

The TMTA Bulletin

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Winter 2015

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TENNESSEE MATHEMATICS TEACHERS ASSOCIATION

PRESIDENT'S MESSAGE

I hope this Bulletin finds each of you doing well as we are more than halfway into this school year. I would first like to express my sincere thanks for the opportunity to serve as your president of the Tennessee Mathematics Teachers Association (TMTA), a National Council of Teachers of Mathematics (NCTM) Affiliate, for the past two years. I would also like to personally thank each of you for what you do each day in preparing and molding the future leaders of our state, nation and world.

You should find many upcoming events for the spring, summer and into the next school year in this bulletin. There are also changes to the TMTA and NCTM websites that can help you in your classrooms and cities throughout the state of Tennessee. There is also a list of state officers in this bulletin. Each level of mathematics teacher in our organization has a Vice-President to represent them and advocate for you on our Executive Board. If you do not know your Vice-President then I encourage you to look at the Executive Committee List find your Vice-President and meet them. They are here to help you and your fellow colleagues, so keep them informed about issues that you are facing in your school district.

Please let me know if there is anything that I or any of the executive committee members can do for you, your fellow colleagues or school district. Have a great spring and very enjoyable summer.

See you this fall in Nashville at the NCTM Regional Meeting, November 18-20, 2015.

Desiree McCullough

TMTA President



TENNESSEE MATHEMATICS TEACHERS ASSOCIATION



Visit the website for additional information at <http://www.nctm.org/Conferences-and-Professional-Development/Research-Conference/>

TMTA will not have a Conference in 2015.

We encourage our members to attend the
NCTM Regional Meeting
in Nashville on November 18-20!

Mark your Calendars
and
Make Plans to Attend!



Nashville
November 18-20



NATIONAL COUNCIL OF TEACHERS OF MATHEMATICS

The 2015 NCTM Annual Meeting will be in Boston, April 15-18. Each Affiliate is entitled to send one delegate and one alternate to the Regional Caucuses which meet Wednesday afternoon, April 15, and to the Delegate Assembly Thursday morning, April 16. Ours is the Southern Caucus, meeting 2:30-4:30; the Assembly is first thing, 7:30-9:00AM, starting with breakfast buffet. Delegates must register by March 2. Go to <http://www.nctm.org/Affiliates/Events/Delegate-Assembly>

The purpose of the Caucus is to identify issues of concern to Affiliates in our Region, to meet and network with representatives from neighboring Affiliates, and to meet and hear from NCTM leadership. The Delegate Assembly is a parliamentary business meeting designed to provide Affiliates a voice in the policies and direction of NCTM. Approved resolutions are forwarded to the Board of Directors for consideration at their next meeting.

The next Affiliate Leaders Conference will be held in Phoenix, Arizona, July 14-16. This is always a pleasant and informative workshop, helpful to officers as they are dealing with common issues of membership, participation, and relevant activities. It can be most helpful if two can go together from your Affiliate, since some time will be given for planning how to implement ideas discussed.

Ann Indingaro, NCTM Representative

TENNESSEE ASSOCIATION OF MATHEMATICS TEACHER EDUCATORS

Jeffrey Pair was the recipient of the first TAMTE Conference Travel Scholarship. This scholarship pays for registration for a first-time attendee at the annual Association of Mathematics Teacher Educators (AMTE) conference. Mr. Pair is pursuing a doctorate in mathematics education at Middle Tennessee State University. He attended the AMTE conference in Orlando in February 2015.

TAMTE board members for 2014-2015 are:

President – Ann Assad

Past President – JoAnn Cady

Treasurer – Stephanie Kolitsch

Secretary – Sarah Bleiler

School District Liaison – Pam Stidham

Community Colleges Member At Large – Julianna Gregory

Private School Member At Large – Brandon Banes

CHATTANOOGA AREA OF MATHEMATICS TEACHER ASSOCIATION

The CAMTA 2015 spring meeting will be held on the UTC campus,
on Thursday, March 5, at 5:30 p.m.

Please contact Deborah-McAllister@utc.edu for details.

Please “like” CAMTA on Facebook!

MIDDLE TENNESSEE MATHEMATICS TEACHERS

The Middle Tennessee Math Teachers are looking for one or two counties in Middle Tennessee who would be interested in a one day in-service on content and best practices. This would be free to the teachers and county. If you are interested, please contact me at teresac1@wcs.edu

SECONDARY SCHOOLS

Alice Carson-Vice President for Secondary Schools

There are new Early Post Secondary Opportunities for high school students (EPSOs). This pilot program is being offered by the state of Tennessee. More information can be found at the following websites.

<http://www.tn.gov/education/cte/postsecondary.shtml>

http://www.tn.gov/education/cte/doc/cte_dc_statewide_dual_credit_101.pdf



TENNESSEE MATHEMATICS TEACHERS ASSOCIATION

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CLASSROOM MINI-GRANT

Did you know that TMTA offers a classroom mini-grant for technology or manipulatives for your classroom? The application is available online at <https://tmta.wildapricot.org/> under the Grants tab.

Applications are due September 1 of each year. Here is a quote from a former winner:

I received the TMTA Grant in 2010. I was able to purchase a Mimeo Teach device which allows me to connect my computer to a whiteboard and create an “interactive” device. I can use any program on my computer and display it on the board and interact with it through an electronic pen. I am able to use my Ti-Nspire software on the board and display the graphs interactively. We can also electronically write on the board. The students love it when I use the board and always desire to interact with it. It grabs their attention and does an excellent job of demonstrating and displaying the graphs of functions. The device is portable and can be shared with other teachers. It has made learning fun and “interactive”!

Another former winner noted: “I would not be able to accomplish what I do now without the materials from the grant.” If you would like more information, feel free to contact the Mini-grant Committee Chair, Jackie Vogel, at vogelj@apsu.edu.

PAST WINNERS:

- 2011: Sheila Horstman
- 2012: No Award Given
- 2013: Tammi Terry
- 2014: Lea Keith
- 2015: Now Taking Applications

Tennessee Mathematics Teachers' Association Mini-Grant Proposal

The Tennessee Mathematics Teachers Association will award a \$1,000 mini-grant to a Tennessee classroom teacher to be used for technology or manipulatives. In order to be eligible:

- * your school or district must demonstrate financial need;
- * you must attend the TMTA Fall Conference to receive your award; and
- * you must speak at the next TMTA Fall Conference about your use of the mini-grant.

Application deadline is September 1. If you have any questions, contact Jackie Vogel at the following address:

Dr. Jackie Vogel
APSU Box 4626
Clarksville, TN 37044
vogelj@apsu.edu

Please complete the following application and email the completed application to vogelj@apsu.edu by September 1.

Last Name	
First Name	
Current School	
Email Address	
Home Street Address	
City	
State	
Zip Code	
Phone Number	
Current Teaching Assignment and/or Grade Level	

You must address the following questions in order for your application to be considered complete.

1. Why do you need the mini-grant?
2. How will you use the mini-grant money?
3. Include a specific, detailed Itemized Budget

SCHOLARSHIPS

TMTA offers two scholarships each year:

- * The Dr. Henry Frandsen Scholarship for Teachers is awarded to a promising undergraduate committed to teaching mathematics at either the secondary or elementary level.
- * The TMTA Teacher/Scholar Award is awarded to a TMTA member currently teaching in Tennessee and pursuing either a Masters, Ed.S., or doctoral degree to improve his or her mathematics teaching.

DR. HENRY FRANSDEN SCHOLARSHIP FOR TEACHERS

Criteria:

- * applicants must be committed to teaching mathematics in Tennessee at either the secondary or elementary level.
- * applicants must have declared an appropriate major at their institution

A completed application must include the following:

- * scholarship application form
- * a brief statement of educational and career plans as they relate to teaching mathematics
- * current official transcript
- * two sealed letters of recommendation, at least one of which must be submitted by a faculty member of the mathematics department, and BOTH of which must address the applicant's commitment to teaching

Award Information:

- * \$1000 scholarship
- * FREE TMTA Membership in Year 1
- * FREE TMTA CONFERENCE REGISTRATION FEE FOR the following year (includes banquet, conference, and membership)

TMTA TEACHER/SCHOLAR SCHOLARSHIP

Criteria:

- * applicants must be a TMTA member currently teaching in Tennessee and pursuing either a Masters, Ed.S., or doctoral degree to improve their mathematics teaching

A completed application must include the following:

- * scholarship application form

Award Information:

- * \$1000 scholarship
- * FREE TMTA Membership in Year 1

Applications can be downloaded at <https://tmta.wildapricot.org/>
under the Scholarship tab and are due by June 1.

**Everything Old is New Again:
Using TMTA Contest Exams to Challenge All Students**
by Stephanie Kolitsch

Many TMTA members and non-members use old TMTA contest exams to help the best and brightest of their students prepare for future TMTA contests. Old exams can be found on the new TMTA website: TMTA.wildapricot.org (click on the Contests tab and look for the link to the old contest exams). These exams are a treasure trove of ideas for challenging, non-routine problems that can be used to engage all students in rich mathematical tasks. Many will need some scaffolding such as extra instructions or preliminary problems to lead students to the solution, but once you have generated an idea from the problems, you can easily create the scaffolding to meet your students' needs. Below we provide some examples for inspiration. Each example includes the problem as originally stated, the current state standard(s) it can be used to address, and suggestions for adapting the problem into a mathematical task. All of these examples can be modified to address all eight mathematical practices:

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

For these examples, we have concentrated on geometry problems. However, there are a plethora of problems from Algebra I, Algebra II, Pre-Calculus, Calculus and Advanced Topics, and Statistics that can be considered as well. We intentionally did not include any answers, so you will have the opportunity to explore these problems much as your students would.

From the 1963 Comprehensive Exam:

Problem 3: If A and B are right circular cylinders, if the height of A is twice the height of B, and if the diameter of the base of A is half the diameter of the base of B, then the ratio of the volume of A to the volume of B is:

- a) 8 b) 2 c) $\frac{1}{8}$ d) $\frac{1}{2}$ e) 1

Current Tennessee Standard addressed: G.MD. 3. Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems. *

Suggestions:

1. Give the students 2-3 problems that meet the criteria outlined in the problem and ask them to find the volumes. Ask them if this result will always hold. Ask them to write their observation in words and to generalize the pattern(s) they have identified.
2. Give the students the problem as stated and ask them to create their own problem using numbers that meet the criteria of the problem. Ask them to solve the problem they have created. Share several created examples with the entire group, then ask the group to explain whether the ratio is the same as long as the cylinders meet the criteria.
3. Use the same ideas as in the previous suggestions except use a different solid.
4. Use the same ideas as in the previous suggestions except focus on the surface area instead of the volume.

From the 1963 Comprehensive Exam:

Problem 33: One diagonal of a rhombus is 8 inches, and the area of the rhombus is 24 square inches. The length of the other diagonal is:

- a) 3 in. b) $2\sqrt{6}$ in. c) 6 in. d) 8 in. e) not determined

Current Tennessee Standards addressed: G.CO. 11. Prove theorems about parallelograms. Theorems include: opposite sides are congruent, opposite angles are congruent, the diagonals of a parallelogram bisect each other, and conversely, rectangles are parallelograms with congruent diagonals.

G.CO. 12. Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.).

Copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line.

Suggestions:

1. Ask students to construct a rhombus with one diagonal of length 8 inches and calculate its area. If the area is not 24 square inches, ask the students how they would adjust the lengths of the sides of their rhombus to create one with the appropriate area.
2. Ask students to construct a rhombus with one diagonal of length 8 inches and calculate its area. Ask students to list the steps in their process for creating the rhombus and to prove that the figure they created using their directions is a rhombus. As an alternative, once students have listed the steps, they could trade with another student. The other student could then follow the steps to construct the rhombus and use that set of steps to either prove that their shape is a rhombus or explain why the shape is not a rhombus.

From the 1963 Comprehensive Exam:

Problem 37: AB is a diameter of a circle with center O. A line through A intersects the circle at C and intersects the tangent drawn at B at the point D. The tangent at C intersects BD at M. Then the length of MC is the same as:

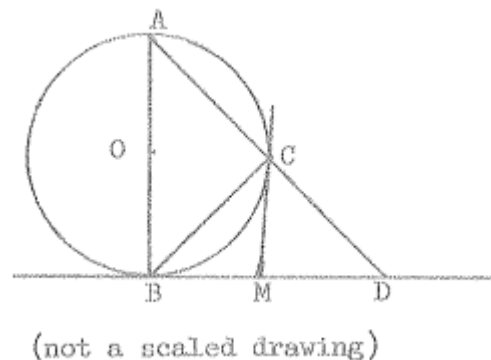
a) *the radius of the circle*

b) *the line segment CD*

c) $\frac{2}{3}$ *of BC*

d) $AB - AC$

e) MD



Current Tennessee Standards addressed: G.CO. 12. Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). Copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line.

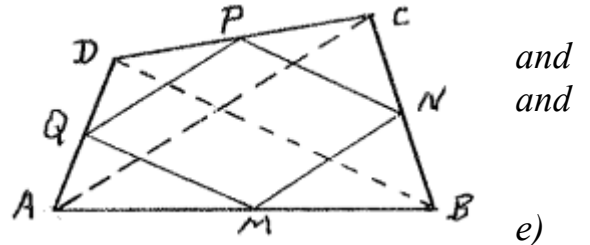
Suggestion:

Use GeoGebra (or another geometry software) to construct the drawing. Use the measurement feature of the software to measure various segments to determine which length matches the length of segment MC. Once students are convinced, ask them to prove their conjecture.

From the 1963 Plane Geometry Exam:

Problem 22: ABCD is any quadrilateral. M, N, P, Q are midpoints of the sides. If diagonals $AC = 12$ and $BD = 13$, the perimeter of MNPQ equals:

- a) 24 b) 25 c) 26 d) 36
 e) 39



Current Tennessee Standards addressed: G.CO. 11. Prove theorems about parallelograms. Theorems include: opposite sides are congruent, opposite angles are congruent, the diagonals of a parallelogram bisect each other, and conversely, rectangles are parallelograms with congruent diagonals.

G.CO. 12. Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). Copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line.

Suggestions:

1. a) Give the students a rectangle and ask them to follow the directions outlined in the problem. Ask them to make a conjecture about what shape MNPQ is, then ask them to prove their conjecture.

b) Once the students have tried the problem with a rectangle, ask them to create any scalene quadrilateral and repeat with this new quadrilateral. Does their conjecture from part (a) hold for this quadrilateral? Does their proof from part (a) hold for this quadrilateral? If not, how could they prove their conjecture in this instance?
2. Use the idea above with geometry software such as GeoGebra.

From the 1963 Plane Geometry Exam:

Problem 22: The largest possible area of a right triangle with hypotenuse 10 is

- a) 100 b) 50 c) 25 d) $10\sqrt{2}$ e) none of these

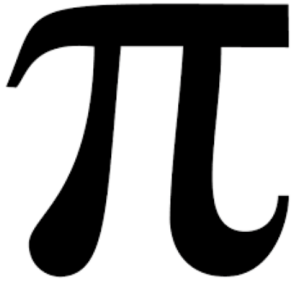
Current Tennessee Standards addressed: G.CO.2. Identify and describe relationships among inscribed angles, radii, and chords. Include the relationship between central, inscribed, and circumscribed angles; inscribed angles on a diameter are right angles; the radius of a circle is perpendicular to the tangent where the radius intersects the circle.

G.CO. 12. Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). Copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line.

Suggestions:

1. Ask students to construct several triangles that meet the criteria of the problem and calculate their areas. Ask the students to make a conjecture about the triangle with the maximum area and prove their conjecture is true.
2. Ask students to make a conjecture about the shape formed by putting together the vertices of the right angle in ALL such right triangles. (They could begin by drawing different right triangles with the same length hypotenuse on patty paper then stacking the patty paper (matching the hypotenuses) and tracking the vertices of the right angle in each triangle. Two push pins and a string will also work.)
2. Use geometry software, such as GeoGebra, to construct a diagram that will allow students to explore ALL such triangles. Find the triangle with the maximum area using this diagram.

These are just a few ideas for problems from two different TMTA contest exams. Explore, create, and then engage your students. All we ask is that you don't keep your creativity to yourself—share with other teachers and think about making a presentation at a professional conference. (Hint: TMTA and your local affiliates are ALWAYS looking for presenters!)



Get READY for a historic Pi Day this year! Pi Day is celebrated on March 14th (3/14) around the world. Pi (Greek letter “ π ”) is the symbol used in mathematics to represent a constant — the ratio of the circumference of a circle to its diameter — which is approximately 3.14159. However, this year at 9:26:53 on Pi Day will read once in a lifetime 3.14.15 9:26:53! Make it memorable for your students!

SURF THE WEB, BUT SWIM AROUND ON OUR SITE!

<https://tmta.wildapricot.org/>



TENNESSEE MATHEMATICS TEACHERS ASSOCIATION

Reach out to your TMTA President, other Executive Committee members, and your affiliate groups for any questions, assistance, or information if you should ever need it!



Keep in touch!

Do you have an article to share? New Ideas? News? Lesson Plans? Teaching Strategies? Submit your article for the next TMTA Bulletin to Andre Crafford at acrafford@collierville.k12.tn.us