

Indiana State University's
Pi Mu Epsilon

Presents

“Problems of the Month”

Directions: Show your completed solution and work to each problem in order to be considered for a monetary award. Submit your solutions to:

Department of Math and Computer Science
RO-A146
Terre Haute, IN 47809
ATTN: Pi Mu Epsilon
rgrossman@indstate.edu

(Emailed or mailed solutions are acceptable methods of entry)

All entries should include:

Name; Address; Phone Number; Title (Student, Faculty, Staff); Email Address

All entries must be received by **MARCH 27, 2009** no later than **4:30pm**.

\$5 Problem

1. Prove that 3 times the sum of 3 squares is also the sum of 4 squares. (Of course, 0^2 is considered to be a square).
2. Prove that $(a^2 + b^2 + c^2)(x^2 + y^2 + z^2)$ is also the sum of 4 squares.

(PME Spring 2006 Journal)

\$1 Problem

1. Given points A: (0,0,7); B: (0,18,0) and C: (6,0,0). Assume there exists a plane that passes through all three of these points. Calculate the volume underneath this plane, bounded by the x, y and z axes.
2. Given points A: (0,0,a); B: (0,b,0) and C: (c,0,0) where $a,b,c > 0$. Assume there exists a plane that passes through all three of these points. Calculate the volume underneath this plane, bounded by the x, y and z axes.

Terms and Conditions of “Problems of the Month”

- 1) Only Indiana State University students, faculty and staff are allowed to participate for cash prizes. All employees of the Math and Computer Science Department are ineligible to participate for any cash prizes. Submitted solutions imply authentic, original solutions from the individual whose name appears on the solution sheet(s).
- 2) Submissions are due one month from date of publication at the close of the business day. You may mail your entry to the Math and Computer Science Dept., ATTN: Pi Mu Epsilon or email your entry to rgrossman@indstate.edu. Only one entry per person per month. Please include your name; address; phone number; title (student, faculty, staff); email address with your entry.
- 3) Correct entries will be placed in a random drawing to determine the winners of the \$1 Problem and \$5 Problem respectfully. Only winners of the cash prize will be contacted. The names of all correct entries will be publicized on the Math and Computer Science webpage and University announcement(s).
- 4) Details on the Grand Prize: Must submit at least one correct entry to a “Problem of the Month” competition within the given academic semester. The winner of the Grand Prize will be chosen at random.
- 5) Winners of a “Problem of the Month” shall be eligible to win monetary proceeds up to and no more than two times during a given semester. Winners of the "Grand Prize" are ineligible to win additional Grand Prizes within a two year time window.
- 6) All cash winnings are subject to taxes and are the sole responsibility of the winner to properly report to the IRS.