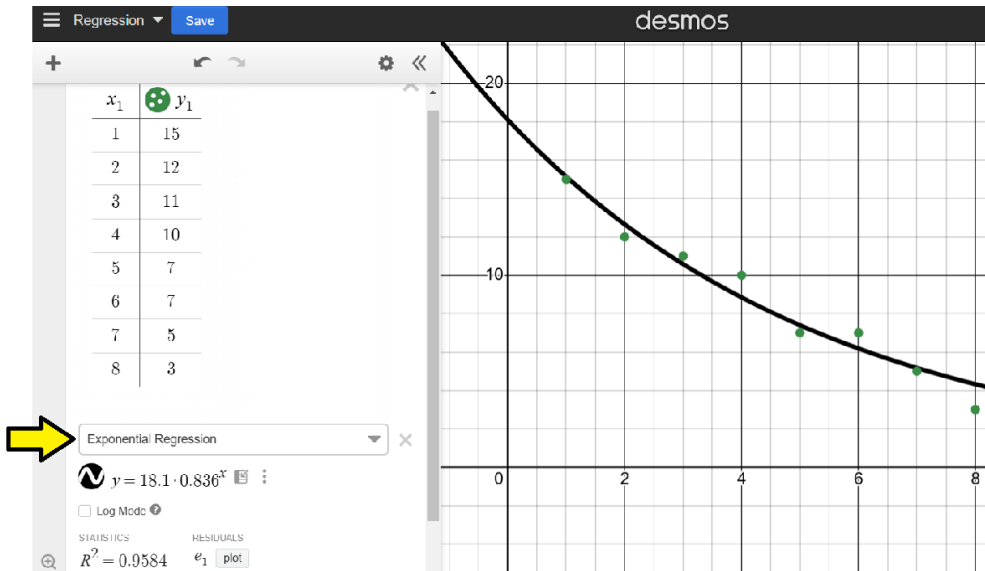


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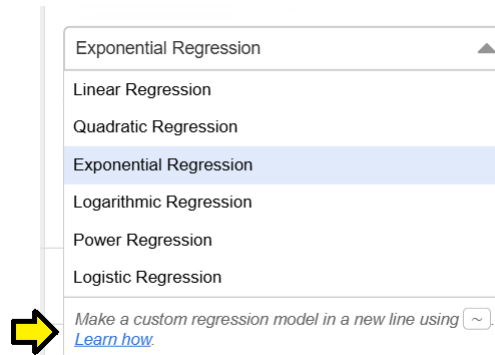


Mark's Thoughts (*continued*)

Linear Regression is the default model, but you can select other models quickly by using the drop-down menu. Here, I selected “Exponential Regression” as the model. (Note there is now “Log Mode” available and the correlation coefficient no longer applies. Each regression model has unique characteristics.)



The new regression icon and menu is smooth, but it is worth noting that the old, clunky method of using regression in Desmos is still available. For more details, follow the “learn how” link in the drop-down menu.



I invite you to explore these new features. For many more details and tips, visit the [Desmos Studio update home](#).

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Presidential Award for Excellence in Mathematics and Science Teaching

The Presidential Award for Excellence in Mathematics and Science Teaching (PAEMST) is the highest recognition that a kindergarten through 12th grade mathematics or science teacher may receive for outstanding teaching in the United States. Since 1983, more than 5,200 teachers have been recognized for their contributions to mathematics and science education. Awardees serve as models for their colleagues, inspiration to their communities, and leaders in the improvement of mathematics and science education.

Presidential awardees receive a citation signed by the President of the United States, a trip to Washington DC to attend a series of recognition events and professional development opportunities, and a \$10,000 award from the National Science Foundation. We are eagerly awaiting an announcement from the White House recognizing outstanding mathematics and science teachers from previous cycles!

Anyone--principals, teachers, parents, students, or members of the general public--may nominate a teacher by completing the nomination form available on the PAEMST website. For more information, please visit www.paemst.nsf.gov. The nomination window is now open to recognize 7th-12th grade mathematics and science teachers.

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“Since 1983, more than 5,200 teachers have been recognized for the contributions”





Elementary Highlights

It is that time of year when the excitement is high around all things football. I am not a huge football fan, but as I found myself watching more football with family and friends, we decided to do a fantasy football family game where we pick the winning team and earn a little bragging rights. I will say I have a lot of fun watching the games now that I can relate to it a little bit.

Listening to my nieces and nephews talk about the games made me think about math as the excitement is high and the math is real. In high school, I know they can play with numbers and statistics including salaries when doing picks. I started thinking about how I could grab the excitement and bring it to elementary.

I encourage you to think about your standards and how you can incorporate the love of football into the learning. It can be as simple as taking the scores and figuring out if they are odd or even numbers. You can compare and contrast the numbers or even take the scores of many games and line them up in number order. Maybe you focus on one game for the week and have kids make predictions.

In upper elementary, you can include some things like averages and percentages or even get creative and incorporate some fractions. I think students would be engaged if they could figure out the fraction of passes completed for a favorite player.

I encourage you to think about how you can take the excitement around football and use it in your classroom. Whether a quick bell ringer, story problem, or the lesson for the day, I think all ages would love a little fantasy football.

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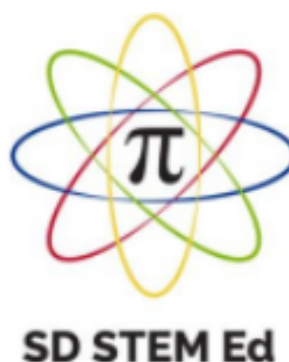


“...think about how you can take the excitement around football and use it in your classroom...”

There's Still Time to Submit a Speaker Proposal!

Greetings great teachers of SD! I just want to bring to your attention that we have less than 2 days left to submit a speaker proposal form to our winter STEM ED conference in Huron on Feb, 6-8. I know there are a lot of great teachers out there so how about sharing some of that wisdom with the rest of your colleagues. You can use this [link](#) to register your talk. Please consider helping us have a great conference with lots of exciting talks to attend.

Dan VanPeurse





6-8 Highlights

Welcome back to school! We just wrapped up 1st quarter at Northwestern, and I am taking this time to reflect on my own teaching before starting next quarter. One of my biggest challenges this year has been bell work. I used to have a high standard of how students came into the room and what their responsibilities were. My students were expected to come in, sit down, and work on differentiated spiral review skills assigned using a technology program. At the end of last year, those skills became an assignment instead of just bell work. I assumed that the students would continue to work on these skills at the start of class and that the only change would be that they would be getting a grade for their work. Instead, my hardest working students got them done outside of class, and my students who always refused to do them before still refused to do them. Just like that, I accidentally destroyed a great classroom management routine.

I am taking the quarter change as a chance to restart, so I have rounded up some great bell work ideas to use and share with you. I've listed 5, so you could do a different daily activity!

1. How Many? Monday: I give students a picture of a collection of items and ask them how they would count them. This works great for discovering different patterns and makes writing explicit equations for sequences easier. A collection of How Did You Count Images can be found [here](#).
2. All-Ten Tuesday: Students are given 4 numbers and the four basic operations and are challenged to create the numbers 1 through ten. It is very similar to the 4 twos challenge, but [each day](#) there are four new numbers to use.
3. WODB Wednesday: Which One Doesn't Belong is a powerful tool to get students thinking critically. Students are asked to determine which of the four panels doesn't fit with the others. As an extra challenge, I have my students look for a way each of the four panels could be seen as not belonging. Check out this great [database](#) to find a WODB to fit your next lesson!
4. Test Prep Thursday: Using the interim assessment items portal, I display a question from our current topic and have the kids determine the answer. We then talk about the different solving strategies and skills used in the question. If you do not have a login yet, talk to your assessment coordinator. While you are waiting for an account, there are [sample items](#) available without logging in too.
5. Fill-It-In Friday: [Dakabibi puzzles](#) are great to get students talking and thinking about numbers. Each day there is a new challenge where students have to place numbers in an expression or equation. Sometimes the goal is to make a balanced equation, sometimes the goal is to maximize or minimize an expression. My students love that there is almost always more than one correct answer.

I am looking forward to sharing more ideas and resources with you this year. Feel free to reach out with any questions you have or ideas you want to share!

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“I have rounded up some great bell work ideas ...”



9-12 Spotlight

AP Precalculus

For the 2023/2024 school year, College Board rolled out a new Advanced Placement course, AP Precalculus. My colleague, Robert Julius, and I worked together to pilot the course to more than 100 students at Stevens High School. The pilot was a great learning experience and provided a new opportunity for our students. I thought we could share our learning with other teachers or schools who may be interested in offering the course.

Benefits to Students

- AP Precalculus allows students to learn traditional precalculus content using a curriculum laid out by College Board and adopted by schools across the nation. College Board provides a wealth of learning materials including videos and practice problems to support instruction.
- Students have the opportunity to take the AP Precalculus test at the end of the school year. At all South Dakota Board of Regents schools, a score of 3 or higher on the AP test would allow the student to earn 3 hours of Precalculus credit. Precalculus can be used to replace College Algebra as a college math credit.
- Advanced Placement courses on a transcript communicate to colleges that the student has taken rigorous courses.
- In our school district, AP courses are graded on a 5 point scale – meaning that a B in the course is transcribed as a 4.
- Because College Board created both curriculums, students are ensured that their AP Precalculus learning will set them up well for success in AP Calculus.

Is the Content Different?

- For the most part, the content in AP Precalculus aligns with the content that we were already teaching including polynomial, rational, exponential, log, and trig functions. There is a substantial trig unit including focus on special right triangles, trig values of special angles, solving trig equations, trig properties, and trig proofs.
- The AP curriculum does introduce the concept of limits and using limit notation to describe end behavior and behavior at asymptotes and holes.
- The AP curriculum does include a brief introduction to polar functions and semi-log plots.
- College Board created 4 learning units, but only 3 are included on the test. The 4th unit includes advanced topics that can be covered as time allows. Some of those topics include matrices, parametric equations, vectors, and conic sections.



“The pilot was a great learning experience and provided a new opportunity for our students.”

(Continued p.9)



9-12 Spotlight (*continued*)

How did it go?

- We all learned a lot along the way and continue to learn more daily. Our school district decided to move forward with replacing all Precalculus and Trigonometry courses with AP Precalculus, so now we are teaching the course at two high schools to about 200 students.
- It was our first year teaching a new course, but our students were wildly successful on the AP test. More than 90% of our students earned a score that would allow for college credit. We will be better prepared for next year and are shooting for 100% pass rate.

Hopefully this gives you an understanding of the opportunity available for you and your students. If you are ready to dive in, we would love to share with you and add you to our learning community. Please reach out.

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SDCTM Social Media Presence

In October the SDCTM conference chair, Cindy Kroon, posted important information about the STEM Education Conference! Continue to watch for updates on registration deadlines.

Use these platforms to also share lessons that worked well, a workshop you are attending, questions you want to pose to math educators across the state, or a fun celebration you would like elevated!

Let's make our social media presence heard, SD Math Teachers!

You can follow SDCTM on the following social media platforms:



Instagram: SDCTM_Math



Facebook: South Dakota Teachers of Mathematics



X (Twitter): @SouthDakotaCTM



Be sure to watch for updates on all of these platforms!



“Let's make our social media presence heard, SD Math Teachers!”



NCTM Representative Tips

What's happening on the NCTM Schedule?

Let's start with the local STEM Conference. This conference is held at the Huron Event Center in Huron SD on February 6-8, 2025. This conference has many breakout sessions that are presented by the Math and Science teachers of South Dakota. Early bird registration is open now and closes on December 1, 2024. If you are going, get registered and save some money.

The NCTM Spring Conference is held in Kansas City, Mo on February 5-7, 2025. The NCTM Spring Conferences provide dynamic, face-to-face networking and learning opportunities for mathematics educators across the nation. These opportunities are a great way to engage with your fellow NCTM members and offer ideal community-building events for students and new professionals. The NCTM Spring Conference was formerly known as the NCTM Regional Conference and Exposition. So if you are looking for an update on that conference, here it is. The registration opened at the end of September, so don't wait to sign up. The theme this year is "Championship Playbook: Empowering Our Students to Experience the World Through a Mathematical Lens."

The NCTM Virtual Conference is held on April 2-5, 2025. The Virtual Conference provides a widely accessible, learning experience for mathematics educators. There is a mix of live and on-demand education sessions. There are also several opportunities to see and connect with colleagues through interactive round tables and social activities.

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“The Virtual Conference provides a widely accessible, learning experience for mathematics educators.”



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