The Seventh Adventures in Mathematics

– Tangled Up in Math

FUN ACTIVITIES • FRIDAY, March 1, 2019 • 8:20 AM – 3:00 PM

Adventures in Mathematics (AIM), a finalist of the 2015 Tech Titans Award (http://www.techtitans.org/)-the Future University, is an annual event organized by the Department of Mathematics at Texas A&M University-Commerce for high school math teachers and their students. Participants will be involved in hands-on activities in math, listen to talks on math careers, watch planetarium shows, tour campus, and experience a lunch in the student cafeteria. The purpose of AIM is to increase students' interests in learning mathematics and offer teachers examples, methods and stories, which can be used in classrooms. High school teachers may receive a certificate of Continuing Professional Development Units upon request. A registration fee of $3 per participant (including teachers) is required to help cover all activities, refreshments and lunch. High schools are responsible for their own transportations to Commerce, TX.

For AIM, we also organize the Northeast Texas Algebra Competition (NTAC) at the level of algebra II. High school students led by their teachers are eligible to participate. In addition to individual awards, team awards will be given to the top five teams. A team score is determined by the sum of the top four scores of each team. At the end of AIM, competition awards and door prizes will be presented. Fifteen competition winners will receive the following prizes and certifications:

- **First Place: A TI-84, a scholarship of $2,000**
- **Second Place: A scholarship of $1500**
- **Third, Fourth, Fifth Place: A scholarship of $1000**
- **10 Honorable mentions: A scholarship of $500**

To receive the scholarship, a winner must notify the department head of mathematics, and attend Texas A&M University-Commerce as a fulltime math major within three years after graduation from high school. Winners are also encouraged to apply for additional university and math scholarships.

To help us prepare sufficient food and parking permits, please register by Friday, February 15, 2019. Contact Dr. Tingxiu Wang (tingxiu.wang@tamuc.edu, or 903-886-5958) for questions.

Where:	**Sam Rayburn Student Center Texas A&M University Commerce Commerce, TX 75429**
8:20 AM - 8:50 AM:	**Registration (early registration is appreciated)**
8:50 AM - 9:05 AM:	**Welcome and information (all meet in the Conference Rooms A, B, and C)**
9:05 AM - 10:00 AM:	**Northeast Texas Algebra Competition, Activities I through IX,**
10:10AM - 11:00 AM:	**Keynote: Mathematical Square Dancing, Untangling Rational Numbers by Dr. Jane Long**
11:10 AM - 2:00 PM:	**Lunch, Activities I through IX, teachers only**
2:15 PM - 2:45 PM:	**Competition awards and door prizes (graphing calculators and other gifts) (winners need to be present for door prizes)**

DESCRIPTION OF ACTIVITIES

NORTHEAST TEXAS ALGEBRA COMPETITION (NTAC), 8:50 AM – 10:00 AM

The Northeast Texas Algebra Competition (NTAC) is at the level of algebra II. Each school can have up to 10 students participating in NTAC with two alternates. The alternates may participate if there are extra clickers available. There will be 60 questions and students will have 20 seconds for each question. No pencils, paper or calculators are allowed during the competition. A student will work these questions in his/her head and submit answers with a "clicker." Any alternate who will take the place of a team member must be reported to the NTAC coordinator by 9:00 AM.

Keynote Speaker: Dr. Jane Long

Mathematical Square Dancing: Untangling Rational Numbers

In this hands-on activity, we'll use problem-solving strategies to investigate some simple movements and models with ropes that have surprising mathematical connections. Based on a model from John Conway, this exploration will intrigue mathematicians of all levels and experiences.

Dr. Jane Long is an Associate Professor of Mathematics at Stephen F. Austin State University. She earned her Ph.D. in algebraic topology from the University of Maryland in 2008 and has been on the faculty at SFA since then. Her teaching interests include inquiry-based learning and problem solving, especially through enrichment groups for students and teachers called Math Circles. As the founding director of the East Texas Math Teachers' Circle and formerly the associate director of the National Association of Math Circles, Dr. Long regularly visits Math Circles for students and teachers as an invited facilitator and frequently engages in outreach activities related to problem solving for people of all ages and levels.

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The following activities will be held at the same time for 50 minutes and then repeated if possible.

Activity I: Unknotting the Tricks behind Mathematical Mysteries (Tricks) by Mrs. Rebecca Steward and Mr. Adam Bowden
Description: In this activity, we will demonstrate several tricks which may seem like magic to accomplish. However, we will reveal the mathematical patterns hidden behind the curtain. Can you help unravel the mysteries along with us? Come by participate in our tricks and activities, learn the math, and have some fun!

Activity II: Tangled up in the question 'In which parts of our lives do we use those sophisticated mathematical ideas that mathematicians are working on?' (Math Work) by Dr. Mehmet Celik
Description: Providing an answer to this question is a challenging task even for a well initiated mathematician. If you are tangled up in such a natural question about mathematics, this presentation is an attempt to get a bird's-eye view of the predicament and to look for a possible egress. To do this vividly, pictures will be used and to do it clearly we will use the clearest language ever invented by man, Mathematics.

Activity III: Topologists, Geometers and Surgeons (TGS) by Dr. Ye-Lin Ou
Description: What is Topology? What is Geometry? What is the difference between the two groups of mathematicians who study these subjects? Dr. Ye-Lin Ou will give you some answers through some performances and some conversations among topologists, geometers and surgeons.

Activity IV: Math Club Activities by Math Club Members
Description: This workshop will present creative, interactive, and engaging math activities. Participants will have the opportunity to witness and experience the creative aspects of math and catch a glimpse into the fascination and delight mathematicians experience when thinking about mathematics.

Activity V: Student forum led by Mrs. Laura Beene
Description: university students will have a forum about campus life, extracurricular activities, math clubs, Greek life, undergraduate research and career options.

Activity VI: Drones by Dr. Burchan Aydin
Description: Drones are emerging into various industries and almost all aspects of our lives. The existing and future applications of drones in civil and commercial domains will be presented. Additionally, a basic drone programming activity will be demonstrated. Seating is limited, and admission tickets are required.

Activity VII: 3D-Printing by Dr. Perry Moler
Description: In a computer lab, students will learn about 3D-printing, and then select a graph to print. Seating is limited, and admission tickets are required.

Activity VIII: Campus Tour
Description: Touring the campus of Texas A&M University-Commerce can take hours. However, during this 50-minute tour, students will be guided through the central part of the campus and visit the departments of Biology, Chemistry, Engineering and Technology, and Physics.

Activity IX: Planetarium Show, TBA
Description: a title will be elected in January. Seating is limited, and admission tickets are required.

For Teachers Only by Ms. Laura Beene and Ms. Debra Newton
Description: In this session math teachers will have the opportunity to experience various activities and applications that can be used in a mathematics classroom. Activities presented can be used in the following subject areas: Algebra I, Algebra II, Geometry, and Pre-Cal.