



KYMAA Newsletter

Winter 2022

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KYMAA Calendar

- Mar 04 Distinguished Teaching Award Nominations Due
Mar 18 Abstract Submissions Due
Mar 18 Nominations for Officer Positions Requested
Apr 01 KYMAA Conference

Regional Conferences

- Feb 25 [WKU](#) Symposium
Feb 25 [KYMATYC](#) in City
Mar 06 [KCM](#) virtual
Mar 10 [MAA-SE](#) in Mt. Berry, GA
Mar 25 [IL MAA](#) in Decatur, IL
Apr 01 [Allegheny MAA](#) in Fairmont, WV
Apr 07 [MO MAA](#) in Kansas City, MO
Apr 08 [IN MAA](#) in Marion, IN
Apr 25 [OH MAA](#) in Cincinnati, OH
Nov 11 [KAS](#) in Morehead, KY

National Conferences

- Apr 06 [JMM](#) (virtual)
Jun 03 [Mastery Grading](#) (virtual)
Jun 16 [AWM](#) in Minneapolis, MN
Jul 11 [SIAM](#) Annual in Pittsburgh, PA
Aug 03 [MAA Mathfest](#) in Philadelphia, PA
Aug 06 [ASA JSM](#) in Washington, DC
Sep 28 [NCTM](#) (virtual)
Oct 27 [SACNAS](#) (virtual)
Nov 17 [AMATYC](#) in Toronto

Maths Competitions

- Feb 17 [COMAP](#) MCM/ICM

MAA's Promise to You

(from MAA's Math Values Blog at mathvalues.org)

At the heart of the Mathematical Association of America (MAA) are two things: mathematics and people. Our [mission, vision, and values](#) reflect those two priorities. Mathematics is created by humans (or discovered, if you prefer a Neoplatonist conception of the world). It is created for humans as well. And as has been discussed in this and many other forums, the fruits of mathematics have served some of us better than others.



The fact of the matter is that the world around us is inequitable in its design. Many students from underserved groups are left behind by our current educational systems, only to find an even more inhospitable society waiting for them. While these systems have become normalized over centuries, silence from our mathematical community is nothing short of complicity in injustice. We cannot ignore those who suffer from our unfair systems as nameless faces, for they are our colleagues and our friends.

We at MAA reaffirm our commitment to working toward systemic change and justice. Every day, we commit ourselves to creating a more equitable and accessible mathematics community, but we have much to learn and a long way to go. We deeply value and appreciate members of our community who have taken the time and effort to share their stories and help us shape MAA into a community we can all be proud of. We also value the leadership shown by our partner organizations.

The work to become a community of mathematicians will never be done, but we are committed to this ongoing journey with you. Acknowledging that the world around us is inequitable and unjust, even when it is difficult or uncomfortable, is a foundational first step to doing this work.

I acknowledge that there are many different conceptions of what a just world would be. These differences reflect the varied experiences we've had, and the differing values we hold as a result. Our journey requires that we listen to understand the experiences of others; that we accept the legitimacy of views that we may find challenging; that we accept that our own views of the world were and continue to be shaped through our interactions with an unjust world; and that we stand willing to give up what may be long-standing beliefs about economic, political, and social structures. And perhaps most importantly for us, to recognize that our profession will change over time, just as it has in the past, but that we have the ability to influence that evolution in ways that improve the outcomes for all.

In that spirit, I hope that you'll look to continue to hear about mathematics, and mathematical experiences, from across our community. Together, we can build a better, and more inclusive, future for our discipline.

Michael Pearson
MAA Executive Director

KYMAA Call for Nominations

Distinguished Teaching Award

Nominations for the KYMAA Distinguished Teaching Award are due **March 4, 2022**. Nominating a colleague consists of emailing a single letter of recommendation and biographical form to the [KYMAA Secretary](#). More detailed information is available at the [KYMAA website](#).

KYMAA Officers

At the Annual Meeting, KYMAA will be electing officers to 3-year terms for the positions of

Vice-Chair and Newsletter Editor.

Additionally, KYMAA will be electing an officer to complete the remaining 1-year term for the position of

Treasurer

After the Annual Meeting, the KYMAA Executive Committee will appoint an officer to a 3-year term in the position of

Webmaster and Historian

and would welcome volunteers and nominations.

Duties for each position are described in the [KYMAA Bylaws](#). Officers must be members of the MAA Kentucky Section, and can volunteer or be nominated in advance of the spring meeting via email by sending name, contact information, and a short biographical sketch to the nominating committee by mid-March.

Annual Conference Overview

This year's annual conference will be held **virtually** on **April 1-2**.

Abstract Submission: **March 18**

A full schedule will be posted at [KYMAA Meetings Webpage](#); talks typically begin around 3pm on Friday afternoon.

We are excited to welcome this year's invited speakers. They are:



Carrie Diaz Eaton, *Unity College*

Revising our model - again

Bio: Dr. Carrie Diaz Eaton is an Associate Professor of Digital and Computational Studies at Bates College. Dr. Diaz Eaton currently serves as the Chair for the Committee for Minority Participation in Mathematics for the MAA, and most recently was awarded 2020 was awarded the SMB John Jungck Excellence in Education Prize. She is also co-founder and former co-Director of QUBES, and co-founder and current PI of the Institute for a Racially

Just, Open, and Inclusive STEM Education. Dr. Diaz Eaton is also a proud 1st generation Latinx and is also a mother. Dr. Diaz Eaton values the complex interplay at the intersection of her identities, professional activism in STEM education, and her research.

Aparna Higgins, *University of Dayton*

Adding digits of a number (and repeating)

Bio: Aparna Higgins has taught mathematics at the University of Dayton since 1984. She enjoys working with undergraduates on research in mathematics. Aparna was honored with the MAA's Haimo Award for Distinguished College or University Teaching in 2005. Aparna has served the MAA in many capacities, including as director of Project NExt.



Bethany Noblitt, *Northern Kentucky University*

A reflection on teachers and teaching

Bio: Dr. Bethany Noblitt is a full professor in the Department of Mathematics and Statistics at NKU. She started at NKU in 1999 and while teaching in a temporary position she pursued and obtained a PhD in mathematics education at the University of Cincinnati. She enjoys learning with pre-service mathematics teachers and thinking about ways to connect college mathematics to K-12 mathematics for teachers and their students.

Mathematics for a Better World: Unexpected Directions

Want to help keep the celebration of mathematics going?
Share your thoughts on how mathematics contributes toward a better world!
Send your ideas or a write-up to the [Newsletter Editor](#).

$1 + 1 = 2$. Discuss with the people near you.

No immediate clarification or specific responses to questions. Just: discuss with the people near you.

For context, the above directions are my favorite way to get “syllabus day” started. It has been too long for me to remember who told me about or where I found this, but it immediately became my favorite day one discussion topic; my sincere apologies to whoever is not receiving the credit I would very much like to give them.

The points of conversation have expanded from the original three suggested and now include:

1. the value of starting with “obvious” things when faced with an unclear or challenging task,
2. recognition of how something that looks so simple now used to look very difficult, which is accompanied by a reminder that everyone learns at different paces and that taking more time to process new ideas does not make you dumb,
3. how the Arabic numerals we use reflect the multicultural development and advancement of mathematics,
4. how the numbers and symbols on the page are used to represent ideas and the consistency within this system exhibits some of the power and beauty of mathematics,
5. that symbols can have multiple meanings depending on the context, like the equal sign that can represent a statement of equality, instructions (e.g. $1 + 1 =$), or a question (e.g. $1 + x = 2$), and
6. how the context can change the validity of claims, like how $1 + 1 = 3$ when two people each have enough vertical fence posts for one section of horizontal fencing but together have enough for three sections.^a

What amazes me most about this discussion is how students at all undergraduate levels have been both receptive to the conversations stemming from these and also excited to engage with and think about mathematics differently than they did in grade school.^b I like to believe that facilitating positive experiences through giving students unexpected directions has the potential (however small) to help heal students’ traumas with mathematics and potentially prevent them from passing it on to their children; that sounds like a better world to me. Below is a short list of some examples of unexpected directions I know students have enjoyed; I’d love to expand the list if you have any to add. [Email Me](#)

- Construct a Hasse diagram for privilege based on people’s relative wealth (wealthy vs poor), race (white vs POC), and gender (male vs female).^c
- Using this database of photos, determine your Celebrity Look-A-Like.^d
- Fold this piece of paper so that you can use a single, straight-line cut to cut out the shape printed on it.^e
- We’re going to spend this semester using maths to figure out how to solve a Rubik’s cube.^f
- Nine playing cards, specifically A-9 of one suite, are face up on a table. Two players alternate turns picking up a card with the goal of being the first to hold a hand containing a subset of three cards whose sum is 15. Prove that this game is tic-tac-toe in disguise.^g

As mathematical literacy retains its value in our complex world, I hope that engaging with students in the mathematics of current topics (potentially facilitated by unexpected directions) contributes to mathematically-informed decisions toward a better world.

Axel Brandt
Northern Kentucky University

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^afrom “Failing on Its Own Terms” by Brian Katz, [AMS Inclusion/Exclusion Blog](#) (a thought-provoking read that I have revisited multiple times)

^bWhen I teach courses in the calculus sequence I often think a lot about the [MAA/NCTM Joint Position Statement](#) that “the college curriculum should offer students an experience that is new and engaging, broadening their understanding of the world of mathematics” and wonder about how well the typical starting college with three semesters of a calculation-focused treatment of calculus aligns.

^c[The Art of Logic in an Illogical World](#) by Eugenia Cheng

^d[Math Bytes](#) by Tim Chartier

^e[Erik Demaine’s MIT website](#)

^f[Games & Puzzles](#) book in the [Discovering the Art of Mathematics](#) series

^g[Teaching Mathematics Through Games](#) by Mindy Capaldi at AMS Bookstore

Student Challenge Corner

2022.1: The unit square is partitioned into finitely many smaller squares, not necessarily of the same size. Consider the smaller squares that “intersect” the unit square’s main diagonal (possibly at a corner). Is it possible for the sum of their perimeters to exceed 2022? (Prove it!)

Students: Think you’ve figured it out? Write up your answer and email it to the [Newsletter Editor](#) Submissions received on or before **April 10** will be recognized alongside one correct submission selected to be published in the next newsletter.

Faculty: Have a challenge to contribute or willing to help review submissions? Email the [Newsletter Editor](#) to be included!

Previous Challenge

2021.3: Let $\sigma(x)$ be the function that sums the digits of a positive integer x ; e.g. $\sigma(524) = 5 + 2 + 4 = 11$. Consider N where $N = x + \sigma(x) + \sigma(\sigma(x))$. Prove that N is a multiple of an integer k with $k > 1$.

Answer. We leverage the fact that a (base 10) number and the sum of its digits are congruent modulo 3, that is $x \equiv \sigma(x) \pmod{3}$. To show this, let a be an n -digit number, say

$$a = \sum_{k=0}^n a_k \cdot 10^k, \text{ where } a_k \in \{0, 1, 2, \dots, 9\} \text{ for all } k.$$

This gives us

$$a = \sum_{k=0}^n a_k \cdot 10^k = \sum_{k=0}^n a_k (10^k - 1 + 1) = \sum_{k=0}^n a_k (10^k - 1) + \sum_{k=0}^n a_k = \sum_{k=0}^n a_k \underbrace{99 \dots 9}_{k \text{ times}} + \sum_{k=0}^n a_k = 3 \sum_{k=0}^n a_k \underbrace{33 \dots 3}_{k \text{ times}} + \sum_{k=0}^n a_k.$$

Thus $a - \sum_{k=0}^n a_k = 3m$ for some $m \in \mathbb{Z}$. By the definition of congruence modulo 3, a and the sum of its digits are congruent modulo 3, as desired.

Then we have

$$N \equiv x + \sigma(x) + \sigma(\sigma(x)) \equiv x + x + \sigma(x) \equiv 3x \equiv 0 \pmod{3}.$$

Therefore, N is a multiple of 3. □

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The mission of the Mathematical Association of America is to advance the mathematical sciences by:

- supporting effective mathematical education at all levels,
- supporting research and scholarship,
- providing professional development,
- influencing public policy, and
- promoting public appreciation and understanding of mathematics.



The Kentucky Section of the Mathematical Association of America is devoted to promoting and encouraging the study, the teaching, and the learning of mathematics in the state of Kentucky.

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Links of Potential Interest

maa.org

sections.maa.org/kentucky

mathcareers.maa.org

mathprograms.org