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Department of Mathematics, Bridgewater State University

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I graduated from Bridgewater State University with a double major in mathematics and elementary education. By the end of my student teaching in grade three, it was clear to me that really what I wanted to do all day was teach math because I just didn't have a passion for the rest of the subjects. Plus, there were so many more job opportunities in high school math than elementary, and much less competition. I had taken and passed the high school mathematics MTEL, so I was qualified for those jobs; that is, other than having no experience teaching.

To my delight, my old high school hired me as a math teacher in June, which gave me the whole summer to prepare. I read every book about classroom management and pedagogy I could get my hands on, and spent hours planning the routines of my Algebra 1 and Geometry classes. I asked veteran teachers how they ran their classrooms, and decided that I could improve on their traditional ways by heeding the advice from the books I was reading.

I wish someone had told me to ignore all of the wise ideas of books and just try to stay above water with the bare minimum of my job- lesson planning, grading, and communicating home. By the end of the second week of school, half of the ideas from my teaching books I had started turned out to be impractical. By winter break, nearly all of them were tossed aside because there was just too much to juggle as a teacher.
I learned that teaching math to the masses in public school became trying to trick, persuade, and force students into learning. For many students, their actions were spent trying to derail my teaching from happening altogether. How did my love for math and well-planned lessons alone not motivate them? This thing called teaching was not what I had signed up for!

I learned countless valuable lessons that first year and hugely improved my second year. After that I taught summer school, which challenged me a whole new way and made me grow even more as an educator. Now I can pick up those teaching books with a frame of reference and really pick out some great ideas. Even still the ideas may not work out in reality, but at least now I'm in a place where everything else in under control so I can take small risks.

I wish the best of luck to future mathematics educators. Respect the learning process, and brace yourself for the inevitably crazy first year of teaching.

Puzzles and Primes

Submitted by Paul Fairbanks
Matt is a nine year old friend of who loves numbers and I am a college math professor. When we get together, we talk about math.

I told Matt how I tried to fool myself that I wasn't really very old over the years: When I turned 68, I said that was just two 34s; that's not so old. At 69, that's just three 23s; that's pretty young. At 70 – two 35s, not bad. But this year I told him I'll be 71; how can I divide up that age into some younger ages? Well Matt thought about that for a while and then concluded "You're old!"

After the chuckling by others stopped, we discussed the concept of a prime number. We went back to 2,3,5,7,etc. and he observed how certain ages couldn't be "broken up" into 2 or 3 or 4 younger ages. Then I asked Matt what I could do next year at age 72; he quickly came up with three 24s. (Interestingly, he didn't care for two 36s because "36 is pretty old.) Then of course we looked at all the other possibilities with 72,resulting in discovering the idea of "abundant" numbers.

It was rather convenient that when I asked him when the next prime number occurred it was right there at 73, giving me the opportunity to broach the subject of "twin primes". Matt called me the next day and told me he had found the next set of twin primes, 89 and 91. He was hooked!

What a great topic prime numbers are for a reasonably bright youngster. If he ever asks the inevitable "What good is this?" I need to be ready with a clear explanation of applications of large primes in coding.

I can also have some fun with a "prime-creating machine": P=2x3+1=7, P=2x3x5+1=31, P=2x3x5x7+1=211, P=2x3x5x7x11+1=2311. Matt, we'll be famous! (Or not.) However, this might pave the way for the indirect proof that there is no largest prime number, but that's in his future, hopefully.

Sometimes when I have a class which is dragging, or the room is chilly, or for some reason a change in the room environment is needed, I try the following exercise. You

should have at least 16 students for this to be interesting. (If necessary you can be the 16th.)

Point to each student in order, and assign numbers to them in order: 1,2,3, etc. Now explain to them: when you hear a number which divides your assigned number, standup; when you hear another number which divides your number sit down; continue to stand and sit and remain in your position once your number is called. (Remind them that their number is a divisor of itself; e.g., 1 divides 13 and 13 divides 13.) Now you slowly count 1, 2, 3, … .

What should be the result if you've clearly explained the drill and they all followed your instructions? Only the perfect squares 1,4,9,16,25 should be standing. Pretty neat when everybody does it correctly, and kind of humorous when only one or two screw up!

When I supervised student-teachers, I had them try this. As you will discover, it's a challenge to get everyone to perform correctly, but it's always fun. Naturally, you'd only do this if there are no physically-challenged students.

Pi Mu Epsilon Induction

On Sunday, April 6, BSU's chapter of Pi Mu Epsilon inducted 26 new members and the Abramson Colloquium welcomed Dr. Erik Demaine of MIT, who spoke on connections between art and math.

Math Chats

On Tuesday, April 22, Yaqin Sun spoke on "Methods of Primality Testing" and "A Mathematical Analysis of a Game of Craps", Terrence Kelleher presented "A Proof of the Second Derivative Test in Multivariable Calculus", and Terry Mullen gave "An Introduction to Frame Theory". Posters presented included "Parallelograms and Parallelepiped" by Jamie Nelson and Ali Linde, "Parametric Coordinates for Moebius Strip" by Brittani St Pierre and Tara Lee, "Motion in 3D and Ferris Wheel" by Tameka

Braund and Olivia Sugrue, and “Center of Mass in 3D” by Brian Daundelin, Devon West-Coates and Eric Whitacker.

Posters on the Hill

Submitted by Jenny Shanahan
Bridgewater ATP and Honors student Robert Guillette, mentored by Dr. Irina Seceleanu, was selected to present at the most competitive undergraduate-research venue in the country: Posters on the Hill in Washington, DC. Posters on the Hill, held in the Rayburn Building of the U.S. House of Representatives on Capitol Hill, selects just 60 outstanding undergraduate research projects from across the country and across all academic disciplines; over 600 proposals were reviewed.

Congressional Representatives, U.S. Senators, their staff members, and the staffs of numerous governmental agencies (including the NSF) are invited to hear about research conducted by the “best and brightest” undergraduate students in the U.S.

Math Kangaroo

On March 20, 2014, approximately 100 grade school students gathered in the Conant Science Center to participate in the Math Kangaroo International Mathematics Competition. Eight contestants were top scorers in the state, and one placed nationally! Next year the competition will take place on March 19th.

Concentrations in Statistics and Pure Math

Starting in the fall semester, the Mathematics Department is adding two new concentrations to its existing BS in Mathematics.

The Pure Mathematics concentration emphasizes Analysis, Abstract Algebra, and the proof-based structure of modern mathematics for students interested in graduate studies in mathematics or working in fields that require advanced mathematical techniques and ideas. Do you want to learn more about the intrinsic beauty and effectiveness of pure mathematics? Are you interested in attending graduate school in mathematics or a related field? The pure mathematics concentration will help you to do this.

The Statistics concentration offers an in-depth development of the field of mathematical statistics. Students choosing this concentration will learn how to design sampling procedures and experiments, build and test models, and make optimal use of one’s data in testing hypotheses or making predictions.

Tom Moore's article “Pythagorean Triples Challenge” appeared in Vol. 7, No. 4, of Girls’ Angle Bulletin. Girls’ Angle is a nonprofit math club for girls based in Cambridge, MA. Founded in 2007, they publish a bulletin that is colorfully and attractively produced. Tom’s article is in the latest bulletin and all 39 past issues are freely available online at http://girlsangle.org/page/bulletin.php.