June 2026

Canadian Mathematical Society
Société mathématique du Canada

(Vol. 58, No. 3)

CMS NOTES de la SMC

IN THIS ISSUE

The Stories We Tell

Cover Article June 2026 (Vol. 58, No. 3)

Kseniya Garaschuk (University of the Fraser Valley)

Notes Contributing Editor, CRUX Editor-in-Chief & Chair of Equity, Diversity and Inclusiveness Committee

I recently visited the Kennedy Space Center with my 9-year old daughter. I am not a space travel fanatic, but I would highly recommend this place to anyone: seeing the rockets in full scale (including the Saturn V rocket that sent humans to the Moon), standing in the command center of the Apollo mission, seeing the actual Space Shuttle Atlantis (and yes, the Canadarm) that flew 33 missions before retiring *right there* — it was a really humbling experience. We spent an entire day there, exploring the many exhibits and reading an overwhelming number of panels. At the end of the day, as we were on the bus back to the main parking lot, the video talked about the importance of the Center to motivate and attract the new generation to STEM fields and space exploration. So I asked my daughter if she wants to be a rocket scientist or an astronaut. Her answer was immediate: "No way, it sounds impossible."

She's completely right. In describing the cutting edge technology, the exhibits highlighted complexity. While focusing on the inspirational nature of space travel and the people involved in it, they made them all appear superhuman. They went for motivation, awe and marvel, but they forgot about being relatable. Leaving astronauts aside (their main characteristics were bravery, courage and fearlessness — as opposed to hours of hard work, training and perseverance), all the scientists involved were all portrayed as geniuses. There was no real discussion of a series of failures and lessons learned, no moments of trial and error upon which eventual success was built – rather, it was the standard Hollywood-style moments of deep and seemingly random insights by separate individuals that drove progress forward. Moreover, there was no mention of the sheer number of people who worked on the program, which by some estimates is over 400,000. The exhibits made it look like each one of only a dozen engineers knew every single piece, nook, cranny and wire of the entire rocket. Of course it looks impossible to be one of them!

In our efforts to inspire, we often construct narratives that unintentionally exclude. Consider the role models we present to our students in mathematics. We have Carl Friendrich Gauss and the famous sum of integers example, a story of a child prodigy, which I tell to my first-year university students, who I now suspect may experience it as proof of how far away from being competent in math they are – after all, they weren't inventing new math formulas at the age of 12. We have Srinivasa Ramanujan and formulas appearing to him in dreams, while the rest of us mortals can barely remember what we dreamed about at all. We have Isaac Newton discovering calculus in isolation during the plague, while we struggled to keep sane being stuck inside (with technology!) during the Covid-19 pandemic. According to these stories, to do well in math, you must be an exceptionally gifted child, have magical dreams or be a genius loner – this last part also being helped by the many narratives of mathematicians as socially awkward individuals. Unsurprisingly, it gets only worse for women: we get Katherine Johnson calculating trajectories at NASA with near-mythic precision and the undeniable genius of Emmy Noether revolutionizing algebra. But we also have the women who overcame extraordinary barriers simply to be allowed to study mathematics at all such as Sophie Germain learning mathematics in secret and corresponding under a male pseudonym, while Sophia Kovalevskaya entered into a marriage of convenience to be allowed to study abroad. These are powerful stories, but they make success feel unattainable without extraordinary resilience and sacrifice.

The problem is not necessarily our role models though, it is the stories we tell. Not only do we highlight the prodigies, the once-in-a-generation thinkers, but we also compress careers into neat timbits of brilliance. While many of our role models are iconic, if we only showcase their effortless brilliance, endless confidence and singular devotion, then we suggest that exceptionality is a prerequisite for belonging. In reality, told differently, these are also the stories of people arguing, hypothesising, revising, collaborating and sometimes simply getting things wrong for a very long time before they got anything right. Isaac Newton was not only a brilliant scholar, but also someone deeply entangled in bitter disputes over credit and ideas with Leibniz, holding onto his grudges and turning grievances into a personal vendetta. Ramanujan was a mathematical prodigy that failed all other school subjects, got expelled and suffered mental health challenges throughout his life. Emmy Noether was known for her collaborative approach, working closely with colleagues and students, leading many seminars where ideas were shaped collectively. Sophie Germain persevered through three attempts over seven years of research until the Paris Academy of Sciences was satisfied by the findings and awarded her the Academy Prize. We forget the human side to our human examples.

But speaking of role models, if our goal is not only to inspire but to invite, then we need to include different kinds of "heros" and tell their stories too. Stories not just about trailblazers and firsts, but about typical paths into the discipline and the many people who follow them. Most people are not looking to be an exception – they want to be part of a community, not fighting for representation and acceptance, but focusing on collaboration and work. This requires a shift in emphasis: from exceptional milestones and celebrating outliers to inclusion. I'd like to hear stories of what a regular mathematician's day looks like, where their struggles and successes come from, who they work with and how they move through the field. I want to hear the stories of the very concrete people that I can see in the hall and maybe work with someday. What's missing is not inspiration, but inclusion and recognition of the many ways one can participate in mathematics and science, of collaboration and community, of the fact that most advances are not the result of isolated flashes of genius, but of communities of people building understanding over time. Our discipline is sustained and flourishing due to many.

Let's allow the stories to change. Our narratives must reflect the work we actually do; not a distant world of superhuman brilliance, but rather a human one: built by many, sustained by many and open to many.

Copyright & Permissions

The Canadian Mathematical Society grants permission to individual readers of this publication to copy articles for their own personal use. Use for any other purpose is strictly prohibited. To obtain a license for anything other than copying articles for personal use, please contact the Canadian Mathematical Society to request permissions or licensing terms.

Canadian Mathematical Society — 616 Cooper St., Ottawa, ON K1R 5J2, Canada

Collaboration With Our New Robot Overlords

Editorial June 2026 (Vol. 58, No. 3)

Robert Dawson (Saint Mary's University)
Editor, CMS Notes

The Canadian SF writer Robert Sawyer once wrote a short story ("Flashes", 2006) in which an alien civilization beams enormous quantities of information to Earth. Some of it was clearly knowledge for which humans were not mature enough — for instance, how to make antimatter in weaponizable quantities with easily available equipment. There was also a description of a wave of despair among researchers in the mathematical and physical sciences, who suddenly find themselves centuries behind the cutting edge of research. It did not end well.

In the last couple years, the Notes has run some articles about generative AI and large language models. At first most people I know who thought about this software at all thought in terms of undergraduate students having a new way to cheat in unsupervised essay-writing, or as a more flexible way to create boiler-plate letters of recommendation. But in the last year or so there have been announcements that have to make any mathematician sit up and take notice.

For instance, there have been reports of AIs (specialized for the task, and using incredible amounts of processing power) getting medal-level scores on IMO papers. More recently, several conjectures of Erdős have been resolved using AI. Most recent among these is Erdős's "unit distance problem." The problem is to find configurations of n points in the plane in which the maximum number of pairs are at distance 1. Erdős conjectured that the number of unit distances would be $O(n^{1+c/\log\log n})$. The AI showed that it is at least $O(n^{1+\epsilon})$.

It's worth stressing that the computer's role was not doing a massive grind through thousands of alternatives (as in Appel and Haken's 1976 proof of the four-color conjecture); the proof is much like something a human might have come up with, apparently quite direct and readable if you have the background, and indeed it largely links together known results from (quite disparate) areas of math.

There's no doubt that something has happened. And we can't write it off by saying "the invention of the bicycle didn't destroy interest in foot racing" as the wise did when the first computer beat a chess grand master. But the boundary between computers' work and people's work has been shifting for over a century.

In 1903 Frank Nelson Cole exhibited the factors of the 67th Mersenne number at an AMS conference, making explicit an 1876 existence proof by Lucas. He spent an hour doing the exponentiation and mutiplication by hand on the blackboard (brave fellow!) and earned a standing ovation. Finding the factors had taken him far longer than that, "three years of Sundays" by his account Just now, I opened MAPLE on the HP laptop I'm writing this on, and typed

```
> ifactor(2^67 − 1);
```

The answer

```
(761838257287)*(193707721)
```

came back in a fraction of a second. (Sorry, Frank.) Has romance vanished from the mathematical world? Has the pale algorithm conquered the great Pan? With due respect, I think not. Number theorists can use this new facility with factorization to do much more interesting things.

We may be at the dawn of a new age in mathematics, but this is not happening for the first time, and I believe that this age, too, will have a place in it for humans–and more interesting problems than we can solve, even with computer help. If you have an opinion on this, please send it to us: whatever the outcome, it's probably important to our field. (Any persuasive argument that it really is just a flash in the pan will, however, be read with particular interest.)

Copyright & Permissions

The Canadian Mathematical Society grants permission to individual readers of this publication to copy articles for their own personal use. Use for any other purpose is strictly prohibited. To obtain a license for anything other than copying articles for personal use, please contact the Canadian Mathematical Society to request permissions or licensing terms.

Canadian Mathematical Society — 616 Cooper St., Ottawa, ON K1R 5J2, Canada

Multi-Digit Subtraction: Alternative Assessment 501

Education Notes June 2026 (Vol. 58, No. 3)

Egan J Chernoff (University of Saskatchewan)
Notes Contributing Editor

Education Notes bring mathematical and educational ideas forth to the CMS readership in a manner that promotes discussion of relevant topics including research, activities, issues, and noteworthy news items. Comments, suggestions, and submissions are welcome.

Egan J Chernoff, *University of Saskatchewan (egan.chernoff@usask.ca)*
Kseniya Garaschuk, *University of the Fraser Valley (kseniya.garaschuk@ufv.ca)*

I've been flying a lot, which means I've been talking to strangers. Just old people, however. Young people (who, I think, should be in school or at work, especially on a weekday) already have their headphones on/in and are streaming/scrolling on their phone/tablet before I can even turn my head to acknowledge their existence (and that of their Labubu). Old people, they make eye contact, acknowledge the existence of another human being and even, yes, sometimes strike up a conversation.

On a recent flight, a conversation continued beyond flight and airplane and destination pleasantries. Eventually getting to the inevitable "What do you do?" question, I told my seatmate that I taught future math teachers. Unlike in past experiences, where my declaration would result in moving on to another topic of conversation, they were interested and, to my surprise, had a bunch of questions.

Both of us on our way to Toronto, we talked about the *Mathematics Proficiency Test* (MPT) that was recently reinstated as a requirement for teachers who are looking to be certified in Ontario, which they were familiar with because, well, they were old, lived in Ontario and followed the news. They were gobsmacked when I told them that some students were still coming to grips with their times tables during the first year of university these days. I even told them about my *Elementary Mathematics Teacher Adeptness Test* (the ELEMTAT), which is where I have students in my Methods for Elementary Mathematics class (ECUR 312) write a grade seven/eight final exam, in mathematics, yes, as their final exam for my course. As an idea, they quite liked the ELEMTAT, and even asked if my exam, like the MPT, was ever challenged in court, which resulted in a good chuckle. We talked about a lot of things other than mathematical content knowledge. We just kept talking.

At some point over Manitoba, and I'm still not really sure how we got there (in terms of the conversation, that is), we started talking about alternative forms of assessment. When they went to school, they never experienced project-based learning or portfolios or journalling in math class. Me, too, I told them, but then I reminded them we were old, which got us both to have another good chuckle. Then, while talking about math-class staples (quizzes, tests and exams) our conversation shifted to grading, marking and evaluating alternative forms of assessment in, of all classes, math class. I'll be honest, I didn't have great answers to all of their questions, but I did have one pretty decent answer (in my opinion) to their very well posed general question, which I paraphrase here as, *Well, I guess what I'm asking is… What sort of alternative assessment would let you really know that they know what they're supposed to know?* A great question. What follows is a recreation of my answer.

As I mentioned at the outset, and as I told my seatmate, I've been flying a lot. On a recent trip to Europe, I proceeded to tell them, my wife and I were "stuck" in our hotel room one evening and, as ugly North Americans are apt to do, we turned on the television. Ok, ok, I turned on the television. Flipping through the channels (yes, looking for an "English" channel, no, I don't speak Dutch), I stumbled on an airing of Premier League action. No, not Premier League Football (read: Soccer). Premier League Darts!

That's right, Premier League Darts is a thing. Actually, if the audience in the arena, that's right, the arena (e.g., The 02, London or AO Arena, Manchester), is any indication, it's a big thing. In front of a crowd of 14000 people, wearing costumes, drinking beer and incessantly chanting and singing, two contestants throw darts at a tiny, little dart board, which is set up on a stage strategically placed somewhere in the vast arena. Thankfully, due to some excellent camera work, everything that is happening on the stage gets projected in real time onto super large televisions for the many, many thousands that are way too far away to see whether that last dart thrown was a double or triple twenty (or treble twenty). The whole scene is akin to a concert. As my wife nodded off to sleep, me, I became more and more glued to the television.

Learning as I watched, Premier League Darts adheres to, what (I later learned) is called, 501 Darts. In this version of the game, both contestants start with 501 points, and the goal is to get to exactly zero. Taking turns, they each get to throw three darts (per round) at a dartboard which is numbered, clockwise from the top, as 20, 1, 18, 4, 13, 6, 10, 15, 2, 17, 3, 19, 7, 16, 8, 11, 14, 9, 12, 5. Should your three darts land, say, 20, 1 and 5 then you would take 26 points off your starting total of 501 and then the next turn you would start at 475. Add to the mix that there is an inner bullseye, which is worth 50; an outer bullseye (a ring around the inner bullseye) worth 25; a very thin, inner concentric circle called the Treble (or Triple) Ring, which results in three times as many points for the dart (e.g., landing in the treble ring relative to the 20 "slice" or "wedge" makes 60); and, another very thin, outer concentric circle called the Double Ring, which doubles your points. In addition, you must land in the double ring with the dart that gets you exactly to zero or you "bust" and have to start your next turn where you started your last turn. Lots going on.

Looking at an example, albeit for just one player, 501 less 180 (Treble 20 x 3 darts) then less 180 (Treble 20 x 3 darts) again leaves one with 141. With 141 remaining, landing 60 (Treble 20), 57 (Treble 19) and 24 (Double 12) would get you to zero. As long as you got to zero before your opponent, you win that "leg" of the match. Then, depending on the gravity of the match you are playing, the match becomes a race and the first to reach a particular number of legs wins.

My apologies to those of you reading that are intimately familiar with the game and, say, the notion of preferred checkouts. For those of you not familiar with the game, there's a vast number of resources on the Internet, as expected, should this dartboard discussion have piqued your interest. It's time, however, for me to get back to my recreation of my answer to the very nice, old person on the plane that asked me, when it comes to alternative forms of assessment, which was something along the lines of, *What sort of alternative assessment in math class would let me really know that they really know what they're supposed to know?*

The set up for my answer went better than I thought. First off, my seatmate was familiar with darts. They had played the game in their youth in a friend's basement and even had played it in a pub a few times during what they called their formative years. Second, they were unfamiliar with Specific Expectation B2.4 and B2.5 (Addition and Subtraction) of B2 (Operations) of B (Number) of the Expectations by Strand of the Grade 3 Mathematics Curriculum of the province of Ontario; however, when I rephrased things as being able to subtract one, two or three digit numbers from a three digit number, for example, 501 – 139 or 362 – 29, they knew immediately what I was talking about. Lastly, in terms of my setup, when I asked them if they had ever watched Premier League Darts on television, they replied that the only Premier League they had ever watched was Soccer.

Just like my wife, my seatmate was surprised to learn that I had watched Premier League Darts late into the night while in a hotel room in Amsterdam. I couldn't stop watching. It was amazing from every angle. The crowd, for example. I still can't get over the crowd. Close to 15000 people all gathered in one place to watch people playing darts is impressive. The darters, too, were impressive. The hand eye coordination, the skill level, the practice and commitment, all of it, very impressive. The most important , however, sure, from the perspective of someone who has dedicated their working life to the teaching and learning of mathematics, the underlying mental arithmetic prowess of the darters.

Seamlessly, effortlessly, whether making a shot, but especially when missing an intended shot, the mental arithmetic of the darters is strong, but it wasn't really discussed during the television broadcast. It just was. Sure, throwing three darts into the teeny tiny Treble 20 part of the dart board is very impressive. It is. Just as impressive, in my opinion, is changing outs (your checkout) when, say, your first dart misses. Only needing, say, 67 to checkout, the plan is simple, triple 17 (51) and double 8 (16). Two darts. Easy. Unless, that is, you miss the triple 17 and then land on a single 17, which leave you 50, which means you could land double bullseye to get to zero. What if you miss the bullseye, however. Ok, let's look at three darts. Triple 9 (27) and double 20 (40) would work and if you missed the triple 9 then you could use your single 9 (9) then single (18) and then double 20 (40) to get to zero. All of that mental arithmetic happening ahead of time and in real time as the darter walks up to the line and throws their three darts. That's why I was watching darts late into the night. Further, it's not just the darter that was exuded an undercurrent of mental arithmetic prowess during the airing of Premier League Darts I watched that night in the hotel.

In addition to the two darters, on that little stage in front of a sea of tens of thousands of people, there is a Referee (also know as the Caller). The job of the referee, with only a microphone in their hand, is to announce the total of the darts thrown. Treble 20 for all three darts in a turn would result in a resounding, protracted announcement of 180 to the crowd. To which the crowd would raucously cheer and applaud in response. Similarly, however, they would have to announce 61 for when the darter lands 19, while trying for treble 19, and then decides and lands treble 14 because they're looking to reach a particular number for their next turn. No delays, no asking to be given a second while they make sure their calculation is correct. Just a simple, calm announcement of 61 into the microphone. The mental arithmetic skills of the referee in Premier League Darts is impressive. The same goes for that fourth person on the stage.

The first time that I saw the Marker (also known as the Chalker) I was uneasy. I was uneasy because of how close they stood next to the dart board. From the perspective of someone who did not enjoy getting called up to the chalkboard in math class, the sheer notion of the Marker is the stuff of nightmares. The job of the marker, you guessed it, is to keep track of the points. The marker is in charge of subtracting – in front of tens of thousands of people and however many people are watching on their televisions or phones or whatever – the totals announced by the referee on a whiteboard. Both players. No pausing. No asking for a second or two to make sure they borrowed from the hundreds column properly and got that one correct. Just subtraction from 501 over and over and over. Subtraction of one, two and three digit numbers from one, two and three digit numbers (you know what I mean). I would also point out, beyond the massive audience watching your incessant subtraction, there are major stakes for the darters, that is, there is no room for mistakes because they're working just as fast and have the total, too. Like I said, a nightmare for anyone that was ever called up to the front of the room in math class and, subsequently, had a bad experience. I should point out that I do believe that the darters, the referee and the marker are not working in silos, that is, I believe that all four people on the stage are working out all of the mental arithmetic all of the time. My belief stems from the mental arithmetic skills that were also displayed by commentators and analysts associated with the television broadcast.

I don't know who the commentators were for the broadcast that I watched. Perhaps they are professional commentators, perhaps they were former professional darters. No matter. The mental arithmetic skills of the commentators was also impressive. They were doing the arithmetic, all of it, and doing it a half step before the Referee and the Caller. Their skills were especially on display the closer each of the darters got to zero. Using my earlier example of needing 67 to checkout, the commentators, without hesitation, seeing a missed treble 17 would result in a comment about whether the darter was "shy" about the bullseye (double 25) at this point relative to what the other darter has left, and whether they were going to rely on three darts instead of two. Mental-arithmetic-based colour commentary. Wow! Whether the darters, the referee, the caller or the commentators, the undercurrent of mental arithmetic is a thing of beauty in Premier League Darts. It was at this point that my seatmate politely interrupted my long winded set up.

They, my seatmate, wasn't trying to be rude. Rather, we were about to land and they wanted to make sure that I wasn't skirting the question they had asked about alternative forms of assessment in the mathematics classroom, and how I could know, for sure, that a math student knew what they were supposed to know. Turning to them, making eye contact, shaking their hand and thanking them for a lovely conversation, I told them that if they wanted to be sure that a student in grade 3 had met Specific Expectation B2.4 and B2.5 (Addition and Subtraction) of B2 (Operations) of B (Number) of the Expectations by Strand of the Grade 3 Mathematics Curriculum of the province of Ontario then I would, yes, rely on an alternative form assessment. I call it Alternative Assessment 501 for multi-digit subtraction: could I replace, either of the darters, the referee, the chalker or the announcers with that grade three math student, and that the broadcast, from a mental arithmetic perspective, not skip a beat. If so, then I knew that they knew what the needed to know. With my response, gathering their things, they paused for a minute.

After the pause, they rightfully noted that it would be a little harsh to put a grade 3 student in such a predicament. I acquiesced. I did note, however, that we were discussing alternative forms of assessment, which meant that a teacher could, in their classroom, do their very best to recreate a broadcast of the Premier League Darts that I watched on television that one night in a hotel in Amsterdam. Different students in different roles, that is, two darters, a referee, a chalker, and a couple of the stronger students providing the colour commentary for the action that was taking place. To be honest, such an alternative form of assessment for multi-digit subtraction wouldn't be that hard to pull off. The hardest part, I told them, would be fitting 10000 to 14000 fans into a grade 3 classroom. To which they replied, without hesitation, "From what I've read and heard, classrooms are overcrowded to begin with…". Touché.

CMS NOTES

On Finding Inverse Functions and the "Swap and Solve" Disconnect

Education Notes June 2026 (Vol. 58, No. 3)

Konstantin Guryev (Simon Fraser University)

Rina Zazkis (Simon Fraser University)

Education Notes bring mathematical and educational ideas forth to the CMS readership in a manner that promotes discussion of relevant topics including research, activities, issues, and noteworthy news items. Comments, suggestions, and submissions are welcome.

Egan J Chernoff, *University of Saskatchewan (egan.chernoff@usask.ca)*
Kseniya Garaschuk, *University of the Fraser Valley (kseniya.garaschuk@ufv.ca)*

The Procedural Trap vs. The Conceptual Reality

In mathematics classrooms in North America, an algebraic techniques is deeply entrenched as the standard algorithm for finding an inverse function: "Switch x and y, then solve for y." While algebraically efficient in simple, unconstrained linear cases, this mechanical routine frequently strips away the actual meaning of the function. It leaves both students and teachers disoriented when they encounter domain restrictions or real-world contexts where variables hold fixed meanings (Paoletti et al., 2018).

The conceptual reality is that an inverse function reverses the process of the original function – it maps outputs back to their original inputs. When instruction prioritizes procedural fluency over this logical foundation, the switching technique turns into a mathematical "trick" rather than a structural consequence. In fact, what escapes most students and teachers who rely of the swapping procedure is that it "works" based on the mathematical definition if inverse.

Furthermore, this procedural focus often breeds a deeper cognitive avoidance of non-invertibility. For instance, when presented with a quadratic function over an unrestricted domain – such as $f(x)=(x+1)^2$ for all real numbers – many students and teachers experience a strong resistance to declaring that "the inverse does not exist." Instead of recognizing that the function fails injectivity, they often succumb to a "space of fuzziness," providing a "slanted parabola" or writing down a flawed +/– square root expression (Marmur & Zazkis, 2018). Even those who recognize the issue often feel compelled to artificially restrict the domain on the spot just to avoid the claim of inexistence and revert to the known algorithm.

To explore what happens when a domain restriction is an inherent part of the problem, let us analyze a specific illustrative example that exposes the fragility of procedural automatism.

Consider the following problem: Find the inverse function of $f(x)=(x+1)^2$ given the restricted domain $x \le -2$.

Mathematically, there is no difference in the underlying logic whether one chooses to express the variable first or swap them first in case when variables hold no fixed meanings. However, the order in which a solver executes these procedures fundamentally alters the cognitive load and the visibility of the functional relationship. How do you expect your students will approach the task? For our students, the swapping approach appeared to be a preferred one, which often led them astray.

Swapping x and y first (The Procedural Trap)

We have observed the cognitive stupor that frequently occurs when a student immediately applies the school curriculum convention of swapping the variables at the very first step:

$$x=(y+1)^2$$

The goal is now to isolate the "new" y and state the domain of the inverse. It is precisely here that the technique often breaks down into disconnected silos:

- The Radical Stupor: Upon trying to take the square root of both sides, some individuals freeze. They glance back at the original problem statement ($x \le -2$) and incorrectly deduce that they cannot take the square root of x because x is negative. They completely forget that the "new" x is actually the former y (the output), which is non-negative.
- The Absolute Value Oversight: Those who bypass this hurdle and write $\sqrt{x} = y + 1$ routinely forget the absolute value entirely, or they assume it resolves with a positive sign because y+1 "looks" positive. They fail to realize that because the "new" y is the former x, it is bound by the original constraint (y <= –2), making y+1 negative. Thus, they miss the required negative sign, leading to an incorrect final function.

To avoid either pitfall, we describe a different approach.

Expressing x in terms of y first (The Conceptual Path)

By maintaining the original variables during the algebraic manipulation, the functional roles of input and output remain clear and traceable:

1. We begin with the functional relationship: $y=(x+1)^2$

2. Because both sides are non-negative within our constraints, we take the square root of both sides. Recalling that the square root of a square is the absolute value, we write: $\sqrt{y} = |x+1|$

3. Since the given domain states $x \leq -2$, it follows that $x+1 \leq -1$, meaning the expression inside the absolute value is negative. Thus, the absolute value clears with a negative sign: $\sqrt{y} = -(x+1)$.

4. Solving for x yields: $x = -\sqrt{y} - 1$

At this stage, the mathematical inversion is entirely complete. We have successfully determined how the independent variable x depends on the output y. To finish the description of this new function, we identify its domain, which must coincide exactly with the range of the original function. Since $x \leq -2$, the output values are $y \geq 1$. Hence, the domain of the inverse is
$y \geq 1$.

For convenience, and to follow the standard convention that allows us to graph both functions on the same coordinate axes, we can now execute a variable swap:
$y = -\sqrt{x} - 1$ for $x \geq 1$.

Every step in this progression preserves the logical connections between the functional law, the variables, and their corresponding domains.

Conclusion

The "swap and solve" technique is incredibly powerful in unconstrained linear cases where students see an open path to isolating , giving them a safe sense of progress. However, as our quadratic example demonstrates, this structural safety is an illusion. In more complex or restricted settings, swapping the variables at the beginning can obscure the relationships among the function rule, the domain, and the range.

We admit that completely banishing a technique so deeply showcased in the classrooms may be impossible. Rather, teaching must shift instructional focus away from mechanical routines and toward meaningful solutions. Introductory calculus course in college or university may be an appropriate place to reconsider what "worked" in school. By anchoring procedural steps in their logical, structural foundations, we can ensure our students view algebraic manipulations not as isolated magic tricks, but as a direct reflection of the structural beauty of inverse relationships.

References

Marmur, O. & Zazkis, R. (2018). Space of fuzziness: Avoidance of deterministic decisions in the case of the inverse function. *Educational Studies in Mathematics*, *99*(3), 261-275.

Paoletti, T., Stevens, I. E., Hobson, N. L., Moore, K. C., & LaForest, K. R. (2018). Inverse function: Pre-service teachers' techniques and meanings. *Educa-tional Studies in Mathematics*, 97(1), 93-109.

Copyright & Permissions

The Canadian Mathematical Society grants permission to individual readers of this publication to copy articles for their own personal use. Use for any other purpose is strictly prohibited. To obtain a license for anything other than copying articles for personal use, please contact the Canadian Mathematical Society to request permissions or licensing terms.

Canadian Mathematical Society — 616 Cooper St., Ottawa, ON K1R 5J2, Canada

Cohorts and Communities in the Algebra Project

Madeline Muntersbjorn (University of Toledo)

CSHPM Notes brings scholarly work on the history and philosophy of mathematics to the broader mathematics community. Authors are members of the Canadian Society for History and Philosophy of Mathematics (CSHPM). Comments and suggestions are welcome; they may be directed to the column's editors:
Amy Ackerberg-Hastings, *independent scholar (aackerbe@verizon.net)*
Nicolas Fillion, *Simon Fraser University (nfillion@sfu.ca)*

On May 22, 2024, the *New York Times* ran a story by Troy Closson, "The Algebra Problem: How Middle School Math Became a National Flashpoint," which began with the lines: "Top students can benefit greatly by being offered the subject early. But many districts offer few Black and Latino eighth graders a chance to study it" [1]. The article called readers' attention to perennial problems the US has with unequal access to algebra for adolescents, but it did not offer solutions. In contrast, the Algebra Project is an ingenious solution that has been around for more than four decades. A shout-out to its founder, Bob Moses, was pinned as the top comment out of thousands that were posted in the first 24 hours after the story was published. But, for this *NYT* reader who has researched the Project's history and pedagogical significance, it was dismaying to read how many commenters assumed that Moses probably retired when he became an older man and that the Algebra Project likely died with him—neither assumption could be further from the truth. Moses worked tirelessly his entire life, and the Algebra Project continues to raise the floor of mathematical literacy in locations across the US. This short essay introduces *CMS Notes* readers to Moses, the historical figure, and the Algebra Project, an ongoing endeavor, by focusing on two themes, cohorts and communities.

Robert P. "Bob" Moses (1935–2021) was a US Civil Rights activist who, in the 1960s, helped organize the Mississippi Freedom Democratic Party and encouraged voter registration. In 2001, Moses co-authored *Radical Equations: Civil Rights from Mississippi to the Algebra Project* with Charles E. Cobb, Jr. (Figure 1). This book tells the story of how the Algebra Project came into being as part of Moses's continued commitment to the cause of Civil Rights: "I know how strange it can sound to say that math literacy—and algebra in particular—is the key to the future of disenfranchised communities, but that's what I think, and believe with all of my heart" [4, p. 5]. Two strands of argument supported this conviction, one that looked back to the tradition of grassroots organizing Moses practiced as a field secretary for the Student Non-violent Coordinating Committee (SNCC), and another strand that looked forward to the future of work in the information age. Looking back, Moses noted that past efforts of Freedom Fighters got Jim Crow out of the vote, the Democratic party, and public accommodations, but they did not get Jim Crow out of the public schools that continued to offer "sharecropper" educations to too many young people. He concluded that ensuring all students have a quality education is part of the unfinished business of the Civil Rights movement.

Looking forward, Moses noted that the rise of information technology had created an unprecedented need for mathematics literacy: "People who don't have it are like the people who couldn't read and write in the industrial age" [4, p. 14; see also p. 116]. To be successful in today's economy, one must understand the tools used to organize information and to communicate quantitative data if one wants to compete for the best jobs and have some say in how society is organized: "The Algebra Project is not about simply transferring a body of knowledge to children. It is about using that knowledge as a tool to a much larger end" [4, p. 15]. Students in Algebra Project classrooms not only learn to read, write, and reason with the formal symbols of mathematics, but also learn how to communicate their ideas and intuitions and cultivate consensus around the shared mathematical features of lived experience [5].

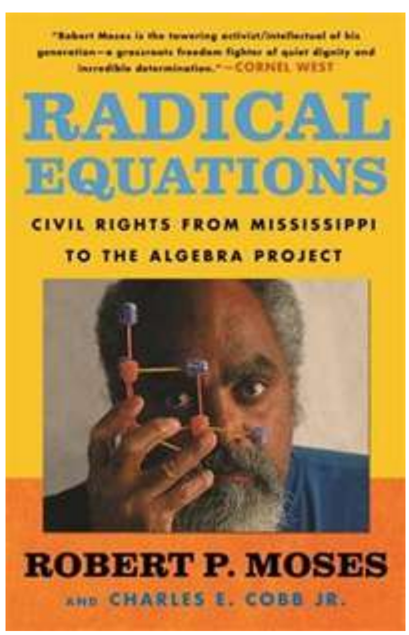

Figure 1. Cover of *Radical Equations* (2001). Beacon Press.

Algebra Project pedagogy involves a Five-Step Curricular Process that intersects with a three-phase classroom work cycle [7; Figure 2]. The work cycle begins with individual reflection, followed by small group work, followed by whole class discussion. The 5-Step Curricular Process starts with (1) a shared physical experience, followed by (2) individual representations of that experience. These individual reflections are then (3) shared in small groups using ordinary language. The small group's efforts are (4) communicated to the class using more formal languages, or "Feature Talk." Feature Talk is an intermediary between the ordinary languages students speak and the symbolic languages mathematicians and scientists use to communicate ideas. Equations and other formal expressions are not direct translations of ordinary language expressions but instead represent a structured discourse designed to minimize ambiguity and maximize consensus: "This 'regimented discourse' is the conceptual language that underlies all the various symbolic representations you find in the sciences and mathematics" [4, p. 97].

In the final step in the curricular process, Feature Talk expressions—which can become quite cumbersome in their specificity—are (5) translated into mathematical symbols to achieve a greater economy of expression. Algebra Project pedagogy has many advantages. For one, students learn that the same mathematical idea can be conveyed in more than one way: in ordinary languages, artificial languages, and formal symbols. For another, abstract systems of signification make more sense when students have grounding metaphors to call upon when cultivating their mathematical intuitions. Further, students acquire insight into the historical development of mathematics over time as a creative and collaborative endeavor [6]. But these pedagogical gains are far from the whole story of the Algebra Project: "It's important to make it clear that even the development of some sterling new curriculum—a real breakthrough—would not make us happy if it did not deeply and seriously address the issue of access to literacy for everyone" [4, p. 15].

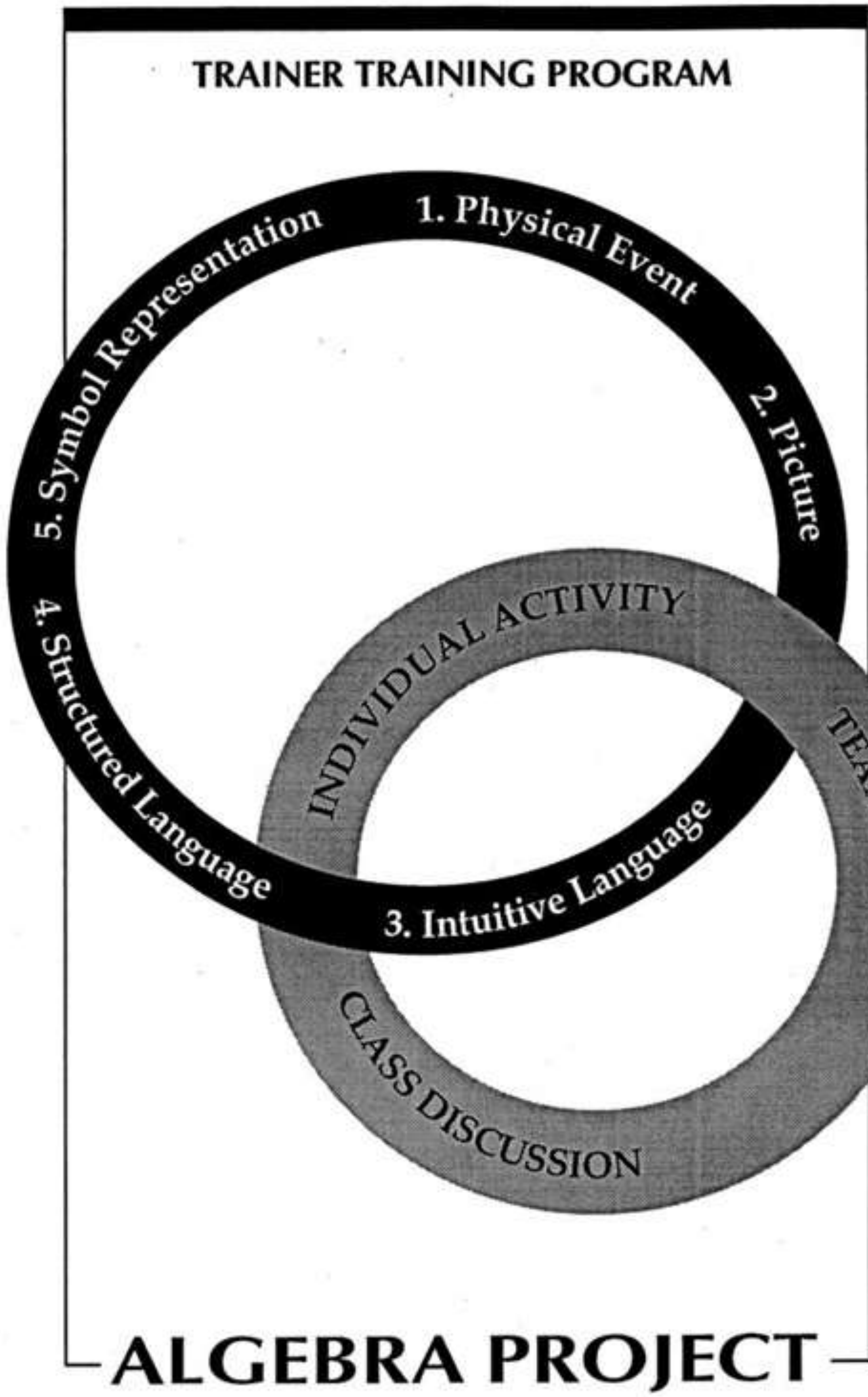

Figure 2. 1992 diagram of the reciprocal mutually-supporting framework of the Algebra Project's Work Cycle and Five-Step Curricular Process. The Algebra Project Blog, December 22, 2025.

For Moses, mathematics education was a political organizing strategy: "Math is a tool for organizing around the issue of access in the economic arena" [4, p. 136]. Initially, in the 1980s, the Algebra Project targeted middle school mathematics as a site to help students learn the fundamentals of basic algebra. In the 1990s, the Algebra Project expanded to consider how to organize classes so that high school students most at risk could not only pass four years of math but also graduate high school ready for post-secondary educational opportunities. For the project to take root, communities of students, parents, and educators had to take seriously the prospect that all students—even those who currently score in the bottom quartile on mathematics tests—can graduate high school ready to take college-level mathematics. This prospect can be a tough sell: "All parents thought *their* child should do algebra, but not all parents thought that *every* child should do algebra" [4, p. 98]. The question comes up: Aren't there some young people who cannot learn algebra? Moses countered this question by noting that students need two things to be able to learn algebra: they must be able to count, and they must be able to focus on what is happening in the classroom. Of the two desiderata, the former is easier to pull off than the latter. The Algebra Project seeks to demystify mathematics as something only a few gifted people can do well and replace that exclusionary image of mathematics with a more inclusive picture wherein everyone who can count can do mathematics well if they are given quality learning opportunities.

What do quality learning opportunities look like? One difference between the education researcher and the community organizer is, "The organizer does not have the complete answer in advance. . . . The organizer wants to construct a solution with the community" [4, p. 112]. Moses helped organize a program in which the same students would take math together as a cohort for a double-period every day. As he wrote in 2009, "With funding from the National Science Foundation, the Algebra Project works within individual classrooms, where we get students to agree to do ninety minutes of math with us every day for four years of high school. They work to catch up their deficits and jump through the country's three hoops: the state hoop, the ACT/SAT hoop, and the university hoop" (Moses 2009, p. 379). Students in four out of five cohorts in a multi-site study graduated in higher numbers compared to comparable controls [2; Figure 3]. In addition to developing mathematical proficiency, students formed lasting bonds with peers and instructors. These cohorts made mutual accountability and moral support possible for everyone in the mathematics classroom and created a supportive context for student achievements [8].

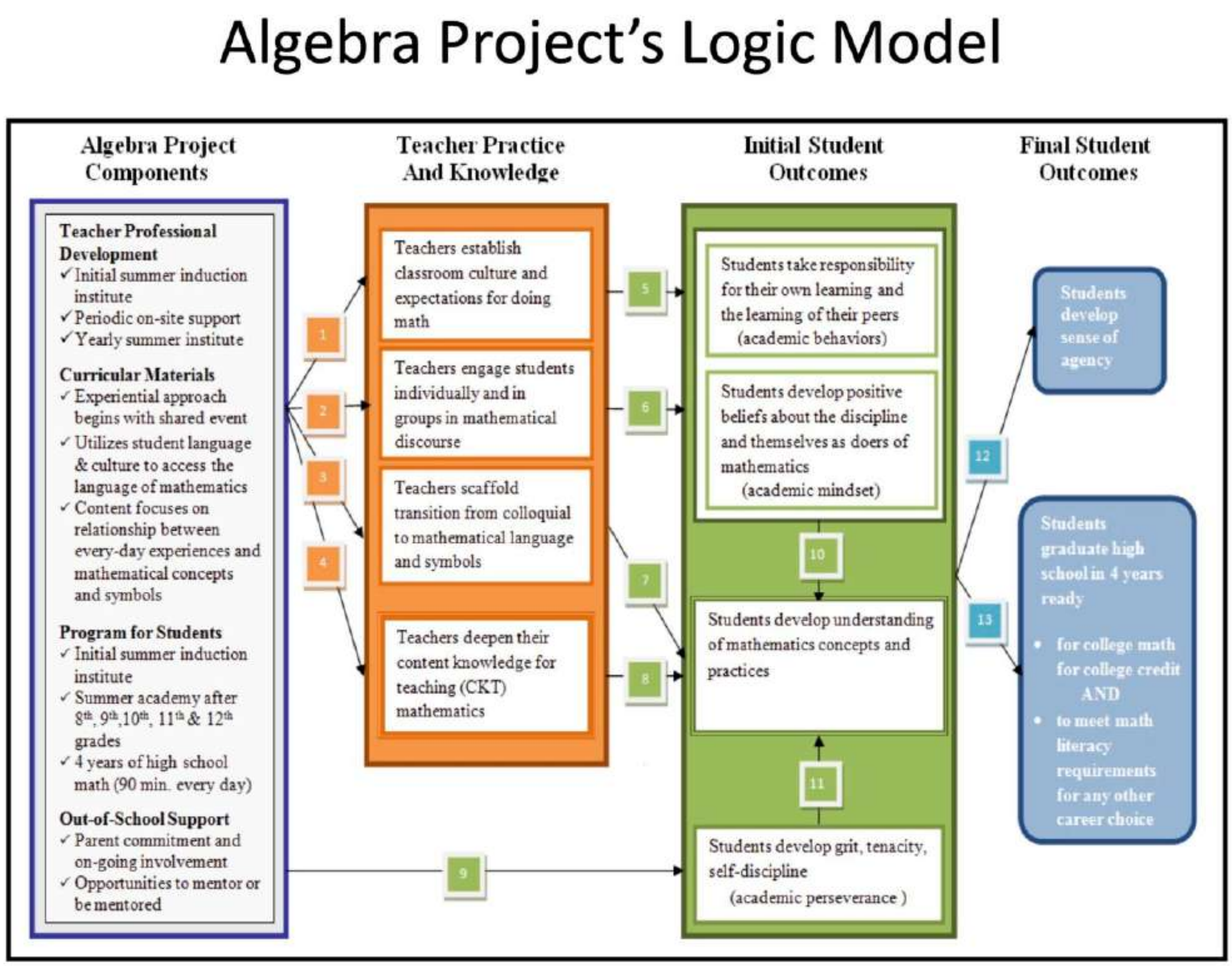

Figure 3. 2014 diagram showing the Algebra Project's Logic Model. Product Efficacy Argument for "The Development of Student Cohorts for the Enhancement of Mathematical Literacy in Under Served Populations," NSF Grant DRL-0822175 Final Report, November 30, 2014, p. 4.

What role can communities play in supporting innovative and inclusive education initiatives? One of the most important things we can do is begin to see mathematics, not as something some people do with some parts of their brains, but as something everyone does with their entire being as social and symbolic creatures. Mathematics owes its status as the unifying language of the sciences to its clarity and capacity to generate consensus about the mathematical features of our shared experiences. As Moses argued, if we want to raise the floor of mathematical literacy for the 21st century, we need to see all young people as mathematical beings capable of learning to read, write, and reason with the languages of mathematics: "I think everyone agrees that if it is possible to open the door to real mathematics understanding, it would be a good thing. If *we* can do it, then *we* should" [4, p. 111].

References

[1] Closson, Troy. (2024). "The Algebra Problem: How Middle School Math Became a National Flashpoint." *New York Times*. May 22, 2024, Section A, p. 1. https://www.nytimes.com/2024/05/22/nyregion/middle-school-math-algebra.html

[2] Educational Testing Service. (2014). Product Efficacy Argument for The Development of Student Cohorts for the Enhancement of Mathematics Literacy in Underserved Populations, by the Algebra Project, Inc. NSF Grant DRL-0822175 Final Report. https://algebra.org//wp-content/uploads/2024/03/HighSchoolCohortsFinalReport-AP2014.pdf.

[3] Moses, Robert P. (2009, Summer). An Earned Insurgency: Quality Education as a Constitutional Right. *Harvard Educational Review* 79(2), 370–381.

[4] Moses, Robert P., and Charles E. Cobb, Jr. (2001). *Radical Equations: Civil Rights from Mississippi to the Algebra Project*. Boston: Beacon.

[5] Moynihan, Ben et al. (2026). *The Algebra Project Inc.* https://algebra.org.

[6] Muntersbjorn, Madeline. (2023). The Algebra Project, Feature Talk, and the History of Mathematics. In *Research in History and Philosophy of Mathematics: The CSHPM 2021 Volume*, edited by Maria Zack and David Waszek, 261–275. Annals of the Canadian Society for History and Philosophy of Mathematics. Cham, Switzerland: Springer Nature.

[7] Soguero, Aidan, and Bill Crombie. (2024, October 9). The Algebra Project Work Cycle. *The Algebra Project Inc.* https://algebra.org/2024/10/09/the-algebra-project-work-cycle/.

[8] West, Mary M. (2016, January 30). The Algebra Project: Overview of Research & Evaluation, 1991–2015. https://iris.siue.edu/math-literacy-archive/files/original/82b7ceef4d303db77a55e7b34e9b6412.pdf.

Madeline Muntersbjorn teaches logic and philosophy of science at the University of Toledo in northwest Ohio, US. She is currently co-editing a book of interviews and essays, Bob Moses: Lecture and Legacies, *with Greg Budzban and Maisha Moses for the University of North Carolina Press.*

Copyright & Permissions

The Canadian Mathematical Society grants permission to individual readers of this publication to copy articles for their own personal use. Use for any other purpose is strictly prohibited. To obtain a license for anything other than copying articles for personal use, please contact the Canadian Mathematical Society to request permissions or licensing terms.

Canadian Mathematical Society — 616 Cooper St., Ottawa, ON K1R 5J2, Canada

Copyright & Permissions

The Canadian Mathematical Society grants permission to individual readers of this publication to copy articles for their own personal use. Use for any other purpose is strictly prohibited. To obtain a license for anything other than copying articles for personal use, please contact the Canadian Mathematical Society to request permissions or licensing terms.

Canadian Mathematical Society — 616 Cooper St., Ottawa, ON K1R 5J2, Canada

2026 CMS MathEd Meeting (Online)

The Canadian Mathematical Society (CMS) welcomes and invites education presentation proposals for its event, the 2026 CMS MathEd Meeting (Online) will take place on:

Friday, November 27th, 2026, (from 17:00 EST to 20:00 EST), and

Saturday, November 28th, 2026, (from 11:00 EST to 15:00 EST)

For this meeting, we will accept proposals on any theme in mathematics education.

Education presentation proposals will be selected by the CMS Meetings Oversight Committee, which will also schedule the accepted sessions, in communication with their proposer(s).

Proposals should include:

(1) Names, affiliations, and contact information of the presenter(s). This is a fantastic opportunity for early career researchers and practitioners to propose presentations.

(2) A title and brief abstract of the presentation.

All presentations will be of the standard CMS length: 20-minute presentations + 5-10 minute Q&A.

The deadline for the presentation proposals is **Friday, October 2nd, 2026**. There is a limited number of presentation spots. Preferences will be given to early submissions.

Please fill out the following Google form:

https://docs.google.com/forms/d/e/1FAIpQLScz09UQKtwzOrEtH_qVAVki57yzi1RJkKDh86TBhLmZrQhUIg/viewform?usp=dialog

Copyright & Permissions

The Canadian Mathematical Society grants permission to individual readers of this publication to copy articles for their own personal use. Use for any other purpose is strictly prohibited. To obtain a license for anything other than copying articles for personal use, please contact the Canadian Mathematical Society to request permissions or licensing terms.

Canadian Mathematical Society — 616 Cooper St., Ottawa, ON K1R 5J2, Canada

Call for Education Sessions

The Canadian Mathematical Society (CMS) welcomes and invites education session proposals for the 2026 CMS Winter Meeting in Montreal, Quebec, from December 11-14, 2026.

The education session proposals will be selected by the CMS Meeting Education Session Committee, which will also schedule the accepted sessions, in communication with the session co-organizers.

In accordance with the CMS mandate to propose conferences which are accessible and welcoming to all groups, diversity amongst organizers and speakers is strongly encouraged. To support organizers in their important work and in their efforts towards inclusivity and diversity, the CMS will host an open call for abstracts for all sessions, and asks organizers to consider all eligible abstract submissions for their session.

Diversity includes topics of interest, career stages, geographic location, and demographics; designated underrepresented groups include, but are not limited to, women, Indigenous Peoples, persons with disabilities, members of visible minority/racialized groups, and members of LGBTQ2+ communities. Please see here for more information about what is meant by diversity, and for tips towards organizing an inclusive session.

Note that there will be a separate call for Scientific Sessions.

All proposed sessions should be in line with the CMS Code of Conduct.

Proposals should be submitted online, and will require the following:

1. Names, affiliations, and contact information for all session co-organizers. Early career researchers are welcomed to propose sessions.
2. The education session's title, and a 2-3-sentence summary that will be posted on the CMS Meeting website if your proposal is selected.
3. A pdf file including a description of the topic and purpose of the session (1-2 paragraphs), as well as a description of considerations made towards an equitable and inclusive session for a diverse group of participants. This file will not be publicly posted.
4. Indicate the number of time blocks needed. A block can be between 2 and 2.5 hours in length.
5. A list of potential speakers, which includes those who have tentatively confirmed to present, with their full name and affiliation. A request of tentatively confirmed speakers is based on the need to evaluate an education session proposal on EDI consideration. An inclusive and diverse set of speakers is highly encouraged.
6. The structure of your session. Traditionally, each presenter gets 20 minutes to talk, 5 minutes of Q&A, and a 5-minute buffer for transition. We are open to different formats as well, such as a panel, interactive session/workshop, 10-minute lightning talks, etc.

We kindly ask that organizers consider not presenting at their own session. However they are welcome to consider presenting at any other education session.

Proposals will be selected by the CMS Education Oversight Meetings Committee. If you have any questions, please email Andie Burazin (a.burazin@utoronto.ca) and Sarah Watson (meetings@cms.math.ca).

The CMS kindly asks session organizers to consider all eligible abstract submissions for their session, as up to 30 speakers per session can be accommodated.

All sessions will take place from December 12 to 14, 2026.

Submission Form and Deadlines:

Please submit proposals by filling out this form. There will be two rounds of submissions. Proposals submitted by June 19, 2026, will be considered in the first round, where preference will be given to first round submissions. The deadline for the second round will be August 31, 2026.

Submit Session

2026 CMS Winter Meeting, Dec 11-14 | Call for Scientific Sessions

CMS Notes

CMS Meetings June 2026 (Vol. 58, No. 3)

The Canadian Mathematical Society (CMS) welcomes and invites scientific session proposals for the **2026 CMS Winter Meeting in Montreal from December 11-14, 2026.**

- The purpose of the scientific sessions is to share cutting edge research on a given mathematical topic, as suggested by the organizers.
- Sessions are scheduled blocks, with each block ranging from 2 to 2.5 hours in length, and take place from December 12-14. Typical scientific sessions have between 10 and 20 talks of 20 minutes each, with 10 minutes between talks, but 50-min talks are possible. Indeed, the organizers are welcome to suggest non-traditional usage of the block times and format.
- In accordance with the CMS mandate to propose conferences which are accessible and welcoming to all groups, diversity amongst organizers and speakers is strongly encouraged. To support organizers in their important work and in their efforts towards inclusivity and diversity, the CMS will host an open call for abstracts for all sessions, and asks organizers to consider all eligible abstract submissions for their session.
- Diversity includes topics of interest, career stages, geographic location, and demographics; designated underrepresented groups include, but are not limited to, women, Indigenous Peoples, persons with disabilities, members of visible minority/racialized groups, and members of LGBTQ2+ communities.
- Note that there will be a separate follow-up call for Education Sessions.
- All proposed sessions should be in line with the CMS Code of Conduct.

Proposals should be submitted online, and will require the following:

1. Names, affiliations, and contact information for two or three organizers: A lead organizer and one or two co-organizer(s).
2. A title and a two to three-sentence summary that will be posted on the website for potential speakers.
3. The number of blocks requested (blocks are 2 or 2.5 hours long).
4. A pdf file including a description of the topic and purpose of the session (1-2 paragraphs), as well as a description of considerations made towards an equitable and inclusive session for a diverse group of participants. This file will not be publicly posted.
5. A spreadsheet including list of possible speakers. Please have columns "Last Name", "First Name", "Affiliation", "Career Stage", and "Webpage", with as much information filled out for potential speakers as possible. This file will not be publicly posted. The template for the list of potential speakers can be found here.

Proposals will be selected by the Scientific Organizing Committee, limited by available classroom space, with priority for sessions that show intention to include a mix of senior and junior researchers, to make parts of their session accessible to graduate students, and to include speakers from designated underrepresented groups.

A note on Organizers

The lead organizer should hold a PhD or equivalent in the area of expertise relevant to the subject of the session. Having a senior researcher (e.g. Professor or tenured Associate Professor) paired with someone earlier in their career (e.g. tenure track Assistant Professor or Postdoctoral Fellow) would be ideal.

We ask that each potential organizer only propose a single session.

Submission Form and Deadlines:

Please submit proposals by filling out this form. There will be two rounds of submissions. Proposals submitted by June 19, 2026, will be considered in the first round, with responses ongoing. The deadline for the second round will be August 31, 2026.

Submit Session

2026 CMS Winter Meeting, Dec 11-14 | Call for Mini Courses

CMS Meetings June 2026 (Vol. 58, No. 3)

The Canadian Mathematical Society (CMS) welcomes and invites proposals for mini-courses for the CMS Winter Meeting in Montreal from December 11-14, 2026.

Since 2019, the CMS meeting program has included a limited number of three-hour mini-courses with the following objectives:

- Initiating attendees to the subject of a novel scientific session, so as to broaden the scope of its audience and appeal; or
- Introducing attendees to a cutting-edge area of pure or applied mathematics, for both research and professional interests; or
- Providing professional development opportunities and advice, particularly for graduate students and new PhDs.

The CMS Winter Meeting mini-courses will be held Friday, December 11. Attendees will be charged a small registration fee.

All proposed sessions should be in line with the CMS Code of Conduct.

Proposals should Include:

(1) The names, affiliations and emails of the organizers. Each mini course is allowed one or two organizers per course.

(2) A title and a brief description of the focus and purpose of the mini-course, being particularly clear on how it meets one of the three objectives outlined above;

(3) A brief description of the anticipated mathematical background of the audience.

Deadlines

As the number of mini-courses is limited, please submit your proposal before August 31, 2026 via our online form.

Submit

Copyright & Permissions

The Canadian Mathematical Society grants permission to individual readers of this publication to copy articles for their own personal use. Use for any other purpose is strictly prohibited. To obtain a license for anything other than copying articles for personal use, please contact the Canadian Mathematical Society to request permissions or licensing terms.

Canadian Mathematical Society — 616 Cooper St., Ottawa, ON K1R 5J2, Canada

The CMS is currently accepting applications for the 2027 Endowment Grants. The CMS Endowment Grants fund projects that contribute to the broader good of the Canadian mathematical community. Projects funded by the Endowment Grants must be consistent with the interests of the CMS – to promote the advancement, discovery, learning and application of mathematics.

Deadline for applications: September 30, 2026

For more information, and to apply: https://cms.math.ca/education/endowment-grants/

Copyright & Permissions

The Canadian Mathematical Society grants permission to individual readers of this publication to copy articles for their own personal use. Use for any other purpose is strictly prohibited. To obtain a license for anything other than copying articles for personal use, please contact the Canadian Mathematical Society to request permissions or licensing terms.

Canadian Mathematical Society — 616 Cooper St., Ottawa, ON K1R 5J2, Canada

The CMS is currently accepting applications for the 2027 Competition Grants. In addition to hosting its own math competitions, the CMS offers math competition grants for activities at the elementary and secondary school levels. These grants are open to Canadian contests of different kinds at the school level. This includes:

- Traditional: students solve problems in a timed written exam
- Projects: Teams competing to solve a strategic problem over a longer period of time
- Posters: Preparation of a mathematical solution or discussion for display purposes

Deadline for applications: November 15, 2026

For more information, and to apply: https://cms.math.ca/education/competition-grants/application-information/

Copyright & Permissions

The Canadian Mathematical Society grants permission to individual readers of this publication to copy articles for their own personal use. Use for any other purpose is strictly prohibited. To obtain a license for anything other than copying articles for personal use, please contact the Canadian Mathematical Society to request permissions or licensing terms.

Canadian Mathematical Society — 616 Cooper St., Ottawa, ON K1R 5J2, Canada

Call for Nominations: 2027 Cathleen Synge Morawetz Prize

The Canadian Mathematical Society (CMS) is currently welcoming nominations for the 2027 Cathleen Synge Morawetz Prize. This award recognizes an author (or authors) of an outstanding research publication.

Subject area for 2027: Geometry and Topology

Deadline for nominations: September 30, 2026. No nominations or documents will be accepted beyond this deadline.

Visit our website for more information: https://cms.math.ca/awards/cathleen-synge-morawetz-prize/nomination-information/

Copyright & Permissions

The Canadian Mathematical Society grants permission to individual readers of this publication to copy articles for their own personal use. Use for any other purpose is strictly prohibited. To obtain a license for anything other than copying articles for personal use, please contact the Canadian Mathematical Society to request permissions or licensing terms.

Canadian Mathematical Society — 616 Cooper St., Ottawa, ON K1R 5J2, Canada

Call for Nominations: 2027 Coxeter-James Prize

The Canadian Mathematical Society (CMS) is currently welcoming nominations for the 2027 Coxeter-James Prize. This award recognizes young mathematicians who have made outstanding contributions to mathematical research.

Deadline for nominations: September 30, 2026. No nominations or documents will be accepted beyond this deadline.

Visit our website for more information: https://cms.math.ca/awards/coxeter-james-prize/nomination-information/

Copyright & Permissions

The Canadian Mathematical Society grants permission to individual readers of this publication to copy articles for their own personal use. Use for any other purpose is strictly prohibited. To obtain a license for anything other than copying articles for personal use, please contact the Canadian Mathematical Society to request permissions or licensing terms.

Canadian Mathematical Society — 616 Cooper St., Ottawa, ON K1R 5J2, Canada

Call for Nominations: 2027 Krieger-Nelson Prize

The Canadian Mathematical Society (CMS) is currently welcoming nominations for the 2027 Krieger-Nelson Prize. This award recognizes outstanding research by a mathematician who identifies as a woman.

Deadline for nominations: September 30, 2026. No nominations or documents will be accepted beyond this deadline.

Visit our website for more information: https://cms.math.ca/awards/krieger-nelson-prize/nomination-information/

Copyright & Permissions

The Canadian Mathematical Society grants permission to individual readers of this publication to copy articles for their own personal use. Use for any other purpose is strictly prohibited. To obtain a license for anything other than copying articles for personal use, please contact the Canadian Mathematical Society to request permissions or licensing terms.

Canadian Mathematical Society — 616 Cooper St., Ottawa, ON K1R 5J2, Canada

Call for Nominations: 2027 Jeffery-Williams Prize

The Canadian Mathematical Society (CMS) is currently welcoming nominations for the 2027 Jeffery-Williams Prize. This award recognizes mathematicians who have made outstanding contributions to mathematical research.

Deadline for nominations: September 30, 2026. No nominations or documents will be accepted beyond this deadline.

Visit our website for more information: https://cms.math.ca/awards/jeffery-williams-prize/nomination-information/

Copyright & Permissions

The Canadian Mathematical Society grants permission to individual readers of this publication to copy articles for their own personal use. Use for any other purpose is strictly prohibited. To obtain a license for anything other than copying articles for personal use, please contact the Canadian Mathematical Society to request permissions or licensing terms.

Canadian Mathematical Society — 616 Cooper St., Ottawa, ON K1R 5J2, Canada

Notes from the Margin – Summer 2026 Issue

CMS Student Committee

Dear mathematics and statistics students,

It is my pleasure to announce that the Summer 2026 issue of Notes from the Margin is available now on the CMS Student Committee website:

https://studc.math.ca/wp-content/uploads/2026/06/NftM-S2026.pdf

This issue features articles regarding Graph Theory, Euler's Formula and Number Theory. We have also decided to interview two veterans of the CMS Student Committee who are leaving over the summer. Finally, we have received some more articles from the Women in Math. DRP at the University of Waterloo. As always, thanks to all our contributors for making this publication possible!

Looking past this current issue, we warmly encourage you to write an article for the upcoming issue: the submission deadline for the Winter 2026 issue is **October 1st, 2026.** You can find our guidelines at the following address

https://studc.math.ca/notes-from-the-margin/,

or you can reach out to us directly at student-editor@cms.math.ca.

Sincerely,

Jérémy Champagne and Fateme Peimany
Co-Editors of Notes from the Margin

Copyright & Permissions

The Canadian Mathematical Society grants permission to individual readers of this publication to copy articles for their own personal use. Use for any other purpose is strictly prohibited. To obtain a license for anything other than copying articles for personal use, please contact the Canadian Mathematical Society to request permissions or licensing terms.

Canadian Mathematical Society — 616 Cooper St., Ottawa, ON K1R 5J2, Canada