Ⓜ New York Math Circle Spring 2020

Executive Director Kovan Pillai

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Director's Report

Welcome to New York Math Circle's ninth newsletter! We have continued to offer MS and HS contest topic workshops this semester and have expanded our ES workshop offerings. Given the demand, we are hoping to start a full ES program in Fall 2020.

We would like to congratulate alumni Matthew Lerner-Brecher, Serina Hu, Merrick Cai, Milan Haiman, Steven Litvak-Winkler, and Calvin Aw for their strong showing in the December 2019 Putnam Exam; the Putnam Exam is widely regarded as the most difficult mathematics test in the world - can you solve any of these problems?

COVID 19 has created new challenges for us. We held our first online classes on the weekend of 4/4 and our instructors have risen to the challenge of providing a high-quality online program. Most instructors use the Zoom platform but a few use Google Meet, and we stay organized through Google Classroom.

We are restructuring both our Summer MSHS program and our Summer HS

program to accommodate the new online reality and have reduced the fees for these programs.

We greatly appreciate the patience of the NYMC community as we have needed some time to get up to speed.

Even with lowered fees, a number of our students are not able to afford our program - your donations can help subsidize their fees so they can continue to attend classes. All individual and corporate contributions are tax-deductible.

DONATE NOW

Summer MSHS 2020 registration is now open:

REGISTER NOW

Challenge Yourself!

MSA in how many ways can I order an ice cream sundae with ice cream, one topping, and sprinkles if the store offers vanilla, chocolate, or strawberry ice cream, hot fudge, caramel or raspberry toppings, and chocolate or rainbow sprinkles?

MSB If $2^x 3^y 5^z$ = 54000, find x+y+z.

MSC A *Pythagorean triple* is a set of three positive whole numbers (a, b, c) such that $c^2 = a^2 + b^2$. For instance, (6, 8, 10) and (5,12,13) are Pythagorean triples. Explain why abc must be a multiple of 60, if (a, b, c) is a Pythagorean triple.

HSA In rectangle ABCD, point P is in the interior of the rectangle. If AP =1, BP=2, and DP=3, find the length of CP. Express your answer in simplest radical form.

HSB In every square of a 9 x 9 board there is a bug. At a signal, each bug crawls into a horizontally or vertically adjacent square. Prove that now at least 1 square is empty.

HSB How many 10-digit numbers have all digits distinct and are divisible by 11,111?

HSB If 23! = 2*A*,85*B*,01*C*,73*D*,88*E*,97*F*,*G*40,000, find *G*.

HSC The pairwise distances between three parallel lines are 9, 12, and 21.

Find the area of an equilateral triangle with one vertex on each line. (Can you construct this triangle, given the lines?)
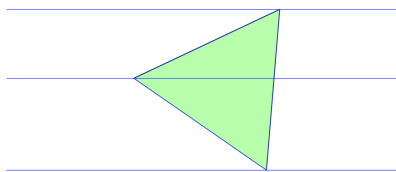
College Bridge The function f : R → R satisfies

x + f (x) = f (f (x))

for every x ∈ R. Find all the solutions of the equation f (f (x)) = 0.

Alumni Spotlight - Matthew Kendall

by Alison Mak, NYMC Program Manager

We're so excited to feature Matthew Kendall as our alumni spotlight for this newsletter.
Matthew not only demonstrates great academic achievement, but he is also a skilled musician. While studying math at Princeton, he also studies music and plays cello in Princeton's orchestra and in a cello chamber

ensemble.

Alison: How did you become interested in math?
Matthew: I can't pinpoint an exact time when I became interested in math, but I've always liked solving puzzles. When I was in sixth grade, I received "The Moscow Puzzles: 359 Mathematical Recreations" book as a gift from my math teacher. The book was filled with problems that were interesting to think about, such as those with arranging matchsticks.

Alison: How have you achieved your goals - different activities math camps and contests?
Matthew: In ninth grade, I joined NYMC, the New York City Math Team, and other math groups. Through these programs, I found people who were just as enthusiastic about math as I was. I spent many Friday school nights thinking about math problems with these friends, and I definitely grew from these experiences. I also went to the AwesomeMath and MathILy summer programs as a highschooler.

Alison: How has NYMC influenced you?
Matthew: I grew as a problem-solver and made many friends from NYMC: it is rare to find so many people, both teachers, and students, who are interested in math. I had just as much fun when I came back as a TA during the last two summers.

Alison: Could you please share with us what you're studying in college? Goals?
Matthew: I am planning on majoring in math at Princeton, and I am thinking of pursuing math into academia.

Alison: Could you provide younger students with some advice?
Matthew: Don't let contest scores deter your love of math! Matthew loves math as it is "something interesting to think about." He feels highly rewarded when he is able to make

progress on a problem that's been on his mind.

We wish Matthew the best at Princeton! You're an inspiration to all of us!

Where are they now?

Merrick Cai, NYMC student in 2017 is at MIT.

Dora Woodruff, NYMC student from 2016-2020, will major in Mathematics at Harvard.

Milan Haiman, NYMC student from 2012-2017 will major in Mathematics at MIT.

Daniel Acosta, NYMC student from 2018-2019 will major in Mathematics at MIT.

Catherine Ye, NYMC student from 2013-2017 will major in Applied Mathematics at Harvard

Raphie Rosen, NYMC student in 2018 will major in Mathematics at the University of Chicago.

Ron Nissim, NYMC student from 2016-2018 is currently majoring in Mathematics at NYU.

Matthew Kendall, NYMC student from 2015-2017 will major in Mathematics at Princeton.

Max Kaliner, NYMC student from 2016-2018 will major in Mathematics at Columbia University.

Abraham Derival, NYMC student from 2016-2018 is currently attending CUNY.

Tatyana Lazareva, NYMC student in 2017 is currently majoring in Business Administration at Northeastern University.

Maya Khesin, NYMC student from 2017-2020 will major in Physics or Computer Science at Carleton University.

Jayson Vu, NYMC student in 2019, will major in Applied Mathematics at Rochester Institute of Technology.

Nancy Xu, NYMC student from 2019-2020, will major in mathematics at Princeton.

Daniel Borovskiy, NYMC student in 2018, will major in mathematics and/or economics at Columbia University.

Joy Aun, NYMC student from 2010-2015 is currently majoring in Mechanical Engineering at the University of Michigan.

Kadhir Pillai, NYMC student in 2015 will major in Artificial Intelligence at

Carnegie Mellon University.

Daniel Brous, NYMC student from 2017-2019 will major in Mathematics at the University of Chicago.

Where are **YOU** now? Please contact us at info@nymathcircle.org - we'd love to hear from you!

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