

Mathematics Competition

\$25 prize for the best solution for each of 5 problems.

\$100 prize for solving the most problems throughout the semester.

Problem #4 of five - Oct 12 to Oct 26, 2012

An old calculus problem asks you to cut a one meter long wire into two pieces and form a regular polygon out of one piece and a circle out of the other piece. The problem is to find the location of the cut that minimizes the total area of the two shapes.

a) If the regular polygon is an equilateral triangle, prove that the minimum occurs when the circle is the size that can be inscribed in the triangle.

b) If the regular polygon is a square, prove that the minimum occurs when the circle is the size that can be inscribed in the square.

c) Is the above true for any regular polygon? Prove or disprove.

Direct any questions to Kamlesh Parwani, OM 3351, or Keith Wolcott, OM 3341

Rules and Awards

- Any undergraduate currently enrolled at EIU is eligible to participate.
- Each solution is to be the work of one individual and is to be submitted with the solver's name, year in school, email address, local address and home address.
- Each solution is to be written or typed and is due in the main Mathematics Department office (OM3611) by 2:00 p. m., Friday, Oct 26.
- Entries will be graded on the basis of clarity of exposition and elegance of solution.
- An award of \$25 will be given for the best solution for each of the 5 semester problems. In case no award is made, the prize will be added to the next week's award. In the case of a two-way tie, the award will be split. If there are more than two 'best' solutions, a system of drawings will determine the winners.
- **\$100 prize** for solving the most problems throughout the semester.

- **Challenges, solutions, names of all solvers, and comments will be posted on the Challenge of the Week homepage:**

<http://www.eiu.edu/math/challenge.php>