Message from the NMMATYC President

Greetings NMMATYC members,

I hope everyone is having a wonderful fall semester. We let go of summer and embrace the changes as autumn arrives, albeit reluctantly in my hometown of El Paso which is finally experiencing pleasant days and cooler nights. One of my goals as NMMATYC president was to give our website a make-over. If you haven't visited our website recently, please do so. I hope you will approve of the changes, and any suggestions you have for its improvement are most welcome. This summer was dedicated to re-vitalizing our website. I am so very grateful to our newsletter editor, Jeremy Ramirez, for his patience, dedication, time, and for going beyond the call of duty and being a major force in updating the website. Meanwhile, NMMATYC's webmaster Philip Kaatz worked with our treasurer and 2020 conference co-chair, Adrian Delgado, in setting up our 2020 conference website which is up and running on our website waiting for folks to register! I'd like to thank NMMATYC member, Ruth Ann Ordaz for the photo of Silver City's beautiful mountain range which now graces our webpage. Ruth Ann, an excellent photographer, took the shot at our last conference.

To preserve and honor NMMATYC's history, I asked Jeremy to add several links and with the help of Dr. Joanne Peeples and Adrian Delgado, I culled and organized conference photos, minutes and agendas, conference programs, newsletters, and in the name of transparency, financial reports which are all saved in the link titled "Archives." Student and faculty awards are in the process of being updated, and a photo gallery has been added. Another of my goals as president is to honor those who serve NMMATYC with unparalleled dedication. It was my pleasure to honor several of our founding members at the 2019 conference in Silver City, as well as Dr. Joanne Peeples. In this spirit, a "Tribute" link was included which honors Vicki Froehlich, David Lovelock and Michelle Jimenez, whose family graciously contributed the article and accompanying photo. Michelle's parents were also honored at our 2019 conference.

Adrian Delgado and I are co-chairs of the 2020 conference to be held in El Paso, Texas on April 3rd and 4th. I was overjoyed to secure Ken Ono as our speaker. I have always been intrigued by the work and life of the great Indian mathematician Srinivasa Ramanujan, and this interest led me two summers ago to read Ken Ono's book, *My Search for Ramanujan: How I Learned to Count.* The book weaves the lives of Dr. Ono and Ramanujan and details the journey which led Dr. Ono to research and collaborate with others to unravel some of the unsolved mysteries of Ramanujan's mathematical legacy. I have paved the way for my co-chair and NMMATYC treasurer, Adrian Delgado, to provide you with more information on the 2020 NMMATYC Conference. The conference website is up and running at http://www.nm.matyc.org/. Please join NMMATYC and register and be part of a tribute to two phenomenal mathematicians, Dr. Ken Ono and Srinivasa Ramanujan.

The 45th AMATYC conference will be held on November 14 – 17 in Milwaukee Wisconsin. The keynote speakers are Francis Su, mathematics professor and author from Harvey Mudd College whose topic is Mathematics for Human Flourishing and James Tanton, mathematician, math educator, and author who will discuss A Dozen Proofs that 1 Equals 2: A Misguided Review of Mathematics. John Urschel, mathematician and retired professional football player for the NFL (any Ravens fans reading this?) will relate his journey from the NFL to MIT and a Ph.D.! In addition to mathematics at the conference, experience a taste of Milwaukee's culture and enjoy polka lessons! I hope to see you there!

Stay safe and enjoy the rest of the semester and the coming holidays!

Pat Barrientos
NMMATYC President

Photos and Programs from Past Conferences

If anyone has photos any photos or programs from any of the past NMMATYC conferences. Please share them with us! We would like to archive them on the website! Please e-mail anything you would like to share to pbarrien@epcc.edu and let us know what conference it is from!

NMMATYC Executive Board Nominations

Interested in serving on the NMMATYC Executive Board? We are accepting nominations for the positions of president-elect, treasurer, and secretary. Submit a short bio and picture to nominating@nmmatyc.com

**The deadline to apply is Friday, March, 6, 2020**

2020 NMMATYC Annual Conference

April 3-4th El Paso, TX
El Paso Community College, ASC – B
https://sites.google.com/site/nmmatyc2020/

The New Mexico Mathematical Association for Two-Year Colleges (NMMATYC) will hold the 31st annual conference on April 3-4 in El Paso, TX at El Paso Community College in the Administrative Services Building ASC – B.
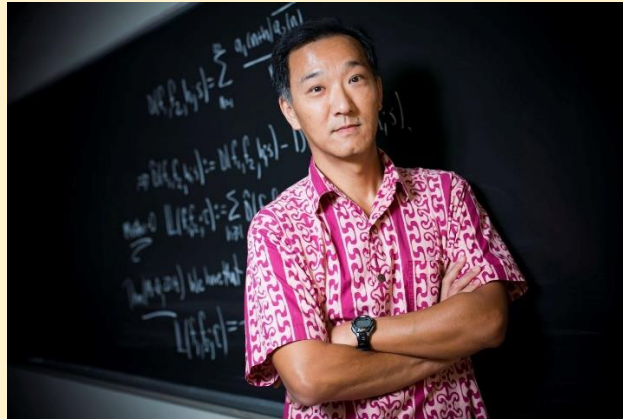
Keynote Speaker: Ken Ono is the Thomas Jefferson Professor of Mathematics at the University of Virginia, and the Asa Griggs Candler Professor of Mathematics at Emory University. He is the Vice President of the American Mathematical Society. He is a voting member of the International Mathematical Union, and the longest standing member of the US National Committee for Mathematics at the US National Academy of Sciences. He was also an Associated Producer of the film "The Man Who Knew Infinity." He is considered an expert in the theory of modular forms. His contributions include several monographs and more than 180 research and popular articles in number theory, combinatorics and algebra. He earned his Ph.D. from UCLA in 1993 and has received many awards for his research in number theory, including a Guggenheim Fellowship, a Packard Fellowship and a Sloan Research Fellowship. He was awarded a Presidential Early Career Award for Science and Engineering (PECASE) by Bill Clinton in 2000 and was named a Distinguished Teaching Scholar by the National Science Foundation in 2005.

Articulation Meeting: The New Mexico Articulation Task Force for Mathematics and Statistics will meet concurrently with the NMMATYC conference, as usual. The articulation meeting will be on Friday April 3, 2020 from 1-3 PM, approximately. The meeting place is to be announced.

Student and Faculty Awards: Please don't forget to nominate students and faculty for our awards and scholarships. Forms are available on both the official NMMATYC website and the conference webpage.

The **deadline for early registration** is **Friday March 20, 2020**. The deadline to submit a presentation is also on Friday March 20th. For details please see the conference website **https://sites.google.com/site/nmmatyc2020/** .

If you have any questions, feel free to contact this year's conference co-chairs;

Patricia Barrientos or Adrian Delgado at conference@nmmatyc.com.

NMMATYC Scholarships and Faculty Awards

If you know of a student that has completed a **minimum of 12 credit hours** (6 hours must be from a New Mexico or El Paso 2-year college), maintained an **overall GPA of 3.2 and a cumulative GPA of 3.5 in all MATH courses**, please refer them to the **NMMATYC website** at http://www.nm.matyc.org/ and look under *Student and Faculty Awards*

Two Memorial Scholarships are offered:
"Vicki Froehlich" and *"Michelle Jimenez"*
Each scholarship is in the amount of $500
The deadline to apply is March 6th, 2020.

We also offer two **faculty awards**:
"David Lovelock Teaching Award"
"NMMATYC Professional Developmental Travel Award"

Further information can be found at http://www.nm.matyc.org/
and look under *Student and Faculty Awards*
The deadline to apply is March 6th, 2020.

For additional information please contact Sara Hanson: nominating@nmmatyc.com

An Introduction to Logarithms

by Dr. Joanne Peeples
El Paso Community College – Transmountain Campus

The following is an assignment that introduces logarithms. This is given to students in the lab associated with precalculus classes. Rather than focus on how to use logarithms, this assignment focuses on the history of logarithms and the purpose that they serve.

"In your math class you have been studying logarithms and memorizing all the rules for logarithms. Did you ever wonder where they originated, and why?

Around the turn of the seventeenth century, John Napier realized there was a need to be able to transform multiplication into addition and subtraction. Astronomers were working with large numbers, and needed to multiply, divide, and raise to a power with extreme accuracy. This was BC (Before Calculators), so they had to do all their calculations by hand.

Napier's logarithmic tables were first published in his first set of tables in 1614 in his book Description of the Wonderful Canon of Logarithms. This book had an introduction, and instructions on how to use the tables. Rather than look at how these tables were constructed, let's explore how they were used. To do this, the exercises below will use logarithms base e or base 10 (Napier's tables were base (1/e)) and your "table" will be your calculator.

1) Multiply: 631 times 724

a) $\ln 631 =$ _____   *and* $\ln 724 =$ _____

   add these two numbers together _____

   now "unlog" this sum (i.e. e^{sum}) _____

Is this the same answer you get if you multiply 631 and 724? _____

Try the multiplication of 631 and 724 without a calculator (below), how fast were you able to do it?

b) $\log 631 =$ _____   *and* $\log 724 =$ _____

   add these two numbers together _____

   now "unlog" this sum (i.e. 10^{sum}) _____

Is this the same answer you get if you multiply 631 and 724 using "natural logarithms? _____

Is this the same answer you get if you multiply 631 and 724 without a calculator? _____

2. Consider the problem $\dfrac{725^4 \times 342}{\sqrt[3]{147}}$

a) Using the logarithm tables you find on your calculator find:

ln (725) = _____ *(i)*

ln (342) = _____ *(ii)*

ln (147) = _____ *(iii)*

and multiply your answer (i) by 4, add this to your answer (ii) and subtract one-third of answer (iii).

_____ = _____ *(iv)*

"unlog" your answer (iv) (i.e. $e^{(iv)}$) .   What is your answer? _____ *(v)*

Work the problem on your calculator, does your answer match your answer in (v)?

Could <u>you</u> work this problem BC? _____

With the invention of logarithms, the Scientific Age received a big boost! It was almost a hundred years later that mathematicians started thinking of logarithms and exponentials as functions (which is how they are taught in textbooks, today). The logarithms were just the tables, and the user would reading them "forward" and "backward" ("unlogging" them). In 1614, there was no precalculus or calculus, but logarithms paved the way to improve accuracy when calculating."

Factoring Issues

by Alberto Isassi
El Paso Community College – Transmountain Campus

I am currently a first-year tenure track math instructor at the El Paso Community College. Throughout my 15 years as a math tutor and instructor, I have noticed many students who attend college have a hard time with mathematics. It is apparent that students struggle with operations of real numbers, basic algebra, and factoring polynomials. I have taught courses from developmental math to Calculus and I was very surprised that some students majoring in engineering and mathematics do not have a solid foundation in factoring polynomials with two, three, and four terms. Factoring is an important topic in mathematics; it is needed in courses from college algebra to calculus courses and even to higher mathematics such as Differential Equations and Linear Algebra. Factoring is used in finding the zeros of a polynomial function, solving trigonometric functions, limits, relative extrema, possible inflection points, area between two curves, eigenvalues etc.

I have modified the concept of factoring to tailor any type of student. I modified the steps (Factoring Steps handout) in which I give to all my students regardless of the math they are enrolled in. As an instructor, I tell my students to form study groups and help each other. I go as far as challenging them in coming up with easier methods to explain the material to each other. In certain occasions, it takes a student's approach of explaining math concepts for other students to comprehend. I know from experience; I used to lead study groups throughout my undergraduate and graduate studies. The students who I assisted would mention that I had a way of breaking the material down for them to understand, even easier than the instructor. My modified method of factoring is perfected and updated from students input. I inform my students that if they can come up with a better way to explain the material to other students to let me know what they did and how they accomplished it. My modified method of factoring was further modified by two students. I know it works; I have been helping students pass their math classes, TSI exam for the medical field and presented TSI Bootcamps to high school students and students enrolling into El Paso Community College. The TSI exam consists of various topics, but mainly topics related to factoring. I frequently get complements from students for my method of factoring. The complement that I often get is "I did not know how to factor until now". The students' facial expressions tell me all I need to know. This method works!

My method is same as the textbook but modified with key observations for students to seek. It consists of two handouts (Factoring Steps and Factor Sheet) tailored for students assuming that they do not know anything in regard to factoring. Taking this approach, no student gets left behind. For those students majoring in mathematics and engineering, they grasp the concept faster and actually understand how it works, and for non-math majors, they can actually know how to factor but without understanding the concept at that time. In most cases, it takes about one to two hours for someone to learn how to factor. I do not move on until all the students I assist feel confident in moving on. I let them work on examples so I can make assessments before I am convinced that they understand.

I have submitted a proposal to present a workshop on factoring during the Spring 2020 Faculty Developmental Week at El Paso Community College, which runs through January 13-17. I also have plans to present a workshop at the 2020 31st Annual NMMATYC Conference April 3-4. If my proposals are accepted, I will demonstrate to participants how it works and the significant impact it has on students.

Factoring Steps

1. **GCF** (Greatest Common Factor) "What is the highest factor to factor out?"

2. **Determine the number of terms.**

   Note: Make sure terms are in order (if not, rewrite in order from highest degree to smallest before continuing).

   2a) **If 2 terms:**

   (1) Perfect Squares: Ex. $x^2 - y^2 = (x - y)(x + y)$

   $x^2 + y^2 \rightarrow$ *Prime!!*

   (2) Perfect Cube: $x^3 - y^3 = (x - y)(x^2 + xy + y^2)$

   $x^3 + y^3 = (x + y)(x^2 - xy + y^2)$

   2b) **If 3 terms:**

   (1) $x^2 + bx + c \rightarrow$ *Easy Factoring*
   $(\quad)(\quad)$

   (2) $ax^2 + bx + c \rightarrow$ *Grouping* $\rightarrow$ $\overset{\overline{a \cdot c}}{ax^2 + bx + c}$ (3) terms
   (4) terms
   (2) terms
   factored

   2c) **If 4 terms:** $\rightarrow$ *Grouping!!*

FACTOR SHEET

2 If the last digits is 0, 2, 4, 6 or 8
3 If the sum of the digits end in 3, 6 or 9
4 If the last two digits are divisible by 4
5 If the last digit is 0 or 5

6 If the number is divisible by 2 and 3
9 If the sum of the digits is divisible by 9
10 If the last digit is zero
12 If number is divisible by 3 and 4

1	2	3	4	5	6	7	8	9	10
Special	Prime 1,2	Prime 1,3	1,2,4	Prime 1,5	1,2,3,6	Prime 1,7	1,2,4,8	1,3,9	1,2,5,10
11	12	13	14	15	16	17	18	19	20
Prime 1,11	1,2,3, 4,6,12	Prime 1,13	1,2,7, 14	1,3,5, 15	1,2,4,8, 16	Prime 1,17	1,2,3, 6,9,18	Prime 1,19	1,2,4, 5,10,20
21	22	23	24	25	26	27	28	29	30
1,3,7, 21	1,2,11, 22	Prime 1,23	1,2,3,4, 6,8,12, 24	1,5,25	1,2,13, 26	1,3,9,27	1,2,4,7, 14,28	Prime 1,29	1,2,3,5, 6,10,15, 30
31	32	33	34	35	36	37	38	39	40
Prime 1,31	1,2,4,8, 16,32	1,3,11, 33	1,2,17,34	1,5,7,35	1,2,3,4, 6,9,12, 18,36	Prime 1,37	1,2,19, 38	1,3,13, 39	1,2,4,5, 8,10,20, 40
41	42	43	44	45	46	47	48	49	50
Prime 1,41	1,2,3,6, 7,14,21, 42	Prime 1,43	1,2,4, 11,22,44	1,3,5,9, 15,45	1,2,23, 46	Prime 1,47	1,2,3,4, 6,8,12, 16,24,48	1,7,49	1,2,5, 10,25,50
51	52	53	54	55	56	57	58	59	60
1,3,17,51	1,2,4, 13,26,52	Prime 1,53	1,2,3,6, 9,18,27,54	1,5,11,55	1,2,4,7, 8,14,28,56	1,3,19,57	1,2,29,58	Prime 1,59	1,2,3,4,5, 6,10,12, 15,20,30,60
61	62	63	64	65	66	67	68	69	70
Prime 1,61	1,2,31,62	1,3,7,9, 21,63	1,2,4,8,16, 32,64	1,5,13,65	1,2,3,6, 11,22,33,66	Prime 1,67	1,2,4,17,34, 68	1,3,23,69	1,2,5,7,10, 14,35,70
71	72	73	74	75	76	77	78	79	80
Prime 1,71	1,2,3,4,6,8, 9,12,18,24, 36,72	Prime 1,73	1,2,37,74	1,3,5,15, 25,75	1,2,4,19, 38,76	1,7,11,77	1,2,3,6,13, 26,39,78	Prime 1,79	1,2,4,5,8, 10,16,20, 40,80
81	82	83	84	85	86	87	88	89	90
1,3,9,27, 81	1,2,41,82	Prime 1,83	1,2,3,4,6,7, 12,14,21, 28,42,84	1,5,17,85	1,2,43,86	1,3,29,87	1,2,4,8,11,2 2,44,88	Prime 1,89	1,2,3,5,6,9, 10,15,18, 30,45,90
91	92	93	94	95	96	97	98	99	100
1,7,13,91	1,2,4,23, 46,92	1,3,31,93	1,2, 47,94	1,5,19,95	1,2,3,4,6,8, 12,16,24 32,48,96	Prime 1,97	1,2,7,14, 49,98	1,3,9,11, 33,99	1,2,4,5,10, 20,25,50 100

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Articles for the Next Newsletter?

If you want to share any exciting news going on in your college, interesting presentation, best practices in the classroom, or events happening in the world of mathematics, have it published in the next NMMATYC Newsletter! Submit your articles to Jeremy Ramirez at newsletter@nmmatyc.com

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