



Here's Newsletter #5 for the 2024 – 2025 season. Four Meets done; one to go!! Good Luck to everyone

In this newsletter, notice these items

1. A message from **Executive Director Tom Young**
2. A message from **Head of Problem Writing Team Colin Gardner – Springer (hints for Meet Five!)**
3. Ads for State Tournament T-Shirt Design and Video Contest
4. Dates for SMI 2025 and Schedule
5. Looking ahead at the schedule for the state tournament
6. Call for Grading and Data Entry paid helpers at State Tournament
7. Problem Corner

## 1. A Message from Executive Director Tom Young

**Hello all!** I am encouraged!

While the total number of schools is not where we want to be, the number of students per school has slowly risen since Covid. Colin Gardner – Springer, our Head of the Problem Writing Team (HPWT), put together some statistics to show where we stand historically. Here is his rationale and data

**For comparison sake, I pulled equivalent data from Meet 1 across those seasons. We've definitely seen a slow increase in participation numbers and average team size since Covid. In fact, our average team size for Meet 1 this year exceeds what it was in 2019-20. We also may be losing fewer students from Meet 1 to Meet 5, although it's hard to tell if that's a real trend.**

Year	Meet 1 Teams	Meet 1 Participants	Team Size	Meet 5 Participants	Meet 1-5 % Dropoff
2015-16	180	2947	16.4	2628	10.8%
2016-17	173	2733	15.8	2428	11.1%
2017-18	173	2741	15.8	2460	10.3%
2018-19	176	2521	14.3	2285	9.4%
2019-20	178	2403	13.5	2298	4.3%
2020-21	163	1813	11.1	1674	7.6%
2021-22	159	1929	12.1	1830	5.1%
2022-23	163	2003	12.3	1852	7.5%
2023-24	157	2083	13.3	1892	9.1%
2024-25	155	2133	13.8		

Covid hit us hard, but coaches, whatever you are doing to recruit more students – keep doing it!

### Maintain the Math Team culture of coolness!

*And hats off to Colin and his team's* work in producing challenging *and* accessible problems. Students stick with Math Team, and grow, if they have success. Give feedback via the surveys mentioned later in his column.

- Attend the 2025 Summer Coaches Conference July 17 and 18 to continue to learn and help shape the future of the League. It's a Hall of Fame year! Send nominations!
- Take notice of the advertisement and lineup for the Summer Math Institute 2025. There are many students who would enjoy the week! Encourage them!
- **Remember the requirement to meet in person at Meet Five.** If there is an Act of God preventing you from doing that, notify us. If there is an Act of Choice preventing you from doing that, choose to change that choice.

Go. Math. Team.

## 2. A message from Colin Gardner – Springer

**An error has been corrected on the Formula Sheet:** the formula for a parabola with vertex  $(0,0)$ , focus  $(0,p)$ , and directrix  $y=-p$  is  $x^2=4py$ , not  $y=4px^2$  as incorrectly stated. **Please be sure to use the corrected Formula Sheet (revised 1/29/2025) for Meet 5 preparation and while taking Meet 5.** This document has been updated on the league website. My apologies for letting this slip through.

Along the same lines, problem A3 on Meet 3 was ambiguous as stated: we assumed that the upper right vertex of the rectangle would be on the given line, but the problem did not explicitly state this. We received many challenges from students who submitted an answer of 1600 based on both intercepts being on the line. In fact, rectangles of any area, up to infinitely large, can be constructed with an intercept on the line, but challenges were received only for the alternate answer of 1600.

On reflection, we decided to accept these challenges, and furthermore to accept 1600 as a valid alternate answer to this problem, giving credit to everyone who submitted an answer of 1600 whether or not they challenged.

Some of you have likely noticed (and some students certainly have), that we sometimes ask for answers in a form such as  $n/70$  (e.g. A5 on Meet 4), even though the resulting fraction ( $90/70$  in this case) isn't in lowest terms. One reason for this is to generate less guessable answers - most low numbers get randomly guessed for most problems, so we like to avoid small numbers to decrease the likelihood of lucky guesses (especially on hard problems which are likely to have high power scores). Another reason, again for harder problems, is to ensure that common incorrect answers still lead to an integer answer (e.g. for A5 all three roots produced integer values for  $n$ , but only one was correct). Of course, lucky guesses are always possible, and hard problems may sometimes have small answers in the future. It may be worth making students aware of this: they shouldn't assume that they made a mistake if their answer didn't lead to a reduced fraction.

Looking ahead to Meet 5, as usual there is at least one problem taken almost directly from [Sample Meet 5.1](#), so I'd encourage you to share that with your students.

They will also see a problem related to the Collatz Conjecture, so by all means introduce this to your students if you'd like (I recommend Numberphile's YouTube video at <https://www.youtube.com/watch?v=094y1Z2wpJg>). I find this conjecture to be a fun example of how very simple propositions can be nearly impossible to solve. There are many interesting and deep results to be tackled by any of our students who choose to continue their exploration of mathematics beyond high school!

This season has seen significant changes in many areas, including to Meet structure, topics, and procedures (e.g. the formula sheet). We'd like input on what worked and what didn't - both from you as coaches, as well as from your students - to help inform any necessary course corrections.

**Please share the student survey linked below with your students, and fill out the coach survey yourself, as convenient (but no later than the State Tournament on March 0th):**

### [2024-25 Coach Survey](#)

Thank you for your input, for guiding your math team, and for your commitment to the Minnesota State High School Math League! Best of luck on Meet 5!

Colin Gardner-Springer  
Head of the Problem Writing Team

[colin@gardner-springer.com](mailto:colin@gardner-springer.com)

### [2024-25 Student Survey \(QR code\)](#)



### 3.

## MN State High School Math League Math Team Video Contest

1<sup>st</sup> place: \$200 to school's math team

2<sup>nd</sup> place: \$150 to school's math team

3<sup>rd</sup> place: \$100 to school's math team

### Video Guidelines:

Produce a 90 second video explaining why you like to be involved in the Math League. Videos might include: student interviews, teacher endorsements, sample problems, or video of practices/meets.

### Video Entry Submission:

Videos are due to the Math League Office  
([mathleague@augsborg.edu](mailto:mathleague@augsborg.edu))  
by *March 4th, 2025*.

- Videos contest entries must be sent and approved by the school math team coach.
- Winning schools will be notified by March 7, 2025.
- Winning video will be shown at the State Tournament on March 10, 2025, uploaded to the Math League website, and may be used for recruitment efforts

**Cleverness Appreciated!**

# MN State High School Math League 2025 State Tournament

## T-shirt Design Contest

Prize: **\$50 VISA Gift Card and a Free T-shirt**

### *How to enter:*

Submit a one-color design for the t-shirt front.

The design should include the words:

MN State HS Math League State Tournament March 10, 2025

**Special consideration given to clever designs that incorporate the fact that it's the League's 45<sup>th</sup> year and  $45^2 = 2025$**

- Email your design by **Feb. 8** to: [mathleague@augsborg.edu](mailto:mathleague@augsborg.edu)
- Accepted file format: pdf only
- Include your name, grade and school in the email submission.
- Winner will be notified by Feb. 11<sup>th</sup> via email.

Email [mathleague@augsborg.edu](mailto:mathleague@augsborg.edu) with questions

## 4. Summer Math Institute

**SMI: June 22 – June 27, 2025**

Summer Math Institute Lineup (subject to minor changes)

		7 <sup>th</sup> through 9 <sup>th</sup> graders	10 <sup>th</sup> through 12 <sup>th</sup> graders
Monday	Morning	String Polyhedra, Creating Puzzles, Ambigrams	Visualizing Big Data
Monday	Afternoon	Visualizing Big Data	String Polyhedra, Creating Puzzles, Ambigrams
Tuesday	Morning	The Wonders of Desmos	Intriguing Number Theory
Tuesday	Afternoon	Intriguing Number Theory	The Wonders of Desmos
Wednesday	Morning	The Wonders of Desmos	Intriguing Number Theory
Wednesday	Afternoon	Intriguing Number Theory	The Wonders of Desmos
Thursday	Morning	Creating Integer Sequences	Counting and Combinatorics in the AMC
Thursday	Afternoon	Counting and Combinatorics in the AMC	Creating Integer Sequences
Friday	Morning	Creating Integer Sequences	Counting and Combinatorics in the AMC
Friday	Afternoon	Counting and Combinatorics in the AMC	Creating Integer Sequences

Featured Instructors: [Scott Kim](#), [Annie Perkins](#), [Ben Orlin](#)

**Go to our web page ([mnmathleague.org](http://mnmathleague.org)) and click on STUDENTS > SUMMER MATH INSTITUTE for registration form**

# 5. Looking ahead to State Tournament Schedule

## 2025 State Tournament

**Check-in** 8:45am - 9:45am Atrium

- Invitational students checked in and ready to go with pencil at 9:15 in cafeteria (no backpacks)
- If no invitational, checked in and ready to go by 10am

**Invitational** 9:15am - 9:45am Cafeteria

**Welcome** 10:00am-10:30am Auditorium

- Perfect Scores
- Season Information
- Regular Season Awards
- Coaches should double check their scores throughout the day
- Logistics of the Day
- Good Bye & Good Luck!

*Challenge Window open for invitational 10:30am - 10:50am*

**Event A** 11:00am -11:15am Cafeteria

- *Students will just have time to go to the bathroom. They will stay seated.*

**Event B** 11:30am - 11:45am Cafeteria

- *Solutions for A & B will be posted.*

**Lunch** 11:45am - 1:00pm

*Challenge Window open for events A & B 12:45pm - 1:05pm*

**Event C** 1:15pm - 1:30pm Cafeteria

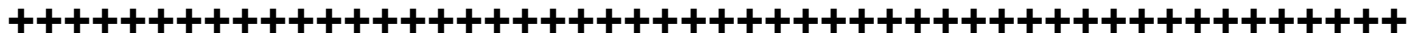
- *Solutions for C will be posted.*

**Team Event** 1:45pm - 2:15pm Individual Home Rooms

*Challenge Window open for events C & Team Event 2:20pm - 3:00pm*

**Awards** 2:30pm - 4:15pm Auditorium

- Introduce Honorary Judges,
- Math Bowl
- & State Tournament Awards



6. A call for **help** at the State Tournament Monday, March 10 at Spring Lake Park high school.

***Because all students take all tests, we need 16 to 20 graders and 8 to 10 data entry workers.***

The position pays \$50 for the day

**Please consider!**



## Problem Corner

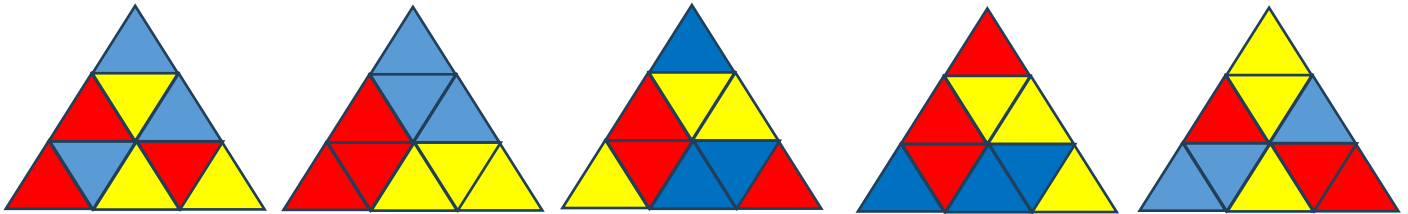
an effort to spur conversation

If you'd like to contribute a problem or send in a solution, email [tomyoungmathman@gmail.com](mailto:tomyoungmathman@gmail.com)

Student solutions encouraged!

## Newsletter Puzzler #48

Given an equilateral triangle with 9 smaller equilateral triangles. Find a way to break the larger triangle into three equal "shapes", i. e. , three shapes that tessellate the larger triangle. The three "shapes", consisting of 3 smaller triangles, should be identical when oriented the same. Here is an example of a "shape" that does not work. The triangle cannot be tessellated with the blue shape.



Jon Labrensz and his Moorhead math team found these 5 tessellations!

## Newsletter Puzzler #49

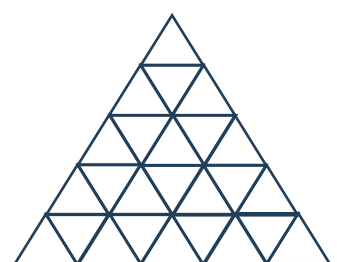
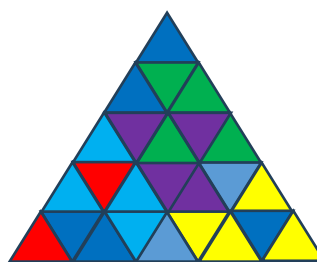
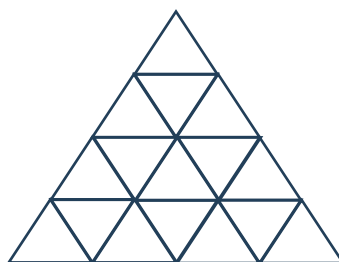
Now the question is: how many 4 – triangle patterns will tessellate an equilateral triangle with 16 sub triangles?

Here's one way. Are there others? And what about the 5 case? Six? More?

Only 1 for 4??



no success on 5 yet (need 5, five triangle groups)



Six?

Need 6

Six triangle groups

