TCU Math News Letter

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You know that I write slowly. This is chiefly because I am never satisfied until I have said as much as possible in a few words and writing briefly takes far more time than writing at length.

- Karl Friedrich Gauss

Editor: Dr. Rhonda Hatcher and Archive of Newsletters

Putnam Mathematics Contest

The Sixty-sixth Annual William Lowell Putnam Mathematical Competition will be held on Saturday, December 3, 2005, from 9:00 a.m. to noon and 2:00 to 5:00 p.m. The questions require different levels of mathematical background, and all require a bit of ingenuity to solve. The scores on the exam are typically quite low, and even answering a couple of questions is considered an excellent performance. The competition is open to undergraduates enrolled in colleges and universities of the United States and Canada who have not yet received a college degree.

Those interested in signing up to take the Putnam Exam this year should contact Professor George Gilbert (g.gilbert@tcu.edu or leave a message at x6061).

Also, please let Professor Gilbert know if you would like to participate in one or more practice or training sessions over the course of the semester.

Texas Undergraduate Mathematics Conference

The first Texas Undergraduate Mathematics Conference (TUMC) will be held at Sam Houston State University on Saturday, October 15, 2005. All interested undergraduate students from Texas colleges and universities are encouraged to attend the conference, whether or not they are presenting.

Professor Scott Chapman of Trinity University in San Antonio will be the keynote speaker. His talk is scheduled from 11:00 a.m. to 12:15 p.m. Student presentations are scheduled from 9:00 to 10:30 a.m. and from 1:30 to 4:00 p.m.

Also included among the day's activities will be a panel discussion about life in graduate school featuring panelists from graduate programs around the state and beyond. The panel discussion is scheduled from 4:15 to 5:30 p.m.

Undergraduates interested in presenting a talk must submit an abstract by September 23, 2005. Presentations will be accepted for a wide-variety of talks, including but not limited to undergraduate research, mathematics history, mathematics education, and mathematics applications.

Funds are available to house students on a first-come first-served basis in the University Hotel on the SHSU

campus for the night of October 14th. Breakfast, lunch, and snacks will be provided for all conference participants on Saturday, October 15th. Depending on available funds, travel support may also be available.

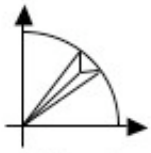
More information, including information on how to submit an abstract, housing information, and a schedule is available online at http://www.shsu.edu/~mth_jaj/tumc.

Solution to the April 2005 Problem of the Month

Find the area of the region that satisfies the inequalities

$$x^2 + y^2 \le 25,\ x \ge 3,\ y \ge 3.$$

Solution: The requested area is the difference of that of the sector and the two triangles. The vertical side of the upper triangle has length 1. The altitude to that side is 3. Thus, the area of each triangle is 3/2 and the area of both together is 3.



Using the law of cosines (or the addition law for cosine or dot products from linear algebra), the angle θ of the sector satisfies

$$\cos\theta = \frac{5^2 + 5^2 - \sqrt{2}^2}{2 \cdot 5 \cdot 5} = \frac{24}{25}.$$

Therefore, the requested area is

$$\frac{5^2}{2}\arccos\left(\frac{24}{25}\right) - 3 = \frac{25}{2}\arccos\left(\frac{24}{25}\right) - 3 \approx 0.5474.$$

September 2005 Problem of the Month

This month's problem is a variant of a Bradley University Problem of the Week. Ten pennies are placed in the triangular configuration shown below, some heads, some tails. Must there exist three pennies whose centers form an equilateral triangle be either all heads or all tails? (Two possible equilateral triangles are indicated on the diagram.)

Students and others are invited to submit solutions to Dr. George Gilbert (Math Dept. Office or P.O. 298900). Correct solutions submitted by persons who are not members of the TCU math faculty will be acknowledged in the next issue of the newsletter. Note that a correct solution is an answer and a justification of its correctness. The solution to the problem will

be published in the next edition of the newsletter.

The TCU Math Newsletter will be published each month during the academic year. Dr. Hatcher: Editor; Dr. Gilbert: Problem Editor; Dr. Doran: Thought of the Month Editor. Items which you would like to have included should be sent to Dr. Hatcher (Math Dept. Office or P.O. 298900).