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# ***TCU Math News Letter***

**Volume 8, Number 4 December 1999-January 2000**

*Of Newton with his prism and silent face,  
The marble index of a mind for ever Voyaging through strange  
seas of Thought, alone.*  
--- Wordsworth

[Editor: Dr. Rhonda Hatcher](#) and [Archive of Newsletters](#)

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## **TCU Lectureship Talk on January 25**

Professor David Metzler of Rice University will present the talk "Cohomological Localization for Manifolds with Boundary" on Tuesday, January 25, 2000 as part of the Texas Christian University Research Lectureship series.

The talk will begin at 4:00 p.m. in Winton Scott Hall 145. Refreshments will be served in Winton Scott Hall 171 during the half-hour preceding the talk. All TCU students, faculty, and other interested members of the community are invited to attend the lectures.

## **Summer Job Opportunities for Undergraduates at the National Security Agency**

The National Security Agency (NSA) has summer employment opportunities for undergraduate students majoring in mathematics, electrical or computer engineering, computer science, or language (Far Eastern, Middle Eastern, or Slavic - not Russian) through a program called the College Summer Employment Program (CSEP). The program provides 12-week paid work assignments to selected participants. In the program, students are given the opportunity to obtain hands-on experience in their field of study.

Participants in the CSEP work the summer following their junior year in assignments commensurate with their academic status, interests, and/or employment background. Summer employment is also available to those pursuing graduate degrees. Students majoring in Computer Science and Engineering must have a minimum 3.0 grade point average and those majoring in Mathematics must send 2 letters of recommendation along with their resume and copy of transcripts. Applicants and all their immediate family members must be U.S. citizens.

Participants receive full-time work assignments. Undergraduate students work at the GGD06/01 pay level (\$23,305) per annum. Participants receive paid roundtrip travel expenses between the school and the work site.

To apply for the program, eligible students should submit a resume and transcript to:

College Summer Employment Program  
National Security Agency

Attn: S232 - Suite 6840  
Ft. George G. Meade, Md. 20755-6840

For more information about this program and other employment opportunities at the National Security Agency both before or after graduation, visit the agency's web site.

## Graders for Spring 2000 Semester

Students interested in grading for a mathematics course in the Spring 2000 semester should speak with Dr. Victor Belfi before leaving for Christmas break or shortly after returning for the spring semester. Dr. Belfi's office is in Winton Scott Hall 151.

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## Solution to the November 1999 Problem of the Month

**Problem:** Find all real solutions to  $(x^2 - 5x + 5)^{(x^2 - 9x + 20)} = 1$

**Solution:** The real solutions are  $x = 1, 2, 3, 4, 5$ .

An exponential can be 1 if (i) the exponent is 0 and the base is not 0, (ii) the base is 1, or (iii) the base is -1 and the exponent is a fraction with even numerator.

(i) Setting the exponent,  $x^2 - 9x + 20$ , to 0, we obtain  $x = 4, 5$ . In neither case is the base 0.

(ii) Setting the base,  $x^2 - 5x + 5$ , to 1, we obtain  $x = 1, 4$ .

(iii) Setting the base,  $x^2 - 5x + 5$ , to -1, we obtain  $x = 2, 3$ . The exponents are then 6 and 2, respectively, so both values are solutions.

This month's problem was solved by undergraduate Dustin Sitar.

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## Problem of the Month

Find the maximum volume of a right cone inscribed in a sphere of radius 1. (By inscribed, we mean that the vertex and circumference of the base of the cone are on the surface of the sphere.)

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.

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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).