Minnesota State High School Mathematics League

Newsletter

Issue #45, September 26, 2024

A message from the Executive Director, Tom Young

Here's Newsletter #1 for the 2024 – 2025 season. It's a new season!! Good Luck to everyone

In this newsletter, notice these items (It's a big newsletter!!)

1. Video Contest winners Past and Present
2. A message from Executive Director Tom Young regarding recruitment and maintaining schools
3. A message from Head Problem Writer Colin Gardner – Springer ***(with hints for Meet One!)***
4. Plan for next year for Math League 2.0
5. In Memoriam
6. A look back at the All-State Team successes for the year

6.5 Order a Math League Polo Shirt

7. Meet Dates for 2024 – 2025
8. A Primer on how to use the online system
9. Problem Corner

Photos from SMI

1. Math Team Video Contest Winners over the Past Few Years

Highly recommend watching them!!

Student Promo
Coaches Promo
Student Winning Video 2022
Student Winning Video 2020
Student Winning Video 2024
Student Winning Video 2019
Promotional video

2. A message from Executive Director Tom Young

We are in need of more coaches.

Plain and not so simple.

As a result of many factors, our member schools have dropped from a high of 185 to now 160 schools. COVID hurt, but so has attrition due to not finding replacement coaches after retirement. While most coaches find a successor, some are unable [not from a lack of trying, but] from a lack of commitment from their colleagues.

Sharin Park and I continue our efforts to find new schools and retain current ones yet have limited success. We gain some here, lose some there.

It breaks my heart because there are students who could benefit greatly from participating in the League.

You can help.

Bend the ear of a colleague you know from a neighboring school that doesn't have a Math Team. Explain the benefits that not only do the students reap, but how Math Team coaching has improved your teaching.

Math League is a vibrant entity that can keep growing and reaching more students in the state. Thanks for doing a small part in helping it grow.

More importantly, thanks for being a coach and helping to nurture growth in your students.

Go. Math. Team.

3. A message from Colin Gardner – Springer

The 2024-25 season is nearly underway, and big changes are here!

As you should be aware by now, each Meet will consist of three individual events, and all participants will take all three events. To facilitate this, Meet topics have been significantly reorganized.

Each individual event consists of five problems, each worth a single point. The first two problems for each event are considered “quickies”, and should be accessible to all students. The maximum individual score is now therefore 15 points per Meet.

Given that less experienced students will be exposed to topics they’re likely to be unfamiliar with, the League has prepared a formula sheet which will be distributed to all students for reference during each Meet. The hope is that this gives them a step up, allowing students unfamiliar with a topic the possibility of success, while also encouraging Meet preparation by studying past problems rather than cramming formulas. Note, however, that the formula sheet is not comprehensive - some topics may require formulae which aren’t included.

The team round format is unchanged, although now based on the new topics list and with each correct answer worth five points for the team (giving a maximum possible team score of 30, or 150 when the eight individual scores are also factored in).

All answers continue to be integers, and calculators are still not permitted on any round.

We realize that all of these changes place a burden on you, our coaches, as you prepare students for a successful season. In an attempt to ease the transition, several resources are available to you:

- Updated 2024-25 Meet Topics List, including a more detailed event-by-event breakdown of topics on subsequent pages
- The 2024-25 Formula Sheet, which will be provided to all students during Meets. You may want to familiarize them with it beforehand, and draw their attention to the portions which may be relevant to the upcoming Meet. This, and the Topics List, are published on the public League site under “Documents”.
- Ten Sample Meets (two each for Meets 1 through 5), containing curated selections of (mostly) past Math League problems, which can be used as practice materials.
- Gary Kannel has updated the Event Builder tool to generate additional sample Meets based on the new topics layout.
- For those of you using Alcumus (from the Art of Problem Solving) to prepare students, we’ve cross-referenced the new Event topics with corresponding Alcumus topics (where possible).

These materials are also available to you on the league scoring site, under Help -> New Meet Format. You'll also find presentations from the related sessions at our Summer Coaches Conference (those materials also available here).

During the conference I announced two big hints for this year's Meets:

1. **At least one problem on Meet 1 is nearly identical to one of the first ten problems from 2023's AMC 12A.**
2. **At least one problem on each Meet will be nearly identical to a problem from the corresponding M.1 Sample Meet.**

For Meet 1 in particular, students who studied the first 10 problems of last year's AMC 12A will recognize at least one problem (and be better prepared for the 2024 AMC 10/12 which takes place shortly after Meet 1), and students who reviewed Sample Meet 1.1 will recognize at least one additional problem. To be clear, these problems will be functionally identical, but the answer is likely to be different, so simply memorizing the answers won't help.

Note that these Meets include answers, but not full solution writeups. The answer page includes the problem source - if necessary you (or your students) should be able to look up the solution on our scoring site. Note also that typos may have been introduced as these problems were reformatted - if in doubt please check against the original referenced problem (and let me know if you find a discrepancy).

As always, please remind your less experienced students that they will be seeing unfamiliar topics. They should try to solve what they can, and expect to see year-over-year improvement in the coming years as they become familiar with additional topics. That said, encourage them to give all problems a try (especially the first 2-3 from each Event), even if they seem intimidating. Perhaps something on the formula sheet might help?

While more topics are covered, each student will now face six "quickie" problems per Meet, up from two previously, so we hope that even inexperienced students will have a higher likelihood of a successful Meet. On the flip side, top students can expect to face challenging problems this season, requiring "out of the box" thinking. Now that everyone has the same formula sheet, performing well statewide will be even more correlated to strong problem solving skills and especially to time spent studying past competition problems.

Following the season, the League will again survey coaches to learn what worked and what didn't with this new format, which will inform any adjustments for coming seasons. Please feel free to share your observations - good and bad - both now and at the conclusion of the season.

Thank you coaches; have a great season!

Colin Gardner-Springer
Head of the Problem Writing Team (HPWT)
colin@gardner-springer.com

4. New Competition Structure for 2024 – 2025 and beyond

Overview: Due to the pandemic and the shifting nature of the League Operations the League Office thought it was necessary to evaluate our current operations to see if they fit the reality of today. In order to get the best data, the League Office distributed a survey that went out to all coaches, hosted an in-person retreat with 15+ coaches and the Executive Committee, and dedicated the majority of the Coaches Conference to this topic. Based on the robust discussions over the last few months, the Executive Committee drafted this proposal which the Board approved October 1st. These changes will go into effect in the 2024 – 2025 season

Timeline: These changes, adopted by the Board, will be implemented for the 2024-2025 school year.

Part 1: The structure of meets will be changed from 4 individual events to 3 individual events, ***with all students participating in all individual events.***

Rationale:

- Allows 9th and 10th grade students more access for advanced questions.
- Keeps the time frame for In-Person Meets the same
- Eliminates the disparity of choosing different events for different students.
- Retains the process of selecting the scoring team ahead of time.
- Allows for easier substitutions when students are absent.

Specific Details:

- The 3 individual events will each have 5 questions.
  - Each question will be worth 1 point.
  - There will be two "quickie questions" per event.
  - Power scoring will still be in place.
- Coaches will still need to set their scoring team prior to the Meet start.
  - No more than 6 of the 8 scoring team members shall be beyond the 10th grade (as is currently the case).
- Team Event Scoring
  - There will be 6 questions on the team event.
  - Each question will be worth 5 points.
  - A perfect team score at one meet will be 150 points.
- The topic list was revised and submitted to the board for approval..
- Additional practice materials will be created, perhaps including a reorganizing of the problem archive.

Part 2: Implement a "Guess the Interval" for Meet 1 and Meet 5.

Rationale: This event will increase competition fun for all students and the team aspect and bonding amongst students.

Specific Details:

On Hold

- The League Office will create and provide an overview, scoring instructions, and instructional video on how to implement it.
- This will not be a part of the scoring system.
- This event will be available as an in-person, virtual, and hybrid version for Meet 1.
- This event will take place live at Meet 5.

5. In Memoriam

We are saddened to break the news that All State coach, Matt Eggert, passed away after battling a virulent form of esophageal cancer for the past year. He was one day short of his 44th birthday.

Matt was a devoted math league coach and great guy.

Matt graduated from Spring Lake Park high school in 1999, he then continued on to the University of Minnesota where he achieved his bachelor's degrees in chemical engineering and materials science. After brief time working at Boston Scientific and 3M, he went on to earn his master's degree in education from Hamline university.

His passion was to educate the young minds of his community.

More information can be found at

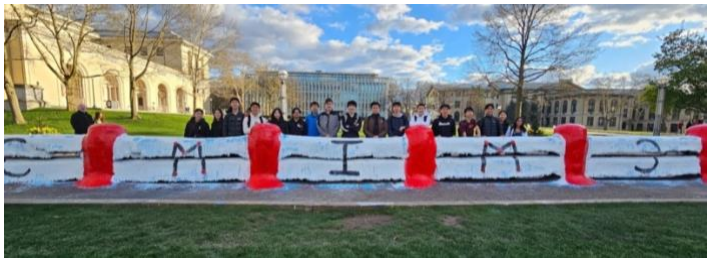
https://www.millerfuneralfridley.com/obituaries/matthew-eggert

6. All State Team Year in Review

At ARML, in Iowa City on June 1st, 2024, we officially closed the book on the 2023/24 season for the Minnesota All-State Math Team!

The season began with a remarkable performance at the Harvard/MIT Math Tournament. Led by Sam Kretzschmar (Spring Lake Park) and Henry Zheng (Edina), Minnesota's top team took 3rd in the team round and finished in 8th in the sweepstakes out of over 90 teams. Team members also enjoyed meeting up with alumni in Boston– fourteen former members of the team met us for lunch and to show us around campus!

In the Spring, we also sent three teams to Pittsburgh for the Carnegie Mellon Math and Informatics Contest. Angie Huang (East Ridge) and Austin Wang (Mounds View) finished in the top fifty individuals, and Sam Peterson (International School of Minnesota) helped team to a top 10 finish in the proof-based algorithm round.



The following weekend, we had 40 students gather at St Paul Academy to compete virtually in the Stanford Math Tournament. Kevin Qiu (Wayzata) and Golden Peng (Century) led their team to a top 5 finish in the Guts round of that tournament.

Finally, we loaded up two charter buses and took the entire team down to Iowa City for the American Regional Math League (ARML). Our top team finished in third place at our site behind Texas and Chicago, and 7th nationwide in the B Division. Special congratulations to Eric Ding, an 8th grader from Century in Rochester, who placed in the top 25 individually nationwide.

The 2023/24 All State team saw participation from sixty-eight competitors from forty-one schools across Minnesota. We continue to look to expand the team, reach as many schools as possible, and grow.

6.5 Buy an embroidered Math League Polo Shirt

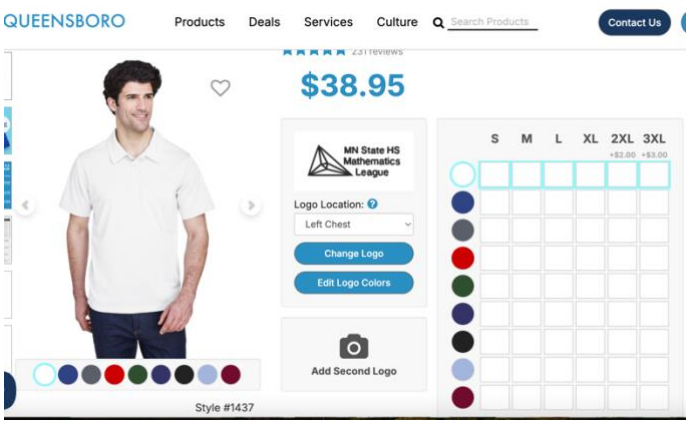
Would you like to buy a Polo Shirt embroidered with the League logo?

Here is what the shirt looks in a Men's Medium

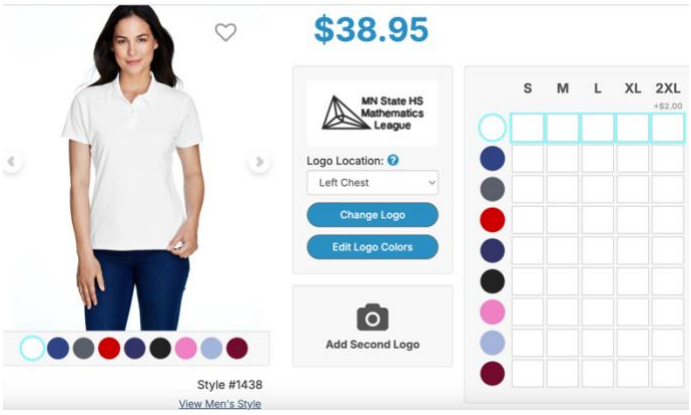
The retail price of the shirts is $38.95 but we get a discount. We can offer the shirt to you for $25. If you would like to order a shirt, ***return a copy of the order form*** with the size and color you want to tomyoungmathman@gmail.com. Orders needed by October 7th. The shirt is 100% polyester

Pay with a check (we don't do Venmo) to

MN State High School Math League
Augsburg University Campus Box #22
2211 Riverside Avenue
Minneapolis, MN 55454



Go. Math. Team.



7. 2024 - 2025 Meet Dates

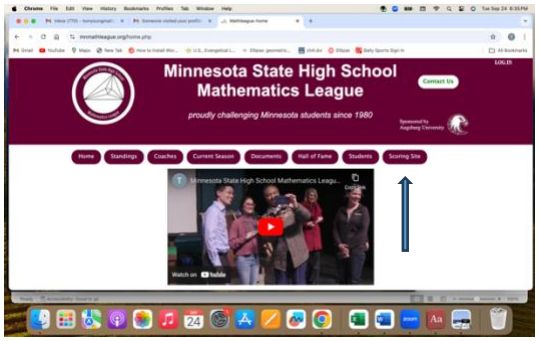
Meet 1: November 4 (5), 2024
Meet 2: November 25 (26), 2024
Meet 3: December 16 (17), 2024
Meet 4: January 27 (28), 2025
Meet 5: February 10 (11), 2025
State Tournament: March 10, 2025 at Spring Lake Park HS

8. A primer on how to use the online system to start a team and run a meet

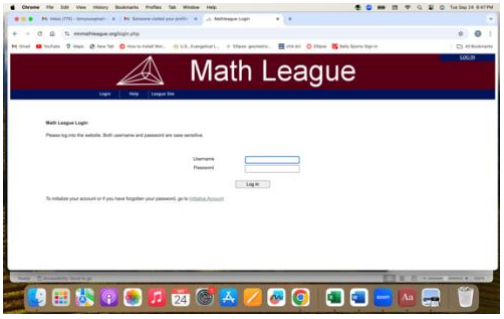
When you start your team, be enthusiastic and recruit, recruit, recruit.

As students join, enter their names into the online scoring system.

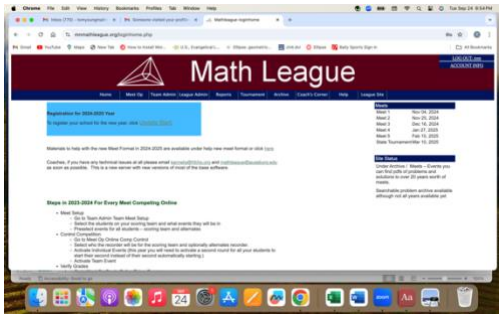
Go to league website at **mnmathleague.org**



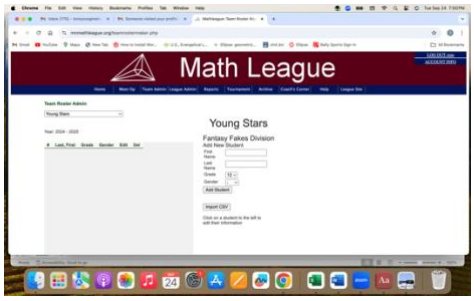
Click on **SCORING SITE** button. This will direct you to the online platform. Log in.



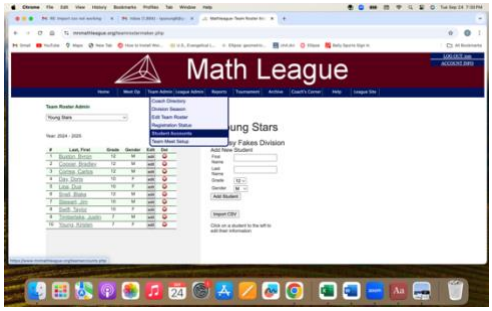
You will see this:



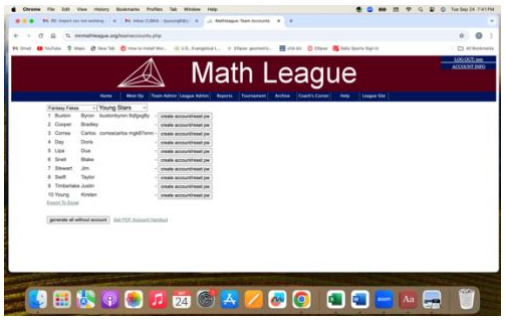
Click on Team Admin > Edit Team Roster

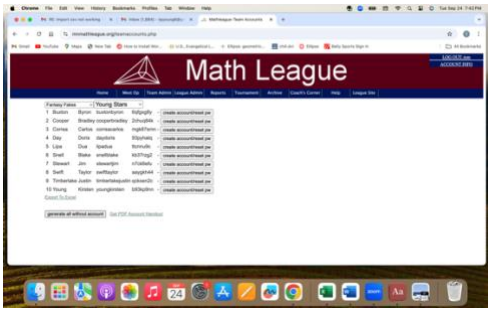


Add students all at once or as they join.



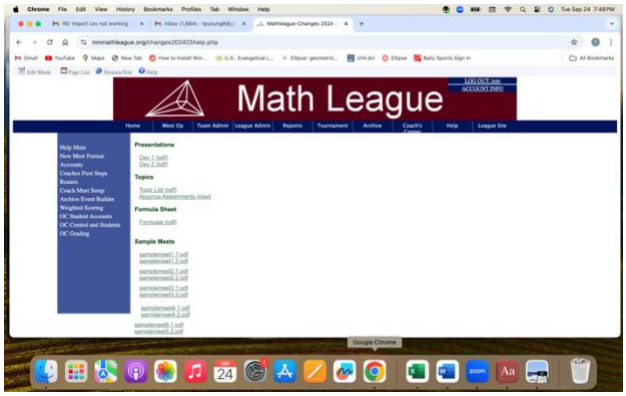
Give students a username and password so that they can log in to scoring site for a meet. Click on Team Admin > Student Accounts. Either generate them individually or all at once





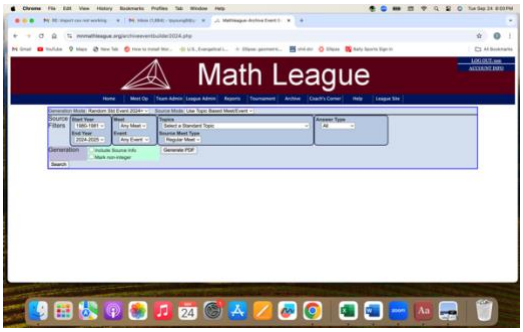
You're now ready for a meet. To Practice for a meet, there are a couple of resources

Click on Help > New Meet Format



During your team practices, your students should work on Sample Meet One and Two. Teams should also examine the Topic List and anticipate problems germane to those concepts. Students should also become acquainted with the Formula Sheet. Students will be able to use a CLEAN COPY of the formula sheet when they take their tests during a meet.

Our online database is geared to the old structure, but it can help you create topic specific problem sets. For example, click on Archive > Event Builder New



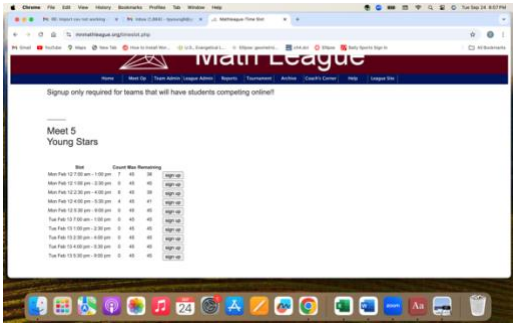
Experiment!

You also could use other online databases like Art of Problem Solving's ALCUMUS.

Everything should now be in place to participate in a Meet.

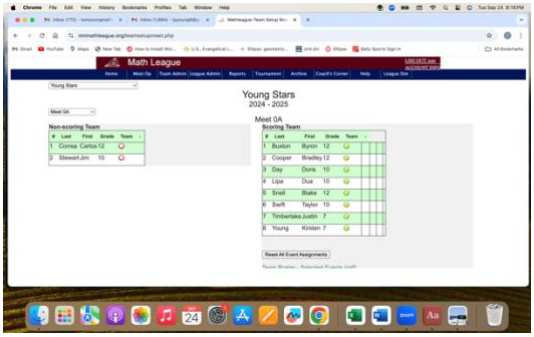
We will have two sample Meets 0A and 0B on Monday October 21 (22) and October 28 (29). On the Wednesday prior to the Meet, coaches can sign up for a time slot. Here's how:

Click on Meet Op > Time Slot SignUp. Click on the time you want as long as it is not full. Signup is first come, first served



After you sign up for a slot, you need to register your varsity team for the meet. Click on Team Admin > Team Meet Setup.

Click on the red radio button for the 8 varsity competitors. Remember that your team has to have at least 2 tenth graders or younger.

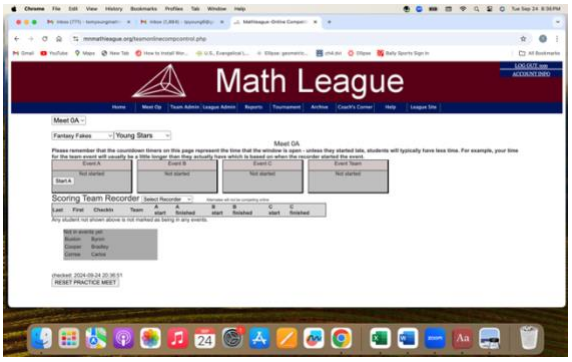


What happens at a Meet

Students log in to the site using their username and password you gave them. When they log in, they will see this:

They will follow the directions but basically they click Compete and click the Register button and wait for you to start an event.

As a coach, you click on Meet Op > Online Comp Control

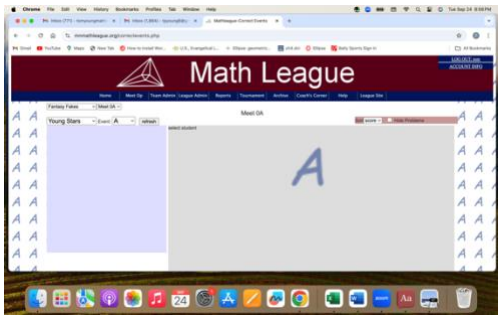


When you are done distributing a paper copy of the test and a CLEAN COPY of the Formula sheet and if every student is ready, activate Event A. There will be a timer that shows the status of the event. ***To receive credit, we take the entry on the computer. A student that has the right answer on their paper copy should not receive credit.*** Once event A finishes, collect the paper copies of the problems. Give the students an appropriate rest and repeat for events B and C.

Notice, you have to pick a recorder for the Team Event. Only one student can enter the team solution. Run the team event like you did Events ABC except that the students can talk.

Once every event is finished, you can distribute the solutions you received the Friday prior. You have one last job and that is to VERIFY the student answers.

Click on Meet Op > Grade Online Taken Events



If you are unsure what to do, that's why we have 2 practice meets!

Problem Corner

an effort to spur conversation

If you'd like to contribute a problem or send in a solution, email tomyoungmathman@gmail.com

Student solutions encouraged!

Newsletter Puzzler #44

Q.9. A bag of Apricots was divided between Amitabh and Abhitabh. Abhitabh said, "It's not fair! You have 3 times as many Apricots I have." Amitabh said, "OK, I will give you one Apricot for each year of your age." Abhitab replied, "Still not fair. Now, you have twice as many Apricots as I have." "Dear, that's fair enough as I am twice older than you", said Amitabh. Amitabh went to Kitchen to drink juice. While he was in Kitchen, Abhitabh took apricots from Amitabh's pile equal to Amitabh's age. Who has more apricots now?

Solution

Let's assume that initially Abhitabh got N apricots and his age is T years. Hence, initially Amitabh got 3N apricots and his age is 2T years.

Operation	Amitabh's Apricots	Abhitabh's Apricots
Initially	3N	N
Amitabh gave T apricots to Abhitabh (equals age of Abhitabh)	3N - T	N + T
Abhitabh took 2T apricots from Amitabh's pile (equals age of Amitabh)	3N - 3T	N + 3T

It is given that after Amitabh gave T apricots to Abhitabh, Amitabh had twice as many apricots as Abhitabh had.

3N - T = 2*(N + T)

3N - T = 2N + 2T

N = 3T

From the table, at the end Amitabh has (3N - 3T) apricots and Abhitabh has (N + 3T) apricots.

Substituting N = 3T, we get

Amitabh's apricots = 3N - 3T = 9T - 3T = 6T

Abhitabh's apricots = N + 3T = 3T + 3T = 6T

Thus, at the end Amitabh and Abhitabh, both have the same number of apricots.

Newsletter Puzzler #45

Read OEIS entry A363381 and imagine it in 3D. Send ideas to Executive Director Tom Young