A message from the Executive Director, Tom Young

Don't forget to extend the information about SMI to your students, and don't forget to attend the Summer Coaches Conference.

SMI: June 28 – July 3 at Augsburg

7 – 9 _Knots!_ taught by Annie Perkins and Megan Schmidt
10 – 12 _Number Theory in the Math League and AMC_ taught by Ken Suman

Coaches Conference: July 9 and 10 at Augsburg

40th Year State of the State: An examination of our rules and events

WE WANT YOUR OPINIONS ON MATH LEAGUE MATTERS!! COME TO THE SUMMER CONFERENCE

I encourage you to participate in both! I also encourage you to read the rest of the newsletter, paying special attention to: _**the hints about the state tournament**_ from Tom Kilkelly

Brainerd HS Pictures from Meet 5

Brainerd Students

Ready For Action!

Staples Motley Students

Coach Joel Lofstrom
Coach Marly Simmons

The expression **"determine exactly"** is often used in our problems to encourage simplifying and/or discourage numerical calculator solutions. You will find it used fourteen times on this year's tournament problems.

There are also other expressions stating what or how answers should be expressed that should draw your attention. **The following are all used in this year's tournament problems:** "compute the smallest," "express as a quotient of two relatively prime integers," "coordinates must be simplified," "standard form for a line: $Ax + By = C$, where A, B, C are relatively prime integers with $A \geq 0$," "how many," "determine the least possible," and "written as a decimal."

Graders moan every time a student solves the problem, but they must mark it wrong because a student didn't pay attention to the fine print. Help minimize the moaning in the grading room!

Some other terminology/concepts to be familiar with:

incenter, circumcenter, and orthocenter

Good luck to everyone at the state tournament!

2020 Summer Math Institute
June 28 – July 3, 2020 at Augsburg University

The League will offer two one-week programs of the Summer Mathematics Institute in 2020.
Both programs run the same week: June 28 – July 3, 2020.

One is for students entering grades 7-9 in fall of 2020. **The topic will be Knots! and it will be taught by Annie Perkins and Megan Schmidt.** The other is for students entering grades 10-12 in fall of 2020.   **The topic will be Number Theory in Math League and the AMC. It will be taught by Ken Suman.**

These mathematical topics are not typical taught in the regular high school curriculum. The 10-12 program is definitely aimed to prepare students for secondary mathematics competitions.

These are both one-week residential opportunities. Both programs are located at Augsburg University in Minneapolis. **Application deadline is April 15, 2020 or until the camp is full.** Returning students are eligible for a $25 discount. Cost is $600. Tuition includes room and board and a field trip experience. Check mnmathleague.org later in January 2020 for an application.

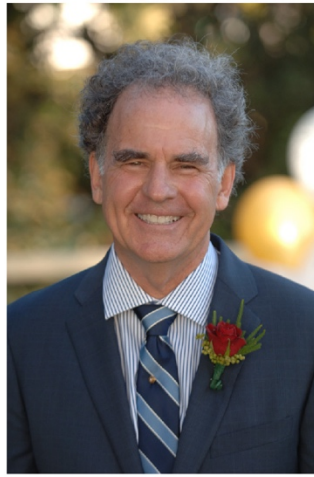Email mathleague@augsburg.edu with questions

Rochester Math Festival

March 15, 2020, Sunday, 9AM-5PM, @ Mayo Civic Center

Distinguished Speakers

Dr. Zachary Franco   Dr. Chris Wright   Dr. Pavlo Pylyavskyy

Rochester Area Math Competition (RAMC 2020)

4 Sections: Elementary I (K-2), Elememtary II (3-5),
Middle School (6-8), High School (9-12)
Individual round and team round
Awards to top students and top teams

Registration Open Now!

rochestermathclub.com

Math Lectures FREE!
RAMC $10 per student
Vendor slots available

Summer Coaches Conference 2020
Dates: July 9 and 10

### 40th Year State of the State: An examination of our rules and events

Many activities are being planned, including Hall of Fame Induction
and Alumni gathering. If you know of alumni who might be interested,
send us contact information. If you have nominees for the Hall of Fame,
send them to tyoung@district16.or

++
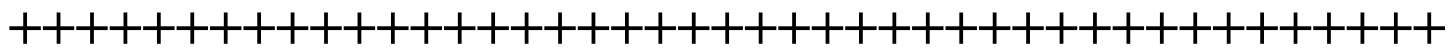
Retiring coaches
If you know of, or are, a retiring coach, send us a note. We'd like to honor you!
tyoung@district 16.org or mathleague@augsburg.edu

++
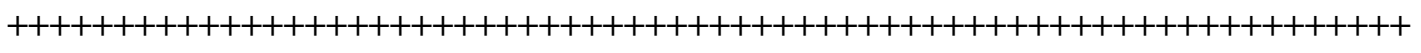
The Roberts Award Scholarship

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, 2020

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

Newsletter 18 Puzzle

You are equipped with two 2's, two 3's, and the ability to combine them using addition, subtraction, multiplication, division, and exponentiation. Your job is to create all of the integers from 0 to 36.

You may use any number of parentheses to control the order of operations and **when possible, all four of the numbers must be used to create a given integer.**

For example: $11 = 2\verb|^|3+3$,
however, 11 can be created using all four numbers and therefore, this solution would not be sufficient.

Solution to Newsletter 18 Puzzle

0 = 2 + 3 − 2 − 3	10 = 2*2 + 3 + 3	20 = 2*3*3 + 2	30 = 2*3*(2 + 3)
1 = (2 + 3) / (2 + 3)	11 = 2*3 + 2 + 3	21 = 3*(2^2 + 3)	31 = 2^2 + 3^3
2 = 2^3 − 2*3	12 = 2*3 + 2*3	22 = 2*(2 + 3*3)	32 = 2^(3 + 3) / 2
3 = 3^2 − 2*3	13 = 2*2 + 3*3	23 = 3^3 − 2^2	33 = (2*3)^2 − 3
4 = 2*2*3 / 3	14 = 3^2 + 2 + 3	24 = 2*2*(3 + 3)	34 = (3 + 3)^2 − 2
5 = 3*3 − 2*2	15 = 2*2*3 + 3	25 = 3*3^2 − 2	35 = 2^(2 + 3) + 3
6 = 3 + 3 + 2 − 2	16 = 2^3 + 2^3	26 = 3*2^3 + 2	36 = 2*2*3*3
7 = 2*3 − 2 + 3	17 = 2^3 + 3^2	27 = 3^3 + 2 − 2	
8 = 3^2 + 2 − 3	18 = 3^2 + 3^2	28 = (2 + 3)^2 + 3	
9 = 2*2*3 − 3	19 = 2*2^3 + 3	29 = 3*3^2 + 2	

Newsletter #19 Puzzler

Prove that $x^3 + y^3 = 3$ is unsolvable using integers for x and y