A message from the Executive Director, Tom Young

Hello all!

Newsletter #3 for the 2022 – 2023 season. In it, notice these items:

1. **Meet 5 expectations**
2. State Tournament Video contest
3. State Tournament T-shirt Design contest
4. State Tournament schedule for the day and expectation for attendance
5. **Announcing Po-Shen Loh as guest speaker at State Tournament**
6. *Announcing Documentary of Math Bowl and Math League in general*
7. Summer Math Camp Dates
8. Summer Coaches Conference
9. **Request for volunteers to serve on committee to examine our practices and suggest changes.**

Allow me to highlight a couple of items:

1. Meet 5 expectations

Per the Board of Directors decision at the Fall Board meeting, schools are expected to meet at a common site at the division level for meet five. While most divisions will use paper and pencil, divisions with appropriate technology and bandwidth can use the online system. I'd caution that most should use paper/pencil. We don't want to overload the server! The benefit is that students will be getting together and interacting across schools.

Divisions should plan a recognition ceremony for meet 5. Divisions can be reimbursed up to $70 per school to offset the cost of the ceremony. Our league manual says:

> Division Coordinators, working with guidelines developed by Division Coaches, should plan a suitable awards ceremony at the conclusion of the regular season. This most often takes the form of a dinner (or a pizza party) paid for by an area industry (or by assessing each school in the Division). Division Coordinators may forward bills for their recognition event of up to $70 per team to the League office.

During the pandemic, when schools were meeting alone, we extended the $70 credit to each individual school. However, given that we want divisions to have a pizza party at the end of the season, the $70 will be allotted for that purpose.

Division Coordinators should submit receipts by February 17th using this link:

Meet 5 Reimbursement Form

Continued next page

A message from the Executive Director, Tom Young, continued

5. **Announcing Po-Shen Loh as guest speaker at State Tournament**

Po-Shen Loh, the coach of the USA IMO team, will be our guest at the state tournament. He will be speaking at 10:45 about competitive mathematics and its benefits. All teams that qualify for the state tournament are expected to attend. *We also want to invite students and coaches, from schools that do not qualify for the tournament, to come to South St. Paul high school on March 13 to listen to Dr. Loh.*

I think students and coaches will be inspired by his talk. Po-Shen is staying the entire day with us. If you find time, say hello!

Here is a link highlighting his philosophy of mathematics teaching: Po-Shen Loh

9. **Request for volunteers to serve on committee to examine our practices and suggest changes.**

The continued success of the league is something I reflect on often. While most schools have a vibrant math team, there are some schools that struggle to fill a full team of eight. Here is a histogram of the size of the teams across the state
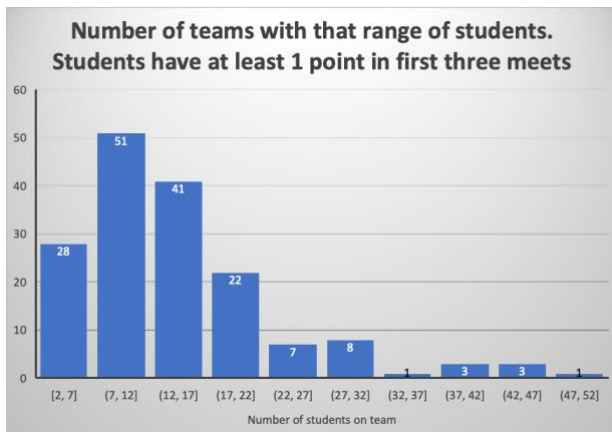
Notice there are 28 teams with fewer than eight students. As a coach, I remember how difficult it was sometimes to get new students involved. Perhaps it is time for a facelift in the league to make it more appealing to freshman and sophomores. **I am looking for volunteers to serve on a committee to examine our practices and suggest changes that will make the League more vibrant.**

One idea that I will pursue for next year is the creation of a Math League "Escape Room in a Box." My vision is that each team would receive a box (briefcase?) with an escape room theme to use as the coach sees fit. One thought is it could be used as a recruiting tool.

Send me ideas! Remember we want to create a culture of coolness!

1. **Meet 5 expectations**

   All teams in a division are expected to travel to a common site for Meet Five. Plaques for the first-place team in the division and framed certificates for the second-place team will be sent along with individual awards. Divisions should organize a recognition party. Divisions will be reimbursed $70 per team for the Meet Five party. Reimbursements for food and refreshments for the party should be requested by the division coordinator. Section winners will receive a plaque at the state tournament.

2. **State Tournament Video contest**

   See ad later in the newsletter

3. **State Tournament T-shirt Design contest**

   See ad later in the newsletter

4. **State Tournament schedule for the day and expectation for attendance**

   All schools that qualify for the state tournament are expected to arrive before 10:30. Students and coaches will be attending a talk by the coach of the USA IMO team, Po-Shen Loh. Also, teams will be guests for lunch. The rough schedule is as follows

         10 - 10:30 Invitational test
         10:45 - 11:25 Po-Shen Loh talk
         11:30 - 12:30 lunch
         12:45 - 2 Math Bowl
         2 - 5 Events A - D, Team event, and awards

   Events will be administered as they were last year. Students will take events A through D in the cafeteria. Each team will have their own homeroom.

5. **Announcing Po-Shen Loh as guest speaker at State Tournament**

   We are honored to have Po-Shen Loh as our guest speaker for the state tournament. He is an American professor of mathematics at Carnegie Mellon University and the national coach of the United States' International Math Olympiad team. Under his coaching, the team won the competition in 2015, 2016, 2018, and 2019—their first victories since 1994. He previously won a silver medal for the US as a participant in 1999. Po-Shen Loh runs a popular course to train students for the William Lowell Putnam Mathematical Competition known as Putnam Seminar and is the founder of the educational website Expii. *All are welcome to attend!!*

6. **Announcing Documentary of Math Bowl and Math League in general**

   We have contracted with a local videographer to make a short documentary about the Math League featuring the Math Bowl. We will be asking for some student interviews. Be aware that you may be on camera. If you haven't already, coaches should have students sign the Code of Conduct/Media Release form which includes an opt out for students who do not want to be photographed.

7. **Summer Math Institute Dates**

   See ad later in the newsletter

8. **Summer Coaches Conference**

   See ad later in the newsletter

9. **Request for volunteers to serve on committee to examine our practices and suggest changes.**

   Math league has been around for 43 years and has maintained a certain style of competition. Given the fact that some schools are having difficulty recruiting students, we want to explore possible changes to the league format. Volunteers will be asked to attend a summer retreat, brainstorm possible changes and help present those ideas to coaches at the Summer Coaches Conference

Summer Coaches Conference 2023
Topic: Giving Math League a Facelift
Dates: July 27 - 28

With the challenge of making Math Team more appealing to students, the topic of the conference will be how to give Math Team a facelift. Conversation items include: topic list, number of topics per meet, how a meet is run, getting more schools and students involved

Make plans to attend!!

Thursday night social is dinner and a ball game at the St. Paul Saints stadium!

2023 Summer Math Institute
June 25 – June 30 Residential Camp for $10^{th} – 12^{th}$ graders
June 25 – June 30 Residential Camp for $7^{th} – 9^{th}$ graders

The League plans to offer two one-week concurrent residential programs of the Summer Mathematics Institute in 2023. It's full speed ahead!!

The first is for students entering grades 7-9 in fall of 2023. **Instructors: Deb Fagan and Meg Bierwirth. Topic: TBD**

The second is for students entering grades 10-12 in fall of 2023. **Instructor: Dr. Ken Suman Topic: Geometry in the MSHSML**

MN State High School Math League

2023 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 High School Math League
State Tournament
March 13, 2023

- Email your design by **Feb. 9th** to: mathleague@augsburg.edu
- Accepted file format: pdf only
- Include your name, grade and school in the email submission.
- Winner will be notified by Feb. 17th via email.

Email mathleague@augsburg.edu with questions

MN State High School Math League Math Team Video Contest

1ˢᵗ place: $200 to school's math team
2ⁿᵈ place: $150 to school's math team
3ʳᵈ 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. Be Creative!!!!!!!!!!

Video Entry Submission:

Videos are due to the Math League Office (mathleague@augsburg.edu) by *March 1ˢᵗ, 2023*.

- **Videos contest entries must be sent and approved by the school math team coach.**
- **Winning schools will be notified by March 7, 2023.**
- **Winning video will be shown at the State Tournament on March 14, 2023, uploaded to the Math League Facebook page, and may be used for other promotional purposes.**

Questions? Email mathleague@augsburg.edu

The Roberts Award Scholarship

The Roberts Award Scholarship(s) were established in honor of the League founder, Dr. Wayne Roberts of Macalester College.

The Scholarship(s) are offered to help offset the costs for students interested in attending an out-of-state math opportunity. They are offered once each year. A set amount of funds will be available each year, and multiple awards are possible.

Deadline to apply for this season is April 30, 2023

Applications can be found on our web site at: http://mnmathleague.org/?page_id=1033

==

==

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 #35 Puzzler:
https://www.hitbullseye.com/puzzle/best-math-puzzles.php

Q.1. A number of 5 digits have the following properties:
The number comprising the leftmost two digits is divisible by 2, that comprising the leftmost three digits is divisible by 3, the leftmost four by 4, the leftmost five by 5, . Each digit in the number is different i.e. no digits are repeated. The digit 0 does not occur in the number i.e. it is comprised only of the digits 5-9 in some order. How many such numbers are possible and find their value/values?.

Solution: One of the coaches asked, "why didn't they allow the digits to be 1 through 9? Frankly I hadn't read the problem that closely but upon inspection, it appears the reason that the problem posers restricted it to numbers 5 through 9 was that there were only two answers then. If we do allow all digits 1 through 9, the answer is that there are 68 possible five-digit numbers with those properties.

To solve this problem, the coach mentioned above wrote out all the possibilities and came up with 67 five-digit numbers. It was a Herculean task and one that came oh so close to the correct answer.

Often, I use Eclipse to write a Java program when confronted with multiple answer problems such as this. On the next page you'll find rough hacker spaghetti code that accomplishes the task of finding all five-digit numbers with these properties.

```java
public class NumbersThatWork {

    public static void main(String[] args) {
        // TODO Auto-generated method stub


        int        leftMostOne  = 0;
        int        leftMostTwo  = 0;
        int  leftMostThree = 0;
        int  leftMostFour = 0;

        int ctr = 0;
        int num = 0;
        int numToSeparate =0;
        int separated1 = 0;
        int separated2 = 0;
        int separated3 = 0;
        int separated4 = 0;
        int separated5 = 0;


    for (int number1 =10005; number1 < 100000; number1 +=10){

        numToSeparate = number1;

        separated1 = numToSeparate%10;
        numToSeparate = numToSeparate/10;
        separated2 = numToSeparate%10;
        numToSeparate = numToSeparate/10;
        separated3 = numToSeparate%10;
        numToSeparate = numToSeparate/10;
        separated4 = numToSeparate%10;
        numToSeparate = numToSeparate/10;
        separated5 = numToSeparate%10;

        if ((separated1!=0)&&(separated2!=0)&&(separated3!=0)&&(separated4!=0)&&(separated5!=0)) {


            if
((separated1!=separated2)&&(separated1!=separated3)&&(separated1!=separated4)&&(separated1!=separated5)&&(separated2!=separated3)&&(separated2!=se
parated4)&&(separated2!=separated5)&&(separated3!=separated4)&&(separated3!=separated5)&&(separated4!=separated5)) {




                ctr = 0;

        leftMostOne = number1/10000;
        leftMostTwo = number1/1000;
```

```
        leftMostThree = number1/100;
        leftMostFour = number1/10;


        if (leftMostTwo%2==0) {ctr++;}
        if (leftMostThree%3==0) {ctr++;}
        if (leftMostFour%4==0) {ctr++;}

        if (ctr==3) {num++; System.out.println(num+" "+number1);}

      }
      }
      }
      System.out.println("Finished");

    }
}
```

Newsletter #36 Puzzler:

In the polynomial $x^4 - 18x^3 + kx^2 + 200x - 1984 = 0$ the product of two of its roots is -32. Find k.