



KYMAA Newsletter

Spring 2021

In This Issue...

- [Chair Report](#)
- [Student Challenge Corner](#)
- [Annual Conference Recap](#)
- [Chapter Updates](#)

KYMAA Calendar

Apr 01 [KYMAA](#) Conference

Regional Conferences

Sep 24 [Miami \(OH\)](#)
Conference

Sep 25 [IN MAA](#) in Notre Dame

Apr 01 [KY MAA](#) at UofL

Apr 01 [Allegheny MAA](#) in
Fairmont, WV

National Conferences

Jun 11 [Mastery Grading](#)
(virtual)

Jul 19 [SIAM](#) Annual (virtual)

Aug 04 [MAA](#) Mathfest (virtual)

Aug 07 [ASA](#) JSM (virtual)

Sep 22 [NCTM](#) in Atlanta

Oct 28 [SACNAS](#) (virtual)

Oct 28 [AMATYC](#) in Phoenix

Jan 05 [AMS](#) JMM in Seattle

Have mathematical events you'd like included in the calendar? Email the [Newsletter Editor](#).

From the KYMAA Chair

Greetings to all in the Kentucky section! We made it through an interesting and challenging academic year. I hope you have been able to thrive and learn new things in the face of so much change.



Although we were not able to meet in person at our spring meeting, at least we were able to meet online and hopefully catch up a little. Thanks to those of you who were able to participate and make the meeting a success. Special thanks go to our outgoing officers, Kathy Lewis, Joel Kilty, Atilla Sit, and Cheryll Crowe Johnson. Their leadership was vital in putting together the section's first ever virtual conference.

Next spring we hope to meet in person on the campus of the University of Louisville. You can help with our 2022 plans. Expect to see a survey this summer about what you would like in that meeting. Please take the time to fill out the survey when it comes your way.

I hope you are able to rest some and recharge your batteries this summer after a difficult year. Don't forget that MathFest is virtual again this summer. Although in-person meetings are always more fun and engaging, the cost of a virtual meeting is considerably less. Let's have a good representation from our section at this year's MathFest. I hope to see you there!

Steve Wilkinson, KYMAA Chair
Northern Kentucky University

Student Challenge Corner

2021.2: For every pair of numbers x and y , the operation \otimes assigns a number $x \otimes y$ in such a way that

$$x \otimes x = 0, \text{ and } x \otimes (y \otimes z) = (x \otimes y) + z \text{ for any } x, y, z.$$

Determine $2021 \otimes 1979$ (with proof!).

Students: Think you've figured it out? Write up your answer and email it to the [Newsletter Editor](#). Submissions can be typed or even hand-written (we'll take care of the \LaTeX formatting). Submissions received on or before **September 3, 2021** will be recognized. One correct submission may be selected to appear in the next newsletter.

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

Previous Challenge

2021.1: How many integer solutions does $x^2 + y^2 + z^2 = x^3 + y^3 + z^3$ have? (Prove it!)

Answer from MK Kasturiratna at NKU (edited for length).

Answer. There are infinitely many integer solutions, some of which we find here. As x, y, z are independent of each other, to simplify the equation, we can write one variable in terms of another. Let $y = -x$. Then

$$x^2 + y^2 + z^2 = x^2 + (-x)^2 + z^2 = x^2 + x^2 + z^2 = 2x^2 + z^2$$

and

$$x^3 + y^3 + z^3 = x^3 + (-x)^3 + z^3 = z^3.$$

So $2x^2 + z^2 = z^3$. We can rewrite this as

$$2x^2 = z^3 - z^2 = z^2(z - 1)$$

$$x^2 = \frac{(z - 1)}{2} z^2.$$

As z is independent, and can be any value, in order to make this equation easy to work with, we can set $\frac{(z-1)}{2} = a^2$ where a is some integer. Thus $x^2 = a^2 z^2$ and taking the square root gives $x = az$.

We can also re-write the equation $\frac{(z-1)}{2} = a^2$ to get $z = 2a^2 + 1$. If we substitute the above equation into $x = az$ we get $x = a(2a^2 + 1)$. As $y = -x$, we can get $y = -a(2a^2 + 1)$. As a can be any integer, $x^2 + y^2 + z^2 = x^3 + y^3 + z^3$ has infinitely many integer solutions of the form

$$x = a(2a^2 + 1), \quad y = -a(2a^2 + 1), \quad \text{and } z = 2a^2 + 1.$$

To verify, we substitute the above into $x^2 + y^2 + z^2 = x^3 + y^3 + z^3$ to get

$$x^2 + y^2 + z^2 = (a(2a^2 + 1))^2 + (-a(2a^2 + 1))^2 + (2a^2 + 1)^2 = 1 + 6a^2 + 12a^4 + 8a^6$$

and

$$x^3 + y^3 + z^3 = (a(2a^2 + 1))^3 + (-a(2a^2 + 1))^3 + (2a^2 + 1)^3 = 1 + 6a^2 + 12a^4 + 8a^6,$$

which are the same, as desired. □

Annual KYMAA Conference Recap

First, a big thank you to outgoing officers for their time, energy, and flexibility in keeping things going during the past year and planning a virtual conference. Special thanks to Joel and Atilla for volunteering an extra year in officer positions after the pandemic canceled last year's meetings and elections.



Kathy Lewis
Morehead State
Fmr. Chair



Joel Kilty
Centre College
Fmr. Secretary



Atilla Sit
Eastern Kentucky
Fmr. Treasurer



Cheryll Crowe Johnson
Asbury University
Fmr. AMC Coordinator

There were 23 contributed talks this year, 13 of which were from students. During the business meeting, [new officers](#) were elected to positions of Chair-Elect, Treasurer, Secretary, Student Chapters Coordinator, and Newsletter Editor. Congratulations to this year's KYMAA Distinguished Teaching Award recipient.



Bethany Noblitt
Northern Kentucky University

Thank you also to this year's nominations and Teaching Award selection committee members.

Nominations

Doug Chatam (Morehead State)
Elizabeth Donovan (Murray State)
Robert Reihmann (Thomas More)
Tom Richmand (Western Kentucky)
John Wilson (Centre)

Teaching Award

Jeffrey Heath (Centre)
Claus Ernst (Western Kentucky)
Will Harris (Georgetown)
Cheryll Crowe Johnson (Asbury)
Jen Miller (Bellarmine)

Save the Date: Next year's conference will be held **April 1-2, 2022** at the **University of Louisville**.

Chapter Updates

What's new at your institution? Email the [newsletter editor](#) and we'll share what's happening!

Alice Lloyd College

-

Asbury College

-

Ashland Community & Technical College

-

Bellarmino University

-

Berea College

-

Big Sandy Community & Technical College

-

Bluegrass Community & Technical College

-

Brescia University

-

Campbellsville University

-

Centre College

-

Eastern Kentucky University

-

Elizabethtown Community College

-

Georgetown College

-

Hazard Community & Technical College

-

Henderson Community College

-

Hopkinsville Community College

-

Jefferson Community College

-

Kentucky Christian University

-

Kentucky State University

-

Kentucky Wesleyan College

-

Lindsey Wilson College

-

Madisonville Community College

-

Midway College

-

Morehead State University

-

Murray State University

-

Northern Kentucky University

-

Owensboro Community & Technical College

-

Saint Catherine College

-

Somerset Community College

-

Spalding University

-

Thomas More University

-

Transylvania University

-

Union College

-

University of Kentucky

-

University of Louisville

-

University of the Cumberlands

-

Western Kentucky University

-

West Kentucky Community & Technical College

-

[Back to Contents](#)



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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[Back to Contents](#)

Links of Potential Interest

maa.org

sections.maa.org/kentucky

mathcareers.maa.org

mathprograms.org